

GÜHRING

WIERTŁA



PRECYZJA



Dr. Jörg Gühring

Prezes



Oliver Gühring

Dyrektor Sprzedaży i
Marketingu

7000

Pracowników
na świecie



3500

Pracowników
w Niemczech



Wewnętrzny program szkoleń
i doskonalenia zawodowego



Międzynarodowy transfer wiedzy dzięki
programowi wymiany pracowników na
całym świecie



Dietmar Pfränger

Dyrektor R&D, Logistyki,
Techniki i Produkcji



Bernd Schatz

Dyrektor Finansowy



90000

Narzędzi standardowych

4000

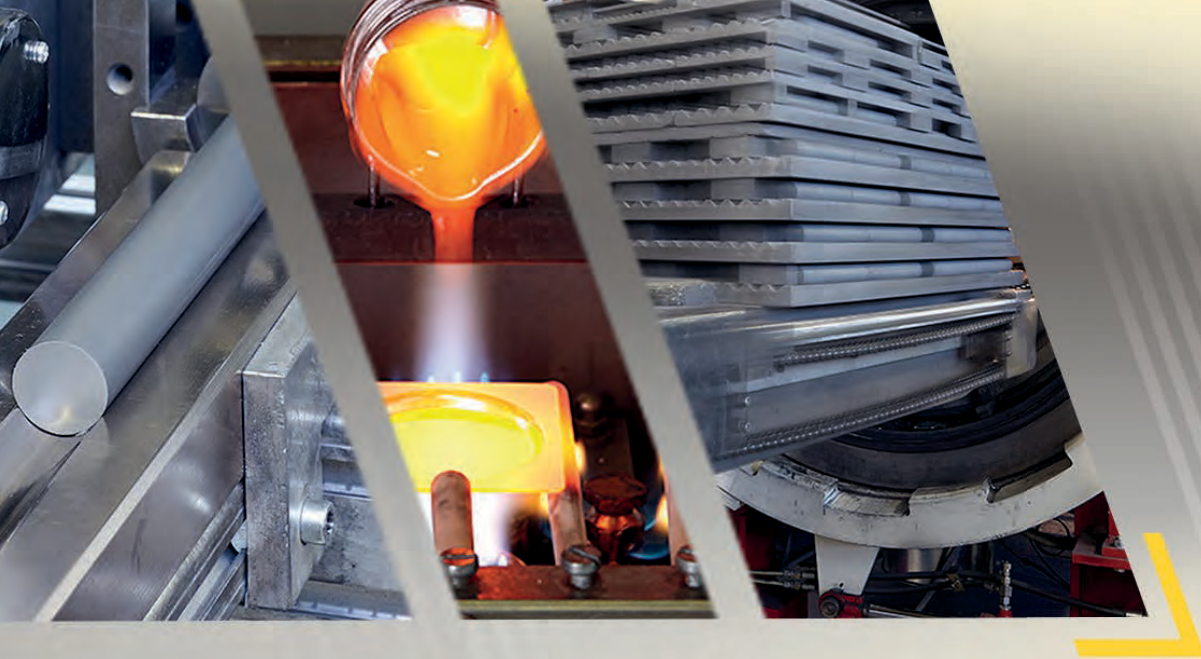
Typów narzędzi

55%
45%



■ Narzędzia standardowe
■ Narzędzia specjalne

GÜHRING

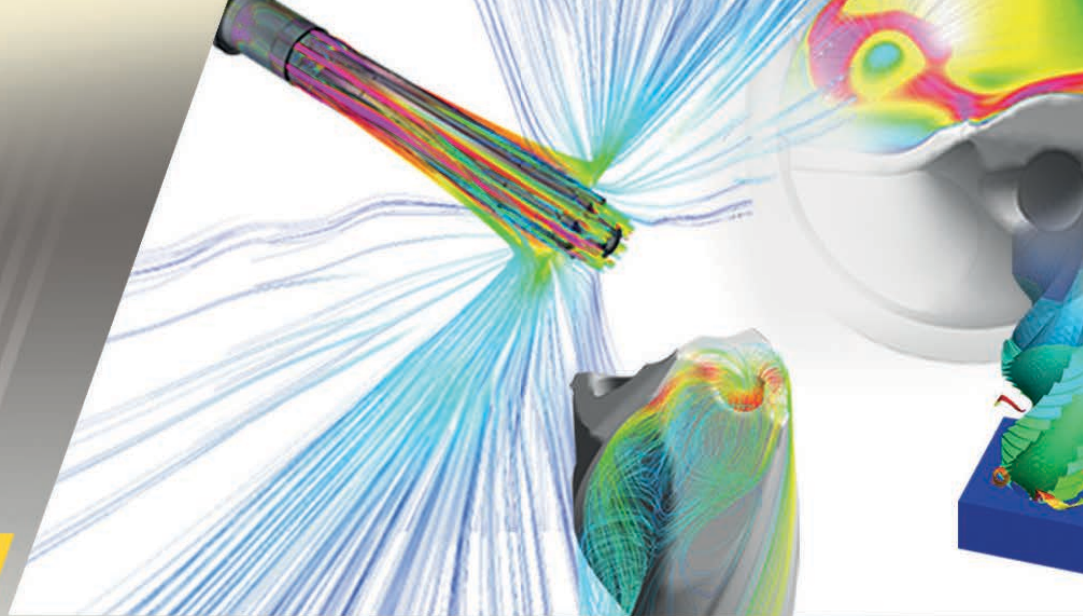


MATERIAŁY NARZĘDZIOWE
Własna produkcja węglików spiekanych

Optymalny rozwój
wszelkich aspektów
narzędziowych dzięki
własnemu działowi R&D

DZIAŁ BUDOWY MASZYN I URZĄDZEŃ
Własny dział produkcji maszyn i urządzeń





GEOMETRIE

Własny dział R&D udoskonalający narzędzia



POWŁOKI

Własny dział wytwarzania i rozwoju powłok



Wszystko od jednego dostawcy - kompleksowo i globalnie

Dzięki światowej sieci produkcji i sprzedaży firma Guhring dostarcza precyzyjne narzędzia skrawające na wszystkie ważne rynki. Użytkownicy działający w przemysłach: samochodowym, lotniczym i budowy maszyn polegają na innowacyjnych narzędziach produkowanych globalnie na najwyższym poziomie jakościowym.

48

PRZEDSTAWICIELSTW

PONAD **70**
CENTRÓW PRODUKCYJNYCH
I SERWISOWYCH



CANADA
Guhring Corp.
sales@guhring.com
www.guhring.com

**USA
BROOKFIELD**
Guhring Inc.
sales@guhring.com
www.guhring.com

**USA
NEW HUDSON**
Guhring Inc.
sales@guhring.com
www.guhring.com

MEXICO
Guhring Mexico S.A. de C.V.
guhring.mexico@guhring.com
www.guhring.com/mx

BRAZIL
Guhring Brasil
Ferrementaria Ltda.
vendeb@guhring.com.br
www.guhring.com/br

**SOUTH
AFRICA**
Guhring (Africa) Pty Ltd.
info@guhring.co.za
www.guhring.co.za

SWEDEN
Guhring Sweden AB
info@guhring.se
www.guhring.se

**GREAT
BRITAIN**
Guhring Ltd.
info@guhring.co.uk
www.guhring.co.uk

NETHERLANDS
Guhring Nederland B.V.
info@guhring.nl
www.guhring.nl

BELGIUM
N.V. Guhring B.V.
info@guhring.be
www.guhring.be

**SWITZERLAND/
ROTKREUZ**
Guhring Rotkreuz AG
info@guhring.ch
www.guhring.ch

**SWITZERLAND/
AULOORE**
G&B Industrie-Service-GmbH
mailto:info@guhring.ch
www.guhring.ch

**ALBSTADT
HEADQUARTER**
Guhring AG
info@guhring.de
www.guhring.de

**ALBSTADT
FACTORY 2**
Guhring AG
info@guhring.de
www.guhring.de

**ALBSTADT
ONSTMETTINGEN**
Guhring AG
info@guhring.de
www.guhring.de

**SIGMARINGEN
LAGE**
Guhring AG
info@guhring.de
www.guhring.de

**RAMSTEIN-
MIESENBACH**
Guhring AG
info@guhring.de
www.guhring.de

LEVERKUSEN
Guhring AG
info@guhring.de
www.guhring.de

WEHINGEN
Guhring AG
info@guhring.de
www.guhring.de

EISENACH
St. Wendeler AG
info@guhring.de
www.guhring.de

GEISLINGEN
Guhring AG
info@guhring.de
www.guhring.de

MINDELHEIM
Guhring AG
info@guhring.de
www.guhring.de

NUREMBERG
Guhring Tools
Info@holzler-guhring.de
www.holzler-guhring.de

REGENSBURG
Guhring AG
info@guhring.de
www.guhring.de

Dzięki najnowocześniejszym technologiom firma Guhring może spełniać wszelkie oczekiwania klienta: od projektowania kompletnych procesów produkcyjnych do wdrażania narzędzi precyzyjnych. Dodatkowo nasi eksperci ciągle wspierają klientów na całym świecie. Produkcja, serwis i przedstawiciele są do Państwa dyspozycji od jednego, globalnego dostawcy.

Własna produkcja węglików
spiekanych

Własny dział produkcji maszyn

Własne urządzenia do powłok

Najwyższa światowa jakość



CHEMNITZ
Dr. Guhring KG
info@guhring.de
www.guhring.de



BERLIN
G. B&B
Produktionwerkzeuge
info@guhring.de
www.guhring.de



RUMANIA
Guhring S.r.l. Romania
romania@guhring.de



VIETNAM
Guhring Vietnam LLC
info@guhring.vn



AUSTRALIA
Guhring Pty. Ltd.
guhring@guhring.com.au
www.guhring.com.au



KULMBACH
Guhring KG
service@german-
carbide.com



ZORBAU
Industrie Guhring GmbH
info@industrial-guhring.de



HUNGARY
Ind. Guhring KFT
info@india.hu
www.india.hu



THAILAND
Guhring Thailand Co., Ltd.
info.thai@guhring.de
www.guhring.co.th



INDONESIA
PT. Guhring Indonesia
sales@guhring.co.id
www.guhring.co.id



**MARKT-
ERLBACH**
Guhring KG
info@guhring.de
www.guhring.de



SPAIN
Guhring S.A.S.
guhring@guhring.es
www.guhring.es



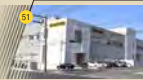
AUSTRIA
Guhring Ges.m.b.H.
vertrieb@guhring.at
www.guhring.at



INDIA
Guhring India Pvt. Ltd.
info@guhring.in
www.guhring.in



TAIWAN
Guhring Taiwan Ltd.
info@guhring.com.tw
www.guhring.com.tw



**TREUEN
FACTORY 1**
Dr. Guhring KG
info@guhring.de
www.guhring.de



**ITALY
UBERME**
Uberme Guhring Italia
info@uberme.it
www.uberme.it



POLAND
Guhring Sp. z o.o.
handel@guhring.pl
www.guhring.pl



CHINA
Guhring (China) Ltd.
info@guhringchina.com
www.guhringchina.com



JAPAN
Guhring Japan Co., Ltd.
info.japan@guhring.com
www.guhring.com.jp



**TREUEN
FACTORY 2**
Dr. Guhring KG
info@guhring.de
www.guhring.de



**ITALY
MISSAGLIA**
Guhring s.r.l. - Unipersonale
info@guhring-italy.com
www.guhring-italy.com



**CZECH
REPUBLIC**
Guhring s.r.o.
info@guhring.cz
www.guhring.cz



TURKEY
Guhring Team-San. Tic. Ltd. San.
guhring@guhring.com.tr
www.guhring.com.tr



KOREA
Guhring Korea Co., Ltd.
info@guhring.co.kr
www.guhring.co.kr



**TREUEN
FACTORY 3**
Dr. Guhring KG
info@guhring.de
www.guhring.de



FRANCE
Guhring France S.A.R.L.
info@guhring-france.com



DENMARK
Guhring A/S
info@guhring.dk
www.guhring.dk



RUSSIA
Guhring (Russia)
info@guhring.ru
www.guhring.ru




Wszystko od JEDNEGO DOSTAWCY

Wielka różnorodność oferty obejmującej mikro-wiertła od \varnothing 0.05 mm, specjalne rozwiązania do \varnothing 180 mm, narzędzia ze stali HSS jak i węglików spiekanych, 50,000 produktów do każdego zastosowania.



PEŁNOWĘGLIKOWE WIERTŁA RATIO

od strony 3



SYSTEM WIERTARSKI Z PŁYTKAMI WYM. HT 800

od strony 123



HSS/HSCO WIERTŁA KRĘTE

▄▄▄ chwyt walcowy

▄▄▄ chwyt Morse'a

od strony 175, 435



WIERTŁA LUFOWE

❧ wiertła lufowe 1-ostrzowe i 2-ostrzowe

❧ wiertła lufowe kręte

od strony 515


1:1



MIKRO-WIERTŁA WĘGLIK + HSSE

od strony 645

ZOOM



NAWIERTAKI NC & NAWIERTAKI DO NAKIEŁKÓW

od strony 665



WIERTŁA STOPNIOWE & ROZWIERTAKI ZGRUBNE

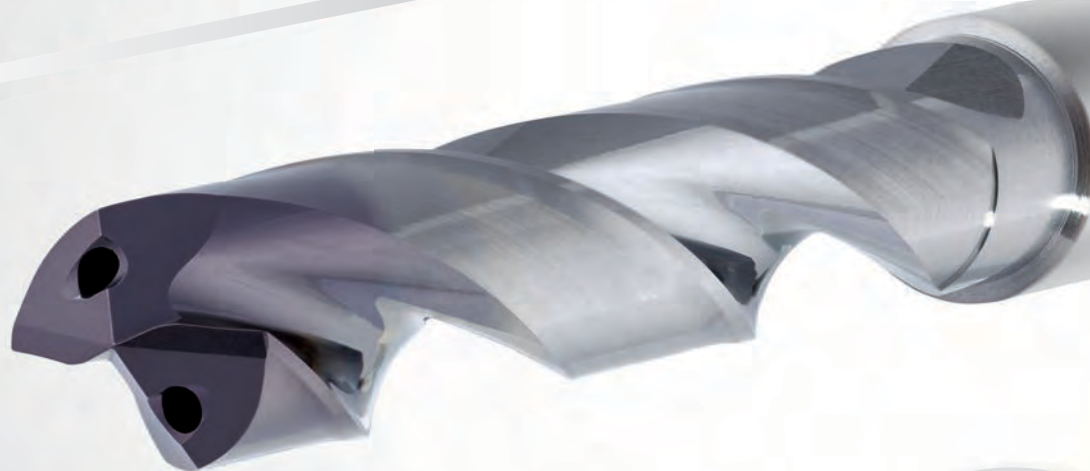
od strony 711

Innowacje

Firma Guhring wdraża innowacje na każdym etapie wytwarzania. Perfekcja w badaniach, rozwoju i produkcji narzędzi. Perfekcja w obróbce – to nasze aspiracje.

**JAKOŚĆ PREMIUM
PRZY OBRÓBCE STALI**

NEW



//RATIO//

RT 100 S

- // optymalna mikro-geometria do stali
- // wysokie parametry skrawania
- // powtarzalna trwałość narzędzi

→ od strony 59, 96



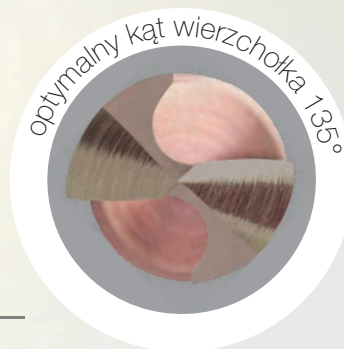
NEW

AeroX

- // wiertła kręte z HSCO8 do wiercenia ręcznego w stalach konstrukcyjnych, stopowych, stopach Tytanu i aluminium
- // łagodna praca dzięki specjalnej geometrii wierzchołka

→ od strony 313

OPTYMALNA GRUBOŚĆ RDZENIA
specjalny, stożkowy rdzeń zapewnia optymalną sztywność narzędzia i zredukowane siły skrawania



NEW



Dla maksymalnej odporności na ścieranie i temperaturę

M42 nanoFire

- // maksymalna wydajność zwłaszcza dla stali stopowych i stopów specjalnych
- // sztywna budowa dzięki mocnemu rdzeniowi, kąt wierzchołkowy 135°

→ od strony 317

NEW

Wiertła HSS z chłodzeniem wew.

- // do wiercenia konstrukcji stalowych w warunkach niestabilnych
 - // osiowe lub promieniowe doprowadzenie chłodziwa
 - // minimalna wielkość zadziorów
- od strony 499



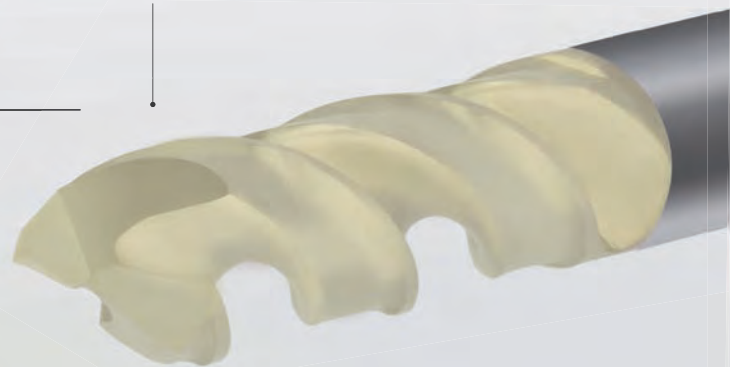
NEW

VA-HSCO Sirius Wiertła

- // zwiększona trwałość dzięki powłoce Sirius duża odporność na ścieranie w połączeniu z zoptymalizowaną geometrią wierzchołka 130°

→ od strony 231

Pokrycie **SIRIUS**
dla najwyższej wydajności
zwłaszcza w stalach nierdzewnych



Pokrycie **NanoFIRE**
maksymalna odporność na ścieranie i temperaturę

NEW

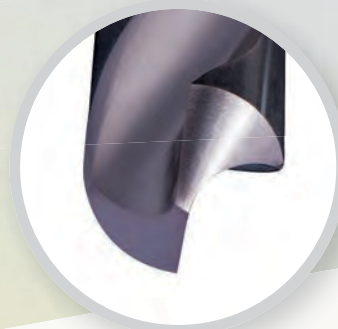
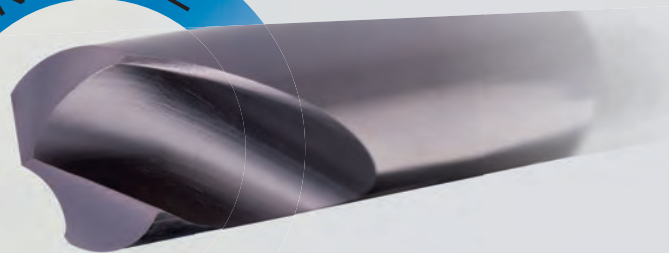
Nawiertaki NC HSCO

z powłoką NanoFIRE

- // precyzyjne nawiercanie z maksymalną wydajnością i trwałością
- // najlepsze wyniki dzięki powłoce NanoFIRE

→ od strony 705

Pokrycie NanoFIRE



NEW

Płytki i listwy wymienne EB800

z nową powłoką

- // optymalne dopasowanie do materiału obrabianego dzięki różnym powłokom

→ od strony 556



GÜHRING

Innowacje

Obecnie stosowane materiały wymagają stałego ulepszania procesów obróbczych. Firma Guhring wzmacnia pozycję lidera w wyznaczaniu kierunku rozwoju dotyczącego rotacyjnych narzędzi skrawających.

INNOWACYJNY PROJEKT
dla bardziej efektywnego chłodzenia

NEW

NEW



//RATIO//

RT 100 Trigon®

- // optymalna prędkość przepływu
- // specjalnie zalecane do obróbki stali nierdzewnych, stopów Tytanu i Super Stopów
- // zwiększony wydatek chłodzenia

→ od strony 813



NEW

WIĘKSZA EKONOMICZNA EFEKTYWNOŚĆ
WIERCENIA stopów aluminium



//RATIO//

RT 100 AL



- // pełny zakres obrabianych stopów aluminium zarówno ciągnionych jak i odlewanych
- // rozwiązanie specjalne dla średnic od \varnothing 3 do 20 mm i głębokości do 12xD
- // odpowiednie do chłodzenia emulsją i mgłą olejową MQL

→ od strony 815

NEW

NEW

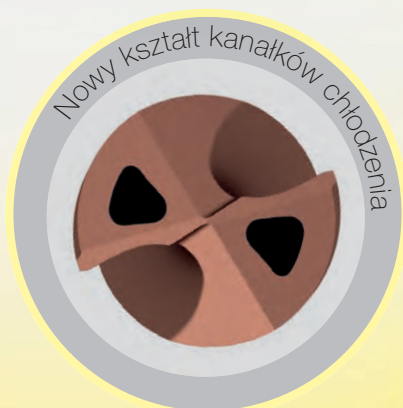


//RATIO//

RT 100 C

- // specjalnie dedykowane do obróbki stali długowiórowych
- // doskonałe usuwanie wiórów nawet przy niskich prędkościach skrawania
- // kształt rowków i geometria ostrzy optymalnie dopasowane do tego rodzaju obróbki

→ od strony 814



GÜHRING

R&D

KOMPOZYTY WZMACNIANE WŁÓKNAMI

Rozwiązania narzędziowe do materiałów silnie ścierających

OBRÓBKA KOMPOZYTÓW

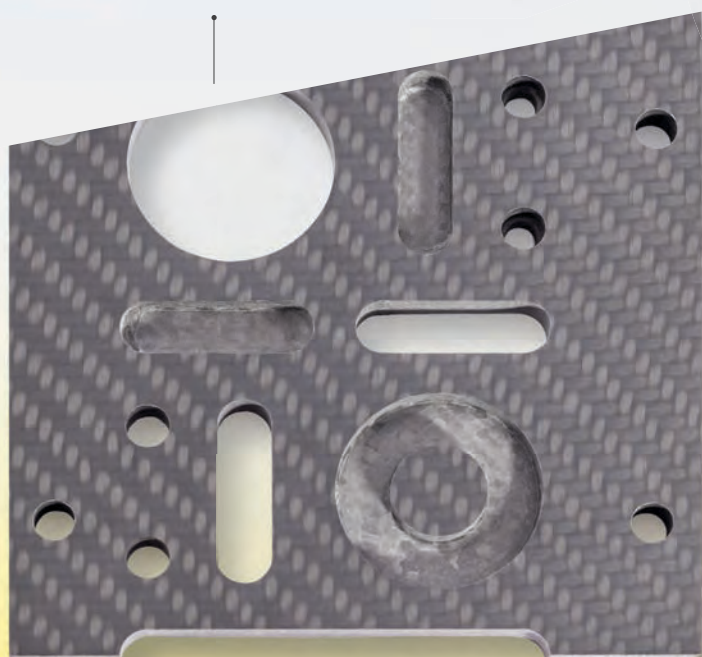
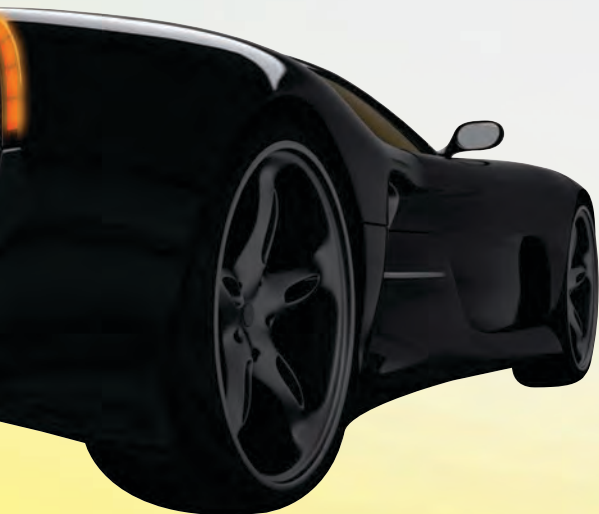
Specjalnie opracowanie narzędzia do obróbki kompozytów wzmocnionych włóknami węglowymi (CFRP) i szklanymi (GFRP) oraz materiałów wielowarstwowych

- // redukcja naprężeń cieplnych na narożach i krawędziach narzędzia
- // obrabiana powierzchnia wolna od delaminacji
- // brak zniszczeń przez „wypychanie” i „wyciąganie” włókien
- // zapobieganie „wyciąganiu” rozdzielonych włókien
- // zminimalizowane tworzenie zadziorów
- // zapobieganie uszkodzeniom termicznym

→ od strony 816

WIERCENIE KOMPOZYTÓW

z optymalną jakością obróbki



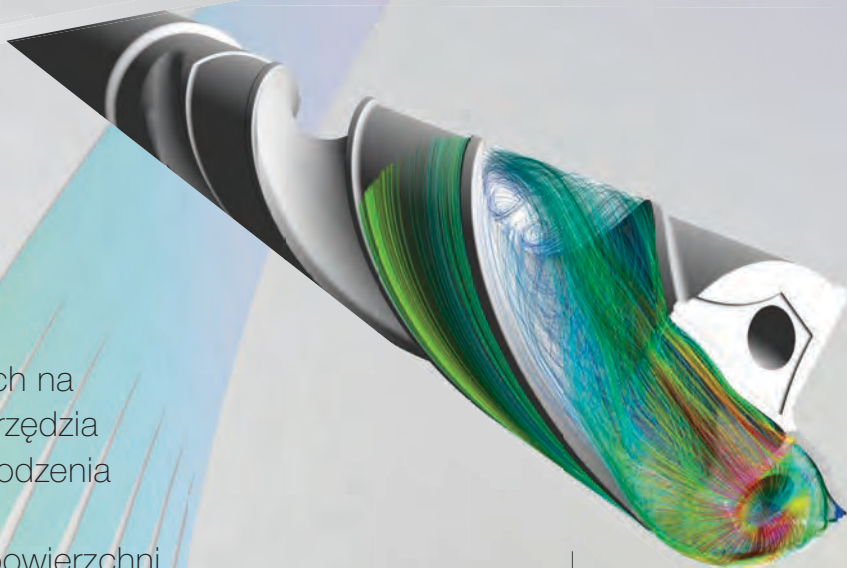
EW POWIERZCHNIA PRZYŁOŻENIA KSZTAŁTOWANA LASEROWO

zwiększenie trwałości narzędzi przez precyzyjne doprowadzenie chłodzenia

- // redukcja naprężeń cieplnych na narożach i krawędziach narzędzia
- // zwiększona wydajność chłodzenia
- // poprawiona jakość otworu
- // dowolność kształtowania powierzchni przyłożenia dzięki obróbce laserowej

→ od strony 819

symulacja z Komputerową Analizą Przepływów (CFD)



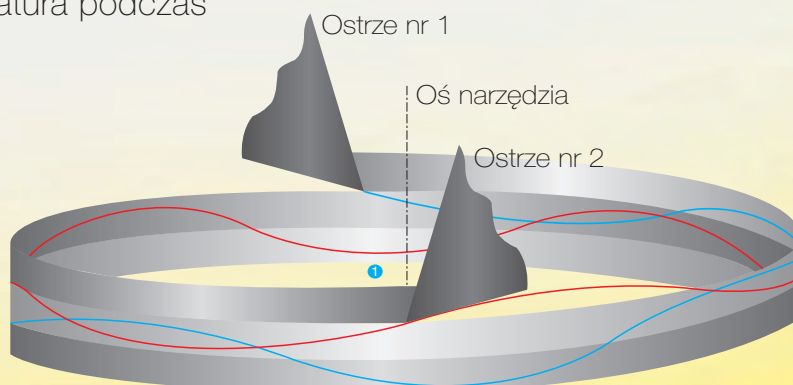
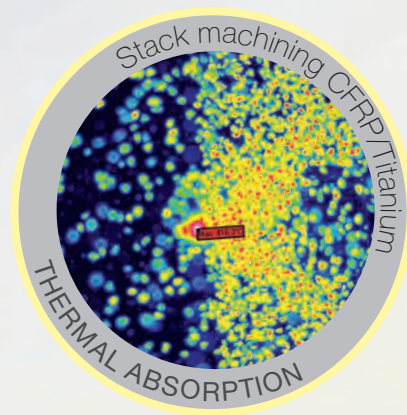
NEW

OBRÓBKA WSPOMAGANA ENERGIĄ DRGAŃ

optymalizacja procesu skrawania dzięki dodatkowym ruchom narzędzia

- // bardziej korzystny proces formowania wiórów / polepszone łamanie wiórów
- // łatwiejsze usuwanie wiórów
- // tworzenie optymalnych punktów łamania wiórów
- // zredukowany narost na ostrzu
- // niższe siły i temperatura podczas skrawania

→ od strony 821

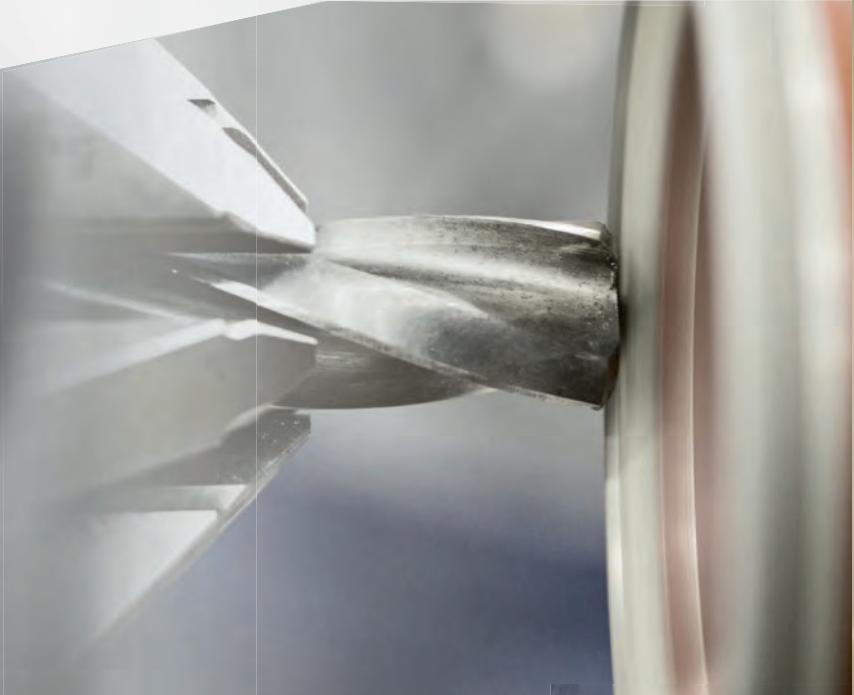


OSTRZENIE, POKRYWANIE, USUWANIE POWŁOK, MODYFIKACJE
NARZĘDZI, PRODUKCJA NIEWIELKICH SERII NARZĘDZI

DOSTĘPNE NATYCHMIAST



Ostrzenie i
pokrywanie



Narzędzia Indywidualnie dopasowane do potrzeb klienta – recepta na sukces firmy Guhring

Na oczekiwania klienta odpowiadamy perfekcją w obróbce.
Firma Guhring dostarcza innowacyjne technologie oraz wsparcie
ekspertów od projektowania procesów do produkcji narzędzi
precyzyjnych.



GUHRING

Zakłady produkcyjne Treuen



GUHRING



LOKALIZACJA

TREUEN



PIKTOGRAMY
SZYBKI PRZEGLĄD

Kody ISO

P	Stale, stale stopowe
M	Stale nierdzewne
K	Żeliwa szare, żeliwa sferoidalne i żeliwa ciągliwe
N	Aluminium i inne metale nieżelazne
S	Stopy specjalne
H	Stale hartowane i żeliwa utwardzane

Zalecenia dotyczące przydatności narzędzi w określonych zastosowaniach dostępne są na następujących stronach zawierających informacje o cenach i programach:

- optymalne zastosowanie
- możliwe zastosowanie

Piktogramy

Materiał narzędzia	HSS	HSS-E	HSCO	M42	HSS-E-PM				
	Stale szybko tnące								
	HM		VHM						
	Węgiel monolit								
Głębokość obróbki	1xD	1,5xD	3xD	4xD	5xD	7xD	8xD	10xD
Tolerancja Ø	m7	h5	h6	h7	h8	0/-0,004		
Forma chwytu	HA	HB	HE		Cyl		MK		
	wg DIN 6535				cylindryczne		chwyt MK		
Kierunek skrawania	R			L			N		
	prawy			lewy			neutralny		
Chłodzenie wew.									
	z chłodz. wewn.			bez chłodz. wewn.					
Forma	A	B	R					
Kąt wierzchołkowy	90°	118°	120°	130°	135°	140°	150°	
Korekcja ścina									
Norma	DIN 333	DIN 338	DIN 340	DIN 345	DIN 1869	DIN 6537K	DIN 6537L	DIN 6539
	wg DIN								
	WN								
	norma zakładowa								
Typ	EB 100	GT 100	HT 800 WP	H	N	RT 100 T	RT 100 U	W

Powłoki

- | | | | |
|-------------------|-----------------------|------------------------|----------------------------------|
| bez powłoki | złotobrazowe | F FIRE/nanoFIRE | Y Signum |
| parowane | A TiAlN | C TiCN | Ni powierzchnia niklowana |
| azotowane | A TiAlN SuperA | S TiN | M MolyGlide |
| łysinki azotowane | a TiAlN nanoA | S Sirius | Cb Carbo |

STRONY PRODUKTOWE

Wszystkie dane w jednym miejscu!

Wiertła RATIO, z kanałkami chłodz.

3xD	RT 100	DIN 6537K	140°	m7	
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P ● Korekcja ścina $\geq \varnothing 3,300$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M ○
K ●
N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe - $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AISI
S ○
H ○

GÜHRING NAVIGATOR

Param. skr. na str. 750

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	HE

Zalecenia zastosowania:

- optymalne zastosowanie
- możliwe zastosowanie

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
3,300	6,000	62,000	20,000	36,000
3,400	6,000	62,000	20,000	36,000
4,000	6,000	66,000	24,000	36,000
5,000	6,000	66,000	28,000	36,000
5,500	6,000	66,000	28,000	36,000
5,600	6,000	66,000	28,000	36,000
5,800	6,000	66,000	28,000	36,000
6,000	6,000	66,000	28,000	36,000
6,100	8,000	79,000	34,000	36,000
6,200	8,000	79,000	34,000	36,000
6,300	8,000	79,000	34,000	36,000
6,400	8,000	79,000	34,000	36,000
6,600	8,000	79,000	34,000	36,000
6,800	8,000	79,000	34,000	36,000
7,000	8,000	79,000	34,000	36,000
7,100	8,000	79,000	41,000	36,000
7,140	8,000	79,000	41,000	36,000
7,400	8,000	79,000	41,000	36,000
7,500	8,000	79,000	41,000	36,000
7,540	8,000	79,000	41,000	36,000
7,800	8,000	79,000	41,000	36,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
10,500	12,000	102,000	55,000	45,000
10,600	12,000	102,000	55,000	45,000
10,700	12,000	102,000	55,000	45,000
10,800	12,000	102,000	55,000	45,000
11,000	12,000	102,000	55,000	45,000
11,300	12,000	102,000	55,000	45,000
11,500	12,000	102,000	55,000	45,000
11,510	29/64	12,000	102,000	55,000
11,910	15/32	12,000	102,000	55,000
12,000	12,000	102,000	55,000	45,000
12,100	14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000
12,500	14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000
12,900	14,000	107,000	60,000	45,000
13,000	14,000	107,000	60,000	45,000
13,500	14,000	107,000	60,000	45,000
13,890	35/64	14,000	107,000	60,000
14,000	14,000	107,000	60,000	45,000
14,500	16,000	115,000	65,000	48,000
14,680	37/64	16,000	115,000	65,000

Nr artykułu **1181**

Nr artykułu **1**

Podczas zamówienia prosimy o podanie numeru artykułu i średnicy nominalnej p. wiertło Ratio z chłodz. wewn. o średnicy 5.5 = 1181 5.500

Informacje dotyczące warunków sprzedaży, dostawy i płatności udzielane są na zapytanie.

Kopiowanie i rozpowszechnianie, nawet w części, jest zabronione.

Możliwe błędy w druku i wprowadzane zmiany nie są podstawą do żadnych roszczeń. Wszystkie produkty oznaczone jako produkowane wg norm DIN, mogą być dostarczone z wymiarami różniącymi się od katalogowych, jeśli spełniają warunki norm DIN.

Drukowane w Niemczech


Gühring KG
Postfach 10 02 47 · D-72423 Albstadt
Herderstraße 50-54 · D-72458 Albstadt

Tel.: +49 74 31 17-0
Fax: +49 74 31 17-21 279

Internet: www.guehring.de
E-Mail: info@guehring.de




Wiertła RATIO

 Quickfinder dla grupy materiałowej	od strony 4
Spis treści	od strony 12
Program	od strony 16


System wiertarski z płytkami wym. T 800

Spis treści	od strony 124
Program	od strony 128

Wiertła kręte z chwytem walcowym

Spis treści	od strony 176
 Quickfinder dla grupy materiałowej	od strony 184
Program	od strony 192

Wiertła kręte z chwytem MK

Spis treści	od strony 436
 Quickfinder dla grupy materiałowej	od strony 440
Program	od strony 448

Wiertła lufowe

Spis treści	od strony 516
Program	od strony 523

Mikro-wiertła

Spis treści	od strony 646
Program	od strony 649

Nawiertaki do nakiełków / Nawiertaki NC

Spis treści	od strony 666
Program	od strony 668

Wiertła stopniowe / Rozwiertaki zgrubne

Spis treści	od strony 712
Program	od strony 714

GÜHRING NAVIGATOR	od strony 749
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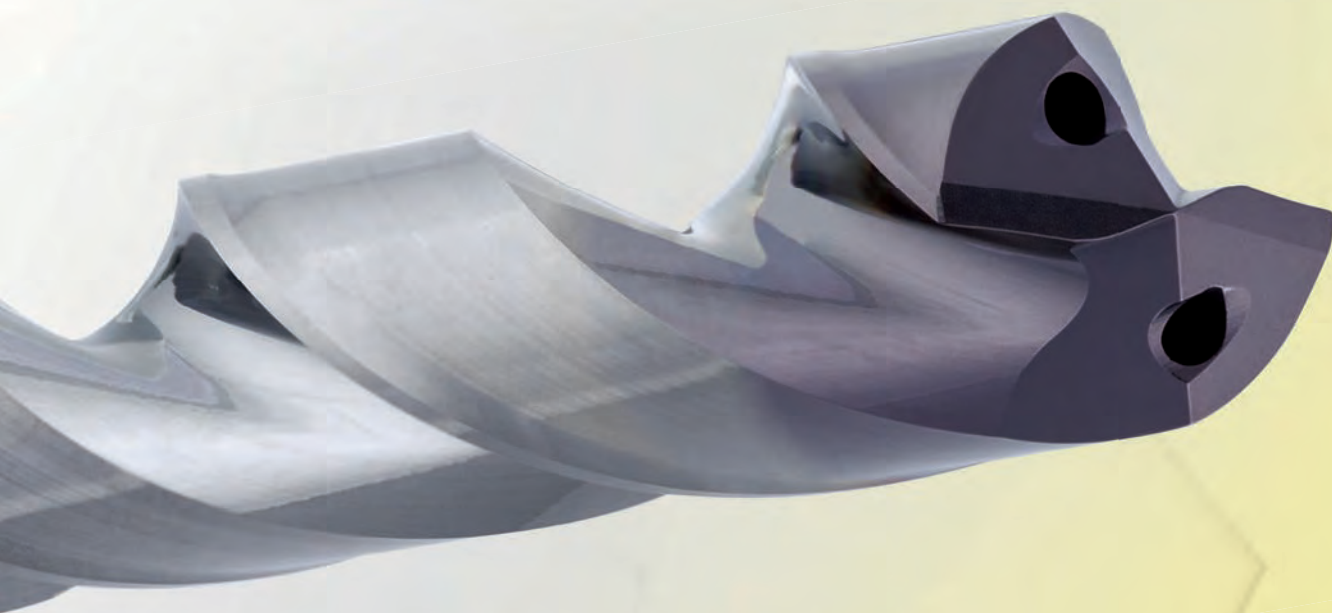
Sekcja techniczna	od strony 811
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Nr artykułu	od strony 871
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WIERTŁA RATIO

Ratio®





STALE



STALE
HARTOWANE

3xD

4xD

5xD

7xD

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 5759
od strony 59

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 2477
od strony 39

Ø 3,00 - 20,00 mm
Nr artykułu 2479
od strony 61

Ø 3,00 - 20,00 mm
Nr artykułu 4044
od strony 85

≤ 1400
N/mm²

≤ 1400
N/mm²

≤ 1600
N/mm²

≤ 1400
N/mm²

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 2480
od strony 16

Ø 3,00 - 20,00 mm
Nr artykułu 2996
od strony 30

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 8521
od strony 68

No 1

Ø 3,00 - 16,00 mm
Nr artykułu 8522
od strony 90

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6405
od strony 110

Ø 0,50 - 3,00 mm
Nr artykułu 6400
od strony 108

Ø 0,50 - 3,00 mm
Nr artykułu 6401
od strony 109

≤ 1400
N/mm²

15xD

20xD

25xD

30xD

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6412
od strony 112

No 1

Ø 3,00 - 14,00 mm
Nr artykułu 6509
od strony 102

No 1

Ø 3,00 - 14,00 mm
Nr artykułu 6511
od strony 104

No 1

Ø 3,00 - 12,00 mm
Nr artykułu 6512
od strony 105

No 1

Ø 3,00 - 10,00 mm
Nr artykułu 6513
od strony 106



QUICKFINDER

8xD

12xD

No 1 idealne narzędzie do obróbki stali konstrukcyjnych

No 1 idealne narzędzie stale konstrukcyjne i wysokowytrzymałe do 1600 N/mm²

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 5760
od strony 96



RT100 S z chłodzeniem wewnętrznym

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 5525
od strony 100



RT100 U z chłodzeniem wewnętrznym

Typ H do stali hartowanych
do 62 HRC
Nr artykułu 1946, s. 389



RT100 U bez chłodzenia wewnętrznego



RT100 HF z chłodzeniem wewnętrznym

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6408
od strony 111



Mikro-wiertła „ExclusiveLine”
z chłodzeniem wewnętrznym



Mikro-wiertła „ExclusiveLine” bez
chłodzenia wewnętrznego

40xD

No 1

Ø 3,00 - 8,00 mm
Nr artykułu 6514
od strony 107



Mikro-wiertła „ExclusiveLine”
z chłodzeniem wewnętrznym



RT 100 T



STALE
NIERDZEWNE



STOPY TYTANU
SUPER STOPY

3xD

4xD

5xD

7xD

No 1 No 1
Ø 3,00 - 20,00 mm
Nr artykułu 8510
od strony 48



No 1 No 1
Ø 3,00 - 20,00 mm
Nr artykułu 8511
od strony 72



No 1
Ø 3,00 - 20,00 mm
Nr artykułu 8520
od strony 44



No 1
Ø 3,00 - 20,00 mm
Nr artykułu 8521
od strony 68

No 1
Ø 3,00 - 16,00 mm
Nr artykułu 8522
od strony 90

S
Ø 3,50 - 20,00 mm
Nr artykułu 2468
od strony 52



S
Ø 3,00 - 20,00 mm
Nr artykułu 2478
od strony 76



No 1 No 1
Ø 1,40 - 3,00 mm
Nr artykułu 6405
od strony 110



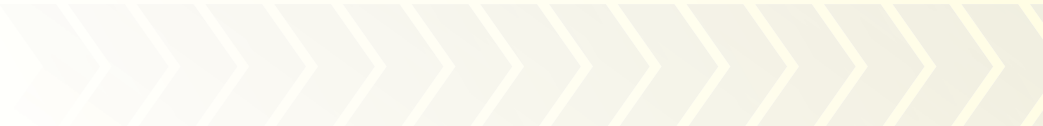
15xD

20xD

25xD

30xD

No 1 No 1
Ø 1,40 - 3,00 mm
Nr artykułu 6412
od strony 112



No 1 No 1
Ø 3,00 - 14,00 mm
Nr artykułu 6509
od strony 102

No 1 No 1
Ø 3,00 - 14,00 mm
Nr artykułu 6511
od strony 104

No 1 No 1
Ø 3,00 - 12,00 mm
Nr artykułu 6512
od strony 105

No 1 No 1
Ø 3,00 - 10,00 mm
Nr artykułu 6513
od strony 106

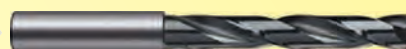


QUICKFINDER

8xD

No 1 idealne narzędzie do stali nierdzewnych

No 1 idealne narzędzie do stopów Tytanu i Super Stopów



RT100 VA



RT100 HF z chłodzeniem wewnętrznym



RT100 F z chłodzeniem wewnętrznym

No 1 **No 1**

Ø 1,40 - 3,00 mm
Nr artykułu 6408
od strony 111



Mikro-wiertła „ExclusiveLine”
z chłodzeniem wewnętrznym

40xD



Mikro-wiertła „ExclusiveLine”
z chłodzeniem wewnętrznym

No 1 **No 1**

Ø 3,00 - 8,00 mm
Nr artykułu 6514
od strony 107



RT 100 T



K ŻELIWA

3xD	4xD	5xD	7xD
		No 1 Ø 3,00 - 20,00 mm Nr artykułu 6501 od strony 82	No 1 Ø 4,00 - 20,00 mm Nr artykułu 6502 od strony 91
No 1 Ø 3,00 - 20,00 mm Nr artykułu 2477 od strony 39		Ø 3,00 - 20,00 mm Nr artykułu 2479 od strony 61	Ø 3,00 - 20,00 mm Nr artykułu 4044 od strony 85
Ø 3,00 - 20,00 mm Nr artykułu 2480 od strony 16		Ø 3,00 - 20,00 mm Nr artykułu 2996 od strony 30	
	No 1 Ø 3,00 - 20,00 mm Nr artykułu 768 od strony 56		Ø 3,00 - 20,00 mm Nr artykułu 769 od strony 93
		No 1 Ø 1,40 - 3,00 mm Nr artykułu 6405 od strony 110	
	Ø 0,50 - 3,00 mm Nr artykułu 6400 od strony 108		Ø 0,50 - 3,00 mm Nr artykułu 6401 od strony 109
15xD	20xD	25xD	30xD
No 1 Ø 1,40 - 3,00 mm Nr artykułu 6412 od strony 112			
No 1 Ø 3,00 - 14,00 mm Nr artykułu 6509 od strony 102	No 1 Ø 3,00 - 14,00 mm Nr artykułu 6511 od strony 104	No 1 Ø 3,00 - 12,00 mm Nr artykułu 6512 od strony 105	No 1 Ø 3,00 - 10,00 mm Nr artykułu 6513 od strony 106
Ø 5,00 - 14,00 mm Nr artykułu 773 od strony 103			



QUICKFINDER

8xD

10xD

12xD

No 1 idealne narzędzie


RT 100 R

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 5525
od strony 100



RT100 U z chłodzeniem wewnętrznym



RT100 U bez chłodzenia wewnętrznego

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 770
od strony 98



RT100 GG Żeliwa

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6408
od strony 111



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego

40xD



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym

No 1

Ø 3,00 - 8,00 mm
Nr artykułu 6514
od strony 107



RT 100 T



RT 150 GN



ALUMINIUM, METALE KOLOROWE, TWORZYWA SZTUCZNE

4xD

5xD

7xD

8xD

No 1

Ø 3,00 - 20,00 mm
Nr artykułu 6068
od strony 58

No 1

Ø 3,00 - 19,50 mm
Nr artykułu 6069
od strony 94

Ø 3,00 - 20,00 mm
Nr artykułu 2713
od strony 113

No 1

Ø 3,00 - 20,00 mm*

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6405
od strony 110

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6408
od strony 111

15xD

20xD

25xD

30xD

No 1

Ø 5,00 - 14,00 mm
Nr artykułu 773
od strony 103

No 1

Ø 3,00 - max. 14,00 mm*

No 1

Ø 1,40 - 3,00 mm
Nr artykułu 6412
od strony 112

*narzędzia specjalne na zapytanie



QUICKFINDER

10xD

No 1 idealne narzędzie

Wiertła RATIO

No 1

Ø 3,00 - 19,50 mm
Nr artykułu 6070
od strony 99



RT150 GG



FT 200 G z chłodzeniem wewnętrznym



RT100 AL



Mikro-wiertła „ExclusiveLine”
z chłodzeniem wewnętrznym



RT 150 GN

wiertła do Kevlaru
Nr artykułu 1149
s. 431



RT 100 T Aluminium

Typ N do obróbki aluminium
i tworzyw sztucznych
Nr artykułu 732 s. 319



Mikro-wiertła „ExclusiveLine”
z chłodzeniem wewnętrznym



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Forma chwytu	Typ	Norma	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
---	---	---	---	---	---	----------------------	---------------------	--------------	-----	-------	--------------------	--------------	-------	-------------	---------------------	--------

Wiertła RATIO bez kanałków chłodz.

•	○	•	○	○	○		3xD	HA	RT 100 U	DIN 6537K	VHM	F	3,000 - 20,000	2480	752	16
•	○	•	○	○	○		3xD	HE	RT 100 U	DIN 6537K	VHM	F	3,100 - 20,000	2472	752	18
•	○	•	○	○	○		3xD	Cyl	RT 100 U	DIN 6539	VHM	F	3,000 - 15,500	2473	752	20
•	○	•	○	○	○		3xD	HE	RT 100 U	DIN 6537K	VHM	S	3,000 - 20,000	1184	752	21
•	○	•	○	○	○		3xD	Cyl	RT 100 U	DIN 6539	VHM	S	3,000 - 16,000	1242	752	23
•	○	•	○	○	○		3xD	HA	RT 100 HF	DIN 6537K	VHM	Y	3,000 - 20,000	8524	752	25
○	○	○	○	•	○		3xD	HA	RT 100 F	DIN 6537K	VHM	F	3,700 - 12,000	2475	752	27
○	•	○	○	○	○		3xD	Cyl	RT 100 F	DIN 6539	VHM	S	3,000 - 14,000	1702	752	28
•	○	•	○	○	○		5xD	HA	RT 100 U	DIN 6537L	VHM	F	3,000 - 20,000	2996	756	30
•	○	•	○	○	○		5xD	HE	RT 100 U	DIN 6537L	VHM	F	3,100 - 20,000	2719	756	32
•	○	•	○	○	○		5xD	Cyl	RT 100 U	WN	VHM	F	5,000 - 14,000	2474	756	34
•	○	•	○	○	○		5xD	HA	RT 100 U	DIN 6537L	VHM	S	3,300 - 12,000	2717	756	35
•	○	•	○	○	○		5xD	Cyl	RT 100 U	WN	VHM	S	5,000 - 16,000	1243	756	36
○	○	○	○	•	○		5xD	HA	RT 100 F	DIN 6537L	VHM	F	3,000 - 15,000	2712	756	38

Wiertła RATIO, z kanałkami chłodz.

•	○	•	○	○	○		3xD	HA	RT 100 U	DIN 6537K	VHM	F	3,000 - 20,000	2477	750	39
•	○	•	○	○	○		3xD	HE	RT 100 U	DIN 6537K	VHM	F	3,000 - 20,000	2469	750	41
•	○	•	○	○	○		3xD	HE	RT 100 U	DIN 6537K	VHM	S	3,300 - 19,500	1181	750	43
•	○	•	○	○	○		3xD	HA	RT 100 HF	DIN 6537K	VHM	Y	3,000 - 20,000	8520	750	44
•	○	•	○	○	○		3xD	HE	RT 100 HF	DIN 6537K	VHM	Y	3,000 - 20,000	8620	750	46
•	○	•	○	○	○		3xD	HA	RT 100 VA	DIN 6537K	VHM	a	3,000 - 20,000	8510	750	48
•	○	•	○	○	○		3xD	HE	RT 100 VA	DIN 6537K	VHM	a	3,000 - 20,000	8610	750	50
○	○	○	○	•	○		3xD	HE	RT 100 F	DIN 6537K	VHM	F	3,500 - 20,000	2468	750	52
○	○	○	○	•	○		3xD	HA	RT 100 F	DIN 6537K	VHM	S	3,100 - 22,000	1660	750	53



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Forma chwytu	Typ	Norma	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
○	○	○	○	●	○		3xD	HE	RT 100 F	DIN 6537 K	VHM	S	4,000 - 25,000	1180	750	54
●	○	○	○				3xD	HE	RT 80 U	DIN 6538 K	HM	S	9,500 - 25,500	1171	750	55
		●	○				4xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	768	752	56
		○	●				4xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	6068	752	58
●	○	○	○	○	○		5xD	HA	RT 100 S	DIN 6537 L	VHM	F	3,000 - 20,000	5759	754	59
●	○	●	○	○	○		5xD	HA	RT 100 U	DIN 6537 L	VHM	F	3,000 - 20,000	2479	754	61
●	○	●	○	○	○		5xD	HE	RT 100 U	DIN 6537 L	VHM	F	3,300 - 20,000	2471	754	63
●	○	●	○	○	○		5xD	HA	RT 100 U	DIN 6537 L	VHM	S	3,000 - 19,500	1663	754	65
●	○	●	○	○	○		5xD	HE	RT 100 U	DIN 6537 L	VHM	S	3,300 - 20,000	1183	754	66
●		●	○				5xD	HA	RT 100 HF	DIN 6537 L	VHM	Y	3,000 - 20,000	8521	756	68
●		●	○				5xD	HE	RT 100 HF	DIN 6537 L	VHM	Y	3,000 - 20,000	8621	756	70
	●		●				5xD	HA	RT 100 VA	DIN 6537 L	VHM	a	3,000 - 20,000	8511	756	72
	●		●				5xD	HE	RT 100 VA	DIN 6537 L	VHM	a	3,000 - 20,000	8611	756	74
○	○	○	○	●	○		5xD	HA	RT 100 F	DIN 6537 L	VHM	F	3,000 - 20,000	2478	754	76
○	○	○	○	●	○		5xD	HE	RT 100 F	DIN 6537 L	VHM	F	3,000 - 20,000	2470	754	77
○	○	○	○	●	○		5xD	HA	RT 100 F	DIN 6537 L	VHM	S	3,000 - 23,500	1662	754	78
○	○	○	○	●	○		5xD	HE	RT 100 F	DIN 6537 L	VHM	S	3,000 - 25,000	1182	754	80
		●					5xD	HA	RT 100 R	DIN 6537 L	VHM	F	3,000 - 20,000	6501	754	82
●	○	○	○				5xD	HE	RT 80 U	DIN 6538 M	HM	S	9,800 - 25,500	1172	754	84
●	○	●	○	○	○		7xD	HA	RT 100 U	WN	VHM	F	3,000 - 20,000	4044	758	85
●	○	●	○	○	○		7xD	HE	RT 100 U	WN	VHM	F	3,000 - 19,500	4045	758	87
●	○	●	○	○	○		7xD	HA	RT 100 U	WN	VHM	S	3,000 - 19,500	2711	758	89
●		●		○			7xD	HA	RT 100 HF	WN	VHM	Y	3,000 - 16,000	8522	758	90
	●						7xD	HA	RT 100 R	WN	VHM	F	4,000 - 20,000	6502	758	91





P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Forma chwytu	Typ	Norma	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
	•	○					7xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	769	758	93
	○	•					7xD	HA	RT 150 GG	WN	VHM	○	3,000 - 19,500	6069	758	94
•	○	○	○				7xD	HE	RT 80U	DIN 6538L	HM	Ⓢ	9,600 - 25,000	1173	758	95
•	○	○	○	○			8xD	HA	RT 100 S	WN	VHM	Ⓡ	3,000 - 20,000	5760	758	96
		•	○				10xD	HA	RT 150 GG	WN	VHM	○	3,000 - 20,000	770	758	98
		○	•				10xD	HA	RT 150 GG	WN	VHM	○	3,000 - 19,500	6070	758	99
•	○	•	○	○			12xD	HA	RT 100 U	WN	VHM	Ⓡ	3,000 - 20,000	5525	758	100
•	•	•	○	○			15xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 14,000	6509	760	102
		•	•				15xD	HA	RT 150 GN	WN	VHM	○	5,000 - 14,000	773	760	103
•	•	•	○	○			20xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 14,000	6511	760	104
•	•	•	○	○			25xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 12,000	6512	760	105
•	•	•	○	○			30xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 10,000	6513	760	106
•	•	•	○	○			40xD	HA	RT 100 T	WN	VHM	Ⓡ	3,000 - 8,000	6514	760	107
Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego																
•	•	•	○	○			4xD	Cyl	N	WN	VHM	Ⓡ	0,500 - 3,000	6400	796	108
•	•	•	○	○			7xD	Cyl	N	WN	VHM	Ⓡ	0,500 - 3,000	6401	796	109
Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym																
•	•	•	○	○			5xD	Cyl	N	WN	VHM	Ⓡ	1,400 - 3,000	6405	796	110
•	•	•	○	○			8xD	Cyl	N	WN	VHM	Ⓡ	1,400 - 3,000	6408	796	111
•	•	•	○	○			15xD	Cyl	N	WN	VHM	Ⓡ	1,400 - 3,000	6412	796	112
Wiertła RATIO, 3-ostrzowe																
		•	•				5xD	HA	FT 200 G	DIN 6537L	VHM	○	3,000 - 20,000	2713	762	113
○	○	○					5xD	Cyl	GS 200 U	DIN 6539	VHM	Ⓢ	3,000 - 14,400	611	762	114
○	○	○					5xD	Cyl	GS 200 U	DIN 6539	VHM	○	3,000 - 20,000	731	762	115
		○	○				5xD	Cyl	GS 200 G	DIN 6539	VHM	○	3,570 - 12,500	745	762	116



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Forma chwytu	Typ	Norma	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła RATIO, 3-ostrowe

			○	○			5xD	Cyl	GS200 G	DIN 6539	VHM	○	3,000 - 20,000	1025	762	117
○			○	○			5xD	Cyl	GS200 F	DIN 6539	VHM	Ⓢ	3,000 - 11,000	1027	762	119

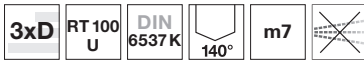
Wiertła stopniowe RATIO, 3-ostrowe

			○	○			3xD	Cyl	GS200 G	WN	VHM	○	3,400 - 20,000	1032		120
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Wiertła RATIO



Wiertła RATIO bez kanałków chłodz.

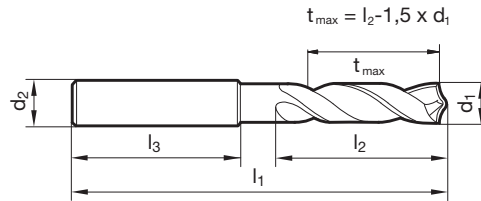


P	•	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	○	
K	•	
N	○	stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
S	○	
H	○	

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HA

GÜHRING NAVIGATOR

Param. skr. na str. 752



Nr artykułu **2480**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	7,000		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	7,200		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,300		8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
3,900		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	8,000		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,400		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,400		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,500		10,000	89,000	47,000	40,000
4,650		6,000	66,000	24,000	36,000	8,700		10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	10,000		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	10,100		12,000	102,000	55,000	45,000
5,550		6,000	66,000	28,000	36,000	10,200		12,000	102,000	55,000	45,000
5,560	7/32	6,000	66,000	28,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	10,400		12,000	102,000	55,000	45,000
5,650		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,700		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,900		6,000	66,000	28,000	36,000	10,900		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	11,500		12,000	102,000	55,000	45,000
6,350	1/4	8,000	79,000	34,000	36,000	11,600		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	11,800		12,000	102,000	55,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,100	33/64	14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,400		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
14,800		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,100		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,600		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,500		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO bez kanałków chłodz.

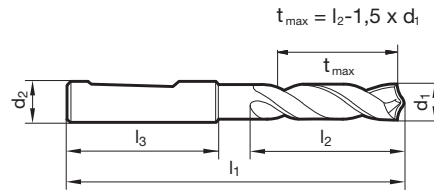


- P** ● Korekcja ścina $\geq \varnothing 3,100$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HE

GÜHRING NAVIGATOR

Param. skr. na str. 752



Nr artykułu **2472**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,100		6,000	62,000	20,000	36,000	9,250		10,000	89,000	47,000	40,000
3,200		6,000	62,000	20,000	36,000	9,400		10,000	89,000	47,000	40,000
3,500		6,000	62,000	20,000	36,000	9,500		10,000	89,000	47,000	40,000
3,600		6,000	62,000	20,000	36,000	9,800		10,000	89,000	47,000	40,000
3,700		6,000	62,000	20,000	36,000	10,000		10,000	89,000	47,000	40,000
3,900		6,000	66,000	24,000	36,000	10,100		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	10,200		12,000	102,000	55,000	45,000
4,200		6,000	66,000	24,000	36,000	10,300		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
4,600		6,000	66,000	24,000	36,000	10,400		12,000	102,000	55,000	45,000
4,900		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,600		12,000	102,000	55,000	45,000
5,100		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,200		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	10,900		12,000	102,000	55,000	45,000
5,400		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,200		12,000	102,000	55,000	45,000
5,900		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,800		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	12,200		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	12,500		14,000	107,000	60,000	45,000
7,200		8,000	79,000	41,000	36,000	12,600		14,000	107,000	60,000	45,000
7,300		8,000	79,000	41,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,700		8,000	79,000	41,000	36,000	13,300		14,000	107,000	60,000	45,000
7,900		8,000	79,000	41,000	36,000	13,500		14,000	107,000	60,000	45,000
8,000		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
8,100		10,000	89,000	47,000	40,000	14,200		16,000	115,000	65,000	48,000
8,200		10,000	89,000	47,000	40,000	14,290	9/16	16,000	115,000	65,000	48,000
8,300		10,000	89,000	47,000	40,000	14,500		16,000	115,000	65,000	48,000
8,500		10,000	89,000	47,000	40,000	14,700		16,000	115,000	65,000	48,000
8,600		10,000	89,000	47,000	40,000	15,000		16,000	115,000	65,000	48,000
8,700		10,000	89,000	47,000	40,000	15,200		16,000	115,000	65,000	48,000
8,900		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
9,000		10,000	89,000	47,000	40,000	15,700		16,000	115,000	65,000	48,000
9,100		10,000	89,000	47,000	40,000	15,800		16,000	115,000	65,000	48,000
9,200		10,000	89,000	47,000	40,000	16,200		18,000	123,000	73,000	48,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,300		20,000	131,000	79,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
18,500		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO bez kanałków chłodz.

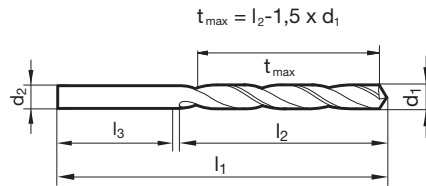


- P** ● Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	walcowy

GÜHRING NAVIGATOR

Param. skr. na str. 752



Nr artykułu **2473**

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		3,000	46,000	16,000	30,000
3,200		3,200	49,000	18,000	31,000
3,300		3,300	49,000	18,000	31,000
3,500		3,500	52,000	20,000	32,000
3,800		3,800	55,000	22,000	33,000
3,900		3,900	55,000	22,000	33,000
4,000		4,000	55,000	22,000	33,000
4,200		4,200	55,000	22,000	33,000
4,500		4,500	58,000	24,000	34,000
4,600		4,600	58,000	24,000	34,000
4,900		4,900	62,000	26,000	36,000
5,000		5,000	62,000	26,000	36,000
5,200		5,200	62,000	26,000	36,000
5,500		5,500	66,000	28,000	38,000
5,800		5,800	66,000	28,000	38,000
6,000		6,000	66,000	28,000	38,000
6,100		6,100	70,000	31,000	39,000
6,200		6,200	70,000	31,000	39,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
6,400		6,400	70,000	31,000	39,000
7,000		7,000	74,000	34,000	40,000
7,400		7,400	74,000	34,000	40,000
8,100		8,100	79,000	37,000	42,000
8,500		8,500	79,000	37,000	42,000
8,800		8,800	84,000	40,000	44,000
9,100		9,100	84,000	40,000	44,000
9,400		9,400	84,000	40,000	44,000
10,000		10,000	89,000	43,000	46,000
10,200		10,200	89,000	43,000	46,000
10,500		10,500	89,000	43,000	46,000
11,500		11,500	95,000	47,000	48,000
11,800		11,800	95,000	47,000	48,000
12,000		12,000	102,000	51,000	51,000
12,500		12,500	102,000	51,000	51,000
14,000		14,000	107,000	54,000	53,000
15,500		15,500	115,000	58,000	57,000



Wiertła RATIO bez kanałów chłodz.



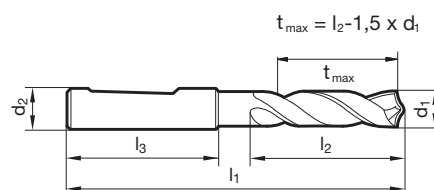
P	•	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	○	
K	•	
N	○	stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
S	○	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 752

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	HE

Wiertła RATIO



Nr artykułu

1184

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	7,000		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
3,500		6,000	62,000	20,000	36,000	7,200		8,000	79,000	41,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	7,300		8,000	79,000	41,000	36,000
3,600		6,000	62,000	20,000	36,000	7,400		8,000	79,000	41,000	36,000
3,700		6,000	62,000	20,000	36,000	7,500		8,000	79,000	41,000	36,000
3,800		6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
3,900		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	8,000		8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	8,100		10,000	89,000	47,000	40,000
4,500		6,000	66,000	24,000	36,000	8,200		10,000	89,000	47,000	40,000
4,600		6,000	66,000	24,000	36,000	8,300		10,000	89,000	47,000	40,000
4,700		6,000	66,000	24,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
4,760	3/16	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
4,800		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	9,400		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	9,500		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,520	3/8	10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,600		10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,700		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,800		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,900		10,000	89,000	47,000	40,000
6,100		8,000	79,000	34,000	36,000	9,920	25/64	10,000	89,000	47,000	40,000
6,200		8,000	79,000	34,000	36,000	10,000		10,000	89,000	47,000	40,000
6,300		8,000	79,000	34,000	36,000	10,100		12,000	102,000	55,000	45,000
6,350	1/4	8,000	79,000	34,000	36,000	10,200		12,000	102,000	55,000	45,000
6,400		8,000	79,000	34,000	36,000	10,300		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	10,500		12,000	102,000	55,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,600		12,000	102,000	55,000	45,000
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,400		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,100	33/64	14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,400		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,800		14,000	107,000	60,000	45,000
13,890	35/64	14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,400		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
14,800		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,200		16,000	115,000	65,000	48,000
15,480	39/64	16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,800		16,000	115,000	65,000	48,000
15,870	5/8	16,000	115,000	65,000	48,000
15,900		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,100		18,000	123,000	73,000	48,000
16,270	41/64	18,000	123,000	73,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,800		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,460	11/16	18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
17,700		18,000	123,000	73,000	48,000
17,860	45/64	18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,100		20,000	131,000	79,000	50,000
18,300		20,000	131,000	79,000	50,000
18,500		20,000	131,000	79,000	50,000
18,650	47/64	20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,200		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
19,600		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



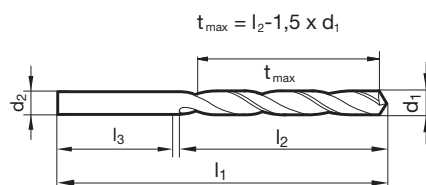
Wiertła RATIO bez kanałków chłodz.



P	•	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	○	
K	•	
N	○	stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
S	○	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 752



Nr artykułu

1242

d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		3,000	46,000	16,000	30,000	6,350		6,350	70,000	31,000	39,000
3,100		3,100	49,000	18,000	31,000	6,400		6,400	70,000	31,000	39,000
3,170	1/8	3,170	49,000	18,000	31,000	6,500		6,500	70,000	31,000	39,000
3,200		3,200	49,000	18,000	31,000	6,600		6,600	70,000	31,000	39,000
3,300		3,300	49,000	18,000	31,000	6,700		6,700	70,000	31,000	39,000
3,400		3,400	52,000	20,000	32,000	6,750	17/64	6,750	74,000	34,000	40,000
3,500		3,500	52,000	20,000	32,000	6,800		6,800	74,000	34,000	40,000
3,570	9/64	3,570	52,000	20,000	32,000	6,900		6,900	74,000	34,000	40,000
3,600		3,600	52,000	20,000	32,000	7,000		7,000	74,000	34,000	40,000
3,700		3,700	52,000	20,000	32,000	7,100		7,100	74,000	34,000	40,000
3,800		3,800	55,000	22,000	33,000	7,140	9/32	7,140	74,000	34,000	40,000
3,900		3,900	55,000	22,000	33,000	7,200		7,200	74,000	34,000	40,000
3,970	5/32	3,970	55,000	22,000	33,000	7,300		7,300	74,000	34,000	40,000
4,000		4,000	55,000	22,000	33,000	7,400		7,400	74,000	34,000	40,000
4,100		4,100	55,000	22,000	33,000	7,500		7,500	74,000	34,000	40,000
4,200		4,200	55,000	22,000	33,000	7,540	19/64	7,540	79,000	37,000	42,000
4,300		4,300	58,000	24,000	34,000	7,600		7,600	79,000	37,000	42,000
4,370	11/64	4,370	58,000	24,000	34,000	7,700		7,700	79,000	37,000	42,000
4,400		4,400	58,000	24,000	34,000	7,800		7,800	79,000	37,000	42,000
4,500		4,500	58,000	24,000	34,000	7,900		7,900	79,000	37,000	42,000
4,600		4,600	58,000	24,000	34,000	7,940	5/16	7,940	79,000	37,000	42,000
4,700		4,700	58,000	24,000	34,000	8,000		8,000	79,000	37,000	42,000
4,760	3/16	4,760	62,000	26,000	36,000	8,100		8,100	79,000	37,000	42,000
4,800		4,800	62,000	26,000	36,000	8,200		8,200	79,000	37,000	42,000
4,900		4,900	62,000	26,000	36,000	8,300		8,300	79,000	37,000	42,000
5,000		5,000	62,000	26,000	36,000	8,330	21/64	8,330	79,000	37,000	42,000
5,100		5,100	62,000	26,000	36,000	8,400		8,400	79,000	37,000	42,000
5,160	13/64	5,160	62,000	26,000	36,000	8,500		8,500	79,000	37,000	42,000
5,200		5,200	62,000	26,000	36,000	8,600		8,600	84,000	40,000	44,000
5,300		5,300	62,000	26,000	36,000	8,700		8,700	84,000	40,000	44,000
5,400		5,400	66,000	28,000	38,000	8,730	11/32	8,730	84,000	40,000	44,000
5,500		5,500	66,000	28,000	38,000	8,800		8,800	84,000	40,000	44,000
5,560	7/32	5,560	66,000	28,000	38,000	8,900		8,900	84,000	40,000	44,000
5,600		5,600	66,000	28,000	38,000	9,000		9,000	84,000	40,000	44,000
5,700		5,700	66,000	28,000	38,000	9,100		9,100	84,000	40,000	44,000
5,800		5,800	66,000	28,000	38,000	9,130	23/64	9,130	84,000	40,000	44,000
5,900		5,900	66,000	28,000	38,000	9,200		9,200	84,000	40,000	44,000
5,950	15/64	5,950	66,000	28,000	38,000	9,300		9,300	84,000	40,000	44,000
6,000		6,000	66,000	28,000	38,000	9,400		9,400	84,000	40,000	44,000
6,100		6,100	70,000	31,000	39,000	9,500		9,500	84,000	40,000	44,000
6,200		6,200	70,000	31,000	39,000	9,520	3/8	9,520	89,000	43,000	46,000
6,300		6,300	70,000	31,000	39,000	9,600		9,600	89,000	43,000	46,000



d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,700		9,700	89,000	43,000	46,000
9,800		9,800	89,000	43,000	46,000
9,900		9,900	89,000	43,000	46,000
9,920	25/64	9,920	89,000	43,000	46,000
10,000		10,000	89,000	43,000	46,000
10,100		10,100	89,000	43,000	46,000
10,200		10,200	89,000	43,000	46,000
10,300		10,300	89,000	43,000	46,000
10,320	13/32	10,320	89,000	43,000	46,000
10,400		10,400	89,000	43,000	46,000
10,500		10,500	89,000	43,000	46,000
10,600		10,600	89,000	43,000	46,000
10,700		10,700	95,000	47,000	48,000
10,720	27/64	10,720	95,000	47,000	48,000
10,800		10,800	95,000	47,000	48,000
10,900		10,900	95,000	47,000	48,000
11,000		11,000	95,000	47,000	48,000
11,100		11,100	95,000	47,000	48,000
11,110	7/16	11,110	95,000	47,000	48,000
11,200		11,200	95,000	47,000	48,000
11,300		11,300	95,000	47,000	48,000
11,400		11,400	95,000	47,000	48,000
11,500		11,500	95,000	47,000	48,000
11,510	29/64	11,510	95,000	47,000	48,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,600		11,600	95,000	47,000	48,000
11,800		11,800	95,000	47,000	48,000
11,900		11,900	102,000	51,000	51,000
11,910	15/32	11,910	102,000	51,000	51,000
12,000		12,000	102,000	51,000	51,000
12,500		12,500	102,000	51,000	51,000
12,700	1/2	12,700	102,000	51,000	51,000
13,000		13,000	102,000	51,000	51,000
13,500		13,500	107,000	54,000	53,000
14,000		14,000	107,000	54,000	53,000
14,500		14,500	111,000	56,000	55,000
15,000		15,000	111,000	56,000	55,000
15,500		15,500	115,000	58,000	57,000
16,000		16,000	115,000	58,000	57,000



Wiertła RATIO bez kanałków chłodz.



Materiał narzędzia

Węglik mono.

Powierzchnia



Forma chwytu

HA

Wiertła RATIO

P • Korekcja ścina $\geq \emptyset 3,000$ • geometria zataczana • główna krawędź skrawająca jest lekko wklęsła • optymalna geometria ostrzy

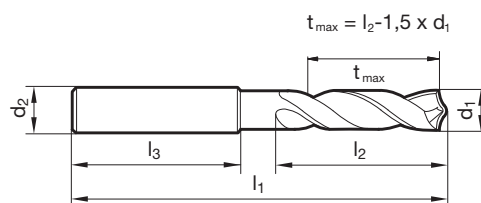
M**K****N**

stale stopowe i wysokowytrzymałe $\leq 1600 \text{ N/mm}^2$ • Inconel, Hastelloy, Monel • Tytan i stopy tytanu

S •**H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 752



Nr artykułu

8524

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000

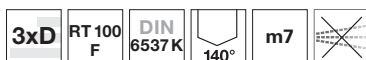


d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO bez kanałów chłodz.

Materiał narzędzia **Węglik mono.**Powierzchnia **F**

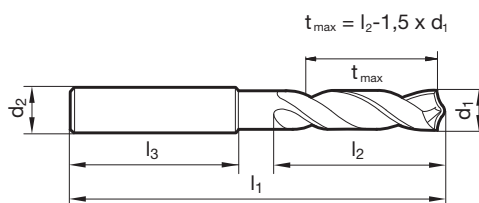
Forma chwytu HA

Wiertła RATIO

P	○	Korekcja ścina $\geq \varnothing 5,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
M	○	
K	○	
N	○	stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
S	●	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 752

Nr artykułu **2475**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,700		6,000	62,000	20,000	36,000
4,650		6,000	66,000	24,000	36,000
5,000		6,000	66,000	28,000	36,000
5,500		6,000	66,000	28,000	36,000
6,000		6,000	66,000	28,000	36,000
6,500		8,000	79,000	34,000	36,000
6,800		8,000	79,000	34,000	36,000
7,000		8,000	79,000	34,000	36,000
8,000		8,000	79,000	41,000	36,000
8,500		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,000		10,000	89,000	47,000	40,000
10,500		12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000



Wiertła RATIO bez kanałków chłodz.



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ●
- K** ○
- N** ○ stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel
- S** ○ • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali • stale wysokostopowe
- H** ○

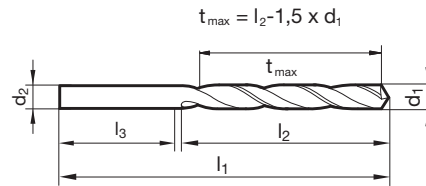
Materiał narzędzia **Węglik mono.**

Powierzchnia **S**

Forma chwytu walcowy

GÜHRINGNAVIGATOR

Param. skr. na str. 752



Nr artykułu **1702**

d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		3,000	46,000	16,000	30,000	6,400		6,400	70,000	31,000	39,000
3,100		3,100	49,000	18,000	31,000	6,500		6,500	70,000	31,000	39,000
3,170	1/8	3,170	49,000	18,000	31,000	6,600		6,600	70,000	31,000	39,000
3,200		3,200	49,000	18,000	31,000	6,700		6,700	70,000	31,000	39,000
3,300		3,300	49,000	18,000	31,000	6,750	17/64	6,750	74,000	34,000	40,000
3,400		3,400	52,000	20,000	32,000	6,800		6,800	74,000	34,000	40,000
3,500		3,500	52,000	20,000	32,000	6,900		6,900	74,000	34,000	40,000
3,570	9/64	3,570	52,000	20,000	32,000	7,000		7,000	74,000	34,000	40,000
3,600		3,600	52,000	20,000	32,000	7,100		7,100	74,000	34,000	40,000
3,700		3,700	52,000	20,000	32,000	7,140	9/32	7,140	74,000	34,000	40,000
3,800		3,800	55,000	22,000	33,000	7,200		7,200	74,000	34,000	40,000
3,900		3,900	55,000	22,000	33,000	7,300		7,300	74,000	34,000	40,000
3,970	5/32	3,970	55,000	22,000	33,000	7,400		7,400	74,000	34,000	40,000
4,000		4,000	55,000	22,000	33,000	7,540	19/64	7,540	79,000	37,000	42,000
4,100		4,100	55,000	22,000	33,000	7,600		7,600	79,000	37,000	42,000
4,200		4,200	55,000	22,000	33,000	7,700		7,700	79,000	37,000	42,000
4,300		4,300	58,000	24,000	34,000	7,800		7,800	79,000	37,000	42,000
4,370	11/64	4,370	58,000	24,000	34,000	7,900		7,900	79,000	37,000	42,000
4,400		4,400	58,000	24,000	34,000	7,940	5/16	7,940	79,000	37,000	42,000
4,500		4,500	58,000	24,000	34,000	8,000		8,000	79,000	37,000	42,000
4,600		4,600	58,000	24,000	34,000	8,100		8,100	79,000	37,000	42,000
4,700		4,700	58,000	24,000	34,000	8,200		8,200	79,000	37,000	42,000
4,760	3/16	4,760	62,000	26,000	36,000	8,300		8,300	79,000	37,000	42,000
4,800		4,800	62,000	26,000	36,000	8,330	21/64	8,330	79,000	37,000	42,000
4,900		4,900	62,000	26,000	36,000	8,400		8,400	79,000	37,000	42,000
5,000		5,000	62,000	26,000	36,000	8,500		8,500	79,000	37,000	42,000
5,100		5,100	62,000	26,000	36,000	8,600		8,600	84,000	40,000	44,000
5,160	13/64	5,160	62,000	26,000	36,000	8,700		8,700	84,000	40,000	44,000
5,200		5,200	62,000	26,000	36,000	8,730	11/32	8,730	84,000	40,000	44,000
5,300		5,300	62,000	26,000	36,000	8,800		8,800	84,000	40,000	44,000
5,400		5,400	66,000	28,000	38,000	8,900		8,900	84,000	40,000	44,000
5,500		5,500	66,000	28,000	38,000	9,000		9,000	84,000	40,000	44,000
5,560	7/32	5,560	66,000	28,000	38,000	9,100		9,100	84,000	40,000	44,000
5,600		5,600	66,000	28,000	38,000	9,130	23/64	9,130	84,000	40,000	44,000
5,700		5,700	66,000	28,000	38,000	9,400		9,400	84,000	40,000	44,000
5,800		5,800	66,000	28,000	38,000	9,500		9,500	84,000	40,000	44,000
5,950	15/64	5,950	66,000	28,000	38,000	9,520	3/8	9,520	89,000	43,000	46,000
6,000		6,000	66,000	28,000	38,000	9,600		9,600	89,000	43,000	46,000
6,100		6,100	70,000	31,000	39,000	9,700		9,700	89,000	43,000	46,000
6,200		6,200	70,000	31,000	39,000	9,800		9,800	89,000	43,000	46,000
6,300		6,300	70,000	31,000	39,000	9,900		9,900	89,000	43,000	46,000
6,350	1/4	6,350	70,000	31,000	39,000	9,920	25/64	9,920	89,000	43,000	46,000

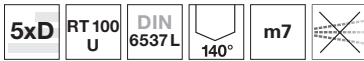


d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,000		10,000	89,000	43,000	46,000
10,200		10,200	89,000	43,000	46,000
10,300		10,300	89,000	43,000	46,000
10,320	13/32	10,320	89,000	43,000	46,000
10,720	27/64	10,720	95,000	47,000	48,000
11,000		11,000	95,000	47,000	48,000
11,110	7/16	11,110	95,000	47,000	48,000
11,300		11,300	95,000	47,000	48,000
11,500		11,500	95,000	47,000	48,000
11,510	29/64	11,510	95,000	47,000	48,000
11,910	15/32	11,910	102,000	51,000	51,000
12,000		12,000	102,000	51,000	51,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,300	31/64	12,300	102,000	51,000	51,000
12,500		12,500	102,000	51,000	51,000
12,700	1/2	12,700	102,000	51,000	51,000
13,000		13,000	102,000	51,000	51,000
13,500		13,500	107,000	54,000	53,000
14,000		14,000	107,000	54,000	53,000



Wiertła RATIO bez kanałków chłodz.

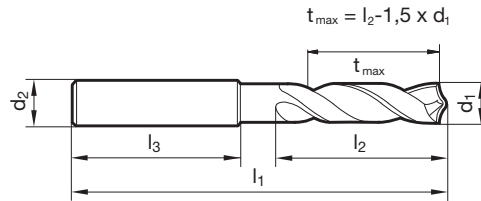


- P** ● Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 756

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HA



Nr artykułu **2996**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	7,000		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	7,100		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	7,200		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	7,300		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	7,500		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	7,600		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	7,700		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	7,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	7,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	8,000		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	8,100		10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	8,200		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	10,300		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
5,900		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	10,700		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	10,800		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,000		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000

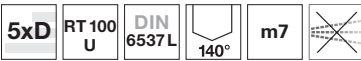


d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO bez kanałków chłodz.

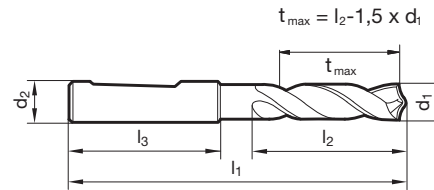


- | | | |
|----------|---|---|
| P | • | Korekcja ścina $\geq \varnothing 3,100$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy |
| M | ○ | |
| K | • | |
| N | ○ | stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi |
| S | ○ | |
| H | ○ | |

GÜHRING NAVIGATOR

Param. skr. na str. 756

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HE



Nr artykułu **2719**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,100		6,000	66,000	28,000	36,000	7,800		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	7,900		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	8,000		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	8,100		10,000	103,000	61,000	40,000
3,700		6,000	66,000	28,000	36,000	8,200		10,000	103,000	61,000	40,000
3,800		6,000	74,000	36,000	36,000	8,300		10,000	103,000	61,000	40,000
3,900		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	8,600		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	9,600		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	9,900		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
5,550		6,000	82,000	44,000	36,000	10,400		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,700		6,000	82,000	44,000	36,000	10,600		12,000	118,000	71,000	45,000
5,900		6,000	82,000	44,000	36,000	10,700		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	10,800		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,300		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
7,100		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
7,200		8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
7,300		8,000	91,000	53,000	36,000	11,910	15/32	12,000	118,000	71,000	45,000
7,500		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
7,600		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
7,700		8,000	91,000	53,000	36,000	12,700	1/2	14,000	124,000	77,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO bez kanałków chłodz.



- P** ● Korekcja ścina $\geq \varnothing 5,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

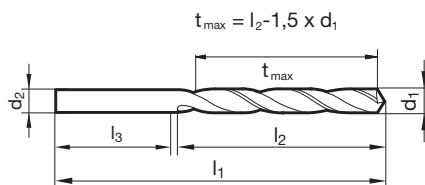
Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

Forma chwytu walcowy

GÜHRING NAVIGATOR

Param. skr. na str. 756



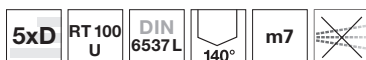
Nr artykułu **2474**

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		5,000	73,000	34,000	39,000
5,400		5,400	76,000	38,000	38,000
5,500		5,500	76,000	38,000	38,000
5,600		5,600	81,000	41,000	40,000
5,700		5,700	81,000	41,000	40,000
6,200		6,200	81,000	41,000	40,000
6,400		6,400	81,000	41,000	40,000
6,500		6,500	81,000	41,000	40,000
6,600		6,600	83,000	43,000	40,000
6,800		6,800	83,000	43,000	40,000
7,100		7,100	87,000	45,000	42,000
7,200		7,200	87,000	45,000	42,000
7,400		7,400	87,000	45,000	42,000
7,700		7,700	90,000	48,000	42,000
8,000		8,000	90,000	48,000	42,000
8,100		8,100	96,000	53,000	43,000
8,500		8,500	96,000	53,000	43,000
8,700		8,700	98,000	55,000	43,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,000		9,000	98,000	55,000	43,000
9,200		9,200	102,000	58,000	44,000
9,300		9,300	102,000	58,000	44,000
9,700		9,700	105,000	60,000	45,000
9,800		9,800	105,000	60,000	45,000
10,200		10,200	112,000	66,000	46,000
10,300		10,300	112,000	66,000	46,000
10,400		10,400	112,000	66,000	46,000
10,500		10,500	112,000	66,000	46,000
10,600		10,600	114,000	68,000	46,000
10,800		10,800	114,000	68,000	46,000
10,900		10,900	114,000	68,000	46,000
11,000		11,000	114,000	68,000	46,000
11,600		11,600	121,000	73,000	48,000
11,800		11,800	121,000	73,000	48,000
13,000		13,000	137,000	78,000	59,000
14,000		14,000	147,000	86,000	61,000



Wiertła RATIO bez kanałów chłodz.



Materiał narzędzia **Węglik mono.**

Powierzchnia **S**

Forma chwytu HA

Wiertła RATIO

P • Korekcja ścina $\geq \varnothing 3,300$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy

M ○

K •

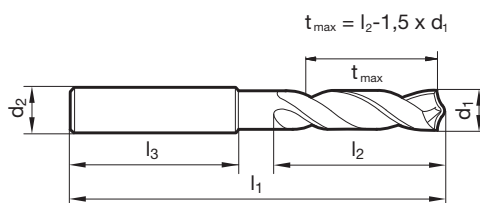
N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszania cieplnego • stale stopowe - $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi

S ○

H ○

GÜHRING NAVIGATOR

Param. skr. na str. 756



Nr artykułu **2717**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,800		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000



Wiertła RATIO bez kanałków chłodz.

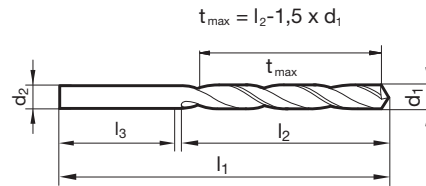


- | | | |
|----------|---|---|
| P | • | Korekcja ścina $\geq \varnothing 5,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy |
| M | ○ | |
| K | • | |
| N | ○ | stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi |
| S | ○ | |
| H | ○ | |

GÜHRING NAVIGATOR

Param. skr. na str. 756

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	walcowy



Nr artykułu **1243**

d1		d2	l1	l2	l3	d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
5,000		5,000	73,000	34,000	39,000	8,330	21/64	8,330	96,000	53,000	43,000
5,100		5,100	76,000	38,000	38,000	8,400		8,400	96,000	53,000	43,000
5,160	13/64	5,160	76,000	38,000	38,000	8,500		8,500	96,000	53,000	43,000
5,200		5,200	76,000	38,000	38,000	8,600		8,600	98,000	55,000	43,000
5,300		5,300	76,000	38,000	38,000	8,700		8,700	98,000	55,000	43,000
5,400		5,400	76,000	38,000	38,000	8,730	11/32	8,730	98,000	55,000	43,000
5,500		5,500	76,000	38,000	38,000	8,800		8,800	98,000	55,000	43,000
5,560	7/32	5,560	81,000	41,000	40,000	8,900		8,900	98,000	55,000	43,000
5,600		5,600	81,000	41,000	40,000	9,000		9,000	98,000	55,000	43,000
5,700		5,700	81,000	41,000	40,000	9,100		9,100	102,000	58,000	44,000
5,800		5,800	81,000	41,000	40,000	9,130	23/64	9,130	102,000	58,000	44,000
5,900		5,900	81,000	41,000	40,000	9,200		9,200	102,000	58,000	44,000
5,950	15/64	5,950	81,000	41,000	40,000	9,300		9,300	102,000	58,000	44,000
6,000		6,000	81,000	41,000	40,000	9,500		9,500	102,000	58,000	44,000
6,100		6,100	81,000	41,000	40,000	9,520	3/8	9,520	105,000	60,000	45,000
6,200		6,200	81,000	41,000	40,000	9,600		9,600	105,000	60,000	45,000
6,300		6,300	81,000	41,000	40,000	9,700		9,700	105,000	60,000	45,000
6,350	1/4	6,350	81,000	41,000	40,000	9,800		9,800	105,000	60,000	45,000
6,400		6,400	81,000	41,000	40,000	9,900		9,900	105,000	60,000	45,000
6,500		6,500	81,000	41,000	40,000	9,920	25/64	9,920	105,000	60,000	45,000
6,600		6,600	83,000	43,000	40,000	10,000		10,000	105,000	60,000	45,000
6,700		6,700	83,000	43,000	40,000	10,100		10,100	112,000	66,000	46,000
6,750	17/64	6,750	83,000	43,000	40,000	10,200		10,200	112,000	66,000	46,000
6,800		6,800	83,000	43,000	40,000	10,300		10,300	112,000	66,000	46,000
6,900		6,900	83,000	43,000	40,000	10,320	13/32	10,320	112,000	66,000	46,000
7,000		7,000	83,000	43,000	40,000	10,400		10,400	112,000	66,000	46,000
7,100		7,100	87,000	45,000	42,000	10,500		10,500	112,000	66,000	46,000
7,140	9/32	7,140	87,000	45,000	42,000	10,600		10,600	114,000	68,000	46,000
7,200		7,200	87,000	45,000	42,000	10,700		10,700	114,000	68,000	46,000
7,300		7,300	87,000	45,000	42,000	10,720	27/64	10,720	114,000	68,000	46,000
7,400		7,400	87,000	45,000	42,000	10,800		10,800	114,000	68,000	46,000
7,500		7,500	87,000	45,000	42,000	10,900		10,900	114,000	68,000	46,000
7,540	19/64	7,540	90,000	48,000	42,000	11,000		11,000	114,000	68,000	46,000
7,600		7,600	90,000	48,000	42,000	11,100		11,100	118,000	71,000	47,000
7,700		7,700	90,000	48,000	42,000	11,110	7/16	11,110	118,000	71,000	47,000
7,800		7,800	90,000	48,000	42,000	11,400		11,400	118,000	71,000	47,000
7,900		7,900	90,000	48,000	42,000	11,500		11,500	118,000	71,000	47,000
7,940	5/16	7,940	90,000	48,000	42,000	11,600		11,600	121,000	73,000	48,000
8,000		8,000	90,000	48,000	42,000	11,700		11,700	121,000	73,000	48,000
8,100		8,100	96,000	53,000	43,000	11,800		11,800	121,000	73,000	48,000
8,200		8,200	96,000	53,000	43,000	11,900		11,900	121,000	73,000	48,000
8,300		8,300	96,000	53,000	43,000	11,910	15/32	11,910	121,000	73,000	48,000

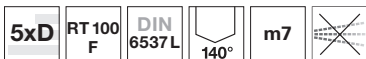


d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	121,000	73,000	48,000
12,500		12,500	135,000	76,000	59,000
12,700	1/2	12,700	137,000	78,000	59,000
13,000		13,000	137,000	78,000	59,000
13,500		13,500	144,000	84,000	60,000
14,000		14,000	147,000	86,000	61,000

d1		d2	l1	l2	l3
mm	inch	mm	mm	mm	mm
14,500		14,500	151,000	89,000	62,000
15,000		15,000	153,000	91,000	62,000
15,500		15,500	157,000	94,000	63,000
16,000		16,000	160,000	96,000	64,000



Wiertła RATIO bez kanałków chłodz.



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

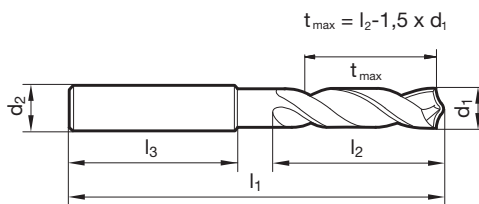
Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 756



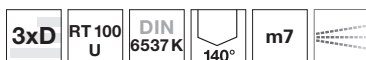
Nr artykułu **2712**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
4,000		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
5,000		6,000	82,000	44,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,500		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
15,000		16,000	133,000	83,000	48,000



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

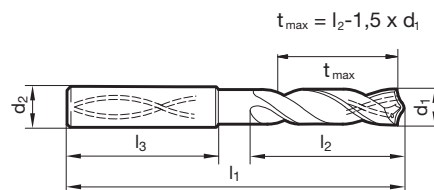
Forma chwytu HA

Wiertła RATIO

- P** • Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe - $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **2477**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	5,700		6,000	66,000	28,000	36,000
3,100		6,000	62,000	20,000	36,000	5,750		6,000	66,000	28,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	5,800		6,000	66,000	28,000	36,000
3,200		6,000	62,000	20,000	36,000	5,900		6,000	66,000	28,000	36,000
3,250		6,000	62,000	20,000	36,000	5,950	15/64	6,000	66,000	28,000	36,000
3,300		6,000	62,000	20,000	36,000	6,000		6,000	66,000	28,000	36,000
3,400		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	6,500		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	6,530		8,000	79,000	34,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	6,600		8,000	79,000	34,000	36,000
4,000		6,000	66,000	24,000	36,000	6,700		8,000	79,000	34,000	36,000
4,040		6,000	66,000	24,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
4,100		6,000	66,000	24,000	36,000	6,800		8,000	79,000	34,000	36,000
4,200		6,000	66,000	24,000	36,000	6,900		8,000	79,000	34,000	36,000
4,300		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,450		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,450		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	7,550		8,000	79,000	41,000	36,000
4,900		6,000	66,000	28,000	36,000	7,600		8,000	79,000	41,000	36,000
5,000		6,000	66,000	28,000	36,000	7,650		8,000	79,000	41,000	36,000
5,100		6,000	66,000	28,000	36,000	7,700		8,000	79,000	41,000	36,000
5,110		6,000	66,000	28,000	36,000	7,800		8,000	79,000	41,000	36,000
5,160	13/64	6,000	66,000	28,000	36,000	7,900		8,000	79,000	41,000	36,000
5,200		6,000	66,000	28,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
5,300		6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
5,400		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
5,410		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,650		6,000	66,000	28,000	36,000	8,550		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,600		10,000	89,000	47,000	40,000
8,700		10,000	89,000	47,000	40,000
8,730	11/32	10,000	89,000	47,000	40,000
8,800		10,000	89,000	47,000	40,000
8,900		10,000	89,000	47,000	40,000
9,000		10,000	89,000	47,000	40,000
9,050		10,000	89,000	47,000	40,000
9,100		10,000	89,000	47,000	40,000
9,130	23/64	10,000	89,000	47,000	40,000
9,200		10,000	89,000	47,000	40,000
9,250		10,000	89,000	47,000	40,000
9,300		10,000	89,000	47,000	40,000
9,340		10,000	89,000	47,000	40,000
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,550		10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	15,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,510	29/64	12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,100		14,000	107,000	60,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,400		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,600		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
12,900		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,200		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,490	17/32	14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,550		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
13,890	35/64	14,000	107,000	60,000	45,000
13,900		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,680	37/64	16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
14,900		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,080	19/32	16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,480	39/64	16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,800		16,000	115,000	65,000	48,000
15,870	5/8	16,000	115,000	65,000	48,000
15,900		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,270	41/64	18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,670	21/32	18,000	123,000	73,000	48,000
16,700		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,070	43/64	18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,460	11/16	18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
17,700		18,000	123,000	73,000	48,000
17,860	45/64	18,000	123,000	73,000	48,000
17,900		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,260	23/32	20,000	131,000	79,000	50,000
18,300		20,000	131,000	79,000	50,000
18,500		20,000	131,000	79,000	50,000
18,700		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,250		20,000	131,000	79,000	50,000
19,446		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
19,700		20,000	131,000	79,000	50,000
19,840	25/32	20,000	131,000	79,000	50,000
19,900		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO, z kanałkami chłodz.



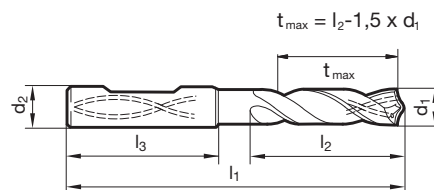
P	•	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	○	
K	•	
N	○	stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
S	○	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 750

Materiał narzędzia **Węglik mono.**Powierzchnia **F**Forma chwytu **HE**

Wiertła RATIO



Nr artykułu

2469

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	8,550		10,000	89,000	47,000	40,000
3,200		6,000	62,000	20,000	36,000	8,600		10,000	89,000	47,000	40,000
3,250		6,000	62,000	20,000	36,000	8,700		10,000	89,000	47,000	40,000
3,300		6,000	62,000	20,000	36,000	8,800		10,000	89,000	47,000	40,000
3,400		6,000	62,000	20,000	36,000	9,000		10,000	89,000	47,000	40,000
3,500		6,000	62,000	20,000	36,000	9,050		10,000	89,000	47,000	40,000
3,800		6,000	66,000	24,000	36,000	9,200		10,000	89,000	47,000	40,000
3,970	5/32	6,000	66,000	24,000	36,000	9,250		10,000	89,000	47,000	40,000
4,000		6,000	66,000	24,000	36,000	9,300		10,000	89,000	47,000	40,000
4,100		6,000	66,000	24,000	36,000	9,500		10,000	89,000	47,000	40,000
4,200		6,000	66,000	24,000	36,000	9,550		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	9,600		10,000	89,000	47,000	40,000
4,370	11/64	6,000	66,000	24,000	36,000	9,800		10,000	89,000	47,000	40,000
4,400		6,000	66,000	24,000	36,000	10,100		12,000	102,000	55,000	45,000
4,450		6,000	66,000	24,000	36,000	10,200		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	10,300		12,000	102,000	55,000	45,000
4,700		6,000	66,000	24,000	36,000	10,400		12,000	102,000	55,000	45,000
4,800		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,100		6,000	66,000	28,000	36,000	10,900		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,110	7/16	12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
5,650		6,000	66,000	28,000	36,000	11,400		12,000	102,000	55,000	45,000
5,750		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,550		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,600		12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	11,700		12,000	102,000	55,000	45,000
6,500		8,000	79,000	34,000	36,000	11,800		12,000	102,000	55,000	45,000
6,600		8,000	79,000	34,000	36,000	11,900		12,000	102,000	55,000	45,000
6,700		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,800		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
7,000		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	12,200		14,000	107,000	60,000	45,000
7,200		8,000	79,000	41,000	36,000	12,500		14,000	107,000	60,000	45,000
7,450		8,000	79,000	41,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,650		8,000	79,000	41,000	36,000	13,100	33/64	14,000	107,000	60,000	45,000
8,000		8,000	79,000	41,000	36,000	13,300		14,000	107,000	60,000	45,000
8,200		10,000	89,000	47,000	40,000	13,400		14,000	107,000	60,000	45,000
8,400		10,000	89,000	47,000	40,000	13,500		14,000	107,000	60,000	45,000
8,500		10,000	89,000	47,000	40,000	13,550		14,000	107,000	60,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,700		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,800		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,100		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,550		16,000	115,000	65,000	48,000
15,600		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
15,900		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,100		18,000	123,000	73,000	48,000
16,200		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
17,550		18,000	123,000	73,000	48,000
17,900		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,300		20,000	131,000	79,000	50,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
19,550		20,000	131,000	79,000	50,000
19,900		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO, z kanałkami chłodz.



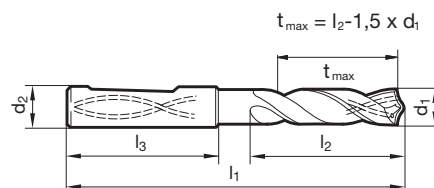
P	•	Korekcja ścina $\geq \varnothing 3,300$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	○	
K	•	
N	○	stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
S	○	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 750

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	HE

Wiertła RATIO



Nr artykułu

1181

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	62,000	20,000	36,000	10,500		12,000	102,000	55,000	45,000
3,400		6,000	62,000	20,000	36,000	10,600		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	10,700		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,800		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,300		12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,510	29/64	12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,300		8,000	79,000	34,000	36,000	12,100		14,000	107,000	60,000	45,000
6,400		8,000	79,000	34,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
6,600		8,000	79,000	34,000	36,000	12,500		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	12,900		14,000	107,000	60,000	45,000
7,100		8,000	79,000	41,000	36,000	13,000		14,000	107,000	60,000	45,000
7,140	9/32	8,000	79,000	41,000	36,000	13,500		14,000	107,000	60,000	45,000
7,400		8,000	79,000	41,000	36,000	13,890	35/64	14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
7,540	19/64	8,000	79,000	41,000	36,000	14,500		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	14,680	37/64	16,000	115,000	65,000	48,000
7,940	5/16	8,000	79,000	41,000	36,000	14,900		16,000	115,000	65,000	48,000
8,000		8,000	79,000	41,000	36,000	15,000		16,000	115,000	65,000	48,000
8,100		10,000	89,000	47,000	40,000	15,480	39/64	16,000	115,000	65,000	48,000
8,200		10,000	89,000	47,000	40,000	15,500		16,000	115,000	65,000	48,000
8,400		10,000	89,000	47,000	40,000	16,100		18,000	123,000	73,000	48,000
8,500		10,000	89,000	47,000	40,000	16,200		18,000	123,000	73,000	48,000
8,700		10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
8,800		10,000	89,000	47,000	40,000	17,000		18,000	123,000	73,000	48,000
9,000		10,000	89,000	47,000	40,000	17,500		18,000	123,000	73,000	48,000
9,200		10,000	89,000	47,000	40,000	17,700		18,000	123,000	73,000	48,000
9,700		10,000	89,000	47,000	40,000	18,000		18,000	123,000	73,000	48,000
9,800		10,000	89,000	47,000	40,000	18,700		20,000	131,000	79,000	50,000
10,000		10,000	89,000	47,000	40,000	19,000		20,000	131,000	79,000	50,000
10,200		12,000	102,000	55,000	45,000	19,500		20,000	131,000	79,000	50,000
10,300		12,000	102,000	55,000	45,000						



Wiertła RATIO, z kanałkami chłodz.



P • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca jest lekko wklęsła • optymalna geometria ostrzy

- M**
- K**
- N**
- S** •
- H** ○

stale stopowe i wysokowytrzymałe $\leq 1600 \text{ N/mm}^2$ • Inconel, Hastelloy, Monel • Tytan i stopy tytanu

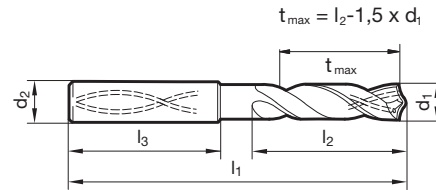
Materiał narzędzia **Węglik mono.**

Powierzchnia **Y**

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **8520**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,720	27/64	12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,300	31/64	14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,490	17/32	14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO, z kanałkami chłodz.

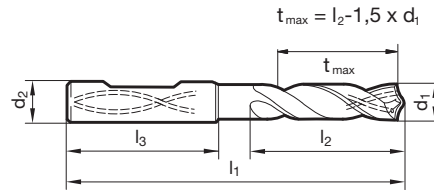


- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca jest lekko wklęsła • optymalna geometria ostrzy
- M**
- K**
- N** stałe stopowe i wysokowytrzymałe $\leq 1600 \text{ N/mm}^2$ • Inconel, Hastelloy, Monel • Tytan i stopy tytanu
- S** •
- H** ○

Materiał narzędzia	Węglik mono.
Powierzchnia	Y
Forma chwytu	HE

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **8620**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO, z kanałkami chłodz.



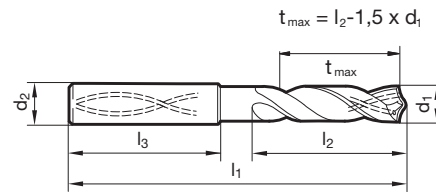
P	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	•
K	
N	stale nierdz./kwaso-/żaro-wytrzymałe • Tytan i stopy tytanu • Inconel, Hastelloy, Monel
S	•
H	

Materiał narzędzia **Węglik mono.**

Powierzchnia HA
 Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **8510**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO, z kanałkami chłodz.



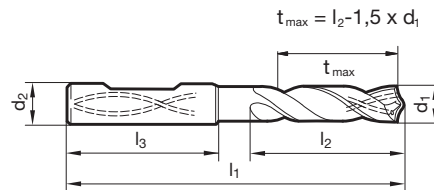
P	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	•
K	
N	stale nierdz./kwaso-/żaro-wytrzymałe • Tytan i stopy tytanu • Inconel, Hastelloy, Monel
S	•
H	

Materiał narzędzia **Węglik mono.**

Powierzchnia
 Forma chwytu HE

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **8610**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	62,000	20,000	36,000	6,100		8,000	79,000	34,000	36,000
3,100		6,000	62,000	20,000	36,000	6,200		8,000	79,000	34,000	36,000
3,170	1/8	6,000	62,000	20,000	36,000	6,300		8,000	79,000	34,000	36,000
3,200		6,000	62,000	20,000	36,000	6,350	1/4	8,000	79,000	34,000	36,000
3,250		6,000	62,000	20,000	36,000	6,400		8,000	79,000	34,000	36,000
3,300		6,000	62,000	20,000	36,000	6,500		8,000	79,000	34,000	36,000
3,400		6,000	62,000	20,000	36,000	6,600		8,000	79,000	34,000	36,000
3,500		6,000	62,000	20,000	36,000	6,700		8,000	79,000	34,000	36,000
3,570	9/64	6,000	62,000	20,000	36,000	6,750	17/64	8,000	79,000	34,000	36,000
3,600		6,000	62,000	20,000	36,000	6,800		8,000	79,000	34,000	36,000
3,700		6,000	62,000	20,000	36,000	6,900		8,000	79,000	34,000	36,000
3,800		6,000	66,000	24,000	36,000	7,000		8,000	79,000	34,000	36,000
3,900		6,000	66,000	24,000	36,000	7,100		8,000	79,000	41,000	36,000
3,970	5/32	6,000	66,000	24,000	36,000	7,140	9/32	8,000	79,000	41,000	36,000
4,000		6,000	66,000	24,000	36,000	7,200		8,000	79,000	41,000	36,000
4,100		6,000	66,000	24,000	36,000	7,300		8,000	79,000	41,000	36,000
4,200		6,000	66,000	24,000	36,000	7,400		8,000	79,000	41,000	36,000
4,300		6,000	66,000	24,000	36,000	7,500		8,000	79,000	41,000	36,000
4,370	11/64	6,000	66,000	24,000	36,000	7,540	19/64	8,000	79,000	41,000	36,000
4,400		6,000	66,000	24,000	36,000	7,600		8,000	79,000	41,000	36,000
4,500		6,000	66,000	24,000	36,000	7,700		8,000	79,000	41,000	36,000
4,600		6,000	66,000	24,000	36,000	7,800		8,000	79,000	41,000	36,000
4,650		6,000	66,000	24,000	36,000	7,900		8,000	79,000	41,000	36,000
4,700		6,000	66,000	24,000	36,000	7,940	5/16	8,000	79,000	41,000	36,000
4,760	3/16	6,000	66,000	28,000	36,000	8,000		8,000	79,000	41,000	36,000
4,800		6,000	66,000	28,000	36,000	8,100		10,000	89,000	47,000	40,000
4,900		6,000	66,000	28,000	36,000	8,200		10,000	89,000	47,000	40,000
5,000		6,000	66,000	28,000	36,000	8,300		10,000	89,000	47,000	40,000
5,100		6,000	66,000	28,000	36,000	8,330	21/64	10,000	89,000	47,000	40,000
5,160	13/64	6,000	66,000	28,000	36,000	8,400		10,000	89,000	47,000	40,000
5,200		6,000	66,000	28,000	36,000	8,500		10,000	89,000	47,000	40,000
5,300		6,000	66,000	28,000	36,000	8,600		10,000	89,000	47,000	40,000
5,400		6,000	66,000	28,000	36,000	8,700		10,000	89,000	47,000	40,000
5,500		6,000	66,000	28,000	36,000	8,730	11/32	10,000	89,000	47,000	40,000
5,550		6,000	66,000	28,000	36,000	8,800		10,000	89,000	47,000	40,000
5,560	7/32	6,000	66,000	28,000	36,000	8,900		10,000	89,000	47,000	40,000
5,600		6,000	66,000	28,000	36,000	9,000		10,000	89,000	47,000	40,000
5,700		6,000	66,000	28,000	36,000	9,100		10,000	89,000	47,000	40,000
5,800		6,000	66,000	28,000	36,000	9,130	23/64	10,000	89,000	47,000	40,000
5,900		6,000	66,000	28,000	36,000	9,200		10,000	89,000	47,000	40,000
5,950	15/64	6,000	66,000	28,000	36,000	9,250		10,000	89,000	47,000	40,000
6,000		6,000	66,000	28,000	36,000	9,300		10,000	89,000	47,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	89,000	47,000	40,000
9,500		10,000	89,000	47,000	40,000
9,520	3/8	10,000	89,000	47,000	40,000
9,600		10,000	89,000	47,000	40,000
9,700		10,000	89,000	47,000	40,000
9,800		10,000	89,000	47,000	40,000
9,900		10,000	89,000	47,000	40,000
9,920	25/64	10,000	89,000	47,000	40,000
10,000		10,000	89,000	47,000	40,000
10,100		12,000	102,000	55,000	45,000
10,200		12,000	102,000	55,000	45,000
10,300		12,000	102,000	55,000	45,000
10,320	13/32	12,000	102,000	55,000	45,000
10,400		12,000	102,000	55,000	45,000
10,500		12,000	102,000	55,000	45,000
10,600		12,000	102,000	55,000	45,000
10,700		12,000	102,000	55,000	45,000
10,800		12,000	102,000	55,000	45,000
10,900		12,000	102,000	55,000	45,000
11,000		12,000	102,000	55,000	45,000
11,100		12,000	102,000	55,000	45,000
11,110	7/16	12,000	102,000	55,000	45,000
11,200		12,000	102,000	55,000	45,000
11,300		12,000	102,000	55,000	45,000
11,400		12,000	102,000	55,000	45,000
11,500		12,000	102,000	55,000	45,000
11,600		12,000	102,000	55,000	45,000
11,700		12,000	102,000	55,000	45,000
11,800		12,000	102,000	55,000	45,000
11,900		12,000	102,000	55,000	45,000
11,910	15/32	12,000	102,000	55,000	45,000
12,000		12,000	102,000	55,000	45,000
12,200		14,000	107,000	60,000	45,000
12,500		14,000	107,000	60,000	45,000
12,700	1/2	14,000	107,000	60,000	45,000
12,800		14,000	107,000	60,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	107,000	60,000	45,000
13,300		14,000	107,000	60,000	45,000
13,500		14,000	107,000	60,000	45,000
13,700		14,000	107,000	60,000	45,000
14,000		14,000	107,000	60,000	45,000
14,200		16,000	115,000	65,000	48,000
14,290	9/16	16,000	115,000	65,000	48,000
14,300		16,000	115,000	65,000	48,000
14,500		16,000	115,000	65,000	48,000
14,700		16,000	115,000	65,000	48,000
15,000		16,000	115,000	65,000	48,000
15,200		16,000	115,000	65,000	48,000
15,300		16,000	115,000	65,000	48,000
15,500		16,000	115,000	65,000	48,000
15,700		16,000	115,000	65,000	48,000
16,000		16,000	115,000	65,000	48,000
16,300		18,000	123,000	73,000	48,000
16,500		18,000	123,000	73,000	48,000
16,900		18,000	123,000	73,000	48,000
17,000		18,000	123,000	73,000	48,000
17,300		18,000	123,000	73,000	48,000
17,500		18,000	123,000	73,000	48,000
18,000		18,000	123,000	73,000	48,000
18,500		20,000	131,000	79,000	50,000
18,900		20,000	131,000	79,000	50,000
19,000		20,000	131,000	79,000	50,000
19,050	3/4	20,000	131,000	79,000	50,000
19,300		20,000	131,000	79,000	50,000
19,500		20,000	131,000	79,000	50,000
20,000		20,000	131,000	79,000	50,000



Wiertła RATIO, z kanałkami chłodz.



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

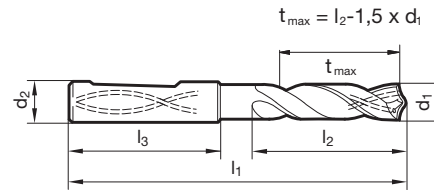
Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

Forma chwytu **HE**

GÜHRING NAVIGATOR

Param. skr. na str. 750

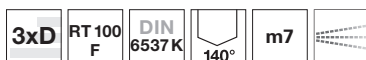


Nr artykułu **2468**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,500		6,000	62,000	20,000	36,000	10,800		12,000	102,000	55,000	45,000
3,700		6,000	62,000	20,000	36,000	11,000		12,000	102,000	55,000	45,000
3,800		6,000	66,000	24,000	36,000	11,300		12,000	102,000	55,000	45,000
4,000		6,000	66,000	24,000	36,000	11,500		12,000	102,000	55,000	45,000
4,200		6,000	66,000	24,000	36,000	11,800		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	12,000		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	12,200		14,000	107,000	60,000	45,000
5,200		6,000	66,000	28,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
5,500		6,000	66,000	28,000	36,000	12,500		14,000	107,000	60,000	45,000
5,800		6,000	66,000	28,000	36,000	12,700	1/2	14,000	107,000	60,000	45,000
6,000		6,000	66,000	28,000	36,000	13,000		14,000	107,000	60,000	45,000
6,300		8,000	79,000	34,000	36,000	13,500		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	14,000		14,000	107,000	60,000	45,000
6,900		8,000	79,000	34,000	36,000	14,500		16,000	115,000	65,000	48,000
7,000		8,000	79,000	34,000	36,000	15,000		16,000	115,000	65,000	48,000
7,500		8,000	79,000	41,000	36,000	15,500		16,000	115,000	65,000	48,000
8,000		8,000	79,000	41,000	36,000	16,000		16,000	115,000	65,000	48,000
8,100		10,000	89,000	47,000	40,000	16,500		18,000	123,000	73,000	48,000
8,200		10,000	89,000	47,000	40,000	17,000		18,000	123,000	73,000	48,000
8,300		10,000	89,000	47,000	40,000	17,500		18,000	123,000	73,000	48,000
8,500		10,000	89,000	47,000	40,000	18,000		18,000	123,000	73,000	48,000
8,600		10,000	89,000	47,000	40,000	20,000		20,000	131,000	79,000	50,000
9,000		10,000	89,000	47,000	40,000						
9,500		10,000	89,000	47,000	40,000						
10,000		10,000	89,000	47,000	40,000						
10,100		12,000	102,000	55,000	45,000						
10,200		12,000	102,000	55,000	45,000						
10,300		12,000	102,000	55,000	45,000						
10,400		12,000	102,000	55,000	45,000						
10,500		12,000	102,000	55,000	45,000						



Wiertła RATIO, z kanałkami chłodz.



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

Materiał narzędzia **Węglik mono.**

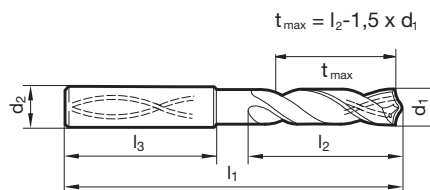
Powierzchnia **S**

Forma chwytu HA

Wiertła RATIO

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **1660**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,100		6,000	62,000	20,000	36,000	9,500		10,000	89,000	47,000	40,000
4,000		6,000	66,000	24,000	36,000	9,700		10,000	89,000	47,000	40,000
4,100		6,000	66,000	24,000	36,000	9,800		10,000	89,000	47,000	40,000
4,200		6,000	66,000	24,000	36,000	10,000		10,000	89,000	47,000	40,000
4,300		6,000	66,000	24,000	36,000	10,200		12,000	102,000	55,000	45,000
4,700		6,000	66,000	24,000	36,000	10,320	13/32	12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	10,500		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	10,700		12,000	102,000	55,000	45,000
5,400		6,000	66,000	28,000	36,000	11,000		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,200		12,000	102,000	55,000	45,000
5,600		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
6,000		6,000	66,000	28,000	36,000	11,800		12,000	102,000	55,000	45,000
6,100		8,000	79,000	34,000	36,000	12,000		12,000	102,000	55,000	45,000
6,200		8,000	79,000	34,000	36,000	12,500		14,000	107,000	60,000	45,000
6,500		8,000	79,000	34,000	36,000	13,000		14,000	107,000	60,000	45,000
6,700		8,000	79,000	34,000	36,000	13,100	33/64	14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	13,200		14,000	107,000	60,000	45,000
7,000		8,000	79,000	34,000	36,000	13,500		14,000	107,000	60,000	45,000
7,400		8,000	79,000	41,000	36,000	14,000		14,000	107,000	60,000	45,000
7,500		8,000	79,000	41,000	36,000	15,000		16,000	115,000	65,000	48,000
7,600		8,000	79,000	41,000	36,000	15,500		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	16,500		18,000	123,000	73,000	48,000
8,000		8,000	79,000	41,000	36,000	19,600		20,000	131,000	79,000	50,000
8,100		10,000	89,000	47,000	40,000	20,500		25,000	146,000	84,000	56,000
8,300		10,000	89,000	47,000	40,000	21,500		25,000	146,000	84,000	56,000
8,400		10,000	89,000	47,000	40,000	22,000		25,000	146,000	84,000	56,000
8,500		10,000	89,000	47,000	40,000						
8,800		10,000	89,000	47,000	40,000						
9,000		10,000	89,000	47,000	40,000						
9,200		10,000	89,000	47,000	40,000						



Wiertła RATIO, z kanałkami chłodz.



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądze, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

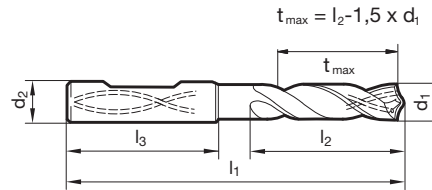
Materiał narzędzia **Węglik mono.**

Powierzchnia **S**

Forma chwytu **HE**

GÜHRING NAVIGATOR

Param. skr. na str. 750



Nr artykułu **1180**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
4,000		6,000	66,000	24,000	36,000	10,720	27/64	12,000	102,000	55,000	45,000
4,100		6,000	66,000	24,000	36,000	10,800		12,000	102,000	55,000	45,000
4,200		6,000	66,000	24,000	36,000	11,000		12,000	102,000	55,000	45,000
4,300		6,000	66,000	24,000	36,000	11,100		12,000	102,000	55,000	45,000
4,500		6,000	66,000	24,000	36,000	11,200		12,000	102,000	55,000	45,000
5,000		6,000	66,000	28,000	36,000	11,400		12,000	102,000	55,000	45,000
5,200		6,000	66,000	28,000	36,000	11,500		12,000	102,000	55,000	45,000
5,300		6,000	66,000	28,000	36,000	11,510	29/64	12,000	102,000	55,000	45,000
5,400		6,000	66,000	28,000	36,000	11,800		12,000	102,000	55,000	45,000
5,500		6,000	66,000	28,000	36,000	11,910	15/32	12,000	102,000	55,000	45,000
5,800		6,000	66,000	28,000	36,000	12,000		12,000	102,000	55,000	45,000
5,950	15/64	6,000	66,000	28,000	36,000	12,200		14,000	107,000	60,000	45,000
6,000		6,000	66,000	28,000	36,000	12,300	31/64	14,000	107,000	60,000	45,000
6,200		8,000	79,000	34,000	36,000	12,600		14,000	107,000	60,000	45,000
6,300		8,000	79,000	34,000	36,000	13,000		14,000	107,000	60,000	45,000
6,500		8,000	79,000	34,000	36,000	13,500		14,000	107,000	60,000	45,000
6,600		8,000	79,000	34,000	36,000	14,000		14,000	107,000	60,000	45,000
6,800		8,000	79,000	34,000	36,000	14,290	9/16	16,000	115,000	65,000	48,000
7,000		8,000	79,000	34,000	36,000	14,500		16,000	115,000	65,000	48,000
7,140	9/32	8,000	79,000	41,000	36,000	15,000		16,000	115,000	65,000	48,000
7,300		8,000	79,000	41,000	36,000	15,500		16,000	115,000	65,000	48,000
7,600		8,000	79,000	41,000	36,000	16,000		16,000	115,000	65,000	48,000
7,800		8,000	79,000	41,000	36,000	16,500		18,000	123,000	73,000	48,000
8,000		8,000	79,000	41,000	36,000	17,500		18,000	123,000	73,000	48,000
8,100		10,000	89,000	47,000	40,000	18,000		18,000	123,000	73,000	48,000
8,200		10,000	89,000	47,000	40,000	18,500		20,000	131,000	79,000	50,000
8,330	21/64	10,000	89,000	47,000	40,000	19,000		20,000	131,000	79,000	50,000
8,400		10,000	89,000	47,000	40,000	19,450	49/64	20,000	131,000	79,000	50,000
8,500		10,000	89,000	47,000	40,000	20,000		20,000	131,000	79,000	50,000
8,800		10,000	89,000	47,000	40,000	20,500		25,000	146,000	84,000	56,000
9,200		10,000	89,000	47,000	40,000	21,000		25,000	146,000	84,000	56,000
9,500		10,000	89,000	47,000	40,000	22,000		25,000	146,000	84,000	56,000
9,600		10,000	89,000	47,000	40,000	22,500		25,000	153,000	91,000	56,000
9,700		10,000	89,000	47,000	40,000	23,000		25,000	153,000	91,000	56,000
9,800		10,000	89,000	47,000	40,000	24,000		25,000	153,000	91,000	56,000
10,000		10,000	89,000	47,000	40,000	25,000	63/64	25,000	153,000	91,000	56,000
10,100		12,000	102,000	55,000	45,000						
10,200		12,000	102,000	55,000	45,000						
10,300		12,000	102,000	55,000	45,000						
10,320	13/32	12,000	102,000	55,000	45,000						
10,400		12,000	102,000	55,000	45,000						
10,500		12,000	102,000	55,000	45,000						



Wiertła RATIO, z kanałkami chłodz.



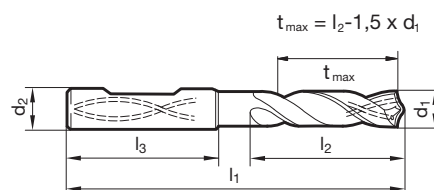
P	•	Korekcja ścina $\geq \varnothing 9,500$ • geometria zataczana • korpus z HSS z wlotowaną płytką z węgla • tłumi wibracje i uderzenia
M	○	
K	○	
N	○	stale niestopowe/niskostopowe • żeliwa szare, żeliwa sferoidalne
S	○	• mosiądże, brązy, tworzywa sztuczne, grafit
H		

GÜHRING NAVIGATOR

Param. skr. na str. 750

Materiał narzędzia	Węgiel
Powierzchnia	Ⓢ
Forma chwytu	HE

Wiertła RATIO



Nr artykułu

1171

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
9,500		16,000	103,000	51,000	48,000	15,100		20,000	122,000	68,000	50,000
9,700		16,000	103,000	51,000	48,000	15,500		20,000	122,000	68,000	50,000
9,800		16,000	103,000	51,000	48,000	15,600		20,000	122,000	68,000	50,000
9,900		16,000	103,000	51,000	48,000	15,700		20,000	122,000	68,000	50,000
10,000		16,000	103,000	51,000	48,000	15,800		20,000	122,000	68,000	50,000
10,100		16,000	103,000	51,000	48,000	16,000		20,000	122,000	68,000	50,000
10,200		16,000	103,000	51,000	48,000	16,200		20,000	130,000	76,000	50,000
10,400		16,000	103,000	51,000	48,000	16,500		20,000	130,000	76,000	50,000
10,500		16,000	103,000	51,000	48,000	16,700		20,000	130,000	76,000	50,000
10,600		16,000	103,000	51,000	48,000	17,000		20,000	130,000	76,000	50,000
10,700		16,000	103,000	51,000	48,000	17,300		20,000	130,000	76,000	50,000
10,800		16,000	103,000	51,000	48,000	17,500		20,000	130,000	76,000	50,000
10,900		16,000	103,000	51,000	48,000	17,700		20,000	130,000	76,000	50,000
11,000		16,000	103,000	51,000	48,000	17,800		20,000	130,000	76,000	50,000
11,200		16,000	103,000	51,000	48,000	17,860	45/64	20,000	130,000	76,000	50,000
11,500		16,000	103,000	51,000	48,000	18,000		20,000	130,000	76,000	50,000
11,600		16,000	103,000	51,000	48,000	18,500		25,000	144,000	84,000	56,000
11,700		16,000	103,000	51,000	48,000	19,000		25,000	144,000	84,000	56,000
12,000		16,000	103,000	51,000	48,000	19,500		25,000	144,000	84,000	56,000
12,100		16,000	111,000	59,000	48,000	19,600		25,000	144,000	84,000	56,000
12,200		16,000	111,000	59,000	48,000	19,700		25,000	144,000	84,000	56,000
12,300	31/64	16,000	111,000	59,000	48,000	20,000		25,000	144,000	84,000	56,000
12,400		16,000	111,000	59,000	48,000	20,500		25,000	153,000	93,000	56,000
12,500		16,000	111,000	59,000	48,000	21,000		25,000	153,000	93,000	56,000
12,600		16,000	111,000	59,000	48,000	21,500		25,000	153,000	93,000	56,000
12,700	1/2	16,000	111,000	59,000	48,000	22,000		25,000	153,000	93,000	56,000
13,000		16,000	111,000	59,000	48,000	22,220	7/8	25,000	161,000	101,000	56,000
13,500		16,000	111,000	59,000	48,000	22,500		25,000	161,000	101,000	56,000
13,700		16,000	111,000	59,000	48,000	23,000		25,000	161,000	101,000	56,000
13,800		16,000	111,000	59,000	48,000	23,500		25,000	161,000	101,000	56,000
14,000		16,000	111,000	59,000	48,000	24,000		25,000	161,000	101,000	56,000
14,200		20,000	122,000	68,000	50,000	24,500		32,000	174,000	110,000	60,000
14,400		20,000	122,000	68,000	50,000	25,000	63/64	32,000	174,000	110,000	60,000
14,600		20,000	122,000	68,000	50,000	25,500		32,000	174,000	110,000	60,000
14,700		20,000	122,000	68,000	50,000						
15,000		20,000	122,000	68,000	50,000						



Wiertła RATIO, z kanałkami chłodz.



- P** Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • wąskie tolerancje średnic
- M** • bardzo dobra jakość powierzchni otworu • kontrolować ciśnienie chłodziwa
- K** •
- N** ○ żeliwa szare, ciągliwe i sferoidalne
- S**
- H**

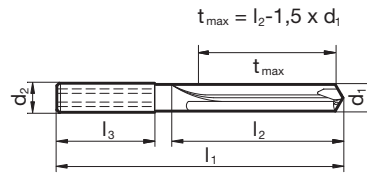
Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 752



Nr artykułu **768**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	24,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,100		6,000	66,000	24,000	36,000	6,800		8,000	91,000	53,000	36,000
3,200		6,000	66,000	24,000	36,000	6,900		8,000	91,000	53,000	36,000
3,300		6,000	66,000	24,000	36,000	7,000		8,000	91,000	53,000	36,000
3,400		6,000	66,000	24,000	36,000	7,100		8,000	91,000	53,000	36,000
3,500		6,000	66,000	24,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
3,600		6,000	66,000	24,000	36,000	7,200		8,000	91,000	53,000	36,000
3,700		6,000	66,000	24,000	36,000	7,300		8,000	91,000	53,000	36,000
3,800		6,000	74,000	30,000	36,000	7,400		8,000	91,000	53,000	36,000
3,900		6,000	74,000	30,000	36,000	7,500		8,000	91,000	53,000	36,000
4,000		6,000	74,000	30,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,100		6,000	74,000	30,000	36,000	7,600		8,000	91,000	53,000	36,000
4,200		6,000	74,000	30,000	36,000	7,700		8,000	91,000	53,000	36,000
4,300		6,000	74,000	30,000	36,000	7,800		8,000	91,000	53,000	36,000
4,400		6,000	74,000	30,000	36,000	7,900		8,000	91,000	53,000	36,000
4,500		6,000	74,000	30,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,600		6,000	74,000	30,000	36,000	8,000		8,000	91,000	53,000	36,000
4,700		6,000	74,000	30,000	36,000	8,100		10,000	103,000	61,000	40,000
4,800		6,000	74,000	36,000	36,000	8,200		10,000	103,000	61,000	40,000
4,900		6,000	74,000	36,000	36,000	8,300		10,000	103,000	61,000	40,000
5,000		6,000	74,000	36,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,100		6,000	74,000	36,000	36,000	8,400		10,000	103,000	61,000	40,000
5,160	13/64	6,000	74,000	36,000	36,000	8,500		10,000	103,000	61,000	40,000
5,200		6,000	74,000	36,000	36,000	8,600		10,000	103,000	61,000	40,000
5,300		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
5,400		6,000	74,000	36,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,500		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
6,000		6,000	74,000	36,000	36,000	9,400		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,500		10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	9,600		10,000	103,000	61,000	40,000
6,350	1/4	8,000	91,000	53,000	36,000	9,700		10,000	103,000	61,000	40,000
6,400		8,000	91,000	53,000	36,000	9,800		10,000	103,000	61,000	40,000
6,500		8,000	91,000	53,000	36,000	9,900		10,000	103,000	61,000	40,000
6,600		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,700		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,200		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,300	31/64	14,000	124,000	74,000	45,000
12,500		14,000	124,000	74,000	45,000
12,700	1/2	14,000	124,000	74,000	45,000
13,000		14,000	124,000	74,000	45,000
13,500		14,000	124,000	74,000	45,000
14,000		14,000	124,000	74,000	45,000
14,500		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



- P** Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • wąskie tolerancje średnic
- M** • bardzo dobra jakość powierzchni otworu • sprawdzać optymalne ciśnienie chłodziwa
- K** ○
- N** • aluminium i stopy Al • stopy Al z wysoką zawartością Si
- S**
- H**

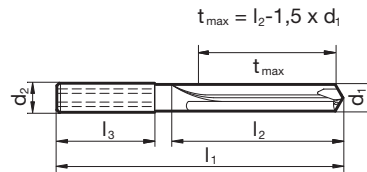
Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 752



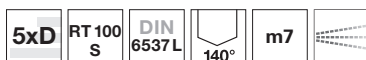
Nr artykułu **6068**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	24,000	36,000
3,200		6,000	66,000	24,000	36,000
3,300		6,000	66,000	24,000	36,000
3,500		6,000	66,000	24,000	36,000
3,800		6,000	74,000	30,000	36,000
3,900		6,000	74,000	30,000	36,000
4,000		6,000	74,000	30,000	36,000
4,200		6,000	74,000	30,000	36,000
5,000		6,000	74,000	36,000	36,000
5,300		6,000	74,000	36,000	36,000
5,400		6,000	74,000	36,000	36,000
5,500		6,000	74,000	36,000	36,000
5,800		6,000	74,000	36,000	36,000
6,000		6,000	74,000	36,000	36,000
6,100		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,300		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,100		10,000	103,000	61,000	40,000
8,300		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,700		10,000	103,000	61,000	40,000
8,730	11/32	10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,300	31/64	14,000	124,000	74,000	45,000
12,500		14,000	124,000	74,000	45,000
12,700	1/2	14,000	124,000	74,000	45,000
13,000		14,000	124,000	74,000	45,000
13,500		14,000	124,000	74,000	45,000
14,000		14,000	124,000	74,000	45,000
15,000		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

Forma chwytu **HA**



Wiertła RATIO

P • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy • maksymalna wydajność

M ○

K ○

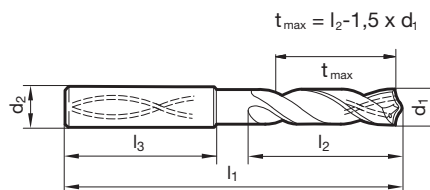
N ○ stале konstrukcyjne i do nawęglania • stале automatowe, stале do ulepszenia cieplnego • stal (stopowa/węglowa) Rm do 1400 N/mm²

S ○

H ○

GÜHRING NAVIGATOR

Param. skr. na str. 754



Nr artykułu **5759**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	6,000		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,530		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,040		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,550		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,600		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,650		8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,700		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,800		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,900		8,000	91,000	53,000	36,000
5,110		6,000	82,000	44,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
5,200		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,410		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,650		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,340		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,550		10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510		12,000	118,000	71,000	45,000
11,550		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300		14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
12,900		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100		14,000	124,000	77,000	45,000
13,200		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,490		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,600		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,890		14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,680		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
14,900		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,080		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,480		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,550		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870		16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,270		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670		18,000	143,000	93,000	48,000
16,700		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,070		18,000	143,000	93,000	48,000
17,460		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
17,550		18,000	143,000	93,000	48,000
17,700		18,000	143,000	93,000	48,000
17,860		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,260		20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,700		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,250		20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,446		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
19,550		20,000	153,000	101,000	50,000
19,700		20,000	153,000	101,000	50,000
19,840		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.

Materiał narzędzia **Węglik mono.**Powierzchnia **F**

Forma chwytu HA

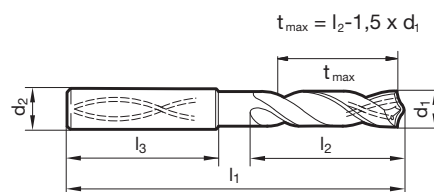
P • Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy

M ○**K** •**N** ○**S** ○**H** ○

stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi

GÜHRINGNAVIGATOR

Param. skr. na str. 754



Nr artykułu

2479

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	5,800		6,000	82,000	44,000	36,000
3,100		6,000	66,000	28,000	36,000	5,900		6,000	82,000	44,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	5,950	15/64	6,000	82,000	44,000	36,000
3,200		6,000	66,000	28,000	36,000	6,000		6,000	82,000	44,000	36,000
3,250		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,530		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	6,600		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	6,700		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	6,800		8,000	91,000	53,000	36,000
4,040		6,000	74,000	36,000	36,000	6,900		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,550		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,600		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	7,650		8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	7,700		8,000	91,000	53,000	36,000
5,000		6,000	82,000	44,000	36,000	7,800		8,000	91,000	53,000	36,000
5,100		6,000	82,000	44,000	36,000	7,900		8,000	91,000	53,000	36,000
5,110		6,000	82,000	44,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
5,160	13/64	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
5,200		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,410		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,650		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,900		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,100		10,000	103,000	61,000	40,000
9,130	23/64	10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,250		10,000	103,000	61,000	40,000
9,300		10,000	103,000	61,000	40,000
9,340		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,550		10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,550		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,200		14,000	124,000	77,000	45,000
13,490	17/32	14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,600		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,890	35/64	14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,680	37/64	16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,080	19/32	16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,480	39/64	16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,270	41/64	18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670	21/32	18,000	143,000	93,000	48,000
16,700		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,070	43/64	18,000	143,000	93,000	48,000
17,460	11/16	18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
17,700		18,000	143,000	93,000	48,000
17,860	45/64	18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,260	23/32	20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,700		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,250		20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,446		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
19,700		20,000	153,000	101,000	50,000
19,840	25/32	20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.

Materiał narzędzia **Węglik mono.**Powierzchnia **F**Forma chwytu **HE**

Wiertła RATIO

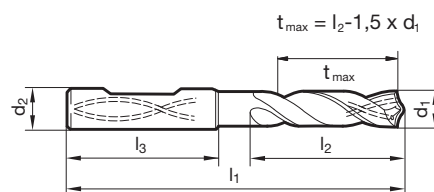
P • Korekcja ścina $\geq \varnothing 3,300$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy

M ○**K** •**N** ○**S** ○**H** ○

stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi

GÜHRINGNAVIGATOR

Param. skr. na str. 754



Nr artykułu

2471

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	66,000	28,000	36,000	8,600		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	8,900		10,000	103,000	61,000	40,000
3,700		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	9,250		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	9,700		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,800		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,900		10,000	103,000	61,000	40,000
4,700		6,000	74,000	36,000	36,000	10,000		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,000		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,100		6,000	82,000	44,000	36,000	10,300		12,000	118,000	71,000	45,000
5,200		6,000	82,000	44,000	36,000	10,400		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,400		6,000	82,000	44,000	36,000	10,600		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,800		12,000	118,000	71,000	45,000
5,550		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
5,700		6,000	82,000	44,000	36,000	11,100		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,300		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,400		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
6,400		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,900		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	12,100		14,000	124,000	77,000	45,000
6,900		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
7,000		8,000	91,000	53,000	36,000	12,300	31/64	14,000	124,000	77,000	45,000
7,100		8,000	91,000	53,000	36,000	12,400		14,000	124,000	77,000	45,000
7,200		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
7,300		8,000	91,000	53,000	36,000	12,700	1/2	14,000	124,000	77,000	45,000
7,500		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
7,700		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
7,800		8,000	91,000	53,000	36,000	13,800		14,000	124,000	77,000	45,000
8,000		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
8,100		10,000	103,000	61,000	40,000	14,100		16,000	133,000	83,000	48,000
8,200		10,000	103,000	61,000	40,000	14,200		16,000	133,000	83,000	48,000
8,300		10,000	103,000	61,000	40,000	14,500		16,000	133,000	83,000	48,000
8,500		10,000	103,000	61,000	40,000	14,700		16,000	133,000	83,000	48,000

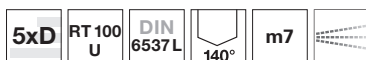


d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,200		20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,600		20,000	153,000	101,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

Powierzchnia **S**

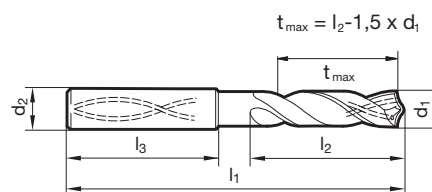
Forma chwytu HA

Wiertła RATIO

- P** ● Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 754



Nr artykułu **1663**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,700		6,000	66,000	28,000	36,000
4,000		6,000	74,000	36,000	36,000
4,500		6,000	74,000	36,000	36,000
4,650		6,000	74,000	36,000	36,000
4,700		6,000	74,000	36,000	36,000
4,800		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,400		6,000	82,000	44,000	36,000
5,800		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,100		8,000	91,000	53,000	36,000
6,200		8,000	91,000	53,000	36,000
6,300		8,000	91,000	53,000	36,000
6,350	1/4	8,000	91,000	53,000	36,000
6,400		8,000	91,000	53,000	36,000
6,500		8,000	91,000	53,000	36,000
6,700		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,100		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
8,200		10,000	103,000	61,000	40,000
8,400		10,000	103,000	61,000	40,000
8,500		10,000	103,000	61,000	40,000
8,800		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,200		10,000	103,000	61,000	40,000
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
10,500		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
13,000		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.

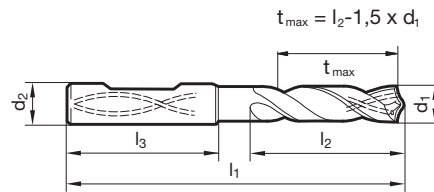


- | | | |
|----------|---|---|
| P | • | Korekcja ścina $\geq \varnothing 3,300$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy |
| M | ○ | |
| K | • | stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi |
| N | ○ | |
| S | ○ | |
| H | ○ | |

GÜHRING NAVIGATOR

Param. skr. na str. 754

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	HE



Nr artykułu **1183**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,300		6,000	66,000	28,000	36,000	7,200		8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	8,000		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,500		10,000	103,000	61,000	40,000
6,200		8,000	91,000	53,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
6,300		8,000	91,000	53,000	36,000	9,600		10,000	103,000	61,000	40,000
6,350	1/4	8,000	91,000	53,000	36,000	9,700		10,000	103,000	61,000	40,000
6,400		8,000	91,000	53,000	36,000	9,800		10,000	103,000	61,000	40,000
6,500		8,000	91,000	53,000	36,000	9,900		10,000	103,000	61,000	40,000
6,600		8,000	91,000	53,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
6,700		8,000	91,000	53,000	36,000	10,000		10,000	103,000	61,000	40,000
6,750	17/64	8,000	91,000	53,000	36,000	10,100		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	10,200		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	10,300		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	10,320	13/32	12,000	118,000	71,000	45,000
7,100		8,000	91,000	53,000	36,000	10,400		12,000	118,000	71,000	45,000
7,140	9/32	8,000	91,000	53,000	36,000	10,500		12,000	118,000	71,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,300	31/64	14,000	124,000	77,000	45,000
12,400		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,600		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
12,900		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,200		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,600		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,800		14,000	124,000	77,000	45,000
13,890	35/64	14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,100		16,000	133,000	83,000	48,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,680	37/64	16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
14,800		16,000	133,000	83,000	48,000
14,900		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,100		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,480	39/64	16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,100		18,000	143,000	93,000	48,000
16,200		18,000	143,000	93,000	48,000
16,270	41/64	18,000	143,000	93,000	48,000
16,400		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,600		18,000	143,000	93,000	48,000
16,700		18,000	143,000	93,000	48,000
16,800		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,070	43/64	18,000	143,000	93,000	48,000
17,200		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,400		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
17,600		18,000	143,000	93,000	48,000
17,700		18,000	143,000	93,000	48,000
17,800		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,100		20,000	153,000	101,000	50,000
18,200		20,000	153,000	101,000	50,000
18,300		20,000	153,000	101,000	50,000
18,400		20,000	153,000	101,000	50,000
18,500		20,000	153,000	101,000	50,000
18,600		20,000	153,000	101,000	50,000
18,650	47/64	20,000	153,000	101,000	50,000
18,700		20,000	153,000	101,000	50,000
18,800		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
19,700		20,000	153,000	101,000	50,000
19,800		20,000	153,000	101,000	50,000
19,900		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



P • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca jest lekko wklęsła • optymalna geometria ostrzy

M

K

N stałe stopowe i wysokowytrzymałe $\leq 1600 \text{ N/mm}^2$ • Inconel, Hastelloy, Monel • Tytan i stopy tytanu

S •

H ○

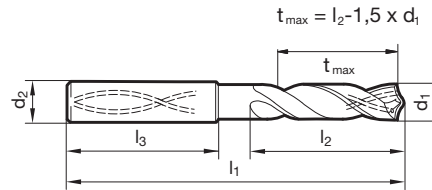
Materiał narzędzia **Węglik mono.**

Powierzchnia **Y**

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 756



Nr artykułu **8521**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,720	27/64	12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,510	29/64	12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



P • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca jest lekko wklęsła • optymalna geometria ostrzy

M

K

N stałe stopowe i wysokowytrzymałe $\leq 1600 \text{ N/mm}^2$ • Inconel, Hastelloy, Monel • Tytan i stopy tytanu

S •

H ○

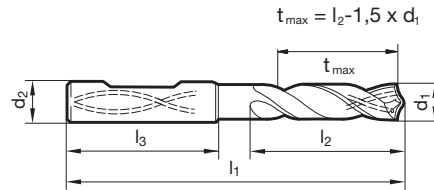
Materiał narzędzia **Węglik mono.**

Powierzchnia **Y**

Forma chwytu **HE**

GÜHRING NAVIGATOR

Param. skr. na str. 756



Nr artykułu **8621**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



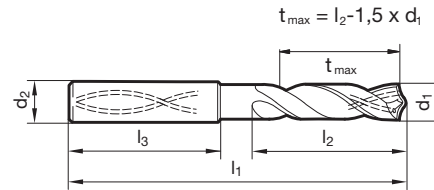
P	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	•
K	
N	stale nierdz./kwaso-/żaro-wytrzymałe • Tytan i stopy tytanu • Inconel, Hastelloy, Monel
S	•
H	

Materiał narzędzia **Węglik mono.**

Powierzchnia HA
 Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 756



Nr artykułu **8511**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.

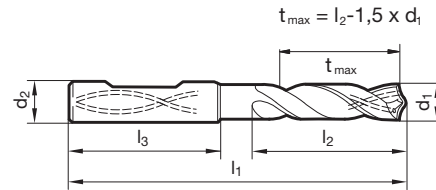


P	Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
M	•
K	
N	stale nierdz./kwaso-/żaro-wytrzymałe • Tytan i stopy tytanu • Inconel, Hastelloy, Monel
S	•
H	

GÜHRING NAVIGATOR

Param. skr. na str. 756

Materiał narzędzia	Węglik mono.
Powierzchnia	
Forma chwytu	HE



Nr artykułu **8611**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,100		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,250		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,400		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,400		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
9,520	3/8	10,000	103,000	61,000	40,000
9,600		10,000	103,000	61,000	40,000
9,700		10,000	103,000	61,000	40,000
9,800		10,000	103,000	61,000	40,000
9,900		10,000	103,000	61,000	40,000
9,920	25/64	10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,100		12,000	118,000	71,000	45,000
10,200		12,000	118,000	71,000	45,000
10,300		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,400		12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
10,600		12,000	118,000	71,000	45,000
10,700		12,000	118,000	71,000	45,000
10,800		12,000	118,000	71,000	45,000
10,900		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,100		12,000	118,000	71,000	45,000
11,110	7/16	12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
11,400		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000
11,600		12,000	118,000	71,000	45,000
11,700		12,000	118,000	71,000	45,000
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
11,910	15/32	12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
13,000		14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,200		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,300		18,000	143,000	93,000	48,000
16,500		18,000	143,000	93,000	48,000
16,900		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,300		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
18,900		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,050	3/4	20,000	153,000	101,000	50,000
19,300		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.

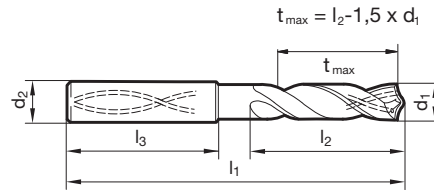


- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 754

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HA



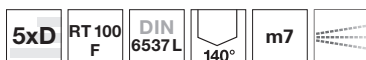
Nr artykułu **2478**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000
3,300		6,000	66,000	28,000	36,000
3,500		6,000	66,000	28,000	36,000
4,000		6,000	74,000	36,000	36,000
4,200		6,000	74,000	36,000	36,000
4,800		6,000	82,000	44,000	36,000
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,500		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,400		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,550		8,000	91,000	53,000	36,000
7,700		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,000		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,200		12,000	118,000	71,000	45,000
11,300		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,500		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądże, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

Materiał narzędzia **Węglik mono.**

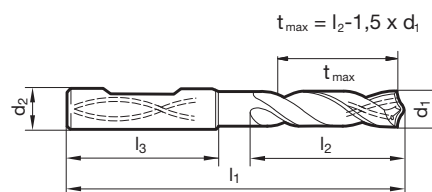
Powierzchnia **F**

Forma chwytu HE

Wiertła RATIO

GÜHRING NAVIGATOR

Param. skr. na str. 754



Nr artykułu **2470**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	9,200		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,400		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	11,100		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	11,400		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,500		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	12,200		14,000	124,000	77,000	45,000
6,700		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
6,800		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
7,000		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
7,100		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
7,200		8,000	91,000	53,000	36,000	14,100		16,000	133,000	83,000	48,000
7,600		8,000	91,000	53,000	36,000	14,500		16,000	133,000	83,000	48,000
7,700		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
8,000		8,000	91,000	53,000	36,000	16,000		16,000	133,000	83,000	48,000
8,100		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
8,500		10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
8,600		10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
8,700		10,000	103,000	61,000	40,000	18,000		18,000	143,000	93,000	48,000
8,800		10,000	103,000	61,000	40,000	20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.

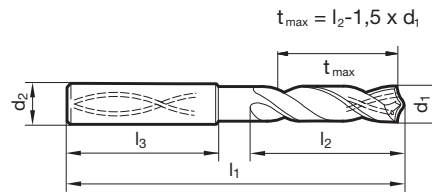


- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądze, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	HA

GÜHRING NAVIGATOR

Param. skr. na str. 754



Nr artykułu **1662**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	6,200		8,000	91,000	53,000	36,000
3,100		6,000	66,000	28,000	36,000	6,300		8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	6,350	1/4	8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	6,400		8,000	91,000	53,000	36,000
3,300		6,000	66,000	28,000	36,000	6,500		8,000	91,000	53,000	36,000
3,400		6,000	66,000	28,000	36,000	6,600		8,000	91,000	53,000	36,000
3,500		6,000	66,000	28,000	36,000	6,700		8,000	91,000	53,000	36,000
3,570	9/64	6,000	66,000	28,000	36,000	6,750	17/64	8,000	91,000	53,000	36,000
3,600		6,000	66,000	28,000	36,000	6,800		8,000	91,000	53,000	36,000
3,700		6,000	66,000	28,000	36,000	6,900		8,000	91,000	53,000	36,000
3,800		6,000	74,000	36,000	36,000	7,000		8,000	91,000	53,000	36,000
3,900		6,000	74,000	36,000	36,000	7,100		8,000	91,000	53,000	36,000
3,970	5/32	6,000	74,000	36,000	36,000	7,140	9/32	8,000	91,000	53,000	36,000
4,000		6,000	74,000	36,000	36,000	7,200		8,000	91,000	53,000	36,000
4,100		6,000	74,000	36,000	36,000	7,300		8,000	91,000	53,000	36,000
4,200		6,000	74,000	36,000	36,000	7,400		8,000	91,000	53,000	36,000
4,300		6,000	74,000	36,000	36,000	7,500		8,000	91,000	53,000	36,000
4,370	11/64	6,000	74,000	36,000	36,000	7,540	19/64	8,000	91,000	53,000	36,000
4,400		6,000	74,000	36,000	36,000	7,550		8,000	91,000	53,000	36,000
4,500		6,000	74,000	36,000	36,000	7,600		8,000	91,000	53,000	36,000
4,600		6,000	74,000	36,000	36,000	7,700		8,000	91,000	53,000	36,000
4,650		6,000	74,000	36,000	36,000	7,800		8,000	91,000	53,000	36,000
4,700		6,000	74,000	36,000	36,000	7,900		8,000	91,000	53,000	36,000
4,760	3/16	6,000	82,000	44,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
4,800		6,000	82,000	44,000	36,000	8,000		8,000	91,000	53,000	36,000
4,900		6,000	82,000	44,000	36,000	8,100		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	8,200		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	8,300		10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	8,500		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	8,600		10,000	103,000	61,000	40,000
5,400		6,000	82,000	44,000	36,000	8,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	8,730	11/32	10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	8,800		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	8,900		10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	9,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	9,100		10,000	103,000	61,000	40,000
5,800		6,000	82,000	44,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
5,900		6,000	82,000	44,000	36,000	9,200		10,000	103,000	61,000	40,000
5,950	15/64	6,000	82,000	44,000	36,000	9,250		10,000	103,000	61,000	40,000
6,000		6,000	82,000	44,000	36,000	9,300		10,000	103,000	61,000	40,000
6,100		8,000	91,000	53,000	36,000	9,400		10,000	103,000	61,000	40,000



Wiertła RATIO, z kanałkami chłodz.

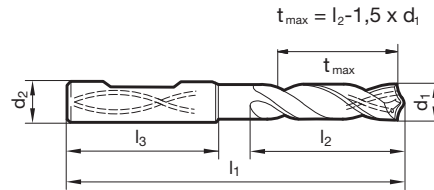


- P** ○ Korekcja ścina $\geq \varnothing 10,100$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalna geometria ostrzy • szybki przebieg skrawania
- M** ○
- K** ○
- N** ○ stale wysokostopowe • stale nierdz./kwaso-/żaro-wytrzymałe • Inconel, Hastelloy, Monel • mosiądze, brązy • aluminium i stopy Al • magnez i stopy magnezu • Tytan i stopy tytanu • wyroby spiekane z proszków metali
- S** ●
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 754

Materiał narzędzia	Węglik mono.
Powierzchnia	S
Forma chwytu	HE



Nr artykułu **1182**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	9,130	23/64	10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	9,400		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,500		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	9,600		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
4,900		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,200		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,400		6,000	82,000	44,000	36,000	10,300		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
5,600		6,000	82,000	44,000	36,000	10,700		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	10,800		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
6,100		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
6,200		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
6,300		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	11,800		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	12,000		12,000	118,000	71,000	45,000
6,700		8,000	91,000	53,000	36,000	12,500		14,000	124,000	77,000	45,000
6,800		8,000	91,000	53,000	36,000	12,800		14,000	124,000	77,000	45,000
6,900		8,000	91,000	53,000	36,000	12,900		14,000	124,000	77,000	45,000
7,000		8,000	91,000	53,000	36,000	13,000		14,000	124,000	77,000	45,000
7,140	9/32	8,000	91,000	53,000	36,000	13,200		14,000	124,000	77,000	45,000
7,200		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
7,400		8,000	91,000	53,000	36,000	13,890	35/64	14,000	124,000	77,000	45,000
7,500		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
7,600		8,000	91,000	53,000	36,000	14,100		16,000	133,000	83,000	48,000
7,800		8,000	91,000	53,000	36,000	14,500		16,000	133,000	83,000	48,000
7,900		8,000	91,000	53,000	36,000	14,600		16,000	133,000	83,000	48,000
8,000		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
8,100		10,000	103,000	61,000	40,000	15,500		16,000	133,000	83,000	48,000
8,200		10,000	103,000	61,000	40,000	16,000		16,000	133,000	83,000	48,000
8,300		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
8,500		10,000	103,000	61,000	40,000	16,600		18,000	143,000	93,000	48,000
8,600		10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
8,700		10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
8,800		10,000	103,000	61,000	40,000	18,000		18,000	143,000	93,000	48,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
20,000		20,000	153,000	101,000	50,000
20,500		25,000	165,000	105,000	56,000
21,000		25,000	165,000	105,000	56,000
21,500		25,000	165,000	105,000	56,000
22,000		25,000	165,000	105,000	56,000
22,500		25,000	180,000	117,000	56,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
24,000		25,000	180,000	117,000	56,000
24,500		25,000	180,000	117,000	56,000
25,000	63/64	25,000	180,000	117,000	56,000



Wiertła RATIO, z kanałkami chłodz.

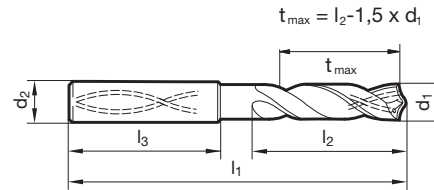


- P** Korekcja ścina $\geq \varnothing 3,000$ • opatentowana geometria promieniowa ostrzy
- główna krawędź skrawająca - prosta (po korekcie)
- M**
- K** •
- N** żeliwo wermikularne GGV oraz ADI, CDI • żeliwa szare, ciągliwe i sferoidalne
- S**
- H**

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HA

GÜHRING NAVIGATOR

Param. skr. na str. 754



Nr artykułu **6501**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	7,940	5/16	8,000	91,000	53,000	36,000
3,170	1/8	6,000	66,000	28,000	36,000	8,000		8,000	91,000	53,000	36,000
3,200		6,000	66,000	28,000	36,000	8,100		10,000	103,000	61,000	40,000
3,300		6,000	66,000	28,000	36,000	8,200		10,000	103,000	61,000	40,000
3,400		6,000	66,000	28,000	36,000	8,300		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	8,330	21/64	10,000	103,000	61,000	40,000
3,600		6,000	66,000	28,000	36,000	8,500		10,000	103,000	61,000	40,000
3,800		6,000	74,000	36,000	36,000	8,600		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	8,700		10,000	103,000	61,000	40,000
4,100		6,000	74,000	36,000	36,000	8,800		10,000	103,000	61,000	40,000
4,200		6,000	74,000	36,000	36,000	8,900		10,000	103,000	61,000	40,000
4,300		6,000	74,000	36,000	36,000	9,000		10,000	103,000	61,000	40,000
4,400		6,000	74,000	36,000	36,000	9,100		10,000	103,000	61,000	40,000
4,500		6,000	74,000	36,000	36,000	9,200		10,000	103,000	61,000	40,000
4,600		6,000	74,000	36,000	36,000	9,250		10,000	103,000	61,000	40,000
4,650		6,000	74,000	36,000	36,000	9,300		10,000	103,000	61,000	40,000
4,800		6,000	82,000	44,000	36,000	9,400		10,000	103,000	61,000	40,000
5,000		6,000	82,000	44,000	36,000	9,500		10,000	103,000	61,000	40,000
5,100		6,000	82,000	44,000	36,000	9,520	3/8	10,000	103,000	61,000	40,000
5,160	13/64	6,000	82,000	44,000	36,000	9,600		10,000	103,000	61,000	40,000
5,300		6,000	82,000	44,000	36,000	9,700		10,000	103,000	61,000	40,000
5,500		6,000	82,000	44,000	36,000	9,800		10,000	103,000	61,000	40,000
5,550		6,000	82,000	44,000	36,000	9,900		10,000	103,000	61,000	40,000
5,560	7/32	6,000	82,000	44,000	36,000	9,920	25/64	10,000	103,000	61,000	40,000
5,600		6,000	82,000	44,000	36,000	10,000		10,000	103,000	61,000	40,000
5,700		6,000	82,000	44,000	36,000	10,100		12,000	118,000	71,000	45,000
5,800		6,000	82,000	44,000	36,000	10,200		12,000	118,000	71,000	45,000
5,900		6,000	82,000	44,000	36,000	10,400		12,000	118,000	71,000	45,000
6,000		6,000	82,000	44,000	36,000	10,500		12,000	118,000	71,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	10,600		12,000	118,000	71,000	45,000
6,500		8,000	91,000	53,000	36,000	10,700		12,000	118,000	71,000	45,000
6,600		8,000	91,000	53,000	36,000	10,720	27/64	12,000	118,000	71,000	45,000
6,750	17/64	8,000	91,000	53,000	36,000	10,800		12,000	118,000	71,000	45,000
6,800		8,000	91,000	53,000	36,000	10,900		12,000	118,000	71,000	45,000
6,900		8,000	91,000	53,000	36,000	11,000		12,000	118,000	71,000	45,000
7,000		8,000	91,000	53,000	36,000	11,100		12,000	118,000	71,000	45,000
7,200		8,000	91,000	53,000	36,000	11,110	7/16	12,000	118,000	71,000	45,000
7,300		8,000	91,000	53,000	36,000	11,200		12,000	118,000	71,000	45,000
7,400		8,000	91,000	53,000	36,000	11,300		12,000	118,000	71,000	45,000
7,500		8,000	91,000	53,000	36,000	11,500		12,000	118,000	71,000	45,000
7,800		8,000	91,000	53,000	36,000	11,600		12,000	118,000	71,000	45,000
7,900		8,000	91,000	53,000	36,000	11,700		12,000	118,000	71,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,800		12,000	118,000	71,000	45,000
11,900		12,000	118,000	71,000	45,000
12,000		12,000	118,000	71,000	45,000
12,100		14,000	124,000	77,000	45,000
12,200		14,000	124,000	77,000	45,000
12,500		14,000	124,000	77,000	45,000
12,700	1/2	14,000	124,000	77,000	45,000
12,800		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,100	33/64	14,000	124,000	77,000	45,000
13,300		14,000	124,000	77,000	45,000
13,400		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
13,700		14,000	124,000	77,000	45,000
13,900		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,200		16,000	133,000	83,000	48,000
14,290	9/16	16,000	133,000	83,000	48,000
14,300		16,000	133,000	83,000	48,000
14,400		16,000	133,000	83,000	48,000
14,500		16,000	133,000	83,000	48,000
14,600		16,000	133,000	83,000	48,000
14,700		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
15,100		16,000	133,000	83,000	48,000
15,300		16,000	133,000	83,000	48,000
15,400		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,600		16,000	133,000	83,000	48,000
15,700		16,000	133,000	83,000	48,000
15,800		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
15,900		16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
16,670	21/32	18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
18,500		20,000	153,000	101,000	50,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Wiertła RATIO, z kanałkami chłodz.



P • Korekcja ścina $\geq \varnothing 9,800$ • geometria zataczana • korpus z HSS z wlotowaną płytką z węgla • tłumi wibracje i uderzenia

M ○

K ○

N ○ stale niestopowe/niskostopowe • żeliwa szare, żeliwa sferoidalne

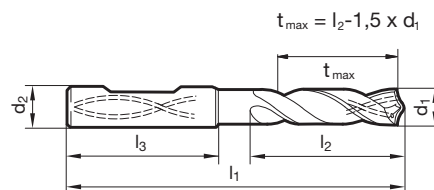
S ○ mosiądze, brązy, tworzywa sztuczne, grafit

H ○

GÜHRING NAVIGATOR

Param. skr. na str. 754

Materiał narzędzia	Węglik
Powierzchnia	Ⓢ
Forma chwytu	HE



Nr artykułu

1172

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,800	W	16,000	127,000	75,000	48,000
10,000		16,000	127,000	75,000	48,000
10,200		16,000	127,000	75,000	48,000
10,500		16,000	127,000	75,000	48,000
10,600		16,000	127,000	75,000	48,000
10,700		16,000	127,000	75,000	48,000
10,800		16,000	127,000	75,000	48,000
11,000		16,000	127,000	75,000	48,000
11,500		16,000	127,000	75,000	48,000
11,900		16,000	127,000	75,000	48,000
12,000		16,000	127,000	75,000	48,000
12,300	31/64	16,000	139,000	87,000	48,000
12,500		16,000	139,000	87,000	48,000
12,700	1/2	16,000	139,000	87,000	48,000
12,900		16,000	139,000	87,000	48,000
13,000		16,000	139,000	87,000	48,000
13,100	33/64	16,000	139,000	87,000	48,000
13,500		16,000	139,000	87,000	48,000
13,700		16,000	139,000	87,000	48,000
13,900		16,000	139,000	87,000	48,000
14,000		16,000	139,000	87,000	48,000
14,500		20,000	154,000	100,000	50,000
14,600		20,000	154,000	100,000	50,000
15,000		20,000	154,000	100,000	50,000
15,200		20,000	154,000	100,000	50,000
15,500		20,000	154,000	100,000	50,000
15,700		20,000	154,000	100,000	50,000
16,000		20,000	154,000	100,000	50,000
16,200		20,000	166,000	112,000	50,000
16,500		20,000	166,000	112,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
16,700		20,000	166,000	112,000	50,000
16,800		20,000	166,000	112,000	50,000
17,000		20,000	166,000	112,000	50,000
17,200		20,000	166,000	112,000	50,000
17,300		20,000	166,000	112,000	50,000
17,500		20,000	166,000	112,000	50,000
18,000		20,000	166,000	112,000	50,000
18,500		25,000	184,000	124,000	56,000
19,000		25,000	184,000	124,000	56,000
19,500		25,000	184,000	124,000	56,000
19,600		25,000	184,000	124,000	56,000
19,700		25,000	184,000	124,000	56,000
20,000		25,000	184,000	124,000	56,000
20,500		25,000	197,000	137,000	56,000
21,000		25,000	197,000	137,000	56,000
21,500		25,000	197,000	137,000	56,000
22,000		25,000	197,000	137,000	56,000
22,220	7/8	25,000	209,000	149,000	56,000
22,500		25,000	209,000	149,000	56,000
23,000		25,000	209,000	149,000	56,000
23,500		25,000	209,000	149,000	56,000
24,000		25,000	209,000	149,000	56,000
24,500		32,000	226,000	162,000	60,000
25,000	63/64	32,000	226,000	162,000	60,000
25,500		32,000	226,000	162,000	60,000



Wiertła RATIO, z kanałkami chłodz.



- P** ● Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

Materiał narzędzia **Węglik mono.**

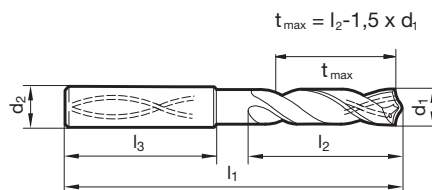
Powierzchnia **F**

Forma chwytu HA

Wiertła RATIO

GÜHRINGNAVIGATOR

Param. skr. na str. 758



Nr artykułu **4044**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	5,900		6,000	97,000	57,000	36,000
3,100		6,000	70,000	30,000	36,000	5,950	15/64	6,000	97,000	57,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	6,000		6,000	97,000	57,000	36,000
3,200		6,000	70,000	30,000	36,000	6,100		8,000	106,000	66,000	36,000
3,250		6,000	70,000	30,000	36,000	6,200		8,000	106,000	66,000	36,000
3,300		6,000	70,000	30,000	36,000	6,300		8,000	106,000	66,000	36,000
3,400		6,000	75,000	35,500	36,000	6,350	1/4	8,000	106,000	66,000	36,000
3,500		6,000	75,000	35,500	36,000	6,400		8,000	106,000	66,000	36,000
3,570	9/64	6,000	75,000	35,500	36,000	6,500		8,000	106,000	66,000	36,000
3,600		6,000	75,000	35,500	36,000	6,530		8,000	106,000	66,000	36,000
3,700		6,000	75,000	35,500	36,000	6,600		8,000	106,000	66,000	36,000
3,800		6,000	75,000	37,500	36,000	6,700		8,000	106,000	66,000	36,000
3,900		6,000	75,000	37,500	36,000	6,750	17/64	8,000	106,000	66,000	36,000
3,970	5/32	6,000	75,000	37,500	36,000	6,800		8,000	106,000	66,000	36,000
4,000		6,000	75,000	37,500	36,000	6,900		8,000	116,000	76,000	36,000
4,040		6,000	75,000	37,500	36,000	7,000		8,000	116,000	76,000	36,000
4,100		6,000	75,000	37,500	36,000	7,100		8,000	116,000	76,000	36,000
4,200		6,000	75,000	37,500	36,000	7,140	9/32	8,000	116,000	76,000	36,000
4,300		6,000	85,000	45,000	36,000	7,200		8,000	116,000	76,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000	7,300		8,000	116,000	76,000	36,000
4,400		6,000	85,000	45,000	36,000	7,400		8,000	116,000	76,000	36,000
4,500		6,000	85,000	45,000	36,000	7,500		8,000	116,000	76,000	36,000
4,600		6,000	85,000	45,000	36,000	7,540	19/64	8,000	116,000	76,000	36,000
4,650		6,000	85,000	45,000	36,000	7,600		8,000	116,000	76,000	36,000
4,700		6,000	85,000	45,000	36,000	7,700		8,000	116,000	76,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000	7,800		8,000	116,000	76,000	36,000
4,800		6,000	90,000	50,000	36,000	7,900		8,000	116,000	76,000	36,000
4,900		6,000	90,000	50,000	36,000	7,940	5/16	8,000	116,000	76,000	36,000
5,000		6,000	90,000	50,000	36,000	8,000		8,000	116,000	76,000	36,000
5,100		6,000	90,000	50,000	36,000	8,100		10,000	131,000	87,000	40,000
5,110		6,000	90,000	50,000	36,000	8,200		10,000	131,000	87,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	8,300		10,000	131,000	87,000	40,000
5,200		6,000	90,000	50,000	36,000	8,330	21/64	10,000	131,000	87,000	40,000
5,300		6,000	90,000	50,000	36,000	8,400		10,000	131,000	87,000	40,000
5,400		6,000	97,000	57,000	36,000	8,500		10,000	131,000	87,000	40,000
5,410		6,000	97,000	57,000	36,000	8,600		10,000	131,000	87,000	40,000
5,500		6,000	97,000	57,000	36,000	8,700		10,000	131,000	87,000	40,000
5,550		6,000	97,000	57,000	36,000	8,730	11/32	10,000	131,000	87,000	40,000
5,560	7/32	6,000	97,000	57,000	36,000	8,800		10,000	131,000	87,000	40,000
5,600		6,000	97,000	57,000	36,000	8,900		10,000	131,000	87,000	40,000
5,700		6,000	97,000	57,000	36,000	9,000		10,000	131,000	87,000	40,000
5,800		6,000	97,000	57,000	36,000	9,100		10,000	139,000	95,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,130	23/64	10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,250		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,340		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
9,600		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
9,920	25/64	10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,100		12,000	155,000	106,000	45,000
10,200		12,000	155,000	106,000	45,000
10,300		12,000	155,000	106,000	45,000
10,320	13/32	12,000	155,000	106,000	45,000
10,400		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,600		12,000	155,000	106,000	45,000
10,700		12,000	155,000	106,000	45,000
10,720	27/64	12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
10,900		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,100		12,000	163,000	114,000	45,000
11,110	7/16	12,000	163,000	114,000	45,000
11,200		12,000	163,000	114,000	45,000
11,300		12,000	163,000	114,000	45,000
11,400		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,510	29/64	12,000	163,000	114,000	45,000
11,600		12,000	163,000	114,000	45,000
11,700		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
11,900		12,000	163,000	114,000	45,000
11,910	15/32	12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,100		14,000	182,000	133,000	45,000
12,200		14,000	182,000	133,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100	33/64	14,000	182,000	133,000	45,000
13,490	17/32	14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,890	35/64	14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,200		16,000	204,000	152,000	48,000
14,290	9/16	16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,480	39/64	16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,870	5/8	16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
16,900		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
18,900		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000



Wiertła RATIO, z kanałkami chłodz.

Materiał narzędzia **Węglik mono.**Powierzchnia **F**Forma chwytu **HE**

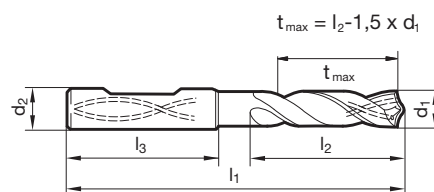
P • Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy

M ○**K** •**N** ○**S** ○**H** ○

stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi

GÜHRINGNAVIGATOR

Param. skr. na str. 758

Nr artykułu **4045**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	7,100		8,000	116,000	76,000	36,000
3,100		6,000	70,000	30,000	36,000	7,200		8,000	116,000	76,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	7,400		8,000	116,000	76,000	36,000
3,200		6,000	70,000	30,000	36,000	7,500		8,000	116,000	76,000	36,000
3,250		6,000	70,000	30,000	36,000	7,600		8,000	116,000	76,000	36,000
3,300		6,000	70,000	30,000	36,000	7,700		8,000	116,000	76,000	36,000
3,400		6,000	75,000	35,500	36,000	8,000		8,000	116,000	76,000	36,000
3,500		6,000	75,000	35,500	36,000	8,100		10,000	131,000	87,000	40,000
3,570	9/64	6,000	75,000	35,500	36,000	8,200		10,000	131,000	87,000	40,000
3,600		6,000	75,000	35,500	36,000	8,400		10,000	131,000	87,000	40,000
3,700		6,000	75,000	35,500	36,000	8,500		10,000	131,000	87,000	40,000
3,800		6,000	75,000	37,500	36,000	8,600		10,000	131,000	87,000	40,000
3,900		6,000	75,000	37,500	36,000	8,700		10,000	131,000	87,000	40,000
3,970	5/32	6,000	75,000	37,500	36,000	9,000		10,000	131,000	87,000	40,000
4,000		6,000	75,000	37,500	36,000	9,100		10,000	139,000	95,000	40,000
4,100		6,000	75,000	37,500	36,000	9,300		10,000	139,000	95,000	40,000
4,300		6,000	85,000	45,000	36,000	9,400		10,000	139,000	95,000	40,000
4,400		6,000	85,000	45,000	36,000	9,500		10,000	139,000	95,000	40,000
4,500		6,000	85,000	45,000	36,000	9,700		10,000	139,000	95,000	40,000
4,650		6,000	85,000	45,000	36,000	9,800		10,000	139,000	95,000	40,000
4,700		6,000	85,000	45,000	36,000	9,900		10,000	139,000	95,000	40,000
4,900		6,000	90,000	50,000	36,000	10,000		10,000	139,000	95,000	40,000
5,000		6,000	90,000	50,000	36,000	10,200		12,000	155,000	106,000	45,000
5,100		6,000	90,000	50,000	36,000	10,300		12,000	155,000	106,000	45,000
5,160	13/64	6,000	90,000	50,000	36,000	10,500		12,000	155,000	106,000	45,000
5,200		6,000	90,000	50,000	36,000	10,800		12,000	155,000	106,000	45,000
5,300		6,000	90,000	50,000	36,000	11,000		12,000	155,000	106,000	45,000
5,400		6,000	97,000	57,000	36,000	11,200		12,000	163,000	114,000	45,000
5,500		6,000	97,000	57,000	36,000	11,500		12,000	163,000	114,000	45,000
5,700		6,000	97,000	57,000	36,000	11,800		12,000	163,000	114,000	45,000
5,800		6,000	97,000	57,000	36,000	12,000		12,000	163,000	114,000	45,000
5,900		6,000	97,000	57,000	36,000	12,200		14,000	182,000	133,000	45,000
6,000		6,000	97,000	57,000	36,000	12,500		14,000	182,000	133,000	45,000
6,200		8,000	106,000	66,000	36,000	13,500		14,000	182,000	133,000	45,000
6,300		8,000	106,000	66,000	36,000	14,000		14,000	182,000	133,000	45,000
6,350	1/4	8,000	106,000	66,000	36,000	14,200		16,000	204,000	152,000	48,000
6,500		8,000	106,000	66,000	36,000	14,500		16,000	204,000	152,000	48,000
6,600		8,000	106,000	66,000	36,000	15,000		16,000	204,000	152,000	48,000
6,700		8,000	106,000	66,000	36,000	15,500		16,000	204,000	152,000	48,000
6,800		8,000	106,000	66,000	36,000	16,000		16,000	204,000	152,000	48,000
6,900		8,000	116,000	76,000	36,000	16,500		18,000	223,000	171,000	48,000
7,000		8,000	116,000	76,000	36,000	17,000		18,000	223,000	171,000	48,000



Wiertła RATIO

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
17,500		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

Powierzchnia **S**

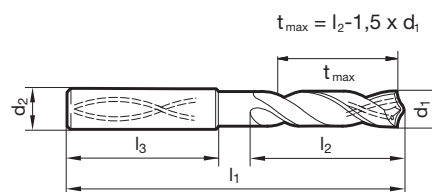
Forma chwytu HA

Wiertła RATIO

- P** ● Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** ●
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 758



Nr artykułu **2711**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000
3,100		6,000	70,000	30,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000
3,200		6,000	70,000	30,000	36,000
3,250		6,000	70,000	30,000	36,000
3,300		6,000	70,000	30,000	36,000
3,400		6,000	75,000	35,500	36,000
3,500		6,000	75,000	35,500	36,000
3,570	9/64	6,000	75,000	35,500	36,000
3,600		6,000	75,000	35,500	36,000
3,700		6,000	75,000	35,500	36,000
3,800		6,000	75,000	37,500	36,000
3,900		6,000	75,000	37,500	36,000
3,970	5/32	6,000	75,000	37,500	36,000
4,300		6,000	85,000	45,000	36,000
4,400		6,000	85,000	45,000	36,000
5,000		6,000	90,000	50,000	36,000
5,200		6,000	90,000	50,000	36,000
5,500		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,100		8,000	106,000	66,000	36,000
6,200		8,000	106,000	66,000	36,000
6,500		8,000	106,000	66,000	36,000
6,600		8,000	106,000	66,000	36,000
6,800		8,000	106,000	66,000	36,000
7,000		8,000	116,000	76,000	36,000
7,100		8,000	116,000	76,000	36,000
7,300		8,000	116,000	76,000	36,000
7,500		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	131,000	87,000	40,000
8,600		10,000	131,000	87,000	40,000
8,700		10,000	131,000	87,000	40,000
9,000		10,000	131,000	87,000	40,000
9,100		10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,300		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,500		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,200		14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,800		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
15,000		16,000	204,000	152,000	48,000
15,200		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,800		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000



Wiertła RATIO, z kanałkami chłodz.

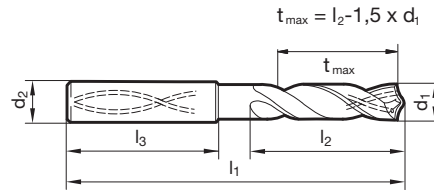


- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca jest lekko wklęsła • optymalna geometria ostrzy
- M**
- K**
- N** stałe stopowe i wysokowytrzymałe $\leq 1600 \text{ N/mm}^2$ • Inconel, Hastelloy, Monel • Tytan i stopy tytanu
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 758

Materiał narzędzia	Węglik mono.
Powierzchnia	Y
Forma chwytu	HA



Nr artykułu **8522**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	8,730	11/32	10,000	131,000	87,000	40,000
3,170	1/8	6,000	70,000	30,000	36,000	8,800		10,000	131,000	87,000	40,000
3,250		6,000	70,000	30,000	36,000	9,000		10,000	131,000	87,000	40,000
3,300		6,000	70,000	30,000	36,000	9,130	23/64	10,000	139,000	95,000	40,000
3,400		6,000	75,000	35,500	36,000	9,250		10,000	139,000	95,000	40,000
3,500		6,000	75,000	35,500	36,000	9,340		10,000	139,000	95,000	40,000
3,570	9/64	6,000	75,000	35,500	36,000	9,400		10,000	139,000	95,000	40,000
3,700		6,000	75,000	35,500	36,000	9,500		10,000	139,000	95,000	40,000
3,970	5/32	6,000	75,000	37,500	36,000	9,520	3/8	10,000	139,000	95,000	40,000
4,000		6,000	75,000	37,500	36,000	9,920	25/64	10,000	139,000	95,000	40,000
4,200		6,000	75,000	37,500	36,000	10,000		10,000	139,000	95,000	40,000
4,300		6,000	85,000	45,000	36,000	10,200		12,000	155,000	106,000	45,000
4,370	11/64	6,000	85,000	45,000	36,000	10,320	13/32	12,000	155,000	106,000	45,000
4,500		6,000	85,000	45,000	36,000	10,400		12,000	155,000	106,000	45,000
4,650		6,000	85,000	45,000	36,000	10,500		12,000	155,000	106,000	45,000
4,760	3/16	6,000	90,000	50,000	36,000	10,720	27/64	12,000	155,000	106,000	45,000
5,000		6,000	90,000	50,000	36,000	10,800		12,000	155,000	106,000	45,000
5,100		6,000	90,000	50,000	36,000	11,000		12,000	155,000	106,000	45,000
5,160	13/64	6,000	90,000	50,000	36,000	11,110	7/16	12,000	163,000	114,000	45,000
5,200		6,000	90,000	50,000	36,000	11,300		12,000	163,000	114,000	45,000
5,500		6,000	97,000	57,000	36,000	11,400		12,000	163,000	114,000	45,000
5,550		6,000	97,000	57,000	36,000	11,500		12,000	163,000	114,000	45,000
5,560	7/32	6,000	97,000	57,000	36,000	11,510	29/64	12,000	163,000	114,000	45,000
5,950	15/64	6,000	97,000	57,000	36,000	11,910	15/32	12,000	163,000	114,000	45,000
6,000		6,000	97,000	57,000	36,000	12,000		12,000	163,000	114,000	45,000
6,350	1/4	8,000	106,000	66,000	36,000	12,300	31/64	14,000	182,000	133,000	45,000
6,500		8,000	106,000	66,000	36,000	12,500		14,000	182,000	133,000	45,000
6,530		8,000	106,000	66,000	36,000	12,700	1/2	14,000	182,000	133,000	45,000
6,750	17/64	8,000	106,000	66,000	36,000	13,000		14,000	182,000	133,000	45,000
6,800		8,000	106,000	66,000	36,000	13,100	33/64	14,000	182,000	133,000	45,000
6,900		8,000	116,000	76,000	36,000	13,490	17/32	14,000	182,000	133,000	45,000
7,000		8,000	116,000	76,000	36,000	13,500		14,000	182,000	133,000	45,000
7,140	9/32	8,000	116,000	76,000	36,000	14,000		14,000	182,000	133,000	45,000
7,400		8,000	116,000	76,000	36,000	14,290	9/16	16,000	204,000	152,000	48,000
7,500		8,000	116,000	76,000	36,000	14,500		16,000	204,000	152,000	48,000
7,540	19/64	8,000	116,000	76,000	36,000	15,000		16,000	204,000	152,000	48,000
7,800		8,000	116,000	76,000	36,000	15,100		16,000	204,000	152,000	48,000
7,940	5/16	8,000	116,000	76,000	36,000	15,500		16,000	204,000	152,000	48,000
8,000		8,000	116,000	76,000	36,000	15,870	5/8	16,000	204,000	152,000	48,000
8,330	21/64	10,000	131,000	87,000	40,000	16,000		16,000	204,000	152,000	48,000
8,500		10,000	131,000	87,000	40,000						
8,600		10,000	131,000	87,000	40,000						



Wiertła RATIO, z kanałkami chłodz.

Materiał narzędzia **Węglik mono.**Powierzchnia **F**Forma chwytu **HA**

Wiertła RATIO

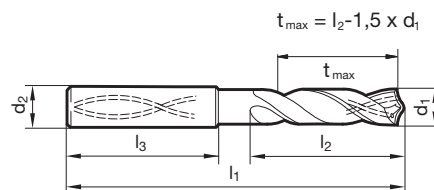
P Korekcja ścina $\geq \varnothing 4,000$ • opatentowana geometria promieniowa ostrzy
• główna krawędź skrawająca - prosta (po korekcie)

M**K** •**N**

żeliwo wermikularne GGV oraz ADI, CDI • żeliwa szare, ciągliwe i sferoidalne

S**H****GÜHRING**NAVIGATOR

Param. skr. na str. 758



Nr artykułu

6502

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
4,000		6,000	75,000	37,500	36,000	8,800		10,000	131,000	87,000	40,000
4,300		6,000	85,000	45,000	36,000	8,900		10,000	131,000	87,000	40,000
4,370	11/64	6,000	85,000	45,000	36,000	9,000		10,000	131,000	87,000	40,000
4,400		6,000	85,000	45,000	36,000	9,100		10,000	139,000	95,000	40,000
4,500		6,000	85,000	45,000	36,000	9,250		10,000	139,000	95,000	40,000
4,600		6,000	85,000	45,000	36,000	9,300		10,000	139,000	95,000	40,000
4,700		6,000	85,000	45,000	36,000	9,400		10,000	139,000	95,000	40,000
4,760	3/16	6,000	90,000	50,000	36,000	9,500		10,000	139,000	95,000	40,000
4,900		6,000	90,000	50,000	36,000	9,600		10,000	139,000	95,000	40,000
5,000		6,000	90,000	50,000	36,000	9,700		10,000	139,000	95,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	9,800		10,000	139,000	95,000	40,000
5,300		6,000	90,000	50,000	36,000	9,900		10,000	139,000	95,000	40,000
5,500		6,000	97,000	57,000	36,000	10,000		10,000	139,000	95,000	40,000
5,550		6,000	97,000	57,000	36,000	10,100		12,000	155,000	106,000	45,000
5,560	7/32	6,000	97,000	57,000	36,000	10,200		12,000	155,000	106,000	45,000
5,600		6,000	97,000	57,000	36,000	10,300		12,000	155,000	106,000	45,000
5,700		6,000	97,000	57,000	36,000	10,320	13/32	12,000	155,000	106,000	45,000
5,800		6,000	97,000	57,000	36,000	10,400		12,000	155,000	106,000	45,000
5,900		6,000	97,000	57,000	36,000	10,500		12,000	155,000	106,000	45,000
6,000		6,000	97,000	57,000	36,000	10,700		12,000	155,000	106,000	45,000
6,100		8,000	106,000	66,000	36,000	10,800		12,000	155,000	106,000	45,000
6,200		8,000	106,000	66,000	36,000	10,900		12,000	155,000	106,000	45,000
6,300		8,000	106,000	66,000	36,000	11,000		12,000	155,000	106,000	45,000
6,400		8,000	106,000	66,000	36,000	11,100		12,000	163,000	114,000	45,000
6,500		8,000	106,000	66,000	36,000	11,200		12,000	163,000	114,000	45,000
6,700		8,000	106,000	66,000	36,000	11,300		12,000	163,000	114,000	45,000
6,800		8,000	106,000	66,000	36,000	11,500		12,000	163,000	114,000	45,000
6,900		8,000	116,000	76,000	36,000	11,600		12,000	163,000	114,000	45,000
7,000		8,000	116,000	76,000	36,000	11,700		12,000	163,000	114,000	45,000
7,140	9/32	8,000	116,000	76,000	36,000	11,800		12,000	163,000	114,000	45,000
7,200		8,000	116,000	76,000	36,000	12,000		12,000	163,000	114,000	45,000
7,500		8,000	116,000	76,000	36,000	12,100		14,000	182,000	133,000	45,000
7,600		8,000	116,000	76,000	36,000	12,300	31/64	14,000	182,000	133,000	45,000
7,700		8,000	116,000	76,000	36,000	12,400		14,000	182,000	133,000	45,000
8,000		8,000	116,000	76,000	36,000	12,500		14,000	182,000	133,000	45,000
8,100		10,000	131,000	87,000	40,000	12,600		14,000	182,000	133,000	45,000
8,200		10,000	131,000	87,000	40,000	12,700	1/2	14,000	182,000	133,000	45,000
8,300		10,000	131,000	87,000	40,000	12,800		14,000	182,000	133,000	45,000
8,330	21/64	10,000	131,000	87,000	40,000	13,000		14,000	182,000	133,000	45,000
8,400		10,000	131,000	87,000	40,000	13,100	33/64	14,000	182,000	133,000	45,000
8,500		10,000	131,000	87,000	40,000	13,300		14,000	182,000	133,000	45,000
8,600		10,000	131,000	87,000	40,000	13,500		14,000	182,000	133,000	45,000



Wiertła RATIO, z kanałkami chłodz.

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

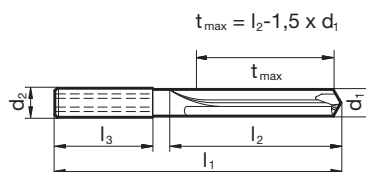
Forma chwytu HA

P Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • wąskie tolerancje średnic
• bardzo dobra jakość powierzchni otworu • kontrolować ciśnienie chłodziwa

M**K** •**N** ○ żeliwa szare, ciągliwe i sferoidalne**S****H****GÜHRING** NAVIGATOR

Param. skr. na str. 758

Wiertła RATIO

Nr artykułu **769**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	74,000	32,000	36,000	9,500		10,000	139,000	95,000	40,000
3,100		6,000	74,000	32,000	36,000	9,520	3/8	10,000	139,000	95,000	40,000
3,200		6,000	74,000	32,000	36,000	10,000		10,000	139,000	95,000	40,000
3,300		6,000	74,000	32,000	36,000	10,200		12,000	163,000	114,000	45,000
3,500		6,000	74,000	34,000	36,000	10,320	13/32	12,000	163,000	114,000	45,000
3,600		6,000	74,000	34,000	36,000	10,500		12,000	163,000	114,000	45,000
3,700		6,000	74,000	34,000	36,000	10,720	27/64	12,000	163,000	114,000	45,000
3,800		6,000	97,000	45,000	36,000	11,000		12,000	163,000	114,000	45,000
3,900		6,000	97,000	45,000	36,000	11,110	7/16	12,000	163,000	114,000	45,000
4,000		6,000	97,000	45,000	36,000	11,500		12,000	163,000	114,000	45,000
4,100		6,000	97,000	45,000	36,000	11,510	29/64	12,000	163,000	114,000	45,000
4,200		6,000	97,000	45,000	36,000	12,000		12,000	163,000	114,000	45,000
4,300		6,000	97,000	45,000	36,000	12,300	31/64	14,000	182,000	133,000	45,000
4,400		6,000	97,000	45,000	36,000	12,500		14,000	182,000	133,000	45,000
4,500		6,000	97,000	45,000	36,000	12,700	1/2	14,000	182,000	133,000	45,000
4,700		6,000	97,000	45,000	36,000	13,000		14,000	182,000	133,000	45,000
4,800		6,000	97,000	57,000	36,000	13,500		14,000	182,000	133,000	45,000
4,900		6,000	97,000	57,000	36,000	14,000		14,000	182,000	133,000	45,000
5,000		6,000	97,000	57,000	36,000	14,500		16,000	204,000	152,000	48,000
5,160	13/64	6,000	97,000	57,000	36,000	15,000		16,000	204,000	152,000	48,000
5,500		6,000	97,000	57,000	36,000	15,500		16,000	204,000	152,000	48,000
6,000		6,000	97,000	57,000	36,000	16,000		16,000	204,000	152,000	48,000
6,350	1/4	8,000	116,000	76,000	36,000	16,500		18,000	223,000	171,000	48,000
6,500		8,000	116,000	76,000	36,000	17,000		18,000	223,000	171,000	48,000
6,800		8,000	116,000	76,000	36,000	17,500		18,000	223,000	171,000	48,000
7,000		8,000	116,000	76,000	36,000	18,000		18,000	223,000	171,000	48,000
7,140	9/32	8,000	116,000	76,000	36,000	18,500		20,000	244,000	190,000	50,000
7,500		8,000	116,000	76,000	36,000	19,000		20,000	244,000	190,000	50,000
7,800		8,000	116,000	76,000	36,000	20,000		20,000	244,000	190,000	50,000
7,940	5/16	8,000	116,000	76,000	36,000						
8,000		8,000	116,000	76,000	36,000						
8,330	21/64	10,000	139,000	95,000	40,000						
8,500		10,000	139,000	95,000	40,000						
8,730	11/32	10,000	139,000	95,000	40,000						
9,000		10,000	139,000	95,000	40,000						
9,130	23/64	10,000	139,000	95,000	40,000						



Wiertła RATIO, z kanałkami chłodz.

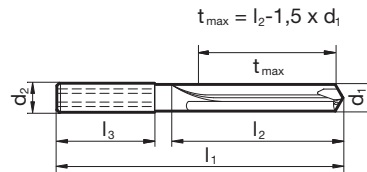


- P** Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • wąskie tolerancje średnic
- M** • bardzo dobra jakość powierzchni otworu • sprawdzać optymalne ciśnienie chłodziwa
- K** ○
- N** • aluminium i stopy Al • stopy Al z wysoką zawartością Si
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 758

Materiał narzędzia	Węglik mono.
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **6069**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	74,000	32,000	36,000
3,200		6,000	74,000	32,000	36,000
3,300		6,000	74,000	32,000	36,000
3,500		6,000	74,000	34,000	36,000
3,600		6,000	74,000	34,000	36,000
4,000		6,000	97,000	45,000	36,000
4,200		6,000	97,000	45,000	36,000
4,300		6,000	97,000	45,000	36,000
4,500		6,000	97,000	45,000	36,000
5,000		6,000	97,000	57,000	36,000
6,000		6,000	97,000	57,000	36,000
6,350	1/4	8,000	116,000	76,000	36,000
6,500		8,000	116,000	76,000	36,000
6,800		8,000	116,000	76,000	36,000
7,000		8,000	116,000	76,000	36,000
7,800		8,000	116,000	76,000	36,000
8,000		8,000	116,000	76,000	36,000
8,500		10,000	139,000	95,000	40,000
8,730	11/32	10,000	139,000	95,000	40,000
9,000		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,200		12,000	163,000	114,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
10,320	13/32	12,000	163,000	114,000	45,000
10,500		12,000	163,000	114,000	45,000
10,720	27/64	12,000	163,000	114,000	45,000
11,000		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,300	31/64	14,000	182,000	133,000	45,000
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,500		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000



Wiertła RATIO, z kanałkami chłodz.



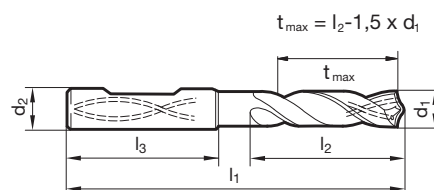
P	•	Korekcja ścina $\geq \varnothing 9,600$ • geometria zataczana • korpus z HSS z wlotowaną płytką z węgla • tłumi wibracje i uderzenia
M	○	
K	○	
N	○	stale niestopowe/niskostopowe • żeliwa szare, żeliwa sferoidalne
S	○	• mosiądże, brązy, tworzywa sztuczne, grafit
H		

GÜHRING NAVIGATOR

Param. skr. na str. 758

Materiał narzędzia	Węglik
Powierzchnia	Ⓢ
Forma chwytu	HE

Wiertła RATIO



Nr artykułu

1173

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
9,600		16,000	151,000	99,000	48,000	15,700		20,000	186,000	132,000	50,000
9,700		16,000	151,000	99,000	48,000	15,800		20,000	186,000	132,000	50,000
10,000		16,000	151,000	99,000	48,000	16,000		20,000	186,000	132,000	50,000
10,200		16,000	151,000	99,000	48,000	16,500		20,000	202,000	148,000	50,000
10,400		16,000	151,000	99,000	48,000	17,000		20,000	202,000	148,000	50,000
11,000		16,000	151,000	99,000	48,000	17,200		20,000	202,000	148,000	50,000
11,500		16,000	151,000	99,000	48,000	17,460	11/16	20,000	202,000	148,000	50,000
11,700		16,000	151,000	99,000	48,000	17,500		20,000	202,000	148,000	50,000
12,000		16,000	151,000	99,000	48,000	18,000		20,000	202,000	148,000	50,000
12,200		16,000	167,000	115,000	48,000	18,500		25,000	224,000	164,000	56,000
12,400		16,000	167,000	115,000	48,000	19,000		25,000	224,000	164,000	56,000
12,500		16,000	167,000	115,000	48,000	20,000		25,000	224,000	164,000	56,000
12,700	1/2	16,000	167,000	115,000	48,000	21,000		25,000	241,000	181,000	56,000
13,000		16,000	167,000	115,000	48,000	22,000		25,000	241,000	181,000	56,000
13,500		16,000	167,000	115,000	48,000	22,500		25,000	257,000	197,000	56,000
14,000		16,000	167,000	115,000	48,000	25,000	63/64	32,000	278,000	214,000	60,000
14,500		20,000	186,000	132,000	50,000						
15,000		20,000	186,000	132,000	50,000						



Wiertła RATIO, z kanałkami chłodz.

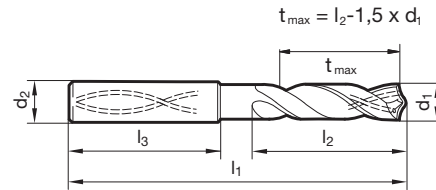


- P** ● geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy • maksymalna wydajność
- M** ○
- K** ○
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stal (stopowa/węglowa) Rm do 1400 N/mm²
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 758

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HA



Nr artykułu **5760**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	70,000	30,000	36,000	5,900		6,000	97,000	57,000	36,000
3,100		6,000	70,000	30,000	36,000	5,950		6,000	97,000	57,000	36,000
3,170	1/8	6,000	70,000	30,000	36,000	6,000		6,000	97,000	57,000	36,000
3,200		6,000	70,000	30,000	36,000	6,100		8,000	106,000	66,000	36,000
3,250		6,000	70,000	30,000	36,000	6,200		8,000	106,000	66,000	36,000
3,300		6,000	70,000	30,000	36,000	6,300		8,000	106,000	66,000	36,000
3,400		6,000	75,000	35,500	36,000	6,350	1/4	8,000	106,000	66,000	36,000
3,500		6,000	75,000	35,500	36,000	6,400		8,000	106,000	66,000	36,000
3,570	9/64	6,000	75,000	35,500	36,000	6,500		8,000	106,000	66,000	36,000
3,600		6,000	75,000	35,500	36,000	6,530		8,000	106,000	66,000	36,000
3,700		6,000	75,000	35,500	36,000	6,600		8,000	106,000	66,000	36,000
3,800		6,000	75,000	37,500	36,000	6,700		8,000	106,000	66,000	36,000
3,900		6,000	75,000	37,500	36,000	6,750		8,000	106,000	66,000	36,000
3,970	5/32	6,000	75,000	37,500	36,000	6,800		8,000	106,000	66,000	36,000
4,000		6,000	75,000	37,500	36,000	6,900		8,000	116,000	76,000	36,000
4,040		6,000	75,000	37,500	36,000	7,000		8,000	116,000	76,000	36,000
4,100		6,000	75,000	37,500	36,000	7,100		8,000	116,000	76,000	36,000
4,200		6,000	75,000	37,500	36,000	7,140		8,000	116,000	76,000	36,000
4,300		6,000	85,000	45,000	36,000	7,200		8,000	116,000	76,000	36,000
4,370	11/64	6,000	85,000	45,000	36,000	7,300		8,000	116,000	76,000	36,000
4,400		6,000	85,000	45,000	36,000	7,400		8,000	116,000	76,000	36,000
4,500		6,000	85,000	45,000	36,000	7,500		8,000	116,000	76,000	36,000
4,600		6,000	85,000	45,000	36,000	7,540		8,000	116,000	76,000	36,000
4,650		6,000	85,000	45,000	36,000	7,600		8,000	116,000	76,000	36,000
4,700		6,000	85,000	45,000	36,000	7,700		8,000	116,000	76,000	36,000
4,760	3/16	6,000	90,000	50,000	36,000	7,800		8,000	116,000	76,000	36,000
4,800		6,000	90,000	50,000	36,000	7,900		8,000	116,000	76,000	36,000
4,900		6,000	90,000	50,000	36,000	7,940		8,000	116,000	76,000	36,000
5,000		6,000	90,000	50,000	36,000	8,000		8,000	116,000	76,000	36,000
5,100		6,000	90,000	50,000	36,000	8,100		10,000	131,000	87,000	40,000
5,110		6,000	90,000	50,000	36,000	8,200		10,000	131,000	87,000	40,000
5,160	13/64	6,000	90,000	50,000	36,000	8,300		10,000	131,000	87,000	40,000
5,200		6,000	90,000	50,000	36,000	8,330		10,000	131,000	87,000	40,000
5,300		6,000	90,000	50,000	36,000	8,400		10,000	131,000	87,000	40,000
5,400		6,000	97,000	57,000	36,000	8,500		10,000	131,000	87,000	40,000
5,410		6,000	97,000	57,000	36,000	8,600		10,000	131,000	87,000	40,000
5,500		6,000	97,000	57,000	36,000	8,700		10,000	131,000	87,000	40,000
5,550		6,000	97,000	57,000	36,000	8,730		10,000	131,000	87,000	40,000
5,560		6,000	97,000	57,000	36,000	8,800		10,000	131,000	87,000	40,000
5,600		6,000	97,000	57,000	36,000	8,900		10,000	131,000	87,000	40,000
5,700		6,000	97,000	57,000	36,000	9,000		10,000	131,000	87,000	40,000
5,800		6,000	97,000	57,000	36,000	9,100		10,000	139,000	95,000	40,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
9,130		10,000	139,000	95,000	40,000
9,200		10,000	139,000	95,000	40,000
9,250		10,000	139,000	95,000	40,000
9,300		10,000	139,000	95,000	40,000
9,340		10,000	139,000	95,000	40,000
9,400		10,000	139,000	95,000	40,000
9,500		10,000	139,000	95,000	40,000
9,520	3/8	10,000	139,000	95,000	40,000
9,600		10,000	139,000	95,000	40,000
9,700		10,000	139,000	95,000	40,000
9,800		10,000	139,000	95,000	40,000
9,900		10,000	139,000	95,000	40,000
9,920		10,000	139,000	95,000	40,000
10,000		10,000	139,000	95,000	40,000
10,100		12,000	155,000	106,000	45,000
10,200		12,000	155,000	106,000	45,000
10,300		12,000	155,000	106,000	45,000
10,320		12,000	155,000	106,000	45,000
10,400		12,000	155,000	106,000	45,000
10,500		12,000	155,000	106,000	45,000
10,600		12,000	155,000	106,000	45,000
10,700		12,000	155,000	106,000	45,000
10,720		12,000	155,000	106,000	45,000
10,800		12,000	155,000	106,000	45,000
10,900		12,000	155,000	106,000	45,000
11,000		12,000	155,000	106,000	45,000
11,100		12,000	163,000	114,000	45,000
11,110		12,000	163,000	114,000	45,000
11,200		12,000	163,000	114,000	45,000
11,300		12,000	163,000	114,000	45,000
11,400		12,000	163,000	114,000	45,000
11,500		12,000	163,000	114,000	45,000
11,510		12,000	163,000	114,000	45,000
11,600		12,000	163,000	114,000	45,000
11,700		12,000	163,000	114,000	45,000
11,800		12,000	163,000	114,000	45,000
11,900		12,000	163,000	114,000	45,000
11,910		12,000	163,000	114,000	45,000
12,000		12,000	163,000	114,000	45,000
12,100		14,000	182,000	133,000	45,000
12,200		14,000	182,000	133,000	45,000
12,300		14,000	182,000	133,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,500		14,000	182,000	133,000	45,000
12,700	1/2	14,000	182,000	133,000	45,000
13,000		14,000	182,000	133,000	45,000
13,100		14,000	182,000	133,000	45,000
13,490		14,000	182,000	133,000	45,000
13,500		14,000	182,000	133,000	45,000
13,700		14,000	182,000	133,000	45,000
13,890		14,000	182,000	133,000	45,000
14,000		14,000	182,000	133,000	45,000
14,100		16,000	204,000	152,000	48,000
14,200		16,000	204,000	152,000	48,000
14,290		16,000	204,000	152,000	48,000
14,500		16,000	204,000	152,000	48,000
14,700		16,000	204,000	152,000	48,000
15,000		16,000	204,000	152,000	48,000
15,100		16,000	204,000	152,000	48,000
15,480		16,000	204,000	152,000	48,000
15,500		16,000	204,000	152,000	48,000
15,700		16,000	204,000	152,000	48,000
15,870		16,000	204,000	152,000	48,000
16,000		16,000	204,000	152,000	48,000
16,500		18,000	223,000	171,000	48,000
16,900		18,000	223,000	171,000	48,000
17,000		18,000	223,000	171,000	48,000
17,500		18,000	223,000	171,000	48,000
17,700		18,000	223,000	171,000	48,000
18,000		18,000	223,000	171,000	48,000
18,500		20,000	244,000	190,000	50,000
18,900		20,000	244,000	190,000	50,000
19,000		20,000	244,000	190,000	50,000
19,050	3/4	20,000	244,000	190,000	50,000
19,500		20,000	244,000	190,000	50,000
20,000		20,000	244,000	190,000	50,000



Wiertła RATIO, z kanałkami chłodz.

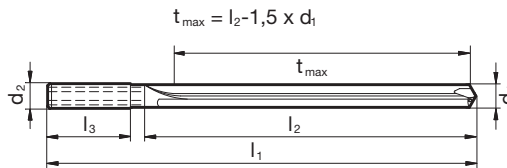


- P** Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • wąskie tolerancje średnic
- M** • bardzo dobra jakość powierzchni otworu • kontrolować ciśnienie chłodziwa
- K** •
- N** ○ żeliwa szare, ciągliwe i sferoidalne
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 758

Materiał narzędzia	Węglik mono.
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **770**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	91,000	42,000	36,000	10,000		10,000	175,000	130,000	40,000
3,100		6,000	91,000	42,000	36,000	10,200		12,000	209,000	159,000	45,000
3,300		6,000	91,000	42,000	36,000	10,500		12,000	209,000	159,000	45,000
3,800		6,000	121,000	77,000	36,000	10,720	27/64	12,000	209,000	159,000	45,000
4,000		6,000	121,000	77,000	36,000	11,000		12,000	209,000	159,000	45,000
4,100		6,000	121,000	77,000	36,000	11,500		12,000	209,000	159,000	45,000
4,200		6,000	121,000	77,000	36,000	11,510	29/64	12,000	209,000	159,000	45,000
4,300		6,000	121,000	77,000	36,000	12,000		12,000	209,000	159,000	45,000
4,400		6,000	121,000	77,000	36,000	12,300	31/64	14,000	233,000	183,000	45,000
4,500		6,000	121,000	77,000	36,000	12,500		14,000	233,000	183,000	45,000
4,800		6,000	121,000	82,000	36,000	12,700	1/2	14,000	233,000	183,000	45,000
4,900		6,000	121,000	82,000	36,000	13,000		14,000	233,000	183,000	45,000
5,000		6,000	121,000	82,000	36,000	13,500		14,000	233,000	183,000	45,000
5,160	13/64	6,000	121,000	82,000	36,000	14,000		14,000	233,000	183,000	45,000
5,500		6,000	121,000	82,000	36,000	14,500		16,000	260,000	207,000	48,000
5,560	7/32	6,000	121,000	82,000	36,000	15,000		16,000	260,000	207,000	48,000
6,000		6,000	121,000	82,000	36,000	15,500		16,000	260,000	207,000	48,000
6,500		8,000	146,000	106,000	36,000	16,500		18,000	284,000	231,000	48,000
6,750	17/64	8,000	146,000	106,000	36,000	17,000		18,000	284,000	231,000	48,000
6,800		8,000	146,000	106,000	36,000	17,500		18,000	284,000	231,000	48,000
7,000		8,000	146,000	106,000	36,000	18,000		18,000	284,000	231,000	48,000
7,140	9/32	8,000	146,000	106,000	36,000	19,000		20,000	308,000	255,000	50,000
7,500		8,000	146,000	106,000	36,000	20,000		20,000	308,000	255,000	50,000
7,800		8,000	146,000	106,000	36,000						
7,940	5/16	8,000	146,000	106,000	36,000						
8,000		8,000	146,000	106,000	36,000						
8,500		10,000	175,000	130,000	40,000						
8,730	11/32	10,000	175,000	130,000	40,000						
9,000		10,000	175,000	130,000	40,000						
9,500		10,000	175,000	130,000	40,000						



Wiertła RATIO, z kanałkami chłodz.



P	Korekcja ścina $\geq \emptyset 3,000$ • geom. ścinowa • wąskie tolerancje średnic
M	• bardzo dobra jakość powierzchni otworu • sprawdzać optymalne ciśnienie chłodziwa
K	○
N	• aluminium i stopy Al • stopy Al z wysoką zawartością Si
S	
H	

GÜHRING NAVIGATOR

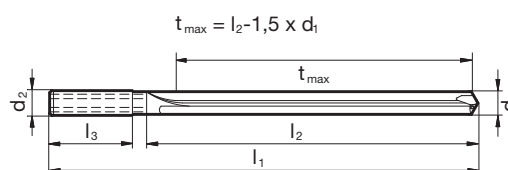
Param. skr. na str. 758

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu HA

Wiertła RATIO



Nr artykułu

6070

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	91,000	42,000	36,000	10,500		12,000	209,000	159,000	45,000
3,100		6,000	91,000	42,000	36,000	11,000		12,000	209,000	159,000	45,000
3,300		6,000	91,000	42,000	36,000	11,110	7/16	12,000	209,000	159,000	45,000
3,500		6,000	91,000	48,000	36,000	12,000		12,000	209,000	159,000	45,000
3,800		6,000	121,000	77,000	36,000	12,700	1/2	14,000	233,000	183,000	45,000
4,000		6,000	121,000	77,000	36,000	13,000		14,000	233,000	183,000	45,000
4,700		6,000	121,000	77,000	36,000	14,000		14,000	233,000	183,000	45,000
4,800		6,000	121,000	82,000	36,000	15,000		16,000	260,000	207,000	48,000
5,000		6,000	121,000	82,000	36,000	16,000		16,000	260,000	207,000	48,000
5,500		6,000	121,000	82,000	36,000	17,000		18,000	284,000	231,000	48,000
6,000		6,000	121,000	82,000	36,000	17,500		18,000	284,000	231,000	48,000
6,350	1/4	8,000	146,000	106,000	36,000	18,000		18,000	284,000	231,000	48,000
6,500		8,000	146,000	106,000	36,000	18,500		20,000	308,000	255,000	50,000
6,800		8,000	146,000	106,000	36,000	19,500		20,000	308,000	255,000	50,000
7,500		8,000	146,000	106,000	36,000						
7,800		8,000	146,000	106,000	36,000						
7,940	5/16	8,000	146,000	106,000	36,000						
8,000		8,000	146,000	106,000	36,000						
8,500		10,000	175,000	130,000	40,000						
8,730	11/32	10,000	175,000	130,000	40,000						
9,000		10,000	175,000	130,000	40,000						
9,500		10,000	175,000	130,000	40,000						
9,520	3/8	10,000	175,000	130,000	40,000						
10,000		10,000	175,000	130,000	40,000						



Wiertła RATIO, z kanałkami chłodz.

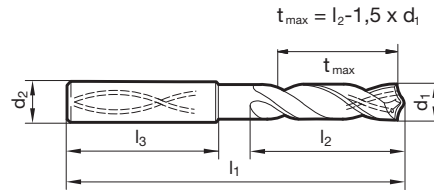


- P** • Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • główna krawędź skrawająca - prosta • optymalna geometria ostrzy
- M** ○
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane • brąz, mosiądz • wysokostopowe stopy AlSi
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 758

Materiał narzędzia	Węglik mono.
Powierzchnia	F
Forma chwytu	HA



Nr artykułu **5525**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	90,000	50,000	36,000	7,000		8,000	146,000	108,000	36,000
3,100		6,000	90,000	50,000	36,000	7,100		8,000	146,000	108,000	36,000
3,170	1/8	6,000	90,000	50,000	36,000	7,200		8,000	146,000	108,000	36,000
3,200		6,000	90,000	50,000	36,000	7,300		8,000	146,000	108,000	36,000
3,300		6,000	90,000	50,000	36,000	7,400		8,000	146,000	108,000	36,000
3,400		6,000	90,000	50,000	36,000	7,500		8,000	146,000	108,000	36,000
3,500		6,000	90,000	50,000	36,000	7,600		8,000	146,000	108,000	36,000
3,600		6,000	90,000	50,000	36,000	7,700		8,000	146,000	108,000	36,000
3,700		6,000	90,000	50,000	36,000	7,800		8,000	146,000	108,000	36,000
3,800		6,000	102,000	64,000	36,000	7,900		8,000	146,000	108,000	36,000
3,900		6,000	102,000	64,000	36,000	8,000		8,000	146,000	108,000	36,000
4,000		6,000	102,000	64,000	36,000	8,100		10,000	162,000	120,000	40,000
4,100		6,000	102,000	64,000	36,000	8,200		10,000	162,000	120,000	40,000
4,200		6,000	102,000	64,000	36,000	8,300		10,000	162,000	120,000	40,000
4,300		6,000	102,000	64,000	36,000	8,400		10,000	162,000	120,000	40,000
4,400		6,000	102,000	64,000	36,000	8,500		10,000	162,000	120,000	40,000
4,500		6,000	102,000	64,000	36,000	8,600		10,000	162,000	120,000	40,000
4,600		6,000	102,000	64,000	36,000	8,700		10,000	162,000	120,000	40,000
4,700		6,000	102,000	64,000	36,000	8,800		10,000	162,000	120,000	40,000
4,800		6,000	116,000	78,000	36,000	8,900		10,000	162,000	120,000	40,000
4,900		6,000	116,000	78,000	36,000	9,000		10,000	162,000	120,000	40,000
5,000		6,000	116,000	78,000	36,000	9,100		10,000	162,000	120,000	40,000
5,100		6,000	116,000	78,000	36,000	9,200		10,000	162,000	120,000	40,000
5,200		6,000	116,000	78,000	36,000	9,300		10,000	162,000	120,000	40,000
5,300		6,000	116,000	78,000	36,000	9,400		10,000	162,000	120,000	40,000
5,400		6,000	116,000	78,000	36,000	9,500		10,000	162,000	120,000	40,000
5,500		6,000	116,000	78,000	36,000	9,520	3/8	10,000	162,000	120,000	40,000
5,600		6,000	116,000	78,000	36,000	9,600		10,000	162,000	120,000	40,000
5,700		6,000	116,000	78,000	36,000	9,700		10,000	162,000	120,000	40,000
5,800		6,000	116,000	78,000	36,000	9,800		10,000	162,000	120,000	40,000
5,900		6,000	116,000	78,000	36,000	9,900		10,000	162,000	120,000	40,000
6,000		6,000	116,000	78,000	36,000	10,000		10,000	162,000	120,000	40,000
6,100		8,000	146,000	108,000	36,000	10,200		12,000	204,000	156,000	45,000
6,200		8,000	146,000	108,000	36,000	10,500		12,000	204,000	156,000	45,000
6,300		8,000	146,000	108,000	36,000	11,000		12,000	204,000	156,000	45,000
6,350	1/4	8,000	146,000	108,000	36,000	11,500		12,000	204,000	156,000	45,000
6,400		8,000	146,000	108,000	36,000	12,000		12,000	204,000	156,000	45,000
6,500		8,000	146,000	108,000	36,000	12,500		14,000	230,000	182,000	45,000
6,600		8,000	146,000	108,000	36,000	12,700	1/2	14,000	230,000	182,000	45,000
6,700		8,000	146,000	108,000	36,000	13,000		14,000	230,000	182,000	45,000
6,800		8,000	146,000	108,000	36,000	13,500		14,000	230,000	182,000	45,000
6,900		8,000	146,000	108,000	36,000	14,000		14,000	230,000	182,000	45,000



d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
14,500		16,000	260,000	208,000	48,000
15,000		16,000	260,000	208,000	48,000
15,500		16,000	260,000	208,000	48,000
16,000		16,000	260,000	208,000	48,000
16,500		18,000	285,000	234,000	48,000
17,000		18,000	285,000	234,000	48,000
17,500		18,000	285,000	234,000	48,000
18,000		18,000	285,000	234,000	48,000
18,500		20,000	310,000	258,000	50,000
19,000		20,000	310,000	258,000	50,000
19,050	3/4	20,000	310,000	258,000	50,000
19,500		20,000	310,000	258,000	50,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
20,000		20,000	310,000	258,000	50,000



Wiertła RATIO, z kanałkami chłodz.



- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

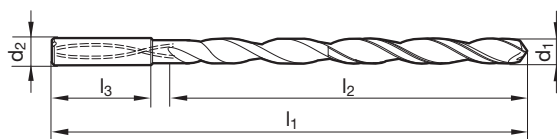
Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6509**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	95,000	55,000	36,000
3,170	1/8	6,000	106,000	67,000	36,000
3,500		6,000	116,000	76,000	36,000
3,570	9/64	6,000	116,000	76,000	36,000
3,970	5/32	6,000	116,000	76,000	36,000
4,000		6,000	116,000	76,000	36,000
4,370	11/64	6,000	133,000	93,000	36,000
4,500		6,000	133,000	93,000	36,000
4,760	3/16	6,000	133,000	93,000	36,000
5,000		6,000	133,000	93,000	36,000
5,100		6,000	150,000	110,000	36,000
5,160	13/64	6,000	150,000	110,000	36,000
5,410		6,000	150,000	110,000	36,000
5,500		6,000	150,000	110,000	36,000
5,560	7/32	6,000	150,000	110,000	36,000
5,950	15/64	6,000	150,000	110,000	36,000
6,000		6,000	150,000	110,000	36,000
6,350	1/4	8,000	167,000	127,000	36,000
6,500		8,000	167,000	127,000	36,000
6,750	17/64	8,000	167,000	127,000	36,000
7,000		8,000	167,000	127,000	36,000
7,140	9/32	8,000	183,000	143,000	36,000
7,500		8,000	183,000	143,000	36,000
7,540	19/64	8,000	183,000	143,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
7,940	5/16	8,000	183,000	143,000	36,000
8,000		8,000	183,000	143,000	36,000
8,330	21/64	10,000	204,000	160,000	40,000
8,500		10,000	204,000	160,000	40,000
8,730	11/32	10,000	204,000	160,000	40,000
9,000		10,000	204,000	160,000	40,000
9,130	23/64	10,000	221,000	177,000	40,000
9,520	3/8	10,000	221,000	177,000	40,000
9,920	25/64	10,000	221,000	177,000	40,000
10,000		10,000	221,000	177,000	40,000
10,320	13/32	12,000	247,000	198,000	45,000
10,720	27/64	12,000	247,000	198,000	45,000
11,000		12,000	247,000	198,000	45,000
11,110	7/16	12,000	263,000	214,000	45,000
11,510	29/64	12,000	263,000	214,000	45,000
11,910	15/32	12,000	263,000	214,000	45,000
12,000		12,000	263,000	214,000	45,000
12,300	31/64	14,000	297,000	248,000	45,000
12,700	1/2	14,000	297,000	248,000	45,000
13,100	33/64	14,000	297,000	248,000	45,000
13,490	17/32	14,000	297,000	248,000	45,000
13,890	35/64	14,000	297,000	248,000	45,000
14,000		14,000	297,000	248,000	45,000



Wiertła RATIO, z kanałkami chłodz.

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu HA

Wiertła RATIO

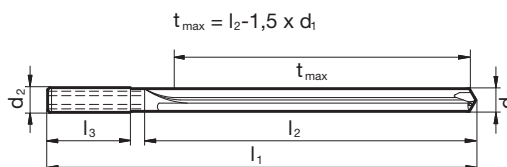
P Korekcja ścina $\geq \varnothing 5,000$ • geometria zataczana • ujemny kąt spirali • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • kontrolować ciśnienie chłodziwa

M**K** •**N** •**S****H**

aluminium i stopy Al • stopy Al z wysoką zawartością Si • żeliwa szare, ciągliwe i sferoidalne

GÜHRINGNAVIGATOR

Param. skr. na str. 760

Nr artykułu **773**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		6,000	145,000	105,000	36,000
6,000		6,000	145,000	105,000	36,000
8,000		8,000	180,000	137,000	36,000
9,000		10,000	217,000	170,000	40,000
10,000		10,000	217,000	170,000	40,000
11,000		12,000	258,000	205,000	45,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	258,000	205,000	45,000
14,000		14,000	290,000	236,000	45,000



Wiertła RATIO, z kanałkami chłodz.



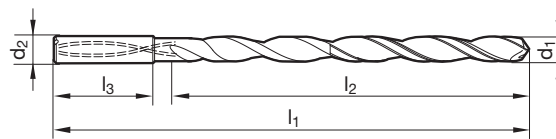
- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

Materiał narzędzia **Węglik mono.**

Powierzchnia **A**
 Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6511**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	110,000	70,000	36,000	8,730	11/32	10,000	249,000	205,000	40,000
3,100		6,000	123,000	83,000	36,000	9,000		10,000	249,000	205,000	40,000
3,170	1/8	6,000	123,000	83,000	36,000	9,130	23/64	10,000	271,000	227,000	40,000
3,500		6,000	136,000	96,000	36,000	9,520	3/8	10,000	271,000	227,000	40,000
3,570	9/64	6,000	136,000	96,000	36,000	9,920	25/64	10,000	271,000	227,000	40,000
3,970	5/32	6,000	136,000	96,000	36,000	10,000		10,000	271,000	227,000	40,000
4,000		6,000	136,000	96,000	36,000	10,320	13/32	12,000	302,000	253,000	45,000
4,200		6,000	158,000	118,000	36,000	10,720	27/64	12,000	302,000	253,000	45,000
4,370	11/64	6,000	158,000	118,000	36,000	11,000		12,000	302,000	253,000	45,000
4,500		6,000	158,000	118,000	36,000	11,110	7/16	12,000	323,000	274,000	45,000
4,760	3/16	6,000	158,000	118,000	36,000	11,510	29/64	12,000	323,000	274,000	45,000
5,000		6,000	158,000	118,000	36,000	11,910	15/32	12,000	323,000	274,000	45,000
5,100		6,000	180,000	140,000	36,000	12,000		12,000	323,000	274,000	45,000
5,160	13/64	6,000	180,000	140,000	36,000	12,300	31/64	14,000	367,000	318,000	45,000
5,410		6,000	180,000	140,000	36,000	12,700	1/2	14,000	367,000	318,000	45,000
5,500		6,000	180,000	140,000	36,000	13,100	33/64	14,000	367,000	318,000	45,000
5,560	7/32	6,000	180,000	140,000	36,000	13,490	17/32	14,000	367,000	318,000	45,000
5,950	15/64	6,000	180,000	140,000	36,000	13,890	35/64	14,000	367,000	318,000	45,000
6,000		6,000	180,000	140,000	36,000	14,000		14,000	367,000	318,000	45,000
6,350	1/4	8,000	202,000	162,000	36,000						
6,500		8,000	202,000	162,000	36,000						
6,750	17/64	8,000	202,000	162,000	36,000						
7,000		8,000	202,000	162,000	36,000						
7,140	9/32	8,000	223,000	183,000	36,000						
7,500		8,000	223,000	183,000	36,000						
7,540	19/64	8,000	223,000	183,000	36,000						
7,940	5/16	8,000	223,000	183,000	36,000						
8,000		8,000	223,000	183,000	36,000						
8,330	21/64	10,000	249,000	205,000	40,000						
8,500		10,000	249,000	205,000	40,000						



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

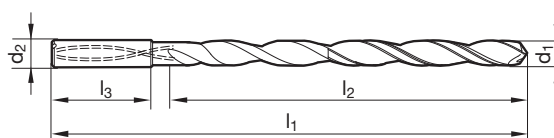
Forma chwytu HA

Wiertła RATIO

- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6512**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	125,000	85,000	36,000	7,000		8,000	237,000	197,000	36,000
3,100		6,000	141,000	101,000	36,000	7,140	9/32	8,000	263,000	223,000	36,000
3,170	1/8	6,000	141,000	101,000	36,000	7,500		8,000	263,000	223,000	36,000
3,500		6,000	156,000	116,000	36,000	7,540	19/64	8,000	263,000	223,000	36,000
3,570	9/64	6,000	156,000	116,000	36,000	7,940	5/16	8,000	263,000	223,000	36,000
3,800		6,000	156,000	116,000	36,000	8,000		8,000	263,000	223,000	36,000
3,970	5/32	6,000	156,000	116,000	36,000	8,330	21/64	10,000	294,000	250,000	40,000
4,000		6,000	156,000	116,000	36,000	8,500		10,000	294,000	250,000	40,000
4,200		6,000	183,000	143,000	36,000	8,730	11/32	10,000	294,000	250,000	40,000
4,370	11/64	6,000	183,000	143,000	36,000	8,800		10,000	294,000	250,000	40,000
4,500		6,000	183,000	143,000	36,000	9,000		10,000	294,000	250,000	40,000
4,760	3/16	6,000	183,000	143,000	36,000	9,130	23/64	10,000	321,000	277,000	40,000
5,000		6,000	183,000	143,000	36,000	9,520	3/8	10,000	321,000	277,000	40,000
5,100		6,000	210,000	170,000	36,000	9,920	25/64	10,000	321,000	277,000	40,000
5,160	13/64	6,000	210,000	170,000	36,000	10,000		10,000	321,000	277,000	40,000
5,410		6,000	210,000	170,000	36,000	10,320	13/32	12,000	359,000	310,000	45,000
5,500		6,000	210,000	170,000	36,000	10,720	27/64	12,000	359,000	310,000	45,000
5,560	7/32	6,000	210,000	170,000	36,000	11,000		12,000	359,000	310,000	45,000
5,950	15/64	6,000	210,000	170,000	36,000	11,110	7/16	12,000	386,000	337,000	45,000
6,000		6,000	210,000	170,000	36,000	11,510	29/64	12,000	386,000	337,000	45,000
6,300		8,000	237,000	197,000	36,000	11,910	15/32	12,000	386,000	337,000	45,000
6,350	1/4	8,000	237,000	197,000	36,000	12,000		12,000	386,000	337,000	45,000
6,500		8,000	237,000	197,000	36,000						
6,750	17/64	8,000	237,000	197,000	36,000						



Wiertła RATIO, z kanałkami chłodz.



- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

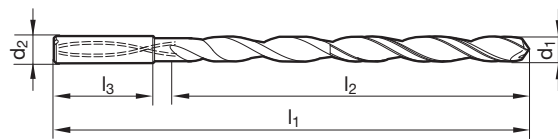
Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6513**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	140,000	100,000	36,000	7,000		8,000	272,000	232,000	36,000
3,100		6,000	158,000	118,000	36,000	7,140	9/32	8,000	303,000	263,000	36,000
3,170	1/8	6,000	158,000	118,000	36,000	7,500		8,000	303,000	263,000	36,000
3,500		6,000	176,000	136,000	36,000	7,540	19/64	8,000	303,000	263,000	36,000
3,570	9/64	6,000	176,000	136,000	36,000	7,940	5/16	8,000	303,000	263,000	36,000
3,800		6,000	176,000	136,000	36,000	8,000		8,000	303,000	263,000	36,000
3,970	5/32	6,000	176,000	136,000	36,000	8,330	21/64	10,000	339,000	295,000	40,000
4,000		6,000	176,000	136,000	36,000	8,500		10,000	339,000	295,000	40,000
4,200		6,000	208,000	168,000	36,000	8,730	11/32	10,000	339,000	295,000	40,000
4,370	11/64	6,000	208,000	168,000	36,000	8,800		10,000	339,000	295,000	40,000
4,500		6,000	208,000	168,000	36,000	9,000		10,000	339,000	295,000	40,000
4,760	3/16	6,000	208,000	168,000	36,000	9,130	23/64	10,000	371,000	327,000	40,000
5,000		6,000	208,000	168,000	36,000	9,520	3/8	10,000	371,000	327,000	40,000
5,100		6,000	240,000	200,000	36,000	9,920	25/64	10,000	371,000	327,000	40,000
5,160	13/64	6,000	240,000	200,000	36,000	10,000		10,000	371,000	327,000	40,000
5,410		6,000	240,000	200,000	36,000						
5,500		6,000	240,000	200,000	36,000						
5,560	7/32	6,000	240,000	200,000	36,000						
5,950	15/64	6,000	240,000	200,000	36,000						
6,000		6,000	240,000	200,000	36,000						
6,300		8,000	272,000	232,000	36,000						
6,350	1/4	8,000	272,000	232,000	36,000						
6,500		8,000	272,000	232,000	36,000						
6,750	17/64	8,000	272,000	232,000	36,000						



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia

Węglik mono.

Powierzchnia

A

Forma chwytu

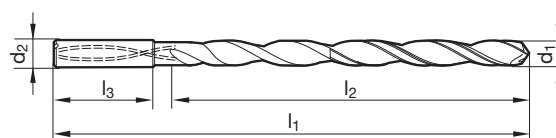
HA

Wiertła RATIO

P	•	Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
M	•	
K	•	
N	○	stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
S	○	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu

6514

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	170,000	130,000	36,000	5,950	15/64	6,000	300,000	260,000	36,000
3,100		6,000	193,000	153,000	36,000	6,000		6,000	300,000	260,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000	6,300		8,000	322,000	282,000	36,000
3,500		6,000	193,000	153,000	36,000	6,350	1/4	8,000	322,000	282,000	36,000
3,570	9/64	6,000	216,000	176,000	36,000	6,500		8,000	322,000	282,000	36,000
3,800		6,000	216,000	176,000	36,000	6,750	17/64	8,000	342,000	302,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000	7,000		8,000	342,000	302,000	36,000
4,000		6,000	216,000	176,000	36,000	7,140	9/32	8,000	363,000	323,000	36,000
4,200		6,000	238,000	198,000	36,000	7,500		8,000	363,000	323,000	36,000
4,370	11/64	6,000	238,000	198,000	36,000	7,540	19/64	8,000	383,000	343,000	36,000
4,500		6,000	238,000	198,000	36,000	7,940	5/16	8,000	383,000	343,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000	8,000		8,000	383,000	343,000	36,000
5,000		6,000	258,000	218,000	36,000						
5,100		6,000	280,000	240,000	36,000						
5,160	13/64	6,000	280,000	240,000	36,000						
5,410		6,000	280,000	240,000	36,000						
5,500		6,000	280,000	240,000	36,000						
5,560	7/32	6,000	300,000	260,000	36,000						



Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego



Materiał narzędzia

Węglik mono.

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 0,500$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane

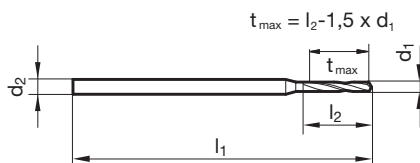
M •**K** •

N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopow – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane

S ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu

6400

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	3,000
0,550	3,000	47,000	3,300
0,600	3,000	47,000	3,600
0,650	3,000	47,000	3,900
0,700	3,000	47,000	4,200
0,750	3,000	47,000	4,500
0,800	3,000	47,000	4,800
0,850	3,000	47,000	5,100
0,900	3,000	47,000	5,400
0,950	3,000	47,000	5,700
1,000	3,000	47,000	6,000
1,050	3,000	47,000	6,300
1,100	3,000	47,000	6,600
1,150	3,000	47,000	6,900
1,200	3,000	47,000	7,200
1,250	3,000	47,000	7,500
1,300	3,000	47,000	7,800
1,350	3,000	47,000	8,100
1,400	3,000	47,000	8,400
1,450	3,000	47,000	8,700
1,500	3,000	47,000	9,000
1,550	3,000	47,000	9,300
1,590	3,000	47,000	9,600
1,600	3,000	47,000	9,600
1,650	3,000	47,000	9,900
1,700	3,000	47,000	10,200
1,750	3,000	47,000	10,500
1,800	3,000	52,000	10,800
1,850	3,000	52,000	11,100
1,900	3,000	52,000	11,400

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	11,700
1,980	4,000	59,000	12,000
2,000	4,000	59,000	12,000
2,050	4,000	59,000	12,300
2,100	4,000	59,000	12,600
2,150	4,000	59,000	12,900
2,200	4,000	59,000	13,200
2,250	4,000	59,000	13,500
2,300	4,000	59,000	13,800
2,350	4,000	59,000	14,100
2,380	4,000	59,000	14,400
2,400	4,000	59,000	14,400
2,450	4,000	59,000	14,700
2,500	4,000	59,000	15,000
2,550	4,000	59,000	15,300
2,600	4,000	59,000	15,600
2,650	4,000	59,000	15,900
2,700	4,000	59,000	16,200
2,750	4,000	59,000	16,500
2,780	4,000	59,000	16,800
2,800	4,000	59,000	16,800
2,850	4,000	59,000	17,100
2,900	4,000	59,000	17,400
2,950	4,000	59,000	17,700
3,000	4,000	59,000	18,000



Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego



Materiał narzędzia

Węglik mono.

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 0,500$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane

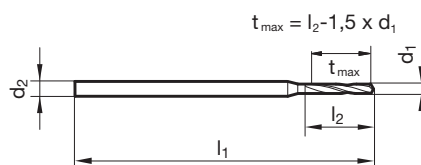
M •**K** •

N ○ stале konstrukcyjne i do nawęglania • stале automatowe, stале do ulepszenia cieplnego • stале stopowe – $R_m < 1200 \text{ N/mm}^2$ • stале nierdzewne • materiały odlewane

S ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu

6401

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	4,000
0,550	3,000	47,000	4,400
0,600	3,000	47,000	4,800
0,650	3,000	47,000	5,200
0,700	3,000	47,000	5,600
0,750	3,000	47,000	6,000
0,800	3,000	47,000	6,400
0,850	3,000	47,000	6,800
0,900	3,000	47,000	7,200
0,950	3,000	47,000	7,600
1,000	3,000	47,000	8,000
1,050	3,000	47,000	8,400
1,100	3,000	47,000	8,800
1,150	3,000	47,000	9,200
1,200	3,000	52,000	10,800
1,250	3,000	52,000	11,300
1,300	3,000	52,000	11,700
1,350	3,000	52,000	12,200
1,400	3,000	52,000	12,600
1,450	3,000	52,000	13,100
1,500	3,000	52,000	13,500
1,550	3,000	52,000	14,000
1,590	3,000	52,000	14,400
1,600	3,000	52,000	14,400
1,650	3,000	52,000	14,900
1,700	3,000	52,000	15,300
1,750	3,000	52,000	15,800
1,800	3,000	52,000	16,200
1,850	3,000	52,000	16,700
1,900	3,000	52,000	17,100

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	17,600
1,980	4,000	63,000	18,000
2,000	4,000	63,000	18,000
2,050	4,000	63,000	18,500
2,100	4,000	63,000	18,900
2,150	4,000	63,000	19,400
2,200	4,000	63,000	19,800
2,250	4,000	63,000	20,300
2,300	4,000	63,000	20,700
2,350	4,000	63,000	21,200
2,380	4,000	63,000	21,600
2,400	4,000	63,000	21,600
2,450	4,000	63,000	22,100
2,500	4,000	63,000	22,500
2,550	4,000	63,000	23,000
2,600	4,000	67,000	23,400
2,650	4,000	67,000	23,900
2,700	4,000	67,000	24,300
2,750	4,000	67,000	24,800
2,780	4,000	67,000	25,200
2,800	4,000	67,000	25,200
2,850	4,000	67,000	25,700
2,900	4,000	67,000	26,100
2,950	4,000	67,000	26,600
3,000	4,000	67,000	27,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia

Węglik mono.

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane

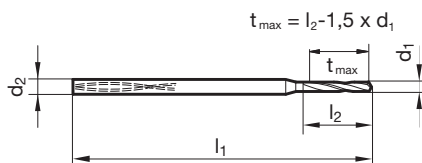
M •**K** •

N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane

S ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu

6405

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	11,000
1,450	4,000	52,000	12,000
1,500	4,000	52,000	12,000
1,550	4,000	52,000	12,000
1,590	4,000	52,000	13,000
1,600	4,000	52,000	13,000
1,650	4,000	52,000	13,000
1,700	4,000	56,000	14,000
1,750	4,000	56,000	14,000
1,800	4,000	56,000	14,000
1,850	4,000	56,000	15,000
1,900	4,000	56,000	15,000
1,950	4,000	56,000	16,000
1,980	4,000	56,000	16,000
2,000	4,000	56,000	16,000
2,050	4,000	56,000	16,000
2,100	4,000	62,000	17,000
2,150	4,000	62,000	17,000
2,200	4,000	62,000	18,000
2,250	4,000	62,000	18,000
2,300	4,000	62,000	18,000
2,350	4,000	62,000	19,000
2,380	4,000	62,000	19,000
2,400	4,000	62,000	19,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,450	4,000	62,000	20,000
2,500	4,000	62,000	20,000
2,550	4,000	62,000	20,000
2,600	4,000	66,000	21,000
2,650	4,000	66,000	21,000
2,700	4,000	66,000	22,000
2,750	4,000	66,000	22,000
2,780	4,000	66,000	22,000
2,800	4,000	66,000	22,000
2,850	4,000	66,000	23,000
2,900	4,000	66,000	23,000
2,950	4,000	66,000	24,000
3,000	4,000	66,000	24,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia

Węglik mono.

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane

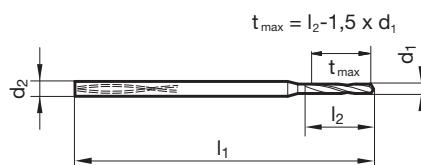
M •**K** •

N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane

S ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu

6408

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	15,000
1,450	4,000	52,000	16,000
1,500	4,000	52,000	17,000
1,550	4,000	52,000	17,000
1,590	4,000	52,000	18,000
1,600	4,000	52,000	18,000
1,650	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,750	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,850	4,000	56,000	20,000
1,900	4,000	56,000	21,000
1,950	4,000	56,000	21,000
1,980	4,000	56,000	22,000
2,000	4,000	56,000	22,000
2,050	4,000	56,000	23,000
2,100	4,000	62,000	23,000
2,150	4,000	62,000	24,000
2,200	4,000	62,000	24,000
2,250	4,000	62,000	25,000
2,300	4,000	62,000	25,000
2,320	4,000	62,000	26,000
2,350	4,000	62,000	26,000
2,380	4,000	62,000	26,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,400	4,000	62,000	26,000
2,450	4,000	62,000	27,000
2,500	4,000	62,000	28,000
2,550	4,000	62,000	28,000
2,600	4,000	66,000	29,000
2,650	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,750	4,000	66,000	30,000
2,780	4,000	66,000	31,000
2,800	4,000	66,000	31,000
2,850	4,000	66,000	31,000
2,900	4,000	66,000	32,000
2,950	4,000	66,000	32,000
3,000	4,000	66,000	33,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia

Węglik mono.

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \text{Ø } 1,400$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane

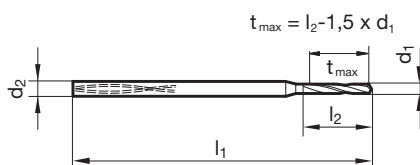
M •**K** •

N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do
ulepszania cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale
nierdzewne • materiały odlewane

S ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu

6412

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	62,000	25,000
1,500	4,000	62,000	27,000
1,590	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,700	4,000	70,000	31,000
1,800	4,000	70,000	32,000
1,900	4,000	70,000	34,000
1,980	4,000	70,000	36,000
2,000	4,000	70,000	36,000
2,100	4,000	78,000	38,000
2,200	4,000	78,000	40,000
2,300	4,000	78,000	42,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,380	4,000	78,000	44,000
2,400	4,000	78,000	44,000
2,500	4,000	78,000	45,000
2,600	4,000	87,000	47,000
2,700	4,000	87,000	48,000
2,780	4,000	87,000	50,000
2,800	4,000	87,000	50,000
2,900	4,000	87,000	52,000
3,000	4,000	87,000	54,000



Wiertła RATIO, 3-ostrowe



Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu HA

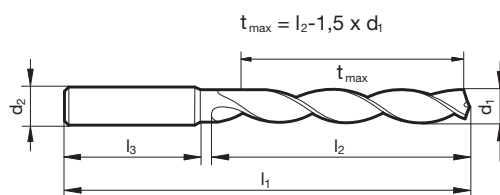
P Korekcja ścina $\geq \varnothing 3,000$ • ostrzenie „Spiro-point” • szerokie rowki wiórowe
• optymalne centrowanie • przeznaczone do obróbki przerywanej



N • żeliwa • długowiórowe stopy Al • mosiądże, brązy

GÜHRING NAVIGATOR

Param. skr. na str. 762

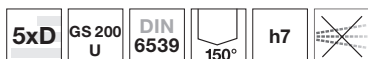


Nr artykułu **2713**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	66,000	28,000	36,000	8,700		10,000	103,000	61,000	40,000
3,100		6,000	66,000	28,000	36,000	8,800		10,000	103,000	61,000	40,000
3,200		6,000	66,000	28,000	36,000	9,000		10,000	103,000	61,000	40,000
3,300		6,000	66,000	28,000	36,000	9,100		10,000	103,000	61,000	40,000
3,500		6,000	66,000	28,000	36,000	9,500		10,000	103,000	61,000	40,000
3,700		6,000	66,000	28,000	36,000	9,800		10,000	103,000	61,000	40,000
3,800		6,000	74,000	36,000	36,000	10,000		10,000	103,000	61,000	40,000
4,000		6,000	74,000	36,000	36,000	10,100		12,000	118,000	71,000	45,000
4,100		6,000	74,000	36,000	36,000	10,200		12,000	118,000	71,000	45,000
4,200		6,000	74,000	36,000	36,000	10,300		12,000	118,000	71,000	45,000
4,500		6,000	74,000	36,000	36,000	10,500		12,000	118,000	71,000	45,000
4,800		6,000	82,000	44,000	36,000	11,000		12,000	118,000	71,000	45,000
5,000		6,000	82,000	44,000	36,000	11,200		12,000	118,000	71,000	45,000
5,100		6,000	82,000	44,000	36,000	11,500		12,000	118,000	71,000	45,000
5,200		6,000	82,000	44,000	36,000	11,800		12,000	118,000	71,000	45,000
5,300		6,000	82,000	44,000	36,000	12,000		12,000	118,000	71,000	45,000
5,500		6,000	82,000	44,000	36,000	12,100		14,000	124,000	77,000	45,000
5,800		6,000	82,000	44,000	36,000	12,500		14,000	124,000	77,000	45,000
6,000		6,000	82,000	44,000	36,000	13,000		14,000	124,000	77,000	45,000
6,100		8,000	91,000	53,000	36,000	13,500		14,000	124,000	77,000	45,000
6,200		8,000	91,000	53,000	36,000	14,000		14,000	124,000	77,000	45,000
6,400		8,000	91,000	53,000	36,000	14,500		16,000	133,000	83,000	48,000
6,500		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
6,700		8,000	91,000	53,000	36,000	15,500		16,000	133,000	83,000	48,000
6,800		8,000	91,000	53,000	36,000	16,000		16,000	133,000	83,000	48,000
7,000		8,000	91,000	53,000	36,000	16,500		18,000	143,000	93,000	48,000
7,100		8,000	91,000	53,000	36,000	17,000		18,000	143,000	93,000	48,000
7,400		8,000	91,000	53,000	36,000	17,500		18,000	143,000	93,000	48,000
7,500		8,000	91,000	53,000	36,000	18,000		18,000	143,000	93,000	48,000
7,800		8,000	91,000	53,000	36,000	18,500		20,000	153,000	101,000	50,000
8,000		8,000	91,000	53,000	36,000	19,000		20,000	153,000	101,000	50,000
8,100		10,000	103,000	61,000	40,000	19,500		20,000	153,000	101,000	50,000
8,200		10,000	103,000	61,000	40,000	20,000		20,000	153,000	101,000	50,000
8,400		10,000	103,000	61,000	40,000						
8,500		10,000	103,000	61,000	40,000						
8,600		10,000	103,000	61,000	40,000						



Wiertła RATIO, 3-ostrzowe



Materiał narzędzia

Węglik mono.

Powierzchnia

S

Forma chwytu

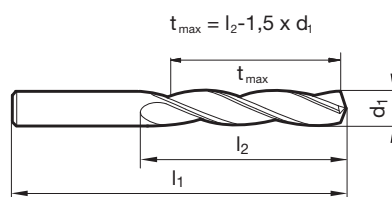
walcowy

P ○ Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • przeznaczone do obróbki przerywanej

M**K** ○**N** ○staliwo • stале stopowe/niestopowe - $R_m > 1000 \text{ N/mm}^2$ **S****H**

GÜHRING NAVIGATOR

Param. skr. na str. 762



Nr artykułu

611

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	22,000
3,100		49,000	24,000
3,900		55,000	30,000
4,000		55,000	30,000
4,100		55,000	30,000
4,200		55,000	30,000
5,000		62,000	35,000
6,000		66,000	39,000
6,200		70,000	42,000
6,800		74,000	45,000
7,000		74,000	45,000
8,000		79,000	48,000

d1		l1	l2
mm	inch	mm	mm
8,500		79,000	48,000
10,000		89,000	55,000
10,200		89,000	55,000
12,000		102,000	65,000
14,000		107,000	66,000
14,400		111,000	70,000



Wiertła RATIO, 3-ostrzowe

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu walcowy

P ○ Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • przeznaczone do obróbki przerywanej

M ○

K ○

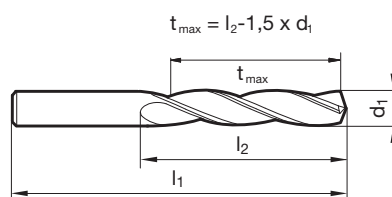
N ○ staliwo • stale stopowe/niestopowe - $R_m > 1000 \text{ N/mm}^2$

S ○

H ○

GÜHRING NAVIGATOR

Param. skr. na str. 762



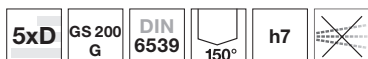
Nr artykułu

731

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		46,000	22,000	7,800		79,000	48,000
3,100		49,000	24,000	8,000		79,000	48,000
3,200		49,000	24,000	8,100		79,000	48,000
3,300		49,000	24,000	8,300		79,000	48,000
3,400		52,000	27,000	8,400		79,000	48,000
3,500		52,000	27,000	8,500		79,000	48,000
3,600		52,000	27,000	9,000		84,000	52,000
3,700		52,000	27,000	9,600		89,000	55,000
3,800		55,000	30,000	9,700		89,000	55,000
3,900		55,000	30,000	9,800		89,000	55,000
3,970	5/32	55,000	30,000	9,900		89,000	55,000
4,000		55,000	30,000	10,000		89,000	55,000
4,200		55,000	30,000	10,200		89,000	55,000
4,300		58,000	32,000	10,320	13/32	89,000	55,000
4,500		58,000	32,000	10,400		89,000	55,000
4,700		58,000	32,000	10,500		89,000	55,000
4,760	3/16	62,000	35,000	10,800		95,000	60,000
4,800		62,000	35,000	11,000		95,000	60,000
5,000		62,000	35,000	11,300		95,000	60,000
5,100		62,000	35,000	11,500		95,000	60,000
5,200		62,000	35,000	11,600		95,000	60,000
5,300		62,000	35,000	11,700		95,000	60,000
5,400		66,000	39,000	12,000		102,000	65,000
5,500		66,000	39,000	12,100		102,000	65,000
5,600		66,000	39,000	12,500		102,000	65,000
5,800		66,000	39,000	13,000		102,000	65,000
6,000		66,000	39,000	13,200		102,000	65,000
6,100		70,000	42,000	13,500		107,000	66,000
6,400		70,000	42,000	14,000		107,000	66,000
6,500		70,000	42,000	14,300		111,000	70,000
6,700		70,000	42,000	16,000		115,000	73,000
6,750	17/64	74,000	45,000	17,500		123,000	76,000
6,800		74,000	45,000	20,000		131,000	79,000
7,000		74,000	45,000				
7,500		74,000	45,000				
7,700		79,000	48,000				



Wiertła RATIO, 3-ostrzowe

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

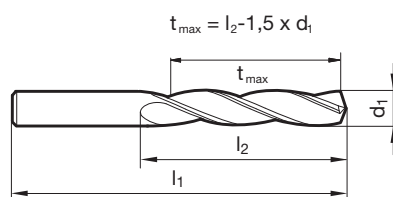
Forma chwytu walcowy

P Korekcja ścina $\geq \varnothing 3,570$ • geom. ścinowa • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • przeznaczone do obróbki przerywanej

M**K** ○**N** ○ materiały odlewane • stopy odlewnicze Al**S****H**

GÜHRING NAVIGATOR

Param. skr. na str. 762



Nr artykułu

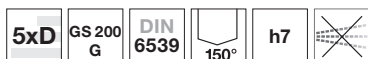
745

d1		l1	l2
mm	inch	mm	mm
3,570	9/64	52,000	27,000
4,370	11/64	58,000	32,000
6,900		74,000	45,000
7,300		74,000	45,000
7,940	5/16	79,000	48,000
8,330	21/64	79,000	48,000

d1		l1	l2
mm	inch	mm	mm
8,800		84,000	52,000
9,700		89,000	55,000
10,720	27/64	95,000	60,000
12,500		102,000	65,000



Wiertła RATIO, 3-ostrzowe



Materiał narzędzia

Węglik mono.

Powierzchnia



Forma chwytu

walcowy

P Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • przeznaczone do obróbki przerywanej

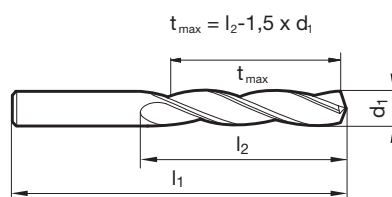
M**K** ○**N** ○

materiały odlewane • stopy odlewnicze Al

S**H**

GÜHRING NAVIGATOR

Param. skr. na str. 762



Nr artykułu

1025

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		46,000	22,000	7,100		74,000	45,000
3,100		49,000	24,000	7,200		74,000	45,000
3,200		49,000	24,000	7,300		74,000	45,000
3,300		49,000	24,000	7,400		74,000	45,000
3,400		52,000	27,000	7,500		74,000	45,000
3,500		52,000	27,000	7,600		79,000	48,000
3,570	9/64	52,000	27,000	7,700		79,000	48,000
3,600		52,000	27,000	7,800		79,000	48,000
3,700		52,000	27,000	7,900		79,000	48,000
3,800		55,000	30,000	8,000		79,000	48,000
3,900		55,000	30,000	8,100		79,000	48,000
3,970	5/32	55,000	30,000	8,200		79,000	48,000
4,000		55,000	30,000	8,400		79,000	48,000
4,100		55,000	30,000	8,500		79,000	48,000
4,200		55,000	30,000	8,600		84,000	52,000
4,300		58,000	32,000	8,700		84,000	52,000
4,370	11/64	58,000	32,000	8,800		84,000	52,000
4,500		58,000	32,000	9,000		84,000	52,000
4,600		58,000	32,000	9,100		84,000	52,000
4,700		58,000	32,000	9,300		84,000	52,000
4,800		62,000	35,000	9,500		84,000	52,000
4,900		62,000	35,000	9,520	3/8	89,000	55,000
5,000		62,000	35,000	9,600		89,000	55,000
5,100		62,000	35,000	9,700		89,000	55,000
5,200		62,000	35,000	9,800		89,000	55,000
5,300		62,000	35,000	10,000		89,000	55,000
5,400		66,000	39,000	10,100		89,000	55,000
5,500		66,000	39,000	10,200		89,000	55,000
5,600		66,000	39,000	10,300		89,000	55,000
5,700		66,000	39,000	10,500		89,000	55,000
5,800		66,000	39,000	10,700		95,000	60,000
5,900		66,000	39,000	11,000		95,000	60,000
6,000		66,000	39,000	11,110	7/16	95,000	60,000
6,100		70,000	42,000	11,200		95,000	60,000
6,200		70,000	42,000	11,500		95,000	60,000
6,300		70,000	42,000	11,510	29/64	95,000	60,000
6,400		70,000	42,000	11,700		95,000	60,000
6,500		70,000	42,000	11,800		95,000	60,000
6,600		70,000	42,000	11,910	15/32	102,000	65,000
6,700		70,000	42,000	12,000		102,000	65,000
6,800		74,000	45,000	12,200		102,000	65,000
7,000		74,000	45,000	12,500		102,000	65,000



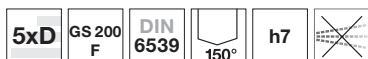
Wiertła RATIO

d1		l1	l2
mm	inch	mm	mm
12,700	1/2	102,000	65,000
13,000		102,000	65,000
13,500		107,000	66,000
13,800		107,000	66,000
14,000		107,000	66,000
14,300		111,000	70,000
14,500		111,000	70,000
15,000		111,000	70,000
15,870	5/8	115,000	73,000
16,000		115,000	73,000
17,000		119,000	73,000
18,500		127,000	76,000

d1		l1	l2
mm	inch	mm	mm
19,000		127,000	76,000
20,000		131,000	79,000



Wiertła RATIO, 3-ostrzowe

Materiał narzędzia **Węglik mono.**Powierzchnia **S**

Forma chwytu walcowy

Wiertła RATIO

P ◦ Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • przeznaczone do obróbki przerywanej

M ◦

K ◦

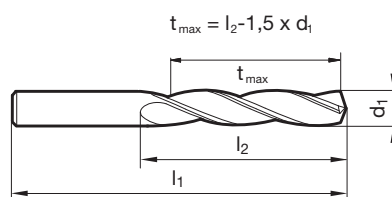
N ◦ stale automatowe, stale konstrukcyjne • stale stopowe/niestopowe - $R_m > 1000 \text{ N/mm}^2$

S ◦

H ◦

GÜHRING NAVIGATOR

Param. skr. na str. 762



Nr artykułu

1027

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	22,000
3,200		49,000	24,000
3,900		55,000	30,000
4,000		55,000	30,000
4,900		62,000	35,000
5,000		62,000	35,000
5,300		62,000	35,000
5,500		66,000	39,000
6,000		66,000	39,000
6,200		70,000	42,000
7,000		74,000	45,000
9,000		84,000	52,000

d1		l1	l2
mm	inch	mm	mm
10,000		89,000	55,000
11,000		95,000	60,000



Wiertła stopniowe RATIO, 3-ostrzowe



Materiał narzędzia

Węglik mono.

Powierzchnia



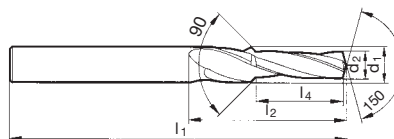
Forma chwytu

walcowy

P Korekcja ścina $\geq \varnothing 3,400$ • geom. ścinowa • do otworów bardzo dokładnych wymiarowo • bardzo dobra jakość powierzchni otworu • przeznaczone do obróbki przerywanej

M**K** ○**N** ○**S****H**

materiały odlewane • stopy odlewnicze Al



Nr artykułu

1032

d1	d2	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
3,400	2,500	52,000	27,000	9,000	M 3
4,500	3,300	58,000	32,000	11,000	M 4
5,500	4,200	66,000	39,000	14,000	M 5
5,500	4,700	66,000	39,000	14,000	
6,600	5,000	70,000	42,000	16,000	M 6
9,000	6,800	84,000	52,000	22,000	M 8
11,000	8,500	95,000	60,000	28,000	M10
11,000	8,800	95,000	60,000	28,000	M10X1,25
13,500	10,200	107,000	66,000	33,000	M12
15,500	13,200	115,000	73,000	38,000	
17,500	15,000	123,000	76,000	41,000	M16 X1
20,000	16,000	131,000	79,000	43,000	M18X2



GM 300

Uchwyty narzędziowe i
systemy mocujące do
wszystkich zastosowań

Więcej informacji można znaleźć
w naszym katalogu GM300.





SYSTEM WIERTARSKI Z PŁYTKAMI WYM. T 800





System wiertarski HT800

Wraz z systemem wiertarskim z wymiennymi płytkami firma Gühring dostarcza wysokowydajne i optymalnie kosztowe narzędzia do obróbki otworów o średnicach od 11 do 40 mm.

System wiertarski HT800 jest idealny do wykonywania wysokiej jakości otworów o dużych średnicach w różnych materiałach obrabianych. Znajdzie zastosowanie w przemyśle energetycznym, samochodowym i w produkcji konstrukcji stalowych.

ZWIĘKSZONA TRWAŁOŚĆ NARZĘDZI

- płytki wymienne są perfekcyjnie dopasowane do danego zastosowania w zakresie materiału, geometrii i sposobu wykończenia powierzchni narzędzia
- optymalne wyniki obróbki stali, stali nierdzewnych, żeliwa lub aluminium

OPTYMALNA EWAKUACJA WIÓRÓW

- specjalny kształt rowków wiórowych
- bardzo gładkie powierzchnie narzędzia

STABILNE KORPUSY

- niewielkie stopniowanie średnic korpusów zmniejsza zużycie płytek
- lepsza chropowatość powierzchni otworu
- pewniejsze prowadzenie narzędzia w otworze
- zwiększone trwałości

DOKŁADNIE WYKONANE GNIAZDA PŁYTEK

- możliwa wymiana płytek w obrabiarce
- korpusy pozostają zamocowane
- nie jest konieczne ponowne ustawienia narzędzia
- zwiększona powtarzalność procesu i skrócone czasy przygotowawcze

PERFEKCYJNE CHŁODZENIE

- kanałki chłodzenia o maksymalnych przekrojach
- wyjście kanałków w rowkach wiórowych





Odpowiednia płytki do każdego materiału i zastosowania



System wiertarski z
płytkami wym. T 800

HT 800 WP

Odpowiedni korpus do każdej głębokości wiercenia i zastosowania

Nr artykułu	4105	4106	4107	4108	4109	4110
Głębokość wiercenia	1 x D	1,5 x D	3 x D	5 x D	7 x D	10 x D
Średnica	11,0 - 40,00	11,0 - 40,00	11,0 - 40,00	11,0 - 40,00	11,0 - 31,99	11,0 - 31,99
Forma chwytu	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE	DIN 6535-HE



Korpus do otworu pilotującego nr art. 4105 ma dodatkowe gniazda na płytki fazujące. To pozwala na jednoczesne wykonanie otworu pilotującego i fazy 45°.



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Forma chwytu	Typ	Norma	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
---	---	---	---	---	---	----------------------	---------------------	--------------	-----	-------	--------------------	--------------	-------	-------------	---------------------	--------

Korpusy wiertel składanych HT 800

System wiertarski z płytkami wym. T 800

	1xD	HE	HT 800 WP	WN	Ni	4105	764	138
	1,5xD	HE	HT 800 WP	WN	Ni	4106	764	128
	3xD	HE	HT 800 WP	WN	Ni	4107	764	130
	5xD	HE	HT 800 WP	WN	Ni	4108	766	132
	7xD	HE	HT 800 WP	WN	Ni	4109	766	134
	10xD	HE	HT 800 WP	WN	Ni	4110	768	136

Płytki wymienne do HT 800

	HT 800 WP	WN	VHM	F	11,000 - 40,000	4113	764	142
	HT 800 WP	WN	VHM		11,000 - 40,000	4114	764	148
	HT 800 WP	WN	VHM	F	11,000 - 40,000	4112	764	139
	HT 800 WP	WN	VHM	a	11,000 - 40,000	4115	764	145
	HT 800 WP	WN	VHM	a	11,000 - 40,000	4111	768	151

Płytki fazujące do HT 800

	WN	VHM			7635	156
	WN	VHM	S		7645	154
	WN	VHM	A		7632	155

Śruby mocujące

	WN	6128	157
	WN	4071	158







Korpusy wiertel składanych RT 800

	3xD	HE	RT 800 WP	WN	Ni	5242	770	159
	5xD	HE	RT 800 WP	WN	Ni	5243	770	160
	7xD	HE	RT 800 WP	WN	Ni	5248	770	161

Płytki wymienne do RT 800

	RT 800 WP	WN	VHM	F	16,000 - 40,500	2485	770	164
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P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Forma chwytu	Typ	Norma	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona	
Płytki wymienne do RT 800																	
		○	●								RT 800 WP	WN	VHM	○	16,000 - 40,000	2747	770 166
		●	○								RT 800 WP	WN	VHM	●	16,000 - 40,500	1047	770 162
Śruby mocujące do RT 800																	
																1071	168
Wkrętaki dynamometryczne																	
																4915	169
Nasadki Torx																	
																4917	170
Wkrętak Torx																	
																1612	171

System wiertarski z płytkami wym. T 800



Korpusy wiertel składanych HT 800

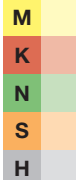


Materiał narzędzia

Powierzchnia

Forma chwytu HE

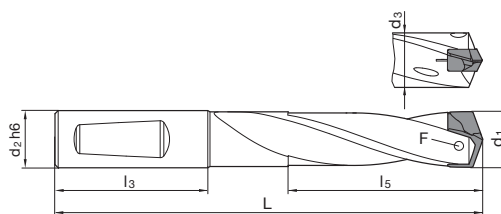
P powierzchnia niklowana • szczególnie wysoka odporność ścierania • optymalny kształt rowków wiórowych • optymalny wylot kanałków chłodzących • zawiera śruby mocujące nr art. 4071 • Zawiera wkrętak nr art. 1612



System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4106**

d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	84,000	45,000	19,300	4071 2.200	11,000
11,00-11,49	12,700	10,700	84,000	45,000	19,300	4071 2.200	11,005
11,50-11,99	12,000	11,200	85,000	45,000	20,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	85,000	45,000	20,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	87,000	45,000	21,000	4071 2.201	12,000
12,00-12,49	12,700	11,700	87,000	45,000	21,000	4071 2.201	12,005
12,50-12,99	14,000	12,200	89,000	45,000	21,900	4071 2.201	12,500
12,50-12,99	15,875	12,200	89,000	45,000	21,900	4071 2.201	12,505
13,00-13,49	14,000	12,700	90,000	45,000	22,600	4071 2.500	13,000
13,00-13,49	15,875	12,700	90,000	45,000	22,600	4071 2.500	13,005
13,50-13,99	14,000	13,200	92,000	45,000	23,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	92,000	45,000	23,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	93,000	45,000	24,500	4071 3.000	14,000
14,00-14,49	15,875	13,700	93,000	45,000	24,500	4071 3.000	14,005
14,50-14,99	16,000	14,200	98,000	48,000	25,300	4071 3.000	14,500
14,50-14,99	15,875	14,200	98,000	48,000	25,300	4071 3.000	14,505
15,00-15,49	16,000	14,700	100,000	48,000	26,100	4071 3.001	15,000
15,00-15,49	15,875	14,700	100,000	48,000	26,100	4071 3.001	15,005
15,50-15,99	16,000	15,200	101,000	48,000	27,000	4071 3.001	15,500
15,50-15,99	15,875	15,200	101,000	48,000	27,000	4071 3.001	15,505
16,00-16,49	16,000	15,700	102,000	48,000	27,800	4071 3.500	16,000
16,00-16,49	15,875	15,700	102,000	48,000	27,800	4071 3.500	16,005
16,50-16,99	18,000	16,200	105,000	48,000	28,700	4071 3.500	16,500
16,50-16,99	19,050	16,200	105,000	48,000	28,700	4071 3.500	16,505
17,00-17,49	18,000	16,700	106,000	48,000	29,600	4071 3.500	17,000
17,00-17,49	19,050	16,700	106,000	48,000	29,600	4071 3.500	17,005
17,50-17,99	18,000	17,200	107,000	48,000	30,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	107,000	48,000	30,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	109,000	48,000	31,200	4071 4.000	18,000
18,00-18,49	19,050	17,700	109,000	48,000	31,200	4071 4.000	18,005
18,50-18,99	20,000	18,200	113,000	50,000	32,100	4071 4.000	18,500
18,50-18,99	19,050	18,200	113,000	50,000	32,100	4071 4.000	18,505
19,00-19,49	20,000	18,700	114,000	50,000	32,900	4071 4.000	19,000
19,00-19,49	19,050	18,700	114,000	50,000	32,900	4071 4.000	19,005
19,50-19,99	20,000	19,200	116,000	50,000	33,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	116,000	50,000	33,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	117,000	50,000	34,600	4071 4.500	20,000
20,00-20,49	19,050	19,700	117,000	50,000	34,600	4071 4.500	20,005
20,50-20,99	25,000	20,200	128,000	56,000	35,500	4071 4.500	20,500
20,50-20,99	25,400	20,200	128,000	56,000	35,500	4071 4.500	20,505
21,00-21,49	25,000	20,700	129,000	56,000	36,400	4071 4.500	21,000
21,00-21,49	25,400	20,700	129,000	56,000	36,400	4071 4.500	21,005



d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	130,000	56,000	37,200	4071 4.500	21,500
21,50-21,99	25,400	21,200	130,000	56,000	37,200	4071 4.500	21,505
22,00-22,49	25,000	21,700	131,000	56,000	38,000	4071 5.000	22,000
22,00-22,49	25,400	21,700	131,000	56,000	38,000	4071 5.000	22,005
22,50-22,99	25,000	22,200	134,000	56,000	38,900	4071 5.000	22,500
22,50-22,99	25,400	22,200	134,000	56,000	38,900	4071 5.000	22,505
23,00-23,49	25,000	22,700	135,000	56,000	39,800	4071 5.000	23,000
23,00-23,49	25,400	22,700	135,000	56,000	39,800	4071 5.000	23,005
23,50-23,99	25,000	23,200	137,000	56,000	40,600	4071 5.000	23,500
23,50-23,99	25,400	23,200	137,000	56,000	40,600	4071 5.000	23,505
24,00-24,49	25,000	23,700	138,000	56,000	41,500	4071 5.001	24,000
24,00-24,49	25,400	23,700	138,000	56,000	41,500	4071 5.001	24,005
24,50-24,99	25,000	24,200	140,000	56,000	42,300	4071 5.001	24,500
24,50-24,99	25,400	24,200	140,000	56,000	42,300	4071 5.001	24,505
25,00-25,49	25,000	24,700	142,000	56,000	43,200	4071 5.001	25,000
25,00-25,49	25,400	24,700	142,000	56,000	43,200	4071 5.001	25,005
25,50-25,99	32,000	25,200	148,000	60,000	44,000	4071 5.001	25,500
25,50-25,99	31,750	25,200	148,000	60,000	44,000	4071 5.001	25,505
26,00-26,49	32,000	25,700	151,000	60,000	44,300	4071 5.003	26,000
26,00-26,49	31,750	25,700	151,000	60,000	44,300	4071 5.003	26,005
26,50-26,99	32,000	26,200	153,000	60,000	45,100	4071 5.003	26,500
26,50-26,99	31,750	26,200	153,000	60,000	45,100	4071 5.003	26,505
27,00-27,49	32,000	26,700	155,000	60,000	46,000	4071 5.003	27,000
27,00-27,49	31,750	26,700	155,000	60,000	46,000	4071 5.003	27,005
27,50-27,99	32,000	27,200	156,000	60,000	46,800	4071 5.003	27,500
27,50-27,99	31,750	27,200	156,000	60,000	46,800	4071 5.003	27,505
28,00-28,49	32,000	27,700	157,000	60,000	47,700	4071 5.003	28,000
28,00-28,49	31,750	27,700	157,000	60,000	47,700	4071 5.003	28,005
28,50-28,99	32,000	28,200	159,000	60,000	48,500	4071 5.003	28,500
28,50-28,99	31,750	28,200	159,000	60,000	48,500	4071 5.003	28,505
29,00-29,49	32,000	28,700	161,000	60,000	49,400	4071 5.003	29,000
29,00-29,49	31,750	28,700	161,000	60,000	49,400	4071 5.003	29,005
29,50-29,99	32,000	29,200	162,000	60,000	50,200	4071 5.003	29,500
29,50-29,99	31,750	29,200	162,000	60,000	50,200	4071 5.003	29,505
30,00-30,49	32,000	29,700	164,000	60,000	50,900	4071 6.000	30,000
30,00-30,49	31,750	29,700	164,000	60,000	50,900	4071 6.000	30,005
30,50-30,99	32,000	30,200	166,000	60,000	51,700	4071 6.000	30,500
30,50-30,99	31,750	30,200	166,000	60,000	51,700	4071 6.000	30,505
31,00-31,49	32,000	30,700	167,000	60,000	52,600	4071 6.000	31,000
31,00-31,49	31,750	30,700	167,000	60,000	52,600	4071 6.000	31,005
31,50-31,99	32,000	31,200	168,000	60,000	53,400	4071 6.000	31,500
31,50-31,99	31,750	31,200	168,000	60,000	53,400	4071 6.000	31,505
32,00-32,99	32,000	31,700	172,000	60,000	55,100	4071 6.001	32,000
32,00-32,99	31,750	31,700	172,000	60,000	55,100	4071 6.001	32,005
33,00-33,99	32,000	32,700	175,000	60,000	56,800	4071 6.001	33,000
33,00-33,99	31,750	32,700	175,000	60,000	56,800	4071 6.001	33,005
34,00-34,99	32,000	33,700	178,000	60,000	58,500	4071 6.001	34,000
34,00-34,99	31,750	33,700	178,000	60,000	58,500	4071 6.001	34,005
35,00-35,99	32,000	34,700	181,000	60,000	60,200	4071 6.001	35,000
35,00-35,99	31,750	34,700	181,000	60,000	60,200	4071 6.001	35,005
36,00-36,99	32,000	35,700	184,000	60,000	61,800	4071 6.002	36,000
36,00-36,99	31,750	35,700	184,000	60,000	61,800	4071 6.002	36,005
37,00-37,99	32,000	36,700	188,000	60,000	63,500	4071 6.002	37,000
37,00-37,99	31,750	36,700	188,000	60,000	63,500	4071 6.002	37,005
38,00-38,99	32,000	37,700	191,000	60,000	65,200	4071 6.002	38,000
38,00-38,99	31,750	37,700	191,000	60,000	65,200	4071 6.002	38,005
39,00-40,00	32,000	38,700	194,000	60,000	66,900	4071 6.002	39,000
39,00-40,00	31,750	38,700	194,000	60,000	66,900	4071 6.002	39,005



Korpusy wiertel składanych HT 800

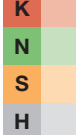


Materiał narzędzia

Powierzchnia

Forma chwytu HE

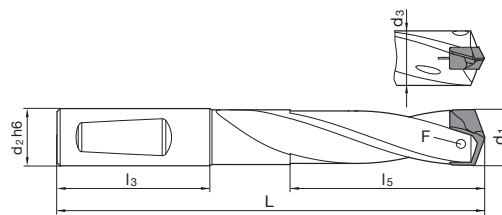
P powierzchnia niklowana • szczególnie wysoka odporność ścierania • optymalny kształt rowków wiórowych • optymalny wylot kanałków chłodzących • zawiera śruby mocujące nr art. 4071 • Zawiera wkrętak nr art. 1612



System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4107**

d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	101,000	45,000	36,600	4071 2.200	11,000
11,00-11,49	12,700	10,700	101,000	45,000	36,600	4071 2.200	11,005
11,50-11,99	12,000	11,200	103,000	45,000	38,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	103,000	45,000	38,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	106,000	45,000	39,700	4071 2.201	12,000
12,00-12,49	12,700	11,700	106,000	45,000	39,700	4071 2.201	12,005
12,50-12,99	14,000	12,200	108,000	45,000	41,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	108,000	45,000	41,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	110,000	45,000	42,900	4071 2.500	13,000
13,00-13,49	15,875	12,700	110,000	45,000	42,900	4071 2.500	13,005
13,50-13,99	14,000	13,200	113,000	45,000	44,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	113,000	45,000	44,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	115,000	45,000	46,200	4071 3.000	14,000
14,00-14,49	15,875	13,700	115,000	45,000	46,200	4071 3.000	14,005
14,50-14,99	16,000	14,200	120,000	48,000	47,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	120,000	48,000	47,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	123,000	48,000	49,300	4071 3.001	15,000
15,00-15,49	15,875	14,700	123,000	48,000	49,300	4071 3.001	15,005
15,50-15,99	16,000	15,200	125,000	48,000	50,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	125,000	48,000	50,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	127,000	48,000	52,900	4071 3.500	16,000
16,00-16,49	15,875	15,700	127,000	48,000	52,900	4071 3.500	16,005
16,50-16,99	18,000	16,200	130,000	48,000	54,100	4071 3.500	16,500
16,50-16,99	19,050	16,200	130,000	48,000	54,100	4071 3.500	16,505
17,00-17,49	18,000	16,700	132,000	48,000	55,800	4071 3.500	17,000
17,00-17,49	19,050	16,700	132,000	48,000	55,800	4071 3.500	17,005
17,50-17,99	18,000	17,200	134,000	48,000	57,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	134,000	48,000	57,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	137,000	48,000	58,900	4071 4.000	18,000
18,00-18,49	19,050	17,700	137,000	48,000	58,900	4071 4.000	18,005
18,50-18,99	20,000	18,200	141,000	50,000	60,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	141,000	50,000	60,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	143,000	50,000	62,100	4071 4.000	19,000
19,00-19,49	19,050	18,700	143,000	50,000	62,100	4071 4.000	19,005
19,50-19,99	20,000	19,200	146,000	50,000	63,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	146,000	50,000	63,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	148,000	50,000	65,300	4071 4.500	20,000
20,00-20,49	19,050	19,700	148,000	50,000	65,300	4071 4.500	20,005
20,50-20,99	25,000	20,200	159,000	56,000	67,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	159,000	56,000	67,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	161,000	56,000	68,600	4071 4.500	21,000
21,00-21,49	25,400	20,700	161,000	56,000	68,600	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	kod
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	163,000	56,000	70,100	4071 4.500	21,500
21,50-21,99	25,400	21,200	163,000	56,000	70,100	4071 4.500	21,505
22,00-22,49	25,000	21,700	165,000	56,000	71,700	4071 5.000	22,000
22,00-22,49	25,400	21,700	165,000	56,000	71,700	4071 5.000	22,005
22,50-22,99	25,000	22,200	168,000	56,000	73,300	4071 5.000	22,500
22,50-22,99	25,400	22,200	168,000	56,000	73,300	4071 5.000	22,505
23,00-23,49	25,000	22,700	170,000	56,000	74,900	4071 5.000	23,000
23,00-23,49	25,400	22,700	170,000	56,000	74,900	4071 5.000	23,005
23,50-23,99	25,000	23,200	173,000	56,000	76,500	4071 5.000	23,500
23,50-23,99	25,400	23,200	173,000	56,000	76,500	4071 5.000	23,505
24,00-24,49	25,000	23,700	175,000	56,000	78,100	4071 5.001	24,000
24,00-24,49	25,400	23,700	175,000	56,000	78,100	4071 5.001	24,005
24,50-24,99	25,000	24,200	177,000	56,000	79,700	4071 5.001	24,500
24,50-24,99	25,400	24,200	177,000	56,000	79,700	4071 5.001	24,505
25,00-25,49	25,000	24,700	180,000	56,000	81,300	4071 5.001	25,000
25,00-25,49	25,400	24,700	180,000	56,000	81,300	4071 5.001	25,005
25,50-25,99	32,000	25,200	187,000	60,000	82,900	4071 5.001	25,500
25,50-25,99	31,750	25,200	187,000	60,000	82,900	4071 5.001	25,505
26,00-26,49	32,000	25,700	191,000	60,000	84,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	191,000	60,000	84,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	193,000	60,000	86,100	4071 5.003	26,500
26,50-26,99	31,750	26,200	193,000	60,000	86,100	4071 5.003	26,505
27,00-27,49	32,000	26,700	196,000	60,000	87,200	4071 5.003	27,000
27,00-27,49	31,750	26,700	196,000	60,000	87,200	4071 5.003	27,005
27,50-27,99	32,000	27,200	198,000	60,000	88,900	4071 5.003	27,500
27,50-27,99	31,750	27,200	198,000	60,000	88,900	4071 5.003	27,505
28,00-28,49	32,000	27,700	200,000	60,000	90,400	4071 5.003	28,000
28,00-28,49	31,750	27,700	200,000	60,000	90,400	4071 5.003	28,005
28,50-28,99	32,000	28,200	202,000	60,000	92,500	4071 5.003	28,500
28,50-28,99	31,750	28,200	202,000	60,000	92,500	4071 5.003	28,505
29,00-29,49	32,000	28,700	205,000	60,000	94,600	4071 5.003	29,000
29,00-29,49	31,750	28,700	205,000	60,000	94,600	4071 5.003	29,005
29,50-29,99	32,000	29,200	207,000	60,000	95,100	4071 5.003	29,500
29,50-29,99	31,750	29,200	207,000	60,000	95,100	4071 5.003	29,505
30,00-30,49	32,000	29,700	210,000	60,000	96,700	4071 6.000	30,000
30,00-30,49	31,750	29,700	210,000	60,000	96,700	4071 6.000	30,005
30,50-30,99	32,000	30,200	212,000	60,000	98,300	4071 6.000	30,500
30,50-30,99	31,750	30,200	212,000	60,000	98,300	4071 6.000	30,505
31,00-31,49	32,000	30,700	214,000	60,000	99,800	4071 6.000	31,000
31,00-31,49	31,750	30,700	214,000	60,000	99,800	4071 6.000	31,005
31,50-31,99	32,000	31,200	216,000	60,000	101,400	4071 6.000	31,500
31,50-31,99	31,750	31,200	216,000	60,000	101,400	4071 6.000	31,505
32,00-32,99	32,000	31,700	221,000	60,000	104,600	4071 6.001	32,000
32,00-32,99	31,750	31,700	221,000	60,000	104,600	4071 6.001	32,005
33,00-33,99	32,000	32,700	226,000	60,000	107,800	4071 6.001	33,000
33,00-33,99	31,750	32,700	226,000	60,000	107,800	4071 6.001	33,005
34,00-34,99	32,000	33,700	230,000	60,000	111,000	4071 6.001	34,000
34,00-34,99	31,750	33,700	230,000	60,000	111,000	4071 6.001	34,005
35,00-35,99	32,000	34,700	235,000	60,000	114,200	4071 6.001	35,000
35,00-35,99	31,750	34,700	235,000	60,000	114,200	4071 6.001	35,005
36,00-36,99	32,000	35,700	240,000	60,000	117,300	4071 6.002	36,000
36,00-36,99	31,750	35,700	240,000	60,000	117,300	4071 6.002	36,005
37,00-37,99	32,000	36,700	245,000	60,000	120,500	4071 6.002	37,000
37,00-37,99	31,750	36,700	245,000	60,000	120,500	4071 6.002	37,005
38,00-38,99	32,000	37,700	249,000	60,000	123,700	4071 6.002	38,000
38,00-38,99	31,750	37,700	249,000	60,000	123,700	4071 6.002	38,005
39,00-40,00	32,000	38,700	254,000	60,000	126,900	4071 6.002	39,000
39,00-40,00	31,750	38,700	254,000	60,000	126,900	4071 6.002	39,005



Korpusy wiertel składanych HT 800

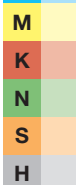


Materiał narzędzia

Powierzchnia

Forma chwytu HE

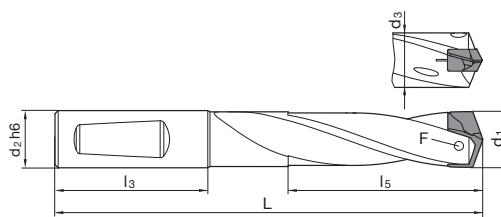
P powierzchnia niklowana • szczególnie wysoka odporność ścierania • optymalny kształt rowków wiórowych • optymalny wylot kanałków chłodzących • zawiera śruby mocujące nr art. 4071 • Zawiera wkrętak nr art. 1612



System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4108**

d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	124,000	45,000	59,600	4071 2.200	11,000
11,00-11,49	12,700	10,700	124,000	45,000	59,600	4071 2.200	11,005
11,50-11,99	12,000	11,200	127,000	45,000	62,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	127,000	45,000	62,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	131,000	45,000	64,700	4071 2.201	12,000
12,00-12,49	12,700	11,700	131,000	45,000	64,700	4071 2.201	12,005
12,50-12,99	14,000	12,200	134,000	45,000	67,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	134,000	45,000	67,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	137,000	45,000	69,900	4071 2.500	13,000
13,00-13,49	15,875	12,700	137,000	45,000	69,900	4071 2.500	13,005
13,50-13,99	14,000	13,200	141,000	45,000	72,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	141,000	45,000	72,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	144,000	45,000	75,200	4071 3.000	14,000
14,00-14,49	15,875	13,700	144,000	45,000	75,200	4071 3.000	14,005
14,50-14,99	16,000	14,200	150,000	48,000	77,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	150,000	48,000	77,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	154,000	48,000	80,300	4071 3.001	15,000
15,00-15,49	15,875	14,700	154,000	48,000	80,300	4071 3.001	15,005
15,50-15,99	16,000	15,200	157,000	48,000	82,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	157,000	48,000	82,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	160,000	48,000	85,900	4071 3.500	16,000
16,00-16,49	15,875	15,700	160,000	48,000	85,900	4071 3.500	16,005
16,50-16,99	18,000	16,200	164,000	48,000	88,100	4071 3.500	16,500
16,50-16,99	19,050	16,200	164,000	48,000	88,100	4071 3.500	16,505
17,00-17,49	18,000	16,700	167,000	48,000	90,800	4071 3.500	17,000
17,00-17,49	19,050	16,700	167,000	48,000	90,800	4071 3.500	17,005
17,50-17,99	18,000	17,200	170,000	48,000	93,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	170,000	48,000	93,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	174,000	48,000	95,900	4071 4.000	18,000
18,00-18,49	19,050	17,700	174,000	48,000	95,900	4071 4.000	18,005
18,50-18,99	20,000	18,200	179,000	50,000	98,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	179,000	50,000	98,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	182,000	50,000	101,100	4071 4.000	19,000
19,00-19,49	19,050	18,700	182,000	50,000	101,100	4071 4.000	19,005
19,50-19,99	20,000	19,200	186,000	50,000	103,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	186,000	50,000	103,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	189,000	50,000	106,300	4071 4.500	20,000
20,00-20,49	19,050	19,700	189,000	50,000	106,300	4071 4.500	20,005
20,50-20,99	25,000	20,200	201,000	56,000	109,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	201,000	56,000	109,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	204,000	56,000	111,600	4071 4.500	21,000
21,00-21,49	25,400	20,700	204,000	56,000	111,600	4071 4.500	21,005



d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	207,000	56,000	114,100	4071 4.500	21,500
21,50-21,99	25,400	21,200	207,000	56,000	114,100	4071 4.500	21,505
22,00-22,49	25,000	21,700	210,000	56,000	116,700	4071 5.000	22,000
22,00-22,49	25,400	21,700	210,000	56,000	116,700	4071 5.000	22,005
22,50-22,99	25,000	22,200	214,000	56,000	119,300	4071 5.000	22,500
22,50-22,99	25,400	22,200	214,000	56,000	119,300	4071 5.000	22,505
23,00-23,49	25,000	22,700	217,000	56,000	121,900	4071 5.000	23,000
23,00-23,49	25,400	22,700	217,000	56,000	121,900	4071 5.000	23,005
23,50-23,99	25,000	23,200	221,000	56,000	124,500	4071 5.000	23,500
23,50-23,99	25,400	23,200	221,000	56,000	124,500	4071 5.000	23,505
24,00-24,49	25,000	23,700	224,000	56,000	127,100	4071 5.001	24,000
24,00-24,49	25,400	23,700	224,000	56,000	127,100	4071 5.001	24,005
24,50-24,99	25,000	24,200	227,000	56,000	129,700	4071 5.001	24,500
24,50-24,99	25,400	24,200	227,000	56,000	129,700	4071 5.001	24,505
25,00-25,49	25,000	24,700	231,000	56,000	132,300	4071 5.001	25,000
25,00-25,49	25,400	24,700	231,000	56,000	132,300	4071 5.001	25,005
25,50-25,99	32,000	25,200	239,000	60,000	134,900	4071 5.001	25,500
25,50-25,99	31,750	25,200	239,000	60,000	134,900	4071 5.001	25,505
26,00-26,49	32,000	25,700	244,000	60,000	137,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	244,000	60,000	137,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	247,000	60,000	140,000	4071 5.003	26,500
26,50-26,99	31,750	26,200	247,000	60,000	140,000	4071 5.003	26,505
27,00-27,49	32,000	26,700	251,000	60,000	142,200	4071 5.003	27,000
27,00-27,49	31,750	26,700	251,000	60,000	142,200	4071 5.003	27,005
27,50-27,99	32,000	27,200	254,000	60,000	144,800	4071 5.003	27,500
28,00-28,49	32,000	27,700	257,000	60,000	147,400	4071 5.003	28,000
28,00-28,49	31,750	27,700	257,000	60,000	147,400	4071 5.003	28,005
28,50-28,99	32,000	28,200	260,000	60,000	150,400	4071 5.003	28,500
28,50-28,99	31,750	28,200	260,000	60,000	150,400	4071 5.003	28,505
29,00-29,49	32,000	28,700	264,000	60,000	153,500	4071 5.003	29,000
29,00-29,49	31,750	28,700	264,000	60,000	153,500	4071 5.003	29,005
29,50-29,99	32,000	29,200	267,000	60,000	155,100	4071 5.003	29,500
30,00-30,49	32,000	29,700	271,000	60,000	157,600	4071 6.000	30,000
30,00-30,49	31,750	29,700	271,000	60,000	157,600	4071 6.000	30,005
30,50-30,99	32,000	30,200	274,000	60,000	160,200	4071 6.000	30,500
31,00-31,49	32,000	30,700	277,000	60,000	162,800	4071 6.000	31,000
31,50-31,99	32,000	31,200	280,000	60,000	165,400	4071 6.000	31,500
32,00-32,99	32,000	31,700	287,000	60,000	170,600	4071 6.001	32,000
32,00-32,99	31,750	31,700	287,000	60,000	170,600	4071 6.001	32,005
33,00-33,99	32,000	32,700	294,000	60,000	175,800	4071 6.001	33,000
33,00-33,99	31,750	32,700	294,000	60,000	175,800	4071 6.001	33,005
34,00-34,99	32,000	33,700	300,000	60,000	181,000	4071 6.001	34,000
34,00-34,99	31,750	33,700	300,000	60,000	181,000	4071 6.001	34,005
35,00-35,99	32,000	34,700	307,000	60,000	186,200	4071 6.001	35,000
35,00-35,99	31,750	34,700	307,000	60,000	186,200	4071 6.001	35,005
36,00-36,99	32,000	35,700	314,000	60,000	191,300	4071 6.002	36,000
37,00-37,99	32,000	36,700	321,000	60,000	196,500	4071 6.002	37,000
37,00-37,99	31,750	36,700	321,000	60,000	196,500	4071 6.002	37,005
38,00-38,99	32,000	37,700	327,000	60,000	201,700	4071 6.002	38,000
38,00-38,99	31,750	37,700	327,000	60,000	201,700	4071 6.002	38,005
39,00-40,00	32,000	38,700	334,000	60,000	206,900	4071 6.002	39,000

System wiertarski z
płytkami wym. T 800



Korpusy wiertel składanych HT 800

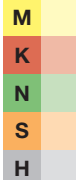


Materiał narzędzia

Powierzchnia

Forma chwytu HE

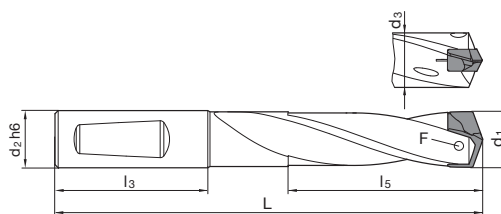
P powierzchnia niklowana • szczególnie wysoka odporność ścierania • optymalny kształt rowków wiórowych • optymalny wylot kanałków chłodzących • zawiera śruby mocujące nr art. 4071 • Zawiera wkrętak nr art. 1612



System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4109**

d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	147,000	45,000	82,600	4071 2.200	11,000
11,00-11,49	12,700	10,700	147,000	45,000	82,600	4071 2.200	11,005
11,50-11,99	12,000	11,200	151,000	45,000	86,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	151,000	45,000	86,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	156,000	45,000	89,700	4071 2.201	12,000
12,00-12,49	12,700	11,700	156,000	45,000	89,700	4071 2.201	12,005
12,50-12,99	14,000	12,200	160,000	45,000	93,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	160,000	45,000	93,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	164,000	45,000	96,900	4071 2.500	13,000
13,00-13,49	15,875	12,700	164,000	45,000	96,900	4071 2.500	13,005
13,50-13,99	14,000	13,200	169,000	45,000	100,600	4071 2.500	13,500
13,50-13,99	15,875	13,200	169,000	45,000	100,600	4071 2.500	13,505
14,00-14,49	14,000	13,700	173,000	45,000	104,200	4071 3.000	14,000
14,00-14,49	15,875	13,700	173,000	45,000	104,200	4071 3.000	14,005
14,50-14,99	16,000	14,200	180,000	48,000	107,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	180,000	48,000	107,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	185,000	48,000	111,300	4071 3.001	15,000
15,00-15,49	15,875	14,700	185,000	48,000	111,300	4071 3.001	15,005
15,50-15,99	16,000	15,200	189,000	48,000	114,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	189,000	48,000	114,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	193,000	48,000	118,900	4071 3.500	16,000
16,00-16,49	15,875	15,700	193,000	48,000	118,900	4071 3.500	16,005
16,50-16,99	18,000	16,200	198,000	48,000	122,100	4071 3.500	16,500
16,50-16,99	19,050	16,200	198,000	48,000	122,100	4071 3.500	16,505
17,00-17,49	18,000	16,700	202,000	48,000	125,800	4071 3.500	17,000
17,00-17,49	19,050	16,700	202,000	48,000	125,800	4071 3.500	17,005
17,50-17,99	18,000	17,200	206,000	48,000	129,400	4071 3.500	17,500
17,50-17,99	19,050	17,200	206,000	48,000	129,400	4071 3.500	17,505
18,00-18,49	18,000	17,700	211,000	48,000	132,900	4071 4.000	18,000
18,00-18,49	19,050	17,700	211,000	48,000	132,900	4071 4.000	18,005
18,50-18,99	20,000	18,200	217,000	50,000	136,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	217,000	50,000	136,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	221,000	50,000	140,100	4071 4.000	19,000
19,00-19,49	19,050	18,700	221,000	50,000	140,100	4071 4.000	19,005
19,50-19,99	20,000	19,200	226,000	50,000	143,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	226,000	50,000	143,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	230,000	50,000	147,300	4071 4.500	20,000
20,00-20,49	19,050	19,700	230,000	50,000	147,300	4071 4.500	20,005
20,50-20,99	25,000	20,200	243,000	56,000	151,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	243,000	56,000	151,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	247,000	56,000	154,600	4071 4.500	21,000
21,00-21,49	25,400	20,700	247,000	56,000	154,600	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	kod
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	251,000	56,000	158,100	4071 4.500	21,500
21,50-21,99	25,400	21,200	251,000	56,000	158,100	4071 4.500	21,505
22,00-22,49	25,000	21,700	255,000	56,000	161,700	4071 5.000	22,000
22,00-22,49	25,400	21,700	255,000	56,000	161,700	4071 5.000	22,005
22,50-22,99	25,000	22,200	260,000	56,000	165,300	4071 5.000	22,500
22,50-22,99	25,400	22,200	260,000	56,000	165,300	4071 5.000	22,505
23,00-23,49	25,000	22,700	264,000	56,000	168,900	4071 5.000	23,000
23,00-23,49	25,400	22,700	264,000	56,000	168,900	4071 5.000	23,005
23,50-23,99	25,000	23,200	269,000	56,000	172,500	4071 5.000	23,500
23,50-23,99	25,400	23,200	269,000	56,000	172,500	4071 5.000	23,505
24,00-24,49	25,000	23,700	273,000	56,000	176,100	4071 5.001	24,000
24,00-24,49	25,400	23,700	273,000	56,000	176,100	4071 5.001	24,005
24,50-24,99	25,000	24,200	277,000	56,000	179,700	4071 5.001	24,500
24,50-24,99	25,400	24,200	277,000	56,000	179,700	4071 5.001	24,505
25,00-25,49	25,000	24,700	282,000	56,000	183,300	4071 5.001	25,000
25,00-25,49	25,400	24,700	282,000	56,000	183,300	4071 5.001	25,005
25,50-25,99	32,000	25,200	291,000	60,000	186,900	4071 5.001	25,500
25,50-25,99	31,750	25,200	291,000	60,000	186,900	4071 5.001	25,505
26,00-26,49	32,000	25,700	297,000	60,000	190,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	297,000	60,000	190,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	301,000	60,000	194,000	4071 5.003	26,500
26,50-26,99	31,750	26,200	301,000	60,000	194,000	4071 5.003	26,505
27,00-27,49	32,000	26,700	306,000	60,000	197,200	4071 5.003	27,000
27,00-27,49	31,750	26,700	306,000	60,000	197,200	4071 5.003	27,005
27,50-27,99	32,000	27,200	310,000	60,000	200,800	4071 5.003	27,500
27,50-27,99	31,750	27,200	310,000	60,000	200,800	4071 5.003	27,505
28,00-28,49	32,000	27,700	314,000	60,000	204,400	4071 5.003	28,000
28,00-28,49	31,750	27,700	314,000	60,000	204,400	4071 5.003	28,005
28,50-28,99	32,000	28,200	318,000	60,000	208,400	4071 5.003	28,500
28,50-28,99	31,750	28,200	318,000	60,000	208,400	4071 5.003	28,505
29,00-29,49	32,000	28,700	323,000	60,000	212,500	4071 5.003	29,000
29,00-29,49	31,750	28,700	323,000	60,000	212,500	4071 5.003	29,005
29,50-29,99	32,000	29,200	327,000	60,000	215,100	4071 5.003	29,500
29,50-29,99	31,750	29,200	327,000	60,000	215,100	4071 5.003	29,505
30,00-30,49	32,000	29,700	332,000	60,000	218,600	4071 6.000	30,000
30,00-30,49	31,750	29,700	332,000	60,000	218,600	4071 6.000	30,005
30,50-30,99	32,000	30,200	336,000	60,000	222,200	4071 6.000	30,500
30,50-30,99	31,750	30,200	336,000	60,000	222,200	4071 6.000	30,505
31,00-31,49	32,000	30,700	340,000	60,000	225,800	4071 6.000	31,000
31,00-31,49	31,750	30,700	340,000	60,000	225,800	4071 6.000	31,005
31,50-31,99	32,000	31,200	344,000	60,000	229,400	4071 6.000	31,500
31,50-31,99	31,750	31,200	344,000	60,000	229,400	4071 6.000	31,505
33,00-33,99	32,000	32,700	362,000	60,000	244,600	4071 6.001	33,000
39,00-40,00	32,000	38,700	413,000	60,000	287,400	4071 6.002	39,000



Korpusy wiertel składanych HT 800



Materiał narzędzia

Powierzchnia

Forma chwytu HE

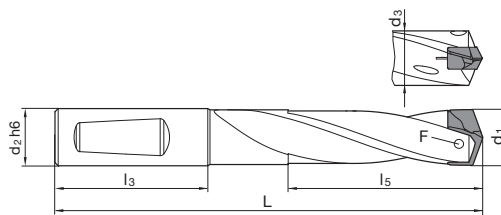
P powierzchnia niklowana • szczególnie wysoka odporność ścierania • optymalny kształt rowków wiórowych • optymalny wylot kanałków chłodzących • zawiera śruby mocujące nr art. 4071 • Zawiera wkrętak nr art. 1612



System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4110**

d1	d2 h6	d3	L	l3	l5	F	kod
mm	mm	mm	mm	mm	mm		
11,00-11,49	12,000	10,700	182,000	45,000	117,100	4071 2.200	11,000
11,00-11,49	12,700	10,700	182,000	45,000	117,100	4071 2.200	11,005
11,50-11,99	12,000	11,200	187,000	45,000	122,100	4071 2.200	11,500
11,50-11,99	12,700	11,200	187,000	45,000	122,100	4071 2.200	11,505
12,00-12,49	12,000	11,700	194,000	45,000	127,200	4071 2.201	12,000
12,00-12,49	12,700	11,700	194,000	45,000	127,200	4071 2.201	12,005
12,50-12,99	14,000	12,200	199,000	45,000	132,300	4071 2.201	12,500
12,50-12,99	15,875	12,200	199,000	45,000	132,300	4071 2.201	12,505
13,00-13,49	14,000	12,700	205,000	45,000	137,500	4071 2.500	13,000
13,00-13,49	15,875	12,700	205,000	45,000	137,500	4071 2.500	13,005
13,50-13,99	14,000	13,200	211,000	45,000	142,500	4071 2.500	13,500
13,50-13,99	15,875	13,200	211,000	45,000	142,500	4071 2.500	13,505
14,00-14,49	14,000	13,700	217,000	45,000	147,700	4071 3.000	14,000
14,00-14,49	15,875	13,700	217,000	45,000	147,700	4071 3.000	14,005
14,50-14,99	16,000	14,200	225,000	48,000	152,800	4071 3.000	14,500
14,50-14,99	15,875	14,200	225,000	48,000	152,800	4071 3.000	14,505
15,00-15,49	16,000	14,700	232,000	48,000	157,800	4071 3.001	15,000
15,00-15,49	15,875	14,700	232,000	48,000	157,800	4071 3.001	15,005
15,50-15,99	16,000	15,200	237,000	48,000	162,900	4071 3.001	15,500
15,50-15,99	15,875	15,200	237,000	48,000	162,900	4071 3.001	15,505
16,00-16,49	16,000	15,700	243,000	48,000	168,000	4071 3.500	16,000
16,00-16,49	15,875	15,700	243,000	48,000	168,000	4071 3.500	16,005
16,50-16,99	18,000	16,200	249,000	48,000	170,000	4071 3.500	16,500
16,50-16,99	19,050	16,200	249,000	48,000	170,000	4071 3.500	16,505
17,00-17,49	18,000	16,700	255,000	48,000	178,300	4071 3.500	17,000
17,00-17,49	19,050	16,700	255,000	48,000	178,300	4071 3.500	17,005
17,50-17,99	18,000	17,200	260,000	48,000	183,500	4071 3.500	17,500
17,50-17,99	19,050	17,200	260,000	48,000	183,500	4071 3.500	17,505
18,00-18,49	18,000	17,700	267,000	48,000	188,400	4071 4.000	18,000
18,00-18,49	19,050	17,700	267,000	48,000	188,400	4071 4.000	18,005
18,50-18,99	20,000	18,200	274,000	50,000	193,500	4071 4.000	18,500
18,50-18,99	19,050	18,200	274,000	50,000	193,500	4071 4.000	18,505
19,00-19,49	20,000	18,700	280,000	50,000	198,700	4071 4.000	19,000
19,00-19,49	19,050	18,700	280,000	50,000	198,700	4071 4.000	19,005
19,50-19,99	20,000	19,200	286,000	50,000	203,700	4071 4.000	19,500
19,50-19,99	19,050	19,200	286,000	50,000	203,700	4071 4.000	19,505
20,00-20,49	20,000	19,700	292,000	50,000	208,900	4071 4.500	20,000
20,00-20,49	19,050	19,700	292,000	50,000	208,900	4071 4.500	20,005
20,50-20,99	25,000	20,200	306,000	56,000	214,000	4071 4.500	20,500
20,50-20,99	25,400	20,200	306,000	56,000	214,000	4071 4.500	20,505
21,00-21,49	25,000	20,700	312,000	56,000	219,100	4071 4.500	21,000
21,00-21,49	25,400	20,700	312,000	56,000	219,100	4071 4.500	21,005



d1	d2 h6	d3	L	I3	I5	F	kod
mm	mm	mm	mm	mm	mm		
21,50-21,99	25,000	21,200	317,000	56,000	224,200	4071 4.500	21,500
21,50-21,99	25,400	21,200	317,000	56,000	224,200	4071 4.500	21,505
22,00-22,49	25,000	21,700	323,000	56,000	229,300	4071 5.000	22,000
22,00-22,49	25,400	21,700	323,000	56,000	229,300	4071 5.000	22,005
22,50-22,99	25,000	22,200	329,000	56,000	234,400	4071 5.000	22,500
22,50-22,99	25,400	22,200	329,000	56,000	234,400	4071 5.000	22,505
23,00-23,49	25,000	22,700	335,000	56,000	239,500	4071 5.000	23,000
23,00-23,49	25,400	22,700	335,000	56,000	239,500	4071 5.000	23,005
23,50-23,99	25,000	23,200	341,000	56,000	244,600	4071 5.000	23,500
23,50-23,99	25,400	23,200	341,000	56,000	244,600	4071 5.000	23,505
24,00-24,49	25,000	23,700	347,000	56,000	249,700	4071 5.001	24,000
24,00-24,49	25,400	23,700	347,000	56,000	249,700	4071 5.001	24,005
24,50-24,99	25,000	24,200	352,000	56,000	254,800	4071 5.001	24,500
24,50-24,99	25,400	24,200	352,000	56,000	254,800	4071 5.001	24,505
25,00-25,49	25,000	24,700	359,000	56,000	259,900	4071 5.001	25,000
25,00-25,49	25,400	24,700	359,000	56,000	259,900	4071 5.001	25,005
25,50-25,99	32,000	25,200	369,000	60,000	265,000	4071 5.001	25,500
25,50-25,99	31,750	25,200	369,000	60,000	265,000	4071 5.001	25,505
26,00-26,49	32,000	25,700	377,000	60,000	270,000	4071 5.003	26,000
26,00-26,49	31,750	25,700	377,000	60,000	270,000	4071 5.003	26,005
26,50-26,99	32,000	26,200	382,000	60,000	275,000	4071 5.003	26,500
26,50-26,99	31,750	26,200	382,000	60,000	275,000	4071 5.003	26,505
27,00-27,49	32,000	26,700	388,000	60,000	280,100	4071 5.003	27,000
27,00-27,49	31,750	26,700	388,000	60,000	280,100	4071 5.003	27,005
27,50-27,99	32,000	27,200	394,000	60,000	285,200	4071 5.003	27,500
27,50-27,99	31,750	27,200	394,000	60,000	285,200	4071 5.003	27,505
28,00-28,49	32,000	27,700	400,000	60,000	290,300	4071 5.003	28,000
28,00-28,49	31,750	27,700	400,000	60,000	290,300	4071 5.003	28,005
28,50-28,99	32,000	28,200	405,000	60,000	295,400	4071 5.003	28,500
28,50-28,99	31,750	28,200	405,000	60,000	295,400	4071 5.003	28,505
29,00-29,49	32,000	28,700	412,000	60,000	300,500	4071 5.003	29,000
29,00-29,49	31,750	28,700	412,000	60,000	300,500	4071 5.003	29,005
29,50-29,99	32,000	29,200	418,000	60,000	305,600	4071 5.003	29,500
29,50-29,99	31,750	29,200	418,000	60,000	305,600	4071 5.003	29,505
30,00-30,49	32,000	29,700	424,000	60,000	310,600	4071 6.000	30,000
30,00-30,49	31,750	29,700	424,000	60,000	310,600	4071 6.000	30,005
30,50-30,99	32,000	30,200	429,000	60,000	315,700	4071 6.000	30,500
30,50-30,99	31,750	30,200	429,000	60,000	315,700	4071 6.000	30,505
31,00-31,49	32,000	30,700	435,000	60,000	320,800	4071 6.000	31,000
31,00-31,49	31,750	30,700	435,000	60,000	320,800	4071 6.000	31,005
31,50-31,99	32,000	31,200	441,000	60,000	325,900	4071 6.000	31,500
31,50-31,99	31,750	31,200	441,000	60,000	325,900	4071 6.000	31,505



Korpusy wiertel składanych HT 800



System wiertarski z płytkami wym. T 800

P powierzchnia niklowana • szczególnie wysoka odporność ścierania • optymalny kształt rowków wiórowych • optymalny wylot kanałków chłodzących • Zawiera śruby mocujące nr art. 4071 i 6128 • Zawiera wkretek nr art. 1612

N do wykonywania otworów pilotujących z fazką 45°

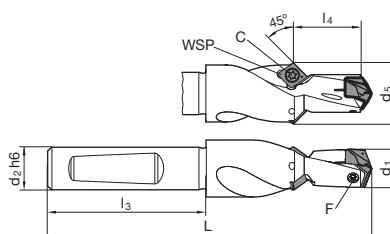
Materiał narzędzia

Powierzchnia

Forma chwytu HE

GÜHRING NAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4105**

d1	d2 h6	d5	L	l3	l4	WSP	C	F	kod
mm	mm	mm	mm	mm	mm				
11,00-11,99	12,000	17,000	81,000	45,000	12,000	CP..0502..	6128 2.000	4071 2.200	11,000
11,00-11,99	12,700	17,000	81,000	45,000	12,000	CP..0502..	6128 2.000	4071 2.200	11,005
12,00-12,99	12,000	18,000	84,000	45,000	13,000	CP..0502..	6128 2.000	4071 2.201	12,000
12,00-12,99	12,700	18,000	84,000	45,000	13,000	CP..0502..	6128 2.000	4071 2.201	12,005
13,00-13,99	14,000	18,000	86,000	45,000	14,000	CP..0502..	6128 2.000	4071 2.500	13,000
13,00-13,99	15,875	18,000	86,000	45,000	14,000	CP..0502..	6128 2.000	4071 2.500	13,005
14,00-15,99	16,000	18,000	93,000	48,000	16,000	CP..0502..	6128 2.000	4071 3.000	14,000
14,00-15,99	15,875	18,000	93,000	48,000	16,000	CP..0502..	6128 2.000	4071 3.000	14,005
16,00-17,99	18,000	20,000	99,000	48,000	18,000	CP..0602..	6128 2.500	4071 3.500	16,000
16,00-17,99	19,050	20,000	99,000	48,000	18,000	CP..0602..	6128 2.500	4071 3.500	16,005
18,00-19,99	20,000	22,000	106,000	50,000	20,000	CP..0602..	6128 2.500	4071 4.000	18,000
18,00-19,99	19,050	22,000	106,000	50,000	20,000	CP..0602..	6128 2.500	4071 4.000	18,005
20,00-21,99	25,000	25,000	117,000	56,000	22,000	CP..0602..	6128 2.500	4071 4.500	20,000
20,00-21,99	25,400	25,400	117,000	56,000	22,000	CP..0602..	6128 2.500	4071 4.500	20,005
22,00-23,99	25,000	26,000	122,000	56,000	24,000	CP..0602..	6128 2.500	4071 5.000	22,000
22,00-23,99	25,400	26,000	122,000	56,000	24,000	CP..0602..	6128 2.500	4071 5.000	22,005
24,00-25,99	25,000	28,000	128,000	56,000	26,000	CP..0602..	6128 2.500	4071 5.001	24,000
24,00-25,99	25,400	28,000	128,000	56,000	26,000	CP..0602..	6128 2.500	4071 5.001	24,005
26,00-27,99	32,000	32,000	142,000	60,000	28,000	CP..0602..	6128 2.500	4071 5.003	26,000
26,00-27,99	31,750	32,000	142,000	60,000	28,000	CP..0602..	6128 2.500	4071 5.003	26,005
28,00-29,99	32,000	34,000	147,000	60,000	30,000	CP..0602..	6128 2.500	4071 5.003	28,000
28,00-29,99	31,750	34,000	147,000	60,000	30,000	CP..09T3..	6128 2.500	4071 5.003	28,005
30,00-31,99	32,000	38,000	152,000	60,000	32,000	CP..09T3..	6128 4.006	4071 6.000	30,000
30,00-31,99	31,750	38,000	152,000	60,000	32,000	CP..09T3..	6128 4.006	4071 6.000	30,005
32,00-35,99	32,000	42,000	163,000	60,000	36,000	CP..09T3..	6128 4.006	4071 6.001	32,000
32,00-35,99	31,750	42,000	163,000	60,000	36,000	CP..09T3..	6128 4.006	4071 6.001	32,005
36,00-40,00	32,000	46,000	173,000	60,000	40,000	CP..09T3..	6128 4.006	4071 6.002	36,000
36,00-40,00	31,750	46,000	173,000	60,000	40,000	CP..09T3..	6128 4.006	4071 6.002	36,005



Płytki wymienne do HT 800

Materiał narzędzia **Węglik mono.**Powierzchnia **F**

Forma chwytu

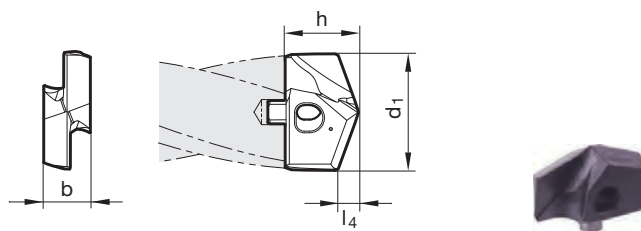
P • Korekcja ścina $\geq \varnothing 11,000$ • geom. ścinowa • główna krawędź skrawająca - prosta (po korekcji) • zawiera śruby mocujące nr art. 4071

M ○**K** ○**N** ○**S** ○**H** ○

stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe - $R_m < 1200 \text{ N/mm}^2$

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4112**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
11,000		2,100	4,500	7,500	11,000
11,200		2,100	4,500	7,500	11,200
11,500		2,100	4,500	7,500	11,500
11,510	29/64	2,100	4,500	7,500	11,510
11,700		2,200	4,500	7,500	11,700
11,800		2,200	4,500	7,500	11,800
11,910	15/32	2,200	4,500	7,500	11,910
12,000		2,200	5,000	7,700	12,000
12,100		2,300	5,000	7,700	12,100
12,200		2,300	5,000	7,700	12,200
12,300	31/64	2,300	5,000	7,700	12,300
12,500		2,300	5,000	7,700	12,500
12,600		2,300	5,000	7,700	12,600
12,700	1/2	2,400	5,000	7,700	12,700
12,800		2,400	5,000	7,700	12,800
12,900		2,400	5,000	7,700	12,900
13,000		2,400	5,500	8,500	13,000
13,100	33/64	2,400	5,500	8,500	13,100
13,300		2,500	5,500	8,500	13,300
13,490	17/32	2,500	5,500	8,500	13,490
13,500		2,500	5,500	8,500	13,500
13,600		2,500	5,500	8,500	13,600
13,700		2,500	5,500	8,500	13,700
13,800		2,600	5,500	8,500	13,800
13,890	35/64	2,600	5,500	8,500	13,890
14,000		2,600	6,000	9,600	14,000
14,100		2,600	6,000	9,600	14,100
14,290	9/16	2,700	6,000	9,600	14,290
14,400		2,700	6,000	9,600	14,400
14,500		2,700	6,000	9,600	14,500
14,600		2,700	6,000	9,600	14,600
14,680	37/64	2,700	6,000	9,600	14,680
14,700		2,700	6,000	9,600	14,700
14,800		2,700	6,000	9,600	14,800
15,000		2,800	6,000	9,800	15,000
15,080	19/32	2,800	6,000	9,800	15,080
15,100		2,800	6,000	9,800	15,100
15,200		2,800	6,000	9,800	15,200
15,300		2,800	6,000	9,800	15,300
15,480	39/64	2,900	6,000	9,800	15,480
15,500		2,900	6,000	9,800	15,500
15,600		2,900	6,000	9,800	15,600



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
15,700		2,900	6,000	9,800	15,700
15,800		2,900	6,000	9,800	15,800
15,870	5/8	2,900	6,000	9,800	15,870
16,000		3,000	7,000	11,000	16,000
16,270	41/64	3,000	7,000	11,000	16,270
16,500		3,100	7,000	11,000	16,500
16,670	21/32	3,100	7,000	11,000	16,670
17,000		3,100	7,000	11,000	17,000
17,070	43/64	3,200	7,000	11,000	17,070
17,300		3,200	7,000	11,000	17,300
17,460	11/16	3,200	7,000	11,000	17,460
17,500		3,200	7,000	11,000	17,500
17,600		3,300	7,000	11,000	17,600
17,860	45/64	3,300	7,000	11,000	17,860
18,000		3,300	8,000	12,600	18,000
18,260	23/32	3,400	8,000	12,600	18,260
18,500		3,400	8,000	12,600	18,500
18,650	47/64	3,400	8,000	12,600	18,650
18,900		3,500	8,000	12,600	18,900
19,000		3,500	8,000	12,600	19,000
19,050	3/4	3,500	8,000	12,600	19,050
19,250		3,600	8,000	12,600	19,250
19,300		3,600	8,000	12,600	19,300
19,450	49/64	3,600	8,000	12,600	19,450
19,500		3,600	8,000	12,600	19,500
19,600		3,600	8,000	12,600	19,600
19,840	25/32	3,700	8,000	12,600	19,840
20,000		3,700	9,000	13,900	20,000
20,240	51/64	3,700	9,000	13,900	20,240
20,500		3,800	9,000	13,900	20,500
20,640	13/16	3,800	9,000	13,900	20,640
20,900		3,900	9,000	13,900	20,900
21,000		3,900	9,000	13,900	21,000
21,030	53/64	3,900	9,000	13,900	21,030
21,100		3,900	9,000	13,900	21,100
21,430	27/32	3,900	9,000	13,900	21,430
21,500		4,000	9,000	13,900	21,500
21,700		4,000	9,000	13,900	21,700
21,830	55/64	4,000	9,000	13,900	21,830
22,000		4,100	10,000	15,300	22,000
22,220	7/8	4,100	10,000	15,300	22,220
22,500		4,100	10,000	15,300	22,500
22,620	57/64	4,200	10,000	15,300	22,620
22,700		4,200	10,000	15,300	22,700
23,000		4,200	10,000	15,300	23,000
23,020	29/32	4,200	10,000	15,300	23,020
23,420	59/64	4,300	10,000	15,300	23,420
23,500		4,300	10,000	15,300	23,500
23,700		4,400	10,000	15,300	23,700
23,810	15/16	4,400	10,000	15,300	23,810
24,000		4,400	11,000	15,800	24,000
24,100		4,400	11,000	15,800	24,100
24,210	61/64	4,500	11,000	15,800	24,210
24,500		4,500	11,000	15,800	24,500
24,610	31/32	4,500	11,000	15,800	24,610
25,000	63/64	4,600	11,000	15,800	25,000
25,400	1	4,700	11,000	15,800	25,400
25,500		4,700	11,000	15,800	25,500
25,670		4,700	11,000	15,800	25,670
25,700		4,700	11,000	15,800	25,700
25,810		4,700	11,000	15,800	25,810
26,000		4,800	12,000	20,000	26,000
26,190	1 1/32	4,800	12,000	20,000	26,190
26,500		4,900	12,000	20,000	26,500
26,590	1 3/64	4,900	12,000	20,000	26,590
27,000		5,000	12,000	20,000	27,000
27,500		5,100	12,000	20,000	27,500
27,700		5,100	12,000	20,000	27,700
27,780	1 3/32	5,100	12,000	20,000	27,780
28,000		5,100	13,000	20,700	28,000
28,180	1 7/64	5,200	13,000	20,700	28,180
28,500		5,200	13,000	20,700	28,500



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
28,580		5,300	13,000	20,700	28,580
29,000		5,300	13,000	20,700	29,000
29,370	1 5/32	5,400	13,000	20,700	29,370
29,500		5,400	13,000	20,700	29,500
29,600		5,400	13,000	20,700	29,600
29,770	1 11/64	5,500	13,000	20,700	29,770
30,000		5,500	14,000	22,300	30,000
30,160	1 3/16	5,500	14,000	22,300	30,160
30,500		5,600	14,000	22,300	30,500
30,960	1 7/32	5,700	14,000	22,300	30,960
31,000		5,700	14,000	22,300	31,000
31,500		5,800	14,000	22,300	31,500
31,750	1 1/4	5,800	14,000	22,300	31,750
32,000		5,900	15,000	23,100	32,000
32,500		6,000	15,000	23,100	32,500
32,540	1 9/32	6,000	15,000	23,100	32,540
32,940	1 19/64	6,000	15,000	23,100	32,940
33,000		6,100	15,000	23,100	33,000
33,340	1 5/16	6,100	15,000	23,100	33,340
33,500		6,100	15,000	23,100	33,500
34,000		6,200	15,000	23,100	34,000
34,130	1 11/32	6,300	15,000	23,100	34,130
34,500		6,300	15,000	23,100	34,500
34,930		6,400	15,000	23,100	34,930
35,000		6,400	15,000	23,100	35,000
35,500		6,500	15,000	23,100	35,500
35,720	1 13/32	6,600	15,000	23,100	35,720
36,000		6,600	16,000	23,900	36,000
36,500		6,700	16,000	23,900	36,500
36,510	1 7/16	6,700	16,000	23,900	36,510
37,000		6,800	16,000	23,900	37,000
37,310	1 15/32	6,800	16,000	23,900	37,310
37,500		6,900	16,000	23,900	37,500
38,000		7,000	16,000	23,900	38,000
38,100	1 1/2	7,000	16,000	23,900	38,100
38,500	1 33/64	7,100	16,000	23,900	38,500
39,000		7,100	16,000	23,900	39,000
39,500		7,200	16,000	23,900	39,500
40,000		7,300	16,000	23,900	40,000



Płytki wymienne do HT 800

Materiał narzędzia **Węgiel mono.**Powierzchnia **F**

Forma chwyty

P ○ Korekcja ścina $\geq \varnothing 11,000$ • geom. ścinowa • główna krawędź skrawająca - prosta (po korekcie) • zawiera śruby mocujące nr art. 4071

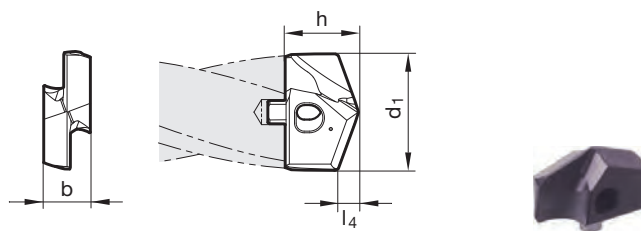
M**K** •**N****S****H**

żeliwo wermikularne GGV • żeliwa szare, ciągliwe i sferoidalne

System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4113**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
11,000		2,700	4,500	7,500	11,000
11,200		2,700	4,500	7,500	11,200
11,500		2,800	4,500	7,500	11,500
11,510	29/64	2,800	4,500	7,500	11,510
11,700		2,800	4,500	7,500	11,700
11,800		2,800	4,500	7,500	11,800
11,910	15/32	2,800	4,500	7,500	11,910
12,000		2,900	5,000	7,700	12,000
12,100		2,900	5,000	7,700	12,100
12,200		2,900	5,000	7,700	12,200
12,300	31/64	2,900	5,000	7,700	12,300
12,500		3,100	5,000	7,700	12,500
12,600		3,100	5,000	7,700	12,600
12,700	1/2	3,100	5,000	7,700	12,700
12,800		3,100	5,000	7,700	12,800
12,900		3,100	5,000	7,700	12,900
13,000		3,200	5,500	8,500	13,000
13,100	33/64	3,200	5,500	8,500	13,100
13,300		3,200	5,500	8,500	13,300
13,490	17/32	3,200	5,500	8,500	13,490
13,500		3,300	5,500	8,500	13,500
13,600		3,300	5,500	8,500	13,600
13,700		3,300	5,500	8,500	13,700
13,800		3,300	5,500	8,500	13,800
13,890	35/64	3,300	5,500	8,500	13,890
14,000		3,400	6,000	9,600	14,000
14,100		3,400	6,000	9,600	14,100
14,290	9/16	3,400	6,000	9,600	14,290
14,400		3,400	6,000	9,600	14,400
14,500		3,600	6,000	9,600	14,500
14,600		3,600	6,000	9,600	14,600
14,680	37/64	3,600	6,000	9,600	14,680
14,700		3,600	6,000	9,600	14,700
14,800		3,600	6,000	9,600	14,800
15,000		3,700	6,000	9,800	15,000
15,080	19/32	3,700	6,000	9,800	15,080
15,100		3,700	6,000	9,800	15,100
15,200		3,700	6,000	9,800	15,200
15,300		3,700	6,000	9,800	15,300
15,480	39/64	3,700	6,000	9,800	15,480
15,500		3,800	6,000	9,800	15,500
15,600		3,800	6,000	9,800	15,600



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
15,700		3,800	6,000	9,800	15,700
15,800		3,800	6,000	9,800	15,800
15,870	5/8	3,800	6,000	9,800	15,870
16,000		3,900	7,000	11,000	16,000
16,270	41/64	3,900	7,000	11,000	16,270
16,500		4,100	7,000	11,000	16,500
16,670	21/32	4,100	7,000	11,000	16,670
17,000		4,200	7,000	11,000	17,000
17,070	43/64	4,200	7,000	11,000	17,070
17,300		4,200	7,000	11,000	17,300
17,460	11/16	4,200	7,000	11,000	17,460
17,500		4,300	7,000	11,000	17,500
17,600		4,300	7,000	11,000	17,600
17,860	45/64	4,300	7,000	11,000	17,860
18,000		4,400	8,000	12,600	18,000
18,260	23/32	4,400	8,000	12,600	18,260
18,500		4,500	8,000	12,600	18,500
18,650	47/64	4,500	8,000	12,600	18,650
18,900		4,500	8,000	12,600	18,900
19,000		4,700	8,000	12,600	19,000
19,050	3/4	4,700	8,000	12,600	19,050
19,250		4,700	8,000	12,600	19,250
19,300		4,700	8,000	12,600	19,300
19,450	49/64	4,700	8,000	12,600	19,450
19,500		4,800	8,000	12,600	19,500
19,600		4,800	8,000	12,600	19,600
19,840	25/32	4,800	8,000	12,600	19,840
20,000		4,900	9,000	13,900	20,000
20,240	51/64	4,900	9,000	13,900	20,240
20,500		5,100	9,000	13,900	20,500
20,640	13/16	5,100	9,000	13,900	20,640
20,900		5,100	9,000	13,900	20,900
21,000		5,200	9,000	13,900	21,000
21,030	53/64	5,200	9,000	13,900	21,030
21,100		5,200	9,000	13,900	21,100
21,430	27/32	5,200	9,000	13,900	21,430
21,500		5,300	9,000	13,900	21,500
21,700		5,300	9,000	13,900	21,700
21,830	55/64	5,300	9,000	13,900	21,830
22,000		5,400	10,000	15,300	22,000
22,220	7/8	5,400	10,000	15,300	22,220
22,500		5,600	10,000	15,300	22,500
22,620	57/64	5,600	10,000	15,300	22,620
22,700		5,600	10,000	15,300	22,700
23,000		5,700	10,000	15,300	23,000
23,020	29/32	5,700	10,000	15,300	23,020
23,420	59/64	5,700	10,000	15,300	23,420
23,500		5,800	10,000	15,300	23,500
23,700		5,800	10,000	15,300	23,700
23,810	15/16	5,800	10,000	15,300	23,810
24,000		6,000	11,000	15,800	24,000
24,100		6,000	11,000	15,800	24,100
24,210	61/64	6,000	11,000	15,800	24,210
24,500		6,100	11,000	15,800	24,500
24,610	31/32	6,100	11,000	15,800	24,610
25,000	63/64	6,200	11,000	15,800	25,000
25,400	1	6,200	11,000	15,800	25,400
25,500		6,300	11,000	15,800	25,500
25,670		6,300	11,000	15,800	25,670
25,700		6,300	11,000	15,800	25,700
25,810		6,300	11,000	15,800	25,810
26,000		6,400	12,000	20,000	26,000
26,190	1 1/32	6,400	12,000	20,000	26,190
26,500		6,500	12,000	20,000	26,500
26,590	1 3/64	6,500	12,000	20,000	26,590
27,000		6,600	12,000	20,000	27,000
27,500		6,700	12,000	20,000	27,500
27,700		6,700	12,000	20,000	27,700
27,780	1 3/32	6,700	12,000	20,000	27,780
28,000		6,800	13,000	20,700	28,000
28,180	1 7/64	6,800	13,000	20,700	28,180
28,500		6,900	13,000	20,700	28,500



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
28,580		6,900	13,000	20,700	28,580
29,000		7,100	13,000	20,700	29,000
29,370	1 5/32	7,100	13,000	20,700	29,370
29,500		7,200	13,000	20,700	29,500
29,770	1 11/64	7,200	13,000	20,700	29,770
30,000		7,300	14,000	22,300	30,000
30,160	1 3/16	7,300	14,000	22,300	30,160
30,500		7,400	14,000	22,300	30,500
30,960	1 7/32	7,400	14,000	22,300	30,960
31,000		7,500	14,000	22,300	31,000
31,500		7,600	14,000	22,300	31,500
31,750	1 1/4	7,600	14,000	22,300	31,750
32,000		7,700	15,000	23,100	32,000
32,500		7,800	15,000	23,100	32,500
32,540	1 9/32	7,800	15,000	23,100	32,540
32,940	1 19/64	7,800	15,000	23,100	32,940
33,000		7,900	15,000	23,100	33,000
33,340	1 5/16	7,900	15,000	23,100	33,340
33,500		8,100	15,000	23,100	33,500
34,000		8,200	15,000	23,100	34,000
34,130	1 11/32	8,200	15,000	23,100	34,130
34,500		8,400	15,000	23,100	34,500
34,930		8,400	15,000	23,100	34,930
35,000		8,500	15,000	23,100	35,000
35,500		8,600	15,000	23,100	35,500
35,720	1 13/32	8,600	15,000	23,100	35,720
36,000		8,700	16,000	23,900	36,000
36,500		8,800	16,000	23,900	36,500
36,510	1 7/16	8,800	16,000	23,900	36,510
37,000		9,000	16,000	23,900	37,000
37,310	1 15/32	9,000	16,000	23,900	37,310
37,500		9,100	16,000	23,900	37,500
38,000		9,200	16,000	23,900	38,000
38,100	1 1/2	9,200	16,000	23,900	38,100
38,500	1 33/64	9,400	16,000	23,900	38,500
39,000		9,500	16,000	23,900	39,000
39,500		9,700	16,000	23,900	39,500
40,000		9,700	16,000	23,900	40,000



Płytki wymienne do HT 800

Materiał narzędzia **Węglik mono.**Powierzchnia **a**

Forma chwytu

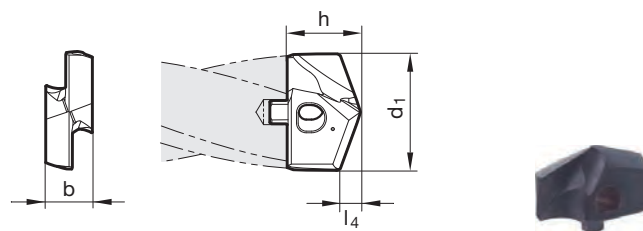
P ○ Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • główna krawędź skrawająca - prosta (po korekcie) • zawiera śruby mocujące nr art. 4071

M ●
K
N
S ○
H ○

stale nierdzewne

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4115**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
11,000		2,100	4,500	7,500	11,000
11,200		2,100	4,500	7,500	11,200
11,500		2,100	4,500	7,500	11,500
11,510	29/64	2,100	4,500	7,500	11,510
11,700		2,200	4,500	7,500	11,700
11,800		2,200	4,500	7,500	11,800
11,910	15/32	2,200	4,500	7,500	11,910
12,000		2,200	5,000	7,700	12,000
12,100		2,300	5,000	7,700	12,100
12,200		2,300	5,000	7,700	12,200
12,300	31/64	2,300	5,000	7,700	12,300
12,500		2,300	5,000	7,700	12,500
12,600		2,300	5,000	7,700	12,600
12,700	1/2	2,400	5,000	7,700	12,700
12,800		2,400	5,000	7,700	12,800
12,900		2,400	5,000	7,700	12,900
13,000		2,400	5,500	8,500	13,000
13,100	33/64	2,400	5,500	8,500	13,100
13,490	17/32	2,500	5,500	8,500	13,490
13,500		2,500	5,500	8,500	13,500
13,600		2,500	5,500	8,500	13,600
13,700		2,500	5,500	8,500	13,700
13,800		2,600	5,500	8,500	13,800
13,890	35/64	2,600	5,500	8,500	13,890
14,000		2,600	6,000	9,600	14,000
14,100		2,600	6,000	9,600	14,100
14,290	9/16	2,700	6,000	9,600	14,290
14,400		2,700	6,000	9,600	14,400
14,500		2,700	6,000	9,600	14,500
14,600		2,700	6,000	9,600	14,600
14,700		2,700	6,000	9,600	14,700
14,800		2,700	6,000	9,600	14,800
15,000		2,800	6,000	9,800	15,000
15,080	19/32	2,800	6,000	9,800	15,080
15,100		2,800	6,000	9,800	15,100
15,200		2,800	6,000	9,800	15,200
15,300		2,800	6,000	9,800	15,300
15,500		2,900	6,000	9,800	15,500
15,600		2,900	6,000	9,800	15,600
15,700		2,900	6,000	9,800	15,700
15,800		2,900	6,000	9,800	15,800
15,870	5/8	2,900	6,000	9,800	15,870



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
16,000		3,000	7,000	11,000	16,000
16,270	41/64	3,000	7,000	11,000	16,270
16,500		3,100	7,000	11,000	16,500
16,670	21/32	3,100	7,000	11,000	16,670
17,000		3,100	7,000	11,000	17,000
17,070	43/64	3,200	7,000	11,000	17,070
17,460	11/16	3,200	7,000	11,000	17,460
17,500		3,200	7,000	11,000	17,500
17,600		3,300	7,000	11,000	17,600
17,860	45/64	3,300	7,000	11,000	17,860
18,000		3,300	8,000	12,600	18,000
18,260	23/32	3,400	8,000	12,600	18,260
18,500		3,400	8,000	12,600	18,500
18,650	47/64	3,400	8,000	12,600	18,650
19,000		3,500	8,000	12,600	19,000
19,050	3/4	3,500	8,000	12,600	19,050
19,250		3,600	8,000	12,600	19,250
19,450	49/64	3,600	8,000	12,600	19,450
19,500		3,600	8,000	12,600	19,500
19,600		3,600	8,000	12,600	19,600
19,840	25/32	3,700	8,000	12,600	19,840
20,000		3,700	9,000	13,900	20,000
20,240	51/64	3,700	9,000	13,900	20,240
20,500		3,800	9,000	13,900	20,500
20,640	13/16	3,800	9,000	13,900	20,640
21,000		3,900	9,000	13,900	21,000
21,030	53/64	3,900	9,000	13,900	21,030
21,100		3,900	9,000	13,900	21,100
21,430	27/32	3,900	9,000	13,900	21,430
21,500		4,000	9,000	13,900	21,500
21,830	55/64	4,000	9,000	13,900	21,830
22,000		4,100	10,000	15,300	22,000
22,220	7/8	4,100	10,000	15,300	22,220
22,500		4,100	10,000	15,300	22,500
22,620	57/64	4,200	10,000	15,300	22,620
23,000		4,200	10,000	15,300	23,000
23,020	29/32	4,200	10,000	15,300	23,020
23,420	59/64	4,300	10,000	15,300	23,420
23,500		4,300	10,000	15,300	23,500
23,810	15/16	4,400	10,000	15,300	23,810
24,000		4,400	11,000	15,800	24,000
24,100		4,400	11,000	15,800	24,100
24,210	61/64	4,500	11,000	15,800	24,210
24,500		4,500	11,000	15,800	24,500
24,610	31/32	4,500	11,000	15,800	24,610
25,000	63/64	4,600	11,000	15,800	25,000
25,400	1	4,700	11,000	15,800	25,400
25,500		4,700	11,000	15,800	25,500
25,700		4,700	11,000	15,800	25,700
26,000		4,800	12,000	20,000	26,000
26,190	1 1/32	4,800	12,000	20,000	26,190
26,500		4,900	12,000	20,000	26,500
26,590	1 3/64	4,900	12,000	20,000	26,590
27,000		5,000	12,000	20,000	27,000
27,500		5,100	12,000	20,000	27,500
27,700		5,100	12,000	20,000	27,700
27,780	1 3/32	5,100	12,000	20,000	27,780
28,000		5,100	13,000	20,700	28,000
28,180	1 7/64	5,200	13,000	20,700	28,180
28,500		5,200	13,000	20,700	28,500
28,580		5,300	13,000	20,700	28,580
29,000		5,300	13,000	20,700	29,000
29,370	1 5/32	5,400	13,000	20,700	29,370
29,500		5,400	13,000	20,700	29,500
29,770	1 11/64	5,500	13,000	20,700	29,770
30,000		5,500	14,000	22,300	30,000
30,160	1 3/16	5,500	14,000	22,300	30,160
30,500		5,600	14,000	22,300	30,500
30,960	1 7/32	5,700	14,000	22,300	30,960
31,000		5,700	14,000	22,300	31,000
31,500		5,800	14,000	22,300	31,500
31,750	1 1/4	5,800	14,000	22,300	31,750



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
32,000		5,900	15,000	23,100	32,000
32,500		6,000	15,000	23,100	32,500
32,540	1 9/32	6,000	15,000	23,100	32,540
33,000		6,100	15,000	23,100	33,000
33,340	1 5/16	6,100	15,000	23,100	33,340
33,500		6,100	15,000	23,100	33,500
34,000		6,200	15,000	23,100	34,000
34,130	1 11/32	6,300	15,000	23,100	34,130
34,500		6,300	15,000	23,100	34,500
34,930		6,400	15,000	23,100	34,930
35,000		6,400	15,000	23,100	35,000
35,500		6,500	15,000	23,100	35,500
35,720	1 13/32	6,600	15,000	23,100	35,720
36,000		6,600	16,000	23,900	36,000
36,500		6,700	16,000	23,900	36,500
36,510	1 7/16	6,700	16,000	23,900	36,510
37,000		6,800	16,000	23,900	37,000
37,310	1 15/32	6,800	16,000	23,900	37,310
37,500		6,900	16,000	23,900	37,500
38,000		7,000	16,000	23,900	38,000
38,100	1 1/2	7,000	16,000	23,900	38,100
38,500	1 33/64	7,100	16,000	23,900	38,500
39,000		7,100	16,000	23,900	39,000
39,500		7,200	16,000	23,900	39,500
40,000		7,300	16,000	23,900	40,000

System wiertarski z
płytkami wym. T 800



Płytki wymienne do HT 800

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu

P Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • zawiera śruby mocujące nr art. 4071

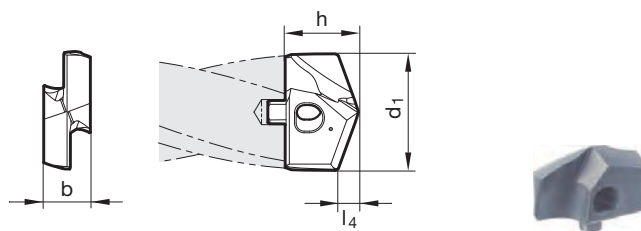
M**K****N** •**S****H**

aluminium i stopy Al • metale nieżelazne

System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 764-768

Nr artykułu **4114**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
11,000		2,100	4,500	7,500	11,000
11,200		2,100	4,500	7,500	11,200
11,500		2,100	4,500	7,500	11,500
11,510	29/64	2,100	4,500	7,500	11,510
11,700		2,200	4,500	7,500	11,700
11,800		2,200	4,500	7,500	11,800
11,910	15/32	2,200	4,500	7,500	11,910
12,000		2,200	5,000	7,700	12,000
12,100		2,300	5,000	7,700	12,100
12,200		2,300	5,000	7,700	12,200
12,300	31/64	2,300	5,000	7,700	12,300
12,500		2,300	5,000	7,700	12,500
12,600		2,300	5,000	7,700	12,600
12,700	1/2	2,400	5,000	7,700	12,700
12,800		2,400	5,000	7,700	12,800
12,900		2,400	5,000	7,700	12,900
13,000		2,400	5,500	8,500	13,000
13,100	33/64	2,400	5,500	8,500	13,100
13,490	17/32	2,500	5,500	8,500	13,490
13,500		2,500	5,500	8,500	13,500
13,600		2,500	5,500	8,500	13,600
13,700		2,500	5,500	8,500	13,700
13,800		2,600	5,500	8,500	13,800
13,890	35/64	2,600	5,500	8,500	13,890
14,000		2,600	6,000	9,600	14,000
14,100		2,600	6,000	9,600	14,100
14,290	9/16	2,700	6,000	9,600	14,290
14,400		2,700	6,000	9,600	14,400
14,500		2,700	6,000	9,600	14,500
14,600		2,700	6,000	9,600	14,600
14,680	37/64	2,700	6,000	9,600	14,680
14,700		2,700	6,000	9,600	14,700
14,800		2,700	6,000	9,600	14,800
15,000		2,800	6,000	9,800	15,000
15,080	19/32	2,800	6,000	9,800	15,080
15,100		2,800	6,000	9,800	15,100
15,200		2,800	6,000	9,800	15,200
15,300		2,800	6,000	9,800	15,300
15,480	39/64	2,900	6,000	9,800	15,480
15,500		2,900	6,000	9,800	15,500
15,600		2,900	6,000	9,800	15,600
15,700		2,900	6,000	9,800	15,700



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
15,800		2,900	6,000	9,800	15,800
15,870	5/8	2,900	6,000	9,800	15,870
16,000		3,000	7,000	11,000	16,000
16,270	41/64	3,000	7,000	11,000	16,270
16,500		3,100	7,000	11,000	16,500
16,670	21/32	3,100	7,000	11,000	16,670
17,000		3,100	7,000	11,000	17,000
17,070	43/64	3,200	7,000	11,000	17,070
17,460	11/16	3,200	7,000	11,000	17,460
17,500		3,200	7,000	11,000	17,500
17,600		3,300	7,000	11,000	17,600
17,860	45/64	3,300	7,000	11,000	17,860
18,000		3,300	8,000	12,600	18,000
18,260	23/32	3,400	8,000	12,600	18,260
18,500		3,400	8,000	12,600	18,500
18,650	47/64	3,400	8,000	12,600	18,650
19,000		3,500	8,000	12,600	19,000
19,050	3/4	3,500	8,000	12,600	19,050
19,250		3,600	8,000	12,600	19,250
19,450	49/64	3,600	8,000	12,600	19,450
19,500		3,600	8,000	12,600	19,500
19,600		3,600	8,000	12,600	19,600
19,840	25/32	3,700	8,000	12,600	19,840
20,000		3,700	9,000	13,900	20,000
20,240	51/64	3,700	9,000	13,900	20,240
20,500		3,800	9,000	13,900	20,500
20,640	13/16	3,800	9,000	13,900	20,640
21,000		3,900	9,000	13,900	21,000
21,030	53/64	3,900	9,000	13,900	21,030
21,100		3,900	9,000	13,900	21,100
21,430	27/32	3,900	9,000	13,900	21,430
21,500		4,000	9,000	13,900	21,500
21,830	55/64	4,000	9,000	13,900	21,830
22,000		4,100	10,000	15,300	22,000
22,220	7/8	4,100	10,000	15,300	22,220
22,500		4,100	10,000	15,300	22,500
22,620	57/64	4,200	10,000	15,300	22,620
23,000		4,200	10,000	15,300	23,000
23,020	29/32	4,200	10,000	15,300	23,020
23,420	59/64	4,300	10,000	15,300	23,420
23,500		4,300	10,000	15,300	23,500
23,810	15/16	4,400	10,000	15,300	23,810
24,000		4,400	11,000	15,800	24,000
24,100		4,400	11,000	15,800	24,100
24,210	61/64	4,500	11,000	15,800	24,210
24,500		4,500	11,000	15,800	24,500
24,610	31/32	4,500	11,000	15,800	24,610
25,000	63/64	4,600	11,000	15,800	25,000
25,400	1	4,700	11,000	15,800	25,400
25,500		4,700	11,000	15,800	25,500
25,670		4,700	11,000	15,800	25,670
25,700		4,700	11,000	15,800	25,700
25,810		4,700	11,000	15,800	25,810
26,000		4,800	12,000	20,000	26,000
26,190	1 1/32	4,800	12,000	20,000	26,190
26,500		4,900	12,000	20,000	26,500
26,590	1 3/64	4,900	12,000	20,000	26,590
27,000		5,000	12,000	20,000	27,000
27,500		5,100	12,000	20,000	27,500
27,700		5,100	12,000	20,000	27,700
27,780	1 3/32	5,100	12,000	20,000	27,780
28,000		5,100	13,000	20,700	28,000
28,180	1 7/64	5,200	13,000	20,700	28,180
28,500		5,200	13,000	20,700	28,500
28,580		5,300	13,000	20,700	28,580
29,000		5,300	13,000	20,700	29,000
29,370	1 5/32	5,400	13,000	20,700	29,370
29,500		5,400	13,000	20,700	29,500
29,770	1 11/64	5,500	13,000	20,700	29,770
30,000		5,500	14,000	22,300	30,000
30,160	1 3/16	5,500	14,000	22,300	30,160
30,500		5,600	14,000	22,300	30,500



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
30,960	1 7/32	5,700	14,000	22,300	30,960
31,000		5,700	14,000	22,300	31,000
31,500		5,800	14,000	22,300	31,500
31,750	1 1/4	5,800	14,000	22,300	31,750
32,000		5,900	15,000	23,100	32,000
32,500		6,000	15,000	23,100	32,500
32,540	1 9/32	6,000	15,000	23,100	32,540
32,940	1 19/64	6,000	15,000	23,100	32,940
33,000		6,100	15,000	23,100	33,000
33,340		6,100	15,000	23,100	33,340
33,500	1 5/16	6,100	15,000	23,100	33,500
34,000		6,200	15,000	23,100	34,000
34,130		6,300	15,000	23,100	34,130
34,500	1 11/32	6,300	15,000	23,100	34,500
34,930		6,400	15,000	23,100	34,930
35,000		6,400	15,000	23,100	35,000
35,500	1 13/32	6,500	15,000	23,100	35,500
35,720		6,600	15,000	23,100	35,720
36,000		6,600	16,000	23,900	36,000
36,500	1 7/16	6,700	16,000	23,900	36,500
36,510		6,700	16,000	23,900	36,510
37,000		6,800	16,000	23,900	37,000
37,310	1 15/32	6,800	16,000	23,900	37,310
37,500		6,900	16,000	23,900	37,500
38,000		7,000	16,000	23,900	38,000
38,100	1 1/2	7,000	16,000	23,900	38,100
38,500		7,100	16,000	23,900	38,500
39,000		7,100	16,000	23,900	39,000
39,500	1 33/64	7,200	16,000	23,900	39,500
39,500		7,200	16,000	23,900	39,500
40,000		7,300	16,000	23,900	40,000



Płytki wymienne do HT 800

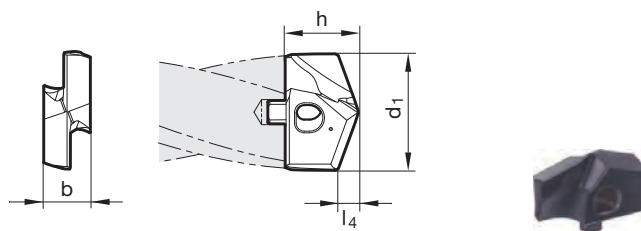
Materiał narzędzia **Węglik mono.**Powierzchnia **a**

Forma chwytu

P	○	Korekcja ścina $\geq \varnothing 11,000$ • geom. ścinowa • główna krawędź skrawająca - prosta (po korekcie) • zawiera śruby mocujące nr art. 4071
M	○	
K	○	
N	○	
S	○	Piloting in all materials
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 768

Nr artykułu **4111**

d1		l4	b	h	kod
mm	inch				
11,000		1,800	4,500	7,200	11,000
11,200		1,800	4,500	7,200	11,200
11,500		1,900	4,500	7,200	11,500
11,510	29/64	1,900	4,500	7,200	11,510
11,700		1,900	4,500	7,200	11,700
11,800		1,900	4,500	7,200	11,800
11,910	15/32	1,900	4,500	7,200	11,910
12,000		1,900	5,000	7,400	12,000
12,100		2,000	5,000	7,400	12,100
12,200		2,000	5,000	7,400	12,200
12,300	31/64	2,000	5,000	7,400	12,300
12,500		2,000	5,000	7,400	12,500
12,600		2,000	5,000	7,400	12,600
12,700	1/2	2,100	5,000	7,400	12,700
12,800		2,100	5,000	7,400	12,800
12,900		2,100	5,000	7,400	12,900
13,000		2,100	5,500	8,200	13,000
13,100	33/64	2,100	5,500	8,200	13,100
13,490	17/32	2,200	5,500	8,200	13,490
13,500		2,200	5,500	8,200	13,500
13,600		2,200	5,500	8,200	13,600
13,700		2,200	5,500	8,200	13,700
13,800		2,200	5,500	8,200	13,800
13,890	35/64	2,200	5,500	8,200	13,890
14,000		2,300	6,000	9,400	14,000
14,100		2,300	6,000	9,400	14,100
14,290	9/16	2,300	6,000	9,400	14,290
14,400		2,300	6,000	9,400	14,400
14,500		2,300	6,000	9,400	14,500
14,600		2,400	6,000	9,400	14,600
14,680	37/64	2,400	6,000	9,400	14,680
14,700		2,400	6,000	9,400	14,700
14,800		2,400	6,000	9,400	14,800
15,000		2,400	6,000	9,400	15,000
15,080	19/32	2,400	6,000	9,400	15,080
15,100		2,400	6,000	9,400	15,100
15,200		2,400	6,000	9,400	15,200
15,300		2,500	6,000	9,400	15,300
15,480	39/64	2,500	6,000	9,400	15,480
15,500		2,500	6,000	9,400	15,500
15,600		2,500	6,000	9,400	15,600
15,700		2,500	6,000	9,400	15,700



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
15,800		2,500	6,000	9,400	15,800
15,870	5/8	2,600	6,000	9,400	15,870
16,000		2,600	7,000	10,600	16,000
16,270	41/64	2,600	7,000	10,600	16,270
16,500		2,700	7,000	10,600	16,500
16,670	21/32	2,700	7,000	10,600	16,670
17,000		2,700	7,000	10,600	17,000
17,070	43/64	2,700	7,000	10,600	17,070
17,460	11/16	2,800	7,000	10,600	17,460
17,500		2,800	7,000	10,600	17,500
17,600		2,800	7,000	10,600	17,600
17,860	45/64	2,900	7,000	10,600	17,860
18,000		2,900	8,000	12,100	18,000
18,260	23/32	2,900	8,000	12,100	18,260
18,500		3,000	8,000	12,100	18,500
18,650	47/64	3,000	8,000	12,100	18,650
19,000		3,000	8,000	12,100	19,000
19,050	3/4	3,100	8,000	12,100	19,050
19,450	49/64	3,100	8,000	12,100	19,450
19,500		3,100	8,000	12,100	19,500
19,600		3,100	8,000	12,100	19,600
19,840	25/32	3,200	8,000	12,100	19,840
20,000		3,200	9,000	13,300	20,000
20,240	51/64	3,200	9,000	13,300	20,240
20,500		3,300	9,000	13,300	20,500
20,640	13/16	3,300	9,000	13,300	20,640
21,000		3,400	9,000	13,300	21,000
21,030	53/64	3,400	9,000	13,300	21,030
21,100		3,400	9,000	13,300	21,100
21,430	27/32	3,400	9,000	13,300	21,430
21,500		3,400	9,000	13,300	21,500
21,830	55/64	3,500	9,000	13,300	21,830
22,000		3,500	10,000	14,800	22,000
22,220	7/8	3,600	10,000	14,800	22,220
22,500		3,600	10,000	14,800	22,500
22,620	57/64	3,600	10,000	14,800	22,620
23,000		3,700	10,000	14,800	23,000
23,020	29/32	3,700	10,000	14,800	23,020
23,420	59/64	3,700	10,000	14,800	23,420
23,500		3,800	10,000	14,800	23,500
23,810	15/16	3,800	10,000	14,800	23,810
24,000		3,800	11,000	15,300	24,000
24,100		3,800	11,000	15,300	24,100
24,210	61/64	3,900	11,000	15,300	24,210
24,500		3,900	11,000	15,300	24,500
24,610	31/32	3,900	11,000	15,300	24,610
25,000	63/64	4,000	11,000	15,300	25,000
25,400	1	4,100	11,000	15,300	25,400
25,500		4,100	11,000	15,300	25,500
25,700		4,100	11,000	15,300	25,700
26,000		4,100	12,000	19,400	26,000
26,190	1 1/32	4,200	12,000	19,400	26,190
26,500		4,200	12,000	19,400	26,500
26,590	1 3/64	4,200	12,000	19,400	26,590
27,000		4,300	12,000	19,400	27,000
27,500		4,400	12,000	19,400	27,500
27,700		4,400	12,000	19,400	27,700
27,780	1 3/32	4,400	12,000	19,400	27,780
28,000		4,500	13,000	20,100	28,000
28,180	1 7/64	4,500	13,000	20,100	28,180
28,500		4,500	13,000	20,100	28,500
28,580		4,600	13,000	20,100	28,580
29,000		4,600	13,000	20,100	29,000
29,370	1 5/32	4,700	13,000	20,100	29,370
29,500		4,700	13,000	20,100	29,500
30,000		4,800	14,000	21,700	30,000
30,160	1 3/16	4,800	14,000	21,700	30,160
30,500		4,900	14,000	21,700	30,500
30,960	1 7/32	4,900	14,000	21,700	30,960
31,000		4,900	14,000	21,700	31,000
31,500		5,000	14,000	21,700	31,500
31,750	1 1/4	5,100	14,000	21,700	31,750



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
32,000		5,100	15,000	22,400	32,000
32,500		5,200	15,000	22,400	32,500
32,540	1 9/32	5,200	15,000	22,400	32,540
33,000		5,300	15,000	22,400	33,000
33,340	1 5/16	5,300	15,000	22,400	33,340
33,500		5,300	15,000	22,400	33,500
34,000		5,400	15,000	22,400	34,000
34,130	1 11/32	5,400	15,000	22,400	34,130
34,500		5,500	15,000	22,400	34,500
34,930		5,600	15,000	22,400	34,930
35,000		5,600	15,000	22,400	35,000
35,500		5,600	15,000	22,400	35,500
35,720	1 13/32	5,700	15,000	22,400	35,720
36,000		5,700	16,000	23,200	36,000
36,500		5,800	16,000	23,200	36,500
36,510	1 7/16	5,800	16,000	23,200	36,510
37,000		5,900	16,000	23,200	37,000
37,310	1 15/32	5,900	16,000	23,200	37,310
37,500		6,000	16,000	23,200	37,500
38,000		6,000	16,000	23,200	38,000
38,100	1 1/2	6,100	16,000	23,200	38,100
38,500	1 33/64	6,100	16,000	23,200	38,500
39,000		6,200	16,000	23,200	39,000
39,500		6,300	16,000	23,200	39,500
40,000		6,400	16,000	23,200	40,000

System wiertarski z
płytkami wym. T 800



Płytki fazujące do HT 800



Materiał narzędzia **Węglik mono.**

Powierzchnia **S**

Forma chwytu

P • Śruby mocujące nr art. 6128, zamawiane oddzielnie

M ○

K ○

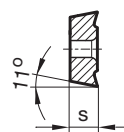
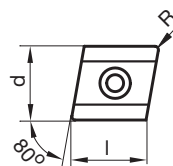
N ○

S ○

H ○

stopowe/niestopowe stali i staliwa

System wiertarski z płytkami wym. T 800



Nr artykułu **7645**

ISO	d	s	R	l	kod
	mm	mm	mm	mm	
CPGT050202FR-P	5,560	2,380	0,200	5,640	52,020
CPGT050204FR-P	5,560	2,380	0,400	5,640	52,040
CPGT060202FR-P	6,350	2,380	0,200	6,450	62,020
CPGT060204FR-P	6,350	2,380	0,400	6,450	62,040
CPGT09T308FR-P	9,525	3,970	0,800	9,670	93,080



Płytki fazujące do HT 800

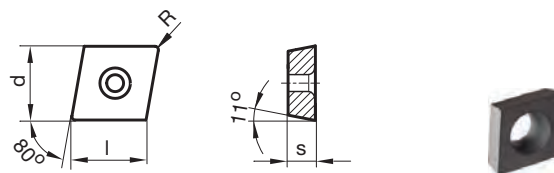
Materiał narzędzia **Węglik mono.**Powierzchnia **A**

Forma chwytu

P ○ Śruby mocujące nr art. 6128, zamawiane oddzielnie

M**K** ●**N****S****H**

żeliwa szare, ciągliwe i sferoidalne

System wiertarski z
płytkami wym. T 800Nr artykułu **7632**

ISO	d	s	R	l	kod
	mm	mm	mm	mm	
CPGW050202FN-K	5,560	2,380	0,200	5,640	52,020
CPGW050204FN-K	5,560	2,380	0,400	5,640	52,040
CPGW060202FN-K	6,350	2,380	0,200	6,450	62,020
CPGW060204FN-K	6,350	2,380	0,400	6,450	62,040
CPGW09T308FN-K	9,525	3,970	0,800	9,670	93,080



Płytki fazujące do HT 800



Materiał narzędzia **Węglik mono.**

Powierzchnia ○

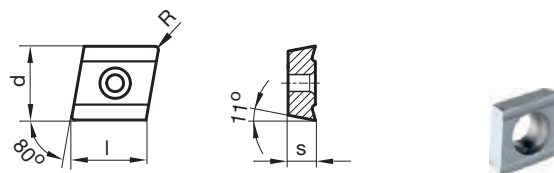
Forma chwytu

P Śruby mocujące nr art. 6128, zamawiane oddzielnie

- M**
- K**
- N** •
- S**
- H**

aluminium i stopy Al • metale nieżelazne

System wiertarski z płytkami wym. T 800

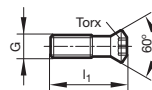


Nr artykułu **7635**

ISO	d	s	R	l	kod
	mm	mm	mm	mm	
CPGT050202FR-AL	5,560	2,380	0,200	5,640	52,020
CPGT050204FR-AL	5,560	2,380	0,400	5,640	52,040
CPGT060202FR-AL	6,350	2,380	0,200	6,450	62,020
CPGT060204FR-AL	6,350	2,380	0,400	6,450	62,040
CPGT09T308FR-AL	9,525	3,970	0,800	9,670	93,080



Śruby mocujące



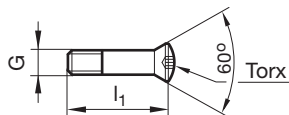
Nr artykułu

6128

G	l1	Torx	kod
	mm		
M2 x 5,5	5,500	T6	2,000
M2,2 x 5	5,000	T6	2,200
M2 x 5,3	5,300	T7	2,500
M2,5 x 6,5	6,500	T7	2,501
M2,5 x 5,7	5,700	T7	2,502
M3,5 x 10	10,000	T15	3,500
M3,5 x 12	12,000	T15	3,501
M3,5 x 8,5	8,500	T15	3,502
M3,5 x 8	8,000	T15	3,503
M4 x 13,5	13,500	T15	4,000
M4 x 8,4	8,400	T15	4,001
M4 x 10,8	10,800	T15	4,002
M4 x 0,5	11,000	T15	4,003
M4 x 9,5	9,500	T20	4,004
M4 x 0,5	9,000	T15	4,005
M4 x 9,5	9,500	T15	4,006
M4,5 x 11	11,000	T15	4,500
M4,5 x 7,5	7,500	T15	4,501
M4,5 x 11	11,000	T20	4,502
M5 x 17	17,000	T20	5,000
M5 x 11	11,000	T20	5,001



Śruby mocujące

System wiertarski z
płytkami wym. T 800

Nr artykułu

4071

G	l1	Torx	kod
	mm		
M1,6	4,000	T5	1,600
M1,6	4,400	T5	1,601
M2,2	9,500	T7	2,200
M2,2	10,500	T7	2,201
M2,2	5,600	T7	2,202
M2,2	4,600	T7	2,203
M2,5	11,400	T8	2,500
M2,5	6,400	T8	2,501
M2,5	5,200	T8	2,502
M3	13,100	T9	3,001
M3	6,400	T9	3,002
M3	8,000	T9	3,003
M3,5	14,250	T10	3,500
M4	16,000	T15	4,000
M4	7,700	T15	4,001
M4	10,600	T15	4,002
M4,5	18,000	T15	4,500
M5	19,750	T20	5,000
M5	21,750	T20	5,001
M5	14,200	T20	5,002
M5	23,400	T20	5,003
M6	27,000	T25	6,000
M6	28,500	T25	6,001
M6	32,500	T25	6,002



Korpusy wiertel składanych RT 800



P Korekcja ścina $\geq \varnothing 17,000$ • zwarta konstrukcja • pewne mocowanie płytki w gnieździe korpusu • zawiera śruby mocujące nr art. 1071 • Zawiera wkrętak nr art. 1612



Materiał narzędzia

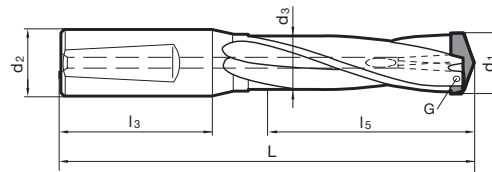
Powierzchnia **Ni**

Forma chwytu HE

System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 770

Nr artykułu **5242**

d1	d2	d3	L	l3	l5	G	kod
mm	mm	mm	mm	mm	mm		
16,00-17,00	20,000	15,700	130,000	50,000	54,000	1071 3.006	17,000
16,00-17,00	19,050	15,700	130,000	50,000	54,000	1071 3.006	17,005
17,01-17,99	20,000	16,700	130,000	50,000	54,000	1071 3.006	17,990
17,01-17,99	19,050	16,700	130,000	50,000	54,000	1071 3.006	17,995
18,00-19,00	20,000	17,700	138,000	50,000	60,000	1071 3.000	19,000
18,00-19,00	19,050	17,700	138,000	50,000	60,000	1071 3.000	19,005
19,01-20,00	20,000	18,700	138,000	50,000	60,000	1071 3.000	20,000
19,01-20,00	19,050	18,700	138,000	50,000	60,000	1071 3.000	20,005
20,01-21,00	25,000	19,700	153,000	56,000	66,000	1071 3.000	21,000
20,01-21,00	25,400	19,700	153,000	56,000	66,000	1071 3.000	21,005
21,01-22,50	25,000	20,700	153,000	56,000	66,000	1071 3.000	22,500
21,01-22,50	25,400	21,200	153,000	56,000	66,000	1071 3.000	22,505
22,51-24,00	25,000	22,200	161,000	56,000	72,000	1071 3.500	24,000
22,51-24,00	25,400	22,700	161,000	56,000	72,000	1071 3.500	24,005
24,01-25,50	25,000	23,700	170,000	56,000	78,000	1071 3.500	25,500
24,01-25,50	25,400	24,200	170,000	56,000	78,000	1071 3.500	25,505
25,51-27,50	32,000	25,200	182,000	60,000	84,000	1071 4.000	27,500
25,51-27,50	31,750	26,200	182,000	60,000	84,000	1071 4.000	27,505
27,51-29,50	32,000	27,200	190,000	60,000	90,000	1071 4.000	29,500
27,51-29,50	31,750	28,200	190,000	60,000	90,000	1071 4.000	29,505
29,51-32,00	32,000	29,200	198,000	60,000	96,000	1071 4.500	32,000
29,51-32,00	31,750	30,700	198,000	60,000	96,000	1071 4.500	32,005
32,01-34,50	32,000	31,700	206,000	60,000	102,000	1071 4.500	34,500
32,01-34,50	31,750	33,200	206,000	60,000	102,000	1071 4.500	34,505
34,51-37,50	32,000	34,000	218,000	60,000	114,000	1071 5.000	37,500
34,51-37,50	31,750	36,200	218,000	60,000	114,000	1071 5.000	37,505
37,51-40,50	32,000	37,000	231,000	60,000	120,000	1071 5.000	40,500
37,51-40,50	31,750	39,200	231,000	60,000	120,000	1071 5.000	40,505



Korpusy wiertel składanych RT 800



Materiał narzędzia

Powierzchnia

Forma chwytu HE

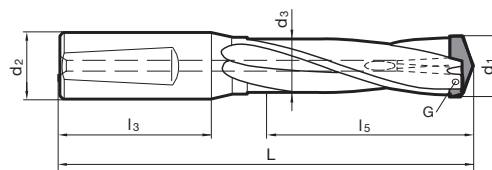
P Korekcja ścina $\geq \varnothing 17,000$ • zwarta konstrukcja • pewne mocowanie płytki w gnieździe korpusu • zawiera śruby mocujące nr art. 1071 • Zawiera wkrętak nr art. 1612



System wiertarski z płytkami wym. T 800

GÜHRING NAVIGATOR

Param. skr. na str. 770

Nr artykułu **5243**

d1	d2	d3	L	l3	l5	G	kod
mm	mm	mm	mm	mm	mm		
16,00-17,00	20,000	15,700	166,000	50,000	90,000	1071 3.006	17,000
16,00-17,00	19,050	15,700	166,000	50,000	90,000	1071 3.006	17,005
17,01-17,99	20,000	16,700	166,000	50,000	90,000	1071 3.006	17,990
17,01-17,99	19,050	16,700	166,000	50,000	90,000	1071 3.006	17,995
18,00-19,00	20,000	17,700	178,000	50,000	100,000	1071 3.000	19,000
18,00-19,00	19,050	17,700	178,000	50,000	100,000	1071 3.000	19,005
19,01-20,00	20,000	18,700	178,000	50,000	100,000	1071 3.000	20,000
19,01-20,00	19,050	18,700	178,000	50,000	100,000	1071 3.000	20,005
20,01-21,00	25,000	19,700	197,000	56,000	110,000	1071 3.000	21,000
20,01-21,00	25,400	19,700	197,000	56,000	110,000	1071 3.000	21,005
21,01-22,50	25,000	20,700	197,000	56,000	110,000	1071 3.000	22,500
21,01-22,50	25,400	21,200	197,000	56,000	110,000	1071 3.000	22,505
22,51-24,00	25,000	22,200	209,000	56,000	120,000	1071 3.500	24,000
22,51-24,00	25,400	22,700	209,000	56,000	120,000	1071 3.500	24,005
24,01-25,50	25,000	23,700	222,000	56,000	130,000	1071 3.500	25,500
24,01-25,50	25,400	24,200	222,000	56,000	130,000	1071 3.500	25,505
25,51-27,50	32,000	25,200	238,000	60,000	140,000	1071 4.000	27,500
25,51-27,50	31,750	26,200	238,000	60,000	140,000	1071 4.000	27,505
27,51-29,50	32,000	27,200	250,000	60,000	150,000	1071 4.000	29,500
27,51-29,50	31,750	28,200	250,000	60,000	150,000	1071 4.000	29,505
29,51-32,00	32,000	29,200	262,000	60,000	160,000	1071 4.500	32,000
29,51-32,00	31,750	30,700	262,000	60,000	160,000	1071 4.500	32,005
32,01-34,50	32,000	31,700	274,000	60,000	170,000	1071 4.500	34,500
32,01-34,50	31,750	33,200	274,000	60,000	170,000	1071 4.500	34,505
34,51-37,50	32,000	34,000	292,000	60,000	190,000	1071 5.000	37,500
34,51-37,50	31,750	36,200	292,000	60,000	190,000	1071 5.000	37,505
37,51-40,50	32,000	37,000	311,000	60,000	200,000	1071 5.000	40,500
37,51-40,50	31,750	39,200	311,000	60,000	200,000	1071 5.000	40,505



Korpusy wiertel składanych RT 800



Materiał narzędzia

Powierzchnia **Ni**

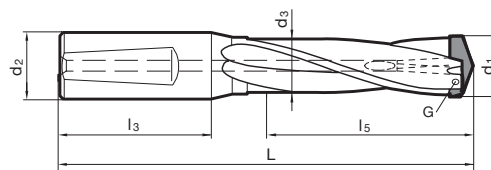
Forma chwytu HE

P Korekcja ścina $\geq \varnothing 17,000$ • zwarta konstrukcja • pewne mocowanie płytki w gnieździe korpusu • zawiera śruby mocujące nr art. 1071 • Zawiera wkrętak nr art. 1612



GÜHRINGNAVIGATOR

Param. skr. na str. 770



System wiertarski z płytkami wym. T 800

Nr artykułu **5248**

d1	d2	d3	L	l3	l5	G	kod
mm	mm	mm	mm	mm	mm		
16,00-17,00	20,000	15,700	202,000	50,000	126,000	1071 3.006	17,000
16,00-17,00	19,050	15,700	202,000	50,000	126,000	1071 3.006	17,005
17,01-17,99	20,000	16,700	202,000	50,000	126,000	1071 3.006	17,990
17,01-17,99	19,050	16,700	202,000	50,000	126,000	1071 3.006	17,995
18,00-19,00	20,000	17,700	218,000	50,000	140,000	1071 3.000	19,000
18,00-19,00	19,050	17,700	218,000	50,000	140,000	1071 3.000	19,005
19,01-20,00	20,000	18,700	218,000	50,000	140,000	1071 3.000	20,000
19,01-20,00	19,050	18,700	218,000	50,000	140,000	1071 3.000	20,005
20,01-21,00	25,000	19,700	241,000	56,000	154,000	1071 3.000	21,000
20,01-21,00	25,400	19,700	241,000	56,000	154,000	1071 3.000	21,005
21,01-22,50	25,000	20,700	241,000	56,000	154,000	1071 3.000	22,500
21,01-22,50	25,400	21,200	241,000	56,000	154,000	1071 3.000	22,505
22,51-24,00	25,000	22,200	257,000	56,000	168,000	1071 3.500	24,000
22,51-24,00	25,400	22,700	257,000	56,000	168,000	1071 3.500	24,005
24,01-25,50	25,000	23,700	274,000	56,000	182,000	1071 3.500	25,500
24,01-25,50	25,400	24,200	274,000	56,000	182,000	1071 3.500	25,505
25,51-27,50	32,000	25,200	294,000	60,000	196,000	1071 4.000	27,500
25,51-27,50	31,750	26,200	294,000	60,000	196,000	1071 4.000	27,505
27,51-29,50	32,000	27,200	310,000	60,000	210,000	1071 4.000	29,500
27,51-29,50	31,750	28,200	310,000	60,000	210,000	1071 4.000	29,505
29,51-32,00	32,000	29,200	326,000	60,000	224,000	1071 4.500	32,000
29,51-32,00	31,750	30,700	326,000	60,000	224,000	1071 4.500	32,005
32,01-34,50	32,000	31,700	342,000	60,000	238,000	1071 4.500	34,500
32,01-34,50	31,750	33,200	342,000	60,000	238,000	1071 4.500	34,505
34,51-37,50	32,000	34,000	366,000	60,000	266,000	1071 5.000	37,500
34,51-37,50	31,750	36,200	366,000	60,000	266,000	1071 5.000	37,505
37,51-40,50	32,000	37,000	391,000	60,000	280,000	1071 5.000	40,500
37,51-40,50	31,750	39,200	391,000	60,000	280,000	1071 5.000	40,505



Płytki wymienne do RT 800

Materiał narzędzia **Węglik mono.**Powierzchnia **S**

Forma chwytu

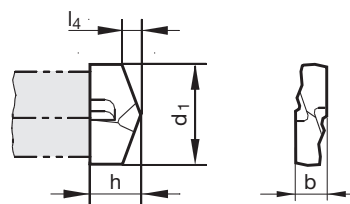
P • Korekcja ścina $\geq \varnothing 16,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • zawiera śruby mocujące nr art. 1071

M ○**K** •**N** ○**S** ○**H** ○stale - Rm < 1000 N/mm²

System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 770

Nr artykułu **1047**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
16,000		3,000	4,500	8,000	16,000
16,270	41/64	3,000	4,500	8,000	16,270
16,500		3,100	4,500	8,000	16,500
16,670	21/32	3,100	4,500	8,000	16,670
17,000		3,100	4,500	8,000	17,000
17,070	43/64	3,200	4,500	8,000	17,070
17,460	11/16	3,200	4,500	8,000	17,460
17,500		3,200	4,500	8,000	17,500
17,860	45/64	3,300	4,500	8,000	17,860
18,000		3,300	5,000	8,000	18,000
18,260	23/32	3,400	5,000	8,000	18,260
18,500		3,400	5,000	8,000	18,500
18,650	47/64	3,400	5,000	8,000	18,650
19,000		3,500	5,000	8,000	19,000
19,050	3/4	3,500	5,000	8,000	19,050
19,250		3,600	5,000	8,000	19,250
19,450	49/64	3,600	5,000	8,000	19,450
19,500		3,600	5,000	8,000	19,500
19,840	25/32	3,700	5,000	8,000	19,840
20,000		3,700	5,000	8,000	20,000
20,240	51/64	3,700	5,500	8,800	20,240
20,500		3,800	5,500	8,800	20,500
20,640	13/16	3,800	5,500	8,800	20,640
21,000		3,900	5,500	8,800	21,000
21,030	53/64	3,900	5,500	8,800	21,030
21,430	27/32	3,900	5,500	8,800	21,430
21,500		4,000	5,500	8,800	21,500
21,830	55/64	4,000	5,500	8,800	21,830
22,000		4,100	5,500	8,800	22,000
22,220	7/8	4,100	5,500	8,800	22,220
22,500		4,100	5,500	8,800	22,500
22,620	57/64	4,200	6,300	10,000	22,620
23,000		4,200	6,300	10,000	23,000
23,020	29/32	4,200	6,300	10,000	23,020
23,420	59/64	4,300	6,300	10,000	23,420
23,500		4,300	6,300	10,000	23,500
23,810	15/16	4,400	6,300	10,000	23,810
24,000		4,400	6,300	10,000	24,000
24,210	61/64	4,500	6,300	10,000	24,210
24,500		4,500	6,300	10,000	24,500
24,610	31/32	4,500	6,300	10,000	24,610
25,000	63/64	4,600	6,300	10,000	25,000



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
25,400	1	4,700	6,300	10,000	25,400
25,500		4,700	6,300	10,000	25,500
26,000		4,800	7,300	11,600	26,000
26,500		4,900	7,300	11,600	26,500
27,000		5,000	7,300	11,600	27,000
27,500		5,100	7,300	11,600	27,500
28,000		5,100	7,300	11,600	28,000
28,500		5,200	7,300	11,600	28,500
29,000		5,300	7,300	11,600	29,000
29,500		5,400	7,300	11,600	29,500
30,000		5,500	8,500	13,600	30,000
30,500		5,600	8,500	13,600	30,500
31,000		5,700	8,500	13,600	31,000
31,500		5,800	8,500	13,600	31,500
32,000		5,900	8,500	13,600	32,000
32,500		6,000	8,500	13,600	32,500
33,000		6,100	8,500	13,600	33,000
33,500		6,100	8,500	13,600	33,500
34,000		6,200	8,500	13,600	34,000
34,500		6,300	8,500	13,600	34,500
35,000		6,400	10,000	16,000	35,000
36,000		6,600	10,000	16,000	36,000
37,000		6,800	10,000	16,000	37,000
37,500		6,900	10,000	16,000	37,500
38,000		7,000	10,000	16,000	38,000
39,000		7,100	10,000	16,000	39,000
40,000		7,300	10,000	16,000	40,000
40,500		7,400	10,000	16,000	40,500

System wiertarski z
płytkami wym. T 800



Płytki wymienne do RT 800

Materiał narzędzia **Węglik mono.**Powierzchnia **F**

Forma chwytu

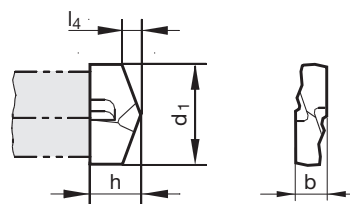
P • Korekcja ścina $\geq \varnothing 16,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • zawiera śruby mocujące nr art. 1071

M ○**K** •**N** ○**S** ○**H** ○stale - Rm < 1000 N/mm²

System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 770

Nr artykułu **2485**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
16,000		3,000	4,500	8,000	16,000
16,270	41/64	3,000	4,500	8,000	16,270
16,500		3,100	4,500	8,000	16,500
16,670	21/32	3,100	4,500	8,000	16,670
17,000		3,100	4,500	8,000	17,000
17,070	43/64	3,200	4,500	8,000	17,070
17,460	11/16	3,200	4,500	8,000	17,460
17,500		3,200	4,500	8,000	17,500
17,860	45/64	3,300	4,500	8,000	17,860
18,000		3,300	5,000	8,000	18,000
18,260	23/32	3,400	5,000	8,000	18,260
18,500		3,400	5,000	8,000	18,500
18,650	47/64	3,400	5,000	8,000	18,650
19,000		3,500	5,000	8,000	19,000
19,050	3/4	3,500	5,000	8,000	19,050
19,250		3,600	5,000	8,000	19,250
19,450	49/64	3,600	5,000	8,000	19,450
19,500		3,600	5,000	8,000	19,500
19,840	25/32	3,700	5,000	8,000	19,840
20,000		3,700	5,000	8,000	20,000
20,240	51/64	3,700	5,500	8,800	20,240
20,500		3,800	5,500	8,800	20,500
20,640	13/16	3,800	5,500	8,800	20,640
21,000		3,900	5,500	8,800	21,000
21,030	53/64	3,900	5,500	8,800	21,030
21,430	27/32	3,900	5,500	8,800	21,430
21,500		4,000	5,500	8,800	21,500
21,830	55/64	4,000	5,500	8,800	21,830
22,000		4,100	5,500	8,800	22,000
22,220	7/8	4,100	5,500	8,800	22,220
22,500		4,100	5,500	8,800	22,500
22,620	57/64	4,200	6,300	10,000	22,620
23,000		4,200	6,300	10,000	23,000
23,020	29/32	4,200	6,300	10,000	23,020
23,420	59/64	4,300	6,300	10,000	23,420
23,500		4,300	6,300	10,000	23,500
23,810	15/16	4,400	6,300	10,000	23,810
24,000		4,400	6,300	10,000	24,000
24,210	61/64	4,500	6,300	10,000	24,210
24,500		4,500	6,300	10,000	24,500
24,610	31/32	4,500	6,300	10,000	24,610
25,000	63/64	4,600	6,300	10,000	25,000



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
25,400	1	4,700	6,300	10,000	25,400
25,500		4,700	6,300	10,000	25,500
26,000		4,800	7,300	11,600	26,000
26,500		4,900	7,300	11,600	26,500
27,000		5,000	7,300	11,600	27,000
27,500		5,100	7,300	11,600	27,500
28,000		5,100	7,300	11,600	28,000
28,500		5,200	7,300	11,600	28,500
29,000		5,300	7,300	11,600	29,000
29,500		5,400	7,300	11,600	29,500
30,000		5,500	8,500	13,600	30,000
30,500		5,600	8,500	13,600	30,500
31,000		5,700	8,500	13,600	31,000
31,500		5,800	8,500	13,600	31,500
32,000		5,900	8,500	13,600	32,000
32,500		6,000	8,500	13,600	32,500
33,000		6,100	8,500	13,600	33,000
33,500		6,100	8,500	13,600	33,500
34,000		6,200	8,500	13,600	34,000
34,500		6,300	8,500	13,600	34,500
35,000		6,400	10,000	16,000	35,000
36,000		6,600	10,000	16,000	36,000
37,000		6,800	10,000	16,000	37,000
37,500		6,900	10,000	16,000	37,500
38,000		7,000	10,000	16,000	38,000
39,000		7,100	10,000	16,000	39,000
40,000		7,300	10,000	16,000	40,000
40,500		7,400	10,000	16,000	40,500

System wiertarski z
płytkami wym. T 800



Płytki wymienne do RT 800

Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Forma chwytu

P Korekcja ścina $\geq \varnothing 16,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • zawiera śruby mocujące nr art. 1071

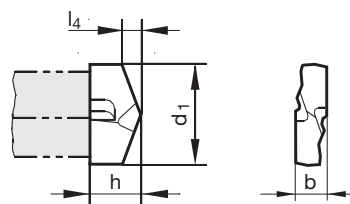
M**K** ○**N** •**S****H**

żeliwa i stopy AlSi

System wiertarski z płytkami wym. T 800

GÜHRINGNAVIGATOR

Param. skr. na str. 770

Nr artykułu **2747**

d1		l4	b	h	kod
mm	inch	mm	mm	mm	
16,000		3,000	4,500	8,000	16,000
16,500		3,100	4,500	8,000	16,500
17,000		3,100	4,500	8,000	17,000
17,070	43/64	3,200	4,500	8,000	17,070
17,500		3,200	4,500	8,000	17,500
18,000		3,300	5,000	8,000	18,000
18,260	23/32	3,400	5,000	8,000	18,260
18,650	47/64	3,400	5,000	8,000	18,650
19,000		3,500	5,000	8,000	19,000
19,050	3/4	3,500	5,000	8,000	19,050
19,250		3,600	5,000	8,000	19,250
19,450	49/64	3,600	5,000	8,000	19,450
19,500		3,600	5,000	8,000	19,500
19,840	25/32	3,700	5,000	8,000	19,840
20,000		3,700	5,000	8,000	20,000
20,500		3,800	5,500	8,800	20,500
20,640	13/16	3,800	5,500	8,800	20,640
21,000		3,900	5,500	8,800	21,000
21,030	53/64	3,900	5,500	8,800	21,030
21,430	27/32	3,900	5,500	8,800	21,430
21,830	55/64	4,000	5,500	8,800	21,830
22,000		4,100	5,500	8,800	22,000
23,000		4,200	6,300	10,000	23,000
23,420	59/64	4,300	6,300	10,000	23,420
23,500		4,300	6,300	10,000	23,500
24,000		4,400	6,300	10,000	24,000
24,210	61/64	4,500	6,300	10,000	24,210
24,500		4,500	6,300	10,000	24,500
25,000	63/64	4,600	6,300	10,000	25,000
25,500		4,700	6,300	10,000	25,500
26,000		4,800	7,300	11,600	26,000
26,500		4,900	7,300	11,600	26,500
27,000		5,000	7,300	11,600	27,000
27,500		5,100	7,300	11,600	27,500
28,000		5,100	7,300	11,600	28,000
29,500		5,400	7,300	11,600	29,500
30,000		5,500	8,500	13,600	30,000
30,500		5,600	8,500	13,600	30,500
31,000		5,700	8,500	13,600	31,000
31,500		5,800	8,500	13,600	31,500
32,000		5,900	8,500	13,600	32,000
32,500		6,000	8,500	13,600	32,500



d1		l4	b	h	kod
mm	inch	mm	mm	mm	
33,000		6,100	8,500	13,600	33,000
33,500		6,100	8,500	13,600	33,500
34,000		6,200	8,500	13,600	34,000
34,500		6,300	8,500	13,600	34,500
35,000		6,400	10,000	16,000	35,000
36,000		6,600	10,000	16,000	36,000
37,000		6,800	10,000	16,000	37,000
39,000		7,100	10,000	16,000	39,000
40,000		7,300	10,000	16,000	40,000

System wiertarski z
płytkami wym. T 800



Śruby mocujące do RT 800

System wiertarski z
płytkami wym. T 800

Nr artykułu

1071

G	l1	Torx	kod
	mm		
M3 x 0,35	7,000	T6	3,000
M3 x 0,35	6,000	T6	3,006
M3,5 x 0,35	8,000	T7	3,500
M4 x 0,5	9,000	T8	4,000
M4 x 0,5	10,000	T8	4,500
M5 x 0,5	11,000	T10	5,000



Wkrętaki dynamometryczne



Nr artykułu

4915

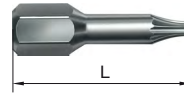
Zabierak		Nm	Typ	kod
1/4"	hexagonal	0,4-1	A	1,001
1/4"	hexagonal	0,8-2	A	2,000
1/4"	hexagonal	1-5	A	5,001
1/4"	hexagonal	2-8	A	8,000
1/4"	hexagonal	12	D	12,000
1/4"	hexagonal	5-14	D	14,000
3/8"	square	5-50	B	50,000
1/2"	square	20-200	C	200,000



Nasadki Torx



System wiertarski z płytkami wym. T 800



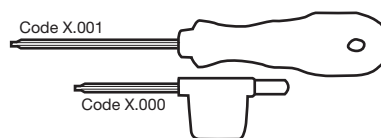
Nr artykułu

4917

Zabierak		Torx	L mm	kod
1/4	hexagonal	T5	25,000	5,000
1/4	hexagonal	T6	25,000	6,000
1/4	hexagonal	T7	25,000	7,000
1/4	hexagonal	T8	25,000	8,000
1/4	hexagonal	T9	25,000	9,000
1/4	hexagonal	T10	25,000	10,000
1/4	hexagonal	T15	25,000	15,000
1/4	hexagonal	T20	25,000	20,000
1/2	square	T25	25,000	25,000



Wkrętak Torx



Nr artykułu

1612

Torx	kod
T5	5,001
T6	6,000
T6	6,001
T7	7,001
T8	8,000
T8	8,001
T9	9,001
T10	10,001
T15	15,000
T15	15,001
T20	20,001
T25	25,001
T30	30,001



HT 800 WP

Prosimy o stosowanie poniższych zaleceń podczas używania wiertła HT800:

Zalecamy każdorazową wymianę śrub mocujących razem z wymianą płytek. Dlatego każdy korpus jest wyposażony w śrubkę mocującą nr art. 4071 i wkrętak nr art. 1612. Każda płytka wymienna jest również dostarczana razem ze śrubą mocującą nr art. 4071. Podczas wymiany płytek prosimy o stosowanie odpowiednich momentów dokręcenia śrub. Stosowanie się do tych zaleceń jest absolutnie konieczne do uzyskania optymalnych wyników obróbki.

Zakres średnic	11,0 - 12,99	13,0 - 13,99	14,0 - 15,99	16,0 - 17,99	18,0 - 19,99	20,0 - 21,99	22,0 - 29,99	30,0 - 40,00
Gwint	M2,2	M2,5	M3	M3,5	M4	M4,5	M5	M6
Rozmiar Torx	T7	T8	T9	T10	T15	T15	T20	T25
Moment mocujący [Nm]	0,8	1,0	1,7	2,7	4,0	6,0	8,0	14,0

Informacje dotyczące mocowania płytek

- Podczas wiercenia otworów przelotowych łysinki płytki muszą pozostać w kontakcie z powierzchnią otworu. Dodatkowo zalecamy zmniejszenie posuwu przy wyjściu narzędzia.
- Do wiercenia otworów o głębokości powyżej 5xD zalecamy wykonanie nawiercenia lub otworu pilotującego przy użyciu korpusu nr art. 4105 i płytki nr art. 4111. Alternatywnie mogą być użyte krótkie wiertła Ratio RT100U lub RT100VA.
- Podczas wiercenia bez nawiercania zalecamy zmniejszenie posuwu na wejściu narzędzia.
- Nie zalecamy użycia wiertła HT800 do wykonywania otworów przerywanych (rowki, krzyżujące się otwory) bez dodatkowych prób. Przy wierceniu przerywanych otworów (max 0.2 x D) zalecamy zmniejszenie posuwu.
- Podczas wiercenia otworów przelotowych łysinki płytki muszą pozostać w kontakcie z powierzchnią otworu. Dodatkowo zalecamy zmniejszenie posuwu przy wyjściu narzędzia.
- W odróżnieniu od typowych wiertła na płytce wymienne, system HT800 może być stosowany do obróbki pakietów blach.
- Podczas wiercenia na tokarkach (gdy narzędzie jest stacjonarne) należy sprawdzić współosiowość narzędzia.
- Ważnym czynnikiem uzyskiwanych wyników wiercenia jest odpowiednie chłodzenie emulsją lub czystym olejem.
- Wiertła HT800 w ograniczonym zakresie mogą być użyte do obróbki na sucho lub ze smarowaniem MQL. Przy użyciu smarowania MQL należy zastosować stożkowe zakończenie chwytu i inne wyposażenie dodatkowe.

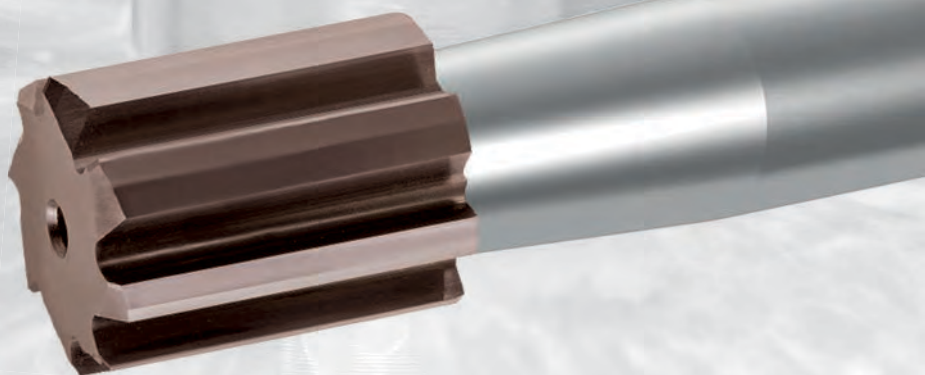
RT 800 WP

Prosimy o stosowanie poniższych zaleceń podczas używania wiertła RT800WP:

- Podczas wiercenia otworów przelotowych łysinki płytki muszą pozostać w kontakcie z powierzchnią otworu.
- Do otworów o głębokości 7xD zalecamy wykonanie nawiercenia o kącie powyżej 140° i średnicy min. 0.6 x D.
- Nie zalecamy użycia wiertła do wykonywania otworów przerywanych (rowki, krzyżujące się otwory) bez dodatkowych prób. Przy wierceniu przerywanych otworów (max 0.2 x D) zalecamy zmniejszenie posuwu.
- W odróżnieniu od typowych wiertła na płytce wymienne, system RT800 może być stosowany do obróbki pakietów blach.
- Podczas wymiany płytki zalecana jest każdorazowo wymiana śruby mocującej (załączonej w pudełku z płytką).

HR 500 T

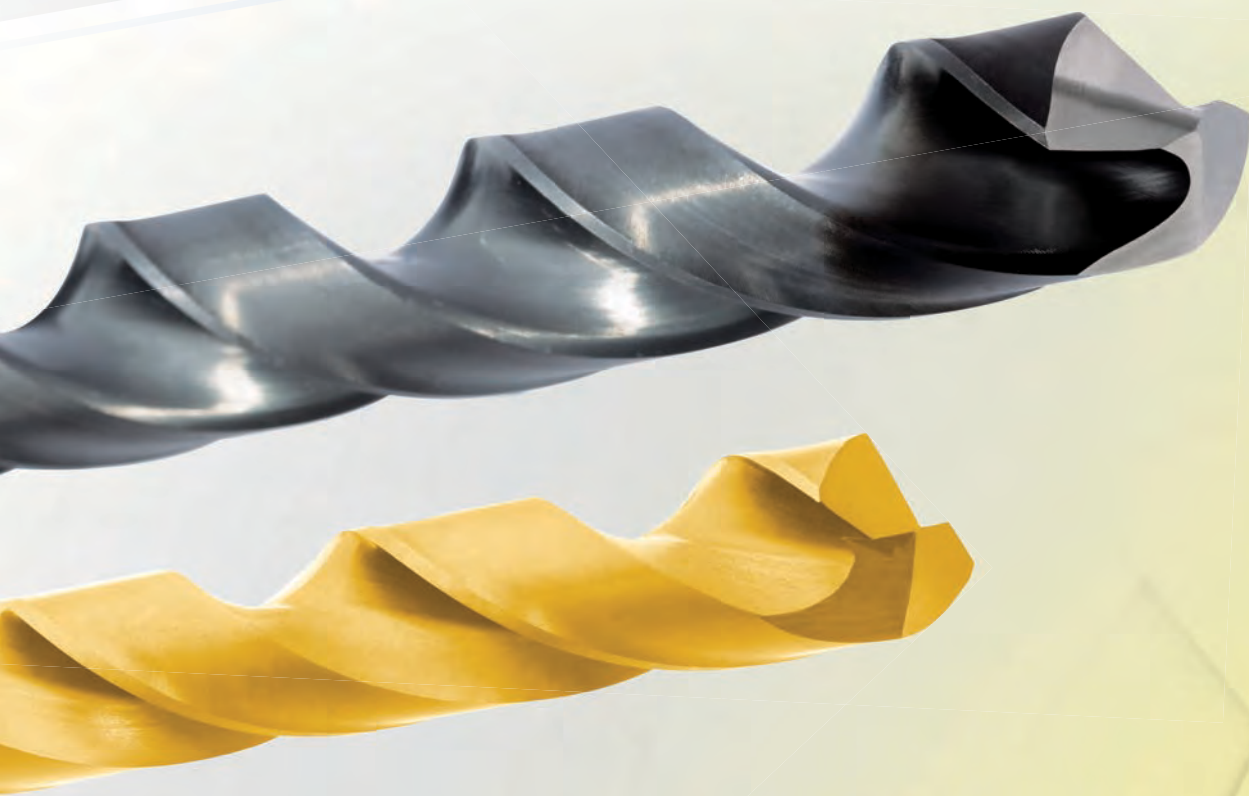
Wysokowydajne, pełnowęglkowe
rozwiertaki w formie wymiennej główki
z chwytami walcowym HA



Więcej informacji można znaleźć w naszym katalogu rozwiertaków.



WIERTŁA KRETE Z CHWYTEM WALCOWYM





P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte, krótkie

Wiertła kręte z chwytem walcowym

•	•	•	•	•	•		~3xD	DIN 1897	N	R	HSS		0,350 - 44,000	223	772	192
•	•	•	•	•	•		~3xD	DIN 1897	N	R	HSS		0,500 - 30,160	653	772	196
•	•	•	•	•	•		~3xD	DIN 1897	N	R	HSS		1,000 - 15,000	2460	772	199
•	•	•	•	•	•		~3xD	DIN 1897	N	L	HSS		0,320 - 50,000	226	772	200
•	•	•	•	•	•		~3xD	DIN 1897	N	L	HSS		0,900 - 13,000	672	772	203
•	•	•	•	•	•		~3xD	DIN 1897	H	R	HSS		0,690 - 21,000	224	772	204
•	•	•	•	•	•		~3xD	DIN 1897	H	L	HSS		0,750 - 24,000	227	772	206
•	•	•	•	•	•		~3xD	DIN 1897	W	R	HSS		1,000 - 20,000	225	772	208
•	•	•	•	•	•		~3xD	DIN 1897	W	L	HSS		1,000 - 20,000	228	772	210
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	R	HSS		1,000 - 20,000	552	772	212
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	L	HSS		1,000 - 19,840	553	772	215
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	R	HSCO		0,400 - 48,000	329	772	218
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	R	HSCO		0,500 - 15,500	659	774	222
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	R	HSCO		1,000 - 13,000	2461	774	224
•	•	•	•	•	•		~3xD	DIN 1897	GV 120	L	HSCO		0,450 - 32,000	330	772	225
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	R	HSCO		1,000 - 20,000	1228	774	227
•	•	•	•	•	•		~3xD	DIN 1897	GT 80	R	HSCO		1,000 - 16,000	2498	774	229
•	•	•	•	•	•		~3xD	DIN 1897	VA	R	HSCO		1,000 - 12,000	1261	772	230
•	•	•	•	•	•		~3xD	DIN 1897	VA	R	HSCO		1,000 - 13,000	572	774	231
•	•	•	•	•	•		~3xD	DIN 1897	P2000	R	HSCO		1,000 - 13,000	2048	774	233
•	•	•	•	•	•		~3xD	DIN 1897	N	R	M42		1,000 - 15,870	1259	772	235
•	•	•	•	•	•		~3xD	DIN 1897	GT 500	R	HSS-E-PM		1,000 - 14,290	515	774	237
•	•	•	•	•	•		3xD	DIN 6539	N	R	VHM		0,500 - 16,000	730	776	239
•	•	•	•	•	•		~3xD	DIN 6539	N	R	VHM		1,000 - 16,000	2463	776	241



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte, krótkie

							~3xD	WN	N	R	VHM	○	0,500 - 6,500	702	776	243
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Wiertła kręte

•	•	○					~5xD	DIN 338	N	R	HSS	○ _{2,36} ^{>0}	0,200 - 20,000	205	778	244
•	•	○					~5xD	DIN 338	N	R	HSS	Ⓢ	0,200 - 19,000	651	780	250
•	•	•					~5xD	DIN 338	N	R	HSS	F	1,000 - 14,500	2456	780	254
•	•	○					~5xD	DIN 338	N	R	HSS	○	2,400 - 5,610	560	778	256
•	•	○					~5xD	DIN 338	N	R	HSS	●	3,000 - 16,000	240	778	257
•	•	○					~5xD	DIN 338	N	L	HSS	○ _{6,00} ^{>0}	0,200 - 20,000	208	778	258
•	•	○					~5xD	DIN 338	N	L	HSS	Ⓢ	0,250 - 14,250	664	780	261
			•				~5xD	DIN 338	H	R	HSS	○	0,200 - 20,000	206	778	263
			•				~5xD	DIN 338	H	L	HSS	○	0,300 - 20,000	209	778	266
			•				~5xD	DIN 338	W	R	HSS	○	0,200 - 20,000	207	778	269
			•				~5xD	DIN 338	W	L	HSS	○	0,250 - 20,000	210	778	272
•	•	•					~5xD	DIN 338	GT 100	R	HSS	○ _{2,36} ^{>0}	0,600 - 16,000	549	778	274
•	•	•					~5xD	DIN 338	GT 100	R	HSS	Ⓢ	1,000 - 15,000	652	780	277
•	•	•					~5xD	DIN 338	GT 100	R	HSS	F	1,000 - 15,000	2457	780	280
•	•	•					~5xD	DIN 338	GT 100	L	HSS	○ _{2,36} ^{>0}	1,000 - 15,500	550	778	281
•	•	•					~5xD	DIN 338	GT 100	L	HSS	Ⓢ	1,300 - 9,800	665	780	283
•	○	•	○				~5xD	DIN 338	N	R	HSCO	○ _{2,36} ^{>0}	0,200 - 20,000	305	780	284
•	○	•	○				~5xD	DIN 338	N	R	HSCO	Ⓢ	1,200 - 13,000	2997	782	288
•	○	•	○				~5xD	DIN 338	N	L	HSCO	○ _{6,00} ^{>0}	0,360 - 18,500	308	780	289
•	○	•	•				~5xD	DIN 338	GT 100	R	HSCO	○ _{2,36} ^{>0}	1,000 - 16,000	622	780	291
•	○	•	○				~5xD	DIN 338	GT 100	R	HSCO	Ⓢ	1,000 - 15,000	658	782	294
•	○	•	•	○			~5xD	DIN 338	GT 100	R	HSCO	F	1,000 - 14,000	2459	782	296

Wiertła kręte z chwytem walcowym



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte

Wiertła kręte z chwytem walcowym

•	○						~5xD	DIN 338	GT 100	(R)	HSCO	C	3,000 - 11,910	1221	782	298
○	•	○					~5xD	DIN 338	GT 100	(R)	HSCO	A	3,000 - 12,000	1223	782	299
○	•		•				~5xD	DIN 338	Ti	(R)	HSCO	○	0,200 - 19,000	605	780	301
○	•		•				~5xD	DIN 338	Ti	(R)	HSCO	S	0,500 - 14,500	657	782	304
○	•		•				~5xD	DIN 338	Ti	(R)	HSCO	F	0,400 - 15,000	2458	782	306
○	•		•				~5xD	DIN 338	Ti	(L)	HSCO	○	1,300 - 9,500	608	780	308
○	•	○	○				~5xD	DIN 338	VA	(R)	HSCO	○	1,000 - 13,000	1260	780	309
•	○	○	○				~5xD	DIN 338	P2000	(R)	HSCO	●	1,000 - 13,000	2047	784	311
•	•	•	•	○			~5xD	DIN 338	AeroX	(R)	M42	●	1,000 - 13,000	1018	784	313
•	○	○	•	•	○		~5xD	DIN 338	N	(R)	M42	○	0,400 - 16,000	1146	780	315
•	•	•	○	•			~5xD	DIN 338	N	(R)	M42	F	1,000 - 16,000	1199	784	317
○	○	○	•	○			~5xD	WN	N	(R)	VHM	○	1,000 - 12,700	732	784	319
○	○	○	•	○			~5xD	WN	N	(R)	VHM	F	1,000 - 12,700	2464	784	321
○	○		•				~5xD	WN	Duro 150	(R)	HM	○	3,000 - 14,000	710	776	323

Wiertła długie

•	•	○					~10xD	DIN 339	N	(R)	HSS	○ ^{>0} _{2,36}	0,800 - 20,000	211	786	325
•	•	○					~10xD	DIN 339	N	(R)	HSS	○	2,400 - 5,000	561	786	327
•	•	•					~10xD	DIN 339	N	(R)	HSS	S	1,000 - 13,000	666	786	328
•	○	•	•	○			~10xD	DIN 339	N	(R)	HSCO	○ ^{>0} _{2,36}	1,100 - 19,000	311	792	330

Wiertła kręte, długie

•	•	○					~10xD	DIN 340	N	(R)	HSS	○ ^{>0} _{2,36}	0,400 - 36,510	217	786	331
•	•	○					~10xD	DIN 340	N	(R)	HSS	S	0,500 - 22,220	667	786	334
•	•	○					~10xD	DIN 340	N	(L)	HSS	○ ^{>0} _{6,00}	0,450 - 29,000	220	786	336
•	•	○					~10xD	DIN 340	N	(R)	HSS	○	2,950 - 25,250	204	786	338
•	•	•					~10xD	DIN 340	H	(R)	HSS	○	0,500 - 16,000	218	786	339



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte, długie

							~10xD	DIN 340	H	L	HSS	○	0,450 - 15,000	221	786	341
							~10xD	DIN 340	W	R	HSS	○	0,500 - 20,640	219	786	342
							~10xD	DIN 340	GT 100	R	HSS	○ _{2,36} ⁻⁰	1,000 - 14,000	535	786	344
							~10xD	DIN 340	GT 100	R	HSS	Ⓢ	1,000 - 14,000	668	786	347
							~10xD	DIN 340	GT 100	R	HSS	F	1,000 - 10,000	2462	786	349
							~10xD	DIN 340	GT 100	L	HSS	○ _{2,36} ⁻⁰	1,400 - 13,000	506	786	350
							~10xD	DIN 340	GT 50	R	HSS	○	1,000 - 32,600	501	786	351
							~10xD	DIN 340	N	R	HSCO	○ _{2,36} ⁻⁰	0,500 - 22,000	317	792	353
							~10xD	DIN 340	GT 100	R	HSCO	○ _{2,36} ⁻⁰	1,000 - 16,000	336	792	355
							~10xD	DIN 340	GT 100	R	HSCO	F	1,000 - 12,000	396	792	357
							~10xD	DIN 340	Ti	R	HSCO	○	1,000 - 15,000	617	792	358
							~10xD	DIN 340	Ti	R	HSCO	Ⓢ	1,000 - 10,200	669	792	360
							~10xD	WN	N	R	VHM	○	0,500 - 1,450	706	792	362

Wiertła kręte z chwytem walcowym

Wiertła kręte, bardzo długie, szereg 1

							~15xD	DIN 1869	N	R	HSS	○ _{2,36} ⁻⁰	1,600 - 13,000	235	788	363
							~15xD	DIN 1869	GT 100	R	HSS	○ _{2,36} ⁻⁰	1,950 - 13,000	502	790	365
							~15xD	DIN 1869	GT 100	R	HSS	Ⓢ	2,000 - 12,700	670	790	367
							~15xD	DIN 1869	GT 50	R	HSS	○	2,000 - 12,700	524	788	368
							~15xD	DIN 1869	GT 100	R	HSCO	●	2,700 - 10,000	618	794	370

Wiertła kręte, bardzo długie, szereg 2

							~20xD	DIN 1869	N	R	HSS	●	2,700 - 13,000	236	788	371
							~20xD	DIN 1869	GT 100	R	HSS	○ _{2,36} ⁻⁰	2,000 - 13,000	503	790	372
							~20xD	DIN 1869	GT 100	R	HSS	Ⓢ	2,700 - 8,500	671	790	374
							~20xD	DIN 1869	GT 50	R	HSS	○	3,000 - 13,000	528	788	375
							~20xD	DIN 1869	GT 100	R	HSCO	●	3,000 - 10,000	619	794	376



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
Wiertła kręte, bardzo długie, szereg 3																
•	•	•	•	•	•		~25xD	DIN 1869	N		HSS	○	3,500 - 13,000	237	788	377
•	•	•	•	•	•		~25xD	DIN 1869	GT 100		HSS	◐	2,500 - 13,000	504	790	378
○	•	•	•	•	•		~25xD	DIN 1869	GT 50		HSS	○	2,500 - 10,000	529	788	379
•	•	•	•	•	•		~25xD	DIN 1869	GT 100		HSCO	◐	2,500 - 13,000	571	794	380
Wiertła kręte, ekstra długie																
•	•	•	•	•	•		>25xD	WN	GT 100		HSS	◐	6,000 - 12,000	242	790	381
•	•	•	•	•	•		>25xD	WN	GT 100		HSS	○	8,000 - 12,000	243	790	382
•	•	•	•	•	•		>25xD	WN	GT 100		HSS	○	10,000 - 12,000	244	790	383
Wiertła z chwytem cylindrycznym, wzmocnionym																
•	•	•	•	•	•		~3xD	WN	GU 500		HSCO	Ⓢ	2,000 - 20,000	512	774	384
•	•	•	•	•	•		~5xD	WN	GU 500		HSCO	Ⓢ	2,000 - 20,000	511	784	386
•	○	•	•	•	•		~5xD	WN	GT 500		HSS-E-PM	Ⓡ	2,000 - 12,900	513	784	388
○	○	•	•	•	•		~3xD	DIN 6537 K	H		VHM	Ⓡ	2,600 - 14,100	1946	776	389
Wiertła lotnicze, długość 6 cali																
•	•	•	•	•	•		NAS 907	N		HSS	○	1,500 - 8,000	577		390	
•	•	•	•	•	•		NAS 907	N		HSS	◐	1,500 - 8,000	579		391	
Wiertła lotnicze, długość 12 cali																
•	•	•	•	•	•		NAS 907	N		HSS	○	1,500 - 8,000	578		392	
•	•	•	•	•	•		NAS 907	N		HSS	◐	1,500 - 8,000	580		393	
Wiertła z chłodzeniem wew.																
•	○	•	•	•	•		~10xD	WN	N		HSS	○	3,000 - 13,000	390	788	394
•	•	•	•	•	•		~5xD	WN	GT 80 IK		HSCO	○	5,000 - 20,000	1131	784	395
•	•	•	•	•	•		~5xD	WN	GT 80 IK		HSCO	Ⓢ	5,000 - 20,000	1132	784	396
Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E																
•	•	•	•	•	•		~5xD	DIN 1899	N		HSS-E-PM	○	0,050 - 1,920	301	796	397
•	•	•	•	•	•		~5xD	DIN 1899	N		HSS-E-PM	Ⓢ	0,160 - 1,900	660	796	400

Wiertła kręte z chwytem walcowym



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E							~5xD	DIN 1899	N	L	HSS-E-PM	○	0,130 - 1,850	303	796	402
Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego							~5xD	WN	N	R	VHM	○	0,200 - 1,400	701	796	404
							WN	N	R	VHM	ⓐ	0,100 - 3,000	3899	796	405	
Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego							4xD	WN	N	R	VHM	ⓐ	0,500 - 3,000	6400	796	407
							7xD	WN	N	R	VHM	ⓐ	0,500 - 3,000	6401	796	408
Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym							5xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6405	796	409
							8xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6408	796	410
							15xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6412	796	411
Wiertła kręte z chwytem Ø12,7 mm							WN	N	R	HSS	●	13,000 - 28,570	268	778	412	
Wiertła kręte z chwytem Ø 16,0 mm							WN	V72	R	HSCO	○	16,000 - 40,000	128	772	413	
Wiertła kręte z chwytem Ø 25,4 mm							WN	V72	R	HSCO	○	25,000 - 40,000	129	772	414	
							WN	V72	L	HSCO	○	25,000 - 39,000	136	772	415	
Wiertła do otworów pod kołki stożkowe							DIN 1898	N	R	HSS	● ^{>0} _{2,36}	2,000 - 12,000	531	416		
Komplet wiertel							~5xD	DIN 338	N	R	HSS	● ^{>0} _{2,36}	201	417		

Wiertła kręte z chwytem walcowym



P M K N S H					Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
•	•	○				~5xD	DIN 338	N	R	HSS	$\begin{matrix} >0 \\ 2,36 \end{matrix}$		200		418
•	•	○				~5xD	DIN 338	N	R	HSS	S		17		419
•	○	•	○			~5xD	DIN 338	N	R	HSCO	○		16		420
○	•		•			~5xD	DIN 338	Ti	R	HSCO	○		18		421
○	•	○	○			~5xD	DIN 338	VA	R	HSCO	○		195		422
•	○	○	○			~5xD	DIN 338	P2000	R	HSCO	●		2049		423
•	○	○	○			~3xD	DIN 1897	P2000	R	HSCO	M		2050		424
•	•	•	•	○		~5xD	DIN 338	AeroX	R	M42	●		1083		425

Wiertła kręte z chwytem walcowym



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
---	---	---	---	---	---	----------------------	---------------------	-------	-----	--------------------	--------------------	--------------	-------	-------------	---------------------	--------

Komplet wiertel

								WN						36		426
								WN						73		427
								WN						11		428

Wiertła kręte z chwytem walcowym

Wiertła z ostrzami węglowymi (HM)

○	○	○					DIN 8037	N	R	HM	○	1,700 - 24,000	703	776	429
							DIN 8038	N	R	HM	○	1,900 - 24,000	704	776	430

Wiertła kręte do Kevlaru (FK)

							WN	FK	R	VHM	○	2,500 - 10,000	1149	776	431
--	--	--	--	--	--	--	----	----	---	-----	---	----------------	------	-----	-----

Wiertła piórkowe

○	○	○					WN	H	R	HM	○	3,000 - 12,000	707	776	432
---	---	---	--	--	--	--	----	---	---	----	---	----------------	-----	-----	-----

Wiertła do betonu

							WN	N	R	HM	○	4,000 - 12,000	716		433
--	--	--	--	--	--	--	----	---	---	----	---	----------------	-----	--	-----



STALE

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

No 1

Ø 1,00 - 14,00 mm
Nr artykułu 2459
od strony 296



No 1

Ø 1,00 - 12,00 mm
Nr artykułu 396
od strony 357



No 1

Ø 2,70 - 10,00 mm
Nr artykułu 618
od strony 370



Ø 1,00 - 15,00 mm
Nr artykułu 2457
od strony 280



Ø 1,00 - 10,00 mm
Nr artykułu 2462
od strony 349



Ø 2,00 - 12,70 mm
Nr artykułu 670
od strony 367



No 1

Ø 1,00 - 13,00 mm
Nr artykułu 2461
od strony 224



Ø 1,00 - 15,00 mm
Nr artykułu 2460
od strony 199



Ø 1,00 - 14,50 mm
Nr artykułu 2456
od strony 254



Ø 0,50 - 22,22 mm
Nr artykułu 667
od strony 334



Ø 1,60 - 13,00 mm
Nr artykułu 235
od strony 363



Ø 1,20 - 13,00 mm
Nr artykułu 2997
od strony 288



Ø 0,50 - 22,00 mm
Nr artykułu 317
od strony 353



No 1

Ø 2,00 - 20,00 mm
Nr artykułu 512
od strony 384



No 1

Ø 2,00 - 20,00 mm
Nr artykułu 511
od strony 386



Ø 2,00 - 12,90 mm
Nr artykułu 513
od strony 388



No 1

Ø 5,00 - 20,00 mm
Nr artykułu 1132
od strony 396



DLA UŁATWIENIA
OBSŁUGI PRZY
MOCOWANIU

DO STOSOWANIA Z
CHŁODZENIEM
WEWNĘTRZNYM

Wiertła kręte z
chwytami walcowymi

chwytami walcowymi

stały chwyt

z chłodzeniem
wewnętrznym



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Norma zakł.
bardzo długie

No 1 idealne
narzędzie

No 1

Ø 3,00 - 10,00 mm
Nr artykułu 619
od strony 376



No 1

Ø 2,50 - 13,00 mm
Nr artykułu 571
od strony 380



GT100, HSCO

No 1

Ø 2,70 - 8,50 mm
Nr artykułu 671
od strony 374



No 1

Ø 2,50 - 13,00 mm
Nr artykułu 504
od strony 378



Ø 6,00 - 12,00 mm
Nr artykułu 242
od strony 381



GT100, HSS



GV120, HSCO

Ø 2,70 - 13,00 mm
Nr artykułu 236
od strony 371



Ø 3,50 - 13,00 mm
Nr artykułu 237
od strony 377



Typ N, HSS



Typ N, HSCO



GU500, HSCO



GT500, HSS-E-PM



GT80IK, HSCO

Wiertła kręte z
chwytem walcowym



STALE
NIERDZEWNE



STOPY TYTANU
SUPER STOPY

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

Wiertła kręte z
chwytami walcowymi

chwytami walcowymi

stały chwyt

z chłodzeniem
wewnętrznym

No 1 No 1

Ø 0,40 - 15,00 mm
Nr artykułu 2458
od strony 306

F S ○

No 1 No 1

Ø 1,00 - 10,2 mm
Nr artykułu 669
od strony 360

S ○

No 1 No 1

Ø 1,00 - 13,00 mm
Nr artykułu 572
od strony 231

S ○

Ø 1,00 - 13,00 mm
Nr artykułu 1260
od strony 309

○

Ø 1,00 - 14,00 mm
Nr artykułu 2459
od strony 296

F S ○

Ø 1,00 - 12,00 mm
Nr artykułu 396
od strony 357

F ○

No 1 No 1

Ø 2,70 - 10,00 mm
Nr artykułu 618
od strony 370

○

Ø 1,00 - 13,00 mm
Nr artykułu 2461
od strony 224

F S ○

Ø 1,00 - 15,87 mm
Nr artykułu 1259
od strony 235

○

Ø 1,00 - 16,00 mm
Nr artykułu 1199
od strony 317

F ○

No 1

Ø 2,00 - 20,00 mm
Nr artykułu 512
od strony 384

S

No 1

Ø 2,00 - 20,00 mm
Nr artykułu 511
od strony 386

S

Ø 2,00 - 12,900 mm
Nr artykułu 513
od strony 388

F

DLA UŁATWIENIA
OBSŁUGI PRZY
MOCOWANIU

No 1 No 1

Ø 5,00 - 20,00 mm
Nr artykułu 1132
od strony 396

S ○

DO STOSOWANIA Z
CHŁODZENIEM
WEWNĘTRZNYM



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Norma zakł.
bardzo długie

No 1 idealne narzędzie
do stali nierdzewnych

No 1 idealne narzędzie
do stopów Tytanu i Super Stopów



Typ Ti, HSCO



Typ VA, HSCO

No 1 **No 1**

Ø 3,00 - 10,00 mm
Nr artykułu 619
od strony 376



No 1 **No 1**

Ø 2,50 - 13,00 mm
Nr artykułu 571
od strony 380



GT100, HSCO



GV120, HSCO



Typ N, M42



GU500, HSCO



GT500, HSS-E-PM



GT801K, HSCO

Wiertła kręte z
chwytami walcowymi



K ŻELIWA

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

Wiertła kręte z
chwytami walcowymi

chwytami walcowymi

stały chwyt

z chłodzeniem
wewnętrznym

No 1

Ø 1,00 - 14,00 mm
Nr artykułu 2459
od strony 296



No 1

Ø 1,00 - 12,00 mm
Nr artykułu 396
od strony 357



No 1

Ø 2,70 - 10,00 mm
Nr artykułu 618
od strony 370



No 1

Ø 1,00 - 15,00 mm
Nr artykułu 2457
od strony 280



No 1

Ø 1,00 - 10,00 mm
Nr artykułu 2462
od strony 349



No 1

Ø 2,00 - 12,70 mm
Nr artykułu 670
od strony 367



No 1

Ø 1,00 - 15,00 mm
Nr artykułu 2460
od strony 199



No 1

Ø 1,00 - 14,50 mm
Nr artykułu 2456
od strony 254



No 1

Ø 0,50 - 22,22 mm
Nr artykułu 667
od strony 334



No 1

Ø 1,60 - 13,00 mm
Nr artykułu 235
od strony 363



No 1

Ø 1,20 - 13,00 mm
Nr artykułu 2997
od strony 288



No 1

Ø 0,50 - 22,00 mm
Nr artykułu 317
od strony 353



No 1

Ø 2,00 - 20,00 mm
Nr artykułu 512
od strony 384



No 1

Ø 2,00 - 20,00 mm
Nr artykułu 511
od strony 386



DLA UŁATWIENIA
OBSŁUGI PRZY
MOCOWANIU

No 1

Ø 2,00 - 12,90 mm
Nr artykułu 513
od strony 388



No 1

Ø 5,00 - 20,00 mm
Nr artykułu 1132
od strony 396



DO STOSOWANIA Z
CHŁODZENIEM
WEWNĘTRZNYM



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Norma zakł.
bardzo długie

No 1 idealne narzędzie

No 1

Ø 3,00 - 10,00 mm
Nr artykułu 619
od strony 376



No 1

Ø 2,50 - 13,00 mm
Nr artykułu 571
od strony 380



GT100, HSCO

No 1

Ø 2,70 - 8,50 mm
Nr artykułu 671
od strony 374



Ø 2,50 - 13,00 mm
Nr artykułu 504
od strony 378



Ø 6,00 - 12,00 mm
Nr artykułu 242
od strony 381



GT100, HSS

Ø 2,70 - 13,00 mm
Nr artykułu 236
od strony 371



Ø 3,50 - 13,00 mm
Nr artykułu 237
od strony 377



Typ N, HSS



Typ N, HSCO



GU500, HSCO



GT500, HSS-E-PM



GT80IK, HSCO



ALUMINIUM, METALE KOLOROWE, TWORZYWA SZTUCZNE

~ 3xD
DIN 1897

~ 5xD
DIN 338

~ 10xD
DIN 340

~ 15xD
DIN 1869
R1

No 1

Ø 1,00 - 20,00 mm
Nr artykułu 225
od strony 208



No 1

Ø 0,20 - 20,00 mm
Nr artykułu 207
od strony 269



No 1

Ø 0,50 - 20,64 mm
Nr artykułu 219
od strony 342



Typ W do miękkich,
długowiórowych materiałów

No 1

Ø 0,69 - 21,00 mm
Nr artykułu 224
od strony 204



No 1

Ø 0,20 - 20,00 mm
Nr artykułu 206
od strony 263



No 1

Ø 0,50 - 16,00 mm
Nr artykułu 218
od strony 339



Typ H do twardych,
kruchych materiałów

No 1

Ø 2,00 - 12,70 mm
Nr artykułu 524
od strony 368



Typ GT50 do miękkich,
długowiórowych materiałów

Ø 1,00 - 32,60 mm
Nr artykułu 501
od strony 351



Ø 1,00 - 15,50 mm
Nr artykułu 550
od strony 281



Ø 1,00 - 14,00 mm
Nr artykułu 535
od strony 344



Ø 1,95 - 13,00 mm
Nr artykułu 502
od strony 365



Ø 1,00 - 16,00 mm
Nr artykułu 622
od strony 291



Ø 1,00 - 16,00 mm
Nr artykułu 336
od strony 355



Ø 2,70 - 10,00 mm
Nr artykułu 618
od strony 370



No 1

Ø 2,00 - 20,00 mm
Nr artykułu 512
od strony 384



No 1

Ø 2,00 - 20,00 mm
Nr artykułu 511
od strony 386



DLA UŁATWIENIA
OBSŁUGI PRZY
MOCOWANIU

No 1

Ø 5,00 - 20,00 mm
Nr artykułu 1131
od strony 395



DO STOSOWANIA Z
CHŁODZENIEM
WEWNĘTRZNYM

Wiertła kręte z
chwytym walcowym

chwytym walcowym

stały chwyt

z chłodzeniem
wewnętrznym



QUICKFINDER

~20xD
DIN 1869
R2

~25xD
DIN 1869
R3

>25xD
Norma zakł.
bardzo długie

No 1 idealne narzędzie



Typ W, HSS



Typ H, HSS

No 1

Ø 3,00 - 13,00 mm
Nr artykułu 528
od strony 375



No 1

Ø 2,50 - 10,00 mm
Nr artykułu 529
od strony 379



GT50, HSS

No 1

Ø 2,70 - 8,50 mm
Nr artykułu 671
od strony 374



Ø 2,50 - 13,00 mm
Nr artykułu 504
od strony 378



Ø 6,00 - 12,00 mm
Nr artykułu 242
od strony 381



GT100, HSS

Ø 3,00 - 10,00 mm
Nr artykułu 619
od strony 376



Ø 2,50 - 13,00 mm
Nr artykułu 571
od strony 380



GT100, HSCO



GU500, HSCO



GT80IK, HSCO

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie



P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • do użycia na tokarkach automatycznych/rewolwerowych • przeznaczone również do wiertarek ręcznych

K •
N ○ elementy cienkościenne

S
H

Materiał narzędzia **HSS**

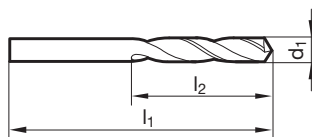
Powierzchnia

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 772



Nr artykułu **223**

d1		l1	l2
mm	inch	mm	mm
0,350		19,000	2,000
0,400	1/64	19,000	2,500
0,480		19,000	2,500
0,500		20,000	3,000
0,550		21,000	3,500
0,575		21,000	3,500
0,600		21,000	3,500
0,650		22,000	4,000
0,660		22,000	4,000
0,700		23,000	4,500
0,720		23,000	4,500
0,750		23,000	4,500
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,820		24,000	5,000
0,850		24,000	5,000
0,890		25,000	5,500
0,900		25,000	5,500
0,930		25,000	5,500
0,950		25,000	5,500
0,980		26,000	6,000
1,000		26,000	6,000
1,020		26,000	6,000
1,030		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,110		28,000	7,000
1,120		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,220		30,000	8,000
1,250		30,000	8,000
1,260		30,000	8,000
1,280		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000

d1		l1	l2
mm	inch	mm	mm
1,400		32,000	9,000
1,430		32,000	9,000
1,450		32,000	9,000
1,480		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,520		34,000	10,000
1,550		34,000	10,000
1,570		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,720		36,000	11,000
1,730		36,000	11,000
1,740		36,000	11,000
1,750		36,000	11,000
1,770		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,970		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,020		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,120		38,000	12,000
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,220		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000



d1		l1	l2
mm	inch	mm	mm
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,420		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,480		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,520		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,920		46,000	16,000
2,950		46,000	16,000
2,970		46,000	16,000
3,000		46,000	16,000
3,020		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,220		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,580		52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,960		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,020		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,080		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,380		58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,020		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,350		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,550		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,450		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,550		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,760		74,000	34,000

Wiertła kręte z
chwytami walcowymi



d1		l1	l2
mm	inch	mm	mm
6,800		74,000	34,000
6,850		74,000	34,000
6,900		74,000	34,000
6,950		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,050		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,150		74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,450		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,550		79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,750		79,000	37,000
7,800		79,000	37,000
7,850		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,050		79,000	37,000
8,100		79,000	37,000
8,150		79,000	37,000
8,200		79,000	37,000
8,250		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,450		79,000	37,000
8,500		79,000	37,000
8,550		84,000	40,000
8,600		84,000	40,000
8,610		84,000	40,000
8,650		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,750		84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
8,950		84,000	40,000
9,000		84,000	40,000
9,050		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,150		84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,270		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,350		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,650		89,000	43,000
9,700		89,000	43,000
9,750		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
9,800		89,000	43,000
9,850		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,050		89,000	43,000
10,080		89,000	43,000
10,100		89,000	43,000
10,150		89,000	43,000
10,200		89,000	43,000
10,250		89,000	43,000
10,260		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,400		89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,700		95,000	47,000
10,720	27/64	95,000	47,000
10,750		95,000	47,000
10,800		95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,250		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,600		95,000	47,000
11,700		95,000	47,000
11,750		95,000	47,000
11,800		95,000	47,000
11,900		102,000	51,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,050		102,000	51,000
12,100		102,000	51,000
12,150		102,000	51,000
12,200		102,000	51,000
12,250		102,000	51,000
12,300	31/64	102,000	51,000
12,400		102,000	51,000
12,500		102,000	51,000
12,600		102,000	51,000
12,700	1/2	102,000	51,000
12,750		102,000	51,000
12,800		102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,200		102,000	51,000
13,250		107,000	54,000
13,300		107,000	54,000
13,400		107,000	54,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,600		107,000	54,000
13,700		107,000	54,000
13,750		107,000	54,000
13,800		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,100		111,000	56,000
14,200		111,000	56,000
14,290	9/16	111,000	56,000
14,300		111,000	56,000
14,400		111,000	56,000
14,500		111,000	56,000



d1		l1	l2
mm	inch	mm	mm
14,600		111,000	56,000
14,680	37/64	111,000	56,000
14,700		111,000	56,000
14,750		111,000	56,000
14,800		111,000	56,000
14,900		111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,100		115,000	58,000
15,200		115,000	58,000
15,250		115,000	58,000
15,400		115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,600		115,000	58,000
15,700		115,000	58,000
15,750		115,000	58,000
15,800		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,100		119,000	60,000
16,150		119,000	60,000
16,200		119,000	60,000
16,250		119,000	60,000
16,270	41/64	119,000	60,000
16,300		119,000	60,000
16,500		119,000	60,000
16,670	21/32	119,000	60,000
16,750		119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,100		123,000	62,000
17,200		123,000	62,000
17,250		123,000	62,000
17,460	11/16	123,000	62,000
17,500		123,000	62,000
17,600		123,000	62,000
17,750		123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,100		127,000	64,000
18,200		127,000	64,000
18,250		127,000	64,000
18,260	23/32	127,000	64,000
18,500		127,000	64,000
18,650	47/64	127,000	64,000
18,750		127,000	64,000
19,000		127,000	64,000

d1		l1	l2
mm	inch	mm	mm
19,050		131,000	66,000
19,100	3/4	131,000	66,000
19,250		131,000	66,000
19,500		131,000	66,000
19,840	25/32	131,000	66,000
20,000		131,000	66,000
20,100		136,000	68,000
20,240	51/64	136,000	68,000
20,250		136,000	68,000
20,500		136,000	68,000
20,640	13/16	136,000	68,000
20,750		136,000	68,000
20,800		136,000	68,000
21,000		136,000	68,000
21,030	53/64	136,000	68,000
21,430	27/32	141,000	70,000
21,500		141,000	70,000
21,830	55/64	141,000	70,000
22,000		141,000	70,000
22,220	7/8	141,000	70,000
22,500		146,000	72,000
23,000		146,000	72,000
23,020	29/32	146,000	72,000
23,420	59/64	146,000	72,000
23,500		146,000	72,000
23,810	15/16	151,000	75,000
24,000		151,000	75,000
24,210	61/64	151,000	75,000
24,500		151,000	75,000
24,610	31/32	151,000	75,000
25,000	63/64	151,000	75,000
25,400	1	156,000	78,000
26,000		156,000	78,000
26,500		156,000	78,000
27,000		162,000	81,000
27,500		162,000	81,000
28,000		162,000	81,000
28,570	1 1/8	168,000	84,000
29,000		168,000	84,000
29,370	1 5/32	168,000	84,000
30,000		168,000	84,000
31,000		174,000	87,000
32,000		180,000	90,000
33,000		180,000	90,000
40,000		200,000	100,000
44,000		214,000	108,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie



P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • przeznaczone również do wiertarek ręcznych • do użycia na tokarkach automatycznych/rewolwerowych

K •
N ○ elementy cienkościenne

S
H

Materiał narzędzia **HSS**

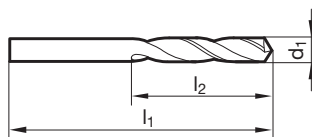
Powierzchnia **S**

Kierunek skrawania **R**

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 772



Nr artykułu **653**

d1		l1	l2
mm	inch	mm	mm
0,500		20,000	3,000
0,600		21,000	3,500
0,700		23,000	4,500
0,750		23,000	4,500
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,900		25,000	5,500
1,000		26,000	6,000
1,020		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,110		28,000	7,000
1,120		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000

d1		l1	l2
mm	inch	mm	mm
2,000		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000



d1		l1	l2
mm	inch	mm	mm
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,520		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000

d1		l1	l2
mm	inch	mm	mm
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,450		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,250		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,550		84,000	40,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,750		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,400		89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,720	27/64	95,000	47,000
10,750		95,000	47,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
10,800		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,750		95,000	47,000
11,800		95,000	47,000
11,900		102,000	51,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,100		102,000	51,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,700		107,000	54,000
13,800		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,200		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,800		111,000	56,000
14,900		111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,250		115,000	58,000
15,500		115,000	58,000
15,800		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,250		119,000	60,000
16,270	41/64	119,000	60,000
16,500		119,000	60,000

d1		l1	l2
mm	inch	mm	mm
16,670	21/32	119,000	60,000
17,000		119,000	60,000
17,460	11/16	123,000	62,000
17,500		123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,250		127,000	64,000
18,260	23/32	127,000	64,000
18,500		127,000	64,000
18,650	47/64	127,000	64,000
19,000		127,000	64,000
19,050	3/4	131,000	66,000
19,500		131,000	66,000
20,000		131,000	66,000
20,500		136,000	68,000
20,640	13/16	136,000	68,000
21,000		136,000	68,000
21,500		141,000	70,000
22,000		141,000	70,000
22,500		146,000	72,000
22,620	57/64	146,000	72,000
23,000		146,000	72,000
23,420	59/64	146,000	72,000
24,000		151,000	75,000
24,500		151,000	75,000
25,000	63/64	151,000	75,000
25,400	1	156,000	78,000
27,500		162,000	81,000
28,500		168,000	84,000
29,370	1 5/32	168,000	84,000
29,500		168,000	84,000
30,000		168,000	84,000
30,160	1 3/16	174,000	87,000



Wiertła kręte, krótkie

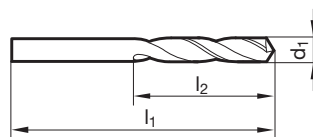


- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • do użycia na tokarkach automatycznych/rewolwerowych • przeznaczone również do wiertarek ręcznych
- M**
- K** •
- N** • elementy cienkościenne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 772

Materiał narzędzia	HSS
Powierzchnia	F
Kierunek skrawania	R



Wiertła kręte z chwytami walcowymi

Nr artykułu **2460**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
2,000		38,000	12,000
2,200		40,000	13,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,900		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,700		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000

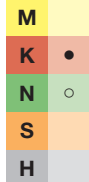
d1		l1	l2
mm	inch	mm	mm
6,200		70,000	31,000
6,300		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,800		74,000	34,000
7,100		74,000	34,000
7,300		74,000	34,000
7,500		74,000	34,000
7,800		79,000	37,000
8,300		79,000	37,000
8,500		79,000	37,000
8,700		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,300		84,000	40,000
9,600		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,500		89,000	43,000
11,200		95,000	47,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,500		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000



Wiertła kręte, krótkie



P • Korekcja ścina $\geq \varnothing 14,050$ • geometria zataczana • do użycia na tokarkach automatycznych/rewolwerowych



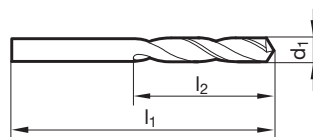
N ○ elementy cienkościenne

GÜHRING NAVIGATOR

Param. skr. na str. 772

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	



Nr artykułu

226

d1		l1	l2
mm	inch	mm	mm
0,320		19,000	2,000
0,500		20,000	3,000
0,550		21,000	3,500
0,580		21,000	3,500
0,620		22,000	4,000
0,650		22,000	4,000
0,700		23,000	4,500
0,740		23,000	4,500
0,750		23,000	4,500
0,800		24,000	5,000
0,810		24,000	5,000
0,850		24,000	5,000
0,875		25,000	5,500
0,890		25,000	5,500
0,900		25,000	5,500
0,950		25,000	5,500
0,970		26,000	6,000
0,975		26,000	6,000
1,000		26,000	6,000
1,020		26,000	6,000
1,030		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,060		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,220		30,000	8,000
1,250		30,000	8,000
1,320		30,000	8,000
1,330		32,000	9,000
1,350		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,580		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000

d1		l1	l2
mm	inch	mm	mm
1,610		34,000	10,000
1,650		34,000	10,000
1,670		34,000	10,000
1,700		34,000	10,000
1,720		36,000	11,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,810		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,940		38,000	12,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,010		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,220		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,360		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,520		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000



d1		l1	l2
mm	inch	mm	mm
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,720		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,880		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,020		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,230		49,000	18,000
3,250		49,000	18,000
3,300		49,000	18,000
3,330		49,000	18,000
3,400		52,000	20,000
3,420		52,000	20,000
3,450		52,000	20,000
3,480		52,000	20,000
3,500		52,000	20,000
3,530		52,000	20,000
3,700		52,000	20,000
3,710		52,000	20,000
3,720		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,770		55,000	22,000
3,800		55,000	22,000
3,840		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,020		55,000	22,000
4,030		55,000	22,000
4,033		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,230		55,000	22,000
4,250		55,000	22,000
4,290		58,000	24,000
4,300		58,000	24,000
4,350		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,520		58,000	24,000
4,560		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,920		62,000	26,000
4,930		62,000	26,000
4,950		62,000	26,000
4,970		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
5,050		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,620		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,150		70,000	31,000
6,170		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,540		70,000	31,000
6,550		70,000	31,000
6,570		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
6,920		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,350		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,450		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,550		79,000	37,000
7,700		79,000	37,000
7,750		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,850		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,130	23/64	84,000	40,000
9,150		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,350		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,700		89,000	43,000
9,750		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,050		89,000	43,000
10,080		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,800		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,250		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,750		95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,200		102,000	51,000
12,450		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,200		102,000	51,000
13,250		107,000	54,000
13,750		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,050		111,000	56,000
14,200		111,000	56,000

d1		l1	l2
mm	inch	mm	mm
14,250		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,700		111,000	56,000
15,000		111,000	56,000
15,200		115,000	58,000
15,480	39/64	115,000	58,000
15,600		115,000	58,000
15,750		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,200		119,000	60,000
16,500		119,000	60,000
16,670	21/32	119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,750		123,000	62,000
18,000		123,000	62,000
18,500		127,000	64,000
19,050	3/4	131,000	66,000
19,840	25/32	131,000	66,000
20,000		131,000	66,000
20,640	13/16	136,000	68,000
21,000		136,000	68,000
21,250		141,000	70,000
21,750		141,000	70,000
21,830	55/64	141,000	70,000
22,000		141,000	70,000
22,400		141,000	70,000
23,000		146,000	72,000
24,000		151,000	75,000
25,500		156,000	78,000
26,190	1 1/32	156,000	78,000
26,590	1 3/64	162,000	81,000
26,990	1 1/16	162,000	81,000
27,380	1 5/64	162,000	81,000
29,000		168,000	84,000
30,960	1 7/32	174,000	87,000
31,500		174,000	87,000
32,150	1 17/64	180,000	90,000
32,940	1 19/64	180,000	90,000
33,000		180,000	90,000
34,500		186,000	93,000
34,920	1 3/8	186,000	93,000
36,000		193,000	96,000
37,000		193,000	96,000
40,000		200,000	100,000
45,000		214,000	108,000
48,000		228,000	116,000
50,000		228,000	116,000



Wiertła kręte, krótkie



P • Korekcja ścina $\geq \varnothing 2,400$ • geometria zataczana • do użycia na tokarkach automatycznych/rewolwerowych

M

K •

N ○ elementy cienkościenne

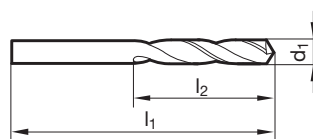
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 772

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	L



Wiertła kręte z
chwytami walcowymi

Nr artykułu **672**

d1		l1	l2
mm	inch	mm	mm
0,900		25,000	5,500
0,950		25,000	5,500
1,000		26,000	6,000
1,100		28,000	7,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,800		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,920		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,150		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
4,000		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
4,900		62,000	26,000
5,000		62,000	26,000
5,200		62,000	26,000
5,600		66,000	28,000
5,700		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,500		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,500		74,000	34,000
7,900		79,000	37,000
8,000		79,000	37,000
8,500		79,000	37,000
8,700		84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,500		84,000	40,000
9,800		89,000	43,000
10,000		89,000	43,000
11,000		95,000	47,000
11,500		95,000	47,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000



Wiertła kręte, krótkie



P Korekcja ścina $\geq \varnothing 14,500$ • geometria zataczana

- M**
- K**
- N** • twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax
- S**
- H**

Materiał narzędzia **HSS**

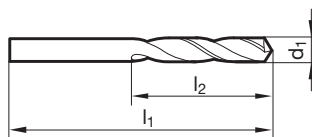
Powierzchnia

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 772



Nr artykułu **224**

d1		l1	l2
mm	inch	mm	mm
0,690		23,000	4,500
0,900		25,000	5,500
0,950		25,000	5,500
1,000		26,000	6,000
1,100		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,620		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
2,000		38,000	12,000
2,020		38,000	12,000
2,050		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,250		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,450		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,600		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,050		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000



d1		l1	l2
mm	inch	mm	mm
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,750		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
9,000		84,000	40,000

d1		l1	l2
mm	inch	mm	mm
9,200		84,000	40,000
9,500		84,000	40,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,320	13/32	89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000
14,000		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000
17,000		119,000	60,000
18,000		123,000	62,000
19,000		127,000	64,000
20,000		131,000	66,000
21,000		136,000	68,000

Wiertła kręte z
chwytem walcowym



Wiertła kręte, krótkie



P Korekcja ścina $\geq \varnothing 15,000$ • geometria zataczana

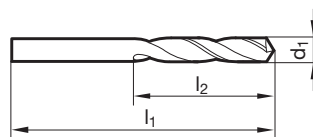
- M**
- K**
- N** • do twardych, kruchych materiałów • mosiądz, stopy magnezu • brąz,
- S** brąz fosforowy • łupek, mika, pertinax
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 772

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓛ



Nr artykułu **227**

d1		l1	l2
mm	inch	mm	mm
0,750		23,000	4,500
1,040		26,000	6,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,350		32,000	9,000
1,540		34,000	10,000
1,590	1/16	34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
2,100		38,000	12,000
2,150		40,000	13,000
2,200		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,480		43,000	14,000
2,500		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,970	5/32	55,000	22,000
4,100		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,600		58,000	24,000

d1		l1	l2
mm	inch	mm	mm
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,600		70,000	31,000
6,750	17/64	74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,750		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,500		79,000	37,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
9,130	23/64	84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,320	13/32	89,000	43,000
10,720	27/64	95,000	47,000



d1		l1	l2
mm	inch	mm	mm
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,510	29/64	95,000	47,000
11,910	15/32	102,000	51,000
13,500		107,000	54,000
15,000		111,000	56,000

d1		l1	l2
mm	inch	mm	mm
22,200		141,000	70,000
24,000		151,000	75,000



Wiertła kręte, krótkie



P Korekcja ścina $\geq \varnothing 2,380$ • geometria zataczana

- M**
- K**
- N** •
- S**
- H**

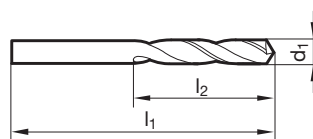
miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
• cynk, miedź rafinowana, silumin, elektron • miękkie tworzywa sztuczne, drewno

GÜHRING NAVIGATOR

Param. skr. na str. 772

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **225**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
1,980	5/64	38,000	12,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,250		40,000	13,000
2,300		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,560	7/32	66,000	28,000
5,700		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,300		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,800		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,200		79,000	37,000



d1		l1	l2
mm	inch	mm	mm
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,730		84,000	40,000
8,900	11/32	84,000	40,000
9,000		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,400		84,000	40,000
9,520	3/8	89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,500		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
12,000		102,000	51,000
12,100		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000
17,500		123,000	62,000
18,000	3/4	123,000	62,000
19,050		131,000	66,000
19,750		131,000	66,000
20,000		131,000	66,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie



P Korekcja ścina $\geq \varnothing 2,380$ • geometria zataczana

- M**
- K**
- N** •
- S**
- H**

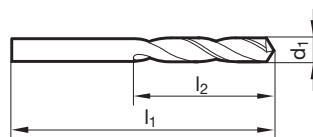
miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
• cynk, miedź rafinowana, silumin, elektron • miękkie tworzywa sztuczne, drewno

GÜHRINGNAVIGATOR

Param. skr. na str. 772

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓛ



Nr artykułu **228**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
1,980	5/64	38,000	12,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,420		43,000	14,000
2,500		43,000	14,000
2,570		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
2,920		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,100		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,400		66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,950	15/64	66,000	28,000
6,100		70,000	31,000
6,150		70,000	31,000
6,350	1/4	70,000	31,000
6,500		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,800		79,000	37,000
7,940	5/16	79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,730	11/32	84,000	40,000
9,000		84,000	40,000
9,130	23/64	84,000	40,000
9,500		84,000	40,000
9,920	25/64	89,000	43,000
10,320	13/32	89,000	43,000

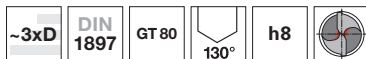


d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,910	15/32	102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,500		107,000	54,000
14,000		107,000	54,000

d1		l1	l2
mm	inch	mm	mm
14,500		111,000	56,000
14,700		111,000	56,000
15,000		111,000	56,000
15,500		115,000	58,000
16,500		119,000	60,000
18,000		123,000	62,000
20,000		131,000	66,000



Wiertła kręte, krótkie



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • stale o podwyższonej wytrzymałości • bez pokrycia < 2.36 mm

M ○

K ○

N • stale automatowe • stale nierdzewne/kwaso-odporne • stale do nawęglania/ulepszenia - $R_m < 800 \text{ N/mm}^2$ • krótko-/średnio-wiórowe stopy Al/Cu

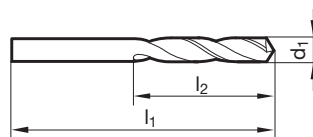
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 772

Wiertła kręte z chwytami walcowymi



Nr artykułu **552**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,530		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,820		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950	5/64	38,000	12,000
1,980		38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,130		40,000	13,000

d1		l1	l2
mm	inch	mm	mm
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,320		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000



d1		l1	l2
mm	inch	mm	mm
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,350		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000

d1		l1	l2
mm	inch	mm	mm
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
10,600		89,000	43,000
10,720	27/64	95,000	47,000
10,800		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,400		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,890	35/64	107,000	54,000

d1		l1	l2
mm	inch	mm	mm
14,000		107,000	54,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,680	37/64	111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,270	41/64	119,000	60,000
16,500		119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,460	11/16	123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,260	23/32	127,000	64,000
19,000		127,000	64,000
19,050	3/4	131,000	66,000
19,840	25/32	131,000	66,000
20,000		131,000	66,000



Wiertła kręte, krótkie



Materiał narzędzia **HSS**

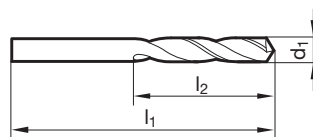
Powierzchnia $\geq 0.16.0$

Kierunek skrawania

- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • stale o podwyższonej wytrzymałości • bez pokrycia < 2.36 mm
- M** ○
- K** ○
- N** ● stale automatowe • stale nierdzewne/kwaso-odporne • stale do nawęglania/ulepszenia - Rm < 800 N/mm² • krótko-/średnio-wiórowe stopy Al/Cu
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 772



Wiertła kręte z chwytem walcowym

Nr artykułu **553**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,020		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000

d1		l1	l2
mm	inch	mm	mm
2,350		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,650		52,000	20,000
3,660		52,000	20,000
3,680		52,000	20,000
3,700		52,000	20,000
3,750		52,000	20,000



d1		l1	l2
mm	inch	mm	mm
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000

d1		l1	l2
mm	inch	mm	mm
7,030		74,000	34,000
7,140	9/32	74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,200		79,000	37,000
8,330	21/64	79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,730	11/32	84,000	40,000
8,840		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,130	23/64	84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,700		95,000	47,000
10,720	27/64	95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,250		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,680	37/64	111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,270	41/64	119,000	60,000



d1		l1	l2
mm	inch	mm	mm
17,070	43/64	123,000	62,000
17,460	11/16	123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,260	23/32	127,000	64,000
18,500		127,000	64,000

d1		l1	l2
mm	inch	mm	mm
18,650	47/64	127,000	64,000
19,000		127,000	64,000
19,500		131,000	66,000
19,840	25/32	131,000	66,000



Wiertła kręte, krótkie



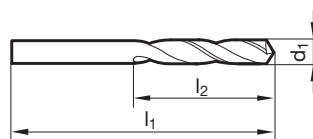
- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** •
- K** •
- N** ○ stale nierdzewne/kwaso-odporne • stale sprężynowe • austenityczne
- S** • stale nierdzewne • Hastelloy, Inconel, Nimonic
- H** ○

Materiał narzędzia	HSCO
Powierzchnia	$\geq 0,2,36$
Kierunek skrawania	(R)

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 772



Nr artykułu

329

d1		l1	l2
mm	inch	mm	mm
0,400	1/64	19,000	2,500
0,500		20,000	3,000
0,510		20,000	3,000
0,520		20,000	3,000
0,550		21,000	3,500
0,570		21,000	3,500
0,580		21,000	3,500
0,590		21,000	3,500
0,600		21,000	3,500
0,610		22,000	4,000
0,640		22,000	4,000
0,650		22,000	4,000
0,700		23,000	4,500
0,730		23,000	4,500
0,740		23,000	4,500
0,750		23,000	4,500
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,810		24,000	5,000
0,820		24,000	5,000
0,840		24,000	5,000
0,850		24,000	5,000
0,860		25,000	5,500
0,870		25,000	5,500
0,900		25,000	5,500
0,910		25,000	5,500
0,940		25,000	5,500
0,950		25,000	5,500
0,960		26,000	6,000
0,970		26,000	6,000
0,990		26,000	6,000
1,000		26,000	6,000
1,020		26,000	6,000
1,030		26,000	6,000
1,050		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,170		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000

d1		l1	l2
mm	inch	mm	mm
1,200		30,000	8,000
1,210		30,000	8,000
1,230		30,000	8,000
1,250		30,000	8,000
1,280		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,330		32,000	9,000
1,350		32,000	9,000
1,370		32,000	9,000
1,400		32,000	9,000
1,450		32,000	9,000
1,470		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,550		34,000	10,000
1,570		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,630		34,000	10,000
1,650		34,000	10,000
1,680		34,000	10,000
1,700		34,000	10,000
1,730		36,000	11,000
1,750		36,000	11,000
1,780		36,000	11,000
1,800		36,000	11,000
1,820		36,000	11,000
1,830		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,950		38,000	12,000
1,970		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,030		38,000	12,000
2,050		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000



d1		l1	l2
mm	inch	mm	mm
2,100		38,000	12,000
2,150		40,000	13,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,320		40,000	13,000
2,350		40,000	13,000
2,360		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,420		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,470		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,520		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,650		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,750		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,830		46,000	16,000
2,850		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,020		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,520		52,000	20,000
3,550		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,750		52,000	20,000
3,800		55,000	22,000
3,850		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,950		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000

d1		l1	l2
mm	inch	mm	mm
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,350		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,450		58,000	24,000
4,500		58,000	24,000
4,550		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,750		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,950		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,020		62,000	26,000
5,050		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,150		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,250		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,350		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,450		66,000	28,000
5,500		66,000	28,000
5,550		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,850		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,320		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,450		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,550		70,000	31,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z chwytym walcowym

d1		l1	l2
mm	inch	mm	mm
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,850		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,050		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,250		74,000	34,000
7,300		74,000	34,000
7,350		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,550		79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,750		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,050		79,000	37,000
8,100		79,000	37,000
8,150		79,000	37,000
8,200		79,000	37,000
8,250		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,520		84,000	40,000
8,550		84,000	40,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,750		84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,050		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,750		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,050		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
10,080		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,400		89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,600		89,000	43,000
10,700		95,000	47,000
10,720	27/64	95,000	47,000
10,800		95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,110	7/16	95,000	47,000
11,200		95,000	47,000
11,250		95,000	47,000
11,300		95,000	47,000
11,400		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,600		95,000	47,000
11,700		95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,100		102,000	51,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,600		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
12,900		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,200		102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
13,600		107,000	54,000
13,750		107,000	54,000
13,800		107,000	54,000
13,890	35/64	107,000	54,000
14,000		107,000	54,000
14,200		111,000	56,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
14,680	37/64	111,000	56,000
14,750		111,000	56,000
15,000		111,000	56,000
15,080	19/32	115,000	58,000
15,480	39/64	115,000	58,000
15,500		115,000	58,000
15,870	5/8	115,000	58,000
16,000		115,000	58,000
16,200		119,000	60,000
16,270	41/64	119,000	60,000
16,500		119,000	60,000
16,670	21/32	119,000	60,000
17,000		119,000	60,000
17,070	43/64	123,000	62,000
17,460	11/16	123,000	62,000
17,500		123,000	62,000
17,860	45/64	123,000	62,000
18,000		123,000	62,000
18,500		127,000	64,000
18,650	47/64	127,000	64,000
19,000		127,000	64,000
19,050	3/4	131,000	66,000
19,450	49/64	131,000	66,000
19,500		131,000	66,000



d1		l1	l2
mm	inch	mm	mm
19,840	25/32	131,000	66,000
20,000		131,000	66,000
20,250		136,000	68,000
20,500	13/16	136,000	68,000
20,640		136,000	68,000
21,000		136,000	68,000
22,000		141,000	70,000
22,200		141,000	70,000
23,000	63/64	146,000	72,000
24,000		151,000	75,000
24,500		151,000	75,000
25,000		151,000	75,000

d1		l1	l2
mm	inch	mm	mm
25,400	1	156,000	78,000
25,500		156,000	78,000
26,000		156,000	78,000
28,000		162,000	81,000
48,000		228,000	116,000



Wiertła kręte, krótkie



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** •
- K** •
- N** ○ stale nierdzewne/kwaso-odporne • stale sprężynowe • austenityczne
- S** • stale nierdzewne • Hastelloy, Inconel, Nimonic
- H** ○

Materiał narzędzia **HSCO**

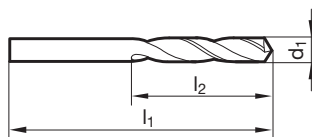
Powierzchnia **S**

Kierunek skrawania **R**

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 774



Nr artykułu **659**

d1		l1	l2
mm	inch	mm	mm
0,500		20,000	3,000
0,600		21,000	3,500
0,650		22,000	4,000
0,700		23,000	4,500
0,740		23,000	4,500
0,750		23,000	4,500
0,780		24,000	5,000
0,790	1/32	24,000	5,000
0,800		24,000	5,000
0,850		24,000	5,000
0,900		25,000	5,500
0,950		25,000	5,500
1,000		26,000	6,000
1,020		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,150		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,250		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,450		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,530		34,000	10,000
1,550		34,000	10,000
1,570		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,970		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000

d1		l1	l2
mm	inch	mm	mm
2,000		38,000	12,000
2,050		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,350		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,450		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,550		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,850		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,030		49,000	18,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,250		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,350		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000



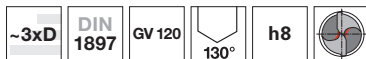
d1		l1	l2
mm	inch	mm	mm
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,050		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,150		55,000	22,000
4,200		55,000	22,000
4,250		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,050		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000

d1		l1	l2
mm	inch	mm	mm
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,100		89,000	43,000
10,200		89,000	43,000
10,250		89,000	43,000
10,320	13/32	89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
10,800		95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
12,000		102,000	51,000
12,100		102,000	51,000
12,200		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
12,800		102,000	51,000
13,000		102,000	51,000
13,300		107,000	54,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000
14,500		111,000	56,000
15,000		111,000	56,000
15,500		115,000	58,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie



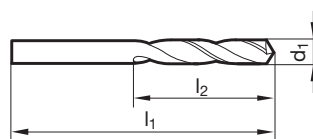
- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** •
- K** •
- N** ○ stale nierdzewne/kwaso-odporne • stale sprężynowe • austenityczne
- S** • stale nierdzewne • Hastelloy, Inconel, Nimonic
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 774

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSCO
Powierzchnia	F
Kierunek skrawania	R



Nr artykułu

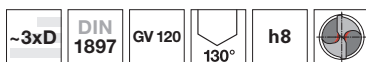
2461

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
4,000		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,600		66,000	28,000
5,800		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,800		79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,500		84,000	40,000
9,800		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000
11,500		95,000	47,000
12,000		102,000	51,000
13,000		102,000	51,000



Wiertła kręte, krótkie

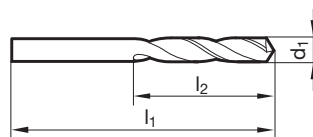


- P** • Korekcja ścina $\geq \text{Ø } 2,370$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** •
- K** •
- N** ○ stale nierdzewne/kwaso-odporne • stale sprężynowe • austenityczne
- S** • stale nierdzewne • Hastelloy, Inconel, Nimonic
- H** ○

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	

GÜHRINGNAVIGATOR

Param. skr. na str. 772



Wiertła kręte z chwytym walcowym

Nr artykułu **330**

d1		l1	l2
mm	inch	mm	mm
0,450		19,000	2,500
0,500		20,000	3,000
0,620		22,000	4,000
0,700		23,000	4,500
0,710		23,000	4,500
0,750		23,000	4,500
0,800		24,000	5,000
0,900		25,000	5,500
1,000		26,000	6,000
1,030		26,000	6,000
1,040		26,000	6,000
1,050		26,000	6,000
1,060		26,000	6,000
1,090		28,000	7,000
1,150		28,000	7,000
1,170		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,210		30,000	8,000
1,220		30,000	8,000
1,230		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,350		32,000	9,000
1,420		32,000	9,000
1,450		32,000	9,000
1,470		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,530		34,000	10,000
1,550		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,650		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000

d1		l1	l2
mm	inch	mm	mm
2,000		38,000	12,000
2,020		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,440		43,000	14,000
2,500		43,000	14,000
2,550		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,750		46,000	16,000
2,770		46,000	16,000
2,780	7/64	46,000	16,000
2,820		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,150		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,860		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,570		58,000	24,000
4,620		58,000	24,000
4,760	3/16	62,000	26,000
4,850		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,750		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,050		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,370		74,000	34,000
7,490		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,700		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,330	21/64	79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,610		84,000	40,000

d1		l1	l2
mm	inch	mm	mm
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,700		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,260		89,000	43,000
10,490		89,000	43,000
10,720	27/64	95,000	47,000
10,900		95,000	47,000
11,000		95,000	47,000
11,100		95,000	47,000
11,200		95,000	47,000
11,300		95,000	47,000
11,510	29/64	95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,400		102,000	51,000
13,000		102,000	51,000
13,500		107,000	54,000
14,000		107,000	54,000
14,700		111,000	56,000
15,100		115,000	58,000
15,500		115,000	58,000
16,000		115,000	58,000
19,500		131,000	66,000
19,750		131,000	66,000
22,500		146,000	72,000
23,500		146,000	72,000
24,000		151,000	75,000
25,000	63/64	151,000	75,000
25,500		156,000	78,000
26,000		156,000	78,000
27,000		162,000	81,000
32,000		180,000	90,000



Wiertła kręte, krótkie

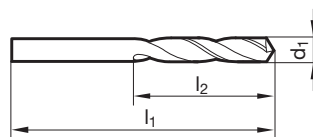


- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** ○
- K** ○
- N** ○ stale o podwyższonej wytrzymałości • długowiórowe materiały Rm $\leq 1000 \text{ N/mm}^2$ • stopy Al i Cu • miękkie brązy • miedź elektrolityczna
- S** ○ • mosiądz ciągliwy
- H** ○

Materiał narzędzia	HSCO
Powierzchnia	S
Kierunek skrawania	R

GÜHRING NAVIGATOR

Param. skr. na str. 774



Wiertła kręte z chwytami walcowymi

Nr artykułu **1228**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000

d1		l1	l2
mm	inch	mm	mm
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,160	13/64	62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,800		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,500		79,000	37,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
8,600		84,000	40,000
8,700		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,320	13/32	89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000

d1		l1	l2
mm	inch	mm	mm
12,800		102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
14,000		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000
15,500		115,000	58,000
16,000		115,000	58,000
16,500		119,000	60,000
17,000		119,000	60,000
17,500		123,000	62,000
18,000		123,000	62,000
18,500		127,000	64,000
19,000		127,000	64,000
20,000		131,000	66,000



Wiertła kręte, krótkie



- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie
- M** ○
- K** ○
- N** ○ długowiórowe materiały $R_m \leq 1000 \text{ N/mm}^2$ • stopy Al i Cu • miękkie brązy
• miedź elektrolityczna • mosiądz ciągliwy
- S** ○
- H** ○

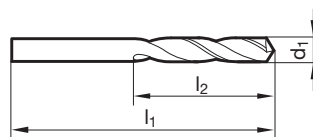
Materiał narzędzia **HSCO**

Powierzchnia **F**

Kierunek skrawania **R**

GÜHRINGNAVIGATOR

Param. skr. na str. 774



Wiertła kręte z
chwytami walcowymi

Nr artykułu **2498**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,200		30,000	8,000
1,300		30,000	8,000
1,500		32,000	9,000
1,600		34,000	10,000
1,800		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,500		66,000	28,000

d1		l1	l2
mm	inch	mm	mm
5,600		66,000	28,000
6,000		66,000	28,000
6,200		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
8,000		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
9,000		84,000	40,000
9,300		84,000	40,000
9,500		84,000	40,000
10,000		89,000	43,000
10,200		89,000	43,000
10,500		89,000	43,000
10,800		95,000	47,000
11,000		95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000
13,500		107,000	54,000
14,000		107,000	54,000
14,500		111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000



Wiertła kręte, krótkie



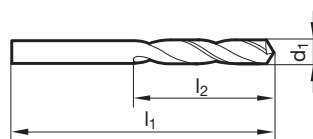
P	○	geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
M	●	
K		
N	○	stale nierdzewne austenityczne /kwaso-/żaro-odporne (V2A i V4A)
S	○	
H		

GÜHRING NAVIGATOR

Param. skr. na str. 772

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu

1261

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,500		32,000	9,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,700		34,000	10,000
1,900		36,000	11,000
2,000		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,500		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,500		66,000	28,000
5,600		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000

d1		l1	l2
mm	inch	mm	mm
6,100		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,300		84,000	40,000
9,500		84,000	40,000
9,900		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000
10,900		95,000	47,000
11,500		95,000	47,000
12,000		102,000	51,000



Wiertła kręte, krótkie



- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • zoptymalizowane ostrzenie krzyżowe
- M** ● kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- K** ○
- N** ○ stale nierdzewne austenityczne /kwaso-/żaro-odporne (V2A i V4A)
- S** ● stopy specjalne
- H** ●

Materiał narzędzia **HSCO**

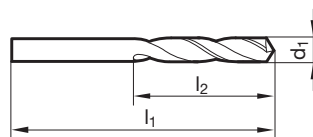
Powierzchnia **S**

Kierunek skrawania **R**



GÜHRINGNAVIGATOR

Param. skr. na str. 774



Wiertła kręte z chwytami walcowymi

Nr artykułu **572**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000

d1		l1	l2
mm	inch	mm	mm
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,550		66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,450		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000



d1		l1	l2
mm	inch	mm	mm
9,100		84,000	40,000
9,200		84,000	40,000
9,250		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000

d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
11,000		95,000	47,000
11,200		95,000	47,000
11,500		95,000	47,000
11,800		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • uniwersalne zastosowanie falistego oszlifowania • kobaltowa stal szybko tnąca
- M** ○ • zwiększona odporność na zużycie • do profesjonalnego montażu
- K** ○ • przeznaczone również do wiertarek ręcznych
- N** ○ • długowiórowe stale - $R_m < 1000 \text{ N/mm}^2$ • żeliwa i stopy AlSi
- S** ○
- H** ○

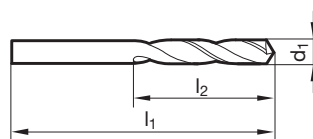
Materiał narzędzia **HSCO**

Powierzchnia **M**

Kierunek skrawania **R**

GÜHRING NAVIGATOR

Param. skr. na str. 774



Wiertła kręte z
chwytami walcowymi

Nr artykułu **2048**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,400		43,000	14,000
2,700		46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000
4,700		58,000	24,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000

d1		l1	l2
mm	inch	mm	mm
5,800		66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,700		70,000	31,000
6,900		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,400		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
8,800		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,100		84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,200		89,000	43,000



d1		l1	l2
mm	inch	mm	mm
10,500		89,000	43,000
11,500		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
13,000		102,000	51,000

d1		l1	l2
mm	inch	mm	mm

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie

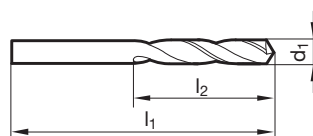


- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • stale o wysokiej zawartości Co i Mo • szczególnie wysoka odporność ścieranie
- M** ○
- K** ○
- N** ● średnio-/wysokowytrzymałe stopy na bazie CrNi • Hastelloy, Inconel, Nimonic • stale nierdz./kwaso-/żaro-wytrzymałe • blachy odporne na ścieranie • stale, brązy - Rm < 1400 N/mm²
- S** ●
- H** ○

Materiał narzędzia	M42
Powierzchnia	○
Kierunek skrawania	Ⓜ

GÜHRINGNAVIGATOR

Param. skr. na str. 772



Wiertła kręte z chwytem walcowym

Nr artykułu **1259**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,100		28,000	7,000
1,200		30,000	8,000
1,300		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,600		34,000	10,000
1,700		34,000	10,000
1,800		36,000	11,000
1,900		36,000	11,000
2,000		38,000	12,000
2,100		38,000	12,000
2,200		40,000	13,000
2,300		40,000	13,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,500		43,000	14,000
2,600		43,000	14,000
2,700		46,000	16,000
2,780	7/64	46,000	16,000
2,800		46,000	16,000
2,900		46,000	16,000
3,000		46,000	16,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,500		52,000	20,000
3,600		52,000	20,000
3,700		52,000	20,000
3,800		55,000	22,000
3,900		55,000	22,000
3,970	5/32	55,000	22,000
4,000		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,600		58,000	24,000

d1		l1	l2
mm	inch	mm	mm
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,900		62,000	26,000
5,000		62,000	26,000
5,100		62,000	26,000
5,200		62,000	26,000
5,300		62,000	26,000
5,400		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,800		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,100		70,000	31,000
6,200		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,600		70,000	31,000
6,800		74,000	34,000
7,000		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000



d1		l1	l2
mm	inch	mm	mm
8,500		79,000	37,000
8,600		84,000	40,000
8,700		84,000	40,000
9,000		84,000	40,000
9,300		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,800		89,000	43,000
9,900		89,000	43,000
10,000		89,000	43,000
10,500		89,000	43,000
11,000		95,000	47,000

d1		l1	l2
mm	inch	mm	mm
11,500		95,000	47,000
12,000		102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
14,000		107,000	54,000
15,000		111,000	56,000
15,870	5/8	115,000	58,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, krótkie



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana ze specjalną korekcją ścina typu B • proszkowa, kobaltowa stal szybko tnąca • szczególnie wysoka sztywność • szczególnie wysoka odporność ścieranie
- M** ○
- K** •
- N** ○ wysokowytrzymałe materiały, stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania • żeliwo, miedź, brąz
- S** ○
- H** ○

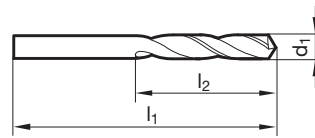
Materiał narzędzia **HSS-E-PM**

Powierzchnia **F**

Kierunek skrawania **R**

GÜHRING NAVIGATOR

Param. skr. na str. 774



Wiertła kręte z chwytym walcowym

Nr artykułu **515**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000

d1		l1	l2
mm	inch	mm	mm
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,650		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,350		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,800		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
13,100	33/64	102,000	51,000
13,490	17/32	107,000	54,000
13,500		107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000



Wiertła kręte, krótkie



Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania

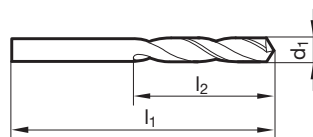


- P** ○ Korekcja ścina $\geq \varnothing 2,060$ • geom. ścinowa • główna krawędź skrawająca - prosta
- M** ○
- K** ○
- N** ● stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • żeliwa szare • brąz, mosiądz • aluminium i stopy Al • magnez i stopy magnezu • tworzywa sztuczne, w tym również wzmacniane włóknami
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 776

Wiertła kręte z chwytem walcowym



Nr artykułu **730**

d1		l1	l2
mm	inch	mm	mm
0,500		20,000	3,000
0,600		21,000	3,500
0,700		23,000	4,500
0,800		24,000	5,000
0,900		25,000	5,500
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000

d1		l1	l2
mm	inch	mm	mm
2,440		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,580		43,000	14,000
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000
4,500		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,490		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000

d1		l1	l2
mm	inch	mm	mm
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,700		95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,500		102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
13,490	17/32	107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000



Wiertła kręte, krótkie



Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

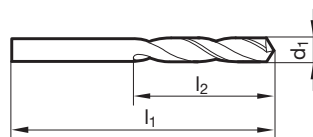
Kierunek skrawania **R**

- P** ○ Korekcja ścina $\geq \varnothing 2,060$ • geom. ścinowa • główna krawędź skrawająca - prosta
- M** ○
- K** ○
- N** ● stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • materiały odlewane • mosiądze • stopy Al z wysoką zawartością Si • magnez i stopy magnezu • tworzywa sztuczne, w tym również wzmacniane włóknami
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 776

Wiertła kręte z chwytem walcowym



Nr artykułu **2463**

d1		l1	l2
mm	inch	mm	mm
1,000		26,000	6,000
1,020		26,000	6,000
1,040		26,000	6,000
1,070		28,000	7,000
1,090		28,000	7,000
1,100		28,000	7,000
1,180		28,000	7,000
1,190	3/64	30,000	8,000
1,200		30,000	8,000
1,300		30,000	8,000
1,320		30,000	8,000
1,400		32,000	9,000
1,500		32,000	9,000
1,510		34,000	10,000
1,590	1/16	34,000	10,000
1,600		34,000	10,000
1,610		34,000	10,000
1,700		34,000	10,000
1,780		36,000	11,000
1,800		36,000	11,000
1,850		36,000	11,000
1,900		36,000	11,000
1,930		38,000	12,000
1,980	5/64	38,000	12,000
1,990		38,000	12,000
2,000		38,000	12,000
2,060		38,000	12,000
2,080		38,000	12,000
2,100		38,000	12,000
2,180		40,000	13,000
2,200		40,000	13,000
2,250		40,000	13,000
2,260		40,000	13,000
2,300		40,000	13,000
2,370		43,000	14,000
2,380	3/32	43,000	14,000
2,400		43,000	14,000
2,440		43,000	14,000
2,490		43,000	14,000
2,500		43,000	14,000
2,530		43,000	14,000
2,580		43,000	14,000

d1		l1	l2
mm	inch	mm	mm
2,600		43,000	14,000
2,640		43,000	14,000
2,700		46,000	16,000
2,710		46,000	16,000
2,780	7/64	46,000	16,000
2,790		46,000	16,000
2,800		46,000	16,000
2,820		46,000	16,000
2,870		46,000	16,000
2,900		46,000	16,000
2,950		46,000	16,000
3,000		46,000	16,000
3,050		49,000	18,000
3,100		49,000	18,000
3,170	1/8	49,000	18,000
3,200		49,000	18,000
3,260		49,000	18,000
3,300		49,000	18,000
3,400		52,000	20,000
3,450		52,000	20,000
3,500		52,000	20,000
3,570	9/64	52,000	20,000
3,600		52,000	20,000
3,660		52,000	20,000
3,700		52,000	20,000
3,730		52,000	20,000
3,800		55,000	22,000
3,860		55,000	22,000
3,900		55,000	22,000
3,910		55,000	22,000
3,970	5/32	55,000	22,000
3,990		55,000	22,000
4,000		55,000	22,000
4,040		55,000	22,000
4,090		55,000	22,000
4,100		55,000	22,000
4,200		55,000	22,000
4,220		55,000	22,000
4,300		58,000	24,000
4,370	11/64	58,000	24,000
4,390		58,000	24,000
4,400		58,000	24,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,500		58,000	24,000
4,570		58,000	24,000
4,600		58,000	24,000
4,620		58,000	24,000
4,700		58,000	24,000
4,760	3/16	62,000	26,000
4,800		62,000	26,000
4,850		62,000	26,000
4,900		62,000	26,000
4,920		62,000	26,000
4,980		62,000	26,000
5,000		62,000	26,000
5,060		62,000	26,000
5,100		62,000	26,000
5,110		62,000	26,000
5,160	13/64	62,000	26,000
5,180		62,000	26,000
5,200		62,000	26,000
5,220		62,000	26,000
5,300		62,000	26,000
5,310		66,000	28,000
5,400		66,000	28,000
5,410		66,000	28,000
5,500		66,000	28,000
5,560	7/32	66,000	28,000
5,600		66,000	28,000
5,610		66,000	28,000
5,700		66,000	28,000
5,790		66,000	28,000
5,800		66,000	28,000
5,900		66,000	28,000
5,940		66,000	28,000
5,950	15/64	66,000	28,000
6,000		66,000	28,000
6,040		70,000	31,000
6,100		70,000	31,000
6,150		70,000	31,000
6,200		70,000	31,000
6,250		70,000	31,000
6,300		70,000	31,000
6,350	1/4	70,000	31,000
6,400		70,000	31,000
6,500		70,000	31,000
6,530		70,000	31,000
6,600		70,000	31,000
6,630		70,000	31,000
6,700		70,000	31,000
6,750	17/64	74,000	34,000
6,800		74,000	34,000
6,900		74,000	34,000
7,000		74,000	34,000
7,030		74,000	34,000
7,100		74,000	34,000
7,140	9/32	74,000	34,000
7,200		74,000	34,000
7,300		74,000	34,000
7,370		74,000	34,000
7,400		74,000	34,000
7,500		74,000	34,000
7,540	19/64	79,000	37,000
7,600		79,000	37,000
7,670		79,000	37,000
7,700		79,000	37,000
7,800		79,000	37,000
7,900		79,000	37,000
7,940	5/16	79,000	37,000

d1		l1	l2
mm	inch	mm	mm
8,000		79,000	37,000
8,030		79,000	37,000
8,100		79,000	37,000
8,200		79,000	37,000
8,300		79,000	37,000
8,330	21/64	79,000	37,000
8,400		79,000	37,000
8,430		79,000	37,000
8,500		79,000	37,000
8,600		84,000	40,000
8,610		84,000	40,000
8,700		84,000	40,000
8,730	11/32	84,000	40,000
8,800		84,000	40,000
8,840		84,000	40,000
8,900		84,000	40,000
9,000		84,000	40,000
9,090		84,000	40,000
9,100		84,000	40,000
9,130	23/64	84,000	40,000
9,200		84,000	40,000
9,300		84,000	40,000
9,340		84,000	40,000
9,400		84,000	40,000
9,500		84,000	40,000
9,520	3/8	89,000	43,000
9,580		89,000	43,000
9,600		89,000	43,000
9,700		89,000	43,000
9,800		89,000	43,000
9,900		89,000	43,000
9,920	25/64	89,000	43,000
10,000		89,000	43,000
10,080		89,000	43,000
10,200		89,000	43,000
10,260		89,000	43,000
10,300		89,000	43,000
10,320	13/32	89,000	43,000
10,490		89,000	43,000
10,500		89,000	43,000
10,720	27/64	95,000	47,000
11,000		95,000	47,000
11,110	7/16	95,000	47,000
11,500		95,000	47,000
11,510	29/64	95,000	47,000
11,910	15/32	102,000	51,000
12,000		102,000	51,000
12,300	31/64	102,000	51,000
12,700	1/2	102,000	51,000
13,000		102,000	51,000
13,490	17/32	107,000	54,000
14,000		107,000	54,000
14,290	9/16	111,000	56,000
15,000		111,000	56,000
16,000		115,000	58,000



Wiertła kręte, krótkie



- P** geom. ścinowa • główna krawędź skrawająca - prosta
- M**
- K**
- N** tworzywa sztuczne, wzmocnione włóknem szklanym • duroplasty powodujące mocne zużywanie się łysinek i krawędzi tnących
- S**
- H**

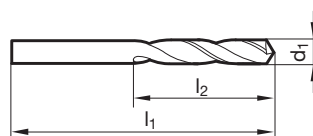
Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Kierunek skrawania **(R)**

GÜHRINGNAVIGATOR

Param. skr. na str. 776



Wiertła kręte z chwytem walcowym

Nr artykułu **702**

d1		l1	l2
mm	inch	mm	mm
0,500		30,000	6,500
0,550		30,000	6,500
0,600		30,000	6,500
0,650		30,000	6,500
0,700		30,000	6,500
0,750		30,000	8,500
0,800		30,000	8,500
0,900		30,000	9,500
1,000		30,000	11,000
1,050		30,000	11,000
1,100		30,000	11,000
1,200		30,000	13,000
1,350		30,000	13,000
1,400		30,000	13,000
1,450		30,000	13,000
1,500		30,000	13,000
1,600		40,000	17,500
1,650		40,000	17,500
1,700		40,000	17,500
1,800		40,000	17,500
1,850		40,000	17,500
1,900		40,000	17,500
2,000		40,000	17,500
2,010		40,000	17,500
2,050		40,000	17,500
2,100		40,000	17,500
2,200		40,000	17,500
2,260		40,000	17,500
2,300		40,000	17,500
2,400		40,000	17,500
2,490		40,000	17,500
2,500		40,000	17,500
2,530		45,000	20,000
2,600		45,000	20,000
2,700		45,000	20,000
2,800		45,000	20,000

d1		l1	l2
mm	inch	mm	mm
3,000		45,000	20,000
3,050		50,000	22,000
3,100		50,000	22,000
3,200		50,000	22,000
3,260		50,000	22,000
3,300		50,000	22,000
3,400		50,000	22,000
3,450		50,000	22,000
3,500		50,000	22,000
3,570	9/64	50,000	22,000
3,600		50,000	22,000
3,910		50,000	22,000
4,000		50,000	22,000
4,200		50,000	25,000
4,300		50,000	25,000
4,400		50,000	25,000
4,700		50,000	25,000
5,000		50,000	25,000
5,200		50,000	25,000
5,310		50,000	25,000
5,610		50,000	25,000
5,790		50,000	25,000
5,950	15/64	50,000	25,000
6,000		50,000	25,000
6,250		65,000	30,000
6,350	1/4	65,000	30,000
6,500		65,000	30,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana
- M**
- K** •
- N** ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

Materiał narzędzia **HSS**

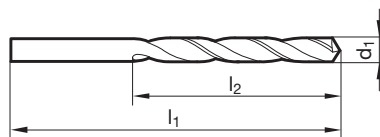
Powierzchnia $\text{Ra} > 2,36$

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 778



Nr artykułu **205**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,200		19,000	2,500	0,620		26,000	8,000
0,210		19,000	2,500	0,630		26,000	8,000
0,220		19,000	2,500	0,640		26,000	8,000
0,230		19,000	2,500	0,650		26,000	8,000
0,240		19,000	2,500	0,660		26,000	8,000
0,250		19,000	3,000	0,670		26,000	8,000
0,260		19,000	3,000	0,680		28,000	9,000
0,270		19,000	3,000	0,690		28,000	9,000
0,280		19,000	3,000	0,700		28,000	9,000
0,290		19,000	3,000	0,710		28,000	9,000
0,300		19,000	3,000	0,720		28,000	9,000
0,310		19,000	4,000	0,730		28,000	9,000
0,320		19,000	4,000	0,740		28,000	9,000
0,330		19,000	4,000	0,750		28,000	9,000
0,340		19,000	4,000	0,760		30,000	10,000
0,350		19,000	4,000	0,770		30,000	10,000
0,360		19,000	4,000	0,780		30,000	10,000
0,370		19,000	4,000	0,790	1/32	30,000	10,000
0,380		19,000	4,000	0,800		30,000	10,000
0,390		20,000	5,000	0,810		30,000	10,000
0,400	1/64	20,000	5,000	0,820		30,000	10,000
0,410		20,000	5,000	0,830		30,000	10,000
0,420		20,000	5,000	0,840		30,000	10,000
0,430		20,000	5,000	0,850		30,000	10,000
0,440		20,000	5,000	0,860		32,000	11,000
0,450		20,000	5,000	0,870		32,000	11,000
0,460		20,000	5,000	0,880		32,000	11,000
0,470		20,000	5,000	0,890		32,000	11,000
0,480		20,000	5,000	0,900		32,000	11,000
0,490		22,000	6,000	0,910		32,000	11,000
0,500		22,000	6,000	0,920		32,000	11,000
0,510		22,000	6,000	0,930		32,000	11,000
0,520		22,000	6,000	0,940		32,000	11,000
0,530		22,000	6,000	0,950		32,000	11,000
0,540		24,000	7,000	0,960		34,000	12,000
0,550		24,000	7,000	0,970		34,000	12,000
0,560		24,000	7,000	0,980		34,000	12,000
0,570		24,000	7,000	0,990		34,000	12,000
0,580		24,000	7,000	1,000		34,000	12,000
0,590		24,000	7,000	1,010		34,000	12,000
0,600		24,000	7,000	1,020		34,000	12,000
0,610		26,000	8,000	1,030		34,000	12,000



d1		l1	l2
mm	inch	mm	mm
1,040		34,000	12,000
1,050		34,000	12,000
1,060		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,110		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,310		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,340		40,000	18,000
1,350		40,000	18,000
1,360		40,000	18,000
1,370		40,000	18,000
1,380		40,000	18,000
1,390		40,000	18,000
1,400		40,000	18,000
1,410		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,630		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,690		43,000	20,000
1,700		43,000	20,000
1,710		46,000	22,000
1,720		46,000	22,000
1,730		46,000	22,000
1,740		46,000	22,000
1,750		46,000	22,000

d1		l1	l2
mm	inch	mm	mm
1,760		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,790		46,000	22,000
1,800		46,000	22,000
1,810		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,840		46,000	22,000
1,850		46,000	22,000
1,860		46,000	22,000
1,870		46,000	22,000
1,880		46,000	22,000
1,890		46,000	22,000
1,900		46,000	22,000
1,910		49,000	24,000
1,920		49,000	24,000
1,930		49,000	24,000
1,940		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,010		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,070		49,000	24,000
2,080		49,000	24,000
2,090		49,000	24,000
2,100		49,000	24,000
2,110		49,000	24,000
2,120		49,000	24,000
2,130		53,000	27,000
2,140		53,000	27,000
2,150		53,000	27,000
2,170		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,210		53,000	27,000
2,220		53,000	27,000
2,230		53,000	27,000
2,240		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,270		53,000	27,000
2,280		53,000	27,000
2,290		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,330		53,000	27,000
2,340		53,000	27,000
2,350		53,000	27,000
2,360		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,390		57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,430		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,460		57,000	30,000
2,470		57,000	30,000
2,480		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,510		57,000	30,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
2,520		57,000	30,000
2,530		57,000	30,000
2,540		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,610		57,000	30,000
2,620		57,000	30,000
2,630		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,660		61,000	33,000
2,670		61,000	33,000
2,680		61,000	33,000
2,700		61,000	33,000
2,710		61,000	33,000
2,720		61,000	33,000
2,730		61,000	33,000
2,750		61,000	33,000
2,760		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,830		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,880		61,000	33,000
2,900		61,000	33,000
2,910		61,000	33,000
2,920		61,000	33,000
2,930		61,000	33,000
2,940		61,000	33,000
2,950		61,000	33,000
2,960		61,000	33,000
2,970		61,000	33,000
2,980		61,000	33,000
2,990		61,000	33,000
3,000		61,000	33,000
3,010		65,000	36,000
3,020		65,000	36,000
3,030		65,000	36,000
3,040		65,000	36,000
3,050		65,000	36,000
3,060		65,000	36,000
3,070		65,000	36,000
3,080		65,000	36,000
3,100		65,000	36,000
3,120		65,000	36,000
3,130		65,000	36,000
3,150		65,000	36,000
3,160		65,000	36,000
3,170	1/8	65,000	36,000
3,180		65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,230		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,320		65,000	36,000
3,330		65,000	36,000
3,350		65,000	36,000
3,360		70,000	39,000
3,370		70,000	39,000
3,380		70,000	39,000
3,400		70,000	39,000
3,420		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,520		70,000	39,000

d1		l1	l2
mm	inch	mm	mm
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,610		70,000	39,000
3,620		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,680		70,000	39,000
3,700		70,000	39,000
3,725		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,820		75,000	43,000
3,830		75,000	43,000
3,850		75,000	43,000
3,860		75,000	43,000
3,870		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,920		75,000	43,000
3,930		75,000	43,000
3,940		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,980		75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,010		75,000	43,000
4,020		75,000	43,000
4,030		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,060		75,000	43,000
4,070		75,000	43,000
4,080		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,120		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,270		80,000	47,000
4,300		80,000	47,000
4,320		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,380		80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,420		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,520		80,000	47,000
4,530		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,730		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,770		86,000	52,000
4,800		86,000	52,000
4,830		86,000	52,000
4,850		86,000	52,000
4,860		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000



d1		l1	l2
mm	inch	mm	mm
4,930		86,000	52,000
4,950		86,000	52,000
4,970		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,025		86,000	52,000
5,030		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,080		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,120		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,190		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,260		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,350		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,420		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,630		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,920		93,000	57,000
5,930		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
5,960		93,000	57,000
5,970		93,000	57,000
5,980		93,000	57,000
5,990		93,000	57,000
6,000		93,000	57,000
6,030		101,000	63,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,170		101,000	63,000
6,200		101,000	63,000
6,210		101,000	63,000
6,220		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,380		101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,760		109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,040		109,000	69,000
7,050		109,000	69,000
7,070		109,000	69,000
7,100		109,000	69,000
7,130		109,000	69,000
7,140	9/32	109,000	69,000
7,150		109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,320		109,000	69,000
7,350		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,550		117,000	75,000
7,600		117,000	75,000
7,650		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
7,950		117,000	75,000
7,980		117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,130		117,000	75,000
8,150		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,350		117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,450		117,000	75,000
8,500		117,000	75,000
8,550		125,000	81,000
8,600		125,000	81,000
8,610		125,000	81,000
8,650		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,850		125,000	81,000
8,900		125,000	81,000
8,950		125,000	81,000
9,000		125,000	81,000
9,050		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,150		125,000	81,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,450		125,000	81,000
9,500		125,000	81,000
9,510		133,000	87,000
9,520	3/8	133,000	87,000
9,570		133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,650		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,850		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
9,950		133,000	87,000
10,000		133,000	87,000
10,050		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,150		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,350		133,000	87,000
10,400		133,000	87,000
10,450		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,550		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,050		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,150		142,000	94,000
11,200		142,000	94,000
11,250		142,000	94,000
11,300		142,000	94,000
11,350		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,050		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,650		151,000	101,000
12,700	1/2	151,000	101,000

d1		l1	l2
mm	inch	mm	mm
12,750		151,000	101,000
12,800		151,000	101,000
12,850		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,250		160,000	108,000
13,300		160,000	108,000
13,400		160,000	108,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000
13,530		160,000	108,000
13,600		160,000	108,000
13,700		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,900		160,000	108,000
14,000		160,000	108,000
14,100		169,000	114,000
14,200		169,000	114,000
14,250		169,000	114,000
14,290	9/16	169,000	114,000
14,300		169,000	114,000
14,400		169,000	114,000
14,450		169,000	114,000
14,500		169,000	114,000
14,600		169,000	114,000
14,680	37/64	169,000	114,000
14,700		169,000	114,000
14,750		169,000	114,000
14,800		169,000	114,000
14,900		169,000	114,000
15,000		169,000	114,000
15,080	19/32	178,000	120,000
15,100		178,000	120,000
15,200		178,000	120,000
15,250		178,000	120,000
15,300		178,000	120,000
15,400		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,600		178,000	120,000
15,700		178,000	120,000
15,750		178,000	120,000
15,800		178,000	120,000
15,870	5/8	178,000	120,000
15,900		178,000	120,000
16,000		178,000	120,000
16,100		184,000	125,000
16,200		184,000	125,000
16,250		184,000	125,000
16,270	41/64	184,000	125,000
16,300		184,000	125,000
16,400		184,000	125,000
16,500		184,000	125,000
16,600		184,000	125,000
16,670	21/32	184,000	125,000
16,700		184,000	125,000
16,750		184,000	125,000
16,800		184,000	125,000
16,900		184,000	125,000
17,000		184,000	125,000
17,070	43/64	191,000	130,000
17,200		191,000	130,000
17,250		191,000	130,000
17,300		191,000	130,000
17,400		191,000	130,000
17,460	11/16	191,000	130,000
17,500		191,000	130,000
17,600		191,000	130,000



d1		l1	l2
mm	inch	mm	mm
17,700		191,000	130,000
17,750		191,000	130,000
17,800		191,000	130,000
17,860	45/64	191,000	130,000
17,900		191,000	130,000
18,000		191,000	130,000
18,100		198,000	135,000
18,200		198,000	135,000
18,260	23/32	198,000	135,000
18,400		198,000	135,000
18,500		198,000	135,000
18,650	47/64	198,000	135,000

d1		l1	l2
mm	inch	mm	mm
18,750		198,000	135,000
18,800		198,000	135,000
19,000		198,000	135,000
19,050	3/4	205,000	140,000
19,100		205,000	140,000
19,200		205,000	140,000
19,250		205,000	140,000
19,500		205,000	140,000
19,600		205,000	140,000
19,750		205,000	140,000
19,840	25/32	205,000	140,000
20,000		205,000	140,000



Wiertła kręte



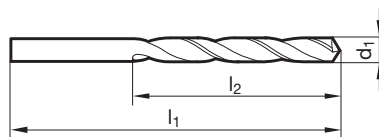
- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana
- M**
- K** •
- N** ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 780



Nr artykułu **651**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,200		19,000	2,500	0,720		28,000	9,000
0,250		19,000	3,000	0,740		28,000	9,000
0,280		19,000	3,000	0,750		28,000	9,000
0,300		19,000	3,000	0,770		30,000	10,000
0,310		19,000	4,000	0,780		30,000	10,000
0,320		19,000	4,000	0,790	1/32	30,000	10,000
0,330		19,000	4,000	0,800		30,000	10,000
0,340		19,000	4,000	0,810		30,000	10,000
0,360		19,000	4,000	0,820		30,000	10,000
0,370		19,000	4,000	0,830		30,000	10,000
0,380		19,000	4,000	0,840		30,000	10,000
0,390		20,000	5,000	0,850		30,000	10,000
0,400	1/64	20,000	5,000	0,860		32,000	11,000
0,410		20,000	5,000	0,870		32,000	11,000
0,420		20,000	5,000	0,880		32,000	11,000
0,430		20,000	5,000	0,890		32,000	11,000
0,440		20,000	5,000	0,900		32,000	11,000
0,450		20,000	5,000	0,910		32,000	11,000
0,460		20,000	5,000	0,920		32,000	11,000
0,470		20,000	5,000	0,930		32,000	11,000
0,480		20,000	5,000	0,940		32,000	11,000
0,490		22,000	6,000	0,950		32,000	11,000
0,500		22,000	6,000	0,960		34,000	12,000
0,510		22,000	6,000	0,970		34,000	12,000
0,520		22,000	6,000	0,980		34,000	12,000
0,530		22,000	6,000	0,990		34,000	12,000
0,540		24,000	7,000	1,000		34,000	12,000
0,550		24,000	7,000	1,020		34,000	12,000
0,570		24,000	7,000	1,030		34,000	12,000
0,580		24,000	7,000	1,040		34,000	12,000
0,590		24,000	7,000	1,050		34,000	12,000
0,600		24,000	7,000	1,060		34,000	12,000
0,610		26,000	8,000	1,070		36,000	14,000
0,620		26,000	8,000	1,080		36,000	14,000
0,630		26,000	8,000	1,090		36,000	14,000
0,640		26,000	8,000	1,100		36,000	14,000
0,650		26,000	8,000	1,110		36,000	14,000
0,660		26,000	8,000	1,120		36,000	14,000
0,680		28,000	9,000	1,130		36,000	14,000
0,690		28,000	9,000	1,140		36,000	14,000
0,700		28,000	9,000	1,150		36,000	14,000
0,710		28,000	9,000	1,160		36,000	14,000



d1		l1	l2
mm	inch	mm	mm
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,340		40,000	18,000
1,350		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,710		46,000	22,000
1,720		46,000	22,000
1,730		46,000	22,000
1,750		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,850		46,000	22,000
1,870		46,000	22,000
1,900		46,000	22,000
1,910		49,000	24,000
1,930		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000

d1		l1	l2
mm	inch	mm	mm
2,300		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,720		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,950		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,020		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,030		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,150		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,450		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,850		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,050		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,550		133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,060		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000



Wiertła kręte



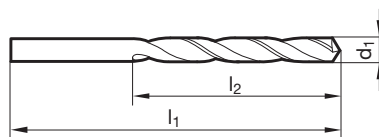
- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana
- M**
- K** •
- N** • stopowe/niestopowe stале i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

Materiał narzędzia	HSS
Powierzchnia	F
Kierunek skrawania	R

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 780



Nr artykułu **2456**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	5,600		93,000	57,000
1,100		36,000	14,000	5,700		93,000	57,000
1,200		38,000	16,000	5,800		93,000	57,000
1,300		38,000	16,000	5,900		93,000	57,000
1,400		40,000	18,000	6,000		93,000	57,000
1,500		40,000	18,000	6,100		101,000	63,000
1,600		43,000	20,000	6,200		101,000	63,000
1,700		43,000	20,000	6,300		101,000	63,000
1,800		46,000	22,000	6,400		101,000	63,000
1,900		46,000	22,000	6,500		101,000	63,000
2,000		49,000	24,000	6,600		101,000	63,000
2,100		49,000	24,000	6,700		101,000	63,000
2,200		53,000	27,000	6,800		109,000	69,000
2,300		53,000	27,000	6,900		109,000	69,000
2,400		57,000	30,000	7,000		109,000	69,000
2,500		57,000	30,000	7,200		109,000	69,000
2,600		57,000	30,000	7,300		109,000	69,000
2,700		61,000	33,000	7,400		109,000	69,000
2,800		61,000	33,000	7,500		109,000	69,000
2,900		61,000	33,000	7,600		117,000	75,000
3,000		61,000	33,000	7,700		117,000	75,000
3,100		65,000	36,000	7,800		117,000	75,000
3,200		65,000	36,000	7,900		117,000	75,000
3,300		65,000	36,000	8,000		117,000	75,000
3,400		70,000	39,000	8,100		117,000	75,000
3,500		70,000	39,000	8,200		117,000	75,000
3,600		70,000	39,000	8,300		117,000	75,000
3,700		70,000	39,000	8,500		117,000	75,000
3,800		75,000	43,000	8,600		125,000	81,000
3,900		75,000	43,000	8,700		125,000	81,000
4,000		75,000	43,000	8,800		125,000	81,000
4,100		75,000	43,000	8,900		125,000	81,000
4,200		75,000	43,000	9,000		125,000	81,000
4,300		80,000	47,000	9,500		125,000	81,000
4,400		80,000	47,000	9,600		133,000	87,000
4,500		80,000	47,000	9,700		133,000	87,000
4,600		80,000	47,000	9,800		133,000	87,000
4,800		86,000	52,000	9,900		133,000	87,000
5,000		86,000	52,000	10,000		133,000	87,000
5,100		86,000	52,000	10,100		133,000	87,000
5,200		86,000	52,000	10,200		133,000	87,000
5,500		93,000	57,000	10,300		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,400		133,000	87,000
10,700		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,400		142,000	94,000
11,700		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,900		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000
14,500		169,000	114,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 2,370$ • geometria zataczana
- M**
- K** •
- N** ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

Materiał narzędzia **HSS**

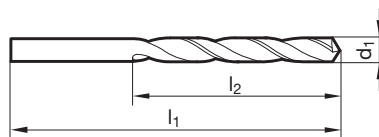
Powierzchnia ○

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 778



Nr artykułu

560

d1		l1	l2
mm	inch	mm	mm
2,400		57,000	30,000
2,500		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,200		65,000	36,000
3,240		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,800		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
3,860		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,610		93,000	57,000



Wiertła kręte



Materiał narzędzia **HSS**

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • z zabierakiem wg DIN 1809

M

K •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

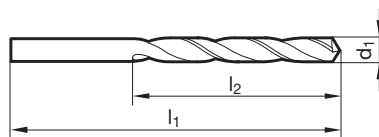
H

GÜHRING NAVIGATOR

Param. skr. na str. 778



Wiertła kręte z
chwytami walcowymi



Nr artykułu **240**

d1		l1	l2
mm	inch	mm	mm
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,800		133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000
13,000		151,000	101,000
13,490	17/32	160,000	108,000
15,000		169,000	114,000
16,000		178,000	120,000



Wiertła kręte



P	•	Korekcja ścina $\geq \varnothing 14,700$ • geometria zataczana
M		
K	•	
N	○	stopowe/niestopowe stале i staliwa • żeliwa szare, ciągliwe i sferoidalne
S		• proszki spiekane metali, nowe srebro (alpaka), grafit
H		

Materiał narzędzia **HSS**

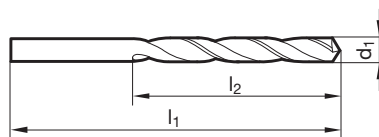
Powierzchnia >0.060

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 778



Nr artykułu **208**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,200		19,000	2,500	0,750		28,000	9,000
0,240		19,000	2,500	0,770		30,000	10,000
0,290		19,000	3,000	0,775		30,000	10,000
0,300		19,000	3,000	0,780		30,000	10,000
0,340		19,000	4,000	0,790	1/32	30,000	10,000
0,350		19,000	4,000	0,800		30,000	10,000
0,360		19,000	4,000	0,810		30,000	10,000
0,370		19,000	4,000	0,820		30,000	10,000
0,390		20,000	5,000	0,830		30,000	10,000
0,400	1/64	20,000	5,000	0,840		30,000	10,000
0,410		20,000	5,000	0,850		30,000	10,000
0,420		20,000	5,000	0,860		32,000	11,000
0,430		20,000	5,000	0,870		32,000	11,000
0,440		20,000	5,000	0,880		32,000	11,000
0,450		20,000	5,000	0,890		32,000	11,000
0,460		20,000	5,000	0,900		32,000	11,000
0,470		20,000	5,000	0,910		32,000	11,000
0,480		20,000	5,000	0,930		32,000	11,000
0,500		22,000	6,000	0,950		32,000	11,000
0,510		22,000	6,000	0,960		34,000	12,000
0,520		22,000	6,000	0,970		34,000	12,000
0,530		22,000	6,000	0,980		34,000	12,000
0,540		24,000	7,000	0,990		34,000	12,000
0,550		24,000	7,000	1,000		34,000	12,000
0,560		24,000	7,000	1,020		34,000	12,000
0,570		24,000	7,000	1,040		34,000	12,000
0,580		24,000	7,000	1,050		34,000	12,000
0,600		24,000	7,000	1,070		36,000	14,000
0,610		26,000	8,000	1,080		36,000	14,000
0,620		26,000	8,000	1,090		36,000	14,000
0,630		26,000	8,000	1,100		36,000	14,000
0,640		26,000	8,000	1,110		36,000	14,000
0,650		26,000	8,000	1,120		36,000	14,000
0,660		26,000	8,000	1,130		36,000	14,000
0,670		26,000	8,000	1,150		36,000	14,000
0,680		28,000	9,000	1,170		36,000	14,000
0,690		28,000	9,000	1,180		36,000	14,000
0,700		28,000	9,000	1,190	3/64	38,000	16,000
0,710		28,000	9,000	1,200		38,000	16,000
0,720		28,000	9,000	1,210		38,000	16,000
0,730		28,000	9,000	1,220		38,000	16,000
0,740		28,000	9,000	1,250		38,000	16,000



d1		l1	l2
mm	inch	mm	mm
1,270		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,310		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,380		40,000	18,000
1,390		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,465		40,000	18,000
1,470		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,630		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,760		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,790		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,840		46,000	22,000
1,850		46,000	22,000
1,880		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,940		49,000	24,000
1,950		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,240		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,360		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,580		57,000	30,000

d1		l1	l2
mm	inch	mm	mm
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,660		61,000	33,000
2,670		61,000	33,000
2,700		61,000	33,000
2,710		61,000	33,000
2,730		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,870		61,000	33,000
2,880		61,000	33,000
2,900		61,000	33,000
2,910		61,000	33,000
2,950		61,000	33,000
2,970		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,280		65,000	36,000
3,300		65,000	36,000
3,320		65,000	36,000
3,330		65,000	36,000
3,340		65,000	36,000
3,370		70,000	39,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,470		70,000	39,000
3,500		70,000	39,000
3,530		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,870		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,130		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,520		80,000	47,000
4,530		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,680		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,930		86,000	52,000
4,950		86,000	52,000
4,970		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,080		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,520		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,570		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,880		109,000	69,000
6,900		109,000	69,000
6,910		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,040		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,220		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,520		117,000	75,000
7,540	19/64	117,000	75,000
7,550		117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,330	21/64	117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,650		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,750		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,250		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,750		151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,250		160,000	108,000
13,400		160,000	108,000
13,600		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
14,700		169,000	114,000
14,800		169,000	114,000
14,900		169,000	114,000
15,000		169,000	114,000
15,050		178,000	120,000
15,500		178,000	120,000
15,600		178,000	120,000
15,700		178,000	120,000
15,750		178,000	120,000
15,800		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000
17,250		191,000	130,000
17,500		191,000	130,000
19,000		198,000	135,000
19,050	3/4	205,000	140,000
19,500		205,000	140,000
20,000		205,000	140,000



Wiertła kręte



Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **L**

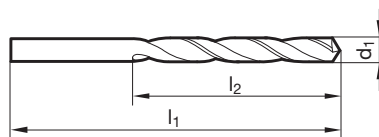
P • Korekcja ścina $\geq \varnothing 2,380$ • geometria zataczana



N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

GÜHRING NAVIGATOR

Param. skr. na str. 780



Wiertła kręte z
chwytami walcowymi

Nr artykułu **664**

d1		l1	l2
mm	inch	mm	mm
0,250		19,000	3,000
0,420		20,000	5,000
0,430		20,000	5,000
0,450		20,000	5,000
0,500		22,000	6,000
0,550		24,000	7,000
0,575		24,000	7,000
0,600		24,000	7,000
0,670		26,000	8,000
0,680		28,000	9,000
0,770		30,000	10,000
0,800		30,000	10,000
0,900		32,000	11,000
0,950		32,000	11,000
1,000		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,400		40,000	18,000
1,420		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,550		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000

d1		l1	l2
mm	inch	mm	mm
2,050		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,300		53,000	27,000
2,360		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,500		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2	
mm	inch	mm	mm	
4,760	3/16	86,000	52,000	
4,800		86,000	52,000	
4,900		86,000	52,000	
5,000		86,000	52,000	
5,060		86,000	52,000	
5,100		86,000	52,000	
5,160		13/64	86,000	52,000
5,200		86,000	52,000	
5,300		86,000	52,000	
5,400		93,000	57,000	
5,410		93,000	57,000	
5,500		93,000	57,000	
5,560		7/32	93,000	57,000
5,700		93,000	57,000	
5,950	15/64	93,000	57,000	
6,000		93,000	57,000	
6,200		101,000	63,000	
6,250		101,000	63,000	
6,350		1/4	101,000	63,000
6,400		101,000	63,000	
6,700		101,000	63,000	
6,800		109,000	69,000	
7,000		109,000	69,000	
7,140		9/32	109,000	69,000
7,200		109,000	69,000	
7,300		109,000	69,000	
7,500		109,000	69,000	
7,540		19/64	117,000	75,000
7,850		117,000	75,000	
7,900		117,000	75,000	

d1		l1	l2	
mm	inch	mm	mm	
8,000		117,000	75,000	
8,500		117,000	75,000	
8,730		11/32	125,000	81,000
8,800		125,000	81,000	
9,100		125,000	81,000	
9,130		23/64	125,000	81,000
9,400		125,000	81,000	
9,500		125,000	81,000	
9,600		133,000	87,000	
9,800		133,000	87,000	
9,920		25/64	133,000	87,000
10,000		133,000	87,000	
10,200		133,000	87,000	
10,320		13/32	133,000	87,000
10,900		142,000	94,000	
11,000		142,000	94,000	
12,000		151,000	101,000	
12,400		151,000	101,000	
12,500		151,000	101,000	
13,500		160,000	108,000	
14,250		169,000	114,000	



Wiertła kręte



- P** Korekcja ścina $\geq \varnothing 14,500$ • geometria zataczana
- M**
- K**
- N** • twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax
- S**
- H**

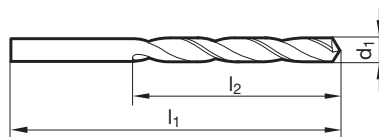
Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 778



Wiertła kręte z chwytym walcowym

Nr artykułu **206**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,210		19,000	2,500
0,220		19,000	2,500
0,240		19,000	2,500
0,250		19,000	3,000
0,280		19,000	3,000
0,290		19,000	3,000
0,300		19,000	3,000
0,310		19,000	4,000
0,320		19,000	4,000
0,340		19,000	4,000
0,350		19,000	4,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,440		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,480		20,000	5,000
0,500		22,000	6,000
0,520		22,000	6,000
0,530		22,000	6,000
0,550		24,000	7,000
0,560		24,000	7,000
0,570		24,000	7,000
0,600		24,000	7,000
0,620		26,000	8,000
0,640		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,670		26,000	8,000
0,680		28,000	9,000
0,690		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,770		30,000	10,000
0,780		30,000	10,000

d1		l1	l2
mm	inch	mm	mm
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,820		30,000	10,000
0,830		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,930		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,060		34,000	12,000
1,070		36,000	14,000
1,080		36,000	14,000
1,100		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,250		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
1,320		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,370		40,000	18,000
1,380		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,620		43,000	20,000
1,650		43,000	20,000
1,670		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,730		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000
1,870		46,000	22,000
1,900		46,000	22,000
1,920		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,010		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,070		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,220		53,000	27,000
2,230		53,000	27,000
2,250		53,000	27,000
2,270		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,470		57,000	30,000
2,480		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000

d1		l1	l2
mm	inch	mm	mm
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,840		61,000	33,000
2,850		61,000	33,000
2,900		61,000	33,000
2,920		61,000	33,000
2,950		61,000	33,000
2,970		61,000	33,000
3,000		61,000	33,000
3,010		65,000	36,000
3,020		65,000	36,000
3,030		65,000	36,000
3,040		65,000	36,000
3,050		65,000	36,000
3,060		65,000	36,000
3,070		65,000	36,000
3,100		65,000	36,000
3,120		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,410		70,000	39,000
3,450		70,000	39,000
3,470		70,000	39,000
3,500		70,000	39,000
3,520		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,720		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,830		75,000	43,000
3,850		75,000	43,000
3,870		75,000	43,000
3,880		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,020		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,420		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000



d1		l1	l2
mm	inch	mm	mm
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,350		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,850		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000

d1		l1	l2
mm	inch	mm	mm
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,150		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,700		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,200		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000
16,000		178,000	120,000
17,000		184,000	125,000
18,000		191,000	130,000
19,000		198,000	135,000
20,000		205,000	140,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



P Korekcja ścina $\geq \varnothing 14,200$ • geometria zataczana

- M**
- K**
- N** •
- S**
- H**

• twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax

Materiał narzędzia **HSS**

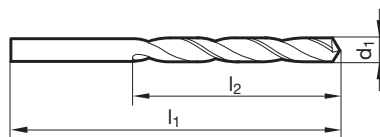
Powierzchnia

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 778

Wiertła kręte z chwytami walcowymi



Nr artykułu **209**

d1		l1	l2
mm	inch	mm	mm
0,300		19,000	3,000
0,400	1/64	20,000	5,000
0,450		20,000	5,000
0,480		20,000	5,000
0,490		22,000	6,000
0,500		22,000	6,000
0,530		22,000	6,000
0,540		24,000	7,000
0,550		24,000	7,000
0,580		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,620		26,000	8,000
0,640		26,000	8,000
0,660		26,000	8,000
0,670		26,000	8,000
0,680		28,000	9,000
0,700		28,000	9,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,780		30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,860		32,000	11,000
0,880		32,000	11,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,940		32,000	11,000
0,950		32,000	11,000
0,960		34,000	12,000
0,970		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,060		34,000	12,000
1,080		36,000	14,000
1,100		36,000	14,000
1,120		36,000	14,000

d1		l1	l2
mm	inch	mm	mm
1,130		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,165		36,000	14,000
1,170		36,000	14,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,380		40,000	18,000
1,400		40,000	18,000
1,410		40,000	18,000
1,450		40,000	18,000
1,480		40,000	18,000
1,500		40,000	18,000
1,520		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,730		46,000	22,000
1,740		46,000	22,000
1,750		46,000	22,000
1,800		46,000	22,000
1,810		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,850		46,000	22,000



d1		l1	l2
mm	inch	mm	mm
1,860		46,000	22,000
1,870		46,000	22,000
1,890		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,100		49,000	24,000
2,140		53,000	27,000
2,150		53,000	27,000
2,200		53,000	27,000
2,220		53,000	27,000
2,230		53,000	27,000
2,240		53,000	27,000
2,250		53,000	27,000
2,280		53,000	27,000
2,290		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,390		57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,450		57,000	30,000
2,470		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,830		61,000	33,000
2,850		61,000	33,000
2,900		61,000	33,000
2,930		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,070		65,000	36,000
3,080		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,160		65,000	36,000
3,170	1/8	65,000	36,000
3,175		65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,270		65,000	36,000
3,300		65,000	36,000
3,340		65,000	36,000
3,350		65,000	36,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,470		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,580		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,710		70,000	39,000
3,730		70,000	39,000
3,830		75,000	43,000
3,900		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
3,950		75,000	43,000
3,960		75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,100		75,000	43,000
4,120		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,280		80,000	47,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,850		86,000	52,000
4,870		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,650		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,120		101,000	63,000
6,130		101,000	63,000
6,150		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,150		109,000	69,000
7,200		109,000	69,000
7,220		109,000	69,000
7,300		109,000	69,000
7,350		109,000	69,000
7,550		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
8,000		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,450		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,250		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,750		133,000	87,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
9,800		133,000	87,000
9,850		133,000	87,000
10,000		133,000	87,000
10,500		133,000	87,000
11,100		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
12,050		151,000	101,000
12,100		151,000	101,000
12,150		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,800		151,000	101,000
13,100	33/64	151,000	101,000
13,300		160,000	108,000
13,500		160,000	108,000
13,800		160,000	108,000
14,200		169,000	114,000

d1		l1	l2
mm	inch	mm	mm
14,300		169,000	114,000
14,400		169,000	114,000
14,500		169,000	114,000
15,100		178,000	120,000
15,300		178,000	120,000
15,500		178,000	120,000
16,000		178,000	120,000
17,000		184,000	125,000
18,000		191,000	130,000
20,000		205,000	140,000



Wiertła kręte



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

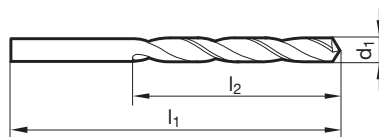
P Korekcja ścina ≥ Ø 14,500 • geometria zataczana

- M**
- K**
- N** •
- S** •
- H**

- miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
- cynk, miedź rafinowana, silumin, elektron • miękkie tworzywa sztuczne
- drewno

GÜHRINGNAVIGATOR

Param. skr. na str. 778



Wiertła kręte z chwytym walcowym

Nr artykułu **207**

d1		l1	l2
mm	inch	mm	mm
0,200		19,000	2,500
0,250		19,000	3,000
0,300		19,000	3,000
0,340		19,000	4,000
0,350		19,000	4,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,450		20,000	5,000
0,460		20,000	5,000
0,500		22,000	6,000
0,520		22,000	6,000
0,550		24,000	7,000
0,570		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,620		26,000	8,000
0,650		26,000	8,000
0,660		26,000	8,000
0,700		28,000	9,000
0,720		28,000	9,000
0,750		28,000	9,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,870		32,000	11,000
0,900		32,000	11,000
0,950		32,000	11,000
0,970		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,010		34,000	12,000
1,020		34,000	12,000
1,050		34,000	12,000
1,100		36,000	14,000
1,110		36,000	14,000
1,120		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000

d1		l1	l2
mm	inch	mm	mm
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000
1,270		38,000	16,000
1,280		38,000	16,000
1,300		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,380		40,000	18,000
1,400		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,630		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,770		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,920		49,000	24,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
2,030		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,270		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,730		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,830		61,000	33,000
2,850		61,000	33,000
2,900		61,000	33,000
2,930		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,030		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000

d1		l1	l2
mm	inch	mm	mm
4,500		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,030		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000



d1		l1	l2
mm	inch	mm	mm
8,450		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,700		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,000		142,000	94,000
11,100		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
14,700		169,000	114,000
15,000		169,000	114,000
15,600		178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
17,000		184,000	125,000
17,500		191,000	130,000
18,000		191,000	130,000
20,000		205,000	140,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



P Korekcja ścina $\geq \varnothing 14,500$ • geometria zataczana



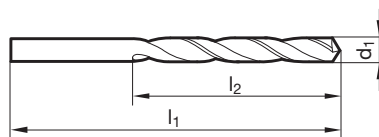
- N** • miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
- S** • cynk, miedź rafinowana, silumin, elektron • miękkie tworzywa sztuczne
- H** • drewno

GÜHRINGNAVIGATOR

Param. skr. na str. 778

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓛ



Nr artykułu **210**

d1		l1	l2
mm	inch	mm	mm
0,250		19,000	3,000
0,270		19,000	3,000
0,280		19,000	3,000
0,320		19,000	4,000
0,330		19,000	4,000
0,340		19,000	4,000
0,360		19,000	4,000
0,390		20,000	5,000
0,400	1/64	20,000	5,000
0,410		20,000	5,000
0,420		20,000	5,000
0,430		20,000	5,000
0,450		20,000	5,000
0,470		20,000	5,000
0,490		22,000	6,000
0,500		22,000	6,000
0,525		22,000	6,000
0,530		22,000	6,000
0,560		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,610		26,000	8,000
0,660		26,000	8,000
0,710		28,000	9,000
0,720		28,000	9,000
0,730		28,000	9,000
0,740		28,000	9,000
0,750		28,000	9,000
0,760		30,000	10,000
0,770		30,000	10,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,810		30,000	10,000
0,825		30,000	10,000
0,840		30,000	10,000
0,850		30,000	10,000
0,860		32,000	11,000
0,880		32,000	11,000
0,890		32,000	11,000
0,900		32,000	11,000
0,950		32,000	11,000
0,970		34,000	12,000

d1		l1	l2
mm	inch	mm	mm
0,980		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,100		36,000	14,000
1,120		36,000	14,000
1,150		36,000	14,000
1,210		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,400		40,000	18,000
1,450		40,000	18,000
1,480		40,000	18,000
1,500		40,000	18,000
1,540		43,000	20,000
1,550		43,000	20,000
1,580		43,000	20,000
1,600		43,000	20,000
1,630		43,000	20,000
1,700		43,000	20,000
1,750		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,950		49,000	24,000
2,000		49,000	24,000
2,150		53,000	27,000
2,200		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,340		53,000	27,000
2,350		53,000	27,000
2,380	3/32	57,000	30,000
2,450		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,570		57,000	30,000



d1		l1	l2
mm	inch	mm	mm
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
2,970		61,000	33,000
3,000		61,000	33,000
3,130		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,280		65,000	36,000
3,300		65,000	36,000
3,380		70,000	39,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,820		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,920		75,000	43,000
4,000		75,000	43,000
4,030		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,400		80,000	47,000
4,500		80,000	47,000
4,520		80,000	47,000
4,550		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,720		80,000	47,000
4,750		80,000	47,000
4,850		86,000	52,000
4,900		86,000	52,000
4,950		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,100		86,000	52,000
5,150		86,000	52,000
5,200		86,000	52,000
5,400		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,620		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,030		101,000	63,000
6,050		101,000	63,000
6,080		101,000	63,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,150		101,000	63,000
6,200		101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,250		109,000	69,000
7,350		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,900		117,000	75,000
8,050		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,750		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,650		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
10,700		142,000	94,000
10,750		142,000	94,000
11,100		142,000	94,000
11,500		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,950		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,500		151,000	101,000
12,800		151,000	101,000
13,200		151,000	101,000
14,500		169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000
16,000		178,000	120,000
16,200		184,000	125,000
17,000		184,000	125,000
17,300		191,000	130,000
17,500		191,000	130,000
17,600		191,000	130,000
18,000		191,000	130,000
19,000		198,000	135,000
19,500		205,000	140,000
19,800		205,000	140,000
20,000		205,000	140,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 0,970$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** •
- N** • żeliwa szare • stale - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stale CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia **HSS**

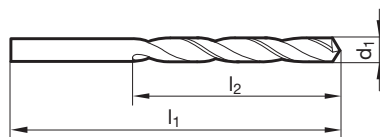
Powierzchnia

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 778



Nr artykułu **549**

d1		l1	l2
mm	inch	mm	mm
0,600		24,000	7,000
0,700		28,000	9,000
0,710		28,000	9,000
0,790	1/32	30,000	10,000
0,800		30,000	10,000
0,890		32,000	11,000
0,900		32,000	11,000
0,950		32,000	11,000
0,970		34,000	12,000
0,990		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,240		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,305		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000

d1		l1	l2
mm	inch	mm	mm
1,620		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,690		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,820		46,000	22,000
1,850		46,000	22,000
1,860		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,330		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,480		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000



d1		l1	l2
mm	inch	mm	mm
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
2,980		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,080		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,220		65,000	36,000
3,230		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,580		70,000	39,000
3,600		70,000	39,000
3,660		70,000	39,000
3,680		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,870		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,210		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000

d1		l1	l2
mm	inch	mm	mm
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,950		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,030		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,350		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,550		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,830		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,040		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,290		109,000	69,000
7,300		109,000	69,000

Wiertła kręte z
chwytami walcowymi



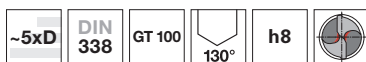
Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,580		117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,350		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,150		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,750		151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000
13,600		160,000	108,000
13,700		160,000	108,000
13,890	35/64	160,000	108,000
14,000		160,000	108,000
14,250		169,000	114,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,080	19/32	178,000	120,000
15,400		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,750		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** •
- N** • żeliwa szare • stale - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stale CrNi, m.in. nierdzewne
- S**
- H**

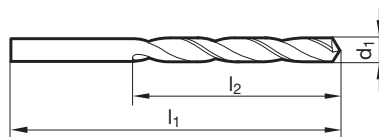
Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **R**

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Wiertła kręte z chwytym walcowym

Nr artykułu **652**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,220		38,000	16,000
1,250		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,530		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000

d1		l1	l2
mm	inch	mm	mm
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,490	17/32	160,000	108,000
13,890	35/64	160,000	108,000



d1		l1	l2
mm	inch	mm	mm
14,000		160,000	108,000
14,290	9/16	169,000	114,000
15,000		169,000	114,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** •
- N** • żeliwa szare • stale - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stale CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia **HSS**

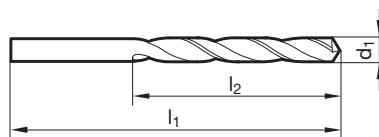
Powierzchnia **F**

Kierunek skrawania **R**

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 780



Nr artykułu

2457

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,300		38,000	16,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,400		57,000	30,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,800		75,000	43,000
4,000		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000

d1		l1	l2
mm	inch	mm	mm
5,600		93,000	57,000
5,700		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,600		101,000	63,000
6,800		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,700		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,100		125,000	81,000
9,400		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
10,300		133,000	87,000
10,700		142,000	94,000
11,400		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
15,000		169,000	114,000



Wiertła kręte



Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 0,236$

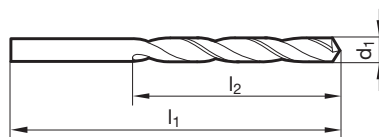
Kierunek skrawania

P • Korekcja ścina $\geq \text{Ø} 1,000$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$

- M**
- K** •
- N** • żeliwa szare • stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 778



Wiertła kręte z chwytym walcowym

Nr artykułu **550**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,300		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,450		40,000	18,000
1,485		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,550		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,780		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,670		61,000	33,000
2,700		61,000	33,000

d1		l1	l2
mm	inch	mm	mm
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,175	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,620		80,000	47,000
4,760	3/16	86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,700		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,200		125,000	81,000
9,400		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,600		133,000	87,000
10,800		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,900		151,000	101,000
12,400		151,000	101,000
12,800		151,000	101,000
14,290	9/16	169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,300$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** •
- N** • żeliwa szare • stale - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stale CrNi, m.in. nierdzewne
- S**
- H**

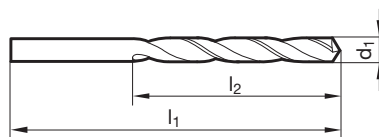
Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **L**

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Wiertła kręte z chwytem walcowym

Nr artykułu **665**

d1		l1	l2
mm	inch	mm	mm
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,570	9/64	70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
3,900		75,000	43,000
4,000		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,500		101,000	63,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,540	19/64	117,000	75,000
7,800		117,000	75,000
7,940	5/16	117,000	75,000
8,600		125,000	81,000
9,130	23/64	125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,800		133,000	87,000



Wiertła kręte



- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** ○
- K** ●
- N** ○ stopowe/niestopowe stale i staliwa • materiały odlewane $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** ○
- H** ○

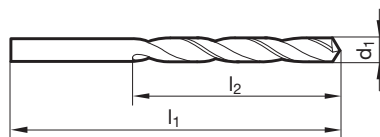
Materiał narzędzia **HSCO**

Powierzchnia $>0.2,36$

Kierunek skrawania **R**

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Nr artykułu **305**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,200		19,000	2,500	0,660		26,000	8,000
0,220		19,000	2,500	0,670		26,000	8,000
0,230		19,000	2,500	0,680		28,000	9,000
0,250		19,000	3,000	0,700		28,000	9,000
0,260		19,000	3,000	0,710		28,000	9,000
0,270		19,000	3,000	0,720		28,000	9,000
0,280		19,000	3,000	0,730		28,000	9,000
0,300		19,000	3,000	0,740		28,000	9,000
0,310		19,000	4,000	0,750		28,000	9,000
0,320		19,000	4,000	0,760		30,000	10,000
0,330		19,000	4,000	0,770		30,000	10,000
0,340		19,000	4,000	0,780		30,000	10,000
0,350		19,000	4,000	0,790	1/32	30,000	10,000
0,360		19,000	4,000	0,800		30,000	10,000
0,370		19,000	4,000	0,810		30,000	10,000
0,380		19,000	4,000	0,820		30,000	10,000
0,390		20,000	5,000	0,830		30,000	10,000
0,400	1/64	20,000	5,000	0,840		30,000	10,000
0,410		20,000	5,000	0,850		30,000	10,000
0,420		20,000	5,000	0,860		32,000	11,000
0,430		20,000	5,000	0,870		32,000	11,000
0,440		20,000	5,000	0,880		32,000	11,000
0,450		20,000	5,000	0,890		32,000	11,000
0,460		20,000	5,000	0,900		32,000	11,000
0,470		20,000	5,000	0,910		32,000	11,000
0,480		20,000	5,000	0,920		32,000	11,000
0,490		22,000	6,000	0,930		32,000	11,000
0,500		22,000	6,000	0,940		32,000	11,000
0,510		22,000	6,000	0,950		32,000	11,000
0,520		22,000	6,000	0,960		34,000	12,000
0,530		22,000	6,000	0,970		34,000	12,000
0,540		24,000	7,000	0,980		34,000	12,000
0,550		24,000	7,000	0,990		34,000	12,000
0,560		24,000	7,000	1,000		34,000	12,000
0,570		24,000	7,000	1,010		34,000	12,000
0,580		24,000	7,000	1,020		34,000	12,000
0,590		24,000	7,000	1,030		34,000	12,000
0,600		24,000	7,000	1,040		34,000	12,000
0,610		26,000	8,000	1,050		34,000	12,000
0,620		26,000	8,000	1,070		36,000	14,000
0,640		26,000	8,000	1,080		36,000	14,000
0,650		26,000	8,000	1,090		36,000	14,000

Wiertła kręte z chwytami walcowymi



d1		l1	l2
mm	inch	mm	mm
1,100		36,000	14,000
1,120		36,000	14,000
1,130		36,000	14,000
1,140		36,000	14,000
1,150		36,000	14,000
1,160		36,000	14,000
1,170		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,220		38,000	16,000
1,230		38,000	16,000
1,250		38,000	16,000
1,260		38,000	16,000
1,280		38,000	16,000
1,290		38,000	16,000
1,300		38,000	16,000
1,310		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,360		40,000	18,000
1,370		40,000	18,000
1,380		40,000	18,000
1,400		40,000	18,000
1,410		40,000	18,000
1,420		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,460		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000
1,530		43,000	20,000
1,540		43,000	20,000
1,550		43,000	20,000
1,560		43,000	20,000
1,570		43,000	20,000
1,580		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,650		43,000	20,000
1,660		43,000	20,000
1,670		43,000	20,000
1,680		43,000	20,000
1,700		43,000	20,000
1,710		46,000	22,000
1,720		46,000	22,000
1,730		46,000	22,000
1,740		46,000	22,000
1,750		46,000	22,000
1,760		46,000	22,000
1,780		46,000	22,000
1,790		46,000	22,000
1,800		46,000	22,000
1,810		46,000	22,000
1,820		46,000	22,000
1,830		46,000	22,000
1,840		46,000	22,000
1,850		46,000	22,000
1,860		46,000	22,000
1,900		46,000	22,000
1,910		49,000	24,000
1,930		49,000	24,000

d1		l1	l2
mm	inch	mm	mm
1,950		49,000	24,000
1,960		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,010		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,040		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,070		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,230		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,470		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,510		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,920		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,020		65,000	36,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,330		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,850		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,020		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,070		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,120		75,000	43,000
4,150		75,000	43,000
4,170		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,020		86,000	52,000
5,050		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,150		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,450		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,650		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000

d1		l1	l2
mm	inch	mm	mm
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,450		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,760		109,000	69,000
6,800		109,000	69,000
6,850		109,000	69,000
6,900		109,000	69,000
6,950		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,050		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,250		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,050		117,000	75,000
8,100		117,000	75,000
8,150		117,000	75,000
8,200		117,000	75,000
8,250		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,250		125,000	81,000
9,300		125,000	81,000



d1		l1	l2
mm	inch	mm	mm
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,750		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,050		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,750		142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,250		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,250		151,000	101,000

d1		l1	l2
mm	inch	mm	mm
12,300	31/64	151,000	101,000
12,400		151,000	101,000
12,500		151,000	101,000
12,600		151,000	101,000
12,700	1/2	151,000	101,000
12,750		151,000	101,000
12,800		151,000	101,000
12,900		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,200		151,000	101,000
13,300		160,000	108,000
13,490	17/32	160,000	108,000
13,500		160,000	108,000
13,600		160,000	108,000
13,700		160,000	108,000
13,750		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,900		160,000	108,000
14,000		160,000	108,000
14,100		169,000	114,000
14,200		169,000	114,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,250		178,000	120,000
15,480	39/64	178,000	120,000
15,500		178,000	120,000
15,750		178,000	120,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
16,670	21/32	184,000	125,000
17,000		184,000	125,000
17,460	11/16	191,000	130,000
17,500		191,000	130,000
18,000		191,000	130,000
18,500		198,000	135,000
19,000		198,000	135,000
19,500		205,000	140,000
20,000		205,000	140,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



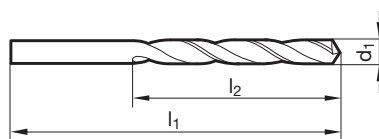
P ●	Korekcja ścina $\geq \varnothing 1,200$ • geometria zataczana • kobaltowa stal szybkołnąca • zwiększona odporność na zużycie
M ○	
K ●	
N ○	stale stopowe i niestopowe • żeliwa $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
S ○	
H ○	

GÜHRING NAVIGATOR

Param. skr. na str. 782

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSCO
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

2997

d1		l1	l2
mm	inch	mm	mm
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,500		57,000	30,000
2,700		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,800		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,200		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000



Wiertła kręte

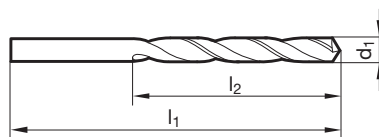


- P** • Korekcja ścina $\geq \varnothing 2,370$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** ○
- K** •
- N** ○ stale stopowe i niestopowe • żeliwa $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 780

Materiał narzędzia	HSCO
Powierzchnia	$\geq \frac{0}{6,00}$
Kierunek skrawania	



Wiertła kręte z chwytem walcowym

Nr artykułu **308**

d1		l1	l2
mm	inch	mm	mm
0,360		19,000	4,000
0,390		20,000	5,000
0,500		22,000	6,000
0,560		24,000	7,000
0,590		24,000	7,000
0,600		24,000	7,000
0,620		26,000	8,000
0,630		26,000	8,000
0,650		26,000	8,000
0,750		28,000	9,000
0,780		30,000	10,000
0,800		30,000	10,000
0,820		30,000	10,000
0,900		32,000	11,000
0,910		32,000	11,000
0,920		32,000	11,000
0,930		32,000	11,000
0,950		32,000	11,000
0,980		34,000	12,000
1,000		34,000	12,000
1,020		34,000	12,000
1,030		34,000	12,000
1,050		34,000	12,000
1,080		36,000	14,000
1,100		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,210		38,000	16,000
1,230		38,000	16,000
1,320		38,000	16,000
1,330		40,000	18,000
1,350		40,000	18,000
1,400		40,000	18,000
1,430		40,000	18,000
1,450		40,000	18,000
1,470		40,000	18,000
1,480		40,000	18,000
1,490		40,000	18,000
1,510		43,000	20,000
1,520		43,000	20,000

d1		l1	l2
mm	inch	mm	mm
1,600		43,000	20,000
1,610		43,000	20,000
1,620		43,000	20,000
1,700		43,000	20,000
1,720		46,000	22,000
1,750		46,000	22,000
1,780		46,000	22,000
1,800		46,000	22,000
1,830		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,520		57,000	30,000
2,530		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000



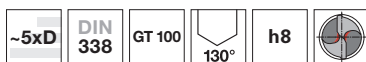
Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,420		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,530		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,830		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,570		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,530		101,000	63,000
6,700		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	109,000	69,000
7,040		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,040		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,260		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,050		151,000	101,000
12,250		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,750		160,000	108,000
14,300		169,000	114,000
14,500		169,000	114,000
16,200		184,000	125,000
16,500		184,000	125,000
18,000		191,000	130,000
18,500		198,000	135,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M** ○
- K** •
- N** • stale stopowe/niestopowe • materiały odlewane $R_m > 800 \text{ N/mm}^2$
- S** • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- H**

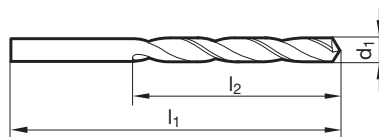
Materiał narzędzia **HSCO**

Powierzchnia $\text{Ra} > 0,2,36$

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Wiertła kręte z chwytem walcowym

Nr artykułu **622**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,050		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,130		36,000	14,000
1,150		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,250		38,000	16,000
1,270		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,430		40,000	18,000
1,440		40,000	18,000
1,450		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,550		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,780		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,920		49,000	24,000
1,930		49,000	24,000
1,950		49,000	24,000
1,960		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,050		49,000	24,000
2,060		49,000	24,000

d1		l1	l2
mm	inch	mm	mm
2,080		49,000	24,000
2,100		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,420		57,000	30,000
2,440		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000
2,640		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,020		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,550		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,050		101,000	63,000
6,100		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,650		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,450		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,750		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,250		133,000	87,000
10,260		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
10,900		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,300		142,000	94,000
11,400		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,700		142,000	94,000
11,800		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
16,000		178,000	120,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M** ○
- K** •
- N** ○ stale stopowe i niestopowe • materiały odlewane $R_m > 800 \text{ N/mm}^2$
- S** ○ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- H** ○

Materiał narzędzia **HSCO**

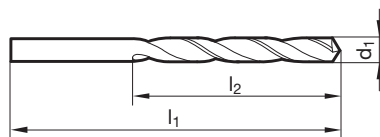
Powierzchnia **S**

Kierunek skrawania **R**

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 782



Nr artykułu **658**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,300		53,000	27,000
1,020		34,000	12,000	2,350		53,000	27,000
1,050		34,000	12,000	2,370		57,000	30,000
1,070		36,000	14,000	2,380	3/32	57,000	30,000
1,100		36,000	14,000	2,400		57,000	30,000
1,130		36,000	14,000	2,440		57,000	30,000
1,150		36,000	14,000	2,450		57,000	30,000
1,190	3/64	38,000	16,000	2,490		57,000	30,000
1,200		38,000	16,000	2,500		57,000	30,000
1,300		38,000	16,000	2,530		57,000	30,000
1,320		38,000	16,000	2,550		57,000	30,000
1,350		40,000	18,000	2,580		57,000	30,000
1,400		40,000	18,000	2,600		57,000	30,000
1,430		40,000	18,000	2,640		57,000	30,000
1,450		40,000	18,000	2,650		57,000	30,000
1,500		40,000	18,000	2,700		61,000	33,000
1,510		43,000	20,000	2,750		61,000	33,000
1,550		43,000	20,000	2,780	7/64	61,000	33,000
1,590	1/16	43,000	20,000	2,790		61,000	33,000
1,600		43,000	20,000	2,800		61,000	33,000
1,610		43,000	20,000	2,820		61,000	33,000
1,630		43,000	20,000	2,870		61,000	33,000
1,650		43,000	20,000	2,900		61,000	33,000
1,700		43,000	20,000	2,950		61,000	33,000
1,780		46,000	22,000	3,000		61,000	33,000
1,800		46,000	22,000	3,050		65,000	36,000
1,850		46,000	22,000	3,100		65,000	36,000
1,900		46,000	22,000	3,170	1/8	65,000	36,000
1,930		49,000	24,000	3,200		65,000	36,000
1,950		49,000	24,000	3,250		65,000	36,000
1,980	5/64	49,000	24,000	3,260		65,000	36,000
1,990		49,000	24,000	3,300		65,000	36,000
2,000		49,000	24,000	3,400		70,000	39,000
2,050		49,000	24,000	3,450		70,000	39,000
2,060		49,000	24,000	3,500		70,000	39,000
2,080		49,000	24,000	3,570	9/64	70,000	39,000
2,100		49,000	24,000	3,600		70,000	39,000
2,150		53,000	27,000	3,660		70,000	39,000
2,180		53,000	27,000	3,700		70,000	39,000
2,200		53,000	27,000	3,750		70,000	39,000
2,250		53,000	27,000	3,800		75,000	43,000
2,260		53,000	27,000	3,860		75,000	43,000



d1		l1	l2
mm	inch	mm	mm
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,030		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,850		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,750		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,700		142,000	94,000
11,800		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,500		151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000
15,000		169,000	114,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybkotnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M** ○
- K** ●
- N** ● stale stopowe i niestopowe • materiały odlewane $R_m > 800 \text{ N/mm}^2$
- S** ● stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- H** ○

Materiał narzędzia **HSCO**

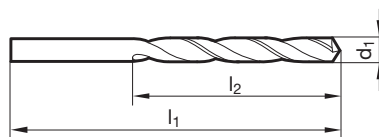
Powierzchnia **F**

Kierunek skrawania **R**



GÜHRINGNAVIGATOR

Param. skr. na str. 782



Nr artykułu

2459

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	5,200		86,000	52,000
1,100		36,000	14,000	5,300		86,000	52,000
1,200		38,000	16,000	5,400		93,000	57,000
1,300		38,000	16,000	5,500		93,000	57,000
1,400		40,000	18,000	5,600		93,000	57,000
1,500		40,000	18,000	5,700		93,000	57,000
1,600		43,000	20,000	5,800		93,000	57,000
1,700		43,000	20,000	5,900		93,000	57,000
1,800		46,000	22,000	6,000		93,000	57,000
1,900		46,000	22,000	6,100		101,000	63,000
2,000		49,000	24,000	6,200		101,000	63,000
2,100		49,000	24,000	6,300		101,000	63,000
2,200		53,000	27,000	6,400		101,000	63,000
2,300		53,000	27,000	6,500		101,000	63,000
2,400		57,000	30,000	6,600		101,000	63,000
2,500		57,000	30,000	6,700		101,000	63,000
2,600		57,000	30,000	6,800		109,000	69,000
2,700		61,000	33,000	6,900		109,000	69,000
2,800		61,000	33,000	7,000		109,000	69,000
2,900		61,000	33,000	7,100		109,000	69,000
3,000		61,000	33,000	7,300		109,000	69,000
3,100		65,000	36,000	7,400		109,000	69,000
3,200		65,000	36,000	7,500		109,000	69,000
3,300		65,000	36,000	7,700		117,000	75,000
3,400		70,000	39,000	7,800		117,000	75,000
3,500		70,000	39,000	7,900		117,000	75,000
3,600		70,000	39,000	8,000		117,000	75,000
3,700		70,000	39,000	8,100		117,000	75,000
3,800		75,000	43,000	8,200		117,000	75,000
3,900		75,000	43,000	8,300		117,000	75,000
4,000		75,000	43,000	8,400		117,000	75,000
4,100		75,000	43,000	8,500		117,000	75,000
4,200		75,000	43,000	8,600		125,000	81,000
4,300		80,000	47,000	8,700		125,000	81,000
4,400		80,000	47,000	8,800		125,000	81,000
4,500		80,000	47,000	9,000		125,000	81,000
4,600		80,000	47,000	9,200		125,000	81,000
4,700		80,000	47,000	9,400		125,000	81,000
4,800		86,000	52,000	9,500		125,000	81,000
4,900		86,000	52,000	9,700		133,000	87,000
5,000		86,000	52,000	9,800		133,000	87,000
5,100		86,000	52,000	9,900		133,000	87,000

Wiertła kręte z chwytami walcowymi

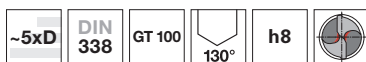


d1		l1	l2
mm	inch	mm	mm
10,000		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,500		142,000	94,000
12,000		151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** ○
- N** stale stopowe i niestopowe • materiały odlewane $R_m > 800 \text{ N/mm}^2$
- S** • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- H**

Materiał narzędzia **HSCO**

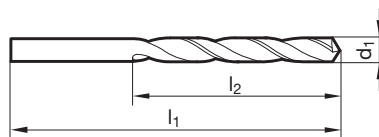
Powierzchnia

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 782



Nr artykułu

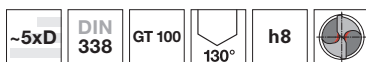
1221

d1		l1	l2
mm	inch	mm	mm
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,200		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,700		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,400		109,000	69,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,400		133,000	87,000
10,700		142,000	94,000
11,200		142,000	94,000
11,910	15/32	151,000	101,000



Wiertła kręte



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • kobaltowa stal szybkotnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M** ○
- K** ●
- N** ○ stale stopowe i niestopowe • materiały odlewane $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** ○
- H** ○

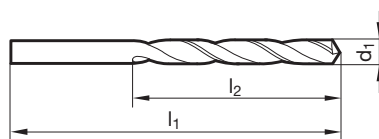
Materiał narzędzia **HSCO**

Powierzchnia **A**

Kierunek skrawania **R**

GÜHRINGNAVIGATOR

Param. skr. na str. 782



Wiertła kręte z chwytem walcowym

Nr artykułu **1223**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		61,000	33,000	6,300		101,000	63,000
3,050		65,000	36,000	6,350	1/4	101,000	63,000
3,100		65,000	36,000	6,400		101,000	63,000
3,170	1/8	65,000	36,000	6,500		101,000	63,000
3,200		65,000	36,000	6,600		101,000	63,000
3,300		65,000	36,000	6,700		101,000	63,000
3,500		70,000	39,000	6,900		109,000	69,000
3,600		70,000	39,000	7,000		109,000	69,000
3,700		70,000	39,000	7,100		109,000	69,000
3,800		75,000	43,000	7,200		109,000	69,000
3,860		75,000	43,000	7,300		109,000	69,000
3,900		75,000	43,000	7,400		109,000	69,000
3,970	5/32	75,000	43,000	7,500		109,000	69,000
4,000		75,000	43,000	7,600		117,000	75,000
4,040		75,000	43,000	7,700		117,000	75,000
4,100		75,000	43,000	7,800		117,000	75,000
4,200		75,000	43,000	7,900		117,000	75,000
4,300		80,000	47,000	7,940	5/16	117,000	75,000
4,370	11/64	80,000	47,000	8,000		117,000	75,000
4,400		80,000	47,000	8,100		117,000	75,000
4,500		80,000	47,000	8,200		117,000	75,000
4,600		80,000	47,000	8,300		117,000	75,000
4,700		80,000	47,000	8,400		117,000	75,000
4,760	3/16	86,000	52,000	8,500		117,000	75,000
4,800		86,000	52,000	8,600		125,000	81,000
4,900		86,000	52,000	8,700		125,000	81,000
4,920		86,000	52,000	8,730	11/32	125,000	81,000
4,980		86,000	52,000	8,800		125,000	81,000
5,000		86,000	52,000	9,000		125,000	81,000
5,100		86,000	52,000	9,130	23/64	125,000	81,000
5,160	13/64	86,000	52,000	9,200		125,000	81,000
5,200		86,000	52,000	9,500		125,000	81,000
5,300		86,000	52,000	9,520	3/8	133,000	87,000
5,400		93,000	57,000	9,530		133,000	87,000
5,500		93,000	57,000	9,800		133,000	87,000
5,600		93,000	57,000	9,900		133,000	87,000
5,700		93,000	57,000	9,920	25/64	133,000	87,000
5,800		93,000	57,000	10,000		133,000	87,000
5,900		93,000	57,000	10,100		133,000	87,000
5,950	15/64	93,000	57,000	10,200		133,000	87,000
6,000		93,000	57,000	10,300		133,000	87,000
6,100		101,000	63,000	10,400		133,000	87,000



d1		l1	l2
mm	inch	mm	mm
10,500		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,200		142,000	94,000
11,500		142,000	94,000
11,700		142,000	94,000
12,000		151,000	101,000



Wiertła kręte

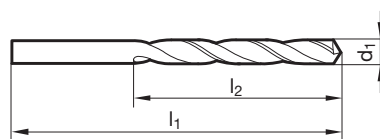


- P** ○ Korekcja ścina $\geq \varnothing 0,970$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaro-
odporne • wysokowytrzymałe / krótkowłórowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • Hastelloy, Inconel, Nimonic
- H** ●

GÜHRINGNAVIGATOR

Param. skr. na str. 780

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ



Wiertła kręte z
chwytami walcowymi

Nr artykułu **605**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,200		19,000	2,500	1,040		34,000	12,000
0,300		19,000	3,000	1,050		34,000	12,000
0,380		19,000	4,000	1,070		36,000	14,000
0,400	1/64	20,000	5,000	1,080		36,000	14,000
0,440		20,000	5,000	1,090		36,000	14,000
0,450		20,000	5,000	1,100		36,000	14,000
0,500		22,000	6,000	1,140		36,000	14,000
0,510		22,000	6,000	1,150		36,000	14,000
0,530		22,000	6,000	1,160		36,000	14,000
0,550		24,000	7,000	1,180		36,000	14,000
0,570		24,000	7,000	1,190	3/64	38,000	16,000
0,580		24,000	7,000	1,200		38,000	16,000
0,600		24,000	7,000	1,210		38,000	16,000
0,610		26,000	8,000	1,220		38,000	16,000
0,640		26,000	8,000	1,230		38,000	16,000
0,650		26,000	8,000	1,250		38,000	16,000
0,700		28,000	9,000	1,290		38,000	16,000
0,710		28,000	9,000	1,300		38,000	16,000
0,720		28,000	9,000	1,320		38,000	16,000
0,750		28,000	9,000	1,350		40,000	18,000
0,760		30,000	10,000	1,400		40,000	18,000
0,790	1/32	30,000	10,000	1,450		40,000	18,000
0,800		30,000	10,000	1,460		40,000	18,000
0,810		30,000	10,000	1,500		40,000	18,000
0,820		30,000	10,000	1,510		43,000	20,000
0,830		30,000	10,000	1,520		43,000	20,000
0,840		30,000	10,000	1,530		43,000	20,000
0,850		30,000	10,000	1,550		43,000	20,000
0,860		32,000	11,000	1,570		43,000	20,000
0,870		32,000	11,000	1,590	1/16	43,000	20,000
0,880		32,000	11,000	1,600		43,000	20,000
0,887		32,000	11,000	1,610		43,000	20,000
0,890		32,000	11,000	1,620		43,000	20,000
0,900		32,000	11,000	1,650		43,000	20,000
0,910		32,000	11,000	1,680		43,000	20,000
0,920		32,000	11,000	1,700		43,000	20,000
0,940		32,000	11,000	1,730		46,000	22,000
0,950		32,000	11,000	1,750		46,000	22,000
0,980		34,000	12,000	1,780		46,000	22,000
0,990		34,000	12,000	1,800		46,000	22,000
1,000		34,000	12,000	1,820		46,000	22,000
1,020		34,000	12,000	1,850		46,000	22,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
1,900		46,000	22,000
1,930		49,000	24,000
1,950		49,000	24,000
1,970		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,020		49,000	24,000
2,030		49,000	24,000
2,050		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,120		49,000	24,000
2,150		53,000	27,000
2,180		53,000	27,000
2,200		53,000	27,000
2,250		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,320		53,000	27,000
2,350		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,450		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,550		57,000	30,000
2,600		57,000	30,000
2,650		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,810		61,000	33,000
2,820		61,000	33,000
2,850		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,030		65,000	36,000
3,050		65,000	36,000
3,100		65,000	36,000
3,150		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,350		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,750		70,000	39,000
3,790		75,000	43,000
3,800		75,000	43,000
3,900		75,000	43,000
3,950		75,000	43,000
3,970	5/32	75,000	43,000
3,980		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,050		75,000	43,000

d1		l1	l2
mm	inch	mm	mm
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,450		80,000	47,000
4,500		80,000	47,000
4,570		80,000	47,000
4,600		80,000	47,000
4,650		80,000	47,000
4,700		80,000	47,000
4,750		80,000	47,000
4,760	3/16	86,000	52,000
4,790		86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,250		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,550		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,750		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,050		101,000	63,000
6,080		101,000	63,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000



d1		l1	l2
mm	inch	mm	mm
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,550		125,000	81,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,700		142,000	94,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,100		142,000	94,000
11,110	7/16	142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,200		142,000	94,000
11,300		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,600		142,000	94,000
11,700		142,000	94,000
11,750		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,500		160,000	108,000
13,800		160,000	108,000
13,890	35/64	160,000	108,000
13,970		160,000	108,000
14,000		160,000	108,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
14,680	37/64	169,000	114,000
15,000		169,000	114,000
15,500		178,000	120,000
16,000		178,000	120,000
16,500		184,000	125,000
17,000		184,000	125,000
17,500		191,000	130,000
18,000		191,000	130,000
19,000		198,000	135,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte

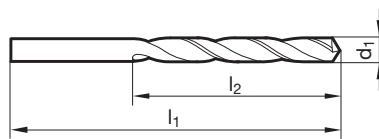


- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie
- M** •
- K** •
- N** Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaro-
odporne • wysokowytrzymałe / krótkowiórowe stale $R_m > 900 \text{ N/mm}^2$
- S** • Hastelloy, Inconel, Nimonic
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 782

Materiał narzędzia	HSCO
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

657

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		22,000	6,000	1,900		46,000	22,000
0,530		22,000	6,000	1,950		49,000	24,000
0,600		24,000	7,000	1,980	5/64	49,000	24,000
0,650		26,000	8,000	2,000		49,000	24,000
0,700		28,000	9,000	2,050		49,000	24,000
0,750		28,000	9,000	2,100		49,000	24,000
0,800		30,000	10,000	2,150		53,000	27,000
0,850		30,000	10,000	2,200		53,000	27,000
0,880		32,000	11,000	2,250		53,000	27,000
0,900		32,000	11,000	2,260		53,000	27,000
0,920		32,000	11,000	2,300		53,000	27,000
0,940		32,000	11,000	2,350		53,000	27,000
0,950		32,000	11,000	2,380	3/32	57,000	30,000
1,000		34,000	12,000	2,400		57,000	30,000
1,050		34,000	12,000	2,440		57,000	30,000
1,100		36,000	14,000	2,500		57,000	30,000
1,150		36,000	14,000	2,530		57,000	30,000
1,180		36,000	14,000	2,550		57,000	30,000
1,190	3/64	38,000	16,000	2,600		57,000	30,000
1,200		38,000	16,000	2,700		61,000	33,000
1,210		38,000	16,000	2,750		61,000	33,000
1,250		38,000	16,000	2,780	7/64	61,000	33,000
1,300		38,000	16,000	2,800		61,000	33,000
1,320		38,000	16,000	2,820		61,000	33,000
1,350		40,000	18,000	2,900		61,000	33,000
1,390		40,000	18,000	2,950		61,000	33,000
1,400		40,000	18,000	3,000		61,000	33,000
1,450		40,000	18,000	3,050		65,000	36,000
1,500		40,000	18,000	3,100		65,000	36,000
1,510		43,000	20,000	3,150		65,000	36,000
1,520		43,000	20,000	3,170	1/8	65,000	36,000
1,550		43,000	20,000	3,200		65,000	36,000
1,590	1/16	43,000	20,000	3,250		65,000	36,000
1,600		43,000	20,000	3,260		65,000	36,000
1,610		43,000	20,000	3,300		65,000	36,000
1,620		43,000	20,000	3,350		65,000	36,000
1,650		43,000	20,000	3,400		70,000	39,000
1,700		43,000	20,000	3,500		70,000	39,000
1,750		46,000	22,000	3,570	9/64	70,000	39,000
1,780		46,000	22,000	3,600		70,000	39,000
1,800		46,000	22,000	3,650		70,000	39,000
1,850		46,000	22,000	3,700		70,000	39,000

Wiertła kręte z chwytami walcowymi



d1		l1	l2
mm	inch	mm	mm
3,750		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,050		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,350		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,550		125,000	81,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,100		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
14,500		169,000	114,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaroodporne • wysokowytrzymałe / krótkowłórowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • Hastelloy, Inconel, Nimonic
- H** ●

Materiał narzędzia **HSC0**

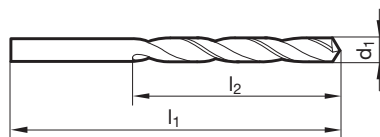
Powierzchnia **F**

Kierunek skrawania **R**

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 782



Nr artykułu **2458**

d1		l1	l2
mm	inch	mm	mm
0,400	1/64	20,000	5,000
0,810		30,000	10,000
1,000		34,000	12,000
1,100		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,530		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,650		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,050		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,750		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000

d1		l1	l2
mm	inch	mm	mm
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,150		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,050		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000



d1		l1	l2
mm	inch	mm	mm
6,900		109,000	69,000
7,000		109,000	69,000
7,140	9/32	109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
9,000		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
9,800		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,400		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,490	17/32	160,000	108,000
14,000		160,000	108,000
14,290	9/16	169,000	114,000
14,500		169,000	114,000
15,000		169,000	114,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaroodporne • wysokowytrzymałe / krótkowłórowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • Hastelloy, Inconel, Nimonic
- H** ●

Materiał narzędzia **HSCO**

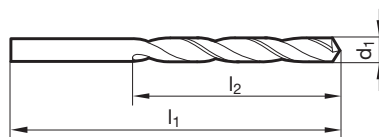
Powierzchnia ○

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Nr artykułu **608**

d1		l1	l2
mm	inch	mm	mm
1,300		38,000	16,000
1,320		38,000	16,000
1,350		40,000	18,000
1,400		40,000	18,000
1,600		43,000	20,000
1,620		43,000	20,000
1,640		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,950		49,000	24,000
2,000		49,000	24,000
2,150		53,000	27,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,750		61,000	33,000
2,800		61,000	33,000
3,000		61,000	33,000
3,300		65,000	36,000
3,320		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,550		70,000	39,000
3,600		70,000	39,000
3,650		70,000	39,000
3,700		70,000	39,000
3,900		75,000	43,000
4,000		75,000	43,000
4,250		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000

d1		l1	l2
mm	inch	mm	mm
4,920		86,000	52,000
5,000		86,000	52,000
5,200		86,000	52,000
5,400		93,000	57,000
5,450		93,000	57,000
5,580		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,300		101,000	63,000
6,600		101,000	63,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,100		117,000	75,000
8,400		117,000	75,000
8,750		125,000	81,000
8,800		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,500		125,000	81,000



Wiertła kręte

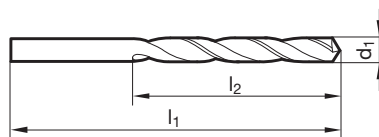


- P** ○ geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ○ stале nierdzewne austenityczne /kwaso-/żaro-odporne (V2A i V4A)
- S** ○
- H** ●

GÜHRING NAVIGATOR

Param. skr. na str. 780

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ



Wiertła kręte z chwytami walcowymi

Nr artykułu **1260**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	5,100		86,000	52,000
1,100		36,000	14,000	5,200		86,000	52,000
1,200		38,000	16,000	5,300		86,000	52,000
1,300		38,000	16,000	5,400		93,000	57,000
1,400		40,000	18,000	5,500		93,000	57,000
1,500		40,000	18,000	5,600		93,000	57,000
1,600		43,000	20,000	5,700		93,000	57,000
1,700		43,000	20,000	5,800		93,000	57,000
1,800		46,000	22,000	5,900		93,000	57,000
1,900		46,000	22,000	6,000		93,000	57,000
2,000		49,000	24,000	6,100		101,000	63,000
2,100		49,000	24,000	6,200		101,000	63,000
2,200		53,000	27,000	6,300		101,000	63,000
2,300		53,000	27,000	6,400		101,000	63,000
2,400		57,000	30,000	6,500		101,000	63,000
2,500		57,000	30,000	6,600		101,000	63,000
2,600		57,000	30,000	6,700		101,000	63,000
2,700		61,000	33,000	6,800		109,000	69,000
2,800		61,000	33,000	6,900		109,000	69,000
2,900		61,000	33,000	7,000		109,000	69,000
3,000		61,000	33,000	7,100		109,000	69,000
3,100		65,000	36,000	7,200		109,000	69,000
3,200		65,000	36,000	7,300		109,000	69,000
3,300		65,000	36,000	7,400		109,000	69,000
3,400		70,000	39,000	7,500		109,000	69,000
3,500		70,000	39,000	7,700		117,000	75,000
3,570	9/64	70,000	39,000	7,800		117,000	75,000
3,600		70,000	39,000	7,900		117,000	75,000
3,700		70,000	39,000	8,000		117,000	75,000
3,800		75,000	43,000	8,100		117,000	75,000
3,900		75,000	43,000	8,200		117,000	75,000
4,000		75,000	43,000	8,300		117,000	75,000
4,100		75,000	43,000	8,400		117,000	75,000
4,200		75,000	43,000	8,500		117,000	75,000
4,300		80,000	47,000	8,600		125,000	81,000
4,400		80,000	47,000	8,700		125,000	81,000
4,500		80,000	47,000	8,800		125,000	81,000
4,600		80,000	47,000	8,900		125,000	81,000
4,700		80,000	47,000	9,000		125,000	81,000
4,800		86,000	52,000	9,100		125,000	81,000
4,900		86,000	52,000	9,200		125,000	81,000
5,000		86,000	52,000	9,400		125,000	81,000



d1		l1	l2
mm	inch	mm	mm
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,500		133,000	87,000
10,600		133,000	87,000
10,800		142,000	94,000

d1		l1	l2
mm	inch	mm	mm
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,800		142,000	94,000
11,900		151,000	101,000
12,000		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte



- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • uniwersalne zastosowanie falistego oszlifowania • kobaltowa stal szybko tnąca
- M** ○ • zwiększona odporność na zużycie
- K** ○
- N** ○ stale - $R_m < 1000 \text{ N/mm}^2$ • stopy AISi
- S** ○
- H** ○

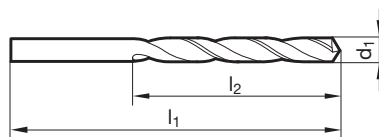
Materiał narzędzia **HSCO**

Powierzchnia

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 784



Wiertła kręte z chwytem walcowym

Nr artykułu **2047**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,100		36,000	14,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,200		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000

d1		l1	l2
mm	inch	mm	mm
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000



d1		l1	l2
mm	inch	mm	mm
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000
11,500		142,000	94,000
12,000		151,000	101,000

d1		l1	l2
mm	inch	mm	mm
12,500		151,000	101,000
13,000		151,000	101,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte AeroX



- P** • Korekcja ścina $\geq \varnothing 1,000$ • zoptymalizowane ostrzenie krzyżowe
- M** • stal HSCO z 8% zawartością kobaltu dla maksymalnej trwałości i wytrzymałości oraz wysokiej odporności na temperaturę
- K** •
- N** • • materiały odlewane • metale nieżelazne • Tytan i stopy tytanu
- S** •
- H** ○

Materiał narzędzia **M42**

Powierzchnia

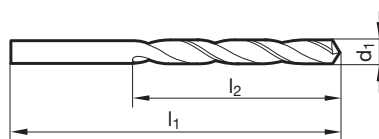
Kierunek skrawania



Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 784



Nr artykułu **1018**

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,100		36,000	14,000
1,200		38,000	16,000
1,300		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,700		43,000	20,000
1,800		46,000	22,000
1,900		46,000	22,000
1,980	5/64	49,000	24,000
2,000		49,000	24,000
2,100		49,000	24,000
2,200		53,000	27,000
2,300		53,000	27,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,500		57,000	30,000
2,600		57,000	30,000
2,700		61,000	33,000
2,780	7/64	61,000	33,000
2,800		61,000	33,000
2,900		61,000	33,000
3,000		61,000	33,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,250		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,700		70,000	39,000
3,800		75,000	43,000
3,900		75,000	43,000
3,970	5/32	75,000	43,000
4,000		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,300		80,000	47,000

d1		l1	l2
mm	inch	mm	mm
4,400		80,000	47,000
4,500		80,000	47,000
4,600		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,900		86,000	52,000
5,000		86,000	52,000
5,100		86,000	52,000
5,160	13/64	86,000	52,000
5,200		86,000	52,000
5,300		86,000	52,000
5,400		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,700		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,100		101,000	63,000
6,200		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,600		101,000	63,000
6,700		101,000	63,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000
7,600		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000



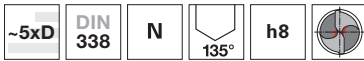
Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,100		133,000	87,000
10,200		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
10,800		142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,200		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
12,700	1/2	151,000	101,000
12,800		151,000	101,000
13,000		151,000	101,000



Wiertła kręte



- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • stale o wysokiej zawartości Co i Mo • szczególnie wysoka odporność ścieranie
- M** ○
- K** ○
- N** ● średnio-/wysokowytrzymałe stopy na bazie CrNi • Hastelloy, Inconel, Nimonic • stale nierdz./kwaso-/żaro-wytrzymałe • blachy odporne na ścieranie • stale, brązy - Rm < 1400 N/mm²
- S** ●
- H** ○

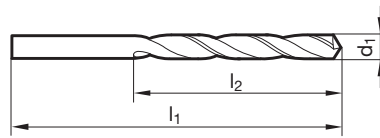
Materiał narzędzia **M42**

Powierzchnia ○

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Wiertła kręte z chwytem walcowym

Nr artykułu **1146**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,400	1/64	20,000	5,000	4,200		75,000	43,000
0,500		22,000	6,000	4,300		80,000	47,000
0,800		30,000	10,000	4,400		80,000	47,000
0,900		32,000	11,000	4,500		80,000	47,000
1,000		34,000	12,000	4,600		80,000	47,000
1,100		36,000	14,000	4,700		80,000	47,000
1,200		38,000	16,000	4,760	3/16	86,000	52,000
1,300		38,000	16,000	4,800		86,000	52,000
1,400		40,000	18,000	4,900		86,000	52,000
1,500		40,000	18,000	5,000		86,000	52,000
1,590	1/16	43,000	20,000	5,100		86,000	52,000
1,600		43,000	20,000	5,200		86,000	52,000
1,700		43,000	20,000	5,300		86,000	52,000
1,800		46,000	22,000	5,400		93,000	57,000
1,900		46,000	22,000	5,500		93,000	57,000
1,980	5/64	49,000	24,000	5,600		93,000	57,000
2,000		49,000	24,000	5,700		93,000	57,000
2,100		49,000	24,000	5,800		93,000	57,000
2,200		53,000	27,000	5,900		93,000	57,000
2,300		53,000	27,000	5,950	15/64	93,000	57,000
2,380	3/32	57,000	30,000	6,000		93,000	57,000
2,400		57,000	30,000	6,100		101,000	63,000
2,500		57,000	30,000	6,200		101,000	63,000
2,600		57,000	30,000	6,300		101,000	63,000
2,700		61,000	33,000	6,350	1/4	101,000	63,000
2,780	7/64	61,000	33,000	6,400		101,000	63,000
2,800		61,000	33,000	6,500		101,000	63,000
2,900		61,000	33,000	6,600		101,000	63,000
3,000		61,000	33,000	6,700		101,000	63,000
3,100		65,000	36,000	6,750	17/64	109,000	69,000
3,170	1/8	65,000	36,000	6,800		109,000	69,000
3,200		65,000	36,000	6,900		109,000	69,000
3,300		65,000	36,000	7,000		109,000	69,000
3,400		70,000	39,000	7,100		109,000	69,000
3,500		70,000	39,000	7,200		109,000	69,000
3,600		70,000	39,000	7,300		109,000	69,000
3,700		70,000	39,000	7,400		109,000	69,000
3,800		75,000	43,000	7,500		109,000	69,000
3,900		75,000	43,000	7,540	19/64	117,000	75,000
3,970	5/32	75,000	43,000	7,600		117,000	75,000
4,000		75,000	43,000	7,700		117,000	75,000
4,100		75,000	43,000	7,800		117,000	75,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
7,900		117,000	75,000
8,000		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
11,000		142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
13,100	33/64	151,000	101,000
13,500		160,000	108,000
14,000		160,000	108,000
15,000		169,000	114,000
15,870	5/8	178,000	120,000
16,000		178,000	120,000



Wiertła kręte



- P** • Korekcja ścina $\geq \varnothing 1,000$ • zoptymalizowane ostrzenie krzyżowe • stal HSCO z 8% zawartością kobaltu • szczególnie wysoka odporność ścieranie
- M** •
- K** •
- N** ○ średnio-/wysokowytrzymałe stopy na bazie CrNi • Hastelloy, Inconel, Nimonic • stале nierdz./kwaso-/żaro-wytrzymałe • blachy odporne na ścieranie • stале, brązy - Rm < 1400 N/mm²
- S** •
- H**

Materiał narzędzia **M42**

Powierzchnia **F**

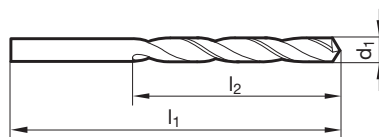
Kierunek skrawania **R**



Wiertła kręte z chwytem walcowym

GÜHRINGNAVIGATOR

Param. skr. na str. 784



Nr artykułu **1199**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	4,760	3/16	86,000	52,000
1,100		36,000	14,000	4,800		86,000	52,000
1,200		38,000	16,000	4,900		86,000	52,000
1,300		38,000	16,000	5,000		86,000	52,000
1,400		40,000	18,000	5,100		86,000	52,000
1,500		40,000	18,000	5,160	13/64	86,000	52,000
1,590	1/16	43,000	20,000	5,200		86,000	52,000
1,600		43,000	20,000	5,300		86,000	52,000
1,700		43,000	20,000	5,400		93,000	57,000
1,800		46,000	22,000	5,500		93,000	57,000
1,900		46,000	22,000	5,600		93,000	57,000
2,000		49,000	24,000	5,700		93,000	57,000
2,100		49,000	24,000	5,800		93,000	57,000
2,200		53,000	27,000	5,900		93,000	57,000
2,300		53,000	27,000	5,950	15/64	93,000	57,000
2,380	3/32	57,000	30,000	6,000		93,000	57,000
2,400		57,000	30,000	6,100		101,000	63,000
2,500		57,000	30,000	6,200		101,000	63,000
2,600		57,000	30,000	6,300		101,000	63,000
2,700		61,000	33,000	6,350	1/4	101,000	63,000
2,800		61,000	33,000	6,400		101,000	63,000
2,900		61,000	33,000	6,500		101,000	63,000
3,000		61,000	33,000	6,600		101,000	63,000
3,100		65,000	36,000	6,700		101,000	63,000
3,170	1/8	65,000	36,000	6,750	17/64	109,000	69,000
3,200		65,000	36,000	6,800		109,000	69,000
3,300		65,000	36,000	6,900		109,000	69,000
3,400		70,000	39,000	7,000		109,000	69,000
3,500		70,000	39,000	7,100		109,000	69,000
3,600		70,000	39,000	7,200		109,000	69,000
3,700		70,000	39,000	7,300		109,000	69,000
3,800		75,000	43,000	7,400		109,000	69,000
3,900		75,000	43,000	7,500		109,000	69,000
3,970	5/32	75,000	43,000	7,600		117,000	75,000
4,000		75,000	43,000	7,700		117,000	75,000
4,100		75,000	43,000	7,800		117,000	75,000
4,200		75,000	43,000	7,900		117,000	75,000
4,300		80,000	47,000	8,000		117,000	75,000
4,400		80,000	47,000	8,100		117,000	75,000
4,500		80,000	47,000	8,200		117,000	75,000
4,600		80,000	47,000	8,300		117,000	75,000
4,700		80,000	47,000	8,400		117,000	75,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
8,500		117,000	75,000
8,600		125,000	81,000
8,700		125,000	81,000
8,730		125,000	81,000
8,800		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,100		125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000

d1		l1	l2
mm	inch	mm	mm
10,100		133,000	87,000
10,200		133,000	87,000
10,500		133,000	87,000
10,800		142,000	94,000
11,000		142,000	94,000
11,200		142,000	94,000
11,500		142,000	94,000
11,800		142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,200		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000
15,000		169,000	114,000
16,000		178,000	120,000



Wiertła kręte



Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania



P ○ Korekcja ścina $\geq \varnothing 2,060$ • geom. ścinowa • główna krawędź skrawająca - prosta

M ○

K ○

N ● stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • żeliwa szare • brąz, mosiądz • aluminium i stopy

S ○ Al • magnez i stopy magnezu • tworzywa sztuczne, w tym również

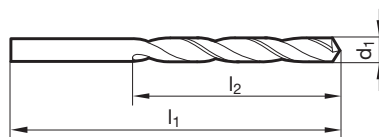
H wzmocnione włóknami

GÜHRINGNAVIGATOR

Param. skr. na str. 784



Wiertła kręte z
chwytami walcowym



Nr artykułu

732

d1		l1	l2
mm	inch	mm	mm
1,000		34,000	12,000
1,020		34,000	12,000
1,040		34,000	12,000
1,070		36,000	14,000
1,090		36,000	14,000
1,100		36,000	14,000
1,180		36,000	14,000
1,190	3/64	38,000	16,000
1,200		38,000	16,000
1,300		38,000	16,000
1,320		38,000	16,000
1,400		40,000	18,000
1,500		40,000	18,000
1,510		43,000	20,000
1,590	1/16	43,000	20,000
1,600		43,000	20,000
1,610		43,000	20,000
1,700		43,000	20,000
1,780		46,000	22,000
1,800		46,000	22,000
1,850		46,000	22,000
1,900		46,000	22,000
1,930		49,000	24,000
1,980	5/64	49,000	24,000
1,990		49,000	24,000
2,000		49,000	24,000
2,060		49,000	24,000
2,080		49,000	24,000
2,100		49,000	24,000
2,180		53,000	27,000
2,200		53,000	27,000
2,260		53,000	27,000
2,300		53,000	27,000
2,370		57,000	30,000
2,380	3/32	57,000	30,000
2,400		57,000	30,000
2,440		57,000	30,000
2,490		57,000	30,000
2,500		57,000	30,000
2,530		57,000	30,000
2,580		57,000	30,000
2,600		57,000	30,000

d1		l1	l2
mm	inch	mm	mm
2,640		57,000	30,000
2,700		61,000	33,000
2,710		61,000	33,000
2,780	7/64	61,000	33,000
2,790		61,000	33,000
2,800		61,000	33,000
2,820		61,000	33,000
2,870		61,000	33,000
2,900		61,000	33,000
2,950		61,000	33,000
3,000		61,000	33,000
3,050		65,000	36,000
3,100		65,000	36,000
3,170	1/8	65,000	36,000
3,200		65,000	36,000
3,260		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,450		70,000	39,000
3,500		70,000	39,000
3,570	9/64	70,000	39,000
3,600		70,000	39,000
3,660		70,000	39,000
3,700		70,000	39,000
3,730		70,000	39,000
3,800		75,000	43,000
3,860		75,000	43,000
3,900		75,000	43,000
3,910		75,000	43,000
3,970	5/32	75,000	43,000
3,990		75,000	43,000
4,000		75,000	43,000
4,040		75,000	43,000
4,090		75,000	43,000
4,100		75,000	43,000
4,200		75,000	43,000
4,220		75,000	43,000
4,300		80,000	47,000
4,370	11/64	80,000	47,000
4,390		80,000	47,000
4,400		80,000	47,000
4,500		80,000	47,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,200		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,700	1/2	151,000	101,000



Wiertła kręte



Materiał narzędzia **Węglik mono.**

Powierzchnia **F**

Kierunek skrawania **R**

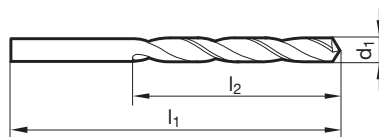
- P** ○ Korekcja ścina $\geq \varnothing 2,060$ • geom. ścinowa • główna krawędź skrawająca - prosta
- M** ○
- K** ○
- N** ● stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • materiały odlewane • mosiądże • stopy Al z wysoką zawartością Si • magnez i stopy magnezu • tworzywa sztuczne, w tym również wzmacniane włóknami
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 784



Wiertła kręte z chwytym walcowym



Nr artykułu **2464**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		34,000	12,000	2,640		57,000	30,000
1,020		34,000	12,000	2,700		61,000	33,000
1,040		34,000	12,000	2,710		61,000	33,000
1,070		36,000	14,000	2,780	7/64	61,000	33,000
1,090		36,000	14,000	2,790		61,000	33,000
1,100		36,000	14,000	2,800		61,000	33,000
1,180		36,000	14,000	2,820		61,000	33,000
1,190	3/64	38,000	16,000	2,870		61,000	33,000
1,200		38,000	16,000	2,900		61,000	33,000
1,300		38,000	16,000	2,950		61,000	33,000
1,320		38,000	16,000	3,000		61,000	33,000
1,400		40,000	18,000	3,050		65,000	36,000
1,500		40,000	18,000	3,100		65,000	36,000
1,510		43,000	20,000	3,170	1/8	65,000	36,000
1,590	1/16	43,000	20,000	3,200		65,000	36,000
1,600		43,000	20,000	3,260		65,000	36,000
1,610		43,000	20,000	3,300		65,000	36,000
1,700		43,000	20,000	3,400		70,000	39,000
1,780		46,000	22,000	3,450		70,000	39,000
1,800		46,000	22,000	3,500		70,000	39,000
1,850		46,000	22,000	3,570	9/64	70,000	39,000
1,900		46,000	22,000	3,600		70,000	39,000
1,930		49,000	24,000	3,660		70,000	39,000
1,980	5/64	49,000	24,000	3,700		70,000	39,000
1,990		49,000	24,000	3,730		70,000	39,000
2,000		49,000	24,000	3,800		75,000	43,000
2,060		49,000	24,000	3,860		75,000	43,000
2,080		49,000	24,000	3,900		75,000	43,000
2,100		49,000	24,000	3,910		75,000	43,000
2,180		53,000	27,000	3,970	5/32	75,000	43,000
2,200		53,000	27,000	3,990		75,000	43,000
2,260		53,000	27,000	4,000		75,000	43,000
2,300		53,000	27,000	4,040		75,000	43,000
2,370		57,000	30,000	4,090		75,000	43,000
2,380	3/32	57,000	30,000	4,100		75,000	43,000
2,400		57,000	30,000	4,200		75,000	43,000
2,440		57,000	30,000	4,220		75,000	43,000
2,490		57,000	30,000	4,300		80,000	47,000
2,500		57,000	30,000	4,370	11/64	80,000	47,000
2,530		57,000	30,000	4,390		80,000	47,000
2,580		57,000	30,000	4,400		80,000	47,000
2,600		57,000	30,000	4,500		80,000	47,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,570		80,000	47,000
4,600		80,000	47,000
4,620		80,000	47,000
4,700		80,000	47,000
4,760	3/16	86,000	52,000
4,800		86,000	52,000
4,850		86,000	52,000
4,900		86,000	52,000
4,920		86,000	52,000
4,980		86,000	52,000
5,000		86,000	52,000
5,060		86,000	52,000
5,100		86,000	52,000
5,110		86,000	52,000
5,160	13/64	86,000	52,000
5,180		86,000	52,000
5,200		86,000	52,000
5,220		86,000	52,000
5,300		86,000	52,000
5,310		93,000	57,000
5,400		93,000	57,000
5,410		93,000	57,000
5,500		93,000	57,000
5,560	7/32	93,000	57,000
5,600		93,000	57,000
5,610		93,000	57,000
5,700		93,000	57,000
5,790		93,000	57,000
5,800		93,000	57,000
5,900		93,000	57,000
5,940		93,000	57,000
5,950	15/64	93,000	57,000
6,000		93,000	57,000
6,040		101,000	63,000
6,100		101,000	63,000
6,150		101,000	63,000
6,200		101,000	63,000
6,250		101,000	63,000
6,300		101,000	63,000
6,350	1/4	101,000	63,000
6,400		101,000	63,000
6,500		101,000	63,000
6,530		101,000	63,000
6,600		101,000	63,000
6,630		101,000	63,000
6,700		101,000	63,000
6,750	17/64	109,000	69,000
6,800		109,000	69,000
6,900		109,000	69,000
7,000		109,000	69,000
7,030		109,000	69,000
7,100		109,000	69,000
7,140	9/32	109,000	69,000
7,200		109,000	69,000
7,300		109,000	69,000
7,370		109,000	69,000
7,400		109,000	69,000
7,490		109,000	69,000
7,500		109,000	69,000
7,540	19/64	117,000	75,000

d1		l1	l2
mm	inch	mm	mm
7,600		117,000	75,000
7,670		117,000	75,000
7,700		117,000	75,000
7,800		117,000	75,000
7,900		117,000	75,000
7,940	5/16	117,000	75,000
8,000		117,000	75,000
8,030		117,000	75,000
8,100		117,000	75,000
8,200		117,000	75,000
8,300		117,000	75,000
8,330	21/64	117,000	75,000
8,400		117,000	75,000
8,430		117,000	75,000
8,500		117,000	75,000
8,600		125,000	81,000
8,610		125,000	81,000
8,700		125,000	81,000
8,730	11/32	125,000	81,000
8,800		125,000	81,000
8,840		125,000	81,000
8,900		125,000	81,000
9,000		125,000	81,000
9,090		125,000	81,000
9,100		125,000	81,000
9,130	23/64	125,000	81,000
9,200		125,000	81,000
9,300		125,000	81,000
9,340		125,000	81,000
9,400		125,000	81,000
9,500		125,000	81,000
9,520	3/8	133,000	87,000
9,580		133,000	87,000
9,600		133,000	87,000
9,700		133,000	87,000
9,800		133,000	87,000
9,900		133,000	87,000
9,920	25/64	133,000	87,000
10,000		133,000	87,000
10,080		133,000	87,000
10,200		133,000	87,000
10,260		133,000	87,000
10,300		133,000	87,000
10,320	13/32	133,000	87,000
10,490		133,000	87,000
10,500		133,000	87,000
10,720	27/64	142,000	94,000
11,000		142,000	94,000
11,110	7/16	142,000	94,000
11,500		142,000	94,000
11,510	29/64	142,000	94,000
11,910	15/32	151,000	101,000
12,000		151,000	101,000
12,300	31/64	151,000	101,000
12,700	1/2	151,000	101,000



Wiertła kręte



Materiał narzędzia **Węglik**

Powierzchnia ○

Kierunek skrawania (R)

P ○ Korekcja ścina $\geq \varnothing 2,700$ • geom. ścinowa • wiertło specjalne • lutowane
płytki węglkowe

M

K ○

N materiały intensywnie ścierające • stale ulepszone cieplnie/hartowane
• twarde staliwa, stale manganowe, twarde brązy

S

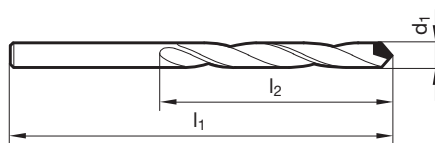
H •

GÜHRINGNAVIGATOR

Param. skr. na str. 776



Wiertła kręte z
chwytami walcowymi



Nr artykułu **710**

d1		l1	l2
mm	inch	mm	mm
3,000		61,000	33,000
3,100		65,000	36,000
3,300		65,000	36,000
3,400		70,000	39,000
3,500		70,000	39,000
4,000		75,000	43,000
4,200		75,000	43,000
4,500		80,000	47,000
4,700		80,000	47,000
5,000		86,000	52,000
5,100		86,000	52,000
5,500		93,000	57,000
6,000		93,000	57,000
6,300		101,000	63,000
6,500		101,000	63,000
6,800		109,000	69,000
7,000		109,000	69,000
7,100		109,000	69,000

d1		l1	l2
mm	inch	mm	mm
7,200		109,000	69,000
7,400		109,000	69,000
7,500		109,000	69,000
8,000		117,000	75,000
8,500		117,000	75,000
9,000		125,000	81,000
9,500		125,000	81,000
10,000		133,000	87,000
10,200		133,000	87,000
11,000		142,000	94,000
12,000		151,000	101,000
12,500		151,000	101,000
13,000		151,000	101,000
14,000		160,000	108,000

Narzędzia HSS

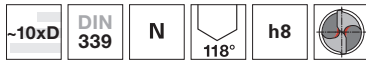
Wiertła ze stali szybko tnącej w specjalnym wykonaniu, do indywidualnych zadań obróbczych

Firma Guhring jest liderem produkcji narzędzi ze stali szybko tnących, dzięki ponad stuletniemu doświadczeniu i najbardziej zaawansowanym technologiom. Dzięki temu może dostarczać narzędzia specjalne, z dopasowaną do zastosowania powłoką supertwardą, w najkorzystniejszej cenie w stosunku do jakości. Nieważne czy to mikro-wiertło, narzędzie stopniowe, czy wielostrzowe – zaufaj naszemu doświadczeniu w produkcji narzędzi HSS.





Wiertła długie

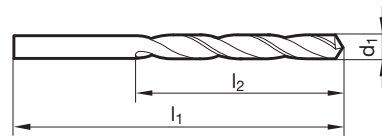


- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • do wiercenia przez tulejki wiertarskie
- M**
- K** •
- N** ○ stopowe/niestopowe stале i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	$\varnothing_{2,36}^{+0}$
Kierunek skrawania	R



Nr artykułu

211

Wiertła kręte z chwytym walcowym

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,800		42,000	22,000	2,350		70,000	44,000
1,000		48,000	26,000	2,360		70,000	44,000
1,050		48,000	26,000	2,400		74,000	47,000
1,080		50,000	28,000	2,450		74,000	47,000
1,100		50,000	28,000	2,470		74,000	47,000
1,110		50,000	28,000	2,500		74,000	47,000
1,150		50,000	28,000	2,550		74,000	47,000
1,200		52,000	30,000	2,600		74,000	47,000
1,230		52,000	30,000	2,620		74,000	47,000
1,250		52,000	30,000	2,650		74,000	47,000
1,300		52,000	30,000	2,680		79,000	51,000
1,350		55,000	33,000	2,700		79,000	51,000
1,380		55,000	33,000	2,730		79,000	51,000
1,400		55,000	33,000	2,800		79,000	51,000
1,430		55,000	33,000	2,900		79,000	51,000
1,450		55,000	33,000	2,950		79,000	51,000
1,460		55,000	33,000	2,960		79,000	51,000
1,480		55,000	33,000	3,000		79,000	51,000
1,500		55,000	33,000	3,050		84,000	55,000
1,520		58,000	35,000	3,070		84,000	55,000
1,580		58,000	35,000	3,100		84,000	55,000
1,600		58,000	35,000	3,150		84,000	55,000
1,620		58,000	35,000	3,170	1/8	84,000	55,000
1,650		58,000	35,000	3,200		84,000	55,000
1,700		58,000	35,000	3,250		84,000	55,000
1,800		62,000	38,000	3,300		84,000	55,000
1,810		62,000	38,000	3,400		91,000	60,000
1,850		62,000	38,000	3,480		91,000	60,000
1,870		62,000	38,000	3,500		91,000	60,000
1,900		62,000	38,000	3,600		91,000	60,000
1,930		66,000	41,000	3,700		91,000	60,000
1,980	5/64	66,000	41,000	3,730		91,000	60,000
1,990		66,000	41,000	3,800		96,000	64,000
2,000		66,000	41,000	3,900		96,000	64,000
2,020		66,000	41,000	3,950		96,000	64,000
2,030		66,000	41,000	4,000		96,000	64,000
2,050		66,000	41,000	4,100		96,000	64,000
2,100		66,000	41,000	4,200		96,000	64,000
2,150		70,000	44,000	4,300		102,000	69,000
2,200		70,000	44,000	4,400		102,000	69,000
2,220		70,000	44,000	4,500		102,000	69,000
2,320		70,000	44,000	4,580		102,000	69,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,600		102,000	69,000
4,700		102,000	69,000
4,750		102,000	69,000
4,800		108,000	74,000
4,900		108,000	74,000
4,950		108,000	74,000
5,000		108,000	74,000
5,100		108,000	74,000
5,200		108,000	74,000
5,300		108,000	74,000
5,330		116,000	80,000
5,350		116,000	80,000
5,400		116,000	80,000
5,500		116,000	80,000
5,550		116,000	80,000
5,600		116,000	80,000
5,700		116,000	80,000
5,800		116,000	80,000
5,900		116,000	80,000
6,000		116,000	80,000
6,100		124,000	86,000
6,150		124,000	86,000
6,200		124,000	86,000
6,350	1/4	124,000	86,000
6,400		124,000	86,000
6,500		124,000	86,000
6,600		124,000	86,000
6,700		124,000	86,000
6,800		133,000	93,000
6,900		133,000	93,000
7,000		133,000	93,000
7,050		133,000	93,000
7,100		133,000	93,000
7,150		133,000	93,000
7,200		133,000	93,000
7,300		133,000	93,000
7,400		133,000	93,000
7,600		142,000	100,000
7,750		142,000	100,000
7,800		142,000	100,000
7,950		142,000	100,000
8,000		142,000	100,000
8,100		142,000	100,000
8,120		142,000	100,000
8,200		142,000	100,000
8,300		142,000	100,000
8,500		142,000	100,000
8,600		151,000	107,000

d1		l1	l2
mm	inch	mm	mm
8,700		151,000	107,000
8,730	11/32	151,000	107,000
8,900		151,000	107,000
9,000		151,000	107,000
9,100		151,000	107,000
9,200		151,000	107,000
9,300		151,000	107,000
9,500		151,000	107,000
9,600		162,000	116,000
9,650		162,000	116,000
9,700		162,000	116,000
9,750		162,000	116,000
9,800		162,000	116,000
10,000		162,000	116,000
10,200		162,000	116,000
10,500		162,000	116,000
10,800		173,000	125,000
10,900		173,000	125,000
11,000		173,000	125,000
11,300		173,000	125,000
11,400		173,000	125,000
11,500		173,000	125,000
11,700		173,000	125,000
11,750		173,000	125,000
12,000		184,000	134,000
12,100		184,000	134,000
12,300	31/64	184,000	134,000
12,500		184,000	134,000
13,000		184,000	134,000
13,200		184,000	134,000
13,500		194,000	142,000
13,800		194,000	142,000
14,200		202,000	147,000
14,500		202,000	147,000
15,000		202,000	147,000
15,500		211,000	153,000
16,500		218,000	159,000
17,000		218,000	159,000
18,000		226,000	165,000
18,250		234,000	171,000
18,500		234,000	171,000
19,000		234,000	171,000
19,500		242,000	177,000
20,000		242,000	177,000



Wiertła długie



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

P ● Korekcja ścina $\geq \varnothing 2,400$ • geometria zataczana • do wiercenia przez tulejki wiertarskie

M

K ●

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit

S

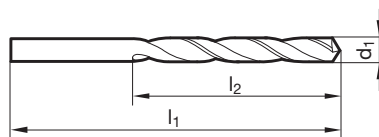
H

GÜHRING NAVIGATOR

Param. skr. na str. 786



Wiertła kręte z
chwytami walcowymi



Nr artykułu **561**

d1		l1	l2
mm	inch	mm	mm
2,400		74,000	47,000
2,500		74,000	47,000
2,600		74,000	47,000
3,000		79,000	51,000
3,100		84,000	55,000
3,120		84,000	55,000
3,200		84,000	55,000
3,300		84,000	55,000
4,000		96,000	64,000
4,250		96,000	64,000
4,400		102,000	69,000
4,800		108,000	74,000

d1		l1	l2
mm	inch	mm	mm
5,000		108,000	74,000



Wiertła długie

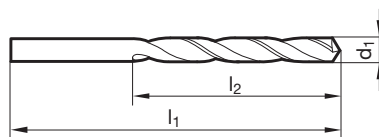


- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • do wiercenia przez tulejki wiertarskie
- M**
- K** •
- N** • stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

666

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		48,000	26,000	4,100		96,000	64,000
1,100		50,000	28,000	4,200		96,000	64,000
1,200		52,000	30,000	4,300		102,000	69,000
1,280		52,000	30,000	4,400		102,000	69,000
1,300		52,000	30,000	4,500		102,000	69,000
1,350		55,000	33,000	4,600		102,000	69,000
1,400		55,000	33,000	4,800		108,000	74,000
1,450		55,000	33,000	5,000		108,000	74,000
1,500		55,000	33,000	5,100		108,000	74,000
1,510		58,000	35,000	5,150		108,000	74,000
1,550		58,000	35,000	5,300		108,000	74,000
1,600		58,000	35,000	5,400		116,000	80,000
1,700		58,000	35,000	5,500		116,000	80,000
1,800		62,000	38,000	5,600		116,000	80,000
1,900		62,000	38,000	5,700		116,000	80,000
1,980	5/64	66,000	41,000	5,800		116,000	80,000
1,990		66,000	41,000	6,000		116,000	80,000
2,000		66,000	41,000	6,100		124,000	86,000
2,020		66,000	41,000	6,200		124,000	86,000
2,100		66,000	41,000	6,350	1/4	124,000	86,000
2,200		70,000	44,000	6,400		124,000	86,000
2,300		70,000	44,000	6,500		124,000	86,000
2,400		74,000	47,000	6,600		124,000	86,000
2,450		74,000	47,000	6,700		124,000	86,000
2,500		74,000	47,000	6,800		133,000	93,000
2,550		74,000	47,000	6,900		133,000	93,000
2,600		74,000	47,000	7,000		133,000	93,000
2,800		79,000	51,000	7,100		133,000	93,000
2,900		79,000	51,000	7,200		133,000	93,000
3,000		79,000	51,000	7,300		133,000	93,000
3,100		84,000	55,000	7,500		133,000	93,000
3,150		84,000	55,000	7,600		142,000	100,000
3,200		84,000	55,000	7,700		142,000	100,000
3,300		84,000	55,000	7,800		142,000	100,000
3,400		91,000	60,000	7,900		142,000	100,000
3,500		91,000	60,000	7,940	5/16	142,000	100,000
3,570	9/64	91,000	60,000	8,000		142,000	100,000
3,600		91,000	60,000	8,200		142,000	100,000
3,700		91,000	60,000	8,500		142,000	100,000
3,800		96,000	64,000	8,600		151,000	107,000
3,900		96,000	64,000	9,000		151,000	107,000
4,000		96,000	64,000	9,600		162,000	116,000

Wiertła kręte z chwytami walcowymi



d1		l1	l2
mm	inch	mm	mm
9,800		162,000	116,000
10,000		162,000	116,000
10,200		162,000	116,000
11,000		173,000	125,000
11,500		173,000	125,000
11,910	15/32	184,000	134,000

d1		l1	l2
mm	inch	mm	mm
12,500		184,000	134,000
13,000		184,000	134,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 2,36$

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szczególnie do głębokich otworów

M

K •

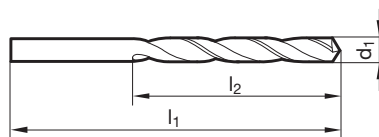
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu **217**

d1		l1	l2
mm	inch	mm	mm
0,400	1/64	30,000	10,000
0,440		30,000	10,000
0,450		30,000	10,000
0,470		30,000	10,000
0,500		32,000	12,000
0,520		32,000	12,000
0,550		35,000	15,000
0,570		35,000	15,000
0,600		35,000	15,000
0,620		38,000	18,000
0,650		38,000	18,000
0,700		42,000	21,000
0,730		42,000	21,000
0,750		42,000	21,000
0,760		46,000	25,000
0,790	1/32	46,000	25,000
0,800		46,000	25,000
0,820		46,000	25,000
0,850		46,000	25,000
0,900		51,000	29,000
0,910		51,000	29,000
0,920		51,000	29,000
0,950		51,000	29,000
0,970		56,000	33,000
1,000		56,000	33,000
1,040		56,000	33,000
1,050		56,000	33,000
1,080		60,000	37,000
1,090		60,000	37,000
1,100		60,000	37,000
1,120		60,000	37,000
1,130		60,000	37,000
1,150		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,350		70,000	45,000
1,400		70,000	45,000
1,450		70,000	45,000
1,490		70,000	45,000

d1		l1	l2
mm	inch	mm	mm
1,500		70,000	45,000
1,510		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,030		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,420		95,000	62,000
2,440		95,000	62,000
2,450		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,620		95,000	62,000
2,640		95,000	62,000
2,650		95,000	62,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,030		106,000	69,000
3,050		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,850		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,950		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,030		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,450		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,650		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,950		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,030		132,000	87,000
5,050		132,000	87,000

d1		l1	l2
mm	inch	mm	mm
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,150		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,350		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,550		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,060		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000



d1		l1	l2
mm	inch	mm	mm
9,200		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,250		184,000	121,000
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,600		195,000	128,000
11,700		195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,100		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
12,800		205,000	134,000
13,000		205,000	134,000
13,200		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,200		220,000	144,000
14,250		220,000	144,000
14,290	9/16	220,000	144,000
14,490		220,000	144,000
14,500		220,000	144,000
14,900		220,000	144,000

d1		l1	l2
mm	inch	mm	mm
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,200		227,000	149,000
15,250		227,000	149,000
15,400		227,000	149,000
15,480	39/64	227,000	149,000
15,500		227,000	149,000
15,600		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
16,270	41/64	235,000	154,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
17,000		235,000	154,000
17,070	43/64	241,000	158,000
17,460	11/16	241,000	158,000
17,500		241,000	158,000
18,000		241,000	158,000
18,500		247,000	162,000
18,650	47/64	247,000	162,000
19,000		247,000	162,000
19,050	3/4	254,000	166,000
19,500		254,000	166,000
20,000		254,000	166,000
20,500		261,000	171,000
20,640	13/16	261,000	171,000
21,000		261,000	171,000
21,500		268,000	176,000
22,000		268,000	176,000
23,300		275,000	180,000
23,810	15/16	282,000	185,000
24,000		282,000	185,000
25,000	63/64	282,000	185,000
26,190	1 1/32	290,000	190,000
26,500		290,000	190,000
26,990	1 1/16	298,000	195,000
28,570	1 1/8	307,000	201,000
29,000		307,000	201,000
29,370	1 5/32	307,000	201,000
29,500		307,000	201,000
30,160	1 3/16	316,000	207,000
30,960	1 7/32	316,000	207,000
31,000		316,000	207,000
36,510	1 7/16	345,000	225,000



Wiertła kręte, długie



P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szczególnie do głębokich otworów • do wiercenia przez tulejki wiertarskie

M

K •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
S • proszki spiekane metali, nowe srebro (alpaka), grafit

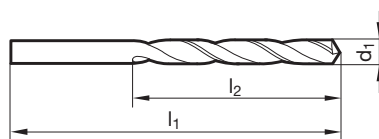
H

GÜHRING NAVIGATOR

Param. skr. na str. 786

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

667

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,800		100,000	66,000
0,600		35,000	15,000	2,850		100,000	66,000
0,700		42,000	21,000	2,870		100,000	66,000
0,750		42,000	21,000	2,900		100,000	66,000
0,800		46,000	25,000	3,000		100,000	66,000
0,900		51,000	29,000	3,030		106,000	69,000
0,950		51,000	29,000	3,050		106,000	69,000
1,000		56,000	33,000	3,100		106,000	69,000
1,100		60,000	37,000	3,170	1/8	106,000	69,000
1,150		60,000	37,000	3,200		106,000	69,000
1,200		65,000	41,000	3,250		106,000	69,000
1,250		65,000	41,000	3,260		106,000	69,000
1,300		65,000	41,000	3,300		106,000	69,000
1,350		70,000	45,000	3,350		106,000	69,000
1,400		70,000	45,000	3,400		112,000	73,000
1,450		70,000	45,000	3,500		112,000	73,000
1,500		70,000	45,000	3,570	9/64	112,000	73,000
1,550		76,000	50,000	3,600		112,000	73,000
1,590	1/16	76,000	50,000	3,650		112,000	73,000
1,600		76,000	50,000	3,700		112,000	73,000
1,650		76,000	50,000	3,730		112,000	73,000
1,700		76,000	50,000	3,750		112,000	73,000
1,800		80,000	53,000	3,800		119,000	78,000
1,850		80,000	53,000	3,850		119,000	78,000
1,900		80,000	53,000	3,900		119,000	78,000
1,950		85,000	56,000	3,950		119,000	78,000
1,980	5/64	85,000	56,000	3,970	5/32	119,000	78,000
2,000		85,000	56,000	4,000		119,000	78,000
2,100		85,000	56,000	4,050		119,000	78,000
2,200		90,000	59,000	4,100		119,000	78,000
2,300		90,000	59,000	4,200		119,000	78,000
2,350		90,000	59,000	4,250		119,000	78,000
2,370		95,000	62,000	4,300		126,000	82,000
2,380	3/32	95,000	62,000	4,370	11/64	126,000	82,000
2,440		95,000	62,000	4,400		126,000	82,000
2,450		95,000	62,000	4,500		126,000	82,000
2,500		95,000	62,000	4,570		126,000	82,000
2,530		95,000	62,000	4,600		126,000	82,000
2,650		95,000	62,000	4,620		126,000	82,000
2,700		100,000	66,000	4,650		126,000	82,000
2,750		100,000	66,000	4,700		126,000	82,000
2,780	7/64	100,000	66,000	4,750		126,000	82,000



d1		l1	l2
mm	inch	mm	mm
4,760	3/16	132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,700		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,050		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,100		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,750		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,500		220,000	144,000
14,750		220,000	144,000
14,800		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
16,000		227,000	149,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
16,750		235,000	154,000
17,000		235,000	154,000
17,460	11/16	241,000	158,000
18,000		241,000	158,000
18,250		247,000	162,000
22,220	7/8	268,000	176,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, długie



- P** • Korekcja ścina $\geq \varnothing 14,750$ • geometria zataczana • szczególnie do głębokich otworów • do wiercenia przez tulejki wiertarskie
- M**
- K** •
- N** ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit
- S**
- H**

Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 6,00$

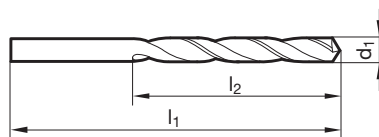
Kierunek skrawania



Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu **220**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,450		30,000	10,000	4,500		126,000	82,000
0,470		30,000	10,000	4,600		126,000	82,000
0,900		51,000	29,000	4,780		132,000	87,000
0,950		51,000	29,000	4,800		132,000	87,000
1,100		60,000	37,000	4,950		132,000	87,000
1,150		60,000	37,000	5,000		132,000	87,000
1,200		65,000	41,000	5,100		132,000	87,000
1,250		65,000	41,000	5,200		132,000	87,000
1,400		70,000	45,000	5,600		139,000	91,000
1,450		70,000	45,000	5,700		139,000	91,000
1,500		70,000	45,000	6,000		139,000	91,000
1,600		76,000	50,000	6,050		148,000	97,000
1,630		76,000	50,000	6,100		148,000	97,000
1,660		76,000	50,000	6,400		148,000	97,000
1,730		80,000	53,000	6,500		148,000	97,000
1,800		80,000	53,000	6,600		148,000	97,000
1,850		80,000	53,000	6,800		156,000	102,000
1,900		80,000	53,000	7,200		156,000	102,000
2,000		85,000	56,000	7,500		156,000	102,000
2,300		90,000	59,000	7,800		165,000	109,000
2,500		95,000	62,000	8,000		165,000	109,000
2,700		100,000	66,000	8,100		165,000	109,000
2,750		100,000	66,000	8,250		165,000	109,000
2,900		100,000	66,000	8,400		165,000	109,000
2,950		100,000	66,000	8,800		175,000	115,000
3,000		100,000	66,000	9,000		175,000	115,000
3,050		106,000	69,000	9,520	3/8	184,000	121,000
3,070		106,000	69,000	9,700		184,000	121,000
3,100		106,000	69,000	9,800		184,000	121,000
3,250		106,000	69,000	9,900		184,000	121,000
3,300		106,000	69,000	10,000		184,000	121,000
3,350		106,000	69,000	10,100		184,000	121,000
3,400		112,000	73,000	10,500		184,000	121,000
3,500		112,000	73,000	11,000		195,000	128,000
3,550		112,000	73,000	11,500		195,000	128,000
3,600		112,000	73,000	11,900		205,000	134,000
3,700		112,000	73,000	12,000		205,000	134,000
3,800		119,000	78,000	12,200		205,000	134,000
4,000		119,000	78,000	12,500		205,000	134,000
4,050		119,000	78,000	13,000		205,000	134,000
4,250		119,000	78,000	13,500		214,000	140,000
4,300		126,000	82,000	14,750		220,000	144,000



d1		l1	l2
mm	inch	mm	mm
19,000		247,000	162,000
20,000		254,000	166,000
22,000		268,000	176,000
25,000	63/64	282,000	185,000
25,500		290,000	190,000
29,000		307,000	201,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, długie

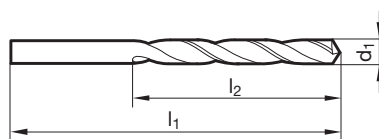


- P** • Korekcja ścina $\geq \varnothing 2,950$ • geometria zataczana • z zabierakiem
- M**
- K** •
- N** ○ stopowe/niestopowe stале i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu

204

d1		l1	l2
mm	inch	mm	mm
2,950		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,080		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,800		139,000	91,000
5,850		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,000		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,400		165,000	109,000
8,450		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,300		184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,800		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
13,000		205,000	134,000
25,250		290,000	190,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia



Kierunek skrawania



P Korekcja ścina $\geq \varnothing 15,000$ • geometria zataczana • szczególnie do głębokich otworów

M

K

N • twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax

S

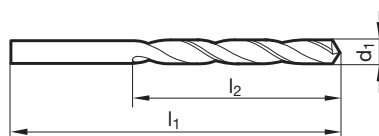
H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Wiertła kręte z
chwytami walcowymi



Nr artykułu **218**

d1		l1	l2
mm	inch	mm	mm
0,500		32,000	12,000
0,520		32,000	12,000
0,550		35,000	15,000
0,600		35,000	15,000
0,650		38,000	18,000
0,700		42,000	21,000
0,750		42,000	21,000
0,800		46,000	25,000
0,820		46,000	25,000
0,840		46,000	25,000
0,850		46,000	25,000
0,900		51,000	29,000
0,950		51,000	29,000
0,970		56,000	33,000
1,000		56,000	33,000
1,050		56,000	33,000
1,100		60,000	37,000
1,150		60,000	37,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,550		76,000	50,000
1,560		76,000	50,000
1,570		76,000	50,000
1,580		76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,800		80,000	53,000
1,820		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,950		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,180		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000

d1		l1	l2
mm	inch	mm	mm
2,300		90,000	59,000
2,350		90,000	59,000
2,400		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,600		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,800		100,000	66,000
2,830		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,940		100,000	66,000
3,000		100,000	66,000
3,020		106,000	69,000
3,050		106,000	69,000
3,060		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,180		106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,270		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,030		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,900		132,000	87,000



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,420		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,350		156,000	102,000
7,500		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,700		175,000	115,000
9,000		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
11,250		195,000	128,000
12,100		205,000	134,000
14,000		214,000	140,000
15,000		220,000	144,000
16,000		227,000	149,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia

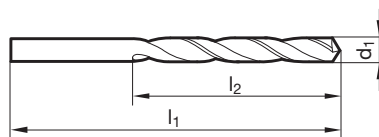
Kierunek skrawania

P Korekcja ścina $\geq \varnothing 15,000$ • geometria zataczana • szczególnie do głębokich otworów

- M**
- K**
- N** • twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Wiertła kręte z chwytami walcowymi

Nr artykułu **221**

d1		l1	l2
mm	inch	mm	mm
0,450		30,000	10,000
0,600		35,000	15,000
0,650		38,000	18,000
0,900		51,000	29,000
1,100		60,000	37,000
1,240		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,370		70,000	45,000
1,400		70,000	45,000
1,500		70,000	45,000
1,550		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,160		90,000	59,000
2,180		90,000	59,000
2,200		90,000	59,000
2,270		90,000	59,000
2,350		90,000	59,000
2,850		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000

d1		l1	l2
mm	inch	mm	mm
3,510		112,000	73,000
3,700		112,000	73,000
4,100		119,000	78,000
4,200		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000
4,900		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,100		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,800		156,000	102,000
8,000		165,000	109,000
9,000		175,000	115,000
12,800		205,000	134,000
15,000		220,000	144,000



Wiertła kręte, długie



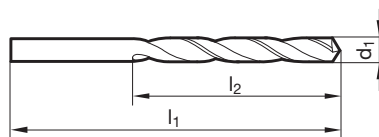
- P** Korekcja ścina $\geq \varnothing 14,500$ • geometria zataczana • szczególnie do głębokich otworów
- M**
- K**
- N** • miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
- S** • cynk, miedź rafinowana, silumin, elektron • miękkie tworzywa sztuczne, drewno
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 786

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **219**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,100		85,000	56,000
0,600		35,000	15,000	2,150		90,000	59,000
0,650		38,000	18,000	2,200		90,000	59,000
0,700		42,000	21,000	2,250		90,000	59,000
0,740		42,000	21,000	2,300		90,000	59,000
0,750		42,000	21,000	2,350		90,000	59,000
0,800		46,000	25,000	2,380	3/32	95,000	62,000
0,850		46,000	25,000	2,400		95,000	62,000
0,900		51,000	29,000	2,430		95,000	62,000
0,950		51,000	29,000	2,450		95,000	62,000
0,970		56,000	33,000	2,490		95,000	62,000
0,980		56,000	33,000	2,500		95,000	62,000
1,000		56,000	33,000	2,550		95,000	62,000
1,100		60,000	37,000	2,600		95,000	62,000
1,180		60,000	37,000	2,650		95,000	62,000
1,190	3/64	65,000	41,000	2,700		100,000	66,000
1,200		65,000	41,000	2,710		100,000	66,000
1,220		65,000	41,000	2,750		100,000	66,000
1,250		65,000	41,000	2,800		100,000	66,000
1,300		65,000	41,000	2,850		100,000	66,000
1,350		70,000	45,000	2,880		100,000	66,000
1,370		70,000	45,000	2,900		100,000	66,000
1,400		70,000	45,000	2,950		100,000	66,000
1,440		70,000	45,000	3,000		100,000	66,000
1,500		70,000	45,000	3,100		106,000	69,000
1,520		76,000	50,000	3,170	1/8	106,000	69,000
1,600		76,000	50,000	3,180		106,000	69,000
1,610		76,000	50,000	3,200		106,000	69,000
1,650		76,000	50,000	3,250		106,000	69,000
1,700		76,000	50,000	3,260		106,000	69,000
1,750		80,000	53,000	3,300		106,000	69,000
1,760		80,000	53,000	3,350		106,000	69,000
1,770		80,000	53,000	3,400		112,000	73,000
1,780		80,000	53,000	3,500		112,000	73,000
1,800		80,000	53,000	3,550		112,000	73,000
1,850		80,000	53,000	3,600		112,000	73,000
1,900		80,000	53,000	3,650		112,000	73,000
1,950		85,000	56,000	3,700		112,000	73,000
1,970		85,000	56,000	3,750		112,000	73,000
2,000		85,000	56,000	3,800		119,000	78,000
2,050		85,000	56,000	3,830		119,000	78,000
2,070		85,000	56,000	3,900		119,000	78,000



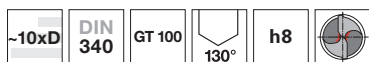
d1		l1	l2
mm	inch	mm	mm
3,920		119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,800		132,000	87,000
4,830		132,000	87,000
4,870		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,430		139,000	91,000
5,500		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,980		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,450		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,550		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,850		165,000	109,000
7,900		165,000	109,000
7,950		165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
8,550		175,000	115,000
8,600		175,000	115,000
8,700		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,300		184,000	121,000
10,700		195,000	128,000
10,750		195,000	128,000
11,000		195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
12,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,750		214,000	140,000
14,000		214,000	140,000
14,500		220,000	144,000
15,000		220,000	144,000
15,500		227,000	149,000
17,000		235,000	154,000
18,000		241,000	158,000
18,250		247,000	162,000
19,000		247,000	162,000
19,840	25/32	254,000	166,000
20,000		254,000	166,000
20,640	13/16	261,000	171,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, długie



- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 0,2,36$

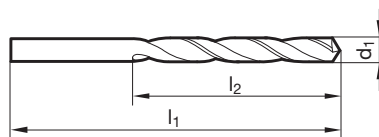
Kierunek skrawania



GÜHRING NAVIGATOR

Param. skr. na str. 786

Wiertła kręte z chwytym walcowym



Nr artykułu **535**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,200		90,000	59,000
1,020		56,000	33,000	2,250		90,000	59,000
1,040		56,000	33,000	2,260		90,000	59,000
1,050		56,000	33,000	2,300		90,000	59,000
1,070		60,000	37,000	2,350		90,000	59,000
1,090		60,000	37,000	2,370		95,000	62,000
1,100		60,000	37,000	2,380	3/32	95,000	62,000
1,150		60,000	37,000	2,400		95,000	62,000
1,180		60,000	37,000	2,440		95,000	62,000
1,190	3/64	65,000	41,000	2,450		95,000	62,000
1,200		65,000	41,000	2,480		95,000	62,000
1,250		65,000	41,000	2,490		95,000	62,000
1,300		65,000	41,000	2,500		95,000	62,000
1,320		65,000	41,000	2,530		95,000	62,000
1,350		70,000	45,000	2,550		95,000	62,000
1,400		70,000	45,000	2,580		95,000	62,000
1,450		70,000	45,000	2,600		95,000	62,000
1,500		70,000	45,000	2,640		95,000	62,000
1,510		76,000	50,000	2,650		95,000	62,000
1,520		76,000	50,000	2,700		100,000	66,000
1,550		76,000	50,000	2,710		100,000	66,000
1,590	1/16	76,000	50,000	2,750		100,000	66,000
1,600		76,000	50,000	2,780	7/64	100,000	66,000
1,650		76,000	50,000	2,790		100,000	66,000
1,670		76,000	50,000	2,800		100,000	66,000
1,700		76,000	50,000	2,820		100,000	66,000
1,750		80,000	53,000	2,830		100,000	66,000
1,780		80,000	53,000	2,850		100,000	66,000
1,800		80,000	53,000	2,870		100,000	66,000
1,850		80,000	53,000	2,900		100,000	66,000
1,900		80,000	53,000	2,940		100,000	66,000
1,930		85,000	56,000	2,950		100,000	66,000
1,950		85,000	56,000	3,000		100,000	66,000
1,980	5/64	85,000	56,000	3,050		106,000	69,000
1,990		85,000	56,000	3,100		106,000	69,000
2,000		85,000	56,000	3,150		106,000	69,000
2,050		85,000	56,000	3,170	1/8	106,000	69,000
2,060		85,000	56,000	3,200		106,000	69,000
2,080		85,000	56,000	3,250		106,000	69,000
2,100		85,000	56,000	3,260		106,000	69,000
2,150		90,000	59,000	3,270		106,000	69,000
2,180		90,000	59,000	3,300		106,000	69,000



d1		l1	l2
mm	inch	mm	mm
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,130		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,050		148,000	97,000
6,100		148,000	97,000

d1		l1	l2
mm	inch	mm	mm
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
6,910		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,040		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,850		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,490		184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,100		195,000	128,000
11,110	7/16	195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000

d1		l1	l2
mm	inch	mm	mm
12,000		205,000	134,000
12,150		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,600		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

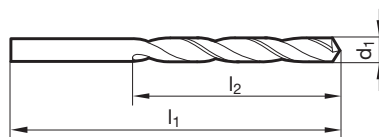
H

GÜHRING NAVIGATOR

Param. skr. na str. 786



Wiertła kręte z chwytym walcowym



Nr artykułu **668**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,090		60,000	37,000
1,100		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
1,990		85,000	56,000
2,000		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,180		90,000	59,000
2,200		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,530		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,640		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,780	7/64	100,000	66,000

d1		l1	l2
mm	inch	mm	mm
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,870		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000



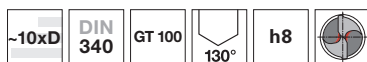
Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
4,850		132,000	87,000
4,900		132,000	87,000
4,910		132,000	87,000
4,920		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,760		156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,340		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
14,000		214,000	140,000



Wiertła kręte, długie


 Materiał narzędzia **HSS**

 Powierzchnia **F**

 Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

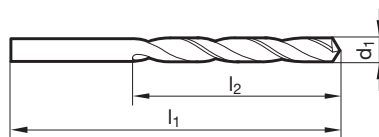
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu

2462

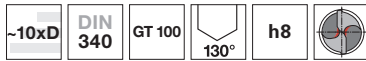
d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,500		70,000	45,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,400		95,000	62,000
2,500		95,000	62,000
2,600		95,000	62,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000

d1		l1	l2
mm	inch	mm	mm
3,800		119,000	78,000
4,000		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,500		126,000	82,000
4,800		132,000	87,000
5,000		132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,800		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,600		165,000	109,000
8,000		165,000	109,000
9,000		175,000	115,000
10,000		184,000	121,000

 Wiertła kręte z
chwytami walcowymi



Wiertła kręte, długie



- P** • Korekcja ścina $\geq \varnothing 1,400$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia **HSS**

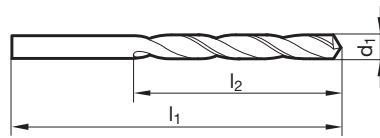
Powierzchnia

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu **506**

d1		l1	l2
mm	inch	mm	mm
1,400		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,680		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,500		95,000	62,000
2,800		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,800		119,000	78,000
3,950		119,000	78,000
4,000		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000

d1		l1	l2
mm	inch	mm	mm
4,600		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,950		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
7,400		156,000	102,000
7,800		165,000	109,000
8,500		165,000	109,000
9,000		175,000	115,000
9,900		184,000	121,000
10,320	13/32	184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ○ Korekcja ścina $\geq \varnothing 2,370$ • geometria zataczana • szczególnie duże rowki wiórowe

M

K

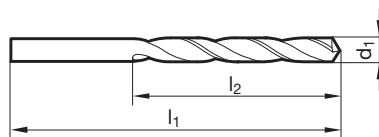
N • miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnż, argalium, miękkie tworzywa sztuczne, drewno

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu **501**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,020		56,000	33,000
1,030		56,000	33,000
1,040		56,000	33,000
1,070		60,000	37,000
1,090		60,000	37,000
1,100		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,400		70,000	45,000
1,450		70,000	45,000
1,480		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
1,990		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,180		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000

d1		l1	l2
mm	inch	mm	mm
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,440		95,000	62,000
2,450		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,520		95,000	62,000
2,530		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,640		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,660		112,000	73,000

Wiertła kręte z
chwytami walcowymi



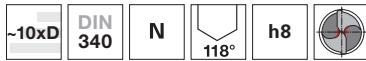
Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
3,700		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,030		148,000	97,000
6,040		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,040		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,025		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,580		184,000	121,000
9,600		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,200		184,000	121,000
10,260		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
14,000		214,000	140,000
32,600		325,000	213,000



Wiertła kręte, długie

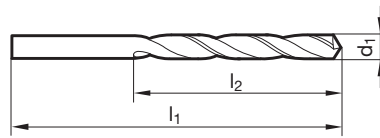


- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** ○
- K** ●
- N** ● stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	$\geq 0,2,36$
Kierunek skrawania	(R)



Wiertła kręte z chwytem walcowym

Nr artykułu **317**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,500		95,000	62,000
0,600		35,000	15,000	2,600		95,000	62,000
0,700		42,000	21,000	2,700		100,000	66,000
0,750		42,000	21,000	2,780	7/64	100,000	66,000
0,800		46,000	25,000	2,800		100,000	66,000
0,850		46,000	25,000	2,900		100,000	66,000
0,900		51,000	29,000	3,000		100,000	66,000
0,950		51,000	29,000	3,050		106,000	69,000
0,960		56,000	33,000	3,100		106,000	69,000
1,000		56,000	33,000	3,170	1/8	106,000	69,000
1,020		56,000	33,000	3,200		106,000	69,000
1,050		56,000	33,000	3,250		106,000	69,000
1,100		60,000	37,000	3,300		106,000	69,000
1,150		60,000	37,000	3,400		112,000	73,000
1,190	3/64	65,000	41,000	3,500		112,000	73,000
1,200		65,000	41,000	3,550		112,000	73,000
1,250		65,000	41,000	3,570	9/64	112,000	73,000
1,300		65,000	41,000	3,600		112,000	73,000
1,350		70,000	45,000	3,700		112,000	73,000
1,400		70,000	45,000	3,800		119,000	78,000
1,450		70,000	45,000	3,900		119,000	78,000
1,500		70,000	45,000	3,970	5/32	119,000	78,000
1,510		76,000	50,000	4,000		119,000	78,000
1,550		76,000	50,000	4,040		119,000	78,000
1,590	1/16	76,000	50,000	4,100		119,000	78,000
1,600		76,000	50,000	4,200		119,000	78,000
1,650		76,000	50,000	4,300		126,000	82,000
1,700		76,000	50,000	4,370	11/64	126,000	82,000
1,780		80,000	53,000	4,400		126,000	82,000
1,800		80,000	53,000	4,500		126,000	82,000
1,850		80,000	53,000	4,600		126,000	82,000
1,900		80,000	53,000	4,700		126,000	82,000
1,950		85,000	56,000	4,760	3/16	132,000	87,000
1,980	5/64	85,000	56,000	4,800		132,000	87,000
2,000		85,000	56,000	4,850		132,000	87,000
2,050		85,000	56,000	4,900		132,000	87,000
2,060		85,000	56,000	5,000		132,000	87,000
2,100		85,000	56,000	5,050		132,000	87,000
2,200		90,000	59,000	5,100		132,000	87,000
2,300		90,000	59,000	5,160	13/64	132,000	87,000
2,380	3/32	95,000	62,000	5,200		132,000	87,000
2,400		95,000	62,000	5,300		132,000	87,000



Wiertła kręte z chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,500		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,400		220,000	144,000
14,600		220,000	144,000
14,680	37/64	220,000	144,000
14,700		220,000	144,000
14,750		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,480	39/64	227,000	149,000
15,800		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
22,000		268,000	176,000



Wiertła kręte, długie



Materiał narzędzia **HSCO**

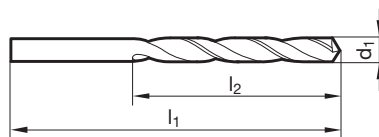
Powierzchnia $\text{Ra} > 0,2,36$

Kierunek skrawania

- P** • Korekcja ścina $\geq \text{Ø } 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 792



Wiertła kręte z chwytym walcowym

Nr artykułu **336**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,020		56,000	33,000
1,040		56,000	33,000
1,070		60,000	37,000
1,090		60,000	37,000
1,100		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,980	5/64	85,000	56,000
1,990		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,180		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000

d1		l1	l2
mm	inch	mm	mm
2,440		95,000	62,000
2,450		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,530		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,640		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,440		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000



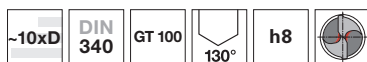
Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
6,900		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
10,750		195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,500		227,000	149,000
16,000		227,000	149,000



Wiertła kręte, długie



Materiał narzędzia **HSCO**

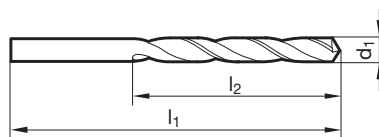
Powierzchnia **F**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • szczególnie wysoka odporność ścierania • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 792



Wiertła kręte z chwytym walcowym

Nr artykułu **396**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,500		70,000	45,000
1,600		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,400		95,000	62,000
2,500		95,000	62,000
2,700		100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,500		126,000	82,000
4,800		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000

d1		l1	l2
mm	inch	mm	mm
5,800		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,200		148,000	97,000
6,500		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
7,000		156,000	102,000
7,200		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,500		175,000	115,000
9,600		184,000	121,000
9,700		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
12,000		205,000	134,000



Wiertła kręte, długie

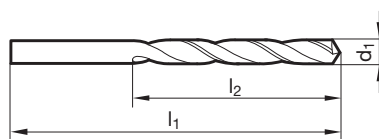


- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaro-
odporne • wysokowytrzymałe / krótkowłórowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • stale łożyskowe • Hastelloy, Inconel, Nimonic
- H** ●

GÜHRINGNAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu

617

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,100		60,000	37,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,450		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000

d1		l1	l2
mm	inch	mm	mm
3,300		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,600		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		139,000	91,000
5,400		139,000	91,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
6,000		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000



d1		l1	l2
mm	inch	mm	mm
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,800		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,510	29/64	195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,000		220,000	144,000

Wiertła kręte z
chwytami walcowymi



Wiertła kręte, długie

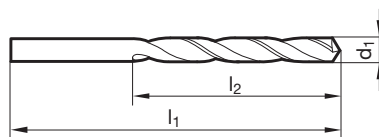


- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaroodporne • wysokowytrzymałe / krótkowłókowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • stale łożyskowe • Hastelloy, Inconel, Nimonic
- H** ●

GÜHRING NAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

669

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,200		65,000	41,000
1,300		65,000	41,000
1,400		70,000	45,000
1,500		70,000	45,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,900		80,000	53,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,500		95,000	62,000
2,600		95,000	62,000
2,700		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,800		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000

d1		l1	l2
mm	inch	mm	mm
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,500		165,000	109,000
8,730	11/32	175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000

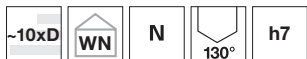


d1		l1	l2
mm	inch	mm	mm
9,300		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, długie



- P** geom. ścinowa • główna krawędź skrawająca - prosta
- M**
- K**
- N** tworzywa sztuczne, wzmocnione włóknem szklanym • duroplasty powodujące mocne zużywanie się łysinek i krawędzi tnących
- S**
- H**

Materiał narzędzia **Węglik mono.**

Powierzchnia



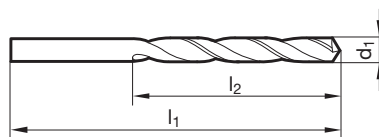
Kierunek skrawania



Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 792



Nr artykułu

706

d1		l1	l2
mm	inch	mm	mm
0,500		38,000	8,500
0,600		38,000	9,500
0,650		38,000	10,500
0,700		38,000	10,500
0,750		38,000	12,500
0,800		38,000	12,500
0,850		38,000	14,500
0,900		38,000	14,500
1,000		38,000	17,000
1,050		38,000	17,000
1,100		38,000	17,000
1,400		38,000	17,000

d1		l1	l2
mm	inch	mm	mm
1,450		38,000	17,000



Wiertła kręte, bardzo długie, szereg 1

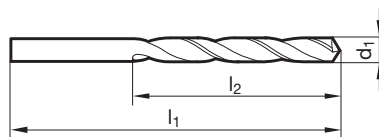


- P** • Korekcja ścina $\geq \varnothing 2,380$ • geometria zataczana • do bardzo głębokich otworów
- M**
- K** •
- N** ○ stopowe/niestopowe stali i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	$\geq 0,236$
Kierunek skrawania	(R)



Nr artykułu **235**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,600		115,000	75,000	4,600		185,000	125,000
1,700		115,000	75,000	4,700		185,000	125,000
1,800		120,000	80,000	4,760	3/16	195,000	135,000
1,900		120,000	80,000	4,800		195,000	135,000
1,930		125,000	85,000	4,900		195,000	135,000
1,950		125,000	85,000	5,000		195,000	135,000
2,000		125,000	85,000	5,100		195,000	135,000
2,050		125,000	85,000	5,200		195,000	135,000
2,100		125,000	85,000	5,300		195,000	135,000
2,200		135,000	90,000	5,340		205,000	140,000
2,300		135,000	90,000	5,400		205,000	140,000
2,350		135,000	90,000	5,500		205,000	140,000
2,380	3/32	140,000	95,000	5,560	7/32	205,000	140,000
2,400		140,000	95,000	5,600		205,000	140,000
2,500		140,000	95,000	5,700		205,000	140,000
2,600		140,000	95,000	5,800		205,000	140,000
2,700		150,000	100,000	5,900		205,000	140,000
2,800		150,000	100,000	6,000		205,000	140,000
2,900		150,000	100,000	6,100		215,000	150,000
3,000		150,000	100,000	6,200		215,000	150,000
3,100		155,000	105,000	6,250		215,000	150,000
3,170	1/8	155,000	105,000	6,300		215,000	150,000
3,200		155,000	105,000	6,350	1/4	215,000	150,000
3,250		155,000	105,000	6,400		215,000	150,000
3,300		155,000	105,000	6,500		215,000	150,000
3,400		165,000	115,000	6,600		215,000	150,000
3,500		165,000	115,000	6,700		215,000	150,000
3,570	9/64	165,000	115,000	6,750	17/64	225,000	155,000
3,600		165,000	115,000	6,800		225,000	155,000
3,650		165,000	115,000	7,000		225,000	155,000
3,700		165,000	115,000	7,200		225,000	155,000
3,750		165,000	115,000	7,400		225,000	155,000
3,800		175,000	120,000	7,500		225,000	155,000
3,900		175,000	120,000	7,700		240,000	165,000
3,970	5/32	175,000	120,000	7,800		240,000	165,000
4,000		175,000	120,000	7,900		240,000	165,000
4,100		175,000	120,000	7,940	5/16	240,000	165,000
4,200		175,000	120,000	8,000		240,000	165,000
4,300		185,000	125,000	8,100		240,000	165,000
4,370	11/64	185,000	125,000	8,200		240,000	165,000
4,400		185,000	125,000	8,330	21/64	240,000	165,000
4,500		185,000	125,000	8,400		240,000	165,000

Wiertła kręte z chwytem walcowym



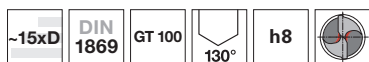
Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,100		265,000	185,000
10,200		265,000	185,000
10,250		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
10,320	13/32	265,000	185,000
10,500		265,000	185,000
11,000		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,100		295,000	205,000
12,250		295,000	205,000
12,300	31/64	295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Wiertła kręte, bardzo długie, szereg 1



Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 0,2,36$

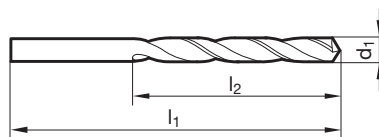
Kierunek skrawania

P • Korekcja ścina $\geq \text{Ø } 1,950$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów

K •
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

GÜHRINGNAVIGATOR

Param. skr. na str. 790



Nr artykułu **502**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,950		125,000	85,000	4,400		185,000	125,000
2,000		125,000	85,000	4,500		185,000	125,000
2,050		125,000	85,000	4,570		185,000	125,000
2,100		125,000	85,000	4,600		185,000	125,000
2,200		135,000	90,000	4,700		185,000	125,000
2,300		135,000	90,000	4,760	3/16	195,000	135,000
2,370		140,000	95,000	4,800		195,000	135,000
2,380	3/32	140,000	95,000	4,900		195,000	135,000
2,400		140,000	95,000	5,000		195,000	135,000
2,500		140,000	95,000	5,100		195,000	135,000
2,550		140,000	95,000	5,110		195,000	135,000
2,580		140,000	95,000	5,160	13/64	195,000	135,000
2,600		140,000	95,000	5,200		195,000	135,000
2,700		150,000	100,000	5,300		195,000	135,000
2,780	7/64	150,000	100,000	5,400		205,000	140,000
2,800		150,000	100,000	5,500		205,000	140,000
2,850		150,000	100,000	5,560	7/32	205,000	140,000
2,870		150,000	100,000	5,600		205,000	140,000
2,900		150,000	100,000	5,700		205,000	140,000
2,950		150,000	100,000	5,750		205,000	140,000
3,000		150,000	100,000	5,800		205,000	140,000
3,030		155,000	105,000	5,900		205,000	140,000
3,100		155,000	105,000	5,950	15/64	205,000	140,000
3,170	1/8	155,000	105,000	6,000		205,000	140,000
3,200		155,000	105,000	6,100		215,000	150,000
3,250		155,000	105,000	6,200		215,000	150,000
3,300		155,000	105,000	6,250		215,000	150,000
3,400		165,000	115,000	6,300		215,000	150,000
3,500		165,000	115,000	6,350	1/4	215,000	150,000
3,570	9/64	165,000	115,000	6,400		215,000	150,000
3,600		165,000	115,000	6,500		215,000	150,000
3,700		165,000	115,000	6,600		215,000	150,000
3,750		165,000	115,000	6,700		215,000	150,000
3,800		175,000	120,000	6,750	17/64	225,000	155,000
3,860		175,000	120,000	6,800		225,000	155,000
3,900		175,000	120,000	6,900		225,000	155,000
3,970	5/32	175,000	120,000	7,000		225,000	155,000
4,000		175,000	120,000	7,100		225,000	155,000
4,100		175,000	120,000	7,200		225,000	155,000
4,200		175,000	120,000	7,300		225,000	155,000
4,300		185,000	125,000	7,500		225,000	155,000
4,370	11/64	185,000	125,000	7,540	19/64	240,000	165,000

Wiertła kręte z
chwytami walcowymi



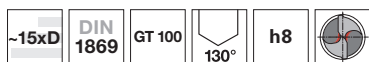
Wiertła kręte z
chwytami walcowymi

d1		l1	l2
mm	inch	mm	mm
7,700		240,000	165,000
7,750		240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,200		240,000	165,000
8,300		240,000	165,000
8,330	21/64	240,000	165,000
8,400		240,000	165,000
8,430		240,000	165,000
8,500		240,000	165,000
8,600		250,000	175,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,200		250,000	175,000
9,300		250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,200		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
10,720	27/64	280,000	195,000
11,000		280,000	195,000
11,110	7/16	280,000	195,000
11,200		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,750		280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Wiertła kręte, bardzo długie, szereg 1



- P** • Korekcja ścina $\geq \varnothing 1,980$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S** ○
- H**

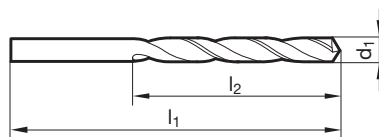
GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Wiertła kręte z chwytem walcowym



Nr artykułu **670**

d1		l1	l2
mm	inch	mm	mm
2,000		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,500		140,000	95,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,200		175,000	120,000
4,370	11/64	185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,500		240,000	165,000
8,730	11/32	250,000	175,000
9,000		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,900		280,000	195,000
11,000		280,000	195,000
11,900		295,000	205,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000



Wiertła kręte, bardzo długie, szereg 1



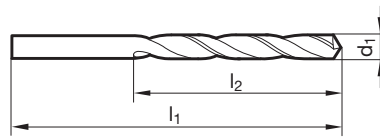
- P** ○ Korekcja ścina $\geq 2,380$ • geometria zataczana • do bardzo głębokich otworów
- M** □
- K** □
- N** ● miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnial, argalium, miękkie tworzywa sztuczne, drewno
- S** □
- H** □

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu **524**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,000		125,000	85,000	5,200		195,000	135,000
2,100		125,000	85,000	5,400		205,000	140,000
2,200		135,000	90,000	5,600		205,000	140,000
2,300		135,000	90,000	5,700		205,000	140,000
2,350		135,000	90,000	5,800		205,000	140,000
2,380	3/32	140,000	95,000	5,900		205,000	140,000
2,400		140,000	95,000	5,950	15/64	205,000	140,000
2,450		140,000	95,000	6,000		205,000	140,000
2,500		140,000	95,000	6,100		215,000	150,000
2,600		140,000	95,000	6,350	1/4	215,000	150,000
2,780	7/64	150,000	100,000	6,400		215,000	150,000
2,800		150,000	100,000	6,500		215,000	150,000
2,900		150,000	100,000	6,600		215,000	150,000
2,950		150,000	100,000	6,750	17/64	225,000	155,000
3,000		150,000	100,000	6,800		225,000	155,000
3,100		155,000	105,000	7,000		225,000	155,000
3,170	1/8	155,000	105,000	7,100		225,000	155,000
3,200		155,000	105,000	7,140	9/32	225,000	155,000
3,300		155,000	105,000	7,300		225,000	155,000
3,350		155,000	105,000	7,400		225,000	155,000
3,400		165,000	115,000	7,500		225,000	155,000
3,450		165,000	115,000	7,540	19/64	240,000	165,000
3,500		165,000	115,000	7,800		240,000	165,000
3,530		165,000	115,000	7,900		240,000	165,000
3,570	9/64	165,000	115,000	7,940	5/16	240,000	165,000
3,600		165,000	115,000	8,000		240,000	165,000
3,800		175,000	120,000	8,100		240,000	165,000
3,900		175,000	120,000	8,330	21/64	240,000	165,000
3,970	5/32	175,000	120,000	8,600		250,000	175,000
4,000		175,000	120,000	8,730	11/32	250,000	175,000
4,100		175,000	120,000	8,900		250,000	175,000
4,200		175,000	120,000	9,000		250,000	175,000
4,250		175,000	120,000	9,130	23/64	250,000	175,000
4,300		185,000	125,000	9,200		250,000	175,000
4,370	11/64	185,000	125,000	9,500		250,000	175,000
4,400		185,000	125,000	9,520	3/8	265,000	185,000
4,500		185,000	125,000	9,920	25/64	265,000	185,000
4,760	3/16	195,000	135,000	10,000		265,000	185,000
4,900		195,000	135,000	10,320	13/32	265,000	185,000
5,000		195,000	135,000	10,500		265,000	185,000
5,100		195,000	135,000	11,000		280,000	195,000
5,160	13/64	195,000	135,000	11,110	7/16	280,000	195,000

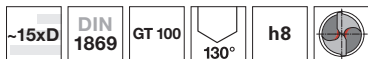


d1		l1	l2
mm	inch	mm	mm
11,500		280,000	195,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,700	1/2	295,000	205,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, bardzo długie, szereg 1



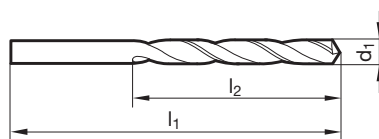
- P** • Korekcja ścina $\geq \varnothing 2,700$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stале wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu

618

d1		l1	l2
mm	inch	mm	mm
2,700		150,000	100,000
2,900		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,400		165,000	115,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,700		165,000	115,000
3,750		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
4,850		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,300		195,000	135,000
5,400		205,000	140,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000

d1		l1	l2
mm	inch	mm	mm
5,800		205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000
6,300		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,700		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,700		240,000	165,000
7,800		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,330	21/64	240,000	165,000
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,700		265,000	185,000
10,000		265,000	185,000



Wiertła kręte, bardzo długie, szereg 2

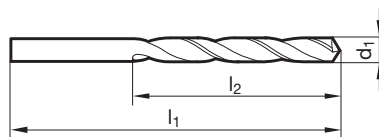


- P** • Korekcja ścina $\geq \varnothing 2,700$ • geometria zataczana • do bardzo głębokich otworów
- M**
- K** •
- N** ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **236**

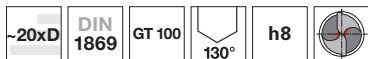
d1		l1	l2
mm	inch	mm	mm
2,700		190,000	130,000
2,800		190,000	130,000
2,900		190,000	130,000
3,000		190,000	130,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,600		210,000	145,000
3,800		220,000	150,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,800		260,000	180,000
5,900		260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000

d1		l1	l2
mm	inch	mm	mm
6,500		275,000	190,000
6,700		275,000	190,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,800		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,100		305,000	210,000
8,500		305,000	210,000
8,700		320,000	220,000
8,730	11/32	320,000	220,000
8,800		320,000	220,000
8,900		320,000	220,000
9,000		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,800		340,000	235,000
10,000		340,000	235,000
10,200		340,000	235,000
10,500		340,000	235,000
11,000		365,000	250,000
11,110	7/16	365,000	250,000
11,500		365,000	250,000
11,510	29/64	365,000	250,000
11,750		365,000	250,000
12,000		375,000	260,000
13,000		375,000	260,000

Wiertła kręte z chwytami walcowymi



Wiertła kręte, bardzo długie, szereg 2



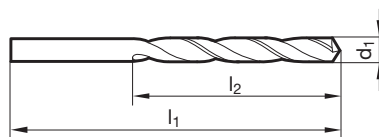
- P** • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **503**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,000		160,000	110,000	6,100		275,000	190,000
2,200		170,000	115,000	6,150		275,000	190,000
2,300		170,000	115,000	6,200		275,000	190,000
2,500		180,000	120,000	6,350	1/4	275,000	190,000
2,800		190,000	130,000	6,400		275,000	190,000
3,000		190,000	130,000	6,500		275,000	190,000
3,030		200,000	135,000	6,600		275,000	190,000
3,100		200,000	135,000	6,700		275,000	190,000
3,170	1/8	200,000	135,000	6,750	17/64	290,000	200,000
3,200		200,000	135,000	6,800		290,000	200,000
3,300		200,000	135,000	6,900		290,000	200,000
3,400		210,000	145,000	7,000		290,000	200,000
3,500		210,000	145,000	7,140	9/32	290,000	200,000
3,570	9/64	210,000	145,000	7,500		290,000	200,000
3,600		210,000	145,000	7,540	19/64	305,000	210,000
3,700		210,000	145,000	7,800		305,000	210,000
3,800		220,000	150,000	7,940	5/16	305,000	210,000
3,900		220,000	150,000	8,000		305,000	210,000
3,970	5/32	220,000	150,000	8,200		305,000	210,000
4,000		220,000	150,000	8,330	21/64	305,000	210,000
4,100		220,000	150,000	8,500		305,000	210,000
4,200		220,000	150,000	8,600		320,000	220,000
4,300		235,000	160,000	8,730	11/32	320,000	220,000
4,370	11/64	235,000	160,000	8,800		320,000	220,000
4,400		235,000	160,000	9,000		320,000	220,000
4,500		235,000	160,000	9,100		320,000	220,000
4,760	3/16	245,000	170,000	9,130	23/64	320,000	220,000
4,800		245,000	170,000	9,500		320,000	220,000
4,900		245,000	170,000	9,520	3/8	340,000	235,000
5,000		245,000	170,000	9,700		340,000	235,000
5,100		245,000	170,000	9,800		340,000	235,000
5,160	13/64	245,000	170,000	9,920	25/64	340,000	235,000
5,200		245,000	170,000	10,000		340,000	235,000
5,300		245,000	170,000	10,200		340,000	235,000
5,400		260,000	180,000	10,500		340,000	235,000
5,500		260,000	180,000	10,720	27/64	365,000	250,000
5,560	7/32	260,000	180,000	11,000		365,000	250,000
5,700		260,000	180,000	11,110	7/16	365,000	250,000
5,800		260,000	180,000	11,500		365,000	250,000
5,900		260,000	180,000	11,510	29/64	365,000	250,000
5,950	15/64	260,000	180,000	11,750		365,000	250,000
6,000		260,000	180,000	11,910	15/32	375,000	260,000

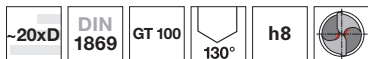


d1		l1	l2
mm	inch	mm	mm
12,000		375,000	260,000
12,300	31/64	375,000	260,000
12,500		375,000	260,000
12,700	1/2	375,000	260,000
13,000		375,000	260,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, bardzo długie, szereg 2



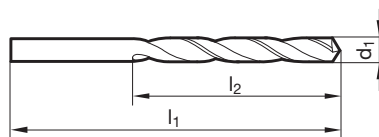
- P** • Korekcja ścina $\geq \varnothing 2,300$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S** ○
- H**

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 790



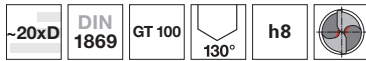
Nr artykułu **671**

d1		l1	l2
mm	inch	mm	mm
2,700		190,000	130,000
2,800		190,000	130,000
3,000		190,000	130,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,090		220,000	150,000
4,370	11/64	235,000	160,000
4,400		235,000	160,000
4,500		235,000	160,000
4,600		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
5,000		245,000	170,000

d1		l1	l2
mm	inch	mm	mm
5,300		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
6,000		260,000	180,000
6,350	1/4	275,000	190,000
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,500		305,000	210,000



Wiertła kręte, bardzo długie, szereg 2



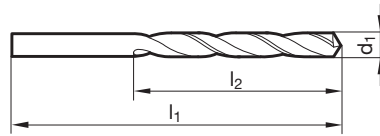
- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu **619**

d1		l1	l2
mm	inch	mm	mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,370	11/64	235,000	160,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,100		275,000	190,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000

d1		l1	l2
mm	inch	mm	mm
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,400		290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,600		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,200		305,000	210,000
8,500		305,000	210,000
8,730	11/32	320,000	220,000
9,000		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,600		340,000	235,000
9,900		340,000	235,000
10,000		340,000	235,000



Wiertła kręte, bardzo długie, szereg 3



Materiał narzędzia **HSS**

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq 3,500$ • geometria zataczana • do bardzo głębokich otworów

M

K •

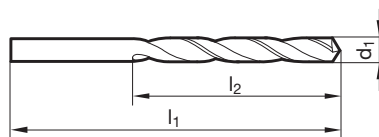
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 788



Wiertła kręte z
chwytami walcowymi

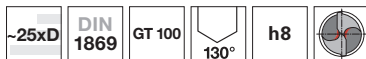
Nr artykułu **237**

d1		l1	l2
mm	inch	mm	mm
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,800		330,000	225,000
5,900		330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,000		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,500		370,000	250,000
7,800		390,000	265,000
8,000		390,000	265,000
8,500		390,000	265,000
9,000		410,000	280,000
9,500		410,000	280,000
9,800		430,000	295,000
10,000		430,000	295,000
10,300		430,000	295,000
10,500		430,000	295,000
11,000		455,000	310,000
11,500		455,000	310,000
11,750		455,000	310,000
12,000		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Wiertła kręte, bardzo długie, szereg 3



- P** • Korekcja ścina $\geq \text{Ø } 2,500$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia **HSS**

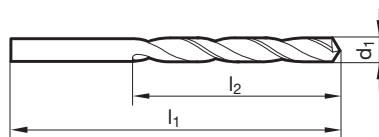
Powierzchnia

Kierunek skrawania

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu

504

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,570	9/64	265,000	180,000
3,600		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,370	11/64	295,000	200,000
4,400		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,750	17/64	370,000	250,000
6,800		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,540	19/64	390,000	265,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,330	21/64	390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
8,900		410,000	280,000
9,000		410,000	280,000
9,200		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
9,530		430,000	295,000
9,920	25/64	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Wiertła kręte, bardzo długie, szereg 3

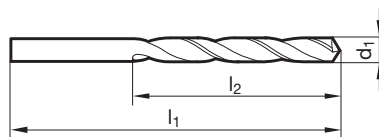


- P** ○ Korekcja ścina $\geq \varnothing 2,500$ • geometria zataczana • do bardzo głębokich otworów
- M** □
- K** □
- N** ● miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno
- S** □
- H** □

GÜHRINGNAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **529**

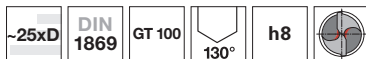
d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
6,000		330,000	225,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,500		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
8,000		390,000	265,000
9,500		410,000	280,000
10,000		430,000	295,000

Wiertła kręte z chwytym walcowym



Wiertła kręte, bardzo długie, szereg 3



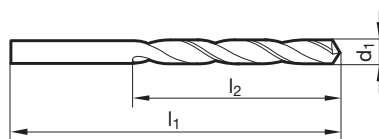
- P** • Korekcja ścina $\geq \varnothing 2,500$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSC0
Powierzchnia	
Kierunek skrawania	



Nr artykułu

571

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	370,000	250,000
6,800		370,000	250,000
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
9,000		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Wiertła kręte, ekstra długie

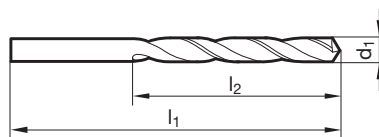


- P** • Korekcja ścina $\geq \varnothing 6,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	



Wiertła kręte z chwytem walcowym

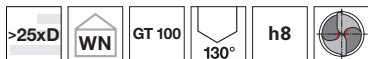
Nr artykułu **242**

d1		l1	l2
mm	inch	mm	mm
6,000		500,000	400,000
8,000		500,000	400,000
10,000		600,000	500,000
11,000		600,000	500,000
12,000		600,000	500,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, ekstra długie



- P** • Korekcja ścina $\geq \varnothing 8,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia **HSS**

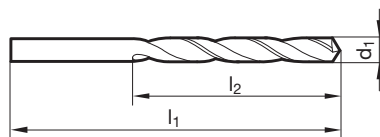
Powierzchnia ○

Kierunek skrawania (R)

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 790



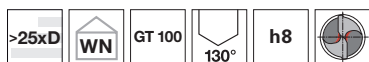
Nr artykułu **243**

d1		l1	l2
mm	inch	mm	mm
8,000		750,000	650,000
10,000		750,000	650,000
11,000		750,000	650,000
12,000		750,000	650,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, ekstra długie



- P** • Korekcja ścina $\geq \text{Ø } 10,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

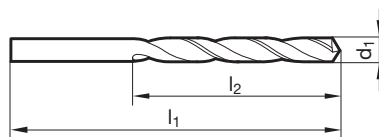
GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Wiertła kręte z chwytym walcowym



Nr artykułu **244**

d1		l1	l2
mm	inch	mm	mm
10,000		1000,000	850,000
11,000		1000,000	850,000
12,000		1000,000	850,000

d1		l1	l2
mm	inch	mm	mm



Wiertła z chwytem cylindrycznym, wzmocnionym



Materiał narzędzia **HSCO**

Powierzchnia **S**

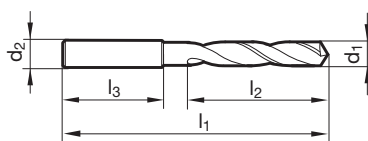
Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 2,000$ • geom. ścinowa • kobaltowa stal szybkotnąca
- M** • nie wymaga dużych sił osiowych • nie wymaga dużych momentów obrotowych • zwiększona odporność na zużycie • uniwersalne zastosowanie
- K** •
- N** • stale stopowe/niestopowe - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i na gorąco • stale nierdzewne • metale nieżelazne
- S** • materiały odlewane • tworzywa sztuczne
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 774

Wiertła kręte z chwytem walcowym



Nr artykułu **512**

d1	d2 h6	l1	l2	l3	d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2,000	3,000	44,000	12,000	28,000	5,800	6,000	72,000	28,000	36,000
2,100	3,000	44,000	12,000	28,000	5,900	6,000	72,000	28,000	36,000
2,200	3,000	45,000	13,000	28,000	5,950	6,000	72,000	28,000	36,000
2,300	3,000	45,000	13,000	28,000	6,000	6,000	72,000	28,000	36,000
2,400	3,000	46,000	14,000	28,000	6,100	8,000	75,000	31,000	36,000
2,500	3,000	46,000	14,000	28,000	6,200	8,000	75,000	31,000	36,000
2,600	3,000	46,000	14,000	28,000	6,300	8,000	75,000	31,000	36,000
2,700	3,000	48,000	16,000	28,000	6,350	8,000	75,000	31,000	36,000
2,780	3,000	48,000	16,000	28,000	6,400	8,000	75,000	31,000	36,000
2,800	3,000	48,000	16,000	28,000	6,500	8,000	75,000	31,000	36,000
2,900	3,000	48,000	16,000	28,000	6,600	8,000	75,000	31,000	36,000
3,000	3,000	48,000	16,000	28,000	6,750	8,000	78,000	34,000	36,000
3,100	4,000	50,000	18,000	28,000	6,800	8,000	78,000	34,000	36,000
3,170	4,000	50,000	18,000	28,000	6,900	8,000	78,000	34,000	36,000
3,200	4,000	50,000	18,000	28,000	7,000	8,000	78,000	34,000	36,000
3,300	4,000	50,000	18,000	28,000	7,100	8,000	78,000	34,000	36,000
3,400	4,000	52,000	20,000	28,000	7,140	8,000	78,000	34,000	36,000
3,500	4,000	52,000	20,000	28,000	7,200	8,000	78,000	34,000	36,000
3,570	4,000	52,000	20,000	28,000	7,300	8,000	78,000	34,000	36,000
3,600	4,000	52,000	20,000	28,000	7,500	8,000	78,000	34,000	36,000
3,700	4,000	52,000	20,000	28,000	7,600	8,000	81,000	37,000	36,000
3,800	4,000	54,000	22,000	28,000	7,800	8,000	81,000	37,000	36,000
3,900	4,000	54,000	22,000	28,000	7,900	8,000	81,000	37,000	36,000
4,000	4,000	54,000	22,000	28,000	7,940	8,000	81,000	37,000	36,000
4,100	6,000	66,000	22,000	36,000	8,000	8,000	81,000	37,000	36,000
4,200	6,000	66,000	22,000	36,000	8,100	10,000	87,000	37,000	40,000
4,300	6,000	68,000	24,000	36,000	8,200	10,000	87,000	37,000	40,000
4,370	6,000	68,000	24,000	36,000	8,300	10,000	87,000	37,000	40,000
4,400	6,000	68,000	24,000	36,000	8,330	10,000	87,000	37,000	40,000
4,500	6,000	68,000	24,000	36,000	8,500	10,000	87,000	37,000	40,000
4,700	6,000	68,000	24,000	36,000	8,600	10,000	91,000	40,000	40,000
4,760	6,000	70,000	26,000	36,000	8,730	10,000	91,000	40,000	40,000
4,800	6,000	70,000	26,000	36,000	8,800	10,000	91,000	40,000	40,000
4,900	6,000	70,000	26,000	36,000	8,900	10,000	91,000	40,000	40,000
5,000	6,000	70,000	26,000	36,000	9,000	10,000	91,000	40,000	40,000
5,100	6,000	70,000	26,000	36,000	9,100	10,000	91,000	40,000	40,000
5,200	6,000	70,000	26,000	36,000	9,130	10,000	91,000	40,000	40,000
5,300	6,000	70,000	26,000	36,000	9,200	10,000	91,000	40,000	40,000
5,400	6,000	72,000	28,000	36,000	9,300	10,000	91,000	40,000	40,000
5,500	6,000	72,000	28,000	36,000	9,400	10,000	91,000	40,000	40,000
5,560	6,000	72,000	28,000	36,000	9,500	10,000	91,000	40,000	40,000
5,600	6,000	72,000	28,000	36,000	9,520	10,000	93,000	43,000	40,000



d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
9,800	10,000	93,000	43,000	40,000
9,900	10,000	93,000	43,000	40,000
9,920	10,000	93,000	43,000	40,000
10,000	10,000	93,000	43,000	40,000
10,100	12,000	100,000	43,000	45,000
10,200	12,000	100,000	43,000	45,000
10,300	12,000	100,000	43,000	45,000
10,320	12,000	100,000	43,000	45,000
10,500	12,000	100,000	43,000	45,000
10,800	12,000	104,000	47,000	45,000
11,000	12,000	104,000	47,000	45,000
11,100	12,000	104,000	47,000	45,000
11,110	12,000	104,000	47,000	45,000
11,200	12,000	104,000	47,000	45,000
11,300	12,000	104,000	47,000	45,000
11,400	12,000	104,000	47,000	45,000
11,500	12,000	104,000	47,000	45,000
11,510	12,000	104,000	47,000	45,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
11,700	12,000	104,000	47,000	45,000
11,800	12,000	104,000	47,000	45,000
12,000	12,000	108,000	51,000	45,000
12,300	16,000	111,000	51,000	48,000
12,500	16,000	111,000	51,000	48,000
13,000	16,000	111,000	51,000	48,000
13,490	16,000	114,000	54,000	48,000
13,500	16,000	114,000	54,000	48,000
14,000	16,000	114,000	54,000	48,000
15,000	16,000	116,000	56,000	48,000
16,000	16,000	118,000	58,000	48,000
16,500	20,000	126,000	60,000	50,000
16,670	20,000	126,000	60,000	50,000
17,500	20,000	128,000	62,000	50,000
18,000	20,000	128,000	62,000	50,000
18,500	20,000	130,000	64,000	50,000
19,500	20,000	132,000	66,000	50,000
20,000	20,000	132,000	66,000	50,000

Wiertła kręte z
chwytami walcowymi



Wiertła z chwytem cylindrycznym, wzmocnionym



Materiał narzędzia **HSCO**

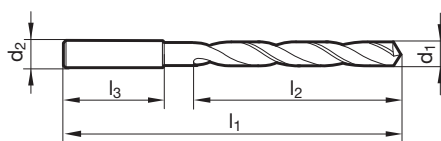
Powierzchnia **S**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 2,000$ • geom. ścinowa • kobaltowa stal szybkotnąca
- M** • nie wymaga dużych sił osiowych • nie wymaga dużych momentów obrotowych • zwiększona odporność na zużycie • uniwersalne zastosowanie
- K** •
- N** • stale stopowe/niestopowe - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i na gorąco • stale nierdzewne • metale nieżelazne
- S** • materiały odlewane • tworzywa sztuczne
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 784



Nr artykułu **511**

d1	d2 h6	l1	l2	l3	d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
2,000	3,000	56,000	24,000	28,000	6,300	8,000	107,000	63,000	36,000
2,100	3,000	56,000	24,000	28,000	6,350	8,000	107,000	63,000	36,000
2,300	3,000	59,000	27,000	28,000	6,400	8,000	107,000	63,000	36,000
2,380	3,000	62,000	30,000	28,000	6,500	8,000	107,000	63,000	36,000
2,400	3,000	62,000	30,000	28,000	6,600	8,000	107,000	63,000	36,000
2,500	3,000	62,000	30,000	28,000	6,750	8,000	113,000	69,000	36,000
2,600	3,000	62,000	30,000	28,000	6,800	8,000	113,000	69,000	36,000
2,780	3,000	65,000	33,000	28,000	6,900	8,000	113,000	69,000	36,000
2,800	3,000	65,000	33,000	28,000	7,000	8,000	113,000	69,000	36,000
2,900	3,000	65,000	33,000	28,000	7,100	8,000	113,000	69,000	36,000
3,000	3,000	65,000	33,000	28,000	7,140	8,000	113,000	69,000	36,000
3,100	4,000	68,000	36,000	28,000	7,200	8,000	113,000	69,000	36,000
3,200	4,000	68,000	36,000	28,000	7,300	8,000	113,000	69,000	36,000
3,300	4,000	68,000	36,000	28,000	7,400	8,000	113,000	69,000	36,000
3,400	4,000	71,000	39,000	28,000	7,500	8,000	113,000	69,000	36,000
3,500	4,000	71,000	39,000	28,000	7,540	8,000	119,000	75,000	36,000
3,570	4,000	71,000	39,000	28,000	7,550	8,000	119,000	75,000	36,000
3,900	4,000	75,000	43,000	28,000	7,600	8,000	119,000	75,000	36,000
3,970	4,000	75,000	43,000	28,000	7,700	8,000	119,000	75,000	36,000
4,000	4,000	75,000	43,000	28,000	7,800	8,000	119,000	75,000	36,000
4,200	6,000	87,000	43,000	36,000	7,900	8,000	119,000	75,000	36,000
4,300	6,000	91,000	47,000	36,000	8,000	8,000	119,000	75,000	36,000
4,370	6,000	91,000	47,000	36,000	8,100	10,000	125,000	75,000	40,000
4,400	6,000	91,000	47,000	36,000	8,200	10,000	125,000	75,000	40,000
4,500	6,000	91,000	47,000	36,000	8,300	10,000	125,000	75,000	40,000
4,650	6,000	91,000	47,000	36,000	8,330	10,000	125,000	75,000	40,000
4,700	6,000	91,000	47,000	36,000	8,500	10,000	125,000	75,000	40,000
4,760	6,000	96,000	52,000	36,000	8,600	10,000	131,000	81,000	40,000
4,800	6,000	96,000	52,000	36,000	8,730	10,000	131,000	81,000	40,000
4,900	6,000	96,000	52,000	36,000	8,800	10,000	131,000	81,000	40,000
5,000	6,000	96,000	52,000	36,000	8,900	10,000	131,000	81,000	40,000
5,100	6,000	96,000	52,000	36,000	9,000	10,000	131,000	81,000	40,000
5,160	6,000	96,000	52,000	36,000	9,100	10,000	131,000	81,000	40,000
5,200	6,000	96,000	52,000	36,000	9,130	10,000	131,000	81,000	40,000
5,300	6,000	96,000	52,000	36,000	9,400	10,000	131,000	81,000	40,000
5,400	6,000	101,000	57,000	36,000	9,500	10,000	131,000	81,000	40,000
5,500	6,000	101,000	57,000	36,000	9,520	10,000	137,000	87,000	40,000
5,600	6,000	101,000	57,000	36,000	9,550	10,000	137,000	87,000	40,000
5,800	6,000	101,000	57,000	36,000	9,600	10,000	137,000	87,000	40,000
5,900	6,000	101,000	57,000	36,000	9,900	10,000	137,000	87,000	40,000
6,000	6,000	101,000	57,000	36,000	9,920	10,000	137,000	87,000	40,000
6,100	8,000	107,000	63,000	36,000	10,000	10,000	137,000	87,000	40,000

Wiertła kręte z chwytem walcowym



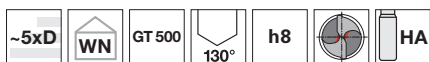
d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
10,100	12,000	144,000	87,000	45,000
10,200	12,000	144,000	87,000	45,000
10,400	12,000	144,000	87,000	45,000
10,500	12,000	144,000	87,000	45,000
10,600	12,000	144,000	87,000	45,000
10,800	12,000	151,000	94,000	45,000
11,000	12,000	151,000	94,000	45,000
11,110	12,000	151,000	94,000	45,000
11,200	12,000	151,000	94,000	45,000
11,300	12,000	151,000	94,000	45,000
11,510	12,000	151,000	94,000	45,000
11,800	12,000	151,000	94,000	45,000
11,910	12,000	158,000	101,000	45,000
12,000	12,000	158,000	101,000	45,000
12,200	16,000	161,000	101,000	48,000
12,500	16,000	161,000	101,000	48,000
12,700	16,000	161,000	101,000	48,000
13,000	16,000	161,000	101,000	48,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
13,500	16,000	166,000	106,000	48,000
13,890	16,000	166,000	106,000	48,000
14,000	16,000	166,000	106,000	48,000
14,500	16,000	169,000	109,000	48,000
15,000	16,000	169,000	109,000	48,000
15,500	16,000	172,000	112,000	48,000
16,000	16,000	172,000	112,000	48,000
16,500	20,000	181,000	115,000	50,000
17,000	20,000	181,000	115,000	50,000
17,460	20,000	184,000	118,000	50,000
17,500	20,000	184,000	118,000	50,000
18,000	20,000	184,000	118,000	50,000
19,000	20,000	188,000	122,000	50,000
19,500	20,000	191,000	125,000	50,000
20,000	20,000	191,000	125,000	50,000

Wiertła kręte z
chwytami walcowymi



Wiertła z chwytym cylindrycznym, wzmocnionym



- P** • Korekcja ścina $\geq \text{Ø } 2,000$ • geometria zataczana ze specjalną korekcją ścina typu B • proszkowa, kobaltowa stal szybko tnąca • szczególnie wysoka sztywność • szczególnie wysoka odporność ścieranie
- M** ○
- K** •
- N** ○ wysokowytrzymałe materiały, stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania • żeliwo, miedź, brąz
- S** ○
- H** ○

Materiał narzędzia **HSS-E-PM**

Powierzchnia **F**

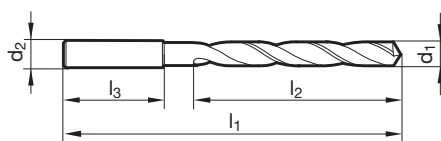
Kierunek skrawania **R**



GÜHRING NAVIGATOR

Param. skr. na str. 784

Wiertła kręte z chwytym walcowym



Nr artykułu **513**

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
2,000	3,000	56,000	24,000	28,000
2,100	3,000	56,000	24,000	28,000
2,380	3,000	62,000	30,000	28,000
2,500	3,000	62,000	30,000	28,000
2,780	3,000	65,000	33,000	28,000
3,000	3,000	65,000	33,000	28,000
3,170	4,000	68,000	36,000	28,000
3,300	4,000	68,000	36,000	28,000
3,500	4,000	71,000	39,000	28,000
3,570	4,000	71,000	39,000	28,000
3,970	4,000	75,000	43,000	28,000
4,000	4,000	75,000	43,000	28,000
4,200	6,000	87,000	43,000	36,000
4,370	6,000	91,000	47,000	36,000
4,500	6,000	91,000	47,000	36,000
4,650	6,000	91,000	47,000	36,000
4,760	6,000	96,000	52,000	36,000
4,800	6,000	96,000	52,000	36,000
5,000	6,000	96,000	52,000	36,000
5,100	6,000	96,000	52,000	36,000
5,160	6,000	96,000	52,000	36,000
5,200	6,000	96,000	52,000	36,000
5,300	6,000	96,000	52,000	36,000
5,500	6,000	101,000	57,000	36,000
5,800	6,000	101,000	57,000	36,000
6,000	6,000	101,000	57,000	36,000
6,350	8,000	107,000	63,000	36,000
6,500	8,000	107,000	63,000	36,000
6,600	8,000	107,000	63,000	36,000
6,750	8,000	113,000	69,000	36,000
6,800	8,000	113,000	69,000	36,000
7,000	8,000	113,000	69,000	36,000
7,140	8,000	113,000	69,000	36,000
7,400	8,000	113,000	69,000	36,000
7,500	8,000	113,000	69,000	36,000
7,540	8,000	119,000	75,000	36,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
7,800	8,000	119,000	75,000	36,000
7,940	8,000	119,000	75,000	36,000
8,000	8,000	119,000	75,000	36,000
8,330	10,000	125,000	75,000	40,000
8,500	10,000	125,000	75,000	40,000
8,730	10,000	131,000	81,000	40,000
8,800	10,000	131,000	81,000	40,000
9,000	10,000	131,000	81,000	40,000
9,130	10,000	131,000	81,000	40,000
9,300	10,000	131,000	81,000	40,000
9,500	10,000	131,000	81,000	40,000
9,520	10,000	137,000	87,000	40,000
9,600	10,000	137,000	87,000	40,000
9,800	10,000	137,000	87,000	40,000
9,920	10,000	137,000	87,000	40,000
10,000	10,000	137,000	87,000	40,000
10,200	12,000	144,000	87,000	45,000
10,500	12,000	144,000	87,000	45,000
10,600	12,000	144,000	87,000	45,000
10,700	12,000	151,000	94,000	45,000
10,900	12,000	151,000	94,000	45,000
11,000	12,000	151,000	94,000	45,000
11,100	12,000	151,000	94,000	45,000
11,300	12,000	151,000	94,000	45,000
11,400	12,000	151,000	94,000	45,000
11,500	12,000	151,000	94,000	45,000
11,900	12,000	158,000	101,000	45,000
12,000	12,000	158,000	101,000	45,000
12,200	14,000	161,000	101,000	45,000
12,300	14,000	161,000	101,000	45,000
12,400	14,000	161,000	101,000	45,000
12,500	14,000	161,000	101,000	45,000
12,600	14,000	161,000	101,000	45,000
12,700	14,000	161,000	101,000	45,000
12,900	14,000	161,000	101,000	45,000



Wiertła z chwytem cylindrycznym, wzmocnionym



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Kierunek skrawania **R**

P ○ Korekcja ścina $\geq \varnothing 2,600$ • geom. ścinowa • główna krawędź skrawająca - prosta (po korekcji)

M

K ○

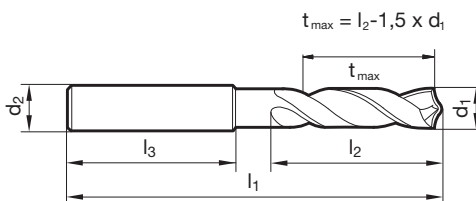
N stале hartowane do 62 HRC

S

H •

GÜHRING NAVIGATOR

Param. skr. na str. 776



Wiertła kręte z chwytem walcowym

Nr artykułu **1946**

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
2,600	6,000	62,000	20,000	36,000
3,000	6,000	62,000	20,000	36,000
3,400	6,000	62,000	20,000	36,000
4,000	6,000	66,000	24,000	36,000
4,300	6,000	66,000	24,000	36,000
5,000	6,000	66,000	28,000	36,000
5,100	6,000	66,000	28,000	36,000
5,600	6,000	66,000	28,000	36,000
6,000	6,000	66,000	28,000	36,000
6,900	8,000	79,000	34,000	36,000
7,100	8,000	79,000	41,000	36,000
8,000	8,000	79,000	41,000	36,000

d1	d2 h6	l1	l2	l3
mm	mm	mm	mm	mm
8,600	10,000	89,000	47,000	40,000
9,100	10,000	89,000	47,000	40,000
10,000	10,000	89,000	47,000	40,000
10,400	12,000	102,000	55,000	45,000
10,600	12,000	102,000	55,000	45,000
11,100	12,000	102,000	55,000	45,000
12,000	12,000	102,000	55,000	45,000
14,100	16,000	115,000	65,000	48,000



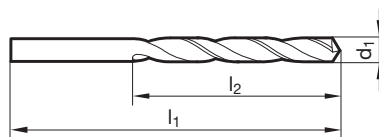
Wiertła lotnicze, długość 6 cali



P	•	Korekcja ścina $\geq \varnothing 1,500$ • geometria zataczana
M		
K	•	
N	•	blachy ze stopów Al • laminaty • stале i żeliwa
S		
H		

Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **577**

d1		l1	l2
mm	inch	mm	mm
1,500		153,000	23,000
1,590	1/16	153,000	26,000
1,650		153,000	26,000
1,750		153,000	26,000
1,780		153,000	26,000
1,900		153,000	26,000
1,930		153,000	29,000
1,980	5/64	153,000	29,000
1,990		153,000	29,000
2,000		153,000	29,000
2,100		153,000	29,000
2,300		153,000	32,500
2,380	3/32	153,000	37,000
2,400		153,000	37,000
2,490		153,000	37,000
2,500		153,000	37,000
2,530		153,000	37,000
2,580		153,000	37,000
2,870		153,000	42,000
2,950		153,000	42,000
3,000		153,000	42,000
3,170	1/8	153,000	42,000
3,200		153,000	42,000
3,260		153,000	42,000
3,500		154,000	49,000
3,570	9/64	154,000	49,000
3,800		154,000	55,000
3,860		154,000	55,000
3,910		154,000	55,000
3,970	5/32	154,000	55,000
4,000		154,000	55,000
4,040		154,000	55,000
4,090		154,000	55,000
4,220		154,000	55,000
4,390		154,000	60,000
4,500		154,000	60,000

d1		l1	l2
mm	inch	mm	mm
4,570		154,000	60,000
4,700		154,000	60,000
4,760	3/16	154,000	63,500
4,800		154,000	63,500
4,850		154,000	63,500
4,920		154,000	63,500
4,980		154,000	63,500
5,000		154,000	63,500
5,160	13/64	154,000	63,500
5,500		154,000	68,500
5,560	7/32	154,000	68,500
5,800		154,000	68,500
5,940		154,000	68,500
5,950	15/64	154,000	68,500
6,040		154,000	75,000
6,150		154,000	75,000
6,200		154,000	75,000
6,250		154,000	75,000
6,350	1/4	154,000	75,000
6,530		154,000	75,000
6,800		155,000	80,000
7,000		155,000	80,000
7,700		155,000	90,000
7,940	5/16	155,000	90,000
8,000		155,000	90,000

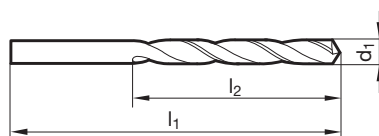


Wiertła lotnicze, długość 6 cali



- P** • Korekcja ścina $\geq \varnothing 1,500$ • geometria zataczana
- M**
- K** •
- N** • blachy ze stopów Al • laminaty • stale i żeliwa
- S**
- H**

Materiał narzędzia	HSS
Powierzchnia	$\bullet \begin{matrix} >0 \\ 2,36 \end{matrix}$
Kierunek skrawania	(R)



Wiertła kręte z chwytami walcowymi

Nr artykułu **579**

d1		l1	l2
mm	inch	mm	mm
1,500		153,000	23,000
1,590	1/16	153,000	26,000
1,780		153,000	26,000
1,980	5/64	153,000	29,000
2,000		153,000	29,000
2,380	3/32	153,000	37,000
2,400		153,000	37,000
2,490		153,000	37,000
2,500		153,000	37,000
2,580		153,000	37,000
2,640		153,000	37,000
2,710		153,000	42,000
2,780	7/64	153,000	42,000
2,790		153,000	42,000
2,820		153,000	42,000
2,870		153,000	42,000
2,950		153,000	42,000
3,000		153,000	42,000
3,050		153,000	42,000
3,170	1/8	153,000	42,000
3,200		153,000	42,000
3,260		153,000	42,000
3,450		154,000	49,000
3,500		154,000	49,000
3,570	9/64	154,000	49,000
3,600		154,000	49,000
3,660		154,000	49,000
3,700		154,000	49,000
3,800		154,000	55,000
3,970	5/32	154,000	55,000

d1		l1	l2
mm	inch	mm	mm
3,990		154,000	55,000
4,000		154,000	55,000
4,040		154,000	55,000
4,090		154,000	55,000
4,370	11/64	154,000	60,000
4,390		154,000	60,000
4,500		154,000	60,000
4,570		154,000	60,000
4,620		154,000	60,000
4,760	3/16	154,000	63,500
4,800		154,000	63,500
4,850		154,000	63,500
4,920		154,000	63,500
4,980		154,000	63,500
5,000		154,000	63,500
5,160	13/64	154,000	63,500
5,560	7/32	154,000	68,500
5,800		154,000	68,500
5,940		154,000	68,500
5,950	15/64	154,000	68,500
6,040		154,000	75,000
6,250		154,000	75,000
6,350	1/4	154,000	75,000
6,450		154,000	75,000
6,530		154,000	75,000
6,750	17/64	155,000	80,000
7,940	5/16	155,000	90,000
8,000		155,000	90,000



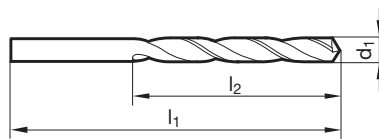
Wiertła lotnicze, długość 12 cali



- P** • Korekcja ścina $\geq \varnothing 1,500$ • geometria zataczana
- M**
- K** •
- N** • blachy ze stopów Al • laminaty • stале i żeliwa
- S**
- H**

Wiertła kręte z chwytym walcowym

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



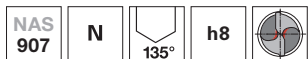
Nr artykułu **578**

d1		l1	l2
mm	inch	mm	mm
1,500		306,000	23,000
1,590	1/16	306,000	26,000
1,780		306,000	26,000
1,850		306,000	26,000
1,930		306,000	29,000
2,000		306,000	29,000
2,180		306,000	32,500
2,260		306,000	32,500
2,380	3/32	306,000	37,000
2,440		306,000	37,000
2,490		306,000	37,000
2,500		306,000	37,000
2,580		306,000	37,000
2,640		306,000	37,000
2,790		306,000	42,000
2,820		306,000	42,000
3,000		306,000	42,000
3,170	1/8	306,000	42,000
3,200		306,000	42,000
3,260		306,000	42,000
3,500		308,000	49,000
3,570	9/64	308,000	49,000
3,660		308,000	49,000
3,800		308,000	55,000
3,970	5/32	308,000	55,000
4,000		308,000	55,000
4,040		308,000	55,000
4,090		308,000	55,000
4,220		308,000	55,000
4,370	11/64	308,000	60,000

d1		l1	l2
mm	inch	mm	mm
4,390		308,000	60,000
4,500		308,000	60,000
4,570		308,000	60,000
4,620		308,000	60,000
4,700		308,000	60,000
4,760	3/16	308,000	63,500
4,800		308,000	63,500
4,850		308,000	63,500
4,920		308,000	63,500
4,980		308,000	63,500
5,000		308,000	63,500
5,160	13/64	308,000	63,500
5,500		308,000	68,500
5,800		308,000	68,500
5,950	15/64	308,000	68,500
6,000		308,000	68,500
6,040		308,000	75,000
6,350	1/4	308,000	75,000
6,530		308,000	75,000
7,000		310,000	80,000
8,000		310,000	90,000

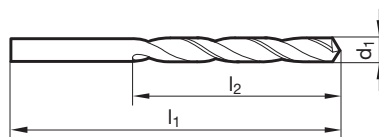


Wiertła lotnicze, długość 12 cali



- P** • Korekcja ścina $\geq \varnothing 1,500$ • geometria zataczana
- M**
- K** •
- N** • blachy ze stopów Al • laminaty • stале i żeliwa
- S**
- H**

Materiał narzędzia	HSS
Powierzchnia	$\text{Ra} > 0,2,36$
Kierunek skrawania	R



Wiertła kręte z chwytym walcowym

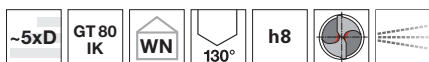
Nr artykułu **580**

d1		l1	l2
mm	inch	mm	mm
1,500		306,000	23,000
1,590	1/16	306,000	26,000
1,780		306,000	26,000
1,980	5/64	306,000	29,000
2,000		306,000	29,000
2,380	3/32	306,000	37,000
2,490		306,000	37,000
2,500		306,000	37,000
2,580		306,000	37,000
2,640		306,000	37,000
2,710		306,000	42,000
2,780	7/64	306,000	42,000
2,790		306,000	42,000
2,820		306,000	42,000
2,870		306,000	42,000
2,950		306,000	42,000
3,000		306,000	42,000
3,170	1/8	306,000	42,000
3,260		306,000	42,000
3,450		308,000	49,000
3,500		308,000	49,000
3,660		308,000	49,000
3,730		308,000	49,000
3,800		308,000	55,000
3,970	5/32	308,000	55,000
3,990		308,000	55,000
4,000		308,000	55,000
4,040		308,000	55,000
4,300		308,000	60,000
4,370	11/64	308,000	60,000

d1		l1	l2
mm	inch	mm	mm
4,390		308,000	60,000
4,500		308,000	60,000
4,570		308,000	60,000
4,620		308,000	60,000
4,700		308,000	60,000
4,760	3/16	308,000	63,500
4,800		308,000	63,500
4,850		308,000	63,500
4,920		308,000	63,500
4,980		308,000	63,500
5,000		308,000	63,500
5,060		308,000	63,500
5,110		308,000	63,500
5,160	13/64	308,000	63,500
5,560	7/32	308,000	68,500
5,790		308,000	68,500
5,940		308,000	68,500
5,950	15/64	308,000	68,500
6,000		308,000	68,500
6,040		308,000	75,000
6,150		308,000	75,000
6,250		308,000	75,000
6,350	1/4	308,000	75,000
6,530		308,000	75,000
7,940	5/16	310,000	90,000
8,000		310,000	90,000



Wiertła z chłodzeniem wew.

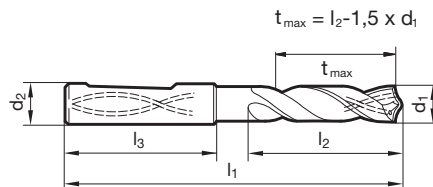


- P** • Korekcja ścina $\geq \varnothing 5,000$ • geometria zataczana • kobaltowa stal szybkotnąca
- M** •
- K** •
- N** • długosiłowe materiały $R_m \leq 1000 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane • metale nieżelazne
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 784

Materiał narzędzia	HSCO
Powierzchnia	○
Forma chwytu	HE



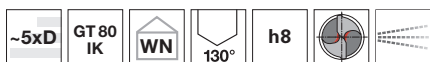
Wiertła kręte z chwytami walcowymi

Nr artykułu **1131**

d1		d6 h6	l1	l2	l3	d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
5,000		6,000	82,000	44,000	36,000	13,000		14,000	124,000	77,000	45,000
5,500		6,000	82,000	44,000	36,000	13,500		14,000	124,000	77,000	45,000
6,000		6,000	82,000	44,000	36,000	14,000		14,000	124,000	77,000	45,000
6,350	1/4	8,000	91,000	53,000	36,000	14,290	9/16	16,000	133,000	83,000	48,000
6,800		8,000	91,000	53,000	36,000	15,000		16,000	133,000	83,000	48,000
7,140	9/32	8,000	91,000	53,000	36,000	15,500		16,000	133,000	83,000	48,000
7,800		8,000	91,000	53,000	36,000	15,870	5/8	16,000	133,000	83,000	48,000
8,000		8,000	91,000	53,000	36,000	16,000		16,000	133,000	83,000	48,000
9,000		10,000	103,000	61,000	40,000	16,500		18,000	143,000	93,000	48,000
9,500		10,000	103,000	61,000	40,000	17,000		18,000	143,000	93,000	48,000
10,000		10,000	103,000	61,000	40,000	17,500		18,000	143,000	93,000	48,000
10,200		12,000	118,000	71,000	45,000	18,000		18,000	143,000	93,000	48,000
10,320	13/32	12,000	118,000	71,000	45,000	18,500		20,000	153,000	101,000	50,000
10,500		12,000	118,000	71,000	45,000	19,500		20,000	153,000	101,000	50,000
11,000		12,000	118,000	71,000	45,000	20,000		20,000	153,000	101,000	50,000
11,500		12,000	118,000	71,000	45,000						
12,000		12,000	118,000	71,000	45,000						
12,500		14,000	124,000	77,000	45,000						



Wiertła z chłodzeniem wew.



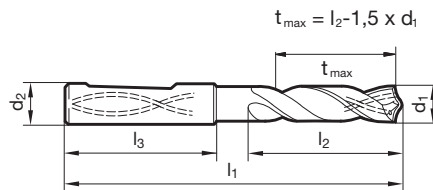
- P** • Korekcja ścina $\geq \varnothing 5,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** •
- K** •
- N** • długosiłowe materiały $R_m \leq 1000 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane • metale nieżelazne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 784

Materiał narzędzia	HSC0
Powierzchnia	S
Forma chwytu	HE

Wiertła kręte z chwytami walcowymi



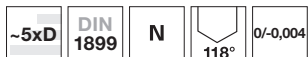
Nr artykułu **1132**

d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,000		6,000	82,000	44,000	36,000
5,500		6,000	82,000	44,000	36,000
6,000		6,000	82,000	44,000	36,000
6,500		8,000	91,000	53,000	36,000
6,800		8,000	91,000	53,000	36,000
7,000		8,000	91,000	53,000	36,000
7,500		8,000	91,000	53,000	36,000
7,800		8,000	91,000	53,000	36,000
8,000		8,000	91,000	53,000	36,000
8,500		10,000	103,000	61,000	40,000
9,000		10,000	103,000	61,000	40,000
9,500		10,000	103,000	61,000	40,000
10,000		10,000	103,000	61,000	40,000
10,200		12,000	118,000	71,000	45,000
10,320	13/32	12,000	118,000	71,000	45,000
10,500		12,000	118,000	71,000	45,000
11,000		12,000	118,000	71,000	45,000
11,500		12,000	118,000	71,000	45,000

d1		d6 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
12,000		12,000	118,000	71,000	45,000
12,500		14,000	124,000	77,000	45,000
13,000		14,000	124,000	77,000	45,000
13,500		14,000	124,000	77,000	45,000
14,000		14,000	124,000	77,000	45,000
14,500		16,000	133,000	83,000	48,000
15,000		16,000	133,000	83,000	48,000
15,500		16,000	133,000	83,000	48,000
15,870	5/8	16,000	133,000	83,000	48,000
16,000		16,000	133,000	83,000	48,000
16,500		18,000	143,000	93,000	48,000
17,000		18,000	143,000	93,000	48,000
17,500		18,000	143,000	93,000	48,000
18,000		18,000	143,000	93,000	48,000
19,000		20,000	153,000	101,000	50,000
19,500		20,000	153,000	101,000	50,000
20,000		20,000	153,000	101,000	50,000



Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E



Materiał narzędzia **HSS-E-PM**

Powierzchnia



Kierunek skrawania



P • geom. ścinowa • ze wzmocnionym chwytem • $\varnothing 0.15\text{ mm}$ kobaltowa stal szybkotnąca

M •

K •

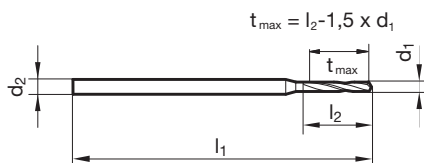
N • stale wysokostopowe

S ○

H

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Wiertła kręte z chwytem walcowym

Nr artykułu **301**

d1	d2	l1	l2
mm	mm	mm	mm
0,050	1,000	25,000	0,400
0,060	1,000	25,000	0,400
0,070	1,000	25,000	0,500
0,075	1,000	25,000	0,500
0,080	1,000	25,000	0,500
0,090	1,000	25,000	0,500
0,100	1,000	25,000	0,500
0,105	1,000	25,000	0,500
0,110	1,000	25,000	0,500
0,115	1,000	25,000	0,500
0,120	1,000	25,000	0,500
0,121	1,000	25,000	0,800
0,125	1,000	25,000	0,800
0,128	1,000	25,000	0,800
0,130	1,000	25,000	0,800
0,140	1,000	25,000	0,800
0,143	1,000	25,000	0,800
0,145	1,000	25,000	0,800
0,147	1,000	25,000	0,800
0,150	1,000	25,000	0,800
0,155	1,000	25,000	1,100
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,175	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,195	1,000	25,000	1,500
0,200	1,000	25,000	1,500
0,205	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,215	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,225	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,235	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,245	1,000	25,000	1,900
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900

d1	d2	l1	l2
mm	mm	mm	mm
0,275	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,285	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,305	1,000	25,000	2,400
0,310	1,000	25,000	2,400
0,315	1,000	25,000	2,400
0,320	1,000	25,000	2,400
0,325	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,335	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,345	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,355	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,365	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,375	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,385	1,000	25,000	3,000
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000
0,405	1,000	25,000	3,000
0,410	1,000	25,000	3,000
0,415	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,425	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,432	1,000	25,000	3,000
0,435	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,445	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,455	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,475	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,485	1,000	25,000	3,400



Wiertła kręte z
chwytami walcowymi

d1	d2	l1	l2
mm	mm	mm	mm
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,505	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,515	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,530	1,000	25,000	3,400
0,535	1,000	25,000	3,900
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,585	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,595	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,605	1,000	25,000	4,200
0,610	1,000	25,000	4,200
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,625	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,632	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,655	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,665	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,705	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,725	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,795	1,500	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,825	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,845	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,930	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,010	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,055	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,130	1,500	25,000	7,600
1,140	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500
1,200	1,500	25,000	8,500
1,210	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,230	1,500	25,000	8,500
1,240	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,260	1,500	25,000	8,500
1,265	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,320	1,500	25,000	8,500
1,325	1,500	25,000	9,500
1,330	1,500	25,000	9,500
1,340	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,370	1,500	25,000	9,500
1,380	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,410	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,430	1,500	25,000	9,500
1,440	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,470	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,520	2,000	30,000	10,600
1,530	2,000	30,000	10,600
1,540	2,000	30,000	10,600
1,550	2,000	30,000	10,600
1,590	2,000	30,000	10,600
1,600	2,000	30,000	10,600
1,610	2,000	30,000	10,600
1,630	2,000	30,000	10,600
1,640	2,000	30,000	10,600
1,650	2,000	30,000	10,600
1,660	2,000	30,000	10,600
1,690	2,000	30,000	10,600
1,700	2,000	30,000	10,600
1,710	2,000	30,000	11,800
1,715	2,000	30,000	11,800
1,730	2,000	30,000	11,800
1,745	2,000	30,000	11,800
1,750	2,000	30,000	11,800
1,775	2,000	30,000	11,800
1,800	2,000	30,000	11,800

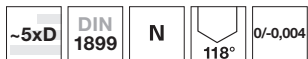


d1	d2	l1	l2
mm	mm	mm	mm
1,830	2,000	30,000	11,800
1,840	2,000	30,000	11,800
1,850	2,000	30,000	11,800
1,860	2,000	30,000	11,800
1,900	2,000	30,000	11,800
1,920	2,000	30,000	13,200

d1	d2	l1	l2
mm	mm	mm	mm



Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E



Materiał narzędzia **HSS-E-PM**

Powierzchnia **S**

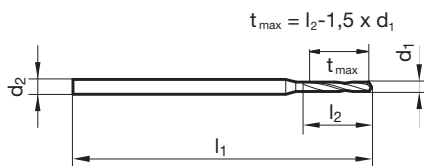
Kierunek skrawania **R**

- P** • geom. ścinowa • ze wzmocnionym chwytem • zwiększona odporność na zużycie
- M** •
- K** •
- N** • stale wysokostopowe
- S** ○
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 796

Wiertła kręte z chwytem walcowym



Nr artykułu **660**

d1	d2	l1	l2
mm	mm	mm	mm
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,200	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,305	1,000	25,000	2,400
0,310	1,000	25,000	2,400
0,320	1,000	25,000	2,400
0,325	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000
0,410	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,490	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400

d1	d2	l1	l2
mm	mm	mm	mm
0,530	1,000	25,000	3,400
0,540	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,610	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800



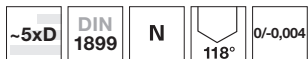
d1	d2	l1	l2
mm	mm	mm	mm
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500

d1	d2	l1	l2
mm	mm	mm	mm
1,200	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,500	2,000	30,000	9,500
1,800	2,000	30,000	11,800
1,900	2,000	30,000	11,800

Wiertła kręte z
chwytami walcowymi



Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E



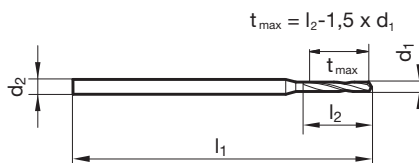
- P** • geom. ścinowa • ze wzmocnionym chwytem • $\varnothing 0.15\text{ mm}$ kobaltowa stal szybkotnąca
- M** •
- K** •
- N** • stale wysokostopowe
- S** ○
- H**

Materiał narzędzia	HSS-E-PM
Powierzchnia	○
Kierunek skrawania	Ⓛ

Wiertła kręte z chwytem walcowym

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Nr artykułu **303**

d1	d2	l1	l2
mm	mm	mm	mm
0,130	1,000	25,000	0,800
0,140	1,000	25,000	0,800
0,150	1,000	25,000	0,800
0,155	1,000	25,000	1,100
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,175	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,185	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,195	1,000	25,000	1,500
0,200	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,215	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,225	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,235	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,245	1,000	25,000	1,900
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900
0,275	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,310	1,000	25,000	2,400
0,315	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,345	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,355	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000

d1	d2	l1	l2
mm	mm	mm	mm
0,410	1,000	25,000	3,000
0,415	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,435	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,465	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,485	1,000	25,000	3,400
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,555	1,000	25,000	3,900
0,565	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,685	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800



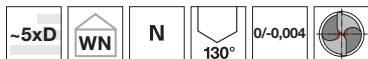
d1	d2	l1	l2
mm	mm	mm	mm
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,805	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,855	1,500	25,000	6,000
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,885	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,915	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,935	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,975	1,500	25,000	6,800
0,980	1,500	25,000	6,800
0,985	1,500	25,000	6,800
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,005	1,500	25,000	6,800
1,020	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,080	1,500	25,000	7,600
1,085	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,125	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,285	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,330	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,360	1,500	25,000	9,500
1,375	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,405	1,500	25,000	9,500
1,425	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,600	2,000	30,000	10,600
1,615	2,000	30,000	10,600
1,800	2,000	30,000	11,800
1,850	2,000	30,000	11,800

Wiertła kręte z
chwytami walcowymi



Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego



Materiał narzędzia **Węglík mono.**

Powierzchnia



Kierunek skrawania

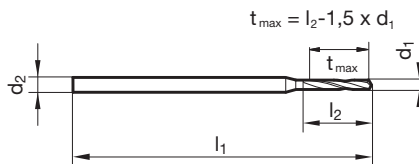


- P** ● Korekcja ścina $\geq \varnothing 0,800$ • geom. ścinowa • główna krawędź skrawająca - prosta
- M** ○
- K** ●
- N** ○ stęle konstrukcyjne i do nawęglania • materiały odlewane • brąz, mosiądz • aluminium i stopy Al • magnez i stopy magnezu • tworzywa sztuczne, w tym również wzmacniane włóknami
- S** ○
- H** ○

Wiertła kręte z chwytem walcowym

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Nr artykułu

701

d1	d2	l1	l2
mm	mm	mm	mm
0,200	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,330	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,400	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,500	1,000	25,000	3,400
0,600	1,000	25,000	3,900
0,650	1,000	25,000	4,200
0,700	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,830	1,500	25,000	5,300

d1	d2	l1	l2
mm	mm	mm	mm
0,850	1,500	25,000	5,300
0,900	1,500	25,000	6,000
1,000	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,400	1,500	25,000	9,500



Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego



Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 0,800$ • geom. ścinowa

M

K •

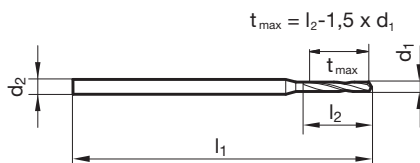
N stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Wiertła kręte z chwytym walcowym

Nr artykułu **3899**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,100	3,000	38,000	1,200
0,150	3,000	38,000	2,000
0,200	3,000	38,000	2,500
0,250	3,000	38,000	3,000
0,260	3,000	38,000	3,000
0,270	3,000	38,000	3,000
0,280	3,000	38,000	3,000
0,300	3,000	38,000	5,000
0,310	3,000	38,000	5,000
0,330	3,000	38,000	5,000
0,350	3,000	38,000	6,000
0,360	3,000	38,000	6,000
0,370	3,000	38,000	6,000
0,380	3,000	38,000	6,000
0,400	3,000	38,000	7,000
0,410	3,000	38,000	7,000
0,430	3,000	38,000	7,000
0,440	3,000	38,000	7,000
0,450	3,000	38,000	7,000
0,480	3,000	38,000	7,000
0,500	3,000	38,000	7,000
0,510	3,000	38,000	7,000
0,530	3,000	38,000	7,000
0,550	3,000	38,000	7,000
0,570	3,000	38,000	7,000
0,600	3,000	38,000	7,000
0,640	3,000	38,000	7,000
0,650	3,000	38,000	7,000
0,660	3,000	38,000	7,000
0,680	3,000	38,000	7,000
0,700	3,000	38,000	8,000
0,710	3,000	38,000	8,000
0,720	3,000	38,000	8,000
0,740	3,000	38,000	8,000
0,750	3,000	38,000	8,000
0,760	3,000	38,000	8,000
0,770	3,000	38,000	8,000
0,780	3,000	38,000	8,000
0,790	3,000	38,000	8,000
0,800	3,000	38,000	10,000
0,810	3,000	38,000	10,000
0,820	3,000	38,000	10,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,830	3,000	38,000	10,000
0,840	3,000	38,000	10,000
0,850	3,000	38,000	10,000
0,860	3,000	38,000	10,000
0,870	3,000	38,000	10,000
0,880	3,000	38,000	10,000
0,890	3,000	38,000	10,000
0,900	3,000	38,000	10,000
0,910	3,000	38,000	10,000
0,920	3,000	38,000	10,000
0,930	3,000	38,000	10,000
0,940	3,000	38,000	10,000
0,950	3,000	38,000	10,000
0,960	3,000	38,000	10,000
0,970	3,000	38,000	10,000
0,980	3,000	38,000	10,000
0,990	3,000	38,000	10,000
1,000	3,000	38,000	10,000
1,010	3,000	38,000	10,000
1,020	3,000	38,000	10,000
1,050	3,000	38,000	10,000
1,060	3,000	38,000	10,000
1,070	3,000	38,000	10,000
1,090	3,000	38,000	10,000
1,100	3,000	38,000	10,000
1,110	3,000	38,000	10,000
1,150	3,000	38,000	10,000
1,170	3,000	38,000	10,000
1,190	3,000	38,000	10,000
1,200	3,000	38,000	10,000
1,210	3,000	38,000	10,000
1,220	3,000	38,000	10,000
1,230	3,000	38,000	10,000
1,240	3,000	38,000	10,000
1,260	3,000	38,000	10,000
1,270	3,000	38,000	10,000
1,280	3,000	38,000	10,000
1,300	3,000	38,000	10,000
1,370	3,000	38,000	10,000
1,400	3,000	38,000	10,000
1,420	3,000	38,000	10,000
1,450	3,000	38,000	10,000



Wiertła kręte z
chwytami walcowymi

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,490	3,000	38,000	10,000
1,500	3,000	38,000	10,000
1,510	3,000	38,000	10,000
1,520	3,000	38,000	10,000
1,550	3,000	38,000	10,000
1,560	3,000	38,000	10,000
1,580	3,000	38,000	10,000
1,590	3,000	38,000	10,000
1,600	3,000	38,000	12,000
1,630	3,000	38,000	12,000
1,650	3,000	38,000	12,000
1,700	3,000	38,000	12,000
1,750	3,000	38,000	12,000
1,800	3,000	38,000	12,000
1,810	3,000	38,000	12,000
1,820	3,000	38,000	12,000
1,830	3,000	38,000	12,000
1,840	3,000	38,000	12,000
1,850	3,000	38,000	12,000
1,860	3,000	38,000	12,000
1,900	3,000	38,000	12,000
1,920	3,000	38,000	12,000
1,950	3,000	38,000	12,000
1,980	3,000	38,000	12,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,000	3,000	38,000	12,000
2,050	3,000	38,000	12,000
2,100	3,000	38,000	12,000
2,150	3,000	38,000	12,000
2,200	3,000	38,000	12,000
2,400	3,000	38,000	12,000
2,500	3,000	38,000	12,000
2,550	3,000	38,000	12,000
2,600	3,000	38,000	12,000
2,750	3,000	38,000	12,000
2,800	3,000	38,000	12,000
2,950	3,000	38,000	12,000
3,000	3,000	38,000	12,000



Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego



Materiał narzędzia **Węglik mono.**

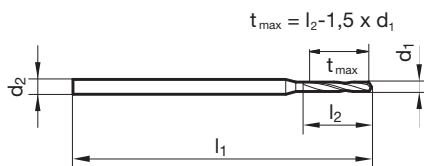
Powierzchnia **A**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 0,500$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Wiertła kręte z chwytem walcowym

Nr artykułu **6400**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	3,000
0,550	3,000	47,000	3,300
0,600	3,000	47,000	3,600
0,650	3,000	47,000	3,900
0,700	3,000	47,000	4,200
0,750	3,000	47,000	4,500
0,800	3,000	47,000	4,800
0,850	3,000	47,000	5,100
0,900	3,000	47,000	5,400
0,950	3,000	47,000	5,700
1,000	3,000	47,000	6,000
1,050	3,000	47,000	6,300
1,100	3,000	47,000	6,600
1,150	3,000	47,000	6,900
1,200	3,000	47,000	7,200
1,250	3,000	47,000	7,500
1,300	3,000	47,000	7,800
1,350	3,000	47,000	8,100
1,400	3,000	47,000	8,400
1,450	3,000	47,000	8,700
1,500	3,000	47,000	9,000
1,550	3,000	47,000	9,300
1,590	3,000	47,000	9,600
1,600	3,000	47,000	9,600
1,650	3,000	47,000	9,900
1,700	3,000	47,000	10,200
1,750	3,000	47,000	10,500
1,800	3,000	52,000	10,800
1,850	3,000	52,000	11,100
1,900	3,000	52,000	11,400

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	11,700
1,980	4,000	59,000	12,000
2,000	4,000	59,000	12,000
2,050	4,000	59,000	12,300
2,100	4,000	59,000	12,600
2,150	4,000	59,000	12,900
2,200	4,000	59,000	13,200
2,250	4,000	59,000	13,500
2,300	4,000	59,000	13,800
2,350	4,000	59,000	14,100
2,380	4,000	59,000	14,400
2,400	4,000	59,000	14,400
2,450	4,000	59,000	14,700
2,500	4,000	59,000	15,000
2,550	4,000	59,000	15,300
2,600	4,000	59,000	15,600
2,650	4,000	59,000	15,900
2,700	4,000	59,000	16,200
2,750	4,000	59,000	16,500
2,780	4,000	59,000	16,800
2,800	4,000	59,000	16,800
2,850	4,000	59,000	17,100
2,900	4,000	59,000	17,400
2,950	4,000	59,000	17,700
3,000	4,000	59,000	18,000



Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

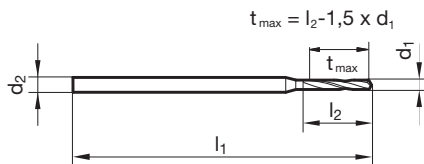
Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 0,500$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H**

Wiertła kręte z chwytami walcowymi

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu **6401**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	4,000
0,550	3,000	47,000	4,400
0,600	3,000	47,000	4,800
0,650	3,000	47,000	5,200
0,700	3,000	47,000	5,600
0,750	3,000	47,000	6,000
0,800	3,000	47,000	6,400
0,850	3,000	47,000	6,800
0,900	3,000	47,000	7,200
0,950	3,000	47,000	7,600
1,000	3,000	47,000	8,000
1,050	3,000	47,000	8,400
1,100	3,000	47,000	8,800
1,150	3,000	47,000	9,200
1,200	3,000	52,000	10,800
1,250	3,000	52,000	11,300
1,300	3,000	52,000	11,700
1,350	3,000	52,000	12,200
1,400	3,000	52,000	12,600
1,450	3,000	52,000	13,100
1,500	3,000	52,000	13,500
1,550	3,000	52,000	14,000
1,590	3,000	52,000	14,400
1,600	3,000	52,000	14,400
1,650	3,000	52,000	14,900
1,700	3,000	52,000	15,300
1,750	3,000	52,000	15,800
1,800	3,000	52,000	16,200
1,850	3,000	52,000	16,700
1,900	3,000	52,000	17,100

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	17,600
1,980	4,000	63,000	18,000
2,000	4,000	63,000	18,000
2,050	4,000	63,000	18,500
2,100	4,000	63,000	18,900
2,150	4,000	63,000	19,400
2,200	4,000	63,000	19,800
2,250	4,000	63,000	20,300
2,300	4,000	63,000	20,700
2,350	4,000	63,000	21,200
2,380	4,000	63,000	21,600
2,400	4,000	63,000	21,600
2,450	4,000	63,000	22,100
2,500	4,000	63,000	22,500
2,550	4,000	63,000	23,000
2,600	4,000	67,000	23,400
2,650	4,000	67,000	23,900
2,700	4,000	67,000	24,300
2,750	4,000	67,000	24,800
2,780	4,000	67,000	25,200
2,800	4,000	67,000	25,200
2,850	4,000	67,000	25,700
2,900	4,000	67,000	26,100
2,950	4,000	67,000	26,600
3,000	4,000	67,000	27,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

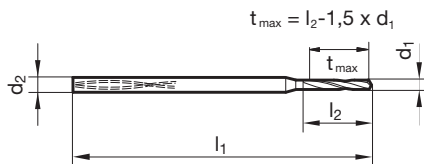
Kierunek skrawania **R**



- P** • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H** □

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Wiertła kręte z chwytem walcowym

Nr artykułu **6405**

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	11,000
1,450	4,000	52,000	12,000
1,500	4,000	52,000	12,000
1,550	4,000	52,000	12,000
1,590	4,000	52,000	13,000
1,600	4,000	52,000	13,000
1,650	4,000	52,000	13,000
1,700	4,000	56,000	14,000
1,750	4,000	56,000	14,000
1,800	4,000	56,000	14,000
1,850	4,000	56,000	15,000
1,900	4,000	56,000	15,000
1,950	4,000	56,000	16,000
1,980	4,000	56,000	16,000
2,000	4,000	56,000	16,000
2,050	4,000	56,000	16,000
2,100	4,000	62,000	17,000
2,150	4,000	62,000	17,000
2,200	4,000	62,000	18,000
2,250	4,000	62,000	18,000
2,300	4,000	62,000	18,000
2,350	4,000	62,000	19,000
2,380	4,000	62,000	19,000
2,400	4,000	62,000	19,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,450	4,000	62,000	20,000
2,500	4,000	62,000	20,000
2,550	4,000	62,000	20,000
2,600	4,000	66,000	21,000
2,650	4,000	66,000	21,000
2,700	4,000	66,000	22,000
2,750	4,000	66,000	22,000
2,780	4,000	66,000	22,000
2,800	4,000	66,000	22,000
2,850	4,000	66,000	23,000
2,900	4,000	66,000	23,000
2,950	4,000	66,000	24,000
3,000	4,000	66,000	24,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane

M •

K •

N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane

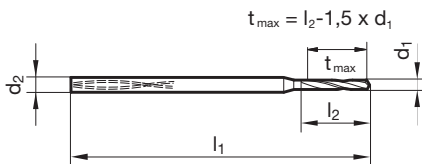
S ○

H

GÜHRING NAVIGATOR

Param. skr. na str. 796

Wiertła kręte z chwytami walcowymi



Nr artykułu **6408**

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	15,000
1,450	4,000	52,000	16,000
1,500	4,000	52,000	17,000
1,550	4,000	52,000	17,000
1,590	4,000	52,000	18,000
1,600	4,000	52,000	18,000
1,650	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,750	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,850	4,000	56,000	20,000
1,900	4,000	56,000	21,000
1,950	4,000	56,000	21,000
1,980	4,000	56,000	22,000
2,000	4,000	56,000	22,000
2,050	4,000	56,000	23,000
2,100	4,000	62,000	23,000
2,150	4,000	62,000	24,000
2,200	4,000	62,000	24,000
2,250	4,000	62,000	25,000
2,300	4,000	62,000	25,000
2,320	4,000	62,000	26,000
2,350	4,000	62,000	26,000
2,380	4,000	62,000	26,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,400	4,000	62,000	26,000
2,450	4,000	62,000	27,000
2,500	4,000	62,000	28,000
2,550	4,000	62,000	28,000
2,600	4,000	66,000	29,000
2,650	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,750	4,000	66,000	30,000
2,780	4,000	66,000	31,000
2,800	4,000	66,000	31,000
2,850	4,000	66,000	31,000
2,900	4,000	66,000	32,000
2,950	4,000	66,000	32,000
3,000	4,000	66,000	33,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia **Węglik mono.**

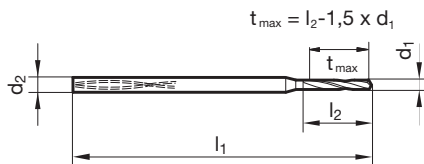
Powierzchnia **A**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \text{Ø } 1,400$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Wiertła kręte z chwytami walcowymi

Nr artykułu **6412**

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	62,000	25,000
1,500	4,000	62,000	27,000
1,590	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,700	4,000	70,000	31,000
1,800	4,000	70,000	32,000
1,900	4,000	70,000	34,000
1,980	4,000	70,000	36,000
2,000	4,000	70,000	36,000
2,100	4,000	78,000	38,000
2,200	4,000	78,000	40,000
2,300	4,000	78,000	42,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,380	4,000	78,000	44,000
2,400	4,000	78,000	44,000
2,500	4,000	78,000	45,000
2,600	4,000	87,000	47,000
2,700	4,000	87,000	48,000
2,780	4,000	87,000	50,000
2,800	4,000	87,000	50,000
2,900	4,000	87,000	52,000
3,000	4,000	87,000	54,000



Wiertła kręte z chwytem Ø12,7 mm



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 14,290$ • geometria zataczana • ze stałym chwytem

M

K •

N ○

S

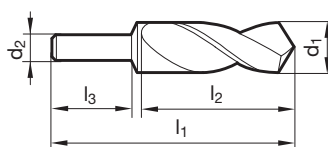
H

stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

GÜHRING NAVIGATOR

Param. skr. na str. 778

Wiertła kręte z chwytem walcowym



Nr artykułu

268

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
13,000	12,700	156,000	82,000	57,000
13,490	12,700	156,000	82,000	57,000
13,500	12,700	156,000	82,000	57,000
14,000	12,700	156,000	82,000	57,000
14,290	12,700	157,000	83,000	57,000
14,500	12,700	157,000	83,000	57,000
15,000	12,700	157,000	83,000	57,000
15,500	12,700	157,000	83,000	57,000
15,870	12,700	157,000	83,000	57,000
16,000	12,700	157,000	83,000	57,000
16,500	12,700	158,000	84,000	57,000
16,670	12,700	158,000	84,000	57,000
17,000	12,700	158,000	84,000	57,000
17,460	12,700	158,000	84,000	57,000
17,500	12,700	158,000	84,000	57,000
18,000	12,700	158,000	84,000	57,000
19,000	12,700	158,000	84,000	57,000
19,050	12,700	159,000	85,000	57,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
19,840	12,700	159,000	85,000	57,000
20,000	12,700	159,000	85,000	57,000
21,000	12,700	159,000	85,000	57,000
21,430	12,700	159,000	85,000	57,000
22,000	12,700	159,000	85,000	57,000
22,220	12,700	159,000	85,000	57,000
23,000	12,700	159,000	85,000	57,000
23,020	12,700	159,000	85,000	57,000
23,810	12,700	160,000	86,000	57,000
24,000	12,700	160,000	86,000	57,000
25,000	12,700	160,000	86,000	57,000
25,400	12,700	160,000	86,000	57,000
28,570	12,700	160,000	86,000	57,000



Wiertła kręte z chwytem Ø 16,0 mm



- P** • nieostrzone • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • ze stałym chwytem • półwyrób z nakiełkami z obu stron
- M** • półfabrykat wiertła (nienaostrzone); do wiertel stopniowych, o różnych geometriach
- K** ○
- N** ○ materiały trudne do obróbki • stale nierdzewne/kwaso-odporne • stale sprężynowe • austenityczne stale nierdzewne
- S** ○
- H** ○

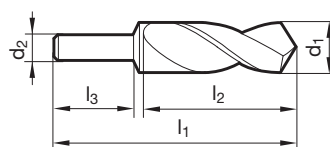
Materiał narzędzia **HSCO**

Powierzchnia ○

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 772



Wiertła kręte z chwytem walcowym

Nr artykułu **128**

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
16,000	16,000	130,000	88,000	42,000
16,500	16,000	130,000	88,000	40,000
17,000	16,000	130,000	88,000	40,000
17,500	16,000	130,000	88,000	40,000
18,000	16,000	130,000	88,000	40,000
19,000	16,000	130,000	88,000	40,000
20,000	16,000	130,000	88,000	40,000
20,500	16,000	130,000	88,000	40,000
21,000	16,000	130,000	88,000	40,000
21,500	16,000	130,000	88,000	40,000
22,000	16,000	130,000	88,000	40,000
22,500	16,000	130,000	88,000	40,000
23,000	16,000	130,000	88,000	40,000
23,500	16,000	130,000	88,000	40,000
24,000	16,000	130,000	88,000	40,000
24,500	16,000	130,000	88,000	40,000
25,000	16,000	130,000	88,000	40,000
25,500	16,000	140,000	98,000	40,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
26,000	16,000	140,000	98,000	40,000
27,000	16,000	140,000	98,000	40,000
28,000	16,000	140,000	98,000	40,000
28,500	16,000	140,000	98,000	40,000
30,000	16,000	140,000	98,000	40,000
31,000	16,000	140,000	98,000	40,000
32,000	16,000	140,000	98,000	40,000
35,000	16,000	140,000	98,000	40,000
38,000	16,000	140,000	98,000	40,000
40,000	16,000	140,000	98,000	40,000



Wiertła kręte z chwytem Ø 25,4 mm



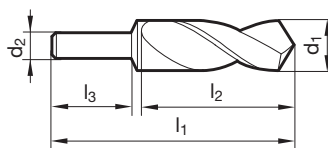
- P** • nieostrzone • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • ze stałym chwytem • półwyrób z nakiełkami z obu stron
- M** • półfabrykat wiertła (nienaostrzone); do wiertel stopniowych, o różnych geometriach
- K** ○
- N** ○ stałe nierdzewne/kwaso-odporne • materiały trudne do obróbki • stałe sprężynowe • austenityczne stałe nierdzewne
- S** ○
- H** ○

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ

Wiertła kręte z chwytem walcowym

GÜHRING NAVIGATOR

Param. skr. na str. 772



Nr artykułu **129**

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
25,000	25,400	140,000	93,000	45,000
26,000	25,400	140,000	93,000	45,000
28,000	25,400	140,000	93,000	45,000
29,500	25,400	140,000	93,000	45,000
30,000	25,400	140,000	93,000	45,000
32,000	25,400	140,000	93,000	45,000
33,000	25,400	140,000	93,000	45,000
34,000	25,400	140,000	93,000	45,000
35,000	25,400	140,000	93,000	45,000
36,000	25,400	140,000	93,000	45,000
37,000	25,400	140,000	93,000	45,000
38,000	25,400	140,000	93,000	45,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
40,000	25,400	140,000	93,000	45,000



Wiertła kręte z chwytem Ø 25,4 mm



- P** • nieostrzone • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • ze stałym chwytem • półwyrób z nakiełkami z obu stron
- M** • półfabrykat wiertła (nienaostrzone); do wiertel stopniowych, o różnych geometriach
- K** ○
- N** ○ materiały trudne do obróbki • nierdzewne/kwasoodporne stале (tzw. stале VA) • stале sprężynowe • austenityczne stале nierdzewne
- S** ○
- H** ○

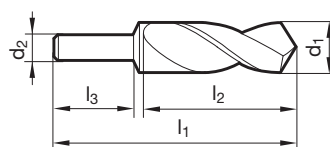
Materiał narzędzia **HSCO**

Powierzchnia ○

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 772



Wiertła kręte z chwytem walcowym

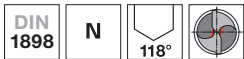
Nr artykułu **136**

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
25,000	25,400	140,000	93,000	45,000
25,500	25,400	140,000	93,000	45,000
26,000	25,400	140,000	93,000	45,000
26,500	25,400	140,000	93,000	45,000
27,500	25,400	140,000	93,000	45,000
29,500	25,400	140,000	93,000	45,000

d1	d2	l1	l2	l3
mm	mm	mm	mm	mm
36,000	25,400	140,000	93,000	45,000
38,000	25,400	140,000	93,000	45,000
39,000	25,400	140,000	93,000	45,000



Wiertła do otworów pod kołki stożkowe



Materiał narzędzia **HSS**

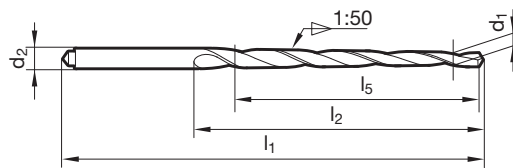
Powierzchnia $\text{Ra} \leq 2,36$

Kierunek skrawania

P ● Korekcja ścina $\geq \text{Ø } 1,000$ • geometria zataczana • do otworów pod kołki stożkowe wg DIN 1 (nowa: DIN EN 22339) i DIN 7978 (nowa: DIN EN 28736) • z zabierakiem

- M** ○
- K** ●
- N** ○
- S** ○
- H** ○

Wiertła kręte z chwytami walcowymi



Nr artykułu **531**

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
2,000	3,150	86,000	52,000	48,000
2,500	3,150	86,000	52,000	48,000
3,000	4,000	100,000	63,000	58,000
3,500	5,000	112,000	74,000	68,000
4,000	5,000	112,000	74,000	68,000
4,500	6,300	122,000	81,000	73,000

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
5,000	6,300	122,000	81,000	73,000
5,500	8,000	160,000	114,000	105,000
6,000	8,000	160,000	114,000	105,000
8,000	10,000	207,000	157,000	145,000
10,000	12,500	245,000	190,000	175,000
12,000	16,000	290,000	228,000	210,000


Komplet wiertel

 Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

P • geometria zataczana • Dostępne są umieszczone w bakelitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.

M	•
K	•
N	○
S	
H	

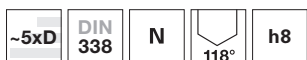

 Wiertła kręte z
chwytami walcowymi

 Nr artykułu **201**

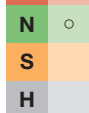
d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-5,9	0,1	50	0,015
6,0-10,0	0,1	41	0,016
1,0-10,5	0,5	24	0,018
1,0-10,5	0,5	32	0,019
1/16 - 1/2	1/64	29	0,021
1,02-5,79	1/64	60	0,026



Komplet wiertel, luzem



P • geometria zataczana • Dostępne są umieszczone w bakielitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.



Materiał narzędzia **HSS**

Powierzchnia $>0.2,36$

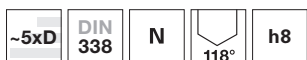
Kierunek skrawania



Nr artykułu **200**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012
1,0-10,0	0,5	19	0,013
1,0-13,0	0,5	25	0,014
1,0-5,9	0,1	50	0,015
6,0-10,0	0,1	41	0,016
1,0-10,5	0,5	24	0,018

Wiertła kręte z chwytami walcowymi


Komplet wiertel


P • geometria zataczana • Dostępne są umieszczone w bakielitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.
M
K •
N ○
S
H

 Materiał narzędzia **HSS**

 Powierzchnia **S**

 Kierunek skrawania **R**

 Wiertła kręte z
chwytami walcowymi

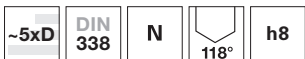
Nr artykułu

17

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-10,0	0,5	19	6,013
1,0-13,0	0,5	25	6,014
1,0-5,9	0,1	50	6,015
6,0-10,0	0,1	41	6,016
1/16 - 1/2	1/64	29	6,021



Komplet wiertel



- P** ● geometria zataczana ● Dostępne są umieszczone w bakelitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.
- M** ○
- K** ●
- N** ○
- S** ○
- H** ○

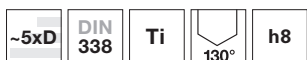
Wiertła kręte z chwytami walcowymi

Materiał narzędzia	HSCO
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **16**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-10,0	0,5	19	3,013
1,0-13,0	0,5	25	3,014
1,0-5,9	0,1	50	3,015
6,0-10,0	0,1	41	3,016
1/16 - 1/2	1/64	29	3,021


Komplet wiertel


P ○ geometria zataczana • Dostępne są umieszczone w bakielitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.
M ●
K ●
N ●
S ●
H ●

 Materiał narzędzia **HSCO**

Powierzchnia ○

Kierunek skrawania (R)


 Wiertła kręte z
chwytami walcowymi

 Nr artykułu **18**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-10,0	0,5	19	8,013
1,0-13,0	0,5	25	8,014
1,0-5,9	0,1	50	8,015
6,0-10,0	0,1	41	8,016
1,0-10,5	0,5	24	8,018



Komplet wiertel



P ○ geometria zataczana • Dostępne są umieszczone w bakelitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.

- M** ●
- K** ○
- N** ○
- S** ○
- H** ○

Materiał narzędzia **HSCO**

Powierzchnia ○

Kierunek skrawania



Nr artykułu **195**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-13,0	0,5	25	8,014
1,0-10,5	0,5	24	8,018

Wiertła kręte z chwytami walcowymi


Komplet wiertel


P ● geometria zataczana ● Dostępne są umieszczone w bakelitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.

M	○
K	○
N	○
S	
H	

 Materiał narzędzia **HSCO**

Powierzchnia



Kierunek skrawania


 Wiertła kręte z
chwytami walcowymi

Nr artykułu

2049

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-13,0	0,5	25	0,014
1,0-10,0	0,5	19	0,013
1,0-10,5	0,5	24	0,018
1,0-5,0	0,1	41	0,011
5,1-10,0	0,1	50	0,012



Komplet wiertel



P ● geometria zataczana • Dostępne są umieszczone w bakelitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne.

- M** ○
- K** ○
- N** ○
- S** ○
- H** ○

Materiał narzędzia **HSCO**

Powierzchnia **M**

Kierunek skrawania **R**



Nr artykułu **2050**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-10,0	0,5	19	0,013
5,1-10,0	0,1	50	0,012

Wiertła kręte z chwytami walcowymi


Komplet wiertel AeroX

 Materiał narzędzia **M42**

Powierzchnia

Kierunek skrawania



- | | | |
|----------|---|---|
| P | • | zoptymalizowane ostrzenie krzyżowe • stal HSCO z 8% zawartością kobaltu • Dostępne są umieszczone w bakelitowych stojakach zestawy standardowych wiertel w najbardziej popularnych wymiarach. Dla łatwiejszego transportu zaleca się użytkowanie ich w zamykanej kasetce. Na życzenie kompletujemy również zestawy specjalne. |
| M | • | |
| K | • | |
| N | • | • materiały odlewane • metale nieżelazne • Tytan i stopy tytanu |
| S | • | |
| H | ○ | |


 Wiertła kręte z
chwytami walcowymi

 Nr artykułu **1083**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-13,0	0,5	25	0,014
1,0-10,0	0,5	19	0,013



Komplet wiertel



kaseta pusta

Wiertła kręte z
chwytami walcowymi



Nr artykułu

36

d1 mm	zwiększone o mm	Ilość/komplet	kod
1,0-13,0			0,214
1,0-10,0			0,213
1,0-5,9			0,215
6,0-10,0			0,216
1,0-10,5			0,218



Komplet wiertel



kaseta pusta

Wiertła kręte z
chwytami walcowymi

Nr artykułu

73

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-13,0			0,614



Komplet wiertel



stojak bakelitowy

Wiertła kręte z
chwytami walcowymi



Nr artykułu **11**

d1	zwiększone o	Ilość/komplet	kod
mm	mm		
1,0-13,0			0,114
5,1-10,0			0,112
1,0-5,0			0,111
1,0-5,9			0,115
1,0-10,0			0,113
1/16 - 1/2			0,121
1/16 - 1/2			0,122



Wiertła z ostrzami węglowymi (HM)


 Materiał narzędzia **Węglik**

Powierzchnia



Kierunek skrawania


P ○ Korekcja ścina $\geq \varnothing 1,700$ • geom. ścinowa • lutowane płytki węglkowe

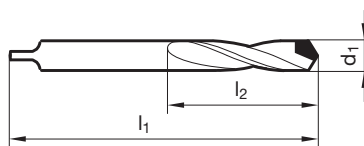
M
K ○

N stal sprężynowa • żeliwa twarde - HB > 300 HB • czysty molibden
 • twarde brązy

S
H ○

GÜHRING NAVIGATOR

Param. skr. na str. 776



Nr artykułu

703

d1	l1	l2
mm	mm	mm
1,700	45,000	18,000
2,600	50,000	20,000
2,700	50,000	20,000
2,900	50,000	20,000
3,000	50,000	20,000
3,100	56,000	25,000
3,200	56,000	25,000
3,250	56,000	25,000
3,300	56,000	25,000
3,500	56,000	25,000
3,700	56,000	25,000
3,800	56,000	25,000
3,900	56,000	25,000
4,000	56,000	25,000
4,100	63,000	28,000
4,200	63,000	28,000
4,300	63,000	28,000
4,500	63,000	28,000
4,800	63,000	28,000
4,900	63,000	28,000
5,000	63,000	28,000
5,100	71,000	32,000
5,200	71,000	32,000
5,300	71,000	32,000
5,400	71,000	32,000
5,500	71,000	32,000
5,800	71,000	32,000
6,000	71,000	32,000
6,200	71,000	32,000
6,300	71,000	32,000
6,350	71,000	32,000
6,400	71,000	32,000
6,500	71,000	32,000
6,700	80,000	40,000
6,800	80,000	40,000
7,000	80,000	40,000

d1	l1	l2
mm	mm	mm
7,200	80,000	40,000
7,500	80,000	40,000
7,800	80,000	40,000
8,000	80,000	40,000
8,200	90,000	50,000
8,400	90,000	50,000
8,500	90,000	50,000
9,000	90,000	50,000
9,500	90,000	50,000
9,800	100,000	56,000
10,000	100,000	56,000
10,200	100,000	56,000
10,400	100,000	56,000
10,500	100,000	56,000
11,000	100,000	56,000
11,500	112,000	63,000
12,000	112,000	63,000
12,500	112,000	63,000
12,700	112,000	63,000
13,000	112,000	63,000
13,500	125,000	71,000
14,000	125,000	71,000
14,500	125,000	71,000
15,000	125,000	71,000
15,500	140,000	80,000
16,000	140,000	80,000
16,500	140,000	80,000
17,000	140,000	80,000
17,500	160,000	90,000
18,000	160,000	90,000
19,000	160,000	90,000
19,500	160,000	90,000
20,000	160,000	90,000
21,000	160,000	90,000
22,000	160,000	90,000
24,000	170,000	100,000



Wiertła z ostrzami węglowymi (HM)



Materiał narzędzia **Węglik**

Powierzchnia

Kierunek skrawania

P Korekcja ścina $\geq \varnothing 1,500$ • geom. ścinowa • lutowane płytki węglkowe

M

K

N tworzywa sztuczne, wzmocnione włóknem szklanym • duroplasty powodujące mocne zużywanie się łysinek i krawędzi tnących

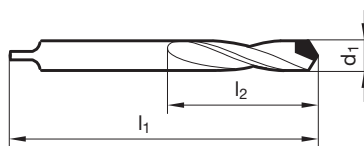
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 776

Wiertła kręte z chwytami walcowymi



Nr artykułu

704

d1	l1	l2
mm	mm	mm
1,900	45,000	18,000
2,200	45,000	18,000
3,100	56,000	25,000
3,200	56,000	25,000
3,500	56,000	25,000
4,200	63,000	28,000

d1	l1	l2
mm	mm	mm
5,000	63,000	28,000
6,000	71,000	32,000
8,000	80,000	40,000
24,000	170,000	100,000



Wiertła kręte do Kevlaru (FK)



P	Korekcja ścina $\geq \varnothing 2,380$ • ostrzenie specjalne
M	
K	
N	tworzywa sztuczne, wzmacniane włóknami
S	
H	

Materiał narzędzia **Węglik mono.**

Powierzchnia

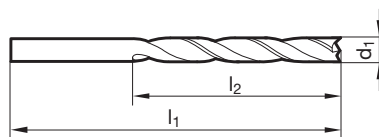


Kierunek skrawania



GÜHRING NAVIGATOR

Param. skr. na str. 776



Wiertła kręte z chwytym walcowym

Nr artykułu **1149**

d1		l1	l2
mm	inch		
2,500		43,000	14,000
3,200		49,000	18,000
3,570	9/64	52,000	20,000
4,000		55,000	22,000
4,760	3/16	62,000	26,000
5,000		62,000	26,000

d1		l1	l2
mm	inch		
6,000		66,000	28,000
8,000		79,000	37,000
10,000		89,000	43,000



Wiertła piórkowe



- P** ○ Korekcja ścina $\geq \varnothing 3,000$ • geom. ścinowa • wiertło specjalne • do trudnych warunków pracy
- M**
- K** ○
- N** żeliwa utwardzone • twarde stale
- S**
- H** ○

Materiał narzędzia **Węglik**

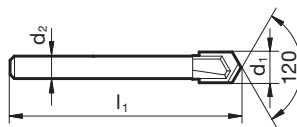
Powierzchnia ○

Kierunek skrawania **(R)**

Wiertła kręte z chwytami walcowymi

GÜHRINGNAVIGATOR

Param. skr. na str. 776



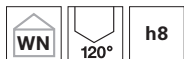
Nr artykułu **707**

d1	l1	l2
mm	mm	mm
3,000	50,000	
5,000	63,000	
5,500	70,000	
6,000	70,000	
8,000	80,000	
9,000	90,000	

d1	l1	l2
mm	mm	mm
12,000	112,000	



Wiertła do betonu



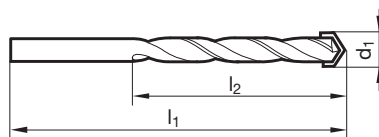
P geom. ścinowa • lutowane płytki węglkowe • do wiercenia zwykłego i udarowego • w płytkach ceramicznych wiercić bez udaru

- M**
- K**
- N** cegła, beton, płytki ceramiczne
- S**
- H**

Materiał narzędzia **Węglik**

Powierzchnia ○

Kierunek skrawania (R)



Wiertła kręte z chwytami walcowymi

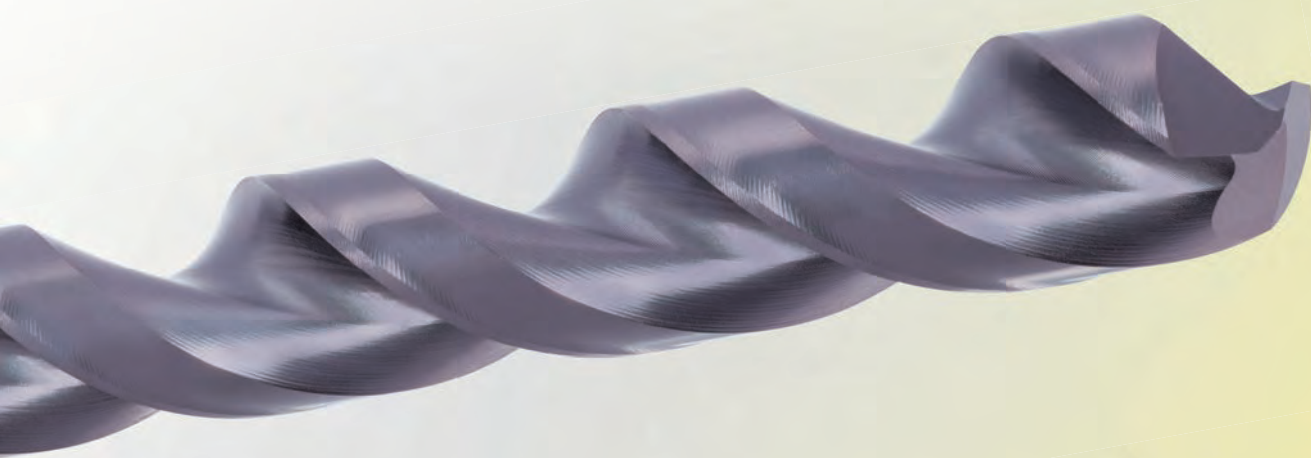
Nr artykułu **716**

d1	l1	l2
mm	mm	mm
4,000	75,000	40,000
5,000	85,000	50,000
6,000	100,000	60,000
8,000	120,000	80,000
10,000	120,000	80,000
12,000	150,000	90,000

d1	l1	l2
mm	mm	mm



WIERTŁA KRETE Z CHWYTEM MK



Wiertła krete z
chwytami MK



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte

•	•	•	•	•	•		~3xD	WN	GV 120	R	HSCO	○	8,100 - 38,000	363	772	448
•	•	•	•	•	•		~3xD	WN	GV 120	R	HSCO	Ⓢ	10,500 - 31,000	663	774	449

Wiertła kręte

•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	○ _{2,36}	2,380 - 96,000	245	778	450
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	○ _{16,0}	10,000 - 28,000	592	778	454
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	Ⓢ	3,000 - 31,000	654	780	455
•	•	•	•	•	•		~5xD	DIN 345	N	L	HSS	○	6,000 - 60,000	248	778	457
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSS	○	8,500 - 59,000	229	778	458
•	•	•	•	•	•		~5xD	DIN 345	H	R	HSS	○	6,700 - 25,250	246	778	459
•	•	•	•	•	•		~5xD	DIN 345	W	R	HSS	○	3,200 - 32,000	247	778	460
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSS	○ _{16,0}	7,940 - 31,750	558	778	461
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSS	Ⓢ	7,940 - 31,500	606	780	462
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSCO	○	4,000 - 50,000	345	780	463
•	•	•	•	•	•		~5xD	DIN 345	N	R	HSCO	Ⓢ	8,000 - 30,000	661	782	465
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	○ _{16,0}	10,000 - 39,000	645	780	466
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	Ⓢ	10,000 - 23,810	662	782	467
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	Ⓒ	10,000 - 30,160	1222	782	468
•	•	•	•	•	•		~5xD	DIN 345	GT 100	R	HSCO	Ⓐ	10,400 - 30,160	1224	782	469
•	•	•	•	•	•		~5xD	DIN 345	VA	R	HSCO	○	10,000 - 34,000	1262	780	470
•	•	•	•	•	•		~5xD	DIN 346	N	R	HSS	○	10,000 - 73,000	251	778	471
•	•	•	•	•	•		~5xD	DIN 346	N	R	HSCO	○	12,000 - 31,500	351	780	472

Wiertła długie

•	•	•	•	•	•		~10xD	DIN 341	N	R	HSS	○	2,900 - 50,000	257	786	473
•	•	•	•	•	•		~10xD	DIN 341	N	R	HSS	Ⓢ	5,500 - 22,000	655	786	475
•	•	•	•	•	•		~10xD	DIN 341	GT 100	R	HSS	○ _{16,0}	5,500 - 32,000	551	786	476

Wiertła kręte z chwytami MK



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
Wiertła długie																
•	•	•					~10xD	DIN 341	GT 100	R	HSS	Ⓢ	7,000 - 23,000	656	786	478
○		•					~10xD	DIN 341	GT 50	R	HSS	○	5,500 - 29,500	505	786	479
•	○	•	•	○			~10xD	DIN 341	N	R	HSC0	●	4,750 - 40,000	357	792	480
•	•	•	•	○			~10xD	DIN 341	GT 100	R	HSC0	● ^{>0/16.0}	10,000 - 26,000	623	792	481
•	•	○					~10xD	WN	N	R	HSS	●	10,000 - 29,000	523	786	482
Wiertła kręte, bardzo długie, szereg 1																
•	•	○					~15xD	DIN 1870	N	R	HSS	●	8,000 - 50,000	266	788	483
•	•	•					~15xD	DIN 1870	GT 100	R	HSS	● ^{>0/16.0}	8,000 - 30,000	526	790	484
○		•					~15xD	DIN 1870	GT 50	R	HSS	○	8,500 - 33,000	525	788	485
•	•	•	•	○			~15xD	DIN 1870	GT 100	R	HSC0	● ^{>0/16.0}	9,520 - 30,000	620	794	486
Wiertła kręte, bardzo długie, szereg 2																
•	•	○					~20xD	DIN 1870	N	R	HSS	●	8,000 - 45,000	267	788	487
•	•	•					~20xD	DIN 1870	GT 100	R	HSS	● ^{>0/16.0}	8,000 - 30,000	527	790	488
○		•					~20xD	DIN 1870	GT 50	R	HSS	○	8,500 - 31,000	542	788	489
•	•	•	•	○			~20xD	DIN 1870	GT 100	R	HSC0	● ^{>0/16.0}	9,520 - 23,420	621	794	490
Wiertła kręte, ekstra długie																
•	•	•					>20xD	WN	GT 100	R	HSS	●	6,000 - 7,500	563	790	491
•	•	•					>20xD	WN	GT 100	R	HSS	●	6,000 - 10,000	564	790	492
•	•	•					>20xD	WN	GT 100	R	HSS	● ^{>0/16.0}	6,000 - 17,000	565	790	493
•	•	•					>20xD	WN	GT 100	R	HSS	● ^{>0/16.0}	8,000 - 40,000	566	790	494
•	•	•					>20xD	WN	GT 100	R	HSS	● ^{>0/16.0}	14,000 - 40,000	293	790	495
•	•	•					>20xD	WN	GT 100	R	HSS	○	14,000 - 18,000	298	790	496
•	•	•					>20xD	WN	GT 100	R	HSS	○	14,000 - 18,000	299	790	497
Wiertła długie, z chłodzeniem wew.																
•	○	•	•				~7xD	WN	N	R	HSS	●	9,920 - 23,020	269	788	498

Wiertła kręte z chwytem MK



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła z chłodzeniem wew. długości wg normy zakładowej

•	○	•	•	•			WN	N	R	HSS	●	8,000 - 50,000	254	788	499
•	○	•	•	•			WN	N	R	HSS	●	8,000 - 42,000	255	788	500

Wiertła z chłodzeniem wew. długości wg DIN 341

•	○	•	•	•			~10xD	WN	N	R	HSS	●	10,000 - 32,000	1101	788	501
•	○	•	•	•			~10xD	WN	N	R	HSS	●	10,000 - 40,000	270	788	502
•	○	•	•	•			~10xD	WN	N	R	HSS	●	10,000 - 44,450	271	788	503
•	○	•	•	•			~10xD	WN	N	R	HSS	●	10,000 - 44,450	272	788	504
•	•	•	•	•	○		~10xD	WN	GT 100	R	HSCO	●	11,000 - 34,920	370	794	505
•	•	•	•	•	○		~10xD	WN	GT 100	R	HSCO	●	11,000 - 34,920	371	794	506
•	•	•	•	•	○		~10xD	WN	GT 100	R	HSCO	●	12,500 - 34,000	372	794	507

Wiertła z chłodzeniem wew. długości wg DIN 1870

•	•	•	•	•	○		~15xD	WN	GT 100	R	HSCO	●	11,000 - 34,000	374	794	508
•	•	•	•	•	○		~15xD	WN	GT 100	R	HSCO	●	11,000 - 34,000	375	794	509
•	•	•	•	•	○		~15xD	WN	GT 100	R	HSCO	●	11,000 - 29,000	376	794	510

Wiertła do otworów pod kołki stożkowe

•	○	•	○	○			DIN 1898	N	R	HSS	●	5,000 - 25,000	532		511
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Wiertła z ostrzami węglowymi (HM)

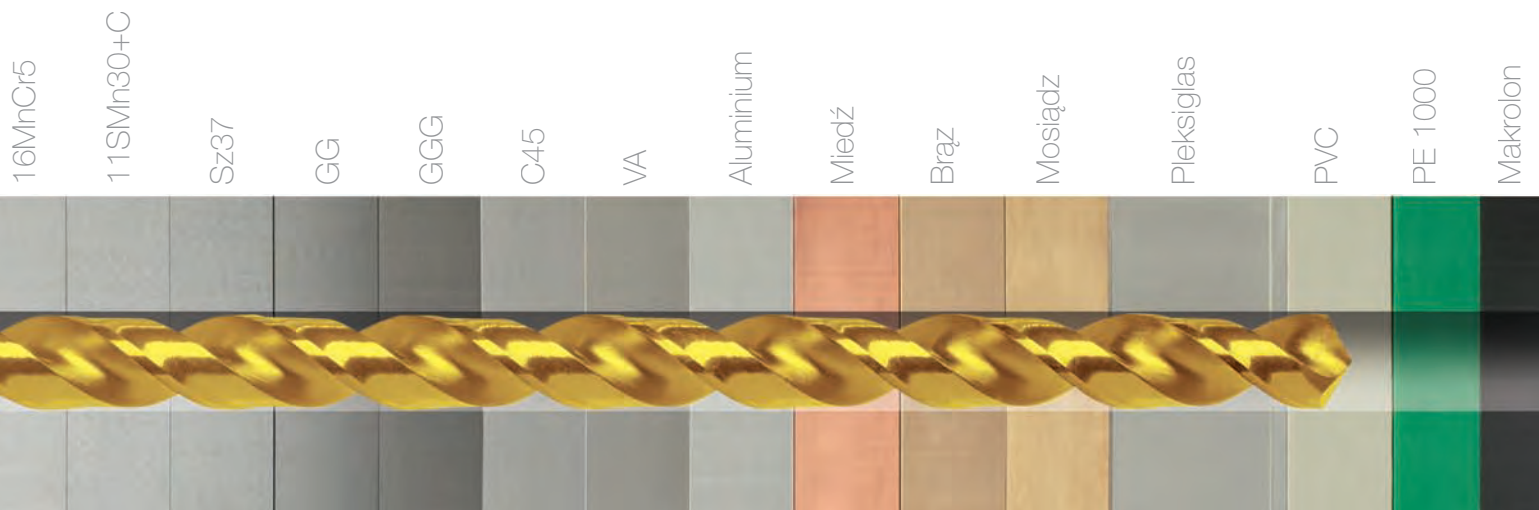
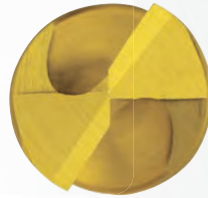
○	○	○	○	○			DIN 8041	N	R	HM	○	8,000 - 40,000	705	776	512
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Wiertła kręte z chwytami MK

GU 500

Uniwersalne wiertło ze stali HSCO

- uniwersalne zastosowanie w większości materiałów
- 4-scinowa geometria wierzchołka zapewnia doskonałe samo-centrowanie wiertła i wysoką dokładność wymiarową otworu
- niskie siły skrawania dzięki precyzyjnie szlifowanej geometrii
- optymalna ewakuacja wiórów dzięki zaokrąglonemu kształtowi rowków wiórowych



GU 500 - uniwersalne zastosowanie w większości materiałów

Stale konstrukcyjne i stale węglowe · stale stopowe do 850 N/mm² · stale nierdzewne · żeliwa
stopy niezależne · aluminium · stopy magnezu · tworzywa sztuczne



STALE

~ 3xD
Norma zakł.

~ 5xD
DIN 345

~ 10xD
DIN 341

~ 15xD
DIN 1870
R1

No 1

Ø 3,00 - 31,00 mm
Nr artykułu 654
od strony 455



No 1

Ø 5,50 - 22,00 mm
Nr artykułu 655
od strony 475



Ø 8,00 - 50,00 mm
Nr artykułu 266
od strony 483



Ø 8,00 - 30,00 mm
Nr artykułu 661
od strony 465



Ø 4,75 - 40,00 mm
Nr artykułu 357
od strony 480



Ø 7,94 - 31,50 mm
Nr artykułu 606
od strony 462



Ø 7,00 - 23,00 mm
Nr artykułu 656
od strony 478



Ø 8,00 - 30,00 mm
Nr artykułu 526
od strony 484



No 1

Ø 10,00 - 23,81 mm
Nr artykułu 662
od strony 467



Ø 10,00 - 26,00 mm
Nr artykułu 623
od strony 481



Ø 9,52 - 30,00 mm
Nr artykułu 620
od strony 486



No 1

Ø 10,50 - 31,00 mm
Nr artykułu 663
od strony 449



~ 10xD
Długość rowków do
DIN 341

~ 15xD
Długość rowków do
DIN 1870 R1

No 1

Ø 10,00 - 32,00 mm
Nr artykułu 1101
od strony 501



Ø 11,00 - 34,92 mm
Nr artykułu 370
od strony 505



No 1

Ø 11,00 - 34,00 mm
Nr artykułu 374
od strony 508



bez chłodzenia wewnętrznego

z chłodzeniem wewnętrznym

Wiertła kręte z chwytem MK



QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Norma zakł.
bardzo długie

No 1 idealne
narzędzie

Ø 8,00 - 45,00 mm
Nr artykułu 267
od strony 487



Typ N, HSS



Typ N, HSCO

Ø 8,00 - 30,00 mm
Nr artykułu 527
od strony 488



No 1

Ø 8,00 - 40,00 mm
Nr artykułu 566
od strony 494



GT100, HSS

No 1

Ø 9,52 - 23,42 mm
Nr artykułu 621
od strony 490



GT100, HSCO



GV120, HSCO



Typ N, HSS



GT100, HSCO

Wiertła kręte z
chwytami MK



STALE
NIERDZEWNE



STOPY TYTANU
SUPER STOPY

~ 3xD
Norma zakł.

~ 5xD
DIN 345

~ 10xD
DIN 341

~ 15xD
DIN 1870
R1

bez chłodzenia wewnętrznego

Wiertła kręte z
chwytem MK

No 1 No 1

Ø 10,00 - 34,00 mm
Nr artykułu 1262
od strony 470



No 1 No 1

Ø 10,00 - 26,00 mm
Nr artykułu 623
od strony 481



No 1 No 1

Ø 9,52 - 30,00 mm
Nr artykułu 620
od strony 486



No 1 No 1

Ø 10,50 - 31,00 mm
Nr artykułu 663
od strony 449



Ø 8,00 - 30,00 mm
Nr artykułu 661
od strony 465



Ø 4,75 - 40,00 mm
Nr artykułu 357
od strony 480



~ 10xD
Długość rowków do
DIN 341

~ 15xD
Długość rowków do
DIN 1870 R1

No 1 No 1

Ø 11,00 - 34,92 mm
Nr artykułu 370
od strony 505



No 1 No 1

Ø 11,00 - 34,00 mm
Nr artykułu 374
od strony 508



z chłodzeniem
wewnętrznym



QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Norma zakł.
bardzo długie

No 1 idealne narzędzie
do stali nierdzewnych

No 1 idealne narzędzie
do stopów Tytanu i Super Stopów



Typ VA, HSCO

No 1 **No 1**

Ø 9,52 - 23,42 mm
Nr artykułu 621
od strony 490



GT100, HSCO



GV120, HSCO



Typ N, HSCO



GT100, HSCO



K ŻELIWA


~ 3xD
Norma zakł.

~ 5xD
DIN 345



~ 10xD
DIN 341


~ 15xD
DIN 1870
R1



No 1


Ø 3,00 - 31,00 mm
Nr artykułu 654
od strony 455
 




No 1




Ø 5,50 - 22,00 mm
Nr artykułu 655
od strony 475
 


Ø 8,00 - 50,00 mm
Nr artykułu 266
od strony 483






Ø 8,00 - 30,00 mm
Nr artykułu 661
od strony 465
 


Ø 4,75 - 40,00 mm
Nr artykułu 357
od strony 480



Ø 7,94 - 31,50 mm
Nr artykułu 606
od strony 462
  

Ø 7,00 - 23,00 mm
Nr artykułu 656
od strony 478
  



Ø 8,00 - 30,00 mm
Nr artykułu 526
od strony 484


Ø 10,00 - 23,81 mm
Nr artykułu 662
od strony 467
   

Ø 10,00 - 26,00 mm
Nr artykułu 623
od strony 481


No 1
Ø 9,52 - 30,00 mm
Nr artykułu 620
od strony 486



No 1


Ø 10,50 - 31,00 mm
Nr artykułu 663
od strony 449
 

~ 10xD
Długość rowków do
DIN 341


~ 15xD
Długość rowków do
DIN 1870 R1

No 1

Ø 10,00 - 32,00 mm
Nr artykułu 1101
od strony 501


Ø 11,00 - 34,92 mm
Nr artykułu 370
od strony 505


No 1

Ø 11,00 - 34,00 mm
Nr artykułu 374
od strony 508


Wiertła kręte z chwytem MK
bez chłodzenia wewnętrzznego

z chłodzeniem wewnętrznym



QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Norma zakł.
bardzo długie

No 1 idealne narzędzie

Ø 8,00 - 45,00 mm
Nr artykułu 267
od strony 487



Typ N, HSS



Typ N, HSCO

Ø 8,00 - 30,00 mm
Nr artykułu 527
od strony 488



No 1

Ø 8,00 - 40,00 mm
Nr artykułu 566
od strony 494



GT100, HSS

No 1

Ø 9,52 - 23,42 mm
Nr artykułu 621
od strony 490



GT100, HSCO



GV120, HSCO



Typ N, HSS



GT100, HSCO

Wiertła kręte z
chwytami MK



ALUMINIUM, METALE KOLOROWE, TWORZYWA SZTUCZNE

~ 3xD
Norma zakł.

~ 5xD
DIN 345

~ 10xD
DIN 341

~ 15xD
DIN 1870
R1

No 1

Ø 3,20 - 32,00 mm
Nr artykułu 247
od strony 460



Typ W do miękkich,
długowiórowych materiałów

No 1

Ø 6,70 - 25,25 mm
Nr artykułu 246
od strony 459



Typ H do twardych,
kruchych materiałów

No 1

Ø 5,50 - 29,50 mm
Nr artykułu 505
od strony 479



No 1

Ø 8,50 - 33,00 mm
Nr artykułu 525
od strony 485



Typ GT50 do miękkich,
długowiórowych materiałów

Ø 7,94 - 31,75 mm
Nr artykułu 558
od strony 461



Ø 5,50 - 32,00 mm
Nr artykułu 551
od strony 476



Ø 8,00 - 30,00 mm
Nr artykułu 526
od strony 484



Ø 10,00 - 39,00 mm
Nr artykułu 645
od strony 466



Ø 10,00 - 26,00 mm
Nr artykułu 623
od strony 481



Ø 9,52 - 30,00 mm
Nr artykułu 620
od strony 486



~ 10xD
Długość rowków do
DIN 341

~ 15xD
Długość rowków do
DIN 1870 R1

No 1

Ø 10,00 - 32,00 mm
Nr artykułu 1101
od strony 501



No 1

Ø 11,00 - 34,92 mm
Nr artykułu 370
od strony 505



Ø 11,00 - 34,00 mm
Nr artykułu 374
od strony 508



bez chłodzenia wewnętrznego

z chłodzeniem wewnętrznym

Wiertła kręte z chwytem MK



QUICKFINDER

~20xD
DIN 1870
R2

>20xD
Norma zakł.
bardzo długie

No 1 idealne narzędzie



Typ W, HSS



Typ H, HSS

No 1

Ø 8,50 - 31,00 mm
Nr artykułu 542
od strony 489



GT50, HSS

No 1

Ø 8,00 - 30,00 mm
Nr artykułu 527
od strony 488



Ø 8,00 - 40,00 mm
Nr artykułu 566
od strony 494



GT100, HSS

Ø 9,52 - 23,42 mm
Nr artykułu 621
od strony 490



GT100, HSCO



Typ N, HSS



GT100, HSCO

Wiertła kręte z
chwytami MK



Wiertła kręte



P • Korekcja ścina $\geq 7,000$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie

M •

K •

N ○ materiały trudne do obróbki • stale nierdzewne/kwaso-odporne • stale sprężynowe, stale austenityczne

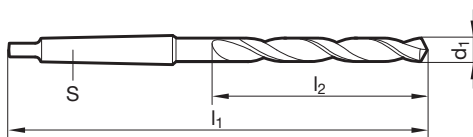
S •

H ○

GÜHRINGNAVIGATOR

Param. skr. na str. 772

Materiał narzędzia	HSCO
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **363**

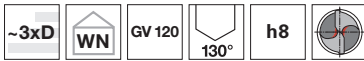
d1		S	l1	l2
mm	inch		mm	mm
8,100		MK-1	130,000	49,000
8,200		MK-1	130,000	49,000
8,300		MK-1	130,000	49,000
8,500		MK-1	130,000	49,000
8,600		MK-1	134,000	53,000
8,730	11/32	MK-1	134,000	53,000
9,000		MK-1	134,000	53,000
9,520	3/8	MK-1	138,000	57,000
9,920	25/64	MK-1	138,000	57,000
10,000		MK-1	138,000	57,000
10,100		MK-1	138,000	57,000
10,200		MK-1	138,000	57,000
10,500		MK-1	138,000	57,000
11,000		MK-1	142,000	61,000
11,750		MK-1	142,000	61,000
12,000		MK-1	147,000	66,000
12,500		MK-1	147,000	66,000
12,700	1/2	MK-1	147,000	66,000
13,000		MK-1	147,000	66,000
13,490	17/32	MK-2	168,000	70,000
13,500		MK-2	168,000	70,000
14,000		MK-2	168,000	70,000
14,500		MK-2	172,000	74,000
15,000		MK-2	172,000	74,000
15,500		MK-2	176,000	78,000
16,000		MK-2	176,000	78,000
16,500		MK-2	179,000	81,000
17,000		MK-2	179,000	81,000
17,500		MK-2	183,000	85,000
18,000		MK-2	183,000	85,000

d1		S	l1	l2
mm	inch		mm	mm
18,500		MK-2	186,000	88,000
19,000		MK-2	186,000	88,000
19,450	49/64	MK-3	212,000	91,000
20,000		MK-3	212,000	91,000
20,500		MK-3	216,000	95,000
20,900		MK-3	216,000	95,000
21,000		MK-3	216,000	95,000
21,500		MK-3	219,000	98,000
22,000		MK-3	219,000	98,000
22,220	7/8	MK-3	219,000	98,000
23,000		MK-3	222,000	101,000
23,020	29/32	MK-3	222,000	101,000
24,000		MK-3	225,000	104,000
24,500		MK-3	225,000	104,000
25,000	63/64	MK-3	225,000	104,000
26,000		MK-4	256,000	107,000
26,500		MK-4	256,000	107,000
27,000		MK-4	259,000	110,000
27,500		MK-4	259,000	110,000
28,000		MK-4	259,000	110,000
29,000		MK-4	263,000	114,000
29,370	1 5/32	MK-4	263,000	114,000
30,000		MK-4	263,000	114,000
32,000		MK-4	269,000	120,000
33,000		MK-4	269,000	120,000
37,000		MK-4	276,000	127,000
38,000		MK-5	317,000	130,000

Wiertła kręte z chwytami MK



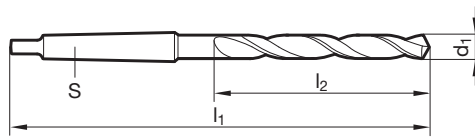
Wiertła kręte



P •	Korekcja ścina $\geq \text{Ø } 9,000$ • geometria zataczana • kobaltowa stal szybkołotnąca • zwiększona odporność na zużycie
M •	
K •	
N ○	materiały trudne do obróbki • nierdzewne/kwasoodporne stale (tzw. stale VA) • stale sprężynowe, stale austenityczne
S •	
H ○	

Materiał narzędzia **HSCO**Powierzchnia **S**Kierunek skrawania **R****GÜHRING**NAVIGATOR

Param. skr. na str. 774



Nr artykułu

663Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
10,500		MK-1	138,000	57,000
10,750		MK-1	142,000	61,000
11,500		MK-1	142,000	61,000
12,500		MK-1	147,000	66,000
13,500		MK-2	168,000	70,000
14,000		MK-2	168,000	70,000
14,250		MK-2	172,000	74,000
15,000		MK-2	172,000	74,000
16,000		MK-2	176,000	78,000
16,500		MK-2	179,000	81,000
17,000		MK-2	179,000	81,000
17,500		MK-2	183,000	85,000

d1		S	l1	l2
mm	inch		mm	mm
18,000		MK-2	183,000	85,000
19,000		MK-2	186,000	88,000
20,000		MK-3	212,000	91,000
21,000		MK-3	216,000	95,000
22,000		MK-3	219,000	98,000
23,000		MK-3	222,000	101,000
25,000	63/64	MK-3	225,000	104,000
27,000		MK-4	259,000	110,000
29,000		MK-4	263,000	114,000
30,000		MK-4	263,000	114,000
31,000		MK-4	266,000	117,000



Wiertła kręte

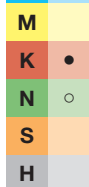


Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 0,2,36$

Kierunek skrawania

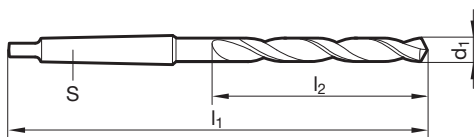
P • Korekcja ścina $\geq \varnothing 14,050$ • geometria zataczana



N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

GÜHRINGNAVIGATOR

Param. skr. na str. 778



Nr artykułu **245**

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
2,380	3/32	MK-1	111,000	30,000	5,950	15/64	MK-1	138,000	57,000
2,400		MK-1	111,000	30,000	6,000		MK-1	138,000	57,000
2,450		MK-1	111,000	30,000	6,050		MK-1	144,000	63,000
2,500		MK-1	111,000	30,000	6,100		MK-1	144,000	63,000
2,650		MK-1	111,000	30,000	6,200		MK-1	144,000	63,000
2,780	7/64	MK-1	114,000	33,000	6,300		MK-1	144,000	63,000
2,900		MK-1	114,000	33,000	6,350	1/4	MK-1	144,000	63,000
3,000		MK-1	114,000	33,000	6,400		MK-1	144,000	63,000
3,050		MK-1	117,000	36,000	6,500		MK-1	144,000	63,000
3,170	1/8	MK-1	117,000	36,000	6,600		MK-1	144,000	63,000
3,200		MK-1	117,000	36,000	6,700		MK-1	144,000	63,000
3,250		MK-1	117,000	36,000	6,750	17/64	MK-1	150,000	69,000
3,300		MK-1	117,000	36,000	6,800		MK-1	150,000	69,000
3,450		MK-1	120,000	39,000	6,900		MK-1	150,000	69,000
3,500		MK-1	120,000	39,000	7,000		MK-1	150,000	69,000
3,570	9/64	MK-1	120,000	39,000	7,140	9/32	MK-1	150,000	69,000
3,600		MK-1	120,000	39,000	7,200		MK-1	150,000	69,000
3,970	5/32	MK-1	124,000	43,000	7,250		MK-1	150,000	69,000
4,000		MK-1	124,000	43,000	7,300		MK-1	150,000	69,000
4,200		MK-1	124,000	43,000	7,400		MK-1	150,000	69,000
4,250		MK-1	124,000	43,000	7,500		MK-1	150,000	69,000
4,300		MK-1	128,000	47,000	7,540	19/64	MK-1	156,000	75,000
4,370	11/64	MK-1	128,000	47,000	7,600		MK-1	156,000	75,000
4,400		MK-1	128,000	47,000	7,700		MK-1	156,000	75,000
4,500		MK-1	128,000	47,000	7,750		MK-1	156,000	75,000
4,600		MK-1	128,000	47,000	7,800		MK-1	156,000	75,000
4,750		MK-1	128,000	47,000	7,900		MK-1	156,000	75,000
4,760	3/16	MK-1	133,000	52,000	7,940	5/16	MK-1	156,000	75,000
4,800		MK-1	133,000	52,000	8,000		MK-1	156,000	75,000
5,000		MK-1	133,000	52,000	8,050		MK-1	156,000	75,000
5,100		MK-1	133,000	52,000	8,100		MK-1	156,000	75,000
5,160	13/64	MK-1	133,000	52,000	8,200		MK-1	156,000	75,000
5,200		MK-1	133,000	52,000	8,250		MK-1	156,000	75,000
5,250		MK-1	133,000	52,000	8,300		MK-1	156,000	75,000
5,300		MK-1	133,000	52,000	8,330	21/64	MK-1	156,000	75,000
5,500		MK-1	138,000	57,000	8,400		MK-1	156,000	75,000
5,560	7/32	MK-1	138,000	57,000	8,400		MK-1	156,000	75,000
5,600		MK-1	138,000	57,000	8,500		MK-1	156,000	75,000
5,700		MK-1	138,000	57,000	8,600		MK-1	162,000	81,000
5,750		MK-1	138,000	57,000	8,700		MK-1	162,000	81,000
5,800		MK-1	138,000	57,000	8,730	11/32	MK-1	162,000	81,000
5,900		MK-1	138,000	57,000	8,750		MK-1	162,000	81,000
					8,800		MK-1	162,000	81,000



d1		S	l1	l2
mm	inch		mm	mm
8,900		MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,050		MK-1	162,000	81,000
9,100		MK-1	162,000	81,000
9,130	23/64	MK-1	162,000	81,000
9,200		MK-1	162,000	81,000
9,250		MK-1	162,000	81,000
9,300		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
9,750		MK-1	168,000	87,000
9,800		MK-1	168,000	87,000
9,900		MK-1	168,000	87,000
9,920	25/64	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
10,100		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,250		MK-1	168,000	87,000
10,300		MK-1	168,000	87,000
10,320	13/32	MK-1	168,000	87,000
10,400		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,520		MK-1	168,000	87,000
10,600		MK-1	168,000	87,000
10,700		MK-1	175,000	94,000
10,720	27/64	MK-1	175,000	94,000
10,750		MK-1	175,000	94,000
10,800		MK-1	175,000	94,000
10,900		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,100		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,200		MK-1	175,000	94,000
11,250		MK-1	175,000	94,000
11,300		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,600		MK-1	175,000	94,000
11,700		MK-1	175,000	94,000
11,750		MK-1	175,000	94,000
11,800		MK-1	175,000	94,000
11,900		MK-1	182,000	101,000
11,910	15/32	MK-1	182,000	101,000
12,000		MK-1	182,000	101,000
12,100		MK-1	182,000	101,000
12,200		MK-1	182,000	101,000
12,250		MK-1	182,000	101,000
12,300	31/64	MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,550		MK-1	182,000	101,000
12,600		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
12,800		MK-1	182,000	101,000
12,900		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,100	33/64	MK-1	182,000	101,000
13,200		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
13,300		MK-1	189,000	108,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
13,600		MK-1	189,000	108,000
13,700		MK-1	189,000	108,000
13,750		MK-1	189,000	108,000
13,800		MK-1	189,000	108,000
13,890	35/64	MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,050		MK-2	212,000	114,000
14,100		MK-2	212,000	114,000
14,200		MK-2	212,000	114,000
14,250		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000

d1		S	l1	l2
mm	inch		mm	mm
14,300		MK-2	212,000	114,000
14,400		MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
14,600		MK-2	212,000	114,000
14,680	37/64	MK-2	212,000	114,000
14,700		MK-2	212,000	114,000
14,750		MK-2	212,000	114,000
14,800		MK-2	212,000	114,000
14,900		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
15,100		MK-2	218,000	120,000
15,200		MK-2	218,000	120,000
15,250		MK-2	218,000	120,000
15,300		MK-2	218,000	120,000
15,400		MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
15,600		MK-2	218,000	120,000
15,700		MK-2	218,000	120,000
15,750		MK-2	218,000	120,000
15,800		MK-2	218,000	120,000
15,870	5/8	MK-2	218,000	120,000
15,900		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,100		MK-2	223,000	125,000
16,200		MK-2	223,000	125,000
16,250		MK-2	223,000	125,000
16,270	41/64	MK-2	223,000	125,000
16,300		MK-2	223,000	125,000
16,400		MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
16,700		MK-2	223,000	125,000
16,750		MK-2	223,000	125,000
16,800		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,070	43/64	MK-2	228,000	130,000
17,100		MK-2	228,000	130,000
17,250		MK-2	228,000	130,000
17,300		MK-2	228,000	130,000
17,400		MK-2	228,000	130,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
17,600		MK-2	228,000	130,000
17,700		MK-2	228,000	130,000
17,750		MK-2	228,000	130,000
17,800		MK-2	228,000	130,000
17,860	45/64	MK-2	228,000	130,000
17,900		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,100		MK-2	233,000	135,000
18,200		MK-2	233,000	135,000
18,250		MK-2	233,000	135,000
18,260	23/32	MK-2	233,000	135,000
18,300		MK-2	233,000	135,000
18,500		MK-2	233,000	135,000
18,650	47/64	MK-2	233,000	135,000
18,750		MK-2	233,000	135,000
18,800		MK-2	233,000	135,000
18,900		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,100		MK-2	238,000	140,000
19,200		MK-2	238,000	140,000
19,250		MK-2	238,000	140,000
19,450	49/64	MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,700		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
19,800		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000



Wiertła kręte z chwytem MK

d1		S	l1	l2
mm	inch		mm	mm
20,100		MK-2	243,000	145,000
20,200		MK-2	243,000	145,000
20,250		MK-2	243,000	145,000
20,300		MK-2	243,000	145,000
20,400		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,640	13/16	MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,030	53/64	MK-2	243,000	145,000
21,100		MK-2	243,000	145,000
21,200		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,430	27/32	MK-2	248,000	150,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
21,830	55/64	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,100		MK-2	248,000	150,000
22,200		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
22,400		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
22,620	57/64	MK-2	253,000	155,000
22,750		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,020	29/32	MK-2	253,000	155,000
23,250		MK-3	276,000	155,000
23,420	59/64	MK-3	276,000	155,000
23,500		MK-3	276,000	155,000
23,750		MK-3	281,000	160,000
23,810	15/16	MK-3	281,000	160,000
23,900		MK-3	281,000	160,000
24,000		MK-3	281,000	160,000
24,100		MK-3	281,000	160,000
24,210	61/64	MK-3	281,000	160,000
24,250		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
24,610	31/32	MK-3	281,000	160,000
24,750		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,100		MK-3	286,000	165,000
25,200		MK-3	286,000	165,000
25,250		MK-3	286,000	165,000
25,400	1	MK-3	286,000	165,000
25,500		MK-3	286,000	165,000
25,750		MK-3	286,000	165,000
25,800	1 1/64	MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,190	1 1/32	MK-3	286,000	165,000
26,250		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
26,590	1 3/64	MK-3	291,000	170,000
26,750		MK-3	291,000	170,000
26,990	1 1/16	MK-3	291,000	170,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
27,750		MK-3	291,000	170,000
27,780	1 3/32	MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,250		MK-3	296,000	175,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
28,750		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,250		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
29,750		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,100		MK-3	301,000	180,000
30,160	1 3/16	MK-3	301,000	180,000

d1		S	l1	l2
mm	inch		mm	mm
30,250		MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
30,560	1 13/64	MK-3	301,000	180,000
30,750		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,250		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750	1 1/4	MK-3	306,000	185,000
32,000		MK-4	334,000	185,000
32,150	1 17/64	MK-4	334,000	185,000
32,250		MK-4	334,000	185,000
32,500		MK-4	334,000	185,000
32,750		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
33,340	1 5/16	MK-4	334,000	185,000
33,500		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
34,500		MK-4	339,000	190,000
34,750		MK-4	339,000	190,000
34,920	1 3/8	MK-4	339,000	190,000
35,000		MK-4	339,000	190,000
35,500		MK-4	339,000	190,000
36,000		MK-4	344,000	195,000
36,500		MK-4	344,000	195,000
36,750		MK-4	344,000	195,000
37,000		MK-4	344,000	195,000
37,310	1 15/32	MK-4	344,000	195,000
37,500		MK-4	344,000	195,000
37,700	1 31/64	MK-4	349,000	200,000
38,000		MK-4	349,000	200,000
38,100	1 1/2	MK-4	349,000	200,000
38,500	1 33/64	MK-4	349,000	200,000
39,000		MK-4	349,000	200,000
39,500		MK-4	349,000	200,000
39,690	1 9/16	MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
40,500		MK-4	354,000	205,000
40,750		MK-4	354,000	205,000
40,800		MK-4	354,000	205,000
41,000		MK-4	354,000	205,000
41,270	1 5/8	MK-4	354,000	205,000
41,500		MK-4	354,000	205,000
42,000		MK-4	354,000	205,000
42,500		MK-4	354,000	205,000
43,000		MK-4	359,000	210,000
43,500		MK-4	359,000	210,000
44,000		MK-4	359,000	210,000
44,450	1 3/4	MK-4	359,000	210,000
44,500		MK-4	359,000	210,000
45,000		MK-4	359,000	210,000
45,500		MK-4	364,000	215,000
46,000		MK-4	364,000	215,000
46,430	1 53/64	MK-4	364,000	215,000
46,500		MK-4	364,000	215,000
47,000		MK-4	364,000	215,000
47,230	1 55/64	MK-4	364,000	215,000
47,500		MK-4	364,000	215,000
47,620	1 7/8	MK-4	369,000	220,000
48,000		MK-4	369,000	220,000
48,020	1 57/64	MK-4	369,000	220,000
48,500		MK-4	369,000	220,000
48,820	1 59/64	MK-4	369,000	220,000
49,000		MK-4	369,000	220,000
49,500		MK-4	369,000	220,000
49,610	1 61/64	MK-4	369,000	220,000
50,000		MK-4	369,000	220,000
50,500		MK-4	374,000	225,000
50,800	2	MK-4	374,000	225,000
51,000		MK-5	412,000	225,000
52,000		MK-5	412,000	225,000
53,000		MK-5	412,000	225,000
53,390		MK-5	417,000	230,000



d1		S	l1	l2
mm	inch		mm	mm
53,400		MK-5	417,000	230,000
54,000		MK-5	417,000	230,000
55,000		MK-5	417,000	230,000
56,000		MK-5	417,000	230,000
57,000		MK-5	422,000	235,000
58,000		MK-5	422,000	235,000
59,000		MK-5	422,000	235,000
60,000		MK-5	422,000	235,000
61,000		MK-5	427,000	240,000
62,000		MK-5	427,000	240,000
63,000		MK-5	427,000	240,000
63,500	2 1/2	MK-5	432,000	245,000
65,000		MK-5	432,000	245,000
66,670	2 5/8	MK-5	432,000	245,000
67,500		MK-5	437,000	250,000
68,000		MK-5	437,000	250,000
69,850	2 3/4	MK-5	437,000	250,000
70,000		MK-5	437,000	250,000

d1		S	l1	l2
mm	inch		mm	mm
71,500		MK-5	442,000	255,000
72,000		MK-5	442,000	255,000
75,000		MK-5	442,000	255,000
76,990	3 1/32	MK-6	514,000	260,000
77,000		MK-6	514,000	260,000
77,790	3 1/16	MK-6	514,000	260,000
78,580	3 3/32	MK-6	514,000	260,000
79,500		MK-6	514,000	260,000
87,310	3 7/16	MK-6	524,000	270,000
89,000		MK-6	524,000	270,000
92,500		MK-6	529,000	275,000
93,000		MK-6	529,000	275,000
94,000		MK-6	529,000	275,000
94,500		MK-6	529,000	275,000
95,250	3 3/4	MK-6	534,000	280,000
95,500		MK-6	534,000	280,000
96,000		MK-6	534,000	280,000



Wiertła kręte



P • Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • w ciężkich warunkach pracy w przemyśle metalowym

M

K •

N ○ stopowe/niestopowe stale i staliwa

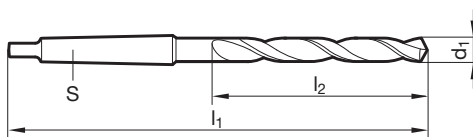
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 778

Materiał narzędzia	HSS
Powierzchnia	$\geq \varnothing 16,0$
Kierunek skrawania	



Nr artykułu

592

Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,320	13/32	MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,910	15/32	MK-1	182,000	101,000
12,000		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000

d1		S	l1	l2
mm	inch		mm	mm
14,290	9/16	MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
17,000		MK-2	223,000	125,000
18,000		MK-2	228,000	130,000
19,050	3/4	MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
21,430	27/32	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
28,000		MK-3	291,000	170,000



Wiertła kręte



Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana

M

K •

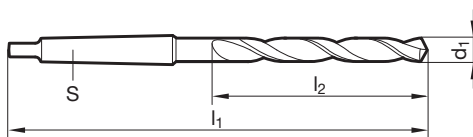
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 780



Nr artykułu **654**

Wiertła kręte z
chwytami MK

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
3,000		MK-1	114,000	33,000	11,110	7/16	MK-1	175,000	94,000
3,170	1/8	MK-1	117,000	36,000	11,200		MK-1	175,000	94,000
3,500		MK-1	120,000	39,000	11,250		MK-1	175,000	94,000
3,970	5/32	MK-1	124,000	43,000	11,500		MK-1	175,000	94,000
4,000		MK-1	124,000	43,000	11,510	29/64	MK-1	175,000	94,000
4,100		MK-1	124,000	43,000	11,750		MK-1	175,000	94,000
4,370	11/64	MK-1	128,000	47,000	11,910	15/32	MK-1	182,000	101,000
4,500		MK-1	128,000	47,000	12,000		MK-1	182,000	101,000
4,760	3/16	MK-1	133,000	52,000	12,200		MK-1	182,000	101,000
5,000		MK-1	133,000	52,000	12,400		MK-1	182,000	101,000
5,160	13/64	MK-1	133,000	52,000	12,500		MK-1	182,000	101,000
5,560	7/32	MK-1	138,000	57,000	12,700	1/2	MK-1	182,000	101,000
6,000		MK-1	138,000	57,000	12,750		MK-1	182,000	101,000
6,500		MK-1	144,000	63,000	13,000		MK-1	182,000	101,000
6,750	17/64	MK-1	150,000	69,000	13,250		MK-1	189,000	108,000
6,800		MK-1	150,000	69,000	13,490	17/32	MK-1	189,000	108,000
7,000		MK-1	150,000	69,000	13,500		MK-1	189,000	108,000
7,100		MK-1	150,000	69,000	13,890	35/64	MK-1	189,000	108,000
7,140	9/32	MK-1	150,000	69,000	14,000		MK-1	189,000	108,000
7,400		MK-1	150,000	69,000	14,200		MK-2	212,000	114,000
7,700		MK-1	156,000	75,000	14,250		MK-2	212,000	114,000
8,000		MK-1	156,000	75,000	14,290	9/16	MK-2	212,000	114,000
8,500		MK-1	156,000	75,000	14,500		MK-2	212,000	114,000
8,730	11/32	MK-1	162,000	81,000	14,680	37/64	MK-2	212,000	114,000
8,800		MK-1	162,000	81,000	14,750		MK-2	212,000	114,000
9,000		MK-1	162,000	81,000	14,900		MK-2	212,000	114,000
9,400		MK-1	162,000	81,000	15,000		MK-2	212,000	114,000
9,520	3/8	MK-1	168,000	87,000	15,250		MK-2	218,000	120,000
9,600		MK-1	168,000	87,000	15,500		MK-2	218,000	120,000
9,750		MK-1	168,000	87,000	15,750		MK-2	218,000	120,000
9,800		MK-1	168,000	87,000	15,870	5/8	MK-2	218,000	120,000
10,000		MK-1	168,000	87,000	16,000		MK-2	218,000	120,000
10,200		MK-1	168,000	87,000	16,200		MK-2	223,000	125,000
10,250		MK-1	168,000	87,000	16,500		MK-2	223,000	125,000
10,300		MK-1	168,000	87,000	17,000		MK-2	223,000	125,000
10,320	13/32	MK-1	168,000	87,000	17,070	43/64	MK-2	228,000	130,000
10,400		MK-1	168,000	87,000	17,250		MK-2	228,000	130,000
10,500		MK-1	168,000	87,000	17,500		MK-2	228,000	130,000
10,720	27/64	MK-1	175,000	94,000	17,750		MK-2	228,000	130,000
10,750		MK-1	175,000	94,000	18,000		MK-2	228,000	130,000
10,800		MK-1	175,000	94,000	18,250		MK-2	233,000	135,000
11,000		MK-1	175,000	94,000	18,260	23/32	MK-2	233,000	135,000



d1		S	l1	l2
mm	inch		mm	mm
18,500		MK-2	233,000	135,000
18,650	47/64	MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,450	49/64	MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,250		MK-2	243,000	145,000
20,500		MK-2	243,000	145,000
20,640	13/16	MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
21,830	55/64	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
23,750		MK-3	281,000	160,000

d1		S	l1	l2
mm	inch		mm	mm
24,000		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
24,750		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,400	1	MK-3	286,000	165,000
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
27,000		MK-3	291,000	170,000
27,380	1 5/64	MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
29,750		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,500		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000

Wiertła kręte z
chwytami MK



Wiertła kręte



P • Korekcja ścina $\geq \varnothing 8,500$ • geometria zataczana • skuteczniejsze łamanie wiórów • przeznaczone szczególnie do obrabiarek w liniach automatycznych

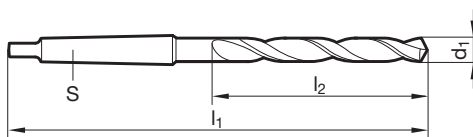
K •
N ○ materiały długowiórowe

S
H

GÜHRINGNAVIGATOR

Param. skr. na str. 778

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **229**

d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	156,000	75,000
8,730	11/32	MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,910	15/32	MK-1	182,000	101,000
12,250		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
13,490	17/32	MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
18,000		MK-2	228,000	130,000
18,250		MK-2	233,000	135,000
19,500		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,640	13/16	MK-2	243,000	145,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
23,810	15/16	MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,400	1	MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,190	1 1/32	MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
35,000		MK-4	339,000	190,000
39,500		MK-4	349,000	200,000
42,500		MK-4	354,000	205,000
43,500		MK-4	359,000	210,000
46,040	1 13/16	MK-4	364,000	215,000
46,500		MK-4	364,000	215,000
47,500		MK-4	364,000	215,000
56,000		MK-5	417,000	230,000
57,000		MK-5	422,000	235,000
58,000		MK-5	422,000	235,000
59,000		MK-5	422,000	235,000

Wiertła kręte z chwytami MK



Wiertła kręte

Materiał narzędzia **HSS**

Powierzchnia



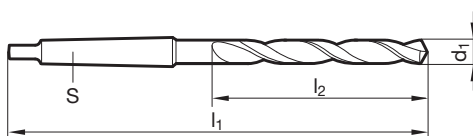
Kierunek skrawania

**P** Korekcja ścina $\geq \varnothing 14,500$ • geometria zataczana**M****K****N** •

twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax

S**H****GÜHRING**NAVIGATOR

Param. skr. na str. 778



Nr artykułu

246Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
6,700		MK-1	144,000	63,000
8,200		MK-1	156,000	75,000
11,000		MK-1	175,000	94,000
11,750		MK-1	175,000	94,000
12,600		MK-1	182,000	101,000
12,800		MK-1	182,000	101,000
13,750		MK-1	189,000	108,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,500		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,500		MK-2	223,000	125,000

d1		S	l1	l2
mm	inch		mm	mm
17,000		MK-2	223,000	125,000
20,500		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
25,000	63/64	MK-3	281,000	160,000
25,250		MK-3	286,000	165,000



Wiertła kręte



P Korekcja ścina $\geq \varnothing 14,100$ • geometria zataczana

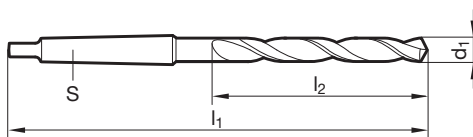


N • miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
S • cynk, miedź rafinowana, silumin, elektron

GÜHRINGNAVIGATOR

Param. skr. na str. 778

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **247**

Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
3,200		MK-1	117,000	36,000
3,300		MK-1	117,000	36,000
3,800		MK-1	124,000	43,000
4,000		MK-1	124,000	43,000
5,000		MK-1	133,000	52,000
5,400		MK-1	138,000	57,000
5,500		MK-1	138,000	57,000
6,000		MK-1	138,000	57,000
6,300		MK-1	144,000	63,000
6,500		MK-1	144,000	63,000
6,600		MK-1	144,000	63,000
6,750	17/64	MK-1	150,000	69,000
6,800		MK-1	150,000	69,000
7,000		MK-1	150,000	69,000
7,500		MK-1	150,000	69,000
7,750		MK-1	156,000	75,000
8,000		MK-1	156,000	75,000
9,200		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,750		MK-1	168,000	87,000
9,800		MK-1	168,000	87,000
12,000		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000

d1		S	l1	l2
mm	inch		mm	mm
13,200		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
16,000		MK-2	218,000	120,000
17,000		MK-2	223,000	125,000
18,000		MK-2	228,000	130,000
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
20,000		MK-2	238,000	140,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
27,000		MK-3	291,000	170,000
27,200		MK-3	291,000	170,000
27,250		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
30,300		MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
32,000		MK-4	334,000	185,000



Wiertła kręte



P • Korekcja ścina $\geq \varnothing 7,940$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$

M

K •

N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

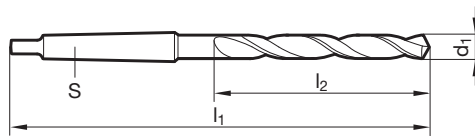
Materiał narzędzia **HSS**

Powierzchnia $\varnothing 16,0$

Kierunek skrawania **R**

GÜHRING NAVIGATOR

Param. skr. na str. 778



Nr artykułu

558

Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
7,940	5/16	MK-1	156,000	75,000
8,000		MK-1	156,000	75,000
8,250		MK-1	156,000	75,000
9,500		MK-1	162,000	81,000
10,000		MK-1	168,000	87,000
10,250		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
12,700	1/2	MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
19,500		MK-2	238,000	140,000

d1		S	l1	l2
mm	inch		mm	mm
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
27,500		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,160	1 3/16	MK-3	301,000	180,000
30,500		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750	1 1/4	MK-3	306,000	185,000



Wiertła kręte

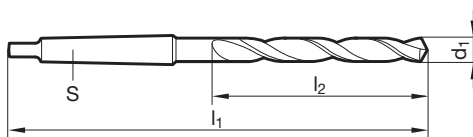


- P** • Korekcja ścina $\geq \varnothing 7,940$ • geometria zataczana • szerokie rowki wiórowe • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 780

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu **606**

Wiertła kręte z chwytym MK

d1		S	l1	l2
mm	inch		mm	mm
7,940	5/16	MK-1	156,000	75,000
8,750		MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
11,110	7/16	MK-1	175,000	94,000
12,250		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
14,500		MK-2	212,000	114,000
15,750		MK-2	218,000	120,000

d1		S	l1	l2
mm	inch		mm	mm
15,870	5/8	MK-2	218,000	120,000
17,500		MK-2	228,000	130,000
23,500		MK-3	276,000	155,000
23,810	15/16	MK-3	281,000	160,000
25,400	1	MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
31,500		MK-3	301,000	180,000



Wiertła kręte



Materiał narzędzia **HSCO**

Powierzchnia

Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie

M ○

K •

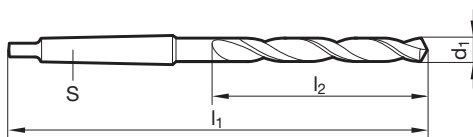
N ○ stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania

S ○

H ○

GÜHRING NAVIGATOR

Param. skr. na str. 780



Nr artykułu **345**

Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
4,000		MK-1	124,000	43,000
5,000		MK-1	133,000	52,000
5,200		MK-1	133,000	52,000
5,500		MK-1	138,000	57,000
6,000		MK-1	138,000	57,000
6,500		MK-1	144,000	63,000
6,700		MK-1	144,000	63,000
6,750	17/64	MK-1	150,000	69,000
6,800		MK-1	150,000	69,000
7,000		MK-1	150,000	69,000
7,500		MK-1	150,000	69,000
8,000		MK-1	156,000	75,000
8,200		MK-1	156,000	75,000
8,500		MK-1	156,000	75,000
8,700		MK-1	162,000	81,000
9,000		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
10,100		MK-1	168,000	87,000
10,150		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,250		MK-1	168,000	87,000
10,320	13/32	MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,700		MK-1	175,000	94,000
10,720	27/64	MK-1	175,000	94,000
10,750		MK-1	175,000	94,000
10,800		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,200		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,600		MK-1	175,000	94,000
11,750		MK-1	175,000	94,000
11,800		MK-1	175,000	94,000
11,900		MK-1	182,000	101,000
12,000		MK-1	182,000	101,000
12,100		MK-1	182,000	101,000
12,200		MK-1	182,000	101,000
12,250		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000

d1		S	l1	l2
mm	inch		mm	mm
12,700	1/2	MK-1	182,000	101,000
12,750		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,100	33/64	MK-1	182,000	101,000
13,200		MK-1	182,000	101,000
13,250		MK-1	189,000	108,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
13,700		MK-1	189,000	108,000
13,750		MK-1	189,000	108,000
13,800		MK-1	189,000	108,000
13,900		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,100		MK-2	212,000	114,000
14,200		MK-2	212,000	114,000
14,250		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
14,750		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,080	19/32	MK-2	218,000	120,000
15,250		MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
15,750		MK-2	218,000	120,000
15,870	5/8	MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,100		MK-2	223,000	125,000
16,250		MK-2	223,000	125,000
16,270	41/64	MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
16,750		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
17,750		MK-2	228,000	130,000
17,860	45/64	MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,200		MK-2	233,000	135,000
18,250		MK-2	233,000	135,000
18,260	23/32	MK-2	233,000	135,000
18,500		MK-2	233,000	135,000



Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
18,650	47/64	MK-2	233,000	135,000
18,750		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
19,050	3/4	MK-2	238,000	140,000
19,250		MK-2	238,000	140,000
19,500		MK-2	238,000	140,000
19,750		MK-2	238,000	140,000
19,840	25/32	MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,250		MK-2	243,000	145,000
20,500	13/16	MK-2	243,000	145,000
20,640		MK-2	243,000	145,000
20,750		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,250		MK-2	248,000	150,000
21,500	7/8	MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,220		MK-2	248,000	150,000
22,250		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
22,620		57/64	MK-2	253,000
23,000	29/32	MK-2	253,000	155,000
23,020		MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
24,000	61/64	MK-3	281,000	160,000
24,210		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
25,000		63/64	MK-3	281,000
25,250	1	MK-3	286,000	165,000
25,400		MK-3	286,000	165,000

d1		S	l1	l2
mm	inch		mm	mm
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
28,570	1 1/8	MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
30,500		MK-3	301,000	180,000
31,000		MK-3	301,000	180,000
31,500		MK-3	301,000	180,000
31,750		1 1/4	MK-3	306,000
32,000		MK-4	334,000	185,000
32,500		MK-4	334,000	185,000
33,000		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000
35,000		MK-4	339,000	190,000
36,000		MK-4	344,000	195,000
37,000		MK-4	344,000	195,000
38,000		MK-4	349,000	200,000
39,000		MK-4	349,000	200,000
40,000		MK-4	349,000	200,000
42,000	1 21/32	MK-4	354,000	205,000
42,070		MK-4	354,000	205,000
43,000		MK-4	359,000	210,000
45,000		MK-4	359,000	210,000
50,000		MK-4	369,000	220,000



Wiertła kręte

Materiał narzędzia **HSCO**Powierzchnia **S**Kierunek skrawania **R**

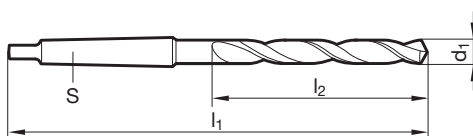
P • Korekcja ścina $\geq \varnothing 7,940$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie

M ○**K** •**N** ○**S** ○**H** ○

stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale
narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale
wysokostopowe • stale do uleps. ciepln. i stale do nawęglania

GÜHRING NAVIGATOR

Param. skr. na str. 782



Nr artykułu

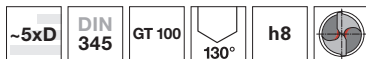
661Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	156,000	75,000
8,500		MK-1	156,000	75,000
9,000		MK-1	162,000	81,000
9,500		MK-1	162,000	81,000
9,520	3/8	MK-1	168,000	87,000
10,000		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,500		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
16,000		MK-2	218,000	120,000
17,000		MK-2	223,000	125,000
17,070	43/64	MK-2	228,000	130,000

d1		S	l1	l2
mm	inch		mm	mm
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
19,000		MK-2	233,000	135,000
19,500		MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
23,810	15/16	MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
29,000		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000



Wiertła kręte

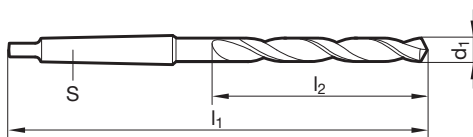


- P** • Korekcja ścina $\geq \varnothing 9,520$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M** ○
- K** •
- N** ○ stałe stopowe/niestopowe i żeliwa - $R_m > 1000 \text{ N/mm}^2$ • stałe narzędziowe do pracy na zimno i gorąco • stałe łożyskowe • stałe wysokostopowe • stałe do ulepszc. ciepln. i stałe do nawęglania
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 780

Materiał narzędzia	HSCO
Powierzchnia	$>0/16,0$
Kierunek skrawania	



Nr artykułu **645**

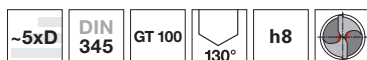
d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,100		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,720	27/64	MK-1	175,000	94,000
10,800		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,500		MK-1	175,000	94,000
11,510	29/64	MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,300		MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,250		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,250		MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
15,750		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,250		MK-2	228,000	130,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000

d1		S	l1	l2
mm	inch		mm	mm
18,250		MK-2	233,000	135,000
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
22,220	7/8	MK-2	248,000	150,000
22,620	57/64	MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
24,000		MK-3	281,000	160,000
24,210	61/64	MK-3	281,000	160,000
24,610	31/32	MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,780	1 3/32	MK-3	291,000	170,000
28,570	1 1/8	MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
31,000		MK-3	301,000	180,000
33,000		MK-4	334,000	185,000
35,000		MK-4	339,000	190,000
37,000		MK-4	344,000	195,000
38,000		MK-4	349,000	200,000
39,000		MK-4	349,000	200,000

Wiertła kręte z chwytami MK



Wiertła kręte

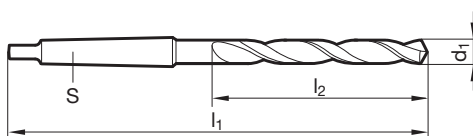


P ●	Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
M ○	
K ●	
N ○	stale stopowe/niestopowe i żeliwa - $R_m > 1000 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do uleps. ciepln. i stale do nawęglania
S ○	
H ○	

GÜHRING NAVIGATOR

Param. skr. na str. 782

Materiał narzędzia	HSCO
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

662

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
11,400		MK-1	175,000	94,000
12,200		MK-1	182,000	101,000
12,300	31/64	MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
14,000		MK-1	189,000	108,000
14,290	9/16	MK-2	212,000	114,000
15,000		MK-2	212,000	114,000

d1		S	l1	l2
mm	inch		mm	mm
16,000		MK-2	218,000	120,000
17,460	11/16	MK-2	228,000	130,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
22,000		MK-2	248,000	150,000
23,000		MK-2	253,000	155,000
23,500		MK-3	276,000	155,000
23,810	15/16	MK-3	281,000	160,000

Wiertła kręte z
chwytami MK



Wiertła kręte

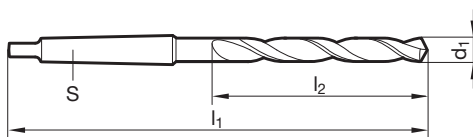


- P** • Korekcja ścina $\geq \text{Ø } 10,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
- M**
- K** ○
- N** stале stopowe/niestopowe i żeliwa - $R_m > 1000 \text{ N/mm}^2$ • stале narzędziowe do pracy na zimno i gorąco • stале łożyskowe • stале wysokostopowe • stале do uleps. ciepln. i stале do nawęglania
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 782

Materiał narzędzia	HSCO
Powierzchnia	G
Kierunek skrawania	R



Nr artykułu **1222**

Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
11,000		MK-1	175,000	94,000
11,110	7/16	MK-1	175,000	94,000
12,500		MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
14,200		MK-2	212,000	114,000
15,870	5/8	MK-2	218,000	120,000
16,500		MK-2	223,000	125,000
16,670	21/32	MK-2	223,000	125,000
17,460	11/16	MK-2	228,000	130,000
19,500		MK-2	238,000	140,000

d1		S	l1	l2
mm	inch		mm	mm
23,500		MK-3	276,000	155,000
23,810	15/16	MK-3	281,000	160,000
25,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
29,500		MK-3	296,000	175,000
30,160	1 3/16	MK-3	301,000	180,000



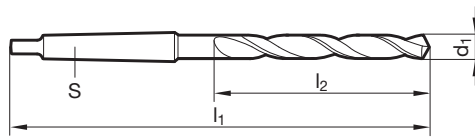
Wiertła kręte



P ○	Korekcja ścina $\geq \varnothing 10,400$ • geometria zataczana • kobaltowa stal szybkołnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • szczególnie do głębokości wiercenia $> 3xD$
M ○	
K ●	
N ○	stale stopowe/niestopowe i żeliwa - $R_m > 1000 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do uleps. ciepln. i stale do nawęglania
S ○	
H ○	

Materiał narzędzia **HSCO**Powierzchnia **A**Kierunek skrawania **R****GÜHRING**NAVIGATOR

Param. skr. na str. 782



Nr artykułu

1224Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
10,400		MK-1	168,000	87,000
11,110	7/16	MK-1	175,000	94,000
12,300	31/64	MK-1	182,000	101,000
12,700	1/2	MK-1	182,000	101,000
14,200		MK-2	212,000	114,000
14,290	9/16	MK-2	212,000	114,000
15,870	5/8	MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,500		MK-2	223,000	125,000
19,000		MK-2	233,000	135,000
19,500		MK-2	238,000	140,000
23,810	15/16	MK-3	281,000	160,000

d1		S	l1	l2
mm	inch		mm	mm
25,500		MK-3	286,000	165,000
26,990	1 1/16	MK-3	291,000	170,000
27,000		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
29,500		MK-3	296,000	175,000
30,160	1 3/16	MK-3	301,000	180,000



Wiertła kręte

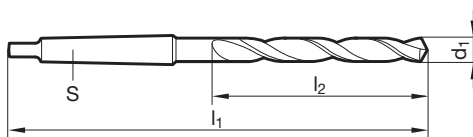


- P** ○ geometria zataczana • kobaltowa stal szybkołnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ○ stale nierdzewne austenityczne /kwaso-/żaro-odporne (V2A i V4A)
- S** ○
- H** ●

GÜHRINGNAVIGATOR

Param. skr. na str. 780

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **1262**

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	168,000	87,000
10,200		MK-1	168,000	87,000
10,500		MK-1	168,000	87,000
10,800		MK-1	175,000	94,000
11,000		MK-1	175,000	94,000
11,200		MK-1	175,000	94,000
11,800		MK-1	175,000	94,000
12,000		MK-1	182,000	101,000
12,300	31/64	MK-1	182,000	101,000
12,500		MK-1	182,000	101,000
13,000		MK-1	182,000	101,000
13,490	17/32	MK-1	189,000	108,000
13,500		MK-1	189,000	108,000
13,800		MK-1	189,000	108,000
14,000		MK-1	189,000	108,000
14,250		MK-2	212,000	114,000
14,500		MK-2	212,000	114,000
14,750		MK-2	212,000	114,000
15,000		MK-2	212,000	114,000
15,250		MK-2	218,000	120,000
15,480	39/64	MK-2	218,000	120,000
15,500		MK-2	218,000	120,000
16,000		MK-2	218,000	120,000
16,250		MK-2	223,000	125,000
16,500		MK-2	223,000	125,000
17,000		MK-2	223,000	125,000
17,500		MK-2	228,000	130,000
18,000		MK-2	228,000	130,000
18,500		MK-2	233,000	135,000
19,000		MK-2	233,000	135,000

d1		S	l1	l2
mm	inch		mm	mm
19,500		MK-2	238,000	140,000
20,000		MK-2	238,000	140,000
20,500		MK-2	243,000	145,000
21,000		MK-2	243,000	145,000
21,500		MK-2	248,000	150,000
21,750		MK-2	248,000	150,000
22,000		MK-2	248,000	150,000
22,500		MK-2	253,000	155,000
23,000		MK-2	253,000	155,000
23,420	59/64	MK-3	276,000	155,000
24,000		MK-3	281,000	160,000
24,500		MK-3	281,000	160,000
25,000	63/64	MK-3	281,000	160,000
25,500		MK-3	286,000	165,000
26,000		MK-3	286,000	165,000
26,500		MK-3	286,000	165,000
27,000		MK-3	291,000	170,000
27,500		MK-3	291,000	170,000
28,000		MK-3	291,000	170,000
28,500		MK-3	296,000	175,000
29,000		MK-3	296,000	175,000
30,000		MK-3	296,000	175,000
32,000		MK-4	334,000	185,000
34,000		MK-4	339,000	190,000

Wiertła kręte z chwytami MK



Wiertła kręte

Materiał narzędzia **HSS**

Powierzchnia



Kierunek skrawania



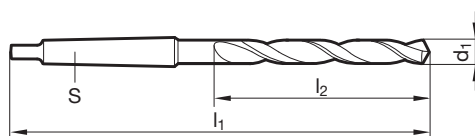
P • Korekcja ścina $\geq \varnothing 14,200$ • geometria zataczana • z powiększonym chwytem stożkowym Morse'a

M**K** •**N** ○

stale stopowe/niestopowe i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit

S**H****GÜHRING**NAVIGATOR

Param. skr. na str. 778



Nr artykułu

251

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	185,000	87,000
10,500		MK-2	185,000	87,000
11,000		MK-2	192,000	94,000
11,910	15/32	MK-2	199,000	101,000
12,000		MK-2	199,000	101,000
12,250		MK-2	199,000	101,000
12,500		MK-2	199,000	101,000
13,000		MK-2	199,000	101,000
13,100	33/64	MK-2	199,000	101,000
13,250		MK-2	206,000	108,000
13,490	17/32	MK-2	206,000	108,000
13,500		MK-2	206,000	108,000
13,890	35/64	MK-2	206,000	108,000
14,000		MK-2	206,000	108,000
16,700		MK-3	246,000	125,000
17,000		MK-3	246,000	125,000
17,250		MK-3	251,000	130,000
18,250		MK-3	256,000	135,000
18,260	23/32	MK-3	256,000	135,000
18,650	47/64	MK-3	256,000	135,000
18,750		MK-3	256,000	135,000
19,000		MK-3	256,000	135,000
19,050	3/4	MK-3	261,000	140,000
19,450	49/64	MK-3	261,000	140,000
19,840	25/32	MK-3	261,000	140,000
20,000		MK-3	261,000	140,000
20,250		MK-3	266,000	145,000
20,640	13/16	MK-3	266,000	145,000
21,000		MK-3	266,000	145,000
21,030	53/64	MK-3	266,000	145,000

d1		S	l1	l2
mm	inch		mm	mm
21,430	27/32	MK-3	271,000	150,000
21,500		MK-3	271,000	150,000
22,000		MK-3	271,000	150,000
22,220	7/8	MK-3	271,000	150,000
23,000		MK-3	276,000	155,000
23,020	29/32	MK-3	276,000	155,000
27,500		MK-4	319,000	170,000
27,750		MK-4	319,000	170,000
27,780	1 3/32	MK-4	319,000	170,000
28,000		MK-4	319,000	170,000
28,180	1 7/64	MK-4	324,000	175,000
28,500		MK-4	324,000	175,000
28,570	1 1/8	MK-4	324,000	175,000
28,970	1 9/64	MK-4	324,000	175,000
29,770	1 11/64	MK-4	324,000	175,000
31,500		MK-4	329,000	180,000
32,000		MK-5	372,000	185,000
36,000		MK-5	382,000	195,000
40,080	1 37/64	MK-5	392,000	205,000
41,000		MK-5	392,000	205,000
41,500		MK-5	392,000	205,000
42,070	1 21/32	MK-5	392,000	205,000
44,050	1 47/64	MK-5	397,000	210,000
45,000		MK-5	397,000	210,000
46,040	1 13/16	MK-5	402,000	215,000
47,000		MK-5	402,000	215,000
49,000		MK-5	407,000	220,000
49,500		MK-5	407,000	220,000
73,000		MK-6	509,000	255,000

Wiertła kręte z chwytem MK



Wiertła kręte



P • Korekcja ścina $\geq \text{Ø } 10,000$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • z powiększonym chwytem stożkowym Morse'a

M ○

K •

N • stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do uleps. ciepln. i stale do nawęglania

S

H

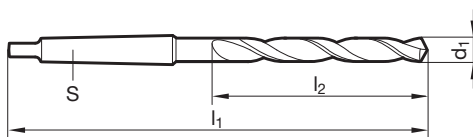
Materiał narzędzia **HSCO**

Powierzchnia

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 780



Nr artykułu **351**

Wiertła kręte z chwytem MK

d1		S	l1	l2
mm	inch		mm	mm
12,000		MK-2	199,000	101,000
13,000		MK-2	199,000	101,000
14,000		MK-2	206,000	108,000
17,500		MK-3	251,000	130,000
18,500		MK-3	256,000	135,000
20,000		MK-3	261,000	140,000
21,000		MK-3	266,000	145,000
21,500		MK-3	271,000	150,000
22,750		MK-3	276,000	155,000
23,000		MK-3	276,000	155,000
29,000		MK-4	324,000	175,000
30,000		MK-4	324,000	175,000

d1		S	l1	l2
mm	inch		mm	mm
31,000		MK-4	329,000	180,000
31,500		MK-4	329,000	180,000



Wiertła długie

Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania



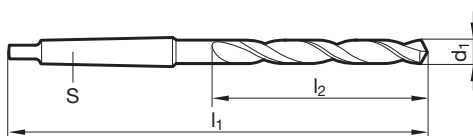
P • Korekcja ścina $\geq \emptyset 14,100$ • geometria zataczana • do wiercenia przez tulejki wiertarskie

M**K** •**N** ○**S****H**

stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu

257

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
2,900		MK-1	132,000	51,000	9,900		MK-1	197,000	116,000
3,900		MK-1	145,000	64,000	10,000		MK-1	197,000	116,000
4,000		MK-1	145,000	64,000	10,050		MK-1	197,000	116,000
4,100		MK-1	145,000	64,000	10,100		MK-1	197,000	116,000
4,200		MK-1	145,000	64,000	10,200		MK-1	197,000	116,000
4,500		MK-1	150,000	69,000	10,250		MK-1	197,000	116,000
4,700		MK-1	150,000	69,000	10,300		MK-1	197,000	116,000
5,000		MK-1	155,000	74,000	10,400		MK-1	197,000	116,000
5,100		MK-1	155,000	74,000	10,500		MK-1	197,000	116,000
5,200		MK-1	155,000	74,000	10,600		MK-1	197,000	116,000
5,250		MK-1	155,000	74,000	10,700		MK-1	206,000	125,000
5,500		MK-1	161,000	80,000	10,750		MK-1	206,000	125,000
5,800		MK-1	161,000	80,000	10,800		MK-1	206,000	125,000
6,000		MK-1	161,000	80,000	10,900		MK-1	206,000	125,000
6,500		MK-1	167,000	86,000	11,000		MK-1	206,000	125,000
6,700		MK-1	167,000	86,000	11,250		MK-1	206,000	125,000
6,800		MK-1	174,000	93,000	11,400		MK-1	206,000	125,000
7,000		MK-1	174,000	93,000	11,500		MK-1	206,000	125,000
7,100		MK-1	174,000	93,000	11,750		MK-1	206,000	125,000
7,200		MK-1	174,000	93,000	11,800		MK-1	206,000	125,000
7,300		MK-1	174,000	93,000	12,000		MK-1	215,000	134,000
7,400		MK-1	174,000	93,000	12,100		MK-1	215,000	134,000
7,500		MK-1	174,000	93,000	12,200		MK-1	215,000	134,000
7,600		MK-1	181,000	100,000	12,250		MK-1	215,000	134,000
7,800		MK-1	181,000	100,000	12,300	31/64	MK-1	215,000	134,000
8,000		MK-1	181,000	100,000	12,400		MK-1	215,000	134,000
8,050		MK-1	181,000	100,000	12,500		MK-1	215,000	134,000
8,200		MK-1	181,000	100,000	12,600		MK-1	215,000	134,000
8,250		MK-1	181,000	100,000	13,000		MK-1	215,000	134,000
8,500		MK-1	181,000	100,000	13,100	33/64	MK-1	215,000	134,000
8,600		MK-1	188,000	107,000	13,200		MK-1	215,000	134,000
8,750		MK-1	188,000	107,000	13,490	17/32	MK-1	223,000	142,000
8,800		MK-1	188,000	107,000	13,500		MK-1	223,000	142,000
8,900		MK-1	188,000	107,000	13,750		MK-1	223,000	142,000
9,000		MK-1	188,000	107,000	13,900		MK-1	223,000	142,000
9,100		MK-1	188,000	107,000	14,000		MK-1	223,000	142,000
9,300		MK-1	188,000	107,000	14,100		MK-2	245,000	147,000
9,400		MK-1	188,000	107,000	14,250		MK-2	245,000	147,000
9,500		MK-1	188,000	107,000	14,290	9/16	MK-2	245,000	147,000
9,600		MK-1	197,000	116,000	14,300		MK-2	245,000	147,000
9,700		MK-1	197,000	116,000	14,400		MK-2	245,000	147,000
9,800		MK-1	197,000	116,000	14,500		MK-2	245,000	147,000

Wiertła kręte z
chwytami MK



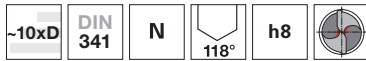
Wiertła kręte z chwytem MK

d1		S	l1	l2
mm	inch		mm	mm
14,750		MK-2	245,000	147,000
14,900		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,200		MK-2	251,000	153,000
15,250		MK-2	251,000	153,000
15,500		MK-2	251,000	153,000
15,600		MK-2	251,000	153,000
15,750		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,100		MK-2	257,000	159,000
16,200		MK-2	257,000	159,000
16,250		MK-2	257,000	159,000
16,500		MK-2	257,000	159,000
16,670	21/32	MK-2	257,000	159,000
16,750		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,250		MK-2	263,000	165,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
17,750		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
18,250		MK-2	269,000	171,000
18,500		MK-2	269,000	171,000
18,750		MK-2	269,000	171,000
19,000		MK-2	269,000	171,000
19,500		MK-2	275,000	177,000
19,750		MK-2	275,000	177,000
19,840	25/32	MK-2	275,000	177,000
20,000		MK-2	275,000	177,000
20,250		MK-2	282,000	184,000
20,500		MK-2	282,000	184,000
20,640	13/16	MK-2	282,000	184,000
21,000		MK-2	282,000	184,000
21,500		MK-2	289,000	191,000
21,750		MK-2	289,000	191,000
21,830	55/64	MK-2	289,000	191,000
22,000		MK-2	289,000	191,000
22,220	7/8	MK-2	289,000	191,000
22,250		MK-2	289,000	191,000
22,500		MK-2	296,000	198,000
23,000		MK-2	296,000	198,000
23,500		MK-3	319,000	198,000
23,750		MK-3	327,000	206,000
23,810	15/16	MK-3	327,000	206,000
24,000		MK-3	327,000	206,000
24,250		MK-3	327,000	206,000
24,500		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000

d1		S	l1	l2
mm	inch		mm	mm
25,250		MK-3	335,000	214,000
25,500		MK-3	335,000	214,000
26,000		MK-3	335,000	214,000
26,500		MK-3	335,000	214,000
26,590	1 3/64	MK-3	343,000	222,000
26,990	1 1/16	MK-3	343,000	222,000
27,000		MK-3	343,000	222,000
27,380	1 5/64	MK-3	343,000	222,000
27,500		MK-3	343,000	222,000
28,000		MK-3	343,000	222,000
28,500		MK-3	351,000	230,000
29,000		MK-3	351,000	230,000
29,500		MK-3	351,000	230,000
30,000		MK-3	351,000	230,000
30,500		MK-3	360,000	239,000
31,000		MK-3	360,000	239,000
32,000		MK-4	397,000	248,000
33,000		MK-4	397,000	248,000
33,500		MK-4	397,000	248,000
34,000		MK-4	406,000	257,000
35,000		MK-4	406,000	257,000
36,000		MK-4	416,000	267,000
36,120	1 27/64	MK-4	416,000	267,000
36,910	1 29/64	MK-4	416,000	267,000
37,000		MK-4	416,000	267,000
37,500		MK-4	416,000	267,000
38,000		MK-4	426,000	277,000
39,000		MK-4	426,000	277,000
39,500		MK-4	426,000	277,000
40,000		MK-4	426,000	277,000
40,080	1 37/64	MK-4	436,000	287,000
40,880	1 39/64	MK-4	436,000	287,000
41,000		MK-4	436,000	287,000
41,670	1 41/64	MK-4	436,000	287,000
42,000		MK-4	436,000	287,000
43,000		MK-4	447,000	298,000
43,660	1 23/32	MK-4	447,000	298,000
44,000		MK-4	447,000	298,000
45,000		MK-4	447,000	298,000
46,830	1 27/32	MK-4	459,000	310,000
48,000		MK-4	470,000	321,000
49,000		MK-4	470,000	321,000
50,000		MK-4	470,000	321,000



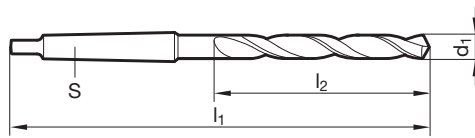
Wiertła kręte



P ●	Korekcja ścina $\geq \varnothing 4,000$ • geometria zataczana • do wiercenia przez tulejki wiertarskie
M	
K ●	
N ○	stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit
S	
H	

Materiał narzędzia **HSS**Powierzchnia **S**Kierunek skrawania **R****GÜHRING**NAVIGATOR

Param. skr. na str. 786



Nr artykułu

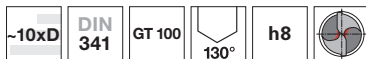
655Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
5,500		MK-1	161,000	80,000
6,000		MK-1	161,000	80,000
6,800		MK-1	174,000	93,000
7,000		MK-1	174,000	93,000
7,300		MK-1	174,000	93,000
8,000		MK-1	181,000	100,000
8,200		MK-1	181,000	100,000
8,400		MK-1	181,000	100,000
8,500		MK-1	181,000	100,000
8,600		MK-1	188,000	107,000
8,700		MK-1	188,000	107,000
8,800		MK-1	188,000	107,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
10,000		MK-1	197,000	116,000
10,050		MK-1	197,000	116,000
10,100		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,400		MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,400		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
11,750		MK-1	206,000	125,000

d1		S	l1	l2
mm	inch		mm	mm
12,000		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,500		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,250		MK-2	245,000	147,000
14,500		MK-2	245,000	147,000
14,750		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,250		MK-2	251,000	153,000
15,870	5/8	MK-2	251,000	153,000
17,000		MK-2	257,000	159,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000



Wiertła długie



P • Korekcja ścina $\geq \varnothing 5,500$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

Materiał narzędzia

HSS

Powierzchnia

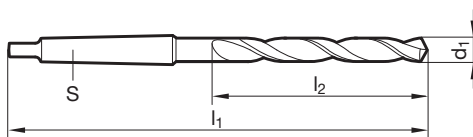


Kierunek skrawania



GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu

551

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
5,500		MK-1	161,000	80,000	13,100	33/64	MK-1	215,000	134,000
5,550		MK-1	161,000	80,000	13,490	17/32	MK-1	223,000	142,000
6,350	1/4	MK-1	167,000	86,000	13,500		MK-1	223,000	142,000
6,500		MK-1	167,000	86,000	13,800		MK-1	223,000	142,000
6,750	17/64	MK-1	174,000	93,000	13,890	35/64	MK-1	223,000	142,000
6,800		MK-1	174,000	93,000	14,000		MK-1	223,000	142,000
7,000		MK-1	174,000	93,000	14,200		MK-2	245,000	147,000
7,500		MK-1	174,000	93,000	14,250		MK-2	245,000	147,000
7,940	5/16	MK-1	181,000	100,000	14,290	9/16	MK-2	245,000	147,000
8,000		MK-1	181,000	100,000	14,500		MK-2	245,000	147,000
8,100		MK-1	181,000	100,000	14,750		MK-2	245,000	147,000
8,200		MK-1	181,000	100,000	15,000		MK-2	245,000	147,000
8,300		MK-1	181,000	100,000	15,250		MK-2	251,000	153,000
8,330	21/64	MK-1	181,000	100,000	15,480	39/64	MK-2	251,000	153,000
8,500		MK-1	181,000	100,000	15,750		MK-2	251,000	153,000
8,600		MK-1	188,000	107,000	16,000		MK-2	251,000	153,000
8,700		MK-1	188,000	107,000	16,500		MK-2	257,000	159,000
8,750		MK-1	188,000	107,000	16,670	21/32	MK-2	257,000	159,000
9,000		MK-1	188,000	107,000	17,000		MK-2	257,000	159,000
9,500		MK-1	188,000	107,000	17,460	11/16	MK-2	263,000	165,000
9,520	3/8	MK-1	197,000	116,000	17,500		MK-2	263,000	165,000
9,800		MK-1	197,000	116,000	18,000		MK-2	263,000	165,000
9,900		MK-1	197,000	116,000	18,260	23/32	MK-2	269,000	171,000
9,920	25/64	MK-1	197,000	116,000	19,000		MK-2	269,000	171,000
10,000		MK-1	197,000	116,000	19,500		MK-2	275,000	177,000
10,200		MK-1	197,000	116,000	19,840	25/32	MK-2	275,000	177,000
10,250		MK-1	197,000	116,000	20,000		MK-2	275,000	177,000
10,320	13/32	MK-1	197,000	116,000	21,000		MK-2	282,000	184,000
10,500		MK-1	197,000	116,000	22,000		MK-2	289,000	191,000
10,750		MK-1	206,000	125,000	23,000		MK-2	296,000	198,000
11,000		MK-1	206,000	125,000	23,020	29/32	MK-2	296,000	198,000
11,110	7/16	MK-1	206,000	125,000	23,500		MK-3	319,000	198,000
11,500		MK-1	206,000	125,000	24,000		MK-3	327,000	206,000
11,510	29/64	MK-1	206,000	125,000	25,000	63/64	MK-3	327,000	206,000
11,750		MK-1	206,000	125,000	26,000		MK-3	335,000	214,000
11,800		MK-1	206,000	125,000	26,590	1 3/64	MK-3	343,000	222,000
12,000		MK-1	215,000	134,000	28,570	1 1/8	MK-3	351,000	230,000
12,300	31/64	MK-1	215,000	134,000	28,900		MK-3	351,000	230,000
12,500		MK-1	215,000	134,000	28,970	1 9/64	MK-3	351,000	230,000
12,700	1/2	MK-1	215,000	134,000	29,000		MK-3	351,000	230,000
12,800		MK-1	215,000	134,000	30,000		MK-3	351,000	230,000
13,000		MK-1	215,000	134,000	30,500		MK-3	360,000	239,000

Wiertła kręte z chwyttem MK

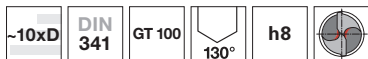


d1		S	l1	l2
mm	inch		mm	mm
30,560	1 13/64	MK-3	360,000	239,000
30,960	1 7/32	MK-3	360,000	239,000
31,000		MK-3	360,000	239,000
31,500		MK-3	360,000	239,000
32,000		MK-4	397,000	248,000

d1		S	l1	l2
mm	inch		mm	mm



Wiertła długie



P • Korekcja ścina $\geq \varnothing 5,600$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

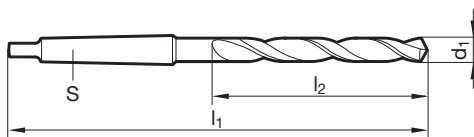
S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu **656**

Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
7,000		MK-1	174,000	93,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
9,920	25/64	MK-1	197,000	116,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,320	13/32	MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,110	7/16	MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,800		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,500		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000

d1		S	l1	l2
mm	inch		mm	mm
16,000		MK-2	251,000	153,000
16,670	21/32	MK-2	257,000	159,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
19,050	3/4	MK-2	275,000	177,000
20,500		MK-2	282,000	184,000
20,640	13/16	MK-2	282,000	184,000
21,500		MK-2	289,000	191,000
23,000		MK-2	296,000	198,000



Wiertła długie



P ○ Korekcja ścina $\geq \varnothing 4,200$ • geometria zataczana • szczególnie duże rowki wiórowe

M □

K □

N ● miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno

S □

H □

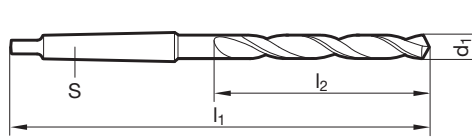
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu

505Wiertła kręte z
chwytami MK

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
5,500		MK-1	161,000	80,000	10,700		MK-1	206,000	125,000
5,600		MK-1	161,000	80,000	10,750		MK-1	206,000	125,000
5,800		MK-1	161,000	80,000	10,800		MK-1	206,000	125,000
6,000		MK-1	161,000	80,000	11,200		MK-1	206,000	125,000
6,100		MK-1	167,000	86,000	11,500		MK-1	206,000	125,000
6,300		MK-1	167,000	86,000	11,800		MK-1	206,000	125,000
6,500		MK-1	167,000	86,000	12,000		MK-1	215,000	134,000
6,700		MK-1	167,000	86,000	12,200		MK-1	215,000	134,000
6,800		MK-1	174,000	93,000	12,500		MK-1	215,000	134,000
7,000		MK-1	174,000	93,000	12,700	1/2	MK-1	215,000	134,000
7,200		MK-1	174,000	93,000	12,800		MK-1	215,000	134,000
7,300		MK-1	174,000	93,000	13,250		MK-1	223,000	142,000
7,500		MK-1	174,000	93,000	13,750		MK-1	223,000	142,000
7,700		MK-1	181,000	100,000	13,800		MK-1	223,000	142,000
7,950		MK-1	181,000	100,000	14,200		MK-2	245,000	147,000
8,000		MK-1	181,000	100,000	14,250		MK-2	245,000	147,000
8,200		MK-1	181,000	100,000	14,300		MK-2	245,000	147,000
8,300		MK-1	181,000	100,000	14,500		MK-2	245,000	147,000
8,400		MK-1	181,000	100,000	15,000		MK-2	245,000	147,000
8,500		MK-1	181,000	100,000	16,000		MK-2	251,000	153,000
8,600		MK-1	188,000	107,000	16,500		MK-2	257,000	159,000
9,050		MK-1	188,000	107,000	16,800		MK-2	257,000	159,000
9,300		MK-1	188,000	107,000	18,500		MK-2	269,000	171,000
9,500		MK-1	188,000	107,000	19,250		MK-2	275,000	177,000
9,600		MK-1	197,000	116,000	21,000		MK-2	282,000	184,000
9,700		MK-1	197,000	116,000	23,500		MK-3	319,000	198,000
9,800		MK-1	197,000	116,000	24,000		MK-3	327,000	206,000
10,000		MK-1	197,000	116,000	29,000		MK-3	351,000	230,000
10,200		MK-1	197,000	116,000	29,500		MK-3	351,000	230,000
10,250		MK-1	197,000	116,000					



Wiertła długie

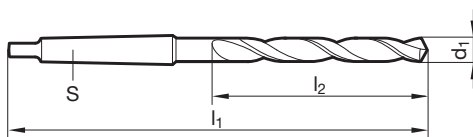


- P** • Korekcja ścina $\geq \varnothing 4,750$ • geometria zataczana • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- M** ○
- K** •
- N** • stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSC0
Powierzchnia	
Kierunek skrawania	



Nr artykułu **357**

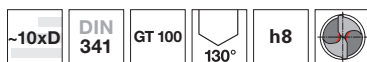

d1		S	l1	l2
mm	inch		mm	mm
4,750		MK-1	150,000	69,000
5,000		MK-1	155,000	74,000
5,400		MK-1	161,000	80,000
6,000		MK-1	161,000	80,000
6,750	17/64	MK-1	174,000	93,000
6,800		MK-1	174,000	93,000
7,000		MK-1	174,000	93,000
8,000		MK-1	181,000	100,000
8,200		MK-1	181,000	100,000
8,500		MK-1	181,000	100,000
8,800		MK-1	188,000	107,000
9,000		MK-1	188,000	107,000
9,500		MK-1	188,000	107,000
9,800		MK-1	197,000	116,000
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,250		MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
11,000		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,250		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000

d1		S	l1	l2
mm	inch		mm	mm
13,500		MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,500		MK-2	245,000	147,000
14,750		MK-2	245,000	147,000
15,000		MK-2	245,000	147,000
15,500		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,750		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
20,000		MK-2	275,000	177,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000
23,000		MK-2	296,000	198,000
24,000		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000
26,000		MK-3	335,000	214,000
26,500		MK-3	335,000	214,000
27,000		MK-3	343,000	222,000
28,000		MK-3	343,000	222,000
30,000		MK-3	351,000	230,000
33,000		MK-4	397,000	248,000
40,000		MK-4	426,000	277,000

Wiertła kręte z chwytami MK



Wiertła długie

Materiał narzędzia **HSCO**Powierzchnia  $\geq \frac{0}{16,0}$ Kierunek skrawania  (R)

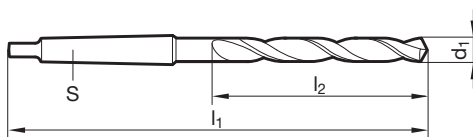
P • Korekcja ścina $\geq \text{Ø } 10,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • przy utrudnionej ewakuacji wiórów

M •**K** •**N** •**S** •**H** ○

stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do uleps. ciepln. i stale do nawęglania

GÜHRING NAVIGATOR

Param. skr. na str. 792

Nr artykułu **623**

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	197,000	116,000
10,200		MK-1	197,000	116,000
10,320	13/32	MK-1	197,000	116,000
10,500		MK-1	197,000	116,000
10,800		MK-1	206,000	125,000
11,000		MK-1	206,000	125,000
11,200		MK-1	206,000	125,000
11,500		MK-1	206,000	125,000
11,510	29/64	MK-1	206,000	125,000
11,800		MK-1	206,000	125,000
12,000		MK-1	215,000	134,000
12,200		MK-1	215,000	134,000
12,400		MK-1	215,000	134,000
12,500		MK-1	215,000	134,000
13,000		MK-1	215,000	134,000
13,490	17/32	MK-1	223,000	142,000
13,500		MK-1	223,000	142,000
13,890	35/64	MK-1	223,000	142,000
14,000		MK-1	223,000	142,000
14,200		MK-2	245,000	147,000
14,290	9/16	MK-2	245,000	147,000
14,500		MK-2	245,000	147,000
14,680	37/64	MK-2	245,000	147,000
15,000		MK-2	245,000	147,000

d1		S	l1	l2
mm	inch		mm	mm
15,500		MK-2	251,000	153,000
16,000		MK-2	251,000	153,000
16,500		MK-2	257,000	159,000
17,000		MK-2	257,000	159,000
17,460	11/16	MK-2	263,000	165,000
17,500		MK-2	263,000	165,000
18,000		MK-2	263,000	165,000
18,500		MK-2	269,000	171,000
19,000		MK-2	269,000	171,000
19,500		MK-2	275,000	177,000
20,000		MK-2	275,000	177,000
20,500		MK-2	282,000	184,000
21,000		MK-2	282,000	184,000
22,000		MK-2	289,000	191,000
22,500		MK-2	296,000	198,000
24,000		MK-3	327,000	206,000
25,000	63/64	MK-3	327,000	206,000
26,000		MK-3	335,000	214,000

Wiertła kręte z
chwytami MK



Wiertła długie



P • Korekcja ścina $\geq \varnothing 16,500$ • geometria zataczana • z powiększonym chwytym stożkowym Morse'a • do wiercenia przez tulejki wiertarskie

M

K •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

Materiał narzędzia **HSS**

Powierzchnia

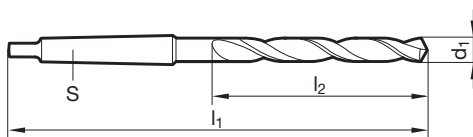


Kierunek skrawania



GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu

523

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	214,000	116,000
11,000		MK-2	223,000	125,000
12,300	31/64	MK-2	232,000	134,000
12,500		MK-2	232,000	134,000
14,000		MK-2	240,000	142,000
21,000		MK-3	305,000	184,000

d1		S	l1	l2
mm	inch		mm	mm
23,000		MK-3	319,000	198,000
29,000		MK-4	379,000	230,000

Wiertła kręte z chwytym MK



Wiertła kręte, bardzo długie, szereg 1

Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

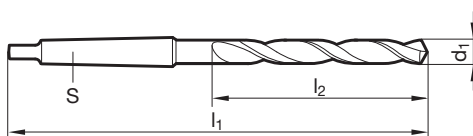
P • Korekcja ścina $\geq \varnothing 7,800$ • geometria zataczana • do bardzo głębokich otworów

M**K** •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
S • proszki spiekane metali, nowe srebro (alpaka), grafit

H**GÜHRING**NAVIGATOR

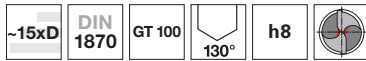
Param. skr. na str. 788

Nr artykułu **266**Wiertła kręte z
chwytami MK

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
8,000		MK-1	265,000	165,000	20,500		MK-2	385,000	260,000
8,500		MK-1	265,000	165,000	20,640	13/16	MK-2	385,000	260,000
9,000		MK-1	275,000	175,000	21,000		MK-2	385,000	260,000
9,500		MK-1	275,000	175,000	21,430	27/32	MK-2	405,000	270,000
10,000		MK-1	285,000	185,000	21,500		MK-2	405,000	270,000
10,200		MK-1	285,000	185,000	22,000		MK-2	405,000	270,000
10,250		MK-1	285,000	185,000	22,500		MK-2	405,000	270,000
10,500		MK-1	285,000	185,000	23,000		MK-2	405,000	270,000
11,000		MK-1	300,000	195,000	23,020	29/32	MK-2	405,000	270,000
11,400		MK-1	300,000	195,000	23,500		MK-3	425,000	270,000
11,500		MK-1	300,000	195,000	24,000		MK-3	440,000	290,000
11,750		MK-1	300,000	195,000	24,500		MK-3	440,000	290,000
11,800		MK-1	300,000	195,000	25,000	63/64	MK-3	440,000	290,000
12,000		MK-1	310,000	205,000	26,000		MK-3	440,000	290,000
12,200		MK-1	310,000	205,000	26,500		MK-3	440,000	290,000
12,500		MK-1	310,000	205,000	27,000		MK-3	460,000	305,000
12,700	1/2	MK-1	310,000	205,000	28,000		MK-3	460,000	305,000
13,000		MK-1	310,000	205,000	30,000		MK-3	460,000	305,000
13,500		MK-1	325,000	220,000	30,500		MK-3	480,000	320,000
13,750		MK-1	325,000	220,000	31,000		MK-3	480,000	320,000
14,000		MK-1	325,000	220,000	32,000		MK-4	505,000	320,000
14,290	9/16	MK-2	340,000	220,000	33,000		MK-4	505,000	320,000
14,500		MK-2	340,000	220,000	34,000		MK-4	530,000	340,000
15,000		MK-2	340,000	220,000	35,000		MK-4	530,000	340,000
15,250		MK-2	355,000	230,000	36,000		MK-4	530,000	340,000
15,500		MK-2	355,000	230,000	38,000		MK-4	555,000	360,000
15,750		MK-2	355,000	230,000	39,000		MK-4	555,000	360,000
15,800		MK-2	355,000	230,000	40,000		MK-4	555,000	360,000
16,000		MK-2	355,000	230,000	42,000		MK-4	555,000	360,000
16,250		MK-2	355,000	230,000	45,000		MK-4	585,000	385,000
16,500		MK-2	355,000	230,000	45,240	1 25/32	MK-4	585,000	385,000
16,670	21/32	MK-2	355,000	230,000	48,000		MK-4	605,000	405,000
17,000		MK-2	355,000	230,000	50,000		MK-4	605,000	405,000
17,500		MK-2	370,000	245,000					
17,750		MK-2	370,000	245,000					
18,000		MK-2	370,000	245,000					
18,500		MK-2	370,000	245,000					
18,650	47/64	MK-2	370,000	245,000					
19,000		MK-2	370,000	245,000					
19,500		MK-2	385,000	260,000					
19,750		MK-2	385,000	260,000					
20,000		MK-2	385,000	260,000					



Wiertła kręte, bardzo długie, szereg 1

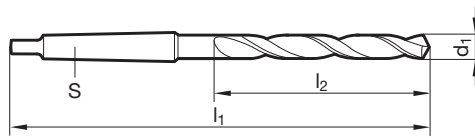


- P** • Korekcja ścina $\geq \varnothing 5,800$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	$>0,16,0$
Kierunek skrawania	



Nr artykułu **526**

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	265,000	165,000
8,500		MK-1	265,000	165,000
8,600		MK-1	275,000	175,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
9,520	3/8	MK-1	285,000	185,000
9,800		MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
10,720	27/64	MK-1	300,000	195,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
11,750		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
12,800		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,490	17/32	MK-1	325,000	220,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,200		MK-2	340,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
15,870	5/8	MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000
17,460	11/16	MK-2	370,000	245,000
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
20,000		MK-2	385,000	260,000
20,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,500		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
25,000	63/64	MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
28,000		MK-3	460,000	305,000
28,500		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
30,000		MK-3	460,000	305,000

Wiertła kręte z chwytami MK



Wiertła kręte, bardzo długie, szereg 1



P ○ Korekcja ścina $\geq 7,900$ • geometria zataczana • do bardzo głębokich otworów • dla materiałów miękkich i długowiórowych

M

K

N • miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno

S

H

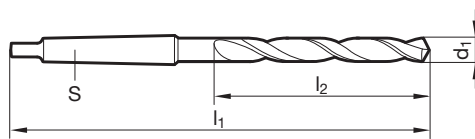
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu

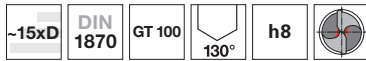
525Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	265,000	165,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
10,000		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
18,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
24,300		MK-3	440,000	290,000
24,380		MK-3	440,000	290,000
24,500		MK-3	440,000	290,000
25,500		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
27,500		MK-3	460,000	305,000
28,000		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
31,000		MK-3	480,000	320,000
33,000		MK-4	505,000	320,000



Wiertła kręte, bardzo długie, szereg 1

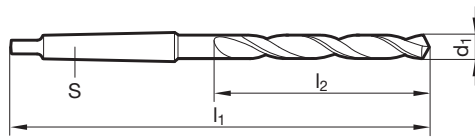


- P** • Korekcja ścina $\geq \varnothing 9,520$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	>0 16,0
Kierunek skrawania	(R)



Nr artykułu **620**

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,320	13/32	MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,300	31/64	MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,080	19/32	MK-2	355,000	230,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
20,000		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,830		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
22,620		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
25,500		MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
27,180		MK-3	460,000	305,000
29,370	1 5/32	MK-3	460,000	305,000
30,000		MK-3	460,000	305,000

Wiertła kręte z chwytami MK



Wiertła kręte, bardzo długie, szereg 2

Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania



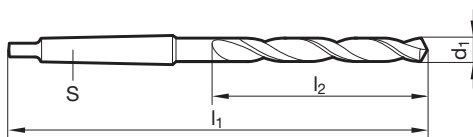
P • Korekcja ścina $\geq \varnothing 7,700$ • geometria zataczana • do bardzo głębokich otworów

M**K** •**N** ○**S****H**

stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu

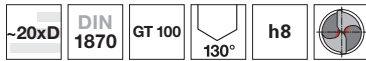
267Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,200		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,750		MK-1	375,000	250,000
11,800		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,490	17/32	MK-1	410,000	275,000
13,500		MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,480	39/64	MK-2	445,000	295,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000
17,000		MK-2	445,000	295,000
17,070	43/64	MK-2	465,000	310,000
17,500		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,050	3/4	MK-2	490,000	325,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
20,640	13/16	MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
21,500		MK-2	515,000	345,000
21,830	55/64	MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
22,800		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
23,020	29/32	MK-2	515,000	345,000
23,750		MK-3	555,000	365,000
23,810	15/16	MK-3	555,000	365,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
28,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000
32,000		MK-4	635,000	410,000
34,000		MK-4	665,000	430,000
40,000		MK-4	695,000	460,000
45,000		MK-4	735,000	490,000



Wiertła kręte, bardzo długie, szereg 2

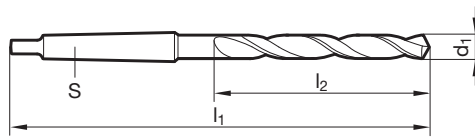


- P** • Korekcja ścina $\geq \varnothing 7,800$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	$> \varnothing_{16,0}$
Kierunek skrawania	



Nr artykułu **527**

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	330,000	210,000
8,400		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
11,110	7/16	MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,510	29/64	MK-1	375,000	250,000
11,800		MK-1	375,000	250,000
11,910	15/32	MK-1	395,000	260,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
12,700	1/2	MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
13,700		MK-1	410,000	275,000
13,800		MK-1	410,000	275,000
13,890	35/64	MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,290	9/16	MK-2	425,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000
17,000		MK-2	445,000	295,000
17,070	43/64	MK-2	465,000	310,000

d1		S	l1	l2
mm	inch		mm	mm
17,500		MK-2	465,000	310,000
17,800		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,450	49/64	MK-2	490,000	325,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000
20,500		MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,030	53/64	MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
23,020	29/32	MK-2	515,000	345,000
23,810	15/16	MK-3	555,000	365,000
24,000		MK-3	555,000	365,000
24,210	61/64	MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
26,190	1 1/32	MK-3	555,000	365,000
26,500		MK-3	555,000	365,000
27,000		MK-3	580,000	385,000
28,000		MK-3	580,000	385,000
28,750		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000

Wiertła kręte z chwytym MK



Wiertła kręte, bardzo długie, szereg 2

Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

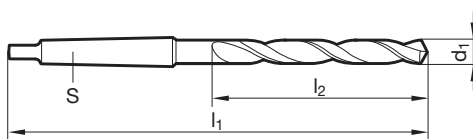
P ○ Korekcja ścina $\geq \varnothing 8,000$ • geometria zataczana • do bardzo głębokich otworów

M**K**

N • miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno

S**H****GÜHRING**NAVIGATOR

Param. skr. na str. 788

Nr artykułu **542**

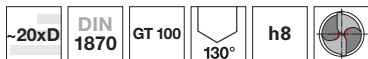
d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	330,000	210,000
8,600		MK-1	345,000	220,000
8,800		MK-1	345,000	220,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,500		MK-1	360,000	235,000
10,700		MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
17,000		MK-2	445,000	295,000
17,500		MK-2	465,000	310,000
20,500		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	490,000	325,000
21,500		MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,500		MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
26,500		MK-3	555,000	365,000
27,500		MK-3	580,000	385,000
28,000		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000

Wiertła kręte z
chwytami MK



Wiertła kręte, bardzo długie, szereg 2

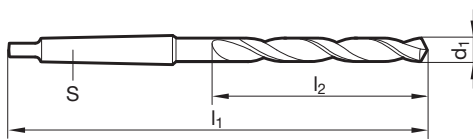


- P** • Korekcja ścina $\geq \varnothing 9,520$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	$\geq \frac{\varnothing}{16,0}$
Kierunek skrawania	(R)



Nr artykułu **621**

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	360,000	235,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
10,720	27/64	MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,510	29/64	MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
12,700	1/2	MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000

d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
16,000		MK-2	445,000	295,000
16,270		MK-2	445,000	295,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
20,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
23,420	59/64	MK-3	535,000	345,000

Wiertła kręte z chwytami MK



Wiertła kręte, ekstra długie



- P** • Korekcja ścina $\geq \varnothing 6,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

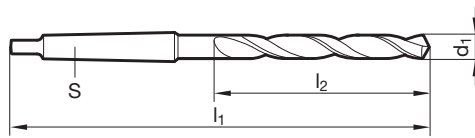
Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **563**

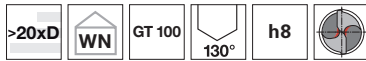
Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch			
6,000		MK-1	200,000	120,000
6,500		MK-1	200,000	120,000
7,000		MK-1	200,000	120,000
7,500		MK-1	200,000	120,000

d1		S	l1	l2
mm	inch			



Wiertła kręte, ekstra długie

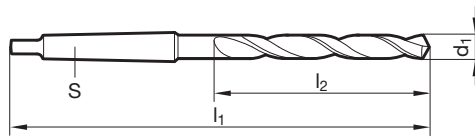


- P** • Korekcja ścina $\geq \varnothing 6,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	



Nr artykułu **564**

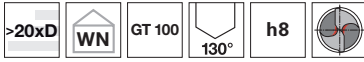
d1		S	l1	l2
mm	inch		mm	mm
6,000		MK-1	300,000	220,000
6,500		MK-1	300,000	220,000
7,000		MK-1	300,000	220,000
8,000		MK-1	350,000	270,000
8,500		MK-1	350,000	270,000
9,000		MK-1	350,000	270,000

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-1	350,000	270,000

Wiertła kręte z chwytym MK



Wiertła kręte, ekstra długie

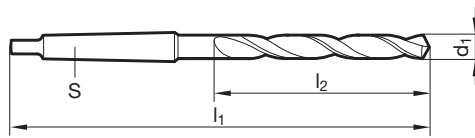


- P** • Korekcja ścina $\geq \varnothing 6,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia	HSS
Powierzchnia	$>0/16,0$
Kierunek skrawania	(R)

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **565**

Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
6,000		MK-1	425,000	345,000
6,500		MK-1	425,000	345,000
7,000		MK-1	425,000	345,000
7,500		MK-1	425,000	345,000
8,000		MK-1	425,000	345,000
8,500		MK-1	425,000	345,000
9,000		MK-1	425,000	345,000
10,000		MK-1	425,000	345,000
11,000		MK-1	425,000	345,000
12,000		MK-1	425,000	345,000
13,000		MK-1	425,000	345,000
14,000		MK-1	425,000	345,000

d1		S	l1	l2
mm	inch		mm	mm
15,000		MK-2	425,000	325,000
16,000		MK-2	425,000	325,000
17,000		MK-2	425,000	325,000



Wiertła kręte, ekstra długie

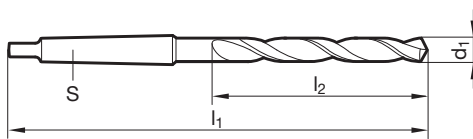


- P** • Korekcja ścina $\geq \varnothing 8,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	>0 16,0
Kierunek skrawania	(R)



Nr artykułu **566**

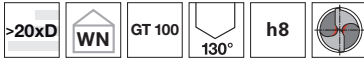
d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	500,000	420,000
8,500		MK-1	500,000	420,000
9,000		MK-1	500,000	420,000
9,500		MK-1	500,000	420,000
10,000		MK-1	500,000	420,000
11,000		MK-1	500,000	420,000
12,000		MK-1	500,000	420,000
13,000		MK-1	500,000	420,000
14,000		MK-1	500,000	420,000
15,000		MK-2	500,000	400,000
16,000		MK-2	500,000	400,000
17,000		MK-2	500,000	400,000

d1		S	l1	l2
mm	inch		mm	mm
18,000		MK-2	500,000	400,000
19,000		MK-2	500,000	400,000
20,000		MK-2	500,000	400,000
21,000		MK-2	500,000	400,000
22,000		MK-2	500,000	400,000
35,000		MK-4	500,000	350,000
40,000		MK-4	500,000	350,000

Wiertła kręte z chwytym MK



Wiertła kręte, ekstra długie

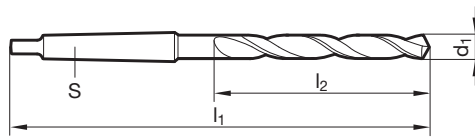


- P** • Korekcja ścina $\geq \varnothing 14,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

Materiał narzędzia	HSS
Powierzchnia	$\geq \varnothing 16,0$
Kierunek skrawania	(R)

GÜHRINGNAVIGATOR

Param. skr. na str. 790



Nr artykułu **293**

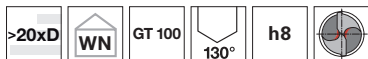
Wiertła kręte z chwyttem MK

d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	600,000	500,000
15,000		MK-2	600,000	500,000
16,000		MK-2	600,000	500,000
17,000		MK-2	600,000	500,000
18,000		MK-2	600,000	500,000
19,000		MK-2	600,000	500,000
20,000		MK-2	600,000	500,000
21,000		MK-2	600,000	500,000
22,000		MK-2	600,000	500,000
23,000		MK-2	600,000	500,000
24,000		MK-3	600,000	475,000
25,000	63/64	MK-3	600,000	475,000

d1		S	l1	l2
mm	inch		mm	mm
26,000		MK-3	600,000	475,000
28,000		MK-3	600,000	475,000
30,000		MK-3	600,000	475,000
32,000		MK-4	600,000	450,000
35,000		MK-4	600,000	450,000
38,000		MK-4	600,000	450,000
40,000		MK-4	600,000	450,000



Wiertła kręte, ekstra długie

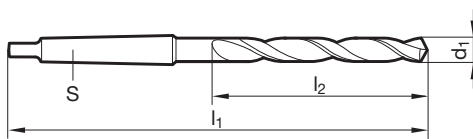


- P** • Korekcja ścina $\geq \varnothing 14,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **298**

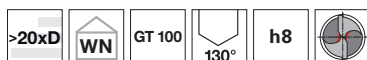
d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	750,000	650,000
15,000		MK-2	750,000	650,000
16,000		MK-2	750,000	650,000
18,000		MK-2	750,000	650,000

d1		S	l1	l2
mm	inch		mm	mm

Wiertła kręte z chwytym MK



Wiertła kręte, ekstra długie



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

P • Korekcja ścina $\geq \varnothing 14,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów

M

K •

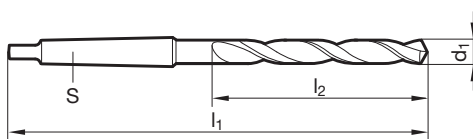
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **299**

Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
14,000		MK-1	1000,000	850,000
15,000		MK-2	1000,000	850,000
16,000		MK-2	1000,000	850,000
18,000		MK-2	1000,000	850,000

d1		S	l1	l2
mm	inch		mm	mm



Wiertła długie, z chłodzeniem wew.

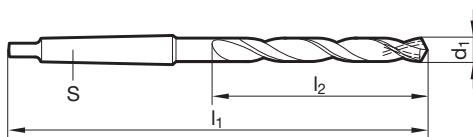


- P** • Korekcja ścina $\geq 0,520$ • geometria zataczana • do wiercenia przez tulejki wiertarskie • promieniowe doprowadzenie chłodziwa przez pierścieniowy adapter Gühringa
- M** ○
- K** •
- N** • pakiety blach • stale, staliwa, żeliwa szare • stale austenityczne - Rm < 800 N/mm²
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **269**

d1		S	l1	l2
mm	inch		mm	mm
9,920	25/64	MK-1	197,000	101,000
10,320	13/32	MK-1	197,000	101,000
10,500		MK-1	197,000	101,000
11,000		MK-1	206,000	110,000
11,110	7/16	MK-1	206,000	110,000
11,500		MK-1	206,000	110,000
12,500		MK-1	215,000	119,000
12,700	1/2	MK-1	215,000	119,000
12,800		MK-1	215,000	119,000
13,000		MK-1	215,000	119,000
13,200		MK-1	215,000	119,000
13,490	17/32	MK-1	223,000	127,000
13,500		MK-1	223,000	127,000
13,800		MK-1	223,000	127,000
14,000		MK-1	223,000	127,000
14,250		MK-2	245,000	133,000
14,290	9/16	MK-2	245,000	133,000
14,500		MK-2	245,000	133,000
15,000		MK-2	245,000	133,000
15,080	19/32	MK-2	251,000	139,000
15,150		MK-2	251,000	139,000
15,180		MK-2	251,000	139,000
15,250		MK-2	251,000	139,000
15,870	5/8	MK-2	251,000	139,000
16,000		MK-2	251,000	139,000
16,500		MK-2	257,000	145,000
16,670	21/32	MK-2	257,000	145,000
16,750		MK-2	257,000	145,000
17,000		MK-2	257,000	145,000
17,100		MK-2	263,000	151,000

d1		S	l1	l2
mm	inch		mm	mm
17,460	11/16	MK-2	263,000	151,000
17,500		MK-2	263,000	151,000
17,750		MK-2	263,000	151,000
18,000		MK-2	263,000	151,000
18,260	23/32	MK-2	269,000	157,000
18,500		MK-2	269,000	157,000
19,000		MK-2	269,000	157,000
19,050	3/4	MK-2	275,000	163,000
19,200		MK-2	275,000	163,000
19,250		MK-2	275,000	163,000
19,500		MK-2	275,000	163,000
19,750		MK-2	275,000	163,000
19,840	25/32	MK-2	275,000	163,000
20,250		MK-2	282,000	170,000
20,640	13/16	MK-2	282,000	170,000
20,750		MK-2	282,000	170,000
21,000		MK-2	282,000	170,000
21,430	27/32	MK-2	289,000	177,000
21,500		MK-2	289,000	177,000
22,220	7/8	MK-2	289,000	177,000
23,020	29/32	MK-2	296,000	184,000

Wiertła kręte z chwytami MK



Wiertła z chłodzeniem wew. długości wg normy zakładowej



P ●	Korekcja ścina $\geq \varnothing 8,000$ • geometria zataczana • osiowe i boczne doprowadzenie chłodzenia przez stożek Morse'a (podobne do DIN 228 forma BK) • otwarcie lub zamknięcie wymaganego sposobu chłodzenia dzięki dołączonej śrubie
M ○	
K ●	
N ●	optymalne do wiercenia konstrukcji stalowych na maszynach zespołowych • pakiety blach • stале, staliwa, żeliwa szare • stале austenityczne - $R_m < 800 \text{ N/mm}^2$
S ●	
H ●	

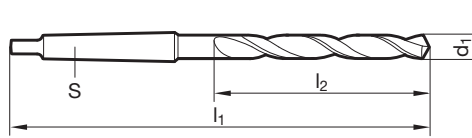
GÜHRING NAVIGATOR

Param. skr. na str. 788

Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania



Nr artykułu

254

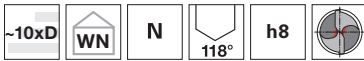
Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-2	268,000	116,000
9,000		MK-2	268,000	116,000
10,000		MK-3	268,000	116,000
10,500		MK-3	268,000	116,000
11,000		MK-3	278,000	125,000
12,000		MK-3	287,000	134,000
13,000		MK-3	287,000	134,000
13,500		MK-3	285,000	142,000
14,000		MK-3	285,000	142,000
15,000		MK-3	300,000	147,000
16,000		MK-3	306,000	153,000
17,000		MK-3	311,000	159,000
17,500		MK-3	318,000	165,000
18,000		MK-3	318,000	165,000
19,000		MK-3	324,000	171,000
20,000		MK-3	330,000	177,000
21,000		MK-3	343,000	184,000
22,000		MK-3	350,000	191,000
23,000		MK-3	357,000	198,000
24,000		MK-3	365,000	206,000
25,000	63/64	MK-3	365,000	206,000
26,000		MK-3	373,000	214,000
27,000		MK-4	407,000	222,000
28,000		MK-4	407,000	222,000

d1		S	l1	l2
mm	inch		mm	mm
29,000		MK-4	410,000	225,000
30,000		MK-4	410,000	225,000
31,000		MK-4	410,000	225,000
32,000		MK-4	410,000	225,000
33,000		MK-4	410,000	225,000
34,000		MK-4	410,000	225,000
35,000		MK-4	410,000	225,000
36,000		MK-4	410,000	225,000
37,000		MK-4	410,000	225,000
38,000		MK-4	410,000	225,000
39,000		MK-4	410,000	225,000
40,000		MK-4	410,000	225,000
41,000		MK-4	410,000	225,000
42,000		MK-4	410,000	225,000
43,000		MK-4	410,000	225,000
44,000		MK-4	410,000	225,000
45,000		MK-4	410,000	225,000
46,000		MK-4	410,000	225,000
47,000		MK-4	410,000	225,000
48,000		MK-4	410,000	225,000
49,000		MK-4	410,000	225,000
50,000		MK-4	410,000	225,000



Wiertła z chłodzeniem wew. długości wg DIN 341



P	•	Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • Do wiercenia przez tulejki wiertarskie. Doprowadzenie chłodziwa wg DIN 228 BK.
M	○	
K	•	
N	•	pakiety blach • stale, staliwa, żeliwa szare • stale austenityczne - Rm < 800 N/mm ²
S		
H		

Materiał narzędzia **HSS**

Powierzchnia

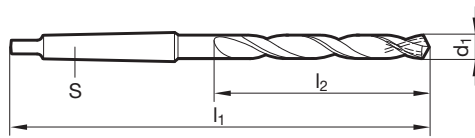


Kierunek skrawania



GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu

1101

Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	223,000	116,000
10,500		MK-2	223,000	116,000
11,000		MK-2	232,000	125,000
11,500		MK-2	232,000	125,000
12,000		MK-2	241,000	134,000
12,500		MK-2	241,000	134,000
13,000		MK-2	241,000	134,000
13,500		MK-2	249,000	142,000
14,000		MK-2	249,000	142,000
14,750		MK-2	254,000	147,000
15,000		MK-2	254,000	147,000
16,000		MK-2	260,000	153,000
16,250		MK-2	266,000	159,000
17,000		MK-2	266,000	159,000
17,500		MK-2	272,000	165,000
18,000		MK-2	272,000	165,000
19,000		MK-2	278,000	171,000
20,000		MK-2	284,000	177,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	291,000	184,000
22,000		MK-2	298,000	191,000
24,000		MK-3	332,000	206,000
25,000	63/64	MK-3	332,000	206,000
26,000		MK-3	340,000	214,000
28,000		MK-3	348,000	222,000
29,000		MK-3	356,000	230,000
30,000		MK-3	356,000	230,000
32,000		MK-4	409,000	248,000



Wiertła z chłodzeniem wew. długości wg DIN 341

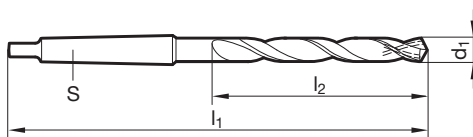


- P** • Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • do wiercenia przez tulejki wiertarskie • osiowe doprowadzenie chłodziwa przez stożek Morse'a
- M** ○
- K** •
- N** • pakiety blach • stale, staliwa, żeliwa szare • stale austenityczne - Rm < 800 N/mm²
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **270**

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	233,000	116,000
11,000		MK-2	242,000	125,000
12,000		MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,200		MK-2	251,000	134,000
13,500		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
14,290	9/16	MK-2	264,000	147,000
15,000		MK-2	264,000	147,000
15,500		MK-2	270,000	153,000
16,000		MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
17,460	11/16	MK-2	282,000	165,000
17,500		MK-2	282,000	165,000
18,000		MK-2	282,000	165,000
18,500		MK-3	307,000	171,000
19,000		MK-3	307,000	171,000
19,500		MK-3	313,000	177,000
20,000		MK-3	313,000	177,000
20,500		MK-3	320,000	184,000
21,000		MK-3	320,000	184,000
22,000		MK-3	327,000	191,000
23,000		MK-3	334,000	198,000

d1		S	l1	l2
mm	inch		mm	mm
23,020	29/32	MK-3	334,000	198,000
24,000		MK-3	342,000	206,000
25,000	63/64	MK-3	342,000	206,000
26,000		MK-3	350,000	214,000
26,500		MK-3	350,000	214,000
27,000		MK-4	385,000	222,000
28,000		MK-4	385,000	222,000
29,000		MK-4	393,000	230,000
29,500		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
32,000		MK-4	421,000	248,000
33,000		MK-4	421,000	248,000
34,000		MK-4	430,000	257,000
35,000		MK-4	430,000	257,000
40,000		MK-4	450,000	277,000

Wiertła kręte z chwytami MK



Wiertła z chłodzeniem wew. długości wg DIN 341

Materiał narzędzia **HSS**

Powierzchnia



Kierunek skrawania



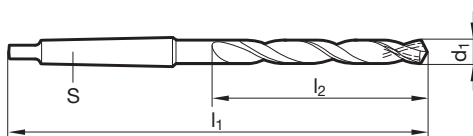
P • Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • do wiercenia przez tulejki wiertarskie • promieniowe doprowadzenie chłodziwa przez pierścieniowy adapter Gühringa

M ○
K •
N • pakiety blach • stale, staliwa, żeliwa szare • stale austenityczne - Rm < 800 N/mm²

S
H

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu

271

d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	233,000	116,000
10,500		MK-2	233,000	116,000
10,720	27/64	MK-2	242,000	125,000
11,000		MK-2	242,000	125,000
11,510	29/64	MK-2	242,000	125,000
11,910	15/32	MK-2	251,000	134,000
12,300	31/64	MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,800		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
14,250		MK-2	264,000	147,000
14,290	9/16	MK-2	264,000	147,000
14,500		MK-2	264,000	147,000
15,000		MK-2	264,000	147,000
15,080	19/32	MK-2	270,000	153,000
15,500		MK-2	270,000	153,000
16,000		MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
17,250		MK-2	282,000	165,000
17,500		MK-2	282,000	165,000
18,250		MK-3	307,000	171,000
18,500		MK-3	307,000	171,000
19,050	3/4	MK-3	313,000	177,000

d1		S	l1	l2
mm	inch		mm	mm
19,500		MK-3	313,000	177,000
19,840	25/32	MK-3	313,000	177,000
20,000		MK-3	313,000	177,000
20,250		MK-3	320,000	184,000
22,500		MK-3	334,000	198,000
23,000		MK-3	334,000	198,000
23,750		MK-3	342,000	206,000
24,250		MK-3	342,000	206,000
24,610	31/32	MK-3	342,000	206,000
25,400	1	MK-3	350,000	214,000
26,000		MK-3	350,000	214,000
26,990	1 1/16	MK-4	385,000	222,000
27,780	1 3/32	MK-4	385,000	222,000
28,570	1 1/8	MK-4	393,000	230,000
28,750		MK-4	393,000	230,000
29,000		MK-4	393,000	230,000
29,500		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
30,500		MK-4	402,000	239,000
34,000		MK-4	430,000	257,000
44,450		MK-4	471,000	298,000

Wiertła kręte z
chwytami MK



Wiertła z chłodzeniem wew. długości wg DIN 341

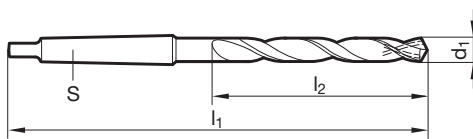


- P** • Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • do wiercenia przez tulejki wiertarskie • promieniowe doprowadzenie chłodziwa przez stożek Morse'a
- M** ○
- K** •
- N** • pakiety blach • stale, staliwa, żeliwa szare • stale austenityczne - Rm < 800 N/mm²
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu

272

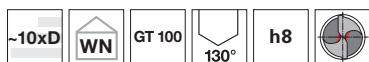
d1		S	l1	l2
mm	inch		mm	mm
10,000		MK-2	233,000	116,000
12,500		MK-2	251,000	134,000
13,200		MK-2	251,000	134,000
13,500		MK-2	259,000	142,000
14,750		MK-2	264,000	147,000
15,500		MK-2	270,000	153,000
15,870	5/8	MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
16,670	21/32	MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
18,000		MK-2	282,000	165,000
18,500		MK-3	307,000	171,000

d1		S	l1	l2
mm	inch		mm	mm
20,000		MK-3	313,000	177,000
22,000		MK-3	327,000	191,000
22,500		MK-3	334,000	198,000
24,000		MK-3	342,000	206,000
26,000		MK-3	350,000	214,000
26,990	1 1/16	MK-4	385,000	222,000
29,500		MK-4	393,000	230,000
32,000		MK-4	421,000	248,000
44,450	1 3/4	MK-4	471,000	298,000

Wiertła kręte z chwytami MK



Wiertła z chłodzeniem wew. długości wg DIN 341



Materiał narzędzia **HSCO**

Powierzchnia



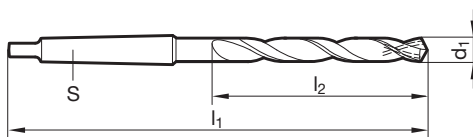
Kierunek skrawania



- P** • Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • osiowe doprowadzenie chłodziwa przez stożek Morse'a • kobaltowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- K** •
- N** • średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./ kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794



Nr artykułu **370**

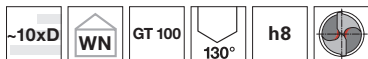
Wiertła kręte z chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	242,000	125,000
12,000		MK-2	251,000	134,000
12,500		MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,500		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
15,000		MK-2	264,000	147,000
15,080	19/32	MK-2	270,000	153,000
16,000		MK-2	270,000	153,000
17,000		MK-2	276,000	159,000
17,500		MK-2	282,000	165,000
18,000		MK-2	282,000	165,000
18,500		MK-3	307,000	171,000
19,000		MK-3	307,000	171,000
20,000		MK-3	313,000	177,000
21,000		MK-3	320,000	184,000
21,500		MK-3	327,000	191,000
22,000		MK-3	327,000	191,000

d1		S	l1	l2
mm	inch		mm	mm
24,000		MK-3	342,000	206,000
24,610	31/32	MK-3	342,000	206,000
29,370	1 5/32	MK-4	393,000	230,000
29,500		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
30,960	1 7/32	MK-4	402,000	239,000
31,000		MK-4	402,000	239,000
32,000		MK-4	421,000	248,000
32,250		MK-4	421,000	248,000
32,500		MK-4	421,000	248,000
32,540	1 9/32	MK-4	421,000	248,000
33,000		MK-4	421,000	248,000
34,130	1 11/32	MK-4	430,000	257,000
34,920	1 3/8	MK-4	430,000	257,000



Wiertła z chłodzeniem wew. długości wg DIN 341

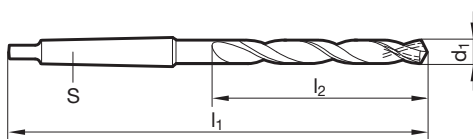


- P** • Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • promieniowe doprowadzenie chłodziwa przez pierścieniowy adapter Gühringa
- M** • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- K** •
- N** • średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./ kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu **371**

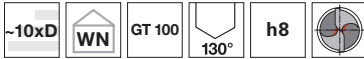
d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	242,000	125,000
11,110	7/16	MK-2	242,000	125,000
11,500		MK-2	242,000	125,000
12,300	31/64	MK-2	251,000	134,000
12,500		MK-2	251,000	134,000
12,800		MK-2	251,000	134,000
13,000		MK-2	251,000	134,000
13,490	17/32	MK-2	259,000	142,000
13,500		MK-2	259,000	142,000
14,000		MK-2	259,000	142,000
14,290	9/16	MK-2	264,000	147,000
14,500		MK-2	264,000	147,000
15,000		MK-2	264,000	147,000
16,000		MK-2	270,000	153,000
16,500		MK-2	276,000	159,000
16,670	21/32	MK-2	276,000	159,000
17,000		MK-2	276,000	159,000
17,460	11/16	MK-2	282,000	165,000
18,260	23/32	MK-3	307,000	171,000
19,500		MK-3	313,000	177,000
19,840	25/32	MK-3	313,000	177,000
20,500		MK-3	320,000	184,000
20,640	13/16	MK-3	320,000	184,000
21,000		MK-3	320,000	184,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	327,000	191,000
22,220	7/8	MK-3	327,000	191,000
22,500		MK-3	334,000	198,000
23,020	29/32	MK-3	334,000	198,000
23,810	15/16	MK-3	342,000	206,000
28,570	1 1/8	MK-4	393,000	230,000
29,000		MK-4	393,000	230,000
30,000		MK-4	393,000	230,000
30,960	1 7/32	MK-4	402,000	239,000
31,750	1 1/4	MK-4	411,000	248,000
32,000		MK-4	421,000	248,000
32,540	1 9/32	MK-4	421,000	248,000
33,340	1 5/16	MK-4	421,000	248,000
34,000		MK-4	430,000	257,000
34,920	1 3/8	MK-4	430,000	257,000

Wiertła kręte z chwytami MK



Wiertła z chłodzeniem wew. długości wg DIN 341



P	•	Korekcja ścina $\geq \varnothing 11,500$ • geometria zataczana • promieniowe doprowadzenie chłodziwa przez stożek Morse'a • kobałtowa stal
M	•	szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
K	•	
N	•	średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./
S	•	kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
H	○	

Materiał narzędzia **HSCO**

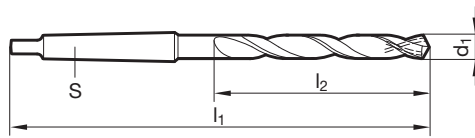
Powierzchnia



Kierunek skrawania

**GÜHRING**NAVIGATOR

Param. skr. na str. 794



Nr artykułu

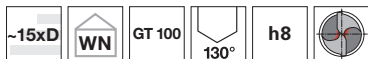
372Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
12,500		MK-2	251,000	134,000
12,700	1/2	MK-2	251,000	134,000
14,000		MK-2	259,000	142,000
16,000		MK-2	270,000	153,000
17,000		MK-2	276,000	159,000
18,500		MK-3	307,000	171,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	327,000	191,000
23,810	15/16	MK-3	342,000	206,000
27,000		MK-4	385,000	222,000
30,000		MK-4	393,000	230,000
34,000		MK-4	430,000	257,000



Wiertła z chłodzeniem wew. długości wg DIN 1870

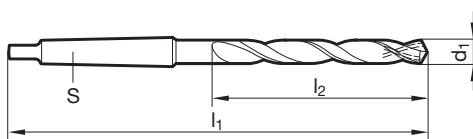


- P** • Korekcja ścina $\geq \text{Ø } 11,000$ • geometria zataczana • osiowe doprowadzenie chłodziwa przez stożek Morse'a • kobałtowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- K** •
- N** • średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./ kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu

374

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
12,000		MK-2	322,000	205,000
12,300	31/64	MK-2	322,000	205,000
12,500		MK-2	322,000	205,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
15,000		MK-2	337,000	220,000
16,000		MK-2	347,000	230,000
16,500		MK-2	347,000	230,000
17,500		MK-2	362,000	245,000
18,000		MK-2	362,000	245,000
18,500		MK-3	381,000	245,000
19,840	25/32	MK-3	396,000	260,000
20,000		MK-3	396,000	260,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
21,500		MK-3	406,000	270,000
24,610	31/32	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch		mm	mm
28,570	1 1/8	MK-4	468,000	305,000
28,750		MK-4	468,000	305,000
29,370	1 5/32	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,250		MK-4	493,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000

Wiertła kręte z chwytami MK



Wiertła z chłodzeniem wew. długości wg DIN 1870

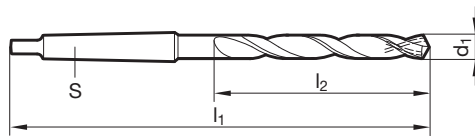


P	•	Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • promieniowe doprowadzenie chłodziwa przez pierścieniowy adapter Gühringa
M	•	• kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
K	•	
N	•	średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./
S	•	kwaso-/żaro-wytrzymałe • wytrzymałości - Rm < 1300 N/mm ²
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu

375

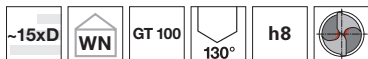
Wiertła kręte z
chwytami MK

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
11,110	7/16	MK-2	312,000	195,000
11,510	29/64	MK-2	312,000	195,000
12,800		MK-2	322,000	205,000
13,500		MK-2	337,000	220,000
18,260	23/32	MK-3	381,000	245,000
19,000		MK-3	381,000	245,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
24,500		MK-3	426,000	290,000
25,000	63/64	MK-3	426,000	290,000
25,400	1	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch		mm	mm
26,500		MK-3	426,000	290,000
28,570	1 1/8	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
33,340	1 5/16	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000



Wiertła z chłodzeniem wew. długości wg DIN 1870

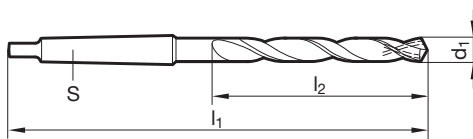


- P** • Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • promieniowe doprowadzenie chłodziwa przez stożek Morse'a • kobałtowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- K** •
- N** • średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./ kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **376**

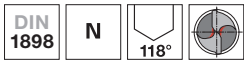
d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
16,500		MK-2	347,000	230,000
18,000		MK-2	362,000	245,000
19,840	25/32	MK-3	396,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	406,000	270,000
27,780	1 3/32	MK-4	468,000	305,000
29,000		MK-4	468,000	305,000

Wiertła kręte z chwytym MK



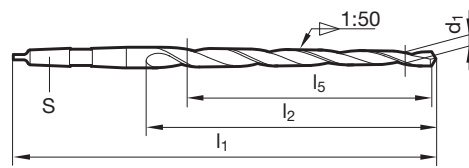
Wiertła do otworów pod kołki stożkowe



P • Korekcja ścina $\geq \varnothing 5,000$ • geometria zataczana • For tapered holes to suit taper pins to DIN 1 (new: DIN EN 22 339), DIN 7978 (new: DIN EN 28 736), DIN 7977 (new: DIN EN 28737) and DIN 258

- M** ○
- K** •
- N** ○
- S** ○
- H** ○

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu **532**

d1	S	l1	l2	l5
mm		mm	mm	mm
5,000	MK-1	155,000	81,000	73,000
6,000	MK-1	187,000	108,000	105,000
8,000	MK-1	227,000	149,000	145,000
10,000	MK-1	257,000	180,000	175,000
12,000	MK-2	315,000	219,000	210,000
13,000	MK-2	325,000	229,000	220,000

d1	S	l1	l2	l5
mm		mm	mm	mm
14,000	MK-2	325,000	229,000	220,000
16,000	MK-2	335,000	239,000	230,000
20,000	MK-3	377,000	263,000	250,000
25,000	MK-3	427,000	311,000	300,000

Wiertła kręte z
chwytami MK



Wiertła z ostrzami węglowymi (HM)



- P** ○ Korekcja ścina $\geq \varnothing 8,000$ • geom. ścinowa • lutowane płytki węglkowe
- M** □
- K** ○
- N** □ stal sprężynowa • żeliwa twarde - HB > 300 HB • czysty molibden
- S** □ • twarde brązy
- H** ○

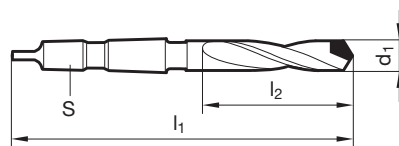
Materiał narzędzia **Węglik**

Powierzchnia ○

Kierunek skrawania **R**

GÜHRINGNAVIGATOR

Param. skr. na str. 776



Nr artykułu **705**

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	130,000	40,000
8,500		MK-1	135,000	45,000
10,000		MK-1	140,000	50,000
10,200		MK-1	140,000	50,000
10,500		MK-1	140,000	50,000
11,000		MK-1	140,000	50,000
11,500		MK-1	146,000	56,000
12,000		MK-1	146,000	56,000
13,000		MK-1	146,000	56,000
13,500		MK-2	168,000	63,000
14,000		MK-2	168,000	63,000
14,500		MK-2	168,000	63,000
15,000		MK-2	168,000	63,000
15,500		MK-2	175,000	70,000
16,000		MK-2	175,000	70,000
16,500		MK-2	175,000	70,000
17,000		MK-2	175,000	70,000
17,500		MK-2	185,000	80,000
18,000		MK-2	185,000	80,000
19,000		MK-2	185,000	80,000
19,500		MK-3	215,000	90,000
20,000		MK-3	215,000	90,000
21,000		MK-3	215,000	90,000
21,500		MK-3	215,000	90,000

d1		S	l1	l2
mm	inch		mm	mm
22,000		MK-3	215,000	90,000
23,000		MK-3	225,000	100,000
24,000		MK-3	225,000	100,000
24,500		MK-3	225,000	100,000
25,000	63/64	MK-3	225,000	100,000
26,000		MK-4	260,000	110,000
26,500		MK-4	260,000	110,000
27,000		MK-4	260,000	110,000
28,000		MK-4	260,000	110,000
30,000		MK-4	275,000	125,000
32,000		MK-4	275,000	125,000
33,000		MK-4	290,000	140,000
38,000		MK-4	310,000	160,000
40,000		MK-4	310,000	160,000

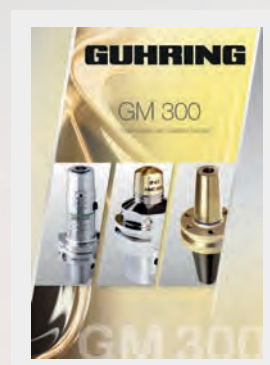
Wiertła kręte z chwytami MK

Oprawka HSK-A do chwytu Morse'a

Do mocowania narzędzi na
stożku Morse'a z płetwą.

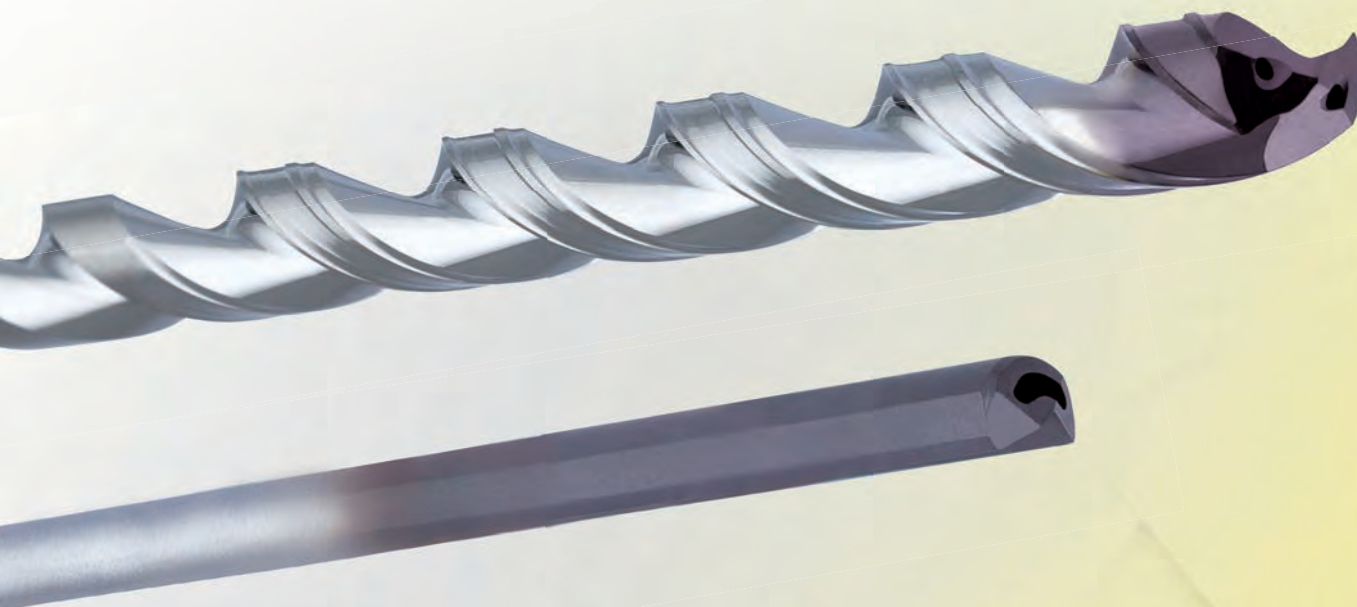


Więcej informacji można znaleźć
w naszym katalogu GM 300.





WIERTŁA LUFOWE





KRĘTE WIERTŁA PEŁNOWĘGLIKOWE,
DO GŁĘBOKICH OTWORÓW



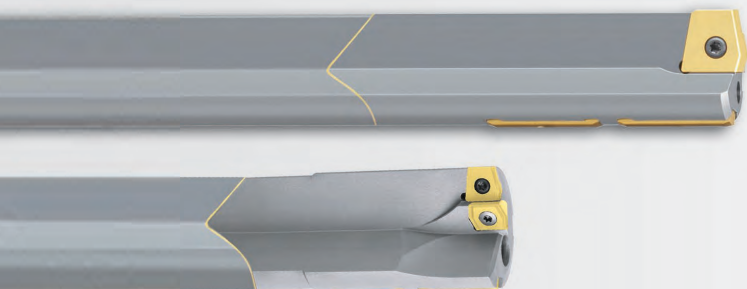
WIERTŁA LUFOWE 1-OSTRZOWE,
PEŁNOWĘGLIKOWE
EB 100



WIERTŁA LUFOWE 1-OSTRZOWE
Z GŁÓWKĄ WĘGLIKOWĄ
EB 80



WIERTŁA LUFOWE 2-OSTRZOWE
Z GŁÓWKĄ WĘGLIKOWĄ
ZB 80



WIERTŁA LUFOWE 1-OSTRZOWE
SKŁADANE
EB 800



KRĘTE WIERTŁA ZE STALI HSS/HSCO,
DO GŁĘBOKICH OTWORÓW



- pełnowęglkowe wiertło kręte do wiercenia głębokich otworów z największymi parametrami
- głębokości wiercenia od 15 x D
- nominalne średnice 3.00 – 14.00 mm
- optymalna stabilność narzędzia i chłodzenie
- wysokie trwałości narzędzi przy krótkich czasach obróbki
- odpowiednie do większości materiałów

od strony 523

- 1-ostrzowe wiertło lufowe do najdokładniejszych otworów
- program produkcji od średnicy 0.9 do 16 mm
- długość rowków wiórowych do 500 mm, max. gł. 100 x D
- wiercenie do 80 x D jednym narzędziem
- odpowiednie do większości materiałów

od strony 529

- 1-ostrzowe wiertło lufowe z główką węglkową
- długość całkowita do 3000 mm
- średnice nominalne od 2 do 40 mm
- dużo opcji produkcji: np. wiertła stopniowe, kształtowe
- odpowiednie do większości materiałów

od strony 540

Wiertła lufowe

- 2-ostrzowe wiertło lufowe z główką węglkową
- średnice nominalne od 6 do 30 mm
- perfekcyjne do obróbki żeliwa: GG25, GGG40, GGV
- ekstremalnie duże kanałki chłodzenia
- specjalna geometria ostrzy

od strony 551

- 1-ostrzowe wiertło lufowe z wymiennymi płytkami i listwami prowadzącymi
- średnice nominalne od 12 do 52 mm
- możliwe zmiana średnicy o 0.5 mm na korpusie
- możliwe różne kombinacje gatunków węgla i powłok
- odpowiednie do większości materiałów

od strony 553

- wiertła kręte HSS/HSCO do wiercenia głębokich otworów
- średnice nominalne od 0.4 do 50 mm
- długość rowków do 850 mm
- dostępne z chwytami walcowymi i Morse'a
- odpowiednie do większości materiałów

od strony 580



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła RATIO, z kanałkami chłodz.

•	•	•	•	•	•		15xD	WN	RT 100 T	R	VHM	A	3,000 - 14,000	6509	760	523
•	•	•	•	•	•		20xD	WN	RT 100 T	R	VHM	A	3,000 - 14,000	6511	760	524
•	•	•	•	•	•		25xD	WN	RT 100 T	R	VHM	A	3,000 - 12,000	6512	760	525
•	•	•	•	•	•		30xD	WN	RT 100 T	R	VHM	A	3,000 - 10,000	6513	760	526
•	•	•	•	•	•		40xD	WN	RT 100 T	R	VHM	A	3,000 - 8,000	6514	760	527

Wiertła lufowe, 1-ostrzowe EB 100

•	•	•	•	•	•		25xD	WN	EB 100	R	VHM	a	2,380 - 12,000	5646	808	529
•	•	•	•	•	•		50xD	WN	EB 100	R	VHM	a	2,380 - 8,000	5647	808	530
•	•	•	•	•	•		75xD	WN	EB 100	R	VHM	a	2,380 - 6,000	5648	808	531
•	•	•	•	•	•		45,00	WN	EB 100	R	VHM	○	1,200 - 3,200	5024	808	532
•	•	•	•	•	•		45,00	WN	EB 100	R	VHM	A	1,200 - 3,200	5632	808	533
•	•	•	•	•	•		80,00	WN	EB 100	R	VHM	○	1,200 - 5,000	5020	808	534
•	•	•	•	•	•		80,00	WN	EB 100	R	VHM	A	1,200 - 5,000	5633	808	535
•	•	•	•	•	•		120,00	WN	EB 100	R	VHM	○	1,500 - 5,000	5026	808	536
•	•	•	•	•	•		120,00	WN	EB 100	R	VHM	A	1,500 - 5,000	5637	808	537
•	•	•	•	•	•		160,00	WN	EB 100	R	VHM	○	1,500 - 8,000	5021	808	538
•	•	•	•	•	•		160,00	WN	EB 100	R	VHM	A	1,500 - 8,000	5638	808	539

Wiertła lufowe, 1-ostrzowe EB 80

•	•	•	•	•	•		20xD	WN	EB 80	R	HM	S	4,000 - 12,000	5018	808	540
•	•	•	•	•	•		20xD	WN	EB 80	R	HM	C	3,970 - 12,700	5639	808	541
•	•	•	•	•	•		30xD	WN	EB 80	R	HM	S	4,000 - 12,000	5460	808	542
•	•	•	•	•	•		30xD	WN	EB 80	R	HM	C	3,970 - 12,700	5640	808	543
•	•	•	•	•	•		40xD	WN	EB 80	R	HM	○	4,000 - 12,000	5689	808	544
•	•	•	•	•	•		40xD	WN	EB 80	R	HM	S	4,000 - 12,000	5022	808	545
•	•	•	•	•	•		40xD	WN	EB 80	R	HM	C	3,970 - 12,700	5641	808	546

Wiertła lufowe



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
Wiertła lufowe, 1-ostrzowe EB 80																
•	○	•	○	○	○		80xD	WN	EB 80	R	HM	○	3,970 - 11,950	5690	808	547
•	○	•	○	○	○		80xD	WN	EB 80	R	HM	Ⓢ	4,950 - 11,950	5023	808	548
○	•	○	•	○	○		80xD	WN	EB 80	R	HM	Ⓢ	4,950 - 12,650	5642	808	549
•	○	•	•	○	○		1100,00	WN	EB 80	R	HM	Ⓢ	6,000 - 22,000	5164	808	550
Wiertła lufowe, 2-ostrzowe ZB 80																
•	○	•	○	○	○		30xD	WN	ZB 80	R	HM	○	8,000 - 12,000	5019	808	551
•	○	•	○	○	○		30xD	WN	ZB 80	R	HM	○	8,000 - 12,000	5643	808	552
Wiertła lufowe, 1-ostrzowe EB 800																
•	○	○	•	○	○		30xD	WN	EB 800	R	HM	Ⓢ	12,000 - 24,000	5644	808	555
Wkrętak Torx																
•	○	•	○	○	○			WN						1612		558
Wkrętaki dynamometryczne																
•	○	•	○	○	○			WN						4915		559
Nasadki Torx																
•	○	•	○	○	○			WN						4917		560
Śruby mocujące																
•	○	•	○	○	○			WN						4071		561
Tulejki wiertarskie																
•	○	•	○	○	○			WN			VHM			5748		565
•	○	•	○	○	○			WN			HSS			5747		566
Pierścienie zgarniające do 1-ostrzowych wiertel lufowych																
•	○	•	○	○	○			WN						5752		569
Tulejki podporowe do 1-ostrzowych wiertel lufowych																
•	○	•	○	○	○			WN						5750		571
Tulejki podporowe do 1- i 2-ostrzowych wiertel lufowych																
•	○	•	○	○	○			WN						5749		573



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
														5753		575
														5751		576
														5754		577
														5755		578
Wiertła kręte, długie																
•	•	•	•	•	•		-10xD	DIN 340	N	R	HSS		0,400 - 36,510	217	786	580
•	•	•	•	•	•		-10xD	DIN 340	N	R	HSS		0,500 - 22,220	667	786	583
•	•	•	•	•	•		-10xD	DIN 340	N	L	HSS		0,450 - 29,000	220	786	585
•	•	•	•	•	•		-10xD	DIN 340	N	R	HSS		2,950 - 25,250	204	786	587
•	•	•	•	•	•		-10xD	DIN 340	H	R	HSS		0,500 - 16,000	218	786	588
•	•	•	•	•	•		-10xD	DIN 340	H	L	HSS		0,450 - 15,000	221	786	590
•	•	•	•	•	•		-10xD	DIN 340	W	R	HSS		0,500 - 20,640	219	786	591
•	•	•	•	•	•		-10xD	DIN 340	GT 100	R	HSS		1,000 - 14,000	535	786	593
•	•	•	•	•	•		-10xD	DIN 340	GT 100	R	HSS		1,000 - 14,000	668	786	596
•	•	•	•	•	•		-10xD	DIN 340	GT 100	R	HSS		1,000 - 10,000	2462	786	598
•	•	•	•	•	•		-10xD	DIN 340	GT 100	L	HSS		1,400 - 13,000	506	786	599
•	•	•	•	•	•		-10xD	DIN 340	GT 50	R	HSS		1,000 - 32,600	501	786	600
•	•	•	•	•	•		-10xD	DIN 340	N	R	HSS		0,500 - 22,000	317	792	602
•	•	•	•	•	•		-10xD	DIN 340	GT 100	R	HSS		1,000 - 16,000	336	792	604
•	•	•	•	•	•		-10xD	DIN 340	GT 100	R	HSS		1,000 - 12,000	396	792	606
•	•	•	•	•	•		-10xD	DIN 340	Ti	R	HSS		1,000 - 15,000	617	792	607
•	•	•	•	•	•		-10xD	DIN 340	Ti	R	HSS		1,000 - 10,200	669	792	609
•	•	•	•	•	•		-10xD	WN	N	R	VHM		0,500 - 1,450	706	792	611

Wiertła lufowe



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte, bardzo długie, szereg 1

•	•	•	○				-15xD	DIN 1869	N	(R)	HSS		1,600 - 13,000	235	788	612
•	•	•					-15xD	DIN 1869	GT 100	(R)	HSS		1,950 - 13,000	502	790	614
•	•	•	○				-15xD	DIN 1869	GT 100	(R)	HSS		2,000 - 12,700	670	790	616
○		•					-15xD	DIN 1869	GT 50	(R)	HSS		2,000 - 12,700	524	788	617
•	•	•	•	○			-15xD	DIN 1869	GT 100	(R)	HSCO		2,700 - 10,000	618	794	619

Wiertła kręte, bardzo długie, szereg 2

•	•	○					-20xD	DIN 1869	N	(R)	HSS		2,700 - 13,000	236	788	620
•	•	•					-20xD	DIN 1869	GT 100	(R)	HSS		2,000 - 13,000	503	790	621
•	•	•	○				-20xD	DIN 1869	GT 100	(R)	HSS		2,700 - 8,500	671	790	623
○		•					-20xD	DIN 1869	GT 50	(R)	HSS		3,000 - 13,000	528	788	624
•	•	•	•	○			-20xD	DIN 1869	GT 100	(R)	HSCO		3,000 - 10,000	619	794	625

Wiertła kręte, bardzo długie, szereg 3

•	•	○					-25xD	DIN 1869	N	(R)	HSS		3,500 - 13,000	237	788	626
•	•	•					-25xD	DIN 1869	GT 100	(R)	HSS		2,500 - 13,000	504	790	627
○		•					-25xD	DIN 1869	GT 50	(R)	HSS		2,500 - 10,000	529	788	628
•	•	•	•	○			-25xD	DIN 1869	GT 100	(R)	HSCO		2,500 - 13,000	571	794	629

Wiertła kręte, ekstra długie

•	•	•					>25xD	WN	GT 100	(R)	HSS		6,000 - 12,000	242	790	630
•	•	•					>25xD	WN	GT 100	(R)	HSS		8,000 - 12,000	243	790	631
•	•	•					>25xD	WN	GT 100	(R)	HSS		10,000 - 12,000	244	790	632

Wiertła kręte, bardzo długie, szereg 1

•	•	○					-15xD	DIN 1870	N	(R)	HSS		8,000 - 50,000	266	788	633
•	•	•					-15xD	DIN 1870	GT 100	(R)	HSS		8,000 - 30,000	526	790	634
○		•					-15xD	DIN 1870	GT 50	(R)	HSS		8,500 - 33,000	525	788	635
•	•	•	•	○			-15xD	DIN 1870	GT 100	(R)	HSCO		9,520 - 30,000	620	794	636

Wiertła lufowe



P	M	K	N	S	H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Wiertła kręte, bardzo długie, szereg 2

•	•	•	•	•	•		-20xD	DIN 1870	N	R	HSS		8,000 - 45,000	267	788	637
•	•	•	•	•	•		-20xD	DIN 1870	GT 100	R	HSS		8,000 - 30,000	527	790	638
•	•	•	•	•	•		-20xD	DIN 1870	GT 50	R	HSS		8,500 - 31,000	542	788	639
•	•	•	•	•	•		-20xD	DIN 1870	GT 100	R	HSCO		9,520 - 23,420	621	794	640

Wiertła z chłodzeniem wew. długości wg DIN 1870

•	•	•	•	•	•		-15xD	WN	GT 100	R	HSCO		11,000 - 34,000	374	794	641
•	•	•	•	•	•		-15xD	WN	GT 100	R	HSCO		11,000 - 34,000	375	794	642
•	•	•	•	•	•		-15xD	WN	GT 100	R	HSCO		11,000 - 29,000	376	794	643



Wiertła **RATIO**, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

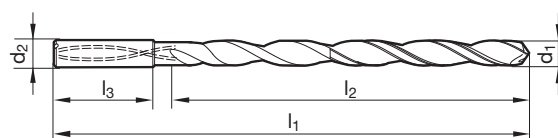
Powierzchnia **A**

Forma chwytu **HA**

- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6509**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	95,000	55,000	36,000
3,170	1/8	6,000	106,000	67,000	36,000
3,500		6,000	116,000	76,000	36,000
3,570	9/64	6,000	116,000	76,000	36,000
3,970	5/32	6,000	116,000	76,000	36,000
4,000		6,000	116,000	76,000	36,000
4,370	11/64	6,000	133,000	93,000	36,000
4,500		6,000	133,000	93,000	36,000
4,760	3/16	6,000	133,000	93,000	36,000
5,000		6,000	133,000	93,000	36,000
5,100		6,000	150,000	110,000	36,000
5,160	13/64	6,000	150,000	110,000	36,000
5,410		6,000	150,000	110,000	36,000
5,500		6,000	150,000	110,000	36,000
5,560	7/32	6,000	150,000	110,000	36,000
5,950	15/64	6,000	150,000	110,000	36,000
6,000		6,000	150,000	110,000	36,000
6,350	1/4	8,000	167,000	127,000	36,000
6,500		8,000	167,000	127,000	36,000
6,750	17/64	8,000	167,000	127,000	36,000
7,000		8,000	167,000	127,000	36,000
7,140	9/32	8,000	183,000	143,000	36,000
7,500		8,000	183,000	143,000	36,000
7,540	19/64	8,000	183,000	143,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
7,940	5/16	8,000	183,000	143,000	36,000
8,000		8,000	183,000	143,000	36,000
8,330	21/64	10,000	204,000	160,000	40,000
8,500		10,000	204,000	160,000	40,000
8,730	11/32	10,000	204,000	160,000	40,000
9,000		10,000	204,000	160,000	40,000
9,130	23/64	10,000	221,000	177,000	40,000
9,520	3/8	10,000	221,000	177,000	40,000
9,920	25/64	10,000	221,000	177,000	40,000
10,000		10,000	221,000	177,000	40,000
10,320	13/32	12,000	247,000	198,000	45,000
10,720	27/64	12,000	247,000	198,000	45,000
11,000		12,000	247,000	198,000	45,000
11,110	7/16	12,000	263,000	214,000	45,000
11,510	29/64	12,000	263,000	214,000	45,000
11,910	15/32	12,000	263,000	214,000	45,000
12,000		12,000	263,000	214,000	45,000
12,300	31/64	14,000	297,000	248,000	45,000
12,700	1/2	14,000	297,000	248,000	45,000
13,100	33/64	14,000	297,000	248,000	45,000
13,490	17/32	14,000	297,000	248,000	45,000
13,890	35/64	14,000	297,000	248,000	45,000
14,000		14,000	297,000	248,000	45,000

Wiertła lufowe



Wiertła RATIO, z kanałkami chłodz.



- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stале konstrukcyjne i do nawęglania • stале automatowe, stале do ulepszenia cieplnego • stале stopowe – $R_m < 1200 \text{ N/mm}^2$ • stале nierdzewne
- S** ○
- H** ○

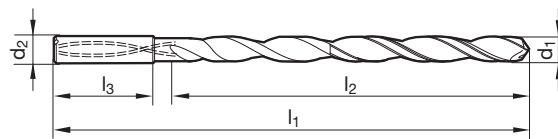
Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Forma chwytu HA

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6511**

Wiertła lufowe

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	110,000	70,000	36,000	8,730	11/32	10,000	249,000	205,000	40,000
3,100		6,000	123,000	83,000	36,000	9,000		10,000	249,000	205,000	40,000
3,170	1/8	6,000	123,000	83,000	36,000	9,130	23/64	10,000	271,000	227,000	40,000
3,500		6,000	136,000	96,000	36,000	9,520	3/8	10,000	271,000	227,000	40,000
3,570	9/64	6,000	136,000	96,000	36,000	9,920	25/64	10,000	271,000	227,000	40,000
3,970	5/32	6,000	136,000	96,000	36,000	10,000		10,000	271,000	227,000	40,000
4,000		6,000	136,000	96,000	36,000	10,320	13/32	12,000	302,000	253,000	45,000
4,200		6,000	158,000	118,000	36,000	10,720	27/64	12,000	302,000	253,000	45,000
4,370	11/64	6,000	158,000	118,000	36,000	11,000		12,000	302,000	253,000	45,000
4,500		6,000	158,000	118,000	36,000	11,110	7/16	12,000	323,000	274,000	45,000
4,760	3/16	6,000	158,000	118,000	36,000	11,510	29/64	12,000	323,000	274,000	45,000
5,000		6,000	158,000	118,000	36,000	11,910	15/32	12,000	323,000	274,000	45,000
5,100		6,000	180,000	140,000	36,000	12,000		12,000	323,000	274,000	45,000
5,160	13/64	6,000	180,000	140,000	36,000	12,300	31/64	14,000	367,000	318,000	45,000
5,410		6,000	180,000	140,000	36,000	12,700	1/2	14,000	367,000	318,000	45,000
5,500		6,000	180,000	140,000	36,000	13,100	33/64	14,000	367,000	318,000	45,000
5,560	7/32	6,000	180,000	140,000	36,000	13,490	17/32	14,000	367,000	318,000	45,000
5,950	15/64	6,000	180,000	140,000	36,000	13,890	35/64	14,000	367,000	318,000	45,000
6,000		6,000	180,000	140,000	36,000	14,000		14,000	367,000	318,000	45,000
6,350	1/4	8,000	202,000	162,000	36,000						
6,500		8,000	202,000	162,000	36,000						
6,750	17/64	8,000	202,000	162,000	36,000						
7,000		8,000	202,000	162,000	36,000						
7,140	9/32	8,000	223,000	183,000	36,000						
7,500		8,000	223,000	183,000	36,000						
7,540	19/64	8,000	223,000	183,000	36,000						
7,940	5/16	8,000	223,000	183,000	36,000						
8,000		8,000	223,000	183,000	36,000						
8,330	21/64	10,000	249,000	205,000	40,000						
8,500		10,000	249,000	205,000	40,000						



Wiertła **RATIO**, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

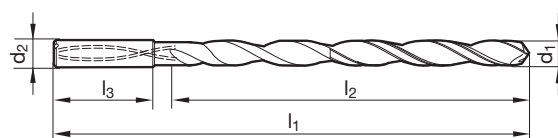
Powierzchnia **A**

Forma chwytu **HA**

- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6512**

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	125,000	85,000	36,000	7,000		8,000	237,000	197,000	36,000
3,100		6,000	141,000	101,000	36,000	7,140	9/32	8,000	263,000	223,000	36,000
3,170	1/8	6,000	141,000	101,000	36,000	7,500		8,000	263,000	223,000	36,000
3,500		6,000	156,000	116,000	36,000	7,540	19/64	8,000	263,000	223,000	36,000
3,570	9/64	6,000	156,000	116,000	36,000	7,940	5/16	8,000	263,000	223,000	36,000
3,800		6,000	156,000	116,000	36,000	8,000		8,000	263,000	223,000	36,000
3,970	5/32	6,000	156,000	116,000	36,000	8,330	21/64	10,000	294,000	250,000	40,000
4,000		6,000	156,000	116,000	36,000	8,500		10,000	294,000	250,000	40,000
4,200		6,000	183,000	143,000	36,000	8,730	11/32	10,000	294,000	250,000	40,000
4,370	11/64	6,000	183,000	143,000	36,000	8,800		10,000	294,000	250,000	40,000
4,500		6,000	183,000	143,000	36,000	9,000		10,000	294,000	250,000	40,000
4,760	3/16	6,000	183,000	143,000	36,000	9,130	23/64	10,000	321,000	277,000	40,000
5,000		6,000	183,000	143,000	36,000	9,520	3/8	10,000	321,000	277,000	40,000
5,100		6,000	210,000	170,000	36,000	9,920	25/64	10,000	321,000	277,000	40,000
5,160	13/64	6,000	210,000	170,000	36,000	10,000		10,000	321,000	277,000	40,000
5,410		6,000	210,000	170,000	36,000	10,320	13/32	12,000	359,000	310,000	45,000
5,500		6,000	210,000	170,000	36,000	10,720	27/64	12,000	359,000	310,000	45,000
5,560	7/32	6,000	210,000	170,000	36,000	11,000		12,000	359,000	310,000	45,000
5,950	15/64	6,000	210,000	170,000	36,000	11,110	7/16	12,000	386,000	337,000	45,000
6,000		6,000	210,000	170,000	36,000	11,510	29/64	12,000	386,000	337,000	45,000
6,300		8,000	237,000	197,000	36,000	11,910	15/32	12,000	386,000	337,000	45,000
6,350	1/4	8,000	237,000	197,000	36,000	12,000		12,000	386,000	337,000	45,000
6,500		8,000	237,000	197,000	36,000						
6,750	17/64	8,000	237,000	197,000	36,000						

Wiertła lufowe



Wiertła **RATIO**, z kanałkami chłodz.

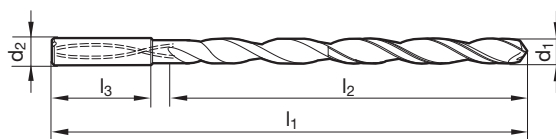


- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 760

Materiał narzędzia	Węglik mono.
Powierzchnia	A
Forma chwytu	HA



Nr artykułu **6513**

Wiertła lufowe

d1		d2 h6	l1	l2	l3	d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm	mm	inch	mm	mm	mm	mm
3,000		6,000	140,000	100,000	36,000	7,000		8,000	272,000	232,000	36,000
3,100		6,000	158,000	118,000	36,000	7,140	9/32	8,000	303,000	263,000	36,000
3,170	1/8	6,000	158,000	118,000	36,000	7,500		8,000	303,000	263,000	36,000
3,500		6,000	176,000	136,000	36,000	7,540	19/64	8,000	303,000	263,000	36,000
3,570	9/64	6,000	176,000	136,000	36,000	7,940	5/16	8,000	303,000	263,000	36,000
3,800		6,000	176,000	136,000	36,000	8,000		8,000	303,000	263,000	36,000
3,970	5/32	6,000	176,000	136,000	36,000	8,330	21/64	10,000	339,000	295,000	40,000
4,000		6,000	176,000	136,000	36,000	8,500		10,000	339,000	295,000	40,000
4,200		6,000	208,000	168,000	36,000	8,730	11/32	10,000	339,000	295,000	40,000
4,370	11/64	6,000	208,000	168,000	36,000	8,800		10,000	339,000	295,000	40,000
4,500		6,000	208,000	168,000	36,000	9,000		10,000	339,000	295,000	40,000
4,760	3/16	6,000	208,000	168,000	36,000	9,130	23/64	10,000	371,000	327,000	40,000
5,000		6,000	208,000	168,000	36,000	9,520	3/8	10,000	371,000	327,000	40,000
5,100		6,000	240,000	200,000	36,000	9,920	25/64	10,000	371,000	327,000	40,000
5,160	13/64	6,000	240,000	200,000	36,000	10,000		10,000	371,000	327,000	40,000
5,410		6,000	240,000	200,000	36,000						
5,500		6,000	240,000	200,000	36,000						
5,560	7/32	6,000	240,000	200,000	36,000						
5,950	15/64	6,000	240,000	200,000	36,000						
6,000		6,000	240,000	200,000	36,000						
6,300		8,000	272,000	232,000	36,000						
6,350	1/4	8,000	272,000	232,000	36,000						
6,500		8,000	272,000	232,000	36,000						
6,750	17/64	8,000	272,000	232,000	36,000						



Wiertła RATIO, z kanałkami chłodz.



Materiał narzędzia **Węglik mono.**

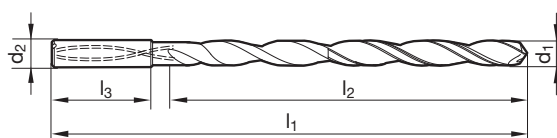
Powierzchnia **A**

Forma chwytu HA

- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • główna krawędź skrawająca - wklęsła • optymalny kształt rowków wiórowych • max. średnica kanałków chłodzących • kontrolować ciśnienie chłodziwa
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 760



Nr artykułu **6514**

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
3,000		6,000	170,000	130,000	36,000
3,100		6,000	193,000	153,000	36,000
3,170	1/8	6,000	193,000	153,000	36,000
3,500		6,000	193,000	153,000	36,000
3,570	9/64	6,000	216,000	176,000	36,000
3,800		6,000	216,000	176,000	36,000
3,970	5/32	6,000	216,000	176,000	36,000
4,000		6,000	216,000	176,000	36,000
4,200		6,000	238,000	198,000	36,000
4,370	11/64	6,000	238,000	198,000	36,000
4,500		6,000	238,000	198,000	36,000
4,760	3/16	6,000	258,000	218,000	36,000
5,000		6,000	258,000	218,000	36,000
5,100		6,000	280,000	240,000	36,000
5,160	13/64	6,000	280,000	240,000	36,000
5,410		6,000	280,000	240,000	36,000
5,500		6,000	280,000	240,000	36,000
5,560	7/32	6,000	300,000	260,000	36,000

d1		d2 h6	l1	l2	l3
mm	inch	mm	mm	mm	mm
5,950	15/64	6,000	300,000	260,000	36,000
6,000		6,000	300,000	260,000	36,000
6,300		8,000	322,000	282,000	36,000
6,350	1/4	8,000	322,000	282,000	36,000
6,500		8,000	322,000	282,000	36,000
6,750	17/64	8,000	342,000	302,000	36,000
7,000		8,000	342,000	302,000	36,000
7,140	9/32	8,000	363,000	323,000	36,000
7,500		8,000	363,000	323,000	36,000
7,540	19/64	8,000	383,000	343,000	36,000
7,940	5/16	8,000	383,000	343,000	36,000
8,000		8,000	383,000	343,000	36,000

Wiertła lufowe



Super szybki serwis

1-ostrzowe wiertło lufowe idealnie dopasowane do danego zadania produkcyjnego może być dostępne w kilka dni, dzięki super szybkiemu programowi produkcji w firmie Gühring.

EB 100

Opcje konstrukcji:

- długość rowka:

45 mm Ø 1,2 / 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2

80 mm Ø 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2 / 3,5 / 4,0 / 4,2 / 4,5 / 5,0

120 mm Ø 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2 / 3,5 / 4,0 / 4,2 / 4,5 / 5,0

160 mm Ø 1,5 / 1,59 / 1,6 / 1,98 / 2,0 / 2,5 / 2,7 / 3,0 / 3,2 / 3,5 / 4,0 / 4,2 / 4,5 / 5,0 / 6,0 / 8,0

- oferta specjalna: średnice robocze 0.9 – 16.0 mm, max. długość rowka 500 mm
- gatunki węgla: K30/K40
- forma główki: G
- z powłoką lub bez
- dostępne ze standardowymi chwytami

Narzędzia specjalne dostępne w 15 dni!

EB 80

Opcje konstrukcji:

- średnice robocze 2.0 – 13.9 mm stopniowane co 0.1 mm
- średnice robocze 14.0 – 22.0 mm stopniowane co 0.5 mm
- długość całkowita do 1,200 mm, min. dł. rowka 20 x D
- forma główki: G
- gatunek węgla: K15
- bez powłoki ze standardową geometrią ostrza do żeliwa i aluminium
- z powłoką S (TiN) i z rozdzielaczem wiórów do stali długowiórowych
- dostępne ze standardowymi chwytami

Narzędzia specjalne dostępne w 10 dni!



Wiertła lufowe, 1-ostrowe EB 100



Materiał narzędzia

Węglik mono.

Powierzchnia



Forma chwytu

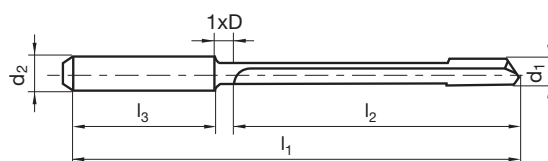
HA

P • forma prowadnic G • chwyt pełnowęglkowy ze stożkowym zakończeniem pod MQL od d1 = 3 mm lub d2 = 6 mm

P	•
M	•
K	○
N	
S	○
H	○

GÜHRING NAVIGATOR

Param. skr. na str. 808



Nr artykułu

5646

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
2,380	3/32	4,000	100,000	70,000	28,000	2,380	
2,500		4,000	115,000	85,000	28,000	2,500	
2,780	7/64	4,000	115,000	85,000	28,000	2,780	
3,000		6,000	145,000	105,000	36,000	3,000	
3,170	1/8	6,000	145,000	105,000	36,000	3,170	
3,500		6,000	145,000	105,000	36,000	3,500	
3,570	9/64	6,000	160,000	120,000	36,000	3,570	
3,970	5/32	6,000	160,000	120,000	36,000	3,970	
4,000		6,000	160,000	120,000	36,000	4,000	
4,370	11/64	6,000	220,000	180,000	36,000	4,370	
4,760	3/16	6,000	220,000	180,000	36,000	4,760	
5,000		6,000	220,000	180,000	36,000	5,000	
5,160	13/64	6,000	220,000	180,000	36,000	5,160	
5,560	7/32	6,000	220,000	180,000	36,000	5,560	
5,950	15/64	6,000	220,000	180,000	36,000	5,950	
6,000		6,000	220,000	180,000	36,000	6,000	
6,350	1/4	8,000	260,000	210,000	36,000	6,350	
6,750	17/64	8,000	260,000	210,000	36,000	6,750	
7,000		8,000	260,000	210,000	36,000	7,000	
7,140	9/32	8,000	285,000	240,000	36,000	7,140	
7,540	19/64	8,000	285,000	240,000	36,000	7,540	
7,940	5/16	8,000	285,000	240,000	36,000	7,940	
8,000		8,000	285,000	240,000	36,000	8,000	
9,000		10,000	350,000	300,000	40,000	9,000	
10,000		10,000	350,000	300,000	40,000	10,000	
11,000		12,000	420,000	360,000	45,000	11,000	
12,000		12,000	420,000	360,000	45,000	12,000	

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 100



Materiał narzędzia **Węglik mono.**

Powierzchnia

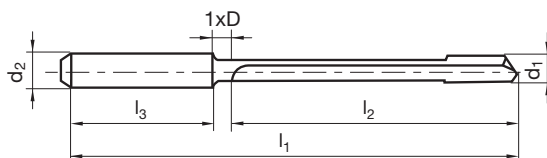
Forma chwytu HA

P • forma prowadnic G • chwyt pełnowęglkowy ze stożkowym zakończeniem pod MQL od d1 = 3 mm lub d2 = 6 mm

M	•
K	○
N	
S	○
H	○

GÜHRINGNAVIGATOR

Param. skr. na str. 808



Nr artykułu **5647**

Wiertła lufowe

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
2,380	3/32	4,000	160,000	130,000	28,000	2,380	
2,500		4,000	185,000	155,000	28,000	2,500	
2,780	7/64	4,000	185,000	155,000	28,000	2,780	
3,000		6,000	230,000	190,000	36,000	3,000	
3,170	1/8	6,000	230,000	190,000	36,000	3,170	
3,500		6,000	230,000	190,000	36,000	3,500	
3,570	9/64	6,000	260,000	220,000	36,000	3,570	
3,970	5/32	6,000	260,000	220,000	36,000	3,970	
4,000		6,000	260,000	220,000	36,000	4,000	
4,370	11/64	6,000	370,000	330,000	36,000	4,370	
4,760	3/16	6,000	370,000	330,000	36,000	4,760	
5,000		6,000	370,000	330,000	36,000	5,000	
5,160	13/64	6,000	370,000	330,000	36,000	5,160	
5,560	7/32	6,000	370,000	330,000	36,000	5,560	
5,950	15/64	6,000	370,000	330,000	36,000	5,950	
6,000		6,000	370,000	330,000	36,000	6,000	
6,350	1/4	8,000	430,000	385,000	36,000	6,350	
6,750	17/64	8,000	430,000	385,000	36,000	6,750	
7,000		8,000	430,000	385,000	36,000	7,000	
7,140	9/32	8,000	485,000	440,000	36,000	7,140	
7,540	19/64	8,000	485,000	440,000	36,000	7,540	
7,940	5/16	8,000	485,000	440,000	36,000	7,940	
8,000		8,000	485,000	440,000	36,000	8,000	



Wiertła lufowe, 1-ostrzowe EB 100



Materiał narzędzia

Węgiel mono.

Powierzchnia



Forma chwytu

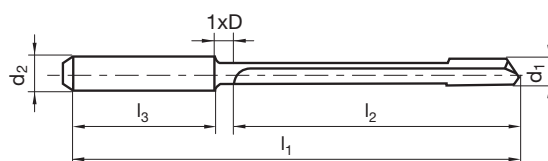
HA

P • forma prowadnic G • chwyt pełnowęglkowy ze stożkowym zakończeniem pod MQL od $d_1 = 3 \text{ mm}$ lub $d_2 = 6 \text{ mm}$

P	•
M	•
K	○
N	
S	○
H	○

GÜHRING NAVIGATOR

Param. skr. na str. 808



Nr artykułu

5648

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
2,380	3/32	4,000	220,000	190,000	28,000	2,380	
2,500		4,000	255,000	220,000	28,000	2,500	
2,780	7/64	4,000	255,000	220,000	28,000	2,780	
3,000		6,000	320,000	280,000	36,000	3,000	
3,170	1/8	6,000	320,000	280,000	36,000	3,170	
3,500		6,000	320,000	280,000	36,000	3,500	
3,570	9/64	6,000	360,000	320,000	36,000	3,570	
3,970	5/32	6,000	360,000	320,000	36,000	3,970	
4,000		6,000	360,000	320,000	36,000	4,000	
4,370	11/64	6,000	525,000	485,000	36,000	4,370	
4,760	3/16	6,000	525,000	485,000	36,000	4,760	
5,000		6,000	525,000	485,000	36,000	5,000	
5,160	13/64	6,000	525,000	485,000	36,000	5,160	
5,560	7/32	6,000	525,000	485,000	36,000	5,560	
5,950	15/64	6,000	525,000	485,000	36,000	5,950	
6,000		6,000	525,000	485,000	36,000	6,000	

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 100

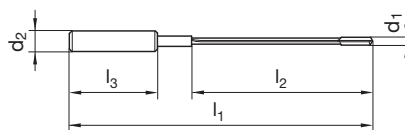


P	○	dł. rowka wiór. 45 mm • forma prowadnic G
M	○	
K	○	
N	●	
S	●	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik mono.
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **5024**

Wiertła lufowe

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,200		4,000	90,000	45,000	28,000	1,200	
1,500		4,000	90,000	45,000	28,000	1,500	
1,590	1/16	4,000	90,000	45,000	28,000	1,590	
1,600		4,000	90,000	45,000	28,000	1,600	
1,980	5/64	4,000	90,000	45,000	28,000	1,980	
2,000		4,000	90,000	45,000	28,000	2,000	
2,500		10,000	100,000	45,000	40,000	2,500	
2,700		10,000	100,000	45,000	40,000	2,700	
3,000		10,000	100,000	45,000	40,000	3,000	
3,200		10,000	100,000	45,000	40,000	3,200	



Wiertła lufowe, 1-ostrowe EB 100

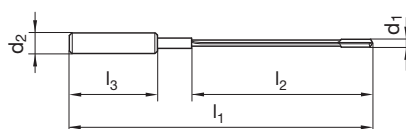
Materiał narzędzia **Węglik mono.**Powierzchnia **A**

Forma chwytu HA

P	•	dł. rowka wiór. 45 mm • forma prowadnic G
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Nr artykułu **5632**

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
1,200		4,000	90,000	45,000	28,000	1,200
1,500		4,000	90,000	45,000	28,000	1,500
1,590	1/16	4,000	90,000	45,000	28,000	1,590
1,600		4,000	90,000	45,000	28,000	1,600
1,980	5/64	4,000	90,000	45,000	28,000	1,980
2,000		4,000	90,000	45,000	28,000	2,000
2,500		10,000	100,000	45,000	40,000	2,500
2,700		10,000	100,000	45,000	40,000	2,700
3,000		10,000	100,000	45,000	40,000	3,000
3,200		10,000	100,000	45,000	40,000	3,200

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 100

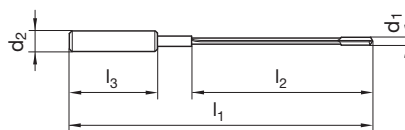


P	○	dł. rowka wiór. 80 mm • forma prowadnic G
M	○	
K	○	
N	●	
S	●	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik mono.
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **5020**

Wiertła lufowe

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,200		4,000	125,000	80,000	28,000	1,200	
1,500		4,000	125,000	80,000	28,000	1,500	
1,590	1/16	4,000	125,000	80,000	28,000	1,590	
1,600		4,000	125,000	80,000	28,000	1,600	
1,980	5/64	4,000	125,000	80,000	28,000	1,980	
2,000		4,000	125,000	80,000	28,000	2,000	
2,500		10,000	135,000	80,000	40,000	2,500	
2,700		10,000	135,000	80,000	40,000	2,700	
3,000		10,000	135,000	80,000	40,000	3,000	
3,200		10,000	135,000	80,000	40,000	3,200	
3,500		10,000	135,000	80,000	40,000	3,500	
4,000		10,000	135,000	80,000	40,000	4,000	
4,200		10,000	135,000	80,000	40,000	4,200	
4,500		10,000	135,000	80,000	40,000	4,500	
5,000		10,000	135,000	80,000	40,000	5,000	



Wiertła lufowe, 1-ostrzowe EB 100


 Materiał narzędzia **Węglik mono.**

 Powierzchnia **A**

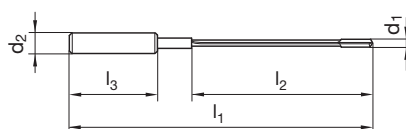
Forma chwytu HA

P • dł. rowka wiór. 80 mm • forma prowadnic G

P	•
M	○
K	•
N	○
S	○
H	○

GÜHRING NAVIGATOR

Param. skr. na str. 808


 Nr artykułu **5633**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,200		4,000	125,000	80,000	28,000	1,200	
1,500		4,000	125,000	80,000	28,000	1,500	
1,590	1/16	4,000	125,000	80,000	28,000	1,590	
1,600		4,000	125,000	80,000	28,000	1,600	
1,980	5/64	4,000	125,000	80,000	28,000	1,980	
2,000		4,000	125,000	80,000	28,000	2,000	
2,500		10,000	135,000	80,000	40,000	2,500	
2,700		10,000	135,000	80,000	40,000	2,700	
3,000		10,000	135,000	80,000	40,000	3,000	
3,200		10,000	135,000	80,000	40,000	3,200	
3,500		10,000	135,000	80,000	40,000	3,500	
4,000		10,000	135,000	80,000	40,000	4,000	
4,200		10,000	135,000	80,000	40,000	4,200	
4,500		10,000	135,000	80,000	40,000	4,500	
5,000		10,000	135,000	80,000	40,000	5,000	

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 100

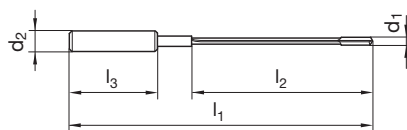


P	○	dł. rowka wiór. 120 mm • forma prowadnic G
M	○	
K	○	
N	●	
S	●	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik mono.
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **5026**

Wiertła lufowe

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,500		4,000	165,000	120,000	28,000	1,500	
1,590	1/16	4,000	165,000	120,000	28,000	1,590	
1,600		4,000	165,000	120,000	28,000	1,600	
1,980	5/64	4,000	165,000	120,000	28,000	1,980	
2,000		4,000	165,000	120,000	28,000	2,000	
2,500		10,000	175,000	120,000	40,000	2,500	
2,700		10,000	175,000	120,000	40,000	2,700	
3,000		10,000	175,000	120,000	40,000	3,000	
3,200		10,000	175,000	120,000	40,000	3,200	
3,500		10,000	175,000	120,000	40,000	3,500	
4,000		10,000	175,000	120,000	40,000	4,000	
4,200		10,000	175,000	120,000	40,000	4,200	
4,500		10,000	175,000	120,000	40,000	4,500	
5,000		10,000	175,000	120,000	40,000	5,000	



Wiertła lufowe, 1-ostrzowe EB 100


 Materiał narzędzia **Węglik mono.**

 Powierzchnia **A**

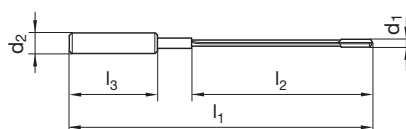
Forma chwytu HA

P • dł. rowka wiór. 120 mm • forma prowadnic G

P	•
M	○
K	•
N	○
S	○
H	○

GÜHRING NAVIGATOR

Param. skr. na str. 808


 Nr artykułu **5637**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,500		4,000	165,000	120,000	28,000	1,500	
1,590	1/16	4,000	165,000	120,000	28,000	1,590	
1,600		4,000	165,000	120,000	28,000	1,600	
1,980	5/64	4,000	165,000	120,000	28,000	1,980	
2,000		4,000	165,000	120,000	28,000	2,000	
2,500		10,000	175,000	120,000	40,000	2,500	
2,700		10,000	175,000	120,000	40,000	2,700	
3,000		10,000	175,000	120,000	40,000	3,000	
3,200		10,000	175,000	120,000	40,000	3,200	
3,500		10,000	175,000	120,000	40,000	3,500	
4,000		10,000	175,000	120,000	40,000	4,000	
4,200		10,000	175,000	120,000	40,000	4,200	
4,500		10,000	175,000	120,000	40,000	4,500	
5,000		10,000	175,000	120,000	40,000	5,000	

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 100

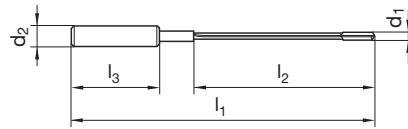


P	○	dł. rowka wiór. 160 mm • forma prowadnic G
M	○	
K	○	
N	●	
S	●	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik mono.
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **5021**

Wiertła lufowe

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,500		4,000	205,000	160,000	28,000	1,500	
1,590	1/16	4,000	205,000	160,000	28,000	1,590	
1,600		4,000	205,000	160,000	28,000	1,600	
1,980	5/64	4,000	205,000	160,000	28,000	1,980	
2,000		4,000	205,000	160,000	28,000	2,000	
2,500		10,000	215,000	160,000	40,000	2,500	
2,700		10,000	215,000	160,000	40,000	2,700	
3,000		10,000	215,000	160,000	40,000	3,000	
3,200		10,000	215,000	160,000	40,000	3,200	
3,500		10,000	215,000	160,000	40,000	3,500	
4,000		10,000	215,000	160,000	40,000	4,000	
4,200		10,000	215,000	160,000	40,000	4,200	
4,500		10,000	215,000	160,000	40,000	4,500	
5,000		10,000	215,000	160,000	40,000	5,000	
6,000		16,000	225,000	160,000	48,000	6,000	
8,000		16,000	225,000	160,000	48,000	8,000	


Wiertła lufowe, 1-ostrzowe EB 100

 Materiał narzędzia **Węglik mono.**

 Powierzchnia **A**

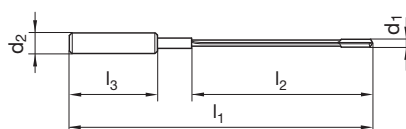
Forma chwytu HA

P • dł. rowka wiór. 160 mm • forma prowadnic G

P	•
M	○
K	•
N	○
S	○
H	○

GÜHRING NAVIGATOR

Param. skr. na str. 808


 Nr artykułu **5638**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
1,500		4,000	205,000	160,000	28,000	1,500	
1,590	1/16	4,000	205,000	160,000	28,000	1,590	
1,600		4,000	205,000	160,000	28,000	1,600	
1,980	5/64	4,000	205,000	160,000	28,000	1,980	
2,000		4,000	205,000	160,000	28,000	2,000	
2,500		10,000	215,000	160,000	40,000	2,500	
2,700		10,000	215,000	160,000	40,000	2,700	
3,000		10,000	215,000	160,000	40,000	3,000	
3,200		10,000	215,000	160,000	40,000	3,200	
3,500		10,000	215,000	160,000	40,000	3,500	
4,000		10,000	215,000	160,000	40,000	4,000	
4,200		10,000	215,000	160,000	40,000	4,200	
4,500		10,000	215,000	160,000	40,000	4,500	
5,000		10,000	215,000	160,000	40,000	5,000	
6,000		16,000	225,000	160,000	48,000	6,000	
8,000		16,000	225,000	160,000	48,000	8,000	

Wiertła lufowe



Wiertła lufowe, 1-ostrowe EB 80

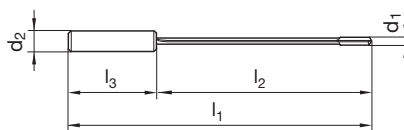


P	•	z odsadzeniem na wypływ chłodziwa • forma prowadnic G • z rozdzielnikiem wiórów
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik
Powierzchnia	S
Forma chwytu	HA



Nr artykułu **5018**

Wiertła lufowe

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
4,000		12,000	150,000	100,000	45,000	4,000
4,200		12,000	160,000	110,000	45,000	4,200
4,500		12,000	170,000	120,000	45,000	4,500
5,000		16,000	180,000	130,000	48,000	5,000
5,500		16,000	190,000	140,000	48,000	5,500
6,000		16,000	210,000	160,000	48,000	6,000
6,500		16,000	220,000	170,000	48,000	6,500
7,000		16,000	235,000	185,000	48,000	7,000
8,000		16,000	260,000	210,000	48,000	8,000
9,000		16,000	280,000	230,000	48,000	9,000
10,000		20,000	320,000	260,000	50,000	10,000
12,000		20,000	370,000	310,000	50,000	12,000



Wiertła lufowe, 1-ostrzowe EB 80


 Materiał narzędzia **Węglik**

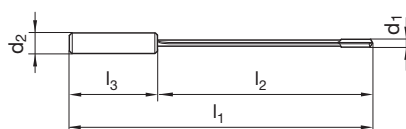
 Powierzchnia **Ⓢ**

 Forma chwytu **HA**

P	○	forma prowadnic G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 808


 Nr artykułu **5639**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
3,970	5/32	10,000	150,000	100,000	40,000	3,970	
4,000		12,000	150,000	100,000	45,000	4,000	
5,000		16,000	180,000	130,000	48,000	5,000	
5,156	13/64	16,000	180,000	130,000	48,000	5,156	
6,000		16,000	210,000	160,000	48,000	6,000	
6,350	1/4	16,000	220,000	170,000	48,000	6,350	
7,000		16,000	235,000	185,000	48,000	7,000	
7,938	5/16	16,000	260,000	210,000	48,000	7,938	
8,000		16,000	260,000	210,000	48,000	8,000	
9,000		16,000	280,000	230,000	48,000	9,000	
9,525	3/8	16,000	290,000	240,000	48,000	9,525	
10,000		20,000	320,000	260,000	50,000	10,000	
11,000		20,000	340,000	290,000	50,000	11,000	
11,113	7/16	20,000	340,000	290,000	50,000	11,113	
12,000		20,000	370,000	310,000	50,000	12,000	
12,700	1/2	20,000	385,000	330,000	50,000	12,700	

Wiertła lufowe



Wiertła lufowe, 1-ostrowe EB 80



Materiał narzędzia **Węglik**

Powierzchnia **S**

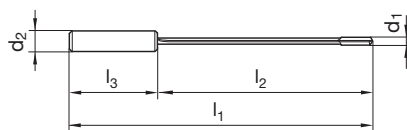
Forma chwytu HA

P • z odsadzeniem na wypływ chłodziwa • forma prowadnic G • z rozdzielnikiem wiórów

M	○
K	•
N	○
S	○
H	○

GÜHRING NAVIGATOR

Param. skr. na str. 808



Nr artykułu **5460**

Wiertła lufowe

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
4,000		12,000	200,000	155,000	45,000	4,000
4,200		12,000	210,000	165,000	45,000	4,200
4,500		12,000	220,000	175,000	45,000	4,500
5,000		16,000	230,000	182,000	48,000	5,000
5,500		16,000	245,000	197,000	48,000	5,500
6,000		16,000	260,000	212,000	48,000	6,000
6,500		16,000	275,000	227,000	48,000	6,500
7,000		16,000	290,000	242,000	48,000	7,000
8,000		16,000	320,000	272,000	48,000	8,000
9,000		16,000	350,000	302,000	48,000	9,000
10,000		20,000	400,000	350,000	50,000	10,000
12,000		20,000	450,000	400,000	50,000	12,000



Wiertła lufowe, 1-ostrzowe EB 80


 Materiał narzędzia **Węglik**

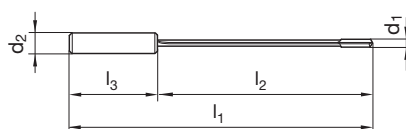
 Powierzchnia **Ⓢ**

 Forma chwytu **HA**

P	○	forma prowadnic G
M	●	
K	○	
N		
S	●	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 808


 Nr artykułu **5640**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
3,970	5/32	10,000	200,000	155,000	40,000	3,970	
4,000		12,000	200,000	155,000	45,000	4,000	
5,000		16,000	230,000	182,000	48,000	5,000	
5,156	13/64	16,000	230,000	182,000	48,000	5,156	
6,000		16,000	260,000	212,000	48,000	6,000	
6,350	1/4	16,000	275,000	227,000	48,000	6,350	
7,000		16,000	290,000	242,000	48,000	7,000	
7,938	5/16	16,000	320,000	272,000	48,000	7,938	
8,000		16,000	320,000	272,000	48,000	8,000	
9,000		16,000	350,000	302,000	48,000	9,000	
9,525	3/8	16,000	380,000	330,000	48,000	9,525	
10,000		20,000	400,000	350,000	50,000	10,000	
11,000		20,000	430,000	380,000	50,000	11,000	
11,113	7/16	20,000	430,000	380,000	50,000	11,113	
12,000		20,000	450,000	400,000	50,000	12,000	
12,700	1/2	20,000	500,000	450,000	50,000	12,700	

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 80



P	•	z odsadzeniem na wypływ chłodziwa • forma prowadnic G • z rozdzielnikiem wiórów
M	○	
K	•	
N	○	
S	○	
H	○	

Materiał narzędzia **Węglik**

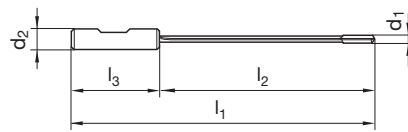
Powierzchnia ○

Forma chwytu HB



GÜHRINGNAVIGATOR

Param. skr. na str. 808



Nr artykułu **5689**

Wiertła lufowe

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
4,000		12,000	230,000	185,000	45,000	4,000
5,000		16,000	280,000	232,000	48,000	5,000
6,000		16,000	320,000	272,000	48,000	6,000
8,000		16,000	420,000	372,000	48,000	8,000
10,000		20,000	510,000	460,000	50,000	10,000
12,000		20,000	600,000	550,000	50,000	12,000

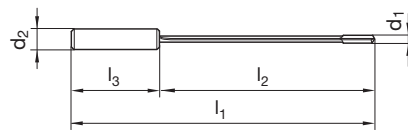

Wiertła lufowe, 1-ostrzowe EB 80


P	•	z odsadzeniem na wypływ chłodziwa • forma prowadnic G • z rozdzielnikiem wiórów
M	○	
K	•	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik
Powierzchnia	S
Forma chwytu	HA


 Nr artykułu **5022**

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
4,000		12,000	230,000	185,000	45,000	4,000
4,200		12,000	240,000	195,000	45,000	4,200
4,500		12,000	250,000	205,000	45,000	4,500
5,000		16,000	280,000	232,000	48,000	5,000
5,500		16,000	300,000	252,000	48,000	5,500
6,000		16,000	320,000	272,000	48,000	6,000
6,500		16,000	340,000	292,000	48,000	6,500
7,000		16,000	370,000	322,000	48,000	7,000
8,000		16,000	420,000	372,000	48,000	8,000
9,000		16,000	450,000	402,000	48,000	9,000
10,000		20,000	510,000	460,000	50,000	10,000
12,000		20,000	600,000	550,000	50,000	12,000

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 80

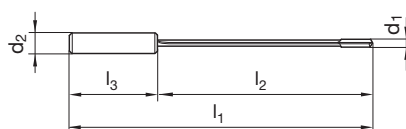


P	○	forma prowadnic G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik
Powierzchnia	⊕
Forma chwytu	HA



Nr artykułu **5641**

Wiertła lufowe

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
3,970	5/32	10,000	230,000	185,000	40,000	3,970	
4,000		12,000	230,000	185,000	45,000	4,000	
5,000		16,000	280,000	232,000	48,000	5,000	
5,156	13/64	16,000	280,000	232,000	48,000	5,156	
6,000		16,000	320,000	272,000	48,000	6,000	
6,350	1/4	16,000	340,000	292,000	48,000	6,350	
7,000		16,000	370,000	322,000	48,000	7,000	
7,938	5/16	16,000	420,000	372,000	48,000	7,938	
8,000		16,000	420,000	372,000	48,000	8,000	
9,000		16,000	450,000	402,000	48,000	9,000	
9,525	3/8	16,000	480,000	432,000	48,000	9,525	
10,000		20,000	510,000	460,000	50,000	10,000	
11,000		20,000	550,000	500,000	50,000	11,000	
11,113	7/16	20,000	550,000	500,000	50,000	11,113	
12,000		20,000	600,000	550,000	50,000	12,000	
12,700	1/2	20,000	635,000	585,000	50,000	12,700	



Wiertła lufowe, 1-ostrzowe EB 80



Materiał narzędzia **Węglik**

Powierzchnia ○

Forma chwytu HB



P ● z odsadzeniem na wypływ chłodziwa • forma prowadnic G • z rozdzielnikiem wiórów

M ○

K ●

N ○

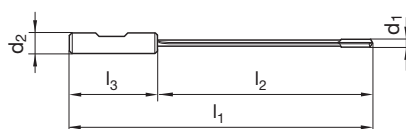
S ○

H ○

max. głębokość wiercenia pojedynczym narzędziem wynosi 40xD, do głębszych otworów należy zastosować wiertło wstępne nr art. 5689

GÜHRING NAVIGATOR

Param. skr. na str. 808



Nr artykułu **5690**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	mm	
3,970	5/32	10,000	390,000	350,000	40,000	3,970	
4,950		16,000	480,000	432,000	48,000	4,950	
5,950	15/64	16,000	560,000	512,000	48,000	5,950	
7,950		16,000	740,000	692,000	48,000	7,950	
9,950		20,000	910,000	860,000	50,000	9,950	
11,950		20,000	1080,000	1030,000	50,000	11,950	

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 80



Materiał narzędzia **Węglik**

Powierzchnia **S**

Forma chwytu HA

P • z odsadzeniem na wypływ chłodziwa • forma prowadnic G • z rozdzielnikiem wiórów

M ○

K •

N ○

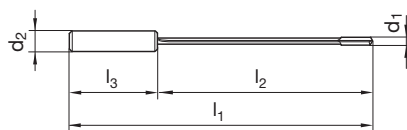
S ○

H ○

maksymalna głębokość wiercenia jednym narzędziem - do 40 x D. Przy większych głębokościach należy zastosować 2 wiertła, np. jako pierwsze Art. 5022

GÜHRING NAVIGATOR

Param. skr. na str. 808



Nr artykułu **5023**

Wiertła lufowe

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
4,950		16,000	480,000	432,000	48,000	4,950
5,950	15/64	16,000	560,000	512,000	48,000	5,950
7,950		16,000	740,000	692,000	48,000	7,950
9,950		20,000	910,000	860,000	50,000	9,950
11,950		20,000	1080,000	1030,000	50,000	11,950

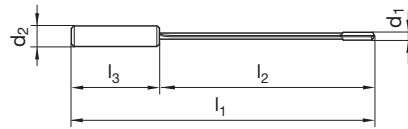

Wiertła lufowe, 1-ostrzowe EB 80


P	○	forma prowadnic G
M	●	
K	○	
N	○	max. głębokość wiercenia pojedynczym narzędziem wynosi 40xD, do głębszych otworów należy zastosować wiertło wstępne nr art. 5641
S	●	
H	○	

GÜHRING NAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik
Powierzchnia	⊙
Forma chwytu	HA


 Nr artykułu **5642**

d1 h5		d2 h6		l1	l2	l3	kod
mm	inch	mm		mm	mm	mm	
4,950		16,000		480,000	432,000	48,000	4,950
5,106		16,000		480,000	432,000	48,000	5,106
5,950	15/64	16,000		560,000	512,000	48,000	5,950
6,300		16,000		590,000	542,000	48,000	6,300
6,950		16,000		650,000	602,000	48,000	6,950
7,888		16,000		740,000	692,000	48,000	7,888
7,950		16,000		740,000	692,000	48,000	7,950
8,950		16,000		820,000	772,000	48,000	8,950
9,475		16,000		870,000	822,000	48,000	9,475
9,950		20,000		910,000	860,000	50,000	9,950
10,950		20,000		995,000	945,000	50,000	10,950
11,063		20,000		995,000	945,000	50,000	11,063
11,950		20,000		1080,000	1030,000	50,000	11,950
12,650		20,000		1140,000	1090,000	50,000	12,650

Wiertła lufowe



Wiertła lufowe, 1-ostrzowe EB 80



Materiał narzędzia **Węglik**

Powierzchnia **S**

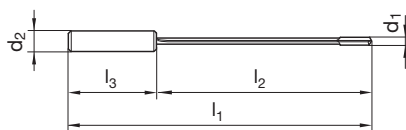
Forma chwytu walcowy

P • dł. całkowita = 1100.00 mm • forma prowadnic G • chwyt do maszyn do głębokiego wiercenia (T3.1)

P	•
M	○
K	•
N	•
S	○
H	○

GÜHRINGNAVIGATOR

Param. skr. na str. 808



Nr artykułu **5164**

Wiertła lufowe

d1 h5		d2 h6	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
6,000		25,000	1100,000	1010,000	70,000	6,000
7,000		25,000	1100,000	1010,000	70,000	7,000
8,000		25,000	1100,000	1010,000	70,000	8,000
10,000		25,000	1100,000	1010,000	70,000	10,000
12,000		25,000	1100,000	1010,000	70,000	12,000
16,000		25,000	1100,000	1010,000	70,000	16,000
20,000		25,000	1100,000	1010,000	70,000	20,000
22,000		25,000	1100,000	1000,000	70,000	22,000



Wiertła lufowe, 2-ostrowe ZB 80



Materiał narzędzia **Węglik**

Powierzchnia ○

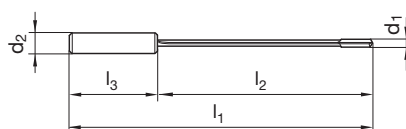
Forma chwytu HA

P 4-łysinkowe wiertło lufowe • dla aluminium

P	
M	
K	
N	•
S	
H	

GÜHRING NAVIGATOR

Param. skr. na str. 808



Nr artykułu **5019**

d1 h5	d2	l1	l2	l3	kod
mm	mm	mm	mm	mm	
8,000	16,000	330,000	280,000	48,000	8,000
10,000	20,000	390,000	340,000	50,000	10,000
12,000	20,000	450,000	400,000	50,000	12,000

Wiertła lufowe



Wiertła lufowe, 2-ostrowe ZB 80



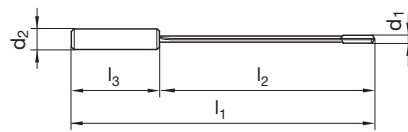
P	
M	
K	•
N	
S	
H	

4-łysinkowe wiertło lufowe • dla materiałów odlewanych

GÜHRINGNAVIGATOR

Param. skr. na str. 808

Materiał narzędzia	Węglik
Powierzchnia	○
Forma chwytu	HA



Nr artykułu **5643**

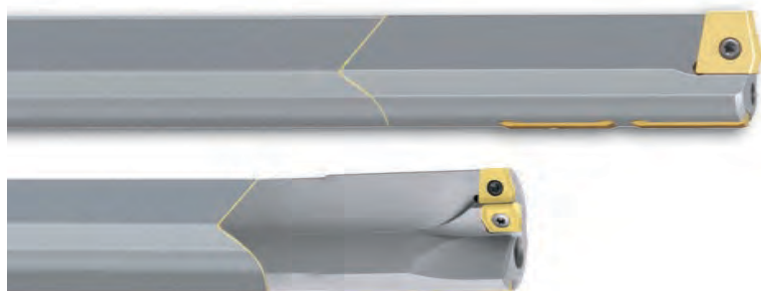
Wiertła lufowe

d1 h5	d2	l1	l2	l3	kod
mm	mm	mm	mm	mm	
8,000	16,000	330,000	280,000	48,000	8,000
10,000	20,000	390,000	340,000	50,000	10,000
12,000	20,000	450,000	400,000	50,000	12,000



EB 800

- możliwe wykonanie specjalne do $\varnothing 52$ mm
- standardowe stopniowanie średnic wykonania płytek i listew prowadzących 1/10 mm, specjalne 1/100 mm



Wiertła lufowe jednoostrzowe, z wymiennymi płytkami skrawającymi i listwami prowadzącymi produkujemy również jako narzędzia specjalne pod konkretne zamówienie klienta. Stosuje się je do obróbki większości materiałów. Są one dostarczane w zakresie średnic $\varnothing 12,0$ do $52,0$ o długości całkowitej do 3000 mm.

Szczególne zalety:

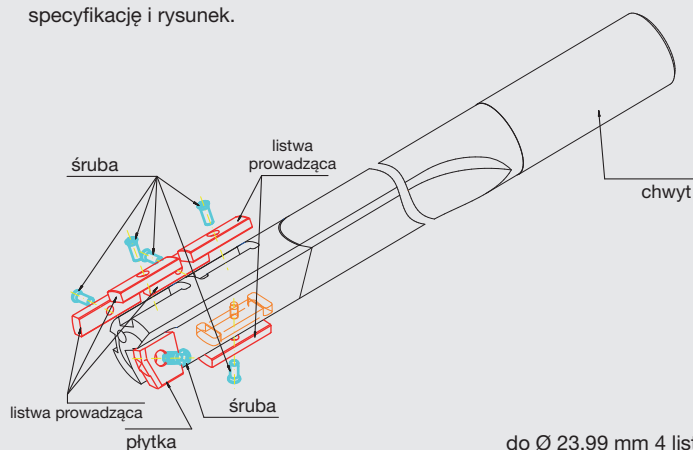
- Dzięki technice wymiany płytek skrawających i listew prowadzących możliwa jest każda kombinacja gatunków węgla oraz pokryć.
- Dzięki precyzyjnym płytkom skrawającym i listwom prowadzącym zbędna jest dodatkowa regulacja.
- Precyzyjne listwy prowadzące produkujemy pod indywidualne zadanie obróbcze ze specjalnie dobranej jakości węgla. Mogą być one montowane ponownie po obrocie, przez co ich trwałość zostaje zwiększona dwukrotnie. Dodatkowo można tu zastosować wszystkie pokrycia Gühring'a.
- Precyzja wykonania płytek skrawających i gniazd pozwala na ograniczenie do minimum ilości wymiennych elementów.

- Wymiana zużytych części wiertła bezpośrednio na obrabiarce ogranicza kosztowne postoje obrabiarki.
- Technika wymiany płytek eliminuje pracochłonne czynności ostrzarskie.
- Właściwy do danego zastosowania dobór płytki wymiennej gwarantuje zawsze skuteczne łamanie wióra także przy obróbce materiałów trudnoobrabialnych.
- Do indywidualnych zadań głębokiego wiercenia dobieramy precyzyjne płytki wymienne ze specjalnego gatunku węgla. Dodatkowo można tu zastosować wszystkie pokrycia firmy Gühring.
- W zakresie średnic przypisanych do danej średnicy nominalnej wiertła, możemy korygować wymiar poprzez zamianę samych elementów wymiennych.
- Części chwytowe wykonujemy ze stali do ulepszenia ciepł. z wymiarami wg:
 - DIN 6535 HA
 - DIN 6535 HE
 - DIN 6535 HB
 - DIN 1835 E
 Możliwe są do wykonania inne formy chwytów, odpowiednie do danej obrabiarki.



Uwaga: - min. długość rowka 15 x D
- możliwe tolerancje średnicy IT9/IT10

Do każdej oferty dołączamy opis narzędzia,
specyfikację i rysunek.



do \varnothing 23,99 mm 4 listwy prowadzące
od \varnothing 24,00 mm 5 listew prowadzących

Zalecane momenty dokręcania

Płytki zewnętrzna

Rozmiar	Średnice w mm	Gwint metryczny ISO w mm	Rozmiar Torx	Moment mocujący [Nm]
0.	12,00 – 15,99	M2,5 x 5,2	T8	1,00
1.	16,00 – 19,99	M3,0 x 6,4	T9	1,40
2.	20,00 – 25,99	M4,0 x 7,7	T15	2,50
3.	26,00 – 29,99	M4,0 x 10,6	T15	2,50
4.	30,00 – 33,99	M4,0 x 10,6	T15	2,50
5.	34,00 – 37,99	M5,0 x 14,2	T20	5,00
6.	38,00 – 40,00	M5,0 x 14,2	T20	5,00
7.	40,01 – 43,99	M3,0 x 6,4	T9	1,40
8.	44,00 – 47,99	M4,0 x 7,7	T15	2,50
9.	48,00 – 52,00	M4,0 x 10,6	T15	2,50

Płytki wewnętrzna

Rozmiar	Średnice w mm	Gwint metryczny ISO w mm	Rozmiar Torx	Moment mocujący [Nm]
7. – 9.	40,01 – 52,00	M4,5 x 11,8	T15	3,00

Listwy prowadzące

Rozmiar	Średnice w mm	Gwint metryczny ISO w mm	Rozmiar Torx	Moment mocujący [Nm]
0.	12,00 – 15,99	M1,6 x 4,4	T5	0,40
1.	16,00 – 17,99	M2,2 x 4,6	T7	0,60
1.	18,00 – 19,99	M2,2 x 5,6	T7	0,60
2.	20,00 – 22,49	M2,5 x 5,2	T8	1,00
2.	22,50 – 25,99	M2,5 x 6,4	T8	1,00
3.	26,00 – 29,99	M2,5 x 6,4	T8	1,00
4. – 9.	30,00 – 52,00	M3,0 x 8,0	T9	1,40



Wiertła lufowe, 1-ostrzowe EB 800



Materiał narzędzia **Węglik**

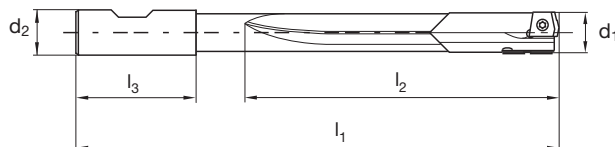
Powierzchnia **S**

Forma chwytu **HB**

P	•	z płytkami wymiennymi • z wymiennymi prowadzicami • with screw driver • with screws • uniwersalne zastosowanie • klucz dynamometryczny nr art. 4915 jest zamawiany oddzielnie
M	○	
K	○	
N	•	
S	○	
H		

GÜHRINGNAVIGATOR

Param. skr. na str. 808

























































Nr artykułu **5644**

d1 h8		d2	l1	l2	l3	kod
mm	inch	mm	mm	mm	mm	
12,000		20,000	446,000	384,000	50,000	12,000
12,700	1/2	20,000	468,000	406,000	50,000	12,700
14,000		20,000	510,000	448,000	50,000	14,000
15,000		25,000	548,000	480,000	56,000	15,000
16,000		25,000	580,000	512,000	56,000	16,000
18,000		25,000	644,000	576,000	56,000	18,000
20,000		32,000	712,000	640,000	60,000	20,000
24,000		32,000	840,000	768,000	60,000	24,000

Wiertła lufowe












Oferta specjalna od Ø 12 do 52 mm, max długość całkowita 3000 mm

Rozmiar Korpusu	Zakres średnic korpusu	Korpus	Płytki (zewnętrzne)				Płytki		
							Śruby	Wkrętak	
									
	Powłoka TiN	Powłoka FIRE	Powłoka Signum	Powłoka TiAlN nanoA					
0.	Ø12.00 - Ø12.49	Korpus dopasowany do wymagań klienta. Długość całkowita do 3000 mm. długość rowka od 10xD					Nr artykułu 4071 2.502 T8 M2.5x 5.2	Nr artykułu 1612 8.001	
	Ø12.50 - Ø12.99								
	Ø13.00 - Ø13.49								
	Ø13.50 - Ø13.99								
	Ø14.00 - Ø14.49								
	Ø14.50 - Ø14.99								
Ø15.00 - Ø15.49						Nr artykułu 4071 3.002 T9 M3x6.4	Nr artykułu 1612 9.001		
Ø15.50 - Ø15.99									
Ø16.00 - Ø16.49									
Ø16.50 - Ø16.99									
Ø17.00 - Ø17.49									
Ø17.50 - Ø17.99									
2.	Ø18.00 - Ø18.49		Korpus dopasowany do wymagań klienta. Długość całkowita do 3000 mm. długość rowka od 10xD	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.001 T15 M4x7.7	Nr artykułu 1612 15.001
	Ø18.50 - Ø18.99								
	Ø19.00 - Ø19.49								
	Ø19.50 - Ø19.99								
	Ø20.00 - Ø20.49								
	Ø20.50 - Ø20.99								
	Ø21.00 - Ø21.49								
	Ø21.50 - Ø21.99								
	Ø22.00 - Ø22.49								
	Ø22.50 - Ø22.99								
	Ø23.00 - Ø23.49								
	Ø23.50 - Ø23.99								
3.	Ø24.00 - Ø24.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø24.50 - Ø24.99								
	Ø25.00 - Ø25.49								
	Ø25.50 - Ø25.99								
	Ø26.00 - Ø26.49								
	Ø26.50 - Ø26.99								
4.	Ø27.00 - Ø27.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø27.50 - Ø27.99								
	Ø28.00 - Ø28.49								
	Ø28.50 - Ø28.99								
	Ø29.00 - Ø29.49								
	Ø29.50 - Ø29.99								
5.	Ø30.00 - Ø30.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø30.50 - Ø30.99								
	Ø31.00 - Ø31.49								
	Ø31.50 - Ø31.99								
	Ø32.00 - Ø32.49								
	Ø32.50 - Ø32.99								
6.	Ø33.00 - Ø33.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø33.50 - Ø33.99								
	Ø34.00 - Ø34.49								
	Ø34.50 - Ø34.99								
	Ø35.00 - Ø35.49								
	Ø35.50 - Ø35.99								
7.	Ø36.00 - Ø36.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø36.50 - Ø36.99								
	Ø37.00 - Ø37.49								
	Ø37.50 - Ø37.99								
	Ø38.00 - Ø38.49								
	Ø38.50 - Ø38.99								
8.	Ø39.00 - Ø39.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø39.50 - Ø40.00								
	Ø40.01 - Ø40.49								
	Ø40.50 - Ø40.99								
	Ø41.00 - Ø41.49								
	Ø41.50 - Ø41.99								
9.	Ø42.00 - Ø42.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 T15 M4x10.6	Nr artykułu 1612 15.001	
	Ø42.50 - Ø42.99								
	Ø43.00 - Ø43.49								
	Ø43.50 - Ø43.99								
	Ø44.00 - Ø44.49								
	Ø44.50 - Ø44.99								
10.	Ø45.00 - Ø45.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.001 TX15 M4x7.7	Nr artykułu 1612 15.001	
	Ø45.50 - Ø45.99								
	Ø46.00 - Ø46.49								
	Ø46.50 - Ø46.99								
	Ø47.00 - Ø47.49								
	Ø47.50 - Ø47.99								
11.	Ø48.00 - Ø48.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.001 TX15 M4x7.7	Nr artykułu 1612 15.001	
	Ø48.50 - Ø48.99								
	Ø49.00 - Ø49.49								
	Ø49.50 - Ø49.99								
	Ø50.00 - Ø50.49								
	Ø50.50 - Ø50.99								
12.	Ø51.00 - Ø51.49	Alternatywnie: Standardowy korpus nr art. 5644 od średnicy 12 mm do 24 mm w wymaganych wymiarach w komplecie z płytkami i listwami przewodzącymi z powłoka TiN	Nr artykułu 5029 + Ø rob. = nr zamówienia	Nr artykułu 5704 + Ø rob. = nr zamówienia	Nr artykułu 5702 + Ø rob. = nr zamówienia	Nr artykułu 5706 + Ø rob. = nr zamówienia	Nr artykułu 4071 4.002 TX15 M4x10.6	Nr artykułu 1612 15.001	
	Ø51.50 - Ø51.99								
	Ø52.00 - Ø52.49								
	Ø52.50 - Ø52.99								
	Ø53.00 - Ø53.49								
	Ø53.50 - Ø53.99								

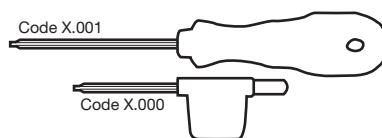
Wiertła lufowe



Płytki (wewnętrzne)	Śruby	Wkrętak	Listwy prowadzące				Śruby	Wkrętak																																																
			Listwy prowadzące																																																					
																																																								
			Powłoka TiN	Powłoka FIRE	Powłoka Signum	Powłoka TiAlN nanoA																																																		
			<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>○</td></tr> <tr><td>K</td><td>○</td></tr> <tr><td>N</td><td>•</td></tr> <tr><td>S</td><td>○</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	○	K	○	N	•	S	○	H	○	<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>○</td></tr> <tr><td>K</td><td>•</td></tr> <tr><td>N</td><td>○</td></tr> <tr><td>S</td><td>○</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	○	K	•	N	○	S	○	H	○	<table border="1"> <tr><td>P</td><td>•</td></tr> <tr><td>M</td><td>•</td></tr> <tr><td>K</td><td>•</td></tr> <tr><td>N</td><td>•</td></tr> <tr><td>S</td><td>•</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	•	M	•	K	•	N	•	S	•	H	○	<table border="1"> <tr><td>P</td><td>○</td></tr> <tr><td>M</td><td>•</td></tr> <tr><td>K</td><td>○</td></tr> <tr><td>N</td><td>○</td></tr> <tr><td>S</td><td>•</td></tr> <tr><td>H</td><td>○</td></tr> </table>	P	○	M	•	K	○	N	○	S	•	H	○	Nr artykułu 4071 1.601 T5 M1.6x4.4	Nr artykułu 1612 5.001
P	•																																																							
M	○																																																							
K	○																																																							
N	•																																																							
S	○																																																							
H	○																																																							
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K	○																																																							
N	○																																																							
S	•																																																							
H	○																																																							
							Nr artykułu 4071 2.203 T7 / M2.2x 4.6	Nr artykułu 1612 7.001																																																
							Nr artykułu 4071 2.202 T7 / M2.2x5.6																																																	
							Nr artykułu 4071 2.502 T8 M2.5x 5.2	Nr artykułu 1612 8.001																																																
			Nr artykułu 5030 + Ø rob. = nr zamówienia	Nr artykułu 5705 + Ø rob. = nr zamówienia	Nr artykułu 5703 + Ø rob. = nr zamówienia	Nr artykułu 5707 + Ø rob. = nr zamówienia	Nr artykułu 4071 2.501 T8 M2.5x6.4																																																	
bright Wiertło specjalne TiN Wiertło specjalne FIRE Wiertło specjalne	Nr artykułu 4071 4.501 T15 M4.5x11.8	Nr artykułu 1612 15.001	Special drill	Special drill	Special drill	Special drill	Nr artykułu 4071 3.003 T9 M3x8	Nr artykułu 1612 9.001																																																



Wkrętak Torx



Nr artykułu

1612

Rozmiar	kod
T5	5,001
T7	7,001
T8	8,001
T9	9,001
T15	15,001
T20	20,001

Wiertła łufowe



Wkrętaki dynamometryczne



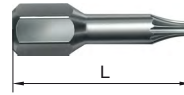
Nr artykułu

4915

Zabierak		Nm	Typ	kod
1/4"	hexagonal	0,4-1	A	1,001
1/4"	hexagonal	1-5	A	5,001



Nasadki Torx



Nr artykułu

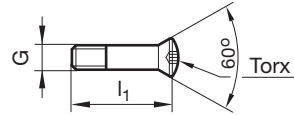
4917

Zabierak		Torx	L	kod
			mm	
1/4	hexagonal	T5	25,000	5,000
1/4	hexagonal	T7	25,000	7,000
1/4	hexagonal	T8	25,000	8,000
1/4	hexagonal	T9	25,000	9,000
1/4	hexagonal	T15	25,000	15,000
1/4	hexagonal	T20	25,000	20,000

Wiertła lufowe



Śruby mocujące



Nr artykułu

4071

G	l1 mm	Torx	kod
M1,6	4,400	T5	1,601
M2,2	5,600	T7	2,202
M2,2	4,600	T7	2,203
M2,5	6,400	T8	2,501
M2,5	5,200	T8	2,502
M3	6,400	T9	3,002
M3	8,000	T9	3,003
M4	7,700	T15	4,001
M4	10,600	T15	4,002
M5	14,200	T20	5,002

Wiertła lufowe



AKCESORIA DO WIERTEŁ LUFOWYCH

Urządzenie Guhringa TBM 116 do 1- ostrzowych wiertel lufowych

TBM 116 jest ręczną szlifierką uniwersalną, o zwartej konstrukcji. Wraz z przyrządem do ostrzenia 1-ostrzowych wiertel lufowych i podwójną tarczą szlifierską tworzy ona perfekcyjną całość. Przeznaczona jest do ostrzenia małych i średnich serii o zróżnicowanych wymiarach wiertel. Dodatkowo umożliwia ona wykonywanie łamaczy wiórów na wiertłach lufowych.

Zakres dostawy:

Jedna szlifierka i dwie lampki oświetleniowe o dużej mocy oraz dwa gniazda elektryczne na 220 V (przyrząd ostrzarski i tarcza szlifierska muszą być zamówione oddzielnie).

Parametry maszyny:

Napięcie robocze 380 V/50 Hz, szybkość obrotowa tarczy 2850 obr/min, max. średnica tarczy 150 mm.

Nr artykułu: 600 127 170





Przyrząd TBV116 do 1-ostrzowych wiertel lufowych o średnicach od Ø3 do Ø30

Przyrząd przeznaczony jest do ostrzenia wiertel lufowych, 1-ostrzowych w zakresie średnic $\text{Ø} 3 - 30 \text{ mm}$. Można na nim wykonywać zarówno geometrie standardowe jak i specjalne. Dzięki krótkiej tulei mocującej nie musimy zwracać uwagi na min. długość rowka wiórowego. W zakresie dostawy uwzględniona jest listwa podporowa, przeznaczona do usztywniania długich narzędzi. Dzięki temu TBV 116 jest przyrządem uniwersalnym i możliwym do zastosowania na każdej typowej szlifierce narzędziowej. Jako wyposażenie TBV 116 polecamy naszą podwójną tarczę szlifierską DSS 125.

Uwaga:

Jednoostrzowe wiertła lufowe mają kąt rozwarcia rowka wiórowego 120° i dlatego nie mogą być mocowane w tulejce zaciskowej na aparacie podziałowym, gdyż grozi to uszkodzeniem narzędzia.

Nr artykułu: 600 127 171



Przyrząd TBV116 do 1-ostrzowych wiertel lufowych o średnicach od Ø1 do Ø6

Nowy, uniwersalny przyrząd ostrzarski TBV 216 jest specjalnie przeznaczony do ostrzenia 1-ostrzowych wiertel lufowych o małych średnicach w zakresie od $\text{Ø} 1,0$ do $6,0 \text{ mm}$ i max. długości 350 mm . Umożliwia on ostrzenie oraz modyfikowanie w/w wiertel w czterech bardzo prostych zabiegach. Szlifowanie przeprowadza się na 3-osiowym, wahlwym przyrządzie, który umożliwia obróbkę pod różnymi kątami.

Wszystkie kąty mogą być ustawiane i korygowane indywidualnie dla danego przypadku.

Zakres dostawy:

- Komplet tulejek prowadzących o średnicach $\text{Ø} 1,0 / 1,5 / 2,0 / 2,5 / 3,0 / 3,5 \text{ mm}$
- różne adaptory
- mikroskop
- oświetlacz punktowy i lupka pomiarowa

Nr artykułu: 600 132 346





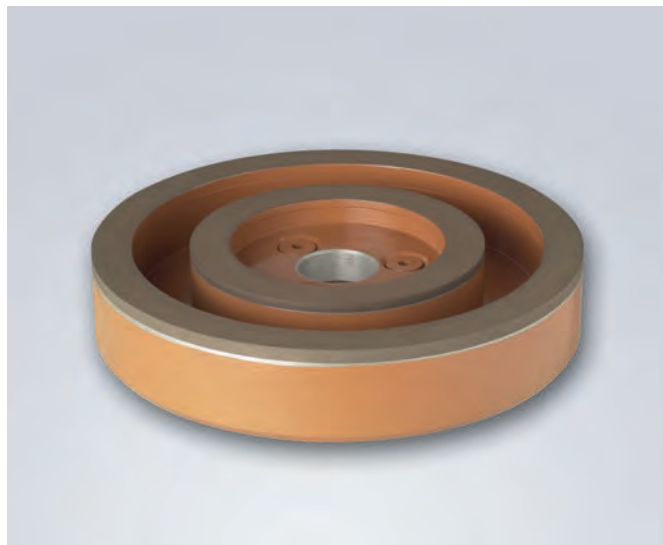
Podwójna tarcza szlifierska DSS 125

Podwójna tarcza szlifierska DSS 125 jest mocno złączona śrubami i w takim zestawie wyważona. W jej skład wchodzi zewnętrzna tarcza diamentowa do obróbki zgrubnej oraz wewnętrzna tarcza diamentowa drobnoziarnista, którą wykańczająco szlifujemy krawędzie tnące. Należy okresowo czyścić tarcze specjalną osełką. Szlifowanie zabrudzoną tarczą może spowodować uszkodzenie ostrzy wiertła.

DSS 125 składa się z:

- jednej zewnętrznej tarczy \varnothing 125 mm, szerokości 10 mm, grubości nasypu 3 mm, z otworem \varnothing 20 mm, ziarnem D 126,
- jednej wewnętrznej tarczy \varnothing 75 mm, szerokości 10 mm, grubości nasypu 2 mm, z otworem \varnothing 20 mm, ziarnem D 46

Nr artykułu: 400 110 098



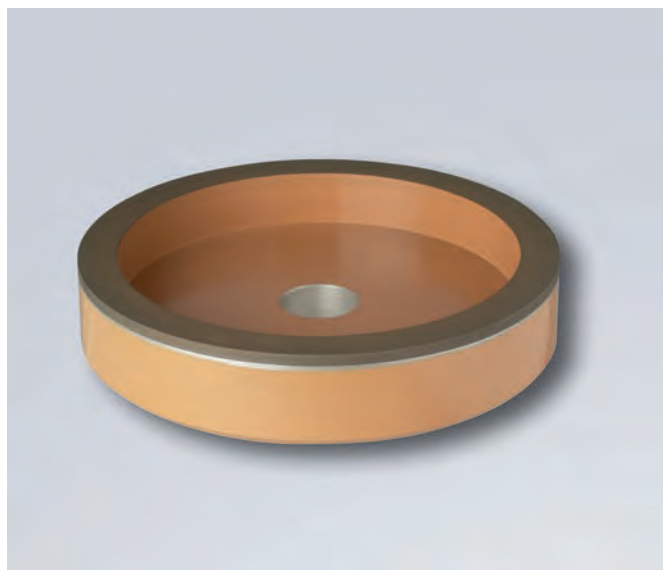
Pojedyncza tarcza szlifierska ESS 125

Tarcza ścierna ESS 125 jest wykańczającą tarczą diamentową pozwalającą uzyskać dobre wykończenie krawędzi tnących. Należy okresowo czyścić tarcze specjalną osełką. Szlifowanie zabrudzoną tarczą może spowodować uszkodzenie ostrzy wiertła.

ESS 125 składa się z:

- jednej tarczy \varnothing 125 mm, szerokości 10 mm, grubości nasypu 3 mm, z otworem \varnothing 20 mm, ziarnem D 25

Nr artykułu: 400 119 203



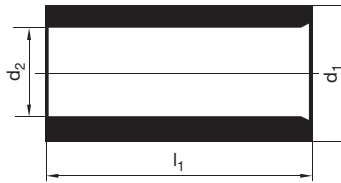


Tulejki wiertarskie



Materiał narzędzia

Węglik mono.



Nr artykułu

5748

d2	d1	l1	kod
mm	mm	mm	
0,900	3,000	9,000	0,900
1,590	4,000	9,000	1,590
1,600	4,000	9,000	1,600
1,605	4,000	9,000	1,605
2,000	5,000	9,000	2,000
2,030	5,000	9,000	2,030
2,040	5,000	9,000	2,040
2,500	5,000	9,000	2,500
3,000	6,000	12,000	3,000
3,500	7,000	12,000	3,500
3,750	7,000	12,000	3,750
4,000	7,000	12,000	4,000
4,500	8,000	12,000	4,500
5,000	8,000	12,000	5,000
5,200	10,000	16,000	5,200
5,500	10,000	16,000	5,500
5,515	10,000	16,000	5,515
5,525	10,000	16,000	5,525
6,000	10,000	16,000	6,000
6,100	12,000	16,000	6,100
6,900	12,000	16,000	6,900
7,100	12,000	16,000	7,100
8,000	12,000	16,000	8,000
8,015	12,000	16,000	8,015
8,510	15,000	20,000	8,510
10,000	15,000	20,000	10,000
10,920	18,000	20,000	10,920
11,000	18,000	20,000	11,000
12,000	18,000	20,000	12,000
12,030	18,000	20,000	12,030

d2	d1	l1	kod
mm	mm	mm	
12,600	22,000	28,000	12,600
14,000	22,000	28,000	14,000
14,030	22,000	28,000	14,030
14,400	22,000	28,000	14,400
16,000	26,000	28,000	16,000
16,030	26,000	28,000	16,030
16,200	26,000	28,000	16,200
18,000	26,000	28,000	18,000
18,030	26,000	28,000	18,030
18,050	26,000	28,000	18,050
20,000	30,000	36,000	20,000
20,030	30,000	36,000	20,030
22,000	30,000	36,000	22,000
22,030	30,000	36,000	22,030
22,120	35,000	36,000	22,120
23,500	35,000	36,000	23,500
24,000	35,000	36,000	24,000
24,030	35,000	36,000	24,030
25,000	35,000	36,000	25,000
26,000	35,000	36,000	26,000
30,000	42,000	45,000	30,000
34,000	48,000	45,000	34,000
40,000	55,000	55,000	40,000

Wiertła lufowe

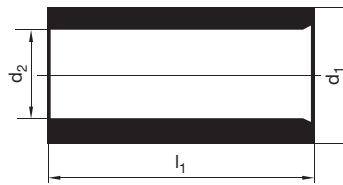


Tulejki wiertarskie



Materiał narzędzia

HSS



Nr artykułu

5747

Wiertła lufowe

d2	d1	l1	kod
mm	mm	mm	
0,900	3,000	9,000	0,900
1,600	4,000	9,000	1,600
2,000	5,000	9,000	2,000
2,200	5,000	9,000	2,200
2,340	5,000	9,000	2,340
2,700	6,000	12,000	2,700
3,000	6,000	12,000	3,000
3,100	6,000	12,000	3,100
3,255	6,000	12,000	3,255
3,300	6,000	12,000	3,300
3,400	7,000	12,000	3,400
3,500	7,000	12,000	3,500
3,650	7,000	12,000	3,650
3,700	7,000	12,000	3,700
3,800	7,000	12,000	3,800
4,000	7,000	12,000	4,000
4,100	8,000	12,000	4,100
4,300	8,000	12,000	4,300
4,500	8,000	12,000	4,500
4,600	8,000	12,000	4,600
4,760	8,000	12,000	4,760
4,763	8,000	12,000	4,763
4,800	8,000	12,000	4,800
5,000	8,000	12,000	5,000
5,020	8,000	12,000	5,020
5,100	10,000	16,000	5,100
5,200	10,000	16,000	5,200
5,300	10,000	16,000	5,300
5,500	10,000	16,000	5,500
5,600	10,000	16,000	5,600
5,800	10,000	16,000	5,800
6,000	10,000	16,000	6,000
6,050	10,000	16,000	6,050
6,100	12,000	16,000	6,100
6,300	12,000	16,000	6,300
6,350	12,000	16,000	6,350
6,370	12,000	16,000	6,370
6,502	12,000	16,000	6,502
6,600	12,000	16,000	6,600
6,730	12,000	16,000	6,730
6,731	12,000	16,000	6,731
6,750	12,000	16,000	6,750

d2	d1	l1	kod
mm	mm	mm	
6,800	12,000	16,000	6,800
7,000	12,000	16,000	7,000
7,100	12,000	16,000	7,100
7,400	12,000	16,000	7,400
7,500	12,000	16,000	7,500
7,600	12,000	16,000	7,600
7,800	12,000	16,000	7,800
7,830	12,000	16,000	7,830
7,938	12,000	16,000	7,938
8,000	12,000	16,000	8,000
8,020	12,000	16,000	8,020
8,050	12,000	16,000	8,050
8,100	15,000	20,000	8,100
8,500	15,000	20,000	8,500
8,530	15,000	20,000	8,530
8,800	15,000	20,000	8,800
9,000	15,000	20,000	9,000
9,100	15,000	20,000	9,100
9,200	15,000	20,000	9,200
9,300	15,000	20,000	9,300
9,500	15,000	20,000	9,500
9,525	15,000	20,000	9,525
9,530	15,000	20,000	9,530
9,570	15,000	20,000	9,570
9,652	15,000	20,000	9,652
9,800	15,000	20,000	9,800
10,000	15,000	20,000	10,000
10,100	18,000	20,000	10,100
10,600	18,000	20,000	10,600
11,080	18,000	20,000	11,080
11,100	18,000	20,000	11,100
11,113	18,000	20,000	11,113
11,500	18,000	20,000	11,500
11,600	18,000	20,000	11,600
12,000	18,000	20,000	12,000
12,020	18,000	20,000	12,020
12,100	22,000	28,000	12,100
12,530	22,000	28,000	12,530
12,600	22,000	28,000	12,600
12,700	22,000	28,000	12,700
12,800	22,000	28,000	12,800
12,954	22,000	28,000	12,954



d2	d1	l1	kod
mm	mm	mm	
13,000	22,000	28,000	13,000
13,400	22,000	28,000	13,400
13,500	22,000	28,000	13,500
13,700	22,000	28,000	13,700
13,800	22,000	28,000	13,800
14,000	22,000	28,000	14,000
14,310	22,000	28,000	14,310
14,620	22,000	28,000	14,620
14,770	22,000	28,000	14,770
15,000	22,000	28,000	15,000
15,875	26,000	28,000	15,875
16,000	26,000	28,000	16,000
16,330	26,000	28,000	16,330
17,040	26,000	28,000	17,040
17,080	26,000	28,000	17,080
18,000	26,000	28,000	18,000
18,255	30,000	36,000	18,255
18,450	30,000	36,000	18,450
19,000	30,000	36,000	19,000
19,050	30,000	36,000	19,050
19,300	30,000	36,000	19,300
19,700	30,000	36,000	19,700
20,000	30,000	36,000	20,000
21,050	30,000	36,000	21,050

d2	d1	l1	kod
mm	mm	mm	
22,000	30,000	36,000	22,000
22,100	35,000	36,000	22,100
22,120	35,000	36,000	22,120
22,225	35,000	36,000	22,225
23,500	35,000	36,000	23,500
24,000	35,000	36,000	24,000
24,500	35,000	36,000	24,500
25,000	35,000	36,000	25,000
25,250	35,000	36,000	25,250
25,400	35,000	36,000	25,400
26,000	35,000	36,000	26,000
28,000	42,000	45,000	28,000
28,169	42,000	45,000	28,169
30,000	42,000	45,000	30,000
30,100	48,000	45,000	30,100
34,000	48,000	45,000	34,000
38,100	55,000	55,000	38,100
40,000	55,000	55,000	40,000



Akcesoria do wiertarek lufowych

W przeciwieństwie do konwencjonalnych obrabiarek na wiertarkach lufowych stosuje się specjalne elementy wyposażenia takie jak np. tulejki wiertarskie, uszczelki, tulejki podtrzymujące itp. Przegląd tych produktów w najbardziej popularnych wymiarach znajduje się na kolejnych stronach.



Ilustracja może się różnić od oryginału

Akcesoria

Pierścienie zgarniające i tulejki prowadzące, nr art. 5749, 5750, 5751, 5752 oraz 5753, pokrywają zakres średnic nominalnych wiertel lufowych. Przy zamówieniu akcesoriów z wulkanu proszę zawsze podawać nr artykułu + nr kodu wg następującej tabeli!

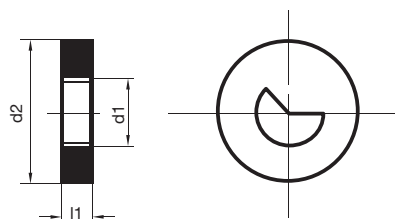
Tabela numerów kodów / wg średnic wiertel lufowych

Nr kodu	Dla zakresu średnic nom. D1	
	od mm	do mm
1,900	2,000	2,099
2,000	2,100	2,199
2,100	2,200	2,299
2,200	2,300	2,399
2,300	2,400	2,499
2,400	2,500	2,599
2,500	2,600	2,699
2,600	2,700	2,799
2,700	2,800	2,899
2,800	2,900	3,099
3,000	3,100	3,359
3,200	3,360	3,459
3,300	3,460	3,559
3,400	3,560	3,799
3,600	3,800	3,959
3,700	3,960	4,259
4,000	4,260	4,499
4,200	4,500	4,749
4,500	4,750	4,999
4,700	5,000	5,249
5,000	5,250	5,499
5,200	5,500	5,749
5,500	5,750	5,999
5,700	6,000	6,249
6,000	6,250	6,449
6,200	6,450	6,749
6,500	6,750	6,999
6,700	7,000	7,299
7,000	7,300	7,599
7,300	7,600	7,799
7,500	7,800	7,999
7,700	8,000	8,299
8,000	8,300	8,699
8,400	8,700	8,999
8,700	9,000	9,299
9,000	9,300	9,699

Nr kodu	Dla zakresu średnic nom. D1	
	od mm	do mm
9,400	9,700	9,999
9,700	10,000	10,299
10,000	10,300	10,799
10,500	10,800	11,299
11,000	11,300	11,799
11,500	11,800	12,399
12,000	12,400	12,899
12,500	12,900	13,399
13,000	13,400	13,899
13,500	13,900	14,399
14,000	14,400	14,899
14,500	14,900	15,399
15,000	15,400	15,899
15,500	15,900	16,399
16,000	16,400	16,899
16,500	16,900	17,399
17,000	17,400	17,899
17,500	17,900	18,399
18,000	18,400	19,509
19,000	19,510	20,509
20,000	20,510	21,509
21,000	21,510	22,609
22,000	22,610	23,609
23,000	23,610	24,609
24,000	24,610	25,609
25,000	25,610	26,609
26,000	26,610	27,609
27,000	27,610	28,609
28,000	28,610	29,609
29,000	29,610	30,609
30,000	30,610	32,609
32,000	32,610	34,699
34,000	34,700	36,699
36,000	36,700	38,699
38,000	38,700	40,000



Pierścienie zgarniające do 1-ostrzowych wiertel lufowych



Nr artykułu

5752

d1 mm	Zakres Ø	d2 mm	l1 mm	kod
2,100	2,200-2,299	20,000	4,000	2,100
2,200	2,300-2,399	20,000	4,000	2,200
2,600	2,700-2,799	20,000	4,000	2,600
2,800	2,900-3,099	20,000	4,000	2,800
3,000	3,100-3,359	20,000	4,000	3,000
3,300	3,460-3,559	20,000	4,000	3,300
3,400	3,560-3,799	20,000	4,000	3,400
3,600	3,800-3,959	20,000	4,000	3,600
3,700	3,960-4,259	20,000	4,000	3,700
4,000	4,260-4,499	20,000	4,000	4,000
4,200	4,500-4,749	20,000	4,000	4,200
4,500	4,750-4,999	20,000	4,000	4,500
4,700	5,000-5,249	20,000	4,000	4,700
5,000	5,250-5,499	32,000	4,000	5,000
5,200	5,500-5,749	32,000	4,000	5,200
5,500	5,750-5,999	32,000	4,000	5,500
5,700	6,000-6,249	32,000	4,000	5,700
6,000	6,250-6,449	32,000	4,000	6,000
6,200	6,450-6,749	32,000	4,000	6,200
6,500	6,750-6,999	32,000	4,000	6,500
6,700	7,000-7,299	32,000	4,000	6,700
7,000	7,300-7,599	32,000	4,000	7,000
7,300	7,600-7,799	32,000	4,000	7,300
7,500	7,800-7,999	32,000	4,000	7,500
7,700	8,000-8,299	32,000	4,000	7,700
8,000	8,300-8,699	32,000	4,000	8,000
8,400	8,700-8,999	32,000	4,000	8,400
8,700	9,000-9,299	32,000	4,000	8,700
9,000	9,300-9,699	32,000	4,000	9,000
9,400	9,700-9,999	32,000	4,000	9,400
9,700	10,000-10,299	32,000	4,000	9,700
10,000	11,300-11,799	32,000	4,000	10,000
10,500	10,800-11,299	32,000	4,000	10,500
11,000	11,300-11,799	32,000	4,000	11,000
11,500	11,800-12,399	32,000	4,000	11,500
12,000	12,400-12,899	32,000	4,000	12,000
12,500	12,900-13,399	32,000	4,000	12,500
13,500	13,900-14,399	32,000	4,000	13,500
14,000	14,400-14,899	32,000	4,000	14,000
14,500	14,900-15,399	32,000	4,000	14,500
15,000	15,400-15,899	32,000	4,000	15,000
15,500	15,900-16,399	40,000	4,000	15,500
16,500	16,900-17,399	40,000	4,000	16,500
17,000	17,400-17,899	40,000	4,000	17,000
17,500	17,900-18,399	40,000	4,000	17,500
18,000	18,400-19,509	40,000	4,000	18,000
19,000	19,510-20,509	40,000	4,000	19,000
20,000	20,510-21,509	40,000	4,000	20,000

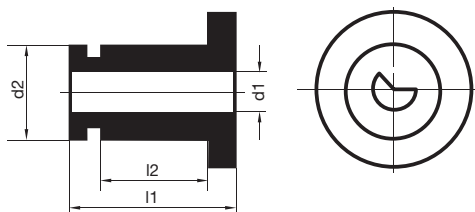
Wiertła lufowe



d1	Zakres Ø	d2	l1	kod
mm		mm	mm	
21,000	21,510-22,609	40,000	4,000	21,000
22,000	22,610-23,609	40,000	4,000	22,000
23,000	23,610-24,609	40,000	4,000	23,000
24,000	24,610-25,609	40,000	4,000	24,000
25,000	25,610-26,609	40,000	4,000	25,000
27,000	27,610-28,609	90,000	4,000	27,000
29,000	29,610-30,609	90,000	4,000	29,000
30,000	30,610-32,609	90,000	4,000	30,000
32,000	32,610-34,699	90,000	4,000	32,000
36,000	36,700-38,699	90,000	4,000	36,000
38,000	38,700-40,000	90,000	4,000	38,000



Tulejki podporowe do 1-ostrzowych wiertel lufowych (z otw. kształtowym)



Nr artykułu

5750

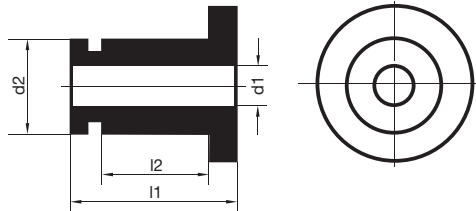
d1	Zakres Ø	d2	l1	l2	kod
mm		mm	mm	mm	
2,100	2,200-2,299	20,000	20,000	12,000	202,100
2,600	2,700-2,799	20,000	20,000	12,000	202,600
2,800	2,900-3,099	20,000	20,000	12,000	202,800
3,000	3,100-3,359	20,000	20,000	12,000	203,000
3,300	3,460-3,559	20,000	20,000	12,000	203,300
3,700	3,960-4,259	20,000	20,000	12,000	203,700
4,700	5,000-5,249	20,000	20,000	12,000	204,700
5,700	6,000-6,249	20,000	20,000	12,000	205,700
6,700	7,000-7,299	20,000	20,000	12,000	206,700
7,700	8,000-8,299	20,000	20,000	12,000	207,700
8,000	8,300-8,699	20,000	20,000	12,000	208,000
8,700	9,000-9,299	20,000	20,000	12,000	208,700
9,700	10,000-10,299	20,000	20,000	12,000	209,700
11,500	11,800-12,399	20,000	20,000	12,000	211,500
3,700	3,960-4,259	30,000	26,000	13,000	303,700
4,000	4,260-4,499	30,000	26,000	13,000	304,000
4,200	4,500-4,749	30,000	26,000	13,000	304,200
4,500	4,750-4,999	30,000	26,000	13,000	304,500
4,700	5,000-5,249	30,000	26,000	13,000	304,700
5,000	5,250-5,499	30,000	26,000	13,000	305,000
5,200	5,500-5,749	30,000	26,000	13,000	305,200
5,500	5,750-5,999	30,000	26,000	13,000	305,500
5,700	6,000-6,249	30,000	26,000	13,000	305,700
6,000	6,250-6,449	30,000	26,000	13,000	306,000
6,200	6,450-6,749	30,000	26,000	13,000	306,200
6,500	6,750-6,999	30,000	26,000	13,000	306,500
6,700	7,000-7,299	30,000	26,000	13,000	306,700
7,000	7,300-7,599	30,000	26,000	13,000	307,000
7,300	7,600-7,799	30,000	26,000	13,000	307,300
7,500	7,800-7,999	30,000	26,000	13,000	307,500
7,700	8,000-8,299	30,000	26,000	13,000	307,700
8,000	8,300-8,699	30,000	26,000	13,000	308,000
8,400	8,700-8,999	30,000	26,000	13,000	308,400
8,700	9,000-9,299	30,000	26,000	13,000	308,700
9,000	9,300-9,699	30,000	26,000	13,000	309,000
9,400	9,700-9,999	30,000	26,000	13,000	309,400
9,700	10,000-10,299	30,000	26,000	13,000	309,700
10,000	10,300-10,799	30,000	26,000	13,000	310,000
10,500	10,800-11,299	30,000	26,000	13,000	310,500
11,000	11,300-11,799	30,000	26,000	13,000	311,000
11,500	11,800-12,399	30,000	26,000	13,000	311,500
12,000	12,400-12,899	30,000	26,000	13,000	312,000
12,500	12,900-13,399	30,000	26,000	13,000	312,500
13,500	13,900-14,399	30,000	26,000	13,000	313,500
14,000	14,400-14,899	30,000	26,000	13,000	314,000
14,500	14,900-15,399	30,000	26,000	13,000	314,500
15,000	15,400-15,899	30,000	26,000	13,000	315,000
15,500	15,900-16,399	30,000	26,000	13,000	315,500



d1	Zakres Ø	d2	l1	l2	kod
mm		mm	mm	mm	
16,500	16,900-17,399	30,000	26,000	13,000	316,500
17,000	17,400-17,899	30,000	26,000	13,000	317,000
17,500	17,900-18,399	30,000	26,000	13,000	317,500
18,000	18,400-19,509	30,000	26,000	13,000	318,000
19,000	19,510-20,509	30,000	26,000	13,000	319,000
21,000	21,510-22,609	30,000	26,000	13,000	321,000
20,000	20,510-21,509	45,000	26,000	16,000	420,000
21,000	21,510-22,609	45,000	26,000	16,000	421,000
22,000	22,610-23,609	45,000	26,000	16,000	422,000
23,000	23,610-24,609	45,000	26,000	16,000	423,000
24,000	24,610-25,609	45,000	26,000	16,000	424,000
25,000	25,610-26,609	45,000	26,000	16,000	425,000
27,000	27,610-28,609	45,000	26,000	16,000	427,000
28,000	28,610-29,609	45,000	26,000	16,000	428,000
29,000	29,610-30,609	45,000	26,000	16,000	429,000
30,000	30,610-32,609	45,000	26,000	16,000	430,000
32,000	32,610-34,699	45,000	26,000	16,000	432,000
34,000	34,700-36,699	45,000	26,000	16,000	434,000



Tulejki podporowe do 1- i 2-ostrowych wiertel lufowych (z otw. okrągłym)



Nr artykułu

5749

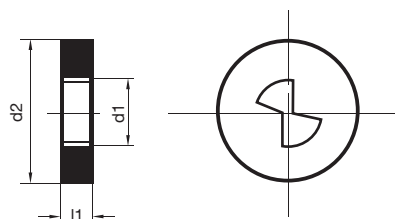
d1	Zakres Ø	d2	l1	l2	kod
mm		mm	mm	mm	
3,000	3,100-3,359	20,000	22,000	12,000	203,000
3,700	3,960-4,259	20,000	22,000	12,000	203,700
4,500	4,750-4,999	20,000	22,000	12,000	204,500
4,700	5,000-5,249	20,000	22,000	12,000	204,700
5,700	6,000-6,249	20,000	22,000	12,000	205,700
8,000	8,300-8,699	20,000	22,000	12,000	208,000
9,700	10,000-10,299	20,000	22,000	12,000	209,700
2,200	2,300-2,399	30,000	26,000	13,000	302,200
3,000	3,100-3,359	30,000	26,000	13,000	303,000
3,300	3,460-3,559	30,000	26,000	13,000	303,300
3,400	3,560-3,799	30,000	26,000	13,000	303,400
3,600	3,800-3,959	30,000	26,000	13,000	303,600
3,700	3,960-4,259	30,000	26,000	13,000	303,700
4,000	4,260-4,499	30,000	26,000	13,000	304,000
4,200	4,500-4,749	30,000	26,000	13,000	304,200
4,500	4,750-4,999	30,000	26,000	13,000	304,500
4,700	5,000-5,249	30,000	26,000	13,000	304,700
5,000	5,250-5,499	30,000	26,000	13,000	305,000
5,200	5,500-5,749	30,000	26,000	13,000	305,200
5,500	5,750-5,999	30,000	26,000	13,000	305,500
5,700	6,000-6,249	30,000	26,000	13,000	305,700
6,000	6,250-6,449	30,000	26,000	13,000	306,000
6,200	6,450-6,749	30,000	26,000	13,000	306,200
6,700	7,000-7,299	30,000	26,000	13,000	306,700
7,500	7,800-7,999	30,000	26,000	13,000	307,500
7,700	8,000-8,299	30,000	26,000	13,000	307,700
8,700	9,000-9,299	30,000	26,000	13,000	308,700
9,000	9,300-9,699	30,000	26,000	13,000	309,000
9,700	10,000-10,299	30,000	26,000	13,000	309,700
10,000	10,300-10,799	30,000	26,000	13,000	310,000
10,500	10,800-11,299	30,000	26,000	13,000	310,500
11,000	11,300-11,799	30,000	26,000	13,000	311,000
11,500	11,800-12,399	30,000	26,000	13,000	311,500
12,000	12,400-12,899	30,000	26,000	13,000	312,000
12,500	12,900-13,399	30,000	26,000	13,000	312,500
13,500	13,900-14,399	30,000	26,000	13,000	313,500
14,000	14,400-14,899	30,000	26,000	13,000	314,000
14,500	14,900-15,399	30,000	26,000	13,000	314,500
15,000	15,400-15,899	30,000	26,000	13,000	315,000
15,500	15,900-16,399	30,000	26,000	13,000	315,500
16,600	17,900-18,399	30,000	26,000	13,000	316,600
17,000	17,400-17,899	30,000	26,000	13,000	317,000
17,500	17,900-18,399	30,000	26,000	13,000	317,500
18,000	18,400-19,509	30,000	26,000	13,000	318,000
19,000	19,510-20,509	30,000	26,000	13,000	319,000
20,000	20,510-21,509	30,000	26,000	13,000	320,000
21,000	21,510-22,609	30,000	26,000	13,000	321,000
22,000	22,610-23,609	30,000	26,000	13,000	322,000



d1	Zakres Ø	d2	l1	l2	kod
mm		mm	mm	mm	
23,000	23,610-24,609	30,000	26,000	13,000	323,000
24,000	24,610-25,609	30,000	26,000	13,000	324,000
4,700	5,000-5,249	45,000	26,000	16,000	404,700
6,200	6,450-6,749	45,000	26,000	16,000	406,200
7,500	7,800-7,999	45,000	26,000	16,000	407,500
7,700	8,000-8,299	45,000	26,000	16,000	407,700
9,000	9,300-9,699	45,000	26,000	16,000	409,000
9,400	9,700-9,999	45,000	26,000	16,000	409,400
9,700	10,000-10,299	45,000	26,000	16,000	409,700
11,500	11,800-12,399	45,000	26,000	16,000	411,500
14,000	14,400-14,899	45,000	26,000	16,000	414,000
15,000	15,400-15,899	45,000	26,000	16,000	415,000
15,500	15,900-16,399	45,000	26,000	16,000	415,500
17,500	17,900-18,399	45,000	26,000	16,000	417,500
18,000	18,400-19,509	45,000	26,000	16,000	418,000
19,000	19,510-20,509	45,000	26,000	16,000	419,000
21,000	21,510-22,609	45,000	26,000	16,000	421,000
24,000	24,610-25,609	45,000	26,000	16,000	424,000
25,000	25,610-26,609	45,000	26,000	16,000	425,000
26,000	26,610-27,609	45,000	26,000	16,000	426,000
27,000	27,610-28,609	45,000	26,000	16,000	427,000
29,000	29,610-30,609	45,000	26,000	16,000	429,000
32,000	32,610-34,699	45,000	26,000	16,000	432,000



Pierścienie zgarniające do 2-ostrzowych wiertel lufowych



Nr artykułu

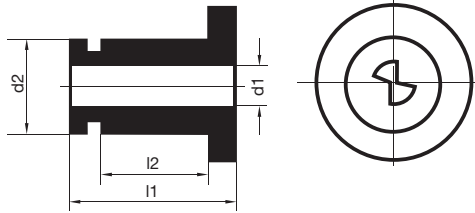
5753

d1 mm	Zakres Ø	d2 mm	l1 mm	kod
5,700	6,000-6,249	32,000	4,000	5,700
7,700	8,000-8,299	32,000	4,000	7,700
8,700	9,000-9,299	32,000	4,000	8,700
9,000	9,300-9,699	32,000	4,000	9,000
9,700	10,000-10,299	32,000	4,000	9,700
11,500	11,800-12,399	32,000	4,000	11,500
13,500	13,900-14,399	32,000	4,000	13,500
15,500	15,900-16,399	40,000	4,000	15,500
19,000	19,510-20,509	40,000	4,000	19,000
23,000	23,610-24,609	40,000	4,000	23,000
25,000	25,610-26,609	40,000	4,000	25,000

Wiertła lufowe



Tulejki podporowe do 2-ostrzowych wiertel lufowych (z otw. kształtowym)



Nr artykułu **5751**

d1	Zakres Ø	d2	l1	l2	kod
mm		mm	mm	mm	
5,700	6,000-6,249	20,000	20,000	12,000	205,700
9,700	10,000-10,299	20,000	20,000	12,000	209,700
6,500	6,750-6,999	30,000	26,000	13,000	306,500
6,700	7,000-7,299	30,000	26,000	13,000	306,700
7,700	8,000-8,299	30,000	26,000	13,000	307,700
9,400	9,700-9,999	30,000	26,000	13,000	309,400
9,700	10,000-10,299	30,000	26,000	13,000	309,700
11,500	11,800-12,399	30,000	26,000	13,000	311,500
15,000	15,400-15,899	30,000	26,000	13,000	315,000
15,500	15,900-16,399	30,000	26,000	13,000	315,500
16,600	17,900-18,399	30,000	26,000	13,000	316,600
17,000	17,400-17,899	30,000	26,000	13,000	317,000
17,500	17,900-18,399	30,000	26,000	13,000	317,500
8,700	9,000-9,299	45,000	26,000	16,000	408,700
13,500	13,900-14,399	45,000	26,000	16,000	413,500
19,000	19,510-20,509	45,000	26,000	16,000	419,000
23,000	23,610-24,609	45,000	26,000	16,000	423,000
24,000	24,610-25,609	45,000	26,000	16,000	424,000
25,000	25,610-26,609	45,000	26,000	16,000	425,000
26,000	26,610-27,609	45,000	26,000	16,000	426,000
27,000	27,610-28,609	45,000	26,000	16,000	427,000

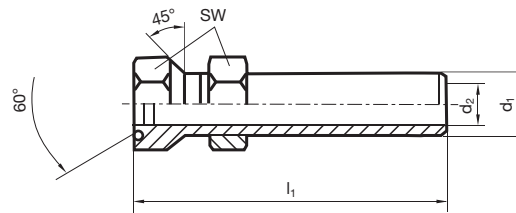
Wiertła lufowe



Śruby regulacyjne



Śruby regulacyjne bez uszczelnienia



Nr artykułu

5754

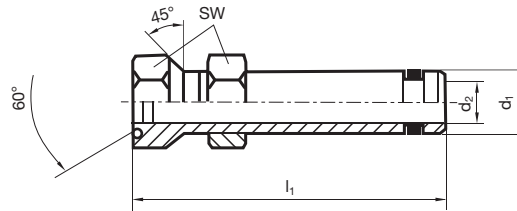
d1	d2	l1	SW	kod
	mm	mm	mm	
M6 x 0,5	3,500	26,000	9,000	6,000
M10 x 1	6,000	38,000	13,000	10,000
M16 x 1,5	10,000	57,000	22,000	16,000



Śruby regulacyjne



Śruby regulacyjne z uszczelnieniem



Nr artykułu

5755

d1	d2	l1	SW	kod
	mm	mm	mm	
M6 x 0,5	3,500	45,000	9,000	6,000
M10 x 1	6,000	50,000	13,000	10,000
M16 x 1,5	10,000	65,000	22,000	16,000
M24X1,5	16,000	90,000	30,000	24,000

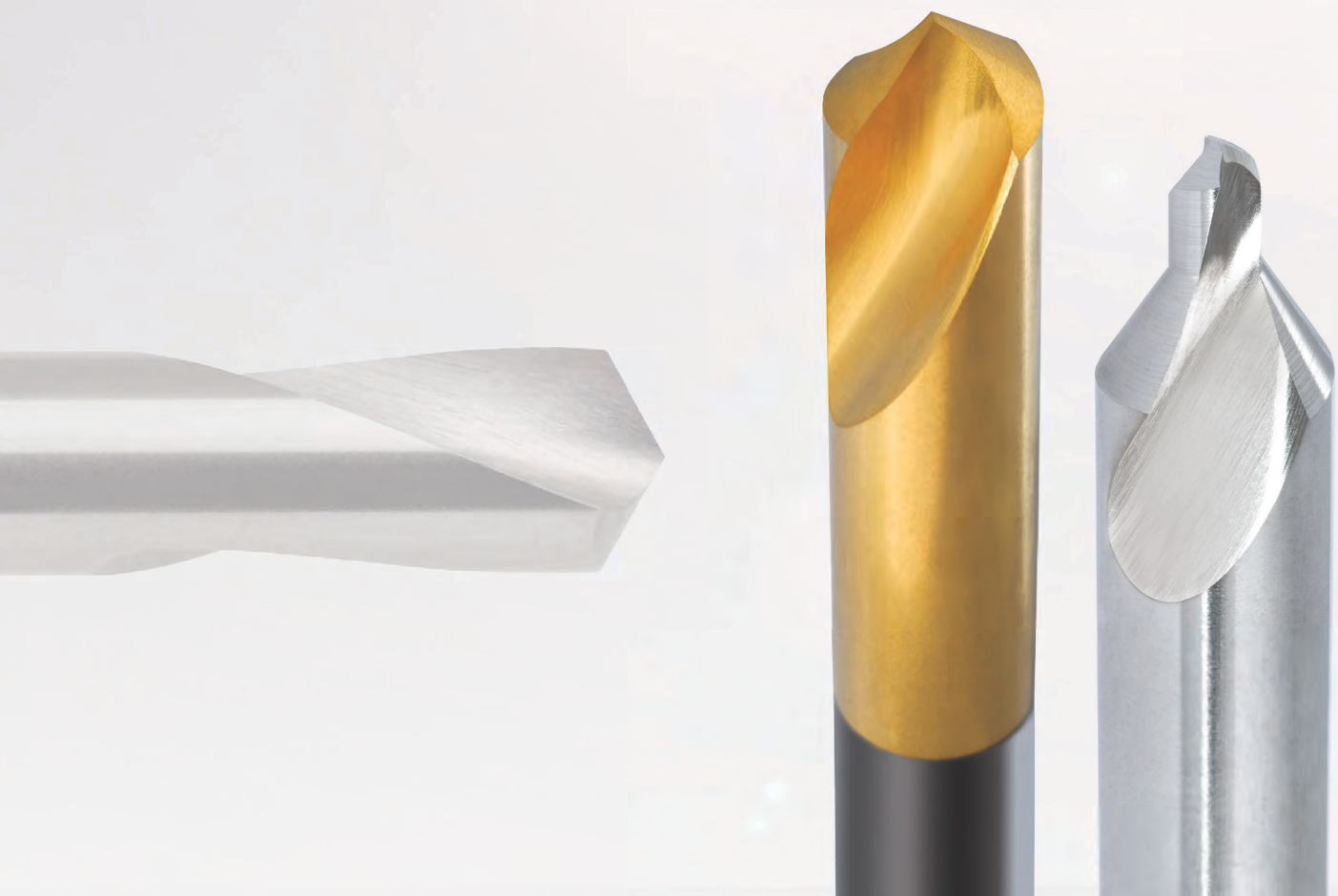
Wiertła lufowe

Nawiertaki NC i nawiertaki do nakielków

Przy stosowaniu długich wiertel rekomendujemy wcześniejsze nawiercanie.

Nasze nawiertaki NC są do tego zabiegu optymalnie dopasowane.

Do produkcji nakielków rekomendujemy stosowanie naszych nawiertaków do nakielków.





Wiertła kręte, długie



P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szczególnie do głębokich otworów

M

K •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

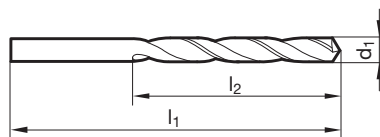
Materiał narzędzia **HSS**

Powierzchnia $\geq \frac{0}{2,36}$

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu

217

Wiertła lufowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,400	1/64	30,000	10,000	1,500		70,000	45,000
0,440		30,000	10,000	1,510		76,000	50,000
0,450		30,000	10,000	1,550		76,000	50,000
0,470		30,000	10,000	1,590	1/16	76,000	50,000
0,500		32,000	12,000	1,600		76,000	50,000
0,520		32,000	12,000	1,610		76,000	50,000
0,550		35,000	15,000	1,650		76,000	50,000
0,570		35,000	15,000	1,700		76,000	50,000
0,600		35,000	15,000	1,750		80,000	53,000
0,620		38,000	18,000	1,780		80,000	53,000
0,650		38,000	18,000	1,800		80,000	53,000
0,700		42,000	21,000	1,850		80,000	53,000
0,730		42,000	21,000	1,900		80,000	53,000
0,750		42,000	21,000	1,930		85,000	56,000
0,760		46,000	25,000	1,950		85,000	56,000
0,790	1/32	46,000	25,000	1,980	5/64	85,000	56,000
0,800		46,000	25,000	2,000		85,000	56,000
0,820		46,000	25,000	2,030		85,000	56,000
0,850		46,000	25,000	2,050		85,000	56,000
0,900		51,000	29,000	2,060		85,000	56,000
0,910		51,000	29,000	2,080		85,000	56,000
0,920		51,000	29,000	2,100		85,000	56,000
0,950		51,000	29,000	2,150		90,000	59,000
0,970		56,000	33,000	2,200		90,000	59,000
1,000		56,000	33,000	2,250		90,000	59,000
1,040		56,000	33,000	2,260		90,000	59,000
1,050		56,000	33,000	2,300		90,000	59,000
1,080		60,000	37,000	2,350		90,000	59,000
1,090		60,000	37,000	2,370		95,000	62,000
1,100		60,000	37,000	2,380	3/32	95,000	62,000
1,120		60,000	37,000	2,400		95,000	62,000
1,130		60,000	37,000	2,420		95,000	62,000
1,150		60,000	37,000	2,440		95,000	62,000
1,180		60,000	37,000	2,450		95,000	62,000
1,190	3/64	65,000	41,000	2,490		95,000	62,000
1,200		65,000	41,000	2,500		95,000	62,000
1,250		65,000	41,000	2,550		95,000	62,000
1,300		65,000	41,000	2,580		95,000	62,000
1,350		70,000	45,000	2,600		95,000	62,000
1,400		70,000	45,000	2,620		95,000	62,000
1,450		70,000	45,000	2,640		95,000	62,000
1,490		70,000	45,000	2,650		95,000	62,000



d1		l1	l2
mm	inch	mm	mm
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,030		106,000	69,000
3,050		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,850		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,950		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,030		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,450		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,650		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,950		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,030		132,000	87,000
5,050		132,000	87,000

d1		l1	l2
mm	inch	mm	mm
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,150		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,350		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,450		139,000	91,000
5,500		139,000	91,000
5,550		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,060		148,000	97,000
6,100		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000

Wiertła lufowe



Wiertła lufowe

d1		l1	l2
mm	inch	mm	mm
9,200		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,250		184,000	121,000
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,700		195,000	128,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,600		195,000	128,000
11,700		195,000	128,000
11,750		195,000	128,000
11,800		195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,100		205,000	134,000
12,200		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
12,800		205,000	134,000
13,000		205,000	134,000
13,200		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800		214,000	140,000
13,890	35/64	214,000	140,000
14,000		214,000	140,000
14,200		220,000	144,000
14,250		220,000	144,000
14,290	9/16	220,000	144,000
14,490		220,000	144,000
14,500		220,000	144,000
14,900		220,000	144,000

d1		l1	l2
mm	inch	mm	mm
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,200		227,000	149,000
15,250		227,000	149,000
15,400		227,000	149,000
15,480	39/64	227,000	149,000
15,500		227,000	149,000
15,600		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
16,270	41/64	235,000	154,000
16,500		235,000	154,000
16,670	21/32	235,000	154,000
17,000		235,000	154,000
17,070	43/64	241,000	158,000
17,460	11/16	241,000	158,000
17,500		241,000	158,000
18,000		241,000	158,000
18,500		247,000	162,000
18,650	47/64	247,000	162,000
19,000		247,000	162,000
19,050	3/4	254,000	166,000
19,500		254,000	166,000
20,000		254,000	166,000
20,500		261,000	171,000
20,640	13/16	261,000	171,000
21,000		261,000	171,000
21,500		268,000	176,000
22,000		268,000	176,000
23,300		275,000	180,000
23,810	15/16	282,000	185,000
24,000		282,000	185,000
25,000	63/64	282,000	185,000
26,190	1 1/32	290,000	190,000
26,500		290,000	190,000
26,990	1 1/16	298,000	195,000
28,570	1 1/8	307,000	201,000
29,000		307,000	201,000
29,370	1 5/32	307,000	201,000
29,500		307,000	201,000
30,160	1 3/16	316,000	207,000
30,960	1 7/32	316,000	207,000
31,000		316,000	207,000
36,510	1 7/16	345,000	225,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szczególnie do głębokich otworów • do wiercenia przez tulejki wiertarskie

M

K •

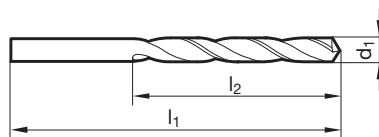
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
S • proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu **667**

d1		l1	l2
mm	inch	mm	mm
0,500		32,000	12,000
0,600		35,000	15,000
0,700		42,000	21,000
0,750		42,000	21,000
0,800		46,000	25,000
0,900		51,000	29,000
0,950		51,000	29,000
1,000		56,000	33,000
1,100		60,000	37,000
1,150		60,000	37,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,350		70,000	45,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
2,000		85,000	56,000
2,100		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,440		95,000	62,000
2,450		95,000	62,000
2,500		95,000	62,000
2,530		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000

d1		l1	l2
mm	inch	mm	mm
2,800		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
3,000		100,000	66,000
3,030		106,000	69,000
3,050		106,000	69,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,850		119,000	78,000
3,900		119,000	78,000
3,950		119,000	78,000
3,970	5/32	119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,650		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000

Wiertła lufowe



d1		l1	l2	
mm	inch	mm	mm	
4,760	3/16	132,000	87,000	
4,850		132,000	87,000	
4,900		132,000	87,000	
5,000	13/64	132,000	87,000	
5,100		132,000	87,000	
5,160		132,000	87,000	
5,200		132,000	87,000	
5,250		132,000	87,000	
5,300	7/32	132,000	87,000	
5,310		139,000	91,000	
5,400		139,000	91,000	
5,410		139,000	91,000	
5,500		139,000	91,000	
5,560		139,000	91,000	
5,600		139,000	91,000	
5,610	1/4	139,000	91,000	
5,700		139,000	91,000	
5,790		139,000	91,000	
5,900		139,000	91,000	
6,000		139,000	91,000	
6,100		148,000	97,000	
6,200		148,000	97,000	
6,250		148,000	97,000	
6,350		148,000	97,000	
6,400		148,000	97,000	
6,500	17/64	148,000	97,000	
6,600		148,000	97,000	
6,750		156,000	102,000	
6,800		156,000	102,000	
7,000		156,000	102,000	
7,100		9/32	156,000	102,000
7,140			156,000	102,000
7,200			156,000	102,000
7,250			156,000	102,000
7,300		19/64	156,000	102,000
7,370			156,000	102,000
7,400			156,000	102,000
7,500	156,000		102,000	
7,540	165,000		109,000	
7,700	165,000		109,000	
7,940	165,000		109,000	
8,000	165,000		109,000	
8,050	165,000		109,000	
8,100	165,000		109,000	
8,200	5/16	165,000	109,000	
8,250		165,000	109,000	
8,300		165,000	109,000	
8,400		165,000	109,000	
8,500		165,000	109,000	
8,700		175,000	115,000	
8,730		175,000	115,000	
8,800		175,000	115,000	
8,900		175,000	115,000	
9,000		175,000	115,000	

d1		l1	l2
mm	inch	mm	mm
9,100	3/8	175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900	25/64	184,000	121,000
9,920		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000	7/16	195,000	128,000
11,110		195,000	128,000
11,500		195,000	128,000
11,750		195,000	128,000
11,910		205,000	134,000
12,000	15/32	205,000	134,000
12,500		205,000	134,000
12,700		205,000	134,000
13,000		205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,800	35/64	214,000	140,000
13,890		214,000	140,000
14,000		214,000	140,000
14,290		220,000	144,000
14,500	9/16	220,000	144,000
14,750		220,000	144,000
14,800		220,000	144,000
14,900	19/32	220,000	144,000
15,000		220,000	144,000
15,080		227,000	149,000
16,000		227,000	149,000
16,500		235,000	154,000
16,670		235,000	154,000
16,750	21/32	235,000	154,000
17,000		235,000	154,000
17,460		241,000	158,000
18,000		241,000	158,000
18,250	7/8	247,000	162,000
22,220		268,000	176,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} \leq 6,00$

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 14,750$ • geometria zataczana • szczególnie do głębokich otworów • do wiercenia przez tulejki wiertarskie

M

K •

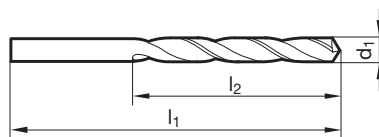
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne • proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu **220**

d1		l1	l2
mm	inch	mm	mm
0,450		30,000	10,000
0,470		30,000	10,000
0,900		51,000	29,000
0,950		51,000	29,000
1,100		60,000	37,000
1,150		60,000	37,000
1,200		65,000	41,000
1,250		65,000	41,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,630		76,000	50,000
1,660		76,000	50,000
1,730		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
2,000		85,000	56,000
2,300		90,000	59,000
2,500		95,000	62,000
2,700		100,000	66,000
2,750		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,070		106,000	69,000
3,100		106,000	69,000
3,250		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,600		112,000	73,000
3,700		112,000	73,000
3,800		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000

d1		l1	l2
mm	inch	mm	mm
4,500		126,000	82,000
4,600		126,000	82,000
4,780		132,000	87,000
4,800		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,600		139,000	91,000
5,700		139,000	91,000
6,000		139,000	91,000
6,050		148,000	97,000
6,100		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,800		156,000	102,000
7,200		156,000	102,000
7,500		156,000	102,000
7,800		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,250		165,000	109,000
8,400		165,000	109,000
8,800		175,000	115,000
9,000		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
11,900		205,000	134,000
12,000		205,000	134,000
12,200		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
13,500		214,000	140,000
14,750		220,000	144,000

Wiertła lufowe



d1		l1	l2
mm	inch	mm	mm
19,000		247,000	162,000
20,000		254,000	166,000
22,000		268,000	176,000
25,000	63/64	282,000	185,000
25,500		290,000	190,000
29,000		307,000	201,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 2,950$ • geometria zataczana • z zabierakiem

M

K •

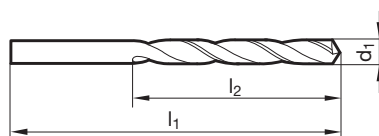
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 786



Nr artykułu **204**

d1		l1	l2
mm	inch	mm	mm
2,950		100,000	66,000
3,000		100,000	66,000
3,100		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,600		112,000	73,000
3,800		119,000	78,000
3,900		119,000	78,000
4,000		119,000	78,000
4,050		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
5,000		132,000	87,000
5,080		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,500		139,000	91,000
5,600		139,000	91,000
5,800		139,000	91,000
5,850		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
7,000		156,000	102,000
7,400		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
8,000		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,400		165,000	109,000
8,450		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,300		175,000	115,000
9,400		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,300		184,000	121,000
10,400		184,000	121,000
10,500		184,000	121,000
10,800		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
13,000		205,000	134,000
25,250		290,000	190,000

Wiertła lufowe



Wiertła kręte, długie



P Korekcja ścina $\geq \varnothing 15,000$ • geometria zataczana • szczególnie do głębokich otworów

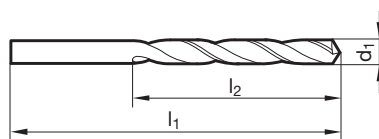


N • twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu

218

Wiertła lufowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,300		90,000	59,000
0,520		32,000	12,000	2,350		90,000	59,000
0,550		35,000	15,000	2,400		95,000	62,000
0,600		35,000	15,000	2,500		95,000	62,000
0,650		38,000	18,000	2,550		95,000	62,000
0,700		42,000	21,000	2,600		95,000	62,000
0,750		42,000	21,000	2,650		95,000	62,000
0,800		46,000	25,000	2,700		100,000	66,000
0,820		46,000	25,000	2,800		100,000	66,000
0,840		46,000	25,000	2,830		100,000	66,000
0,850		46,000	25,000	2,870		100,000	66,000
0,900		51,000	29,000	2,900		100,000	66,000
0,950		51,000	29,000	2,940		100,000	66,000
0,970		56,000	33,000	3,000		100,000	66,000
1,000		56,000	33,000	3,020		106,000	69,000
1,050		56,000	33,000	3,050		106,000	69,000
1,100		60,000	37,000	3,060		106,000	69,000
1,150		60,000	37,000	3,100		106,000	69,000
1,200		65,000	41,000	3,150		106,000	69,000
1,250		65,000	41,000	3,180		106,000	69,000
1,300		65,000	41,000	3,200		106,000	69,000
1,400		70,000	45,000	3,250		106,000	69,000
1,500		70,000	45,000	3,270		106,000	69,000
1,550		76,000	50,000	3,300		106,000	69,000
1,560		76,000	50,000	3,400		112,000	73,000
1,570		76,000	50,000	3,500		112,000	73,000
1,580		76,000	50,000	3,550		112,000	73,000
1,600		76,000	50,000	3,600		112,000	73,000
1,650		76,000	50,000	3,800		119,000	78,000
1,700		76,000	50,000	3,900		119,000	78,000
1,750		80,000	53,000	4,000		119,000	78,000
1,800		80,000	53,000	4,030		119,000	78,000
1,820		80,000	53,000	4,100		119,000	78,000
1,850		80,000	53,000	4,200		119,000	78,000
1,900		80,000	53,000	4,300		126,000	82,000
1,950		85,000	56,000	4,400		126,000	82,000
2,000		85,000	56,000	4,500		126,000	82,000
2,050		85,000	56,000	4,600		126,000	82,000
2,100		85,000	56,000	4,700		126,000	82,000
2,180		90,000	59,000	4,760	3/16	132,000	87,000
2,200		90,000	59,000	4,800		132,000	87,000
2,250		90,000	59,000	4,900		132,000	87,000



Wiertła kręte, długie

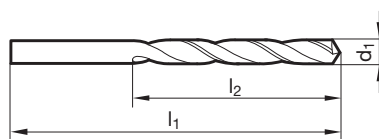


- P** Korekcja ścina $\geq 15,000$ • geometria zataczana • szczególnie do głębokich otworów
- M**
- K**
- N** • twarde, kruche materiały • mosiądz, stopy magnezu • brąz, brąz fosforowy • łupek, mika, pertinax
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓛ



Nr artykułu

221

Wiertła lufkowe

d1		l1	l2
mm	inch	mm	mm
0,450		30,000	10,000
0,600		35,000	15,000
0,650		38,000	18,000
0,900		51,000	29,000
1,100		60,000	37,000
1,240		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,370		70,000	45,000
1,400		70,000	45,000
1,500		70,000	45,000
1,550		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,160		90,000	59,000
2,180		90,000	59,000
2,200		90,000	59,000
2,270		90,000	59,000
2,350		90,000	59,000
2,850		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000

d1		l1	l2
mm	inch	mm	mm
3,510		112,000	73,000
3,700		112,000	73,000
4,100		119,000	78,000
4,200		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000
4,900		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,100		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
6,800		156,000	102,000
8,000		165,000	109,000
9,000		175,000	115,000
12,800		205,000	134,000
15,000		220,000	144,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

P Korekcja ścina $\geq \varnothing 14,500$ • geometria zataczana • szczególnie do głębokich otworów

M

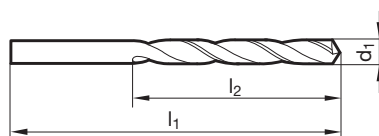
K

N • miękkie, długowiórowe materiały • aluminium, długowiórowe stopy Al
S • cynk, miedź rafinowana, silumin, elektron • miękkie tworzywa sztuczne, drewno

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu **219**

d1		l1	l2
mm	inch	mm	mm
0,500		32,000	12,000
0,600		35,000	15,000
0,650		38,000	18,000
0,700		42,000	21,000
0,740		42,000	21,000
0,750		42,000	21,000
0,800		46,000	25,000
0,850		46,000	25,000
0,900		51,000	29,000
0,950		51,000	29,000
0,970		56,000	33,000
0,980		56,000	33,000
1,000		56,000	33,000
1,100		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,220		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,350		70,000	45,000
1,370		70,000	45,000
1,400		70,000	45,000
1,440		70,000	45,000
1,500		70,000	45,000
1,520		76,000	50,000
1,600		76,000	50,000
1,610		76,000	50,000
1,650		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,760		80,000	53,000
1,770		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,950		85,000	56,000
1,970		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,070		85,000	56,000

d1		l1	l2
mm	inch	mm	mm
2,100		85,000	56,000
2,150		90,000	59,000
2,200		90,000	59,000
2,250		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,430		95,000	62,000
2,450		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,550		95,000	62,000
2,600		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,800		100,000	66,000
2,850		100,000	66,000
2,880		100,000	66,000
2,900		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,100	1/8	106,000	69,000
3,170		106,000	69,000
3,180		106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,300		106,000	69,000
3,350		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,600		112,000	73,000
3,650		112,000	73,000
3,700		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,830		119,000	78,000
3,900		119,000	78,000

Wiertła lufowe



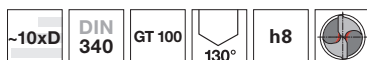
Wiertła lufowe

d1		l1	l2
mm	inch	mm	mm
3,920		119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,100		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,700		126,000	82,000
4,800		132,000	87,000
4,830		132,000	87,000
4,870		132,000	87,000
4,900		132,000	87,000
4,950		132,000	87,000
5,000		132,000	87,000
5,100		132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,430		139,000	91,000
5,500		139,000	91,000
5,650		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,980		139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,700		148,000	97,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,300		156,000	102,000
7,400		156,000	102,000
7,450		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,550		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,850		165,000	109,000
7,900		165,000	109,000
7,950		165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,500		165,000	109,000
8,550		175,000	115,000
8,600		175,000	115,000
8,700		175,000	115,000
8,750		175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,300		184,000	121,000
10,700		195,000	128,000
10,750		195,000	128,000
11,000		195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
12,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,750		214,000	140,000
14,000		214,000	140,000
14,500		220,000	144,000
15,000		220,000	144,000
15,500		227,000	149,000
17,000		235,000	154,000
18,000		241,000	158,000
18,250		247,000	162,000
19,000		247,000	162,000
19,840	25/32	254,000	166,000
20,000		254,000	166,000
20,640	13/16	261,000	171,000



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 0,2,36$

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

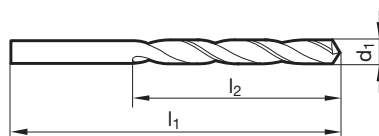
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu **535**

d1		l1	l2
mm	inch	mm	mm
1,000		56,000	33,000
1,020		56,000	33,000
1,040		56,000	33,000
1,050		56,000	33,000
1,070		60,000	37,000
1,090		60,000	37,000
1,100		60,000	37,000
1,150		60,000	37,000
1,180		60,000	37,000
1,190	3/64	65,000	41,000
1,200		65,000	41,000
1,250		65,000	41,000
1,300		65,000	41,000
1,320		65,000	41,000
1,350		70,000	45,000
1,400		70,000	45,000
1,450		70,000	45,000
1,500		70,000	45,000
1,510		76,000	50,000
1,520		76,000	50,000
1,550		76,000	50,000
1,590	1/16	76,000	50,000
1,600		76,000	50,000
1,650		76,000	50,000
1,670		76,000	50,000
1,700		76,000	50,000
1,750		80,000	53,000
1,780		80,000	53,000
1,800		80,000	53,000
1,850		80,000	53,000
1,900		80,000	53,000
1,930		85,000	56,000
1,950		85,000	56,000
1,980	5/64	85,000	56,000
1,990		85,000	56,000
2,000		85,000	56,000
2,050		85,000	56,000
2,060		85,000	56,000
2,080		85,000	56,000
2,100		85,000	56,000
2,150		90,000	59,000
2,180		90,000	59,000

d1		l1	l2
mm	inch	mm	mm
2,200		90,000	59,000
2,250		90,000	59,000
2,260		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,370		95,000	62,000
2,380	3/32	95,000	62,000
2,400		95,000	62,000
2,440		95,000	62,000
2,450		95,000	62,000
2,480		95,000	62,000
2,490		95,000	62,000
2,500		95,000	62,000
2,530		95,000	62,000
2,550		95,000	62,000
2,580		95,000	62,000
2,600		95,000	62,000
2,640		95,000	62,000
2,650		95,000	62,000
2,700		100,000	66,000
2,710		100,000	66,000
2,750		100,000	66,000
2,780	7/64	100,000	66,000
2,790		100,000	66,000
2,800		100,000	66,000
2,820		100,000	66,000
2,830		100,000	66,000
2,850		100,000	66,000
2,870		100,000	66,000
2,900		100,000	66,000
2,940		100,000	66,000
2,950		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,100		106,000	69,000
3,150		106,000	69,000
3,170	1/8	106,000	69,000
3,200		106,000	69,000
3,250		106,000	69,000
3,260		106,000	69,000
3,270		106,000	69,000
3,300		106,000	69,000

Wiertła lufowe



d1		l1	l2
mm	inch	mm	mm
3,400		112,000	73,000
3,450		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,570	9/64	112,000	73,000
3,600		112,000	73,000
3,660		112,000	73,000
3,700		112,000	73,000
3,730		112,000	73,000
3,750		112,000	73,000
3,800		119,000	78,000
3,860		119,000	78,000
3,900		119,000	78,000
3,910		119,000	78,000
3,970	5/32	119,000	78,000
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,050		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,130		119,000	78,000
4,150		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,250		119,000	78,000
4,300		126,000	82,000
4,350		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,750		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,050		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,250		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,750		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,050		148,000	97,000
6,100		148,000	97,000

d1		l1	l2
mm	inch	mm	mm
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
6,910		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,040		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,750		165,000	109,000
7,800		165,000	109,000
7,850		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,250		165,000	109,000
8,300		165,000	109,000
8,330	21/64	165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,340		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,600		184,000	121,000
9,700		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,080		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000



d1		l1	l2
mm	inch	mm	mm
10,300		184,000	121,000
10,320	13/32	184,000	121,000
10,400		184,000	121,000
10,490		184,000	121,000
10,500		184,000	121,000
10,600		184,000	121,000
10,720	27/64	195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,100		195,000	128,000
11,110	7/16	195,000	128,000
11,300		195,000	128,000
11,400		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
11,900		205,000	134,000
11,910	15/32	205,000	134,000

d1		l1	l2
mm	inch	mm	mm
12,000		205,000	134,000
12,150		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,600		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,490	17/32	214,000	140,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000



Wiertła kręte, długie



P • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

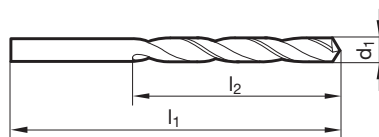
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu

668

Wiertła lufowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,800		100,000	66,000
1,090		60,000	37,000	2,820		100,000	66,000
1,100		60,000	37,000	2,850		100,000	66,000
1,180		60,000	37,000	2,870		100,000	66,000
1,190	3/64	65,000	41,000	2,900		100,000	66,000
1,200		65,000	41,000	2,950		100,000	66,000
1,300		65,000	41,000	3,000		100,000	66,000
1,320		65,000	41,000	3,050		106,000	69,000
1,400		70,000	45,000	3,100		106,000	69,000
1,500		70,000	45,000	3,170	1/8	106,000	69,000
1,510		76,000	50,000	3,200		106,000	69,000
1,590	1/16	76,000	50,000	3,250		106,000	69,000
1,600		76,000	50,000	3,260		106,000	69,000
1,650		76,000	50,000	3,300		106,000	69,000
1,700		76,000	50,000	3,400		112,000	73,000
1,800		80,000	53,000	3,450		112,000	73,000
1,850		80,000	53,000	3,500		112,000	73,000
1,900		80,000	53,000	3,570	9/64	112,000	73,000
1,930		85,000	56,000	3,600		112,000	73,000
1,950		85,000	56,000	3,700		112,000	73,000
1,980	5/64	85,000	56,000	3,730		112,000	73,000
1,990		85,000	56,000	3,750		112,000	73,000
2,000		85,000	56,000	3,800		119,000	78,000
2,060		85,000	56,000	3,860		119,000	78,000
2,080		85,000	56,000	3,870		119,000	78,000
2,100		85,000	56,000	3,900		119,000	78,000
2,180		90,000	59,000	3,910		119,000	78,000
2,200		90,000	59,000	3,970	5/32	119,000	78,000
2,260		90,000	59,000	4,000		119,000	78,000
2,300		90,000	59,000	4,040		119,000	78,000
2,380	3/32	95,000	62,000	4,090		119,000	78,000
2,400		95,000	62,000	4,100		119,000	78,000
2,490		95,000	62,000	4,200		119,000	78,000
2,500		95,000	62,000	4,220		119,000	78,000
2,530		95,000	62,000	4,300		126,000	82,000
2,550		95,000	62,000	4,370	11/64	126,000	82,000
2,580		95,000	62,000	4,400		126,000	82,000
2,600		95,000	62,000	4,500		126,000	82,000
2,640		95,000	62,000	4,600		126,000	82,000
2,700		100,000	66,000	4,700		126,000	82,000
2,710		100,000	66,000	4,760	3/16	132,000	87,000
2,780	7/64	100,000	66,000	4,800		132,000	87,000



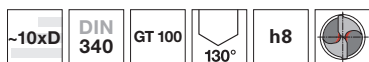
d1		l1	l2
mm	inch	mm	mm
4,850		132,000	87,000
4,900		132,000	87,000
4,910		132,000	87,000
4,920		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,300		132,000	87,000
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,760		156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,250		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000

d1		l1	l2
mm	inch	mm	mm
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,340		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,900		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
14,000		214,000	140,000

Wiertła lufowe



Wiertła kręte, długie

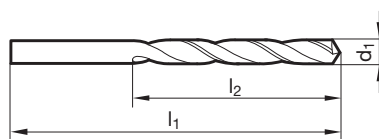


- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stale - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stali CrNi, m.in. nierdzewne
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	F
Kierunek skrawania	R



Nr artykułu

2462

Wiertła luflowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	3,800		119,000	78,000
1,100		60,000	37,000	4,000		119,000	78,000
1,200		65,000	41,000	4,200		119,000	78,000
1,300		65,000	41,000	4,300		126,000	82,000
1,500		70,000	45,000	4,500		126,000	82,000
1,600		76,000	50,000	4,800		132,000	87,000
1,700		76,000	50,000	5,000		132,000	87,000
1,800		80,000	53,000	5,200		132,000	87,000
1,900		80,000	53,000	5,400		139,000	91,000
2,000		85,000	56,000	5,500		139,000	91,000
2,100		85,000	56,000	6,000		139,000	91,000
2,200		90,000	59,000	6,100		148,000	97,000
2,300		90,000	59,000	6,200		148,000	97,000
2,400		95,000	62,000	6,500		148,000	97,000
2,500		95,000	62,000	6,600		148,000	97,000
2,600		95,000	62,000	6,800		156,000	102,000
2,800		100,000	66,000	7,000		156,000	102,000
2,900		100,000	66,000	7,200		156,000	102,000
3,000		100,000	66,000	7,300		156,000	102,000
3,100		106,000	69,000	7,600		165,000	109,000
3,200		106,000	69,000	8,000		165,000	109,000
3,300		106,000	69,000	9,000		175,000	115,000
3,400		112,000	73,000	10,000		184,000	121,000
3,500		112,000	73,000				



Wiertła kręte, długie



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 1,400$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów

M

K •

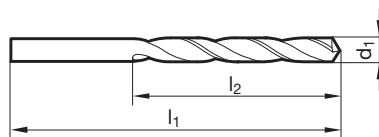
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 786



Nr artykułu **506**

d1		l1	l2
mm	inch	mm	mm
1,400		70,000	45,000
1,500		70,000	45,000
1,600		76,000	50,000
1,680		76,000	50,000
1,800		80,000	53,000
1,850		80,000	53,000
2,000		85,000	56,000
2,200		90,000	59,000
2,300		90,000	59,000
2,350		90,000	59,000
2,500		95,000	62,000
2,800		100,000	66,000
3,000		100,000	66,000
3,050		106,000	69,000
3,200		106,000	69,000
3,300		106,000	69,000
3,400		112,000	73,000
3,500		112,000	73,000
3,550		112,000	73,000
3,800		119,000	78,000
3,950		119,000	78,000
4,000		119,000	78,000
4,400		126,000	82,000
4,500		126,000	82,000

d1		l1	l2
mm	inch	mm	mm
4,600		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,950		132,000	87,000
5,160	13/64	132,000	87,000
5,200		132,000	87,000
5,400		139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
6,000		139,000	91,000
7,400		156,000	102,000
7,800		165,000	109,000
8,500		165,000	109,000
9,000		175,000	115,000
9,900		184,000	121,000
10,320	13/32	184,000	121,000
11,000		195,000	128,000
11,500		195,000	128,000
11,600		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000

Wiertła lufowe



Wiertła kręte, długie



P ○ Korekcja ścina $\geq \varnothing 2,370$ • geometria zataczana • szczególnie duże rowki wiórowe

M

K

N • miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno

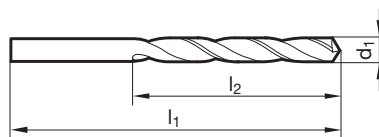
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 786

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu

501

Wiertła lurowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,350		90,000	59,000
1,020		56,000	33,000	2,370		95,000	62,000
1,030		56,000	33,000	2,380	3/32	95,000	62,000
1,040		56,000	33,000	2,400		95,000	62,000
1,070		60,000	37,000	2,440		95,000	62,000
1,090		60,000	37,000	2,450		95,000	62,000
1,100		60,000	37,000	2,490		95,000	62,000
1,180		60,000	37,000	2,500		95,000	62,000
1,190	3/64	65,000	41,000	2,520		95,000	62,000
1,200		65,000	41,000	2,530		95,000	62,000
1,250		65,000	41,000	2,550		95,000	62,000
1,300		65,000	41,000	2,580		95,000	62,000
1,320		65,000	41,000	2,600		95,000	62,000
1,400		70,000	45,000	2,640		95,000	62,000
1,450		70,000	45,000	2,650		95,000	62,000
1,480		70,000	45,000	2,700		100,000	66,000
1,500		70,000	45,000	2,710		100,000	66,000
1,510		76,000	50,000	2,750		100,000	66,000
1,550		76,000	50,000	2,780	7/64	100,000	66,000
1,590	1/16	76,000	50,000	2,790		100,000	66,000
1,600		76,000	50,000	2,800		100,000	66,000
1,610		76,000	50,000	2,820		100,000	66,000
1,700		76,000	50,000	2,850		100,000	66,000
1,750		80,000	53,000	2,870		100,000	66,000
1,780		80,000	53,000	2,900		100,000	66,000
1,800		80,000	53,000	2,950		100,000	66,000
1,850		80,000	53,000	3,000		100,000	66,000
1,900		80,000	53,000	3,050		106,000	69,000
1,930		85,000	56,000	3,100		106,000	69,000
1,950		85,000	56,000	3,170	1/8	106,000	69,000
1,980	5/64	85,000	56,000	3,200		106,000	69,000
1,990		85,000	56,000	3,250		106,000	69,000
2,000		85,000	56,000	3,260		106,000	69,000
2,050		85,000	56,000	3,300		106,000	69,000
2,060		85,000	56,000	3,350		106,000	69,000
2,080		85,000	56,000	3,400		112,000	73,000
2,100		85,000	56,000	3,450		112,000	73,000
2,180		90,000	59,000	3,500		112,000	73,000
2,200		90,000	59,000	3,570	9/64	112,000	73,000
2,250		90,000	59,000	3,600		112,000	73,000
2,260		90,000	59,000	3,650		112,000	73,000
2,300		90,000	59,000	3,660		112,000	73,000



d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,700		112,000	73,000	7,100		156,000	102,000
3,800		119,000	78,000	7,140	9/32	156,000	102,000
3,860		119,000	78,000	7,300		156,000	102,000
3,900		119,000	78,000	7,370		156,000	102,000
3,910		119,000	78,000	7,490		156,000	102,000
3,970	5/32	119,000	78,000	7,500		156,000	102,000
3,990		119,000	78,000	7,540	19/64	165,000	109,000
4,000		119,000	78,000	7,600		165,000	109,000
4,040		119,000	78,000	7,670		165,000	109,000
4,050		119,000	78,000	7,900		165,000	109,000
4,090		119,000	78,000	7,940	5/16	165,000	109,000
4,100		119,000	78,000	8,000		165,000	109,000
4,200		119,000	78,000	8,025		165,000	109,000
4,220		119,000	78,000	8,030		165,000	109,000
4,250		119,000	78,000	8,100		165,000	109,000
4,300		126,000	82,000	8,200		165,000	109,000
4,350		126,000	82,000	8,330	21/64	165,000	109,000
4,370	11/64	126,000	82,000	8,430		165,000	109,000
4,400		126,000	82,000	8,500		165,000	109,000
4,500		126,000	82,000	8,600		175,000	115,000
4,570		126,000	82,000	8,610		175,000	115,000
4,600		126,000	82,000	8,700		175,000	115,000
4,620		126,000	82,000	8,730	11/32	175,000	115,000
4,700		126,000	82,000	8,750		175,000	115,000
4,750		126,000	82,000	8,900		175,000	115,000
4,760	3/16	132,000	87,000	9,000		175,000	115,000
4,800		132,000	87,000	9,090		175,000	115,000
4,850		132,000	87,000	9,100		175,000	115,000
4,900		132,000	87,000	9,130	23/64	175,000	115,000
4,920		132,000	87,000	9,300		175,000	115,000
4,980		132,000	87,000	9,340		175,000	115,000
5,000		132,000	87,000	9,350		175,000	115,000
5,060		132,000	87,000	9,400		175,000	115,000
5,100		132,000	87,000	9,500		175,000	115,000
5,110		132,000	87,000	9,520	3/8	184,000	121,000
5,160	13/64	132,000	87,000	9,580		184,000	121,000
5,180		132,000	87,000	9,600		184,000	121,000
5,200		132,000	87,000	9,800		184,000	121,000
5,300		132,000	87,000	9,900		184,000	121,000
5,310		139,000	91,000	9,920	25/64	184,000	121,000
5,400		139,000	91,000	10,000		184,000	121,000
5,410		139,000	91,000	10,080		184,000	121,000
5,500		139,000	91,000	10,200		184,000	121,000
5,560	7/32	139,000	91,000	10,260		184,000	121,000
5,600		139,000	91,000	10,320	13/32	184,000	121,000
5,610		139,000	91,000	10,500		184,000	121,000
5,650		139,000	91,000	10,600		184,000	121,000
5,700		139,000	91,000	10,700		195,000	128,000
5,790		139,000	91,000	10,720	27/64	195,000	128,000
5,800		139,000	91,000	10,800		195,000	128,000
5,900		139,000	91,000	11,000		195,000	128,000
5,940		139,000	91,000	11,110	7/16	195,000	128,000
5,950	15/64	139,000	91,000	11,200		195,000	128,000
6,000		139,000	91,000	11,400		195,000	128,000
6,030		148,000	97,000	11,500		195,000	128,000
6,040		148,000	97,000	11,510	29/64	195,000	128,000
6,150		148,000	97,000	11,750		195,000	128,000
6,200		148,000	97,000	11,800		195,000	128,000
6,250		148,000	97,000	11,900		205,000	134,000
6,300		148,000	97,000	11,910	15/32	205,000	134,000
6,350	1/4	148,000	97,000	12,000		205,000	134,000
6,400		148,000	97,000	12,200		205,000	134,000
6,500		148,000	97,000	12,300	31/64	205,000	134,000
6,530		148,000	97,000	12,500		205,000	134,000
6,600		148,000	97,000	12,700	1/2	205,000	134,000
6,630		148,000	97,000	13,000		205,000	134,000
6,700		148,000	97,000	13,100	33/64	205,000	134,000
6,750	17/64	156,000	102,000	13,490	17/32	214,000	140,000
6,800		156,000	102,000	14,000		214,000	140,000
6,900		156,000	102,000	32,600		325,000	213,000
7,000		156,000	102,000				
7,040		156,000	102,000				

Wiertła lufowe



Wiertła kręte, długie

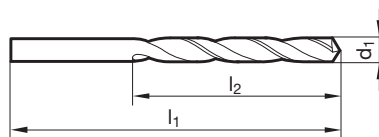


- P** ● Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybkotnąca • zwiększona odporność na zużycie
- M** ○
- K** ●
- N** ● stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	$\text{Ra} > 0,2,36$
Kierunek skrawania	R



Nr artykułu

317

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
0,500		32,000	12,000	2,500		95,000	62,000
0,600		35,000	15,000	2,600		95,000	62,000
0,700		42,000	21,000	2,700		100,000	66,000
0,750		42,000	21,000	2,780	7/64	100,000	66,000
0,800		46,000	25,000	2,800		100,000	66,000
0,850		46,000	25,000	2,900		100,000	66,000
0,900		51,000	29,000	3,000		100,000	66,000
0,950		51,000	29,000	3,050		106,000	69,000
0,960		56,000	33,000	3,100		106,000	69,000
1,000		56,000	33,000	3,170	1/8	106,000	69,000
1,020		56,000	33,000	3,200		106,000	69,000
1,050		56,000	33,000	3,250		106,000	69,000
1,100		60,000	37,000	3,300		106,000	69,000
1,150		60,000	37,000	3,400		112,000	73,000
1,190	3/64	65,000	41,000	3,500		112,000	73,000
1,200		65,000	41,000	3,550		112,000	73,000
1,250		65,000	41,000	3,570	9/64	112,000	73,000
1,300		65,000	41,000	3,600		112,000	73,000
1,350		70,000	45,000	3,700		112,000	73,000
1,400		70,000	45,000	3,800		119,000	78,000
1,450		70,000	45,000	3,900		119,000	78,000
1,500		70,000	45,000	3,970	5/32	119,000	78,000
1,510		76,000	50,000	4,000		119,000	78,000
1,550		76,000	50,000	4,040		119,000	78,000
1,590	1/16	76,000	50,000	4,100		119,000	78,000
1,600		76,000	50,000	4,200		119,000	78,000
1,650		76,000	50,000	4,300		126,000	82,000
1,700		76,000	50,000	4,370	11/64	126,000	82,000
1,780		80,000	53,000	4,400		126,000	82,000
1,800		80,000	53,000	4,500		126,000	82,000
1,850		80,000	53,000	4,600		126,000	82,000
1,900		80,000	53,000	4,700		126,000	82,000
1,950		85,000	56,000	4,760	3/16	132,000	87,000
1,980	5/64	85,000	56,000	4,800		132,000	87,000
2,000		85,000	56,000	4,850		132,000	87,000
2,050		85,000	56,000	4,900		132,000	87,000
2,060		85,000	56,000	5,000		132,000	87,000
2,100		85,000	56,000	5,050		132,000	87,000
2,200		90,000	59,000	5,100		132,000	87,000
2,300		90,000	59,000	5,160	13/64	132,000	87,000
2,380	3/32	95,000	62,000	5,200		132,000	87,000
2,400		95,000	62,000	5,300		132,000	87,000

Wiertła lufowe



d1		l1	l2
mm	inch	mm	mm
5,400		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,700		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,100		148,000	97,000
6,200		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,600		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,200		165,000	109,000
8,330	21/64	165,000	109,000
8,430		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
9,000		175,000	115,000
9,130	23/64	175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,500		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,920	25/64	184,000	121,000
10,000		184,000	121,000
10,100		184,000	121,000
10,200		184,000	121,000
10,320	13/32	184,000	121,000
10,500		184,000	121,000
10,720	27/64	195,000	128,000
10,750		195,000	128,000
10,800		195,000	128,000
11,000		195,000	128,000
11,110	7/16	195,000	128,000
11,200		195,000	128,000
11,500		195,000	128,000
11,510	29/64	195,000	128,000
11,910	15/32	205,000	134,000
12,000		205,000	134,000
12,300	31/64	205,000	134,000
12,500		205,000	134,000
12,700	1/2	205,000	134,000
13,000		205,000	134,000
13,100	33/64	205,000	134,000
13,500		214,000	140,000
13,700		214,000	140,000
13,890	35/64	214,000	140,000
13,900		214,000	140,000
14,000		214,000	140,000
14,290	9/16	220,000	144,000
14,400		220,000	144,000
14,600		220,000	144,000
14,680	37/64	220,000	144,000
14,700		220,000	144,000
14,750		220,000	144,000
14,900		220,000	144,000
15,000		220,000	144,000
15,080	19/32	227,000	149,000
15,480	39/64	227,000	149,000
15,800		227,000	149,000
15,870	5/8	227,000	149,000
16,000		227,000	149,000
22,000		268,000	176,000

Wiertła lufowe



Wiertła kręte, długie

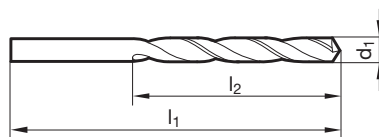


- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** •
- H** •

GÜHRING NAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	$\text{Ra} > 0,2,36$
Kierunek skrawania	R



Nr artykułu

336

Wiertła lufowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	2,440		95,000	62,000
1,020		56,000	33,000	2,450		95,000	62,000
1,040		56,000	33,000	2,490		95,000	62,000
1,070		60,000	37,000	2,500		95,000	62,000
1,090		60,000	37,000	2,530		95,000	62,000
1,100		60,000	37,000	2,550		95,000	62,000
1,180		60,000	37,000	2,580		95,000	62,000
1,190	3/64	65,000	41,000	2,600		95,000	62,000
1,200		65,000	41,000	2,640		95,000	62,000
1,250		65,000	41,000	2,700		100,000	66,000
1,300		65,000	41,000	2,710		100,000	66,000
1,320		65,000	41,000	2,750		100,000	66,000
1,400		70,000	45,000	2,780	7/64	100,000	66,000
1,500		70,000	45,000	2,790		100,000	66,000
1,510		76,000	50,000	2,800		100,000	66,000
1,550		76,000	50,000	2,820		100,000	66,000
1,590	1/16	76,000	50,000	2,850		100,000	66,000
1,600		76,000	50,000	2,870		100,000	66,000
1,610		76,000	50,000	2,900		100,000	66,000
1,700		76,000	50,000	2,950		100,000	66,000
1,750		80,000	53,000	3,000		100,000	66,000
1,780		80,000	53,000	3,050		106,000	69,000
1,800		80,000	53,000	3,100		106,000	69,000
1,850		80,000	53,000	3,170	1/8	106,000	69,000
1,900		80,000	53,000	3,200		106,000	69,000
1,930		85,000	56,000	3,260		106,000	69,000
1,980	5/64	85,000	56,000	3,300		106,000	69,000
1,990		85,000	56,000	3,400		112,000	73,000
2,000		85,000	56,000	3,440		112,000	73,000
2,050		85,000	56,000	3,450		112,000	73,000
2,060		85,000	56,000	3,500		112,000	73,000
2,080		85,000	56,000	3,570	9/64	112,000	73,000
2,100		85,000	56,000	3,600		112,000	73,000
2,180		90,000	59,000	3,660		112,000	73,000
2,200		90,000	59,000	3,700		112,000	73,000
2,250		90,000	59,000	3,730		112,000	73,000
2,260		90,000	59,000	3,750		112,000	73,000
2,300		90,000	59,000	3,800		119,000	78,000
2,350		90,000	59,000	3,860		119,000	78,000
2,370		95,000	62,000	3,900		119,000	78,000
2,380	3/32	95,000	62,000	3,910		119,000	78,000
2,400		95,000	62,000	3,970	5/32	119,000	78,000



d1		l1	l2
mm	inch	mm	mm
3,990		119,000	78,000
4,000		119,000	78,000
4,040		119,000	78,000
4,090		119,000	78,000
4,100		119,000	78,000
4,200		119,000	78,000
4,220		119,000	78,000
4,300		126,000	82,000
4,370	11/64	126,000	82,000
4,390		126,000	82,000
4,400		126,000	82,000
4,500		126,000	82,000
4,570		126,000	82,000
4,600		126,000	82,000
4,620		126,000	82,000
4,700		126,000	82,000
4,760	3/16	132,000	87,000
4,800		132,000	87,000
4,850		132,000	87,000
4,900		132,000	87,000
4,920		132,000	87,000
4,980		132,000	87,000
5,000		132,000	87,000
5,060		132,000	87,000
5,100		132,000	87,000
5,110		132,000	87,000
5,160	13/64	132,000	87,000
5,180		132,000	87,000
5,200		132,000	87,000
5,220		132,000	87,000
5,300		132,000	87,000
5,310		139,000	91,000
5,400		139,000	91,000
5,410		139,000	91,000
5,500		139,000	91,000
5,560	7/32	139,000	91,000
5,600		139,000	91,000
5,610		139,000	91,000
5,700		139,000	91,000
5,790		139,000	91,000
5,800		139,000	91,000
5,900		139,000	91,000
5,940		139,000	91,000
5,950	15/64	139,000	91,000
6,000		139,000	91,000
6,040		148,000	97,000
6,100		148,000	97,000
6,150		148,000	97,000
6,200		148,000	97,000
6,250		148,000	97,000
6,300		148,000	97,000
6,350	1/4	148,000	97,000
6,400		148,000	97,000
6,500		148,000	97,000
6,530		148,000	97,000
6,600		148,000	97,000
6,630		148,000	97,000
6,700		148,000	97,000
6,750	17/64	156,000	102,000
6,800		156,000	102,000

d1		l1	l2
mm	inch	mm	mm
6,900		156,000	102,000
7,000		156,000	102,000
7,030		156,000	102,000
7,100		156,000	102,000
7,140	9/32	156,000	102,000
7,200		156,000	102,000
7,300		156,000	102,000
7,370		156,000	102,000
7,400		156,000	102,000
7,490		156,000	102,000
7,500		156,000	102,000
7,540	19/64	165,000	109,000
7,670		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,900		165,000	109,000
7,940	5/16	165,000	109,000
8,000		165,000	109,000
8,030		165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,610		175,000	115,000
8,700		175,000	115,000
8,730	11/32	175,000	115,000
8,800		175,000	115,000
8,840		175,000	115,000
8,900		175,000	115,000
9,000		175,000	115,000
9,090		175,000	115,000
9,100		175,000	115,000
9,200		175,000	115,000
9,300		175,000	115,000
9,350		175,000	115,000
9,400		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,700		184,000	121,000
9,750		184,000	121,000
9,800		184,000	121,000
9,900		184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000
10,500		184,000	121,000
10,750		195,000	128,000
10,800		195,000	128,000
10,900		195,000	128,000
11,000		195,000	128,000
11,500		195,000	128,000
11,800		195,000	128,000
12,000		205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,500		227,000	149,000
16,000		227,000	149,000

Wiertła lufowe



Wiertła kręte, długie

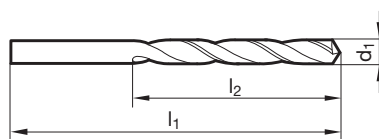


- P** • Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • szczególnie wysoka odporność ścierania • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale stopowe/niestopowe i żeliwa - $R_m > 800 \text{ N/mm}^2$ • stale narzędziowe do pracy na zimno i gorąco • stale łożyskowe • stale wysokostopowe • stale do ulepszc. ciepln. i stale do nawęglania
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	F
Kierunek skrawania	R



Nr artykułu

396

Wiertła luflowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	5,800		139,000	91,000
1,100		60,000	37,000	5,900		139,000	91,000
1,200		65,000	41,000	6,000		139,000	91,000
1,300		65,000	41,000	6,200		148,000	97,000
1,500		70,000	45,000	6,500		148,000	97,000
1,600		76,000	50,000	6,700		148,000	97,000
1,800		80,000	53,000	6,800		156,000	102,000
1,900		80,000	53,000	7,000		156,000	102,000
2,000		85,000	56,000	7,200		156,000	102,000
2,100		85,000	56,000	7,400		156,000	102,000
2,200		90,000	59,000	7,500		156,000	102,000
2,300		90,000	59,000	7,600		165,000	109,000
2,400		95,000	62,000	7,700		165,000	109,000
2,500		95,000	62,000	7,800		165,000	109,000
2,700		100,000	66,000	7,900		165,000	109,000
2,800		100,000	66,000	8,000		165,000	109,000
2,900		100,000	66,000	8,200		165,000	109,000
3,000		100,000	66,000	8,300		165,000	109,000
3,100		106,000	69,000	8,500		165,000	109,000
3,200		106,000	69,000	8,600		175,000	115,000
3,300		106,000	69,000	8,800		175,000	115,000
3,400		112,000	73,000	8,900		175,000	115,000
3,500		112,000	73,000	9,000		175,000	115,000
3,600		112,000	73,000	9,100		175,000	115,000
3,800		119,000	78,000	9,200		175,000	115,000
3,900		119,000	78,000	9,300		175,000	115,000
4,000		119,000	78,000	9,500		175,000	115,000
4,100		119,000	78,000	9,600		184,000	121,000
4,200		119,000	78,000	9,700		184,000	121,000
4,500		126,000	82,000	10,000		184,000	121,000
4,800		132,000	87,000	10,200		184,000	121,000
5,000		132,000	87,000	10,500		184,000	121,000
5,100		132,000	87,000	11,000		195,000	128,000
5,200		132,000	87,000	11,500		195,000	128,000
5,400		139,000	91,000	12,000		205,000	134,000
5,500		139,000	91,000				



Wiertła kręte, długie

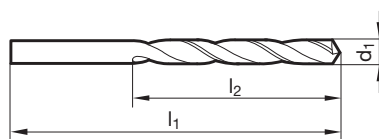


- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaro-
odporne • wysokowytrzymałe / krótkowłórowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • stale łożyskowe • Hastelloy, Inconel, Nimonic
- H** ●

GÜHRINGNAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **617**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	3,300		106,000	69,000
1,100		60,000	37,000	3,400		112,000	73,000
1,200		65,000	41,000	3,450		112,000	73,000
1,300		65,000	41,000	3,500		112,000	73,000
1,400		70,000	45,000	3,570	9/64	112,000	73,000
1,450		70,000	45,000	3,600		112,000	73,000
1,500		70,000	45,000	3,700		112,000	73,000
1,590	1/16	76,000	50,000	3,800		119,000	78,000
1,600		76,000	50,000	3,900		119,000	78,000
1,610		76,000	50,000	3,970	5/32	119,000	78,000
1,650		76,000	50,000	4,000		119,000	78,000
1,700		76,000	50,000	4,050		119,000	78,000
1,750		80,000	53,000	4,100		119,000	78,000
1,800		80,000	53,000	4,200		119,000	78,000
1,850		80,000	53,000	4,300		126,000	82,000
1,900		80,000	53,000	4,400		126,000	82,000
1,930		85,000	56,000	4,500		126,000	82,000
1,950		85,000	56,000	4,600		126,000	82,000
1,980	5/64	85,000	56,000	4,700		126,000	82,000
2,000		85,000	56,000	4,760	3/16	132,000	87,000
2,050		85,000	56,000	4,800		132,000	87,000
2,100		85,000	56,000	4,900		132,000	87,000
2,150		90,000	59,000	4,950		132,000	87,000
2,200		90,000	59,000	5,000		132,000	87,000
2,260		90,000	59,000	5,100		132,000	87,000
2,300		90,000	59,000	5,160	13/64	132,000	87,000
2,380	3/32	95,000	62,000	5,200		132,000	87,000
2,400		95,000	62,000	5,300		132,000	87,000
2,450		95,000	62,000	5,400		139,000	91,000
2,500		95,000	62,000	5,500		139,000	91,000
2,550		95,000	62,000	5,600		139,000	91,000
2,600		95,000	62,000	5,700		139,000	91,000
2,700		100,000	66,000	5,800		139,000	91,000
2,780	7/64	100,000	66,000	6,000		139,000	91,000
2,800		100,000	66,000	6,100		148,000	97,000
2,900		100,000	66,000	6,200		148,000	97,000
3,000		100,000	66,000	6,300		148,000	97,000
3,050		106,000	69,000	6,350	1/4	148,000	97,000
3,100		106,000	69,000	6,400		148,000	97,000
3,170	1/8	106,000	69,000	6,500		148,000	97,000
3,200		106,000	69,000	6,600		148,000	97,000
3,250		106,000	69,000	6,700		148,000	97,000

Wiertła lufowe



d1		l1	l2
mm	inch	mm	mm
6,750	17/64	156,000	102,000
6,800		156,000	102,000
6,900		156,000	102,000
7,000	9/32	156,000	102,000
7,100		156,000	102,000
7,140		156,000	102,000
7,250		156,000	102,000
7,400		156,000	102,000
7,500	19/64	156,000	102,000
7,540		165,000	109,000
7,700		165,000	109,000
7,800		165,000	109,000
7,940		165,000	109,000
8,000	5/16	165,000	109,000
8,100		165,000	109,000
8,200		165,000	109,000
8,300	21/64	165,000	109,000
8,330		165,000	109,000
8,400		165,000	109,000
8,500		165,000	109,000
8,600		175,000	115,000
8,700	11/32	175,000	115,000
8,730		175,000	115,000
8,800		175,000	115,000

d1		l1	l2
mm	inch	mm	mm
9,000		175,000	115,000
9,100		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
9,800		184,000	121,000
10,000		184,000	121,000
10,200	7/16	184,000	121,000
10,500		184,000	121,000
11,000		195,000	128,000
11,110		195,000	128,000
11,510		195,000	128,000
12,000	29/64	205,000	134,000
12,500		205,000	134,000
13,000		205,000	134,000
15,000		220,000	144,000



Wiertła kręte, długie

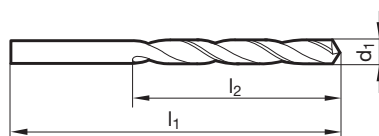


- P** ○ Korekcja ścina $\geq \varnothing 1,000$ • geometria zataczana • kobaltowa stal
szybkotnąca • zwiększona odporność na zużycie
- M** ●
- K** ●
- N** ● Tytan i stopy tytanu • stale nierdzewne austenityczne /kwaso-/żaro-
odporne • wysokowytrzymałe / krótkowłórowe stale $R_m > 900 \text{ N/mm}^2$
- S** ● • stale łożyskowe • Hastelloy, Inconel, Nimonic
- H** ●

GÜHRINGNAVIGATOR

Param. skr. na str. 792

Materiał narzędzia	HSCO
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu **669**

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,000		56,000	33,000	4,300		126,000	82,000
1,200		65,000	41,000	4,370	11/64	126,000	82,000
1,300		65,000	41,000	4,400		126,000	82,000
1,400		70,000	45,000	4,500		126,000	82,000
1,500		70,000	45,000	4,700		126,000	82,000
1,590	1/16	76,000	50,000	4,760	3/16	132,000	87,000
1,600		76,000	50,000	4,800		132,000	87,000
1,700		76,000	50,000	5,000		132,000	87,000
1,800		80,000	53,000	5,100		132,000	87,000
1,900		80,000	53,000	5,160	13/64	132,000	87,000
1,980	5/64	85,000	56,000	5,200		132,000	87,000
2,000		85,000	56,000	5,300		132,000	87,000
2,050		85,000	56,000	5,500		139,000	91,000
2,100		85,000	56,000	5,600		139,000	91,000
2,200		90,000	59,000	5,700		139,000	91,000
2,300		90,000	59,000	5,800		139,000	91,000
2,380	3/32	95,000	62,000	6,000		139,000	91,000
2,400		95,000	62,000	6,100		148,000	97,000
2,500		95,000	62,000	6,200		148,000	97,000
2,600		95,000	62,000	6,300		148,000	97,000
2,700		100,000	66,000	6,350	1/4	148,000	97,000
2,750		100,000	66,000	6,400		148,000	97,000
2,780	7/64	100,000	66,000	6,500		148,000	97,000
2,800		100,000	66,000	6,700		148,000	97,000
2,900		100,000	66,000	6,750	17/64	156,000	102,000
3,000		100,000	66,000	6,800		156,000	102,000
3,100		106,000	69,000	7,000		156,000	102,000
3,170	1/8	106,000	69,000	7,100		156,000	102,000
3,200		106,000	69,000	7,140	9/32	156,000	102,000
3,250		106,000	69,000	7,200		156,000	102,000
3,300		106,000	69,000	7,400		156,000	102,000
3,400		112,000	73,000	7,500		156,000	102,000
3,500		112,000	73,000	7,540	19/64	165,000	109,000
3,570	9/64	112,000	73,000	7,800		165,000	109,000
3,600		112,000	73,000	7,900		165,000	109,000
3,700		112,000	73,000	7,940	5/16	165,000	109,000
3,800		119,000	78,000	8,000		165,000	109,000
3,900		119,000	78,000	8,200		165,000	109,000
3,970	5/32	119,000	78,000	8,500		165,000	109,000
4,000		119,000	78,000	8,730	11/32	175,000	115,000
4,100		119,000	78,000	9,000		175,000	115,000
4,200		119,000	78,000	9,130	23/64	175,000	115,000

Wiertła lufowe

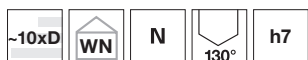


d1		l1	l2
mm	inch	mm	mm
9,300		175,000	115,000
9,500		175,000	115,000
9,520	3/8	184,000	121,000
10,000		184,000	121,000
10,200		184,000	121,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, długie



Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Kierunek skrawania (R)

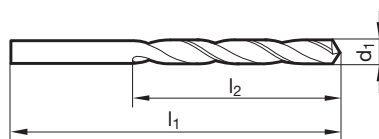
P geom. ścinowa • główna krawędź skrawająca - prosta

- M**
- K**
- N**
- S**
- H**

tworzywa sztuczne, wzmocnione włóknem szklanym • duroplasty powodujące mocne zużywanie się łysinek i krawędzi tnących

GÜHRINGNAVIGATOR

Param. skr. na str. 792



Nr artykułu **706**

d1		l1	l2
mm	inch	mm	mm
0,500		38,000	8,500
0,600		38,000	9,500
0,650		38,000	10,500
0,700		38,000	10,500
0,750		38,000	12,500
0,800		38,000	12,500
0,850		38,000	14,500
0,900		38,000	14,500
1,000		38,000	17,000
1,050		38,000	17,000
1,100		38,000	17,000
1,400		38,000	17,000

d1		l1	l2
mm	inch	mm	mm
1,450		38,000	17,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 1



P • Korekcja ścina $\geq \varnothing 2,380$ • geometria zataczana • do bardzo głębokich otworów

M

K •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

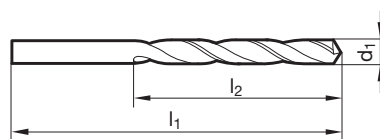
S

H

GÜHRING NAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	$\geq 0,236$
Kierunek skrawania	(R)



Nr artykułu

235

Wiertła lufowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,600		115,000	75,000	4,600		185,000	125,000
1,700		115,000	75,000	4,700		185,000	125,000
1,800		120,000	80,000	4,760	3/16	195,000	135,000
1,900		120,000	80,000	4,800		195,000	135,000
1,930		125,000	85,000	4,900		195,000	135,000
1,950		125,000	85,000	5,000		195,000	135,000
2,000		125,000	85,000	5,100		195,000	135,000
2,050		125,000	85,000	5,200		195,000	135,000
2,100		125,000	85,000	5,300		195,000	135,000
2,200		135,000	90,000	5,340		205,000	140,000
2,300		135,000	90,000	5,400		205,000	140,000
2,350		135,000	90,000	5,500		205,000	140,000
2,380	3/32	140,000	95,000	5,560	7/32	205,000	140,000
2,400		140,000	95,000	5,600		205,000	140,000
2,500		140,000	95,000	5,700		205,000	140,000
2,600		140,000	95,000	5,800		205,000	140,000
2,700		150,000	100,000	5,900		205,000	140,000
2,800		150,000	100,000	6,000		205,000	140,000
2,900		150,000	100,000	6,100		215,000	150,000
3,000		150,000	100,000	6,200		215,000	150,000
3,100		155,000	105,000	6,250		215,000	150,000
3,170	1/8	155,000	105,000	6,300		215,000	150,000
3,200		155,000	105,000	6,350	1/4	215,000	150,000
3,250		155,000	105,000	6,400		215,000	150,000
3,300		155,000	105,000	6,500		215,000	150,000
3,400		165,000	115,000	6,600		215,000	150,000
3,500		165,000	115,000	6,700		215,000	150,000
3,570	9/64	165,000	115,000	6,750	17/64	225,000	155,000
3,600		165,000	115,000	6,800		225,000	155,000
3,650		165,000	115,000	7,000		225,000	155,000
3,700		165,000	115,000	7,200		225,000	155,000
3,750		165,000	115,000	7,400		225,000	155,000
3,800		175,000	120,000	7,500		225,000	155,000
3,900		175,000	120,000	7,700		240,000	165,000
3,970	5/32	175,000	120,000	7,800		240,000	165,000
4,000		175,000	120,000	7,900		240,000	165,000
4,100		175,000	120,000	7,940	5/16	240,000	165,000
4,200		175,000	120,000	8,000		240,000	165,000
4,300		185,000	125,000	8,100		240,000	165,000
4,370	11/64	185,000	125,000	8,200		240,000	165,000
4,400		185,000	125,000	8,330	21/64	240,000	165,000
4,500		185,000	125,000	8,400		240,000	165,000



d1		l1	l2
mm	inch	mm	mm
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,100		265,000	185,000
10,200		265,000	185,000
10,250		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
10,320	13/32	265,000	185,000
10,500		265,000	185,000
11,000		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,100		295,000	205,000
12,250		295,000	205,000
12,300	31/64	295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Wiertła kręte, bardzo długie, szereg 1



Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} > 0,2,36$

Kierunek skrawania

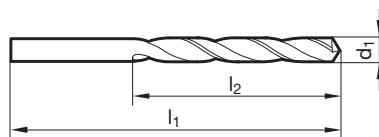
P • Korekcja ścina $\geq \text{Ø} 1,950$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów

K •
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S
H

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **502**

Wiertła lufowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
1,950		125,000	85,000	4,400		185,000	125,000
2,000		125,000	85,000	4,500		185,000	125,000
2,050		125,000	85,000	4,570		185,000	125,000
2,100		125,000	85,000	4,600		185,000	125,000
2,200		135,000	90,000	4,700		185,000	125,000
2,300		135,000	90,000	4,760	3/16	195,000	135,000
2,370		140,000	95,000	4,800		195,000	135,000
2,380	3/32	140,000	95,000	4,900		195,000	135,000
2,400		140,000	95,000	5,000		195,000	135,000
2,500		140,000	95,000	5,100		195,000	135,000
2,550		140,000	95,000	5,110		195,000	135,000
2,580		140,000	95,000	5,160	13/64	195,000	135,000
2,600		140,000	95,000	5,200		195,000	135,000
2,700		150,000	100,000	5,300		195,000	135,000
2,780	7/64	150,000	100,000	5,400		205,000	140,000
2,800		150,000	100,000	5,500		205,000	140,000
2,850		150,000	100,000	5,560	7/32	205,000	140,000
2,870		150,000	100,000	5,600		205,000	140,000
2,900		150,000	100,000	5,700		205,000	140,000
2,950		150,000	100,000	5,750		205,000	140,000
3,000		150,000	100,000	5,800		205,000	140,000
3,030		155,000	105,000	5,900		205,000	140,000
3,100		155,000	105,000	5,950	15/64	205,000	140,000
3,170	1/8	155,000	105,000	6,000		205,000	140,000
3,200		155,000	105,000	6,100		215,000	150,000
3,250		155,000	105,000	6,200		215,000	150,000
3,300		155,000	105,000	6,250		215,000	150,000
3,400		165,000	115,000	6,300		215,000	150,000
3,500		165,000	115,000	6,350	1/4	215,000	150,000
3,570	9/64	165,000	115,000	6,400		215,000	150,000
3,600		165,000	115,000	6,500		215,000	150,000
3,700		165,000	115,000	6,600		215,000	150,000
3,750		165,000	115,000	6,700		215,000	150,000
3,800		175,000	120,000	6,750	17/64	225,000	155,000
3,860		175,000	120,000	6,800		225,000	155,000
3,900		175,000	120,000	6,900		225,000	155,000
3,970	5/32	175,000	120,000	7,000		225,000	155,000
4,000		175,000	120,000	7,100		225,000	155,000
4,100		175,000	120,000	7,200		225,000	155,000
4,200		175,000	120,000	7,300		225,000	155,000
4,300		185,000	125,000	7,500		225,000	155,000
4,370	11/64	185,000	125,000	7,540	19/64	240,000	165,000



d1		l1	l2
mm	inch	mm	mm
7,700		240,000	165,000
7,750		240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,200		240,000	165,000
8,300		240,000	165,000
8,330	21/64	240,000	165,000
8,400		240,000	165,000
8,430		240,000	165,000
8,500		240,000	165,000
8,600		250,000	175,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,200		250,000	175,000
9,300		250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000

d1		l1	l2
mm	inch	mm	mm
9,700		265,000	185,000
9,800		265,000	185,000
9,900		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,200		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
10,720	27/64	280,000	195,000
11,000		280,000	195,000
11,110	7/16	280,000	195,000
11,200		280,000	195,000
11,500		280,000	195,000
11,510	29/64	280,000	195,000
11,750		280,000	195,000
11,800		280,000	195,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000
13,000		295,000	205,000



Wiertła kręte, bardzo długie, szereg 1

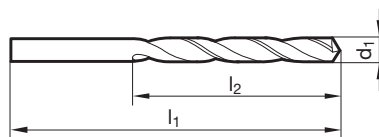


- P** • Korekcja ścina $\geq \varnothing 1,980$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S** ○
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	S
Kierunek skrawania	R



Nr artykułu **670**

Wiertła luflowe

d1		l1	l2
mm	inch	mm	mm
2,000		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,500		140,000	95,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,200		175,000	120,000
4,370	11/64	185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000

d1		l1	l2
mm	inch	mm	mm
6,350	1/4	215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,500		240,000	165,000
8,730	11/32	250,000	175,000
9,000		250,000	175,000
9,520	3/8	265,000	185,000
9,600		265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,900		280,000	195,000
11,000		280,000	195,000
11,900		295,000	205,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,500		295,000	205,000
12,700	1/2	295,000	205,000



Wiertła kręte, bardzo długie, szereg 1

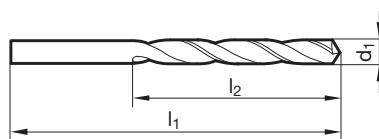


- P** ○ Korekcja ścina $\geq 2,380$ • geometria zataczana • do bardzo głębokich otworów
- M** □
- K** □
- N** ● miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnżl, argalium, miękkie tworzywa sztuczne, drewno
- S** □
- H** □

GÜHRINGNAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **524**

d1		l1	l2
mm	inch	mm	mm
2,000		125,000	85,000
2,100		125,000	85,000
2,200		135,000	90,000
2,300		135,000	90,000
2,350		135,000	90,000
2,380	3/32	140,000	95,000
2,400		140,000	95,000
2,450		140,000	95,000
2,500		140,000	95,000
2,600		140,000	95,000
2,780	7/64	150,000	100,000
2,800		150,000	100,000
2,900		150,000	100,000
2,950		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,350		155,000	105,000
3,400		165,000	115,000
3,450		165,000	115,000
3,500		165,000	115,000
3,530		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,800		175,000	120,000
3,900		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,250		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000
4,760	3/16	195,000	135,000
4,900		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000

d1		l1	l2
mm	inch	mm	mm
5,200		195,000	135,000
5,400		205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000
5,800		205,000	140,000
5,900		205,000	140,000
5,950	15/64	205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
7,000		225,000	155,000
7,100		225,000	155,000
7,140	9/32	225,000	155,000
7,300		225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,800		240,000	165,000
7,900		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,100		240,000	165,000
8,330	21/64	240,000	165,000
8,600		250,000	175,000
8,730	11/32	250,000	175,000
8,900		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,200		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,920	25/64	265,000	185,000
10,000		265,000	185,000
10,320	13/32	265,000	185,000
10,500		265,000	185,000
11,000		280,000	195,000
11,110	7/16	280,000	195,000

Wiertła lufowe

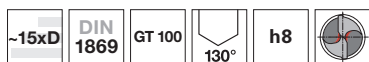


d1		l1	l2
mm	inch	mm	mm
11,500		280,000	195,000
11,910	15/32	295,000	205,000
12,000		295,000	205,000
12,700	1/2	295,000	205,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, bardzo długie, szereg 1

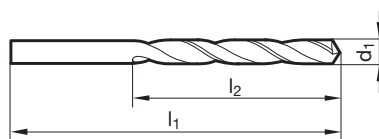


- P** • Korekcja ścina $\geq \varnothing 2,700$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu **618**

d1		l1	l2
mm	inch	mm	mm
2,700		150,000	100,000
2,900		150,000	100,000
3,000		150,000	100,000
3,100		155,000	105,000
3,170	1/8	155,000	105,000
3,200		155,000	105,000
3,300		155,000	105,000
3,400		165,000	115,000
3,500		165,000	115,000
3,570	9/64	165,000	115,000
3,600		165,000	115,000
3,700		165,000	115,000
3,750		165,000	115,000
3,800		175,000	120,000
3,970	5/32	175,000	120,000
4,000		175,000	120,000
4,100		175,000	120,000
4,200		175,000	120,000
4,300		185,000	125,000
4,370	11/64	185,000	125,000
4,400		185,000	125,000
4,500		185,000	125,000
4,600		185,000	125,000
4,760	3/16	195,000	135,000
4,800		195,000	135,000
4,850		195,000	135,000
5,000		195,000	135,000
5,100		195,000	135,000
5,160	13/64	195,000	135,000
5,200		195,000	135,000
5,300		195,000	135,000
5,400		205,000	140,000
5,500		205,000	140,000
5,560	7/32	205,000	140,000
5,600		205,000	140,000
5,700		205,000	140,000

d1		l1	l2
mm	inch	mm	mm
5,800		205,000	140,000
6,000		205,000	140,000
6,100		215,000	150,000
6,200		215,000	150,000
6,300		215,000	150,000
6,350	1/4	215,000	150,000
6,400		215,000	150,000
6,500		215,000	150,000
6,600		215,000	150,000
6,700		215,000	150,000
6,750	17/64	225,000	155,000
6,800		225,000	155,000
7,000		225,000	155,000
7,140	9/32	225,000	155,000
7,400		225,000	155,000
7,500		225,000	155,000
7,540	19/64	240,000	165,000
7,700		240,000	165,000
7,800		240,000	165,000
7,940	5/16	240,000	165,000
8,000		240,000	165,000
8,200		240,000	165,000
8,330	21/64	240,000	165,000
8,500		240,000	165,000
8,700		250,000	175,000
8,730	11/32	250,000	175,000
8,800		250,000	175,000
9,000		250,000	175,000
9,130	23/64	250,000	175,000
9,400		250,000	175,000
9,500		250,000	175,000
9,520	3/8	265,000	185,000
9,700		265,000	185,000
10,000		265,000	185,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 2

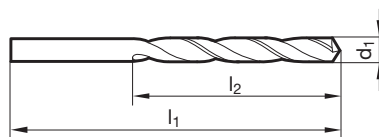


- P** • Korekcja ścina $\geq \varnothing 2,700$ • geometria zataczana • do bardzo głębokich otworów
- M**
- K** •
- N** ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** • proszki spiekane metali, nowe srebro (alpaka), grafit
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ



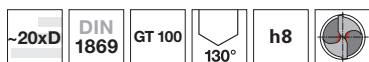
Nr artykułu **236**

Wiertła luźnowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
2,700		190,000	130,000	6,500		275,000	190,000
2,800		190,000	130,000	6,700		275,000	190,000
2,900		190,000	130,000	6,800		290,000	200,000
3,000		190,000	130,000	7,000		290,000	200,000
3,100		200,000	135,000	7,140	9/32	290,000	200,000
3,170	1/8	200,000	135,000	7,500		290,000	200,000
3,200		200,000	135,000	7,540	19/64	305,000	210,000
3,300		200,000	135,000	7,800		305,000	210,000
3,500		210,000	145,000	7,940	5/16	305,000	210,000
3,570	9/64	210,000	145,000	8,000		305,000	210,000
3,600		210,000	145,000	8,100		305,000	210,000
3,800		220,000	150,000	8,500		305,000	210,000
3,970	5/32	220,000	150,000	8,700		320,000	220,000
4,000		220,000	150,000	8,730	11/32	320,000	220,000
4,100		220,000	150,000	8,800		320,000	220,000
4,200		220,000	150,000	8,900		320,000	220,000
4,500		235,000	160,000	9,000		320,000	220,000
4,760	3/16	245,000	170,000	9,130	23/64	320,000	220,000
4,800		245,000	170,000	9,500		320,000	220,000
4,900		245,000	170,000	9,800		340,000	235,000
5,000		245,000	170,000	10,000		340,000	235,000
5,200		245,000	170,000	10,200		340,000	235,000
5,500		260,000	180,000	10,500		340,000	235,000
5,560	7/32	260,000	180,000	11,000		365,000	250,000
5,800		260,000	180,000	11,110	7/16	365,000	250,000
5,900		260,000	180,000	11,500		365,000	250,000
5,950	15/64	260,000	180,000	11,510	29/64	365,000	250,000
6,000		260,000	180,000	11,750		365,000	250,000
6,200		275,000	190,000	12,000		375,000	260,000
6,350	1/4	275,000	190,000	13,000		375,000	260,000



Wiertła kręte, bardzo długie, szereg 2

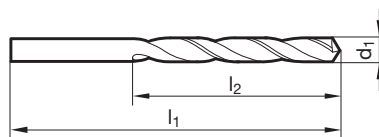


- P** • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	$\text{Ra} > 0,2,36$
Kierunek skrawania	R



Nr artykułu **503**

d1		l1	l2
mm	inch	mm	mm
2,000		160,000	110,000
2,200		170,000	115,000
2,300		170,000	115,000
2,500		180,000	120,000
2,800		190,000	130,000
3,000		190,000	130,000
3,030		200,000	135,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,400		210,000	145,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,600		210,000	145,000
3,700		210,000	145,000
3,800		220,000	150,000
3,900		220,000	150,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,300		235,000	160,000
4,370	11/64	235,000	160,000
4,400		235,000	160,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,100		245,000	170,000
5,160	13/64	245,000	170,000
5,200		245,000	170,000
5,300		245,000	170,000
5,400		260,000	180,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,700		260,000	180,000
5,800		260,000	180,000
5,900		260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000

d1		l1	l2
mm	inch	mm	mm
6,100		275,000	190,000
6,150		275,000	190,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000
6,400		275,000	190,000
6,500		275,000	190,000
6,600		275,000	190,000
6,700		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
6,900		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,800		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,200		305,000	210,000
8,330	21/64	305,000	210,000
8,500		305,000	210,000
8,600		320,000	220,000
8,730	11/32	320,000	220,000
8,800		320,000	220,000
9,000		320,000	220,000
9,100		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,700		340,000	235,000
9,800		340,000	235,000
9,920	25/64	340,000	235,000
10,000		340,000	235,000
10,200		340,000	235,000
10,500		340,000	235,000
10,720	27/64	365,000	250,000
11,000		365,000	250,000
11,110	7/16	365,000	250,000
11,500		365,000	250,000
11,510	29/64	365,000	250,000
11,750		365,000	250,000
11,910	15/32	375,000	260,000

Wiertła lufowe

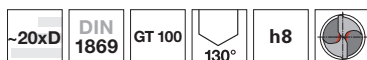


d1		l1	l2
mm	inch	mm	mm
12,000		375,000	260,000
12,300	31/64	375,000	260,000
12,500		375,000	260,000
12,700	1/2	375,000	260,000
13,000		375,000	260,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, bardzo długie, szereg 2



Materiał narzędzia **HSS**

Powierzchnia **S**

Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 2,300$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów

M

K •

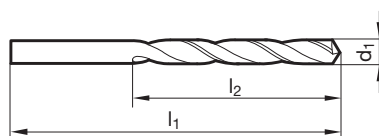
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S ○

H

GÜHRINGNAVIGATOR

Param. skr. na str. 790



Nr artykułu **671**

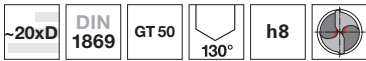
d1		l1	l2
mm	inch	mm	mm
2,700		190,000	130,000
2,800		190,000	130,000
3,000		190,000	130,000
3,100		200,000	135,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,090		220,000	150,000
4,370	11/64	235,000	160,000
4,400		235,000	160,000
4,500		235,000	160,000
4,600		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
5,000		245,000	170,000

d1		l1	l2
mm	inch	mm	mm
5,300		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
6,000		260,000	180,000
6,350	1/4	275,000	190,000
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,500		290,000	200,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,500		305,000	210,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 2

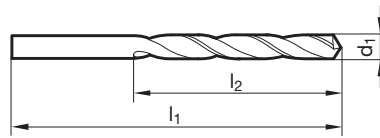


- P** ○ Korekcja ścina $\geq \varnothing 2,800$ • geometria zataczana • do bardzo głębokich otworów
- M** □
- K** □
- N** ● miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno
- S** □
- H** □

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ

GÜHRINGNAVIGATOR

Param. skr. na str. 788



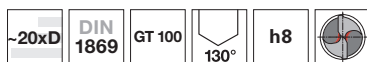
Nr artykułu **528**

Wiertła luźnowe

d1		l1	l2	d1		l1	l2
mm	inch	mm	mm	mm	inch	mm	mm
3,000		190,000	130,000	7,500		290,000	200,000
3,030		200,000	135,000	8,000		305,000	210,000
3,100		200,000	135,000	8,500		305,000	210,000
3,170	1/8	200,000	135,000	9,000		320,000	220,000
3,500		210,000	145,000	10,000		340,000	235,000
3,650		210,000	145,000	10,500		340,000	235,000
3,800		220,000	150,000	11,500		365,000	250,000
4,000		220,000	150,000	13,000		375,000	260,000
4,200		220,000	150,000				
4,500		235,000	160,000				
4,760	3/16	245,000	170,000				
4,800		245,000	170,000				
5,000		245,000	170,000				
5,110		245,000	170,000				
5,500		260,000	180,000				
5,800		260,000	180,000				
6,000		260,000	180,000				
7,000		290,000	200,000				



Wiertła kręte, bardzo długie, szereg 2

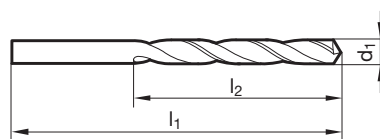


- P** • Korekcja ścina $\geq \varnothing 3,000$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu **619**

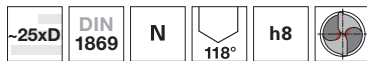
d1		l1	l2
mm	inch	mm	mm
3,000		190,000	130,000
3,170	1/8	200,000	135,000
3,200		200,000	135,000
3,300		200,000	135,000
3,500		210,000	145,000
3,570	9/64	210,000	145,000
3,970	5/32	220,000	150,000
4,000		220,000	150,000
4,100		220,000	150,000
4,200		220,000	150,000
4,370	11/64	235,000	160,000
4,500		235,000	160,000
4,760	3/16	245,000	170,000
4,800		245,000	170,000
4,900		245,000	170,000
5,000		245,000	170,000
5,200		245,000	170,000
5,500		260,000	180,000
5,560	7/32	260,000	180,000
5,950	15/64	260,000	180,000
6,000		260,000	180,000
6,100		275,000	190,000
6,200		275,000	190,000
6,350	1/4	275,000	190,000

d1		l1	l2
mm	inch	mm	mm
6,500		275,000	190,000
6,750	17/64	290,000	200,000
6,800		290,000	200,000
7,000		290,000	200,000
7,140	9/32	290,000	200,000
7,400		290,000	200,000
7,500		290,000	200,000
7,540	19/64	305,000	210,000
7,600		305,000	210,000
7,940	5/16	305,000	210,000
8,000		305,000	210,000
8,200		305,000	210,000
8,500		305,000	210,000
8,730	11/32	320,000	220,000
9,000		320,000	220,000
9,130	23/64	320,000	220,000
9,500		320,000	220,000
9,520	3/8	340,000	235,000
9,600		340,000	235,000
9,900		340,000	235,000
10,000		340,000	235,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 3



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 3,500$ • geometria zataczana • do bardzo głębokich otworów

M

K •

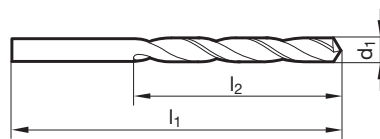
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 788



Nr artykułu

237

Wiertła luflowe

d1		l1	l2
mm	inch	mm	mm
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,800		330,000	225,000
5,900		330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,000		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,500		370,000	250,000
7,800		390,000	265,000
8,000		390,000	265,000
8,500		390,000	265,000
9,000		410,000	280,000
9,500		410,000	280,000
9,800		430,000	295,000
10,000		430,000	295,000
10,300		430,000	295,000
10,500		430,000	295,000
11,000		455,000	310,000
11,500		455,000	310,000
11,750		455,000	310,000
12,000		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000



Wiertła kręte, bardzo długie, szereg 3

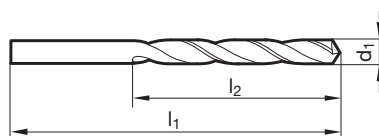


- P** • Korekcja ścina $\geq \varnothing 2,500$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	



Nr artykułu **504**

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,570	9/64	265,000	180,000
3,600		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,370	11/64	295,000	200,000
4,400		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000
6,750	17/64	370,000	250,000
6,800		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,540	19/64	390,000	265,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,330	21/64	390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
8,900		410,000	280,000
9,000		410,000	280,000
9,200		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
9,530		430,000	295,000
9,920	25/64	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 3

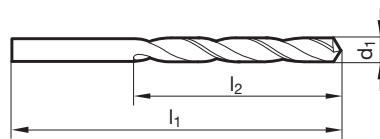


P	○	Korekcja ścina $\geq \varnothing 2,500$ • geometria zataczana • do bardzo głębokich otworów
M		
K		
N	●	miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno
S		
H		

GÜHRING NAVIGATOR

Param. skr. na str. 788

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu

529

Wiertła lufowe

d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,500		265,000	180,000
3,800		280,000	190,000
4,000		280,000	190,000
4,500		295,000	200,000
5,000		315,000	210,000
6,000		330,000	225,000
6,500		350,000	235,000
6,700		350,000	235,000
6,800		370,000	250,000
7,500		370,000	250,000

d1		l1	l2
mm	inch	mm	mm
8,000		390,000	265,000
9,500		410,000	280,000
10,000		430,000	295,000



Wiertła kręte, bardzo długie, szereg 3

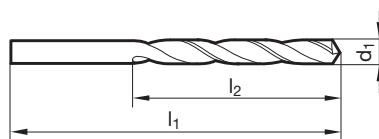


- P** • Korekcja ścina $\geq \varnothing 2,500$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu **571**

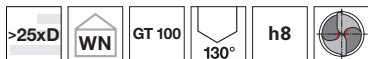
d1		l1	l2
mm	inch	mm	mm
2,500		225,000	150,000
3,000		240,000	160,000
3,100		250,000	170,000
3,170	1/8	250,000	170,000
3,200		250,000	170,000
3,300		250,000	170,000
3,400		265,000	180,000
3,500		265,000	180,000
3,700		265,000	180,000
3,800		280,000	190,000
3,900		280,000	190,000
3,970	5/32	280,000	190,000
4,000		280,000	190,000
4,100		280,000	190,000
4,200		280,000	190,000
4,300		295,000	200,000
4,500		295,000	200,000
4,600		295,000	200,000
4,760	3/16	315,000	210,000
4,800		315,000	210,000
4,900		315,000	210,000
5,000		315,000	210,000
5,100		315,000	210,000
5,200		315,000	210,000
5,500		330,000	225,000
5,560	7/32	330,000	225,000
5,800		330,000	225,000
5,950	15/64	330,000	225,000
6,000		330,000	225,000
6,100		350,000	235,000
6,200		350,000	235,000
6,300		350,000	235,000
6,350	1/4	350,000	235,000
6,400		350,000	235,000
6,500		350,000	235,000
6,700		350,000	235,000

d1		l1	l2
mm	inch	mm	mm
6,750	17/64	370,000	250,000
6,800		370,000	250,000
7,000		370,000	250,000
7,140	9/32	370,000	250,000
7,200		370,000	250,000
7,500		370,000	250,000
7,750		390,000	265,000
7,800		390,000	265,000
7,940	5/16	390,000	265,000
8,000		390,000	265,000
8,200		390,000	265,000
8,500		390,000	265,000
8,600		410,000	280,000
8,730	11/32	410,000	280,000
8,800		410,000	280,000
9,000		410,000	280,000
9,500		410,000	280,000
9,520	3/8	430,000	295,000
10,000		430,000	295,000
10,320	13/32	430,000	295,000
10,500		430,000	295,000
10,720	27/64	455,000	310,000
11,000		455,000	310,000
11,110	7/16	455,000	310,000
11,500		455,000	310,000
12,000		480,000	330,000
12,200		480,000	330,000
12,500		480,000	330,000
13,000		480,000	330,000

Wiertła lufowe



Wiertła kręte, ekstra długie

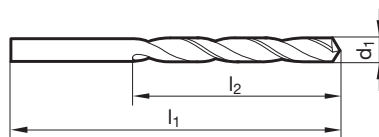


- P** • Korekcja ścina $\geq \varnothing 6,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	



Nr artykułu

242

Wiertła lufowe

d1		l1	l2
mm	inch	mm	mm
6,000		500,000	400,000
8,000		500,000	400,000
10,000		600,000	500,000
11,000		600,000	500,000
12,000		600,000	500,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, ekstra długie



- P** • Korekcja ścina $\geq \varnothing 8,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórow
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

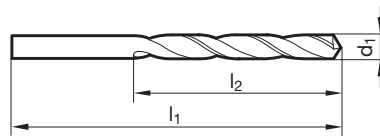
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

GÜHRINGNAVIGATOR

Param. skr. na str. 790



Nr artykułu **243**

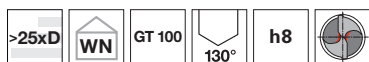
d1		l1	l2
mm	inch	mm	mm
8,000		750,000	650,000
10,000		750,000	650,000
11,000		750,000	650,000
12,000		750,000	650,000

d1		l1	l2
mm	inch	mm	mm

Wiertła lufowe



Wiertła kręte, ekstra długie

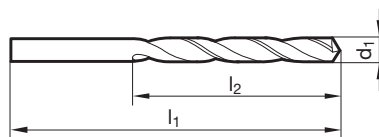


- P** • Korekcja ścina $\geq \varnothing 10,000$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M**
- K** •
- N** • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne
- S**
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 790

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu

244

Wiertła lufowe

d1		l1	l2
mm	inch	mm	mm
10,000		1000,000	850,000
11,000		1000,000	850,000
12,000		1000,000	850,000

d1		l1	l2
mm	inch	mm	mm



Wiertła kręte, bardzo długie, szereg 1



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 7,800$ • geometria zataczana • do bardzo głębokich otworów

M

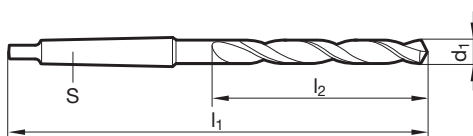
K •

N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
S • proszki spiekane metali, nowe srebro (alpaka), grafit

H

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu **266**

d1		S	l1	l2	d1		S	l1	l2
mm	inch		mm	mm	mm	inch		mm	mm
8,000		MK-1	265,000	165,000	20,500		MK-2	385,000	260,000
8,500		MK-1	265,000	165,000	20,640	13/16	MK-2	385,000	260,000
9,000		MK-1	275,000	175,000	21,000		MK-2	385,000	260,000
9,500		MK-1	275,000	175,000	21,430	27/32	MK-2	405,000	270,000
10,000		MK-1	285,000	185,000	21,500		MK-2	405,000	270,000
10,200		MK-1	285,000	185,000	22,000		MK-2	405,000	270,000
10,250		MK-1	285,000	185,000	22,500		MK-2	405,000	270,000
10,500		MK-1	285,000	185,000	23,000		MK-2	405,000	270,000
11,000		MK-1	300,000	195,000	23,020	29/32	MK-2	405,000	270,000
11,400		MK-1	300,000	195,000	23,500		MK-3	425,000	270,000
11,500		MK-1	300,000	195,000	24,000		MK-3	440,000	290,000
11,750		MK-1	300,000	195,000	24,500		MK-3	440,000	290,000
11,800		MK-1	300,000	195,000	25,000	63/64	MK-3	440,000	290,000
12,000		MK-1	310,000	205,000	26,000		MK-3	440,000	290,000
12,200		MK-1	310,000	205,000	26,500		MK-3	440,000	290,000
12,500		MK-1	310,000	205,000	27,000		MK-3	460,000	305,000
12,700	1/2	MK-1	310,000	205,000	28,000		MK-3	460,000	305,000
13,000		MK-1	310,000	205,000	30,000		MK-3	460,000	305,000
13,500		MK-1	325,000	220,000	30,500		MK-3	480,000	320,000
13,750		MK-1	325,000	220,000	31,000		MK-3	480,000	320,000
14,000		MK-1	325,000	220,000	32,000		MK-4	505,000	320,000
14,290	9/16	MK-2	340,000	220,000	33,000		MK-4	505,000	320,000
14,500		MK-2	340,000	220,000	34,000		MK-4	530,000	340,000
15,000		MK-2	340,000	220,000	35,000		MK-4	530,000	340,000
15,250		MK-2	355,000	230,000	36,000		MK-4	530,000	340,000
15,500		MK-2	355,000	230,000	38,000		MK-4	555,000	360,000
15,750		MK-2	355,000	230,000	39,000		MK-4	555,000	360,000
15,800		MK-2	355,000	230,000	40,000		MK-4	555,000	360,000
16,000		MK-2	355,000	230,000	42,000		MK-4	555,000	360,000
16,250		MK-2	355,000	230,000	45,000		MK-4	585,000	385,000
16,500		MK-2	355,000	230,000	45,240	1 25/32	MK-4	585,000	385,000
16,670	21/32	MK-2	355,000	230,000	48,000		MK-4	605,000	405,000
17,000		MK-2	355,000	230,000	50,000		MK-4	605,000	405,000
17,500		MK-2	370,000	245,000					
17,750		MK-2	370,000	245,000					
18,000		MK-2	370,000	245,000					
18,500		MK-2	370,000	245,000					
18,650	47/64	MK-2	370,000	245,000					
19,000		MK-2	370,000	245,000					
19,500		MK-2	385,000	260,000					
19,750		MK-2	385,000	260,000					
20,000		MK-2	385,000	260,000					

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 1



Materiał narzędzia **HSS**

Powierzchnia >0.16,0

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 5,800$ • geometria zataczana • szerokie rowki wiórowe • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów

M

K •

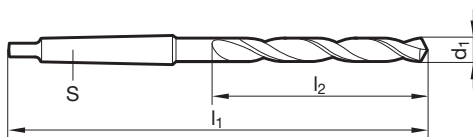
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **526**

Wiertła luźnowe

d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	265,000	165,000
8,500		MK-1	265,000	165,000
8,600		MK-1	275,000	175,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
9,520	3/8	MK-1	285,000	185,000
9,800		MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
10,720	27/64	MK-1	300,000	195,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
11,750		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
12,800		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,490	17/32	MK-1	325,000	220,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,200		MK-2	340,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
15,870	5/8	MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000
17,460	11/16	MK-2	370,000	245,000
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
20,000		MK-2	385,000	260,000
20,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,500		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
25,000	63/64	MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
28,000		MK-3	460,000	305,000
28,500		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
30,000		MK-3	460,000	305,000



Wiertła kręte, bardzo długie, szereg 1



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

P ○ Korekcja ścina $\geq 7,900$ • geometria zataczana • do bardzo głębokich otworów • dla materiałów miękkich i długowiórowych

M

K

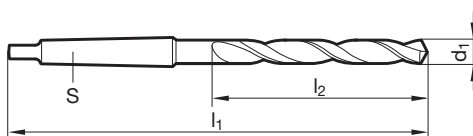
N • miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu **525**

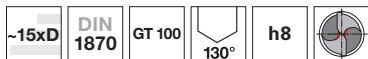
d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	265,000	165,000
8,700		MK-1	275,000	175,000
9,000		MK-1	275,000	175,000
9,500		MK-1	275,000	175,000
10,000		MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
15,000		MK-2	340,000	220,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
18,000		MK-2	370,000	245,000
19,500		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
23,000		MK-2	405,000	270,000
24,000		MK-3	440,000	290,000
24,300		MK-3	440,000	290,000
24,380		MK-3	440,000	290,000
24,500		MK-3	440,000	290,000
25,500		MK-3	440,000	290,000
26,500		MK-3	440,000	290,000
27,500		MK-3	460,000	305,000
28,000		MK-3	460,000	305,000
29,000		MK-3	460,000	305,000
31,000		MK-3	480,000	320,000
33,000		MK-4	505,000	320,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 1



Materiał narzędzia **HSCO**

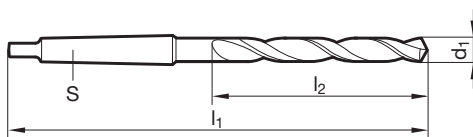
Powierzchnia

Kierunek skrawania

- P** • Korekcja ścina $\geq \varnothing 9,520$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • do bardzo głębokich otworów • przy utrudnionej ewakuacji wiórów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794



Nr artykułu **620**

Wiertła luźrowe

d1		S	l1	l2
mm	inch		mm	mm
9,520	3/8	MK-1	285,000	185,000
10,000		MK-1	285,000	185,000
10,200		MK-1	285,000	185,000
10,320	13/32	MK-1	285,000	185,000
10,500		MK-1	285,000	185,000
11,000		MK-1	300,000	195,000
11,110	7/16	MK-1	300,000	195,000
11,500		MK-1	300,000	195,000
11,510	29/64	MK-1	300,000	195,000
12,000		MK-1	310,000	205,000
12,300	31/64	MK-1	310,000	205,000
12,500		MK-1	310,000	205,000
12,700	1/2	MK-1	310,000	205,000
13,000		MK-1	310,000	205,000
13,500		MK-1	325,000	220,000
14,000		MK-1	325,000	220,000
14,290	9/16	MK-2	340,000	220,000
14,500		MK-2	340,000	220,000
15,000		MK-2	340,000	220,000
15,080	19/32	MK-2	355,000	230,000
15,500		MK-2	355,000	230,000
16,000		MK-2	355,000	230,000
16,500		MK-2	355,000	230,000
17,000		MK-2	355,000	230,000

d1		S	l1	l2
mm	inch		mm	mm
17,500		MK-2	370,000	245,000
18,000		MK-2	370,000	245,000
18,500		MK-2	370,000	245,000
19,000		MK-2	370,000	245,000
20,000		MK-2	385,000	260,000
21,000		MK-2	385,000	260,000
21,830		MK-2	405,000	270,000
22,000		MK-2	405,000	270,000
22,620		MK-2	405,000	270,000
23,000		MK-2	405,000	270,000
25,500		MK-3	440,000	290,000
26,000		MK-3	440,000	290,000
27,180		MK-3	460,000	305,000
29,370	1 5/32	MK-3	460,000	305,000
30,000		MK-3	460,000	305,000



Wiertła kręte, bardzo długie, szereg 2


 Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 7,700$ • geometria zataczana • do bardzo głębokich otworów

M

K •

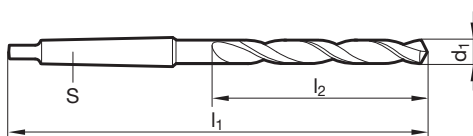
N ○ stopowe/niestopowe stale i staliwa • żeliwa szare, ciągliwe i sferoidalne
• proszki spiekane metali, nowe srebro (alpaka), grafit

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 788


 Nr artykułu **267**

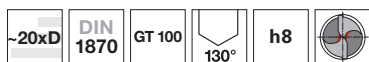
d1		S	l1	l2
mm	inch		mm	mm
8,000		MK-1	330,000	210,000
8,500		MK-1	330,000	210,000
9,000		MK-1	345,000	220,000
10,000		MK-1	360,000	235,000
10,200		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,750		MK-1	375,000	250,000
11,800		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,490	17/32	MK-1	410,000	275,000
13,500		MK-1	410,000	275,000
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
15,480	39/64	MK-2	445,000	295,000
15,500		MK-2	445,000	295,000
16,000		MK-2	445,000	295,000
16,500		MK-2	445,000	295,000
17,000		MK-2	445,000	295,000
17,070	43/64	MK-2	465,000	310,000
17,500		MK-2	465,000	310,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
19,050	3/4	MK-2	490,000	325,000
19,500		MK-2	490,000	325,000
20,000		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
20,640	13/16	MK-2	490,000	325,000
21,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
21,500		MK-2	515,000	345,000
21,830	55/64	MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
22,800		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
23,020	29/32	MK-2	515,000	345,000
23,750		MK-3	555,000	365,000
23,810	15/16	MK-3	555,000	365,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,000	63/64	MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
28,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000
32,000		MK-4	635,000	410,000
34,000		MK-4	665,000	430,000
40,000		MK-4	695,000	460,000
45,000		MK-4	735,000	490,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 2



Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

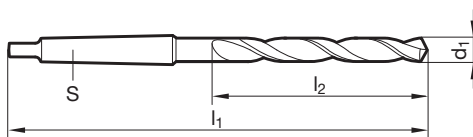
P • Korekcja ścina $\geq \varnothing 7,800$ • geometria zataczana • szerokie rowki wiórowe • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów

K •
N • żeliwa i stале - $R_m < 1000 \text{ N/mm}^2$ • Nie zalecane dla: stале CrNi, m.in. nierdzewne

S
H

GÜHRING NAVIGATOR

Param. skr. na str. 790



Nr artykułu **527**

Wiertła luflowe

d1		S	l1	l2	d1		S	l1	l2
mm	inch				mm	mm			
8,000		MK-1	330,000	210,000	17,500		MK-2	465,000	310,000
8,400		MK-1	330,000	210,000	17,800		MK-2	465,000	310,000
8,500		MK-1	330,000	210,000	18,000		MK-2	465,000	310,000
9,000		MK-1	345,000	220,000	18,500		MK-2	465,000	310,000
9,500		MK-1	345,000	220,000	19,000		MK-2	465,000	310,000
10,000		MK-1	360,000	235,000	19,450	49/64	MK-2	490,000	325,000
10,500		MK-1	360,000	235,000	19,500		MK-2	490,000	325,000
11,000		MK-1	375,000	250,000	20,000		MK-2	490,000	325,000
11,110	7/16	MK-1	375,000	250,000	20,500		MK-2	490,000	325,000
11,500		MK-1	375,000	250,000	21,000		MK-2	490,000	325,000
11,510	29/64	MK-1	375,000	250,000	21,030	53/64	MK-2	490,000	325,000
11,800		MK-1	375,000	250,000	21,430	27/32	MK-2	515,000	345,000
11,910	15/32	MK-1	395,000	260,000	22,000		MK-2	515,000	345,000
12,000		MK-1	395,000	260,000	23,000		MK-2	515,000	345,000
12,500		MK-1	395,000	260,000	23,020	29/32	MK-2	515,000	345,000
12,700	1/2	MK-1	395,000	260,000	23,810	15/16	MK-3	555,000	365,000
13,000		MK-1	395,000	260,000	24,000		MK-3	555,000	365,000
13,500		MK-1	410,000	275,000	24,210	61/64	MK-3	555,000	365,000
13,700		MK-1	410,000	275,000	25,000	63/64	MK-3	555,000	365,000
13,800		MK-1	410,000	275,000	26,000		MK-3	555,000	365,000
13,890	35/64	MK-1	410,000	275,000	26,190	1 1/32	MK-3	555,000	365,000
14,000		MK-1	410,000	275,000	26,500		MK-3	555,000	365,000
14,290	9/16	MK-2	425,000	275,000	27,000		MK-3	580,000	385,000
14,500		MK-2	425,000	275,000	28,000		MK-3	580,000	385,000
15,000		MK-2	425,000	275,000	28,750		MK-3	580,000	385,000
15,500		MK-2	445,000	295,000	29,000		MK-3	580,000	385,000
16,000		MK-2	445,000	295,000	29,500		MK-3	580,000	385,000
16,500		MK-2	445,000	295,000	30,000		MK-3	580,000	385,000
17,000		MK-2	445,000	295,000					
17,070	43/64	MK-2	465,000	310,000					



Wiertła kręte, bardzo długie, szereg 2



Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

P ○ Korekcja ścina $\geq \varnothing 8,000$ • geometria zataczana • do bardzo głębokich otworów

M

K

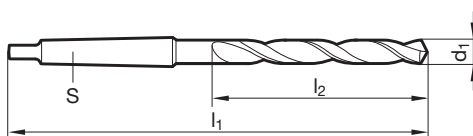
N • miękkie i długowiórowe materiały $R_m \leq 500 \text{ N/mm}^2$ • stal automatowa, miękka • aluminium, długowiórowe stopy Al • cynk, miedź rafinowana, silumin, elektron • żnał, argalium, miękkie tworzywa sztuczne, drewno

S

H

GÜHRINGNAVIGATOR

Param. skr. na str. 788



Nr artykułu **542**

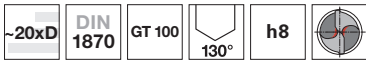
d1		S	l1	l2
mm	inch		mm	mm
8,500		MK-1	330,000	210,000
8,600		MK-1	345,000	220,000
8,800		MK-1	345,000	220,000
9,000		MK-1	345,000	220,000
9,500		MK-1	345,000	220,000
10,500		MK-1	360,000	235,000
10,700		MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
17,000		MK-2	445,000	295,000
17,500		MK-2	465,000	310,000
20,500		MK-2	490,000	325,000

d1		S	l1	l2
mm	inch		mm	mm
21,000		MK-2	490,000	325,000
21,500		MK-2	515,000	345,000
22,000		MK-2	515,000	345,000
23,000		MK-2	515,000	345,000
24,000		MK-3	555,000	365,000
24,500		MK-3	555,000	365,000
25,500		MK-3	555,000	365,000
26,000		MK-3	555,000	365,000
26,500		MK-3	555,000	365,000
27,500		MK-3	580,000	385,000
28,000		MK-3	580,000	385,000
29,000		MK-3	580,000	385,000
29,500		MK-3	580,000	385,000
30,000		MK-3	580,000	385,000
31,000		MK-3	610,000	410,000

Wiertła lufowe



Wiertła kręte, bardzo długie, szereg 2

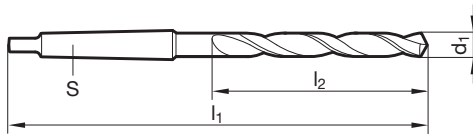


- P** • Korekcja ścina $\geq \varnothing 9,520$ • geometria zataczana • kobaltowa stal szybko tnąca • szerokie rowki wiórowe • zwiększona odporność na zużycie • przy utrudnionej ewakuacji wiórów • do bardzo głębokich otworów
- M** •
- K** •
- N** • stale wysokowytrzymałe i staliwa • żeliwa szare, ciągliwe i sferoidalne
- S** •
- H** ○

Materiał narzędzia **HSCO**

Powierzchnia $\sqrt{Ra} > 16,0$

Kierunek skrawania



Nr artykułu **621**

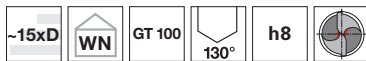
Wiertła lurowe

d1		S	l1	l2
mm	inch			
9,520	3/8	MK-1	360,000	235,000
10,000		MK-1	360,000	235,000
10,500		MK-1	360,000	235,000
10,720	27/64	MK-1	375,000	250,000
11,000		MK-1	375,000	250,000
11,500		MK-1	375,000	250,000
11,510	29/64	MK-1	375,000	250,000
12,000		MK-1	395,000	260,000
12,500		MK-1	395,000	260,000
12,700	1/2	MK-1	395,000	260,000
13,000		MK-1	395,000	260,000
13,500		MK-1	410,000	275,000

d1		S	l1	l2
mm	inch			
14,000		MK-1	410,000	275,000
14,500		MK-2	425,000	275,000
15,000		MK-2	425,000	275,000
16,000		MK-2	445,000	295,000
16,270		MK-2	445,000	295,000
18,000		MK-2	465,000	310,000
18,500		MK-2	465,000	310,000
19,000		MK-2	465,000	310,000
20,000		MK-2	490,000	325,000
21,430	27/32	MK-2	515,000	345,000
23,420	59/64	MK-3	535,000	345,000



Wiertła z chłodzeniem wew. długości wg DIN 1870

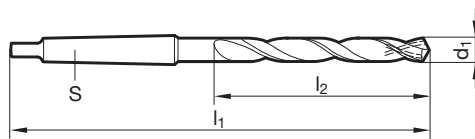


- P** • Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • promieniowe doprowadzenie chłodziwa przez pierścieniowy adapter Gühringa
- M** • kobaltowa stal szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- K** •
- N** • średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./ kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794

Materiał narzędzia	HSCO
Powierzchnia	●
Kierunek skrawania	Ⓜ



Nr artykułu

375

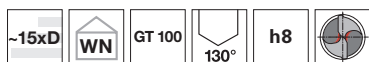
Wiertła lufowe

d1		S	l1	l2
mm	inch			
11,000		MK-2	312,000	195,000
11,110	7/16	MK-2	312,000	195,000
11,510	29/64	MK-2	312,000	195,000
12,800		MK-2	322,000	205,000
13,500		MK-2	337,000	220,000
18,260	23/32	MK-3	381,000	245,000
19,000		MK-3	381,000	245,000
21,000		MK-3	396,000	260,000
21,430	27/32	MK-3	406,000	270,000
24,500		MK-3	426,000	290,000
25,000	63/64	MK-3	426,000	290,000
25,400	1	MK-3	426,000	290,000

d1		S	l1	l2
mm	inch			
26,500		MK-3	426,000	290,000
28,570	1 1/8	MK-4	468,000	305,000
30,960	1 7/32	MK-4	483,000	320,000
32,540	1 9/32	MK-4	493,000	320,000
33,340	1 5/16	MK-4	493,000	320,000
34,000		MK-4	513,000	340,000



Wiertła z chłodzeniem wew. długości wg DIN 1870



Materiał narzędzia **HSCO**

Powierzchnia



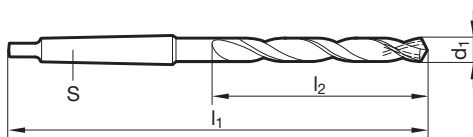
Kierunek skrawania



- P** • Korekcja ścina $\geq \varnothing 11,000$ • geometria zataczana • promieniowe doprowadzenie chłodziwa przez stożek Morse'a • kobałtowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie • do wiercenia przez tulejki wiertarskie
- K** •
- N** • średnio- i wysokowytrzymałe stale • staliwa, żeliwa szare • stale nierdz./ kwaso-/żaro-wytrzymałe • wytrzymałości - $R_m < 1300 \text{ N/mm}^2$
- S** •
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 794



Nr artykułu **376**

d1		S	l1	l2
mm	inch		mm	mm
11,000		MK-2	312,000	195,000
13,000		MK-2	322,000	205,000
14,000		MK-2	337,000	220,000
16,500		MK-2	347,000	230,000
18,000		MK-2	362,000	245,000
19,840	25/32	MK-3	396,000	260,000

d1		S	l1	l2
mm	inch		mm	mm
21,500		MK-3	406,000	270,000
27,780	1 3/32	MK-4	468,000	305,000
29,000		MK-4	468,000	305,000

Wiertła lufowe



MIKRO-WIERTŁA



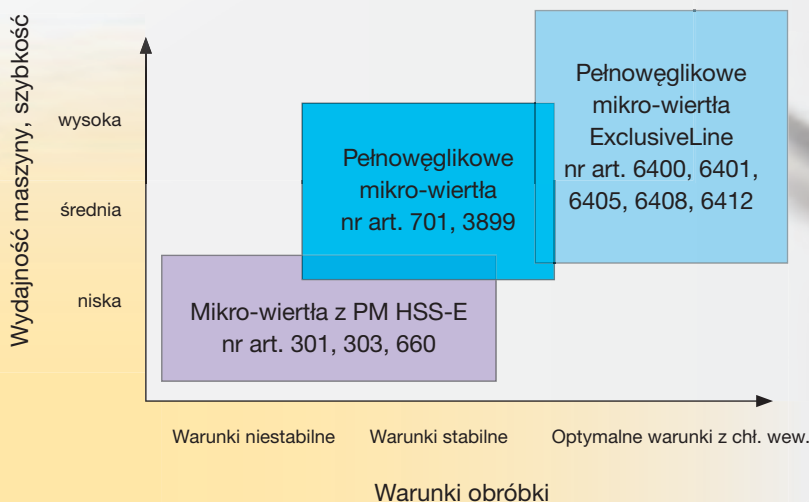


Typy mikro-wiertel

ZALETY I ZAKRES ZASTOSOWANIA

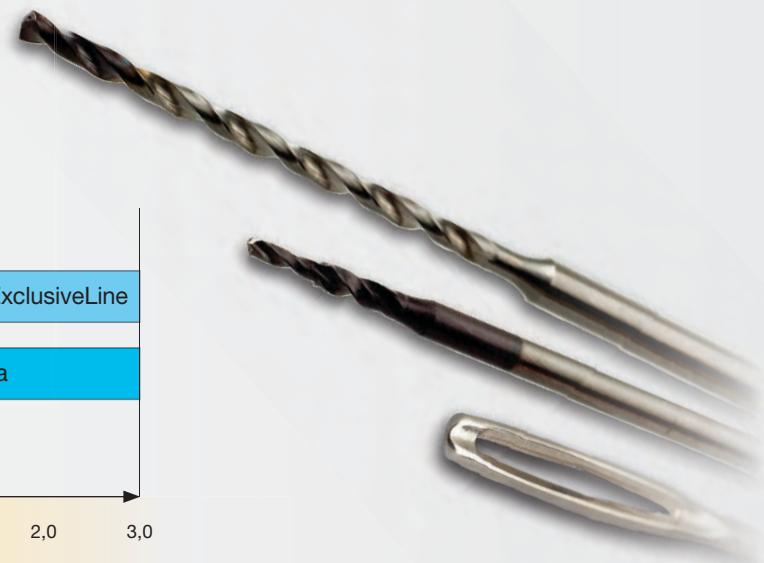
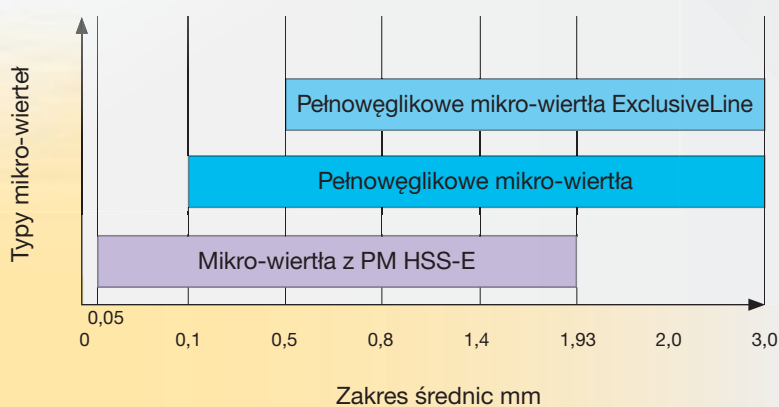
Dla seryjnej produkcji na wysokowydajnych maszynach wyposażonych w chłodzenie wewnętrzne jak również na potrzeby produkcji jednostkowej na mniej zaawansowanych

obrabiarkach, firma Guhring zawsze dostarczy optymalne rozwiązanie.



ZAKRES PROGRAMU

Obszerny program mikro-wiertel firmy Guhring obejmuje zakres średnic od 0.05 do 3.00 mm



Mikro-wiertła produkowane przez firmę Guhring z węgla spiekanego lub z proszkowej stali szybko tnącej (PM HSS-E) są optymalne do produkcji najmniejszych średnic otworów w większości zastosowań.

Wykonywanie bardzo precyzyjnych otworów o małych średnicach należy do najtrudniejszych operacji technologicznych. To tego typu zadań i dla każdego klienta firma Guhring zaoferuje optymalne narzędzia.



MIKRO-WIERTŁA Z PM HSS-E

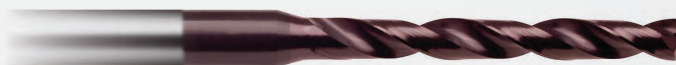
Stal kobaltowa do produkcji mikro-wiertel firmy Guhring jest wytwarzana metodą spiekania proszków, z zachowaniem bardzo jednorodnej struktury materiału. Dzięki temu wiertła te charakteryzują się bardzo wysoką odpornością na ścieranie, wysoką ciągliwością oraz wysoką stabilnością krawędzi skrawającej, zwłaszcza w trudnych, mało stabilnych warunkach zastosowania.



Mikro-wiertła ze stali PM HSS-E są szczególnie zalecane do stosowania na maszynach wielowrzecionowych lub obrabiarkach mniej wydajnych oraz do produkcji jednostkowej i średnioseryjnej. Dla spełnienia większych oczekiwań co do trwałości narzędzi firma Guhring oferuje mikro-wiertła PM HSS-E z dodatkową powłoką TiN. Również do specjalnych zastosowań, gdzie potrzebne są wiertła lewo-tnące, firma Guhring oferuje standardowe rozwiązanie.

PEŁNOWĘGLIKOWE MIKRO-WIERTŁA

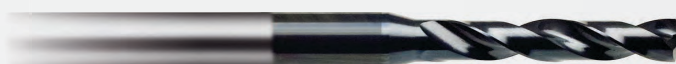
Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego są produkowane w średnicach od 0.1 do 3.0 mm. Z użyciem pełnowęglkowych wiertel jest możliwe osiągnięcie większych trwałości i parametrów skrawania w porównaniu z wiertłami PM HSS-E przy zastosowaniu na dokładnych i wysokowydajnych obrabiarkach.



Jest to możliwe dzięki produkcji narzędzi z ultra drobnoziarnistego węgla spiekane, który charakteryzuje się bardzo wysoką twardością oraz wysoką odpornością na ścieranie i wysoką temperaturę.

PEŁNOWĘGLIKOWE MIKRO-WIERTŁA EXCLUSIVELINE RÓWNIEŻ Z CHŁODZ. WEWN.

Pełnowęglkowe mikro-wiertła z serii ExclusiveLine, dostępne w wersji bez lub z chłodzeniem wewnętrznym umożliwiają bardzo wydajną obróbkę w większości materiałów obrabianych. Narzędzia te zaprezentują swoje wysokie możliwości zwłaszcza przy produkcji masowej i wielkoseryjnej na wysokowydajnych obrabiarkach. Dzięki dopracowanej geometrii 2-ścińcowej z dokładnym honowaniem ostrzy skrawających narzędzia te pozwalają na stosowanie wysokich parametrów skrawania w połączeniu z optymalnym łamaniem wiórów. Specjalna geometria rowków wiórowych umożliwia bezpieczne usuwanie wiórów z otworu. Narzędzia bez chłodzenia wewnętrznego są dostępne w średnicach od 0.5 do 3.0 mm.



Specjalnie do obróbki stali nierdzewnych i Super Stopów oraz do wiercenie głębokich otworów zostały zaprojektowane mikro-wiertła z chłodzeniem wewnętrznym. Dzięki optymalnej geometrii nie jest konieczne stosowanie „odwiórowywania” nawet przy wykonywaniu otworów o głębokości 15xD. Pełnowęglkowe mikro-wiertła są tak zaprojektowane aby przy pomocy narzędzi krótszych (4xD dla wersji bez chłodzenia wewnętrznego i 5xD w wersji z chłodzeniem wewnętrznym) można było wykonywać otwory pilotujące dla wiertel długich (15xD z chłodzeniem wewnętrznym).

Mikro-wiertła

ROZWIĄZANIA SPECJALNE NA ŻYCZENIE KLIENTA

Dodatkowo firma Guhring oferuje program produkcji specjalnych mikro-wiertel ze stali PM HSS-E lub pełnowęglkowych wg wymagań klienta. Obejmuje on wykonanie:



- specjalnych średnic w standardowym zakresie produkcji
- wiertel stopniowych lub fazujących
- specjalnych długości roboczych do 30xD
- różnych rodzajów chwytu
- dodatkowych powłok



P M K N S H	Ilustracja narzędzia	Głębokość wiercenia	Norma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Mikro-wiertła bez chłodzenia wewnętrznego z PM HSS-E

• • • • ○		~5xD	DIN 1899	N	R	HSS-E-PM	○	0,050 - 1,920	301	796	649
• • • • ○		~5xD	DIN 1899	N	R	HSS-E-PM	Ⓢ	0,160 - 1,900	660	796	652
• • • • ○		~5xD	DIN 1899	N	L	HSS-E-PM	○	0,130 - 1,850	303	796	654

Pełnowęglikowe mikro-wiertła bez chłodzenia wewnętrznego

• ○ • ○ ○ ○		~5xD	WN	N	R	VHM	○	0,200 - 1,400	701	796	656
• • • • ○			WN	N	R	VHM	ⓐ	0,100 - 3,000	3899	796	657

Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego

• • • ○ ○		4xD	WN	N	R	VHM	ⓐ	0,500 - 3,000	6400	796	659
• • • ○ ○		7xD	WN	N	R	VHM	ⓐ	0,500 - 3,000	6401	796	660

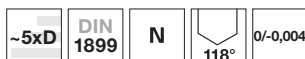
Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym

• • • ○ ○		5xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6405	796	661
• • • ○ ○		8xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6408	796	662
• • • ○ ○		15xD	WN	N	R	VHM	ⓐ	1,400 - 3,000	6412	796	663

Mikro-wiertła



Mikro-wiertła bez chłodzenia wewnętrznego z PM HSS-E



Materiał narzędzia **HSS-E-PM**

Powierzchnia



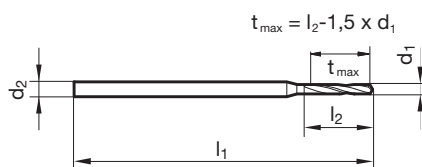
Kierunek skrawania



- P** • geom. ścinowa • ze wzmocnionym chwytem • $\varnothing 0.15\text{ mm}$ kobaltowa stal szybkotnąca
- M** •
- K** •
- N** • stale wysokostopowe
- S** ○
- H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu **301**

d1	d2	l1	l2	d1	d2	l1	l2
mm	mm	mm	mm	mm	mm	mm	mm
0,050	1,000	25,000	0,400	0,275	1,000	25,000	1,900
0,060	1,000	25,000	0,400	0,280	1,000	25,000	1,900
0,070	1,000	25,000	0,500	0,285	1,000	25,000	1,900
0,075	1,000	25,000	0,500	0,290	1,000	25,000	1,900
0,080	1,000	25,000	0,500	0,295	1,000	25,000	1,900
0,090	1,000	25,000	0,500	0,300	1,000	25,000	1,900
0,100	1,000	25,000	0,500	0,305	1,000	25,000	2,400
0,105	1,000	25,000	0,500	0,310	1,000	25,000	2,400
0,110	1,000	25,000	0,500	0,315	1,000	25,000	2,400
0,115	1,000	25,000	0,500	0,320	1,000	25,000	2,400
0,120	1,000	25,000	0,500	0,325	1,000	25,000	2,400
0,121	1,000	25,000	0,800	0,330	1,000	25,000	2,400
0,125	1,000	25,000	0,800	0,335	1,000	25,000	2,400
0,128	1,000	25,000	0,800	0,340	1,000	25,000	2,400
0,130	1,000	25,000	0,800	0,345	1,000	25,000	2,400
0,140	1,000	25,000	0,800	0,350	1,000	25,000	2,400
0,143	1,000	25,000	0,800	0,355	1,000	25,000	2,400
0,145	1,000	25,000	0,800	0,360	1,000	25,000	2,400
0,147	1,000	25,000	0,800	0,365	1,000	25,000	2,400
0,150	1,000	25,000	0,800	0,370	1,000	25,000	2,400
0,155	1,000	25,000	1,100	0,375	1,000	25,000	2,400
0,160	1,000	25,000	1,100	0,380	1,000	25,000	2,400
0,170	1,000	25,000	1,100	0,385	1,000	25,000	3,000
0,175	1,000	25,000	1,100	0,390	1,000	25,000	3,000
0,180	1,000	25,000	1,100	0,400	1,000	25,000	3,000
0,190	1,000	25,000	1,100	0,405	1,000	25,000	3,000
0,195	1,000	25,000	1,500	0,410	1,000	25,000	3,000
0,200	1,000	25,000	1,500	0,415	1,000	25,000	3,000
0,205	1,000	25,000	1,500	0,420	1,000	25,000	3,000
0,210	1,000	25,000	1,500	0,425	1,000	25,000	3,000
0,215	1,000	25,000	1,500	0,430	1,000	25,000	3,000
0,220	1,000	25,000	1,500	0,432	1,000	25,000	3,000
0,225	1,000	25,000	1,500	0,435	1,000	25,000	3,000
0,230	1,000	25,000	1,500	0,440	1,000	25,000	3,000
0,235	1,000	25,000	1,500	0,445	1,000	25,000	3,000
0,240	1,000	25,000	1,500	0,450	1,000	25,000	3,000
0,245	1,000	25,000	1,900	0,455	1,000	25,000	3,000
0,250	1,000	25,000	1,900	0,460	1,000	25,000	3,000
0,255	1,000	25,000	1,900	0,470	1,000	25,000	3,000
0,260	1,000	25,000	1,900	0,475	1,000	25,000	3,000
0,265	1,000	25,000	1,900	0,480	1,000	25,000	3,000
0,270	1,000	25,000	1,900	0,485	1,000	25,000	3,400

Mikro-wiertła



d1	d2	l1	l2
mm	mm	mm	mm
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,505	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,515	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,530	1,000	25,000	3,400
0,535	1,000	25,000	3,900
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,560	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,585	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,595	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,605	1,000	25,000	4,200
0,610	1,000	25,000	4,200
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,625	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,632	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,655	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,665	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,705	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800
0,725	1,000	25,000	4,800
0,730	1,000	25,000	4,800
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,795	1,500	25,000	5,300
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,825	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,845	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,930	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,010	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,055	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,130	1,500	25,000	7,600
1,140	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500
1,200	1,500	25,000	8,500
1,210	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,230	1,500	25,000	8,500
1,240	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,260	1,500	25,000	8,500
1,265	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,320	1,500	25,000	8,500
1,325	1,500	25,000	9,500
1,330	1,500	25,000	9,500
1,340	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,370	1,500	25,000	9,500
1,380	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,410	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,430	1,500	25,000	9,500
1,440	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,470	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,520	2,000	30,000	10,600
1,530	2,000	30,000	10,600
1,540	2,000	30,000	10,600
1,550	2,000	30,000	10,600
1,590	2,000	30,000	10,600
1,600	2,000	30,000	10,600
1,610	2,000	30,000	10,600
1,630	2,000	30,000	10,600
1,640	2,000	30,000	10,600
1,650	2,000	30,000	10,600
1,660	2,000	30,000	10,600
1,690	2,000	30,000	10,600
1,700	2,000	30,000	10,600
1,710	2,000	30,000	11,800
1,715	2,000	30,000	11,800
1,730	2,000	30,000	11,800
1,745	2,000	30,000	11,800
1,750	2,000	30,000	11,800
1,775	2,000	30,000	11,800
1,800	2,000	30,000	11,800

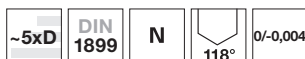


d1	d2	l1	l2
mm	mm	mm	mm
1,830	2,000	30,000	11,800
1,840	2,000	30,000	11,800
1,850	2,000	30,000	11,800
1,860	2,000	30,000	11,800
1,900	2,000	30,000	11,800
1,920	2,000	30,000	13,200

d1	d2	l1	l2
mm	mm	mm	mm

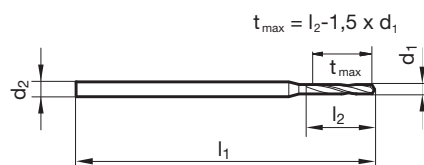


Mikro-wiertła bez chłodzenia wewnętrznego z PM HSS-E

Materiał narzędzia **HSS-E-PM**Powierzchnia **S**Kierunek skrawania **R****P** • geom. ścinowa • ze wzmocnionym chwytem • zwiększona odporność na zużycie**M** •**K** •**N** • stale wysokostopowe**S** ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796

Nr artykułu **660**

d1	d2	l1	l2	d1	d2	l1	l2
mm	mm	mm	mm	mm	mm	mm	mm
0,160	1,000	25,000	1,100	0,530	1,000	25,000	3,400
0,170	1,000	25,000	1,100	0,540	1,000	25,000	3,900
0,180	1,000	25,000	1,100	0,550	1,000	25,000	3,900
0,190	1,000	25,000	1,100	0,560	1,000	25,000	3,900
0,200	1,000	25,000	1,500	0,570	1,000	25,000	3,900
0,210	1,000	25,000	1,500	0,580	1,000	25,000	3,900
0,220	1,000	25,000	1,500	0,590	1,000	25,000	3,900
0,230	1,000	25,000	1,500	0,600	1,000	25,000	3,900
0,240	1,000	25,000	1,500	0,610	1,000	25,000	4,200
0,250	1,000	25,000	1,900	0,620	1,000	25,000	4,200
0,255	1,000	25,000	1,900	0,630	1,000	25,000	4,200
0,260	1,000	25,000	1,900	0,640	1,000	25,000	4,200
0,265	1,000	25,000	1,900	0,650	1,000	25,000	4,200
0,270	1,000	25,000	1,900	0,660	1,000	25,000	4,200
0,280	1,000	25,000	1,900	0,670	1,000	25,000	4,200
0,290	1,000	25,000	1,900	0,680	1,000	25,000	4,800
0,295	1,000	25,000	1,900	0,690	1,000	25,000	4,800
0,300	1,000	25,000	1,900	0,700	1,000	25,000	4,800
0,305	1,000	25,000	2,400	0,710	1,000	25,000	4,800
0,310	1,000	25,000	2,400	0,720	1,000	25,000	4,800
0,320	1,000	25,000	2,400	0,730	1,000	25,000	4,800
0,325	1,000	25,000	2,400	0,740	1,000	25,000	4,800
0,330	1,000	25,000	2,400	0,750	1,000	25,000	4,800
0,340	1,000	25,000	2,400	0,760	1,000	25,000	5,300
0,350	1,000	25,000	2,400	0,770	1,000	25,000	5,300
0,360	1,000	25,000	2,400	0,780	1,000	25,000	5,300
0,370	1,000	25,000	2,400	0,790	1,000	25,000	5,300
0,380	1,000	25,000	2,400	0,800	1,500	25,000	5,300
0,390	1,000	25,000	3,000	0,810	1,500	25,000	5,300
0,400	1,000	25,000	3,000	0,820	1,500	25,000	5,300
0,410	1,000	25,000	3,000	0,830	1,500	25,000	5,300
0,420	1,000	25,000	3,000	0,840	1,500	25,000	5,300
0,430	1,000	25,000	3,000	0,850	1,500	25,000	5,300
0,440	1,000	25,000	3,000	0,860	1,500	25,000	6,000
0,450	1,000	25,000	3,000	0,870	1,500	25,000	6,000
0,460	1,000	25,000	3,000	0,880	1,500	25,000	6,000
0,470	1,000	25,000	3,000	0,900	1,500	25,000	6,000
0,480	1,000	25,000	3,000	0,910	1,500	25,000	6,000
0,490	1,000	25,000	3,400	0,920	1,500	25,000	6,000
0,500	1,000	25,000	3,400	0,940	1,500	25,000	6,000
0,510	1,000	25,000	3,400	0,950	1,500	25,000	6,000
0,520	1,000	25,000	3,400	0,960	1,500	25,000	6,800

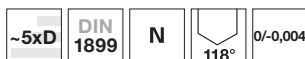


d1	d2	l1	l2
mm	mm	mm	mm
0,970	1,500	25,000	6,800
0,980	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,020	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,070	1,500	25,000	7,600
1,080	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,190	1,500	25,000	8,500

d1	d2	l1	l2
mm	mm	mm	mm
1,200	1,500	25,000	8,500
1,220	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,390	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,420	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,500	2,000	30,000	9,500
1,800	2,000	30,000	11,800
1,900	2,000	30,000	11,800



Mikro-wiertła bez chłodzenia wewnętrznego z PM HSS-E

Materiał narzędzia **HSS-E-PM**

Powierzchnia

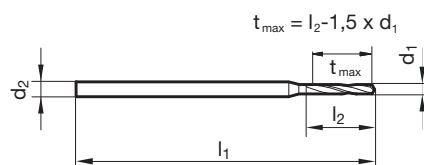


Kierunek skrawania

**P** • geom. ścinowa • ze wzmocnionym chwytem • $\varnothing 0.15\text{ mm}$ kobaltowa stal szybkotnąca**M** •**K** •**N** • stale wysokostopowe**S** ○**H**

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu

303

d1	d2	l1	l2
mm	mm	mm	mm
0,130	1,000	25,000	0,800
0,140	1,000	25,000	0,800
0,150	1,000	25,000	0,800
0,155	1,000	25,000	1,100
0,160	1,000	25,000	1,100
0,170	1,000	25,000	1,100
0,175	1,000	25,000	1,100
0,180	1,000	25,000	1,100
0,185	1,000	25,000	1,100
0,190	1,000	25,000	1,100
0,195	1,000	25,000	1,500
0,200	1,000	25,000	1,500
0,210	1,000	25,000	1,500
0,215	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,225	1,000	25,000	1,500
0,230	1,000	25,000	1,500
0,235	1,000	25,000	1,500
0,240	1,000	25,000	1,500
0,245	1,000	25,000	1,900
0,250	1,000	25,000	1,900
0,255	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,265	1,000	25,000	1,900
0,270	1,000	25,000	1,900
0,275	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,290	1,000	25,000	1,900
0,295	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,310	1,000	25,000	2,400
0,315	1,000	25,000	2,400
0,330	1,000	25,000	2,400
0,340	1,000	25,000	2,400
0,345	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,355	1,000	25,000	2,400
0,360	1,000	25,000	2,400
0,370	1,000	25,000	2,400
0,380	1,000	25,000	2,400
0,390	1,000	25,000	3,000
0,400	1,000	25,000	3,000

d1	d2	l1	l2
mm	mm	mm	mm
0,410	1,000	25,000	3,000
0,415	1,000	25,000	3,000
0,420	1,000	25,000	3,000
0,430	1,000	25,000	3,000
0,435	1,000	25,000	3,000
0,440	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,460	1,000	25,000	3,000
0,465	1,000	25,000	3,000
0,470	1,000	25,000	3,000
0,480	1,000	25,000	3,000
0,485	1,000	25,000	3,400
0,490	1,000	25,000	3,400
0,495	1,000	25,000	3,400
0,500	1,000	25,000	3,400
0,510	1,000	25,000	3,400
0,520	1,000	25,000	3,400
0,525	1,000	25,000	3,400
0,540	1,000	25,000	3,900
0,545	1,000	25,000	3,900
0,550	1,000	25,000	3,900
0,555	1,000	25,000	3,900
0,565	1,000	25,000	3,900
0,570	1,000	25,000	3,900
0,580	1,000	25,000	3,900
0,590	1,000	25,000	3,900
0,600	1,000	25,000	3,900
0,615	1,000	25,000	4,200
0,620	1,000	25,000	4,200
0,630	1,000	25,000	4,200
0,640	1,000	25,000	4,200
0,650	1,000	25,000	4,200
0,660	1,000	25,000	4,200
0,670	1,000	25,000	4,200
0,675	1,000	25,000	4,800
0,680	1,000	25,000	4,800
0,685	1,000	25,000	4,800
0,690	1,000	25,000	4,800
0,695	1,000	25,000	4,800
0,700	1,000	25,000	4,800
0,710	1,000	25,000	4,800
0,720	1,000	25,000	4,800

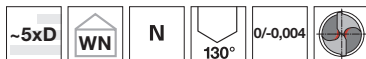


d1	d2	l1	l2
mm	mm	mm	mm
0,740	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,760	1,000	25,000	5,300
0,770	1,000	25,000	5,300
0,780	1,000	25,000	5,300
0,790	1,000	25,000	5,300
0,800	1,500	25,000	5,300
0,805	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,820	1,500	25,000	5,300
0,830	1,500	25,000	5,300
0,840	1,500	25,000	5,300
0,850	1,500	25,000	5,300
0,855	1,500	25,000	6,000
0,860	1,500	25,000	6,000
0,870	1,500	25,000	6,000
0,880	1,500	25,000	6,000
0,885	1,500	25,000	6,000
0,890	1,500	25,000	6,000
0,900	1,500	25,000	6,000
0,910	1,500	25,000	6,000
0,915	1,500	25,000	6,000
0,920	1,500	25,000	6,000
0,925	1,500	25,000	6,000
0,935	1,500	25,000	6,000
0,940	1,500	25,000	6,000
0,950	1,500	25,000	6,000
0,960	1,500	25,000	6,800
0,970	1,500	25,000	6,800
0,975	1,500	25,000	6,800
0,980	1,500	25,000	6,800
0,985	1,500	25,000	6,800
0,990	1,500	25,000	6,800
1,000	1,500	25,000	6,800
1,005	1,500	25,000	6,800
1,020	1,500	25,000	6,800

d1	d2	l1	l2
mm	mm	mm	mm
1,030	1,500	25,000	6,800
1,040	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,060	1,500	25,000	6,800
1,080	1,500	25,000	7,600
1,085	1,500	25,000	7,600
1,090	1,500	25,000	7,600
1,100	1,500	25,000	7,600
1,110	1,500	25,000	7,600
1,120	1,500	25,000	7,600
1,125	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,160	1,500	25,000	7,600
1,170	1,500	25,000	7,600
1,180	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,270	1,500	25,000	8,500
1,280	1,500	25,000	8,500
1,285	1,500	25,000	8,500
1,290	1,500	25,000	8,500
1,310	1,500	25,000	8,500
1,330	1,500	25,000	9,500
1,350	1,500	25,000	9,500
1,360	1,500	25,000	9,500
1,375	1,500	25,000	9,500
1,400	1,500	25,000	9,500
1,405	1,500	25,000	9,500
1,425	1,500	25,000	9,500
1,450	1,500	25,000	9,500
1,460	2,000	30,000	9,500
1,500	2,000	30,000	9,500
1,600	2,000	30,000	10,600
1,615	2,000	30,000	10,600
1,800	2,000	30,000	11,800
1,850	2,000	30,000	11,800



Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego

Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania



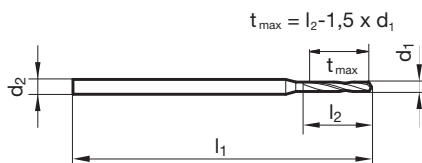
P • Korekcja ścina $\geq \varnothing 0,800$ • geom. ścinowa • główna krawędź skrawająca - prosta

M ○**K** •

N ○ stale konstrukcyjne i do nawęglania • materiały odlewane • brąz, mosiądz • aluminium i stopy Al • magnez i stopy magnezu • tworzywa sztuczne, w tym również wzmacniane włóknami

H ○**GÜHRING**NAVIGATOR

Param. skr. na str. 796



Nr artykułu

701

d1	d2	l1	l2
mm	mm	mm	mm
0,200	1,000	25,000	1,500
0,220	1,000	25,000	1,500
0,250	1,000	25,000	1,900
0,260	1,000	25,000	1,900
0,280	1,000	25,000	1,900
0,300	1,000	25,000	1,900
0,330	1,000	25,000	2,400
0,350	1,000	25,000	2,400
0,400	1,000	25,000	3,000
0,450	1,000	25,000	3,000
0,500	1,000	25,000	3,400
0,600	1,000	25,000	3,900
0,650	1,000	25,000	4,200
0,700	1,000	25,000	4,800
0,750	1,000	25,000	4,800
0,800	1,500	25,000	5,300
0,810	1,500	25,000	5,300
0,830	1,500	25,000	5,300

d1	d2	l1	l2
mm	mm	mm	mm
0,850	1,500	25,000	5,300
0,900	1,500	25,000	6,000
1,000	1,500	25,000	6,800
1,050	1,500	25,000	6,800
1,100	1,500	25,000	7,600
1,150	1,500	25,000	7,600
1,200	1,500	25,000	8,500
1,250	1,500	25,000	8,500
1,300	1,500	25,000	8,500
1,350	1,500	25,000	9,500
1,400	1,500	25,000	9,500



Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego



Materiał narzędzia **Węglík mono.**

Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 0,800$ • geom. ścinowa

M

K •

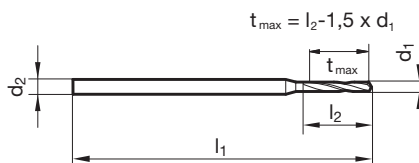
N stąle konstrukcyjne i do nawęglania • stąle automatowe, stąle do ulepszenia cieplnego • stąle stopowe – $R_m < 1200 \text{ N/mm}^2$ • materiały odlewane

S

H

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu **3899**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,100	3,000	38,000	1,200
0,150	3,000	38,000	2,000
0,200	3,000	38,000	2,500
0,250	3,000	38,000	3,000
0,260	3,000	38,000	3,000
0,270	3,000	38,000	3,000
0,280	3,000	38,000	3,000
0,300	3,000	38,000	5,000
0,310	3,000	38,000	5,000
0,330	3,000	38,000	5,000
0,350	3,000	38,000	6,000
0,360	3,000	38,000	6,000
0,370	3,000	38,000	6,000
0,380	3,000	38,000	6,000
0,400	3,000	38,000	7,000
0,410	3,000	38,000	7,000
0,430	3,000	38,000	7,000
0,440	3,000	38,000	7,000
0,450	3,000	38,000	7,000
0,480	3,000	38,000	7,000
0,500	3,000	38,000	7,000
0,510	3,000	38,000	7,000
0,530	3,000	38,000	7,000
0,550	3,000	38,000	7,000
0,570	3,000	38,000	7,000
0,600	3,000	38,000	7,000
0,640	3,000	38,000	7,000
0,650	3,000	38,000	7,000
0,660	3,000	38,000	7,000
0,680	3,000	38,000	7,000
0,700	3,000	38,000	8,000
0,710	3,000	38,000	8,000
0,720	3,000	38,000	8,000
0,740	3,000	38,000	8,000
0,750	3,000	38,000	8,000
0,760	3,000	38,000	8,000
0,770	3,000	38,000	8,000
0,780	3,000	38,000	8,000
0,790	3,000	38,000	8,000
0,800	3,000	38,000	10,000
0,810	3,000	38,000	10,000
0,820	3,000	38,000	10,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,830	3,000	38,000	10,000
0,840	3,000	38,000	10,000
0,850	3,000	38,000	10,000
0,860	3,000	38,000	10,000
0,870	3,000	38,000	10,000
0,880	3,000	38,000	10,000
0,890	3,000	38,000	10,000
0,900	3,000	38,000	10,000
0,910	3,000	38,000	10,000
0,920	3,000	38,000	10,000
0,930	3,000	38,000	10,000
0,940	3,000	38,000	10,000
0,950	3,000	38,000	10,000
0,960	3,000	38,000	10,000
0,970	3,000	38,000	10,000
0,980	3,000	38,000	10,000
0,990	3,000	38,000	10,000
1,000	3,000	38,000	10,000
1,010	3,000	38,000	10,000
1,020	3,000	38,000	10,000
1,050	3,000	38,000	10,000
1,060	3,000	38,000	10,000
1,070	3,000	38,000	10,000
1,090	3,000	38,000	10,000
1,100	3,000	38,000	10,000
1,110	3,000	38,000	10,000
1,150	3,000	38,000	10,000
1,170	3,000	38,000	10,000
1,190	3,000	38,000	10,000
1,200	3,000	38,000	10,000
1,210	3,000	38,000	10,000
1,220	3,000	38,000	10,000
1,230	3,000	38,000	10,000
1,240	3,000	38,000	10,000
1,260	3,000	38,000	10,000
1,270	3,000	38,000	10,000
1,280	3,000	38,000	10,000
1,300	3,000	38,000	10,000
1,370	3,000	38,000	10,000
1,400	3,000	38,000	10,000
1,420	3,000	38,000	10,000
1,450	3,000	38,000	10,000

Mikro-wiertła



d1	d2 h6	l1	l2
mm	mm	mm	mm
1,490	3,000	38,000	10,000
1,500	3,000	38,000	10,000
1,510	3,000	38,000	10,000
1,520	3,000	38,000	10,000
1,550	3,000	38,000	10,000
1,560	3,000	38,000	10,000
1,580	3,000	38,000	10,000
1,590	3,000	38,000	10,000
1,600	3,000	38,000	12,000
1,630	3,000	38,000	12,000
1,650	3,000	38,000	12,000
1,700	3,000	38,000	12,000
1,750	3,000	38,000	12,000
1,800	3,000	38,000	12,000
1,810	3,000	38,000	12,000
1,820	3,000	38,000	12,000
1,830	3,000	38,000	12,000
1,840	3,000	38,000	12,000
1,850	3,000	38,000	12,000
1,860	3,000	38,000	12,000
1,900	3,000	38,000	12,000
1,920	3,000	38,000	12,000
1,950	3,000	38,000	12,000
1,980	3,000	38,000	12,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,000	3,000	38,000	12,000
2,050	3,000	38,000	12,000
2,100	3,000	38,000	12,000
2,150	3,000	38,000	12,000
2,200	3,000	38,000	12,000
2,400	3,000	38,000	12,000
2,500	3,000	38,000	12,000
2,550	3,000	38,000	12,000
2,600	3,000	38,000	12,000
2,750	3,000	38,000	12,000
2,800	3,000	38,000	12,000
2,950	3,000	38,000	12,000
3,000	3,000	38,000	12,000



Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego



Materiał narzędzia **Węglik mono.**

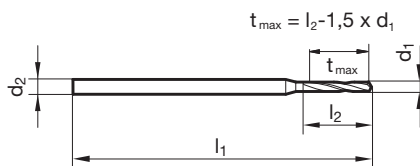
Powierzchnia **A**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 0,500$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Nr artykułu **6400**

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	3,000
0,550	3,000	47,000	3,300
0,600	3,000	47,000	3,600
0,650	3,000	47,000	3,900
0,700	3,000	47,000	4,200
0,750	3,000	47,000	4,500
0,800	3,000	47,000	4,800
0,850	3,000	47,000	5,100
0,900	3,000	47,000	5,400
0,950	3,000	47,000	5,700
1,000	3,000	47,000	6,000
1,050	3,000	47,000	6,300
1,100	3,000	47,000	6,600
1,150	3,000	47,000	6,900
1,200	3,000	47,000	7,200
1,250	3,000	47,000	7,500
1,300	3,000	47,000	7,800
1,350	3,000	47,000	8,100
1,400	3,000	47,000	8,400
1,450	3,000	47,000	8,700
1,500	3,000	47,000	9,000
1,550	3,000	47,000	9,300
1,590	3,000	47,000	9,600
1,600	3,000	47,000	9,600
1,650	3,000	47,000	9,900
1,700	3,000	47,000	10,200
1,750	3,000	47,000	10,500
1,800	3,000	52,000	10,800
1,850	3,000	52,000	11,100
1,900	3,000	52,000	11,400

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	11,700
1,980	4,000	59,000	12,000
2,000	4,000	59,000	12,000
2,050	4,000	59,000	12,300
2,100	4,000	59,000	12,600
2,150	4,000	59,000	12,900
2,200	4,000	59,000	13,200
2,250	4,000	59,000	13,500
2,300	4,000	59,000	13,800
2,350	4,000	59,000	14,100
2,380	4,000	59,000	14,400
2,400	4,000	59,000	14,400
2,450	4,000	59,000	14,700
2,500	4,000	59,000	15,000
2,550	4,000	59,000	15,300
2,600	4,000	59,000	15,600
2,650	4,000	59,000	15,900
2,700	4,000	59,000	16,200
2,750	4,000	59,000	16,500
2,780	4,000	59,000	16,800
2,800	4,000	59,000	16,800
2,850	4,000	59,000	17,100
2,900	4,000	59,000	17,400
2,950	4,000	59,000	17,700
3,000	4,000	59,000	18,000

Mikro-wiertła



Mikrowiertła „ExclusiveLine” bez chłodzenia wewnętrznego



Materiał narzędzia **Węglik mono.**

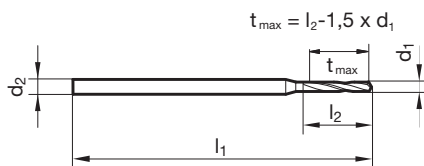
Powierzchnia **A**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 0,500$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Nr artykułu **6401**

Mikro-wiertła

d1	d2 h6	l1	l2
mm	mm	mm	mm
0,500	3,000	47,000	4,000
0,550	3,000	47,000	4,400
0,600	3,000	47,000	4,800
0,650	3,000	47,000	5,200
0,700	3,000	47,000	5,600
0,750	3,000	47,000	6,000
0,800	3,000	47,000	6,400
0,850	3,000	47,000	6,800
0,900	3,000	47,000	7,200
0,950	3,000	47,000	7,600
1,000	3,000	47,000	8,000
1,050	3,000	47,000	8,400
1,100	3,000	47,000	8,800
1,150	3,000	47,000	9,200
1,200	3,000	52,000	10,800
1,250	3,000	52,000	11,300
1,300	3,000	52,000	11,700
1,350	3,000	52,000	12,200
1,400	3,000	52,000	12,600
1,450	3,000	52,000	13,100
1,500	3,000	52,000	13,500
1,550	3,000	52,000	14,000
1,590	3,000	52,000	14,400
1,600	3,000	52,000	14,400
1,650	3,000	52,000	14,900
1,700	3,000	52,000	15,300
1,750	3,000	52,000	15,800
1,800	3,000	52,000	16,200
1,850	3,000	52,000	16,700
1,900	3,000	52,000	17,100

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,950	3,000	52,000	17,600
1,980	4,000	63,000	18,000
2,000	4,000	63,000	18,000
2,050	4,000	63,000	18,500
2,100	4,000	63,000	18,900
2,150	4,000	63,000	19,400
2,200	4,000	63,000	19,800
2,250	4,000	63,000	20,300
2,300	4,000	63,000	20,700
2,350	4,000	63,000	21,200
2,380	4,000	63,000	21,600
2,400	4,000	63,000	21,600
2,450	4,000	63,000	22,100
2,500	4,000	63,000	22,500
2,550	4,000	63,000	23,000
2,600	4,000	67,000	23,400
2,650	4,000	67,000	23,900
2,700	4,000	67,000	24,300
2,750	4,000	67,000	24,800
2,780	4,000	67,000	25,200
2,800	4,000	67,000	25,200
2,850	4,000	67,000	25,700
2,900	4,000	67,000	26,100
2,950	4,000	67,000	26,600
3,000	4,000	67,000	27,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Kierunek skrawania **R**



P • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca
- prosta • ostrza honowane

M •

K •

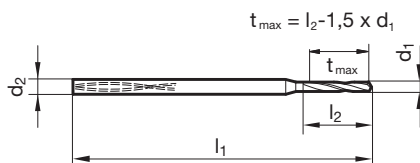
N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane

S ○

H

GÜHRING NAVIGATOR

Param. skr. na str. 796



Nr artykułu **6405**

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	11,000
1,450	4,000	52,000	12,000
1,500	4,000	52,000	12,000
1,550	4,000	52,000	12,000
1,590	4,000	52,000	13,000
1,600	4,000	52,000	13,000
1,650	4,000	52,000	13,000
1,700	4,000	56,000	14,000
1,750	4,000	56,000	14,000
1,800	4,000	56,000	14,000
1,850	4,000	56,000	15,000
1,900	4,000	56,000	15,000
1,950	4,000	56,000	16,000
1,980	4,000	56,000	16,000
2,000	4,000	56,000	16,000
2,050	4,000	56,000	16,000
2,100	4,000	62,000	17,000
2,150	4,000	62,000	17,000
2,200	4,000	62,000	18,000
2,250	4,000	62,000	18,000
2,300	4,000	62,000	18,000
2,350	4,000	62,000	19,000
2,380	4,000	62,000	19,000
2,400	4,000	62,000	19,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,450	4,000	62,000	20,000
2,500	4,000	62,000	20,000
2,550	4,000	62,000	20,000
2,600	4,000	66,000	21,000
2,650	4,000	66,000	21,000
2,700	4,000	66,000	22,000
2,750	4,000	66,000	22,000
2,780	4,000	66,000	22,000
2,800	4,000	66,000	22,000
2,850	4,000	66,000	23,000
2,900	4,000	66,000	23,000
2,950	4,000	66,000	24,000
3,000	4,000	66,000	24,000

Mikro-wiertła



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia **Węglik mono.**

Powierzchnia **A**

Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane

M •

K •

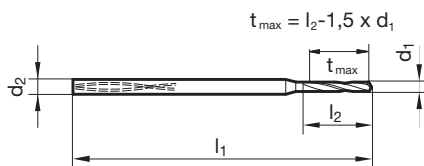
N ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stopy stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane

S ○

H

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Nr artykułu **6408**

Mikro-wiertła

d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	52,000	15,000
1,450	4,000	52,000	16,000
1,500	4,000	52,000	17,000
1,550	4,000	52,000	17,000
1,590	4,000	52,000	18,000
1,600	4,000	52,000	18,000
1,650	4,000	52,000	18,000
1,700	4,000	56,000	19,000
1,750	4,000	56,000	19,000
1,800	4,000	56,000	20,000
1,850	4,000	56,000	20,000
1,900	4,000	56,000	21,000
1,950	4,000	56,000	21,000
1,980	4,000	56,000	22,000
2,000	4,000	56,000	22,000
2,050	4,000	56,000	23,000
2,100	4,000	62,000	23,000
2,150	4,000	62,000	24,000
2,200	4,000	62,000	24,000
2,250	4,000	62,000	25,000
2,300	4,000	62,000	25,000
2,320	4,000	62,000	26,000
2,350	4,000	62,000	26,000
2,380	4,000	62,000	26,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,400	4,000	62,000	26,000
2,450	4,000	62,000	27,000
2,500	4,000	62,000	28,000
2,550	4,000	62,000	28,000
2,600	4,000	66,000	29,000
2,650	4,000	66,000	29,000
2,700	4,000	66,000	30,000
2,750	4,000	66,000	30,000
2,780	4,000	66,000	31,000
2,800	4,000	66,000	31,000
2,850	4,000	66,000	31,000
2,900	4,000	66,000	32,000
2,950	4,000	66,000	32,000
3,000	4,000	66,000	33,000



Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym



Materiał narzędzia **Węglik mono.**

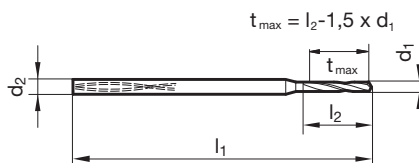
Powierzchnia **A**

Kierunek skrawania **R**

- P** • Korekcja ścina $\geq \varnothing 1,400$ • geom. ścinowa • główna krawędź skrawająca - prosta • ostrza honowane
- M** •
- K** •
- N** ○ stale konstrukcyjne i do nawęglania • stale automatowe, stale do ulepszenia cieplnego • stale stopowe – $R_m < 1200 \text{ N/mm}^2$ • stale nierdzewne • materiały odlewane
- S** ○
- H**

GÜHRINGNAVIGATOR

Param. skr. na str. 796



Nr artykułu **6412**

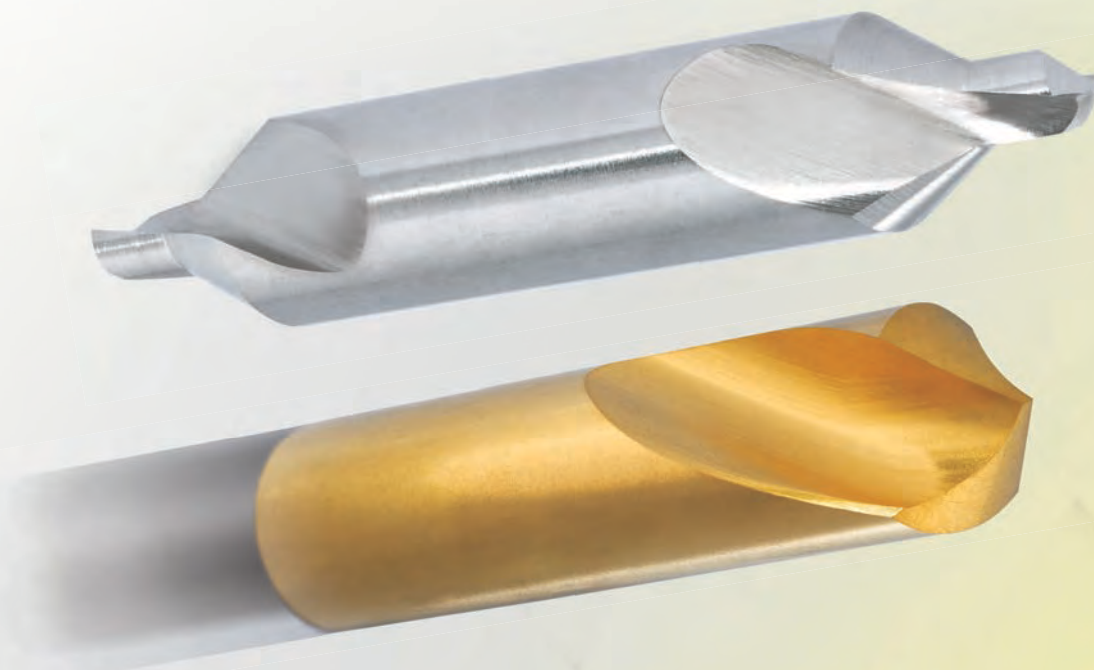
d1	d2 h6	l1	l2
mm	mm	mm	mm
1,400	4,000	62,000	25,000
1,500	4,000	62,000	27,000
1,590	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,600	4,000	62,000	29,000
1,700	4,000	70,000	31,000
1,800	4,000	70,000	32,000
1,900	4,000	70,000	34,000
1,980	4,000	70,000	36,000
2,000	4,000	70,000	36,000
2,100	4,000	78,000	38,000
2,200	4,000	78,000	40,000
2,300	4,000	78,000	42,000

d1	d2 h6	l1	l2
mm	mm	mm	mm
2,380	4,000	78,000	44,000
2,400	4,000	78,000	44,000
2,500	4,000	78,000	45,000
2,600	4,000	87,000	47,000
2,700	4,000	87,000	48,000
2,780	4,000	87,000	50,000
2,800	4,000	87,000	50,000
2,900	4,000	87,000	52,000
3,000	4,000	87,000	54,000

Mikro-wiertła



NAWIERTAKI DO NAKIEŁKÓW / NAWIERTAKI NC





P	M	K	N	S	H	Ilustracja narzędzia	Forma chwytu	Norma	Forma	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Nawiertaki do nakiełków, bez spłaszczenia

•	○	•	•	○			Cyl	DIN 333	A	R	HSS	○	0,500 - 12,500	581	802	668
•	○	•	•	○			Cyl	DIN 333	A	R	HSS	Ⓢ	0,500 - 8,000	613	802	669
•	○	•	•	○			Cyl	DIN 333	A	L	HSS	○	0,500 - 12,500	582		670
•	○	•	•	○			Cyl	DIN 333	A	R	HSS	○	1,000 - 12,500	590		671
•	○	•	•	○			Cyl	DIN 333	R	R	HSS	○	0,500 - 12,500	583	802	672
•	○	•	•	○			Cyl	DIN 333	R	R	HSS	Ⓢ	0,800 - 8,000	614	802	673
•	○	•	•	○			Cyl	DIN 333	R	L	HSS	○	0,800 - 5,000	584		674
•	○	•	•	○			Cyl	DIN 333	B	R	HSS	○	1,000 - 10,000	585	802	675
•	○	•	•	○			Cyl	DIN 333	B	L	HSS	○	1,000 - 10,000	586		676
•	○	•	•	○			Cyl	DIN 333	B	R	HSS	○	1,000 - 6,300	591		677
•	○	•	•	○			Cyl	ASME B94.11 M	A	R	HSS	○	1,190 - 7,940	594		678
•	○	•	•	○			Cyl	ASME B94.11 M	B	R	HSS	○	1,190 - 6,350	595		679
•	○	•	•	○			Cyl	BS 328	A	R	HSS	○	1,190 - 7,940	292	802	680
•	○	•	•	○			Cyl	BS 328	A	L	HSS	○	1,190 - 7,940	294		681
•	•	•	•	○			Cyl	DIN 333	A	R	HSCO	○	1,000 - 4,000	381	802	682
○	○	○	○	○	○		Cyl	WN	A	R	VHM	○	0,500 - 6,300	736		683
•	○	•	•	○			Cyl	WN	A	R	HSS	○	0,500 - 10,000	281		684
•	○	•	•	○			Cyl	WN	A	L	HSS	○	0,800 - 5,000	282		685
•	○	•	•	○			Cyl	WN	R	R	HSS	○	0,500 - 10,000	283		686
•	○	•	•	○			Cyl	WN	R	L	HSS	○	1,600 - 4,000	284		687
•	○	•	•	○			Cyl	WN	B	R	HSS	○	1,000 - 6,300	285		688
•	○	•	•	○			Cyl	WN	A	R	HSS	○	1,000 - 3,150	280	802	689

Nawiertaki do nakiełków, ze spłaszczeniem

•	○	•	•	○			Cyl	DIN 333	A	R	HSS	○	1,600 - 10,000	587	802	690
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Nawiertaki do nakiełków / Nawiertaki NC



P	M	K	N	S	H	Ilustracja narzędzia	Forma chwytu	Norma	Forma	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
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Nawiertaki do nakiełków, ze spłaszczeniem

•	○	•	•	○			Cyl	DIN 333	R	R	HSS	○	1,000 - 10,000	588	802	691
•	○	•	•	○			Cyl	DIN 333	B	R	HSS	○	1,600 - 8,000	589		692
•	○	•	•	○			Cyl	DIN 333	A	R	HSS	○	1,600 - 10,000	287		693
•	○	•	•	○			Cyl	DIN 333	R	R	HSS	○	2,000 - 8,000	288		694
•	○	•	•	○			Cyl	WN	B	R	HSS	○	1,600 - 5,000	289		695

Nawiertaki NC 90°

•	○	•	•	○			Cyl	WN		R	HSS	○	3,000 - 25,400	557	798	696
•	○	•	•	○			Cyl	WN		R	HSS	S	3,000 - 25,400	568	798	697
•	•	•	•	○			B	WN		R	HSCO	○	3,000 - 20,000	1136	798	698
•	•	•	•	○			B	WN		R	HSCO	F	3,000 - 20,000	1133	798	699
•	○	•	•	○			Cyl	WN		R	HSS	○	6,350 - 25,400	559	798	700
○	○	○	○	○	○		Cyl	WN		R	VHM	○	4,000 - 20,000	723		701

Nawiertaki NC 120°

•	○	•	•	○			Cyl	WN		R	HSS	○	3,000 - 25,400	556	798	702
•	○	•	•	○			Cyl	WN		R	HSS	S	3,000 - 25,000	567	798	703
•	•	•	•	○			B	WN		R	HSCO	○	3,000 - 20,000	1134	798	704
•	•	•	•	○			B	WN		R	HSCO	F	3,000 - 20,000	1135	798	705
○	○	○	○	○	○		HA	WN		R	VHM	○	5,000 - 20,000	724		706

Nawiertaki NC 142°

○	○	○	○	○	○		HB	WN		R	VHM	○	4,000 - 20,000	546		707
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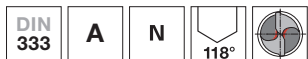
Wiertła dwustronne do karoserii

•	○	•	•	○			Cyl	WN		R	HSS	○ _{2,36} ^{≥0}	1,500 - 10,000	554		708
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Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **HSS**

Powierzchnia ○

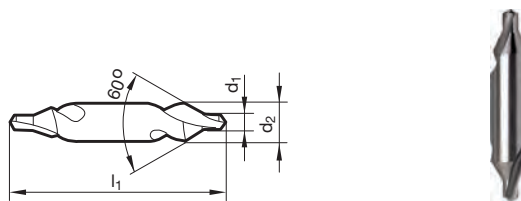
Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **581**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1	d2	l1
mm	mm	mm
10,000	25,000	100,000
12,500	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **HSS**

Powierzchnia **S**

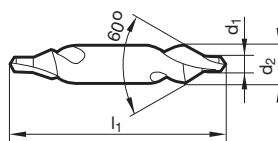
Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony • zwiększona odporność na zużycie

- M** ○
- K** •
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **613**

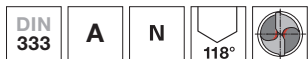
d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000

d1	d2	l1
mm	mm	mm
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



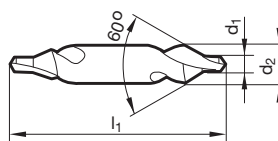
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (L)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **582**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1	d2	l1
mm	mm	mm
10,000	25,000	100,000
12,500	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia

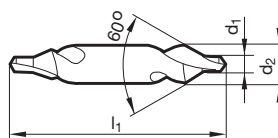


Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

- P** • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • ze zgrubieniem dla zabezpieczenia przed pęknięciem • bez stożka ochronnego
- M** ○ • zagłębienie na przejściu z pogłębienia do otworu, jako dodatkowa przestrzeń na chłodziwo • do nakiełków wg DIN 332, arkusz 1, forma A
- K** •
- N** •
- S** ○
- H** ○



Nr artykułu **590**

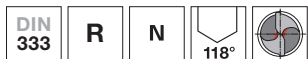
d1	d2	l1
mm	mm	mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1	d2	l1
mm	mm	mm
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000
10,000	25,000	100,000
12,500	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



P • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • poprawia pozycjonowanie pomiędzy kłami tokarki • do nakiełków wg DIN 332 część 1, forma R • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** •
- N** •
- S** ○
- H** ○

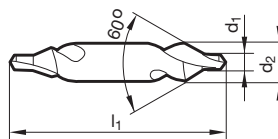
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **583**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

d1	d2	l1
mm	mm	mm
10,000	25,000	100,000
12,500	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **HSS**

Powierzchnia **S**

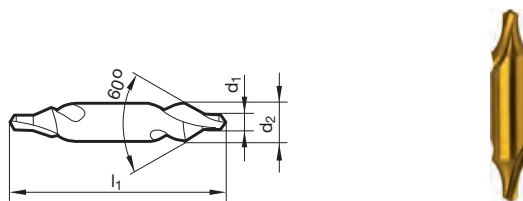
Kierunek skrawania **R**

P • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • zwiększona odporność na zużycie • poprawia pozycjonowanie pomiędzy kłami tokarki • do nakiełków wg DIN 332 część 1, forma R • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** •
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **614**

d1	d2	l1
mm	mm	mm
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000

d1	d2	l1
mm	mm	mm
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000
8,000	20,000	80,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



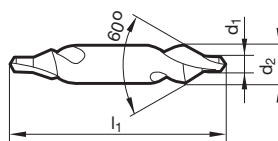
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (L)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • poprawia pozycjonowanie pomiędzy kłami tokarki • do nakiełków wg DIN 332 część 1, forma R • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **584**

d1	d2	l1
mm	mm	mm
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000

d1	d2	l1
mm	mm	mm
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **HSS**

Powierzchnia ○

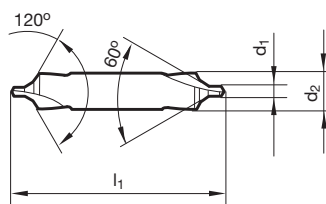
Kierunek skrawania (R)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • wg DIN 332, arkusz 1, forma B • ze stożkiem chronionym 120°

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **585**

d1	d2	l1
mm	mm	mm
1,000	4,000	35,500
1,250	5,000	40,000
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000

d1	d2	l1
mm	mm	mm
4,000	14,000	67,000
5,000	18,000	75,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



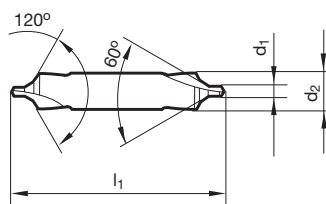
Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • wg DIN 332, arkusz 1, forma B • ze stożkiem chronionym 120°

- M** ○
- K** •
- N** •
- S** ○
- H** ○



Nr artykułu **586**

d1	d2	l1
mm	mm	mm
1,000	4,000	35,500
1,250	5,000	40,000
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000

d1	d2	l1
mm	mm	mm
4,000	14,000	67,000
5,000	18,000	75,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000



Nawiertaki do nakiełków, bez spłaszczenia



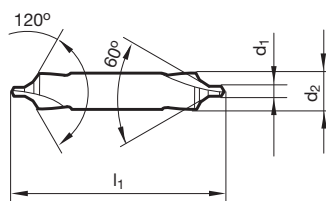
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (R)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • ze zgrubieniem dla zabezpieczenia przed pęknięciem • zagłębienie na przejściu z pogłębienia do otworu, jako dodatkowa przestrzeń na chłodziwo • wg DIN 332, arkusz 1, forma B • ze stożkiem chronionym 120°

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **591**

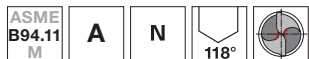
d1	d2	l1
mm	mm	mm
1,000	4,000	35,500
1,600	6,300	45,000
2,000	8,000	50,000
2,500	10,000	56,000
3,150	11,200	60,000
4,000	14,000	67,000

d1	d2	l1
mm	mm	mm
5,000	18,000	75,000
6,300	20,000	80,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



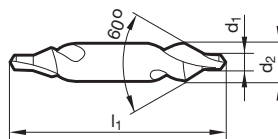
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 1,980$ ● geometria zataczana ● do nakiełków Forma A wg normy U.S.

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **594**

Rozmiar	d1		d2	l1	kod
	mm	inch			
1	1,190	3/64	3,170	32,000	1,190
2	1,980	5/64	4,760	48,000	1,980
3	2,780	7/64	6,350	51,000	2,780
4	3,170	1/8	7,940	54,000	3,170
5	4,760	3/16	11,110	70,000	4,760
6	5,560	7/32	12,700	76,000	5,560

Rozmiar	d1		d2	l1	kod
	mm	inch			
7	6,350	1/4	15,870	83,000	6,350
8	7,940	5/16	19,050	89,000	7,940



Nawiertaki do nakiełków, bez spłaszczenia



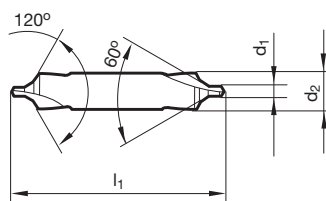
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,380$ ● geometria zataczana ● do nakiełków Forma B wg normy U.S.

P	●
M	○
K	●
N	●
S	○
H	



Nr artykułu **595**

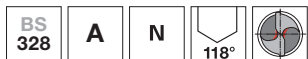
Rozmiar	d1		d2	l1	kod
	mm	inch			
11	1,190	3/64	3,170	32,000	1,190
12	1,590	1/16	4,760	48,000	1,590
13	2,380	3/32	6,350	51,000	2,380
14	2,780	7/64	7,940	54,000	2,780
15	3,970	5/32	11,110	70,000	3,970
16	4,760	3/16	12,700	76,000	4,760

Rozmiar	d1		d2	l1	kod
	mm	inch			
17	5,560	7/32	15,870	83,000	5,560
18	6,350	1/4	19,050	89,000	6,350

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **HSS**

Powierzchnia ○

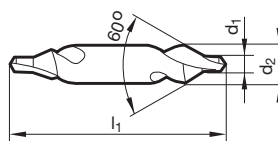
Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 1,190$ ● geometria zataczana ● do nakiełków Forma A wg Norm Brytyjskich

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **292**

Rozmiar	d1		d2	l1	kod
	mm	inch			
1	1,190	3/64	3,170	38,000	1,190
2	1,590	1/16	4,760	44,000	1,590
3	2,380	3/32	6,350	51,000	2,380
4	3,170	1/8	7,940	57,000	3,170
5	4,760	3/16	11,110	63,000	4,760
6	6,350	1/4	15,870	76,000	6,350

Rozmiar	d1		d2	l1	kod
	mm	inch			
7	7,940	5/16	19,050	89,000	7,940



Nawiertaki do nakiełków, bez spłaszczenia



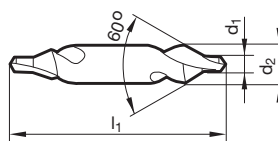
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (L)

P ● Korekcja ścina $\geq \varnothing 1,190$ ● geometria zataczana ● do nakiełków Forma A wg Norm Brytyjskich

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **294**

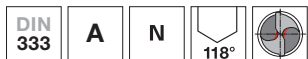
Rozmiar	d1		d2	l1	kod
	mm	inch			
1	1,190	3/64	3,170	38,000	1,190
2	1,590	1/16	4,760	44,000	1,590
3	2,380	3/32	6,350	51,000	2,380
4	3,170	1/8	7,940	57,000	3,170
5	4,760	3/16	11,110	63,000	4,760
6	6,350	1/4	15,870	76,000	6,350

Rozmiar	d1		d2	l1	kod
	mm	inch			
7	7,940	5/16	19,050	89,000	7,940

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



- P** • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • zwiększona odporność na zużycie • do nakiełków wg DIN 332, arkusz 1, forma A
- M** •
- K** •
- N** • materiały - $R_m > 800 \text{ N/mm}^2$ • chromo-niklowe stале nierdz./kwaso-/żaro-wytrzymałe
- S** ○
- H**

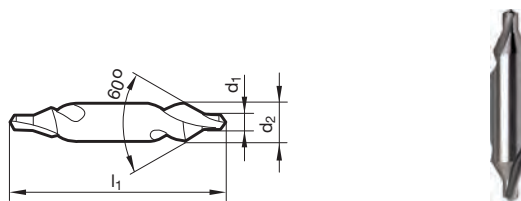
Materiał narzędzia **HSCO**

Powierzchnia ○

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 802



Nr artykułu **381**

d1	d2	l1
mm	mm	mm
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000
2,500	6,300	45,000
3,150	8,000	50,000

d1	d2	l1
mm	mm	mm
4,000	10,000	56,000



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania



P ○ Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

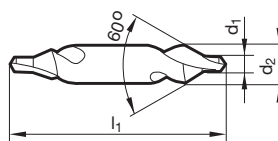
M ○

K ○

N ○ uniwersalny materiał przydatność

S ○

H ○



Nr artykułu

736

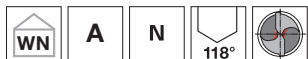
d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	3,150	31,500
1,600	4,000	35,500
2,000	5,000	40,000

d1	d2	l1
mm	mm	mm
2,500	6,300	45,000
3,150	8,000	50,000
4,000	10,000	56,000
5,000	12,500	63,000
6,300	16,000	71,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



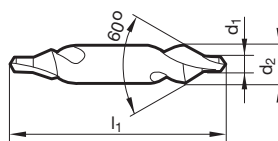
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A (wydanie wycofane 09.1960x), forma A • dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **281**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
1,000	3,150	31,500
1,250	4,000	35,500
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000

d1	d2	l1
mm	mm	mm
3,150	10,000	56,000
4,000	12,500	63,000
5,000	16,000	71,000
6,300	20,000	80,000
8,000	25,000	100,000
10,000	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



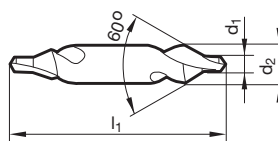
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (L)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A (wydanie wycofane 09.1960x), forma A • dla $d1 \leq 0,8$ mm nakiełek zewn. z jednej strony

P	●
M	○
K	●
N	●
S	○
H	



Nr artykułu **282**

d1	d2	l1
mm	mm	mm
0,800	3,150	25,000
1,250	4,000	35,500
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000
3,150	10,000	56,000

d1	d2	l1
mm	mm	mm
4,000	12,500	63,000
5,000	16,000	71,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



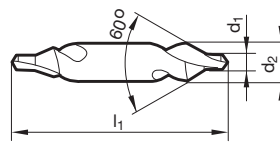
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ ● geometria zataczana ● poprawia pozycjonowanie pomiędzy kłami tokarki ● do nakiełków wg DIN 332, arkusz 1, forma R ● dla $d1 \leq 0.8$ mm nakiełek zewn. z jednej strony

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **283**

d1	d2	l1
mm	mm	mm
0,500	3,150	25,000
0,800	3,150	25,000
1,000	3,150	31,500
1,250	4,000	35,500
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000
3,150	10,000	56,000
4,000	12,500	63,000
5,000	16,000	71,000
6,300	20,000	80,000
8,000	25,000	100,000

d1	d2	l1
mm	mm	mm
10,000	31,500	125,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



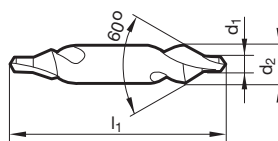
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania (L)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • poprawia pozycjonowanie pomiędzy kłami tokarki • do nakiełków wg DIN 332, arkusz 1, forma R

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **284**

d1	d2	l1
mm	mm	mm
1,600	5,000	40,000
2,000	6,300	45,000
2,500	8,000	50,000
3,150	10,000	56,000
4,000	12,500	63,000

d1	d2	l1
mm	mm	mm

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, bez spłaszczenia



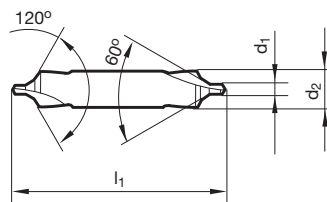
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • do nakiełków wg DIN 332, arkusz 1, forma A (wydanie wycofane 09.1960x), forma B • ze stożkiem chronionym 120°

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **285**

d1	d2	l1
mm	mm	mm
1,000	6,300	40,000
1,600	8,000	50,000
2,000	10,000	56,000
2,500	11,200	63,000
3,150	14,000	71,000
4,000	16,000	80,000

d1	d2	l1
mm	mm	mm
5,000	20,000	90,000
6,300	25,000	100,000



Nawiertaki do nakiełków, bez spłaszczenia



Materiał narzędzia **HSS**

Powierzchnia ○

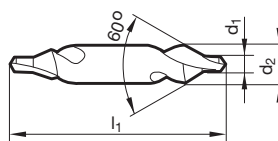
Kierunek skrawania (R)

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bardzo długie
nawiertaki do nakiełków • bez stożka ochronnego • do nakiełków wg
M ○ DIN 332, arkusz 1, forma A • do nakiełków leżących w zagłębieniach

- K** ●
- N** ●
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **280**

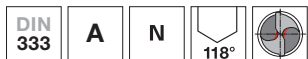
d1	d2	l1
mm	mm	mm
1,000	4,000	120,000
1,600	5,000	120,000
2,000	6,000	120,000
2,500	8,000	120,000
3,150	10,000	120,000

d1	d2	l1
mm	mm	mm

Nawiertaki do
nakiełków /
Nawiertaki NC



Nawiertaki do nakiełków, ze spłaszczeniem



Materiał narzędzia **HSS**

Powierzchnia

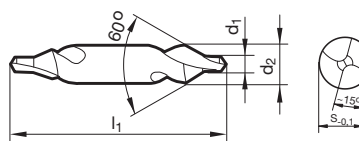
Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • do nakiełków wg DIN 332, arkusz 1, forma A • bez stożka ochronnego

- M** ○
- K** •
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **587**

d1	d2	l1	S
mm	mm	mm	mm
1,600	4,000	35,500	3,250
2,000	5,000	40,000	4,200
2,500	6,300	45,000	5,350
3,150	8,000	50,000	6,950
4,000	10,000	56,000	8,400
5,000	12,500	63,000	10,950

d1	d2	l1	S
mm	mm	mm	mm
6,300	16,000	71,000	14,000
8,000	20,000	80,000	17,900
10,000	25,000	100,000	22,500



Nawiertaki do nakiełków, ze spłaszczeniem



Materiał narzędzia **HSS**

Powierzchnia ○

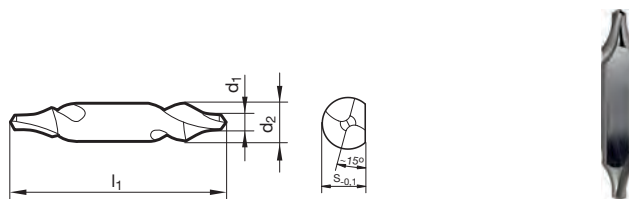
Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • poprawia pozycjonowanie pomiędzy kłami tokarki • do nakiełków wg DIN 332 część 1, forma R

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 802



Nr artykułu **588**

d1	d2	l1	S
mm	mm	mm	mm
1,000	3,150	31,500	2,350
2,000	5,000	40,000	4,200
2,500	6,300	45,000	5,350
3,150	8,000	50,000	6,950
4,000	10,000	56,000	8,400
5,000	12,500	63,000	10,950

d1	d2	l1	S
mm	mm	mm	mm
6,300	16,000	71,000	14,000
8,000	20,000	80,000	17,900
10,000	25,000	100,000	22,500

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki do nakiełków, ze spłaszczeniem



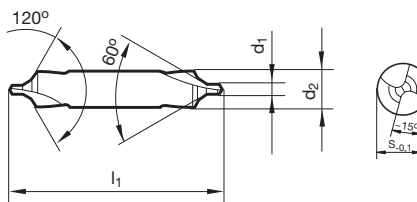
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • wg DIN 332, arkusz 1, forma B • ze stożkiem chronionym 120°

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **589**

d1	d2	l1	S
mm	mm	mm	mm
1,600	6,300	45,000	5,350
2,000	8,000	50,000	6,950
2,500	10,000	56,000	8,400
3,150	11,200	60,000	10,000
4,000	14,000	67,000	12,650
5,000	18,000	75,000	16,400

d1	d2	l1	S
mm	mm	mm	mm
6,300	20,000	80,000	17,900
8,000	25,000	100,000	22,500



Nawiertaki do nakiełków, ze spłaszczeniem



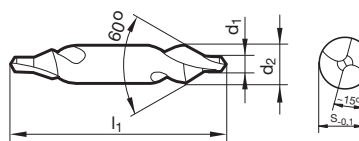
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • bez stożka ochronnego • do nakiełków wg DIN 332, arkusz 1, forma A (wydanie wycofane 09.1960x), forma A

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **287**

d1	d2	l1	S
mm	mm	mm	mm
1,600	5,000	40,000	4,200
2,000	6,300	45,000	5,350
2,500	8,000	50,000	6,850
3,150	10,000	56,000	8,400
4,000	12,500	63,000	10,650
5,000	16,000	71,000	13,650

d1	d2	l1	S
mm	mm	mm	mm
6,300	20,000	80,000	17,400
8,000	25,000	100,000	21,900
10,000	31,500	125,000	27,100

Nawiertaki do nakiełków / Nawiertaki NC



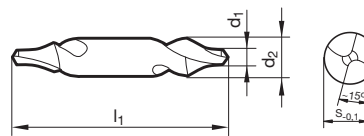
Nawiertaki do nakiełków, ze spłaszczeniem



P • Korekcja ścina $\geq \varnothing 2,000$ • geometria zataczana • poprawia pozycjonowanie pomiędzy kłami tokarki • do nakiełków wg DIN 332, arkusz 1, forma R

- M** ○
- K** •
- N** •
- S** ○
- H** ○

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **288**

d1	d2	l1	S
mm	mm	mm	mm
2,000	6,300	45,000	5,350
2,500	8,000	50,000	6,850
3,150	10,000	56,000	8,400
4,000	12,500	63,000	10,650
5,000	16,000	71,000	13,650
6,300	20,000	80,000	17,400

d1	d2	l1	S
mm	mm	mm	mm
8,000	25,000	100,000	21,900



Nawiertaki do nakiełków, ze spłaszczeniem



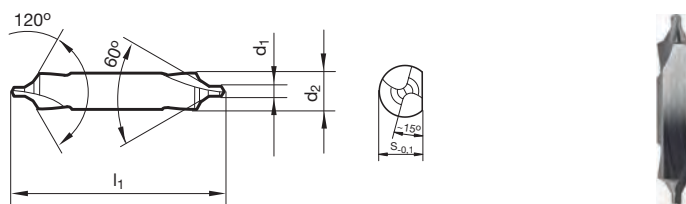
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

P ● Korekcja ścina $\geq \varnothing 2,000$ ● geometria zataczana ● do nakiełków wg DIN 332, arkusz 1, forma A (wydanie wycofane 09.1960x), forma B ● ze stożkiem chronionym 120°

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○



Nr artykułu **289**

d1	d2	l1	S
mm	mm	mm	mm
1,600	8,000	50,000	6,500
2,000	10,000	56,000	7,950
2,500	11,200	63,000	9,500
3,150	14,000	71,000	12,000
4,000	16,000	80,000	14,400
5,000	20,000	90,000	18,400

d1	d2	l1	S
mm	mm	mm	mm

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 90°



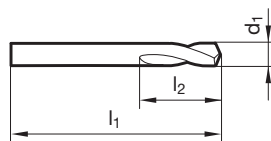
P • geometria zataczana • przeznaczony tylko do nawiercania

- M** ○
- K** •
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 798

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **557**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,000		84,000	22,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
13,000		102,000	30,000

d1		l1	l2
mm	inch	mm	mm
14,000		107,000	33,500
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000
25,400	1	156,000	53,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 90°



Materiał narzędzia **HSS**

Powierzchnia **S**

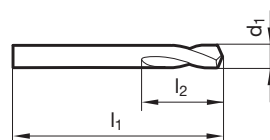
Kierunek skrawania **R**

P • geometria zataczana • przeznaczony tylko do nawiercania

P	•
M	○
K	•
N	•
S	○
H	

GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **568**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500

d1		l1	l2
mm	inch	mm	mm
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000
25,400	1	156,000	53,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 90°



- P** • geometria zataczana • przeznaczony tylko do nawierciana • $\geq \varnothing 6,0$ mm z powierzchnią zabierakową wg DIN 1835-B • kobałtowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie
- K** •
- N** •
- S** ○
- H** •

Materiał narzędzia **HSCO**

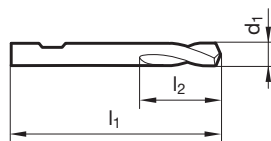
Powierzchnia ○

Kierunek skrawania



GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **1136**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000



Nawiertaki NC 90°



- P** • geometria zataczana • przeznaczony tylko do nawiercania • $\geq \varnothing 6,0$ mm z powierzchnią zabierakową wg DIN 1835-B • kobaltowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie
- K** •
- N** •
- S** ○
- H** □

Materiał narzędzia **HSCO**

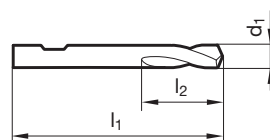
Powierzchnia **F**

Kierunek skrawania **R**



GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **1133**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 90°



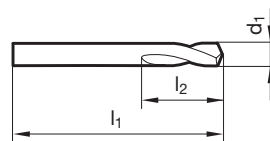
P • geometria zataczana • przeznaczony tylko do nawiercania

- M** ○
- K** •
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 798

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ



Nr artykułu **559**

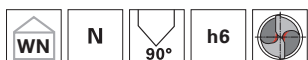
d1		l1	l2
mm	inch	mm	mm
6,350	1/4	105,000	17,000
8,000		118,000	21,000
9,520	3/8	132,000	25,000
12,700	1/2	159,000	30,000
15,870	5/8	186,000	37,500
19,050	3/4	213,000	45,000

d1		l1	l2
mm	inch	mm	mm
25,400	1	216,000	53,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 90°

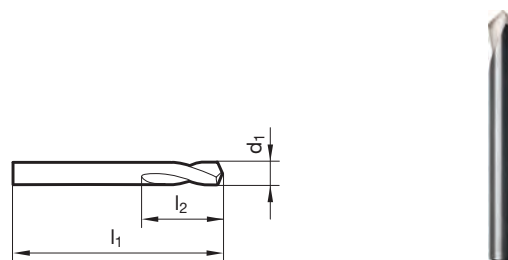


Materiał narzędzia **Węglik mono.**

Powierzchnia ○

Kierunek skrawania **(R)**

- P** ○ Korekcja ścina $\geq \varnothing 6,000$ • geom. ścinowa • przeznaczony tylko do nawiercania
- M** ○
- K** ○
- N** ○ uniwersalny materiał przydatność
- S** ○
- H** ○



Nr artykułu **723**

d1		l1	l2
mm	inch	mm	mm
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,050	3/4	131,000	45,000

d1		l1	l2
mm	inch	mm	mm
20,000		131,000	45,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 120°



P ● geometria zataczana ● przeznaczony tylko do nawiercania

- M** ○
- K** ●
- N** ●
- S** ○
- H** ○

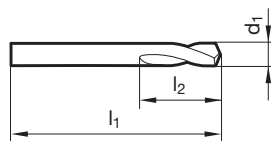
Materiał narzędzia **HSS**

Powierzchnia ○

Kierunek skrawania

GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **556**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
5,600		66,000	16,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
6,500		70,000	17,000
7,000		74,000	19,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
11,550		95,000	28,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
12,700	1/2	102,000	30,000
14,000		107,000	33,500
15,000		111,000	33,500
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,000		127,000	40,000
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000
25,400	1	156,000	53,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 120°



Materiał narzędzia **HSS**

Powierzchnia **S**

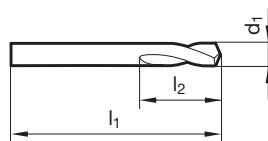
Kierunek skrawania **R**

P • geometria zataczana • przeznaczony tylko do nawiercania

- M** ○
- K** •
- N** •
- S** ○
- H** ○

GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **567**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500

d1		l1	l2
mm	inch	mm	mm
19,050	3/4	131,000	45,000
20,000		131,000	45,000
25,000	63/64	151,000	53,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 120°



- P** • geometria zataczana • przeznaczony tylko do nawierciana • $\geq \varnothing 6,0$ mm z powierzchnią zabierakową wg DIN 1835-B • kobaltowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie
- K** •
- N** •
- S** ○
- H** □

Materiał narzędzia **HSCO**

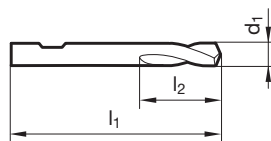
Powierzchnia ○

Kierunek skrawania



GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **1134**

d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000



Nawiertaki NC 120°



- P** • geometria zataczana • przeznaczony tylko do nawiercania • $\geq \varnothing 6,0$ mm z powierzchnią zabierakową wg DIN 1835-B • kobaltowa stal
- M** • szybko tnąca • zwiększona odporność na zużycie
- K** •
- N** •
- S** ○
- H** □

Materiał narzędzia **HSCO**

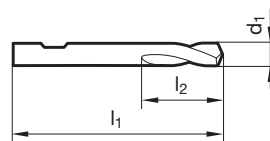
Powierzchnia **F**

Kierunek skrawania **R**

NEW

GÜHRING NAVIGATOR

Param. skr. na str. 798



Nr artykułu **1135**

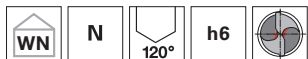
d1		l1	l2
mm	inch	mm	mm
3,000		46,000	12,000
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
16,000		115,000	37,500
20,000		131,000	45,000

Nawiertaki do nakiełków / Nawiertaki NC



Nawiertaki NC 120°



Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania



P ○ Korekcja ścina $\geq \varnothing 13,500$ • geom. ścinowa • przeznaczony tylko do nawiercania

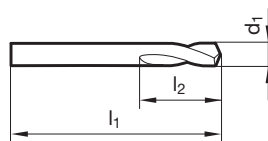
M ○

K ○

N ○ uniwersalny materiał przydatność

S ○

H ○



Nr artykułu **724**

d1		l1	l2
mm	inch	mm	mm
5,000		62,000	14,000
6,000		66,000	16,000
6,350	1/4	70,000	17,000
8,000		79,000	21,000
9,520	3/8	89,000	25,000
10,000		89,000	25,000

d1		l1	l2
mm	inch	mm	mm
12,000		102,000	30,000
12,700	1/2	102,000	30,000
15,870	5/8	115,000	37,500
16,000		115,000	37,500
19,050	3/4	131,000	45,000
20,000		131,000	45,000



Nawiertaki NC 142°



Materiał narzędzia **Węglik mono.**

Powierzchnia



Kierunek skrawania



P ◦ geom. ścinowa • przeznaczony tylko do nawiercania •

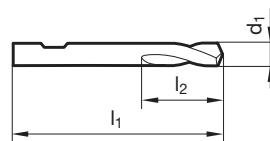
M ◦

K ◦

N ◦ uniwersalny materiał przydatność

S ◦

H ◦



Nr artykułu **546**

d1		l1	l2
mm	inch	mm	mm
4,000		55,000	12,000
5,000		62,000	14,000
6,000		66,000	16,000
8,000		79,000	21,000
10,000		89,000	25,000
12,000		102,000	30,000

d1		l1	l2
mm	inch	mm	mm
16,000		115,000	37,500
20,000		131,000	45,000

Nawiertaki do nakiełek / Nawiertaki NC



Wiertła dwustronne do karoserii

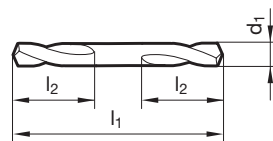


Materiał narzędzia **HSS**

Powierzchnia $\geq 0,2,36$

Kierunek skrawania

- P** ● Korekcja ścina $\geq \text{Ø } 1,450$ • geometria zataczana • do wykorzystania z obu stron • do wiertarek ręcznych w przemyśle samochodowym
- M** ○
- K** ●
- N** ● elementy cienkościenne
- S** ○
- H** ○



Nr artykułu **554**

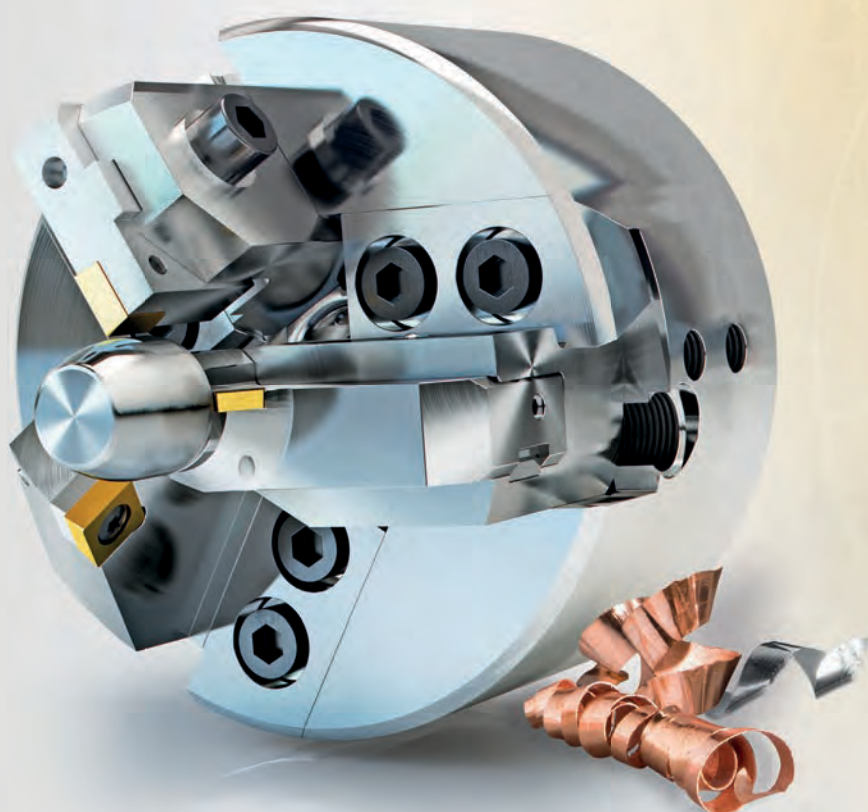
d1	l1	l2
mm	mm	mm
1,500	32,000	6,000
1,900	36,000	7,100
2,000	38,000	7,500
2,100	38,000	7,500
2,200	40,000	8,500
2,300	40,000	8,500
2,400	43,000	9,500
2,450	43,000	9,500
2,500	43,000	9,500
2,600	43,000	9,500
2,700	46,000	10,600
2,780	46,000	10,600
2,800	46,000	10,600
2,900	46,000	10,600
3,000	46,000	10,600
3,050	49,000	11,200
3,100	49,000	11,200
3,170	49,000	11,200
3,200	49,000	11,200
3,260	49,000	11,200
3,300	49,000	11,200
3,500	52,000	12,500
3,570	52,000	12,500
3,600	52,000	12,500
3,650	52,000	12,500
3,700	52,000	12,500
3,800	55,000	14,000
3,970	55,000	14,000
4,000	55,000	14,000
4,100	55,000	14,000
4,200	55,000	14,000
4,300	58,000	15,500
4,500	58,000	15,500
4,600	58,000	15,500
4,760	62,000	17,000
4,800	62,000	17,000

d1	l1	l2
mm	mm	mm
4,900	62,000	17,000
5,000	62,000	17,000
5,100	62,000	17,000
5,200	62,000	17,000
5,300	62,000	17,000
5,400	66,000	19,000
5,500	66,000	19,000
5,560	66,000	19,000
5,600	66,000	19,000
5,800	66,000	19,000
5,900	66,000	19,000
5,950	66,000	19,000
6,000	66,000	19,000
6,100	70,000	21,200
6,350	70,000	21,200
6,500	70,000	21,200
6,800	74,000	23,600
7,000	74,000	23,600
7,100	74,000	23,600
7,500	74,000	23,600
7,940	79,000	25,000
8,000	79,000	25,000
8,500	79,000	25,000
8,600	84,000	25,000
9,000	84,000	25,000
9,500	84,000	25,000
9,520	89,000	25,000
10,000	89,000	25,000

Nawiertaki do nakiełków / Nawiertaki NC

GE 100

Wielofunkcyjne systemy narzędziowe.
Połączenie do 5 zabiegów z zastosowaniem
tylko jednego narzędzia.



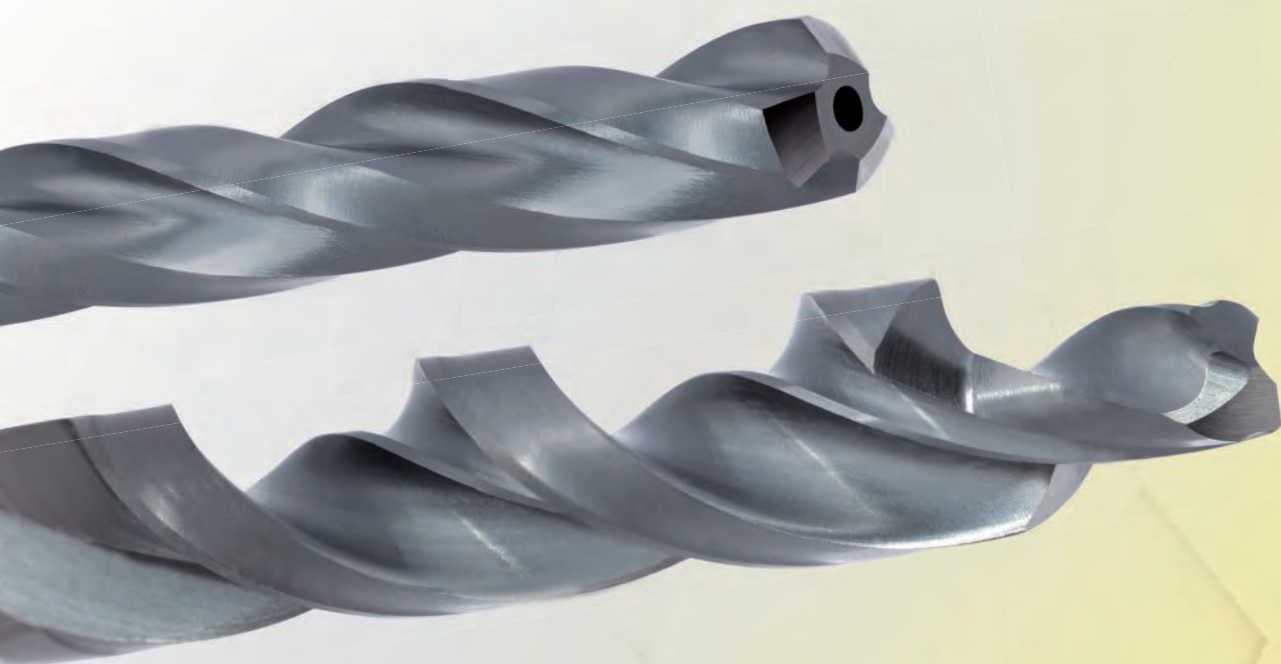
Połączenie w jednym narzędziu dwóch
do czterech regulowanych opravek z
centralnym wiertłem stopniowym,
redukuje czas obróbki do kilku sekund.



Więcej informacji można znaleźć w naszym katalogu GE100.



WIERTŁA STOPNIOWE / ROZWIERTAKI ZGRUBNE





P	M	K	N	S	H	Ilustracja narzędzia	Norma	Forma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
Wiertła stopniowe, do nakiełków DIN 332																
•	○	•	•	○			WN	D	N	R	HSS	●	8,000 - 40,000	274	804	714
•	○	•	•	○			WN	DR	N	R	HSS	●	8,000 - 40,000	574	804	715
•	○	•	•	○			WN	D	N	R	HSS	●	8,000 - 20,000	575	804	716
•	○	•	•	○			WN	D	N	R	HSS	●	14,000 - 40,000	576	804	717
Wiertła stopniowe, z chwytem walc.																
•	○	•	•	○			WN		N	R	HSS	○	6,000 - 19,000	378	804	718
•	○	•	•	○			WN		N	R	HSS	○	6,600 - 21,500	1147	804	719
•	○	•	•	○			WN		N	R	HSS	○	6,000 - 18,000	379	804	720
•	○	•	•	○			WN		N	R	HSS	○	3,400 - 13,500	380	804	721
Wiertła stopniowe, wielolysinkowe, z chwytem walc.																
•	○	•	•	○			DIN 8374	A	N	R	HSS	●	6,000 - 15,000	536	806	722
•	○	•	•	○			DIN 8374	B	N	R	HSS	●	7,500 - 19,000	569	806	723
•	○	•	•	○			WN		N	R	HSS	●	6,600 - 17,200	636	806	724
•	○	•	•	○			WN		N	R	HSS	●	6,000 - 8,000	638	806	725
•	○	•	•	○			DIN 8376		N	R	HSS	●	6,000 - 18,000	538	806	726
○	○	○	○	○	○		WN		N	R	VHM	○	6,000 - 15,000	738		727
•	○	•	•	○			WN		N	R	HSS	●	5,900 - 17,500	514	806	728
•	○	•	•	○			DIN 8378		N	R	HSS	●	3,400 - 13,500	540	806	729
○	○	○	○	○	○		WN		N	R	VHM	○	4,500 - 11,000	739		730
Wiertła stopniowe, wielolysinkowe, z chwytem MK																
•	○	•	•	○			WN		N	R	HSS	●	11,500 - 23,000	637	806	731
•	○	•	•	○			WN		N	R	HSS	●	11,000 - 29,000	537	806	732
•	○	•	•	○			WN		N	R	HSS	●	18,000 - 26,000	639	806	733
•	○	•	•	○			DIN 8377		N	R	HSS	●	10,000 - 33,000	539	806	734
•	○	•	•	○			WN		N	R	HSS	●	9,400 - 33,000	520	806	735

Wiertła stopniowe / Rozwiertaki zgrubne



P	M	K	N	S	H	Ilustracja narzędzia	Norma	Forma	Typ	Kierunek skrawania	Materiał narzędzia	Powierzchnia	d1/mm	Nr artykułu	Param. skr. na str.	Strona
Wiertła stopniowe, wielolysinkowe, z chwytem MK																
•	○	•	○				DIN 8379		N	R	HSS	●	9,000 - 22,000	541	806	736
Rozwiertaki zgrubne, z chwytem walc.																
•	○	•	○				DIN 344		N	R	HSS	●	3,800 - 20,000	533	800	737
○	○	○	○	○	○		WN		N	R	HM	○	3,800 - 15,000	750		739
Rozwiertaki zgrubne, z chwytem MK																
•	○	•	○				DIN 343		N	R	HSS	●	7,800 - 50,000	534	800	740
•	○	•	•	○			DIN 343		N	R	HSCO	●	8,500 - 26,000	634	800	742
•	○	•	○				DIN 1864		N	R	HSS	●	5,000 - 30,000	555	800	743
•	○	•	•	○			DIN 1864		N	R	HSCO	●	8,000 - 15,000	635	800	744
○	○	○	○	○	○		WN		N	R	HM	○	28,700 - 39,600	729		745
Wiertła do otworów pod kołki stożkowe																
•	○	•	○				DIN 1898		N	R	HSS	● _{2,36} ^{>0}	2,000 - 12,000	531		746
•	○	•	○				DIN 1898		N	R	HSS	●	5,000 - 25,000	532		747



Wiertła stopniowe, do nakiełków DIN 332

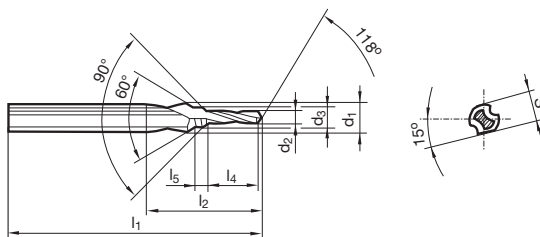


- P** • Korekcja ścina $\geq \varnothing 8,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • chwyt ze spłaszczeniem • kąt pogłębienia 60° • do nakiełków z otworem gwintowanym wg DIN 332, arkusz 2, forma D • zastosowanie do nakiełczarek
- M** ○
- K** •
- N** •
- S** ○
- H** ○

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ

GÜHRINGNAVIGATOR

Param. skr. na str. 804



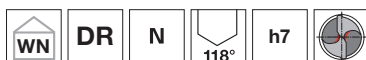
Nr artykułu **274**

d1 h7	d2 h8	d3	l1	l2	l4	l5	S	do gwintu
mm	mm	mm	mm	mm	mm	mm	mm	
8,000	3,300	4,300	63,000	23,000	11,000	1,600	6,750	M 4
10,000	4,200	5,300	67,000	27,000	13,000	2,150	8,450	M 5
12,500	5,000	6,400	71,000	33,000	16,000	2,900	10,450	M 6
14,000	6,800	8,400	88,000	41,000	19,500	3,500	12,500	M 8
16,000	8,500	10,500	94,000	47,000	23,000	4,700	14,850	M10
20,000	10,200	13,000	105,000	59,000	28,000	6,500	18,450	M12
25,000	14,000	17,000	132,000	67,000	33,000	8,300	23,400	M16
31,500	17,500	21,000	145,000	76,500	38,000	10,350	29,350	M20
40,000	21,000	25,000	160,000	90,000	45,000	12,000	36,500	M24

Wiertła stopniowe / Rozwiertaki zgrubne



Wiertła stopniowe, do nakiełków DIN 332


 Materiał narzędzia **HSS**

Powierzchnia



Kierunek skrawania

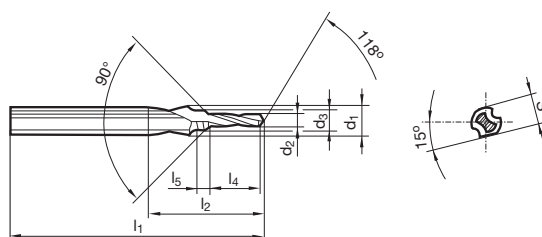


P • Korekcja ścina $\geq \varnothing 8,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • chwyt ze spłaszczeniem • kąt pogłębienia 60° • wg DIN 332, arkusz 2, forma DR • zastosowanie do nakiełczarek

K	•
N	•
S	○
H	

GÜHRING NAVIGATOR

Param. skr. na str. 804



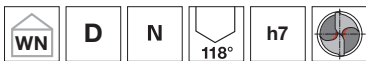
Nr artykułu

574

d1 h7	d2 h8	d3	l1	l2	l4	l5	S	do gwintu
mm	mm	mm	mm	mm	mm	mm	mm	
8,000	3,300	4,300	63,000	23,000	11,000	1,600	6,750	M 4
10,000	4,200	5,300	67,000	27,000	13,000	2,150	8,450	M 5
12,500	5,000	6,400	71,000	33,000	16,000	2,900	10,450	M 6
14,000	6,800	8,400	88,000	41,000	19,500	3,500	12,500	M 8
16,000	8,500	10,500	94,000	47,000	23,000	4,700	14,850	M10
20,000	10,200	13,000	105,000	59,000	28,000	6,500	18,450	M12
25,000	14,000	17,000	132,000	67,000	33,000	8,300	23,400	M16
31,500	17,500	21,000	145,000	76,500	38,000	10,350	29,350	M20
40,000	21,000	25,000	160,000	90,000	45,000	12,000	36,500	M24



Wiertła stopniowe, do nakiełków DIN 332



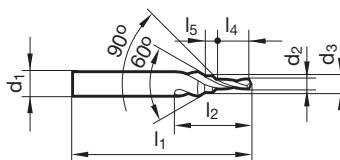
P • Korekcja ścina $\geq \varnothing 8,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • kąt pogłębienia 60° • do nakiełków z otworem gwintowanym wg DIN 332, arkusz 2, forma D

- M** ○
- K** •
- N** •
- S** ○
- H** ○

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ

GÜHRING NAVIGATOR

Param. skr. na str. 804



Nr artykułu **575**

d1 h7	d2 h8	d3	l1	l2	l4	l5	do gwintu
mm	mm	mm	mm	mm	mm	mm	
8,000	3,300	4,300	63,000	23,000	11,000	1,600	M 4
10,000	4,200	5,300	67,000	27,000	13,000	2,150	M 5
12,500	5,000	6,400	71,000	33,000	16,000	2,900	M 6
14,000	6,800	8,400	88,000	41,000	19,500	3,500	M 8
16,000	8,500	10,500	94,000	47,000	23,000	4,700	M10
20,000	10,200	13,000	105,000	59,000	28,000	6,500	M12



Wiertła stopniowe, do nakiełków DIN 332

Materiał narzędzia **HSS**

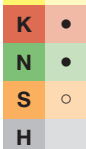
Powierzchnia



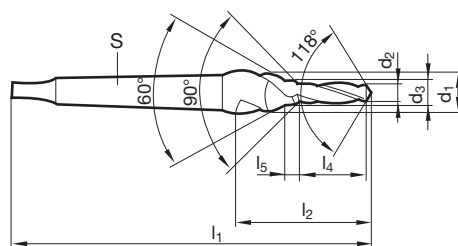
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 14,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d_1$ • geometria zataczana • kąt pogłębienia 60° • do nakiełków z otworem gwintowanym wg DIN 332, arkusz 2, forma D

**GÜHRING**NAVIGATOR

Param. skr. na str. 804



Nr artykułu

576

d1 h7	d2 h8	d3	l1	l2	l4	l5	do gwintu
mm	mm	mm	mm	mm	mm	mm	
14,000	6,800	8,400	110,000	41,000	19,500	3,500	M 8
16,000	8,500	10,500	131,000	47,000	23,000	4,700	M10
20,000	10,200	13,000	145,000	59,000	28,000	6,500	M12
25,000	14,000	17,000	172,000	67,000	33,000	8,300	M16
31,500	17,500	21,000	184,000	76,500	38,000	10,350	M20
40,000	21,000	25,000	222,000	90,000	45,000	12,000	M24



Wiertła stopniowe, z chwytem walc.

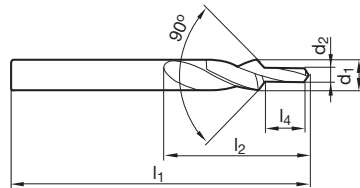


- P** • Korekcja ścina $\geq \varnothing 6,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • bardzo wysoka odporność na skręcanie • dla obrabiarek CNC i NC • do otworów przelotowych wg DIN EN 20273, wykonanie dokładne • do pogłębień 90° pod łeb śruby wg DIN 74, forma A • f zależy od mniejszej średnicy • V_c zależy od większej średnicy
- M** ○
- K** •
- N** •
- S** ○
- H** ○

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ

GÜHRINGNAVIGATOR

Param. skr. na str. 804



Nr artykułu **378**

d1	d2 h6	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,000	3,200	66,000	28,000	9,000	M 3
8,000	4,300	79,000	37,000	11,000	M 4
10,000	5,300	89,000	43,000	13,000	M 5
11,500	6,400	95,000	47,000	15,000	M 6
15,000	8,400	111,000	56,000	19,000	M 8
19,000	10,500	127,000	64,000	23,000	M 10



Wiertła stopniowe, z chwytem walc.

Materiał narzędzia **HSS**

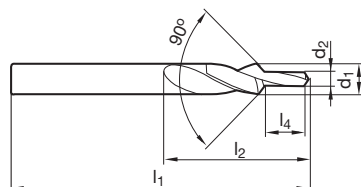
Powierzchnia ○

Kierunek skrawania

- P** ● Korekta ścina $\geq \varnothing 6,600$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • bardzo wysoka odporność na skręcanie • dla obrabiarek CNC i NC • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 90° pod łeb śruby wg DIN 74, forma A
- M** ○
- K** ● • f zależy od mniejszej średnicy • V_c zależy od większej średnicy
- N** ●
- S** ○
- H** ●

GÜHRINGNAVIGATOR

Param. skr. na str. 804



Nr artykułu

1147

d1	d2 h6	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,600	3,400	70,000	31,000	9,000	M 3
9,000	4,500	84,000	40,000	11,000	M 4
11,000	5,500	95,000	47,000	13,000	M 5
13,000	6,600	102,000	51,000	15,000	M 6
17,200	9,000	123,000	62,000	19,000	M 8
21,500	11,000	141,000	70,000	23,000	M 10



Wiertła stopniowe, z chwytem walc.

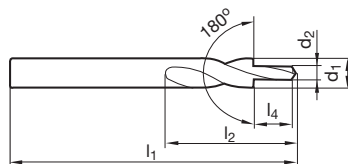


- P** • Korekcja ścina $\geq \varnothing 6,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • bardzo wysoka odporność na skręcanie • dla obrabiarek CNC i NC • do otworów przelotowych wg DIN EN 20273,
- M** ○ średnio dokładne • do pogłębień 180° pod łby śrub wg DIN 974-1, seria 1 • wg DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 • f zależy od mniejszej średnicy • V_c zależy od większej średnicy
- K** •
- N** •
- S** ○
- H** ○

Materiał narzędzia	HSS
Powierzchnia	○
Kierunek skrawania	Ⓜ

GÜHRING NAVIGATOR

Param. skr. na str. 804



Nr artykułu **379**

d1	d2 h6	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,000	3,400	66,000	28,000	9,000	M 3
8,000	4,500	79,000	37,000	11,000	M 4
10,000	5,500	89,000	43,000	13,000	M 5
11,000	6,600	95,000	47,000	15,000	M 6
15,000	9,000	111,000	56,000	19,000	M 8
18,000	11,000	123,000	62,000	23,000	M 10

Wiertła stopniowe / Rozwiertaki zgrubne



Wiertła stopniowe, z chwytem walc.

Materiał narzędzia **HSS**

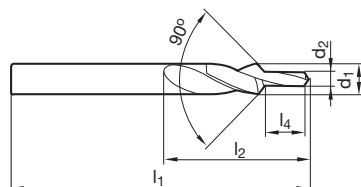
Powierzchnia ○

Kierunek skrawania

- P** ● Korekcja ścina $\geq \varnothing 3,400$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • bardzo wysoka odporność na skręcanie
- M** ○ dla obrabiarek CNC i NC • do otworów gwintowanych o wymiarach wg DIN 336 • do pogłębień 90°, wg DIN EN 20273, otwory przelotowe, średniokładne • f zależy od mniejszej średnicy • Vc zależy od większej średnicy
- K** ●
- N** ●
- S** ○
- H** ●

GÜHRING NAVIGATOR

Param. skr. na str. 804

Nr artykułu **380**

d1	d2 h6	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
3,400	2,500	52,000	20,000	8,800	M 3
4,500	3,300	58,000	24,000	11,400	M 4
5,500	4,200	66,000	28,000	13,600	M 5
6,600	5,000	70,000	31,000	16,500	M 6
9,000	6,800	84,000	40,000	21,000	M 8
11,000	8,500	95,000	47,000	25,500	M 10
13,500	10,200	107,000	54,000	30,000	M 12



Wiertła stopniowe, wieloflanskowe, z chwytem walc.

Materiał narzędzia **HSS**

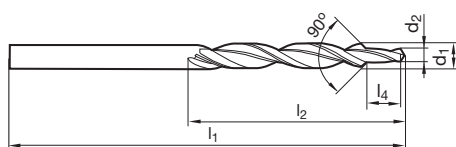
Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 6,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, wykonanie dokładne • pod łby śrub z pogłębieniem 90° • f zależy od mniejszej średnicy • Vc zależy od większej średnicy

K •**N** ○**S****H****GÜHRING** NAVIGATOR

Param. skr. na str. 806



Nr artykułu

536

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,000	3,200	93,000	57,000	9,000	M 3
8,000	4,300	117,000	75,000	11,000	M 4
10,000	5,300	133,000	87,000	13,000	M 5
11,500	6,400	142,000	94,000	15,000	M 6
15,000	8,400	169,000	114,000	19,000	M 8



Wiertła stopniowe, wieloflanskowe, z chwytem walc.

Materiał narzędzia **HSS**

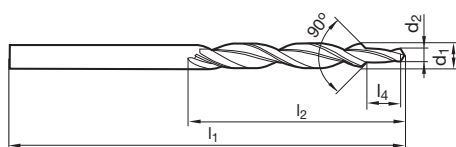
Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 7,500$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 90° pod łeb śruby wg DIN 74, forma A i F • f zależy od mniejszej średnicy • V_c zależy od większej średnicy

K •**N** ○**S** ○**H** ○**GÜHRING** NAVIGATOR

Param. skr. na str. 806

Nr artykułu **569**

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
7,500	3,400	109,000	69,000	9,000	M 3
9,700	4,500	133,000	87,000	11,000	M 4
12,000	5,500	151,000	101,000	13,000	M 5
14,500	6,600	169,000	114,000	15,000	M 6
19,000	9,000	198,000	135,000	19,000	M 8



Wiertła stopniowe, wielofysinkowe, z chwytem walc.

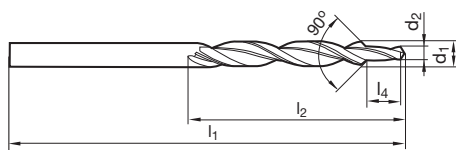


P	•	Korekcja ścina $\geq \varnothing 6,600$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 90° pod łeb śruby wg DIN 74 część 1 (wydanie wycofane 12.1980), forma A i B, wykonanie średniodokładne • f zależy od mniejszej średnicy • Vc zależy od większej średnicy
M	○	
K	•	
N	○	
S	○	
H	○	

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ

GÜHRINGNAVIGATOR

Param. skr. na str. 806



Nr artykułu **636**

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,600	3,400	101,000	63,000	9,000	M 3
9,000	4,500	125,000	81,000	11,000	M 4
11,000	5,500	142,000	94,000	13,000	M 5
13,000	6,600	151,000	101,000	15,000	M 6
17,200	9,000	191,000	130,000	19,000	M 8

Wiertła stopniowe / Rozwiertaki zgrubne



Wiertła stopniowe, wieloflanskowe, z chwytem walc.

Materiał narzędzia **HSS**

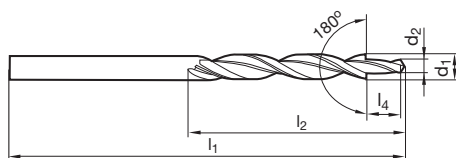
Powierzchnia

Kierunek skrawania

P • Korekcja ścina $\geq \varnothing 6,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, wykonanie dokładne • do pogłębień 180° pod łby śrub wg DIN 974-1, seria 1 • For screws DIN 6912, 7513, 7984 • f zależy od mniejszej średnicy • Vc zależy od większej średnicy

**GÜHRING**NAVIGATOR

Param. skr. na str. 806



Nr artykułu

638

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,000	3,200	93,000	57,000	9,000	M 3
8,000	4,300	117,000	75,000	11,000	M 4



Wiertła stopniowe, wielośliskowe, z chwytem walc.



P • Korekcja ścina $\geq \varnothing 6,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 180° pod łby śrub wg DIN 974-1, seria 1 • wg DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 i DIN 7513, 7516, 7500-1 • f zależy od mniejszej średnicy • Vc zależy od większej średnicy

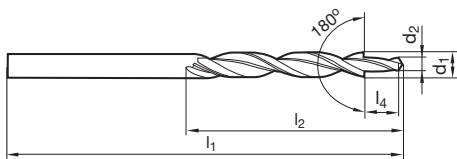
Materiał narzędzia **HSS**

Powierzchnia

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 806



Nr artykułu

538

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,000	3,400	93,000	57,000	9,000	M 3
8,000	4,500	117,000	75,000	11,000	M 4
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6
15,000	9,000	169,000	114,000	19,000	M 8
18,000	11,000	191,000	130,000	23,000	M 10


Wiertła stopniowe, wieloflanskowe, z chwytem walc.

 Materiał narzędzia **Węglik mono.**

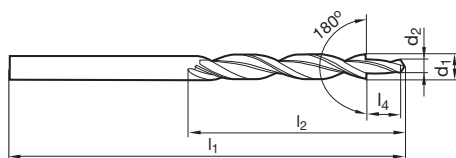
Powierzchnia



Kierunek skrawania



P	○	Korekcja ścina $\geq \varnothing 6,000$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 180° pod łby śrub wg DIN 974-1, seria 1 • For screws DIN 6912, 7513, 7984
M	○	
K	○	• f zależy od mniejszej średnicy • Vc zależy od większej średnicy
N	○	
S	○	uniwersalny materiał przydatność
H	○	



Nr artykułu

738

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
6,000	3,400	93,000	57,000	9,000	M 3
8,000	4,500	117,000	75,000	11,000	M 4
10,000	5,500	133,000	87,000	13,000	M 5
11,000	6,600	142,000	94,000	15,000	M 6
15,000	9,000	169,000	114,000	19,000	M 8



Wiertła stopniowe, wielofysinkowe, z chwytem walc.



Materiał narzędzia **HSS**

Powierzchnia

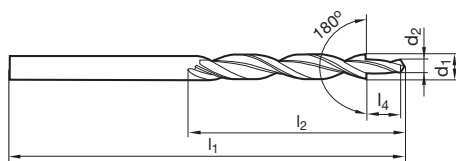
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 5,900$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • for through holes with old countersinks
M ○ Form H, J, K to DIN 75 part 2 (issue 04.1968 retracted), design medium and fine • pod łby śruby wg DIN 844, 912, 6712 • f zależy od mniejszej średnicy • Vc zależy od większej średnicy
K •
N ○
S
H

GÜHRING NAVIGATOR

Param. skr. na str. 806



Nr artykułu **514**

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
5,900	3,200	93,000	57,000	11,000	M 3
7,400	4,300	109,000	69,000	13,000	M 4
8,000	4,800	117,000	75,000	13,000	M 4
9,400	5,300	125,000	81,000	16,000	M 5
10,000	5,800	133,000	87,000	16,000	M 5
10,400	6,400	133,000	87,000	19,000	M 6
11,000	7,000	142,000	94,000	19,000	M 6
13,500	8,400	160,000	108,000	22,000	M 8
16,500	10,500	184,000	125,000	25,000	M 10
17,500	11,500	191,000	130,000	25,000	M 10


Wiertła stopniowe, wielofysinkowe, z chwytem walc.

 Materiał narzędzia **HSS**

Powierzchnia

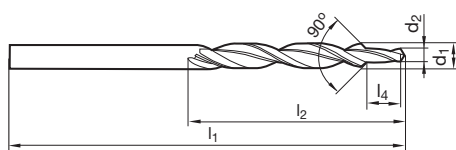
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 3,400$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów gwintowanych o wymiarach wg DIN 336 • do pogłębień 90° , wg DIN EN 20273, otwory przelotowe, średniokładne • f zależy od mniejszej średnicy • V_c zależy od większej średnicy
M ○
K •
N ○
S
H

GÜHRING NAVIGATOR

Param. skr. na str. 806



Nr artykułu

540

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
3,400	2,500	70,000	39,000	8,800	M 3
4,500	3,300	80,000	47,000	11,400	M 4
5,500	4,200	93,000	57,000	13,600	M 5
6,600	5,000	101,000	63,000	16,500	M 6
9,000	6,800	125,000	81,000	21,000	M 8
11,000	8,500	142,000	94,000	25,500	M 10
13,500	10,200	160,000	108,000	30,000	M 12



Wiertła stopniowe, wieloflanskowe, z chwytem walc.

Materiał narzędzia **Węglik mono.**

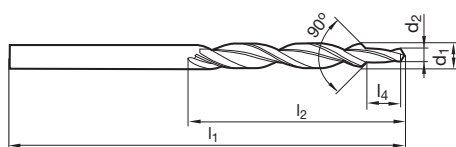
Powierzchnia



Kierunek skrawania



P ○ Korekcja ścina $\geq \varnothing 4,500$ • geometria zataczana • do otworów gwintowanych o wymiarach wg DIN 336 • do pogłębień 90°, wg DIN EN 20273, otwory przelotowe, średniodokładne • f zależy od mniejszej średnicy • Vc zależy od większej średnicy

K ○**N** ○**S** ○ uniwersalny materiał przydatność**H** ○

Nr artykułu

739

d1 h8	d2 h9	l1	l2	l4	do gwintu
mm	mm	mm	mm	mm	
4,500	3,300	80,000	47,000	11,400	M 4
5,500	4,200	93,000	57,000	13,600	M 5
6,600	5,000	101,000	63,000	16,500	M 6
9,000	6,800	125,000	81,000	21,000	M 8
11,000	8,500	142,000	94,000	25,500	M 10



Wiertła stopniowe, wielofysinkowe, z chwytem MK

Materiał narzędzia **HSS**

Powierzchnia



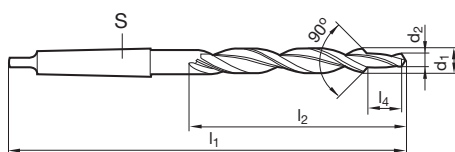
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 11,500$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273,
M ○ wykonanie dokładne • do pogłębień 90° pod łeb śruby wg DIN 74 cz. 1
K • (wydanie wycofane 12.1980), forma A, wykonanie dokładne • f zależy od
 mniejszej średnicy • Vc zależy od większej średnicy

**GÜHRING** NAVIGATOR

Param. skr. na str. 806



Nr artykułu

637

d1 h8	d2 h9	S	l1	l2	l4	do gwintu
mm	mm		mm	mm	mm	
11,500	6,400	MK-1	175,000	94,000	15,000	M 6
15,000	8,400	MK-2	212,000	114,000	19,000	M 8
19,000	10,500	MK-2	233,000	135,000	23,000	M 10
23,000	13,000	MK-2	253,000	155,000	27,000	M 12



Wiertła stopniowe, wielośliskowe, z chwytem MK

Materiał narzędzia **HSS**

Powierzchnia



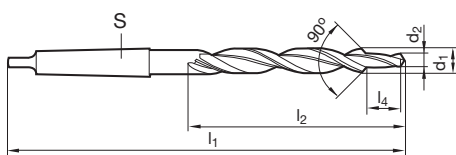
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 11,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 90° pod łeb śruby wg DIN 74 część 1 (wydanie wycofane 12.1980), forma A i B, wykonanie średniodokładne • f zależy od mniejszej średnicy • V_c zależy od większej średnicy

**GÜHRING**NAVIGATOR

Param. skr. na str. 806



Nr artykułu

537

d1 h8	d2 h9	S	l1	l2	l4	do gwintu
mm	mm		mm	mm	mm	
11,000	5,500	MK-1	175,000	94,000	13,000	M 5
17,200	9,000	MK-2	228,000	130,000	19,000	M 8
21,500	11,000	MK-2	248,000	150,000	23,000	M 10
26,000	14,000	MK-3	286,000	165,000	27,000	M 12
29,000	16,000	MK-3	296,000	175,000	31,000	M 14


Wiertła stopniowe, wielofysinkowe, z chwytem MK

 Materiał narzędzia **HSS**

Powierzchnia

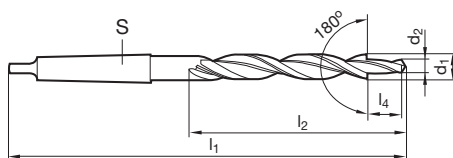
Kierunek skrawania



P • Korekcia ścina $\geq \varnothing 10,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273,
M ○ wykonanie dokładne • do pogłębień 180° pod łby śrub wg DIN 974-1, seria 1 • wg DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579,
K • 14580 • f zależy od mniejszej średnicy • V_c zależy od większej średnicy
N ○
S
H

GÜHRING NAVIGATOR

Param. skr. na str. 806



Nr artykułu

639

d1 h8	d2 h9	S	l1	l2	l4	do gwintu
mm	mm		mm	mm	mm	
18,000	10,500	MK-2	228,000	130,000	23,000	M 10
20,000	13,000	MK-2	238,000	140,000	27,000	M 12
26,000	17,000	MK-3	286,000	165,000	35,000	M 16



Wiertła stopniowe, wieloflanskowe, z chwytem MK

Materiał narzędzia **HSS**

Powierzchnia

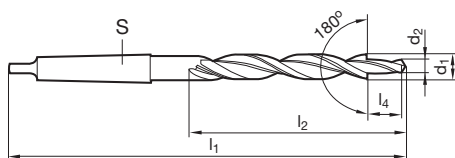
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 10,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych wg DIN EN 20273, średnio dokładne • do pogłębień 180° pod łby śrub wg DIN 974-1, seria 1 • wg DIN 6912, 7984, 34821, DIN EN ISO 1207, 4762, 14579, 14580 i DIN 7513, 7516, 7500-1 • f zależy od mniejszej średnicy • Vc zależy od większej średnicy

**GÜHRING**NAVIGATOR

Param. skr. na str. 806



Nr artykułu

539

d1 h8	d2 h9	S	l1	l2	l4	do gwintu
mm	mm		mm	mm	mm	
10,000	5,500	MK-1	168,000	87,000	13,000	M 5
11,000	6,600	MK-1	175,000	94,000	15,000	M 6
15,000	9,000	MK-2	212,000	114,000	19,000	M 8
18,000	11,000	MK-2	228,000	130,000	23,000	M 10
20,000	13,500	MK-2	238,000	140,000	27,000	M 12
26,000	17,500	MK-3	286,000	165,000	35,000	M 16
30,000	20,000	MK-3	296,000	175,000	39,000	M 18
33,000	22,000	MK-4	334,000	185,000	43,000	M 20


Wiertła stopniowe, wieloflanskowe, z chwytem MK


P • Korekcja ścina $\geq \varnothing 9,400$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów przelotowych ze starymi pogłębieniami forma H, J, K wg DIN 75 arkusz 2 (wydanie 04.1968 wycofane), dokładne i średniodokładne • pod łby śruby wg DIN 844, 912, 6712 • f zależy od mniejszej średnicy • Vc zależy od większej średnicy


 Materiał narzędzia **HSS**

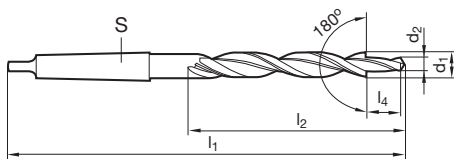
Powierzchnia



Kierunek skrawania


GÜHRING NAVIGATOR

Param. skr. na str. 806



Nr artykułu

520

d1 h8	d2 h9	S	l1	l2	l4	do gwintu
mm	mm		mm	mm	mm	
9,400	5,300	MK-1	162,000	81,000	16,000	M 5
10,000	5,800	MK-1	168,000	87,000	16,000	M 5
11,000	7,000	MK-1	175,000	94,000	19,000	M 6
13,500	8,400	MK-1	189,000	108,000	22,000	M 8
16,500	10,500	MK-2	223,000	125,000	25,000	M 10
17,500	11,500	MK-2	228,000	130,000	25,000	M 10
19,000	13,000	MK-2	233,000	135,000	28,000	M 12
20,000	14,000	MK-2	238,000	140,000	28,000	M 12
23,000	15,000	MK-2	253,000	155,000	30,000	M 14
24,000	16,000	MK-3	281,000	160,000	30,000	M 14
25,000	17,000	MK-3	281,000	160,000	33,000	M 16
26,000	18,000	MK-3	286,000	165,000	33,000	M 16
28,000	19,000	MK-3	291,000	170,000	36,000	M 18
29,000	20,000	MK-3	296,000	175,000	36,000	M 18
31,000	21,000	MK-3	301,000	180,000	39,000	M 20
33,000	23,000	MK-4	334,000	185,000	39,000	M 20



Wiertła stopniowe, wielośliskowe, z chwytem MK

Materiał narzędzia **HSS**

Powierzchnia

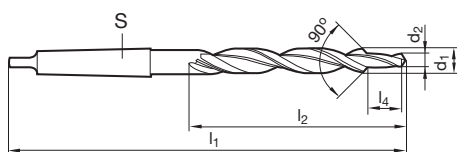
Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 9,000$ • wielkość korekta ścina w odniesieniu do $-\varnothing d1$ • geometria zataczana • do otworów gwintowanych o wymiarach wg DIN 336 • do pogłębień 90° , wg DIN EN 20273, otwory przelotowe, średniokładne • f zależy od mniejszej średnicy • V_c zależy od większej średnicy

**GÜHRING**NAVIGATOR

Param. skr. na str. 806



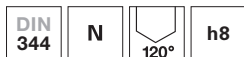
Nr artykułu

541

d1 h8	d2 h9	S	l1	l2	l4	do gwintu
mm	mm		mm	mm	mm	
9,000	6,800	MK-1	162,000	81,000	21,000	M 8
11,000	8,500	MK-1	175,000	94,000	25,500	M 10
13,500	10,200	MK-1	189,000	108,000	30,000	M 12
15,500	12,000	MK-2	218,000	120,000	34,500	M 14
17,500	14,000	MK-2	228,000	130,000	38,500	M 16
20,000	15,500	MK-2	238,000	140,000	43,500	M 18
22,000	17,500	MK-2	248,000	150,000	47,500	M 20



Rozwiertaki zgrubne, z chwytem walc.

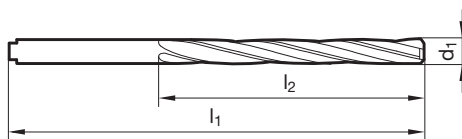


- P** • geometria zataczana • szczególnie wysoka sztywność • do otworów wstępnie wierconych/odlanych/wykrojonych • z zabierakiem wg DIN 1809 • poprawia prostoliniowość otworu • poprawia błędy kołowości
- M** ○
- K** • poprawia jakość powierzchni otworu • średnica \varnothing nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego
- N** ○ • zalecany rozwiertak wykańczający po obróbce tym narzędziem
- S**
- H**

Materiał narzędzia	HSS
Powierzchnia	●
Kierunek skrawania	Ⓜ

GÜHRINGNAVIGATOR

Param. skr. na str. 800



Nr artykułu **533**

d1	l1	l2	d0 ≥
mm	mm	mm	mm
3,800	96,000	64,000	2,80
4,000	96,000	64,000	2,80
4,100	96,000	64,000	2,80
4,400	102,000	69,000	3,20
4,500	102,000	69,000	3,20
4,600	102,000	69,000	3,20
4,750	102,000	69,000	3,20
4,800	108,000	74,000	3,50
4,900	108,000	74,000	3,50
5,000	108,000	74,000	3,50
5,050	108,000	74,000	3,50
5,100	108,000	74,000	3,50
5,300	108,000	74,000	3,50
5,400	116,000	80,000	4,20
5,500	116,000	80,000	4,20
5,550	116,000	80,000	4,20
5,750	116,000	80,000	4,20
5,800	116,000	80,000	4,20
5,850	116,000	80,000	4,20
5,900	116,000	80,000	4,20
6,000	116,000	80,000	4,20
6,100	124,000	86,000	4,20
6,200	124,000	86,000	4,20
6,250	124,000	86,000	4,20
6,300	124,000	86,000	4,20
6,400	124,000	86,000	4,20
6,500	124,000	86,000	4,20
6,700	124,000	86,000	4,20
6,800	133,000	93,000	4,90
7,000	133,000	93,000	4,90
7,150	133,000	93,000	4,90
7,200	133,000	93,000	4,90
7,250	133,000	93,000	4,90
7,500	133,000	93,000	4,90
7,600	142,000	100,000	5,60
7,700	142,000	100,000	5,60
7,750	142,000	100,000	5,60
7,800	142,000	100,000	5,60
7,950	142,000	100,000	5,60
8,000	142,000	100,000	5,60
8,050	142,000	100,000	5,60
8,100	142,000	100,000	5,60

d1	l1	l2	d0 ≥
mm	mm	mm	mm
8,200	142,000	100,000	5,60
8,250	142,000	100,000	5,60
8,300	142,000	100,000	5,60
8,400	142,000	100,000	5,60
8,500	142,000	100,000	5,60
8,600	151,000	107,000	6,30
8,700	151,000	107,000	6,30
8,800	151,000	107,000	6,30
8,850	151,000	107,000	6,30
9,000	151,000	107,000	6,30
9,100	151,000	107,000	6,30
9,200	151,000	107,000	6,30
9,300	151,000	107,000	6,30
9,400	151,000	107,000	6,30
9,500	151,000	107,000	6,30
9,650	162,000	116,000	7,00
9,800	162,000	116,000	7,00
10,000	162,000	116,000	7,00
10,100	162,000	116,000	7,00
10,200	162,000	116,000	7,00
10,300	162,000	116,000	7,00
10,500	162,000	116,000	7,00
10,600	162,000	116,000	7,00
10,700	173,000	125,000	7,70
10,750	173,000	125,000	7,70
11,000	173,000	125,000	7,70
11,250	173,000	125,000	7,70
11,300	173,000	125,000	7,70
11,750	184,000	134,000	8,40
11,800	184,000	134,000	8,40
12,000	184,000	134,000	8,40
12,200	184,000	134,000	8,40
12,500	184,000	134,000	8,40
12,750	184,000	134,000	9,10
13,000	184,000	134,000	9,10
13,500	194,000	142,000	9,80
13,750	194,000	142,000	9,80
14,000	194,000	142,000	9,80
15,000	202,000	147,000	10,50
15,750	211,000	153,000	11,20
16,000	211,000	153,000	11,20
17,000	218,000	159,000	11,90

Wiertła stopniowe / Rozwiertaki zgrubne



d1	l1	l2	d0 ≥
mm	mm	mm	mm
18,000	226,000	165,000	12,60
20,000	242,000	177,000	14,00

d1	l1	l2	d0 ≥
mm	mm	mm	mm



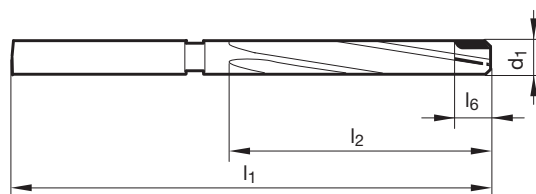
Rozwiertaki zgrubne, z chwytem walc.

Materiał narzędzia **Węglik**

Powierzchnia ○

Kierunek skrawania (R)

- P** ○ geometria zataczana • lutowane płytki węglkowe • do otworów wstępnie wierconych/odlanych/wykrojonych • poprawia prostoliniowość otworu
- M** ○ • poprawia błędy kołowości • poprawia jakość powierzchni otworu
- K** ○ • średnica \varnothing nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego
- N** ○
- S** ○ uniwersalny materiał przydatność
- H** ○



Nr artykułu

750

d1	l1	l2	l6	d0 ≥
mm	mm	mm	mm	mm
3,800	96,000	64,000		2,800
4,800	108,000	74,000		3,500
5,000	108,000	74,000		3,500
5,800	116,000	80,000		4,200
6,000	116,000	80,000		4,200
7,000	133,000	93,000		4,900

d1	l1	l2	l6	d0 ≥
mm	mm	mm	mm	mm
7,800	142,000	100,000		5,600
8,000	142,000	100,000		5,600
14,000	194,000	142,000	19,000	9,800
15,000	202,000	147,000	19,000	10,500



Rozwiertaki zgrubne, z chwytem MK

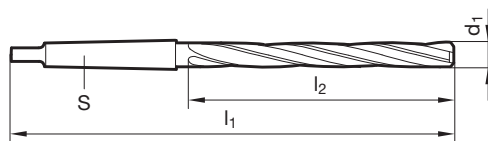


P	•	geometria zataczana • szczególnie wysoka sztywność • do otworów wstępnie wierconych/odlanych/wykrojonych • poprawia prostoliniowość otworu • poprawia błędy kołowości • poprawia jakość powierzchni otworu • średnica \varnothing nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego • zalecany rozwiertak wykańczający po obróbce tym narzędziem
M	○	
K	•	
N	○	
S		
H		

GÜHRING NAVIGATOR

Param. skr. na str. 800

Materiał narzędzia	HSS
Powierzchnia	
Kierunek skrawania	



Nr artykułu

534

d1	S	l1	l2	d0 ≥	d1	S	l1	l2	d0 ≥
mm		mm	mm	mm	mm		mm	mm	mm
7,800	MK-1	156,000	75,000	5,60	16,200	MK-2	223,000	125,000	11,90
8,000	MK-1	156,000	75,000	5,60	16,250	MK-2	223,000	125,000	11,90
8,100	MK-1	156,000	75,000	5,60	16,500	MK-2	223,000	125,000	11,90
8,800	MK-1	162,000	81,000	6,30	16,750	MK-2	223,000	125,000	11,90
9,000	MK-1	162,000	81,000	6,30	17,000	MK-2	223,000	125,000	11,90
9,200	MK-1	162,000	81,000	6,30	17,500	MK-2	228,000	130,000	12,60
9,700	MK-1	168,000	87,000	7,00	17,750	MK-2	228,000	130,000	12,60
9,800	MK-1	168,000	87,000	7,00	18,000	MK-2	228,000	130,000	12,60
9,900	MK-1	168,000	87,000	7,00	18,100	MK-2	233,000	135,000	13,30
10,000	MK-1	168,000	87,000	7,00	18,250	MK-2	233,000	135,000	13,30
10,100	MK-1	168,000	87,000	7,00	18,500	MK-2	233,000	135,000	13,30
10,200	MK-1	168,000	87,000	7,00	18,700	MK-2	233,000	135,000	13,30
10,750	MK-1	175,000	94,000	7,70	18,750	MK-2	233,000	135,000	13,30
11,000	MK-1	175,000	94,000	7,70	18,800	MK-2	233,000	135,000	13,30
11,100	MK-1	175,000	94,000	7,70	19,000	MK-2	233,000	135,000	13,30
11,250	MK-1	175,000	94,000	7,70	19,250	MK-2	238,000	140,000	14,00
11,500	MK-1	175,000	94,000	7,70	19,500	MK-2	238,000	140,000	14,00
11,750	MK-1	182,000	101,000	8,40	19,700	MK-2	238,000	140,000	14,00
11,800	MK-1	182,000	101,000	8,40	19,750	MK-2	238,000	140,000	14,00
12,000	MK-1	182,000	101,000	8,40	20,000	MK-2	238,000	140,000	14,00
12,200	MK-1	182,000	101,000	8,40	20,200	MK-2	243,000	145,000	14,60
12,300	MK-1	182,000	101,000	8,40	20,250	MK-2	243,000	145,000	14,60
12,500	MK-1	182,000	101,000	8,40	20,500	MK-2	243,000	145,000	14,60
12,700	MK-1	182,000	101,000	9,10	20,700	MK-2	243,000	145,000	14,60
12,750	MK-1	182,000	101,000	9,10	21,000	MK-2	243,000	145,000	14,60
13,000	MK-1	182,000	101,000	9,10	21,500	MK-2	248,000	150,000	15,30
13,250	MK-1	189,000	108,000	9,80	21,700	MK-2	248,000	150,000	15,30
13,500	MK-1	189,000	108,000	9,80	21,750	MK-2	248,000	150,000	15,30
13,750	MK-1	189,000	108,000	9,80	22,000	MK-2	248,000	150,000	15,30
13,800	MK-1	189,000	108,000	9,80	22,250	MK-2	248,000	150,000	15,30
14,000	MK-1	189,000	108,000	9,80	22,400	MK-2	248,000	150,000	15,30
14,100	MK-2	212,000	114,000	10,50	22,500	MK-2	253,000	155,000	16,00
14,200	MK-2	212,000	114,000	10,50	22,700	MK-2	253,000	155,000	16,00
14,450	MK-2	212,000	114,000	10,50	23,000	MK-2	253,000	155,000	16,00
14,500	MK-2	212,000	114,000	10,50	23,500	MK-2	253,000	155,000	16,00
14,750	MK-2	212,000	114,000	10,50	23,700	MK-3	281,000	160,000	16,60
15,000	MK-2	212,000	114,000	10,50	24,000	MK-3	281,000	160,000	16,60
15,250	MK-2	218,000	120,000	11,20	24,200	MK-3	281,000	160,000	16,60
15,500	MK-2	218,000	120,000	11,20	24,500	MK-3	281,000	160,000	17,30
15,750	MK-2	218,000	120,000	11,20	24,700	MK-3	281,000	160,000	17,30
16,000	MK-2	218,000	120,000	11,20	24,750	MK-3	281,000	160,000	17,30
16,150	MK-2	223,000	125,000	11,90	25,000	MK-3	281,000	160,000	17,30

Wiertła stopniowe /
Rozwiertaki zgrubne



d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
25,250	MK-3	286,000	165,000	18,00
25,500	MK-3	286,000	165,000	18,00
25,600	MK-3	286,000	165,000	18,00
25,700	MK-3	286,000	165,000	18,00
26,000	MK-3	286,000	165,000	18,00
26,500	MK-3	286,000	165,000	18,00
26,700	MK-3	291,000	170,000	18,60
27,000	MK-3	291,000	170,000	18,60
27,500	MK-3	291,000	170,000	18,60
27,700	MK-3	291,000	170,000	19,30
28,000	MK-3	291,000	170,000	19,30
28,700	MK-3	296,000	175,000	20,00
29,000	MK-3	296,000	175,000	20,00
29,500	MK-3	296,000	175,000	20,50
29,700	MK-3	296,000	175,000	20,50
29,750	MK-3	296,000	175,000	20,50
30,000	MK-3	296,000	175,000	20,50
30,500	MK-3	301,000	180,000	21,00
30,600	MK-3	301,000	180,000	21,00
31,000	MK-3	301,000	180,000	21,00
31,600	MK-4	334,000	185,000	22,00
32,000	MK-4	334,000	185,000	22,00
32,600	MK-4	334,000	185,000	23,00
33,000	MK-4	334,000	185,000	23,00

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
33,600	MK-4	339,000	190,000	24,00
34,000	MK-4	339,000	190,000	24,00
34,600	MK-4	339,000	190,000	25,00
35,000	MK-4	339,000	190,000	25,00
35,600	MK-4	344,000	195,000	25,50
36,000	MK-4	344,000	195,000	25,50
36,600	MK-4	344,000	195,000	26,00
37,600	MK-4	349,000	200,000	26,50
38,000	MK-4	349,000	200,000	26,50
39,000	MK-4	349,000	200,000	27,00
39,600	MK-4	349,000	200,000	28,00
40,000	MK-4	349,000	200,000	28,00
44,000	MK-4	359,000	210,000	30,50
44,600	MK-4	359,000	210,000	31,00
45,000	MK-4	359,000	210,000	31,00
50,000	MK-4	369,000	220,000	34,50



Rozwiertaki zgrubne, z chwytem MK

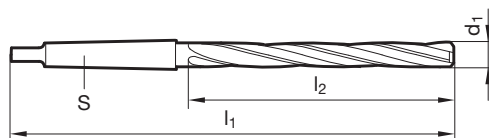


P	•	geometria zataczana • szczególnie wysoka sztywność • do otworów wstępnie wierconych/odlanych/wykrojonych • poprawia prostoliniowość otworu • poprawia błędy kołowości • poprawia jakość powierzchni otworu • średnica \varnothing nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego • zalecany rozwiertak wykańczający po obróbce tym narzędziem
M	○	
K	•	
N	•	
S	○	
H		

GÜHRING NAVIGATOR

Param. skr. na str. 800

Materiał narzędzia	HSCO
Powierzchnia	
Kierunek skrawania	



Nr artykułu

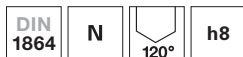
634

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
8,500	MK-1	156,000	75,000	5,60
9,000	MK-1	162,000	81,000	6,30
9,800	MK-1	168,000	87,000	7,00
10,750	MK-1	175,000	94,000	7,70
11,750	MK-1	182,000	101,000	8,40
12,000	MK-1	182,000	101,000	8,40
12,500	MK-1	182,000	101,000	8,40
12,750	MK-1	182,000	101,000	9,10
13,000	MK-1	182,000	101,000	9,10
14,000	MK-1	189,000	108,000	9,80
14,750	MK-2	212,000	114,000	10,50
15,750	MK-2	218,000	120,000	11,20

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
16,000	MK-2	218,000	120,000	11,20
16,500	MK-2	223,000	125,000	11,90
17,000	MK-2	223,000	125,000	11,90
18,000	MK-2	228,000	130,000	12,60
19,700	MK-2	238,000	140,000	14,00
20,000	MK-2	238,000	140,000	14,00
21,000	MK-2	243,000	145,000	14,60
22,000	MK-2	248,000	150,000	15,30
23,000	MK-2	253,000	155,000	16,00
24,000	MK-3	281,000	160,000	16,60
25,000	MK-3	281,000	160,000	17,30
26,000	MK-3	286,000	165,000	18,00



Rozwiertaki zgrubne, z chwytem MK



P • geometria zataczana • szczególnie wysoka sztywność • do otworów wstępnie wierconych/odlanych/wykrojonych • poprawia prostoliniowość otworu • poprawia błędy kołowości • poprawia jakość powierzchni otworu • średnica \varnothing nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego • zalecany rozwiertak wykańczający po obróbce tym narzędziem

Materiał narzędzia **HSS**

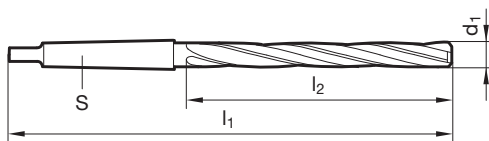
Powierzchnia



Kierunek skrawania

**GÜHRING**NAVIGATOR

Param. skr. na str. 800



Nr artykułu

555

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
5,000	MK-1	155,000	74,000	3,50
8,000	MK-1	181,000	100,000	5,60
8,800	MK-1	188,000	107,000	6,30
9,000	MK-1	188,000	107,000	6,30
9,700	MK-1	197,000	116,000	7,00
9,800	MK-1	197,000	116,000	7,00
10,000	MK-1	197,000	116,000	7,00
10,100	MK-1	197,000	116,000	7,00
10,500	MK-1	197,000	116,000	7,00
11,100	MK-1	206,000	125,000	7,70
11,750	MK-1	215,000	134,000	8,40
12,000	MK-1	215,000	134,000	8,40
12,750	MK-1	215,000	134,000	9,10
13,000	MK-1	215,000	134,000	9,10
13,750	MK-1	223,000	142,000	9,80
14,000	MK-1	223,000	142,000	9,80
15,000	MK-2	245,000	147,000	10,50
15,750	MK-2	251,000	153,000	11,20

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
16,000	MK-2	251,000	153,000	11,20
17,750	MK-2	263,000	165,000	12,60
19,000	MK-2	269,000	171,000	13,30
19,700	MK-2	275,000	177,000	14,00
20,000	MK-2	275,000	177,000	14,00
20,700	MK-2	282,000	184,000	14,60
21,000	MK-2	282,000	184,000	14,60
21,700	MK-2	289,000	191,000	15,30
22,000	MK-2	289,000	191,000	15,30
22,700	MK-2	296,000	198,000	16,00
23,000	MK-2	296,000	198,000	16,00
24,000	MK-3	327,000	206,000	16,60
25,000	MK-3	327,000	206,000	17,30
25,700	MK-3	335,000	214,000	18,00
30,000	MK-3	351,000	230,000	20,50



Rozwiertaki zgrubne, z chwytem MK

DIN 1864	N	120°	h8
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- P** • geometria zataczana • szczególnie wysoka sztywność • do otworów wstępnie wierconych/odlanych/wykrojonych • poprawia prostoliniowość otworu • poprawia błędy kołowości • poprawia jakość powierzchni
- M** ○ otworu • poprawia błędy kołowości • poprawia jakość powierzchni otworu • średnica Ø nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego • zalecany rozwiertak wykańczający po obróbce tym narzędziem
- K** •
- N** •
- S** ○
- H** □

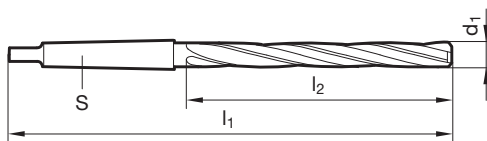
Materiał narzędzia **HSCO**

Powierzchnia

Kierunek skrawania

GÜHRINGNAVIGATOR

Param. skr. na str. 800



Nr artykułu **635**

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm
8,000	MK-1	181,000	100,000	5,60
10,000	MK-1	197,000	116,000	7,00
14,000	MK-1	223,000	142,000	9,80
15,000	MK-2	245,000	147,000	10,50

d1	S	l1	l2	d0 ≥
mm		mm	mm	mm



Rozwiertaki zgrubne, z chwytem MK

Materiał narzędzia **Węglik**

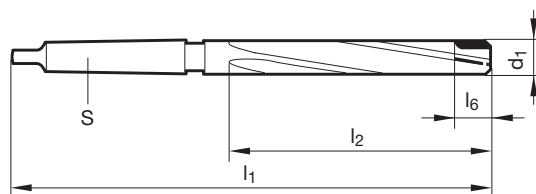
Powierzchnia ○

Kierunek skrawania

- P** ○ geometria zataczana • lutowane płytki węglkowe • do otworów wstępnie wierconych/odlanych/wykrojonych • poprawia prostoliniowość otworu
- M** ○ • poprawia błędy kołowości • poprawia jakość powierzchni otworu
- K** ○ • średnica \varnothing nakroju > od rozwiercanego otworu • zwracać uwagę na średnicę otw. wstępnego
- N** ○
- S** ○ uniwersalny materiał przydatność
- H** ○

GÜHRINGNAVIGATOR

Param. skr. na str. 800



Nr artykułu

729

d1	S	l1	l2	l6	d0 ≥
mm		mm	mm	mm	mm
28,700	MK-3	296,000	175,000	25,000	21,0
29,700	MK-3	296,000	175,000	25,000	22,0
30,600	MK-3	301,000	180,000	25,000	23,0
31,600	MK-4	334,000	185,000	25,000	24,0
33,000	MK-4	334,000	185,000	25,000	25,0
33,600	MK-4	339,000	190,000	25,000	26,0

d1	S	l1	l2	l6	d0 ≥
mm		mm	mm	mm	mm
34,000	MK-4	339,000	190,000	25,000	26,0
36,000	MK-4	344,000	195,000	25,000	28,0
37,600	MK-4	349,000	200,000	25,000	30,0
38,600	MK-4	349,000	200,000	25,000	31,0
39,000	MK-4	349,000	200,000	25,000	31,0
39,600	MK-4	349,000	200,000	25,000	32,0



Wiertła do otworów pod kołki stożkowe



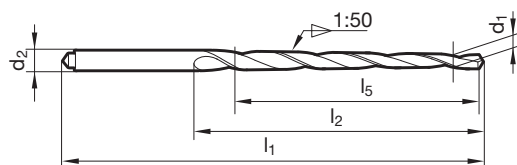
Materiał narzędzia **HSS**

Powierzchnia $\text{Ra} \leq 2,36$

Kierunek skrawania

P • Korekcja ścina $\geq \text{Ø } 1,000$ • geometria zataczana • do otworów pod kołki stożkowe wg DIN 1 (nowa: DIN EN 22339) i DIN 7978 (nowa: DIN EN 28736) • z zabierakiem

- M** ○
- K** •
- N** ○
- S** ○
- H** ○



Nr artykułu **531**

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
2,000	3,150	86,000	52,000	48,000
2,500	3,150	86,000	52,000	48,000
3,000	4,000	100,000	63,000	58,000
3,500	5,000	112,000	74,000	68,000
4,000	5,000	112,000	74,000	68,000
4,500	6,300	122,000	81,000	73,000

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
5,000	6,300	122,000	81,000	73,000
5,500	8,000	160,000	114,000	105,000
6,000	8,000	160,000	114,000	105,000
8,000	10,000	207,000	157,000	145,000
10,000	12,500	245,000	190,000	175,000
12,000	16,000	290,000	228,000	210,000



Wiertła do otworów pod kołki stożkowe


 Materiał narzędzia **HSS**

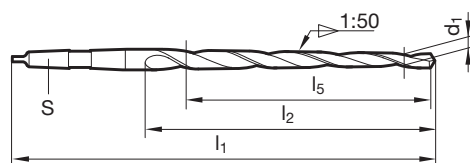
Powierzchnia



Kierunek skrawania



P • Korekcja ścina $\geq \varnothing 5,000$ • geometria zataczana • For tapered holes to suit taper pins to DIN 1 (new: DIN EN 22 339), DIN 7978 (new: DIN EN 28 736), DIN 7977 (new: DIN EN 28737) and DIN 258
M ○
K •
N ○
S
H



Nr artykułu

532

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
5,000		155,000	81,000	73,000
6,000		187,000	108,000	105,000
8,000		227,000	149,000	145,000
10,000		257,000	180,000	175,000
12,000		315,000	219,000	210,000
13,000		325,000	229,000	220,000

d1	d2	l1	l2	l5
mm	mm	mm	mm	mm
14,000		325,000	229,000	220,000
16,000		335,000	239,000	230,000
20,000		377,000	263,000	250,000
25,000		427,000	311,000	300,000

GUANZHU

NANMIO

BRING

GÜHRING NAVIGATOR

GATOR



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- Ⓜ prawy
 - Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



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Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Al
zalecany do obróbki aluminium

G
zalecany do obróbki żeliwa

Chłodziwo:
 Powietrze
 Olej
 Emulsja

Kierunek skrawania:
 prawy
 lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		<input type="radio"/>
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		<input type="radio"/>
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		<input type="radio"/>
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		<input type="radio"/>
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		<input type="radio"/>
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		<input type="radio"/>
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		<input type="radio"/>
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		<input type="radio"/>
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		<input type="radio"/>
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		<input type="radio"/>
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		<input type="radio"/>
Stale do azotowania	1.8504 34CrAl6	≤1000		<input type="radio"/>
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		<input type="radio"/>
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		<input type="radio"/>
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		<input type="radio"/>
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Stale hartowane	-		≤48 HRC ≤66 HRC	<input type="radio"/>
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		<input type="radio"/>
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		<input type="radio"/>
martenzytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		<input type="radio"/>
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB ≤350 HB	<input type="radio"/>
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	<input type="radio"/>
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	<input type="radio"/>
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	<input type="radio"/>
Żeliwa utwardzone	-		≤350 HB	<input type="radio"/>
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	<input type="radio"/>
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	<input type="radio"/>
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		<input type="radio"/>
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		<input type="radio"/>
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		<input type="radio"/>
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		<input type="radio"/>
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input type="radio"/>
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input type="radio"/>
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input type="radio"/>
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input type="radio"/>
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		<input type="radio"/>
	2.0790 CuNi18Zn19Pb	≤850		<input type="radio"/>
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		<input type="radio"/>
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		<input type="radio"/>
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Kevlar	Kevlar	≤1000		<input type="radio"/>
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		<input type="radio"/>



≤3xD Głębokość wiercenia

1702	1184	1242
6539	6537K	6539
W. mono.	W. mono.	W. mono.
K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U
S	S	S
28	21	23

2475	2480	2472	2473
6537K	6537K	6537K	6539
W. mono.	W. mono.	W. mono.	W. mono.
K/P	K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U	RT 100 U
F	F	F	F
27	16	18	20

8524
6537K
W. mono.
K/P
RT 100 HF
Y
25

≤4xD

768	6068
WN	WN
W. mono.	W. mono.
K	K
RT 150 GG	RT 150 GG
○	○
osiowe	osiowe
56	58
Al	G



V _c m/min	Posuw-nr kol.		
100	6	6	6
85	5	5	5
110	7	7	7
85	6	6	6
90	6	6	6
85	6	6	6
80	6	6	6
80	6	6	6
75	5	5	5
100	7	7	7
90	6	6	6
65	4	4	4
75	5	5	5
70	4	4	4
50	5	5	5
40	4	4	4
40	3		
35	2	2	2
35	1	1	1
20	1	1	1
40	2	2	2
15	2	1	1
35	2	2	2
160	7	7	7
120	7	7	7
120	7	6	6
95	7	6	6
25	2	2	2
20	3	3	3
15	1	1	1
15	1	1	1
200	8	8	8
200	8	8	8
170	8	8	8
140	7	7	7
200	7	7	7
80	6	6	6
210	7	7	7
140	6	6	6
80	5	5	5
65	5	5	5
60	4	4	4
45	4	4	4

V _c m/min	Posuw-nr kol.			
130	7	7	7	7
110	6	6	6	6
145	8	8	8	8
110	7	7	7	7
120	7	7	7	7
110	7	7	7	7
105	7	7	7	7
105	7	7	7	7
100	6	6	6	6
130	8	8	8	8
120	7	7	7	7
85	5	5	5	5
100	6	6	6	6
90	5	5	5	5
65	6	6	6	6
55	5	5	5	5
55	4			
45	3	3	3	3
40	1	1	1	1
20	1	1	1	1
40	2	2	2	2
15	1	1	1	1
35	2	2	2	2
210	8	8	8	8
155	8	8	8	8
155	8	7	7	7
125	8	7	7	7
35	3	3	3	3
25	4	4	4	4
15	1	1	1	1
15	1	1	1	1
260	9	9	9	9
260	9	9	9	9
220	9	8	8	8
180	8	8	8	8
260	8	8	8	8
105	7	7	7	7
270	8	8	8	8
180	7	7	7	7
105	6	6	6	6
85	6	6	6	6
80	5	5	5	5
60	5	5	5	5

V _c m/min	VR-Code
130	7
110	6
145	8
110	7
120	7
110	7
105	7
105	7
100	6
130	8
120	7
85	5
100	6
90	5
65	6
55	5
55	4
45	3
40	1
20	1
40	2
15	1
35	2
25	4
15	1
15	1

V _c m/min	Posuw-nr kol.	
120	7	7
100	7	7
90	7	7
80	7	7
40	2	2
410	9	7
410	9	7
380	9	7
330	9	7
280	9	9
110	6	6
80	5	5



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:
○ Powietrze
● Olej
● Emulsja

Kierunek skrawania:
Ⓜ prawy
Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		○
Stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC ≤66 HRC	○
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900 ≤1100		○
Stale nierdzewne, z siarką martenzytyczną	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1100 ≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤5xD Głębokość wiercenia

1172	6501	1662	1182	1663	1183	2478	2470	2479	2471	5759
6538M	6537L	6537L	6537L	6537L	6537L	6537L	6537L	6537L	6537L	6537L
Węglik	W. mono.	W. mono.	W. mono.	W. mono.	W. mono.	W. mono.	W. mono.	W. mono.	W. mono.	W. mono.
P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P	K/P
RT 80 U	RT 100 R	RT 100 F	RT 100 F	RT 100 U	RT 100 U	RT 100 F	RT 100 F	RT 100 U	RT 100 U	RT 100 S
S	F	S	S	S	S	F	F	F	F	F
osiowe	osiowe	osiowe	osiowe	osiowe	osiowe	osiowe	osiowe	osiowe	osiowe	osiowe
84	82	78	80	65	66	76	77	61	63	59



V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.				V _c m/min	Posuw-nr kol.				V _c m/min	Posuw-nr kol.
95	5			110	6	6	6	6	145	7	7	7	7	145-230	8
80	4			90	5	5	5	5	120	6	6	6	6	120-220	7
95	6			130	7	7	7	7	170	8	8	8	8	170-260	8
75	5			110	7	7	7	7	145	8	8	8	8	145-230	8
80	5			100	7	7	7	7	130	8	8	8	8	130-220	8
75	5			95	6	6	6	6	125	7	7	7	7	125-210	7
75	5			90	6	6	6	6	120	7	7	7	7	120-200	7
75	5			90	6	6	6	6	120	7	7	7	7	120-210	7
55	4			80	6	6	6	6	105	7	7	7	7	105-200	7
90	6			110	7	7	7	7	145	8	8	8	8	145-230	8
75	5			90	6	6	6	6	120	7	7	7	7	120-210	7
55	4			65	4	4	4	4	85	5	5	5	5	105-200	6
70	5			85	6	6	6	6	105	7	7	7	7	110-150	7
55	4			80	4	4	5	5	100	5	5	5	5	100-150	5
40	4			60	5	5	5	5	70	6	6	6	6	70-120	6
35	4			50	4	4	4	4	55	5	5	5	5	55-100	5
40	3			45	3	3	4	4	60	4	4	5	5	60-100	5
				45	2	2	2	2	60	3	3	3	3	60-100	5
				40	2	2	2	2	55	3	3	3	3		
				25	1	1	1	1	35	2	2	2	2		
40	2			45	4	4	4	4	60	5	5	5	5		
35	2			40	2	2	2	2	55	2	2	2	2		
35	2			35	4	4	4	4	50	5	5	5	5		
150	6	210	9	160	8	8	8	8	195	9	9	9	9		
110	6	160	9	120	8	8	8	8	160	9	9	9	9		
110	6	160	9	100	8	8	8	8	140	9	9	9	9		
90	5	130	8	95	7	7	7	7	130	8	8	8	8		
				30	2	2	2	2	40	3	3	3	3		
		130	8												
		100	8												
		80	8												
		60	8												
				25	3	3	3	3	35	4	4	4	4		
				35	3	3	3	3	45	4	4	4	4		
				30	2	2	2	2	40	3	3	3	3		
				240	8	8	8	8	310	9	9	9	9		
				240	8	8	8	8	310	9	9	9	9		
				200	8	8	8	8	260	9	9	9	9		
				170	8	8	8	8	220	9	9	9	9		
				230	7	7	7	7	280	8	8	8	8		
				95	6	6	6	6	125	7	7	7	7		
				250	7	7	7	7	325	8	8	8	8		
				170	6	6	6	6	220	7	7	7	7		
				95	6	6	6	6	125	7	7	7	7		
				80	5	5	5	5	105	6	6	6	6		
				70	5	5	5	5	90	6	6	6	6		
				60	5	5	5	5	80	6	6	6	6		
200	7														
200	7														
170	7														
140	6														

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

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Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- Ⓜ prawy
 - Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤5xD Głębokość wiercenia

8511	8611
6537L	6537L
W. mono.	W. mono.
K/P	K/P
RT 100 VA	RT 100 VA
a	a
osiowe	osiowe
72	74

8521	8621
6537L	6537L
W. mono.	W. mono.
K/P	K/P
RT 100 HF	RT 100 HF
Y	Y
osiowe	osiowe
68	70

1243	2717
WN	6537L
W. mono.	W. mono.
K/P	K/P
RT 100 U	RT 100 U
S	S
36	35

2712	2474	2996	2719
6537L	WN	6537L	6537L
W. mono.	W. mono.	W. mono.	W. mono.
K/P	K/P	K/P	K/P
RT 100 F	RT 100 U	RT 100 U	RT 100 U
F	F	F	F
38	34	30	32



V _c m/min	Posuw-nr kol.		V _c m/min	Posuw-nr kol.		V _c m/min	Posuw-nr kol.		V _c m/min	Posuw-nr kol.			
			145	7	7	100	6	6	130	7	7	7	7
			120	6	6	85	5	5	110	6	6	6	6
			170	8	8	110	7	7	145	8	8	8	8
			145	8	8	85	6	6	110	7	7	7	7
			130	8	8	90	6	6	120	7	7	7	7
			125	7	7	85	6	6	110	7	7	7	7
			120	7	7	80	6	6	105	7	7	7	7
			120	7	7	80	6	6	105	7	7	7	7
			105	7	7	75	5	5	100	6	6	6	6
			145	8	8	100	7	7	130	8	8	8	8
			120	7	7	90	6	6	120	7	7	7	7
			85	5	5	65	4	4	85	5	5	5	5
			110	7	7	75	5	5	100	6	6	6	6
			105	5	5	70	4	4	90	5	5	5	5
			80	6	6	50	5	5	65	6	6	6	6
			65	5	5	40	4	4	55	5	5	5	5
			60	4	4				55	4			
			60	3	3	35	2	2	45	3	3	3	3
			55	3	3	35	1	1	35	1	1	1	1
			35	2	2	20	1	1	20	1	1	1	1
80	5	5				40	2	2	45	2	2	2	2
60	2-3	2-3				15	1	1	15	1	1	1	1
80	5	5				35	2	2	35	2	2	2	2
						160	7	7	210	8	8	8	8
						120	7	7	155	8	8	8	8
						120	6	6	145	8	7	7	7
						95	6	6	125	8	7	7	7
						25	2	2	35	3	3	3	3
30	4	4	35	4	4	20	3	3	25	4	4	4	4
45	4	4	45	4	4	15	1	1	15	1	1	1	1
40	3	3	40	3	3	15	1	1	15	1	1	1	1
						200	8	8	260	9	9	9	9
						200	8	8	260	9	9	9	9
						170	8	8	235	9	9	9	9
						140	7	7	170	8	8	8	8
						200	7	7	260	8	8	8	8
						80	6	6	105	7	7	7	7
						210	7	7	270	8	8	8	8
						140	6	6	180	7	7	7	7
						80	5	5	105	6	6	6	6
						65	5	5	85	6	6	6	6
						60	4	4	80	5	5	5	5
						45	4	4	60	5	5	5	5

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Podczas wiercenia otworów o gł. ponad 7 x D zawsze należy wykonać otwór pilotowy:

- Otwór pilotowy może być wykonany krótkim, sztywnym wiertłem. Jego średnica powinna być większa o ok. 0.01 - 0.02 od wiertła typu Ratio. Głębokość otworu pilotowego $\geq 1 \times D$.
- Otwór pilotowy można również wykonać wiertłem Ratio. Wtedy prędkość skrawania i posuw powinny być obniżone o ok. 30-40%.
- Zaleca się ciśnienie chłodziwa 40 bar.

Ze względu na bezpieczeństwo bardzo ważne jest, aby wiertło nie przekraczało prędkości $n = 6\ 000$ obr./min kiedy nie jest podparte. Siły odśrodkowe mogłyby doprowadzić do złamania wiertła zanim zagłębi się ono w materiale.

Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węglik
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Al
zalecany do obróbki aluminium

G
zalecany do obróbki żeliwa

Chłodziwo:
 Powietrze
 Olej
 Emulsja

Kierunek skrawania:
 prawy
 lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		●
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		●
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		●
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		●
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		●
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		●
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		●
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		●
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		●
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		●
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		●
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		●
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		●
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		●
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Stale hartowane	-		≤48 HRC	●
			≤66 HRC	●
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martenzytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	●
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	●
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	●
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	●
Żeliwa utwardzone	-		≤350 HB	●
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	●
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	●
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		●
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		●
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		●
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		●
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		●
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		●
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		●
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		●
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		●
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		●
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		●
	2.0790 CuNi18Zn19Pb	≤850		●
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		●
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		●
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		●
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		●
Kevlar	Kevlar	≤1000		●
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		●



≤7xD Głębokość wiercenia

≤8xD

≤10xD

≤12xD

1173
6538L
Węglik
P
RT80U
S
osiowe
95

769	6069
WN	WN
Węglik mono.	
K	K
RT 150 GG	
○	○
osiowe osiowe	
93	94
Al	G

2711
WN
W. mono.
K/P
RT100U
S
osiowe
89

4044	4045
WN	WN
Węglik mono.	
K/P	K/P
RT 100 U	
F	F
osiowe osiowe	
85	87

6502
WN
W. mono.
K/P
RT100R
F
osiowe
91

8522
WN
W. mono.
K/P
RT100HF
Y
osiowe
90

5760
6537L
W. mono.
K/P
RT100S
F
osiowe
96

770	6070
WN	WN
Węglik mono.	
K	K
RT 150 GG	
○	○
osiowe osiowe	
98	99
Al	G

5525
WN
W. mono.
K/P
RT100U
F
osiowe
100



V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.	V _c m/min	Posuw- nr kol.
95	4			110	5	145	6 6			145-230	7			110	6
75	3			90	4	120	5 5			120-220	6			110	5
90	5			130	6	170	7 7			170-260	7			110	7
75	4			110	6	145	7 7			145-230	7			100	7
80	4			100	6	130	7 7			130-220	7			110	7
75	4			95	5	125	6 6			125-210	6			110	6
60	4			90	5	120	6 6			120-200	6			100	6
75	4			90	5	120	6 6			120-210	6			110	6
60	3			80	5	105	6 6			105-200	6			105	6
90	5			110	6	145	7 7			145-230	7			110	7
75	4			90	5	120	6 6			120-210	6			110	6
55	3			65	3	85	4 4			105-200	5			85	4
75	4			80	5	110	6 6			110-150	6			100	6
55	3			75	4	105	4 4			100-150	4			80	4
40	3			55	4	80	5 5			70-120	5			80	5
35	3			40	3	65	4 4			65-100	4			65	4
40	2			45	2	60	4 4			60-100	4			50	4
				45	1	60	2 2			60-100	4			50	2
				40	1	55	2 2								
				25	1	35	1 1								
35	1			45	3	60	4 4							60	4
33	1			40	2	55	2 2							55	2
25	1			35	3	45	4 4							45	4
150	5	120	6 7	150	7	195	8 8	210	8			120	6 6	120	8
110	5	100	6 7	120	7	160	8 8	160	8			100	6 6	120	8
110	5	90	6 7	100	7	140	8 8	160	8			90	6 6	100	8
90	4	80	6 7	95	6	130	7 7	130	7			80	6 6	90	7
		40	2 2	30	1	40	2 2					40	1 2		
								130	7						
								100	7						
								80	7						
								60	7						
				25	2	35	3 3			35	3				
				35	1	40	3 3			45	3				
				30	1	40	2 2			40	4				
180	6	410	8 7	240	7	310	8 8					410	8 6	150	8
180	6	410	8 7	240	7	310	8 8					410	8 6	150	8
160	6	380	8 8	200	7	260	8 8					380	8 6	150	8
130	5	330	8 8	170	7	220	8 8					330	8 6	120	8
				230	6	280	7 7							150	7
				95	6	125	6 6							80	6
				250	7	325	7 7					280	7 7	120	7
				170	6	220	6 6							120	6
		110	6 6	95	6	125	6 6					110	6 6	40	6
		80	5 5	80	5	105	5 5					80	5 5		
				70	5	90	5 5								
				60	5	80	5 5							40	5

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- Ⓜ prawy
 - Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤15xD

773
WN
Węglik mono.
K
RT 150 GN
○
osiowe
103

≤15xD

6509
WN
Węglik mono.
K/P
RT 100 T
ⓐ
40 bar MQL
102

≤20xD

6511
WN
Węglik mono.
K/P
RT 100 T
ⓐ
40 bar MQL
104

≤25xD

6512
WN
Węglik mono.
K/P
RT 100 T
ⓐ
40 bar MQL
105

≤30xD

6513
WN
Węglik mono.
K/P
RT 100 T
ⓐ
40 bar MQL
106

≤40xD

6514
WN
Węglik mono.
K/P
RT 100 T
ⓐ
40 bar
107



V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.
		110	8			110	8			100	8			80	7
		110	8			110	8			100	8			80	7
		120	8			120	8			120	8			100	8
		120	8			120	8			100	8			100	8
		110	6			110	6			110	6			110	6
		110	8			110	8			100	8			80	7
		100	7			100	7			100	7			80	7
		110	7	80	7	110	7	80	7	100	7	70	7	80	7
		110	6	80	7	110	6	80	7	100	6	70	7	80	6
		110	8			110	8			100	8			80	7
		110	7	80	6-7	110	7	80	6-7	100	7	70	6-7	80	6
		110	6	80	6-7	110	6	80	6-7	100	6	70	6-7	80	6
		100	5			100	5			80	5			80	5
		80	5			80	5			60	5			60	5
		100	6-7			100	6			90	6			80	6-7
		80	5			80	5			70	4			70	4
		50	5			50	5			50	4			50	4
		50	5			50	5			50	4			50	4
		50	4			50	4			50	4			50	4
		100	5			100	5			100	5			80	5
		70	2-3			60	3			60	3			70	2-3
		100	5			100	5			100	5			80	5
120	5	140	8			140	8			130	8			120	8
100	5	100	8			100	8			90	8			80	8
90	5	140	8			140	8			130	8			120	8
80	5	100	8			100	8			90	8			80	8
40	1														
		100	6			100	6			90	6			80	6
		100	6			100	6			90	6			80	6
		90	8	90	8	90	8	90	8	80	8	80	8	70	8
		30	2			30	2			30	2			30	2
410	6														
410	6														
380	7														
330	7														
		120	1			120	1			120	1			120	1
280	6	120	8			120	8			110	8			100	8
110	5														
80	4														



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Typ
Powierzchnia
Chłodzenie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- Ⓜ prawy
 - Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		●
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		●
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Stale hartowane	-		≤48 HRC	●
			≤66 HRC	●
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		●
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		●
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○

Navigator

**GUHRING**NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GühringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Gatunek węgla

Głębokość wiercenia

Powierzchnia

Zastosowanie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:
 ○ Powietrze
 ● Olej
 ● Emulsja

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
stale hartowane	-		≤48 HRC ≤66 HRC	●
stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si > 24 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy długowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmoc. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



HT 800 WP ≤1,5xD

≤3xD

4112
WN
W. mono.
K/P
1,5xD
F
stale
139

4115
WN
W. mono.
K/P
1,5xD
a
stale nierd.
145

4113
WN
W. mono.
K/P
1,5xD
F
żeliwa
142

4114
WN
W. mono.
K/P
1,5xD
○
Al i stop.
148

4112
WN
W. mono.
K/P
3xD
F
stale
139

4115
WN
W. mono.
K/P
3xD
a
stale nierd.
145

4113
WN
W. mono.
K/P
3xD
F
żeliwa
142

4114
WN
W. mono.
K/P
3xD
○
Al i stop.
148



V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr
130	6							130	6						
110	5							110	5						
130	7							130	7						
110	6							110	6						
130	6							130	6						
125	6							125	6						
110	5							110	5						
110	6							110	6						
90	5							90	5						
130	7							130	7						
110	6							110	6						
70	4							70	4						
105	5							105	5						
70	4							70	4						
60	5							60	5						
55	4							55	4						
55	3							55	3						
50	2							50	2						
		25	2							25	2				
		55	3							55	3				
		40	3							40	3				
		35	3							35	3				
				100	6							100	6		
				90	6							90	6		
				120	7							120	7		
				100	6							100	6		
		90	6							90	6				
				80	5							80	5		
				80	5							80	5		
				80	5							80	5		
				80	5							80	5		
		25	2							25	2				
		40	3							40	3				
		35	2							35	2				
						200	7							200	7
						180	7							180	7
						150	7							150	7
						120	7							120	7
						180	7							180	7
						70	6							70	6
						180	7							180	7
						120	6							120	6
						70	6							70	6
						50	6							50	6
						45	6							45	6
						35	5							35	5

Navigator

**GUHRING**NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Gatunek węgla

Głębokość wiercenia

Powierzchnia

Zastosowanie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
stale hartowane	-		≤48 HRC ≤66 HRC	○
stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si > 24 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy długowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



HT 800 WP ≤5xD

≤7xD

4112
WN
W. mono.
K/P
5xD
F
stale
139

4115
WN
W. mono.
K/P
5xD
a
stale nierd.
145

4113
WN
W. mono.
K/P
5xD
F
żeliwa
142

4114
WN
W. mono.
K/P
5xD
○
Al i stop.
148

4112
WN
W. mono.
K/P
7xD
F
stale
139

4115
WN
W. mono.
K/P
7xD
a
stale nierd.
145

4113
WN
W. mono.
K/P
7xD
F
żeliwa
142

4114
WN
W. mono.
K/P
7xD
○
Al i stop.
148



V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr	V _c m/min	Kolumna pos. nr
125	6							120	5						
105	5							105	4						
125	7							120	6						
105	6							105	5						
125	6							120	5						
120	6							110	5						
105	5							100	4						
105	6							100	5						
85	5							85	4						
125	7							120	6						
105	6							100	5						
70	4							70	4						
105	5							105	4						
70	4							70	3						
55	5							55	4						
50	4							50	3						
55	3							55	2						
50	2							50	2						
		25	2							25	1				
		55	3							55	2				
		40	3							40	2				
		35	3							35	2				
				100	6							80	6		
				90	6							70	6		
				120	7							100	7		
				100	6							80	6		
		90	6							70	6				
				80	5							60	5		
				80	5							60	5		
				80	5							60	5		
				80	5							60	5		
		25	2							25	1				
		40	3							40	2				
		35	2							35	1				
						180	7							180	6
						180	7							180	6
						140	7							140	6
						110	7							110	6
						180	7							180	6
						70	6							70	5
						180	7							180	6
						120	6							120	5
						70	6							70	5
						50	6							50	5
						45	6							45	5
						35	5							35	4

Navigator

**GUHRING**NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GühringNavigator na stronie internetowej www.guehring.de.

Nr. art.
Norma/DIN
Materiał ostrza
Gatunek węgla
Głębokość wiercenia
Powierzchnia
Zastosowanie
Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:
○ Powietrze
● Olej
● Emulsja

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
stale hartowane	-		≤48 HRC ≤66 HRC	●
stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si > 24 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy długowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



HT 800 WP ≤10xD

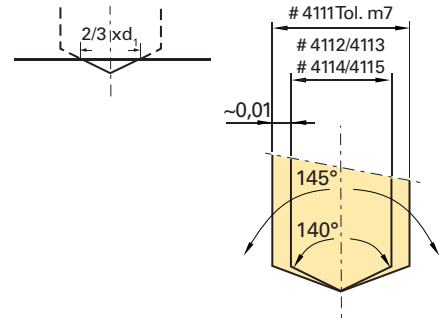
4112
WN
W. mono.
K/P
10xD
F
stale
139

4115
WN
W. mono.
K/P
10xD
a
stale nierd.
145

4113
WN
W. mono.
K/P
10xD
F
żeliwa
142

4114
WN
W. mono.
K/P
10xD
○
Al i stop.
148

4111
WN
W. mono.
K/P
1xD
a
pil./pogłę.
151



- Przy wierceniu otworów przelotowych należy uważać, aby łysinki pozostawały w obrabianym otworze. Oprócz tego zaleca się przed przebicciem dna zredukowanie posuwu.
- Przy głębokości wiercenia ≥ 5xD zaleca się wykonanie nawiercenia lub otworu pilotującego wiertłem o nr art. 4105, z płytką o nr art. 4111. Alternatywnie można to samo wykonać - w zależności od obrabianego materiału - wiertłami Ratio RT 100 U lub RT 100 VA.
- Przy wierceniu bez otworu pilotującego zaleca się zredukowanie posuwu w trakcie nawiercania.
- W przypadku otworów przerywanych (kanałki, otwory poprzeczne) obróbkę należy poprzedzić testami. Przy obróbce przerywanych otworów (dopuszczalna przerwa max. 0,2xD) zaleca się w miarę możliwości zredukować posuw.
- Wiertła HT 800 w przeciwieństwie do klasycznych wiertel składanych nadają się również do wiercenia w pakietach blach.
- Na tokarkach, gdzie wiertło jest nieruchome, należy zwrócić uwagę, aby znajdowało się idealnie w osi obrotu obrabianego przedmiotu.
- Wystarczająco obfite chłodzenie (emulsją lub olejem) jest niezbędne dla zapewnienia optymalnych warunków skrawania.
- Narzędzia te dopuszcza się tylko warunkowo dla obróbki na sucho lub z chłodzeniem mgłą olejową (MQL/MMS). W tym przypadku zaleca się stosowanie stożkowych zakończeń chwytów i innych elementów - specjalnych do MQL/MMS. Nasi przedstawiciele chętnie Państwu doradzą w tym temacie.



Vc m/min	Kolumna pos. nr	Vc m/min	Kolumna pos. nr	Vc m/min	Kolumna pos. nr	Vc m/min	Kolumna pos. nr	Vc m/min	Kolumna pos. nr
100	5							130	6
95	4							110	5
100	6							130	7
95	5							110	6
100	5							130	6
95	5							125	6
90	4							110	5
90	5							110	6
85	4							90	5
100	6							130	7
90	5							110	6
70	4							70	4
95	4							105	5
70	3							70	4
55	4							60	5
50	3							55	4
55	2							55	3
50	2							50	2
		25	1					25	2
		55	2					55	3
		40	2					40	3
		35	2					35	3
				80	6			100	6
				70	6			90	6
				100	7			120	7
				80	6			100	6
		70	6					90	6
				60	5			80	5
				60	5			80	5
				60	5			80	5
				60	5			80	5
		25	1					25	2
		40	2					40	3
		35	1					35	2
						150	6	200	7
						150	6	180	7
						130	6	150	7
						105	6	120	7
						150	6	180	7
						70	5	70	6
						150	6	180	7
						110	5	120	6
						70	5	70	6
						50	5	50	6
						45	5	45	6
						35	4	35	5

**GUHRING NAVIGATOR**

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

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Nr. art.

Norma/DIN

Materiał ostrza

Gatunek węgla

Głębokość wiercenia

Powierzchnia

Zastosowanie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:
 ○ Powietrze
 ● Olej
 ● Emulsja

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
stale hartowane	-		≤48 HRC ≤66 HRC	○
stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si > 24 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy długowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmoc. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

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Nr. art. ®

Nr. art. ™

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

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Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martenzytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤3xD Głębokość wiercenia

572	2048	1228	2498	659	663	2461	512	515
1897	1897	1897	1897	1897	WN	1897	WN	1897
HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSS-E-PM
S	M	S	F	S	S	F	S	F
VA	P2000	GT 80	GT 80	GV 120	GV 120	GV 120	GU 500	GT 500
231	233	227	229	222	449	224	384	237



Vc	Posuw-nr		Posuw-nr	Vc	Posuw-nr	Vc	Posuw-nr	Vc	Posuw-nr	Vc	Posuw-nr	Vc	Posuw-nr	Vc	Posuw-nr	Vc	Posuw-nr	
m/min	kol.		kol.	m/min	kol.	m/min	kol.	m/min	kol.	m/min	kol.	m/min	kol.	m/min	kol.	m/min	kol.	
38	6	35	6	38	6	42	6	38	5	5	42	6	45	6	42	6	42	6
33	5	30	5	33	5	36	5	33	4	4	36	5	35	5	37	5	37	5
44	6	40	6	44	6	48	7	44	5	5	48	6	50	6	47	7	47	7
42	5	40	5	38	5	42	6	38	5	5	42	6	40	6	44	6	44	6
44	5	40	5	44	6	48	6	44	5	5	48	6	44	6	47	6	47	6
44	5	40	5	44	5	48	6	44	5	5	48	6	44	6	47	6	47	6
		35	4	38	4	42	5	38	4	4	42	5	40	5	44	5	44	5
		25	4	27	4	30	5	27	4	4	30	5	27	4	30	4	30	4
		20	3	22	3	24	4	22	3	3	24	4	22	3	25	3	25	3
40	6	40	6	44	4	48	4	44	4	4	48	5	44	6	47	4	47	4
		20	4	22	4	24	5	22	4	4	24	5	22	4	25	5	25	5
		15	3	18	3	20	4	18	3	3	20	4	18	3	20	4	20	4
		20	4	22	4	24	5	22	4	4	24	5	22	4	25	5	25	5
		15	3	18	3	20	4	18	3	3	20	4	16	3	18	4	18	4
		18	4	19	4	21	5	19	4	4	21	5	20	4	22	5	22	5
		12	3	14	3	16	4	14	3	3	16	4	15	3	17	4	17	4
		12	3	14	3	17	4	14	3	3	17	4	13	3	17	4	17	4
		8	2	9	2	11	3	9	2	2	11	3	9	2	12	2	12	2
								4	1	1	5	2						
20	4	14	4	15	4	17	4	20	4	4	22	5	20	4	22	4	22	4
15	3	10	3	10	3	12	3	15	3	3	17	4	16	4	18	3	18	3
18	3	12	3	12	3	14	3	18	3	3	20	4	18	4	20	3	20	3
30	6	38	6	45	6	50	7	40	6	6	45	7	45	6	50	7	50	7
30	6	30	6	40	6	45	7	35	6	6	40	7	40	6	44	7	44	7
		30	6	33	6	36	7	33	6	6	36	7	40	6	45	7	45	7
		25	6	27	6	29	7	27	6	6	29	7	30	6	33	7	33	7
		10	3	8	3	10	4	12	3	3	14	4			16	4	16	4
8	1	5	2					6	2	2	7	2			6	2		
12	2							11	2	2	12	3						
8	2							7	2	2	8	3						
90	7	90	7										70	7				
90	7	90	7										70	7				
80	7	80	7										85	7				
70	6	70	6										70	6				
70	6	85	6										80	6				
70	5	80	5	88	5	96	6						80	5	80	5		
60	5	70	5	77	5	84	6						77	5				
40	5	40	5	44	5	48	6						44	5	60	5		
35	4	40	4	45	5	50	5	45	5	5	50	6	50	4	50	5	50	5
33	4	30	4	40	4	45	5	40	4	4	45	5	40	4	44	5	44	5
20	4	25	4	22	4	25	5	23	4	4	26	5	32	4	33	5	33	5
15	4	15	4	17	4	20	5	17	4	4	20	5	28	4	28	5	28	5
		20	4	22	4	24	5						25	4	25	5		
30	4	25	5	27	5	30	5						27	4				

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Gatunek węgla

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martenzytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤3xD Głębokość wiercenia

730	702	1149	710	703	705	704	707
6539	WN	WN	WN	8037	8041	8038	WN
W. mono	W. mono	W. mono	Węglik	Węglik	Węglik	Węglik	Węglik
K10/K20							
○	○	○	○	○	○	○	○
N	N	N	Duro 150	N	N	N	H
239	243	431	323	429	512	430	432

2463	1946
6539	6537K
W. mono	W. mono
K/P	K/P
F	A
N	H
241	389



Vc m/min	Posuw-nr kol.							Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.
80	4							104	5		
70	4							91	5		
80	5		4	4	4			104	6		
70	4		3	3	3			91	5		
80	4							104	5		
70	4							91	5		
60	4							78	5		
60	4							78	5		
										80	6
80	5							104	6		
60	4							78	5		
										65	4
50	4							65	5		
										80	4
50	3							65	4		
25	2		2	2	2		2	32	3		
20	2		3	3	3			26	4	40	2
10			2	2	2					30	1
25	2							32	2		
15	1							20	1		
25	2							32	2		
90	4		4	4	4			117	5	90	8
80	4		4	4	4			104	5	80	8
80	4		4	4	4			91	5	80	8
70	4		4	4	4			104	5	70	7
10			1	1	1		1			30	2
15	2							20	2		
15	1							15	1		
15	1							15	1		
200	7							260	8		
200	7							260	8		
150	6							195	7		
120	6							156	7		
180	6							234	6		
80	5							104	6		
180	5		5	5	5			234	6		
180	5		5	5	5			234	6		
120	5							156	6		
120	5							156	6		
70	4							91	5		
50	3							65	4		
50	4	4						65	5		
40	3	3					3	52	4		
150			1								
80	3	3					2	104	4		

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

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Nr. art. ®

Nr. art. ℓ

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

ℓ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤5xD Głębokość wiercenia

651	654	652	606
664	665		
338	345	338	345
HSS	HSS	HSS	HSS
S	S	S	S
N	N	GT 100	GT 100
250/261	455	277/283	462

2456	2457
338	338
HSS	HSS
F	F
N	GT 100
254	280

305	345	351	622	645	605	1260	1262	1146
308					608			
338	345	346	338	345	338	338	345	338
HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	HSCO	M42
N	N	N	GT 100	GT 100	Ti	VA	VA	N
284/289	463	472	291	466	301/308	309	470	315



Vc m/min	Posuw-nr kol.				Vc m/min	Posuw-nr kol.		Vc m/min	Posuw-nr kol.													
30	6	6	6	6	32	7	7	35	5	5	5	5	5	5	5	5	5	5	5	5	5	5
24	5	5	5	5	26	6	6	30	5	5	5	5	5	5	5	5	5	5	5	5	5	5
33	6	6	6	6	36	7	7	40	5	5	5	5	5	5	5	5	5	5	5	5	5	5
33	5	5	5	5	36	6	6	40	5	5	5	5	5	5	5	5	5	5	5	5	5	5
28	5	5	5	5	31	6	6	40	5	5	5	5	5	5	5	5	5	5	5	5	5	5
28	5	5	5	5	31	6	6	40	5	5	5	5	5	5	5	5	5	5	5	5	5	5
25	4	4	4	4	28	5	5	35	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	4	4	4	4	24	5	5	20	4	4	4	4	4	4	4	4	4	4	4	4	4	4
								16	3	3	3	3	3	3	3	3	3	3	3	3	3	3
33	6	6	6	6	36	7	7	36	6	6	6	6	6	6	6	6	6	6	6	6	6	6
20	4	4	4	4	22	5	5	20	4	4	4	4	4	4	4	4	4	4	4	4	4	4
14	4	4	4	4	16	5	5	15	3	3	3	3	3	3	3	3	3	3	3	3	3	3
18	4	4	4	4	20	5	5	16	4	4	4	4	4	4	4	4	4	4	4	4	4	4
								12	3	3	3	3	3	3	3	3	3	3	3	3	3	3
								15	4	4	4	4	4	4	4	4	4	4	4	4	4	4
								12	3	3	3	3	3	3	3	3	3	3	3	3	3	3
								15	3	3	3	3	3	3	3	3	3	3	3	3	3	3
								8	2	2	2	2	2	2	2	2	2	2	2	2	2	2
								4														1
								18	4	4	4	4	4	4	4	4	4	4	4	4	4	3
								14	3	3	3	3	2	2	3	3	3	3	3	3	3	3
								16	3	3	3	3	3	3	3	3	3	3	3	3	3	3
								35	6	6	6	6	6	6	6	6	6	6	6	6	6	5
								30	6	6	6	6	6	6	6	6	6	6	6	6	6	5
								30	6	6	6	6	6	6	6	6	6	6	6	6	6	5
								28	6	6	6	6	6	6	6	6	6	6	6	6	6	5
								10	3	3	3	3	3	3	3	3	3	3	3	3	3	3
								8														1
								10														2
								6														2
								90														7
								90														7
								80				7	7									7
								70				6	6									7
								70														6
								40	5	5	5	5	5	5	5	5	5	5	5	5	5	5
								60														5
								40	5	5	5	4	4									5
								35	4	4	4											4
								33	4	4	4											4
								20	4	4	4	4	4	4	4	4	4	4	4	4	4	4
								15	4	4	4	4	4	4	4	4	4	4	4	4	4	4
								20	4	4	4	4	4	4	4	4	4	4	4	4	4	4

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
martenzytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤5xD Głębokość wiercenia

2997	661	658	662	657
338	345	338	345	338
HSCO	HSCO	HSCO	HSCO	HSCO
S	S	S	S	S
N	N	GT 100	GT 100	Ti
288	465	294	467	304

2459	2458
338	338
HSCO	HSCO
F	F
GT 100	Ti
296	306

1223	1224	1221	1222
338	345	338	345
HSCO	HSCO	HSCO	HSCO
A	A	C	C
GT 100	GT 100	GT 100	GT 100
299	469	298	468



V _c m/min	Posuw-nr kol.				
38	6	6	6	6	
33	5	5	5	5	
44	5	5	5	5	
38	5	5	5	5	
44	5	5	5	5	
38	4	4	4	4	
27	4	4	4	4	
22	3	3	3	3	3
44	4	4	4	4	
22	4	4	4	4	
18	3	3	3	3	
22	4	4	4	4	
18	3	3	3	3	
19	4	4	4	4	
14	3	3	3	3	
14	3	3	3	3	3
9	2	2			2
20	4	4	4	4	4
15	3	3			3
18		3	3	3	3
40	6	6	6	6	
35	6	6	6	6	
33	6	6	6	6	
27	6	6	6	6	
12					3
6					2
11					2
7					2
88	5	5	5	5	
40	4	4			
22	4	4	4	4	
17	4	4	4	4	4
22	4	4	4	4	

V _c m/min	Posuw-nr kol.	
42	6	
36	5	
48	6	
42	6	
48	6	
42	5	
30	5	
34	4	4
48	6	
24	5	
20	4	
24	5	
20	4	
20	4	
21	5	
16	4	
17	4	4
11	3	2
6	1	
22	5	5
17	4	3
20	4	4
45	7	
40	7	
36	7	
29	7	
14	4	3
7		2
12		2
8		2
85	8	
72	7	
96	6	
40		
25	5	
20	5	4
24	5	

V _c m/min	Posuw-nr kol.			
42			6	6
36			6	6
48			6	6
42	5	5	6	6
42			5	5
30			5	5
34			4	4
48			7	7
24			5	5
20			4	4
20			5	5
15			4	4
21			5	5
16			4	4
17			4	4
11			3	3
22			5	5
18			4	4
45	7	7		
40	7	7		
36	7	7		
29	7	7		
85	7	7		
96	6	6		
25	5	5		
20	5	5		
24	5	5		



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Chłodzenie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤5xD Głębokość wiercenia

1199	1018	2047	511	513	1131	1132	732	2464
338	338	338	WN	WN	WN	WN	WN	WN
M42	M42	HSCO	HSCO	HSS-E-PM	HSCO	HSCO	W. mono	W. mono
F nano								
N	AeroX	P2000	GU 500	GT 500	GT 80 IK	GT 80 IK	N	N
bez	bez	bez	bez	bez	z	z	bez	bez
317	313	311	386	388	395	396	319	321



V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.	V _c m/min	Posuw-nr kol.
42	6	35	6	35	6	45	6	42	6	48	7	60	7	80	4
36	5	30	5	30	5	35	5	37	5	38	6	48	6	70	4
48	6	40	6	40	6	50	6	47	6	48	7	60	7	80	5
42	5	40	5	40	5	40	5	44	6	38	6	48	6	70	4
44	6	40	5	40	5	44	6	47	6	48	6	60	6	80	4
44	5	40	5	40	5	44	6	47	6	48	6	60	6	70	4
42	5	35	4	35	4	40	5	44	5	38	5	50	5	60	4
30	4	20	4	25	4	27	4	30	4	28	5	33	5	60	4
25	3	16	3	20	3	22	3	25	3	26	4	31	4		
40	6	36	6	40	6	44	6	47	3	43	7	55	7	80	5
25	3	20	3	20	4	22	4	25	4	25	5	31	5	60	4
20	3	15	3	15	3	18	3	20	3	24	4	31	4		
20	3	16	4	20	4	22	4	25	4	25	5	30	5	50	4
18	3	12	3	15	3	16	3	18	4	20	4	24	4		65
21	4	15	3	18	4	20	4	22	5	24	5	30	5	50	3
16	3	12	3	12	3	15	3	17	4	16	4	20	4		65
17	3	15	3	12	3	13	3	14	4	14	4	18	4		
11	2	8	2	8	2	9	2	12	2	12	3	15	3	25	2
6	1	4	1							4	3	5	3	20	2
20	4	18	3	14	4	20	4	22	4	20	5	25	5	25	2
15	3	14	3	10	3	16	4	18	3	14	4	18	4	15	1
18	3	16	3	12	3	18	4	20	3	16	4	20	4	25	2
45	6	35	6	38	6	45	6	50	7	48	7	60	7	90	4
40	6	30	6	30	6	40	6	40	7	38	7	48	7	80	4
36	6	30	6	30	6	40	6	44	7	42	7	52	7	70	4
29	6	28	6	25	6	30	6	33	7	32	7	40	7	80	4
14	3	10	3	10	3			16	4	12	4	15	4		
9	1	8	1	5	2			6	2	10	2	12	2	15	2
12	2	10	2							14	3	18	3	15	1
8	2	6	2							10	3	12	3	15	1
		90	7	90	7	70	7							200	7
		90	7	90	7	70	7							200	7
80	7	80	7	80	7	85	7			95	7	120	7	150	6
70	6	70	6	70	6	70	6			75	8	95	8	120	6
80	6	70	6	85	6	80	6							180	5
70	5	70	5	80	5	80	5	50	5	90	6	100	6	80	5
60	5	60	5	70	5	77	5							180	5
40	5	40	5	40	5	44	5	60	5	45	6	55	6	180	5
35	4	35	4	40	4	50	4	50	5					120	5
33	4	33	4	30	4	40	4	44	5	48	5	60	5	120	5
20	4	20	4	25	4	32	4	33	5	45	5	55	5	70	4
15	4	15	4	15	4	28	4	28	5	38	5	45	5	50	3
		20	4	20	4	25	4	25	4					50	4
		30	5	25	5	27	4			38	6	48	6	40	3
														80	3
														100	4

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Chłodzenie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

prawy

lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskotopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤10xD Głębokość wiercenia

561	211	204	217	257	523
			220		
339	339	340	340	341	WN
HSS	HSS	HSS	HSS	HSS	HSS
N	N	N	N	N	N
bez	bez	bez	bez	bez	bez
327	325	338	331/336	473	482

218	219	501	505	535	551
221				506	
340	340	340	341	340	341
HSS	HSS	HSS	HSS	HSS	HSS
H	W	GT50	GT50	GT100	GT100
bez	bez	bez	bez	bez	bez
339/341	342	351	479	344/350	476

666	667	655	668	656
339	340	341	340	341
HSS	HSS	HSS	HSS	HSS
N	N	N	GT100	GT100
bez	bez	bez	bez	bez
328	334	475	347	478

2462
340
HSS
GT100
bez
349



V _c m/min	Posuw-nr kol.					
24	6	6	6	6	6	6
20	5	5	5	5	5	5
27	6	6	6	6	6	6
27	5	5	5	5	5	5
22	5	5	5	5	5	5
22	5	5	5	5	5	5
27	6	6	6	6	6	6
14	4	4	4	4	4	4
27	6	6	6	6	6	6
27	6	6	6	6	6	6
22	6	6	6	6	6	6
18	6	6	6	6	6	6
65	7	7	7	7	7	7
65	7	7	7	7	7	7
45	7	7	7	7	7	7
45	6	6	6	6	6	6
63	6	6	6	6	6	6
54	5	5	5	5	5	5
36	5	5	5	5	5	5
28	4	4	4	4	4	4
22	4	4	4	4	4	4
22	4	4	4	4	4	4
14	4	4	4	4	4	4
22	5	5	5	5	5	5

V _c m/min	Posuw-nr kol.					
24					6	6
20					5	5
27					6	6
27					5	5
22					5	5
22					5	5
27					6	6
14					4	4
27					6	6
27					6	6
22					6	6
18					6	6
65	7	7	7			
65	7	7	7			
45	7				7	7
45					6	6
63	6				6	6
54		5			5	5
63	6					
36					5	5
28	4					
22					4	4
14	4				4	4
22	5	5	5	5		

V _c m/min	Posuw-nr kol.					
28	6	6	6	6	6	6
22	5	5	5	5	5	5
30	6	6	6	6	6	6
30	5	5	5	5	5	5
25	5	5	5	5	5	5
25	5	5	5	5	5	5
22	4	4	4	4	4	4
18	4	4	4	4	4	4
30	6	6	6	6	6	6
14	4	4	4	4	4	4
12	4	4	4	4	4	4
16	4	4	4	4	4	4
10	3	3	3	3	3	3
30	6	6	6	6	6	6
30	6	6	6	6	6	6
24	6	6	6	6	6	6
20	6	6	6	6	6	6
50	7	7	7	7	7	7
50	6	6	6	6	6	6
70	6	6	6	6	6	6
60	5	5	5	5	5	5
40	5	5	5	5	5	5
30	4	4	4	4	4	4
25	4	4	4	4	4	4
14	4	4	4	4	4	4
12	4	4	4	4	4	4
18	4	4	4	4	4	4
32	5	5	5	5	5	5

V _c m/min	Posuw-nr kol.
30	7
24	6
33	7
33	6
28	6
28	6
24	5
23	5
33	7
18	5
15	5
19	5
13	4
33	7
33	7
26	7
22	7
55	8
55	7
70	
65	6
44	6
30	
25	
16	5
14	5
23	5
32	

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Chłodzenie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskotopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskotopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



>10xD Głębokość wiercenia

502	503	504	242	243	244	526	527	563	564	565	566	293	298	299
1869 R1	1869 R2	1869 R3	WN	WN	WN	1870 R1	1870 R2	WN	WN	WN	WN	WN	WN	WN
HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS	HSS
GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100	GT 100
365	372	378	381	382	383	484	488	491	492	493	494	495	496	497

670	671
1869 R1	1869 R2
HSS	HSS
GT 100	GT 100
367	374



V _c m/min	Posuw-nr kol.														
22	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
12	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
6	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
22	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
20	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
14	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
28	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
22	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
20	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
18	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
12	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
18	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4

V _c m/min	Posuw-nr kol.	
28	5	5
22	4	4
28	5	5
22	4	4
28	4	4
22	4	4
16	3	3
28	5	5
12	3	3
8	2	2
28	5	5
22	5	5
25	5	5
18	5	5
6	1	1
70	6	6
70	6	6
55	6	6
45	5	5
70	5	5
28	4	4
36	4	4
28	3	3
25	3	3
22	3	3
18	3	3
15	3	3
22	4	4

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Gatunek węgla

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskotopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



≤10xD Głębokość wiercenia

311	317	357	336	623	617
339	340	341	340	341	340
HSCO	HSCO	HSCO	HSCO	HSCO	HSCO

N	N	N	GT 100	GT 100	Ti
330	353	480	355	481	358

669
340
HSCO

Ti
360

396
340
HSCO

GT 100
357

706
WN
W. mono

K10/K20
N
362



Vc m/min	Posuw-nr kol.						Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.
33	5	5	5	5	5	5			36	5		
27	5	5	5	5	5	5			30	4		
36	5	5	5	5	5	5			40	5		
32	5	5	5	5	5	5			36	5		
36	5	5	5	5	5	5			40	5		
36	5	5	5	5	5	5			40	5		
22	4	4	4	4	4	4			26	4		
18	4	4	4	4	4	4			18	4		
14	3	3	3	3	3	3	15	3	15	3		
32	5	5	5	5	5	5			32	5		
18	4	4	4	4	4	4			20	4		
13	3	3	3	3	3	3	13	3	18	3		
14	4	4	4	4	4	4			18	4		
10	3	3	3	3	3	3	10	3	12	3		
13	4	4	4	4	4	4			15	4		
10	3	3	3	3	3	3	10	3	12	3		
12	3	3	3	3	3	3	10	3	14	3		
6	2	2	2	2	2	2	8	2	9	3		
4				1	1	1			5	1		
12	4	4	4	4	4	4	15	4	14	4		
8	3	3	3	2	2	3	10	3	10	3		
10	3	3	3	3	3	3	13	3	12	3		
32	6	6	6	6	6	6			35	6		
27	6	6	6	6	6	6			30	6		
26	6	6	6	6	6	6			30	6		
24	6	6	6	6	6	6			26	6		
6	3	3	3	3	3	3	6	3	12	3		
5	1	1	1				6	1				
8							10	2				
5							6	2				
70				7	7				77	7		
60				6	6				66	6		
60						5						
36	5	5	5	5	5				40	6		
54				5	5							
36	5	5	5	5	5				40	6		
30	4	4	4	5	5							
24	4	4	4	5	5							
18	4	4	4	4	4				21	5		
13	4	4	4	4	4	4	25	4	15	5		
16	4	4	4	4	4				30	5	50	4
26						4					40	3
											80	3

Navigator



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Chłodzenie

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		●
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		●
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz Żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskotopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



>10xD Głębokość wiercenia

618	619	620	621
1869 R1	1869 R2	1870 R1	1870 R2
HSCO	HSCO	HSCO	HSCO
GT 100	GT 100	GT 100	GT 100
bez	bez	bez	bez
370	376	486	490

571
1869 R3
HSCO
GT 100
bez
380

370	371	372
WN	WN	WN
HSCO	HSCO	HSCO
GT 100	GT 100	GT 100
z	z	z
505	506	507

374	375	376
WN	WN	WN
HSCO	HSCO	HSCO
GT 100	GT 100	GT 100
z	z	z
508	509	510



Vc m/min	Posuw-nr kol.			
30	4	4	4	4
25	4	4	4	4
33	4	4	4	4
30	4	4	4	4
33	4	4	4	4
33	4	4	4	4
20	3	3	3	3
14	3	3	3	3
10	2	2	2	2
29	4	4	4	4
14	3	3	3	3
10	2	2	2	2
10	3	3	3	3
8	2	2	2	2
11	3	3	3	3
8	2	2	2	2
8	2	2	2	2
5	1	1	1	1
3	1	1	1	1
10	3	3	3	3
8	2	2	2	2
10	2	2	2	2
20	5	5	5	5
16	5	5	5	5
5	2	2	2	2
5	1	1	1	1
6	1	1	1	1
5	1	1	1	1
50	6	6	6	6
40	5	5	5	5
30	4	4	4	4
45	4	4	4	4
30	4	4	4	4
25	4	4	4	4
20	4	4	4	4
16	3	3	3	3
10	3	3	3	3
14	3	3	3	3
20	3	3	3	3

Vc m/min	Posuw-nr kol.
30	4
25	4
33	4
30	4
33	4
33	4
20	3
14	3
10	2
29	4
14	3
10	2
10	3
8	2
11	3
8	2
5	1
3	1
10	3
8	2
10	2
20	5
16	5
5	2
5	1
6	1
5	1
50	6
40	5
30	4
45	4
30	4
25	4
20	4
16	3
10	3
14	3
20	3

Vc m/min	Posuw-nr kol.		
35	6	6	6
30	5	5	5
30	6	6	6
30	5	5	5
35	5	5	5
29	5	5	5
22	4	4	4
18	4	4	4
14	3	3	3
35	6	6	6
18	4	4	4
14	3	3	3
14	4	4	4
12	3	3	3
15	4	4	4
11	3	3	3
11	3	3	3
8	2	2	2
4	2	2	2
14	4	4	4
10	3	3	3
12	3	3	3
30	6	6	6
24	6	6	6
24	6	6	6
20	6	6	6
8	3	3	3
8	1	1	1
10	2	2	2
8	2	2	2
60	7	7	7
50	6	6	6
38	5	5	5
55	5	5	5
36	5	5	5
24	4	4	4
20	4	4	4
14	4	4	4
25	5	5	5

Vc m/min	Posuw-nr kol.		
30	5	5	5
25	4	4	4
30	5	5	5
25	4	4	4
30	4	4	4
25	4	4	4
18	3	3	3
16	3	3	3
12	2	2	2
30	5	5	5
16	3	3	3
12	2	2	2
12	3	3	3
10	2	2	2
13	3	3	3
9	2	2	2
9	2	2	2
6	2	2	2
4	1	1	1
12	3	3	3
8	2	2	2
12	2	2	2
28	5	5	5
22	5	5	5
22	5	5	5
18	5	5	5
6	2	2	2
6	1	1	1
8	2	2	2
6	2	2	2
55	6	6	6
44	5	5	5
35	4	4	4
50	4	4	4
33	4	4	4
22	4	4	4
18	4	4	4
12	4	4	4
25	4	4	4



GÜHRING NAVIGATOR

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

- Nr. art.
- Nr. art.
- Norma/DIN
- Materiał ostrza
- Gatunek węgla
- Powierzchnia
- Typ
- Chłodzenie
- Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	101	102	103	104	105	106	107	108	109
	f (mm/obr.)								
0,10	0,002	0,003	0,003	0,004	0,006	0,007	0,010	0,013	0,016
0,16	0,002	0,003	0,004	0,005	0,007	0,009	0,012	0,016	0,022
0,25	0,003	0,004	0,005	0,007	0,009	0,011	0,014	0,019	0,024
0,30	0,004	0,005	0,007	0,009	0,011	0,015	0,019	0,025	0,033
0,50	0,005	0,007	0,008	0,011	0,014	0,019	0,024	0,031	0,041
0,63	0,007	0,009	0,012	0,015	0,020	0,026	0,034	0,044	0,057
0,80	0,010	0,013	0,016	0,020	0,024	0,031	0,038	0,048	0,060
1,00	0,020	0,024	0,029	0,035	0,041	0,050	0,060	0,072	0,086
1,50	0,030	0,035	0,040	0,046	0,052	0,060	0,069	0,080	0,092
2,00	0,040	0,046	0,053	0,061	0,070	0,080	0,093	0,106	0,122

Ø wiertła mm	Posuw - nr kolumny Nr. art. 6400/6401/6408/6412												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/obr.)												
0,50	0,006	0,012	0,018	0,022	0,030	0,035	0,040	0,045	0,050	0,050	0,055	0,060	0,060
0,80	0,008	0,016	0,024	0,032	0,040	0,050	0,060	0,070	0,080	0,080	0,080	0,090	0,090
1,00	0,012	0,022	0,032	0,042	0,060	0,070	0,080	0,090	0,100	0,100	0,110	0,110	0,120
1,50	0,021	0,036	0,051	0,066	0,090	0,100	0,120	0,130	0,150	0,150	0,160	0,170	0,180
2,00	0,032	0,052	0,072	0,092	0,120	0,140	0,160	0,180	0,200	0,210	0,220	0,230	0,240
2,50	0,045	0,070	0,095	0,120	0,150	0,170	0,200	0,220	0,250	0,260	0,270	0,280	0,300
3,00	0,060	0,090	0,120	0,150	0,180	0,210	0,240	0,270	0,300	0,310	0,330	0,340	0,360

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja

- Kierunek skrawania:
- prawy
 - lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Stale hartowane	-		≤48 HRC ≤66 HRC	
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900 ≤1100		
Stale nierdzewne, z siarką martenzytyczną	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1100 ≤1500		
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	
Żeliwa utwardzone	-		≤350 HB	
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		
Braź krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		
	2.0790 CuNi18Zn19Pb	≤850		
Braź długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Duroplasty	żywica epoksydowa, Resopal, Pertinax, Moltopren	≤150		
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Kevlar	Kevlar	≤1000		
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		



301
303
1899
HSS-E-PM
○
N
bez
649/654

660
1899
HSS-E-PM
Ⓢ
N
bez
652

701
WN
W. mono.
K10/K20
○
N
bez
656

3899
WN
W. mono.
K/P
Ⓐ
N
bez
657

≤4xD ≤7xD

6400	6401
WN	WN
W. mono.	W. mono.
K/P	K/P
Ⓐ	Ⓐ
N	N
bez	bez
108/659	109/660

≤5xD ≤8xD ≤15xD

6405	6408	6412
WN	WN	WN
W. mono.	W. mono.	W. mono.
K/P	K/P	K/P
Ⓐ	Ⓐ	Ⓐ
N	N	N
z	z	z
110/661	111/662	112/663



Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	Vc m/min	Posuw-nr kol.	
21	106	27	106	50	105	100	62	100	64	62	105	62	58	58						
18	105	23	105	35	104	100	62	100	64	62	100	62	58	58						
18	106	23	106	50	105	100	62	100	64	62	105	62	59	59						
16	105	21	105	45	104	90	61	90	63	61	90	61	59	59						
20	105	26	105	45	104	90	62	90	64	62	95	62	58	58						
18	105	23	105	35	104	90	62	90	64	62	95	62	58	58						
14	104	18	104	30	103	90	61	90	63	61	90	61	58	58						
14	104	18	104	30	103	90	61	90	63	61	90	61	58	58						
12	103	16	103	70	60	70	60	70	62	60	70	60	58	58						
18	106	23	106	50	103	100	61	100	63	61	100	61	57	57						
14	104	18	104	40	103	85	61	85	63	61	85	61	58	58						
12	103	16	103	70	60	70	60	70	62	60	70	60	58	58						
14	104	18	104	25	103	70	60	70	62	60	70	60	57	57						
12	103	16	103	60	60	60	60	60	62	60	60	60	57	57						
16	104	20	104	25	103	50	60	50	62	60	50	60	58	58						
14	103	18	103	60	60	60	60	60	62	60	50	60	58	58						
14	103	18	103						57	57	50	57	57	57						
8	102	10	102	20	102				57	57	50	57	57	57						
				15	104															
18	104	20	104	25	103			30	57	57	70	57	57	57						
14	103	16	103	25	102			15	56	56	60	56	56	56						
16	103	18	103	25	102			30	57	57	70	57	57	57						
26	106	33	106	80	105	130	66	130	68	66	150	60	60	60						
22	106	28	106	60	105	130	66	130	68	66	140	60	60	60						
18	106	23	106	60	105	130	66	130	68	66	140	60	60	60						
22	106	28	106	50	105	120	65	120	67	65	130	60	60	60						
				15	103			10	56	56	25	56	56	56						
				45	104			15	56	56	35	56	56	56						
				25	104			15	56	56	35	56	56	56						
				160	107			70	68	68	70	68	68	68						
				150	106			70	68	68	70	68	68	68						
26	107			100	106			135	59	59	135	59	59	59						
18	106			60	106			135	59	59	135	59	59	59						
75	106	80	106	150	105															
42	105	53	105	50	105															
				67	106															
22	105	28	105	44	104															
22	104	28	104	68	103															
18	104	23	104	49	103															
13	104	16	104	53	103															
		14	104	36	103															
16	104	20	104	50	103															
18	104	23	104	36	103															
				60	104															

Navigator

**GÜHRING** NAVIGATOR Nawiertaki NC

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.

Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Kąt wierzchołkowy °

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:
 ○ Powietrze
 ● Olej
 ● Emulsja

Kierunek skrawania:
 Ⓜ prawy
 Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2) 1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤500 ≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		○
Stale do azotowania	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC ≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20) 0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤240 HB ≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35) 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤240 HB ≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si > 24 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600 ≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		○
Mosiądz krótkowiórowy długowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



557	556	559
WN		
HSS		
○	○	○
N	N	N
90	120	90
696	702	700

568	567
WN	
HSS	
Ⓢ	Ⓢ
N	N
90	120
697	703

1136	1134
WN	
HSCO	
○	○
N	N
90	120
698	704

1133	1135
WN	
HSCO	
Ⓢ	Ⓢ
N	N
90	120
699	705



V _c m/min	Posuw-nr kol.		
30	6	6	6
25	5	5	5
32	6	6	6
30	5	5	5
25	5	5	5
25	5	5	5
20	4	4	4
15	4	4	4
12	3	3	3
30	6	6	6
15	4	4	4
8	3	3	3
16	4	4	4
10	3	3	3
6	3	3	3
8	3	3	3
30	6	6	6
30	6	6	6
25	6	6	6
20	6	6	6
70	7	7	7
70	7	7	7
50	7	7	7
50	6	6	6
70	6	6	6
60	5	5	5
60	5	5	5
40	5	5	5
30	4	4	4
25	4	4	4
15	4	4	4
12	4	4	4
18	4	4	4
28	5	5	5

V _c m/min	Posuw-nr kol.	
32	6	6
26	5	5
35	6	6
33	5	5
28	5	5
28	5	5
25	4	4
22	4	4
17	3	3
33	6	6
20	4	4
12	3	3
14	4	4
18	4	4
12	3	3
8	3	3
10	3	3
8	3	3
10	3	3
33	6	6
33	6	6
28	6	6
22	6	6
60	6	6
80	6	6
65	5	5
70	5	5
45	5	5
33	4	4
27	4	4
16	4	4
15	4	4
22	4	4
36	5	5

V _c m/min	Posuw-nr kol.	
35	6	6
30	5	5
40	5	5
40	5	5
35	5	5
35	5	5
30	4	4
22	4	4
17	3	3
33	6	6
20	4	4
15	3	3
14	4	4
12	3	3
18	4	4
12	3	3
8	3	3
8	2	2
12	3	3
10	3	3
10	3	3
33	6	6
33	6	6
30	6	6
25	6	6
6	1	1
8	2	2
6	2	2
80	7	7
80	7	7
60	7	7
60	6	6
70	6	6
65	5	5
70	5	5
45	5	5
35	4	4
33	4	4
20	4	4
15	4	4
22	4	4
36	5	5

V _c m/min	Posuw-nr kol.	
42	6	6
36	5	5
48	6	6
42	6	6
44	6	6
44	6	6
40	5	5
27	4	4
22	3	3
37	6	6
22	4	4
18	3	3
19	4	4
15	3	3
21	4	4
16	3	3
12	3	3
10	2	2
18	3	3
15	3	3
12	3	3
38	6	6
35	6	6
33	6	6
28	6	6
7	1	1
10	2	2
8	2	2
85	7	7
65	7	7
65	6	6
80	6	6
70	5	5
75	5	5
50	5	5
45	5	5
40	4	4
25	4	4
20	4	4
25	4	4
40	4	4



GÜHRING NAVIGATOR Rozwiertaki zgrubne

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GühringNavigator na stronie internetowej www.guehring.de.

Nr. art.



Norma/DIN

Materiał ostrza

Powierzchnia

Typ

Progr. na str.

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

Chłodziwo:

○ Powietrze

● Olej

● Emulsja

Kierunek skrawania:

Ⓜ prawy

Ⓛ lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		○
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		○
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		○
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		○
Stale węglowe do ulepszenia ciepłego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		○
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		○
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		○
Stale stopowe do ulepszenia ciepłego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		○
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		○
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		○
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		○
Stale do azotowania	1.8504 34CrAl6	≤1000		○
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		○
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		○
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		○
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Stale hartowane	-		≤48 HRC	○
			≤66 HRC	○
Stale nierdzewne, z siarką austenityczne martenzytyczne	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		○
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		○
	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		○
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	○
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	○
Żeliwa sferoidalne oraz żeliwa ciągliwe	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	○
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	○
Żeliwa utwardzone	-		≤350 HB	○
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	○
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	○
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		○
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		○
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		○
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		○
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		○
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		○
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Mosiądz krótkowiórowy długowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		○
	2.0790 CuNi18Zn19Pb	≤850		○
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		○
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		○
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		○



533	534	555
DIN 344	DIN 343	DIN 1864
HSS		
N	N	N
737	740	743

634	635
DIN 343	DIN 1864
HSCO	
N	N
742	744



Vc m/min	Posuw-nr kol.		
27	4	4	4
20	4	4	4
28	4	4	4
25	4	4	4
22	4	4	4
20	4	4	4
18	3	3	3
15	4	4	4
8	3	3	3
23	5	5	5
15	4	4	4
8	3	3	3
10	4	4	4
8	3	3	3
10	3	3	3
6	3	3	3
6	3	3	3
5	2	2	2
8	2	2	2
6	2	2	2
5	2	2	2
20	6	6	6
20	5	5	5
18	6	6	6
16	5	5	5
3	1	1	1
5	2	2	2
4	2	2	2
60	7	7	7
60	7	7	7
36	6	6	6
36	6	6	6
40	6	6	6
50	5	5	5
50	5	5	5
30	5	5	5
30	4	4	4
25	4	4	4
15	4	4	4
15	4	4	4
15	4	4	4
25	5	5	5

Vc m/min	Posuw-nr kol.	
30	4	4
25	4	4
32	4	4
30	4	4
25	4	4
22	4	4
20	3	3
17	4	4
10	3	3
25	5	5
17	4	4
10	3	3
13	4	4
10	3	3
13	3	3
8	3	3
8	3	3
6	2	2
10	2	2
8	2	2
6	2	2
25	6	6
25	5	5
20	6	6
18	5	5
4	1	1
6	2	2
5	2	2
70	7	7
70	7	7
40	6	6
40	6	6
50	6	6
55	5	5
55	5	5
35	5	5
35	4	4
30	4	4
20	4	4
18	4	4
20	4	4
30	5	5





GÜHRING NAVIGATOR Nawiertaki do nakielków

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GühringNavigator na stronie internetowej www.guehring.de.

Nr. art.	
Norma/DIN	
Materiał ostrza	
Powierzchnia	
Typ	
Progr. na str.	

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/U)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- prawy
 - lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		
Stale do azotowania	1.8504 34CrAl6	≤1000		
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Stale hartowane	-		≤48 HRC	
			≤66 HRC	
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		
martenzytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	
Żeliwa utwardzone	-		≤350 HB	
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5Zn1Pb	≤500		
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		
Brąz krótkowiórowy	2.1090 CuSn7Zn1Pb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		
	2.0790 CuNi18Zn19Pb	≤850		
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Kevlar	Kevlar	≤1000		
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		



581	583	585	280	292	587	588
DIN 333			WN	BS 328	DIN 333	
HSS						
○	○	○	○	○	○	○
A	R	B	B	A	A	R
668	672	675	689	680	690	691

613	614
DIN 333	
HSS	
Ⓢ	Ⓢ
A	R
669	673

381
DIN 333
HSCÖ
○
A
682



V _c m/min	Posuw-nr kol.						
30	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4
20	4	4	4	4	4	4	4
20	3	3	3	3	3	3	3
15	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3
25	5	5	5	5	5	5	5
15	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3
10	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3
5	2	2	2	2	2	2	2
10	3	3	3	3	3	3	3
8	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3
20	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5
25	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5
3	1	1	1	1	1	1	1
5	2	2	2	2	2	2	2
4	2	2	2	2	2	2	2
70	7	7	7	7	7	7	7
70	7	7	7	7	7	7	7
40	6	6	6	6	6	6	6
40	6	6	6	6	6	6	6
60	6	6	6	6	6	6	6
50	5	5	5	5	5	5	5
60	5	5	5	5	5	5	5
40	5	5	5	5	5	5	5
30	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4
25	5	5	5	5	5	5	5

V _c m/min	Posuw-nr kol.		V _c m/min	Posuw-nr kol.	
35	4	4	35	4	4
30	4	4	30	4	4
35	4	4	35	4	4
35	4	4	35	4	4
30	4	4	30	4	4
25	4	4	25	4	4
22	3	3	22	3	3
17	4	4	17	4	4
10	3	3	10	3	3
30	5	5	30	5	5
18	4	4	18	4	4
10	3	3	10	3	3
13	4	4	13	4	4
10	3	3	10	3	3
13	3	3	13	3	3
8	3	3	8	3	3
8	3	3	8	3	3
8	2	2	8	2	2
15	3	3	15	3	3
10	3	3	10	3	3
8	3	3	8	3	3
25	6	6	25	6	6
25	5	5	25	5	5
30	6	6	30	6	6
25	5	5	25	5	5
6	1	1	6	1	1
6	2	2	6	2	2
5	2	2	5	2	2
50	6	6	50	6	6
70	6	6	70	6	6
60	5	5	60	5	5
70	5	5	70	5	5
45	5	5	45	5	5
35	4	4	35	4	4
30	4	4	30	4	4
20	4	4	20	4	4
18	4	4	18	4	4
20	4	4	20	4	4
30	5	5	30	5	5



GÜHRING NAVIGATOR Wiertła stopniowe, do nakiełków/wiertła stopniowe, z chwytem walc.

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GuhringNavigator na stronie internetowej www.guehring.de.

Nr. art.	
Norma/DIN	
Materiał ostrza	
Powierzchnia	
Typ	
Progr. na str.	

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- prawy
 - lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytłuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twar- dość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		
Stale do azotowania	1.8504 34CrAl6	≤1000		
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		
Stale szybkotnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Stale hartowane	-		≤48 HRC	
			≤66 HRC	
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	
Żeliwa utwardzone	-		≤350 HB	
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		
	2.0790 CuNi18Zn19Pb	≤850		
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Kevlar	Kevlar	≤1000		
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		



274	574	575	576
WN			
HSS			
●	●	●	●
N	N	N	N
714	715	716	717

378	1147	379	380
WN			
HSS			
○	○	○	○
N	N	N	N
718	719	720	721



V _c m/min	Posuw-nr kol.			
30	4	4	4	4
25	4	4	4	4
30	4	4	4	4
30	4	4	4	4
25	4	4	4	4
20	4	4	4	4
20	3	3	3	3
15	4	4	4	4
8	3	3	3	3
25	5	5	5	5
15	4	4	4	4
8	3	3	3	3
10	4	4	4	4
8	3	3	3	3
10	3	3	3	3
6	3	3	3	3
6	3	3	3	3
5	2	2	2	2
8	2	2	2	2
6	2	2	2	2
5	2	2	2	2
20	6	6	6	6
20	5	5	5	5
25	6	6	6	6
20	5	5	5	5
3	1	1	1	1
5	2	2	2	2
4	2	2	2	2
60	7	7	7	7
60	7	7	7	7
40	6	6	6	6
40	6	6	6	6
40	6	6	6	6
50	5	5	5	5
60	5	5	5	5
40	5	5	5	5
30	4	4	4	4
25	4	4	4	4
15	4	4	4	4
15	4	4	4	4
15	4	4	4	4
25	5	5	5	5

V _c m/min	Posuw-nr kol.			
30	4	4	4	4
25	4	4	4	4
30	4	4	4	4
30	4	4	4	4
25	4	4	4	4
20	4	4	4	4
20	3	3	3	3
15	4	4	4	4
8	3	3	3	3
25	5	5	5	5
15	4	4	4	4
8	3	3	3	3
10	4	4	4	4
8	3	3	3	3
10	3	3	3	3
6	3	3	3	3
6	3	3	3	3
5	2	2	2	2
8	2	2	2	2
6	2	2	2	2
5	2	2	2	2
20	6	6	6	6
20	5	5	5	5
25	6	6	6	6
20	5	5	5	5
3	1	1	1	1
5	2	2	2	2
4	2	2	2	2
60	7	7	7	7
60	7	7	7	7
40	6	6	6	6
40	6	6	6	6
40	6	6	6	6
50	5	5	5	5
60	5	5	5	5
40	5	5	5	5
30	4	4	4	4
25	4	4	4	4
15	4	4	4	4
15	4	4	4	4
15	4	4	4	4
25	5	5	5	5



GÜHRING NAVIGATOR Wiertła stopniowe, wielośliskowe

Zaleca się wybór narzędzi z wytłuszczonymi numerami kolumny posuwu.

Do optymalnego doboru narzędzia i zalecanych parametrów skrawania, można również użyć elektronicznej wersji GühringNavigator na stronie internetowej www.guehring.de.

Nr. art.	
Norma/DIN	
Materiał ostrza	
Powierzchnia	
Typ	
Progr. na str.	

Ø wiertła mm	Posuw - nr kolumny								
	1	2	3	4	5	6	7	8	9
	f (mm/obr.)								
0,50	0,004	0,006	0,007	0,008	0,010	0,012	0,014	0,016	0,019
1,00	0,006	0,008	0,012	0,014	0,016	0,018	0,020	0,023	0,025
2,00	0,020	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125
2,50	0,025	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160
3,15	0,032	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,160
4,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,200
5,00	0,040	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250
6,30	0,050	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315
8,00	0,063	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,315
10,00	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,400
12,50	0,080	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500
16,00	0,100	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630
20,00	0,125	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,630
25,00	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	0,800
31,50	0,160	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000
40,00	0,200	0,250	0,315	0,400	0,500	0,630	0,800	1,000	1,250
50,00	0,250	0,310	0,400	0,500	0,630	0,800	1,000	1,250	1,250
63,00	0,315	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600
80,00	0,400	0,500	0,630	0,800	1,000	1,250	1,600	1,600	2,000

- Chłodziwo:
- Powietrze
 - Olej
 - Emulsja
- Kierunek skrawania:
- prawy
 - lewy

Grupa materiałowa	Przykłady materiałów, nowe oznaczenia (w nawiasach stare oznaczenia) Wytuszczone Nr = Nr materiałów wg DIN EN	Wytrzymał. N/mm ²	Twardość	Chłodziwo
Stale konstrukcyjne	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		
Stale automatowe	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		
Stale węglowe do ulepszenia cieplnego	1.0402 C22, 1.1178 C30E (Ck30)	≤700		
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		
Stale stopowe do ulepszenia cieplnego	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		
Stale niestopowe do nawęglania	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Stale stopowe do nawęglania	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		
Stale do azotowania	1.8504 34CrAl6	≤1000		
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		
Stale narzędziowe	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		
Stale szybko tnące	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Federstähle	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Stale hartowane	-		≤48 HRC	
			≤66 HRC	
Stale nierdzewne, z siarką austenityczną	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		
	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		
martensytyczne	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		
Żeliwa	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	
Żeliwa sferoidalne oraz	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	
Żeliwa ciągliwe	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	
Żeliwa utwardzone	-		≤350 HB	
Nowe typy żeliwa GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	
Nowe typy żeliwa ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		
Stopy specjalne	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Tytan i stopy tytanu	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		
Aluminium i stopy Al	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Stopy ciągliwe Al	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Odlewnicze stopy Al ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		
> 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		
Stopy magnezu	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Miedź niskostopowa	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Mosiądz krótkowiórowy	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		
długowiórowy	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		
Brąz krótkowiórowy	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		
	2.0790 CuNi18Zn19Pb	≤850		
Brąz długowiórowy	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		
Duroplasty	Bakelit, Resopal, Pertinax, Moltopren	≤150		
Termoplasty	Plexiglas, Hostalen, Novodur, Makralon	≤100		
Kevlar	Kevlar	≤1000		
Tworzywa wzmac. włókn. szkl. i węgl.	GFK/CFK	≤1000		



536	569	636	638	538	514	540	637	537	639	539	520	541		
DIN 8374		WN		DIN 8376		WN		DIN 8378		WN		DIN 8377	WN	DIN 8379
HSS														
●	●	●	●	●	●	●	●	●	●	●	●	●		
N	N	N	N	N	N	N	N	N	N	N	N	N		
722	723	724	725	726	728	729	731	732	733	734	735	736		



Vc m/min	Posuw-nr kol.												
30	4	4	4	4	4	4	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4	4	4	4	4	4	4
30	4	4	4	4	4	4	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4	4	4	4	4	4	4
20	4	4	4	4	4	4	4	4	4	4	4	4	4
20	3	3	3	3	3	3	3	3	3	3	3	3	3
15	4	4	4	4	4	4	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3	3	3	3	3	3	3
25	5	5	5	5	5	5	5	5	5	5	5	5	5
15	4	4	4	4	4	4	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3	3	3	3	3	3	3
10	4	4	4	4	4	4	4	4	4	4	4	4	4
8	3	3	3	3	3	3	3	3	3	3	3	3	3
10	3	3	3	3	3	3	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
6	3	3	3	3	3	3	3	3	3	3	3	3	3
5	2	2	2	2	2	2	2	2	2	2	2	2	2
8	2	2	2	2	2	2	2	2	2	2	2	2	2
6	2	2	2	2	2	2	2	2	2	2	2	2	2
5	2	2	2	2	2	2	2	2	2	2	2	2	2
20	6	6	6	6	6	6	6	6	6	6	6	6	6
20	5	5	5	5	5	5	5	5	5	5	5	5	5
25	6	6	6	6	6	6	6	6	6	6	6	6	6
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3	1	1	1	1	1	1	1	1	1	1	1	1	1
5	2	2	2	2	2	2	2	2	2	2	2	2	2
4	2	2	2	2	2	2	2	2	2	2	2	2	2
60	7	7	7	7	7	7	7	7	7	7	7	7	7
60	7	7	7	7	7	7	7	7	7	7	7	7	7
40	6	6	6	6	6	6	6	6	6	6	6	6	6
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30	4	4	4	4	4	4	4	4	4	4	4	4	4
25	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4
15	4	4	4	4	4	4	4	4	4	4	4	4	4
25	5	5	5	5	5	5	5	5	5	5	5	5	5

Navigator



Table with 9 columns: Ø wiertła mm od, Posuw - nr kolumny (11-18), and f [mm/obr]. Rows list drill diameters from 1,50 to 40,00 mm.

* Wartość posuwu zawsze odnosi się do narzędzi z zalecanym pokryciem. Zastosowanie narzędzi bez pokrycia nie gwarantuje optymalnej trwałości.

Sposób postępowania przy wierceniu głębokich otworów

- Wykonać otwór pilotujący (L = 1,5 x D / Alu L ≈ 3 x D, w tolerancji G9)
• Wprowadzić wiertło na obrotach ok. 200 obr/min i z posuwem ok. 500 mm/min.
• Włączyć wymagane ciśnienie chłodziwa i obroty.
• Wiercić na pełną głębokość otworu bez odwierowania.
• Po osiągnięciu żądanej głębokości wiercenia wyłączyć chłodzenie.
• Powrót z szybkim posuwem i wyłączonymi obrotami.

Chłodziwo:

- Emulsja
● Olej
○ Powietrze

EB100

Wiertła lufowe 1-ostrzowe

Monolit węgiel

0,9 ... 12,0



≤35xD

>35xD

Main table with 5 columns: Grupa materiałowa, Przykłady materiałów, Wytrzymał. na Twarz., Chłodziwo, and zalecane pokrycie. It includes sub-tables for Vc and Posuw nr kol. for different diameters.



l3

SEKCJA TECHNICZNA





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RT 100 TRIGON®

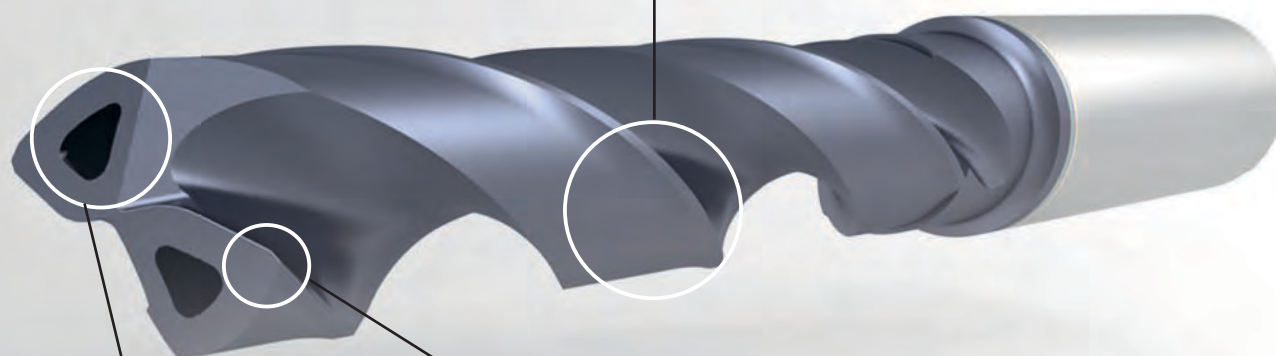
Innowacyjna budowa dla bardziej efektywnego chłodzenia

W stalach nierdzewnych wysoka zawartość chromu i niklu zwiększa odporność na korozję i wytrzymałość na rozciąganie. W konsekwencji pogarsza się skrawalność takiej stali i wzrasta też temperatura podczas skrawania.

Niezależnie od tego, wiertło RT 100 TRIGON® umożliwia wysokie parametry skrawania dzięki innowacyjnemu kształtowi kanałków chłodzących.

Kształt rowków wiórowych

Specjalny kształt rowków wiórowych w połączeniu z ich wysoką jakością powierzchni oraz 4-ścianowa geometria ostrzy zapewniają optymalny proces skrawania i usuwania wiórów.



Przygotowanie ostrza

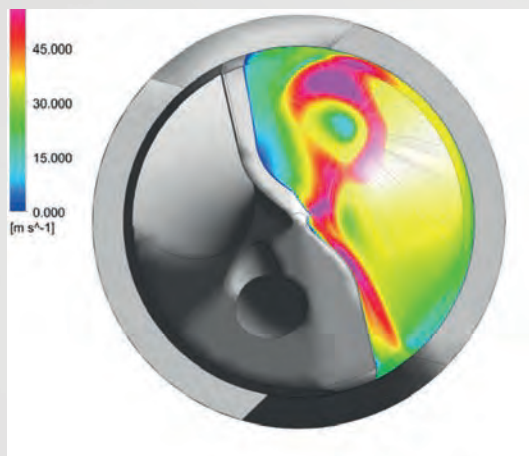
Powłoka bazująca na TiAlN i specjalne przygotowanie krawędzi skrawającej redukuje naprężenia działające na ostrza podczas skrawania i zapewnia wysoką odporność na ścieranie.



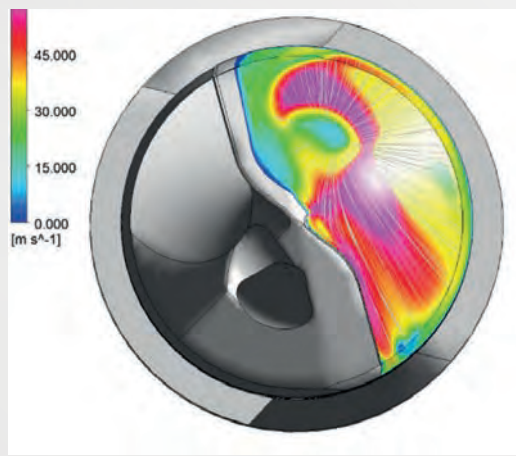
Nowy kształt kanałków chłodzących zapewnia optymalną ilość chłodziwa, szybkość jego przepływu i kierunek, tak aby najlepiej zneutralizować wysoką temperaturę powstałą podczas obróbki. W porównaniu do typowego,

okrągłego przekroju kanałków, ciecz chłodząca jest szybciej dostarczana do najbardziej newralgicznych stref: głównych krawędzi skrawających i naroży wiertła.

Konwencjonalne kanałki chłodzące



Trygonalne kanałki chłodzące



Porównanie charakterystyki przepływu



RT 100 C

Wiertło Ratio do obróbki stali długowiórowych

Geometria ostrzy

Wklęsła krawędź skrawająca zapewnia doskonałe własności podczas obróbki stali długowiórowych. Siły i temperatura podczas skrawania są znacznie zredukowane.

Kształt rowków wiórowych

Kształt rowków wiórowych z małym promieniem, specjalnie zaprojektowany do stali długowiórowych, zapewnia odpowiednie formowanie wiórów nawet przy niskich prędkościach skrawania.

Wysoka jakość powierzchni i odpowiednia powłoka zapewniają łatwe usuwanie wiórów. Wysoka temperatura podczas skrawania jest bezpiecznie odprowadzona.

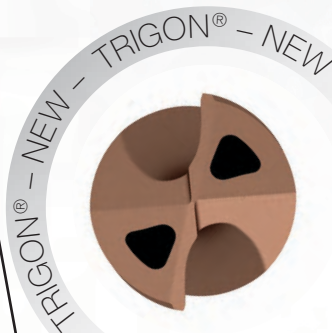
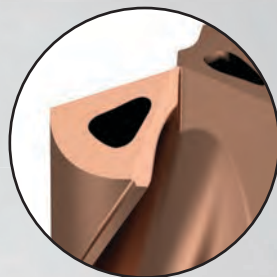
- narzędzie specjalne
- \varnothing 3-20 mm
- głębokość wiercenia do to 7xD
- od \varnothing 6.0 mm z nowymi kanałkami chłodzącymi TRIGON®

Nowy kształt kanałków chłodzących

Nowy kształt kanałków chłodzących zapewnia optymalną ilość chłodziwa, szybkość jego przepływu i kierunek, tak aby najlepiej zneutralizować wysoką temperaturę powstałą podczas obróbki. W porównaniu do typowego, okrągłego przekroju kanałków, ciecz chłodząca jest szybciej dostarczana do najbardziej newralgicznych stref: głównych krawędzi skrawających i naroży wiertła.

Przygotowanie ostrza

Wiertło RT 100 C wyróżnia się specjalnym procesem przygotowania ostrzy, dopracowaną geometrią i doskonałą jakością wykończenia powierzchni. Zapewnia to wysoką trwałość przez zapobieganie powstawania narostu i mikro-pęknięć na ostrzach.





RT 100 AL

Nowe wiertło firmy Gühring do obróbki aluminium

Podczas wiercenia aluminium proces kształtowania i usuwania wiórów jest najbardziej istotny.

Wiertło RT 100 AL umożliwia optymalne formowanie wiórów zarówno podczas obróbki ciągliwych jak o odlewanych stopów aluminium w dużą zawartością krzemu.

Bardzo dokładnie polerowane powierzchnie

- zredukowane temperatura podczas skrawania
- zapobieganie powstawaniu narostu

Obszerna korekta ścina i kształt ostrza

- optymalny proces formowania wiórów

Wiertła RT 100 AL wyróżniają się dzięki idealnej geometrii połączonej z wysoką jakością powierzchni rowków wiórowych, stref ostrzy i korekty ścina. Doskonale przygotowane krawędzie skrawające i naroża uzupełniają całość zapewniając bezpieczny proces formowania i usuwania wiórów oraz zapobiegając powstawaniu narostu i wysokiej temperatury podczas wiercenia aluminium.

Ostre, perfekcyjnie wykończone ostrza

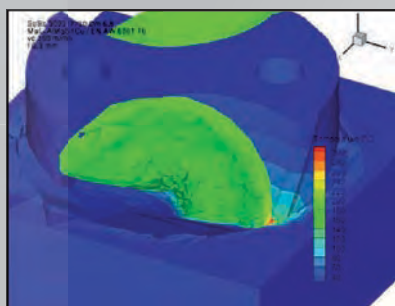
- doskonałe własności skrawania, także w ulepszonych stopach AISi
- krótki wióry również dla ciągliwych stopów aluminium

Geometria rowków wiórowych

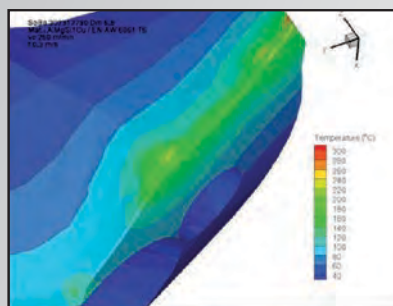
- polerowane rowki do optymalnego usuwania wiórów
- zminimalizowane tarcie
- zapobieganie przyklejaniu się materiału



Formowanie wiórów



Rozkład temperatury na ostrzu



Narzędzie są produkowane w wersji bez powłoki, ale dla bardzo ścierających stopów aluminium możliwe jest wykonanie pokrycia na główce wiertła dla zwiększenia jego trwałości. Specjalne wymiary oraz wiertła stopniowe są dostępne na życzenie.



Kompozyty wzmacniane włóknami (FRP)

Nowoczesne tworzywa wzmacniane włóknami (FRP) są coraz bardziej popularnym materiałem konstrukcyjnym ze względu na niski ciężar połączony z wysoką wytrzymałością. Dzięki większej wydajności ekonomicznej wypierają dotychczasowo stosowane materiały do konstrukcji lekkich takie jak stopy aluminium lub Tytanu. Kompozyty FRP lub materiały wielowarstwowe nie są już tylko zarezerwowane dla wąskiej grupy wyspecjalizowanych odbiorców takich jak przemysł lotniczy czy producenci samochodów sportowych.

Jest to najbardziej widoczne w gałęziach przemysłu najczęściej wykorzystujących konstrukcje lekkie takich jak budowa samochodów osobowych i użytkowych, wytwarzanie elektrowni wiatrowych oraz w budowie maszyn. Kompozyty są wykorzystywane tam gdzie ich specyficzna wytrzymałość, niska masa oraz wysokoefektywny proces wytwarzania będą miały najlepsze zastosowanie.

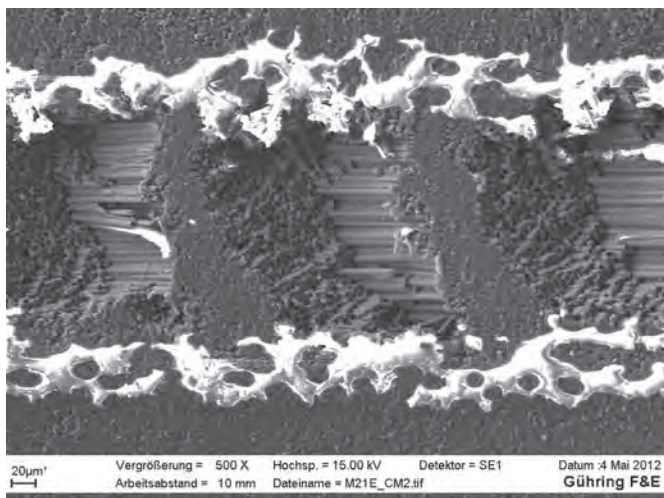
Od roku 1980 firma Guhring dostarcza rozwiązania narzędziowe, zarówno z oferty standardowej jak i specjalnej, dopasowane do obróbki kompozytów FRP. Wieloletnie doświadczenie procentuje kompleksową ofertą wyspecjalizowanych narzędzi dopasowanych do wszelkich zadań obróbki kompozytów takich jak wiercenie ręczne, obróbka przy pomocy urządzeń wierzących lub robotów, aż po stosowanie na obrabiarkach konwencjonalnych i numerycznych.

Narzędzia do obróbki kompozytów firmy Guhring spełniają wszelkie oczekiwania producentów nowoczesnych, lekkich struktur konstrukcyjnych.

- Elementy bez wyrwanych włókien
- Obrabiana powierzchnia wolna od delaminacji
- Brak zniszczeń przez „wypychanie” i „wyciąganie” włókien
- Zapobieganie „wyciąganiu” rozdzielonych włókien
- Zminimalizowane tworzenie zadziorów
- Zapobieganie uszkodzeniom termicznym

Do prawidłowej obróbki kompozytów FRP, nie powodującej ich uszkodzeń, najważniejsze jest użycie narzędzi o wysokiej jakości ostrzach, wykonanych z materiału odpornego na ścieranie. Zachowanie ostrej krawędzi skrawającej jest podsta-

wowym wymogiem aby skutecznie skrawać niezwykle silnie ścierające włókna kompozytów, zwłaszcza w materiałach o zawartości włókien powyżej 55 procent.



Powierzchnia obrobiona kompozytu CFRP pod 500-krotnym powiększeniem

Zdjęcie wykonane przy pomocy mikroskopu skaningowego pokazuje jak wygląda struktura i kierunek włókien węglowych po obróbce. Włókna nie zostały wciśnięte do środka osnowy, ani też wyrwane na zewnątrz kompozytu.

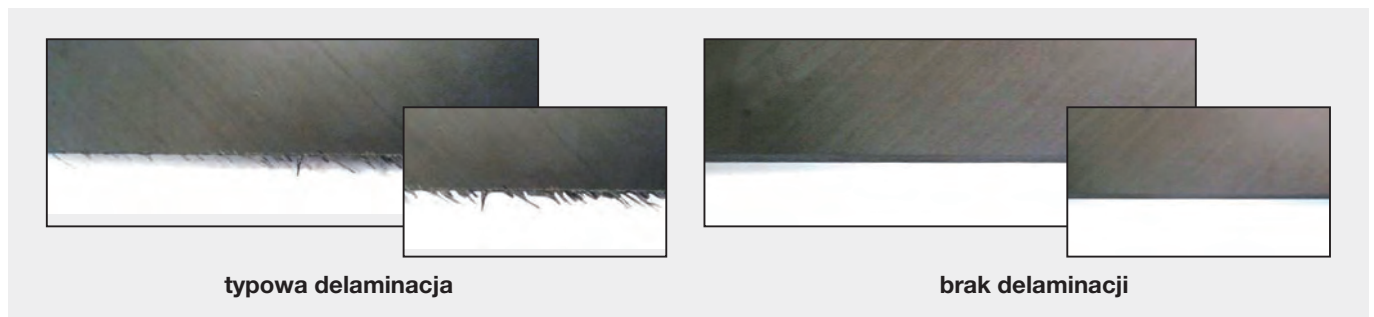


Kompozyty GFRP / CFRP

Kompozyty wzmocnione włóknami węglowymi (GFRP) są używane w dużych ilościach podczas produkcji elementów: elektrowni wiatrowych, wykorzystywanych w transporcie jak i budowaniu konstrukcji lekkich. Tworzywa GFRP są najczęściej używane na średnio obciążone elementy nośne, głównie na powłoki cienkościennie. Wytwórcy preferują użycie tworzyw GFRP na lekko obciążone elementy niż lżejszych kompozytów wzmocnianych włóknami węglowymi (CFRP), ponieważ te pierwsze są tańsze w produkcji i łatwiejsze do obróbki mechanicznej.

Tworzywa wzmocnione włóknami węglowymi (CFRP) mają za to większą wytrzymałość. W zależności od procesu produkcyjnego, same włókna węglowe mają większy współczynnik wytrzymałości w zależności od masy w porównaniu do stali. Dlatego kompozyty CFRP są stosowane na najbardziej obciążone elementy struktur konstrukcyjnych.

Aby ochronić włókna w kompozytach GFRP i CFRP przed działaniem sił uderowych, są one umieszczone wewnątrz osnowy. Zawartość włókien w osnowie określa ich wytrzymałość i dla elementów najbardziej obciążonych może wynosić do 65 procent. Podczas obróbki trzeba brać pod uwagę rodzaj zastosowanych włókien jak i ich kierunek ich ułożenia. Sposób i kierunek ułożenia włókien w kompozycie ma największy wpływ na podatność materiału do tworzenia się delaminacji. Podczas wiercenia najbardziej podatne na delaminację, zwłaszcza na wyjściu otworu, są tworzywa z włóknami ułożonymi przypadkowo w wielu kierunkach. To zjawisko musi być eliminowane przez odpowiednie wykonanie geometrii narzędzia.



Obróbka kompozytów CFRP i GFRP wymaga zastosowania narzędzi specjalnie zaprojektowanych do skrawania silnie ścierających włókien tworzywa. Aby zapobiec typowym uszkodzeniom tego typu materiałów firma Guhring dostar-

cza całą gamę innowacyjnych, wysokowydajnych narzędzi. To umożliwia obróbkę kompozytów wolnych od delaminacji głównie dzięki opanowaniu i ukierunkowaniu sił występujących podczas skrawania.

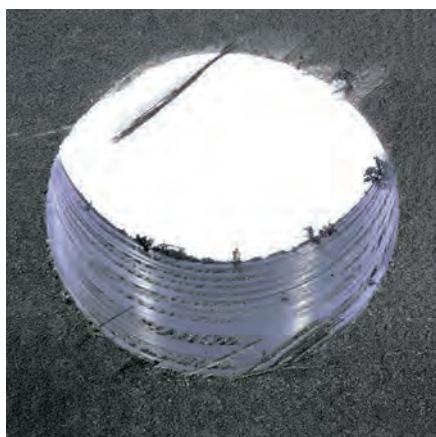




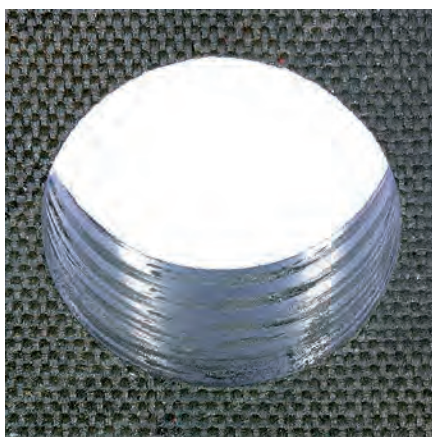
Wiercenie kompozytów FRP

Do operacji wiercenia kompozytów stosuje się narzędzia z różnymi geometriami wierzchołków. Specjalnie dopasowane wiertło zapewni prawidłowe przecinanie włókien zarówno w materiałach o włóknach ułożonych jednokierunkowo

(przeplatanych) jak i wielokierunkowo. Dzięki temu unika się delaminacji zarówno na wejściu (wyciąganie włókien) jak i wyjściu (wypychanie włókien) narzędzia z otworu.



Otwór D = 6,35 mm
Widoczne włókna na powierzchniach otworu i delaminacja



Otwór D = 6,35 mm
Kompozyt CFRP z włóknami przeplatnymi, optymalna jakość otworu



Otwór D = 6,35 mm
Kompozyt CFRP z włóknami wielokierunkowymi, optymalna jakość otworu

Materiały wielowarstwowe

Kombinacja przynajmniej dwóch materiałów o różnych właściwościach jest nazywana kompozytami wielowarstwowymi.

Bardzo często stosowane są kompozyty warstwowe zawierające CFRP/Tytan lub CFRP/Aluminium.

Spotykane są również inne kombinacje materiałów składających się z warstw CFRP, Tytanu, stali nierdzewnych i aluminium. Aby prawidłowo zbudować strukturę z tego typu materiałów, wszystkie warstwy muszą być obrabiane jednocześnie w jednej operacji. Prawdziwym wyzwaniem jest dobranie narzędzia i strategii procesu tak aby uzyskać zadowalającą jakość obróbki prowadzonej jednocześnie w materiałach o tak różnych właściwościach. Podczas obróbki kompozytu CFRP/Tytan, włókna z warstwy CFRP bardzo mocno ścierają i zaokrąglają krawędź skrawającą narzędzia. Z drugiej strony Tytan jest bardzo ciągliwy i podczas obróbki wydziela wysoką temperaturę, która nie jest odprowadzana ze strefy skrawania ponieważ materiał ten ma bardzo niską przewodność cieplną. Wysoka temperatura jak i wysokie siły skrawania mogą bardzo łatwo trwale uszkodzić tworzywo CFRP. Niezależnie od tego proces obróbki tych różnych materiałów musi być bezpieczny i powtarzalny z zachowaniem dużej trwałości narzędzi.

Do obróbki tego typu materiałów firma Guhring oferuje narzędzia wykonywane ze specjalnych węglików spiekanych w wersjach bez lub z dodatkową powłoką oraz z ostrzami z diamentów PKD. Są one odpowiednio dopasowane do struktury obrabianego materiału, zapewniając bezpieczne usuwanie wiórów i odpowiednią jakość obróbki.





Powierzchnia przyłożenia kształtowana laserowo

Zwiększenie trwałości narzędzi poprzez odpowiednie ukierunkowanie cieczy chłodzącej

Podczas operacji wiercenia zastosowanie dużej ilości chłodzenia nie wystarczy, trzeba jeszcze zadbać o to aby trafiło ono do stref szczególnie obciążonych termicznie. Wymaga to odpowiedniego ukształtowania powierzchni przyłożenia narzędzi. Dzięki obróbce laserowej możliwe jest wykonanie praktycznie dowolnego kształtu na tej powierzchni. Przekrój kanałków chłodzących, ich pozycja na powierzchni przyłożenia mają bardzo duży wpływ na skuteczność działania cieczy chłodzącej. Dodatkowo bardzo ważna jest struktura i sposób ukształtowania powierzchni przyłożenia i powierzchni do niej przyległych. Specjalna zaprojektowana struktura jest kształtowana przez obróbkę laserową. Celem tych zabiegów jest

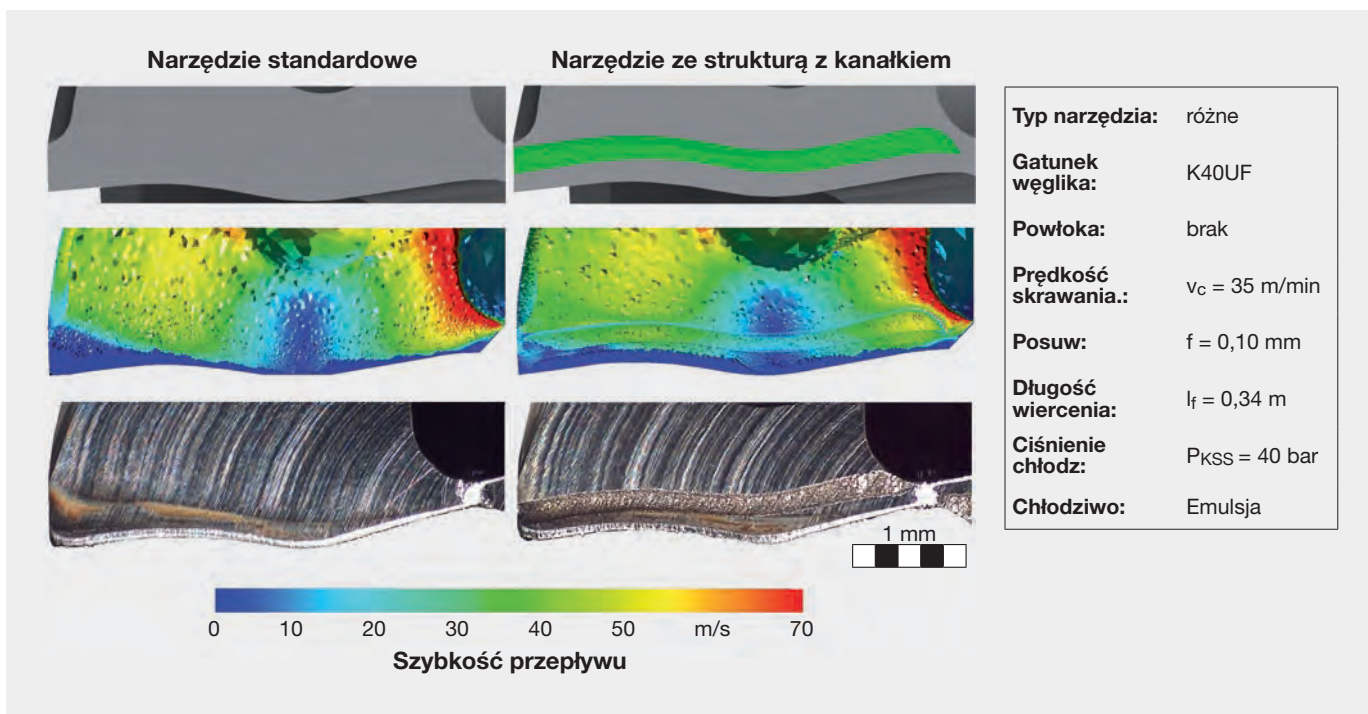
Symulacja z Komputerową Analizą Przepływu (CFD)

Wpływ zmiany średnicy kanałków chłodzących oraz wygenerowanej struktury powierzchni na przepływ cieczy chłodzącej może być szczegółowo badany z użyciem Komputerowej Analizy Przepływu. Wstępne badania bazowały na prostej strukturze z kanałkiem wykonanym wzdłuż ostrza w odległości około 150 μm . Kanałek miał głębokość ok 50 μm . Symulacja CFD potwierdziła pozytywny wpływ struktury na poprawę przepływu cieczy chłodzącej i jej doprowadzanie do stref najbardziej obciążonych termicznie. Większe powierzchnie w pobliżu zewnętrznych naroży wiertła były dotychczas słabo chłodzone z powodu małej przestrzeni pomiędzy powierzchnią dna otworu a powierzchnią przyłożenia narzędzia. Dzięki nałożonej strukturze chłodzenie poprawiło się przez odpowiednie ukierunkowanie cieczy oraz przez zwiększoną przestrzeń na chłodziwo.

precyzyjne doprowadzenie cieczy chłodzącej do stref najbardziej obciążonych termicznie. Chodzi głównie o krawędzie skrawające oraz naroża wiertła. Zredukowanie naprężeń termicznych znacznie spowalnia mechanizmy zużycia narzędzia, przez co wzrasta jego trwałość.

Ma to zastosowanie we wszystkich operacjach wiercenia, gdzie narzędzie jest szczególnie narażone na działanie wysokiej temperatury. Dodatkowo dzięki usprawnieniu przepływu cieczy chłodząco-smarujących i zredukowaniu temperatury skrawania wzrasta także jakość powierzchni otworów obrabianych.

Symulacja komputerowa została potwierdzona przez analizę odbarwień termicznych powstałych na powierzchniach przyłożenia wiertła podczas wiercenia stopu Inconel 718. Przestrzenne rozmieszczenie oraz intensywność odbarwień przypalonego chłodziwa były podobne w całej strefie wykonanego kanałka łącznie ze powierzchniami w pobliżu naroża wiertła. Zmniejszenie naprężeń termicznych znacznie wydłuża trwałość narzędzia i jednocześnie wpływa na poprawę jakości powierzchni wierconego otworu podczas obróbki stopu Inconel 718

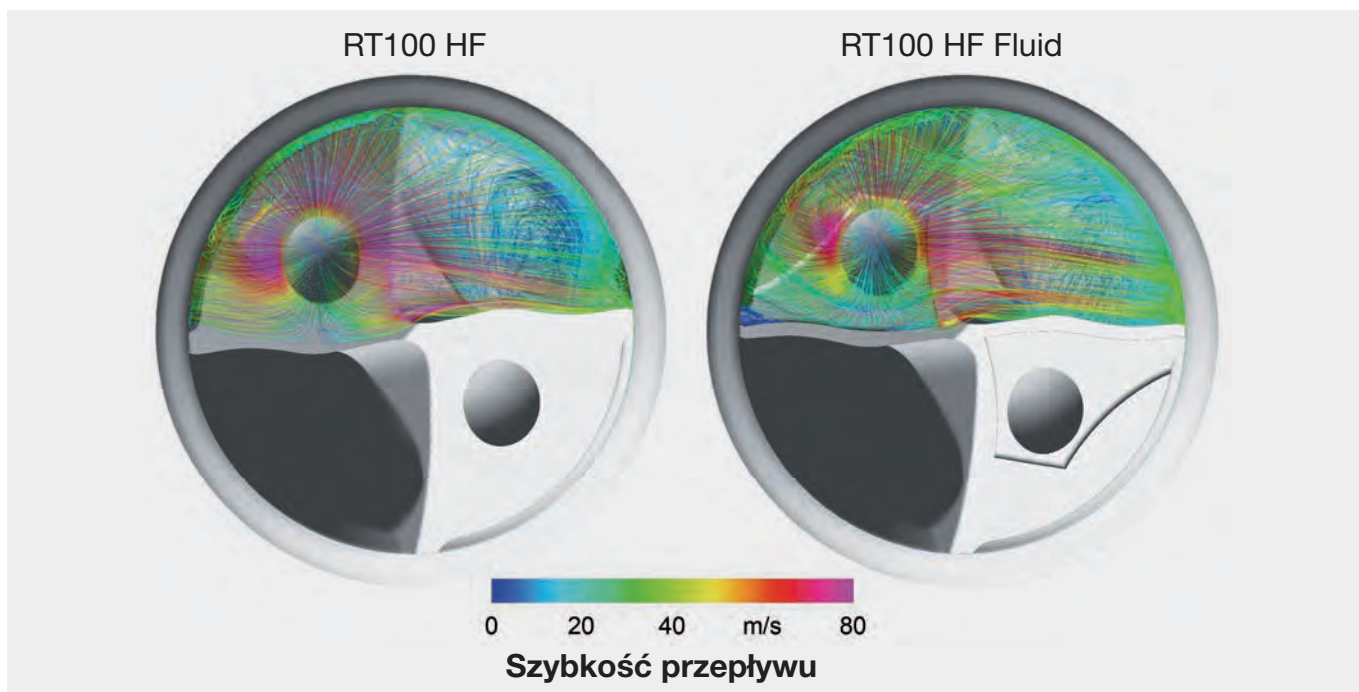




Przegląd struktur zaawansowanych

Bazując na wynikach uzyskanych z prostą strukturą opracowano bardziej złożone formy kształtowania powierzchni przyłożenia aby jeszcze lepiej ukierunkować przepływ cieczy chłodzącej. Dzięki wykorzystaniu obróbki laserowej możliwe było wykonywanie dowolnych kształtów struktury, które nie mogły być wykonywane innymi technikami wytwarzania. Kolejne optymalizacje powierzchni przyłożenia, mające na celu usprawnienie przepływu chłodziwa, obejmowały zmianę: formy, położenia i głębokości wypalanego kształtu. Do weryfikacji wpływu proponowanych zmian na bieżąco wykorzystywano symulacje prowadzone dzięki Komputerowej Analizie Przepływu. Szczegółowo badano jaki wpływ mają zawirowania cieczy na efekty chłodzenia w pobliżu naroży wiertła.

W wyniku podjętych analiz opracowano odpowiedni kształt struktury – nazwanej FLUID - pozwalający na doprowadzenie chłodziwa do strefy docelowej, wyznaczonej przez badania charakteru zużywania się narzędzia. Równoległe do tych badań trwały prace mające na celu optymalizację samego procesu obróbki laserowej, aby wyeliminować jej negatywny wpływ na strefę przy ostrzu skrawającym oraz poprawić jakość powierzchni powstałej podczas wypalania laserem. Stosowana obecnie obróbka laserowa zapewnia chropowatość powierzchni na poziomie $Rz < 5 \mu\text{m}$, niezależnie od wstępnej jakości powierzchni węgla spiekane, oraz nie wywołuje uszkodzeń materiału w strefie ostrza skrawającego. Dodatkowo uzyskana powierzchnia nie ma negatywnego wpływu na siły adhezyjne występujące podczas nakładania powłok supertwardych.



Pola zastosowania

W ten sposób zmodyfikowane narzędzia mogą być szczególnie stosowane do obróbki materiałów wydzielających duże ilości ciepła podczas skrawania takich jak stale nierdzewne, stopy na bazie Tytanu i Niklu. Motorem napędowym do obecnie prowadzonych badań jest obróbka stopu Inconel 718. Jego właściwości powodują ekstremalne obciążenia cieplne i

mechaniczne działające na narzędzia, redukując ich trwałość jak i produktywność. Docelowo modyfikacje poprawiające wydajność chłodzenia mają na celu zwiększenie ekonomiczności tego typu zadań technologicznych.



Optymalizacja procesu obróbki z wykorzystaniem energii drgań

Obróbka nowych materiałów wykorzystywanych w przemyśle, począwszy od kompozytów wzmocnionych włóknami przez materiały ciągliwe jak stopy Tytanu lub miedzi na bardzo kruchych materiałach ceramicznych kończąc, stanowi ogromne wyzwanie ze względu na szybkie zużywanie narzędzi i trud-

ności z formowaniem wiórów. Nowe kierunki optymalizacji takich procesów poprzez wspomaganie skrawania dodatkowymi ruchami narzędzia, mają za zadanie ułatwienie formowania wiórów, zmniejszenie sił skrawania, polepszenie jakości powierzchni obrabianej i wydłużenie trwałości narzędzi.

Założenia wstępne

Obróbka wspomagana energią drgań polega na nałożeniu dodatkowych ruchów narzędzia, na realizowany posuw, z częstotliwością od kilku do kilku tysięcy herców, w zależności od zastosowania. Dodatkowo dochodzi do zmiany efektywnego kierunku skrawania i wzrostu prędkości skrawania na ostrzach narzędzia. W zależności od procesu skrawania i typu użytego narzędzia, obróbka wspomagana drganiami przynosi różne efekty:

- korzystniejszy sposób formowania wiórów/ łatwiejsze ich łamanie
- polepszone usuwanie wiórów
- tworzenie punktów inicjujących pęknięcie w wiórze
- redukcja narostu na ostrzu
- wydłużenie trwałości narzędzia
- zmniejszenie sił skrawania
- redukcja temperatury podczas skrawania

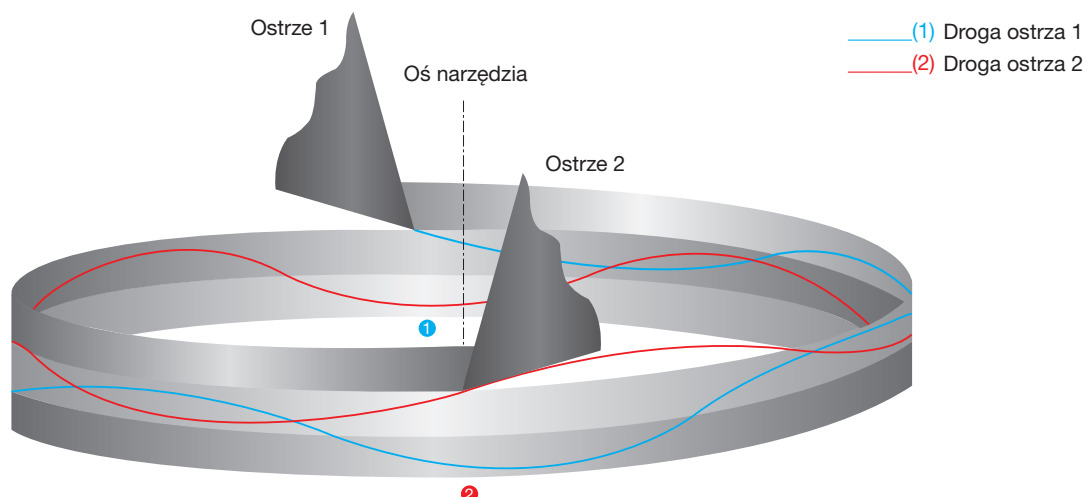
Skrawanie wspomagane drganiami jest obecnie stosowane do obróbki materiałów trudnoobrabialnych takich jak Super Stopy, kompozyty wzmocnione włóknami i wielowarstwowe jak również materiałów długowiórowych np. bezołowiowe stopy miedzi. Należy jednak rozróżnić obróbkę wspomaganą drganiami o niskiej i wysokiej częstotliwości.

1) Drgania niskiej częstotliwości

Dla drgań o niskiej częstotliwości używa się impulsów o częstotliwości do 1 kHz i amplitudzie do 0.5 mm. Do tej kategorii należą również zaprogramowane cykle usuwania wiórów przez wycofywanie narzędzia lub obróbka przerywana przez zatrzymywanie posuwu. Na typowych centrach obróbczych szybkość takich ruchów jest jednak ograniczona dynamiką maszyny. Aby uzyskać dodatkowe ruchy narzędzia z możliwością regulacji częstotliwości są stosowane specjalne urządzenia wzbudzające. Mogą być one wbudowane w konstrukcję obrabiarki lub

stosowane jako głowice nakładane na wrzeciono maszyn. Drgania są wytwarzane mechanicznie przez odpowiedni bieg koła zębatego lub krzywki.

Zmiana stałego ruchu po spirali jakie wykonuje ostrze podczas wiercenia z jednakowym posuwem, na ruch z dodatkowymi drganiami, powoduje też zmianę sposobu formowania wiórów: od stałej do zmiennej grubości skrawanych wiórów.



Dzięki obróbce wspomagananej drganiami niskiej częstotliwości możliwe jest uzyskanie krótkich wiórów nawet podczas obróbki materiałów długowiórowych. Przez modyfikację amplitudy drgań może być kontrolowana grubość wytwarzanych wiórów. Odpowiednie ustawienie amplitudy może skutkować przerwa-

mi w procesie formowanie wióra. Częstotliwość tych przerw jest związana z odpowiednim zgraniem szybkości obrotowej wrzeciona i amplitudy drgań.

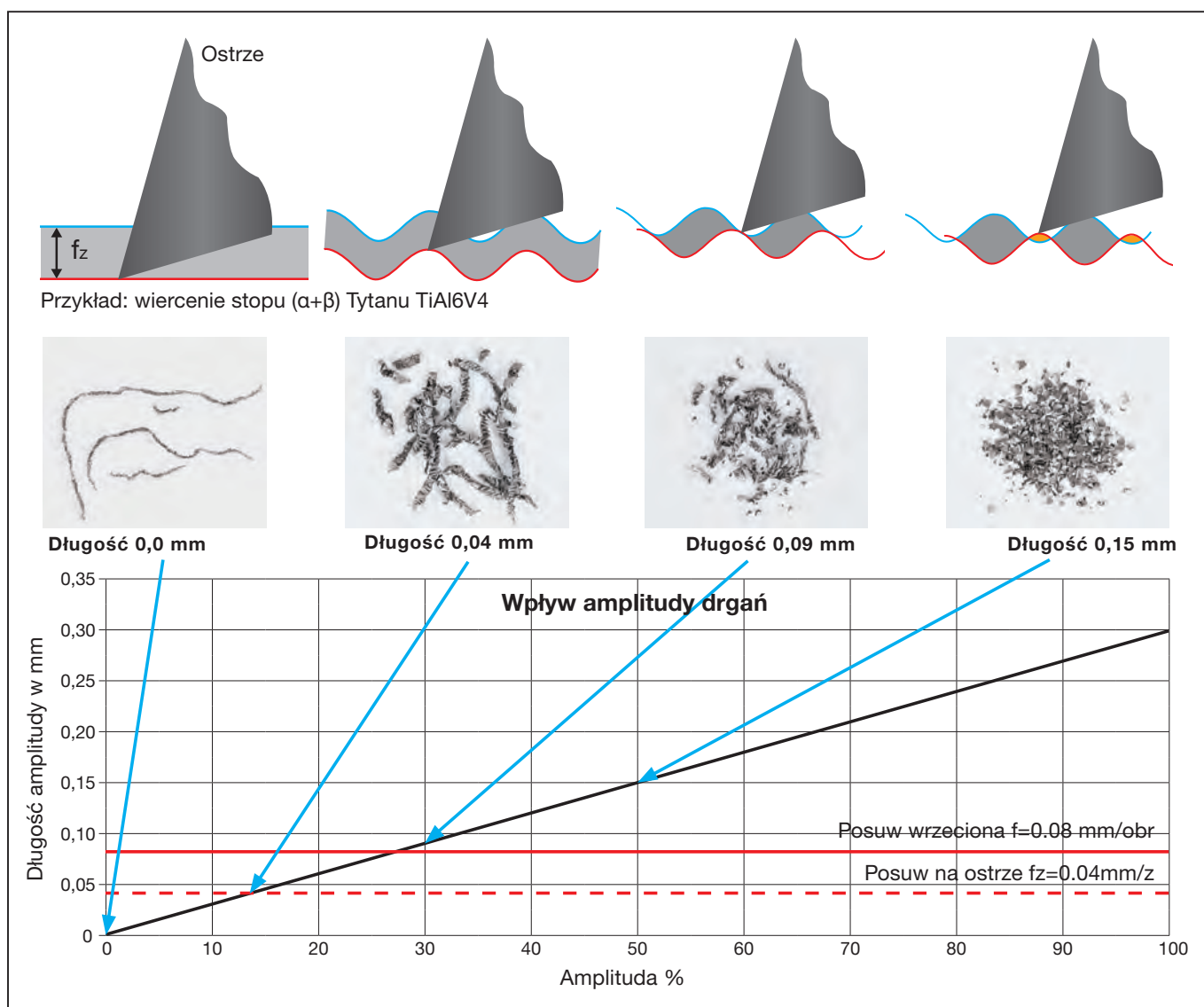
Wpływ drgań na formowanie się wióra

Podczas przeprowadzonego testu wiercono otwory w popularnym stopie Tytanu (TiAl6V4) z wykorzystaniem różnego rodzaju zakresów drgań. Wszystkie testy były wykonywane na sucho, z wykorzystaniem identycznego typu wiertła o średnicy $d = 6.35$ mm. Zastosowano następujące parametry skrawania: $V_c = 30$ m/min i $f = 0.08$ mm/obr.

Analiza powstających wiórów jasno pokazała wpływ amplitudy drgań na sposób ich formowania. Już zastosowanie amplitudy o długości równej grubości wióra znacznie redukuje długość wiórów. Aby uzyskać bardzo krótkie wióry należy zastosować amplitudę większą niż posuw realizowany przez ostrza. Wtedy

ostrze całkowicie wychodzi z materiału obrabianego i proces formowania wiórów jest całkowicie przerwany.

Skrawanie wspomaganane drganiami jest dość często wykorzystywane podczas obróbki kompozytów wielowarstwowych. W tym przypadku można zapobiegać wrywaniu włókien z kompozytów i dodatkowo zredukować temperaturę podczas skrawania tylko przez bezpieczne łamanie i usuwanie wiórów.

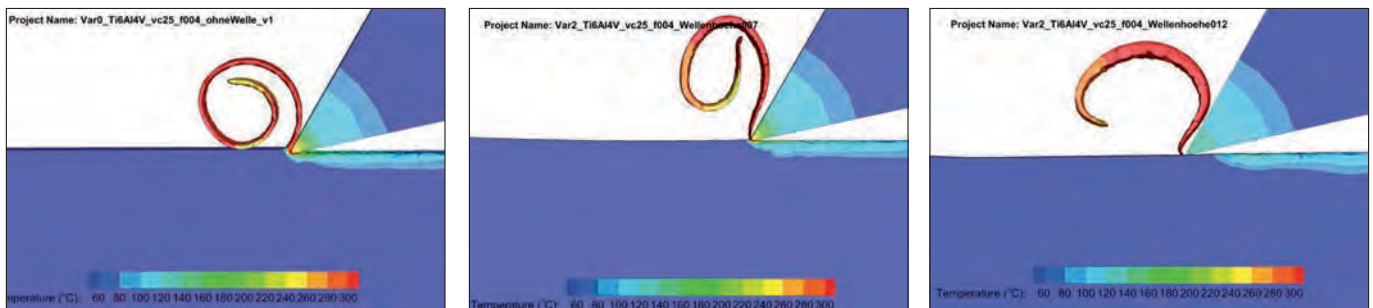




Wpływ zastosowanych drgań na temperaturę skrawania

Z wykorzystaniem analizy Metodą Elementów Skończonych (MES) zaobserwowano, że charakter powstawania wiórów jest zależny od danych warunków skrawania. Poniższe zdjęcia pokazują kształtowanie się wióra symulowane przy pomocy MES. Można na nich zaobserwować zwiększanie grubości

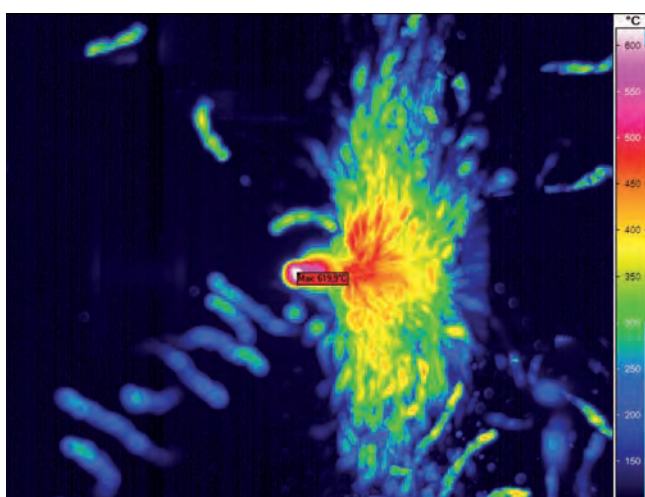
wióra i skracanie wióra wraz ze wzrostem amplitudy drgań. Dodatkowo widoczne jest zwiększenie temperatury skrawania podczas obróbki ciągłej.



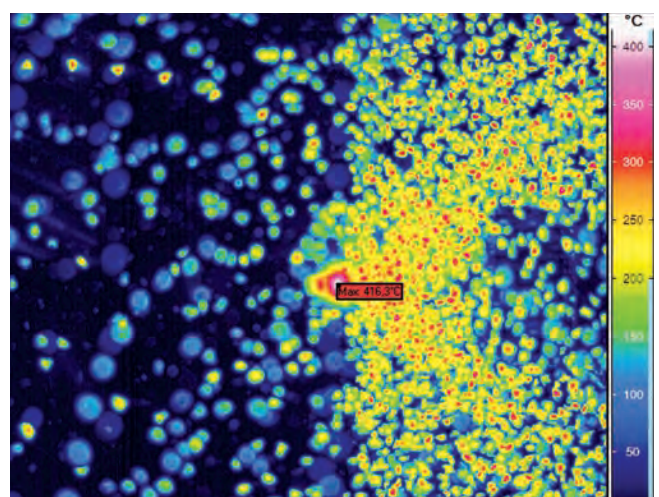
Zjawisko to stało się zupełnie widoczne gdy porównano temperaturę wydzielaną podczas skrawania materiału wielowarstwowego CFRP/Tytan. Do testów użyto identycznego wiertła o średnicy $d = 6.35$ mm. Obróbka odbywała się na sucho z parametrami skrawania: $V_c = 30$ m/min i $f = 0.08$ mm/obr. Temperatura powstająca podczas skrawania była kontrolowana przy pomocy kamery termowizyjnej. Materiał testowy składał się z warstwy CFRP o grubości 6 mm i Tytanu o grubości 14 mm (łącznie 20 mm). Wiercono otwory nieprzelotowe, zachowując dystans 1.5 mm między wierzchołkiem wiertła a dolną powierzchnią panelu. W teście porównano temperaturę skrawania wydzielającą się podczas wiercenia konwencjonal-

nego i wspomaganego drganiami. W przypadku wiercenia bez wspomaganego drganiami maksymalna, zarejestrowana temperatura wyniosła 600°C . Podczas obróbki wspomaganego drganiami maksymalna temperatura była znacznie niższa i wyniosła 450°C . Dodatkowo znacznie poprawiła się jakość powierzchni otworu i zwiększyła się trwałość narzędzi przez uzyskanie krótkich, połamanych wiórów.

Kompozyt warstwowy CFRP / stop ($\alpha+\beta$) TiAl6V4



Obr. na sucho konwencjonalna
 ϑ_{max} : 619°C



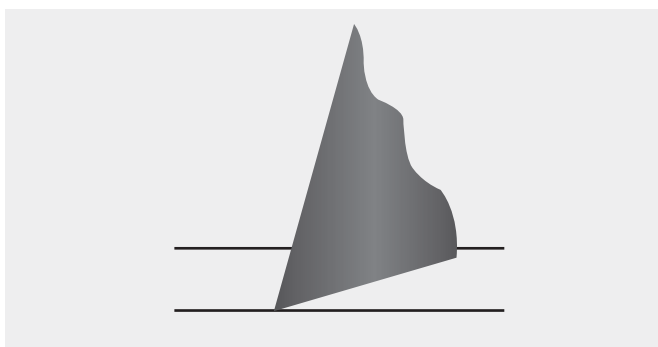
Obr. na sucho wspomaganą
 ϑ_{max} : 416°C

2) Drgania wysokiej częstotliwości (wspomaganie ultradźwiękami)

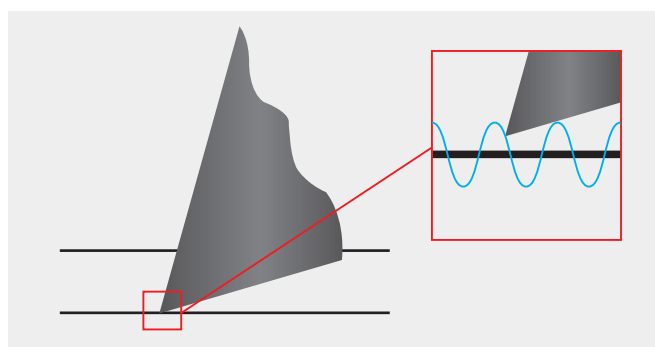
O obróbce z drganiami o wysokiej częstotliwości, nazywanej też obróbką wspomaganą ultradźwiękami, mówimy wtedy gdy połączymy klasyczny proces kinematyczny z drganiami narzędzia (w kierunku jego osi), o częstotliwościach > 16.55 kHz. Maksymalna osiągnięta amplituda drgań wierzchołka narzędzia w takiej obróbce wynosi zwykle od 2 do 30 μm . Jest ona ściśle związana z rodzajem użytego narzędzia, systemem wzbudzenia i zastosowaną energią.

Impulsy są generowane przez oscylator wzbudzający, składający się z generatora, przetwornicy, wzmacniacza i narzędzia w oprawce, nazywany także sonotrodą ultradźwiękową. Generator zamienia energię elektryczną na wysokiej częstotliwości oscylacyjną, która jest przekazywana do przetwornicy. Wzmacniacz zwiększa otrzymaną od przetwornicy amplitudę drgań i przekazuje do sonotrody, gdzie energia elektryczna jest zamieniana na mechaniczną z użyciem wzbudnika piezoelektrycznego. Połączenie ruchu posuwowego narzędzia z drganiami wysokiej częstotliwości bardzo ułatwia obróbkę wysokowytrzymałych materiałów, takich jak kompozyty ceramiczne. Procesy tego typu były dotychczas używane głównie do obróbki materiałów zaawansowanych takich jak ceramika, szkło czy węgiel spiekany, z użyciem narzędzi o niezdefiniowanej krawędzi skrawającej. Obecnie są coraz częściej wykorzystywane także do

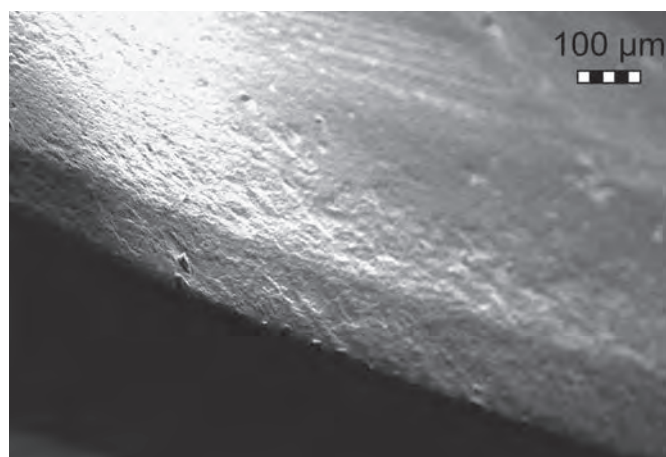
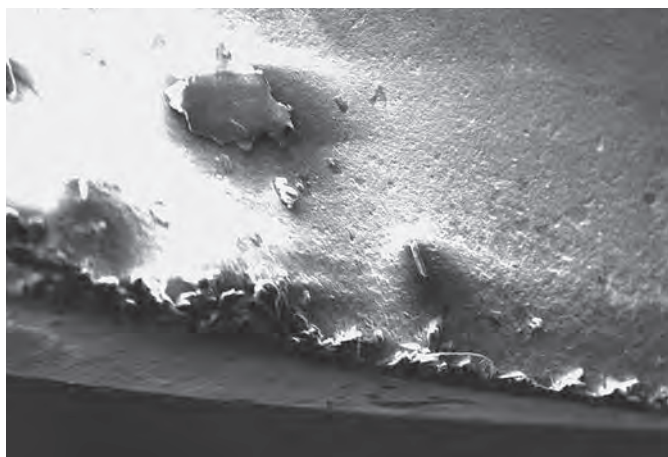
obróbki narzędziami o zdefiniowanych krawędziach skrawających takich jak wiertła czy frezy, zwłaszcza do obróbki materiałów kompozytowych wzmocnionych włóknami, struktur warstwowych czy materiałów piankowych. Drgania ultradźwiękowe, użyte do wspomaganie skrawania narzędzi o zdefiniowanych krawędziach skrawających, powodują powstawanie mikro-pęknięć na powierzchni materiału obrabianego, co powoduje zmniejszenie sił skrawania a także poprawia jakość powierzchni obrabianej. Dodatkowo zauważono też pozytywny wpływ tego typu drgań na zmianę charakteru zużywania się ostrza przy obróbce stali oraz na redukcję powstawania narostu w trakcie skrawania stopów na bazie niklu.



Bez wspomaganie ultradźwiękami



Ze wspomaganie ultradźwiękami



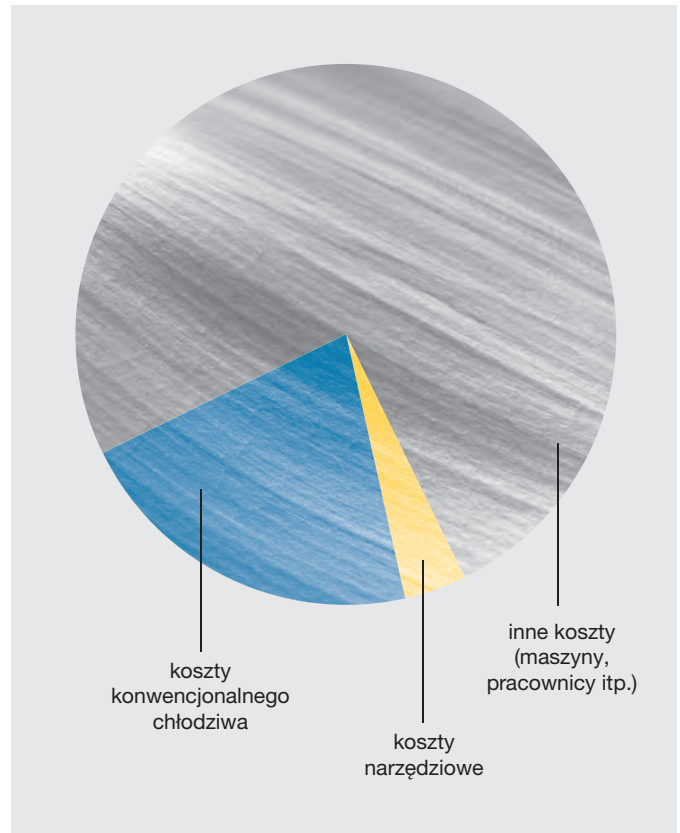


Obróbka z mgłą olejową MQL

Wprowadzenie

W procesach obróbki skrawaniem oprócz kosztów maszynowych i narzędziowych bardzo znaczące są wydatki związane z zakupem, użytkowaniem i utylizacją chłodziwa. Dlatego ograniczenie ilości używanego medium chłodząco-smarującego niesie za sobą wymierne korzyści.

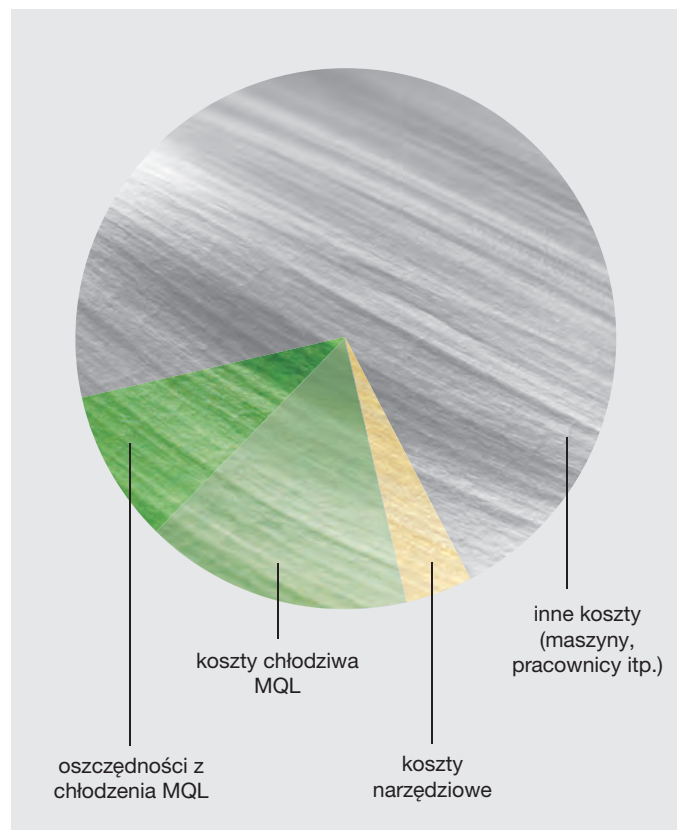
Oprócz korzyści finansowych, bardzo ważny jest też pozytywny wpływ na środowisko jak i ochronę zdrowia pracowników. Firma Guhring jest jednym z pionierów zajmujących się badaniami i wdrażaniem chłodzenia wykorzystującego mgłę olejową MQL już od połowy lat dziewięćdziesiątych.



Cel wdrożenia chłodzenia MQL

Wdrożenie nowego systemu chłodzenia MQL jest znacząco mniej kosztowne niż konwencjonalnego systemu opartego na emulsji. Korzyści wynikające z zastosowania chłodzenia MQL:

- zmniejszenie naprężeń termicznych na wierzchołku narzędzia
- mniejsze zużycie narzędzia
- efektywna ewakuacja wiórów
- zmniejszenie ilości używanego płynu smarującego
- dobre efekty smarowania ostrzy nawet przy głębokim wierceniu
- zmniejszenie kosztów dodatkowych takich jak:
 - koszty czyszczenia części obrabianych
 - koszty utylizacji chłodziwa
 - koszty utylizacji wiórów
- ochrona zdrowia i środowiska





Systemy chłodzenia MQL

Dzięki badaniom prowadzącym przez firmę Guhring zostały przygotowane podwaliny pod praktyczne zastosowanie technologii MQL. Opracowano wszystkie elementy systemu chłodzenia MQL: od urządzeń mocowania opravek we wrzecionie maszyny aż po ostrza skrawające.

Podstawowe cechy systemu:

- budowa modułowa z wykorzystaniem elementów standardowych
- systemy mocowania dla chłodzenia MQL i konwencjonalnego są w pełni kompatybilne
- oprawki hydrauliczne, termoskurczowe i synchroniczne są doposażone we wkładki MQL



Elementy systemu MQL firmy Guhring

Przez wprowadzenie opravek wyposażonych w śrubę regulacyjną, specjalnie opracowaną dla chłodzenia MQL przez firmę Guhring w 2007 roku, rozwiązane zostały wcześniej występujące problemy. Dzięki temu obecnie stosowane systemy doprowadzenia mgły olejowej MQL, są dopasowane do wysokich wymagań nowoczesnych procesów produkcyjnych.

Cechy pierwszego systemu MQL firmy Guhring:

- brak strat chłodziwa
- specjalne wkładki doprowadzające chłodziwo MQL
- specjalnie opracowane końcówki chwytów narzędzi
- stożkowo zakończone śruby regulacyjne w oprawkach

Wszystkie te elementy zostały zestandaryzowane aby ułatwić klientom prawidłowe korzystanie z ich zalet.



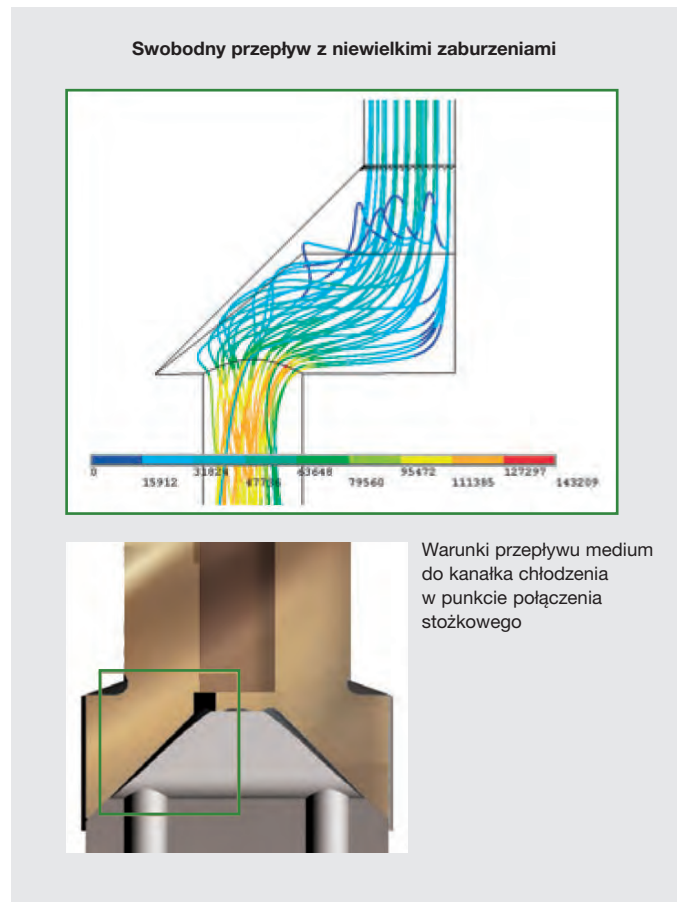


Optymalne zakończenie chwytu. Dla bezpiecznego transportu MQL

Dostarczenie w sumie niewielkich ilości medium smarującego, znajdujących się w mgie olejowej, dokładnie do strefy skrawania jest niezwykle ważne. Dlatego odpowiednie ukształtowanie zakończeń chwytów narzędzi gra bardzo znaczącą rolę. Opracowane przez firmę Guhring stożkowe zakończenie chwytu spełnia wszystkie warunki prawidłowego przepływu MQL.

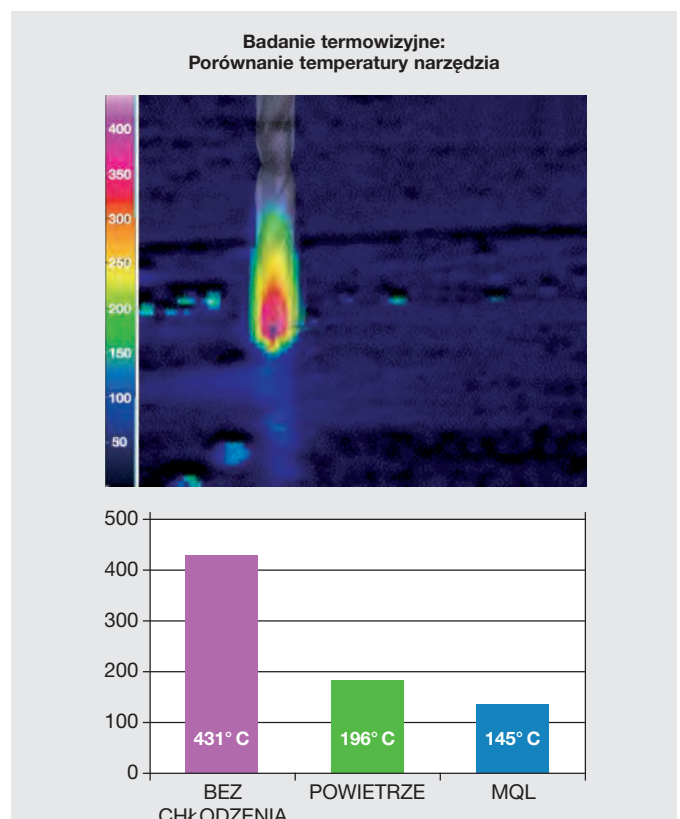
Zalety stożkowego zakończenia chwytu narzędzi:

- brak strat chłodziwa
- minimalna martwa strefa
- łatwe stosowanie
- tanie wykonanie



Zachowanie niskiej temperatury na wierzchołku

Dzięki chłodzeniu MQL temperatura podczas skrawania jest znacznie zredukowana w porównaniu do obróbki na sucho, co skutkuje zwiększeniem trwałości narzędzi i poprawą powtarzalności procesu.



**Najlepsza forma do MQL!**

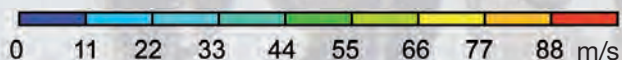
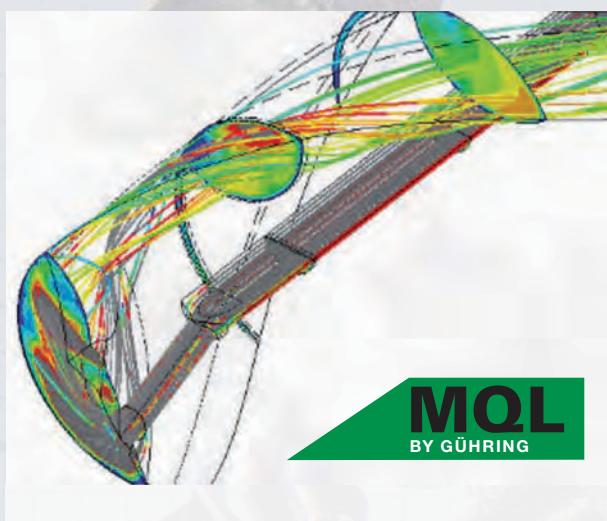
Optymalne wyniki obróbki z chłodzeniem MQL dzięki dopracowanej geometrii wiertła RT 100 T

**1. Kształt rowków wiórowych:**

Kształt rowków wiórowych w narzędziach do MQL firmy Guhring zapewnia uzyskiwanie krótkich wiórów, które są bezpiecznie usuwane z głębokich otworów.

2. Maksymalny przekrój kanałków chłodzenia:

Dostarczenie odpowiedniej ilości chłodzenia jak i bezpieczne usuwanie wiórów jest uzyskiwane przez powiększone przekroje kanałków chłodzenia.

Porównanie szybkości przepływu**Szybkość przepływu**

medium MQL wynosi 30.4 m/s

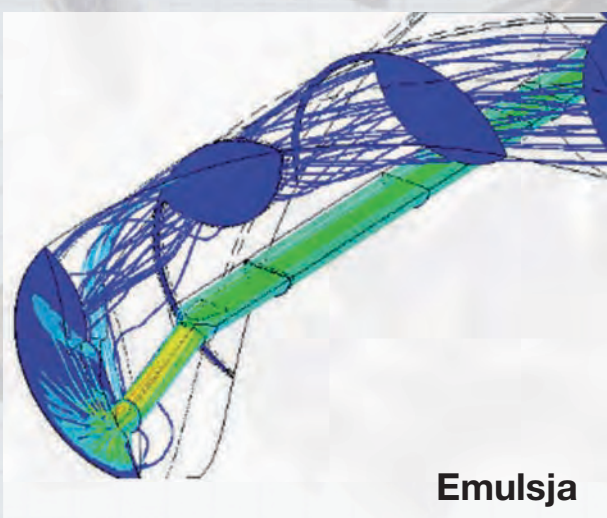
Wydatek chłodzenia

medium MQL wynosi 6960 l/h (powietrza)

Wiertło $\varnothing = 11.7$ mm

Ciśnienie przy pompie = 6 bar

Ciśnienie przy narzędziu = 4 bar

**Szybkość przepływu**

emulsji wynosi 3.5 m/s

Wydatek chłodzenia

emulsji wynosi 600 l/h (powietrza)

Wiertło $\varnothing = 11.7$ mm

Ciśnienie przy pompie = 60 bar

Ciśnienie przy narzędziu = 31 bar



Rodzaje systemów MQL

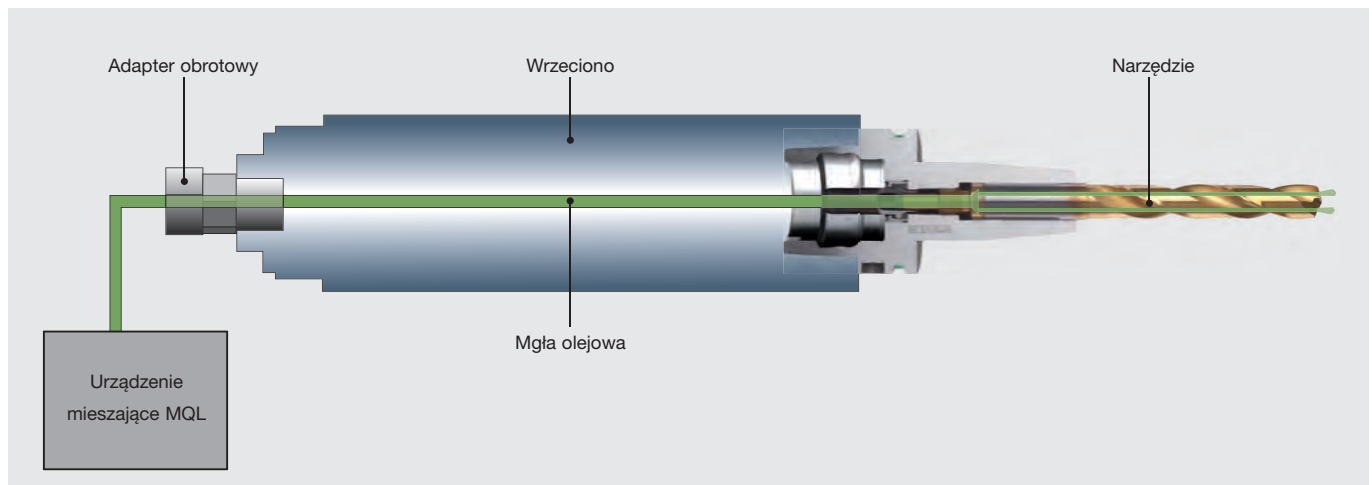
Dostarczenie medium smarującego w chłodzeniu MQL może się odbywać na dwa sposoby: mieszanina powietrza i oleju może być przygotowywana poza obrabiarką i jako mgła olejowa dostarczana do wrzeciona (system 1-kanalowy) lub sprężone powietrze i olej jest dostarczany osobno do komory mieszania we wrzecionie i łączone ze sobą (system 2-kan-

łowy). Aeroszol jest podawany kolejno do maszyny przez specjalny obrotowy adapter (najlepiej z przepływem osiowym), następnie do wrzeciona, przez oprawkę aż po ostrza skrawające narzędzia. Niemożliwe do uniknięcia zmiany przekrojów kanałków doprowadzających medium powinny być możliwie jak najłagodniejsze.

System 1-kanalowy

W systemie 1-kanalowym aeroszol smarujący jest wytwarzany w oddzielnym urządzeniu mieszającym poza obrabiarką. Specjalny system dysz wewnątrz urządzenia wytwarza mgłę

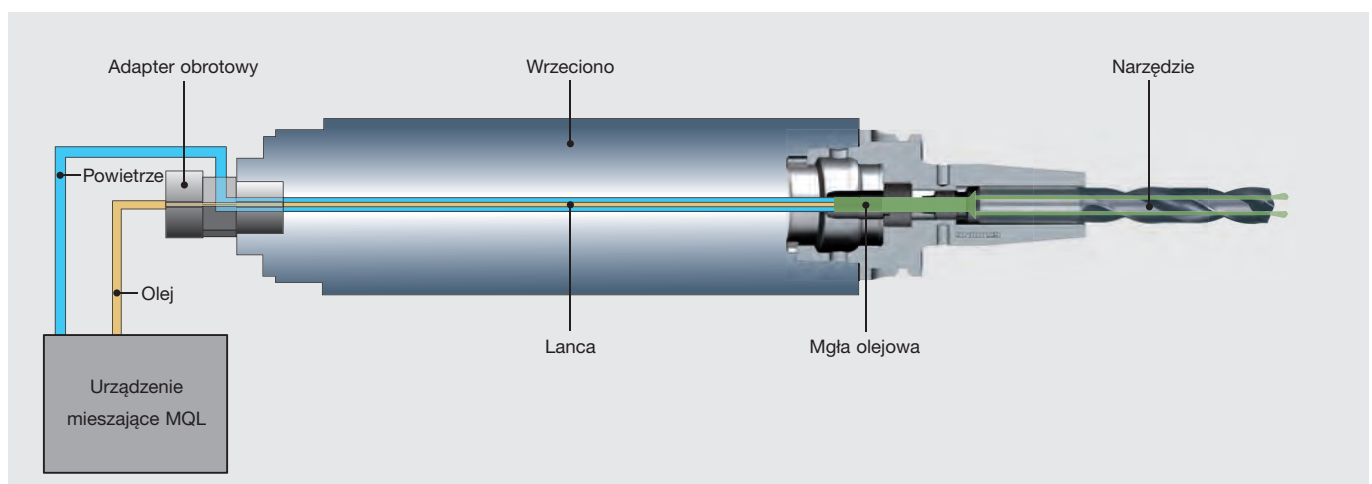
olejową przez regulowany przepływ skompresowanego powietrza łączonego z odpowiednimi ilościami czystego oleju.



System 2-kanalowy

W systemie 2-kanalowym czysty olej jest podawany przez obrotowy adapter z zasobnika przy obrabiarce. Elektrozawór reguluje precyzyjne porcje dostarczanego oleju. Olej jest transportowany przez wrzeciono wewnątrz obrotowej lancy. Drugim kanałem obrotowego adaptera podawane jest sprężone powietrze. Płyne ono przez wrzeciono równoległe do czystego oleju, aż do oprawki narzędzia. Tu następuje zmieszanie powietrza z olejem. Aby ten proces przebiegł prawidłowo,

oprawka jest wyposażona w specjalną rurkę z dyszą, która pełni rolę komory mieszającej. W tym systemie powietrze i olej mogą być mieszane w praktycznie dowolnej ilości. Odległość od komory mieszania do punktu docelowego na wierzchołku narzędzia jest minimalna co pozwala na uzyskanie szybkich czasów reakcji systemu oraz szybkich zmian ilości podawanego oleju.



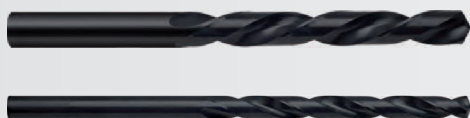


Powierzchnia szlifowana



Zalecana zwłaszcza do wiercenia w ciągliwych jak i odlewanych stopów aluminium z dużą zawartością krzemu, w których narzędzie bez powłoki zapewni wysoką wydajność obróbki. Aby zapobiegać zjawisku narostu narzędzia te są odpowiednio dostosowane do tego zastosowania, przez specjalną geometrię ostrzy oraz bardzo dobrą jakość powierzchni w rowku wiórowym, na korekcie ścina oraz na powierzchni przyłożenia.

Powierzchnie parowane / azotowane



Parowanie powierzchni narzędzi ma przede wszystkim za zadanie zapobieganie korozji oraz poprawę właściwości trybologicznych warstwy wierzchniej dzięki warstwy oksydowanej (grubości od 3 do 10 μm). Azotowanie powierzchni łysinek jest zalecane przy obróbce materiałów silnie ścierających, ponieważ obróbka ta zwiększa twardość i o odporność na ścieranie. Jednakże obecnie stosowane powłoki twarde i miękkie często oferują lepsze właściwości, dlatego parowanie lub azotowanie powierzchni staje się coraz mniej popularne

Powłoka TiN



Max. temperatura zastosowania: < 600°C

Kolor: Żółto-żółty

Struktura: Pojedyncza warstwa

Twardość: 2300 HV0,05

Wprowadzona przez firmę Gühring w 1980 roku. Powłoka TiN jest nakładana na wiertłach ze stali HSS i węglików spiekanych jako jedno z najtańszych pokryć.

Powłoka FIRE/nanoFIRE



Max. temperatura zastosowania: < 800°C

Kolor: Fioletowy

Struktura: Wielowarstwowa

Twardość: 3300 HV0,05

Powłoka FIRE i nanoFIRE składa się z warstw azotków tytanu i aluminium. Została wdrożona pod koniec lat dziewięćdziesiątych XX wieku jako kolejny etap rozwoju powłoki TiN. Wyróżnia się zwiększoną twardością i wysoką odpornością cieplno-chemiczną. Jest stosowana na narzędziach HSS i węglkowych.



Powłoka Raptor



Max. temperatura zastosowania: < 800°C
 Kolor: Jasno-żółty
 Struktura: Wielowarstwowa
 Twardość: 3300 HV0,05

Podstawą powłoki Raptor stanowi struktura wielowarstwowa z TiN/ TiAlN, która zapewnia odpowiednią wydajność przy obróbce stali. Dzięki dodatkowej, zmniejszającej tarcie, powłoce wierzchniej opartej o azotek cyrkonu, pole zastosowania zwiększa się o materiały z silną tendencją do adhezji podczas skrawania (np. stale ferrytyczne i austenityczne oraz stale Duplex)

Powłoka TiAlN



Max. temperatura zastosowania: < 800°C
 Kolor: Fioletowa
 Struktura: Pojedyncza warstwa
 Twardość: 3300 HV0,05

Powłoka TiAlN posiada podobne właściwości do FIRE i nanoFIRE ale ze względu na jej jednowarstwową strukturę jest głównie stosowana na mikro-wiertła.

Powłoka nanoA



Max. temperatura zastosowania: < 900°C
 Kolor: Niebiesko-fioletowa
 Struktura: Pojedyncza warstwa, struktura
 Twardość: 3300 HV0,05

Bazująca na TiAlN powłoka nanoA jest szczególnie zalecana do obróbki stali nierdzewnych ale może być też używana do wiercenia żeliwa, stopów specjalnych na bazie niklu i kobaltu. Dzięki strukturze nano-warstwowej blokuje rozwijanie pęknięć. Dodatkowo dzięki swojemu składowi charakteryzuje się wysoką odpornością cieplno-chemiczną.

Powłoka Sirius



Max. temperatura zastosowania: < 900°C
 Kolor: Jasno-żółty
 Struktura: Pojedyncza warstwa, struktura
 Twardość: 3400 HV0,05

Powłoka Sirius, bazująca na warstwie AlTiN, jest szczególnie zalecana do obróbki stali nierdzewnych. Dzięki nano-warstwowej budowie charakteryzuje się jednocześnie wysoką twardością i ciągliwością. Wierzchnia powłoka cyrkonowa przeciwdziała reakcjom chemicznym z materiałem obrabianym i ułatwia usuwanie wiórów.



Powłoka Signum



Max. temperatura zastosowania: < 800°C
Kolor: Brązowy
Struktura: Wielowarstwowa, nano-kompozytowa
Twardość: 5500 HV0,05

Signum należy do grupy powłok nano-kompozytowych. Jej mikrostruktura jest oparta na mikro-kryształach TiAlN zatopionych w odpornej na wysoką temperaturę osnowie z azotku krzemu. Dzięki temu charakteryzuje się wysoką twardością, przez co jest pierwszym wyborem do obróbki stali hartowanych i żeliwa.

Powłoka Endurum



Max. temperatura zastosowania: < 800°C
Kolor: Miedziany
Struktura: Wielowarstwowa, nano-kompozytowa
Twardość: 4000 HV0,05

Endurum jest kolejnym przedstawicielem rodziny powłok nano-kompozytowych, przez co jest szczególnie zalecana do obróbki stali węglowych, automatowych i manganowych.

Powłoka Zenit



Max. temperatura zastosowania: < 700°C
Kolor: Jasno-żółty
Struktura: Pojedyncza warstwa, struktura
Twardość: 2500 HV0,05

Nano-strukturalna powłoka Zenit była od początku, specjalnie opracowywana do obróbki stopów Tytanu. Jej szczególna struktura i kompozycja znacznie ograniczają zużycie trybo-chemiczne i dzięki czemu tworzą z niej prawdziwego specjalistę do obróbki tych materiałów. Jednocześnie osiąga bardzo dobre rezultaty podczas wiercenia stopów aluminium o średniej zawartości krzemu.

Powłoka Ice



Max. temperatura zastosowania: < 1000°C
Kolor: Szary-metaliczny
Struktura: Wielowarstwowa
Twardość: 3500 HV0,05

Powłoka Ice, bazująca na Tytanie, aluminium i chromie, jest szczególnie zalecana do obróbki materiałów nieżelaznych takich jak stopy miedzi,



Powłoka Carbo

Max. temperatura zastosowania: < 500°C

Kolor: Grafitowy

Struktura: Pojedyncza warstwa

Twardość: 5000 HV0,05



Powłoka Carbo jest częścią grupy powłok DLC - zbliżonych właściwościami do powłok diamentowych. Carbo charakteryzuje się bardzo wysoką twardością, ponieważ jej skład i struktura jest w 100% oparta na węglu. To wyjaśnia jej niesamowitą wydajność podczas obróbki materiałów nieżelaznych takich jak ciągliwe i odlewane stopy aluminium (zawierających < 12% Si), miedź, brązy i mosiądze. Jednocześnie może być używane do obróbki tworzyw sztucznych i drewna.

Powłoka Cristall

Max. temperatura zastosowania: < 600°C

Kolor: Grafitowy

Struktura: Pojedyncza warstwa

Twardość: 8000 HV0,05



Cristall jest powłoką diamentową, której właściwości nie różnią się niczym od naturalnego diamentu. Z wieloma interesującymi właściwościami szczególnie imponuje najwyższą twardością. Dzięki temu mikro-krystaliczna powłoka Cristall jest szczególnie zalecana do obróbki materiałów silnie ścierających takich jak tworzywa wzmacniane włóknami, grafit lub aluminium o wysokiej zawartości krzemu (> 12%). Ze względów technicznych ta powłoka może być nakładana tylko na niektóre gatunki węgla spiekane.



	Wiercenie		
	Węglik spiekany		HSS
	Emulsja	MQL	
Stale węglowe	Endurum	Endurum	Fire
Stale automatowe	Raptor	Raptor	-
Stale manganowe	Fire	Fire	-
Stale niskostopowe	Fire	Fire	Fire
	Endurum	Endurum	TiN
Stale stopowe	Raptor	Raptor	
	Fire	Fire	Fire
Stale hartowane <55 HRC	Signum nanoA	Signum nanoA	TiN
	Signum	Signum	-
Stale hartowane 55-65 HRC	Fire	Fire	-
	TiAlN	TiAlN	-
	Signum	Signum	-
Stale nierdzewne i kwasoodporne	Fire	Fire	-
	TiAlN	TiAlN	-
	nanoA	nanoA	Sirius
Żeliwa	Sirius	Sirius	Fire
	Endurum	Endurum	TiN
	Signum	Signum	Fire
Ciągliwe stopy aluminium	Fire	Fire	-
	nanoA	nanoA	-
	bez powłoki	bez powłoki	bez powłoki
Odlewnicze stopy aluminium (< 12% Si)	Carbo	Carbo	Carbo
	Cristall	Cristall	-
	bez powłoki	bez powłoki	bez powłoki
Odlewnicze stopy aluminium (≥ 12% Si)	Zenit	Zenit	Zenit
	Carbo	Carbo	Carbo
	Cristall	Cristall	-
Stopy na bazie niklu (np. Inconeale)	-	-	-
	-	-	-
	nanoA	nanoA	Fire
Tytan / stopy Tytanu	Signum	Signum	-
	Fire	Fire	-
Miedź / brąz / mosiądz	Zenit	Zenit	Fire
	nanoA	nanoA	-
Stopy kobaltu i chromu	ICE	ICE	TiN
	Carbo	Carbo	-
Metale szlachetne	nanoA	nanoA	-
	Signum	Signum	-
	Fire	Fire	-
Ceramika	nanoA	nanoA	-
Tworzywa nie wzmacniane włóknami	Cristall	Cristall	-
Tworzywa wzmacniane włóknami	Carbo	-	-
	Cristall	Cristall	-
	Signum	Signum	-

Uwaga:

Tabela pokazuje generalne sugestie dla powłok firmy Gühring. Kolejność wyboru: od góry do dołu.



Nawiercanie i otwory pilotujące

Nawiercanie i otwory pilotujące dla HT 800

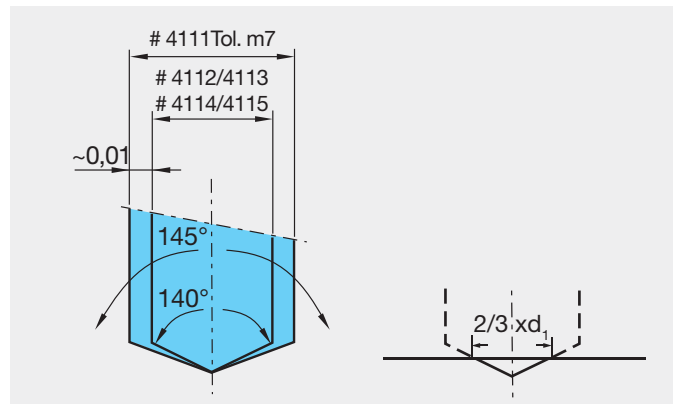
W większości przypadków zalecamy wykonywanie nawiercania/ otworu pilotującego dla wiertel HT 800 o długości roboczej powyżej $5xD$.

Średnica nawiercania powinna wynosić ok. $2/3$ średnicy wierconego otworu.

Dla otworów pilotujących zalecamy głębokość $1xD$.

Dodatkowo kąt wierzchołkowy i średnica wiertła pilotującego powinny być większe niż wiertła zasadniczego.

Aby to zapewnić zalecamy użycie specjalnie dopasowanej płytki do otworów pilotujących nr art. 4111 z kątem wierzchołkowym 145° i tolerancją średnicy $m7$.



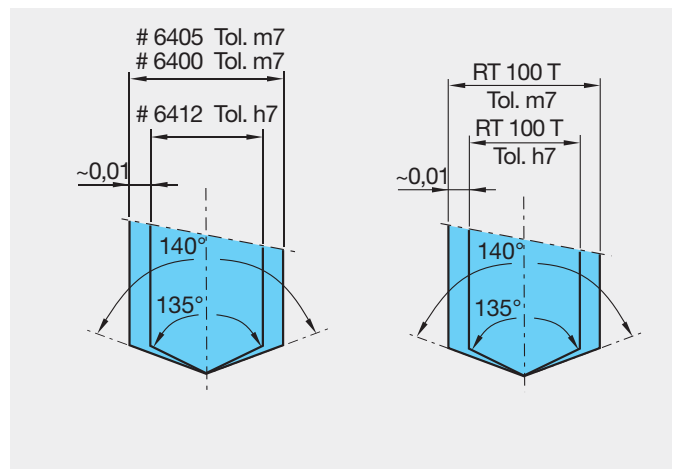
Nawiercanie i otwory pilotujące dla wiertel węglkowych

Dla wiertel węglkowych o długościach roboczych od $7xD$ do $12xD$ zalecamy wykonanie nawiercania lub otworu pilotującego.

Dla wiertel o długości roboczej powyżej $12xD$ wykonanie otworu pilotującego, o głębokości od $1xD$ do $2xD$, jest absolutnie wymagane.

Dla mikro-wiertel ExclusiveLine o długości roboczej $15xD$ zalecamy wykonanie otworu pilotującego wiertłem $4xD$ bez chłodzenia wewnętrznego (nr art. 6400) lub $5xD$ z chłodzeniem wewnętrznym (nr art. 6405), ponieważ mają one optymalnie dopasowany kąt wierzchołkowy i tolerancję średnicy roboczej.

Podczas wiercenia głębokich otworów wiertłami RT100T, otwory pilotujące mogą być wykonywane wiertłami RT100U, o długości $3xD$, z wewnętrznym chłodzeniem (np. nr art. 2477), ponieważ są one optymalnie dopasowane ze względu na kąt wierzchołkowy i tolerancję średnicy roboczej.



Nawiercanie i otwory pilotujące dla wiertel HSS

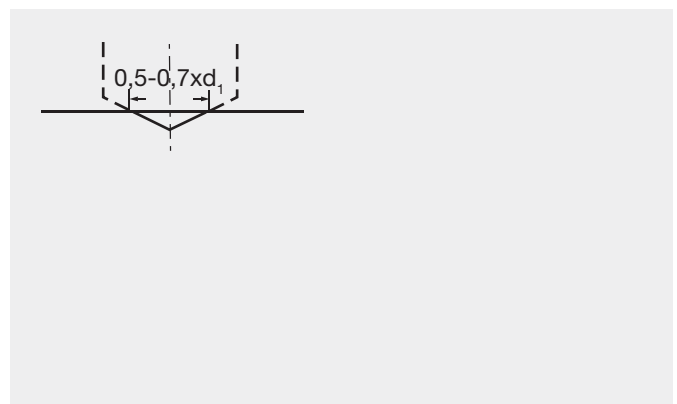
Nawiercanie dla wiertel o długości wg DIN 340

Podczas wiercenia długimi wiertłami HSS/HSCO (wg DIN 340), zalecamy nawiercanie o średnicy $0,5$ do $0,7xD$ (D = średnica otworu). Nawiertaki NC ze stali HSS są do tego optymalnie dopasowane. Szczegółowe informacje dotyczące nawiertaków NC znajdują się w dedykowanej im sekcji tego katalogu.

Otwory pilotujące dla wiertel o długości wg DIN 1869

Podczas wiercenia bardzo długimi wiertłami HSS/HSCO o długościach wg DIN 1869, zalecamy wykonanie otworu pilotującego głębokości od $1xD$ do $2xD$.

Krótkie wiertło typu GV 120 wg DIN 1897 jest optymalne do tego celu.



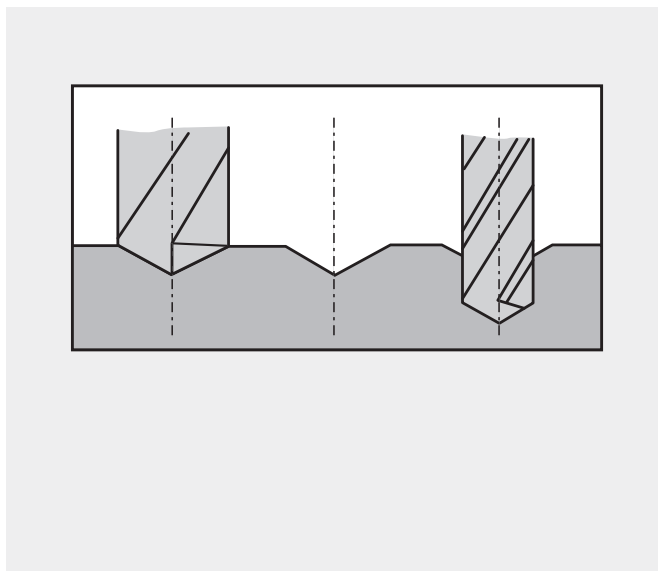


Nawiertaki NC

Nawiertaki NC

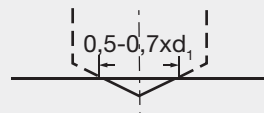
Podczas wiercenia otworów o dużej dokładności pozycji, tolerancji średnicy lub o dużej głębokości oraz wykonywanych na niekorzystnych powierzchniach (np. okrągłych, surowych itp.) zaleca się użycie nawiertaków NC. To pozwala na prawidłowe naprowadzenie wiertła na pozycję wykonywanego otworu i zapobiega jego rozbijaniu.

Nawiertaki NC mogą być też używane do wykonywania fazek i pogłębień (gdy użyty zostanie nawiertak o większej średnicy niż otwór) oraz wykonania nawiercenia w jednym zabiegu. Nawiertaki NC są produkowane z bardzo krótkimi rowkami wiórowymi oraz bez powierzchni przyłożenia na średnicy aby zapewnić im bardzo dużą sztywność, ważną aby utrzymać odpowiednią pozycję nawiercenia. Z tego powodu nawiertaki NC mogą być używane tylko do wykonywania nawierceń i pogłębień o głębokościach wiercenia mniejszych niż długość wierzchołka narzędzia.



Dobór średnicy nawiertaka

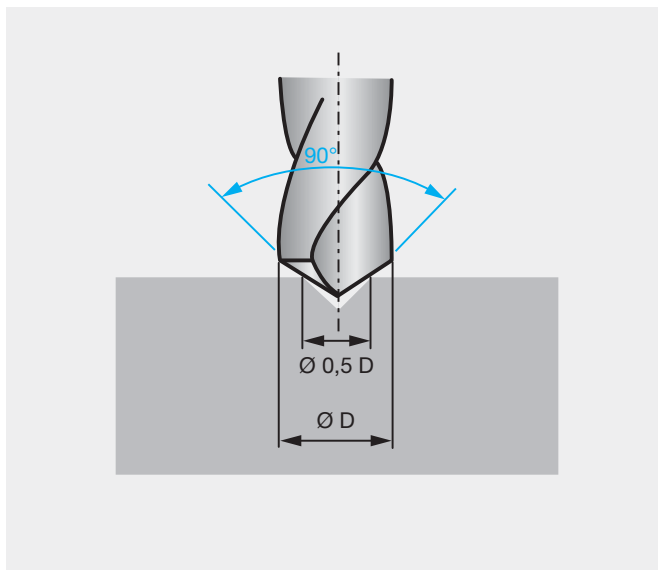
Idealna średnica użytego nawiertaka powinna zawierać się w przedziale od 0.5 do 0.7xD



Nawiertaki NC 90°

Nawiertaki NC o kącie wierzchołkowym 90° są szczególnie zalecane do nawiercania poprzedzającego użycie wiertel HSS/HSCO, które mają relatywnie dużej wielkości ściny. To gwarantuje, że narzędzia zaczną najpierw pracować ostrzami, które naprowadzą go na odpowiednią pozycję.

Dodatkowo, nawiertaki NC o kącie 90° są używane do wykonywania w jednym zabiegu pogłębień o tym samym kącie, jeśli średnica narzędzia jest większa niż docelowa średnica otworu.

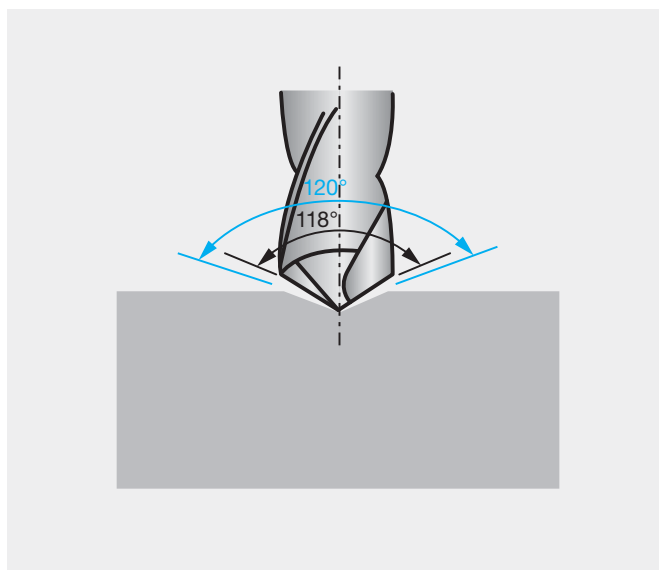




Nawiertaki NC

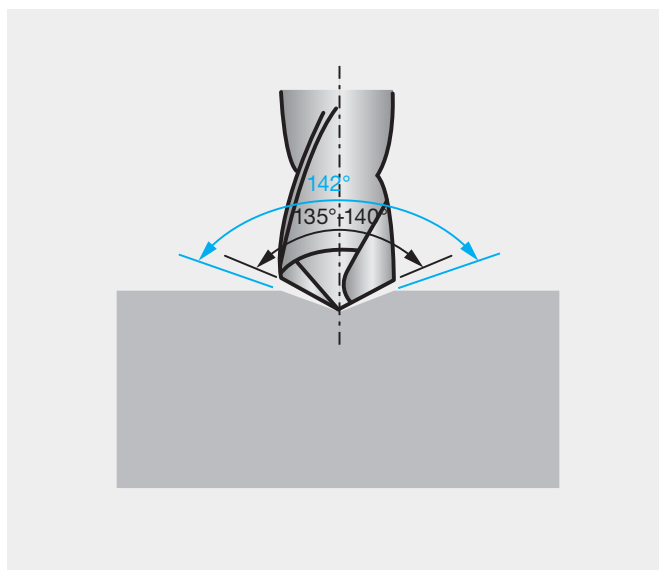
Nawiertaki NC 120°

Nawiertaki NC o kącie 120° są szczególnie zalecane do wykonywania nawierceń poprzedzających użycie wiertła HSS/HSCO z kątami wierzchołkowymi 118°. To zapewnia, że wiertło zacznie pracować najpierw wierzchołkiem i będzie odpowiednio prowadzone w otworze.






Nawiertaki NC 142°

Nawiertaki NC o kącie 142° są szczególnie zalecane do wykonywania nawierceń przed wiertłami z węgla spiekane o kątach wierzchołkowych od 135° do 140°. Dzięki temu wiertło rozpocznie pracę od kontaktu ścina z materiałem, co zapewnia jego prawidłowe pozycjonowanie w otworze. Dodatkowo zapobiega się sytuacji, gdy naroża wiertła rozpoczynają pracę przed ścinem (co mogłoby skutkować wykruszeniem naroży).



Nawiertaki NC

90°	120°	142°
		



Ciśnienie i wydatek chłodziwa Wiertła Ratio

Zilustrowane (rys. 1) poniżej wymagania wydatku chłodzenia stosować tylko dla wiertel krętych Ratio typ RT100.

W przeciwieństwie do ciśnienia, jakie jest właściwe dla danej obrabiarki, ze względu na sam system smarowania, jak również możliwości wystąpienia przecieków, wydatek chłodziwa nie zależy tylko od maszyny. Dlatego podane wykresy ciśnienia służą tylko jako wstępne wytyczne, a właściwe parametry powinny być ustalone za pomocą praktycznych testów na konkretnej obrabiarce.

Wymagane parametry dla wiertel krętych typ RT80 z centralnymi kanałkami chłodzącymi są przedstawione na odrębnym diagramie (rys. 2).

Przedstawione poniżej diagramy dla wiertel Ratio prezentują ich najczęstsze zastosowanie, czyli obróbkę stali.

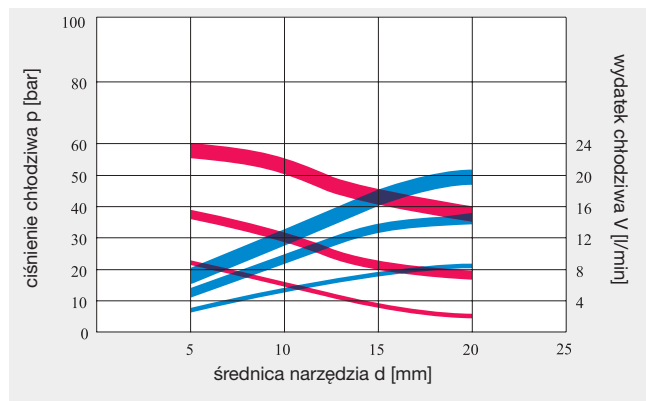
Mogą one także służyć jako wytyczne do obróbki innych materiałów, ponieważ największe ciśnienie jest najczęściej wymagane właśnie podczas obróbki stali.

Szczególnie ważne jest ektywne chłodzenie przy użyciu wiertel Ratio RT 150 o prostych kanałkach chłodzących. Jest to wyraźnie pokazane na przykładach dla wybranych materiałów (żeliwo i aluminium). Na przykład, zmniejszenie trwałości narzędzia spowodowane przez niskie ciśnienie, jest znacznie większe kiedy obrabiamy żeliwo szare, niż kiedy obrabiamy stopy AISi. Ale tylko w przypadku obróbki krótkowiórowych stopów AISi! Absolutnie niezbędne jest "minimalne ciśnienie" lub "dobre ciśnienie" kiedy obrabiamy żeliwo i jest ono najczęściej trochę wyższe niż kiedy obrabiamy stop AISi (rys. 3 i 4).

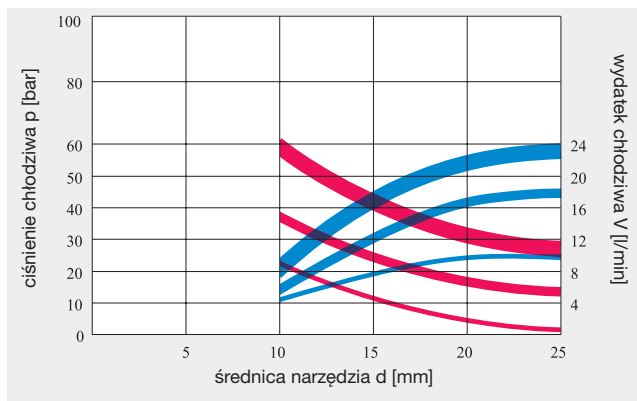
Zalecane parametry (wierćło typu RT 150 GG) wskazane są do wiercenia tylko dla głębokości do 5 x D. Głębsze otwory mogą być wykonywane innymi wiertłami posiadającymi wewnętrzne kanałki chłodzące, jak na przykład RT 150 GN, jednakże wykonywanie głębszych otworów (zależy to od materiału) staje się mniej ekonomiczna.

Wymagane ciśnienie chłodziwa
 ——— ciśnienie optymalne
 ——— dobre ciśnienie
 ——— min. ciśnienie

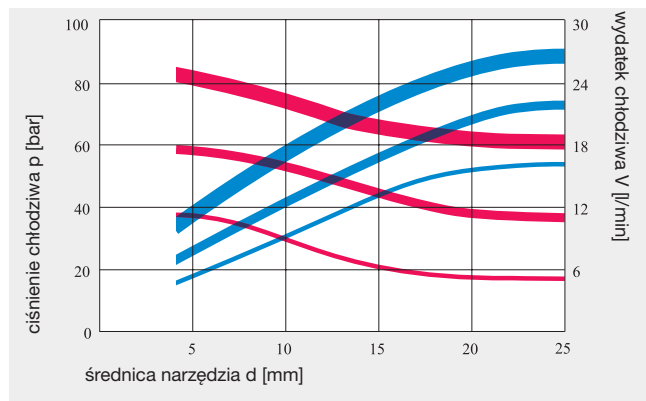
Wymagany wydatek chłodziwa
 ——— wydatek optymalny
 ——— wydatek dobry
 ——— min. wydatek



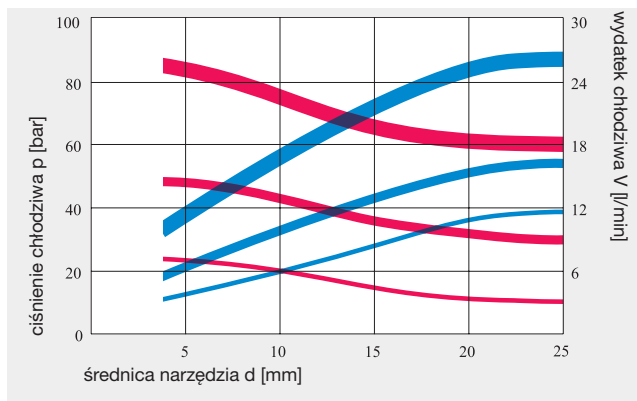
rys. 1:
Wymagane ciśnienie i wydatek chłodziwa dla wiertła Ratio typ RT100, z wewnętrznym chłodzeniem.



rys. 2:
Wymagane ciśnienie i wydatek chłodziwa dla wiertła Ratio typ RT 80 z centralnym wewnętrznym chłodzeniem.



rys. 3:
Wymagane ciśnienie i wydatek chłodziwa dla wiertła Ratio a prostymi rowkami 150 GG, materiał obrabiany: żeliwo.



rys. 4:
Wymagane ciśnienie i wydatek chłodziwa dla wiertła Ratio o prostych rowkach typ 150 GG, materiał obrabiany: AISi7.

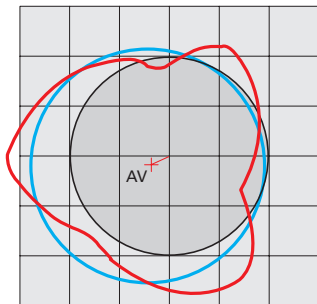


Typowe charakterystyki jakości wykonania otworów

1. 42CrMo4V, \varnothing 14.5 mm

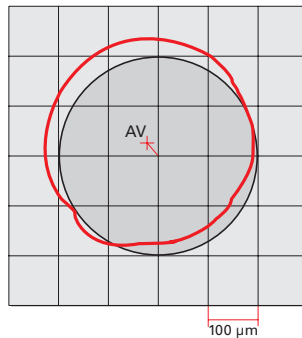
wiertła HSS, typ N
nr art. 651 **S**

vc = 25 m/min
f = 0.25 mm/obr
+Rmax = 131.8 μ m
-Rmax = -49.1 μ m
D rzeczywista = 14.566 mm
dRmax = 103.5 μ m
AV = 49.2 μ m
Ra = 2.6 μ m, Rz = 6.8 μ m **IT12**



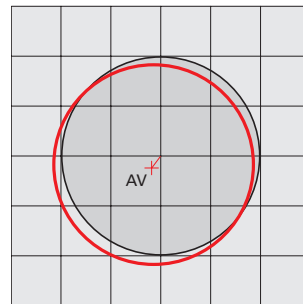
Wiertła Ratio, typ RT 80
nr art. 1171 **S**

vc = 70 m/min
f = 0.25 mm/obr
+Rmax = 42.7 μ m
-Rmax = -29.6 μ m
D rzeczywista = 14.515 mm
dRmax = 12.9 μ m
AV = 35.3 μ m
Ra = 1.4 μ m, Rz = 4.31 μ m **IT9**



Wiertła Ratio, typ RT 100
nr art. 1181 **S**

vc = 70 m/min
f = 0.25 mm/obr
+Rmax = 26.7 μ m
-Rmax = -17.2 μ m
D rzeczywista = 14.509 mm
dRmax = 5.2 μ m
AV = 22.8 μ m
Ra = 1.04 μ m, Rz = 3.2 μ m **IT8**



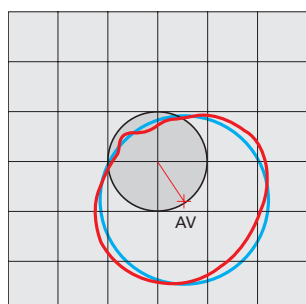
Całkowita wartość max. dodatnich i ujemnych odchyień jest sumą wszystkich białych w odniesieniu do czarnego okręgu, wykonywana poprzez pomiar standardowym przyrządem (dRmax). Czerwone linie (krzyżyk) w środku okręgu pokazują kierunek i amplitudę przemieszczenia AV (przesunięcie z osi) w wykonanym otworze w stosunku do rzeczywistego środka. Parametr ten pokazuje największe odchylenie, które jest decydujące dla klasy jakości IT otworu, w odniesieniu do

średnicy narzędzia. Czarny okrąg na diagramie reprezentuje średnicę nominalną otworu, jaką narzędzie teoretycznie może wykonać. Czerwony zarys pokazuje kształt który w rzeczywistości uzyskano. Średnia wartość promienia dla czerwonego zarysu, tj średnia średnica, przedstawiona jest jako niebieski okrąg. (dla naszych wiertel typu Ratio średnia średnica jest praktycznie taka sama jak średnica wykonanego otworu)

2. GGG40, \varnothing 10.0 mm

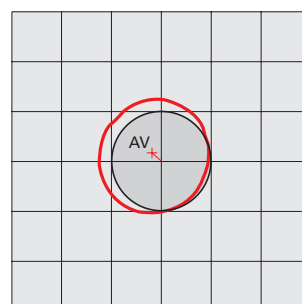
wiertła HSS, typ N
nr art. 651 **S**

vc = 30 m/min
f = 0.2 mm/obr
D rzeczywista = 10.077 mm
+Rmax = 106 μ m
-Rmax = -28 μ m
dRmax = 42 μ m
AV = 68.5 μ m
Ra = 3.7 μ m, Rz = 17.2 μ m **IT12**



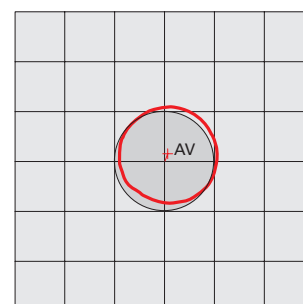
Wiertła Ratio, typ RT 100
nr art. 1181 **S**

vc = 90 m/min
f = 0.3 mm/obr
D rzeczywista = 10.027 mm
+Rmax = 34 μ m
-Rmax = -9.2 μ m
dRmax = 6.5 μ m
AV = 22.5 μ m
Ra = 2.2 μ m, Rz = 11.5 μ m **IT9**



Wiertła Ratio, typ RT 150 GG
nr art. 768 **O**

vc = 130 m/min
f = 0.2 mm/obr
D rzeczywista = 9.994 mm
+Rmax = 11.5 μ m
-Rmax = -18 μ m
dRmax = 5 μ m
AV = 14 μ m
Ra = 1.99 μ m, Rz = 11.2 μ m **IT8**





Wiercenie lufowe - wprowadzenie

W obróbce skrawaniem wiercenie na głębokość $15xD$ i powyżej traktuje się jako głębokie wiercenie, oczywiście wiertłami lufowymi można również wykonywać krótsze otwory. Uzyskuje się przy tym wszystkie zalety wiercenia lufowego takie jak: wysoka gładkość powierzchni, mała odchyłka współosiowości i optymalna prostoliniowość.

Chłodzenie z wysokim ciśnieniem - stało się sprawą oczywistą.

W ostatnich latach zastosowanie chłodzenia wewnętrznego stało się powszechne dla wszystkich typów narzędzi do obróbki otworów. Aby chłodziwo spełniło swoją rolę musi być dostarczone bezpośrednio do strefy skrawania. Dzięki temu uzyskano znaczny wzrost trwałości i zmniejszenie podatności na pękanie wiertel krętych, gwintowników, itp. Obecnie każda konwencjonalna obrabiarka może być dostarczona z opcją wewnętrznego doprowadzenia chłodziwa pod wysokim ciśnieniem i dlatego może być zastosowana do wiercenia głębokich otworów. Udział wiertel lufowych w wyposażeniu obrabiarek CNC jest coraz większy, co świadczy o wzroście popularności tego typu obróbki.

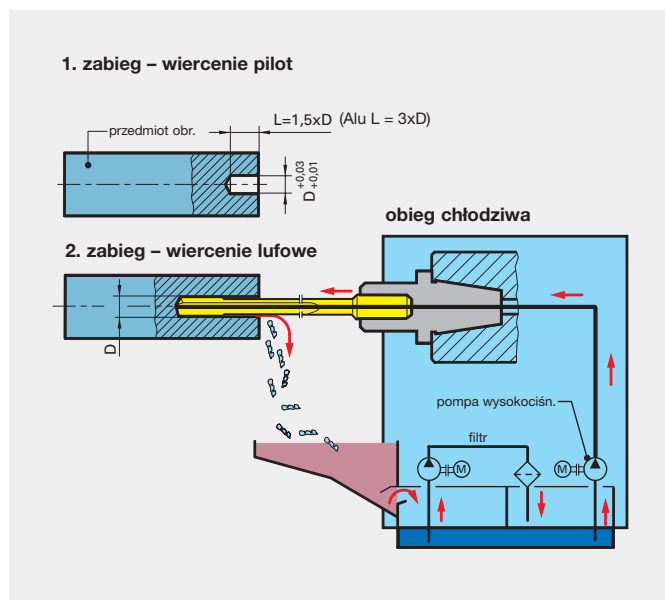


Wiertła lufowe muszą być zawsze podparte w trakcie wprowadzania w materiał. Wiertel lufowych nie można wprowadzać na pełne obroty bez ich podparcia w otworze lub tulejce wiertarskiej.

Uwaga!

Wiertła lufowe z chwytami stalowymi w większości przypadków nie są odpowiednie do mocowania termoskurczowego (poza wyjątkiem - patrz strona T16)

Wiercenie lufowe na obrabiarkach konwencjonalnych



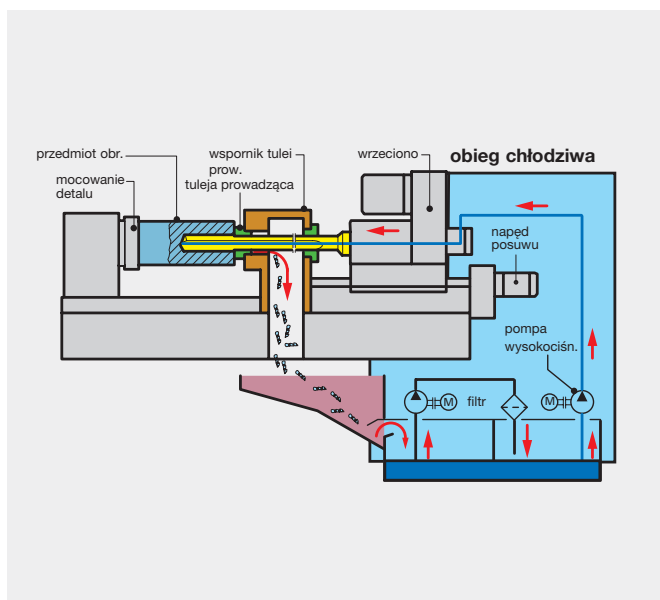
Typowy proces wiercenia lufowego na obrabiarkach konwencjonalnych:

- wykonać otwór pilotujący ($L = 1,5 \times D$ / Alu $L \approx 3 \times D$, w tolerancji H8)
- Wprowadzić wiertło na obrotach ok. 200 obr/min i z posuwem ok. 500 mm/min. Narzędzia powyżej $40xD$ wprowadzać do otworu pilotującego na lewych obrotach.
- włączyć wymagane ciśnienie chłodziwa i obroty.
- wiercić na pełną głębokość otworu bez odwiórowania. Przy zastosowaniu wiertel lufowych o dużej smukłości (np. EB 100 od długości rowka wiórowego 160 mm) zaleca się, aby do głębokości wiercenia ok. 25 mm pracować na zredukowanych parametrach (tj. ok. 75% optymalnej szybkości skrawania).
- po osiągnięciu żądanej głębokości wiercenia wyłączyć chłodzenie.
- powrót z szybkim posuwem i wyłączonymi obrotami.

Ważne uwagi

- Przy głębokościach wiercenia ponad $40xD$ zalecamy zastosowanie dwóch lub więcej wiertel lufowych, np. $\varnothing 10 \times 400$ mm i $\varnothing 9,95 \times 800$ mm.
- Wiertła lufowe do otworów $> 40xD$ powinny być wprowadzane do otworu pilotującego na lewych obrotach.
- Przy wymianie narzędzi powyżej $40xD$ można ustabilizować narzędzie poprzez wyłączenie na 1 sekundę ciśnienia wewnętrznego chłodzenia.
- Do obróbki materiałów długowiórowych zaleca się wiertła lufowe z polerowanymi rowkami wiórowymi.
- Zaleca się stosowanie emulsji z min. 10% stężeniem.
- Wiertła lufowe jednoostrzowe do długowiórowego aluminium powinny mieć oszlifowany wierzchołek pod kątem 180° z odsadzeniem na wypływ chłodziwa.
- Przy nawiercaniu w stopie Al z zawartością Si $< 1\%$, tzn. dla zalecanych szybkości $V_c > 160$ m/min sugerujemy, aby docelowe obroty zastosować dopiero po. Oprócz tego należy wykonać dłuższy otwór pilotujący do ok. $3xD$.

Obrabiarki do głębokiego wiercenia





Poniżej przedstawiony program części chwytowych posiadamy na składzie, ale stanowi on tylko pewien wybór możliwości. Oczywiście produkujemy również specjalne chwyt wg rysun-

ków klientów. Uwaga! Wiertła EB 100 wymagają chwytów ze wzmocnieniem. Więcej informacji udzielamy na życzenie.

Chwyt dla obrabiarek do głębokiego wiercenia

1

kod	d ₁	l ₁	l ₂	l ₃
1.1	10	40	24	-
1.2	10	40	24	45
1.3	10	40	24	55
1.4	16	45	31,2	-
1.5	25	70	34	-
1.6	25	70	34	78

5

kod	d ₁	l ₁	l ₂
5.1	10	60	20
5.2	16	80	28
5.3	25	100	50
5.4	10	100	-
5.5	10	110	-

2

kod	d ₁	l ₁	l ₂	l ₃
2.1	16	50	47	-
2.2	16	50	47	55
2.3	16	50	47	70

6

kod	d ₁	l ₁
6.1	12,7	38
6.2	19,05	70
6.3	38,1	70

3

kod	d ₁	l ₁	l ₂	l ₃
3.1	25	70	34	100

7

kod	d ₁	l ₁	l ₂
7.1	16	112	73
7.2	20	126	82

4

kod	d ₁	l ₁
4.1	19,05	70
4.2	12,70	70
4.3	25,40	70
4.4	31,75	-
4.5	36,10	70

Chwyt wg DIN 1835

forma E

9

kod	d ₁	l ₁
9.1	8	36
9.2	10	40
9.3	12	45
9.4	16	48
9.5	20	50
9.6	25	56
9.7	32	60
9.8	31,75	70
9.9	38,1	70
9.10	40	70

Chwyt wg DIN 6535

forma HA

10

kod	d ₁	l ₁
10.1	8	36
10.2	10	40
10.3	12	45
10.4	16	48
10.5	20	50
10.6	25	56
10.7	32	60
10.8	25	70
10.9	40	70

Chwyt wg VDI

12

kod	d ₁	l ₁
12.1	10	68
12.2	16	90
12.3	25	112

mogą być też używane na wiertarkach do głębokich otworów

forma HB

8

z kodem 8.6, 8.7, 8.8

kod	d ₁	l ₁
8.1	8	36
8.2	10	40
8.3	12	45
8.4	16	48
8.5	20	50
8.6	25	56
8.7	32	60
8.8	40	70

Chwyt wg systemu Speed-Bit

13

kod	d ₁	l ₁	l ₂
13.1	16	40	16
13.2	25	50	25
13.2	35,6	60	-

mogą być też używane na wiertarkach do głębokich otworów

forma HE

11

kod	d ₁	l ₁
11.1	8	36
11.2	10	40
11.3	12	45
11.4	16	48
11.5	20	50
11.6	25,4	70
11.7	25	56
11.8	32	60
11.9	40	70

podobne do HA (moc. skurcz.)

16

kod	d ₁	l ₁
16.1	10	50
16.2	16	64
16.3	20	70
16.4	25	81
16.5	32	92

podobne do forma HE

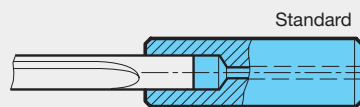
17

kod	d ₁	l ₁
17.1	19,05	70
17.2	25,40	70
17.3	31,75	70
17.4	38,1	70

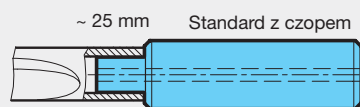
mogą być też używane na wiertarkach do głębokich otworów

Sposoby połączenia chwytu z rurką

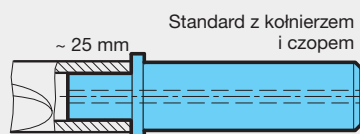
Wersja dla Ø nom. < Ø chwytu (różnica min. 6 mm): rurka umieszczona w otworze chwytu.



Wersja dla Ø nom. ≤ Ø chwytu: rurka osadzona na czopie chwytu.



Wersja dla Ø nom. > Ø chwytu: rurka osadzona na czopie chwytu i oparta na kołnierzu, Ø wew. rurki > Ø chwytu.

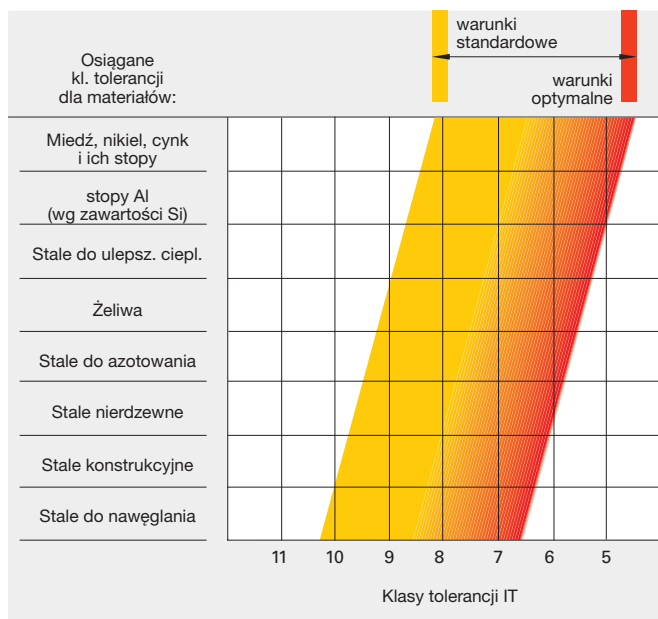




Precyzja wiertel lufowych 1-ostrzowych

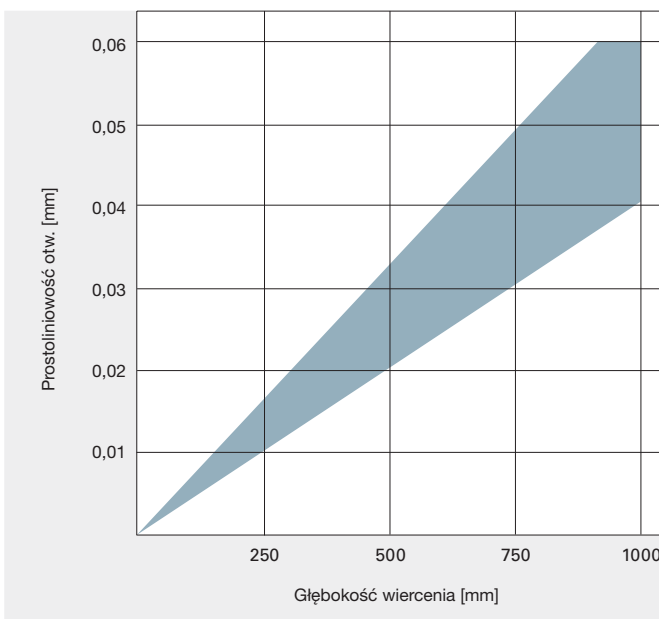
Klasy dokładności*

Wiertłami lufowymi 1-ostrzowymi można uzyskać wyższe klasy dokładności, ponieważ siły skrawania działające na ostrze przejmowane są przez prowadnice. Inaczej dzieje się np. w wiertłach krętych, gdzie już małe odchyłki na obu ostrzach powodują zdecydowane powiększanie otworu.



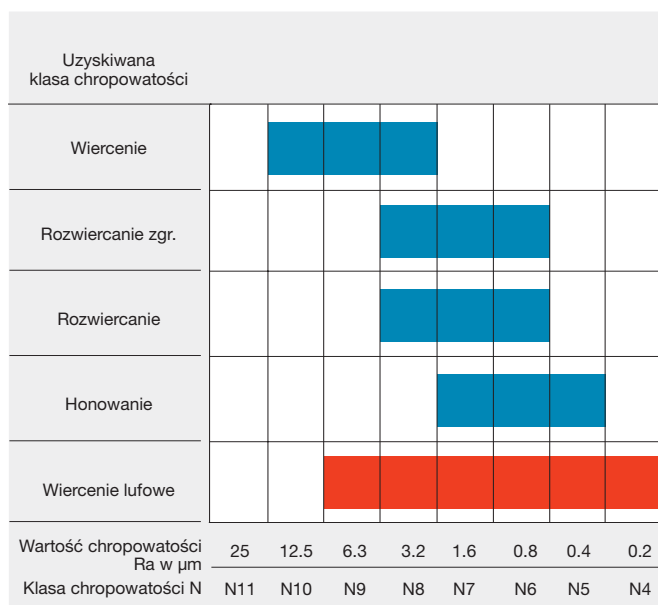
Prostoliniowość otworu*

Precyzyjna główka węglkowa w wiertłach lufowych 1-ostrzowych jest lutowana do elastycznej rurki, dzięki czemu narzędzie wykonuje prostoliniowy otwór, gdyż ewentualne błędy bicia promieniowego nie mają na to wpływu. Jednakże, wady materiałowe i inne czynniki mogą pogorszyć prostoliniowość wykonywanego otworu.



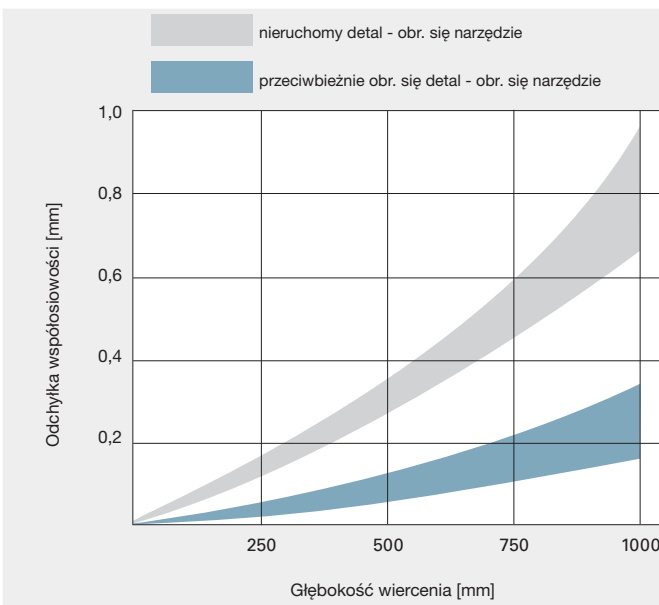
Jakość powierzchni*

Siły oddziaływujące na ostrze przejmowane są przez prowadnice, które dodatkowo wygładzają powierzchnię na całym obwodzie. Warstwa smaru pomiędzy prowadnicami i powierzchnią otworu odgrywa tu bardzo ważną rolę. Im lepszy jest środek chłodziwo-smarujący, tym gładzsza jest powierzchnia obrabiana.



Współosiowość*

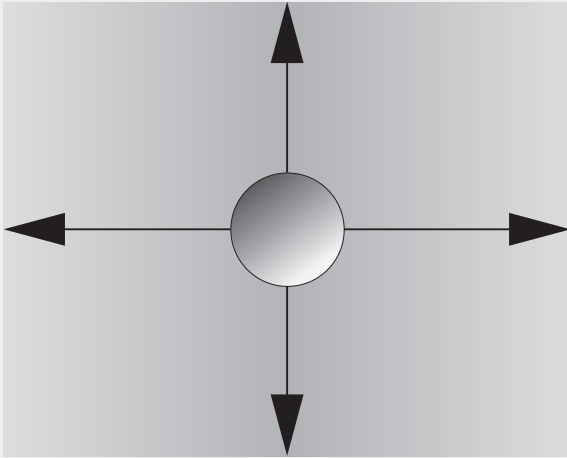
Jeśli otwór wykonywany jest np. handlowym wiertłem krętym, to jakość jego naostrzenia ma m.in. wpływ na współosiowość wykonywanych otworów. Krawędzie tnące są wówczas nierównomiernie obciążone. Przy jednoostrzowych wiertłach lufowych prowadnice przejmują na siebie te siły, co daje dobrą współosiowość.



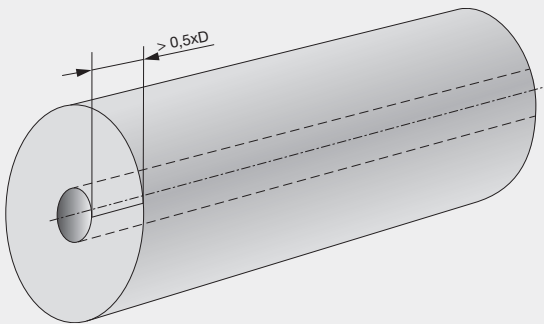
* dwuostrzowe wiertła lufowe – zarówno z prostymi jak i skrętnymi rowkami wiórowymi – osiągają ok. 50% podanych tu wartości



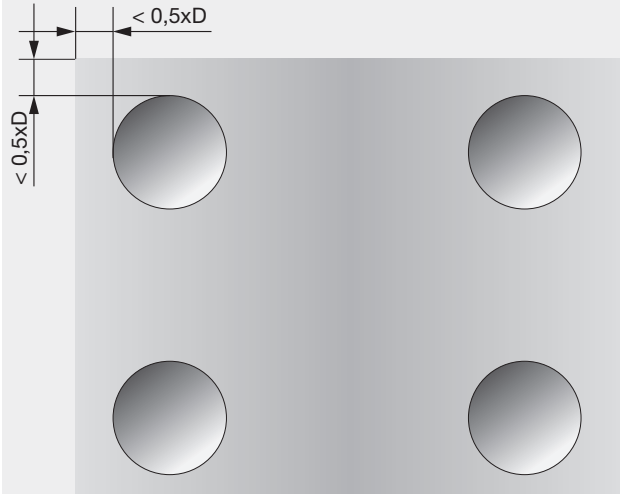
Prostoliniowość otworu / odchylenia



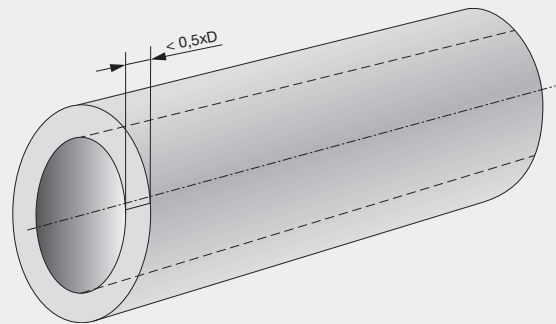
Odległość otworu od krawędzi $> 0,5xD$



Wystarczająca grubość ścianki
($> 0,5xD$) → optymalnie



Odległość otworu od krawędzi $< 0,5xD$



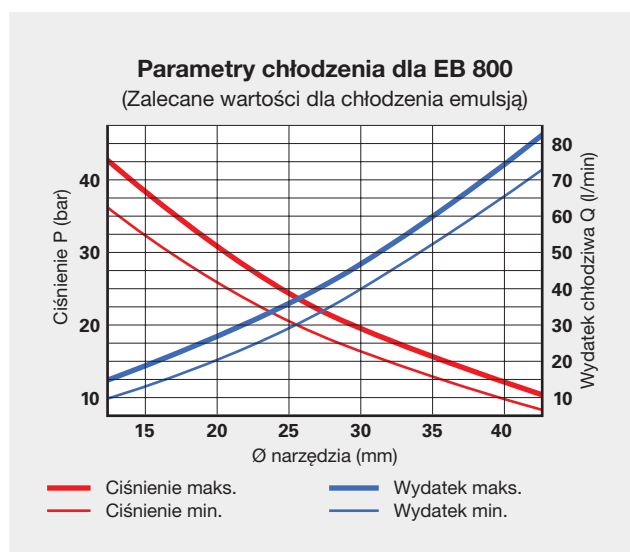
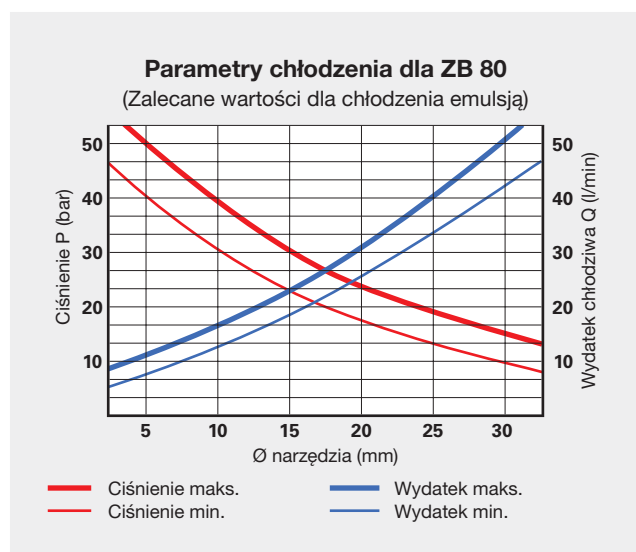
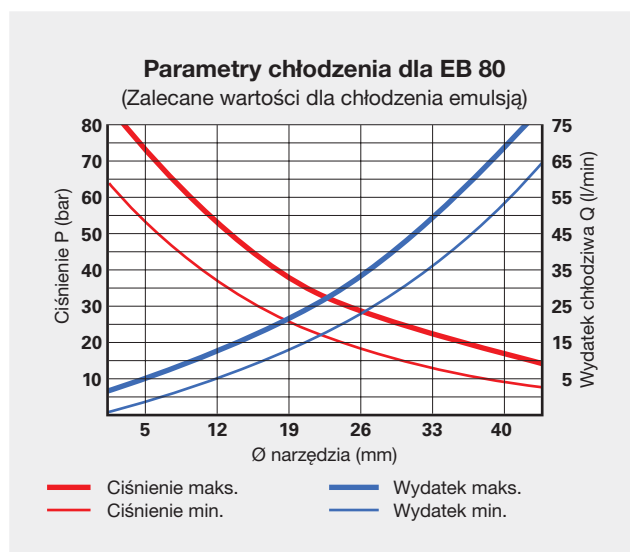
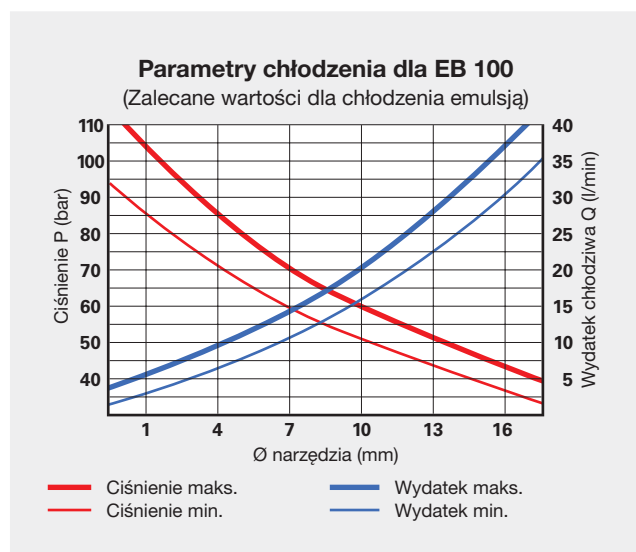
Minimalna grubość ścianki ($0,5xD$)
słabe prowadzenie → może powodować utratę
prostoliniowości otworu



Parametry chłodzenia

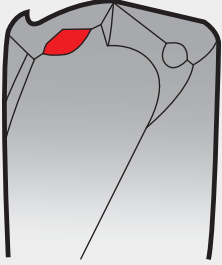
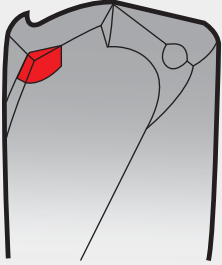
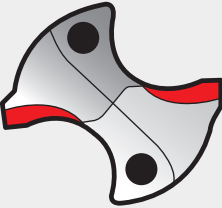
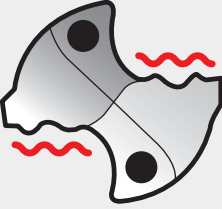
Ogólne zalecenia:

- Wszystkie wiertła lufowe muszą być stosowane z wewnętrznym chłodzeniem: powietrzem, emulsją lub czystym olejem. Bez wewnętrznego chłodzenia wióry nie mogą być usuwane z otworu.
- Wszystkie wiertła lufowe mogą być używane dla chłodzenia czystym olejem. Należy wtedy zwiększyć ciśnienie chłodziwa o 30% aby zapewnić wymagane parametry chłodzenia.
- Podczas stosowania wiertel lufowych z chłodzeniem MMS/MQL może być konieczne zwiększenie ciśnienia chłodziwa dla mniejszych średnic narzędzi.
- Jeżeli ciśnienie i wydatek chłodziwa nie są wystarczające należy zredukować parametry skrawania. Możliwe jest też zastosowanie systemów podnoszących ciśnienie chłodziwa.
- Wraz ze zwiększaniem długości narzędzi wzrasta też wartość ciśnienia potrzebnego do przetransportowania chłodziwa przez kanałki chłodzące.



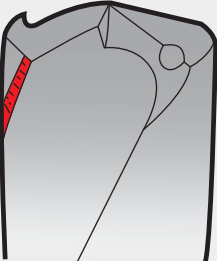

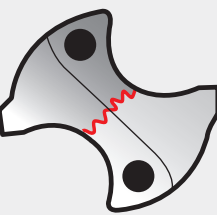
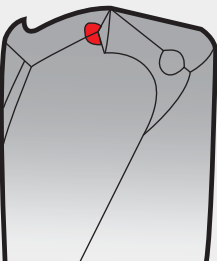


Rozwiązywanie problemów

Problem	Przyczyna	Rozwiązanie
1. Narost na ostrzu 	<ul style="list-style-type: none"> ■ zbyt niska prędkość skrawania ■ zbyt duże honowanie krawędzi skrawającej ■ ostrze skrawające bez powłoki 	<ul style="list-style-type: none"> ■ zwiększyć prędkość skrawania ■ zmniejszyć honowanie krawędzi skrawającej ■ użyć narzędzie z powłoką
2. Wykruszenia na narożach 	<ul style="list-style-type: none"> ■ mało stabilne warunki, niewłaściwe mocowanie części obrab. ■ zbyt duże bicie narzędzia ■ obróbka przerywana 	<ul style="list-style-type: none"> ■ poprawić mocowanie części obrab. ■ sprawdzić bicie narzędzia ■ zmniejszyć posuw
3. Duże zużycie powierzchni przyłożenia 	<ul style="list-style-type: none"> ■ zbyt duża prędkość skrawania ■ zbyt mały posuw ■ zbyt mały kąt przyłożenia 	<ul style="list-style-type: none"> ■ zmniejszyć prędkość skrawania ■ zwiększyć posuw ■ zwiększyć kąt przyłożenia
4. Wykruszenia na ostrzach 	<ul style="list-style-type: none"> ■ mało stabilne warunki, niewłaściwe mocowanie części obrab. ■ obróbka przerywana ■ przekroczona wielkość zużycia ostrza ■ niewłaściwy typ narzędzia 	<ul style="list-style-type: none"> ■ poprawić mocowanie części obrab. ■ zmniejszyć posuw ■ zwiększyć częstotliwość wymian narzędzia ■ użyć odpowiedniego narzędzia

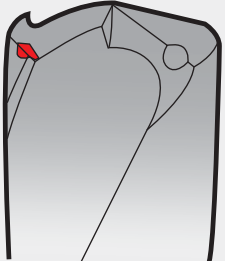
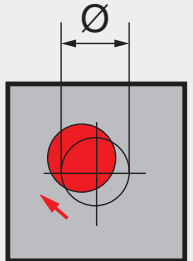
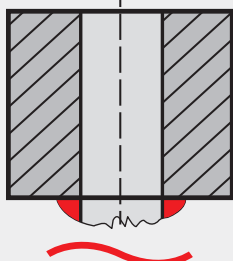
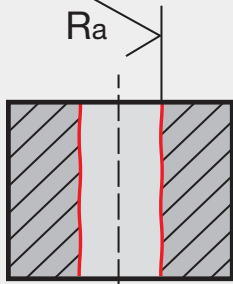


Rozwiązywanie problemów

Problem	Przyczyna	Rozwiązanie
5. Zużycie łysinek 	<ul style="list-style-type: none"> ■ mało stabilne warunki, niewłaściwe mocowanie części obrab. ■ zbyt duże bicie narzędzia ■ zbyt mała zbieżność wiertła ■ niewłaściwe chłodziwo (zbyt mała zawartość oleju) 	<ul style="list-style-type: none"> ■ poprawić mocowanie części obrab. ■ sprawdzić bicie narzędzia ■ zwiększyć zbieżność wiertła ■ zwiększyć zawartość oleju w emulsji lub użyć czysty olej
6. Uszkodzenie korpusu wiertła 	<ul style="list-style-type: none"> ■ mało stabilne warunki, niewłaściwe mocowanie części obrab. ■ zbyt duże bicie narzędzia ■ obróbka przerywana ■ mocno ścierający materiał obrabiany 	<ul style="list-style-type: none"> ■ poprawić mocowanie części obrab. ■ sprawdzić bicie narzędzia ■ zmniejszyć posuw ■ zwiększyć zawartość oleju w emulsji lub użyć czysty olej
7. Duże zużycie ścina 	<ul style="list-style-type: none"> ■ zbyt niska prędkość skrawania ■ zbyt duży posuw ■ zbyt duże honowanie krawędzi skrawającej 	<ul style="list-style-type: none"> ■ zwiększyć prędkość skrawania ■ zmniejszyć posuw ■ zmniejszyć honowanie krawędzi skrawającej
8. Wykruszenia na przejściu ostrza w ścin 	<ul style="list-style-type: none"> ■ zbyt mały kąt przyłożenia ■ zbyt duże honowanie krawędzi skrawającej ■ niewłaściwy typ narzędzia 	<ul style="list-style-type: none"> ■ zwiększyć kąt przyłożenia ■ zmniejszyć honowanie krawędzi skrawającej ■ użyć odpowiedniego narzędzia



Rozwiązywanie problemów

Problem	Przyczyna	Rozwiązanie
9. Deformacja plastyczna naroża 	<ul style="list-style-type: none"> ■ zbyt duża prędkość skrawania ■ zbyt mała wydajność chłodzenia ■ brak lub niewłaściwe honowanie naroża 	<ul style="list-style-type: none"> ■ zmniejszyć prędkość skrawania ■ zwiększyć wydatek/ciśnienie chłodzenia ■ poprawić honowanie
10. Brak współosiowości otworu 	<ul style="list-style-type: none"> ■ mało stabilne warunki, niewłaściwe mocowanie części obrab. ■ zbyt duże bicie narzędzia ■ skośna powierzchnia wejścia narzędzia ■ zbyt duży ścin 	<ul style="list-style-type: none"> ■ poprawić mocowanie części obrab. ■ sprawdzić bicie narzędzia ■ użyć freza do splanowania powierzchni ■ zmniejszyć ścin
11. Duże zadziory na wyjściu otworu 	<ul style="list-style-type: none"> ■ zbyt duży posuw ■ przekroczona wielkość zużycia ostrza ■ zbyt duże honowanie krawędzi skrawającej 	<ul style="list-style-type: none"> ■ zmniejszyć posuw ■ zwiększyć częstotliwość wymian narzędzia ■ zmniejszyć honowanie krawędzi skrawającej
12. Niezadawalająca powierzchnia otworu 	<ul style="list-style-type: none"> ■ mało stabilne warunki, niewłaściwe mocowanie części obrab. ■ zbyt duże bicie narzędzia ■ zbyt mała wydajność chłodzenia 	<ul style="list-style-type: none"> ■ poprawić mocowanie części obrab. ■ sprawdzić bicie narzędzia ■ zwiększyć wydatek/ciśnienie chłodzenia



Stale szybko tnące

Do produkcji narzędzi w firmie Gühring używane są tylko materiały najwyższej jakości. Dokładna selekcja dodatków stopowych, zapewnia optymalne właściwości narzędzia przy wykonywaniu określonego zadania obróbczego.

Wolfram, molibden: zwiększają odporność na odpuszczanie i odporność na ścieranie.

Wanad: zwiększa odporność na ścieranie w narzędziach wykańczających

Kobalt: umożliwia zwiększenie temperatury hartowania i poprawia odporność na wysokie temperatury.

Oznaczenie Gühring'a	Typ	Zakres zastosowania
HSS	Standardowa stal szybko tnąca	Standardowy materiał narzędziowy do typowych zastosowań
HSCO / HSS-E	Stal szybko tnąca, kobaltowa	Stal narzędziowa o wysokiej twardości w podwyższonej temperaturze, szczególnie zalecana do pracy w materiałach generujących duże ilości ciepła i warunkach niewystarczającego chłodzenia.
M42	Stal szybko tnąca, kobaltowa (8%Co)	Stal narzędziowa ze zwiększoną twardością i odpornością na wysokie temperatury, zalecana do materiałów trudno obrabialnych.
HSS-E		
HSS-E-PM	Stal szybko tnąca, kobaltowa, wytwarzana przez spiekanie proszków	Stal narzędziowa o bardzo rozdrobnionej, homogenicznej strukturze. Dzięki niej posiada wysoką twardość i stabilność ostrzy, jest odporna na wysoką temperaturę i ścieranie



Najpopularniejsze gatunki węglików narzędziowych firmy Guhring

Poniższa tabela opisuje najczęściej stosowane gatunki węglika firmy Guhring dostępne w ofercie standardowej. Jej rozszerzeniem jest produkcja specjalna na potrzeby klienta - szczegółowe informacje na www.guehring-carbide.de

Dla ponad 80% zastosowań znanych firmie Guhring, rezultaty osiągnięte przez narzędzia z węglika DK460UF i z odpowiednim pokryciem, nie są gorsze od narzędzi z innego gatunku węglika, w tym pokrywanych. Fakt ten, w połączeniu z dostępnością tego materiału „z magazynu” tłumaczy jego popularność. W celu uzyskania dodatkowych informacji dotyczących gatunków węglików i ich zastosowania prosimy o kontakt z inżynierami firmy Guhring.

Oznaczenie Gühring'a	Zawartość Co [M-%]	Wielkość ziaren węglika wolframu [μm]	Twardość [HV]	Klasyfikacja wg ISO [ISO 513]	Opis
DK460UF K40UF	10	0,6	1620	K20-K40	Gatunek węglika o bardzo szerokim spektrum zastosowań. Stosowany jest głównie jako pokrywany, do obróbki stali, miękkich stopów aluminium, żeliwa jak również do obróbki "superstopów" np. Inconelu 718. Ten gatunek jest "filarem" naszej produkcji węglików.
DK500UF K44UF	12	0,5	1690	K20-K30	Ten gatunek został specjalnie opracowany do obróbki twardych materiałów. Posiada on większą twardość i odporność na odkształcenia niż gatunek DK460UF. Ze względu na wysoką zawartość kobaltu zdecydowanie zaleca się jego stosowanie z dodatkowym pokryciem.
DK255F	8	0,7	1720	K20	Ten gatunek jest zalecany do ciężkiej obróbki materiałów utwardzonych, ciągliwego żeliwa szarego i twardych stopów AISI. Obróbka "na sucho" jest możliwa. Zalecane jest jego stosowanie wraz z pokryciem.
DK120	6	1,3	1620	K15-K20	Ten rodzaj węglika nadaje się szczególnie do zastosowania z pokryciem diamentowym.
DK120UF	7	0,7	1850	K05-K10	Gatunek węglika o szczególnie małym ziarnie i dużej odporności na ścieranie, nadaje się do stosowania na szczególnie sztywnych obrabiarkach i jest zalecany na rozwiertaki.
K55SF	9	0,2-0,4	1920	K05-K10	Do obróbki materiałów o wysokiej odporności na ścieranie, stali nierdzewnych, materiałów kompozytowych np. Kevlar i GRP, stali szybkotnących i do obróbki "na sucho".
DK400N	10	0,7	1580	K20-K40	Bardzo wytrzymały węgiel do obróbki metali żarowytrzymałych.
DK256EH	10	0,6	1750	K20	Ten gatunek jest szczególnie zalecany do obróbki stopów na bazie niklu.
K6UF	6	0,6	1870	K05-K10	Drobnoziarnisty gatunek węglika o najwyższej odporności na ścieranie. Szczególnie zalecany do obróbki materiałów silnie ścierających, kompozytów CFRP i Kevlaru.
K5UF	5	0,5	2010	K05-K10	Nowy, bardzo twardy, gatunek węglika stosowany na wiertła i rozwiertaki. Szczególnie zalecany do obróbki materiałów kompozytowych np. CFRP

Materiały super-twarde

Nie tylko ekstremalnie wysokiej twardości, ale także odporności na wysoką temperaturę materiały supertwarde zawdzięczają osiąganie najwyższych parametrów skrawania i produktywności. Diament polikrystaliczny (PKD) charakteryzuje się najwyższą odpornością na ścieranie. Jest głównie stosowany

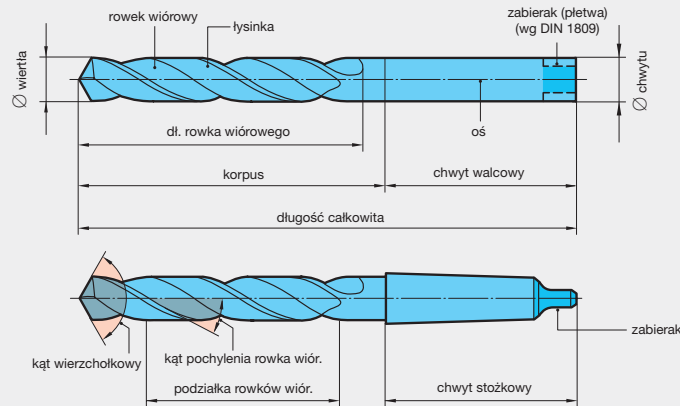
do obróbki stopów aluminium i kompozytów CFRP i GFRP. Przestrzenny azotek boru (CBN) znajduje zastosowanie w materiałach żelaznych. Aby korzystać z potencjału narzędzi z materiałów supertwardych, muszą być one stosowane na najbardziej sztywnych i wydajnych obrabiarkach.

Oznaczenie Gühring'a	Klasyfikacja	Zakres zastosowania	Średnia wielkość ziarna	Zawartość diamentu
PKD	Drobne ziarna	Aluminium i jego stopy AISi <10%Si, stopy magnezu, miedź, mosiądz, brąz, doskonała jakość ostrza skrawającego, wysoka odporność na ścieranie, najwyższa jakość obrabianej powierzchni.	2-4 µm	> 90% PKD
	Średnie ziarna	Gatunek uniwersalny (do obróbki wykańczającej) Stopy AISi <14%Si, stopy miedzi, grafity i kompozyty grafitowe, tworzywa wzmacnianych włóknami, ceramika i węgiel przed spiekaniem (o zawartości spoiwa <15%), doskonała odporność na zużycie, dobra jakość powierzchni	5-10 µm	ok. 92% PKD
	Grube ziarna	Obróbka zgrubna Stopy AISi >14%Si i inne materiały silnie ścierające, MMC, ceramika i węgiel przed spiekaniem (o zawartości spoiwa <15%), najwyższa odporność na ścieranie, wysoka udarność, wysokie trwałości narzędzi, zadowalająca jakość obrabianej powierzchni.	>25 µm	ok. 94% PKD
	Ziarna mieszane	Do materiałów silnie ścierających (np. stopy AISi >14%Si, MMC, kompozyty wzmacniane włóknami) wysoka odporność na zużycie, najwyższa udarność i odporność na ścieranie, dobra jakość powierzchni ostrzy, wysoka trwałość i dobra jakość obrabianej powierzchni.	4 µm+ 25 µm	ok. 95% PKD
PcBN 10..	Niska zawartość CBN na podkładzie węglkowym	Do obróbki stali nawęglanych, hartowanych stali do obróbki cieplnej i narzędziowych, odpowiednie do obróbki ciągłej, średnio i wysoko przerywanej, z głębokościami skrawania ap=0.5-1.5 mm. Wysoka odporność na zużycie, odporność na uderzenia i wysoką temperaturę, wysoka ciągliwość.	<1-4 µm	40-65% CBN
PcBN 20..	Wysoka zawartość CBN na podkładzie węglkowym	Do obróbki perlitycznego żeliwa szarego (>45 HRC), stali proszkowych i żeliw utwardzanych. Stosowane do obróbki ciągłej i przerywanej z głębokościami skrawania ap=0.5-1.5 mm. Wysoka odporność na ścieranie, odporność na uderzenia.	2-3 µm	70-90% CBN
PcBN 30..	Wysoka zawartość CBN bez podkładu węglkowego	Masywny materiał CBN odpowiedni do obróbki zgrubnej. Perlityczne żeliwa szare, twarde powierzchnie odlewów, stali hartowanych. Do zastosowania w oprawkach narzędziowych, wiertłach i wytaczadłach, głowicach frezujących z łapkami dociskowymi. Wysoka odporność na zużycie, odporność na uderzenia.	2-20 µm	70-87% CBN

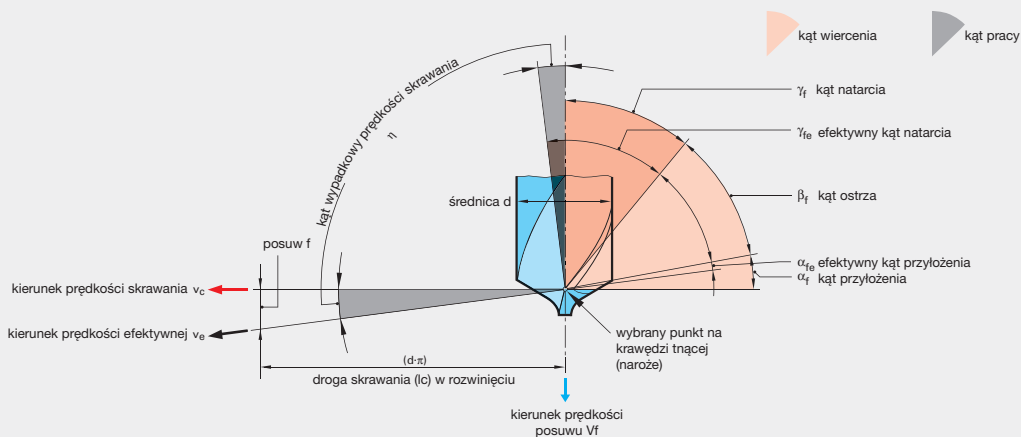
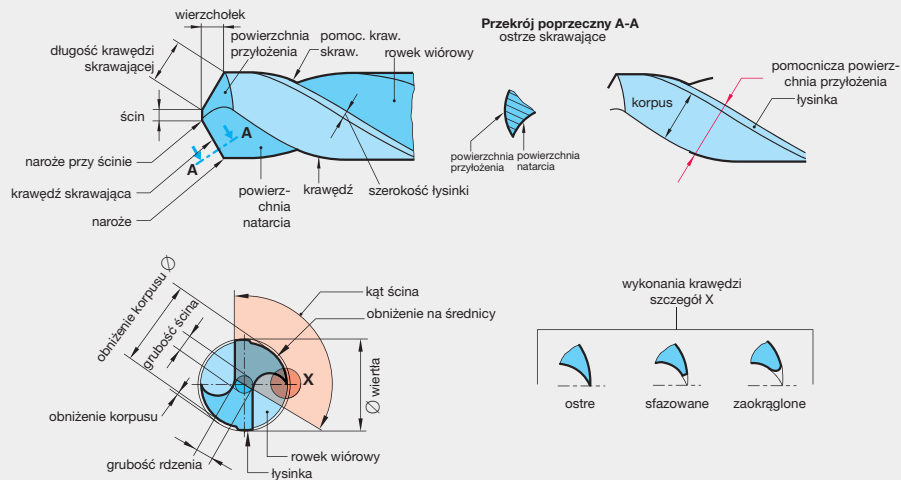


Definicje i wymiary DIN ISO 5419 (wyciąg; edycja 06/98)

Wiertła kręte z chwytem walcowym lub stożkiem Morse'a



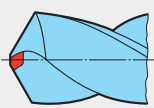
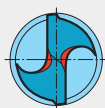
Część robocza



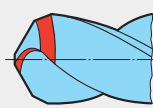
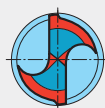


Specjalna geometria ostrza i tolerancje wykonawcze

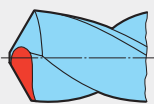
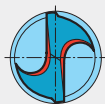
Specjalna geometria ostrza wg DIN 1412 (wyciąg; edycja 03/01)



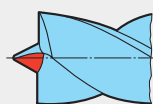
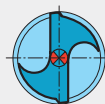
Forma A
Skorygowany
ścian



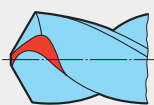
Forma D
Oszlifowanie dla żeliw
z fazą na narożu



Forma B
Skorygowany ścian oraz
główna krawędź
skrawająca



Forma E
Ze szpicem centrującym
(center point)



Forma C
Oszlifowanie krzyżowe

Tolerancje stosowane w produkcji wiertel krętych wg DIN ISO 286, część 2

wymiar nominalny do (włącznie) mm	pola tolerancji μm	
	h8	h7
0,38 ... 0,60	10	7
0,95	12	8
3,00	14	10
6,00	18	12
10,00	22	15
18,00	27	18
30,00	33	21
50,00	39	25
80,00	46	30
120,00	54	35

* Jeżeli potrzebne są inne tolerancje niż ISO h8, prosimy o informację. Opłaty dodatkowe za wykonanie innej tolerancji - patrz tabela na końcu rozdziału "Narzędzia do otworów".

Inne powiązane normy

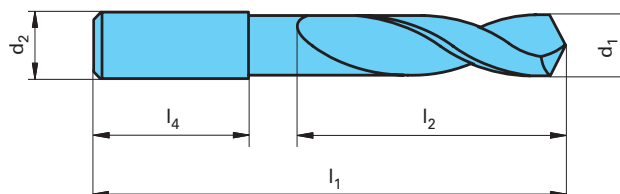
- DIN 228 Część 1 Stożek maszynowy, stożek Morse'a, stożek metryczny, chwyt stożkowy
- DIN 1414-1 wskazówki do projektowania i wykonania dla wiertel krętych ze stali szybkotnącej
- DIN 6580 Definicje dla przemysłu maszynowego; mechanizm i geometria w procesie skrawania
- DIN 6581 Definicje dla przemysłu maszynowego; Część skrawająca, układy odniesienia i kąty.

Powyższe odpisy z norm są przedrukowane za pozwoleniem Niemieckiego Instytutu Normalizacji (German Standards Institute). Większość ostatnich edycji dodano i są one udostępniane w formacie A4 DIN przez Beuth-Verlag GmbH, D-10787 Berlin.

Węglkowe wiertło kręte (Ratio)

Węglkowe wiertło kręte (Ratio) wg DIN 6537

Stosowane dla pełnowęglkowych wiertel krętych z 2 lub 3 ostrzami i chwytem walcowym wg DIN 6535

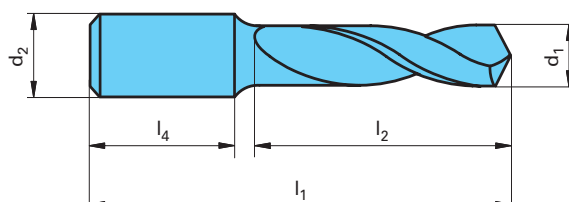


Wymiary w mm

nom. zakres Ø do d1m7	Ø chwytu d2h6	Wiertła Ratio dla 3 x D		Wiertła Ratio dla 5 x D		chwyt długość l4
		długość całkowita l1	max. dł. rowka wiórowego l2	długość całkowita l1	max. dł. rowka wiórowego l2	
2,9...3,75	6	62	20	66	28	36
4,75	6	66	24	74	36	36
6,00	6	66	28	82	44	36
7,00	8	79	34	91	53	36
8,00	8	79	41	91	53	36
10,00	10	89	47	103	61	40
12,00	12	102	55	118	71	45
14,00	14	107	60	124	77	45
16,00	16	115	65	133	83	48
18,00	18	123	73	143	93	48
20,00	20	131	79	153	101	50

Węglkowe wiertło kręte (Ratio) wg DIN 6538

Stosowane dla wiertel krętych z lutowaną płytką lub główką węglkową ze wzmocnionym chwytem walcowym (stalowym) wg DIN 6535. Lutowana główka może być jednolita lub dzielona.



Wymiary w mm

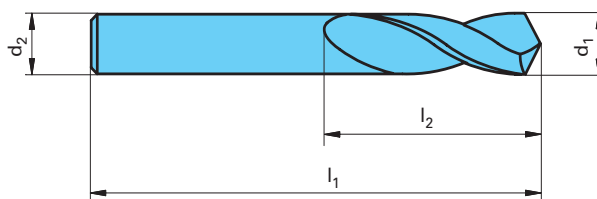
nom. zakres Ø do d1h7	Ø chwytu d2h6	Wiertła Ratio dla 3 x D		Wiertła Ratio dla 5 x D		Wiertła Ratio dla 7 x D		chwyt długość l4
		długość całkowita l1	max. dł. rowka wiórowego l2	długość całkowita l1	max. dł. rowka wiórowego l2	długość całkowita l1	max. dł. rowka wiórowego l2	
9,5...12,0	16	103	51	127	75	151	99	48
14,0	16	111	59	139	87	167	115	48
16,0	20	122	68	154	100	186	132	50
18,0	20	130	76	166	112	202	148	50
20,0	25	144	84	184	124	224	164	56
22,0	25	153	93	197	137	241	181	56
24,0	25	161	101	209	149	257	197	56
26,0	32	174	110	226	162	278	214	60
28,0	32	182	118	238	174	294	230	60
30,0	32	190	126	250	186	310	246	60



Węglkowe wiertło kręte (Ratio)

Węglkowe wiertło kręte (Ratio) wg DIN 6539

Stosowane dla krętych wiertel pełnowęglkowych z jednakową średnicą na całej długości (śred. części roboczej = śred. części chwytowej).



Wymiary w mm

nom. zakres \emptyset do (= chwyt \emptyset d2) d1	długość całkowita l1	dł. rowka wiórowego l2
1,90...2,12	38	12
2,36	40	13
2,65	43	14
3,00	46	16
3,35	49	18
3,75	52	20
4,25	55	22
4,75	58	24
5,30	62	26
6,00	66	28
6,70	70	31
7,50	74	34
8,00	79	37
8,50	79	37
9,50	84	40

nom. zakres \emptyset do (= chwyt \emptyset d2) d1	długość całkowita l1	dł. rowka wiórowego l2
10,00	89	43
10,60	89	43
11,80	95	47
12,00	102	51
13,20	102	51
14,00	107	54
15,00	111	56
16,00	115	58
17,00	119	60
18,00	123	62
19,00	127	64
20,00	131	66



Wiertła kręte z chwytem walcowym

śred. do (włącznie) mm	DIN 338		DIN 339		DIN 340		DIN 1897		DIN 1869 Wiertło bardzo długie					
									seria 1		seria 2		seria 3	
	długość całkowita	dl. rowka wiórowego	długość całkowita	dl. rowka wiórowego	długość całkowita	dl. rowka wiórowego	długość całkowita	dl. rowka wiórowego	długość całkowita	dl. rowka wiórowego	długość całkowita	dl. rowka wiórowego	długość całkowita	dl. rowka wiórowego
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
≤ 0,24	19	2,5					19	1,5						
0,30	19	3					19	1,5						
0,38	19	4					19	2						
0,48	20	5			30*	10*	19	2,5						
0,53	22	6			32*	12*	20	3						
0,60	24	7	32*	15*	35*	15*	21	3,5						
0,67	26	8	36*	18*	38*	18*	22	4						
0,75	28	9	39*	20*	42*	21*	23	4,5						
0,85	30	10	42*	22*	46*	25*	24	5						
0,95	32	11	45*	24*	51*	29*	25	5,5						
1,06	34	12	48	26	56	33	26	6						
1,18	36	14	50	28	60	37	28	7						
1,32	38	16	52	30	65	41	30	8						
1,50	40	18	55	33	70	45	32	9						
1,70	43	20	58	35	76	50	34	10	115*	75*				
1,90	46	22	62	38	80	53	36	11	120*	80*				
2,12	49	24	66	41	85	56	38	12	125	85	160*	110*	205*	135*
2,36	53	27	70	44	90	59	40	13	135	90	170*	115*	215*	145*
2,65	57	30	74	47	95	62	43	14	140	95	180*	120*	225*	150*
3,00	61	33	79	51	100	66	46	16	150	100	190	130	240*	160*
3,35	65	36	84	55	106	69	49	18	155	105	200	135	250*	170*
3,75	70	39	91	60	112	73	52	20	165	115	210	145	265	180
4,25	75	43	96	64	119	78	55	22	175	120	220	150	280	190
4,75	80	47	102	69	126	82	58	24	185	125	235	160	295	200
5,30	86	52	108	74	132	87	62	26	195	135	245	170	315	210
6,00	93	57	116	80	139	91	66	28	205	140	260	180	330	225
6,70	101	63	124	86	148	97	70	31	215	150	275	190	350	235
7,50	109	69	133	93	156	102	74	34	225	155	290	200	370	250
8,50	117	75	142	100	165	109	79	37	240	165	305	210	390	265
9,50	125	81	151	107	175	115	84	40	250	175	320	220	410	280
10,60	133	87	162	116	184	121	89	43	265	185	340	235	430	295
11,80	142	94	173	125	195	128	95	47	280*	195*	365*	250*	455*	310*
13,20	151	101	184	134	205	134	102	51	295*	205*	375*	260*	480*	330*
14,00	160	108	194	142	214	140	107	54						
15,00	169	114	202	147	220	144	111	56						
16,00	178	120	211	153	227	149	115	58						
17,00	184	125	218	159	235	154	119	60						
18,00	191	130	226	165	241	158	123	62						
19,00	198	135	234	171	247	162	127	64						
20,00	205	140	242	177	254	166	131	66						
21,20					261	171	136	68						
22,40					268	176	141	70						
23,60					275	180	146	72						
25,00					282	185	151	75						
26,50					290	190	156	78						
28,00					298	195	162	81						
30,00					307	201	168	84						
31,50					316	207	174	87						
33,50							180	90						
35,50							186	93						
37,50							193	96						
40,00							200	100						
42,50							207	104						
45,00							214	108						
47,50							221	112						
50,00							228	116						

*norma zakładowa

Firma Gühring oferuje wiertła kręte wg Normy Zakładowej o nr art. 242, 243, 244, o długości całkowitej do 1000 mm.



Wiertła z chwytem Morse'a

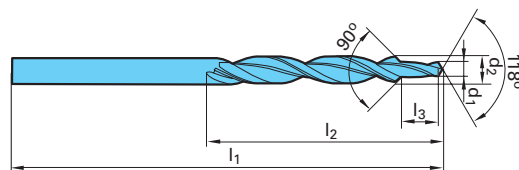
śred. do (włącznie) mm	DIN 345			DIN 346			DIN 341			Wiertła kręte ze wzmocnionym chwytem stożkowym			GV/VA-wiertła* do wiercenia materiałów trud- nych do obróbki			DIN 1870 Wiertło bardzo długie							
																seria 1			seria 2				
	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a	dlugość całkowita	dl. rowka wiórowego	stożek Morse'a		
2,65	111*	30*	1*																				
3,00	114	33	1																				
3,35	117	36	1																				
3,75	120	39	1																				
4,25	124	43	1						145*	64*	1*												
4,75	128	47	1						150*	69*	1*												
5,30	133	52	1						155	74	1												
6,00	138	57	1						161	80	1												
6,70	144	63	1						167	86	1												
7,50	150	69	1						174	93	1												
8,50	156	75	1						181	100	1			130	49	1		265	165	1	330	210	1
9,50	162	81	1						188	107	1			134	53	1		275	175	1	345	220	1
10,60	168	87	1	185*	87*	2*		197	116	1		214	116	2	138	57	1	285	185	1	360	235	1
11,80	175	94	1	192*	94*	2*		206	125	1		223	125	2	142	61	1	300	195	1	375	250	1
13,20	182	101	1	199	101	2		215	134	1		232	134	2	147	66	1	310	205	1	395	260	1
14,00	189	108	1	206	108	2		223	142	1		240	142	2	168	70	2	325	220	1	410	275	1
15,00	212	114	2	235*	114*	3*		245	147	2		268	147	3	172	74	2	340	220	2	425	275	2
16,00	218	120	2	241*	120*	3*		251	153	2		274	153	3	176	78	2	355	230	2	445	295	2
17,00	223	125	2	246*	125*	3*		257	159	2		280	159	3	179	81	2	355	230	2	445	295	2
18,00	228	130	2	251*	130*	3*		263	165	2		286	165	3	183	85	2	370	245	2	465	310	2
19,00	233	135	2	256	135	3		269	171	2		292	171	3	186	88	2	370	245	2	465	310	2
20,00	238	140	2	261	140	3		275	177	2		298	177	3	212	91	3	385	260	2	490	325	2
21,20	243	145	2	266	145	3		282	184	2		305	184	3	216	95	3	385	260	3	490	325	3
22,40	248	150	2	271	150	3		289	191	2		312	191	3	219	98	3	405	270	3	515	345	3
23,02	253	155	2	276	155	3		296	198	2		319	198	3	222	101	3	405	270	3	515	345	3
23,60	276	155	3	304*	155*	4*		319	198	3		347	198	4	222	101	3	425	270	3	535	345	3
25,00	281	160	3	309*	160*	4*		327	206	3		355	206	4	225	104	3	440	290	3	555	365	3
26,50	286	165	3	314*	165*	4*		335	214	3		363	214	4	256	107	4	440	290	3	555	365	3
28,00	291	170	3	319	170	4		343	222	3		371	222	4	259	110	4	460	305	3	580	385	3
30,00	296	175	3	324	175	4		351	230	3		379	230	4	263	114	4	460	305	3	580	385	3
31,50	301	180	3	329	180	4		360	239	3		388	239	4	266	117	4	480	320	3	610	410	3
31,75	306	185	3	334	185	4		369	248	3		397	248	4	269	120	4	480	320	3	610	410	3
33,50	334	185	4	372*	185*	5*		397	248	4		435	248	5	269	120	4	505	320	4	635	410	4
35,50	339	190	4	377*	190*	5*		406	257	4					272	123	4	530	340	4	665	430	4
37,50	344	195	4	382*	195*	5*		416	267	4					276	127	4	530	340	4	665	430	4
40,00	349	200	4	387*	200*	5*		426	277	4					317	130	5	555	360	4	695	460	4
42,50	354	205	4	392	205	5		436	287	4					320	133	5	555	360	4	695	460	4
45,00	359	210	4	397	210	5		447	298	4					323	136	5	585	385	4	735	490	4
47,50	364	215	4	402	215	5		459	310	4								585	385	4	735	490	4
50,00	369	220	4	407	220	5		470	321	4								605	405	4	765	510	4
50,80	374	225	4	412	225	5		475*	326*	4*													
53,00	412	225	5	479*	225*	6*		513*	326*	5*													
56,00	417	230	5	484*	230*	6*		518*	331*	5*													
60,00	422	235	5	489*	235*	6*		523*	336*	5*													
63,00	427	240	5	494*	240*	6*																	
67,00	432	245	5	499	245	6																	
71,00	437	250	5	504	250	6																	
75,00	442	255	5	509	255	6																	
76,50	447	260	5	514	260	6																	
80,00	514	260	6																				
85,00	519	265	6																				
90,00	524	270	6																				
95,00	529	275	6																				
100,00	534	280	6																				
106,00	539*	285*	6*																				

Firma Gühring oferuje wiertła kręte wg Normy Zakładowej o nr art. 293, 298, 299, 563, 564, 565, 566, o długości całkowitej do 1000 mm.

*norma zakładowa



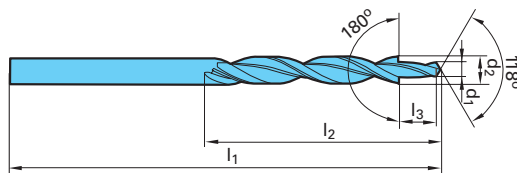
Wiertło stopniowe (90°) wielolysinkowe z chwytem walcowym



Ø pogłębienia d2 h8 mm	Ø otworu d1 h9 mm	długość całkowita l1 mm	dł. rowka wiórowego l2 mm	długość stopnia l3 mm	do gwint	zakres zastosowań
			HSS DIN 8378/	Węglik	Norma zakładowa	
3,4	2,5	70	39	8,8	M 3	Do otworów pod gwinty wg DIN 336 i pogłębień zgodnych z luźnymi otworami wg DIN-ISO 273 (norma stara) i DIN EN 20273 »wykonanie średniokokładne«.
4,5	3,3	80	47	11,4	M 4	
5,5	4,2	93	57	13,6	M 5	
6,6	5,0	101	63	16,5	M 6	
9,0	6,8	125	81	21,0	M 8	
11,0	8,5	142	94	25,5	M10	
13,5	10,2	160	108	30,0	M12	
DIN 8374 dla pogłębień, wykonanie dokładne						
6,0	3,2	93	57	9,0	M 3	Dla otworów wg DIN-ISO 273 (stara norma), DIN EN 20273 »wykonanie dokładne«, pogłębień pod łby śrub formy A i B wg DIN 74 część 1 (norma stara) »wykonanie dokładne« i pogłębień pod łby śrub forma F wg DIN 74. Dla śrub wg DIN 963 (stara norma) i DIN 964 (stara norma).
8,0	4,3	117	75	11,0	M 4	
10,0	5,3	133	87	13,0	M 5	
11,5	6,4	142	94	15,0	M 6	
15,0	8,4	169	114	19,0	M 8	
19,0	10,5	198	135	23,0	M10	
Pogłębienia wg normy zakładowej, wykonanie średniokokładne						
6,6	3,4	101	63	9,0	M 3	Dla otworów wg DIN-ISO 273 (stara norma) i pogłębień pod łby śrub formy A i B wg DIN 74 część 1 (stara norma), »wykonanie średniokokładne«. Dla śrub wg DIN 963 (stara norma) i DIN 964 (stara norma).
9,0	4,5	125	81	11,0	M 4	
11,0	5,5	142	94	13,0	M 5	
13,0	6,6	151	101	15,0	M 6	
17,2	9,0	191	130	19,0	M 8	
Pogłębienia wg DIN 8374, wykonanie średniokokładne						
7,5	3,4	109	69	9,0	M 3	Dla otworów wg DIN-ISO 273 (stara norma) i pogłębień pod łby śrub formy A i B wg DIN 74 część 1 (stara norma), »wykonanie średniokokładne«. Dla śrub wg DIN 963 (stara norma) i DIN 964 (stara norma).
9,7	4,5	133	87	11,0	M 4	
12,0	5,5	151	101	13,0	M 5	
14,5	6,6	169	114	15,0	M 6	
19,9	9,0	198	135	19,0	M 8	



Wiertło stopniowe (180°) wielołyśinkowe z chwytem walcowym

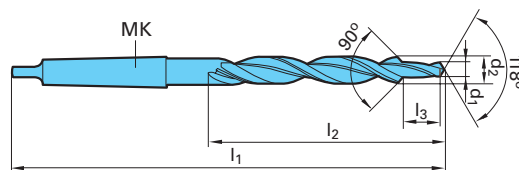


Ø pogłębienia d2 h8 mm	Ø otworu d1 h9 mm	długość całkowita l1 mm	dł. rowka wiórowego l2 mm	długość stopnia l3 mm	do gwint	zakres zastosowań
			HSS DIN 8376/	Węglik	Norma zakładowa	
6,0**	3,4	93**	57**	9,0	M 3	Dla otworów wg DIN-ISO 273 (stara norma), DIN EN 20273 »wykonanie średniodokładne«, pogłębień pod łby śrub wg DIN 974-1 i pogłębień pod łby śrub formy H, J i K wg DIN 74 część 2 (stara norma): »wykonanie średniodokładne«. Dla śrub wg DIN 84 (stara norma), 912 (stara norma), 6912, 7513 i DIN 7984.
6,5	3,4	101	63	9,0	M 3	
8,0	4,5	117	75	11,0	M 4	
10,0	5,5	133	87	13,0	M 5	
11,0	6,6	142	94	15,0	M 6	
15,0	9,0	169	114	19,0	M 8	
18,0	11,0	191	130	23,0	M10	
Norma zakładowa						
6,0	3,2	93	57	9,0	M 3	Dla otworów wg DIN-ISO 273 (stara norma) i pogłębień pod łby śrub forma H, J i K wg DIN 74 część 2 (stara norma): »wykonanie dokładne«. Dla śrub wg DIN 84 (stara norma), 912 (stara norma), 6912, 7513 i DIN 7984.
8,0	4,3	117	75	11,0	M 4	
Normy zakładowe dla pogłębień, wykonanie dokładne (stara norma*)						
5,9	3,2	93	57	11,0	M 3	Dla śrub wg DIN 84 (stara norma), DIN 912 (stara norma) i DIN 6912. Dla „starych“ pogłębień pod łby śrub formy H, J i K wg DIN 75 część 2: »wykonanie dokładne«.
7,4	4,3	109	69	13,0	M 4	
9,4	5,3	125	81	16,0	M 5	
10,4	6,4	133	87	19,0	M 6	
13,5	8,4	160	108	22,0	M 8	
16,5	10,5	184	125	25,0	M10	
Norma zakładowa dla pogłębień, wykonanie średniodokładne (norma stara*)						
8,0	4,8	117	75	13,0	M 3	Dla śrub wg DIN 84 (stara norma), DIN 912 (stara norma) i DIN 6912. Dla „starych“ pogłębień pod łby śrub forma H, J i K wg DIN 75 część 2: »wykonanie średniodokładne«.
10,0	5,8	133	87	16,0	M 4	
11,0	7,0	142	94	19,0	M 5	
14,5	9,5	169	114	22,0	M 6	
17,5	11,5	191	130	25,0	M 8	

* DIN 75, część 2; ** Normy zakładowe



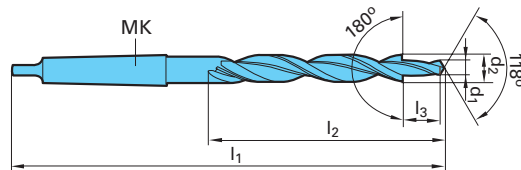
Wiertło stopniowe (90°), z chwytem Morse'a



Ø pogłębienia d2 h8 mm	Ø otworu d1 h9 mm	długość całkowita l1 mm	dł. rowka wiórowego l2 mm	Morse'a stożek MK	długość stopnia l3 mm	do gwint	zakres zastosowań
Norma zakładowa							
11,0	5,5	175	94	1	13,0	M 5	Dla otworów wg DIN-ISO 273 (stara norma), DIN EN 20273 »wykonanie średniodokładne«, pogłębień pod łby śrub forma F wg DIN 74 i pogłębień pod łby śrub forma A i B wg DIN 74 część 1 (norma stara), »wykonanie średniodokładne«. Dla śrub wg DIN 963 (stara norma) i DIN 964 (stara norma).
13,0	6,6	182	101	1	15,0	M 6	
17,2	9,0	228	130	2	19,0	M 8	
21,5	11,0	248	150	2	23,0	M10	
26,0	14,0	286	165	3	27,0	M12	
29,0	16,0	296	175	3	31,0	M14	
DIN 8375							
12,0	5,5	182	101	1	13,0	M 5	Dla otworów wg DIN-ISO 273 (stara norma), DIN EN 20273 »wykonanie średniodokładne«, pogłębień pod łby śrub forma F wg DIN 74 i pogłębień pod łby śrub forma A i B wg DIN 74 część 1 (norma stara), »wykonanie średniodokładne«. Dla śrub wg DIN 963 (stara norma) i DIN 964 (stara norma).
14,5	6,6	---	108	1	15,0	M 6	
19,0	9,0	253	135	2	19,0	M 8	
23,0	11,0	248	155	2	23,0	M10	
Norma zakładowa							
11,5	6,4	175	94	1	15,0	M 6	Dla otworów wg DIN-ISO 273 (stara norma) i pogłębień pod łby śrub formy A i B wg DIN 74 część 1 (stara norma), »wykonanie dokładne«. Dla śrub wg DIN 963 (stara norma) i DIN 964 (stara norma).
15,0	8,4	212	114	2	19,0	M 8	
19,0	10,5	233	135	2	23,0	M10	
23,0	13,0	253	155	2	27,0	M12	
26,0	15,0	286	165	3	31,0	M14	
30,0	17,0	296	175	3	35,0	M16	
DIN 8379							
9,0	6,8	162	81	1	21,0	M 8	Do otworów pod gwinty wg DIN 336, DIN EN 20273 »wykonanie średniodokładne« i pogłębień zgodnych z luznymi otworami wg DIN-ISO 273 (norma stara).
11,0	8,5	175	94	1	25,5	M10	
13,5	10,2	189	108	1	30,0	M12	
15,5	12,0	218	120	2	34,5	M14	
17,5	14,0	228	130	2	38,5	M16	
20,0	15,5	238	140	2	43,5	M18	
22,0	17,5	248	150	2	47,5	M20	



Wiertło stopniowe (180°), z chwytem Morse'a



Ø pogłębienia d2 h8 mm	Ø otworu d1 h9 mm	długość całkowita l1 mm	dł. rowka wiórowego l2 mm	Morse'a stożek MK	długość stopnia l3 mm	do gwintu	zakres zastosowań					
HSS DIN 8377/ Węglik Norma zakładowa												
10,0	5,5	168	87	1	13,0	M 5	Dla otworów wg DIN-ISO 273 (stara norma), DIN EN 20273 »wykonanie średniokładne«, pogłębień pod łby śrub wg DIN 974-1 i pogłębień pod łby śrub formy H, J i K wg DIN 74 część 2 (stara norma): »wykonanie średniokładne«. Dla śrub wg DIN 84 (stara norma), 912 (stara norma), 6912, 7513 i DIN 7984.					
11,0	6,6	175	94	1	15,0	M 6						
15,0	9,0	212	114	2	19,0	M 8						
18,0	11,0	228	130	2	23,0	M10						
20,0	13,5	238	140	2	27,0	M12						
24,0	15,5	281	160	3	31,0	M14						
26,0	17,5	286	165	3	35,0	M16						
30,0	20,0	296	175	3	39,0	M18						
33,0	22,0	334	185	4	43,0	M20						
Norma zakładowa												
10,0	5,3	168	87	1	13,0	M 5	Dla otworów wg DIN-ISO 273 (stara norma) i pogłębień pod łby śrub forma H, J i K wg DIN 74 część 2 (stara norma): »wykonanie dokładne«. Dla śrub wg DIN 84 (stara norma), 912 (stara norma), 6912, 7513 i DIN 7984.					
11,0	6,4	175	94	1	15,0	M 6						
15,0	8,4	212	114	2	19,0	M 8						
18,0	10,5	228	130	2	23,0	M10						
20,0	13,0	238	140	2	27,0	M12						
24,0	15,0	281	160	3	31,0	M14						
26,0	17,0	286	165	3	35,0	M16						
Normy zakładowe dla pogłębień, wykonanie dokładne (stara norma*)												
9,4	5,3	162	81	1	16,0	M 5	Dla śrub wg DIN 84 (stara norma), DIN 912 (stara norma) i DIN 6912. Dla „starych“ pogłębień pod łby śrub forma H, J i K wg DIN 75 część 2: »wykonanie dokładne«.					
10,4	6,4	168	87	1	19,0	M 6						
13,5	8,4	189	108	1	22,0	M 8						
16,5	10,5	223	125	2	25,0	M10						
19,0	13,0	233	135	2	28,0	M12						
23,0	15,0	253	155	2	30,0	M14						
25,0	17,0	281	160	3	33,0	M16						
28,0	19,0	291	170	3	36,0	M18						
31,0	21,0	301	180	3	39,0	M 20						
Norma zakładowa dla pogłębień, wykonanie średniokładne (norma stara*)												
10,0	5,8	168	87	1	16,0	M 5	Dla śrub wg DIN 84 (stara norma), DIN 6912. Dla „starych“ pogłębień pod łby śrub forma H, J i K wg DIN 75 część 2: »wykonanie średniokładne«.					
11,0	7,0	175	94	1	19,0	M 6						
14,5	9,5	212	114	2	22,0	M 8						
17,5	11,5	228	130	2	25,0	M10						
20,0	14,0	238	140	2	28,0	M12						
24,0	16,0	281	160	3	30,0	M14						
26,0	18,0	286	165	3	33,0	M16						
29,0	20,0	296	175	3	36,0	M18						
33,0	23,0	334	185	4	39,0	M20						
cala	mm	cala	mm	cala	mm	cala	mm	MK	cala	mm	dla gwintu	zakres zastosowań
Normy Brytyjskie (BS)												
19/32	15,08	25/64	9,92	8 5/8	219	4 3/4	121	2	3/4	19,05	3/8 cala	Pod łby śrub wg norm brytyjskich (BS)
21/32	16,67	29/64	11,51	8 3/4	222	4 7/8	124	2	7/8	22,22	7/16 cala	
25/32	19,84	33/64	13,10	9 3/8	238	5 1/2	140	2	1	25,40	1/2 cala	

* DIN 75, część 2



Rozwiertak zgrubny z chwytem walcowym

Rozwiertak zgrubny nasadzany

średnica do (włącznie) mm	DIN 344					DIN 222		
	długość całkowita mm	dł. rowka wiórowego mm	średnica do (włącznie) mm	długość całkowita mm	dł. rowka wiórowego mm	nom. Ø do (włącznie) mm	długość całkowita mm	nom. Ø otworu mm
4,25	96*	64*	11,70	173	125	35,5	45	13
4,75	102*	69*	13,20	184	134	45,0	50	16
5,30	108	74	14,00	194	142	53,0	56	19
6,00	116	80	15,00	202	147	63,0	63	22
6,70	124	86	16,00	211	153	75,0	71	27
7,50	133	93	17,00	218	159	90,0	80	32
8,50	142	100	18,00	226	165	101,6	90	40
9,50	151	107	19,00	234	171			
10,60	162	116	20,00	242	177			

Rozwiertak zgrubny z chwytem Morse'a

średnica do (włącznie) mm	DIN 343			DIN 1864		
	długość całkowita mm	dł. rowka wiórowego mm	stożek Morse'a	długość całkowita mm	dł. rowka wiórowego mm	stożek Morse'a
7,50	150*	69*	1*	174*	93*	1*
8,50	156*	75*	1*	181*	100*	1*
9,50	162	81	1	188	107	1
10,60	168	87	1	197	116	1
11,70	175	94	1	206	125	1
13,20	182	101	1	215	134	1
14,00	189	108	1	223	142	1
15,00	212	114	2	245	147	2
16,00	218	120	2	251	153	2
17,00	223	125	2	257	159	2
18,00	228	130	2	263	165	2
19,00	233	135	2	269	171	2
20,00	238	140	2	275	177	2
21,20	243	145	2	282	184	2
22,40	248	150	2	289	191	2
23,60	253	155	2	296	198	2
25,00	281	160	3	327	206	3
26,50	286	165	3	335	214	3
28,00	291	170	3	343	222	3
30,00	296	175	3	351	230	3
31,50	301	180	3	360	239	3
33,50	334	185	4			
35,50	339	190	4			
37,50	344	195	4			
40,00	349	200	4			
42,50	354	205	4			
45,00	359	210	4			
47,50	364	215	4			
50,00	369	220	4			

*norma zakładowa

Mikro-wiertła (długość całkowita 25 mm)

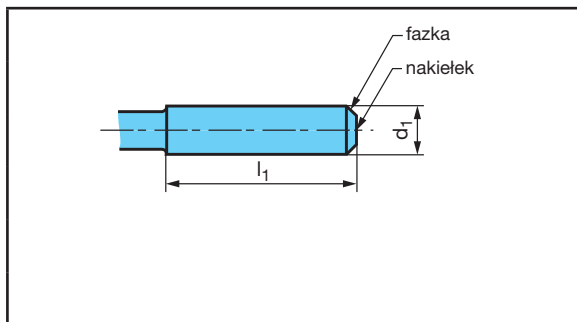
DIN 1899					
średnica do (włącznie) mm	Ø chwyty mm	dł. rowka wiórowego mm	średnica do (włącznie) mm	Ø chwyty mm	dł. rowka wiórowego mm
od 0,1 . . . 0,12	1,0	0,5	0,67	1,0	4,2
0,15	1,0	0,8	0,75	1,0	4,8
0,19	1,0	1,1	0,79	1,0	5,3
0,24	1,0	1,5	0,85	1,5	5,3
0,30	1,0	1,9	0,95	1,5	6,0
0,38	1,0	2,4	1,06	1,5	6,8
0,48	1,0	3,0	1,18	1,5	7,6
0,53	1,0	3,4	1,32	1,5	8,5
0,60	1,0	3,9	1,45	1,5	9,5



Chwyty walcowe dla narzędzi HSS, DIN 1835-1 (wyciąg)

Forma A, prosty

Wymiary w mm



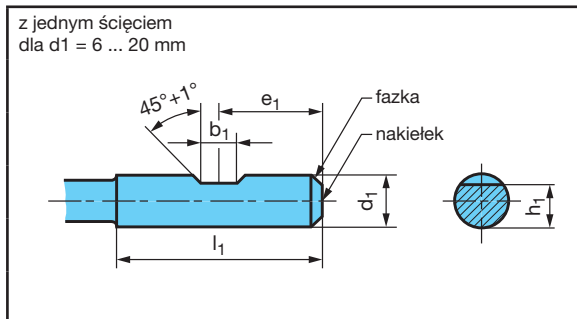
d ₁	h ₁
h8	+2 0
3	28
4	28
5	28
6	36
8	36
10	40

d ₁	h ₁
h8	+2 0
12	45
16	48
20	50
25	56
32	60
40	70

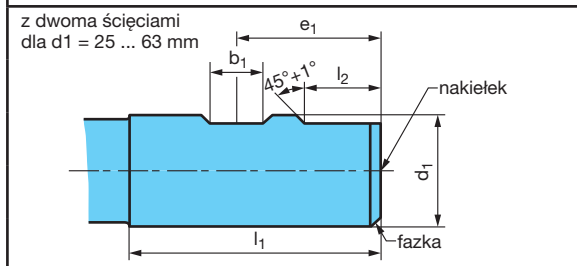
d ₁	h ₁
h8	+2 0
50	80
63	90

Forma B, ze ścięciem Weldon

Wymiary w mm

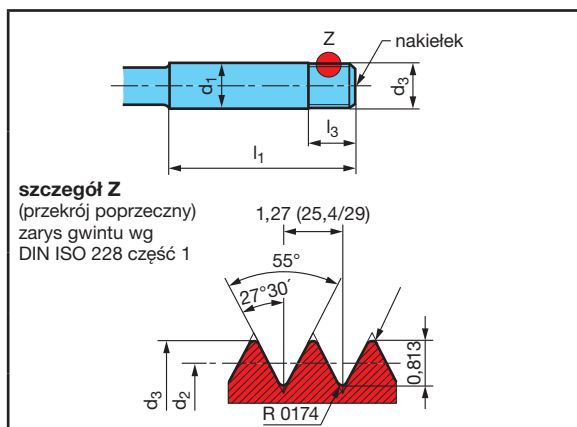


d ₁	b ₁	e ₁	h ₁	l ₁	l ₂	nakiełek forma R DIN 332 sekcja 1
h6	+0,05 0	0 -1	h13	+2 0	+1 0	
6	4,2	18	4,8	36	-	1,6x2,5
8	5,5	18	6,6	36	-	1,6x3,35
10	7	20	8,4	40	-	1,6x3,35
12	8	22,5	10,4	45	-	1,6x3,35
16	10	24	14,2	48	-	2,0x4,25
20	11	25	18,2	50	-	2,5x5,3
25	12	32	23	56	17	2,5x5,3
32	14	36	30	60	19	3,15x6,7
40	14	40	38	70	19	3,15x6,7
50	18	45	47,8	80	23	3,15x6,7
63	18	50	60,8	90	23	3,15x6,7



Forma D, chwyt z gwintem

Wymiary w mm



d ₁	d ₃	tol. pole	d ₂	tol. pole	l ₁	l ₃	nakiełek forma R DIN 332 sekcja 1
h8					+2 0	+2 0	
6	5,9	0 -0,1	5,087	0 -0,1	36	10	1,6 x 2,5
10	9,9	0 -0,1	9,087	0 -0,1	40	10	1,6 x 3,35
12	11,9	0 -0,1	11,087	0 -0,1	45	10	1,6 x 3,35
16	15,9	0 -0,1	15,087	0 -0,1	48	10	2,0 x 4,25
20	19,9	0 -0,15	19,087	0 -0,15	50	15	2,5 x 5,3
25	24,9	0 -0,15	24,087	0 -0,15	56	15	2,5 x 5,3
32	31,9	0 -0,15	31,087	0 -0,15	60	15	3,15 x 6,7



Chwyty walcowe DIN 6535 dla węglkowych wiertel krętych i frezów trzpieniowych

Forma HA, prosty

Wymiary w mm

	d_1	l_1	d_1	l_1
	h6	+2 0	h6	+2 0
	2	28	14	45
	3	28	16	48
	4	28	18	48
	5	28	20	50
	6	36	25	56
	8	36	32	60
	10	40		
	12	45		

Forma HB, ze ścięciem Weldon

Wymiary w mm

<p>z jednym ścięciem dla $d_1 = 6$ i 20 mm</p>	d_1	b_1	e_1	h_1	l_1	l_2
	h6	+0,05 0	0 -1	h11	+2 0	+1 0
	6	4,2	18	5,1	36	-
	8	5,5	18	6,9	36	-
	10	7	20	8,5	40	-
	12	8	22,5	10,4	45	-
	14	8	22,5	12,7	45	-
	16	10	24	14,2	48	-
	18	10	24	16,2	48	-
	20	11	25	18,2	50	-
<p>z dwoma ścięciami dla $d_1 = 25$ i 32 mm</p>	25	12	32	23	56	17
	32	14	36	30	60	19

Forma HE, ze ścięciem Whistle Notch bez kanałów chłodzących*

* Forma: Chwyty walcowe wg DIN 6535 są dostępne z kanałami chłodzącymi lub bez. Zastosowania dla różnych narzędzi, wymiarów i rozstawień kanałków chłodzących są w pełni określone przez odpowiednie normy.

Wymiary w mm

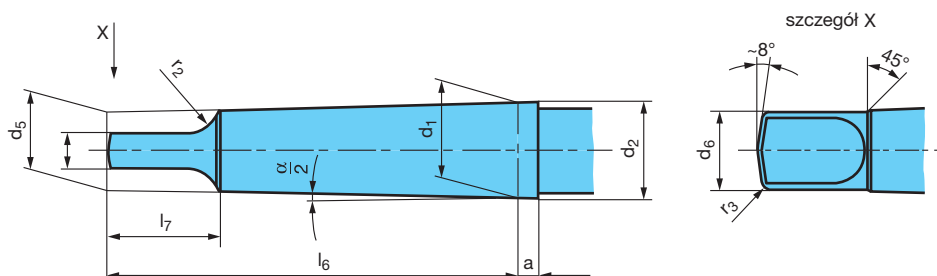
<p>dla $d_1 = 6$ do 20 mm</p>	d_1	(b_2)	(b_3)	h_2	(h_3)	l_1	l_4	l_5	r_2
	h6	≈		h11		+2 0	0 -1	rozmiar nom.	min.
	6	4,3	-	5,1	-	36	25	18	1,2
	8	5,5	-	6,9	-	36	25	18	1,2
	10	7,1	-	8,5	-	40	28	20	1,2
	12	8,2	-	10,4	-	45	33	22,5	1,2
	14	8,1	-	12,7	-	45	33	22,5	1,2
	16	10,1	-	14,2	-	48	36	24	1,6
	18	10,8	-	16,2	-	48	36	24	1,6
	20	11,4	-	18,2	-	50	38	25	1,6
<p>dla $d_1 = 25$ i 32 mm</p>	25	13,6	9,3	23,0	24,1	56	44	32	1,6
	32	15,5	9,9	30,0	31,2	60	48	35	1,6

Sekcja techniczna



Chwył - stożek Morse'a DIN 228 część 1 (wyciąg)

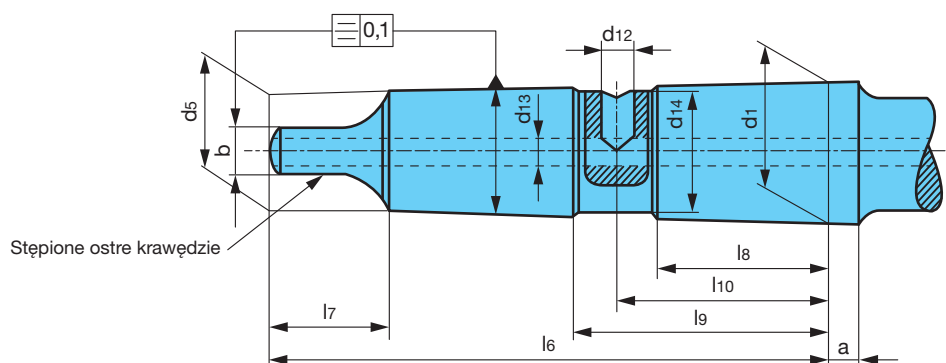
Forma B. stożek Morse'a z płetwą



Wymiary w mm

chwył wg DIN 228 forma B rozmiar	a	tol. pole	b	d ₁	d ₂ ≈	d ₅ ≈	d ₆ max.	l ₆ -1	l ₇ max.	r ₂ max.	r ₃ ≈	$\frac{\alpha}{2}$
MT 1	3,5	+1,4 0	5,2	12,065	12,2	9,0	8,7	62	13,5	5	1,2	1°25'43"
MT 2	5,0	+1,4 0	6,3	17,780	18,0	14,0	13,5	75	16	6	1,6	1°25'50"
MT 3	5,0	+1,7 0	7,9	23,825	24,1	19,1	18,5	94	20	7	2	1°26'16"
MT 4	6,5	+1,9 0	11,9	31,267	31,6	25,2	24,5	117,5	24	8	2,5	1°29'15"
MT 5	6,5	+1,9 0	15,9	44,399	44,7	36,5	35,7	149,5	29	10	3	1°30'26"

Forma BK, stożek Morse'a z płetwą i doprowadzeniem chłodzenia



Wymiary w mm

chwył wg DIN 228 forma B rozmiar	a	tol. pole	b	d ₁	d ₅ ≈	d ₁₂	d ₁₃	d ₁₄ 0 -0,01	l ₆ 0 -1	l ₇ max.	l ₈	l ₉	l ₁₀
MT 1	3,5	+1,4 0	5,2	12,065	9,0	-	-	-	62	13,5	-	-	-
MT 2	5	+1,4 0	6,3	17,780	14,0	4,2	4,2	15,0	75	16	20	34	27
MT 3	5	+1,7 0	7,9	23,825	19,1	5,0	5,0	21,0	94	20	29	43	36
MT 4	6,5	+1,9 0	11,9	31,267	25,2	6,8	6,8	28,0	117,5	24	39	55	47
MT 5	6,5	+1,9 0	15,9	44,399	36,5	8,5	8,5	40,0	149,5	29	51	69	60

Tolerancje nawiertaki

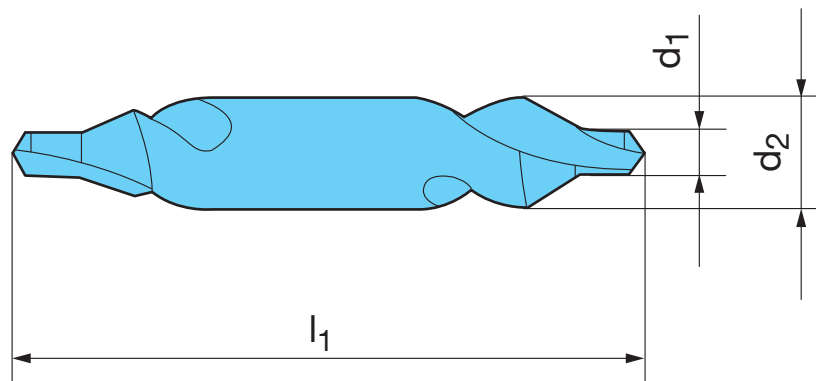
DIN 333	
zakres \varnothing d1 mm	pola tolerancji d1 mm
0,50 – 2,50	0 +0,14
3,15 – 5,00	0 +0,18
6,30 – 10,00	0 +0,22
12,50	0 +0,27

wg nr art. Guhringa 285/286	
zakres \varnothing d1 mm	pola tolerancji d1 mm
1,00 – 1,25	0 +0,10
1,60 – 3,15	0 +0,15
3,15 – 10,00	0 +0,20

wg B.S. 328	
zakres \varnothing d1 mm	pola tolerancji d1 mm
1,19 – 1,59	0 \pm 0,05
2,38 – 3,17	0 \pm 0,07
4,76	0 \pm 0,07
6,35 – 7,94	0 \pm 0,12

wg B.S. 328	
chwyt \varnothing -zakres d1 mm	pola tolerancji d1 mm
3,17 – 4,76	-0,020
6,35	-0,025
7,94 – 11,11	-0,050
15,87 – 19,05	-0,050

wg ASA	
zakres \varnothing d1 mm	pola tolerancji mm
całość	0 + 0,07 mm





Wymiary otworów pod gwinty nacinane

Standardowe gwinty metryczne ISO DIN 13					Drobnozwojne gwinty metryczne ISO DIN 13					Gwinty UNC ASME B1.1									
nom. Ø	skok P	otwór pod gwint Ø DIN 336	średnica rdzenia gwintu wewn. 6H*		nom. Ø	x	skok P	otwór pod gwint Ø DIN 336	średnica rdzenia gwintu wewn. 6H		nom. Ø	x	skok P	otwór pod gwint Ø DIN 336	średnica rdzenia gwintu wewn. 2B				
mm	mm	mm	min.	max.	mm	mm	mm	mm	mm	mm	mm	mm	mm	na cal	mm	min.	max.		
M 1	0,25	0,75	0,729	0,785	M 2,5 x	0,35	2,15	2,121	2,221	M 22 x	1,00	21,00	20,917	21,153	Nr. 1 -	64	1,55	1,425	1,580
M 1,1	0,25	0,85	0,829	0,885	M 3,0 x	0,35	2,65	2,621	2,721	M 22 x	1,50	20,50	20,376	20,676	Nr. 2 -	56	1,85	1,694	1,872
M 1,2	0,25	0,95	0,929	0,985	M 3,5 x	0,35	3,15	3,121	3,221	M 22 x	2,00	20,00	19,835	20,210	Nr. 3 -	48	2,10	1,941	2,146
M 1,4	0,30	1,10	1,075	1,142	M 4,0 x	0,50	3,50	3,459	3,599	M 24 x	1,00	23,00	22,917	23,153	Nr. 4 -	40	2,35	2,157	2,385
M 1,6	0,35	1,25	1,221	1,321	M 4,5 x	0,50	4,00	3,959	4,099	M 24 x	1,50	22,50	22,376	22,676	Nr. 5 -	40	2,65	2,487	2,698
M 1,8	0,35	1,45	1,421	1,521	M 5,0 x	0,50	4,50	4,459	4,599	M 24 x	2,00	22,00	21,835	22,210	Nr. 6 -	32	2,85	2,642	2,896
M 2	0,40	1,60	1,567	1,679	M 5,5 x	0,50	5,00	4,959	5,099	M 25 x	1,00	24,00	23,917	24,153	Nr. 8 -	32	3,50	3,302	3,531
M 2,2	0,45	1,75	1,713	1,838	M 6,0 x	0,75	5,20	5,188	5,378	M 25 x	1,50	23,50	23,376	23,676	Nr. 10 -	24	3,90	3,683	3,937
M 2,5	0,45	2,05	2,013	2,138	M 7,0 x	0,75	6,20	6,188	6,378	M 25 x	2,00	23,00	22,835	23,210	Nr. 12 -	24	4,50	4,343	4,597
M 3	0,50	2,50	2,459	2,599	M 8,0 x	0,50	7,50	7,459	7,599	M 27 x	1,00	26,00	25,917	26,153	1/4 -	20	5,10	4,978	5,258
M 3,5	0,60	2,90	2,850	3,010	M 8,0 x	0,75	7,20	7,188	7,378	M 27 x	1,50	25,50	25,376	25,676	5/16 -	18	6,60	6,401	6,731
M 4	0,70	3,30	3,242	3,422	M 8,0 x	1,00	7,00	6,917	7,153	M 27 x	2,00	25,00	24,835	25,210	3/8 -	16	8,00	7,798	8,153
M 4,5	0,75	3,70	3,688	3,878	M 9,0 x	0,75	8,20	8,188	8,378	M 28 x	1,00	27,00	26,917	27,153	7/16 -	14	9,40	9,144	9,550
M 5	0,80	4,20	4,134	4,334	M 9,0 x	1,00	8,00	7,917	8,153	M 28 x	1,50	26,50	26,376	26,676	1/2 -	13	10,80	10,592	11,024
M 6	1,00	5,00	4,917	5,153	M 10 x	0,75	9,20	9,188	9,378	M 28 x	2,00	26,00	25,835	26,210	9/16 -	12	12,20	11,989	12,446
M 7	1,00	6,00	5,917	6,153	M 10 x	1,00	9,00	8,917	9,153	M 30 x	1,00	29,00	28,917	29,153	5/8 -	11	13,50	13,386	13,868
M 8	1,25	6,80	6,647	6,912	M 10 x	1,25	8,80	8,647	8,912	M 30 x	1,50	28,50	28,376	28,676	3/4 -	10	16,50	16,307	16,840
M 9	1,25	7,80	7,647	7,912	M 11 x	0,75	10,20	10,188	10,378	M 30 x	2,00	28,00	27,835	28,210	7/8 -	9	19,50	19,177	19,761
M 10	1,50	8,50	8,376	8,676	M 11 x	1,00	10,00	9,917	10,153	M 30 x	3,00	27,00	26,752	27,252	1 -	8	22,25	21,971	22,606
M 11	1,50	9,50	9,376	9,676	M 12 x	1,00	11,00	10,917	11,153	M 32 x	1,50	30,50	30,376	30,676	1 1/8 -	7	25,00	24,638	25,349
M 12	1,75	10,20	10,106	10,441	M 12 x	1,25	10,80	10,647	10,912	M 32 x	2,00	30,00	29,835	30,210	1 1/4 -	7	28,00	27,813	28,524
M 14	2,00	12,00	11,835	12,210	M 12 x	1,50	10,50	10,376	10,676	M 33 x	1,50	31,50	31,376	31,676	1 3/8 -	6	30,75	30,353	31,115
M 16	2,00	14,00	13,835	14,210	M 14 x	1,00	13,00	12,917	13,153	M 33 x	2,00	31,00	30,835	31,210	1 1/2 -	6	34,00	33,528	34,290
M 18	2,50	15,50	15,294	15,744	M 14 x	1,25	12,80	12,647	12,912	M 33 x	3,00	30,00	29,752	30,252	1 3/4 -	5	39,50	38,938	39,802
M 20	2,50	17,50	17,294	17,744	M 14 x	1,50	12,50	12,376	12,676	M 35 x	1,50	33,50	33,376	33,676	2 -	4,5	45,00	44,679	45,593
M 22	2,50	19,50	19,294	19,744	M 15 x	1,00	14,00	13,917	14,153	M 36 x	1,50	34,50	34,376	34,676					
M 24	3,00	21,00	20,752	21,252	M 15 x	1,50	13,50	13,376	13,676										
M 27	3,00	24,00	23,752	24,252	M 16 x	1,00	15,00	14,917	15,153										
M 30	3,50	26,50	26,211	26,771	M 16 x	1,25	14,80	14,647	14,912										
M 33	3,50	29,50	29,211	29,771	M 16 x	1,50	14,50	14,376	14,676										
M 36	4,00	32,00	31,670	32,270	M 17 x	1,00	16,00	15,917	16,153										
M 39	4,00	35,00	34,670	35,270	M 17 x	1,50	15,50	15,376	15,676										
M 42	4,50	37,50	37,129	37,799	M 18 x	1,00	17,00	16,917	17,153										
M 45	4,50	40,50	40,129	40,799	M 18 x	1,50	16,50	16,376	16,676										
M 48	5,00	43,00	42,587	43,297	M 20 x	1,00	19,00	18,917	19,153										
M 52	5,00	47,00	46,587	47,297	M 20 x	1,50	18,50	18,376	18,676										
M 56	5,50	50,50	50,046	50,796	M 20 x	2,00	18,00	17,835	18,210										

* M 1,1 do M 1,4 średnica rdzenia gwintu wewn. 5H

Gwinty MJ DIN ISO 5855					Gwinty UNJC ISO 3161				Gwinty UNJF ISO 3161										
nom. Ø	x	skok P	otwór pod gwint Ø DIN 336	średnica rdzenia gwintu wewn. 5H*	nom. Ø	gwinty	otwór pod gwint Ø DIN 336	średnica rdzenia gwintu wewn. 3B	nom. Ø	gwinty	otwór pod gwint Ø DIN 336	średnica rdzenia gwintu wewn.							
mm	mm	mm	mm	mm	na cal	mm	mm	mm	na cal	mm	mm	mm							
MJ 3	x	0,50	2,60	2,513	2,653	Nr. 6 -	32	2,85	2,733	2,939	Nr. 6 -	40	3,00	2,888	3,053				
MJ 4	x	0,70	3,40	3,318	3,498	Nr. 8 -	32	3,55	3,393	3,599	Nr. 8 -	36	3,60	3,480	3,663				
MJ 5	x	0,80	4,30	4,221	4,421	Nr. 10 -	24	4,00	3,795	4,064	Nr. 10 -	32	4,20	4,054	4,255				
MJ 6	x	0,50	5,55	5,513	5,625	Nr. 12 -	24	4,60	4,455	4,704	Nr. 12 -	28	4,75	4,602	4,816				
MJ 6	x	0,75	5,35	5,269	5,419	1/4 -	20	5,30	5,113	5,387	1/4 -	28	5,60	5,466	5,662				
MJ 6	x	1,00	5,10	5,026	5,216	5/16 -	18	6,75	6,563	6,833	5/16 -	24	7,00	6,906	7,109				
MJ 8	x	0,50	7,55	7,513	7,625	3/8 -	16	8,20	7,978	8,255	3/8 -	24	8,60	8,494	8,679				
MJ 8	x	0,75	7,35	7,269	7,419	7/16 -	14	9,60	9,346	9,639	7/16 -	20	10,00	9,876	10,084				
MJ 8	x	1,00	7,10	7,026	7,216	1/2 -	13	11,00	10,798	11,095	1/2 -	20	11,60	11,463	11,661				
MJ 8	x	1,25	6,90	6,782	6,994	9/16 -	12	12,40	12,228	12,482	9/16 -	18	13,00	12,913	13,122				
MJ 10	x	1,00	9,10	9,026	9,216	5/8 -	11	13,80	13,627	13,904	5/8 -	18	14,60	14,501	14,702				
MJ 10	x	1,25	8,90	8,782	8,994														
MJ 10	x	1,50	8,60	8,539	8,775														
MJ 12	x	1,75	10,40	10,295	10,560														
MJ 16	x	2,00	14,20	14,051	14,351														

* MJ 3 x 0,50 do MJ 5 x 0,80 średnica rdzenia gwintu wewn. 6H



Gwinty UNF ASME B1.1				Gwinty BSW Whitworth) BS84				Gwinty rurowe (Whitworth'a) (wg DIN-ISO 228-1)				Gwinty pancerne (Pg) wg DIN 40430							
nom. Ø	zwoje	otwór pod gwint Ø	średnica rdzenia gwintu wewn. 2B	nom. Ø	zwoje	otwór pod gwint Ø	średnica rdzenia gwintu wewn. 2B	nom. Ø	zwoje	otwór pod gwint Ø	średnica rdzenia gwintu wewn.	nom. Ø	zwoje	otwór pod gwint Ø	średnica rdzenia gwintu wewn.				
	na cal	DIN 336 mm	min. mm	max. mm	na cal	DIN 336 mm	min. mm	max. mm	na cal	na cal	DIN 336 mm	min. mm	max. mm	na cal	mm	min. mm	max. mm		
Nr. 1 - 72		1,55	1,473	1,610	W 1/16	60	1,20	1,045	1,230	G 1/16	28	6,80	6,561	6,843	Pg 7	20	11,40	11,280	11,430
Nr. 2 - 64		1,85	1,755	1,910	W 3/32	48	1,80	1,704	1,912	G 1/8	28	8,80	8,566	8,848	Pg 9	18	14,00	13,860	14,010
Nr. 3 - 56		2,15	2,024	2,197	W 1/8	40	2,50	2,362	2,591	G 1/4	19	11,80	11,445	11,890	Pg 11	18	17,30	17,260	17,410
Nr. 4 - 48		2,40	2,271	2,459	W 5/32	32	3,20	2,952	3,214	G 3/8	19	15,25	14,950	15,395	Pg 13,5	18	19,00	19,060	19,210
Nr. 5 - 44		2,70	2,550	2,741	W 3/16	24	3,60	3,407	3,745	G 1/2	14	19,00	18,631	19,172	Pg 16	18	21,30	21,160	21,310
Nr. 6 - 40		2,95	2,819	3,023	W 7/32	24	4,50	4,201	4,539	G 5/8	14	21,00	20,587	21,128	Pg 21	16	26,90	26,780	27,030
Nr. 8 - 36		3,50	3,404	3,607	W 1/4	20	5,10	4,724	5,156	G 3/4	14	24,50	24,117	24,658	Pg 29	16	35,50	35,480	35,730
Nr. 10 - 32		4,10	3,962	4,166	W 5/16	18	6,50	6,130	6,590	G 7/8	14	28,25	27,877	28,418	Pg 36	16	45,50	45,480	45,730
Nr. 12 - 28		4,60	4,496	4,724	W 3/8	16	7,90	7,492	7,987	G 1	11	30,75	30,291	30,931	Pg 42	16	52,50	52,480	52,730
1/4 - 28		5,50	5,359	5,588	W 7/16	14	9,20	8,789	9,330	G 1 1/8	11	35,50	34,939	35,579	Pg 48	16	57,80	57,780	58,030
5/16 - 24		6,90	6,782	7,036	W 1/2	12	10,50	9,989	10,591	G 1 1/4	11	39,50	38,952	39,592					
3/8 - 24		8,50	8,382	8,636	W 9/16	12	12,00	11,577	12,179	G 1 1/2	11	45,25	44,845	45,485					
7/16 - 20		9,90	9,728	10,033	W 5/8	11	13,50	12,918	13,558	G 1 3/4	11	51,00	50,788	51,428					
1/2 - 20		11,50	11,328	11,608	W 3/4	10	16,25	15,797	16,483	G 2	11	57,00	56,656	57,296					
9/16 - 18		12,90	12,751	13,081	W 7/8	9	19,25	18,611	19,353										
5/8 - 18		14,50	14,351	14,681	W 1	8	22,00	21,334	22,147										
3/4 - 16		17,50	17,323	17,678	W 1 1/8	7	24,50	23,928	24,832										
7/8 - 14		20,40	20,269	20,650	W 1 1/4	7	27,75	27,103	28,007										
1 - 12		23,25	23,114	23,571	W 1 3/8	6	30,50	29,504	30,528										
1 1/8 - 12		26,50	26,289	26,746	W 1 1/2	6	33,50	32,679	33,703										
1 1/4 - 12		29,50	29,464	29,921	W 1 5/8	5	35,50	34,769	35,963										
1 3/8 - 12		32,75	32,639	33,096	W 1 3/4	5	39,00	37,944	39,138										
1 1/2 - 12		36,00	35,814	36,271	W 2	4,5	44,50	43,571	44,877										

NPT ANSI B 2.1
Amerykański stożkowy gwint rurowy 1:16

Wersja A (unikaj jeśli możliwe)		Wersja B		nom. Ø	zwoje na cal	śred. otw. pod gwint cylindryczny (A) d ₁	śred. otw. pod gwint stożkowy (B) D ₁	ET mm	BT (min) mm
				1/16 - 27		6,15	6,39	9,29	10,7
				1/8 - 27		8,40	8,74	9,32	10,8
				1/4 - 18		11,10	11,36	13,52	15,6
				3/8 - 18		14,30	14,80	13,83	16,0
				1/2 - 14		17,90	18,32	18,07	20,8
				3/4 - 14		23,30	23,67	18,55	21,3
				1 - 11,5		29,00	29,69	22,29	25,6
				1 1/4 - 11,5		37,70	38,45	22,80	26,1
				1 1/2 - 11,5		43,70	44,52	22,80	26,1
				2 - 11,5		55,60	56,56	23,20	26,5
				2 1/2 - 8		66,30	67,62	31,75	36,3
				3 - 8		82,30	83,52	33,74	38,5

Gwinty EG Metr./Metr. drobnoz. (EG M 14x1,25) pod wkładki Heli Coil DIN 8140				Gwinty EG UNC (UNC-STI) pod wkładki Heli Coil ASME B18.29.1				Gwinty EG UNF (UNF-STI) pod wkładki Heli Coil ASME B18.29.1				
nom. Ø	x skok P	otwór pod gwint Ø	średnica rdzenia gwintu wewn.	nom. Ø	zwoje na cal	otwór pod gwint Ø	średnica rdzenia gwintu wewn.	nom. Ø	zwoje na cal	otwór pod gwint Ø	średnica rdzenia gwintu wewn.	
mm	mm	DIN 336 mm	min. mm	max. mm	na cal	mm	min. mm	max. mm	na cal	mm	min. mm	max. mm
EG M 4 x 0,70		4,20	4,152	4,292	EG Nr. 6 - 32	3,80	3,678	3,879	EG Nr. 6 - 40	3,70	3,644	3,818
EG M 5 x 0,80		5,25	5,174	5,334	EG Nr. 8 - 32	4,40	4,338	4,524	EG Nr. 8 - 36	4,40	4,321	4,498
EG M 6 x 1,00		6,30	6,217	6,407	EG Nr. 10 - 24	5,20	5,055	5,283	EG Nr. 10 - 32	5,10	4,999	5,184
EG M 8 x 1,25		8,40	8,271	8,483	EG Nr. 12 - 24	5,80	5,715	5,944	EG Nr. 12 - 28	5,70	5,682	5,809
EG M10 x 1,50		10,50	10,324	10,560	EG 1/4 - 20	6,70	6,624	6,868	EG 1/4 - 28	6,60	6,546	6,721
EG M12 x 1,75		12,50	12,379	12,644	EG 5/16 - 18	8,40	8,242	8,489	EG 5/16 - 24	8,25	8,166	8,352
EG M14 x 1,25		14,40	14,271	14,483	EG 3/8 - 16	10,00	9,868	10,127	EG 3/8 - 24	9,80	9,754	9,931
EG M16 x 2,00		16,50	16,433	16,733	EG 7/16 - 14	11,60	11,506	11,783	EG 7/16 - 20	11,50	11,389	11,585
					EG 1/2 - 13	13,30	13,122	13,393	EG 1/2 - 20	13,10	12,974	13,172
					EG 9/16 - 12	14,90	14,747	15,032	EG 9/16 - 18	14,70	14,592	14,798
					EG 5/8 - 11	16,50	16,375	16,673	EG 5/8 - 18	16,25	16,180	16,386

Sekcja techniczna



Zalecane wymiary otworów* pod gwinty wygniatane

Standardowe gwinty metryczne ISO DIN 13						Drobnozwojne gwinty metryczne ISO DIN 13														
nom. Ø	skok P	otwór pod gwint		średnica rdzenia gwintu wewn. 7H*		nom. Ø	x	skok P	otwór pod gwint		średnica rdzenia gwintu wewn. 7H*		nom. Ø	x	skok P	otwór pod gwint		średnica rdzenia gwintu wewn. 7H*		
		Ø	min. max.	min. max.	Ø				min. max.	Ø	min. max.	Ø				min. max.				
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	
M 2	0,40	1,85	1,84	1,88	1,567	1,679	M 2,5	x 0,35	2,35	2,35	2,38	2,121	2,221	M 17	x 1,50	16,30	16,26	16,38	15,376	15,751
M 2,2	0,45	2,00	2,01	2,05	1,713	1,838	M 3	x 0,35	2,85	2,85	2,88	2,621	2,721	M 18	x 1,00	17,55	17,52	17,62	16,917	17,217
M 2,5	0,45	2,30	2,28	2,32	2,013	2,138	M 4	x 0,35	3,85	3,85	3,88	3,621	3,721	M 18	x 1,50	17,30	17,26	17,38	16,376	16,751
M 3	0,50	2,80	2,78	2,85	2,459	2,639	M 4	x 0,50	3,80	3,78	3,83	3,459	3,639	M 18	x 2,00	17,10	17,05	17,20	15,835	16,310
M 3,5	0,60	3,25	3,23	3,30	2,850	3,050	M 5	x 0,50	4,80	4,78	4,83	4,459	4,639	M 20	x 1,00	19,55	19,52	19,62	18,917	19,217
M 4	0,70	3,70	3,68	3,76	3,242	3,466	M 5,5	x 0,50	5,30	5,28	5,33	4,959	5,139	M 20	x 1,50	19,30	19,26	19,38	18,376	19,751
M 4,5	0,75	4,20					M 6	x 0,75	5,65	5,62	5,70	5,188	5,424	M 24	x 1,00	23,55	23,52	23,62	22,917	23,217
M 5	0,80	4,65	4,62	4,71	4,134	4,384	M 7	x 0,75	6,65	6,62	6,70	6,188	6,424	M 24	x 1,50	23,30	23,26	23,38	22,376	22,751
M 6	1,00	5,55	5,52	5,62	4,917	5,217	M 8	x 0,75	7,65	7,62	7,70	7,188	7,424	M 24	x 2,00	23,10	23,05	23,20	21,835	22,310
M 7	1,00	6,55	6,52	6,62	5,917	6,217	M 8	x 1,00	7,55	7,52	7,62	6,917	7,217	M 27	x 1,50	26,30	26,26	26,38	25,376	25,751
M 8	1,25	7,40	7,36	7,47	6,647	6,982	M 9	x 0,75	8,65	8,62	8,70	8,188	8,424	M 30	x 1,50	29,30	29,26	29,38	28,376	28,751
M 9	1,25	8,40	8,36	8,47	7,647	7,982	M 9	x 1,00	8,55	8,52	8,62	7,917	8,217	M 33	x 1,50	32,30	32,26	32,38	31,376	31,751
M 10	1,50	9,30	9,26	9,38	8,376	8,751	M 10	x 0,75	9,65	9,62	9,70	9,188	9,424	M 36	x 1,50	35,30	35,26	35,38	34,376	34,751
M 11	1,50	10,30	10,26	10,38	9,376	9,751	M 10	x 1,00	9,55	9,52	9,62	8,917	9,217	M 39	x 1,50	38,30	38,26	38,38	37,376	37,751
M 12	1,75	11,20	11,15	11,29	10,106	10,531	M 10	x 1,25	9,40	9,36	9,47	8,647	8,982	M 42	x 1,50	41,30	41,26	41,38	42,376	42,751
M 14	2,00	13,10	13,05	13,20	11,835	12,310	M 11	x 0,75	10,65	10,62	10,70	10,188	10,424							
M 16	2,00	15,10	15,05	15,20	13,835	14,310	M 11	x 1,00	10,55	10,52	10,62	9,917	10,217							
M 18	2,50	16,90	16,83	17,02	15,294	15,854	M 12	x 1,00	11,55	11,52	11,62	10,917	11,217							
M 20	2,50	18,90	18,83	19,02	17,294	17,854	M 12	x 1,25	11,40	11,36	11,47	10,647	10,982							
M 22	2,50	20,90	20,83	21,02	19,294	19,854	M 12	x 1,50	11,30	11,26	11,38	10,376	10,751							
M 24	3,00	22,70	22,62	22,80	20,752	21,382	M 14	x 1,00	13,55	13,52	13,62	12,917	13,217							
M 27	3,00	25,70	25,62	25,80	23,752	24,382	M 14	x 1,25	13,40	13,36	13,47	12,647	12,982							
M 30	3,50	28,50	28,40	28,60	26,211	26,921	M 14	x 1,50	13,30	13,26	13,38	12,376	12,751							
M 33	3,50	31,50	31,40	31,60	29,211	29,921	M 15	x 1,00	14,55	14,52	14,62	13,917	14,217							
M 36	4,00	34,30	34,17	34,40	31,670	32,420	M 15	x 1,50	14,30	14,26	14,38	13,376	13,751							
M 39	4,00	37,30	37,17	37,40	34,670	35,420	M 16	x 1,00	15,55	15,52	15,62	14,917	15,217							
M 42	4,50	40,10	39,95	40,20	37,129	37,979	M 16	x 1,50	15,30	15,26	15,38	14,376	14,751							
							M 17	x 1,00	16,55	16,52	16,62	15,917	16,217							

* M 2 do M 2,5 średnica rdzenia gwintu wewn. 6H

* M 2,5 x 0,35 do M 4 x 0,35 średnica rdzenia gwintu wewn. 6H

Tolerancja średnicy otworu dla gwintu wykonywanego metodą wygniatania (wg DIN 13, sekcja 50)

Z uwagi na wytrzymałość na rozciąganie nie ma potrzeby wykonywania otworów pod gwint w klasie 6H, lecz wystarcza klasa 7H, gdyż spełnia wymagania, aby pokrywanie się ścianek gwintu wewnętrzznego i zewnętrznego nie było mniejsze niż 0,32 x P. Ponadto, dzięki temu że włókna w materiale nie są poprzecinane, gwinty wygniatane posiadają wyższą wytrzymałość w porównaniu do gwintów nacinanych. W efekcie tego mogą przenosić większe obciążenia.

Gwinty UNC ASME B1.1					Gwinty UNF ASME B1.1					Gwinty rurowe (Whitworth'a) DIN EN ISO 228-1										
Nom. Ø	zwoje	otwór pod gwint		średnica rdzenia gwintu wewn. 2B		Nom. Ø	zwoje	otwór pod gwint		średnica rdzenia gwintu wewn. 2B		Nom. Ø	zwoje	otwór pod gwint		średnica rdzenia gwintu wewn. 2B				
		na cal Ø	min. max. mm	min. max. mm	min. max. mm			na cal Ø	min. max. mm	min. max. mm	min. max. mm			na cal Ø	min. max. mm	min. max. mm	min. max. mm			
Nr. 1 - 64		1,68	1,67	1,70	1,425	1,580	Nr. 1 - 72		1,70	1,69	1,72	1,473	1,610	G 1/16	28	7,30	7,28	7,35	6,561	6,843
Nr. 2 - 56		1,98	1,97	2,01	1,694	1,872	Nr. 2 - 64		2,00	1,99	2,03	1,755	1,910	G 1/8	28	9,30	9,28	9,35	8,566	8,848
Nr. 3 - 48		2,28	2,27	2,32	1,941	2,146	Nr. 3 - 56		2,30	2,29	2,34	2,024	2,197	G 1/4	19	12,50	12,48	12,55	11,445	11,890
Nr. 4 - 40		2,55	2,54	2,59	2,157	2,385	Nr. 4 - 48		2,60	2,59	2,63	2,271	2,459	G 3/8	19	16,00	15,98	16,05	14,950	15,395
Nr. 5 - 40		2,90	2,89	2,94	2,487	2,698	Nr. 5 - 44		2,90	2,89	2,93	2,550	2,741	G 1/2	14	20,00	19,98	20,12	18,631	19,172
Nr. 6 - 32		3,15	3,14	3,19	2,642	2,896	Nr. 6 - 40		3,20	3,19	3,24	2,819	3,023	G 5/8	14	22,00	21,98	22,12	20,587	21,128
Nr. 8 - 32		3,80	3,78	3,82	3,302	3,531	Nr. 8 - 36		3,85	3,83	3,88	3,404	3,607	G 3/4	14	25,50	25,48	25,62	24,117	24,658
Nr. 10 - 24		4,35	4,33	4,39	3,683	3,937	Nr. 10 - 32		4,45	4,43	4,49	3,962	4,166	G 7/8	14	29,25	29,23	29,37	27,877	28,418
Nr. 12 - 24		5,00	4,97	5,03	4,343	4,597	Nr. 12 - 28		5,10	5,07	5,13	4,496	4,724	G 1	11	32,00	31,98	32,15	30,291	30,931
1/4 - 20		5,75	5,72	5,80	4,978	5,258	1/4 - 28		5,95	5,92	5,99	5,359	5,588	G 1 1/4	11	40,75	40,70	40,85	38,952	39,592
5/16 - 18		7,30	7,26	7,37	6,401	6,731	5/16 - 24		7,45	7,42	7,50	6,782	7,036							
3/8 - 16		8,80	8,77	8,88	7,798	8,153	3/8 - 24		9,05	9,02	9,10	8,838	9,166							
7/16 - 14		10,30	10,27	10,37	9,144	9,550	7/16 - 20		10,55	10,48	10,58	9,728	10,033							
1/2 - 13		11,80	11,77	11,88	10,592	11,024	1/2 - 20		12,10	12,08	12,18	11,328	11,608							
9/16 - 12		13,30	13,28	13,39	11,989	12,446	9/16 - 18		13,65	13,61	13,72	12,751	13,081							
5/8 - 11		14,80	14,78	14,90	13,386	13,868	5/8 - 18		15,25	15,21	15,32	14,351	14,681							
3/4 - 10		17,90	17,85	17,97	16,307	16,840	3/4 - 16		18,35	18,30	18,41	17,323	17,678							
7/8 - 9		21,00	20,95	21,10	19,177	19,761	7/8 - 14		21,40	21,35	21,49	20,269	20,650							
1 - 8		24,00	23,95	24,12	21,971	22,606	1 - 12		24,45	24,40	24,54	23,114	23,571							



od 1/64 do 63/64

Wymiar (cale)	mm	Część z cale (dziesiętne)	Wymiar (cale)	mm	Część z cale (dziesiętne)	Wymiar (cale)	mm	Część z cale (dziesiętne)	Wymiar (cale)	mm	Część z cale (dziesiętne)
-	0,10	0,0039	51	1,70	0,0670	4	5,31	0,2090	-	14,00	0,5512
97	0,15	0,0059		1,75	0,0689	3	5,41	0,213	9/16	14,29	0,5625
96	0,16	0,0063	50	1,78	0,0700		5,50	0,2165		14,50	0,5709
95	0,17	0,0067		1,80	0,0709	7/32	5,56	0,2188	37/64	14,68	0,5781
94	0,18	0,0071	49	1,85	0,0730	2	5,61	0,221	-	15,00	0,5906
93	0,19	0,0075		1,90	0,0748	1	5,79	0,228	19/32	15,08	0,5938
92	0,20	0,0079	48	1,93	0,0760	A	5,94	0,234	39/64	15,48	0,6094
91	0,21	0,0083		1,95	0,0768	15/64	5,95	0,2344		15,50	0,6102
90	0,22	0,0087	5/64	1,98	0,0781	-	6,00	0,2362	5/8	15,88	0,625
89	0,23	0,0091	47	1,99	0,0785	B	6,05	0,238	-	16,00	0,6299
88	0,24	0,0095	-	2,00	0,0787	C	6,15	0,242	41/64	16,27	0,6406
-	0,25	0,0098		2,05	0,0807	D	6,25	0,246		16,50	0,6496
87	0,25	0,0100	46	2,06	0,0810	1/4	6,35	0,25	21/32	16,67	0,6562
	0,26	0,0102	45	2,08	0,0820	E	6,35	0,25	-	17,00	0,6693
86	0,27	0,0105		2,15	0,0846		6,50	0,2559	43/64	17,07	0,6719
	0,27	0,0106	44	2,18	0,0860	F	6,53	0,257	11/16	17,46	0,6875
85	0,28	0,0110	43	2,26	0,0890	G	6,63	0,261		17,50	0,689
	0,29	0,0114	42	2,37	0,0935	17/64	6,75	0,2656	45/64	17,86	0,7031
84	0,29	0,0115	3/32	2,38	0,0938		6,75	0,2657	-	18,00	0,7087
-	0,30	0,0118	41	2,44	0,0960	H	6,76	0,266	23/32	18,26	0,7188
83	0,30	0,0120	40	2,50	0,0980	I	6,91	0,272		18,50	0,7283
82	0,32	0,0125	39	2,53	0,0995	-	7,00	0,2756	47/64	18,65	0,7344
	0,32	0,0126	38	2,58	0,1015	J	7,04	0,2772	-	19,00	0,748
81	0,33	0,0130	37	2,64	0,1040	K	7,14	0,281	3/4	19,05	0,75
80	0,34	0,0135	36	2,71	0,1065	9/32	7,14	0,2812	49/64	19,45	0,7656
79	0,37	0,0145	7/64	2,78	0,1094	L	7,37	0,29		19,50	0,7677
1/64	0,40	0,0156	35	2,79	0,11	M	7,49	0,2949	25/32	19,84	0,7812
78	0,41	0,0160	34	2,82	0,111		7,50	0,2953	-	20,00	0,7874
77	0,46	0,0180	33	2,87	0,113	19/64	7,54	0,2969	51/64	20,24	0,7969
-	0,50	0,0197		2,90	0,1142	N	7,67	0,3020		20,50	0,8071
76	0,51	0,0200	32	2,95	0,116		7,75	0,3051	13/16	20,64	0,8125
75	0,53	0,0210	-	3,00	0,1181	5/16	7,94	0,3125	-	21,00	0,8268
74	0,57	0,0225	31	3,05	0,12	-	8,00	0,315	53/64	21,03	0,8281
-	0,60	0,0236	1/8	3,18	0,125	O	8,03	0,316	27/32	21,43	0,8438
73	0,61	0,0240	30	3,26	0,1285	P	8,20	0,323		21,50	0,8465
72	0,64	0,0250		3,30	0,1299	21/64	8,33	0,3281	55/64	21,84	0,8594
71	0,66	0,0260	29	3,45	0,136	Q	8,43	0,332	-	22,00	0,8661
-	0,70	0,0276		3,50	0,1378		8,50	0,3346	7/8	22,23	0,875
70	0,71	0,0280	28	3,57	0,1405	R	8,61	0,339		22,50	0,8858
69	0,74	0,0292	9/64	3,57	0,1406	11/32	8,73	0,3438	57/64	22,62	0,8906
-	0,75	0,0295	27	3,66	0,144		8,75	0,3445	-	23,00	0,9055
68	0,79	0,0310	26	3,73	0,147	S	8,84	0,348	29/32	23,02	0,9062
1/32	0,79	0,0313		3,75	0,1476	-	9,00	0,3543	59/64	23,42	0,9219
-	0,80	0,0315	25	3,80	0,1495	T	9,09	0,358		23,50	0,9252
67	0,81	0,0320	24	3,86	0,152	23/64	9,13	0,3594	15/16	23,81	0,9375
66	0,84	0,0330	23	3,91	0,154	U	9,35	0,368	-	24,00	0,9449
65	0,89	0,0350	5/32	3,97	0,1562		9,50	0,374	61/64	24,21	0,9531
-	0,90	0,0354	22	3,99	0,157	3/8	9,53	0,375		24,50	0,9646
64	0,91	0,0360	-	4,00	0,1575	V	9,56	0,377	31/32	24,61	0,9688
63	0,94	0,0370	21	4,04	0,159	W	9,80	0,386	-	25,00	0,9843
62	0,97	0,0380	20	4,09	0,161	25/64	9,92	0,3906	63/64	25,00	0,9844
61	0,99	0,0390		4,20	0,1654	-	10,00	0,3937	1	25,40	1,00
-	1,00	0,0394	19	4,22	0,166	X	10,08	0,397			
60	1,02	0,0400	18	4,31	0,1695	Y	10,26	0,4040			
59	1,04	0,0410	11/64	4,37	0,1719	13/32	10,32	0,4062			
58	1,07	0,0420	17	4,39	0,173	Z	10,49	0,413			
57	1,09	0,0430	16	4,50	0,177		10,50	0,4134			
56	1,18	0,0465	15	4,57	0,18	27/64	10,72	0,4219			
3/64	1,19	0,0469	14	4,62	0,182	-	11,00	0,4331			
	1,20	0,0472	13	4,70	0,185	7/16	11,11	0,4375			
	1,25	0,0492	3/16	4,76	0,1875		11,50	0,4528			
	1,30	0,0512	12	4,80	0,189	29/64	11,51	0,4531			
55	1,32	0,0520	11	4,85	0,191	15/32	11,91	0,4688			
54	1,40	0,0550	10	4,91	0,1935	-	12,00	0,4724			
	1,45	0,0571	9	4,98	0,196	31/64	12,30	0,4844			
	1,50	0,0591	-	5,00	0,1968		12,50	0,4921			
53	1,51	0,0595	8	5,05	0,199	1/2	12,70	0,50			
	1,55	0,0610	7	5,11	0,2010	-	13,00	0,5118			
1/16	1,59	0,0625	13/64	5,16	0,2031	33/64	13,10	0,5156			
	1,60	0,0630	6	5,18	0,2040	17/32	13,49	0,5312			
52	1,61	0,0635	5	5,22	0,2055		13,50	0,5315			
	1,65	0,0650		5,25	0,2067	35/64	13,89	0,5469			

1 cal = 25.400 0 mm, patrz DIN 4890 (wydanie 2/75)



Nowe oznaczenia materiałów (wybrane)

nr. mat.	oznaczenie stare	oznaczenie nowe	nr. mat.	oznaczenie stare	oznaczenie nowe	nr. mat.	oznaczenie stare	oznaczenie nowe	nr. mat.	oznaczenie stare	oznaczenie nowe
0.6010	GG10	EN-GJL-100	1.0728	60 S 20	-	1.4436	X5CrNiMo17 133	X3CrNiMo17-13-3	1.7043	-	38Cr4
0.6020	GG20	EN-GJL-200	1.0736	9 SMn 36	11SMn37	1.4438	X2CrNiMo18 164	X2CrNiMo18-15-4	1.7147	20 MnCr 5	20MnCr5
0.6025	GG25	EN-GJL-250	1.0737	9 SMnPb 36	11SMnPb37	1.4460	X4CrNiMo275 2	X3CrNiMoN27-5-2	1.7149	20 MnCrS 5	20MnCrS5
0.6035	GG35	EN-GJL-350	1.0756	35 SPb 20	35SPb20	1.4462	X2CrNiMoN225 3	X2CrNiMoN22-5-3	1.7176	55 Cr 3	55Cr3
0.7050	GGG50	EN-GJS-500-7	1.0757	45 SPb 20	46SPb20	1.4509	X6CrTiNb 18	X2CrTiNb18	1.7182	27 MnCrB 5 2	27MnCrB5-2
0.7070	GGG70	EN-GJS-700-2	1.0760	-	38SMn26	1.4510	X6CrTi 17	X3CrTi17	1.7185	33 MnCrB 5 2	33MnCrB5-2
0.8035	GTW35	EN-GJMW-350-4	1.0761	-	38SMnPb26	1.4511	X6CrNb 17	X3CrNb17	1.7189	39 MnCrB 6 2	39MnCrB6-2
0.8155	GTS55	EN-GJMB-550-4	1.0762	-	44SMn28	1.4512	X6CrTi 12	X2CrTi12	1.7213	25 CrMo 4	25CrMo4
0.8170	GTS70	EN-GJMB-700-2	1.0763	-	44SMnPb28	1.4520	X1CrTi 15	X2CrTi17	1.7218	25 CrMo 4	25CrMo4
1.0022	St 01Z	-	1.0873	-	DC06 [Fe P06]	1.4521	X2CrMoTi 18 2	X2CrMoTi18-2	1.7219	-	26CrMo4-2
1.0035	St 33	S185	1.1103	ESTe 255	S255NL1	1.4522	X2CrMoNb 18 2	X2CrMoNb18-2	1.7220	34 CrMo 4	34CrMo4
1.0039	St 37 -2	S235JRH	1.1105	ESTe 315	S315NL1	1.4532	X7CrNiMoAl 15 7	X8CrNiMoAl15-7-2	1.7225	42 CrMo 4	42CrMo4
1.0044	St 44 -2	S275JR	1.1121	Ck 10	C10E	1.4541	X6CrNiTi18 10	X6CrNiTi18-10	1.7226	34 CrMo 4	34CrMo4
1.0050	St 50 -2	E295	1.1141	Ck15	C15E	1.4542	X5CrNiCuNb 17 4	X5CrNiCuNb16-4	1.7227	42 CrMo 4	42CrMo4
1.0060	St 60 -2	E335	1.1151	Ck 22	C22E	1.4550	X6CrNiNb 18 10	X6CrNiNb18-10	1.7228	50 CrMo 4	50CrMo4
1.0070	St 70 -2	E360	1.1158	Ck 25	C25E	1.4558	X2NiCrAlTi 32 20	X2NiCrAlTi32-20	1.7264	20 CrMo 5	20CrMo5
1.0114	St 37 -3U	S235J0	1.1170	28 Mn 6	28Mn6	1.4567	X3CrNiCu 18 9 X	X3CrNiCu18-9-4	1.7261	20 CrMo 4	20CrMo4
1.0226	St 02Z	DX51D	1.1178	Ck 30	C30E	1.4568	X7CrNiAl 17 7	X7CrNiAl17-7	1.7323	20 MoCrS 4	20MoCrS4
1.0242	StE 250 -Z2	S250GD	1.1181	Ck 35	C35E	1.4571	-	X6CrNiMoTi17-12-2	1.7333	22 CrMoS 3 5	22CrMoS3-5
1.0244	StE 280 -Z2	S280GD	1.1186	Ck 40	C40E	1.4577	X3CrNiMoTi 25 25	X3CrNiMoTi25-25	1.7335	13 CrMo 4 4	13CrMo4-5
1.0250	StE 320 -Z3	S320GD	1.1191	Ck 45	C45E	1.4592	X1CrMoTi 29 4	X2CrMoTi29-4	1.7362	12 CrMo 19 5	12CrMo19-5
1.0301	C 10	-	1.1203	Ck 55	C55E	1.4713	X10CrAl 7	X10CrAlSi7	1.7380	10 CrMo 9 10	10CrMo9-10
1.0302	C 10 Pb	-	1.1206	Ck 50	C50E	1.4724	X10CrAl 13	X10CrAlSi13	1.7383	-	11CrMo9-10
1.0306	St 06 Z	DX54D	1.1221	Ck 60	C60E	1.4742	X10CrAl 18	X10CrAlSi18	1.7779	-	20CrMoV13-5-5
1.0312	St 15	DC05 [Fe P05]	1.1241	Cm 50	C50R	1.4762	X10CrAl 24	X10CrAlSi25	1.8159	50 CrV 4	51CrV4
1.0319	RRStE 210.7	L210GA	1.1250	C 75 W	C75W	1.4821	X20CrNiSi 25 4	X20CrNiSi25-4	1.8504	34 CrAl 6	34CrAl6
1.0322	-	DX56D	1.2067	102 Cr 6	102Cr6	1.4828	X15CrNiSi 20 12	X15CrNiSi20-12	1.8519	31 CrMoV 9	31CrMoV9
1.0330	St 12 [St 2]	DC01 [Fe P01]	1.2080	-	X210Cr12	1.4833	X7CrNi 23 14	X7CrNi23-12	1.8550	34 CrAlNi 7	34CrAlNi7
1.0333	USt 13	-	1.2083	-	X42Cr13	1.4841	X15CrNiSi 25 20	X15CrNiSi25-21	1.8807	13 MnNiMoV 5 4	13MnNiMoV5-4
1.0338	St 14 [St 4]	DC04 [Fe P04]	1.2419	-	105WCr6	1.4845	X12CrNi 25 21	X12CrNi25-21	1.8812	18 MnMoV 5 2	18MnMoV5-2
1.0345	H I	P235GH	1.2767	-	X45NiCrMo4	1.4864	X12NiCrSi 36 16	X12NiCrSi35-16	1.8815	18 MnMoV 6 3	18MnMoV6-3
1.0347	RRSt 13 [RRSt 3]	DC03 [Fe P03]	1.3243	S6-5-2-5	S 6-5-2-5	1.4878	X12CrNiTi 18 9	X10CrNiTi18-10	1.8821	StE 355 TM	P355M
1.0348	UH I	P195GH	1.3343	S6-5-2	S 6-5-2	1.4903	-	X10CrMoVNb9-1	1.8824	StE 420 TM	P420M
1.0350	St 03Z	DX52D	1.3344	S6-5-3	S 6-5-3	1.5026	55 Si 7	55Si7	1.8826	StE 460 TM	P460M
1.0355	St 05Z	DX53D	1.4000	X6Cr 13	X6Cr13	1.5131	50 MnSi 4	50MnSi4	1.8828	ESTe 420 TM	P420ML2
1.0356	TtSt 35 N	P215NL	1.4002	X6CrAl 13	X6CrAl13	1.5415	15 Mo 3	16Mo3	1.8831	ESTe 460 TM	P460ML2
1.0358	St 05 Z	-	1.4003	X2Cr 11	X2CrNi12	1.5530	21 MnB 5	20MnB5	1.8832	TStE 355 TM	P355ML1
1.0401	C 15	-	1.4005	-	X12CrS13	1.5531	30 MnB 5	30MnB5	1.8835	TStE 420 TM	P420ML1
1.0402	C 22	C22	1.4006	X10Cr 13	X12Cr13	1.5532	38 MnB 5	38MnB5	1.8837	ESTe 460 TM	P460ML1
1.0403	C 15 Pb	-	1.4016	X6Cr 17	X6Cr17	1.5637	10 Ni 14	12Ni14	1.8879	StE ...	P690Q
1.0406	C 25	C25	1.4021	X20Cr 13	X20Cr13	1.5662	-	X11CrMo5+I	1.8880	WStE ...	P690QH
1.0419	St 52.0	L355	1.4028	X30Cr 13	X30Cr13	1.5680	-	X12Ni5	1.8881	TStE ...	P690QL1
1.0424	St 45.8 (ersetzt)	P265	1.4031	X38Cr 13	X38Cr13	1.5710	36 NiCr 6	36NiCr6	1.8882	10 MnTi 3	10MnTi3
1.0424	St 42.8 (ersetzt)	P265	1.4034	X46Cr 13	X46Cr13	1.5715	-	16NiCrS4	1.8888	ESTe ...	P690QL2
1.0425	H2	P265GH	1.4037	X65Cr13	X65Cr13	1.5752	14 NiCr 14	15NiCr13	1.8900	StE 380	S380N
1.0429	StE 290.7 TM	L290MB	1.4057	X20CrNi 17 2	X17CrNi16-2	1.6210	15 MnNi 6 3	15MnNi6-3	1.8901	StE 460	S460N
1.0457	StE 240.7	L245NB	1.4104	X12CrMoS 17	X14CrMoS17	1.6211	16 MnNi 6 3	16MnNi6-3	1.8902	StE 420	S420N
1.0459	RRStE 240.7	L245GA	1.4105	X4CrMoS 18	X6CrMoS17	1.6310	20 MnMoNi 5 5	20MnMoNi5-5	1.8903	TStE 460	S460NL
1.0461	StE 255	S255N	1.4109	X65CrMo 14	X70CrMo15	1.6311	20 MnMoNi 4 5	20MnMoNi4-5	1.8905	StE 460	P460N
1.0473	19 Mn 6	P355GH	1.4110	X55CrMo 14	X55CrMo14	1.6341	11 NiMoV 5 3	11NiMoV5-3	1.8907	StE 500	S500N
1.0481	17 Mn 4	P295GH	1.4112	X90CrMoV 18	X90CrMoV18	1.6368	15 NiCuMoNb 5	15NiCuMoNb5	1.8910	TStE 380	S380NL
1.0484	StE 290.7	L290NB	1.4113	X6CrMo 17 1	X6CrMo17-1	1.6511	36 CrNiMo 4	36CrNiMo4	1.8911	ESTe 380	S380NL1
1.0486	StE 285	P275N	1.4116	X45CrMoV 15	X50CrMoV15	1.6523	21 NiCrMo 2	21NiCrMo2-2	1.8912	TStE 420	S420NL
1.0501	C 35	C35	1.4120	X20CrMo 13	X20CrMo13	1.6526	21 NiCrMoS 2	21NiCrMoS2-2	1.8913	ESTe 420	S420NL1
1.0503	C 45	C45	1.4122	X35CrMo 17	X39CrMo17-1	1.6580	30 CrNiMo 8	30CrNiMo8	1.8915	TStE 460	P460NL1
1.0505	StE 315	P315N	1.4125	X105CrMo 17	X105CrMo17	1.6582	34 CrNiMo 6	34CrNiMo6	1.8917	WStE 500	S500NL
1.0511	C 40	C40	1.4301	X5CrNi 18 10	X5CrNi18-10	1.6587	17 CrNiMo 6	18CrNiMo7-6	1.8918	ESTe 460	P460NL2
1.0528	C 30	C30	1.4303	X5CrNi 18 12	X4CrNi18-12	1.7003	38 Cr 2	38Cr2	1.8919	ESTe 500	S500NL1
1.0529	StE 350 -Z3	S350GD	1.4305	X10CrNiS 18 9	X8CrNiS18-9	1.7006	46 Cr 2	46Cr2	1.8930	WStE 380	P380NH
1.0535	C 55	C55	1.4306	X2CrNi 19 11	X2CrNi19-11	1.7016	17 Cr 3	17Cr3	1.8932	WStE 420	P420NH
1.0539	StE 355N	S355NH	1.4310	X12CrNi 17 7	X10CrNi18-8	1.7023	38 CrS 2	38CrS2	1.8935	WStE 460	P460NH
1.0540	C 50	C50	1.4311	X2CrNiN 18 10	X2CrNiN18-10	1.7025	46 CrS 2	46CrS2	1.8937	TStE 500	P500NH
1.0547	St 52 -3U	S355J0H	1.4313	X4CrNi 13 4	X3CrNiMo13-4	1.7030	28 Cr 4	28Cr4	1.8972	StE 415.7	L415NB
1.0582	StE 360.7	L360NB	1.4318	X2CrNiN 18 7	X2CrNiN18-7	1.7033	34 Cr 4	34Cr4	1.8973	StE 415.7 TM	L415MB
1.0601	C 60	C60	1.4335	X1CrNi 25 21	X1CrNi25-21	1.7034	37 Cr 4	37Cr4	1.8975	StE 445.7 TM	L450MB
1.0710	15 S 10	-	1.4361	X1CrNiSi 18 15	X1CrNiSi18-15-4	1.7035	41 Cr 4	41Cr4	1.8977	StE 480.7 TM	L485MB
1.0715	9 SMn 28	11SMn30	1.4362	X2CrNiN 23 4	X2CrNiN23-4	1.7036	28 CrS 4	28CrS4	1.8978	StE 550.7 TM	L555MB
1.0718	9 SMnPb 28	11SMnPb30	1.4401	X5CrNiMo17 122	X5CrNiMo17-12-2	1.7037	34 CrS 4	34CrS4			
1.0721	10 S 20	10S20	1.4404	X2CrNiMo17 132	X2CrNiMo17-12-2	1.7038	37 CrS 4	37CrS4			
1.0722	10 S Pb 20	10SPb20	1.4410	X10CrNiMo 18 9	X2CrNiMoN25-7-4	1.7039	41 CrS 4	41CrS4			
1.0726	35 S 20	35S20	1.4418	X4CrNiMo 16 5	X4CrNiMo16-5-1	1.7131	16 MnCr 5	16MnCr5			
1.0727	45 S 20	46S20	1.4435	X2CrNiMo18 143	X2CrNiMo18-14-3	1.7139	16 MnCrS 5	16MnCrS5			

NR ARTYKUŁU

BRIDGE
GÜH



Nr artykułu	Strona	Głębokość wiercenia	Norma	Opis	Material narzędzia	Typ	Forma
11	428		Norma zakł.	Komplet wiertel			
16	420	~5xD	DIN 338	Komplet wiertel	HSCO	N	
17	419	~5xD	DIN 338	Komplet wiertel	HSS	N	
18	421	~5xD	DIN 338	Komplet wiertel	HSCO	Ti	
36	426		Norma zakł.	Komplet wiertel			
73	427		Norma zakł.	Komplet wiertel			
128	413		Norma zakł.	Wiertła kręte z chwytem Ø 16,0 mm	HSCO	V72	
129	414		Norma zakł.	Wiertła kręte z chwytem Ø 25,4 mm	HSCO	V72	
136	415		Norma zakł.	Wiertła kręte z chwytem Ø 25,4 mm	HSCO	V72	
195	422	~5xD	DIN 338	Komplet wiertel	HSCO	VA	
200	418	~5xD	DIN 338		HSS	N	
201	417	~5xD	DIN 338	Komplet wiertel	HSS	N	
204	338, 587	~10xD	DIN 340	Wiertła kręte, długie	HSS	N	
205	244	~5xD	DIN 338	Wiertła kręte	HSS	N	
206	263	~5xD	DIN 338	Wiertła kręte	HSS	H	
207	269	~5xD	DIN 338	Wiertła kręte	HSS	W	
208	258	~5xD	DIN 338	Wiertła kręte	HSS	N	
209	266	~5xD	DIN 338	Wiertła kręte	HSS	H	
210	272	~5xD	DIN 338	Wiertła kręte	HSS	W	
211	325	~10xD	DIN 339	Wiertła długie	HSS	N	
217	331, 580	~10xD	DIN 340	Wiertła kręte, długie	HSS	N	
218	339, 588	~10xD	DIN 340	Wiertła kręte, długie	HSS	H	
219	342, 591	~10xD	DIN 340	Wiertła kręte, długie	HSS	W	
220	336, 585	~10xD	DIN 340	Wiertła kręte, długie	HSS	N	
221	341, 590	~10xD	DIN 340	Wiertła kręte, długie	HSS	H	
223	192	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	N	
224	204	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	H	
225	208	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	W	
226	200	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	N	
227	206	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	H	
228	210	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	W	
229	458	~5xD	DIN 345	Wiertła kręte	HSS	N	
235	363, 612	~15xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 1	HSS	N	
236	371, 620	~20xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 2	HSS	N	
237	377, 626	~25xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 3	HSS	N	
240	257	~5xD	DIN 338	Wiertła kręte	HSS	N	
242	381, 630	>25xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
243	382, 631	>25xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
244	383, 632	>25xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
245	450	~5xD	DIN 345	Wiertła kręte	HSS	N	
246	459	~5xD	DIN 345	Wiertła kręte	HSS	H	
247	460	~5xD	DIN 345	Wiertła kręte	HSS	W	
248	457	~5xD	DIN 345	Wiertła kręte	HSS	N	
251	471	~5xD	DIN 346	Wiertła kręte	HSS	N	
254	499		Norma zakł.	Wiertła z chłodzeniem wew. długości wg normy zakładowej	HSS	N	
255	500		Norma zakł.	Wiertła z chłodzeniem wew. długości wg normy zakładowej	HSS	N	
257	473	~10xD	DIN 341	Wiertła długie	HSS	N	
266	483, 633	~15xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 1	HSS	N	
267	487, 637	~20xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 2	HSS	N	
268	412		Norma zakł.	Wiertła kręte z chwytem Ø12,7 mm	HSS	N	
269	498	~7xD	Norma zakł.	Wiertła długie, z chłodzeniem wew.	HSS	N	
270	502	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSS	N	
271	503	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSS	N	
272	504	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSS	N	
274	714		Norma zakł.	Wiertła stopniowe, do nakiełków DIN 332	HSS	N	D
280	689		Norma zakł.	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	A
281	684		Norma zakł.	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	A
282	685		Norma zakł.	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	A
283	686		Norma zakł.	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	R
284	687		Norma zakł.	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	R
285	688		Norma zakł.	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	B
287	693		DIN 333	Nawiertaki do nakiełków, ze splaszczzeniem	HSS	N	A
288	694		DIN 333	Nawiertaki do nakiełków, ze splaszczzeniem	HSS	N	R
289	695		Norma zakł.	Nawiertaki do nakiełków, ze splaszczzeniem	HSS	N	B
292	680		BS 328	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	A
293	495	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
294	681		BS 328	Nawiertaki do nakiełków, bez splaszczczenia	HSS	N	A
298	496	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
299	497	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
301	397, 649	~5xD	DIN 1899	Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E	HSS-E-PM	N	
303	402, 654	~5xD	DIN 1899	Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E	HSS-E-PM	N	
305	284	~5xD	DIN 338	Wiertła kręte	HSCO	N	



Nr artykułu	Strona	Głębokość wiercenia	Norma	Opis	Material narzędzia	Typ	Forma
308	289	~5xD	DIN 338	Wiertła kręte	HSCO	N	
311	330	~10xD	DIN 339	Wiertła długie	HSCO	N	
317	353, 602	~10xD	DIN 340	Wiertła kręte, długie	HSCO	N	
329	218	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	GV 120	
330	225	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	GV 120	
336	355, 604	~10xD	DIN 340	Wiertła kręte, długie	HSCO	GT 100	
345	463	~5xD	DIN 345	Wiertła kręte	HSCO	N	
351	472	~5xD	DIN 346	Wiertła kręte	HSCO	N	
357	480	~10xD	DIN 341	Wiertła długie	HSCO	N	
363	448	~3xD	Norma zakł.	Wiertła kręte	HSCO	GV 120	
370	505	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSCO	GT 100	
371	506	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSCO	GT 100	
372	507	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSCO	GT 100	
374	508, 641	~15xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 1870	HSCO	GT 100	
375	509, 642	~15xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 1870	HSCO	GT 100	
376	510, 643	~15xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 1870	HSCO	GT 100	
378	718		Norma zakł.	Wiertła stopniowe, z chwytem walc.	HSS	N	
379	720		Norma zakł.	Wiertła stopniowe, z chwytem walc.	HSS	N	
380	721		Norma zakł.	Wiertła stopniowe, z chwytem walc.	HSS	N	
381	682		DIN 333	Nawiertaki do nakieków, bez splaszczania	HSCO	N	A
390	394	~10xD	Norma zakł.	Wiertła z chłodzeniem wew.	HSS	N	
396	357, 606	~10xD	DIN 340	Wiertła kręte, długie	HSCO	GT 100	
501	351, 600	~10xD	DIN 340	Wiertła kręte, długie	HSS	GT 50	
502	365, 614	~15xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 1	HSS	GT 100	
503	372, 621	~20xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 2	HSS	GT 100	
504	378, 627	~25xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 3	HSS	GT 100	
505	479	~10xD	DIN 341	Wiertła długie	HSS	GT 50	
506	350, 599	~10xD	DIN 340	Wiertła kręte, długie	HSS	GT 100	
511	386	~5xD	Norma zakł.	Wiertła z chwytem cylindrycznym, wzmocnionym	HSCO	GU 500	
512	384	~3xD	Norma zakł.	Wiertła z chwytem cylindrycznym, wzmocnionym	HSCO	GU 500	
513	388	~5xD	Norma zakł.	Wiertła z chwytem cylindrycznym, wzmocnionym	HSS-E-PM	GT 500	
514	728		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	
515	237	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS-E-PM	GT 500	
520	735		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem MK	HSS	N	
523	482	~10xD	Norma zakł.	Wiertła długie	HSS	N	
524	368, 617	~15xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 1	HSS	GT 50	
525	485, 635	~15xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 1	HSS	GT 50	
526	484, 634	~15xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 1	HSS	GT 100	
527	488, 638	~20xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 2	HSS	GT 100	
528	375, 624	~20xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 2	HSS	GT 50	
529	379, 628	~25xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 3	HSS	GT 50	
531	416, 746		DIN 1898	Wiertła do otworów pod kółki stożkowe	HSS	N	
532	511, 747		DIN 1898	Wiertła do otworów pod kółki stożkowe	HSS	N	
533	737		DIN 344	Rozwiertaki zgrubne, z chwytem walc.	HSS	N	
534	740		DIN 343	Rozwiertaki zgrubne, z chwytem MK	HSS	N	
535	344, 593	~10xD	DIN 340	Wiertła kręte, długie	HSS	GT 100	
536	722		DIN 8374	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	A
537	732		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem MK	HSS	N	
538	726		DIN 8376	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	
539	734		DIN 8377	Wiertła stopniowe, wielolysinkowe, z chwytem MK	HSS	N	
540	729		DIN 8378	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	
541	736		DIN 8379	Wiertła stopniowe, wielolysinkowe, z chwytem MK	HSS	N	
542	489, 639	~20xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 2	HSS	GT 50	
546	707		Norma zakł.	Nawiertaki NC 142°	Węglik mono.	N	
549	274	~5xD	DIN 338	Wiertła kręte	HSS	GT 100	
550	281	~5xD	DIN 338	Wiertła kręte	HSS	GT 100	
551	476	~10xD	DIN 341	Wiertła długie	HSS	GT 100	
552	212	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	GT 80	
553	215	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	GT 80	
554	708		Norma zakł.	Wiertła dwustronne do karoserii	HSS	DK 77	
555	743		DIN 1864	Rozwiertaki zgrubne, z chwytem MK	HSS	N	
556	702		Norma zakł.	Nawiertaki NC 120°	HSS	N	
557	696		Norma zakł.	Nawiertaki NC 90°	HSS	N	
558	461	~5xD	DIN 345	Wiertła kręte	HSS	GT 100	
559	700		Norma zakł.	Nawiertaki NC 90°	HSS	N	
560	256	~5xD	DIN 338	Wiertła kręte	HSS	N	
561	327	~10xD	DIN 339	Wiertła długie	HSS	N	
563	491	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
564	492	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
565	493	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
566	494	>20xD	Norma zakł.	Wiertła kręte, ekstra długie	HSS	GT 100	
567	703		Norma zakł.	Nawiertaki NC 120°	HSS	N	



Nr artykułu	Strona	Głębokość wiercenia	Norma	Opis	Material narzędzia	Typ	Forma
568	697		Norma zakł.	Nawiertaki NC 90°	HSS	N	
569	723		DIN 8374	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	B
571	380, 629	~25xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 3	HSCO	GT 100	
572	231	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	VA	
574	715		Norma zakł.	Wiertła stopniowe, do nakiełków DIN 332	HSS	N	DR
575	716		Norma zakł.	Wiertła stopniowe, do nakiełków DIN 332	HSS	N	D
576	717		Norma zakł.	Wiertła stopniowe, do nakiełków DIN 332	HSS	N	D
577	390		NAS 907	Wiertła lotnicze, długość 6 cali	HSS	N	
578	392		NAS 907	Wiertła lotnicze, długość 12 cali	HSS	N	
579	391		NAS 907	Wiertła lotnicze, długość 6 cali	HSS	N	
580	393		NAS 907	Wiertła lotnicze, długość 12 cali	HSS	N	
581	668		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	A
582	670		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	A
583	672		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	R
584	674		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	R
585	675		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	B
586	676		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	B
587	690		DIN 333	Nawiertaki do nakiełków, ze splaszczaniem	HSS	N	A
588	691		DIN 333	Nawiertaki do nakiełków, ze splaszczaniem	HSS	N	R
589	692		DIN 333	Nawiertaki do nakiełków, ze splaszczaniem	HSS	N	B
590	671		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	A
591	677		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	B
592	454	~5xD	DIN 345	Wiertła kręte	HSS	N	
594	678		ASME B94.11 M	Nawiertaki do nakiełków, bez splaszczania	HSS	N	A
596	679		ASME B94.11 M	Nawiertaki do nakiełków, bez splaszczania	HSS	N	B
605	301	~5xD	DIN 338	Wiertła kręte	HSCO	Ti	
606	462	~5xD	DIN 345	Wiertła kręte	HSS	GT 100	
608	308	~5xD	DIN 338	Wiertła kręte	HSCO	Ti	
611	114	5xD	DIN 6539	Wiertła RATIO, 3-ostrz.	Węglik mono.	GS 200 U	
613	669		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	A
614	673		DIN 333	Nawiertaki do nakiełków, bez splaszczania	HSS	N	R
617	358, 607	~10xD	DIN 340	Wiertła kręte, długie	HSCO	Ti	
618	370, 619	~15xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 1	HSCO	GT 100	
619	376, 625	~20xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 2	HSCO	GT 100	
620	486, 636	~15xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 1	HSCO	GT 100	
621	490, 640	~20xD	DIN 1870	Wiertła kręte, bardzo długie, szereg 2	HSCO	GT 100	
622	291	~5xD	DIN 338	Wiertła kręte	HSCO	GT 100	
623	481	~10xD	DIN 341	Wiertła długie	HSCO	GT 100	
634	742		DIN 343	Rozwiertaki zgrubne, z chwytem MK	HSCO	N	
635	744		DIN 1864	Rozwiertaki zgrubne, z chwytem MK	HSCO	N	
636	724		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	
637	731		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem MK	HSS	N	
638	725		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	HSS	N	
639	733		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem MK	HSS	N	
645	466	~5xD	DIN 345	Wiertła kręte	HSCO	GT 100	
651	250	~5xD	DIN 338	Wiertła kręte	HSS	N	
652	277	~5xD	DIN 338	Wiertła kręte	HSS	GT 100	
653	196	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	N	
654	455	~5xD	DIN 345	Wiertła kręte	HSS	N	
655	475	~10xD	DIN 341	Wiertła kręte	HSS	N	
656	478	~10xD	DIN 341	Wiertła długie	HSS	GT 100	
657	304	~5xD	DIN 338	Wiertła kręte	HSCO	Ti	
658	294	~5xD	DIN 338	Wiertła kręte	HSCO	GT 100	
659	222	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	GV 120	
660	400, 652	~5xD	DIN 1899	Mikro-wiertła bez chłodzeniem wewnętrznym z PM HSS-E	HSS-E-PM	N	
661	465	~5xD	DIN 345	Wiertła kręte	HSCO	N	
662	467	~5xD	DIN 345	Wiertła kręte	HSCO	GT 100	
663	449	~3xD	Norma zakł.	Wiertła kręte	HSCO	GV 120	
664	261	~5xD	DIN 338	Wiertła kręte	HSS	N	
665	283	~5xD	DIN 338	Wiertła kręte	HSS	GT 100	
666	328	~10xD	DIN 339	Wiertła długie	HSS	N	
667	334, 583	~10xD	DIN 340	Wiertła kręte, długie	HSS	N	
668	347, 596	~10xD	DIN 340	Wiertła kręte, długie	HSS	GT 100	
669	360, 609	~10xD	DIN 340	Wiertła kręte, długie	HSCO	Ti	
670	367, 616	~15xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 1	HSS	GT 100	
671	374, 623	~20xD	DIN 1869	Wiertła kręte, bardzo długie, szereg 2	HSS	GT 100	
672	203	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	N	
701	404, 656	~5xD	Norma zakł.	Pełnowęglkowe mikro-wiertła bez chłodzenia wewnętrznego	Węglik mono.	N	
702	243	~3xD	Norma zakł.	Wiertła kręte, krótkie	Węglik mono.	N	
703	429		DIN 8037	Wiertła z ostrzami węglkowymi (HM)	Węglik	N	
704	430		DIN 8038	Wiertła z ostrzami węglkowymi (HM)	Węglik	N	
705	512		DIN 8041	Wiertła z ostrzami węglkowymi (HM)	Węglik	N	



Nr artykułu	Strona	Głębokość wiercenia	Norma	Opis	Material narzędzia	Typ	Forma
706	362, 611	~10xD	Norma zakł.	Wiertła kręte, długie	Węglik mono.	N	
707	432		Norma zakł.	Wiertła piórkowe	Węglik	H	
710	323	~5xD	Norma zakł.	Wiertła kręte	Węglik	Duro 150	
716	433		Norma zakł.	Wiertła do betonu	Węglik	N	
723	701		Norma zakł.	Nawiertaki NC 90°	Węglik mono.	N	
724	706		Norma zakł.	Nawiertaki NC 120°	Węglik mono.	N	
729	745		Norma zakł.	Rozwiertaki zgrubne, z chwytem MK	Węglik	N	
730	239	3xD	DIN 6539	Wiertła kręte, krótkie	Węglik mono.	N	
731	115	5xD	DIN 6539	Wiertła RATIO, 3-ostrz.	Węglik mono.	GS 200 U	
732	319	~5xD	Norma zakł.	Wiertła kręte	Węglik mono.	N	
736	683		Norma zakł.	Nawiertaki do nakiełków, bez splaszczona	Węglik mono.	N	A
738	727		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	Węglik mono.	N	
739	730		Norma zakł.	Wiertła stopniowe, wielolysinkowe, z chwytem walc.	Węglik mono.	N	
745	116	5xD	DIN 6539	Wiertła RATIO, 3-ostrz.	Węglik mono.	GS 200 G	
750	739		Norma zakł.	Rozwiertaki zgrubne, z chwytem walc.	Węglik	N	
768	56	4xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GG	
769	93	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GG	
770	98	10xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GG	
773	103	15xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GN	
1018	313	~5xD	DIN 338		M42	AeroX	
1025	117	5xD	DIN 6539	Wiertła RATIO, 3-ostrz.	Węglik mono.	GS 200 G	
1027	119	5xD	DIN 6539	Wiertła RATIO, 3-ostrz.	Węglik mono.	GS 200 F	
1032	120	3xD	Norma zakł.	Wiertła stopniowe RATIO, 3-ostrz.	Węglik mono.	GS 200 G	
1047	162		Norma zakł.	Płytki wymienne do RT 800	Węglik mono.	RT 800 WP	
1071	168		Norma zakł.	Śruby mocujące do RT 800			
1083	425	~5xD	DIN 338		M42	AeroX	
1101	501	~10xD	Norma zakł.	Wiertła z chłodzeniem wew. długości wg DIN 341	HSS	N	
1131	395	~5xD	Norma zakł.	Wiertła z chłodzeniem wew.	HSCO	GT 80 IK	
1132	396	~5xD	Norma zakł.	Wiertła z chłodzeniem wew.	HSCO	GT 80 IK	
1133	699		Norma zakł.	Nawiertaki NC 90°	HSCO	N	
1134	704		Norma zakł.	Nawiertaki NC 120°	HSCO	N	
1135	705		Norma zakł.	Nawiertaki NC 120°	HSCO	N	
1136	698		Norma zakł.	Nawiertaki NC 90°	HSCO	N	
1146	315	~5xD	DIN 338	Wiertła kręte	M42	N	
1147	719		Norma zakł.	Wiertła stopniowe, z chwytem walc.	HSS	N	
1149	431		Norma zakł.	Wiertła kręte do Kevlaru (FK)	Węglik mono.	FK	
1171	55	3xD	DIN 6538K	Wiertła RATIO, z kanałkami chłodz.	Węglik	RT 80 U	
1172	84	5xD	DIN 6538M	Wiertła RATIO, z kanałkami chłodz.	Węglik	RT 80 U	
1173	95	7xD	DIN 6538L	Wiertła RATIO, z kanałkami chłodz.	Węglik	RT 80 U	
1180	54	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
1181	43	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
1182	80	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
1183	66	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
1184	21	3xD	DIN 6537K	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
1199	317	~5xD	DIN 338	Wiertła kręte	M42	N	
1221	298	~5xD	DIN 338	Wiertła kręte	HSCO	GT 100	
1222	468	~5xD	DIN 345	Wiertła kręte	HSCO	GT 100	
1223	299	~5xD	DIN 338	Wiertła kręte	HSCO	GT 100	
1224	469	~5xD	DIN 345	Wiertła kręte	HSCO	GT 100	
1228	227	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	GT 80	
1242	23	3xD	DIN 6539	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
1243	36	5xD	Norma zakł.	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
1259	235	~3xD	DIN 1897	Wiertła kręte, krótkie	M42	N	
1260	309	~5xD	DIN 338	Wiertła kręte	HSCO	VA	
1261	230	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	VA	
1262	470	~5xD	DIN 345	Wiertła kręte	HSCO	VA	
1612	171, 558		Norma zakł.	Wkrętak Torx			
1660	53	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
1662	78	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
1663	65	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
1702	28	3xD	DIN 6539	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 F	
1946	389	~3xD	DIN 6537K	Wiertła z chwytem cylindrycznym, wzmocnionym	Węglik mono.	H	
2047	311	~5xD	DIN 338	Wiertła kręte	HSCO	P2000	
2048	233	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	P2000	
2049	423	~5xD	DIN 338	Komplet wiertel	HSCO	P2000	
2050	424	~3xD	DIN 1897	Komplet wiertel	HSCO	P2000	
2456	254	~5xD	DIN 338	Wiertła kręte	HSS	N	
2457	280	~5xD	DIN 338	Wiertła kręte	HSS	GT 100	
2458	306	~5xD	DIN 338	Wiertła kręte	HSCO	Ti	
2459	296	~5xD	DIN 338	Wiertła kręte	HSCO	GT 100	
2460	199	~3xD	DIN 1897	Wiertła kręte, krótkie	HSS	N	
2461	224	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	GV 120	



Nr artykułu	Strona	Głębokość wiercenia	Norma	Opis	Material narzędzia	Typ	Forma
2462	349, 598	~10xD	DIN 340	Wiertła kręte, długie	HSS	GT 100	
2463	241	~3xD	DIN 6539	Wiertła kręte, krótkie	Węglik mono.	N	
2464	321	~5xD	Norma zakł.	Wiertła kręte	Węglik mono.	N	
2468	52	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
2469	41	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
2470	77	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
2471	63	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
2472	18	3xD	DIN 6537K	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2473	20	3xD	DIN 6539	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2474	34	5xD	Norma zakł.	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2475	27	3xD	DIN 6537K	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 F	
2477	39	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
2478	76	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 F	
2479	61	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
2480	16	3xD	DIN 6537K	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2485	164		Norma zakł.	Płytki wymienne do RT 800	Węglik mono.	RT 800 WP	
2498	229	~3xD	DIN 1897	Wiertła kręte, krótkie	HSCO	GT 80	
2711	89	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
2712	38	5xD	DIN 6537L	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 F	
2713	113	5xD	DIN 6537L	Wiertła RATIO, 3-ostrz.	Węglik mono.	FT 200 G	
2717	35	5xD	DIN 6537L	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2719	32	5xD	DIN 6537L	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2747	166		Norma zakł.	Płytki wymienne do RT 800	Węglik mono.	RT 800 WP	
2996	30	5xD	DIN 6537L	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 U	
2997	288	~5xD	DIN 338	Wiertła kręte	HSCO	N	
3899	405, 657		Norma zakł.	Pełnowęglikowe mikro-wiertła bez chłodzenia wewnętrznego	Węglik mono.	N	
4044	85	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
4045	87	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
4071	158, 561		Norma zakł.	Śruby mocujące			
4105	138	1xD	Norma zakł.	Korpusy wiertel składanych HT 800		HT 800 WP	
4106	128	1,5xD	Norma zakł.	Korpusy wiertel składanych HT 800		HT 800 WP	
4107	130	3xD	Norma zakł.	Korpusy wiertel składanych HT 800		HT 800 WP	
4108	132	5xD	Norma zakł.	Korpusy wiertel składanych HT 800		HT 800 WP	
4109	134	7xD	Norma zakł.	Korpusy wiertel składanych HT 800		HT 800 WP	
4110	136	10xD	Norma zakł.	Korpusy wiertel składanych HT 800		HT 800 WP	
4111	151		Norma zakł.	Płytki wymienne do HT 800	Węglik mono.	HT 800 WP	
4112	139		Norma zakł.	Płytki wymienne do HT 800	Węglik mono.	HT 800 WP	
4113	142		Norma zakł.	Płytki wymienne do HT 800	Węglik mono.	HT 800 WP	
4114	148		Norma zakł.	Płytki wymienne do HT 800	Węglik mono.	HT 800 WP	
4115	145		Norma zakł.	Płytki wymienne do HT 800	Węglik mono.	HT 800 WP	
4915	169, 559		Norma zakł.	Wkrętaki dynamometryczne			
4917	170, 560		Norma zakł.	Nasadki Torx			
5018	540	20xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5019	551	30xD	Norma zakł.	Wiertła lufowe, 2-ostrzowe ZB 80	Węglik	ZB 80	
5020	534	80.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5021	538	160.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5022	545	40xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5023	548	80xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5024	532	45.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5026	536	120.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5164	550	1100.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5242	159	3xD	Norma zakł.	Korpusy wiertel składanych RT 800		RT 800 WP	
5243	160	5xD	Norma zakł.	Korpusy wiertel składanych RT 800		RT 800 WP	
5248	161	7xD	Norma zakł.	Korpusy wiertel składanych RT 800		RT 800 WP	
5460	542	30xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5525	100	12xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 U	
5632	533	45.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5633	535	80.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5637	537	120.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5638	539	160.000	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5639	541	20xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5640	543	30xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5641	546	40xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5642	549	80xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5643	552	30xD	Norma zakł.	Wiertła lufowe, 2-ostrzowe ZB 80	Węglik	ZB 80	
5644	555	30xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 800	Węglik	EB 800	
5646	529	25xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5647	530	50xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5648	531	75xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 100	Węglik mono.	EB 100	
5689	544	40xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5690	547	80xD	Norma zakł.	Wiertła lufowe, 1-ostrzowe EB 80	Węglik	EB 80	
5747	566		Norma zakł.	Tulejki wiertarskie	HSS		

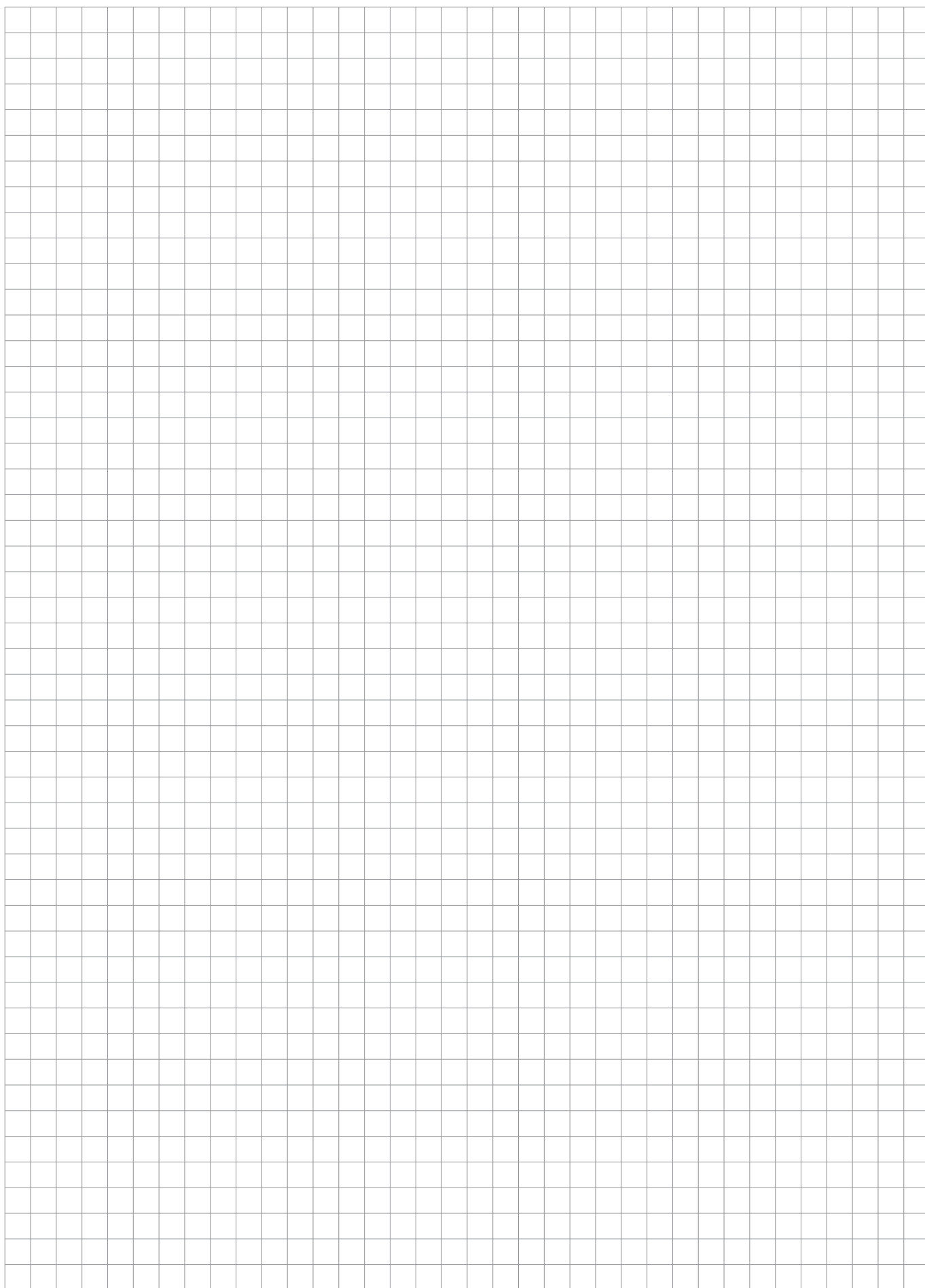


Nr artykułu	Strona	Głębokość wiercenia	Norma	Opis	Material narzędzia	Typ	Forma
5748	565		Norma zakł.	Tulejki wiertarskie	Węglik mono.		
5749	573		Norma zakł.	Tulejki podporowe do 1- i 2-ostrzowych wiertel lufowych (z otw. okrągłym)			
5750	571		Norma zakł.	Tulejki podporowe do 1-ostrzowych wiertel lufowych (z otw. kształtowym)			
5751	576		Norma zakł.	Tulejki podporowe do 2-ostrzowych wiertel lufowych (z otw. kształtowym)			
5752	569		Norma zakł.	Pierścienie zgarniające do 1-ostrzowych wiertel lufowych			
5753	575		Norma zakł.	Pierścienie zgarniające do 2-ostrzowych wiertel lufowych			
5754	577		Norma zakł.	Śruby regulacyjne			
5755	578		Norma zakł.	Śruby regulacyjne			
5759	59	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 S	
5760	96	8xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 S	
6068	58	4xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GG	
6069	94	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GG	
6070	99	10xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 150 GG	
6128	157		Norma zakł.	Śruby mocujące			
6400	108, 407, 659	4xD	Norma zakł.	Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego	Węglik mono.	N	
6401	109, 408, 660	7xD	Norma zakł.	Mikro-wiertła „ExclusiveLine” bez chłodzenia wewnętrznego	Węglik mono.	N	
6405	110, 409, 661	5xD	Norma zakł.	Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym	Węglik mono.	N	
6408	111, 410, 662	8xD	Norma zakł.	Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym	Węglik mono.	N	
6412	112, 411, 663	15xD	Norma zakł.	Mikro-wiertła „ExclusiveLine” z chłodzeniem wewnętrznym	Węglik mono.	N	
6501	82	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 R	
6502	91	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 R	
6509	102, 523	15xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 T	
6511	104, 524	20xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 T	
6512	105, 525	25xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 T	
6513	106, 526	30xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 T	
6514	107, 527	40xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 T	
7632	155		Norma zakł.	Płytki fazujące do HT 800	Węglik mono.		
7635	156		Norma zakł.	Płytki fazujące do HT 800	Węglik mono.		
7645	154		Norma zakł.	Płytki fazujące do HT 800	Węglik mono.		
8510	48	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 VA	
8511	72	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 VA	
8520	44	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 HF	
8521	68	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 HF	
8522	90	7xD	Norma zakł.	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 HF	
8524	25	3xD	DIN 6537K	Wiertła RATIO bez kanałków chłodz.	Węglik mono.	RT 100 HF	
8610	50	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 VA	
8611	74	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 VA	
8620	46	3xD	DIN 6537K	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 HF	
8621	70	5xD	DIN 6537L	Wiertła RATIO, z kanałkami chłodz.	Węglik mono.	RT 100 HF	









Perfekcja w wierceniu





www.guehring.de



Gühring Sp. Z o.o. | Tel.: +48 32 428 70 19 | Fax: +48 32 428 70 44
 Aleja Zagłębia Dąbrowskiego 21 | 41-300 Dąbrowa Górnicza | handel@guehring.pl | www.guehring.pl

Gühring Polska Sp. Z o.o. Regrinding Center | Tel.: +48 33 813 24 25 | +48 33 813 24
 ul. Grażyńskiego 141 | 43-300 Bielsko Biala | centrum@guehring.pl | www.guehring.pl