

GÜHRING



Mould & Die



8,000

employees worldwide

900

sales representatives worldwide



100,000

articles in the standard range



Quality

Made in Germany



1.1 billion

turnover



2,400

tonnes of carbide annually



48

country subsidiaries

You benefit from 125 years of experience in tool development. Our range of cutting tools is well established in the market, has been specially optimised for the requirements of mould & die and has been expanded with additional dimensioning and new products. In addition to quantity, quality also matters, we have therefore invested in specialised production and measurement technologies at our site in Germany – for tools you can rely on.

GÜHRING

Perfection in Machining

Manufacturer's process optimisation

- + guaranteed process reliability with the highest quality*
- + μ -precise solid carbide milling cutters
for high precision requirements*
- + tool range in stock*

We solve the issues of your deadline pressure, indispensable process reliability and requirements for tolerance and surface – with the largest portfolio of standard tools on the market, including specially designed tools for mould & die, with our expertise as a manufacturer. In this way, we counteract pressures due to cost, avoid expensive manual reworking and support you in maintaining your delivery reliability.

**MOULDING
& DIE**

YOUR PARTNER

Far more than just machining



PROCESS CONSULTING & MACHINING COMPETENCE

- + your partner at your side
- + comprehensive know-how
- + process automation

Industry management

Field staff

Product management

Application engineers

CAM specialists

As a machining professional, we are at your side throughout the entire machining process. Thanks to our own sales network of more than 900 tool specialists worldwide, we are always close by. This guarantees first-class support and fast response times. In addition, our CAM specialists provide support for application-related questions and process optimisation.



OUR PRODUCTS

- + highest quality
- + comprehensive range of tools
- + fast availability

Milling tools

Drilling tools

Threading tools

Reaming tools

Clamping systems

Accessories

Benefit from a stocked tool range in the area of milling, drilling, reaming and threading as well as customer-specific special tools. With various clamping devices and corresponding accessories, we offer everything you need for a successful machining process.



TOOL MANAGEMENT

- + uncover potential for improvement
- + save up to 25% in process costs
- + perfecting processes

Gühring Tool Management Software

Tool Manager

Tool Manager digitalises processes for your tools and applications.

TM dispensing systems

Process data analysis

Gühring makes more out of your tools: With the Gühring Tool Management Software (GTMS) and our dispensing systems, you can control your complete tool supply and evaluate the wear data. Or you can hand over this work to our tool managers who apply continuous analysis to optimise your processes.





DIGITAL SERVICES

- + all tool-relevant data available quickly and easily
- + immediate help via various media

CAD data

Would you like to simulate your machining or manage your tools using drawings? We provide you with standard-compliant CAD data and 3D models free of charge in our online shop or in the CAD portal.

Cutting data

You can also obtain all cutting data for your machining in our online shop: Simply enter information about your process and the system calculates the optimal parameters.

Online shop

E-Learning

Web seminars

With our software solutions, you can automate processes and save time and money. We also provide you with free CAD data and 3D models for CAD simulation and the optimum cutting data for your machining. If you have any questions, you can get immediate help on several channels.



RECONDITIONING

- + original quality reconditioning
- + pick-up and delivery service for on-time logistics

Re-grinding

Re-coating

Even the most resistant tool wears out under heavy use. Gühring restores its original performance by professionally regrinding and recoating with original geometries and coatings. This saves you money, with more than 50 service centres worldwide guaranteeing fast service.

For more information about our services and availability in your country, please contact us.



SUCCESS STORY

*Success in mould making
starts with the supplier*

The project

Decades of know-how, competent employees and state-of-the-art machines –

this is what precision mould maker Color Metal relies on in the production of injection moulds.

With 95 employees, the company produces around the clock.

For Color Metal, it is clear: There is also no room for compromise as a tool supplier.

This is why the company has been relying on reliable tools from Gühring for decades.

A collaboration that benefits both sides. Color Metal produces with process reliability and Gühring collects valuable know-how for the champions league of tool development – mould making.

color metal

Giving shape to ideas

» The time and cost pressure in mould making is enormous, so there is no room for imprecise work and errors. In Gühring, we have found a technology partner on an equal footing who has the same high quality standards for their tools as we do for our moulds. «

Otmar Gutmann
Managing Director, Color Metal GmbH



HEITERSHEIM

Baden-Württemberg



95

employees



4,200 m²

production area



21

machines



INJECTION MOULDS

up to 1.0 x 1.5 m



AUTOMATIC LOADING

of machines for continuous 24/7 operation



NETWORKED SYSTEM PRODUCTION

through high-tech machinery



TOOLMAKER OF THE YEAR

an initiative of the RWTH Aachen Machine Tool Laboratory & the Fraunhofer Institute for Production Technology



Otmar Gutmann

Managing Director, Color Metal GmbH

Rolf Ehrler

Product Manager for Milling, Gühring KG

3 reasons to collaborate

That's why mould making relies on Gühring:

01

Tool range in stock

Quality and process reliability, even in hard milling

02

Holistic expertise

Tool and process knowledge directly from the manufacturer

03

Secure tool management

Tool life cycle and test equipment management
at a glance

Tool management made easy

Save 20% on tool costs with TM cabinet and software

Finding instead of searching saves money

Tools lying around, but never the right one to hand: searching for tools takes an incredible amount of time. All tools have their place in our tool management cabinets. Tidy, locked, with controlled dispensing.

The example calculation shows how much it costs to search for tools every year:



X



X



= 30,000 €
per year

15 MIN. SEARCH TIME

daily at 200 working days

20 EMPLOYEES

in production

€30 HOURLY WAGE

per production employee

COST SAVINGS

in the tool search



6 reasons why a tool management system revolutionises your production in mould making:

1

BUY FEWER REPLACEMENT TOOLS

TM cabinet with electronically locked drawers

“Actually, we should already have this tool somewhere” – How many times have you thought about this and still reordered the tool? With an electronic dispensing system, untraceable tools and loss are a thing of the past. Your employees’ awareness of tool consumption is also raised or raised beyond budget limits.

2

MANAGEMENT OF MEASURING AND OPERATING EQUIPMENT

Software-based storage and documentation

If test equipment is not accurately calibrated and documented, you face real problems – not to mention manufacturing errors – during the next audit. A tool management system supports you in the central storage and tracking of testing and measuring equipment. In the software, you define calibration intervals and log measurement results.

3

IDENTIFY POTENTIAL SAVINGS

Customised reporting

With a TM system, you have a complete overview of your total tool costs: You can create monthly consumption reports and infographics and evaluate them according to different criteria such as storage unit, period, product, cost centre, tool type, etc.

4

FASTER ORDER PLANNING

Clever use of parts lists and tool data

Plan your production orders more efficiently: Define tool parts lists instead of individual components, view a history of component parts lists and use all tool data such as 2D drawings and CAD models.

5

SIMPLIFIED REGRINDING MANAGEMENT

Tool life cycle overview

Regrinding is generally cheaper than a new purchase. The TM software records all tool data, such as the remaining tool life or the number of regrinds to date. The software can also automatically trigger a regrinding job.

6

20% LESS PROCESS COSTS WHEN PURCHASING TOOLS

Automated reordering

How much time do you spend ordering standard items? Too much. Enter minimum stock levels for your common tools in the tool management software and the system automatically reorders if stock levels fall below the minimum – no more oversupply or undersupply.

OUR DIGITAL SERVICES

made by **GÜHRING**

Whether you are active in work preparation, tool management, design, production, quality assurance, purchasing or controlling – our digital services make your job easier.



scan me



Innovative software solutions automate your procurement processes, help to prevent system failures and discover potential savings in your production. This reduces your process costs and saves you time and money in your daily work.

We also provide you with all necessary data and information on all machining in mould & die. If you need support, our machining professionals offer immediate help via various digital channels.



NAVIGATOR

The easy product finder: The Navigator guides you to the best tool for your application



CUTTING DATA

We provide you with the right cutting values for every machining task



ONLINE SHOP

Make it easy for yourself: Order tools at the click of a mouse in the Gühring online shop



CAD DATA AND 3D MODELS

Free download of compliant drawings and 3D models for each of your use cases



SOFTWARE CNC GÜHRO THREADMILL

Find the optimal CNC range for your thread milling cutter



GÜHRING TOOL MANAGEMENT SOFTWARE

With GTMS, you can control your entire tool management and optimise your production



GÜHRING ACADEMY

You never stop learning: The Gühring Academy offers you free online further training



EXPERT CHAT

No bots: Chat with us personally!



WHATSAPP

Quick help via WhatsApp when things get stuck: +49 172 6585353



SERVICE HOTLINE

Technical advice and support via our customer care hotline: 00800 2607 2607



LIVE VIDEO SUPPORT

Fast, contactless and interactive: Solve problems using remote analysis with live video support



OCI PUNCHOUT

More convenient ordering: These two interfaces are where the Gühring shop and ERP system merge



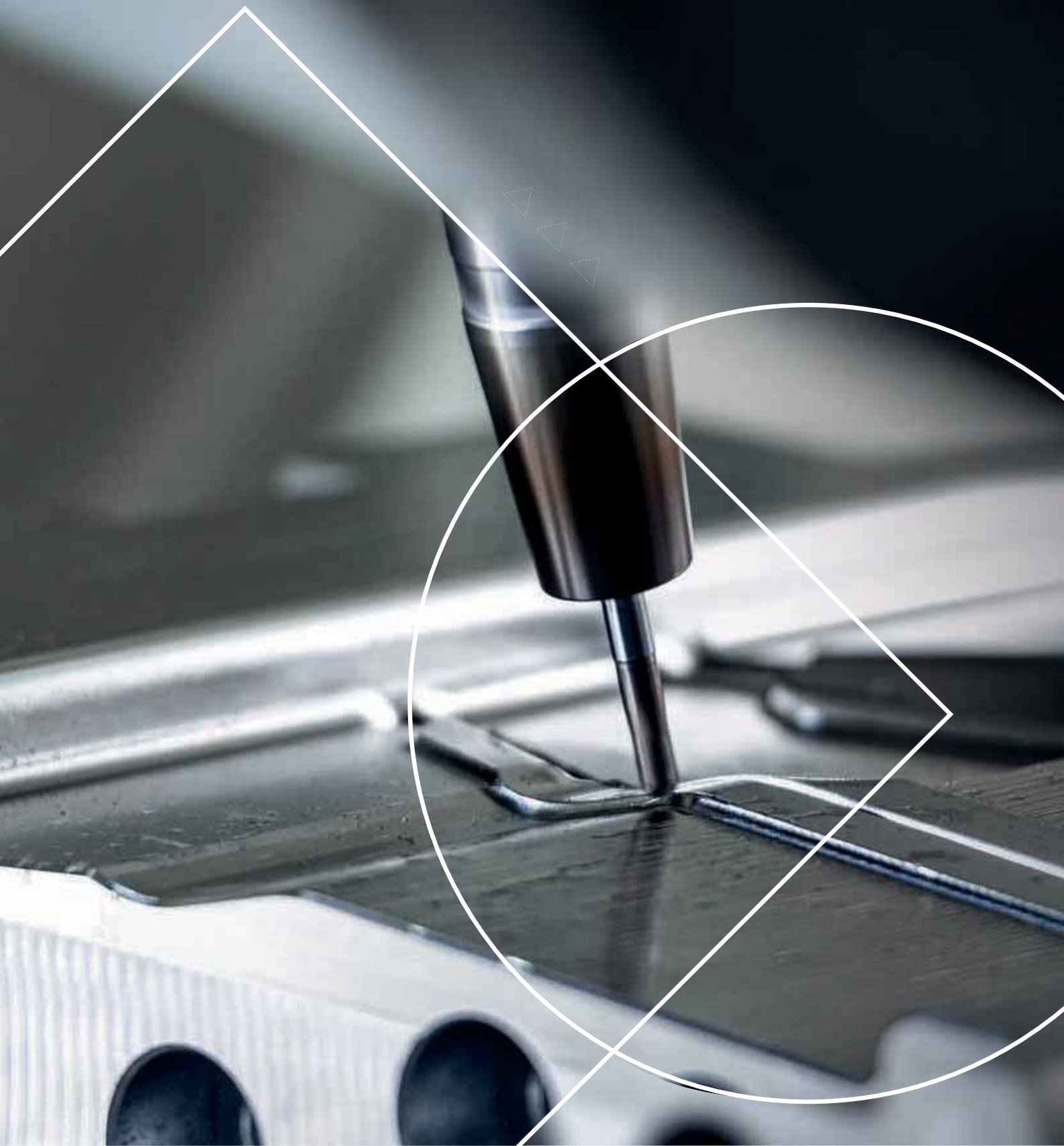
DATA INTERFACE

No more doing the same work twice: Simply connect your ERP, Gühring online shop and TM cabinet

For more information about our services and availability in your country, please contact us.



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Reaming and countersinking tools



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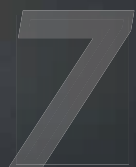
Tool holders



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Technical section



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Component courtesy of Langer GmbH & Co. KG

MILLING

1

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MILLING OVERVIEW



Solid carbide ball nose end mills

- ▶ High-precision, μ -precise full-radius geometry for copy milling and finishing of hardened forms and inserts up to 65 HRC. Four-flute full-radius end mills for softer and harder materials are available for time-saving pre-cutting with high feed rates.



Solid carbide Torus end mills

- ▶ High-precision Torus geometry for copy milling and finishing of hardened shapes and mould inserts up to 65 HRC. For roughing of soft and hard materials high-feed milling cutters with internal cooling are available.



Solid carbide end mills

- ▶ Solid carbide end mills with corner protection chamfers or corner radii with new patented groove profiles for roughing and μ -precise finishing of hardened shapes, pockets, guides and grooves up to 65 HRC. The new solid carbide substrate in combination with the innovative groove profile and our wear-resistant ultra-hard coatings enable unprecedented feed rates with exceptional smoothness in hardened materials.



Solid carbide high-performance milling cutters for steel

- ▶ Universal high-performance geometries for steel processing cover all machining tasks such as modern dynamic GTC roughing, slotting and plunge strategies. The solid carbide milling cutters enable the roughing and finishing of deep pockets and guides in all soft to highly tempered toolmaking steels.



Solid carbide high-performance milling cutters for aluminium and copper

- ▶ Our extremely sharp and polished flute geometries are ideally suited for soft and tough copper and aluminium alloys. The solid carbide end mills, corner radius and full radius milling cutters achieve high machining performance and perfect surface finish qualities.



High-performance milling cutters for graphite and fibre-reinforced plastics

- ▶ The extremely wear-resistant and durable diamond-coated solid carbide milling cutters and PCD tools with internal cooling, corner chamfers, corner or full radius are perfect for use in graphite electrode processing and abrasive fibres.



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G-MOLD



New milling cutters
specially designed for mould making

Neck clearance with smooth transitions
for **interference-free** ranges.

Maximum tool life and perfect
surfaces thanks to **smooth and
edge-resistant Signum & Perrox coating.**

The **GühroJet peripheral cooling**
allows perfect chip removal by means of
compressed air or internal cooling.

The **ultra-hard carbide substrate
designed for mould & die** is around 200 HV
harder and finer-grained. The finest grains
guarantee stable, long-lasting cutting edges
and the best surfaces on the component
thanks to homogeneous wear behaviour.

i G-Mold programme from p. 29

G-Mold

μ 65

65 B

Precision tool

Form

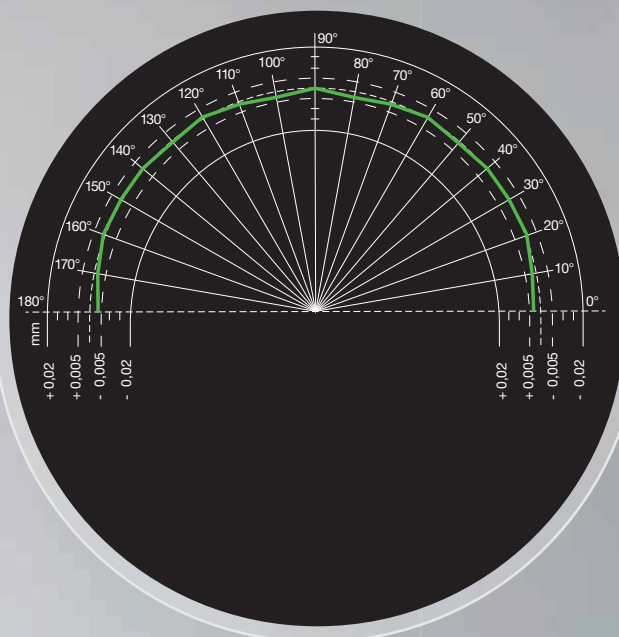
B = Ballnose
T = Torus
F = Finisher
FR = Radiusfinisher
U = Universal
HF = High Feed

suitable for up to
48/55/65 HRC

High-precision milling cutters

G-Mold μ

μ -precise radius accuracy
and line shape
for reproducible component shape accuracy



i G-Mold μ programme from p. 29



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page	
Ball nose end mills G-Mold μ 65 B																	
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,005}$			25°	VHM	⊗	0.200 - 12.000	6815	29
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,005}$			25°	VHM	⊗	0.200 - 12.000	6816	30
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,005}$			25°	VHM	⊗	0.200 - 12.000	6817	31
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,005}$			25°	VHM	⊗	0.200 - 12.000	6818	32
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,005}$			25°	VHM	⊗	0.200 - 8.000	6819	33
Ball nose end mills G-Mold 65 B																	
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 12.000	6832	34
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 12.000	6833	35
○	●	●	●	●	●		2	65 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 10.000	6834	36
○	●	●	●	●	●		4	65 HRC	$R_{\pm 0,02}$			30°	VHM	⊗	1.000 - 12.000	6835	37
○	●	●	●	●	●		4	65 HRC	$R_{\pm 0,02}$			30°	VHM	⊗	1.000 - 12.000	6836	38
Ball nose end mills G-Mold 55 B																	
●	●	●	○	●	●		2	55 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 12.000	6844	39
●	●	●	○	●	●		2	55 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 12.000	6845	40
●	●	●	○	●	●		2	55 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 10.000	6846	41
●	●	●	○	●	●		2	55 HRC	$R_{\pm 0,01}$			30°	VHM	⊗	0.500 - 8.000	6847	42
●	●	●	○	●	●		4	55 HRC	$R_{\pm 0,02}$			30°	VHM	⊗	1.000 - 12.000	6848	43
●	●	●	○	●	●		4	55 HRC	$R_{\pm 0,02}$			30°	VHM	⊗	1.000 - 12.000	6849	44
Ball nose slot drills (2-fluted)																	
●	●	●	●	○	●		2	48 HRC	$R_{\pm 0,05}$			30°	VHM	⊗	0.500 - 20.000	3679	45
●	●	●	●	○	●		2	48 HRC	$R_{\pm 0,05}$			30°	VHM	⊗	0.500 - 20.000	3049	45
XL ball nose slot drills (2-fluted)																	
●	●	●	●	○	●		2	48 HRC	$R_{\pm 0,05}$			30°	VHM	⊗	3.000 - 12.000	3030	46
Ball nose end mills (4-fluted)																	
●	○	●	○	●	○		4	48 HRC	$R_{\pm 0,05}$			30°	VHM	⊗	4.000 - 20.000	3727	47



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
Ratio end mills RF 100 VA																
•	•	•	•	•	•		4	48 HRC	R±0,05		36° 38°	VHM	a	4.000 - 25.000	6707	48
•	•	•	•	•	•		4	48 HRC	R±0,05		36° 38°	VHM	a	4.000 - 25.000	6708	48
XL ball nose end mills (4-fluted)																
•	•	•	•	•	•		4		R±0,05		30°	VHM	F	3.000 - 12.000	3043	49
Die sinking cutter holders GF 200 WP																
•	•	•	•	•	•		2		R±0,01		0°		Ni	10.000 - 32.000	1941	50
•	•	•	•	•	•		2		R±0,02		0°		Ni	10.000 - 25.000	1942	51
Indexable inserts round																
•	•	•	•	•	•		2	55 HRC	R±0,03			Cermet	○	20.000 - 32.000	1947	52
•	•	•	•	•	•		2	55 HRC	R±0,04			VHM	F	20.000 - 32.000	2520	52
Clamping screws for die sinking cutter holders																
•	•	•	•	•	•										1691	53
Torx screwdrivers																
•	•	•	•	•	•										1612	54
Torus end mills G-Mold μ 65 T																
○	•	•	•	•	•		2-4	65 HRC	R±0,005		36°	VHM	X	0.300 - 12.000	6820	55
○	•	•	•	•	•		2-4	65 HRC	R±0,005		36°	VHM	X	0.300 - 12.000	6821	56
○	•	•	•	•	•		2-4	65 HRC	R±0,005		36°	VHM	X	0.300 - 12.000	6822	57
○	•	•	•	•	•		2-4	65 HRC	R±0,005		36°	VHM	X	0.300 - 12.000	6823	58
○	•	•	•	•	•		2-4	65 HRC	R±0,005		36°	VHM	X	0.300 - 8.000	6824	59
Torus end mills G-Mold 65 T																
○	•	•	•	•	•		4	65 HRC	R±0,01		30°	VHM	X	1.000 - 12.000	6837	60
○	•	•	•	•	•		4	65 HRC	R±0,01		30°	VHM	X	1.000 - 12.000	6838	62
Torus end mills G-Mold 55 T																
•	•	•	•	•	•		2	55 HRC	R±0,01		30°	VHM	Y	0.500 - 12.000	6850	63
•	•	•	•	•	•		2	55 HRC	R±0,01		30°	VHM	Y	0.500 - 12.000	6851	65

P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
Torus end mills G-Mold 55 T																
•	•	•	•	•	•		2	55 HRC	R±0,01		30°	VHM	Y	1.000 - 10.000	6852	67
•	•	•	•	•	•		2	55 HRC	R±0,01		30°	VHM	Y	1.000 - 8.000	6853	68
•	•	•	•	•	•		4	55 HRC	R±0,01		30°	VHM	Y	1.000 - 12.000	6854	69
•	•	•	•	•	•		4	55 HRC	R±0,01		30°	VHM	Y	1.000 - 12.000	6855	70
High feed end mills G-Mold 65 HF																
•	•	•	•	•	•		4	65 HRC			30°	VHM	Y	1.000 - 16.000	6830	71
•	•	•	•	•	•		4	65 HRC			30°	VHM	Y	1.000 - 16.000	6814	72
•	•	•	•	•	•		4	65 HRC			30°	VHM	Y	1.000 - 16.000	6831	73
Slot drills with corner radius (2-fluted)																
•	•	•	•	•	•		2	48 HRC	R±0,05		30°	VHM	F	1.000 - 20.000	3561	74
End mills with corner radius (4-fluted)																
•	•	•	•	•	•		4	48 HRC	R±0,05		30°	VHM	F	1.000 - 20.000	3562	75
Multi-tooth end mills with corner radius GH 100 U																
•	•	•	•	•	•		6+	55 HRC	R±0,02		45°	VHM	F	3.000 - 20.000	3563	76
•	•	•	•	•	•		6	55 HRC	R±0,02		45°	VHM	R	6.000 - 20.000	6969	77
Finishing end mills G-Mold μ 48 F																
•	•	•	•	•	•		4-6	48 HRC	45°		40°	VHM	X	3.000 - 20.000	6825	78
•	•	•	•	•	•		4-6	48 HRC	45°	3xD	40°	VHM	X	3.000 - 20.000	6826	79
Finishing end mills G-Mold μ 65 F																
•	•	•	•	•	•		4-6	65 HRC	45°		42°	VHM	X	3.000 - 20.000	6827	80
•	•	•	•	•	•		4-6	65 HRC	45°	3xD	42°	VHM	X	3.000 - 20.000	6828	81
Finishing end mills G-Mold 65 F																
•	•	•	•	•	•		6	65 HRC	45°		42°	VHM	Y	3.000 - 20.000	6945	82
•	•	•	•	•	•		6	65 HRC	45°		42°	VHM	Y	3.000 - 20.000	6946	83
Finishing end mills with corner radius G-Mold 65 FR																
•	•	•	•	•	•		6	65 HRC	R±0,02		42°	VHM	Y	3.000 - 16.000	6947	84



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
Finishing end mills with corner radius G-Mold 65 FR																
○	•	•	•	•	•		6	65 HRC	R±0,02		42°	VHM	Y	3.000 - 16.000	6948	85
Ratio end mills G-Mold 65 U																
○	•	•	•	•	•		4	65 HRC	45°		40° 42°	VHM	Y	3.000 - 20.000	6943	86
○	•	•	•	•	•		4	65 HRC	45°		40° 42°	VHM	Y	3.000 - 20.000	6944	86
Micro-precision milling cutters MicroMill μ 55																
•	•	•	○	•	•		3-4	55 HRC	45°		30°	VHM	X	0.200 - 3.000	6829	88
Ratio end mills RF 100 Microdiver																
•	•	•	•	•	○		3	48 HRC	45°	2,5xD	40°	VHM	X	0.790 - 3.175	6808	90
•	•	•	•	•	○		3	48 HRC	45°	5xD	40°	VHM	X	1.000 - 3.175	6809	91
Ratio end mills RF 100 Diver (3-fluted)																
•	•	•	•	•	•		3		45°		41° 43° 45°	VHM	Y	3.000 - 20.000	6797	92
•	•	•	•	•	•		3		45°		41° 43° 45°	VHM	Y	3.000 - 20.000	6798	92
Ratio end mills RF 100 Diver																
•	•	•	•	•	○		4	48 HRC	45°		36° 38° 37°	VHM	Y	3.000 - 20.000	6803	93
•	•	•	•	•	○		4	48 HRC	45°		36° 38° 37°	VHM	Y	3.000 - 20.000	6804	93
•	•	•	•	•	○		4	48 HRC	45°		36° 38° 37°	VHM	Y	4.000 - 20.000	6736	94
•	•	•	•	•	○		4	48 HRC	45°		36° 38° 37°	VHM	Y	4.000 - 20.000	6737	94
Pilot end mills RF 100 P																
•	○	•	•	○	○		4	48 HRC	45°		30°	VHM	A	1.400 - 12.000	6716	95
Ratio end mills RF 100 Speed P																
•	•	•	•	○	○		4	48 HRC	45°		48°	VHM	A	6.000 - 25.000	6958	96
•	•	•	•	○	○		4	48 HRC	45°		48°	VHM	A	6.000 - 25.000	6959	96
•	•	•	•	○	○		4	48 HRC	45°		48°	VHM	A	6.000 - 25.000	6960	97
•	•	•	•	○	○		4	48 HRC	45°		48°	VHM	A	6.000 - 25.000	6961	97
Ratio end mills RF 100 Speed M																
•	•	•	•	•	○		4		45°		48°	VHM	A	3.000 - 20.000	6765	99



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
Ratio end mills RF 100 Speed M																
•	•			•			4		45°		48°	VHM	A	3.000 - 20.000	6760	99
•	•			•			4		45°		48°	VHM	A	3.000 - 20.000	6766	100
•	•			•			4		45°		48°	VHM	A	3.000 - 20.000	6761	100
Ratio end mills RF 100 5 Speed																
•	•	•	○	•			5		45°	3xD	38°	VHM	A	6.000 - 20.000	6858	101
•	•	•	○	•			5		45°	3xD	38°	VHM	A	6.000 - 20.000	6859	101
•	•	•	○	•			5	R±0,05		3xD	38°	VHM	A	6.000 - 20.000	6860	102
•	•	•	○	•			5	R±0,05		3xD	38°	VHM	A	6.000 - 20.000	6861	102
Ratio end mills RF 100 Sharp																
○	•			•	•		4		R±0,05		38°/40°	VHM	Y	3.000 - 20.000	6964	103
○	•			•	•		4		R±0,05		38°/40°	VHM	Y	3.000 - 20.000	6965	103
Ratio end mills RF 100 Sharp																
•	•			•	•		4		45°	+	38°/40°	VHM	P	1.000 - 20.000	6478	105
•	•			•	•		4		45°	+	38°/40°	VHM	P	1.000 - 20.000	6479	105
•	•			•	•		4		45°		38°/40°	VHM	P	1.000 - 20.000	6480	106
•	•			•	•		4		45°		38°/40°	VHM	P	1.000 - 20.000	6481	106
Standard Ratio end mills RF 100 U (3-fluted)																
•	•			•	•		3		45°		41°/43°/45°	VHM	R	3.000 - 20.000	6728	107
Standard Ratio end mills RF 100 U																
•	○			•	○		4	48 HRC	45°		35°/38°	VHM	R	6.000 - 20.000	6726	108
•	•			•	○		4	48 HRC	R±0,05		35°/38°	VHM	F	6.000 - 25.000	3872	109
•	•			•	○		4	48 HRC	R±0,05		35°/38°	VHM	F	6.000 - 25.000	3873	109
•	•			•	○		4	48 HRC	45°		35°/38°	VHM	F	6.000 - 20.000	5534	110
•	•			•	○		4	48 HRC	45°		35°/38°	VHM	F	4.000 - 25.000	5735	111
•	•			•	○		4	48 HRC	45°		35°/38°	VHM	F	4.000 - 25.000	5535	111



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
•	•	•	•	•	•		4	48 HRC	45°		35°/38°	VHM	F	6.000 - 20.000	3837	112
•	•	•	•	•	•		4	48 HRC	45°		35°/38°	VHM	F	6.000 - 20.000	3838	112
•	•	•	•	•	•		4	48 HRC	45°	3xD	35°/38°	VHM	F	6.000 - 20.000	3839	113
•	•	•	•	•	•		4	48 HRC	45°	3xD	35°/38°	VHM	F	6.000 - 20.000	3871	113
•	•	•	•	•	•		4	48 HRC	45°		35°/38°	VHM	F	10.000 - 25.000	5582	114
•	•	•	•	•	•		4	48 HRC	45°	4xD	38°	VHM	F	6.000 - 25.000	6767	115
•	•	•	•	•	•		4	48 HRC	45°	4xD	38°	VHM	F	6.000 - 25.000	6768	115
•	•	•	•	•	•		4	48 HRC	45°		36°/38°	VHM	Y	6.000 - 20.000	6970	116
•	•	•	•	•	•		4	48 HRC	45°		36°/38°	VHM	Y	6.000 - 20.000	6971	116
•	•	•	•	•	•		4	48 HRC	45°		36°/38°	VHM	Y	6.000 - 20.000	6972	117
•	•	•	•	•	•		4	48 HRC	45°		36°/38°	VHM	Y	6.000 - 20.000	6973	117
•	•	•	•	•	•		4		45°		30°/32°	VHM	F	6.000 - 25.000	6881	118
•	•	•	•	•	•		4		45°		30°/32°	VHM	F	6.000 - 25.000	6882	118
•	•	•	•	•	•		4		45°	3xD	30°/32°	VHM	F	6.000 - 20.000	6883	119
•	•	•	•	•	•		4		45°	3xD	30°/32°	VHM	F	6.000 - 20.000	6884	119
•	•	•	•	•	•		4		45°		30°/32°	VHM	F	6.000 - 20.000	6885	120
•	•	•	•	•	•		4		45°		30°/32°	VHM	F	6.000 - 20.000	6886	120
High-performance roughing end mills RS 100 F																
•	•	•	•	•	•		5-6	48 HRC	45°		45°	VHM	F	6.000 - 25.000	6889	121
•	•	•	•	•	•		5-6	48 HRC	45°		45°	VHM	F	6.000 - 25.000	6890	121
Hard roughing end mills GS 100 H (fine teeth)																
•	•	•	•	•	•		4	55 HRC	45°		20°	VHM	Y	6.000 - 20.000	3682	122
Roughing end mills GS 100 U (fine teeth)																
•	•	•	•	•	•		4-5		45°		30°	VHM	F	6.000 - 25.000	3723	123



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
Ratio end mills Superfinish RF 100 SF																
•	•	•	•	•	○		5	48 HRC	45°		45°	VHM	F	4.000 - 25.000	6709	124
•	•	•	•	•	○		5	48 HRC	45°		45°	VHM	F	4.000 - 25.000	6710	124
•	•	•	•	•	○		5	48 HRC	45°	3xD	45°	VHM	F	4.000 - 20.000	3897	125
•	•	•	•	•	○		5	48 HRC	45°	3xD	45°	VHM	F	4.000 - 20.000	3898	125
•	•	•	•	•	○		6	48 HRC	45°		44° 45° 46°	VHM	R	8.000 - 20.000	6727	126
Multi-tooth end mills GH 100 U																
•	•	•	•	•	○		6+	48 HRC	45°		45°	VHM	F	6.000 - 25.000	3691	127
•	•	•	•	•	○		6+	48 HRC	45°		45°	VHM	F	4.000 - 32.000	3693	128
Front/back deburrer 90°																
•	•	•	•	•	○		4	55 HRC			0°	VHM	a	3.000 - 12.000	495	129
Front/back deburrer 90°, sets																
•	•	•	•	•	○		4	55 HRC			0°	VHM	a		6013	130
Chamfering milling cutters 90°																
•	•	•	•	•	○		4	55 HRC			7°	VHM	A	4.000 - 12.000	5578	131
•	•	•	•	•	○		4	55 HRC	90°		7°	VHM	A	4.000 - 12.000	5579	131
•	•	•	•	•	○		4	65 HRC			7°	VHM	Y	4.000 - 12.000	6784	132
•	•	•	•	•	○		4	65 HRC			7°	VHM	Y	4.000 - 12.000	6785	132
•	•	•	•	•	○		6	55 HRC			7°	VHM	A	6.000 - 20.000	6786	133
•	•	•	•	•	○		6	55 HRC			7°	VHM	A	6.000 - 20.000	6787	133
Chamfering milling cutters 90° SpyroTec																
•	•	•	•	•	○		5				20°-24°	VHM	A	6.000 - 20.000	6992	134
•	•	•	•	•	○		5				20°-24°	VHM	A	6.000 - 20.000	6993	134
Ball nose end mills GA 200 A																
•	•	•	•	•	○		2		R±0,02		35°	VHM	Cb	3.000 - 16.000	6984	135



P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
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Ratio end mills Alu RF 100 A

							3		R±0,05		39° 40° 41°	VHM	○	6.000 - 25.000	3599	136
							3		R±0,05		39° 40° 41°	VHM	○	6.000 - 25.000	6729	136
							3		45°		39° 40° 41°	VHM	⊙	3.000 - 20.000	6978	137
							3		45°		39° 40° 41°	VHM	⊙	3.000 - 20.000	6979	137
							3		45°		39° 40° 41°	VHM	○	3.000 - 20.000	3472	138
							3		45°		39° 40° 41°	VHM	○	3.000 - 20.000	6702	138
							3		45°		39° 40° 41°	VHM	○	6.000 - 20.000	3473	139
							3		45°		39° 40° 41°	VHM	○	6.000 - 20.000	6703	139
							3		45°	3xD	39° 40° 41°	VHM	○	5.000 - 20.000	6730	140
							3		45°	3xD	39° 40° 41°	VHM	○	5.000 - 20.000	6731	140
							3		45°	4xD	39° 40° 41°	VHM	○	6.000 - 20.000	6732	141
							3		45°	4xD	39° 40° 41°	VHM	○	6.000 - 20.000	6733	141
							3		45°	5xD	39° 40° 41°	VHM	○	6.000 - 20.000	6734	142
							3		45°	5xD	39° 40° 41°	VHM	○	6.000 - 20.000	6735	142

Ball nose slot drills (2-fluted)

							2		R±0,05		30°	VHM	⊙	3.000 - 12.000	6724	143
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Ball nose end mills (4-fluted)

							4		R±0,05		30°	VHM	⊙	3.000 - 12.000	6725	144
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Slot drills with corner radius (2-fluted)

							2		R±0,05		30°	VHM	⊙	6.000 - 12.000	6722	145
--	--	--	--	--	--	--	---	--	--------	--	-----	-----	---	----------------	------	-----

End mills with corner radius (4-fluted)

							4		R±0,05		30°	VHM	⊙	6.000 - 12.000	6723	146
--	--	--	--	--	--	--	---	--	--------	--	-----	-----	---	----------------	------	-----

Slot drills XL (3-fluted)

							3		45°		30°	VHM	⊙	3.000 - 16.000	6721	147
--	--	--	--	--	--	--	---	--	-----	--	-----	-----	---	----------------	------	-----

PCD slot drills (2-fluted)

							2		R±0,05		2-4°	PKD	○	4.000 - 20.000	5492	148
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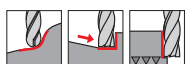
P	M	K	N	S	H	Tool illustration	Z	Hardness	Cutting edge form	Length	Helix angle °	Tool material	Surface	d1/mm	Article no.	Page
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PCD slot drills (2-fluted)

												PKD		4.000 - 20.000	5493	149
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Ball nose end mills G-Mold μ 65 B



P	○
M	○
K	●
N	○
S	○
H	●

GÜHRING NAVIGATOR

Cutting data page 150

- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = 0.5 \times d1 \pm 0.005 \text{ mm}$
- \varnothing tolerance $d1$ of $\varnothing 0.2\text{-}3 \text{ mm } +0.000/-0.010 \text{ mm}$
- with GühroJet peripheral cooling from $\varnothing 0.2\text{-}3 \text{ mm}$
- centre cutting
- neck clearance

Tool material **Solid carbide**

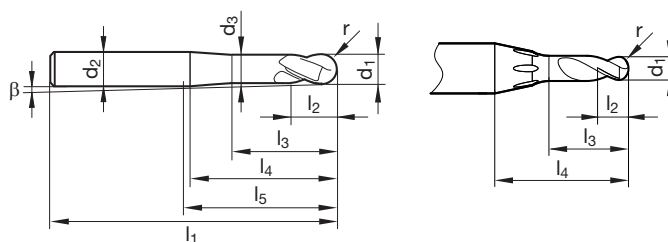
Surface

Type **H**

Shank form **HA**



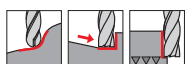
Milling tools



Article no. **6815**

$d1_{\begin{smallmatrix} -0,005 \\ +0,015 \end{smallmatrix}}$	$d2 \text{ h5}$	$d3$	$l1$	$l2$	$l3$	$l4$	$l5$	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.20	4.00	0.18	50	0.2	0.50	9.2	22.0	0.10	11.80	2	6815 0.200
0.30	4.00	0.28	50	0.3	0.75	9.1	22.0	0.15	11.60	2	6815 0.300
0.40	4.00	0.38	50	0.4	1.00	9.1	22.0	0.20	11.40	2	6815 0.400
0.50	4.00	0.45	50	0.5	1.25	9.2	22.0	0.25	11.00	2	6815 0.500
0.60	4.00	0.55	50	0.6	1.50	9.2	22.0	0.30	10.80	2	6815 0.600
0.80	4.00	0.75	50	0.8	2.00	9.1	22.0	0.40	10.40	2	6815 0.800
1.00	4.00	0.92	50	1.0	2.50	9.2	22.0	0.50	9.70	2	6815 1.000
1.20	4.00	1.12	50	1.2	3.00	9.3	22.0	0.60	9.10	2	6815 1.200
1.50	4.00	1.40	50	1.5	4.00	9.6	22.0	0.75	8.00	2	6815 1.500
1.80	4.00	1.70	50	1.8	4.50	9.4	22.0	0.90	7.30	2	6815 1.800
2.00	6.00	1.85	50	2.0	5.00	14.2	14.0	1.00	8.60	2	6815 2.000
2.50	6.00	2.35	50	2.5	6.50	14.6	15.0	1.25	7.40	2	6815 2.500
3.00	6.00	2.85	50	3.0	7.50	14.4	14.0	1.50	6.60	2	6815 3.000
4.00	6.00	3.80	50	4.0	12.50	15.5	14.0	2.00	4.20	2	6815 4.000
5.00	6.00	4.80	50	5.0	15.00	16.6	14.0	2.50	2.00	2	6815 5.000
6.00	6.00	5.70	54	6.0	17.00	17.6	18.0	3.00		2	6815 6.000
8.00	8.00	7.70	58	8.0	22.00	22.6	22.0	4.00		2	6815 8.000
10.00	10.00	9.50	72	10.0	25.00	25.9	32.0	5.00		2	6815 10.000
12.00	12.00	11.50	73	12.0	30.00	30.9	28.0	6.00		2	6815 12.000

Ball nose end mills G-Mold μ 65 B



P	○
M	○
K	●
N	○
S	○
H	●

GÜHRING NAVIGATOR

Cutting data page 150

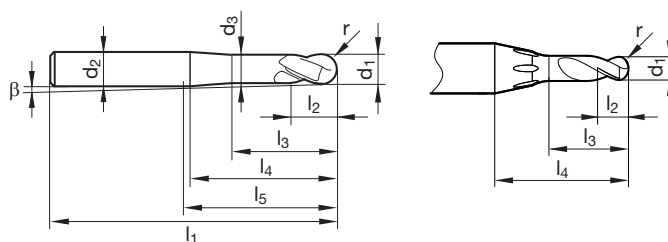
- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = 0.5 \times d1 \pm 0.005$ mm
- \varnothing tolerance $d1$ of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- with GühroJet peripheral cooling from $\varnothing 0.2-3$ mm
- centre cutting
- neck clearance

Tool material **Solid carbide**

Surface

Type H

Shank form HA

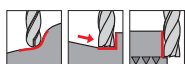


Article no. **6816**

$d1_{\begin{smallmatrix} -0,005 \\ +0,015 \end{smallmatrix}}$	$d2$ h5	$d3$	$l1$	$l2$	$l3$	$l4$	$l5$	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.20	4.00	0.18	50	0.2	0.75	9.5	22.0	0.10	11.40	2	6816 0.200
0.30	4.00	0.28	50	0.3	1.00	9.4	22.0	0.15	11.30	2	6816 0.300
0.40	4.00	0.38	50	0.4	1.50	9.6	22.0	0.20	10.80	2	6816 0.400
0.50	4.00	0.45	50	0.5	1.50	9.5	22.0	0.25	10.70	2	6816 0.500
0.60	4.00	0.55	50	0.6	2.00	9.7	22.0	0.30	10.20	2	6816 0.600
0.80	4.00	0.75	50	0.8	3.00	10.1	22.0	0.40	9.30	2	6816 0.800
1.00	4.00	0.92	50	1.0	3.00	9.7	22.0	0.50	9.20	2	6816 1.000
1.20	4.00	1.12	50	1.2	4.00	10.3	22.0	0.60	8.20	2	6816 1.200
1.50	4.00	1.40	50	1.5	6.00	11.6	22.0	0.75	6.50	2	6816 1.500
1.80	4.00	1.70	50	1.8	6.00	10.9	22.0	0.90	6.20	2	6816 1.800
2.00	6.00	1.85	50	2.0	6.00	15.2	15.0	1.00	8.00	2	6816 2.000
2.50	6.00	2.35	50	2.5	8.00	16.1	16.0	1.25	6.70	2	6816 2.500
3.00	6.00	2.85	57	3.0	10.00	16.9	21.0	1.50	5.50	2	6816 3.000
4.00	6.00	3.80	57	4.0	14.00	17.0	21.0	2.00	3.80	2	6816 4.000
5.00	6.00	4.80	57	5.0	18.00	19.6	21.0	2.50	1.60	2	6816 5.000
6.00	6.00	5.70	57	6.0	20.00	20.6	21.0	3.00		2	6816 6.000
8.00	8.00	7.70	63	8.0	26.00	26.6	27.0	4.00		2	6816 8.000
10.00	10.00	9.50	72	10.0	31.00	31.9	32.0	5.00		2	6816 10.000
12.00	12.00	11.50	83	12.0	37.00	37.9	38.0	6.00		2	6816 12.000



Ball nose end mills G-Mold μ 65 B



P	○
M	○
K	●
N	○
S	○
H	●

GÜHRING NAVIGATOR

Cutting data page 150

- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = 0.5 \times d1 \pm 0.005 \text{ mm}$
- \varnothing tolerance $d1$ of $\varnothing 0.2\text{-}3 \text{ mm } +0.000/-0.010 \text{ mm}$
- with GühroJet peripheral cooling from $\varnothing 0.2\text{-}3 \text{ mm}$
- centre cutting
- neck clearance

Tool material **Solid carbide**

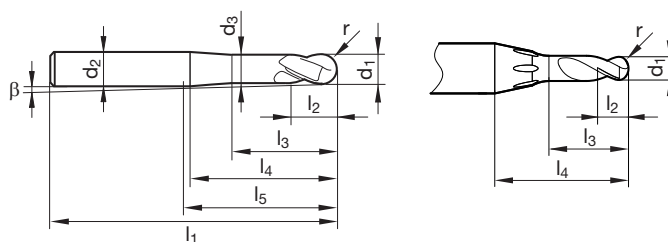
Surface

Type **H**

Shank form **HA**



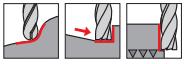
Milling tools



Article no. **6817**

$d1_{\begin{smallmatrix} -0,015 \\ +0,005 \end{smallmatrix}}$	$d2 \text{ h5}$	$d3$	$l1$	$l2$	$l3$	$l4$	$l5$	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.20	4.00	0.18	50	0.2	1.0	9.7	22.0	0.10	11.20	2	6817 0.200
0.30	4.00	0.28	50	0.3	1.5	9.9	22.0	0.15	10.70	2	6817 0.300
0.40	4.00	0.38	50	0.4	2.0	10.1	22.0	0.20	10.30	2	6817 0.400
0.50	4.00	0.45	50	0.5	2.5	10.5	22.0	0.25	9.60	2	6817 0.500
0.60	4.00	0.55	50	0.6	3.0	10.7	22.0	0.30	9.20	2	6817 0.600
0.80	4.00	0.75	50	0.8	4.0	11.1	22.0	0.40	8.50	2	6817 0.800
1.00	4.00	0.92	50	1.0	5.0	11.7	22.0	0.50	7.60	2	6817 1.000
1.20	4.00	1.12	50	1.2	6.0	12.3	22.0	0.60	6.80	2	6817 1.200
1.50	4.00	1.40	50	1.5	8.0	13.6	22.0	0.75	5.50	2	6817 1.500
1.80	4.00	1.70	50	1.8	9.0	13.9	22.0	0.90	4.80	2	6817 1.800
2.00	6.00	1.85	50	2.0	10.0	19.2	19.0	1.00	6.20	2	6817 2.000
2.50	6.00	2.35	50	2.5	12.5	20.6	21.0	1.25	5.10	2	6817 2.500
3.00	6.00	2.85	65	3.0	15.0	21.9	29.0	1.50	4.20	2	6817 3.000
4.00	6.00	3.80	65	4.0	20.0	23.0	29.0	2.00	2.70	2	6817 4.000
5.00	6.00	4.80	65	5.0	25.0	26.6	29.0	2.50	1.10	2	6817 5.000
6.00	6.00	5.70	65	6.0	25.0	25.6	29.0	3.00		2	6817 6.000
8.00	8.00	7.70	75	8.0	30.0	30.6	39.0	4.00		2	6817 8.000
10.00	10.00	9.50	90	10.0	40.0	40.9	50.0	5.00		2	6817 10.000
12.00	12.00	11.50	100	12.0	40.0	40.9	55.0	6.00		2	6817 12.000

Ball nose end mills G-Mold μ 65 B



P	○
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H	●

GÜHRING NAVIGATOR

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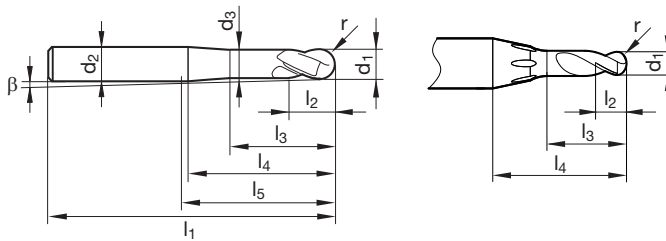
- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = 0.5 \times d1 \pm 0.005 \text{ mm}$
- \varnothing tolerance $d1$ of $\varnothing 0.2\text{-}3 \text{ mm } +0.000/-0.010 \text{ mm}$
- with GühroJet peripheral cooling from $\varnothing 0.2\text{-}3 \text{ mm}$
- centre cutting
- neck clearance

Tool material **Solid carbide**

Surface

Type **H**

Shank form **HA**

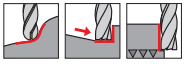


Article no. **6818**

$d1_{\substack{+0.005 \\ -0.015}}$	$d2 \text{ h5}$	$d3$	$l1$	$l2$	$l3$	$l4$	$l5$	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.20	4.00	0.18	50	0.2	1.25	10.0	22.0	0.10	10.80	2	6818 0.200
0.30	4.00	0.28	50	0.3	2.00	10.4	22.0	0.15	10.20	2	6818 0.300
0.40	4.00	0.38	50	0.4	3.00	11.1	22.0	0.20	9.30	2	6818 0.400
0.50	4.00	0.45	50	0.5	3.00	11.0	22.0	0.25	9.20	2	6818 0.500
0.60	4.00	0.55	50	0.6	4.00	11.7	22.0	0.30	8.40	2	6818 0.600
0.80	4.00	0.75	50	0.8	5.00	12.1	22.0	0.40	7.70	2	6818 0.800
1.00	4.00	0.92	50	1.0	7.00	13.7	22.0	0.50	6.40	2	6818 1.000
1.20	4.00	1.12	50	1.2	8.00	14.3	22.0	0.60	5.80	2	6818 1.200
1.50	4.00	1.40	50	1.5	10.00	15.6	22.0	0.75	4.80	2	6818 1.500
1.80	4.00	1.70	55	1.8	12.00	16.9	27.0	0.90	3.90	2	6818 1.800
2.00	6.00	1.85	57	2.0	12.00	21.2	21.0	1.00	5.60	2	6818 2.000
2.50	6.00	2.35	57	2.5	15.00	23.1	23.0	1.25	4.50	2	6818 2.500
3.00	6.00	2.85	65	3.0	18.00	24.9	29.0	1.50	3.60	2	6818 3.000
4.00	6.00	3.80	65	4.0	24.00	27.0	29.0	2.00	2.30	2	6818 4.000
5.00	6.00	4.80	80	5.0	30.00	31.6	44.0	2.50	0.90	2	6818 5.000
6.00	6.00	5.70	80	6.0	30.00	30.6	44.0	3.00		2	6818 6.000
8.00	8.00	7.70	90	8.0	40.00	40.6	54.0	4.00		2	6818 8.000
10.00	10.00	9.50	100	10.0	50.00	50.9	60.0	5.00		2	6818 10.000
12.00	12.00	11.50	120	12.0	60.00	60.9	75.0	6.00		2	6818 12.000



Ball nose end mills G-Mold μ 65 B



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GÜHRING NAVIGATOR

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- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = 0.5 \times d1 \pm 0.005$ mm
- \varnothing tolerance $d1$ of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- with GühroJet peripheral cooling from $\varnothing 0.2-3$ mm
- centre cutting
- neck clearance

Tool material **Solid carbide**

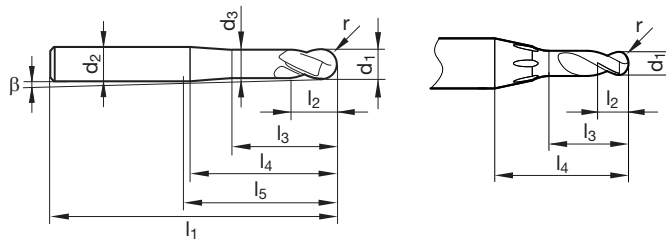
Surface

Type H

Shank form HA



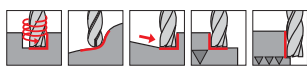
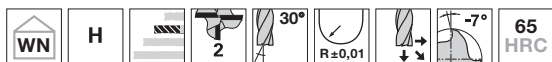
Milling tools



Article no. **6819**

$d1_{\begin{smallmatrix} -0,005 \\ +0,015 \end{smallmatrix}}$	$d2$ h5	$d3$	$l1$	$l2$	$l3$	$l4$	$l5$	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.20	4.00	0.18	50	0.2	1.5	10.2	22.0	0.10	10.60	2	6819 0.200
0.30	4.00	0.28	50	0.3	3.0	11.4	22.0	0.15	9.30	2	6819 0.300
0.40	4.00	0.38	50	0.4	4.0	12.1	22.0	0.20	8.60	2	6819 0.400
0.50	4.00	0.45	50	0.5	5.0	13.0	22.0	0.25	7.80	2	6819 0.500
0.60	4.00	0.55	50	0.6	6.0	13.7	22.0	0.30	7.20	2	6819 0.600
0.80	4.00	0.75	50	0.8	8.0	15.1	22.0	0.40	6.20	2	6819 0.800
1.00	4.00	0.92	50	1.0	10.0	16.7	22.0	0.50	5.30	2	6819 1.000
1.20	4.00	1.12	55	1.2	12.0	18.3	27.0	0.60	4.50	2	6819 1.200
1.50	4.00	1.40	55	1.5	16.0	21.6	27.0	0.75	3.40	2	6819 1.500
1.80	4.00	1.70	63	1.8	20.0	24.9	35.0	0.90	2.60	2	6819 1.800
2.00	6.00	1.85	65	2.0	20.0	29.2	29.0	1.00	4.00	2	6819 2.000
2.50	6.00	2.35	65	2.5	20.0	28.1	29.0	1.25	3.70	2	6819 2.500
3.00	6.00	2.85	70	3.0	25.0	31.9	34.0	1.50	2.80	2	6819 3.000
4.00	6.00	3.80	75	4.0	32.0	35.0	39.0	2.00	1.70	2	6819 4.000
5.00	6.00	4.80	80	5.0	42.0	43.6	44.0	2.50	0.70	2	6819 5.000
6.00	6.00	5.70	100	6.0	40.0	40.6	64.0	3.00		2	6819 6.000
8.00	8.00	7.70	100	8.0	40.0	40.6	64.0	4.00		2	6819 8.000

Ball nose end mills G-Mold 65 B



P **GÜHRING NAVIGATOR**

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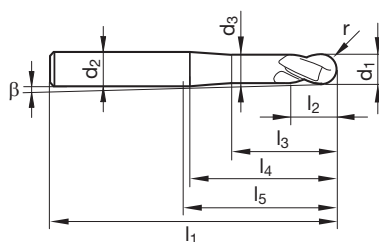
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface

Type **H**

Shank form **HA**

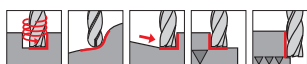


Article no. **6832**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	45	0.5	2.5	9.1	17.0	0.25	10.80	2	6832 0.500
0.80	4.00	0.75	45	0.8	3.2	9.3	17.0	0.40	9.70	2	6832 0.800
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.50	8.70	2	6832 1.000
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.75	6.50	2	6832 1.500
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	1.00	8.30	2	6832 2.000
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	1.50	5.20	2	6832 3.000
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	2.00	3.30	2	6832 4.000
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	2.50	1.50	2	6832 5.000
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	3.00		2	6832 6.000
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	4.00		2	6832 8.000
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	5.00		2	6832 10.000
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	6.00		2	6832 12.000



Ball nose end mills G-Mold 65 B



P **GÜHRING NAVIGATOR**

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- neck clearance
- centre cutting

Tool material **Solid carbide**

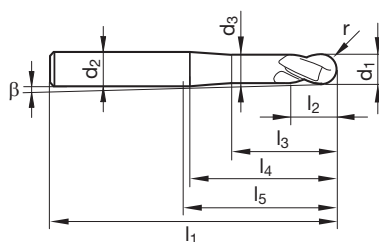
Surface

Type **H**

Shank form **HA**



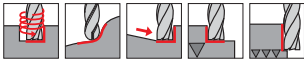
Milling tools



Article no. **6833**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	50	0.5	3.6	10.2	22.0	0.25	9.70	2	6833 0.500
0.80	4.00	0.75	50	0.8	5.0	11.1	22.0	0.40	8.20	2	6833 0.800
1.00	4.00	0.92	50	1.0	6.5	12.2	22.0	0.50	7.00	2	6833 1.000
1.50	4.00	1.40	50	1.5	10.0	14.9	22.0	0.75	4.80	2	6833 1.500
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	1.00	6.10	2	6833 2.000
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	1.50	3.50	2	6833 3.000
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	2.00	2.00	2	6833 4.000
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	2.50	0.80	2	6833 5.000
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	3.00		2	6833 6.000
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	4.00		2	6833 8.000
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	5.00		2	6833 10.000
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	6.00		2	6833 12.000

Ball nose end mills G-Mold 65 B



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GÜHRING NAVIGATOR

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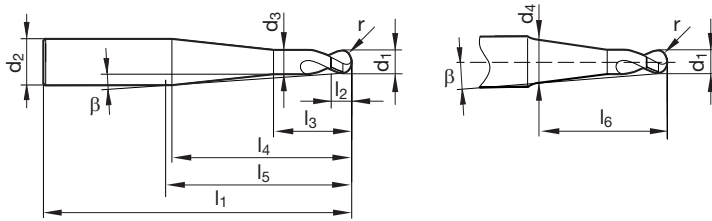
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface

Type **N**

Shank form **HA**

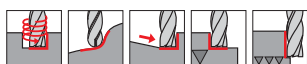


Article no. **6834**

$d1_{-0,03}^{-0,01}$	d2 h5	d3	d4	l1	l2	l3	l4	l5	l6	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	1.47	50	0.5	1.3	14.7	22.0	10.0	0.25	3.00	2	6834 0.500
0.80	4.00	0.75	2.38	50	0.8	2.0	19.0	22.0	16.0	0.40	3.00	2	6834 0.800
1.00	4.00	0.92	2.99	63	1.0	2.5	21.9	35.0	20.0	0.50	3.00	2	6834 1.000
1.50	4.00	1.40		63	1.5	3.8	25.6	35.0		0.75	3.00	2	6834 1.500
2.00	6.00	1.85		80	2.0	5.0	40.1	44.0		1.00	3.00	2	6834 2.000
3.00	6.00	2.85		80	3.0	7.5	31.1	44.0		1.50	3.00	2	6834 3.000
4.00	6.00	3.80		80	4.0	10.0	22.0	44.0		2.00	3.00	2	6834 4.000
5.00	8.00	4.80		90	5.0	12.5	32.1	54.0		2.50	3.00	2	6834 5.000
6.00	8.00	5.70		90	6.0	15.0	43.1	54.0		3.00	1.50	2	6834 6.000
8.00	10.00	7.70		100	8.0	20.0	44.1	60.0		4.00	1.50	2	6834 8.000
10.00	12.00	9.50		120	10.0	25.0	45.1	75.0		5.00	1.50	2	6834 10.000



Ball nose end mills G-Mold 65 B



P **GÜHRING NAVIGATOR**

M Cutting data page 150

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- 4 face cutting edges up to the centre
- neck clearance
- centre cutting

Tool material **Solid carbide**

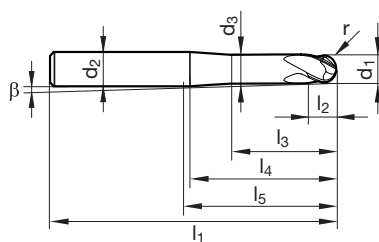
Surface

Type **H**

Shank form **HA**



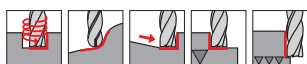
Milling tools



Article no. **6835**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.50	8.70	4	6835 1.000
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.75	6.50	4	6835 1.500
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	1.00	8.30	4	6835 2.000
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	1.50	5.20	4	6835 3.000
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	2.00	3.30	4	6835 4.000
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	2.50	1.50	4	6835 5.000
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	3.00		4	6835 6.000
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	4.00		4	6835 8.000
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	5.00		4	6835 10.000
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	6.00		4	6835 12.000

Ball nose end mills G-Mold 65 B



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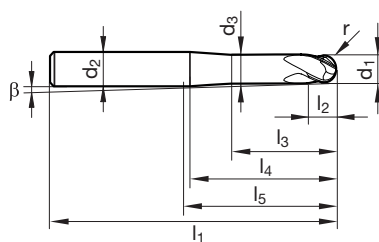
- 4 face cutting edges up to the centre
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface

Type **H**

Shank form **HA**

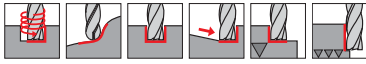
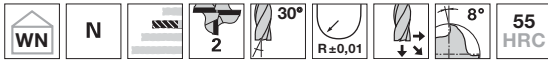


Article no. **6836**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	50	1.0	6.5	12.2	25.0	0.50	7.00	4	6836 1.000
1.50	4.00	1.40	50	1.5	10.0	14.9	25.5	0.75	4.80	4	6836 1.500
2.00	6.00	1.85	57	2.0	13.0	18.7	29.5	1.00	6.10	4	6836 2.000
3.00	6.00	2.85	65	3.0	20.0	24.3	34.5	1.50	3.50	4	6836 3.000
4.00	6.00	3.80	75	4.0	25.0	28.0	40.6	2.00	2.00	4	6836 4.000
5.00	6.00	4.80	75	5.0	31.0	32.6	41.6	2.50	0.80	4	6836 5.000
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	3.00		4	6836 6.000
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	4.00		4	6836 8.000
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	5.00		4	6836 10.000
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	6.00		4	6836 12.000



Ball nose end mills G-Mold 55 B



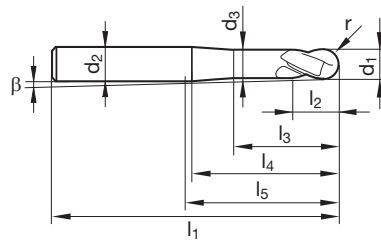
P • **GÜHRING NAVIGATOR**
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- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA



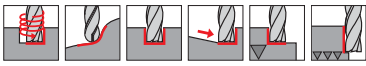
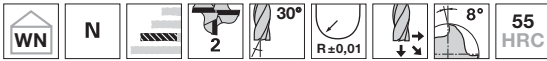
Milling tools



Article no. **6844**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	45	0.5	2.5	9.1	17.0	0.25	10.80	2	6844 0.500
0.80	4.00	0.75	45	0.8	3.2	9.3	17.0	0.40	9.70	2	6844 0.800
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.50	8.70	2	6844 1.000
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.75	6.50	2	6844 1.500
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	1.00	8.30	2	6844 2.000
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	1.50	5.20	2	6844 3.000
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	2.00	3.30	2	6844 4.000
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	2.50	1.50	2	6844 5.000
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	3.00		2	6844 6.000
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	4.00		2	6844 8.000
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	5.00		2	6844 10.000
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	6.00		2	6844 12.000

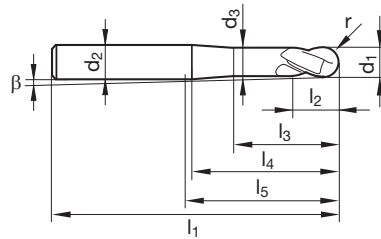
Ball nose end mills G-Mold 55 B



P • **GÜHRING NAVIGATOR**
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- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	Y
Type	N
Shank form	HA

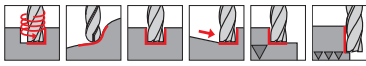
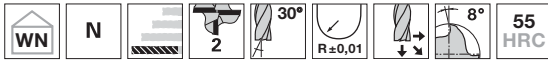


Article no. **6845**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	50	0.5	3.6	10.2	22.0	0.25	9.70	2	6845 0.500
0.80	4.00	0.75	50	0.8	5.0	11.1	22.0	0.40	8.20	2	6845 0.800
1.00	4.00	0.92	50	1.0	6.5	12.2	22.0	0.50	7.00	2	6845 1.000
1.50	4.00	1.40	50	1.5	10.0	14.9	22.0	0.75	4.80	2	6845 1.500
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	1.00	6.10	2	6845 2.000
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	1.50	3.50	2	6845 3.000
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	2.00	2.00	2	6845 4.000
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	2.50	0.80	2	6845 5.000
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	3.00		2	6845 6.000
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	4.00		2	6845 8.000
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	5.00		2	6845 10.000
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	6.00		2	6845 12.000



Ball nose end mills G-Mold 55 B



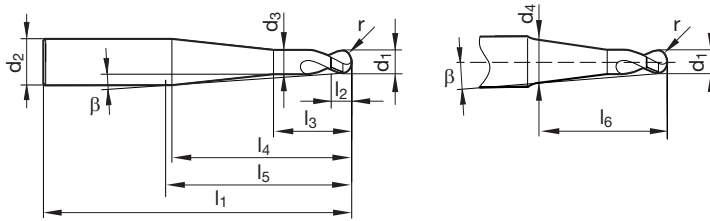
P • **GÜHRING NAVIGATOR**
M • Cutting data page 150
K •
N ○
S •
H •

- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA



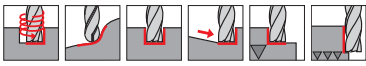
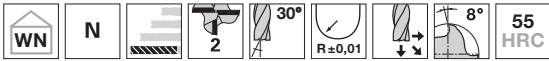
Milling tools



Article no. **6846**

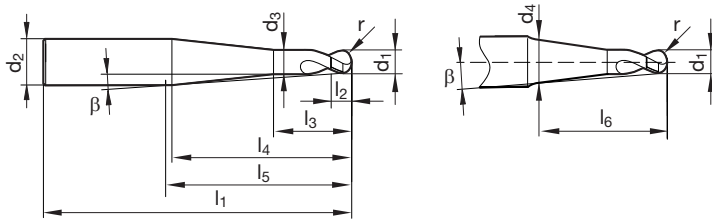
$d1_{-0,03}^{-0,01}$	d2 h5	d3	d4	l1	l2	l3	l4	l5	l6	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	0.96	50	0.5	1.3	15.7	22.0	10.0	0.25	1.50	2	6846 0.500
0.80	4.00	0.75	1.56	50	0.8	2.0	20.5	22.0	16.0	0.40	1.50	2	6846 0.800
1.00	4.00	0.92	1.97	63	1.0	2.5	23.8	35.0	20.0	0.50	1.50	2	6846 1.000
1.50	4.00	1.40	2.98	63	1.5	3.8	31.9	35.0	30.0	0.75	1.50	2	6846 1.500
2.00	6.00	1.85	3.99	80	2.0	5.0	43.7	44.0	40.0	1.00	1.50	2	6846 2.000
3.00	6.00	2.85	4.96	80	3.0	7.5	41.9	44.0	40.0	1.50	1.50	2	6846 3.000
4.00	6.00	3.80		80	4.0	10.0	42.1	44.0		2.00	1.50	2	6846 4.000
5.00	8.00	4.80	6.91	90	5.0	12.5	42.0	54.0	40.0	2.50	1.50	2	6846 5.000
6.00	8.00	5.70		90	6.0	15.0	43.1	54.0		3.00	1.50	2	6846 6.000
8.00	10.00	7.70		100	8.0	20.0	44.1	60.0		4.00	1.50	2	6846 8.000
10.00	12.00	9.50		120	10.0	25.0	45.1	75.0		5.00	1.50	2	6846 10.000

Ball nose end mills G-Mold 55 B



- P** • **GÜHRING NAVIGATOR**
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- neck clearance
 - centre cutting

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA

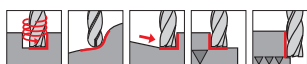


Article no. **6847**

$d1_{-0,03}^{-0,01}$	d2 h5	d3	d4	l1	l2	l3	l4	l5	l6	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	0.79	50	0.5	1.3	16.0	22.0	10.0	0.25	1.00	2	6847 0.500
0.80	4.00	0.75	1.29	50	0.8	2.0	21.0	22.0	16.0	0.40	1.00	2	6847 0.800
1.00	4.00	0.92	1.63	63	1.0	2.5	24.4	35.0	20.0	0.50	1.00	2	6847 1.000
1.50	4.00	1.40	2.47	63	1.5	3.8	32.8	35.0	30.0	0.75	1.00	2	6847 1.500
2.00	6.00	1.85	3.31	80	2.0	5.0	45.0	44.0	40.0	1.00	1.00	2	6847 2.000
3.00	6.00	2.85	4.29	80	3.0	7.5	43.2	44.0	40.0	1.50	1.00	2	6847 3.000
4.00	6.00	3.80	5.28	80	4.0	10.0	41.3	44.0	40.0	2.00	1.00	2	6847 4.000
5.00	8.00	4.80	6.61	90	5.0	12.5	52.6	54.0	50.0	2.50	1.00	2	6847 5.000
6.00	8.00	5.70	7.59	90	6.0	15.0	50.8	54.0	50.0	3.00	1.00	2	6847 6.000
8.00	10.00	7.70		100	8.0	20.0	64.2	60.0		4.00	1.00	2	6847 8.000



Ball nose end mills G-Mold 55 B



P • **GÜHRING NAVIGATOR**

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H •

- 4 face cutting edges up to the centre
- neck clearance
- centre cutting

Tool material **Solid carbide**

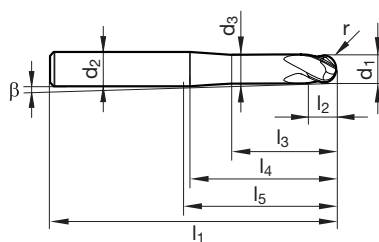
Surface

Type **N**

Shank form **HA**



Milling tools

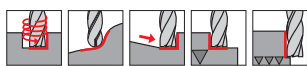


Article no. **6848**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z
mm	mm	mm	mm	mm	mm	mm	mm	mm	°	
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.50	8.70	4
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.75	6.50	4
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	1.00	8.30	4
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	1.50	5.20	4
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	2.00	3.30	4
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	2.50	1.50	4
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	3.00		4
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	4.00		4
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	5.00		4
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	6.00		4

Order no.
6848 1.000
6848 1.500
6848 2.000
6848 3.000
6848 4.000
6848 5.000
6848 6.000
6848 8.000
6848 10.000
6848 12.000

Ball nose end mills G-Mold 55 B



P • **GÜHRING NAVIGATOR**

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S • • 4 face cutting edges up to the centre

H • • neck clearance

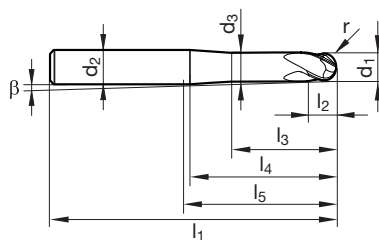
• centre cutting

Tool material **Solid carbide**

Surface

Type N

Shank form HA

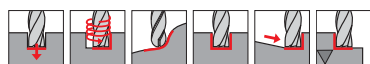
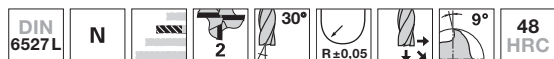


Article no. **6849**

d1 ^{+0,01} _{-0,03}	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	50	1.0	6.5	12.2	25.0	0.50	7.00	4	6849 1.000
1.50	4.00	1.40	50	1.5	10.0	14.9	25.5	0.75	4.80	4	6849 1.500
2.00	6.00	1.85	57	2.0	13.0	18.7	29.5	1.00	6.10	4	6849 2.000
3.00	6.00	2.85	65	3.0	20.0	24.3	34.5	1.50	3.50	4	6849 3.000
4.00	6.00	3.80	75	4.0	25.0	28.0	40.5	2.00	2.00	4	6849 4.000
5.00	6.00	4.80	75	5.0	31.0	32.6	41.5	2.50	0.80	4	6849 5.000
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	3.00		4	6849 6.000
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	4.00		4	6849 8.000
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	5.00		4	6849 10.000
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	6.00		4	6849 12.000



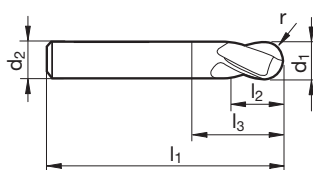
Ball nose slot drills (2-fluted)



P • **GÜHRING NAVIGATOR**
M • Cutting data page 153
K •
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H ○ • centre cutting

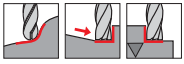
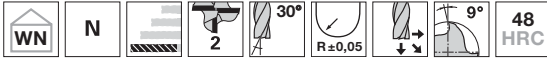
Tool material	Solid carbide	
Surface	F	F
Type	N	N
Shank form	HA	HB

Milling tools



Article no.								3679	3049
d1 h10	d2 h6	l1	l2	l3	l4	r	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm			
0.50	3.00	38	1.0	2.1	10.0	0.250	2	3679 0.500	
0.80	3.00	38	1.0	2.1	10.0	0.400	2	3679 0.800	
1.00	3.00	38	2.0	3.9	10.0	0.500	2	3679 1.000	
1.50	3.00	38	3.0	6.4	10.0	0.750	2	3679 1.500	
2.00	6.00	57	6.0	9.4	21.0	1.000	2	3679 2.000	3049 2.000
3.00	6.00	57	7.0	11.9	21.0	1.500	2	3679 3.000	3049 3.000
4.00	6.00	57	8.0	13.4	21.0	2.000	2	3679 4.000	3049 4.000
5.00	6.00	57	10.0	16.9	21.0	2.500	2	3679 5.000	3049 5.000
6.00	6.00	57	10.0	21.0	21.0	3.000	2	3679 6.000	3049 6.000
8.00	8.00	63	16.0	27.0	27.0	4.000	2	3679 8.000	3049 8.000
10.00	10.00	72	19.0	32.0	32.0	5.000	2	3679 10.000	3049 10.000
12.00	12.00	83	22.0	38.0	38.0	6.000	2	3679 12.000	3049 12.000
14.00	14.00	83	22.0	38.0	38.0	7.000	2	3679 14.000	3049 14.000
16.00	16.00	92	26.0	44.0	44.0	8.000	2	3679 16.000	3049 16.000
18.00	18.00	92	26.0	44.0	44.0	9.000	2	3679 18.000	3049 18.000
18.00	20.00	104	32.0	51.0	54.0	9.000	2	3679 18.001	
20.00	20.00	104	32.0	54.0	54.0	10.000	2	3679 20.000	3049 20.000

XL ball nose slot drills (2-fluted)



P • **GÜHRING NAVIGATOR**

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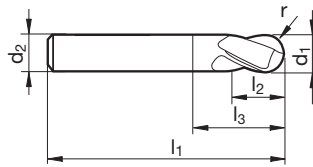
H • centre cutting

Tool material **Solid carbide**

Surface **F**

Type **N**

Shank form **HA**

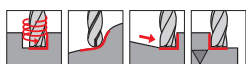
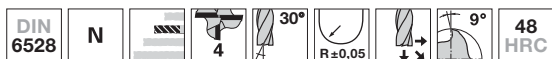


Article no. **3030**

d1 h10	d2 h6	l1	l2	l3	l4	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
3.00	3.00	75	20.0	47.0	47.0	1.500	2	3030 3.000
4.00	4.00	75	25.0	47.0	47.0	2.000	2	3030 4.000
5.00	5.00	75	30.0	47.0	47.0	2.500	2	3030 5.000
6.00	6.00	75	30.0	39.0	39.0	3.000	2	3030 6.000
8.00	8.00	100	40.0	64.0	64.0	4.000	2	3030 8.000
10.00	10.00	100	40.0	60.0	60.0	5.000	2	3030 10.000
12.00	12.00	150	45.0	105.0	105.0	6.000	2	3030 12.000



Ball nose end mills (4-fluted)

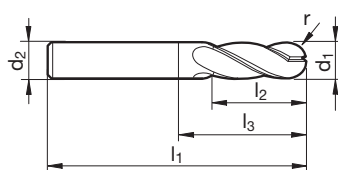


P • **GÜHRING NAVIGATOR**
M ○ Cutting data page 153
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N ○
S •
H ○

- 4 face cutting edges up to the centre
- centre cutting

Tool material	Solid carbide
Surface	F
Type	N
Shank form	HA

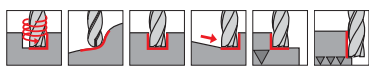
Milling tools



Article no. **3727**

d1 h10	d2 h6	l1	l2	l3	l4	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
4.00	4.00	50	11.0	22.0	22.0	2.000	4	3727 4.000
5.00	5.00	50	13.0	22.0	22.0	2.500	4	3727 5.000
6.00	6.00	57	13.0	21.0	21.0	3.000	4	3727 6.000
8.00	8.00	63	19.0	27.0	27.0	4.000	4	3727 8.000
10.00	10.00	72	22.0	32.0	32.0	5.000	4	3727 10.000
12.00	12.00	83	26.0	38.0	38.0	6.000	4	3727 12.000
14.00	14.00	83	26.0	38.0	38.0	7.000	4	3727 14.000
14.00	16.00	92	32.0	36.0	44.0	7.000	4	3727 14.001
16.00	16.00	92	32.0	44.0	44.0	8.000	4	3727 16.000
18.00	18.00	92	32.0	44.0	44.0	9.000	4	3727 18.000
18.00	20.00	104	38.0	44.0	54.0	9.000	4	3727 18.001
20.00	20.00	104	38.0	54.0	54.0	10.000	4	3727 20.000

Ratio end mills RF 100 VA



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K ○

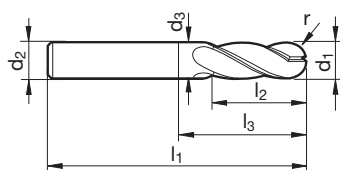
N •

S •

H ○

- 4 face cutting edges up to the centre
- neck clearance
- centre cutting

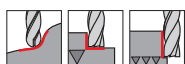
Tool material	Solid carbide	
Surface	a	a
Type	N	N
Shank form	HA	HB



								Article no.	6707	6708
d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm				
4.00	6.00	3.80	57	11.0	18.0	2.0	4	6707 4.000	6708 4.000	
5.00	6.00	4.80	57	13.0	18.0	2.5	4	6707 5.000	6708 5.000	
6.00	6.00	5.70	57	13.0	20.0	3.0	4	6707 6.000	6708 6.000	
8.00	8.00	7.70	63	19.0	26.0	4.0	4	6707 8.000	6708 8.000	
10.00	10.00	9.50	72	22.0	30.0	5.0	4	6707 10.000	6708 10.000	
12.00	12.00	11.50	83	26.0	36.0	6.0	4	6707 12.000	6708 12.000	
16.00	16.00	15.50	92	32.0	42.0	8.0	4	6707 16.000	6708 16.000	
20.00	20.00	19.50	104	38.0	52.0	10.0	4	6707 20.000	6708 20.000	
25.00	25.00	24.00	121	45.0	63.0	12.5	4	6707 25.000	6708 25.000	



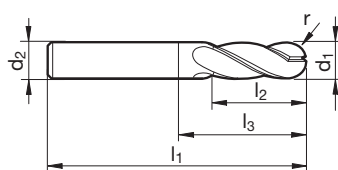
XL ball nose end mills (4-fluted)



- P** • **GÜHRING NAVIGATOR**
M • Cutting data page 153
K ○
N ○
S •
H ○
- 4 face cutting edges up to the centre
 - centre cutting

Tool material	Solid carbide
Surface	F
Type	N
Shank form	HA

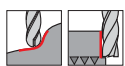
Milling tools



Article no. **3043**

d1 h10	d2 h6	l1	l2	l3	l4	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
3.00	3.00	75.00	20	47.0	47.0	1.50	4	3043 3.000
4.00	4.00	75.00	25	47.0	47.0	2.00	4	3043 4.000
5.00	5.00	75.00	30	47.0	47.0	2.50	4	3043 5.000
6.00	6.00	75.00	30	39.0	39.0	3.00	4	3043 6.000
8.00	8.00	100.00	40	64.0	64.0	4.00	4	3043 8.000
10.00	10.00	100.00	40	60.0	60.0	5.00	4	3043 10.000
12.00	12.00	150.00	45	105.0	105.0	6.00	4	3043 12.000

Die sinking cutter holders GF 200 WP



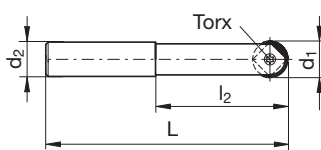
P	•
M	•
K	•
N	○
S	•
H	•

GÜHRING NAVIGATOR

Cutting data page 150

• to be used with indexable inserts art. no.: 1947/2520

Surface	Ⓝ
Type	GF 200
Shank form	HA

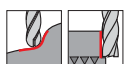


Article no. **1941**

d1 ±0,015	d2 h6	l1	l2	Torx	Order no.
mm	mm	mm	mm		
10.00	10.00	95	45	T8	1941 10.000
12.00	12.00	110	50	T15	1941 12.000
16.00	16.00	125	65	T20	1941 16.000
20.00	20.00	140	75	T20	1941 20.000
25.00	25.00	165	90	T30	1941 25.000
32.00	32.00	185	105	T30	1941 32.000



Die sinking cutter holders GF 200 WP



P	•
M	•
K	•
N	○
S	•
H	•

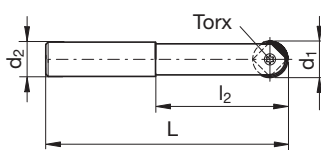
GÜHRING NAVIGATOR

Cutting data page 150

• to be used with indexable inserts art. no.: 1947/2520

Surface	Ni
Type	GF 200
Shank form	HA

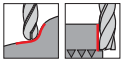
Milling tools



Article no. **1942**

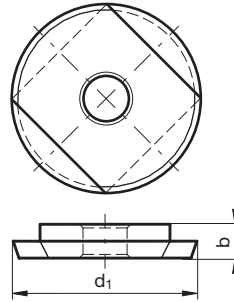
d1 ±0,015	d2 h6	l1	l2	Torx	Order no.
mm	mm	mm	mm		
10.00	12.00	150	35	T8	1942 10.000
12.00	16.00	160	60	T15	1942 12.000
16.00	20.00	174	70	T20	1942 16.000
20.00	25.00	189	80	T20	1942 20.000
25.00	32.00	210	100	T30	1942 25.000

Indexable inserts round



- P** • **GÜHRING NAVIGATOR**
- M** • Cutting data page 150
- K** •
- N** ○
- S** •
- H** • for GF 200 WP • applicable twice

Tool material	Cermet	Solid carbide
Surface	○	Ⓡ



Article no. **1947** **2520**

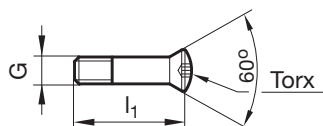
d1 ±0,015		b		Order no.	
mm		mm			
20.00	4.0	1947 20.000	2520 20.000		
10.00	2.5	1947 10.000	2520 10.000		
12.00	2.5	1947 12.000	2520 12.000		
16.00	3.2	1947 16.000	2520 16.000		
25.00	4.6	1947 25.000	2520 25.000		
32.00	5.0		2520 32.000		



Clamping screws for die sinking cutter holders



for GF 200 WP



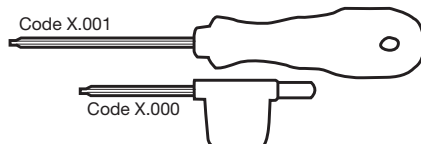
Article no.

1691

G	Torx	l1	Order no.
		mm	
M 4 X0.5	T15	10.200	1691 4.000
M 5 X0.5	T20	12.800	1691 5.000
M 5 X0.5	T20	15.400	1691 5.001
M 3	T8	8.500	1691 3.000
M 8 X0.75	T30	24.800	1691 8.000
M12 X 1.5	T30	20.400	1691 6.000

Torx screwdrivers

Milling tools

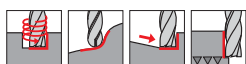
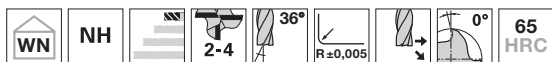


Article no. **1612**

Torx		Order no.
T5		1612 5.001
T6		1612 6.000
T7		1612 7.000
T8		1612 8.000
T9		1612 9.001
T10		1612 10.000
T15		1612 15.000
T20		1612 20.001
SW 5		1612 25.000
T25		1612 25.001
T30		1612 30.001



Torus end mills G-Mold μ 65 T



P	○
M	
K	●
N	
S	
H	●

GÜHRING NAVIGATOR

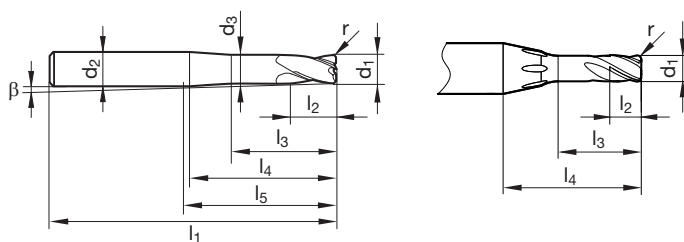
Cutting data page 151

- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = \pm 0.005$ mm
- \varnothing tolerance d_1 of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- with GühroJet peripheral cooling from $\varnothing 0.3-3$ mm
- centre cutting
- neck clearance

Tool material	Solid carbide
Surface	X
Type	NH
Shank form	HA



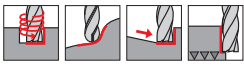
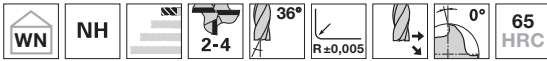
Milling tools



Article no. **6820**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.30	4.00	0.28	50	0.3	0.75	9.1	22,0	0.05	11.50	2	6820 0.300
0.50	4.00	0.45	50	0.5	1.25	9.2	22,0	0.05	10.80	2	6820 0.500
0.50	4.00	0.45	50	0.5	1.25	9.2	22,0	0.10	10.80	2	6820 0.501
0.60	4.00	0.55	50	0.6	1.50	9.2	22,0	0.05	10.50	2	6820 0.600
0.60	4.00	0.55	50	0.6	1.50	9.2	22,0	0.10	10.50	2	6820 0.601
0.80	4.00	0.75	50	0.8	2.00	9.1	22,0	0.05	10.00	2	6820 0.800
0.80	4.00	0.75	50	0.8	2.00	9.1	22,0	0.10	10.00	2	6820 0.801
0.80	4.00	0.75	50	0.8	2.00	9.1	22,0	0.20	10.20	2	6820 0.802
1.00	4.00	0.92	50	1.0	2.50	9.2	22,0	0.10	9.30	2	6820 1.001
1.00	4.00	0.92	50	1.0	2.50	9.2	22,0	0.20	9.40	2	6820 1.002
1.00	4.00	0.92	50	1.0	2.50	9.2	22,0	0.30	9.50	2	6820 1.003
1.50	4.00	1.40	50	1.5	4.00	9.6	27,0	0.10	7.50	2	6820 1.501
1.50	4.00	1.40	50	1.5	4.00	9.6	27,0	0.20	7.50	2	6820 1.502
1.50	4.00	1.40	50	1.5	4.00	9.6	27,0	0.50	7.80	2	6820 1.505
2.00	6.00	1.85	50	2.0	5.00	14.2	29,0	0.20	8.10	2	6820 2.002
2.00	6.00	1.85	50	2.0	5.00	14.2	29,0	0.50	8.30	2	6820 2.005
2.50	6.00	2.35	50	2.5	6.00	14.1	29,0	0.20	7.10	2	6820 2.502
2.50	6.00	2.35	50	2.5	6.00	14.1	29,0	0.50	7.30	2	6820 2.505
3.00	6.00	2.85	50	3.0	8.00	14.9	34,0	0.20	5.80	2	6820 3.002
3.00	6.00	2.85	50	3.0	8.00	14.9	34,0	0.30	5.80	2	6820 3.003
3.00	6.00	2.85	50	3.0	8.00	14.9	34,0	0.50	5.90	2	6820 3.005
4.00	6.00	3.80	50	4.0	10.00	13.0	39,0	0.20	4.40	4	6820 4.002
4.00	6.00	3.80	50	4.0	10.00	13.0	39,0	0.50	4.50	4	6820 4.005
4.00	6.00	3.80	50	4.0	10.00	13.0	39,0	1.00	4.70	4	6820 4.010
5.00	6.00	4.80	50	5.0	12.50	14.1	44,0	0.50	2.10	4	6820 5.005
6.00	6.00	5.70	54	6.0	15.00	15.6	64,0	0.20		4	6820 6.002
6.00	6.00	5.70	54	6.0	15.00	15.6	64,0	0.50		4	6820 6.005
6.00	6.00	5.70	54	6.0	15.00	15.6	64,0	1.00		4	6820 6.010
8.00	8.00	7.70	58	8.0	20.00	20.6	64,0	0.50		4	6820 8.005
8.00	8.00	7.70	58	8.0	20.00	20.6	64,0	0.80		4	6820 8.008
8.00	8.00	7.70	58	8.0	20.00	20.6	64,0	1.00		4	6820 8.010
10.00	10.00	9.50	72	10.0	25.00	25.9	32,0	0.50		4	6820 10.005
10.00	10.00	9.50	72	10.0	25.00	25.9	32,0	1.00		4	6820 10.010
10.00	10.00	9.50	72	10.0	25.00	25.9	32,0	2.00		4	6820 10.020
12.00	12.00	11.50	73	12.0	30.00	30.9	28,0	0.50		4	6820 12.005
12.00	12.00	11.50	73	12.0	30.00	30.9	28,0	1.00		4	6820 12.010
12.00	12.00	11.50	73	12.0	30.00	30.9	28,0	2.00		4	6820 12.020

Torus end mills G-Mold μ 65 T



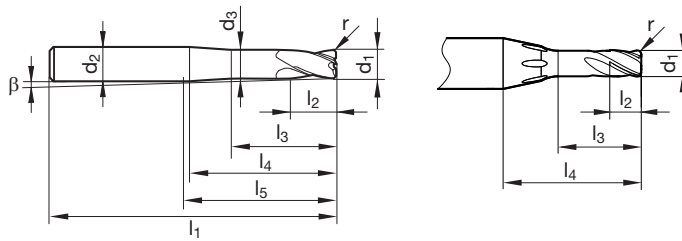
P	○
M	○
K	●
N	○
S	○
H	●

GÜHRING NAVIGATOR

Cutting data page 151

- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = \pm 0.005$ mm
- \varnothing tolerance d_1 of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- with GühroJet peripheral cooling from $\varnothing 0.3-3$ mm
- centre cutting
- neck clearance

Tool material	Solid carbide
Surface	
Type	NH
Shank form	HA

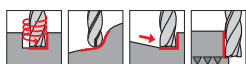


Article no. **6821**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.30	4.00	0.28	50	0.3	1.0	9.4	22,0	0.05	11.20	2	6821 0.300
0.50	4.00	0.45	50	0.5	1.5	9.5	22,0	0.05	10.50	2	6821 0.500
0.50	4.00	0.45	50	0.5	1.5	9.5	22,0	0.10	10.50	2	6821 0.501
0.60	4.00	0.55	50	0.6	2.0	9.7	22,0	0.05	10.00	2	6821 0.600
0.60	4.00	0.55	50	0.6	2.0	9.7	22,0	0.10	10.00	2	6821 0.601
0.80	4.00	0.75	50	0.8	3.0	10.1	22,0	0.05	9.00	2	6821 0.800
0.80	4.00	0.75	50	0.8	3.0	10.1	22,0	0.10	9.10	2	6821 0.801
0.80	4.00	0.75	50	0.8	3.0	10.1	22,0	0.20	9.10	2	6821 0.802
1.00	4.00	0.92	50	1.0	3.0	9.7	22,0	0.10	8.80	2	6821 1.001
1.00	4.00	0.92	50	1.0	3.0	9.7	22,0	0.20	8.90	2	6821 1.002
1.00	4.00	0.92	50	1.0	3.0	9.7	22,0	0.30	9.00	2	6821 1.003
1.50	4.00	1.40	50	1.5	6.0	11.6	27,0	0.10	6.20	2	6821 1.501
1.50	4.00	1.40	50	1.5	6.0	11.6	27,0	0.20	6.20	2	6821 1.502
1.50	4.00	1.40	50	1.5	6.0	11.6	27,0	0.50	6.40	2	6821 1.505
2.00	6.00	1.85	50	2.0	6.0	15.2	29,0	0.20	7.60	2	6821 2.002
2.00	6.00	1.85	50	2.0	6.0	15.2	29,0	0.50	7.70	2	6821 2.005
2.50	6.00	2.35	50	2.5	8.0	16.1	29,0	0.20	6.20	2	6821 2.502
2.50	6.00	2.35	50	2.5	8.0	16.1	29,0	0.50	6.40	2	6821 2.505
3.00	6.00	2.85	57	3.0	10.0	16.9	34,0	0.20	5.10	2	6821 3.002
3.00	6.00	2.85	57	3.0	10.0	16.9	34,0	0.30	5.10	2	6821 3.003
3.00	6.00	2.85	57	3.0	10.0	16.9	34,0	0.50	5.20	2	6821 3.005
4.00	6.00	3.80	57	4.0	14.0	17.0	39,0	0.20	3.40	4	6821 4.002
4.00	6.00	3.80	57	4.0	14.0	17.0	39,0	0.50	3.40	4	6821 4.005
4.00	6.00	3.80	57	4.0	14.0	17.0	39,0	1.00	3.50	4	6821 4.010
5.00	6.00	4.80	57	5.0	18.0	19.6	44,0	0.50	1.50	4	6821 5.005
6.00	6.00	5.70	57	6.0	20.0	20.6	64,0	0.20		4	6821 6.002
6.00	6.00	5.70	57	6.0	20.0	20.6	64,0	0.50		4	6821 6.005
6.00	6.00	5.70	57	6.0	20.0	20.6	64,0	1.00		4	6821 6.010
8.00	8.00	7.70	63	8.0	26.0	26.6	64,0	0.50		4	6821 8.005
8.00	8.00	7.70	63	8.0	26.0	26.6	64,0	0.80		4	6821 8.008
8.00	8.00	7.70	63	8.0	26.0	26.6	64,0	1.00		4	6821 8.010
10.00	10.00	9.50	72	10.0	31.0	31.9	32,0	0.50		4	6821 10.005
10.00	10.00	9.50	72	10.0	31.0	31.9	32,0	1.00		4	6821 10.010
10.00	10.00	9.50	72	10.0	31.0	31.9	32,0	2.00		4	6821 10.020
12.00	12.00	11.50	83	12.0	37.0	37.9	38,0	0.50		4	6821 12.005
12.00	12.00	11.50	83	12.0	37.0	37.9	38,0	1.00		4	6821 12.010
12.00	12.00	11.50	83	12.0	37.0	37.9	38,0	2.00		4	6821 12.020



Torus end mills G-Mold μ 65 T



P **GÜHRING NAVIGATOR**

M Cutting data page 151

- K** • High-precision ball nose end mills for maximum form accuracy
- N** • exact tolerance of the radius contour $r = \pm 0.005$ mm
- S** • \varnothing tolerance d_1 of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- H** • with GühroJet peripheral cooling from $\varnothing 0.3-3$ mm
- centre cutting
- neck clearance

Tool material **Solid carbide**

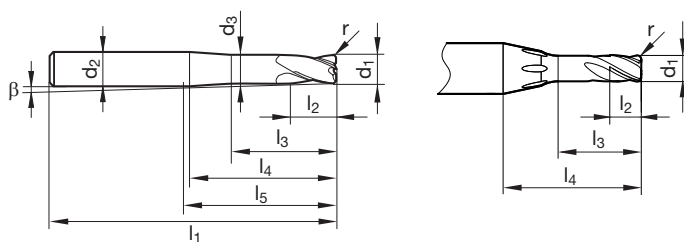
Surface **X**

Type **N**

Shank form **HA**



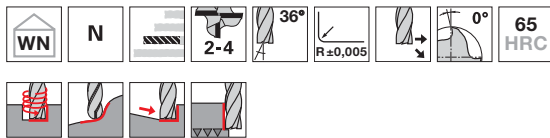
Milling tools



Article no. **6822**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.30	4.00	0.28	50	0.3	1.5	9.9	22,0	0.05	10.60	2	6822 0.300
0.50	4.00	0.45	50	0.5	2.5	10.5	22,0	0.05	9.50	2	6822 0.500
0.50	4.00	0.45	50	0.5	2.5	10.5	22,0	0.10	9.50	2	6822 0.501
0.60	4.00	0.55	50	0.6	3.0	10.7	22,0	0.05	9.00	2	6822 0.600
0.60	4.00	0.55	50	0.6	3.0	10.7	22,0	0.10	9.10	2	6822 0.601
0.80	4.00	0.75	50	0.8	4.0	11.1	22,0	0.05	8.20	2	6822 0.800
0.80	4.00	0.75	50	0.8	4.0	11.1	22,0	0.10	8.20	2	6822 0.801
0.80	4.00	0.75	50	0.8	4.0	11.1	22,0	0.20	8.30	2	6822 0.802
1.00	4.00	0.92	50	1.0	5.0	11.7	22,0	0.10	7.30	2	6822 1.001
1.00	4.00	0.92	50	1.0	5.0	11.7	22,0	0.20	7.40	2	6822 1.002
1.00	4.00	0.92	50	1.0	5.0	11.7	22,0	0.30	7.50	2	6822 1.003
1.50	4.00	1.40	50	1.5	8.0	13.6	27,0	0.10	5.30	2	6822 1.501
1.50	4.00	1.40	50	1.5	8.0	13.6	27,0	0.20	5.30	2	6822 1.502
1.50	4.00	1.40	50	1.5	8.0	13.6	27,0	0.50	5.40	2	6822 1.505
2.00	6.00	1.85	50	2.0	10.0	19.2	29,0	0.20	6.00	2	6822 2.002
2.00	6.00	1.85	50	2.0	10.0	19.2	29,0	0.50	6.10	2	6822 2.005
2.50	6.00	2.35	50	2.5	12.5	20.6	29,0	0.20	4.90	2	6822 2.502
2.50	6.00	2.35	50	2.5	12.5	20.6	29,0	0.50	4.90	2	6822 2.505
3.00	6.00	2.85	65	3.0	15.0	21.9	34,0	0.20	3.90	2	6822 3.002
3.00	6.00	2.85	65	3.0	15.0	21.9	34,0	0.30	3.90	2	6822 3.003
3.00	6.00	2.85	65	3.0	15.0	21.9	34,0	0.50	4.00	2	6822 3.005
4.00	6.00	3.80	65	4.0	20.0	23.0	39,0	0.20	2.50	4	6822 4.002
4.00	6.00	3.80	65	4.0	20.0	23.0	39,0	0.50	2.50	4	6822 4.005
4.00	6.00	3.80	65	4.0	20.0	23.0	39,0	1.00	2.60	4	6822 4.010
5.00	6.00	4.80	65	5.0	25.0	26.6	44,0	0.50	1.10	4	6822 5.005
6.00	6.00	5.70	65	6.0	25.0	25.6	64,0	0.20		4	6822 6.002
6.00	6.00	5.70	65	6.0	25.0	25.6	64,0	0.50		4	6822 6.005
6.00	6.00	5.70	65	6.0	25.0	25.6	64,0	1.00		4	6822 6.010
8.00	8.00	7.70	75	8.0	30.0	30.6	64,0	0.50		4	6822 8.005
8.00	8.00	7.70	75	8.0	30.0	30.6	64,0	0.80		4	6822 8.008
8.00	8.00	7.70	75	8.0	30.0	30.6	64,0	1.00		4	6822 8.010
10.00	10.00	9.50	90	10.0	40.0	40.9	50,0	0.50		4	6822 10.005
10.00	10.00	9.50	90	10.0	40.0	40.9	50,0	1.00		4	6822 10.010
10.00	10.00	9.50	90	10.0	40.0	40.9	50,0	2.00		4	6822 10.020
12.00	12.00	11.50	100	12.0	40.0	40.9	55,0	0.50		4	6822 12.005
12.00	12.00	11.50	100	12.0	40.0	40.9	55,0	1.00		4	6822 12.010
12.00	12.00	11.50	100	12.0	40.0	40.9	55,0	2.00		4	6822 12.020

Torus end mills G-Mold μ 65 T

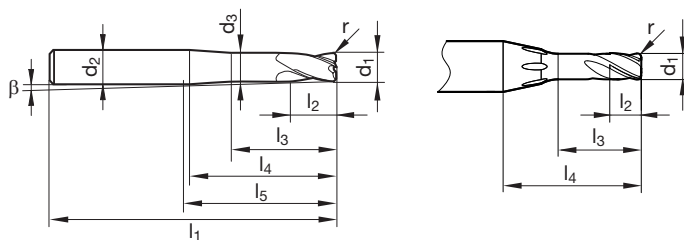


P	○
M	○
K	●
N	○
S	○
H	●

GÜHRING NAVIGATOR

Cutting data page 151

- High-precision ball nose end mills for maximum form accuracy
- exact tolerance of the radius contour $r = \pm 0.005$ mm
- \varnothing tolerance d_1 of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- with GühroJet peripheral cooling from $\varnothing 0.3-3$ mm
- centre cutting
- neck clearance



Tool material	Solid carbide
Surface	
Type	N
Shank form	HA

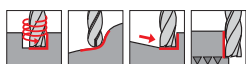


Article no. **6823**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.30	4.00	0.28	50	0.3	2.0	10.4	22,0	0.05	10.10	2	6823 0.300
0.50	4.00	0.45	50	0.5	3.0	11.0	22,0	0.05	9.00	2	6823 0.500
0.50	4.00	0.45	50	0.5	3.0	11.0	22,0	0.10	9.10	2	6823 0.501
0.60	4.00	0.55	50	0.6	4.0	11.7	22,0	0.05	8.30	2	6823 0.600
0.60	4.00	0.55	50	0.6	4.0	11.7	22,0	0.10	8.30	2	6823 0.601
0.80	4.00	0.75	50	0.8	5.0	12.1	22,0	0.05	7.50	2	6823 0.800
0.80	4.00	0.75	50	0.8	5.0	12.1	22,0	0.10	7.60	2	6823 0.801
0.80	4.00	0.75	50	0.8	5.0	12.1	22,0	0.20	7.60	2	6823 0.802
1.00	4.00	0.92	50	1.0	8.0	14.7	22,0	0.10	5.80	2	6823 1.001
1.00	4.00	0.92	50	1.0	8.0	14.7	22,0	0.20	5.90	2	6823 1.002
1.00	4.00	0.92	50	1.0	8.0	14.7	22,0	0.30	5.90	2	6823 1.003
1.50	4.00	1.40	50	1.5	10.0	15.6	27,0	0.10	4.60	2	6823 1.501
1.50	4.00	1.40	50	1.5	10.0	15.6	27,0	0.20	4.60	2	6823 1.502
1.50	4.00	1.40	50	1.5	10.0	15.6	27,0	0.50	4.70	2	6823 1.505
2.00	6.00	1.85	57	2.0	12.0	21.2	29,0	0.20	5.40	2	6823 2.002
2.00	6.00	1.85	57	2.0	12.0	21.2	29,0	0.50	5.50	2	6823 2.005
2.50	6.00	2.35	57	2.5	15.0	23.1	29,0	0.20	4.30	2	6823 2.502
2.50	6.00	2.35	57	2.5	15.0	23.1	29,0	0.50	4.40	2	6823 2.505
3.00	6.00	2.85	65	3.0	18.0	24.9	34,0	0.20	3.40	2	6823 3.002
3.00	6.00	2.85	65	3.0	18.0	24.9	34,0	0.30	3.50	2	6823 3.003
3.00	6.00	2.85	65	3.0	18.0	24.9	34,0	0.50	3.50	2	6823 3.005
4.00	6.00	3.80	65	4.0	24.0	27.0	39,0	0.20	2.10	4	6823 4.002
4.00	6.00	3.80	65	4.0	24.0	27.0	39,0	0.50	2.10	4	6823 4.005
4.00	6.00	3.80	65	4.0	24.0	27.0	39,0	1.00	2.20	4	6823 4.010
5.00	6.00	4.80	80	5.0	30.0	31.6	44,0	0.50	0.90	4	6823 5.005
6.00	6.00	5.70	80	6.0	30.0	30.6	64,0	0.20		4	6823 6.002
6.00	6.00	5.70	80	6.0	30.0	30.6	64,0	0.50		4	6823 6.005
6.00	6.00	5.70	80	6.0	30.0	30.6	64,0	1.00		4	6823 6.010
8.00	8.00	7.70	90	8.0	40.0	40.6	64,0	0.50		4	6823 8.005
8.00	8.00	7.70	90	8.0	40.0	40.6	64,0	0.80		4	6823 8.008
8.00	8.00	7.70	90	8.0	40.0	40.6	64,0	1.00		4	6823 8.010
10.00	10.00	9.50	100	10.0	50.0	50.9	60,0	0.50		4	6823 10.005
10.00	10.00	9.50	100	10.0	50.0	50.9	60,0	1.00		4	6823 10.010
10.00	10.00	9.50	100	10.0	50.0	50.9	60,0	2.00		4	6823 10.020
12.00	12.00	11.50	120	12.0	60.0	60.9	75,0	0.50		4	6823 12.005
12.00	12.00	11.50	120	12.0	60.0	60.9	75,0	1.00		4	6823 12.010
12.00	12.00	11.50	120	12.0	60.0	60.9	75,0	2.00		4	6823 12.020



Torus end mills G-Mold μ 65 T

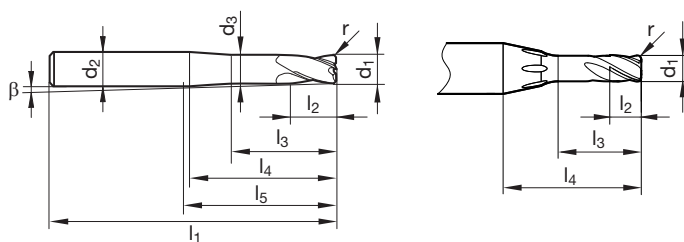


P **GÜHRING NAVIGATOR**

M Cutting data page 151

- K** • High-precision ball nose end mills for maximum form accuracy
- N** • exact tolerance of the radius contour $r = \pm 0.005$ mm
- S** • \varnothing tolerance d_1 of $\varnothing 0.2-3$ mm $+0.000/-0.010$ mm
- H** • with GühroJet peripheral cooling from $\varnothing 0.3-3$ mm
- centre cutting
- neck clearance

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA

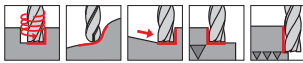
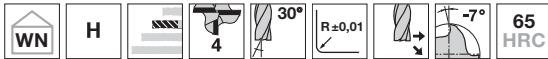


Article no. **6824**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.30	4.00	0.28	50	0.3	3.0	11.4	22,0	0.05	9.20	2	6824 0.300
0.50	4.00	0.45	50	0.5	5.0	13.0	22,0	0.05	7.70	2	6824 0.500
0.50	4.00	0.45	50	0.5	5.0	13.0	22,0	0.10	7.70	2	6824 0.501
0.60	4.00	0.55	50	0.6	6.0	13.7	22,0	0.05	7.10	2	6824 0.600
0.60	4.00	0.55	50	0.6	6.0	13.7	22,0	0.10	7.10	2	6824 0.601
0.80	4.00	0.75	50	0.8	8.0	15.1	22,0	0.05	6.00	2	6824 0.800
0.80	4.00	0.75	50	0.8	8.0	15.1	22,0	0.10	6.10	2	6824 0.801
0.80	4.00	0.75	50	0.8	8.0	15.1	22,0	0.20	6.10	2	6824 0.802
1.00	4.00	0.92	50	1.0	10.0	16.7	22,0	0.10	5.10	2	6824 1.001
1.00	4.00	0.92	50	1.0	10.0	16.7	22,0	0.20	5.20	2	6824 1.002
1.00	4.00	0.92	50	1.0	10.0	16.7	22,0	0.30	5.20	2	6824 1.003
1.50	4.00	1.40	55	1.5	16.0	21.6	27,0	0.10	3.30	2	6824 1.501
1.50	4.00	1.40	55	1.5	16.0	21.6	27,0	0.20	3.30	2	6824 1.502
1.50	4.00	1.40	55	1.5	16.0	21.6	27,0	0.50	3.30	2	6824 1.505
2.00	6.00	1.85	65	2.0	20.0	29.2	29,0	0.20	3.90	2	6824 2.002
2.00	6.00	1.85	65	2.0	20.0	29.2	29,0	0.50	3.90	2	6824 2.005
2.50	6.00	2.35	65	2.5	20.0	28.1	29,0	0.20	3.50	2	6824 2.502
2.50	6.00	2.35	65	2.5	20.0	28.1	29,0	0.50	3.60	2	6824 2.505
3.00	6.00	2.85	70	3.0	25.0	31.9	34,0	0.20	2.70	2	6824 3.002
3.00	6.00	2.85	70	3.0	25.0	31.9	34,0	0.30	2.70	2	6824 3.003
3.00	6.00	2.85	70	3.0	25.0	31.9	34,0	0.50	2.70	2	6824 3.005
4.00	6.00	3.80	75	4.0	32.0	35.0	39,0	0.20	1.60	4	6824 4.002
4.00	6.00	3.80	75	4.0	32.0	35.0	39,0	0.50	1.60	4	6824 4.005
4.00	6.00	3.80	75	4.0	32.0	35.0	39,0	1.00	1.60	4	6824 4.010
5.00	6.00	4.80	80	5.0	42.0	43.6	44,0	0.50	0.60	4	6824 5.005
6.00	6.00	5.70	100	6.0	40.0	40.6	64,0	0.20		4	6824 6.002
6.00	6.00	5.70	100	6.0	40.0	40.6	64,0	0.50		4	6824 6.005
6.00	6.00	5.70	100	6.0	40.0	40.6	64,0	1.00		4	6824 6.010
8.00	8.00	7.70	100	8.0	40.0	40.6	64,0	0.50		4	6824 8.005
8.00	8.00	7.70	100	8.0	40.0	40.6	64,0	0.80		4	6824 8.008
8.00	8.00	7.70	100	8.0	40.0	40.6	64,0	1.00		4	6824 8.010

Milling tools

Torus end mills G-Mold 65 T



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M	○
K	●
N	○
S	○
H	●

GÜHRING NAVIGATOR

Cutting data page 151

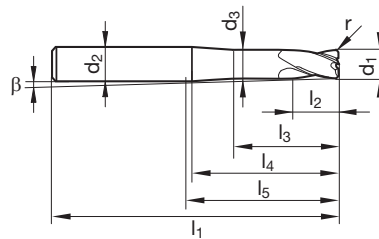
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface **X**

Type **H**

Shank form **HA**



Article no. **6837**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.10	8.80	4	6837 1.001
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.20	8.90	4	6837 1.002
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.20	6.60	4	6837 1.502
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.10	8.30	4	6837 2.001
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.20	8.40	4	6837 2.002
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.50	8.60	4	6837 2.005
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.10	5.30	4	6837 3.001
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.30	5.30	4	6837 3.003
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.50	5.40	4	6837 3.005
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.20	3.40	4	6837 4.002
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.30	3.40	4	6837 4.003
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.50	3.40	4	6837 4.005
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	0.20	1.50	4	6837 5.002
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	0.50	1.50	4	6837 5.005
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	1.00	1.60	4	6837 5.010
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.20		4	6837 6.002
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.30		4	6837 6.003
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.50		4	6837 6.005
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	1.00		4	6837 6.010
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	1.50		4	6837 6.015
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	2.00		4	6837 6.020
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	0.30		4	6837 8.003
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	0.50		4	6837 8.005
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	1.00		4	6837 8.010
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	1.50		4	6837 8.015
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	2.00		4	6837 8.020
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	0.30		4	6837 10.003
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	0.50		4	6837 10.005
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	1.00		4	6837 10.010
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	1.50		4	6837 10.015
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	2.00		4	6837 10.020
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	3.00		4	6837 10.030
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	0.50		4	6837 12.005
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	1.00		4	6837 12.010
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	2.00		4	6837 12.020
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	3.00		4	6837 12.030



Article no.

6837

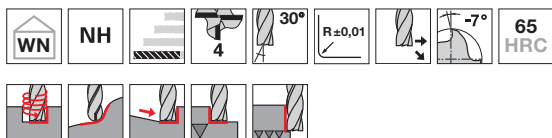
d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z
mm	mm	mm	mm	mm	mm	mm	mm	mm	°	
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	4.00		4

Order no.

6837 12.040

Milling tools

Torus end mills G-Mold 65 T



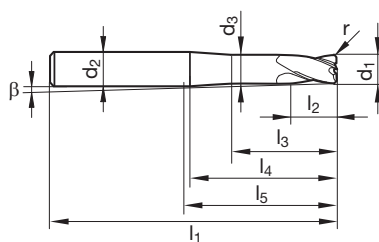
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GÜHRING NAVIGATOR

Cutting data page 151

- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	⊗
Type	NH
Shank form	HA

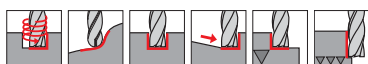


Article no. **6838**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	50	1.0	6.5	12.2	22.0	0.10	7.00	4	6838 1.001
1.00	4.00	0.92	50	1.0	6.5	12.2	22.0	0.20	7.10	4	6838 1.002
1.50	4.00	1.40	50	1.5	10.0	14.9	22.0	0.20	4.80	4	6838 1.502
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	0.10	6.10	4	6838 2.001
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	0.20	6.10	4	6838 2.002
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	0.50	6.20	4	6838 2.005
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	0.10	3.50	4	6838 3.001
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	0.30	3.50	4	6838 3.003
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	0.50	3.60	4	6838 3.005
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	0.20	2.00	4	6838 4.002
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	0.30	2.00	4	6838 4.003
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	0.50	2.00	4	6838 4.005
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	0.20	0.80	4	6838 5.002
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	0.50	0.90	4	6838 5.005
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	1.00	0.90	4	6838 5.010
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	0.20		4	6838 6.002
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	0.30		4	6838 6.003
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	0.50		4	6838 6.005
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	1.00		4	6838 6.010
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	1.50		4	6838 6.015
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	2.00		4	6838 6.020
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	0.30		4	6838 8.003
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	0.50		4	6838 8.005
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	1.00		4	6838 8.010
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	1.50		4	6838 8.015
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	2.00		4	6838 8.020
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	0.30		4	6838 10.003
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	0.50		4	6838 10.005
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	1.00		4	6838 10.010
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	1.50		4	6838 10.015
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	2.00		4	6838 10.020
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	3.00		4	6838 10.030
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	0.50		4	6838 12.005
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	1.00		4	6838 12.010
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	2.00		4	6838 12.020
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	3.00		4	6838 12.030
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	4.00		4	6838 12.040



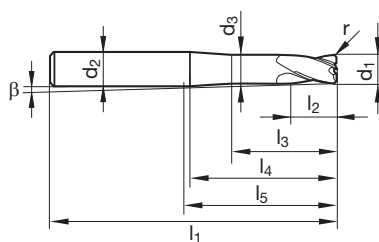
Torus end mills G-Mold 55 T



P • **GÜHRING NAVIGATOR**
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- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	NH
Shank form	HA



Article no. **6850**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	45	0.5	3.0	9.6	17.0	0.10	10.40	2	6850 0.501
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.10	8.80	2	6850 1.001
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.20	8.90	2	6850 1.002
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.20	6.60	2	6850 1.502
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.10	8.30	2	6850 2.001
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.20	8.40	2	6850 2.002
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.50	8.60	2	6850 2.005
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.10	5.30	2	6850 3.001
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.30	5.30	2	6850 3.003
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.50	5.40	2	6850 3.005
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.20	3.40	2	6850 4.002
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.30	3.40	2	6850 4.003
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.50	3.40	2	6850 4.005
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	0.20	1.50	2	6850 5.002
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	0.50	1.50	2	6850 5.005
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	1.00	1.60	2	6850 5.010
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.20		2	6850 6.002
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.30		2	6850 6.003
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.50		2	6850 6.005
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	1.00		2	6850 6.010
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	1.50		2	6850 6.015
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	2.00		2	6850 6.020
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	0.30		2	6850 8.003
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	0.50		2	6850 8.005
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	1.00		2	6850 8.010
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	1.50		2	6850 8.015
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	2.00		2	6850 8.020
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	0.30		2	6850 10.003
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	0.50		2	6850 10.005
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	1.00		2	6850 10.010
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	1.50		2	6850 10.015
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	2.00		2	6850 10.020
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	3.00		2	6850 10.030
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	0.50		2	6850 12.005
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	1.00		2	6850 12.010
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	2.00		2	6850 12.020



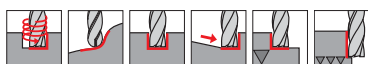
Article no.

6850

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	3.00		2	6850 12.030
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	4.00		2	6850 12.040



Torus end mills G-Mold 55 T



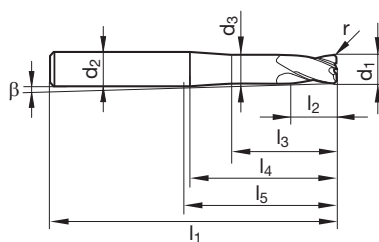
P • **GÜHRING NAVIGATOR**
M • Cutting data page 151
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- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	NH
Shank form	HA



Milling tools



Article no. **6851**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
0.50	4.00	0.45	50	0.5	3.6	10.2	22.0	0.10	9.80	2	6851 0.501
1.00	4.00	0.92	50	1.0	6.5	12.2	22.0	0.10	7.00	2	6851 1.001
1.00	4.00	0.92	50	1.0	6.5	12.2	22.0	0.20	7.10	2	6851 1.002
1.50	4.00	1.40	50	1.5	10.0	14.9	22.0	0.20	4.80	2	6851 1.502
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	0.10	6.10	2	6851 2.001
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	0.20	6.10	2	6851 2.002
2.00	6.00	1.85	57	2.0	13.0	18.7	21.0	0.50	6.20	2	6851 2.005
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	0.10	3.50	2	6851 3.001
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	0.30	3.50	2	6851 3.003
3.00	6.00	2.85	65	3.0	20.0	24.3	29.0	0.50	3.60	2	6851 3.005
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	0.20	2.00	2	6851 4.002
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	0.30	2.00	2	6851 4.003
4.00	6.00	3.80	75	4.0	25.0	28.0	39.0	0.50	2.00	2	6851 4.005
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	0.20	0.80	2	6851 5.002
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	0.50	0.90	2	6851 5.005
5.00	6.00	4.80	75	5.0	31.0	32.6	39.0	1.00	0.90	2	6851 5.010
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	0.20		2	6851 6.002
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	0.30		2	6851 6.003
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	0.50		2	6851 6.005
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	1.00		2	6851 6.010
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	1.50		2	6851 6.015
6.00	6.00	5.70	75	6.0	38.0	38.6	39.0	2.00		2	6851 6.020
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	0.30		2	6851 8.003
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	0.50		2	6851 8.005
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	1.00		2	6851 8.010
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	1.50		2	6851 8.015
8.00	8.00	7.70	90	8.0	53.0	53.6	54.0	2.00		2	6851 8.020
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	0.30		2	6851 10.003
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	0.50		2	6851 10.005
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	1.00		2	6851 10.010
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	1.50		2	6851 10.015
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	2.00		2	6851 10.020
10.00	10.00	9.50	100	10.0	59.0	59.9	60.0	3.00		2	6851 10.030
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	0.50		2	6851 12.005
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	1.00		2	6851 12.010
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	2.00		2	6851 12.020



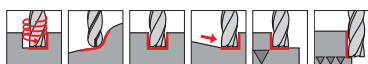
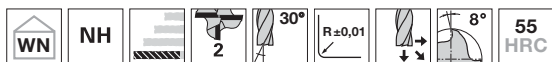
Article no.

6851

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	3.00		2	6851 12.030
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	4.00		2	6851 12.040



Torus end mills G-Mold 55 T



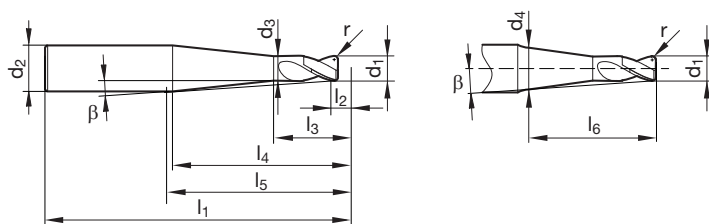
P • **GÜHRING NAVIGATOR**
M • Cutting data page 151
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- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	NH
Shank form	HA



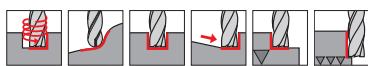
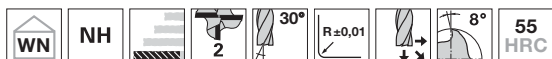
Milling tools



Article no. **6852**

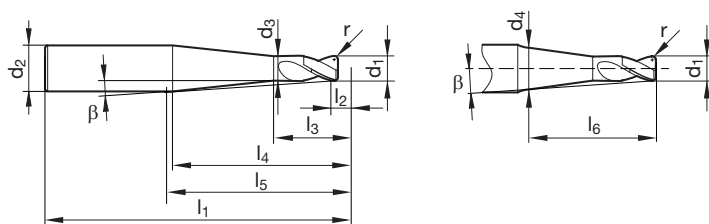
d1 f8	d2 h5	d3	d4	l1	l2	l3	l4	l5	l6	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	1.99	50	1.0	2.5	23.7	22.0	20.0	0.20	1.50	2	6852 1.002
2.00	6.00	1.85	4.04	80	2.0	5.0	43.6	44.0	40.0	0.20	1.50	2	6852 2.002
2.00	6.00	1.85	4.04	80	2.0	5.0	43.6	44.0	40.0	0.50	1.50	2	6852 2.005
3.00	6.00	2.85	5.04	80	3.0	7.5	41.8	44.0	40.0	0.20	1.50	2	6852 3.002
3.00	6.00	2.85	5.04	80	3.0	7.5	41.8	44.0	40.0	0.50	1.50	2	6852 3.005
4.00	6.00	3.80		80	4.0	10.0	40.1	44.0		0.20	1.50	2	6852 4.002
4.00	6.00	3.80		80	4.0	10.0	40.1	44.0		0.50	1.50	2	6852 4.005
6.00	8.00	5.70		90	6.0	15.0	40.1	54.0		0.20	1.50	2	6852 6.002
6.00	8.00	5.70		90	6.0	15.0	40.1	54.0		0.50	1.50	2	6852 6.005
6.00	8.00	5.70		90	6.0	15.0	40.1	54.0		1.00	1.50	2	6852 6.010
8.00	10.00	7.70		100	8.0	20.0	40.1	60.0		0.30	1.50	2	6852 8.003
8.00	10.00	7.70		100	8.0	20.0	40.1	60.0		0.50	1.50	2	6852 8.005
8.00	10.00	7.70		100	8.0	20.0	40.1	60.0		1.00	1.50	2	6852 8.010
10.00	12.00	9.50		120	10.0	25.0	40.1	75.0		0.50	1.50	2	6852 10.005
10.00	12.00	9.50		120	10.0	25.0	40.1	75.0		1.00	1.50	2	6852 10.010
10.00	12.00	9.50		120	10.0	25.0	40.1	75.0		1.50	1.50	2	6852 10.015
10.00	12.00	9.50		120	10.0	25.0	40.1	75.0		2.00	1.50	2	6852 10.020

Torus end mills G-Mold 55 T



- P** • **GÜHRING NAVIGATOR**
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- neck clearance
 - centre cutting

Tool material	Solid carbide
Surface	
Type	NH
Shank form	HA



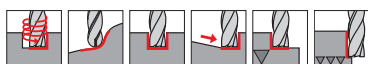
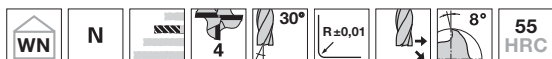
Article no. **6853**

d1 f8	d2 h5	d3	d4	l1	l2	l3	l4	l5	l6	r	β	Z
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	°	
1.00	4.00	0.92	1.65	63	1.0	2.5	24.4	35.0	20.0	0.20	1.00	2
2.00	6.00	1.85	3.35	80	2.0	5.0	44.9	44.0	40.0	0.20	1.00	2
2.00	6.00	1.85	3.35	80	2.0	5.0	44.9	44.0	40.0	0.50	1.00	2
3.00	6.00	2.85	4.35	80	3.0	7.5	43.1	44.0	40.0	0.20	1.00	2
3.00	6.00	2.85	4.35	80	3.0	7.5	43.1	44.0	40.0	0.50	1.00	2
4.00	6.00	3.80	5.35	80	4.0	10.0	41.2	44.0	40.0	0.20	1.00	2
4.00	6.00	3.80	5.35	80	4.0	10.0	41.2	44.0	40.0	0.50	1.00	2
6.00	8.00	5.70	7.70	100	6.0	15.0	50.6	64.0	50.0	0.20	1.00	2
6.00	8.00	5.70	7.70	100	6.0	15.0	50.6	64.0	50.0	0.50	1.00	2
8.00	10.00	7.70		100	8.0	20.0	60.2	60.0		0.50	1.00	2
8.00	10.00	7.70		100	8.0	20.0	60.2	60.0		1.00	1.00	2

Order no.
6853 1.002
6853 2.002
6853 2.005
6853 3.002
6853 3.005
6853 4.002
6853 4.005
6853 6.002
6853 6.005
6853 8.005
6853 8.010



Torus end mills G-Mold 55 T



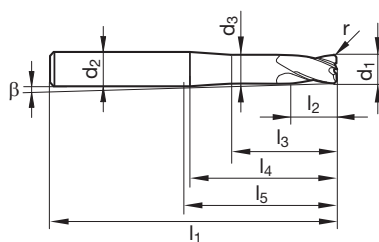
P • **GÜHRING NAVIGATOR**
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H •

- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA



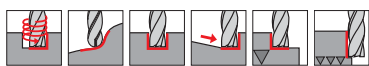
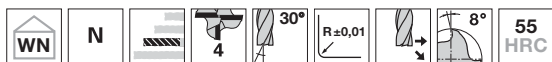
Milling tools



Article no. **6854**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.10	8.80	4	6854 1.001
1.00	4.00	0.92	45	1.0	4.0	9.7	17.0	0.20	8.90	4	6854 1.002
1.50	4.00	1.40	45	1.5	6.0	10.9	17.0	0.20	6.60	4	6854 1.502
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.10	8.30	4	6854 2.001
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.20	8.40	4	6854 2.002
2.00	6.00	1.85	54	2.0	8.0	13.7	18.0	0.50	8.60	4	6854 2.005
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.10	5.30	4	6854 3.001
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.30	5.30	4	6854 3.003
3.00	6.00	2.85	54	3.0	12.0	16.3	18.0	0.50	5.40	4	6854 3.005
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.20	3.40	4	6854 4.002
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.30	3.40	4	6854 4.003
4.00	6.00	3.80	57	4.0	14.0	17.0	21.0	0.50	3.40	4	6854 4.005
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	0.20	1.50	4	6854 5.002
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	0.50	1.50	4	6854 5.005
5.00	6.00	4.80	57	5.0	17.0	18.6	21.0	1.00	1.60	4	6854 5.010
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.20		4	6854 6.002
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.30		4	6854 6.003
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	0.50		4	6854 6.005
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	1.00		4	6854 6.010
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	1.50		4	6854 6.015
6.00	6.00	5.70	57	6.0	20.0	20.6	21.0	2.00		4	6854 6.020
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	0.30		4	6854 8.003
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	0.50		4	6854 8.005
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	1.00		4	6854 8.010
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	1.50		4	6854 8.015
8.00	8.00	7.70	63	8.0	26.0	26.6	27.0	2.00		4	6854 8.020
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	0.30		4	6854 10.003
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	0.50		4	6854 10.005
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	1.00		4	6854 10.010
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	1.50		4	6854 10.015
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	2.00		4	6854 10.020
10.00	10.00	9.50	72	10.0	31.0	31.9	32.0	3.00		4	6854 10.030
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	0.50		4	6854 12.005
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	1.00		4	6854 12.010
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	2.00		4	6854 12.020
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	3.00		4	6854 12.030
12.00	12.00	11.50	83	12.0	37.0	37.9	38.0	4.00		4	6854 12.040

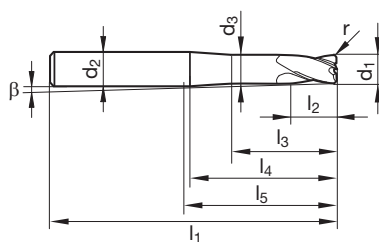
Torus end mills G-Mold 55 T



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- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA

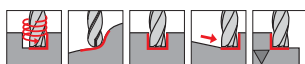


Article no. **6855**

d1 f8	d2 h5	d3	l1	l2	l3	l4	l5	r	β	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	mm	°		
1.00	4.00	0.92	50	1.0	6.5	12.2	20.0	0.10	7.00	4	6855 1.001
1.00	4.00	0.92	50	1.0	6.5	12.2	20.0	0.20	7.10	4	6855 1.002
1.50	4.00	1.40	50	1.5	10.0	14.9	20.0	0.20	4.80	4	6855 1.502
2.00	6.00	1.85	57	2.0	13.0	18.7	17.0	0.10	6.10	4	6855 2.001
2.00	6.00	1.85	57	2.0	13.0	18.7	17.0	0.20	6.10	4	6855 2.002
2.00	6.00	1.85	57	2.0	13.0	18.7	17.0	0.50	6.20	4	6855 2.005
3.00	6.00	2.85	65	3.0	20.0	24.3	25.0	0.10	3.50	4	6855 3.001
3.00	6.00	2.85	65	3.0	20.0	24.3	25.0	0.30	3.50	4	6855 3.003
3.00	6.00	2.85	65	3.0	20.0	24.3	25.0	0.50	3.60	4	6855 3.005
4.00	6.00	3.80	75	4.0	25.0	28.0	35.0	0.20	2.00	4	6855 4.002
4.00	6.00	3.80	75	4.0	25.0	28.0	35.0	0.30	2.00	4	6855 4.003
4.00	6.00	3.80	75	4.0	25.0	28.0	35.0	0.50	2.00	4	6855 4.005
5.00	6.00	4.80	75	5.0	31.0	32.6	35.0	0.20	0.80	4	6855 5.002
5.00	6.00	4.80	75	5.0	31.0	32.6	35.0	0.50	0.90	4	6855 5.005
5.00	6.00	4.80	75	5.0	31.0	32.6	35.0	1.00	0.90	4	6855 5.010
6.00	6.00	5.70	75	6.0	38.0	38.6	35.0	0.20		4	6855 6.002
6.00	6.00	5.70	75	6.0	38.0	38.6	35.0	0.30		4	6855 6.003
6.00	6.00	5.70	75	6.0	38.0	38.6	35.0	0.50		4	6855 6.005
6.00	6.00	5.70	75	6.0	38.0	38.6	35.0	1.00		4	6855 6.010
6.00	6.00	5.70	75	6.0	38.0	38.6	35.0	1.50		4	6855 6.015
6.00	6.00	5.70	75	6.0	38.0	38.6	35.0	2.00		4	6855 6.020
8.00	8.00	7.70	90	8.0	53.0	53.6	50.0	0.30		4	6855 8.003
8.00	8.00	7.70	90	8.0	53.0	53.6	50.0	0.50		4	6855 8.005
8.00	8.00	7.70	90	8.0	53.0	53.6	50.0	1.00		4	6855 8.010
8.00	8.00	7.70	90	8.0	53.0	53.6	50.0	1.50		4	6855 8.015
8.00	8.00	7.70	90	8.0	53.0	53.6	50.0	2.00		4	6855 8.020
10.00	10.00	9.50	100	10.0	59.0	59.9	55.0	0.30		4	6855 10.003
10.00	10.00	9.50	100	10.0	59.0	59.9	55.0	0.50		4	6855 10.005
10.00	10.00	9.50	100	10.0	59.0	59.9	55.0	1.00		4	6855 10.010
10.00	10.00	9.50	100	10.0	59.0	59.9	55.0	1.50		4	6855 10.015
10.00	10.00	9.50	100	10.0	59.0	59.9	55.0	2.00		4	6855 10.020
10.00	10.00	9.50	100	10.0	59.0	59.9	55.0	3.00		4	6855 10.030
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	0.50		4	6855 12.005
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	1.00		4	6855 12.010
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	2.00		4	6855 12.020
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	3.00		4	6855 12.030
12.00	12.00	11.50	120	12.0	74.0	74.9	75.0	4.00		4	6855 12.040



High feed end mills G-Mold 65 HF



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- for high-feed roughing with low ap and maximum fz
- with central internal cooling from Ø 4 mm
- with GühroJet peripheral cooling from Ø 1-3 mm
- neck clearance
- without centre cutting

Tool material **Solid carbide**

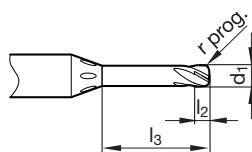
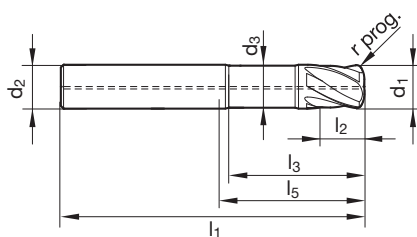
Surface

Type **H**

Shank form **HA**



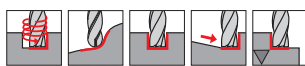
Milling tools



Article no. **6830**

d1 h10	d2 h6	d3	l1	l2	l3	l5	r prog.	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm		
1.00	4.00	0.92	50	0.6	5.0	22.0	0.18	4	6830 1.000
1.50	4.00	1.40	50	1.0	7.5	22.0	0.25	4	6830 1.500
2.00	6.00	1.85	57	1.2	10.0	21.0	0.35	4	6830 2.000
2.50	6.00	2.35	57	1.5	12.5	21.0	0.40	4	6830 2.500
3.00	6.00	2.85	57	2.0	15.0	21.0	0.50	4	6830 3.000
4.00	6.00	3.80	57	3.0	18.0	21.0	0.80	4	6830 4.000
5.00	6.00	4.80	57	4.0	20.0	21.0	0.80	4	6830 5.000
6.00	6.00	5.70	57	5.0	20.0	21.0	1.00	4	6830 6.000
8.00	8.00	7.70	63	6.0	26.0	27.0	1.50	4	6830 8.000
10.00	10.00	9.50	72	8.0	30.0	32.0	2.00	4	6830 10.000
12.00	12.00	11.50	83	10.0	36.0	38.0	2.00	4	6830 12.000
16.00	16.00	15.50	92	12.0	42.0	44.0	2.50	4	6830 16.000

High feed end mills G-Mold 65 HF



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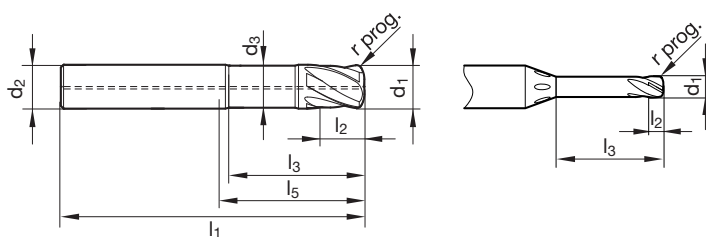
- for high-feed roughing with low ap and maximum fz
- with central internal cooling from Ø 4 mm
- with GühroJet peripheral cooling from Ø 1-3 mm
- neck clearance
- without centre cutting

Tool material **Solid carbide**

Surface

Type H

Shank form ~HA

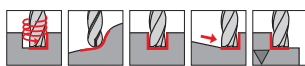


Article no. **6814**

d1 h10	d2 h6	d3	l1	l2	l3	l5	r prog.	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm		
1.00	4.00	0.92	50	0.6	8.0	24.8	0.18	4	6814 1.000
1.50	4.00	1.40	50	1.0	12.0	25.2	0.25	4	6814 1.500
2.00	6.00	1.85	57	1.2	16.0	29.1	0.35	4	6814 2.000
2.50	6.00	2.35	65	1.5	20.0	33.5	0.40	4	6814 2.500
3.00	6.00	2.85	65	2.0	24.0	34.0	0.50	4	6814 3.000
4.00	6.00	3.80	65	3.0	26.0	29.0	0.80	4	6814 4.000
5.00	6.00	4.80	65	4.0	27.0	29.0	0.80	4	6814 5.000
6.00	6.00	5.70	65	5.0	28.0	29.0	1.00	4	6814 6.000
8.00	8.00	7.70	75	6.0	38.0	39.0	1.50	4	6814 8.000
10.00	10.00	9.50	100	8.0	58.0	60.0	2.00	4	6814 10.000
12.00	12.00	11.50	100	10.0	53.0	55.0	2.00	4	6814 12.000
16.00	16.00	15.50	125	12.0	75.0	77.0	2.50	4	6814 16.000



High feed end mills G-Mold 65 HF



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- for high-feed roughing with low ap and maximum fz
- with central internal cooling from Ø 4 mm
- with GühroJet peripheral cooling from Ø 1-3 mm
- neck clearance
- without centre cutting

Tool material **Solid carbide**

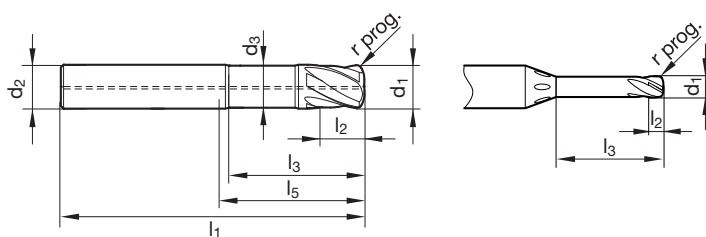
Surface

Type H

Shank form HA



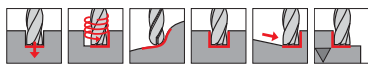
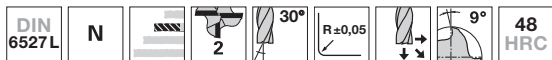
Milling tools



Article no. **6831**

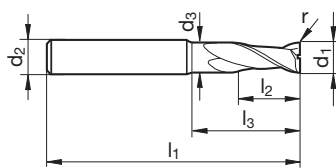
d1 h10	d2 h6	d3	l1	l2	l3	l5	r prog.	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm		
1.00	4.00	0.92	50	0.6	10.0	22.0	0.18	4	6831 1.000
1.50	4.00	1.40	50	1.0	15.0	22.0	0.25	4	6831 1.500
2.00	6.00	1.85	65	1.2	20.0	29.0	0.35	4	6831 2.000
2.50	6.00	2.35	65	1.5	25.0	29.0	0.40	4	6831 2.500
3.00	6.00	2.85	80	2.0	30.0	44.0	0.50	4	6831 3.000
4.00	6.00	3.80	80	3.0	32.0	44.0	0.80	4	6831 4.000
5.00	6.00	4.80	80	4.0	40.0	44.0	0.80	4	6831 5.000
6.00	6.00	5.70	80	5.0	43.0	44.0	1.00	4	6831 6.000
8.00	8.00	7.70	100	6.0	63.0	64.0	1.50	4	6831 8.000
10.00	10.00	9.50	120	8.0	78.0	80.0	2.00	4	6831 10.000
12.00	12.00	11.50	120	10.0	73.0	75.0	2.00	4	6831 12.000
16.00	16.00	15.50	150	12.0	100.0	102.0	2.50	4	6831 16.000

Slot drills with corner radius (2-fluted)



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H • neck clearance
 • centre cutting

Tool material	Solid carbide
Surface	F
Type	N
Shank form	HA

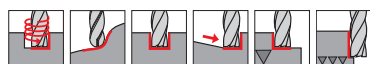
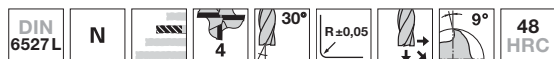


Article no. **3561**

d1 f9	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
1.00	4.00	0.92	50	2.0	6.0	0.10	2	3561 1.001
1.50	4.00	1.40	50	3.0	9.0	0.20	2	3561 1.502
2.00	6.00	1.85	57	6.0	12.0	0.20	2	3561 2.002
2.00	6.00	1.85	57	6.0	12.0	0.50	2	3561 2.005
3.00	6.00	2.85	57	7.0	14.0	0.20	2	3561 3.002
3.00	6.00	2.85	57	7.0	14.0	0.50	2	3561 3.005
4.00	6.00	3.80	57	8.0	16.0	0.20	2	3561 4.002
4.00	6.00	3.80	57	8.0	16.0	0.50	2	3561 4.005
5.00	6.00	4.80	57	10.0	18.0	0.20	2	3561 5.002
6.00	6.00	5.70	57	10.0	20.0	0.50	2	3561 6.005
6.00	6.00	5.70	57	10.0	20.0	1.00	2	3561 6.010
8.00	8.00	7.70	63	16.0	26.0	0.50	2	3561 8.005
8.00	8.00	7.70	63	16.0	26.0	1.00	2	3561 8.010
8.00	8.00	7.70	63	16.0	26.0	1.50	2	3561 8.015
8.00	8.00	7.70	63	16.0	26.0	2.00	2	3561 8.020
10.00	10.00	9.50	72	19.0	30.0	0.50	2	3561 10.005
10.00	10.00	9.50	72	19.0	30.0	1.00	2	3561 10.010
10.00	10.00	9.50	72	19.0	30.0	1.50	2	3561 10.015
10.00	10.00	9.50	72	19.0	30.0	2.00	2	3561 10.020
12.00	12.00	11.50	83	22.0	36.0	0.50	2	3561 12.005
12.00	12.00	11.50	83	22.0	36.0	1.00	2	3561 12.010
12.00	12.00	11.50	83	22.0	36.0	1.50	2	3561 12.015
12.00	12.00	11.50	83	22.0	36.0	2.00	2	3561 12.020
16.00	16.00	15.50	92	26.0	42.0	1.00	2	3561 16.010
16.00	16.00	15.50	92	26.0	42.0	1.50	2	3561 16.015
16.00	16.00	15.50	92	26.0	42.0	2.00	2	3561 16.020
20.00	20.00	19.50	104	32.0	52.0	1.00	2	3561 20.010
20.00	20.00	19.50	104	32.0	52.0	1.50	2	3561 20.015
20.00	20.00	19.50	104	32.0	52.0	2.00	2	3561 20.020



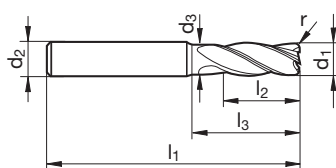
End mills with corner radius (4-fluted)



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- neck clearance
- centre cutting

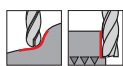
Tool material	Solid carbide
Surface	Ⓡ
Type	N
Shank form	HA



Article no. **3562**

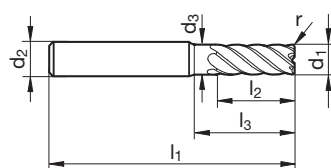
d1 f9	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
1.00	4.00	0.92	50	3.0	6.0	0.10	4	3562 1.001
1.50	4.00	1.40	50	4.0	9.0	0.20	4	3562 1.502
2.00	6.00	1.85	57	7.0	12.0	0.20	4	3562 2.002
2.00	6.00	1.85	57	7.0	12.0	0.50	4	3562 2.005
3.00	6.00	2.85	57	8.0	14.0	0.20	4	3562 3.002
3.00	6.00	2.85	57	8.0	14.0	0.50	4	3562 3.005
4.00	6.00	3.80	57	11.0	16.0	0.20	4	3562 4.002
4.00	6.00	3.80	57	11.0	16.0	0.50	4	3562 4.005
5.00	6.00	4.80	57	13.0	18.0	0.20	4	3562 5.002
6.00	6.00	5.70	57	13.0	20.0	0.50	4	3562 6.005
6.00	6.00	5.70	57	13.0	20.0	1.00	4	3562 6.010
8.00	8.00	7.70	63	19.0	26.0	0.50	4	3562 8.005
8.00	8.00	7.70	63	19.0	26.0	1.00	4	3562 8.010
8.00	8.00	7.70	63	19.0	26.0	1.50	4	3562 8.015
8.00	8.00	7.70	63	19.0	26.0	2.00	4	3562 8.020
10.00	10.00	9.50	72	22.0	30.0	0.50	4	3562 10.005
10.00	10.00	9.50	72	22.0	30.0	0.80	4	3562 10.008
10.00	10.00	9.50	72	22.0	30.0	1.00	4	3562 10.010
10.00	10.00	9.50	72	22.0	30.0	1.50	4	3562 10.015
10.00	10.00	9.50	72	22.0	30.0	2.00	4	3562 10.020
12.00	12.00	11.50	83	26.0	36.0	0.50	4	3562 12.005
12.00	12.00	11.50	83	26.0	36.0	0.80	4	3562 12.008
12.00	12.00	11.50	83	26.0	36.0	1.00	4	3562 12.010
12.00	12.00	11.50	83	26.0	36.0	1.50	4	3562 12.015
12.00	12.00	11.50	83	26.0	36.0	2.00	4	3562 12.020
16.00	16.00	15.50	92	32.0	42.0	1.00	4	3562 16.010
16.00	16.00	15.50	92	32.0	42.0	1.50	4	3562 16.015
16.00	16.00	15.50	92	32.0	42.0	2.00	4	3562 16.020
20.00	20.00	19.50	104	38.0	52.0	1.00	4	3562 20.010
20.00	20.00	19.50	104	38.0	52.0	1.50	4	3562 20.015
20.00	20.00	19.50	104	38.0	52.0	2.00	4	3562 20.020

Multi-tooth end mills with corner radius GH 100 U



P • **GÜHRING NAVIGATOR**
M • Cutting data page 159
K •
N •
S •
H ○ • neck clearance
 • without centre cutting

Tool material	Solid carbide
Surface	F
Type	NH
Shank form	HA

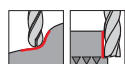


Article no. **3563**

d1 f9	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
3.00	6.00	2.85	57	8.0	14.0	0.20	6	3563 3.002
3.00	6.00	2.85	57	8.0	14.0	0.50	6	3563 3.005
4.00	6.00	3.80	57	11.0	16.0	0.20	6	3563 4.002
4.00	6.00	3.80	57	11.0	16.0	0.50	6	3563 4.005
5.00	6.00	4.80	57	13.0	18.0	0.20	6	3563 5.002
5.00	6.00	4.80	57	13.0	18.0	0.50	6	3563 5.005
6.00	6.00	5.70	57	13.0	20.0	0.20	6	3563 6.002
6.00	6.00	5.70	57	13.0	20.0	0.50	6	3563 6.005
6.00	6.00	5.70	57	13.0	20.0	1.00	6	3563 6.010
8.00	8.00	7.70	63	19.0	26.0	0.30	6	3563 8.003
8.00	8.00	7.70	63	19.0	26.0	0.50	6	3563 8.005
8.00	8.00	7.70	63	19.0	26.0	1.00	6	3563 8.010
8.00	8.00	7.70	63	19.0	26.0	1.50	6	3563 8.015
8.00	8.00	7.70	63	19.0	26.0	2.00	6	3563 8.020
10.00	10.00	9.50	72	22.0	30.0	0.30	6	3563 10.003
10.00	10.00	9.50	72	22.0	30.0	0.50	6	3563 10.005
10.00	10.00	9.50	72	22.0	30.0	1.00	6	3563 10.010
10.00	10.00	9.50	72	22.0	30.0	1.50	6	3563 10.015
10.00	10.00	9.50	72	22.0	30.0	2.00	6	3563 10.020
12.00	12.00	11.50	83	26.0	36.0	0.50	6	3563 12.005
12.00	12.00	11.50	83	26.0	36.0	1.00	6	3563 12.010
12.00	12.00	11.50	83	26.0	36.0	1.50	6	3563 12.015
12.00	12.00	11.50	83	26.0	36.0	2.00	6	3563 12.020
16.00	16.00	15.50	92	32.0	42.0	0.50	6	3563 16.005
16.00	16.00	15.50	92	32.0	42.0	1.00	6	3563 16.010
16.00	16.00	15.50	92	32.0	42.0	1.50	6	3563 16.015
16.00	16.00	15.50	92	32.0	42.0	2.00	6	3563 16.020
20.00	20.00	19.50	104	38.0	52.0	0.50	6	3563 20.005
20.00	20.00	19.50	104	38.0	52.0	1.00	6	3563 20.010
20.00	20.00	19.50	104	38.0	52.0	1.50	6	3563 20.015
20.00	20.00	19.50	104	38.0	52.0	2.00	6	3563 20.020



Multi-tooth end mills GH 100 U



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- Raptor coating
- neck clearance
- without centre cutting

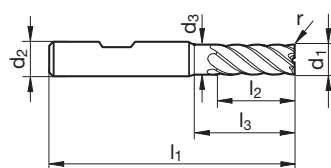
Tool material **Solid carbide**

Surface **(R)**

Type **NH**

Shank form **HB**

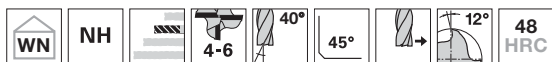
Milling tools



Article no. **6969**

d1 f9	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
6.00	6.00	5.70	57	13.0	20.0	0.50	6	6969 6.005
6.00	6.00	5.70	57	13.0	20.0	1.00	6	6969 6.010
8.00	8.00	7.70	63	19.0	26.0	0.50	6	6969 8.005
8.00	8.00	7.70	63	19.0	26.0	1.00	6	6969 8.010
8.00	8.00	7.70	63	19.0	26.0	1.50	6	6969 8.015
8.00	8.00	7.70	63	19.0	26.0	2.00	6	6969 8.020
10.00	10.00	9.50	72	22.0	30.0	0.50	6	6969 10.005
10.00	10.00	9.50	72	22.0	30.0	1.00	6	6969 10.010
10.00	10.00	9.50	72	22.0	30.0	1.50	6	6969 10.015
10.00	10.00	9.50	72	22.0	30.0	2.00	6	6969 10.020
12.00	12.00	11.50	83	26.0	36.0	0.50	6	6969 12.005
12.00	12.00	11.50	83	26.0	36.0	1.00	6	6969 12.010
12.00	12.00	11.50	83	26.0	36.0	1.50	6	6969 12.015
12.00	12.00	11.50	83	26.0	36.0	2.00	6	6969 12.020
16.00	16.00	15.50	92	32.0	42.0	0.50	6	6969 16.005
16.00	16.00	15.50	92	32.0	42.0	1.00	6	6969 16.010
16.00	16.00	15.50	92	32.0	42.0	1.50	6	6969 16.015
16.00	16.00	15.50	92	32.0	42.0	2.00	6	6969 16.020
20.00	20.00	19.50	104	38.0	52.0	0.50	6	6969 20.005
20.00	20.00	19.50	104	38.0	52.0	1.00	6	6969 20.010
20.00	20.00	19.50	104	38.0	52.0	1.50	6	6969 20.015
20.00	20.00	19.50	104	38.0	52.0	2.00	6	6969 20.020

Finishing end mills G-Mold μ 48 F



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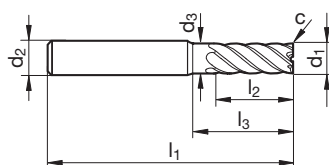
- restricted tolerances for maximum component accuracy
- max. taper 0.005 mm
- neck clearance
- \varnothing 3-8 mm with centre cutting
- \varnothing 10-20 mm without centre cutting

Tool material **Solid carbide**

Surface

Type NH

Shank form HA



Article no. **6825**

d1 f8	d2 h5	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.85	57	8.0	15.0	0.06	4	6825 3.000
4.00	6.00	3.80	57	11.0	18.0	0.08	4	6825 4.000
5.00	6.00	4.80	57	13.0	18.0	0.10	4	6825 5.000
6.00	6.00	5.70	57	13.0	20.0	0.12	4	6825 6.000
8.00	8.00	7.70	63	19.0	26.0	0.08	6	6825 8.000
10.00	10.00	9.50	72	22.0	30.0	0.10	6	6825 10.000
12.00	12.00	11.50	83	26.0	36.0	0.12	6	6825 12.000
16.00	16.00	15.50	92	32.0	42.0	0.16	6	6825 16.000
20.00	20.00	19.50	104	38.0	52.0	0.20	6	6825 20.000

Finishing end mills G-Mold μ 48 F
P • **GÜHRING NAVIGATOR**
M • Cutting data page 159

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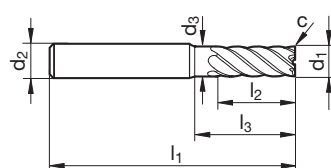
- restricted tolerances for maximum component accuracy
- max. taper 0.005 mm
- neck clearance
- \varnothing 3-8 mm with centre cutting
- \varnothing 10-20 mm without centre cutting

Tool material **Solid carbide**

Surface

Type NH

Shank form HA

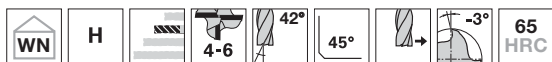


Article no.

6826

d1 f8	d2 h5	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.85	65	12.0	24.0	0.06	4	6826 3.000
4.00	6.00	3.80	65	16.0	26.0	0.08	4	6826 4.000
5.00	6.00	4.80	65	18.0	26.0	0.10	4	6826 5.000
6.00	6.00	5.70	65	21.0	28.0	0.12	4	6826 6.000
8.00	8.00	7.70	75	26.0	38.0	0.08	6	6826 8.000
10.00	10.00	9.50	80	30.0	38.0	0.10	6	6826 10.000
12.00	12.00	11.50	93	36.0	46.0	0.12	6	6826 12.000
16.00	16.00	15.50	108	48.0	58.0	0.16	6	6826 16.000
20.00	20.00	19.50	126	60.0	74.0	0.20	6	6826 20.000

Finishing end mills G-Mold μ 65 F



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GÜHRING NAVIGATOR

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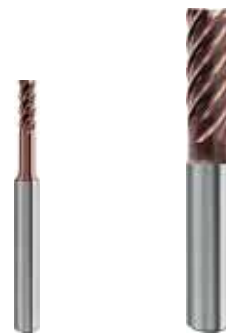
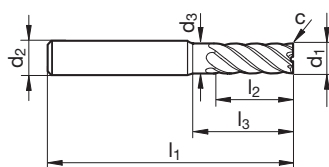
- restricted tolerances for maximum component accuracy
- max. taper 0.005 mm
- neck clearance
- \varnothing 3-8 mm with centre cutting
- \varnothing 10-20 mm without centre cutting

Tool material **Solid carbide**

Surface

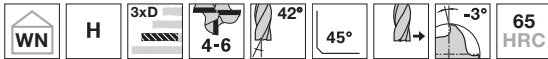
Type H

Shank form HA



Article no. **6827**

d1 f8	d2	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.85	57	8.0	15.0	0.06	4	6827 3.000
4.00	6.00	3.80	57	11.0	18.0	0.08	4	6827 4.000
5.00	6.00	4.80	57	13.0	18.0	0.10	4	6827 5.000
6.00	6.00	5.70	57	13.0	20.0	0.12	4	6827 6.000
8.00	8.00	7.70	63	19.0	26.0	0.08	6	6827 8.000
10.00	10.00	9.50	72	22.0	30.0	0.10	6	6827 10.000
12.00	12.00	11.50	83	26.0	36.0	0.12	6	6827 12.000
16.00	16.00	15.50	92	32.0	42.0	0.16	6	6827 16.000
20.00	20.00	19.50	104	38.0	52.0	0.20	6	6827 20.000

Finishing end mills G-Mold μ 65 F

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H	●

GÜHRING NAVIGATOR

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- restricted tolerances for maximum component accuracy
- max. taper 0.005 mm
- neck clearance
- \varnothing 3-8 mm with centre cutting
- \varnothing 10-20 mm without centre cutting

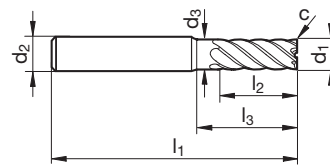
Tool material **Solid carbide**

Surface

Type H

Shank form HA

Milling tools

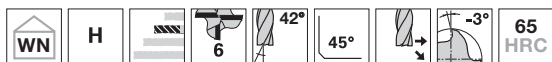


Article no.

6828

d1 f8	d2	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.85	65	12.0	24.0	0.06	4	6828 3.000
4.00	6.00	3.80	65	16.0	26.0	0.08	4	6828 4.000
5.00	6.00	4.80	65	18.0	26.0	0.10	4	6828 5.000
6.00	6.00	5.70	65	21.0	28.0	0.12	4	6828 6.000
8.00	8.00	7.70	75	26.0	38.0	0.08	6	6828 8.000
10.00	10.00	9.50	80	30.0	38.0	0.10	6	6828 10.000
12.00	12.00	11.50	93	36.0	46.0	0.12	6	6828 12.000
16.00	16.00	15.50	108	48.0	58.0	0.16	6	6828 16.000
20.00	20.00	19.50	126	60.0	74.0	0.20	6	6828 20.000

Finishing end mills G-Mold 65 F



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S	○
H	●

GÜHRING NAVIGATOR

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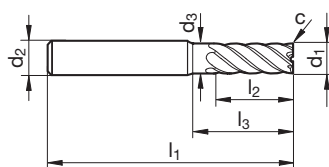
- without centre cutting
- neck clearance

Tool material **Solid carbide**

Surface **Y**

Type **H**

Shank form **HA**



Article no. **6945**

d1 f8	d2 h5	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.85	57	8.0	12.0	0.03	6	6945 3.000
4.00	6.00	3.80	57	11.0	15.0	0.04	6	6945 4.000
5.00	6.00	4.80	57	13.0	18.0	0.05	6	6945 5.000
6.00	6.00	5.70	57	13.0	20.0	0.06	6	6945 6.000
8.00	8.00	7.70	63	19.0	26.0	0.08	6	6945 8.000
10.00	10.00	9.50	72	22.0	31.0	0.10	6	6945 10.000
12.00	12.00	11.50	83	26.0	37.0	0.12	6	6945 12.000
14.00	14.00	13.50	83	26.0	37.0	0.14	6	6945 14.000
16.00	16.00	15.50	92	32.0	43.0	0.16	6	6945 16.000
20.00	20.00	19.50	104	38.0	53.0	0.20	6	6945 20.000



Finishing end mills G-Mold 65 F

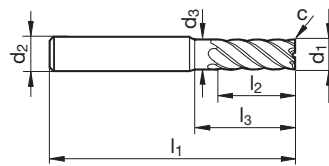


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K	●
N	○
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GÜHRING NAVIGATOR

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- without centre cutting
- neck clearance

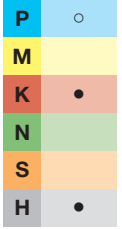
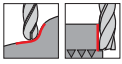
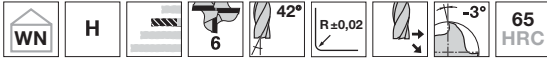
Tool material **Solid carbide**Surface **Y**Type **H**Shank form **HA****NEW**

Article no.

6946

d1 f8	d2 h5	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.85	65	11.0	21.0	0.03	6	6946 3.000
4.00	6.00	3.80	65	14.0	26.0	0.04	6	6946 4.000
5.00	6.00	4.80	75	17.0	32.0	0.05	6	6946 5.000
6.00	6.00	5.70	75	20.0	38.0	0.06	6	6946 6.000
8.00	8.00	7.70	90	28.0	53.0	0.08	6	6946 8.000
10.00	10.00	9.50	100	31.0	59.0	0.10	6	6946 10.000
12.00	12.00	11.50	114	36.0	68.0	0.12	6	6946 12.000
14.00	14.00	13.50	100	42.0	54.0	0.14	6	6946 14.000
16.00	16.00	15.50	125	52.0	76.0	0.16	6	6946 16.000
20.00	20.00	19.50	150	62.0	100.0	0.20	6	6946 20.000

Finishing end mills with corner radius G-Mold 65 FR



GÜHRING NAVIGATOR

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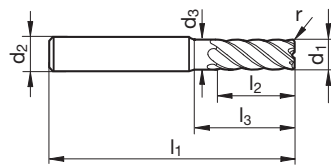
- without centre cutting
- neck clearance

Tool material **Solid carbide**

Surface **Y**

Type **H**

Shank form **HA**

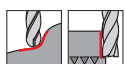


Article no. **6947**

d1 f8	d2 h5	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
3.00	6.00	2.85	57	8.0	12.0	0.10	6	6947 3.001
3.00	6.00	2.85	57	8.0	12.0	0.30	6	6947 3.003
3.00	6.00	2.85	57	8.0	12.0	0.50	6	6947 3.005
4.00	6.00	3.80	57	11.0	15.0	0.20	6	6947 4.002
4.00	6.00	3.80	57	11.0	15.0	0.50	6	6947 4.005
5.00	6.00	4.80	57	13.0	18.0	0.20	6	6947 5.002
5.00	6.00	4.80	57	13.0	18.0	0.50	6	6947 5.005
6.00	6.00	5.70	57	13.0	20.0	0.20	6	6947 6.002
6.00	6.00	5.70	57	13.0	20.0	0.50	6	6947 6.005
6.00	6.00	5.70	57	13.0	20.0	1.00	6	6947 6.010
8.00	8.00	7.70	63	19.0	26.0	0.30	6	6947 8.003
8.00	8.00	7.70	63	19.0	26.0	0.50	6	6947 8.005
8.00	8.00	7.70	63	19.0	26.0	1.00	6	6947 8.010
10.00	10.00	9.50	72	22.0	31.0	0.30	6	6947 10.003
10.00	10.00	9.50	72	22.0	31.0	0.50	6	6947 10.005
10.00	10.00	9.50	72	22.0	31.0	1.00	6	6947 10.010
10.00	10.00	9.50	72	22.0	31.0	1.50	6	6947 10.015
12.00	12.00	11.50	83	26.0	37.0	0.50	6	6947 12.005
12.00	12.00	11.50	83	26.0	37.0	1.00	6	6947 12.010
12.00	12.00	11.50	83	26.0	37.0	1.50	6	6947 12.015
16.00	16.00	15.50	92	32.0	43.0	0.50	6	6947 16.005
16.00	16.00	15.50	92	32.0	43.0	1.00	6	6947 16.010
16.00	16.00	15.50	92	32.0	43.0	2.00	6	6947 16.020



Finishing end mills with corner radius G-Mold 65 FR



P **GÜHRING NAVIGATOR**

Cutting data page 159

P	○
M	□
K	●
N	□
S	□
H	●

- without centre cutting
- neck clearance

Tool material **Solid carbide**

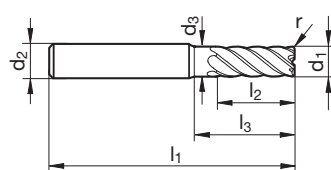
Surface **Y**

Type **H**

Shank form **HA**



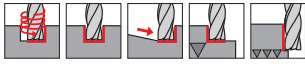
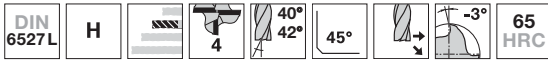
Milling tools



Article no. **6948**

d1 f8	d2 h5	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
3.00	6.00	2.85	75	8.0	25.0	0.20	6	6948 3.002
4.00	6.00	3.80	75	11.0	30.0	0.20	6	6948 4.002
5.00	6.00	4.80	75	13.0	35.0	0.20	6	6948 5.002
6.00	6.00	5.70	80	13.0	42.0	0.50	6	6948 6.005
8.00	8.00	7.70	100	19.0	62.0	0.50	6	6948 8.005
10.00	10.00	9.50	120	22.0	78.0	0.50	6	6948 10.005
12.00	12.00	11.50	150	26.0	101.0	1.00	6	6948 12.010
16.00	16.00	15.50	150	32.0	101.0	1.00	6	6948 16.010

Ratio end mills G-Mold 65 U



P	○
M	○
K	●
N	○
S	○
H	●

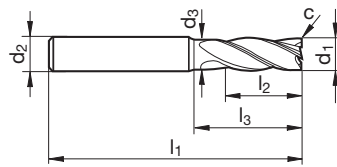
GÜHRING NAVIGATOR

Cutting data page 157

- slotting up to max. 65 HRC
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface	Y	Y
Type	H	H
Shank form	HA	HB



Article no. **6943** **6944**

d1 f9	d2 h5	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
3.00	6.00	2.85	57	8.0	12.0	0.06	4
4.00	6.00	3.80	57	11.0	15.0	0.08	4
5.00	6.00	4.80	57	13.0	18.0	0.10	4
6.00	6.00	5.70	57	13.0	20.0	0.12	4
8.00	8.00	7.70	63	19.0	26.0	0.16	4
10.00	10.00	9.50	72	22.0	31.0	0.20	4
12.00	12.00	11.50	83	26.0	37.0	0.24	4
16.00	16.00	15.50	92	32.0	43.0	0.32	4
20.00	20.00	19.50	104	38.0	53.0	0.40	4

Order no.	
6943 3.000	6944 3.000
6943 4.000	6944 4.000
6943 5.000	6944 5.000
6943 6.000	6944 6.000
6943 8.000	6944 8.000
6943 10.000	6944 10.000
6943 12.000	6944 12.000
6943 16.000	6944 16.000
6943 20.000	6944 20.000

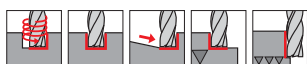
G-Mold μ

*from \varnothing 0.2 - 3 mm
with GühroJet
peripheral cooling*

- + increased service life and process reliability thanks to GühroJet*
- + large selection of full and corner radii as well as corner chamfers in up to 5 different lengths*
- + top surfaces and accuracies thanks to tight tolerances and precise concentricity*



Micro-precision milling cutters MicroMill μ 55



P • **GÜHRING NAVIGATOR**

M • Cutting data page 157

K •

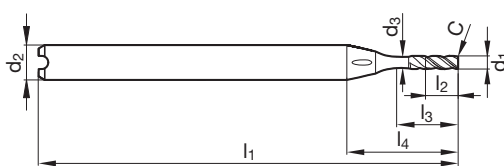
N ○

S •

H •

- High-precision micro-precision milling cutters with 3 different ranges I3
- with internal cooling: GühroJet peripheral cooling with 6 or 4 exits
- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	
Type	N
Shank form	HA



Article no. **6829**

d1 -0,008	d2 h5	d3	l1	l2	l3	l4	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm x 45°		
0.20	4.00	0.18	45	0.20	0.40	9.1	0.00	3	6829 0.201
0.20	4.00	0.18	45	0.20	0.75	9.5	0.00	3	6829 0.202
0.20	4.00	0.18	45	0.20	1.00	9.7	0.00	3	6829 0.203
0.25	4.00	0.23	45	0.25	0.50	9.0	0.00	3	6829 0.251
0.25	4.00	0.23	45	0.25	0.90	9.4	0.00	3	6829 0.252
0.25	4.00	0.23	45	0.25	1.25	9.7	0.00	3	6829 0.253
0.30	4.00	0.28	45	0.30	0.60	9.0	0.00	3	6829 0.301
0.30	4.00	0.28	45	0.30	1.10	9.5	0.00	3	6829 0.302
0.30	4.00	0.28	45	0.30	1.50	9.9	0.00	3	6829 0.303
0.40	4.00	0.38	45	0.40	0.80	8.9	0.01	4	6829 0.401
0.40	4.00	0.38	45	0.40	1.40	9.5	0.01	4	6829 0.402
0.40	4.00	0.38	45	0.40	2.00	10.1	0.01	4	6829 0.403
0.50	4.00	0.45	45	0.50	1.00	9.0	0.01	4	6829 0.501
0.50	4.00	0.45	45	0.50	1.80	9.8	0.01	4	6829 0.502
0.50	4.00	0.45	45	0.50	2.50	10.5	0.01	4	6829 0.503
0.60	4.00	0.55	45	0.60	1.20	8.9	0.01	4	6829 0.601
0.60	4.00	0.55	45	0.60	2.10	9.8	0.01	4	6829 0.602
0.60	4.00	0.55	45	0.60	3.00	10.7	0.01	4	6829 0.603
0.80	4.00	0.75	45	0.80	1.60	8.7	0.01	4	6829 0.801
0.80	4.00	0.75	45	0.80	2.80	9.9	0.01	4	6829 0.802
0.80	4.00	0.75	45	0.80	4.00	11.1	0.01	4	6829 0.803
1.00	4.00	0.92	45	1.00	2.00	8.7	0.02	4	6829 1.001
1.00	4.00	0.92	45	1.00	3.50	10.2	0.02	4	6829 1.002
1.00	4.00	0.92	45	1.00	5.00	11.7	0.02	4	6829 1.003
1.20	4.00	1.12	50	1.20	2.40	8.7	0.01	4	6829 1.201
1.20	4.00	1.12	50	1.20	4.20	10.5	0.01	4	6829 1.202
1.20	4.00	1.12	50	1.20	6.00	12.3	0.01	4	6829 1.203
1.50	4.00	1.40	50	1.50	3.00	8.6	0.01	4	6829 1.501
1.50	4.00	1.40	50	1.50	5.50	11.1	0.01	4	6829 1.502
1.50	4.00	1.40	50	1.50	7.50	13.1	0.01	4	6829 1.503
1.80	4.00	1.70	50	1.80	3.60	8.5	0.01	4	6829 1.801
1.80	4.00	1.70	50	1.80	6.50	11.4	0.01	4	6829 1.802
1.80	4.00	1.70	50	1.80	9.00	13.9	0.01	4	6829 1.803
2.00	6.00	1.85	50	2.00	4.00	13.2	0.02	4	6829 2.001
2.00	6.00	1.85	57	2.00	7.50	16.7	0.02	4	6829 2.002
2.00	6.00	1.85	57	2.00	10.00	19.2	0.02	4	6829 2.003



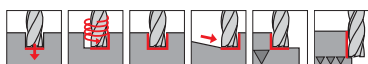
Article no.

6829

d1 -0,008	d2 h5	d3	l1	l2	l3	l4	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm x 45°		
2.20	6.00	2.05	50	2.20	4.40	13.2	0.02	4	6829 2.201
2.20	6.00	2.05	57	2.20	8.00	16.8	0.02	4	6829 2.202
2.20	6.00	2.05	57	2.20	11.00	19.8	0.02	4	6829 2.203
2.50	6.00	2.35	50	2.50	5.00	13.1	0.02	4	6829 2.501
2.50	6.00	2.35	57	2.50	9.00	17.1	0.02	4	6829 2.502
2.50	6.00	2.35	57	2.50	12.50	20.6	0.02	4	6829 2.503
3.00	6.00	2.85	50	3.00	6.00	12.9	0.03	4	6829 3.001
3.00	6.00	2.85	57	3.00	11.00	17.9	0.03	4	6829 3.002
3.00	6.00	2.85	57	3.00	15.00	21.9	0.03	4	6829 3.003

Milling tools

Ratio end mills RF 100 Microdiver



P • **GÜHRING NAVIGATOR**

M • Cutting data page 162-163

K •

N •

S •

H ○

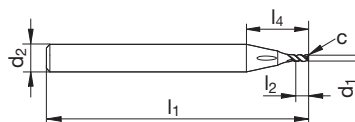
- for extreme cutting values and cutting performance
- with internal cooling: GühroJet peripheral cooling with 6 or 4 exits
- centre cutting
- with special drill face

Tool material **Solid carbide**

Surface **X**

Type **NH**

Shank form **cyl.**

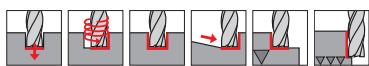
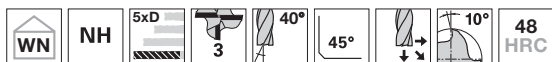


Article no. **6808**

d1 h8	d2 h5	l1	l2	l4	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
0.790	4.00	38	1.9	9.5	0.01	3	6808 0.790
0.800	4.00	38	2.0	9.5	0.01	3	6808 0.800
1.000	4.00	38	2.5	9.3	0.02	3	6808 1.000
1.190	4.00	38	2.9	9.4	0.02	3	6808 1.190
1.200	4.00	38	3.0	9.4	0.02	3	6808 1.200
1.500	4.00	45	3.7	9.7	0.03	3	6808 1.500
1.590	4.00	44	3.9	9.9	0.03	3	6808 1.590
1.800	4.00	45	4.5	10.2	0.03	3	6808 1.800
1.980	6.00	50	4.9	14.7	0.04	3	6808 1.980
2.000	6.00	50	5.0	14.6	0.04	3	6808 2.000
2.200	6.00	50	5.5	14.9	0.04	3	6808 2.200
2.380	6.00	50	5.9	15.2	0.04	3	6808 2.380
2.500	6.00	50	6.2	15.3	0.05	3	6808 2.500
2.780	6.00	50	6.9	15.8	0.05	3	6808 2.780
2.800	6.00	50	7.0	15.9	0.05	3	6808 2.800
3.000	6.00	50	7.5	16.2	0.06	3	6808 3.000
3.175	6.00	50	7.9	17.0	0.06	3	6808 3.175



Ratio end mills RF 100 Microdiver



P • **GÜHRING NAVIGATOR**

M • Cutting data page 164-165

K •

N •

S •

H ○

- for extreme cutting values and cutting performance
- with internal cooling: GühroJet peripheral cooling with 6 or 4 exits
- centre cutting
- with special drill face

Tool material **Solid carbide**

Surface **X**

Type **NH**

Shank form **cyl.**

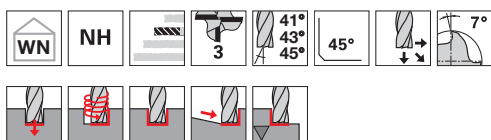
Milling tools



Article no. **6809**

d1 h8	d2 h5	l1	l2	l4	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
1.000	4.00	45	5.0	11.8	0.02	3	6809 1.000
1.190	4.00	50	5.9	12.4	0.02	3	6809 1.190
1.500	4.00	50	7.5	13.5	0.03	3	6809 1.500
1.590	4.00	50	7.9	13.9	0.03	3	6809 1.590
1.980	6.00	57	9.9	19.6	0.04	3	6809 1.980
2.000	6.00	57	10.0	19.6	0.04	3	6809 2.000
2.380	6.00	57	11.9	21.1	0.04	3	6809 2.380
2.500	6.00	57	12.5	21.5	0.05	3	6809 2.500
2.780	6.00	57	13.9	22.8	0.05	3	6809 2.780
3.000	6.00	57	15.0	23.7	0.06	3	6809 3.000
3.175	6.00	57	15.8	25.0	0.06	3	6809 3.175

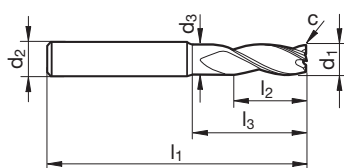
Ratio end mills RF 100 Diver (3-fluted)



P • **GÜHRING NAVIGATOR**
M • Cutting data page 154
K •
N •
S •
H •

- neck clearance
- centre cutting
- with special drill face

Tool material	Solid carbide	
Surface	Y	Y
Type	NH	NH
Shank form	HA	HB

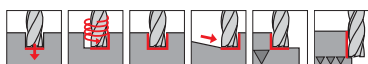


Article no. **6797** **6798**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.80	57	8.0	15.0	0.05	3	6797 3.000 6798 3.000
3.50	6.00	3.30	57	10.0	15.0	0.05	3	6797 3.500 6798 3.500
3.70	6.00	3.50	57	11.0	15.0	0.06	3	6797 3.700 6798 3.700
4.00	6.00	3.80	57	11.0	18.0	0.06	3	6797 4.000 6798 4.000
4.50	6.00	4.30	57	11.0	18.0	0.07	3	6797 4.500 6798 4.500
4.70	6.00	4.50	57	13.0	18.0	0.07	3	6797 4.700 6798 4.700
5.00	6.00	4.80	57	13.0	18.0	0.08	3	6797 5.000 6798 5.000
5.50	6.00	5.30	57	13.0	19.4	0.08	3	6797 5.500 6798 5.500
5.70	6.00	5.50	57	13.0	19.6	0.09	3	6797 5.700 6798 5.700
6.00	6.00	5.70	57	13.0	20.0	0.09	3	6797 6.000 6798 6.000
6.50	8.00	6.20	63	16.0	24.4	0.10	3	6797 6.500 6798 6.500
7.00	8.00	6.70	63	16.0	24.9	0.11	3	6797 7.000 6798 7.000
7.50	8.00	7.20	63	19.0	25.3	0.11	3	6797 7.500 6798 7.500
8.00	8.00	7.70	63	19.0	26.0	0.12	3	6797 8.000 6798 8.000
8.50	10.00	8.20	72	19.0	29.4	0.13	3	6797 8.500 6798 8.500
9.00	10.00	8.70	72	19.0	29.9	0.14	3	6797 9.000 6798 9.000
9.50	10.00	9.20	72	22.0	30.3	0.14	3	6797 9.500 6798 9.500
10.00	10.00	9.50	72	22.0	30.0	0.15	3	6797 10.000 6798 10.000
12.00	12.00	11.50	83	26.0	36.0	0.18	3	6797 12.000 6798 12.000
16.00	16.00	15.50	92	32.0	42.0	0.19	3	6797 16.000 6798 16.000
20.00	20.00	19.50	104	38.0	52.0	0.24	3	6797 20.000 6798 20.000



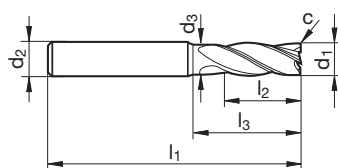
Ratio end mills RF 100 Diver



P • **GÜHRING NAVIGATOR**
M • Cutting data page 154
K •
N •
S •
H ○ • neck clearance
 • centre cutting

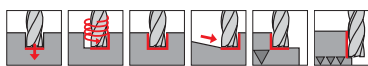
Tool material	Solid carbide	
Surface	Y	Y
Type	N	N
Shank form	HA	HB

Milling tools



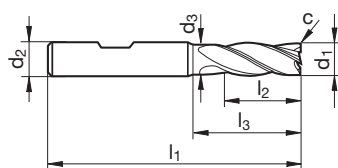
								Article no.	6803	6804
d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm x 45°				
3.00	6.00	2.80	50	5.0	12.0	0.03	4	6803 3.000	6804 3.000	
3.70	6.00	3.50	54	8.0	12.0	0.04	4	6803 3.700	6804 3.700	
4.00	6.00	3.80	54	8.0	15.0	0.04	4	6803 4.000	6804 4.000	
4.70	6.00	4.50	54	9.0	15.0	0.05	4	6803 4.700	6804 4.700	
5.00	6.00	4.80	54	9.0	15.0	0.05	4	6803 5.000	6804 5.000	
5.70	6.00	5.50	54	10.0	16.6	0.06	4	6803 5.700	6804 5.700	
6.00	6.00	5.70	54	10.0	17.0	0.06	4	6803 6.000	6804 6.000	
7.00	8.00	6.70	58	11.0	19.9	0.07	4	6803 7.000	6804 7.000	
7.70	8.00	7.40	58	12.0	20.5	0.08	4	6803 7.700	6804 7.700	
8.00	8.00	7.70	58	12.0	21.0	0.08	4	6803 8.000	6804 8.000	
9.00	10.00	8.70	66	13.0	23.9	0.09	4	6803 9.000	6804 9.000	
9.70	10.00	9.40	66	14.0	24.5	0.10	4	6803 9.700	6804 9.700	
10.00	10.00	9.50	66	14.0	24.0	0.10	4	6803 10.000	6804 10.000	
11.70	12.00	11.20	73	16.0	25.3	0.12	4	6803 11.700	6804 11.700	
12.00	12.00	11.50	73	16.0	26.0	0.12	4	6803 12.000	6804 12.000	
15.60	16.00	15.10	82	22.0	31.2	0.16	4	6803 15.600	6804 15.600	
16.00	16.00	15.50	82	22.0	32.0	0.16	4	6803 16.000	6804 16.000	
19.00	20.00	18.50	92	26.0	38.7	0.19	4	6803 19.000	6804 19.000	
20.00	20.00	19.50	92	26.0	40.0	0.20	4	6803 20.000	6804 20.000	

Ratio end mills RF 100 Diver



P • **GÜHRING NAVIGATOR**
M • Cutting data page 154
K •
N •
S •
H ○ • neck clearance
 • centre cutting

Tool material	Solid carbide	
Surface	Y	Y
Type	NH	NH
Shank form	HB	HA

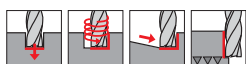
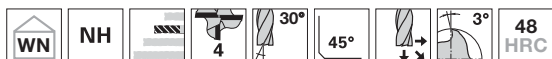


Article no. **6736** **6737**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
4.00	6.00	3.80	57	11.0	18.0	0.04	4	6736 4.000	6737 4.000
5.00	6.00	4.80	57	13.0	18.0	0.05	4	6736 5.000	6737 5.000
5.70	6.00	5.50	57	13.0	19.6	0.06	4	6736 5.700	6737 5.700
6.00	6.00	5.70	57	13.0	20.0	0.06	4	6736 6.000	6737 6.000
7.70	8.00	7.40	63	19.0	25.5	0.08	4	6736 7.700	6737 7.700
8.00	8.00	7.70	63	19.0	26.0	0.08	4	6736 8.000	6737 8.000
9.70	10.00	9.40	72	22.0	30.5	0.10	4	6736 9.700	6737 9.700
10.00	10.00	9.50	72	22.0	30.0	0.10	4	6736 10.000	6737 10.000
11.70	12.00	11.20	83	26.0	35.3	0.12	4	6736 11.700	6737 11.700
12.00	12.00	11.50	83	26.0	36.0	0.12	4	6736 12.000	6737 12.000
13.70	14.00	13.20	83	26.0	35.3	0.14	4	6736 13.700	6737 13.700
14.00	14.00	13.50	83	26.0	36.0	0.14	4	6736 14.000	6737 14.000
15.60	16.00	15.10	92	32.0	41.2	0.16	4	6736 15.600	6737 15.600
16.00	16.00	15.50	92	32.0	42.0	0.16	4	6736 16.000	6737 16.000
19.50	20.00	19.00	104	38.0	51.1	0.20	4	6736 19.500	6737 19.500
20.00	20.00	19.50	104	38.0	52.0	0.20	4	6736 20.000	6737 20.000



Pilot end mills RF 100 P



P • **GÜHRING NAVIGATOR**

M ○ Cutting data page 161

K •

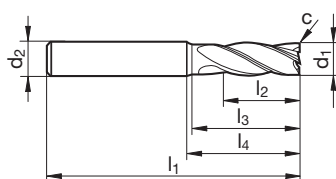
N •

S ○

H ○

- for piloting, drilling, finishing
- adapted diameter tolerance m8 for solid carbide drills
- special pilot geometry
- centre cutting

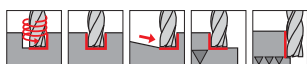
Tool material	Solid carbide
Surface	A
Type	NH
Shank form	HA



Article no. **6716**

d1 m8	d2 h6	l1	l2	l3	l4	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
1.40	3.00	38	3.0	5.9	10.0	0.01	4	6716 1.400
1.50	3.00	38	4.0	6.9	10.0	0.02	4	6716 1.500
1.80	3.00	38	6.0	8.9	10.0	0.02	4	6716 1.800
2.00	3.00	38	6.5	9.4	10.0	0.02	4	6716 2.000
2.10	3.00	38	6.5	9.9	10.0	0.02	4	6716 2.100
2.30	3.00	38	6.5	9.9	10.0	0.02	4	6716 2.300
2.50	3.00	38	6.5	9.9	10.0	0.03	4	6716 2.500
2.80	3.00	38	6.5	10.0	10.0	0.03	4	6716 2.800
3.00	6.00	57	8.0	12.4	21.0	0.03	4	6716 3.000
3.50	6.00	57	10.0	14.9	21.0	0.04	4	6716 3.500
4.00	6.00	57	11.0	15.9	21.0	0.04	4	6716 4.000
4.50	6.00	57	11.0	17.4	21.0	0.05	4	6716 4.500
5.00	6.00	57	13.0	19.4	21.0	0.05	4	6716 5.000
5.50	6.00	57	13.0	20.4	21.0	0.06	4	6716 5.500
6.00	8.00	63	13.0	20.4	27.0	0.06	4	6716 6.000
6.50	8.00	63	13.0	20.9	27.0	0.07	4	6716 6.500
7.00	8.00	63	16.0	23.9	27.0	0.07	4	6716 7.000
7.50	8.00	63	16.0	23.9	27.0	0.08	4	6716 7.500
8.00	10.00	72	19.0	26.9	32.0	0.08	4	6716 8.000
8.50	10.00	72	19.0	28.4	32.0	0.09	4	6716 8.500
9.00	10.00	72	19.0	28.4	32.0	0.09	4	6716 9.000
10.00	12.00	83	22.0	31.4	38.0	0.10	4	6716 10.000
11.00	12.00	83	26.0	36.4	38.0	0.11	4	6716 11.000
12.00	14.00	83	26.0	37.4	38.0	0.12	4	6716 12.000

Ratio end mills RF 100 Speed P



P	•
M	
K	•
N	
S	
H	○

GÜHRING NAVIGATOR

Cutting data page 155

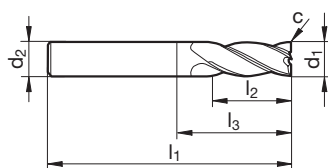
- with chip breaker
- slotting operations of up to max. 0.8xD depth
- re-inforced core from Ø 6 mm
- centre cutting

Tool material **Solid carbide**

Surface **A** **A**

Type NH NH

Shank form HA HB

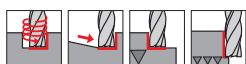


Article no. **6958** **6959**

d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm x 45°			
6.00	6.00	57	15.0	21.0	0.12	4	6958 6.000	6959 6.000
8.00	8.00	63	20.0	27.0	0.16	4	6958 8.000	6959 8.000
10.00	10.00	72	24.0	32.0	0.20	4	6958 10.000	6959 10.000
12.00	12.00	83	28.0	38.0	0.24	4	6958 12.000	6959 12.000
16.00	16.00	92	36.0	44.0	0.32	4	6958 16.000	6959 16.000
20.00	20.00	104	45.0	54.0	0.40	4	6958 20.000	6959 20.000
25.00	25.00	121	55.0	65.0	0.50	4	6958 25.000	6959 25.000



Ratio end mills RF 100 Speed P



P • **GÜHRING NAVIGATOR**

M Cutting data page 155

K •

N

S

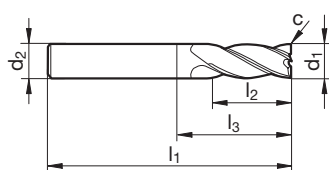
H ○

- with chip breaker
- re-inforced core from Ø 6 mm
- centre cutting

Tool material	Solid carbide	
Surface	A	A
Type	NH	NH
Shank form	HA	HB



Milling tools



							Article no.	6960	6961
d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm x 45°				
6.00	6.00	65	24.0	29.0	0.12	4	6960 6.000	6961 6.000	
8.00	8.00	75	32.0	39.0	0.16	4	6960 8.000	6961 8.000	
10.00	10.00	90	40.0	50.0	0.20	4	6960 10.000	6961 10.000	
12.00	12.00	100	46.0	55.0	0.24	4	6960 12.000	6961 12.000	
16.00	16.00	108	55.0	60.0	0.32	4	6960 16.000	6961 16.000	
20.00	20.00	126	65.0	76.0	0.40	4	6960 20.000	6961 20.000	
25.00	25.00	150	85.0	94.0	0.50	4	6960 25.000	6961 25.000	

RF 100 Speed P

for tool steels

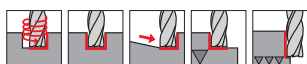


- + *highest removal rates
with GTC strategy*
- + *short chips for
high process reliability*
- + *High-performance roughing
even at high cutting depths*

RF 100
SPEED



Ratio end mills RF 100 Speed M



P • **GÜHRING NAVIGATOR**

M • Cutting data page 155

K

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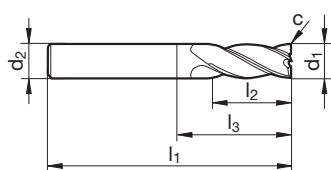
H

- slotting operations of up to max. 0.8xD depth
- re-inforced core from Ø 6 mm
- centre cutting

Tool material	Solid carbide	
Surface	A	A
Type	NH	NH
Shank form	HA	HB

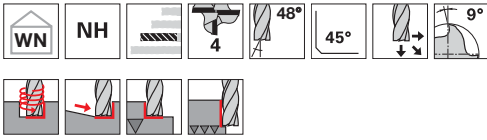


Milling tools



Article no.							6765	6760
d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm x 45°			
3.00	6.00	57	8.0	10.9	0.04	4	6765 3.000	6760 3.000
4.00	6.00	57	11.0	13.9	0.06	4	6765 4.000	6760 4.000
5.00	6.00	57	13.0	15.9	0.07	4	6765 5.000	6760 5.000
6.00	6.00	57	15.0	21.0	0.12	4	6765 6.000	6760 6.000
8.00	8.00	63	20.0	27.0	0.16	4	6765 8.000	6760 8.000
10.00	10.00	72	24.0	32.0	0.20	4	6765 10.000	6760 10.000
12.00	12.00	83	28.0	38.0	0.24	4	6765 12.000	6760 12.000
16.00	16.00	92	36.0	44.0	0.32	4	6765 16.000	6760 16.000
20.00	20.00	104	45.0	54.0	0.40	4	6765 20.000	6760 20.000

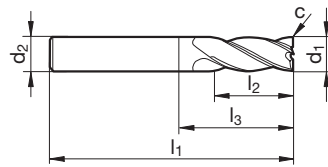
Ratio end mills RF 100 Speed M



P • **GÜHRING NAVIGATOR**
M • Cutting data page 155
K
N
S •
H

- with chip breaker
- re-inforced core from Ø 6 mm
- centre cutting

Tool material	Solid carbide	
Surface	A	A
Type	NH	NH
Shank form	HA	HB

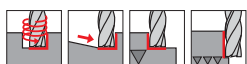


Article no. **6766** **6761**

d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm x 45°			
3.00	6.00	57	12.0	14.9	0.04	4	6766 3.000	6761 3.000
4.00	6.00	65	16.0	18.9	0.06	4	6766 4.000	6761 4.000
5.00	6.00	65	20.0	22.9	0.07	4	6766 5.000	6761 5.000
6.00	6.00	65	24.0	29.0	0.12	4	6766 6.000	6761 6.000
8.00	8.00	75	32.0	39.0	0.16	4	6766 8.000	6761 8.000
10.00	10.00	90	40.0	50.0	0.20	4	6766 10.000	6761 10.000
12.00	12.00	100	46.0	55.0	0.24	4	6766 12.000	6761 12.000
16.00	16.00	108	55.0	60.0	0.32	4	6766 16.000	6761 16.000
20.00	20.00	126	65.0	76.0	0.40	4	6766 20.000	6761 20.000



Ratio end mills RF 100 5 Speed

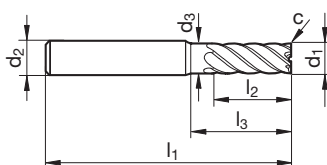


- P** • **GÜHRING NAVIGATOR**
M • Cutting data page 155
K •
N ○
S •
H •
- with chip breaker
 - neck clearance
 - without centre cutting

Tool material	Solid carbide	
Surface	A	A
Type	N	N
Shank form	HA	HB



Milling tools

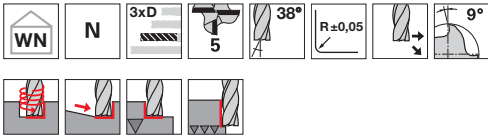


Article no. **6858** **6859**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
6.00	6.00	5.70	65	20.0	28.0	0.12	5
8.00	8.00	7.70	75	26.0	38.0	0.16	5
10.00	10.00	9.50	80	32.0	38.0	0.20	5
12.00	12.00	11.50	93	40.0	46.0	0.24	5
16.00	16.00	15.50	108	50.0	58.0	0.32	5
20.00	20.00	19.50	126	62.0	74.0	0.40	5

Order no.	
6858 6.000	6859 6.000
6858 8.000	6859 8.000
6858 10.000	6859 10.000
6858 12.000	6859 12.000
6858 16.000	6859 16.000
6858 20.000	6859 20.000

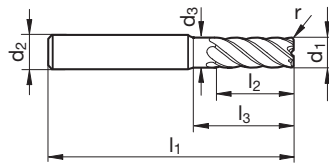
Ratio end mills RF 100 5 Speed



P • **GÜHRING NAVIGATOR**
M • Cutting data page 155
K •
N ○
S •
H •

- with chip breaker
- neck clearance
- without centre cutting

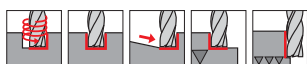
Tool material	Solid carbide	
Surface	A	A
Type	N	N
Shank form	HA	HB



Article no.								6860	6861
d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm			
6.00	6.00	5.70	65	20.0	28.0	0.20	5	6860 6.002	6861 6.002
6.00	6.00	5.70	65	20.0	28.0	0.50	5	6860 6.005	6861 6.005
6.00	6.00	5.70	65	20.0	28.0	1.00	5	6860 6.010	6861 6.010
8.00	8.00	7.70	75	26.0	38.0	0.30	5	6860 8.003	6861 8.003
8.00	8.00	7.70	75	26.0	38.0	0.50	5	6860 8.005	6861 8.005
8.00	8.00	7.70	75	26.0	38.0	1.00	5	6860 8.010	6861 8.010
8.00	8.00	7.70	75	26.0	38.0	1.50	5	6860 8.015	6861 8.015
10.00	10.00	9.50	80	32.0	38.0	0.50	5	6860 10.005	6861 10.005
10.00	10.00	9.50	80	32.0	38.0	1.00	5	6860 10.010	6861 10.010
10.00	10.00	9.50	80	32.0	38.0	1.50	5	6860 10.015	6861 10.015
10.00	10.00	9.50	80	32.0	38.0	2.00	5	6860 10.020	6861 10.020
12.00	12.00	11.50	93	40.0	46.0	0.50	5	6860 12.005	6861 12.005
12.00	12.00	11.50	93	40.0	46.0	1.00	5	6860 12.010	6861 12.010
12.00	12.00	11.50	93	40.0	46.0	1.50	5	6860 12.015	6861 12.015
12.00	12.00	11.50	93	40.0	46.0	2.00	5	6860 12.020	6861 12.020
16.00	16.00	15.50	108	50.0	58.0	0.50	5	6860 16.005	6861 16.005
16.00	16.00	15.50	108	50.0	58.0	1.00	5	6860 16.010	6861 16.010
16.00	16.00	15.50	108	50.0	58.0	1.50	5	6860 16.015	6861 16.015
16.00	16.00	15.50	108	50.0	58.0	2.00	5	6860 16.020	6861 16.020
16.00	16.00	15.50	108	50.0	58.0	3.00	5	6860 16.030	6861 16.030
20.00	20.00	19.50	126	62.0	74.0	1.00	5	6860 20.010	6861 20.010
20.00	20.00	19.50	126	62.0	74.0	1.50	5	6860 20.015	6861 20.015
20.00	20.00	19.50	126	62.0	74.0	2.00	5	6860 20.020	6861 20.020
20.00	20.00	19.50	126	62.0	74.0	3.00	5	6860 20.030	6861 20.030



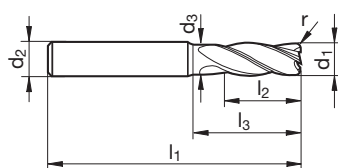
Ratio end mills RF 100 Sharp



P ○ **GÜHRING NAVIGATOR**
M ● Cutting data page 157
K
N ●
S ●
H ● neck clearance
 ● centre cutting

Tool material	Solid carbide	
Surface	Y	Y
Type	N	N
Shank form	HA	HB

Milling tools



								Article no.	6964	6965
d1 e8	d2 h6	d3	l1	l2	l3	r	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm				
3.00	6.00	2.80	57	8.0	15.0	0.20	4	6964 3.002	6965 3.002	
3.00	6.00	2.80	57	8.0	15.0	0.50	4	6964 3.005	6965 3.005	
4.00	6.00	3.80	57	11.0	18.0	0.20	4	6964 4.002	6965 4.002	
4.00	6.00	3.80	57	11.0	18.0	0.50	4	6964 4.005	6965 4.005	
4.00	6.00	3.80	57	11.0	18.0	1.00	4	6964 4.010	6965 4.010	
5.00	6.00	4.80	57	13.0	18.0	0.20	4	6964 5.002	6965 5.002	
5.00	6.00	4.80	57	13.0	18.0	0.50	4	6964 5.005	6965 5.005	
5.00	6.00	4.80	57	13.0	18.0	1.00	4	6964 5.010	6965 5.010	
6.00	6.00	5.70	57	13.0	20.0	0.20	4	6964 6.002	6965 6.002	
6.00	6.00	5.70	57	13.0	20.0	0.50	4	6964 6.005	6965 6.005	
6.00	6.00	5.70	57	13.0	20.0	1.00	4	6964 6.010	6965 6.010	
6.00	6.00	5.70	57	13.0	20.0	1.50	4	6964 6.015	6965 6.015	
8.00	8.00	7.70	63	19.0	26.0	0.30	4	6964 8.003	6965 8.003	
8.00	8.00	7.70	63	19.0	26.0	0.50	4	6964 8.005	6965 8.005	
8.00	8.00	7.70	63	19.0	26.0	1.00	4	6964 8.010	6965 8.010	
8.00	8.00	7.70	63	19.0	26.0	1.50	4	6964 8.015	6965 8.015	
8.00	8.00	7.70	63	19.0	26.0	2.00	4	6964 8.020	6965 8.020	
10.00	10.00	9.50	72	22.0	30.0	0.30	4	6964 10.003	6965 10.003	
10.00	10.00	9.50	72	22.0	30.0	0.50	4	6964 10.005	6965 10.005	
10.00	10.00	9.50	72	22.0	30.0	1.00	4	6964 10.010	6965 10.010	
10.00	10.00	9.50	72	22.0	30.0	1.50	4	6964 10.015	6965 10.015	
10.00	10.00	9.50	72	22.0	30.0	2.00	4	6964 10.020	6965 10.020	
10.00	10.00	9.50	72	22.0	30.0	2.50	4	6964 10.025	6965 10.025	
12.00	12.00	11.50	83	26.0	36.0	0.30	4	6964 12.003	6965 12.003	
12.00	12.00	11.50	83	26.0	36.0	0.50	4	6964 12.005	6965 12.005	
12.00	12.00	11.50	83	26.0	36.0	1.00	4	6964 12.010	6965 12.010	
12.00	12.00	11.50	83	26.0	36.0	1.50	4	6964 12.015	6965 12.015	
12.00	12.00	11.50	83	26.0	36.0	2.00	4	6964 12.020	6965 12.020	
12.00	12.00	11.50	83	26.0	36.0	2.50	4	6964 12.025	6965 12.025	
12.00	12.00	11.50	83	26.0	36.0	3.00	4	6964 12.030	6965 12.030	
16.00	16.00	15.50	92	32.0	42.0	0.50	4	6964 16.005	6965 16.005	
16.00	16.00	15.50	92	32.0	42.0	1.00	4	6964 16.010	6965 16.010	
16.00	16.00	15.50	92	32.0	42.0	1.50	4	6964 16.015	6965 16.015	
16.00	16.00	15.50	92	32.0	42.0	2.00	4	6964 16.020	6965 16.020	
16.00	16.00	15.50	92	32.0	42.0	2.50	4	6964 16.025	6965 16.025	
16.00	16.00	15.50	92	32.0	42.0	3.00	4	6964 16.030	6965 16.030	

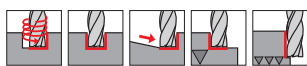


Milling tools

								Article no.	
								6964	6965
d1 e8	d2 h6	d3	l1	l2	l3	r	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm			
16.00	16.00	15.50	92	32.0	42.0	4.00	4	6964 16.040	6965 16.040
20.00	20.00	19.50	104	38.0	52.0	0.50	4	6964 20.005	6965 20.005
20.00	20.00	19.50	104	38.0	52.0	1.00	4	6964 20.010	6965 20.010
20.00	20.00	19.50	104	38.0	52.0	1.50	4	6964 20.015	6965 20.015
20.00	20.00	19.50	104	38.0	52.0	2.00	4	6964 20.020	6965 20.020
20.00	20.00	19.50	104	38.0	52.0	2.50	4	6964 20.025	6965 20.025
20.00	20.00	19.50	104	38.0	52.0	3.00	4	6964 20.030	6965 20.030
20.00	20.00	19.50	104	38.0	52.0	4.00	4	6964 20.040	6965 20.040



Ratio end mills RF 100 Sharp



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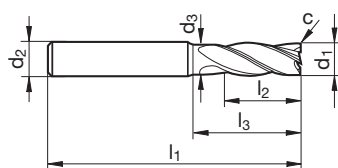
N •

S •

H

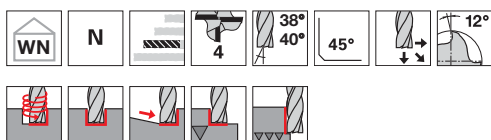
- especially for soft, tough and high-alloyed materials
- longer cutting edge than DIN 6527 L
- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	P	P
Type	N	N
Shank form	HA	HB
	NEW	NEW



								Article no.	6478	6479
d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm x 45°				
1.00	4.00	0.92	50	3.0	4.0	0.02	4	6478 1.000		
1.50	4.00	1.40	50	4.5	6.0	0.03	4	6478 1.500		
2.00	6.00	1.85	50	6.0	8.0	0.04	4	6478 2.000		
2.50	6.00	2.35	50	7.5	10.0	0.05	4	6478 2.500		
3.00	6.00	2.85	57	10.0	15.0	0.06	4	6478 3.000		
4.00	6.00	3.80	57	14.0	18.0	0.08	4	6478 4.000	6479 4.000	
5.00	6.00	4.80	57	15.0	20.0	0.10	4	6478 5.000	6479 5.000	
6.00	6.00	5.70	57	16.0	20.0	0.12	4	6478 6.000	6479 6.000	
8.00	8.00	7.70	63	21.0	26.0	0.16	4	6478 8.000	6479 8.000	
10.00	10.00	9.50	72	25.0	31.0	0.20	4	6478 10.000	6479 10.000	
12.00	12.00	11.50	83	28.0	37.0	0.24	4	6478 12.000	6479 12.000	
14.00	14.00	13.50	83	28.0	37.0	0.28	4	6478 14.000	6479 14.000	
16.00	16.00	15.50	92	36.0	43.0	0.32	4	6478 16.000	6479 16.000	
20.00	20.00	19.50	104	41.0	53.0	0.40	4	6478 20.000	6479 20.000	

Ratio end mills RF 100 Sharp



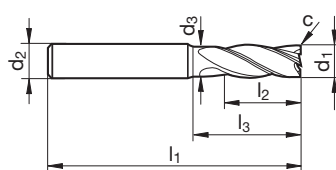
P	•
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N	•
S	•
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- especially for soft, tough and high-alloyed materials
- medium length version
- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	P	P
Type	N	N
Shank form	HA	HB

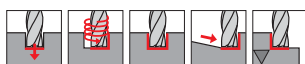


Article no. **6480** **6481**

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
1.00	4.00	0.92	50	3.0	5.5	0.02	4	6480 1.000
1.50	4.00	1.40	50	4.5	8.5	0.03	4	6480 1.500
2.00	6.00	1.85	57	6.0	11.5	0.04	4	6480 2.000
2.50	6.00	2.35	57	7.5	14.5	0.05	4	6480 2.500
3.00	6.00	2.85	65	10.0	20.0	0.06	4	6480 3.000
4.00	6.00	3.80	65	14.0	27.0	0.08	4	6480 4.000 6481 4.000
5.00	6.00	4.80	65	15.0	28.0	0.10	4	6480 5.000 6481 5.000
6.00	6.00	5.70	75	19.0	38.0	0.12	4	6480 6.000 6481 6.000
8.00	8.00	7.70	80	21.0	43.0	0.16	4	6480 8.000 6481 8.000
10.00	10.00	9.50	93	26.0	52.0	0.20	4	6480 10.000 6481 10.000
12.00	12.00	11.50	100	28.0	54.0	0.24	4	6480 12.000 6481 12.000
14.00	14.00	13.50	100	28.0	54.0	0.28	4	6480 14.000 6481 14.000
16.00	16.00	15.50	123	38.0	74.0	0.32	4	6480 16.000 6481 16.000
20.00	20.00	19.50	126	41.0	75.0	0.40	4	6480 20.000 6481 20.000



Standard Ratio end mills RF 100 U (3-fluted)

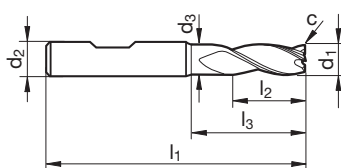


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- Raptor coating
- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	(R)
Type	N
Shank form	HB

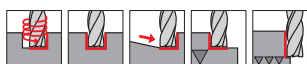
Milling tools



Article no. **6728**

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
3.00	6.00	2.80	57	8.0	15.0	0.05	3	6728 3.000
4.00	6.00	3.80	57	11.0	18.0	0.06	3	6728 4.000
6.00	6.00	5.70	57	13.0	20.0	0.09	3	6728 6.000
8.00	8.00	7.70	63	19.0	26.0	0.12	3	6728 8.000
10.00	10.00	9.50	72	22.0	30.0	0.15	3	6728 10.000
12.00	12.00	11.50	83	26.0	36.0	0.18	3	6728 12.000
16.00	16.00	15.50	92	32.0	42.0	0.19	3	6728 16.000
20.00	20.00	19.50	104	38.0	52.0	0.24	3	6728 20.000

Standard Ratio end mills RF 100 U



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K ○

N ○

S ●

H ○

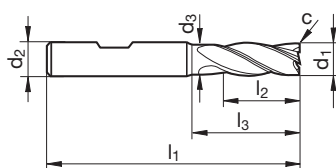
- Raptor coating
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface **R**

Type **N**

Shank form **HB**

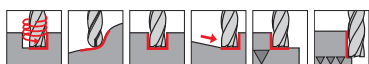


Article no. **6726**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
6.00	6.00	5.70	57	13.0	20.0	0.10	4	6726 6.000
8.00	8.00	7.70	63	19.0	26.0	0.15	4	6726 8.000
10.00	10.00	9.50	72	22.0	30.0	0.20	4	6726 10.000
12.00	12.00	11.50	83	26.0	36.0	0.20	4	6726 12.000
16.00	16.00	15.50	92	32.0	42.0	0.35	4	6726 16.000
20.00	20.00	19.50	104	38.0	52.0	0.45	4	6726 20.000



Standard Ratio end mills RF 100 U



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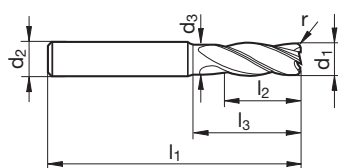
S

H ○

- re-inforced core
- neck clearance
- centre cutting

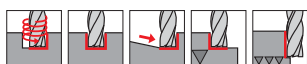
Tool material	Solid carbide	
Surface	F	F
Type	N	N
Shank form	HA	HB

Milling tools



								Article no.	3872	3873
d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm				
6.00	6.00	5.70	57	13.0	20.0	0.50	4	3872 6.005	3873 6.005	
6.00	6.00	5.70	57	13.0	20.0	1.00	4	3872 6.010	3873 6.010	
6.00	6.00	5.70	57	13.0	20.0	2.00	4	3872 6.020	3873 6.020	
8.00	8.00	7.70	63	19.0	26.0	0.50	4	3872 8.005	3873 8.005	
8.00	8.00	7.70	63	19.0	26.0	1.00	4	3872 8.010	3873 8.010	
8.00	8.00	7.70	63	19.0	26.0	2.00	4	3872 8.020	3873 8.020	
10.00	10.00	9.50	72	22.0	30.0	0.50	4	3872 10.005	3873 10.005	
10.00	10.00	9.50	72	22.0	30.0	1.00	4	3872 10.010	3873 10.010	
10.00	10.00	9.50	72	22.0	30.0	2.00	4	3872 10.020	3873 10.020	
12.00	12.00	11.50	83	26.0	36.0	0.50	4	3872 12.005	3873 12.005	
12.00	12.00	11.50	83	26.0	36.0	1.00	4	3872 12.010	3873 12.010	
12.00	12.00	11.50	83	26.0	36.0	2.00	4	3872 12.020	3873 12.020	
16.00	16.00	15.50	92	32.0	42.0	0.50	4	3872 16.005	3873 16.005	
16.00	16.00	15.50	92	32.0	42.0	1.00	4	3872 16.010	3873 16.010	
16.00	16.00	15.50	92	32.0	42.0	2.00	4	3872 16.020	3873 16.020	
16.00	16.00	15.50	92	32.0	42.0	3.00	4	3872 16.030	3873 16.030	
20.00	20.00	19.50	104	38.0	52.0	0.50	4	3872 20.005	3873 20.005	
20.00	20.00	19.50	104	38.0	52.0	1.00	4	3872 20.010	3873 20.010	
20.00	20.00	19.50	104	38.0	52.0	2.00	4	3872 20.020	3873 20.020	
20.00	20.00	19.50	104	38.0	52.0	3.00	4	3872 20.030	3873 20.030	
25.00	25.00	24.00	121	45.0	63.0	2.00	4	3872 25.020	3873 25.020	
25.00	25.00	24.00	121	45.0	63.0	3.00	4	3872 25.030	3873 25.030	

Standard Ratio end mills RF 100 U



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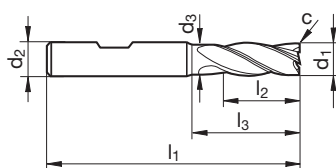
N

S

H ○

- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	Ⓡ
Type	N
Shank form	HB

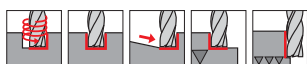


Article no. **5534**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
6.00	6.00	5.70	54	10.0	17.0	0.15	4	5534 6.000
8.00	8.00	7.70	58	12.0	21.0	0.15	4	5534 8.000
10.00	10.00	9.50	66	14.0	24.0	0.20	4	5534 10.000
12.00	12.00	11.50	73	16.0	26.0	0.20	4	5534 12.000
14.00	14.00	13.50	75	18.0	28.0	0.25	4	5534 14.000
16.00	16.00	15.50	82	22.0	32.0	0.35	4	5534 16.000
18.00	18.00	17.50	84	24.0	34.0	0.40	4	5534 18.000
20.00	20.00	19.50	92	26.0	40.0	0.45	4	5534 20.000



Standard Ratio end mills RF 100 U



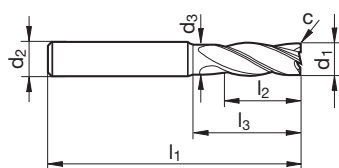
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- neck clearance
- centre cutting

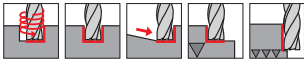
Tool material	Solid carbide	
Surface	F	F
Type	N	N
Shank form	HA	HB

Milling tools



								Article no.	5735	5535
d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm x 45°				
4.00	6.00	3.80	57	11.0	18.0	0.10	4	5735 4.000	5535 4.000	
5.00	6.00	4.80	57	13.0	18.0	0.10	4	5735 5.000	5535 5.000	
6.00	6.00	5.70	57	13.0	20.0	0.10	4	5735 6.000	5535 6.000	
8.00	8.00	7.70	63	19.0	26.0	0.15	4	5735 8.000	5535 8.000	
10.00	10.00	9.50	72	22.0	30.0	0.20	4	5735 10.000	5535 10.000	
12.00	12.00	11.50	83	26.0	36.0	0.20	4	5735 12.000	5535 12.000	
14.00	14.00	13.50	83	26.0	36.0	0.25	4	5735 14.000	5535 14.000	
16.00	16.00	15.50	92	32.0	42.0	0.35	4	5735 16.000	5535 16.000	
18.00	18.00	17.50	92	32.0	42.0	0.40	4	5735 18.000	5535 18.000	
20.00	20.00	19.50	104	38.0	52.0	0.45	4	5735 20.000	5535 20.000	
25.00	25.00	24.00	121	45.0	63.0	0.60	4	5735 25.000	5535 25.000	

Standard Ratio end mills RF 100 U

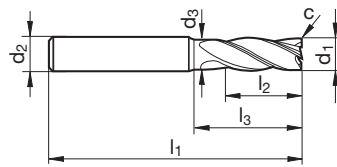


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- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	N	N
Shank form	HA	HB



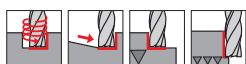
Article no. **3837** **3838**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
6.00	6.00	5.70	65	13.0	28.0	0.10	4
8.00	8.00	7.70	75	19.0	38.0	0.15	4
10.00	10.00	9.50	80	22.0	38.0	0.20	4
12.00	12.00	11.50	93	26.0	46.0	0.20	4
16.00	16.00	15.50	108	32.0	58.0	0.35	4
20.00	20.00	19.50	126	38.0	74.0	0.45	4

Order no.	
3837 6.000	3838 6.000
3837 8.000	3838 8.000
3837 10.000	3838 10.000
3837 12.000	3838 12.000
3837 16.000	3838 16.000
3837 20.000	3838 20.000



Standard Ratio end mills RF 100 U



P • **GÜHRING NAVIGATOR**
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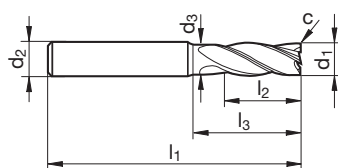
H ○

- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	N	N
Shank form	HA	HB



Milling tools

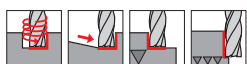


Article no. **3839** **3871**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
6.00	6.00	5.70	65	18.0	28.0	0.10	4
8.00	8.00	7.70	75	24.0	38.0	0.15	4
10.00	10.00	9.50	80	30.0	38.0	0.20	4
12.00	12.00	11.50	93	36.0	46.0	0.20	4
16.00	16.00	15.50	108	48.0	58.0	0.35	4
20.00	20.00	19.50	126	60.0	74.0	0.45	4

Order no.	
3839 6.000	3871 6.000
3839 8.000	3871 8.000
3839 10.000	3871 10.000
3839 12.000	3871 12.000
3839 16.000	3871 16.000
3839 20.000	3871 20.000

Standard Ratio end mills RF 100 U



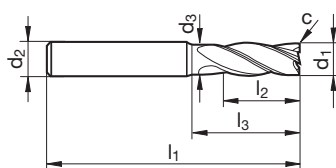
P	•
M	
K	•
N	
S	
H	○

GÜHRING NAVIGATOR

Cutting data page 157

- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	F
Type	N
Shank form	HA



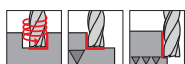
Article no. **5582**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
10.00	10.00	9.50	100	40.0	48.0	0.20	4
12.00	12.00	11.50	150	45.0	58.0	0.20	4
16.00	16.00	15.50	150	65.0	78.0	0.35	4
20.00	20.00	19.50	150	65.0	78.0	0.45	4
25.00	25.00	24.00	150	75.0	92.0	0.60	4

Order no.
5582 10.000
5582 12.000
5582 16.000
5582 20.000
5582 25.000



Standard Ratio end mills RF 100 U



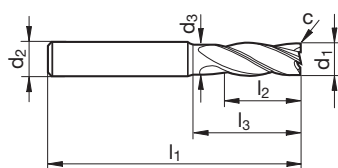
P • **GÜHRING NAVIGATOR**
 Cutting data page 157

M
K •
N
S
H ○

- neck clearance
- centre cutting

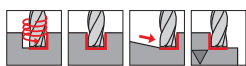
Tool material	Solid carbide	
Surface	F	F
Type	NH	NH
Shank form	HA	HB

Milling tools



								Article no.	6767	6768
d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm x 45°				
6.00	6.00	5.70	65	24.0	28.0	0.12	4	6767 6.000	6768 6.000	
8.00	8.00	7.70	75	32.0	38.0	0.16	4	6767 8.000	6768 8.000	
10.00	10.00	9.50	100	40.0	58.0	0.20	4	6767 10.000	6768 10.000	
12.00	12.00	11.50	100	48.0	53.0	0.24	4	6767 12.000	6768 12.000	
16.00	16.00	15.50	125	64.0	75.0	0.32	4	6767 16.000	6768 16.000	
20.00	20.00	19.50	150	80.0	98.0	0.40	4	6767 20.000	6768 20.000	
25.00	25.00	24.00	175	100.0	117.0	0.50	4	6767 25.000	6768 25.000	

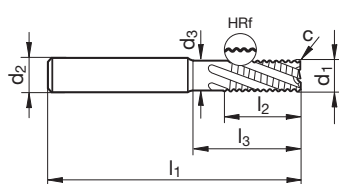
Ratio roughing end mills RF 100 U



P • **GÜHRING NAVIGATOR**
M • Cutting data page 158
K •
N •
S ○
H ○

- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	Y	Y
Type	HRf	HRf
Shank form	HA	HB

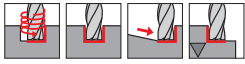
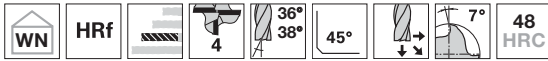


Article no. **6970** **6971**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
6.00	6.00	5.70	57	13.0	20.0	0.12	4	6970 6.000	6971 6.000
8.00	8.00	7.70	63	19.0	26.0	0.16	4	6970 8.000	6971 8.000
10.00	10.00	9.50	72	22.0	30.0	0.20	4	6970 10.000	6971 10.000
12.00	12.00	11.50	83	26.0	36.0	0.24	4	6970 12.000	6971 12.000
16.00	16.00	15.50	92	32.0	42.0	0.32	4	6970 16.000	6971 16.000
20.00	20.00	19.50	104	38.0	52.0	0.40	4	6970 20.000	6971 20.000



Ratio roughing end mills RF 100 U

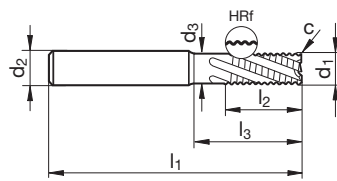


P • **GÜHRING NAVIGATOR**
M • Cutting data page 158
K •
N •
S ○
H ○

- neck clearance
- centre cutting

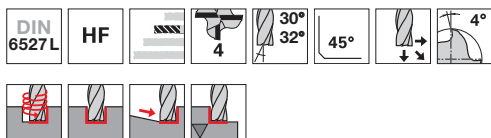
Tool material	Solid carbide	
Surface	Y	Y
Type	HRf	HRf
Shank form	HA	HB

Milling tools



								Article no.	
								6972	6973
d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
6.00	6.00	5.70	65	13.0	28.0	0.12	4	6972 6.000	6973 6.000
8.00	8.00	7.70	75	19.0	38.0	0.16	4	6972 8.000	6973 8.000
10.00	10.00	9.50	80	22.0	38.0	0.20	4	6972 10.000	6973 10.000
12.00	12.00	11.50	93	26.0	46.0	0.24	4	6972 12.000	6973 12.000
16.00	16.00	15.50	108	32.0	58.0	0.32	4	6972 16.000	6973 16.000
20.00	20.00	19.50	126	38.0	74.0	0.40	4	6972 20.000	6973 20.000

Ratio roughing end mills RF 100 U



P • **GÜHRING NAVIGATOR**
 Cutting data page 158

M

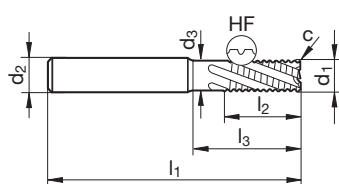
K •

N

S

H • neck clearance
 • centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	HF	HF
Shank form	HA	HB

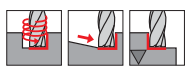


Article no. **6881** **6882**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm	mm x 45°		
6.00	6.00	5.70	57	13.0	20.0	0.12	4	6881 6.000 6882 6.000
8.00	8.00	7.70	63	19.0	26.0	0.16	4	6881 8.000 6882 8.000
10.00	10.00	9.50	72	22.0	30.0	0.20	4	6881 10.000 6882 10.000
12.00	12.00	11.50	83	26.0	36.0	0.24	4	6881 12.000 6882 12.000
16.00	16.00	15.50	92	32.0	42.0	0.32	4	6881 16.000 6882 16.000
20.00	20.00	19.50	104	38.0	52.0	0.40	4	6881 20.000 6882 20.000
25.00	25.00	24.00	121	45.0	63.0	0.50	4	6881 25.000 6882 25.000



Ratio roughing end mills RF 100 U



P • **GÜHRING NAVIGATOR**
 Cutting data page 158

M

K •

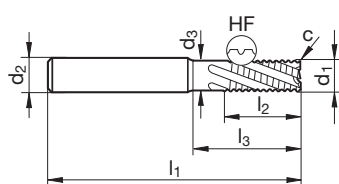
N

S

H • neck clearance
 • centre cutting

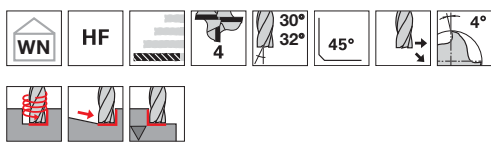
Tool material	Solid carbide	
Surface	F	F
Type	HF	HF
Shank form	HA	HB

Milling tools



								Article no.	6883	6884
d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm x 45°				
6.00	6.00	5.70	65	18.0	28.0	0.12	4	6883 6.000	6884 6.000	
8.00	8.00	7.70	75	24.0	38.0	0.16	4	6883 8.000	6884 8.000	
10.00	10.00	9.50	80	30.0	38.0	0.20	4	6883 10.000	6884 10.000	
12.00	12.00	11.50	93	36.0	46.0	0.24	4	6883 12.000	6884 12.000	
16.00	16.00	15.50	108	48.0	58.0	0.32	4	6883 16.000	6884 16.000	
20.00	20.00	19.50	126	60.0	74.0	0.40	4	6883 20.000	6884 20.000	

Ratio roughing end mills RF 100 U



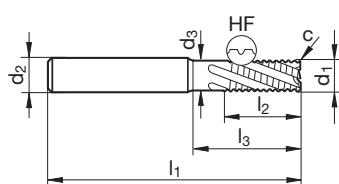
P	•
M	
K	•
N	
S	
H	

GÜHRING NAVIGATOR

Cutting data page 158

- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	HF	HF
Shank form	~HA	~HB



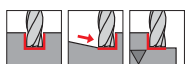
Article no. **6885** **6886**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
6.00	6.00	5.70	75	13.0	34.0	0.12	4
8.00	8.00	7.70	100	19.0	49.0	0.16	4
10.00	10.00	9.50	100	22.0	48.0	0.20	4
12.00	12.00	11.50	150	26.0	58.0	0.24	4
16.00	16.00	15.50	150	32.0	78.0	0.32	4
20.00	20.00	19.50	150	38.0	78.0	0.40	4

Order no.	
6885 6.000	6886 6.000
6885 8.000	6886 8.000
6885 10.000	6886 10.000
6885 12.000	6886 12.000
6885 16.000	6886 16.000
6885 20.000	6886 20.000



High-performance roughing end mills RS 100 F



P	•
M	
K	•
N	
S	
H	○

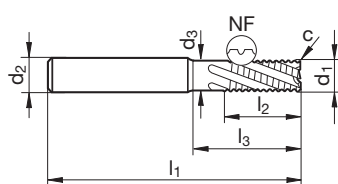
GÜHRING NAVIGATOR

Cutting data page 158

- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	NF	NF
Shank form	HA	HB

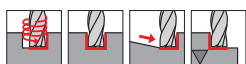
Milling tools



Article no. **6889** **6890**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
6.00	6.00	5.70	57	13.0	20.0	0.30	5	6889 6.000	6890 6.000
8.00	8.00	7.70	63	19.0	26.0	0.30	5	6889 8.000	6890 8.000
10.00	10.00	9.50	72	22.0	30.0	0.30	5	6889 10.000	6890 10.000
12.00	12.00	11.50	83	26.0	36.0	0.50	5	6889 12.000	6890 12.000
14.00	14.00	13.50	83	26.0	36.0	0.50	5	6889 14.000	6890 14.000
16.00	16.00	15.50	92	32.0	42.0	0.50	6	6889 16.000	6890 16.000
18.00	18.00	17.50	92	32.0	42.0	0.50	6	6889 18.000	6890 18.000
20.00	20.00	19.50	104	38.0	52.0	0.50	6	6889 20.000	6890 20.000
25.00	25.00	24.00	121	45.0	63.0	0.60	6	6889 25.000	6890 25.000

Hard roughing end mills GS 100 H (fine teeth)



P • **GÜHRING NAVIGATOR**
 Cutting data page 160

M

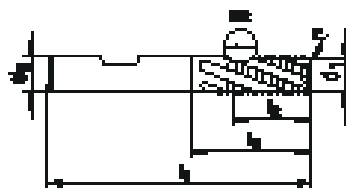
K •

N

S

H • • centre cutting

Tool material	Solid carbide
Surface	Ⓚ
Type	HR
Shank form	HB

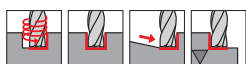


Article no. **3682**

d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
6.000	6.00	57.00	13.00	21.000	0.30	4	3682 6.000
8.000	8.00	63.00	19.00	27.000	0.30	4	3682 8.000
10.000	10.00	72.00	22.00	32.000	0.30	4	3682 10.000
12.000	12.00	83.00	26.00	38.000	0.50	4	3682 12.000
16.000	16.00	92.00	32.00	44.000	0.50	4	3682 16.000
20.000	20.00	104.00	38.00	54.000	0.50	4	3682 20.000



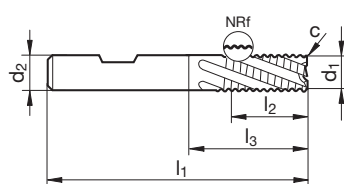
Roughing end mills GS 100 U (fine teeth)



P • **GÜHRING NAVIGATOR**
M • Cutting data page 160
K •
N ○
S ○
H • centre cutting

Tool material	Solid carbide
Surface	F
Type	NRf
Shank form	HB

Milling tools



Article no. **3723**

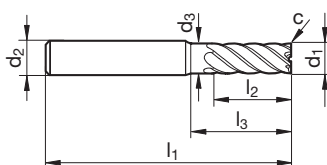
d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
6.000	6.00	57.00	13.00	21.000	0.30	4	3723 6.000
8.000	8.00	63.00	19.00	27.000	0.30	4	3723 8.000
10.000	10.00	72.00	22.00	32.000	0.30	4	3723 10.000
12.000	12.00	83.00	26.00	38.000	0.50	4	3723 12.000
14.000	14.00	83.00	26.00	38.000	0.50	4	3723 14.000
14.000	16.00	92.00	32.00	42.000	0.50	4	3723 14.001
16.000	16.00	92.00	32.00	44.000	0.50	4	3723 16.000
18.000	18.00	92.00	32.00	44.000	0.50	4	3723 18.000
20.000	20.00	104.00	38.00	54.000	0.50	4	3723 20.000
25.000	25.00	121.00	45.00	65.000	0.60	5	3723 25.000

Ratio end mills Superfinish RF 100 SF



P • **GÜHRING NAVIGATOR**
M • Cutting data page 157
K •
N •
S •
H ○ • neck clearance
 • centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	NH	NH
Shank form	HA	HB



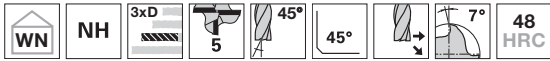
Article no. **6709** **6710**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
4.00	6.00	3.80	57	11.0	18.0	0.05	5
5.00	6.00	4.80	57	13.0	18.0	0.05	5
6.00	6.00	5.70	57	13.0	20.0	0.05	5
8.00	8.00	7.70	63	19.0	26.0	0.10	5
10.00	10.00	9.50	72	22.0	30.0	0.10	5
12.00	12.00	11.50	83	26.0	36.0	0.10	5
16.00	16.00	15.50	92	32.0	42.0	0.15	5
20.00	20.00	19.50	104	38.0	52.0	0.15	5
25.00	25.00	24.00	121	45.0	63.0	0.20	5

Order no.	
6709 4.000	6710 4.000
6709 5.000	6710 5.000
6709 6.000	6710 6.000
6709 8.000	6710 8.000
6709 10.000	6710 10.000
6709 12.000	6710 12.000
6709 16.000	6710 16.000
6709 20.000	6710 20.000
6709 25.000	6710 25.000



Ratio end mills Superfinish RF 100 SF

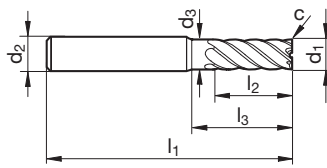


- P** • **GÜHRING NAVIGATOR**
- M** • Cutting data page 157
- K** •
- N** •
- S** •
- H** ○ • neck clearance
• centre cutting

Tool material	Solid carbide	
Surface	F	F
Type	NH	NH
Shank form	HA	HB



Milling tools



								Article no.	3897	3898
d1 h10	d2 h6	d3	l1	l2	l3	c	Z	Order no.		
mm	mm	mm	mm	mm	mm	mm x 45°				
4.00	6.00	3.80	65	12.0	26.0	0.05	5	3897 4.000	3898 4.000	
5.00	6.00	4.80	65	15.0	26.0	0.05	5	3897 5.000	3898 5.000	
6.00	6.00	5.70	65	18.0	28.0	0.05	5	3897 6.000	3898 6.000	
8.00	8.00	7.70	75	24.0	38.0	0.10	5	3897 8.000	3898 8.000	
10.00	10.00	9.50	80	30.0	38.0	0.10	5	3897 10.000	3898 10.000	
12.00	12.00	11.50	93	36.0	46.0	0.10	5	3897 12.000	3898 12.000	
16.00	16.00	15.50	108	48.0	58.0	0.15	5	3897 16.000	3898 16.000	
20.00	20.00	19.50	126	60.0	74.0	0.15	5	3897 20.000	3898 20.000	

Ratio end mills Superfinish RF 100 SF



P • **GÜHRING NAVIGATOR**

M • Cutting data page 157

K

N •

S •

H

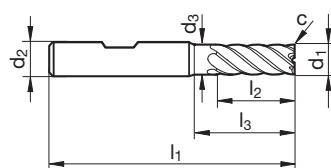
- Raptor coating
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface **(R)**

Type **NH**

Shank form **HB**



Article no. **6727**

d1 h10	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
8.00	8.00	7.70	63	19.0	26.0	0.10	6
10.00	10.00	9.50	72	22.0	30.0	0.10	6
12.00	12.00	11.50	83	26.0	36.0	0.10	6
16.00	16.00	15.50	92	32.0	42.0	0.15	6
20.00	20.00	19.50	104	38.0	52.0	0.15	6

Order no.
6727 8.000
6727 10.000
6727 12.000
6727 16.000
6727 20.000



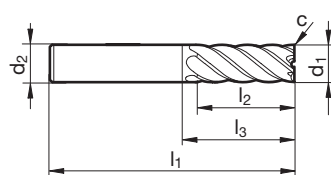
Multi-tooth end mills GH 100 U



- P** • **GÜHRING NAVIGATOR**
M • Cutting data page 159
K •
N •
S ○
H • centre cutting

Tool material	Solid carbide
Surface	F
Type	NH
Shank form	HA

Milling tools



Article no. **3691**

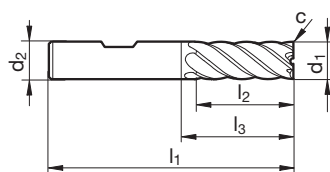
d1 k12	d2 h6	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
6.000	6.00	75.00	30.00	39.000	0.05	6	3691 6.000
8.000	8.00	100.00	40.00	64.000	0.10	6	3691 8.000
10.000	10.00	100.00	40.00	60.000	0.10	6	3691 10.000
12.000	12.00	150.00	45.00	105.000	0.10	6	3691 12.000
16.000	16.00	150.00	65.00	102.000	0.15	6	3691 16.000
20.000	20.00	150.00	65.00	100.000	0.15	8	3691 20.000
25.000	25.00	150.00	75.00	94.000	0.20	10	3691 25.000

Multi-tooth end mills GH 100 U



P • **GÜHRING NAVIGATOR**
M • Cutting data page 159
K •
N •
S ○
H • centre cutting

Tool material	Solid carbide
Surface	Ⓡ
Type	NH
Shank form	HB

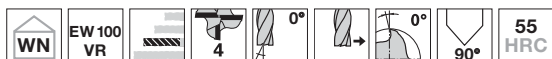


Article no. **3693**

d1 k12	d2 h6	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
4.000	6.00	65.000	16.000	18.500	0.05	6	3693 4.000
5.000	6.00	65.000	18.000	20.900	0.05	6	3693 5.000
6.000	6.00	75.000	30.000	39.000	0.05	6	3693 6.000
8.000	8.00	100.000	40.000	64.000	0.10	6	3693 8.000
10.000	10.00	100.000	40.000	60.000	0.10	6	3693 10.000
12.000	12.00	150.000	45.000	105.000	0.10	6	3693 12.000
16.000	16.00	150.000	65.000	102.000	0.15	6	3693 16.000
20.000	20.00	150.000	65.000	100.000	0.15	8	3693 20.000
25.000	25.00	150.000	75.000	94.000	0.20	10	3693 25.000
25.000	25.00	150.000	75.000	94.000	0.20	8	3693 25.001
32.000	32.00	186.000	106.000	126.000	0.30	8	3693 32.000



Front/back deburrer 90°

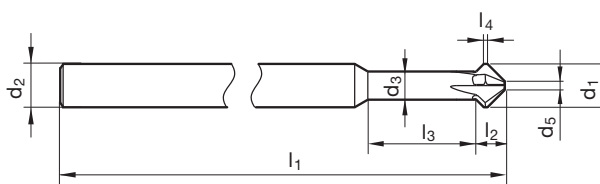


Tool material	Solid carbide
Surface	a
Type	EW 100 VR
Shank form	HA

Milling tools

P • **GÜHRING NAVIGATOR**
M • Cutting data page 161
K •
N ○
S •
H •

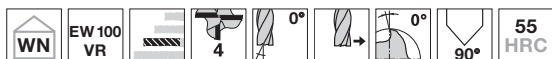
- neck clearance < Ø 6.0 mm
- without centre cutting



Article no. **495**

d1	d2 h6	d3	d5	l1	l2	l3	l4	Z	Order no.
mm	mm	mm	mm	mm	mm	mm	mm		
3.000	4.00	2.200	0.600	75.000	2.100	9.300	0.500	4	495 3.000
4.000	4.00	2.900	0.800	75.000	2.700	12.300	0.500	4	495 4.000
5.000	5.00	3.900	1.000	75.000	3.000	15.000	0.500	4	495 5.000
6.000	6.00	3.900	1.200	100.000	3.900	14.300	0.500	4	495 6.000
8.000	6.00	6.000	1.600	100.000	4.700		0.500	4	495 8.000
10.000	6.00	6.000	2.000	100.000	6.500		0.500	4	495 10.000
12.000	6.00	6.000	2.400	100.000	8.300		0.500	4	495 12.000

Front/back deburrer 90°, sets



Tool material	Solid carbide
Surface	a
Type	EW 100 VR
Shank form	HA

P • **GÜHRING NAVIGATOR**

M • Cutting data page 161

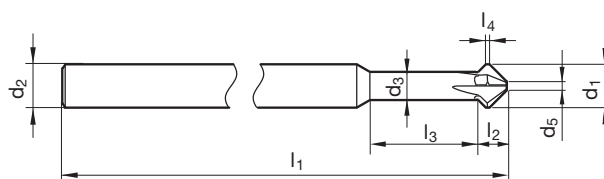
K •

N ○

S • • neck clearance < Ø 6.0 mm

H • • without centre cutting

• consisting of art. no. 495



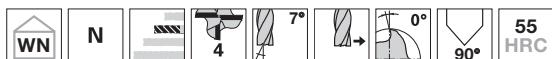
Article no. **6013**

Ø-range mm	Pieces/set
4/6/10	3
4/5/6/8/10	5

Order no.
6013 1.000
6013 2.000



Chamfering milling cutters 90°



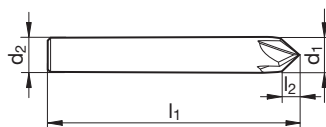
Tool material **Solid carbide**

Surface	A	A
Type	N	N
Shank form	HA	HB

Milling tools

P • **GÜHRING NAVIGATOR**
 Cutting data page 161

M •
K •
N •
S •
H ○

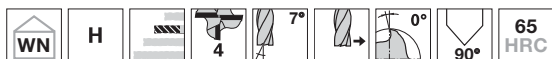


5578 **5579**

d1 js9	d2 h6	l1	l2	Z
mm	mm	mm	mm	
4.000	4.000	50.000	2.000	4
6.000	6.000	57.000	3.000	4
8.000	8.000	63.000	4.000	4
10.000	10.000	72.000	5.000	4
12.000	12.000	83.000	6.000	4

Order no.	
5578 4.000	
5578 6.000	5579 6.000
5578 8.000	5579 8.000
5578 10.000	5579 10.000
5578 12.000	5579 12.000

Chamfering milling cutters 90°



Tool material **Solid carbide**

Surface	Y	Y
Type	H	H
Shank form	HA	HB

P • **GÜHRING NAVIGATOR**

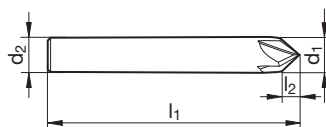
M • Cutting data page 161

K •

N •

S •

H •



6784

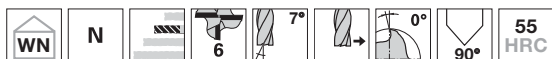
6785

d1 js9	d2 h6	l1	l2	Z
mm	mm	mm	mm	
4.000	4.000	50.000	2.000	4
6.000	6.000	57.000	3.000	4
8.000	8.000	63.000	4.000	4
10.000	10.000	72.000	5.000	4
12.000	12.000	83.000	6.000	4

Order no.	
6784 4.000	
6784 6.000	6785 6.000
6784 8.000	6785 8.000
6784 10.000	6785 10.000
6784 12.000	6785 12.000



Chamfering milling cutters 90°



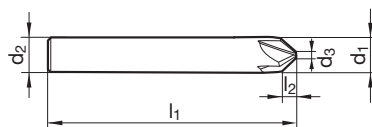
Tool material **Solid carbide**

Surface	A	A
Type	N	N
Shank form	HA	HB
	NEW	NEW

Milling tools

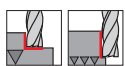
P • **GÜHRING NAVIGATOR**
M • Cutting data page 161
K •
N •
S ○
H ○

- face cutting
- without centre cutting



						Article no.	
						6786	6787
d1 js9	d2 h6	d5	l1	l6	Z	Order no.	
mm	mm	mm	mm	mm			
6.000	6.000	1.500	57.000	2.250	6	6786 6.000	6787 6.000
8.000	8.000	2.000	63.000	3.000	6	6786 8.000	6787 8.000
10.000	10.000	3.000	72.000	3.500	6	6786 10.000	6787 10.000
12.000	12.000	3.000	83.000	4.500	6	6786 12.000	6787 12.000
16.000	16.000	4.000	92.000	6.000	6	6786 16.000	6787 16.000
20.000	20.000	6.000	92.000	7.000	6	6786 20.000	6787 20.000

90° Chamfering milling cutters SpyroTec



P	•
M	•
K	○
N	•
S	•
H	

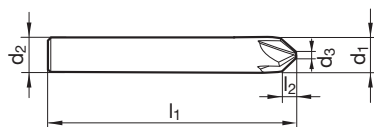
GÜHRING NAVIGATOR

Cutting data page 161

- face cutting
- without centre cutting

Tool material **Solid carbide**

Surface	A	A
Type	N	N
Shank form	HA	HB

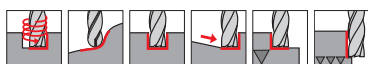


Article no. **6992** **6993**

d1 js9	d2 h6	d3	l1	l2	Z	Order no.	
mm	mm	mm	mm	mm			
6.000	6.000	1.500	57.000	2.250	5	6992 6.000	6993 6.000
8.000	8.000	2.000	63.000	3.000	5	6992 8.000	6993 8.000
10.000	10.000	2.500	72.000	3.750	5	6992 10.000	6993 10.000
12.000	12.000	3.000	83.000	4.500	5	6992 12.000	6993 12.000
16.000	16.000	4.000	92.000	6.000	5	6992 16.000	6993 16.000
20.000	20.000	5.000	104.000	7.500	5	6992 20.000	6993 20.000



Ball nose end mills GA 200 A



P **GÜHRING NAVIGATOR**
Cutting data page 153

M

K

N •

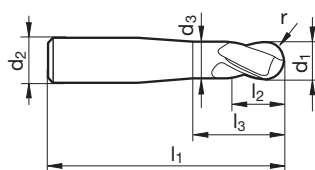
S

H • neck clearance
• centre cutting

Tool material	Solid carbide
Surface	ⓐ
Type	W
Shank form	HA



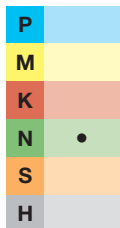
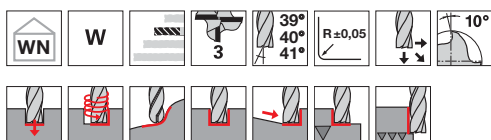
Milling tools



Article no. **6984**

d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
3.00	6.00	2.80	57	4.0	15.0	1.5	2	6984 3.000
4.00	6.00	3.80	57	5.0	18.0	2.0	2	6984 4.000
5.00	6.00	4.80	57	6.0	18.0	2.5	2	6984 5.000
6.00	6.00	5.70	57	7.0	20.0	3.0	2	6984 6.000
8.00	8.00	7.70	63	9.0	26.0	4.0	2	6984 8.000
10.00	10.00	9.50	72	11.0	30.0	5.0	2	6984 10.000
12.00	12.00	11.50	83	12.0	36.0	6.0	2	6984 12.000
16.00	16.00	15.50	92	16.0	42.0	8.0	2	6984 16.000

Ratio end mills Alu RF 100 A

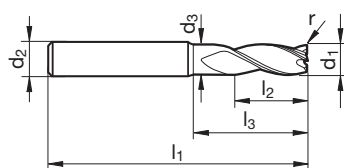


GÜHRING NAVIGATOR

Cutting data page 157

- nano polished cutting edges
- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	○	○
Type	W	W
Shank form	HA	HB

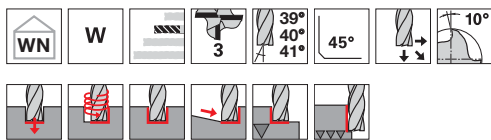


Article no. **3599** **6729**

d1 e8	d2 h6	d3	l1	l2	l3	r	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm			
6.00	6.00	5.70	57	13.0	20.0	0.500	3	3599 6.005	6729 6.005
6.00	6.00	5.70	57	13.0	20.0	1.000	3	3599 6.010	6729 6.010
8.00	8.00	7.70	63	19.0	26.0	0.500	3	3599 8.005	6729 8.005
8.00	8.00	7.70	63	19.0	26.0	1.000	3	3599 8.010	6729 8.010
10.00	10.00	9.50	72	22.0	30.0	0.500	3	3599 10.005	6729 10.005
10.00	10.00	9.50	72	22.0	30.0	1.000	3	3599 10.010	6729 10.010
10.00	10.00	9.50	72	22.0	30.0	1.500	3	3599 10.015	6729 10.015
12.00	12.00	11.50	83	26.0	36.0	0.500	3	3599 12.005	6729 12.005
12.00	12.00	11.50	83	26.0	36.0	1.000	3	3599 12.010	6729 12.010
12.00	12.00	11.50	83	26.0	36.0	1.500	3	3599 12.015	6729 12.015
12.00	12.00	11.50	83	26.0	36.0	2.000	3	3599 12.020	6729 12.020
12.00	12.00	11.50	83	26.0	36.0	2.500	3	3599 12.025	6729 12.025
12.00	12.00	11.50	83	26.0	36.0	3.000	3	3599 12.030	6729 12.030
12.00	12.00	11.50	83	26.0	36.0	4.000	3	3599 12.040	6729 12.040
16.00	16.00	15.50	92	32.0	42.0	1.000	3	3599 16.010	6729 16.010
16.00	16.00	15.50	92	32.0	42.0	2.000	3	3599 16.020	6729 16.020
16.00	16.00	15.50	92	32.0	42.0	2.500	3	3599 16.025	6729 16.025
16.00	16.00	15.50	92	32.0	42.0	3.000	3	3599 16.030	6729 16.030
16.00	16.00	15.50	92	32.0	42.0	4.000	3	3599 16.040	6729 16.040
20.00	20.00	19.50	104	38.0	52.0	1.000	3	3599 20.010	6729 20.010
20.00	20.00	19.50	104	38.0	52.0	2.000	3	3599 20.020	6729 20.020
20.00	20.00	19.50	104	38.0	52.0	2.500	3	3599 20.025	6729 20.025
20.00	20.00	19.50	104	38.0	52.0	3.000	3	3599 20.030	6729 20.030
20.00	20.00	19.50	104	38.0	52.0	4.000	3	3599 20.040	6729 20.040
25.00	25.00	24.00	121	45.0	63.0	2.000	3	3599 25.020	6729 25.020
25.00	25.00	24.00	121	45.0	63.0	3.000	3	3599 25.030	6729 25.030
25.00	25.00	24.00	121	45.0	63.0	4.000	3	3599 25.040	6729 25.040



Ratio end mills Alu RF 100 A



P	
M	
K	
N	•
S	
H	

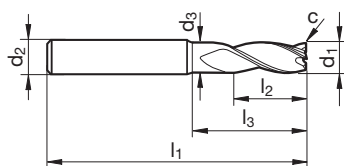
GÜHRING NAVIGATOR

Cutting data page 157

- nano polished cutting edges
- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	ⓐ	ⓐ
Type	W	W
Shank form	HA	HB

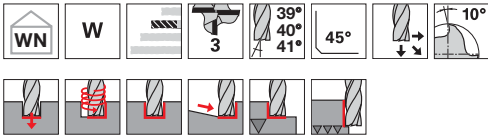
Milling tools



Article no. **6978** **6979**

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
3.00	6.00	2.80	57	8.0	15.0	0.030	3	6978 3.000	6979 3.000
4.00	6.00	3.80	57	11.0	18.0	0.040	3	6978 4.000	6979 4.000
5.00	6.00	4.80	57	13.0	18.0	0.050	3	6978 5.000	6979 5.000
6.00	6.00	5.70	57	13.0	20.0	0.060	3	6978 6.000	6979 6.000
8.00	8.00	7.70	63	19.0	26.0	0.080	3	6978 8.000	6979 8.000
10.00	10.00	9.50	72	22.0	30.0	0.100	3	6978 10.000	6979 10.000
12.00	12.00	11.50	83	26.0	36.0	0.120	3	6978 12.000	6979 12.000
16.00	16.00	15.50	92	32.0	42.0	0.160	3	6978 16.000	6979 16.000
20.00	20.00	19.50	104	38.0	52.0	0.200	3	6978 20.000	6979 20.000

Ratio end mills Alu RF 100 A

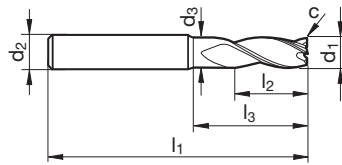


P **GÜHRING NAVIGATOR**
Cutting data page 157

- M**
- K**
- N** •
- S**
- H**

- nano polished cutting edges
- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	○	○
Type	W	W
Shank form	HA	HB

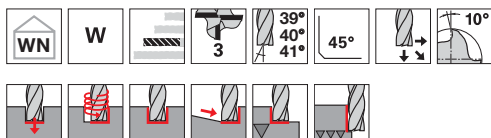


Article no. **3472** **6702**

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
3.00	6.00	2.80	57	8.0	15.0	0.030	3	3472 3.000	6702 3.000
4.00	6.00	3.80	57	11.0	18.0	0.040	3	3472 4.000	6702 4.000
5.00	6.00	4.80	57	13.0	18.0	0.050	3	3472 5.000	6702 5.000
6.00	6.00	5.70	57	13.0	20.0	0.060	3	3472 6.000	6702 6.000
8.00	8.00	7.70	63	19.0	26.0	0.080	3	3472 8.000	6702 8.000
10.00	10.00	9.50	72	22.0	30.0	0.100	3	3472 10.000	6702 10.000
12.00	12.00	11.50	83	26.0	36.0	0.120	3	3472 12.000	6702 12.000
16.00	16.00	15.50	92	32.0	42.0	0.160	3	3472 16.000	6702 16.000
20.00	20.00	19.50	104	38.0	52.0	0.200	3	3472 20.000	6702 20.000



Ratio end mills Alu RF 100 A



P	
M	
K	
N	•
S	
H	

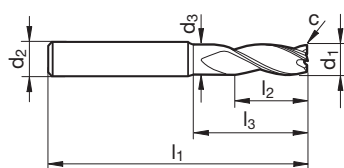
GÜHRING NAVIGATOR

Cutting data page 157

- nano polished cutting edges
- neck clearance
- centre cutting

Tool material	Solid carbide	
Surface	○	○
Type	W	W
Shank form	HA	HB

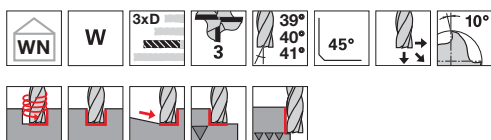
Milling tools



Article no. **3473** **6703**

d1 e8	d2 h6	d3	l1	l2	l3	c	Z	Order no.	
mm	mm	mm	mm	mm	mm	mm x 45°			
6.00	6.00	5.50	65	13.0	28.0	0.060	3	3473 6.000	6703 6.000
8.00	8.00	7.50	75	19.0	38.0	0.080	3	3473 8.000	6703 8.000
10.00	10.00	9.20	80	22.0	38.0	0.100	3	3473 10.000	6703 10.000
12.00	12.00	11.20	93	26.0	46.0	0.120	3	3473 12.000	6703 12.000
16.00	16.00	15.00	108	32.0	58.0	0.160	3	3473 16.000	6703 16.000
20.00	20.00	19.00	126	38.0	74.0	0.200	3	3473 20.000	6703 20.000

Ratio end mills Alu RF 100 A



P	
M	
K	
N	•
S	
H	

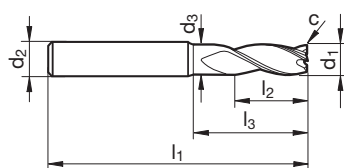
GÜHRING NAVIGATOR

Cutting data page 157

- nano polished cutting edges
- re-inforced core
- neck clearance
- centre cutting

Tool material **Solid carbide**

Surface	○	○
Type	W	W
Shank form	HA	HB



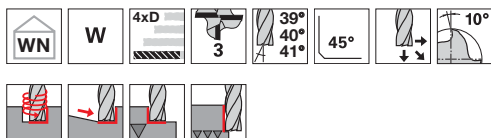
Article no. **6730** **6731**

d1 e8	d2 h6	d3	l1	l2	l3	c	Z
mm	mm	mm	mm	mm	mm	mm x 45°	
5.000	6.000	4.800	57.000	15.000	19.400	0.050	3
6.000	6.000	5.700	65.000	18.000	28.000	0.060	3
8.000	8.000	7.700	75.000	24.000	38.000	0.080	3
10.000	10.000	9.500	80.000	30.000	38.000	0.100	3
12.000	12.000	11.500	93.000	36.000	46.000	0.120	3
16.000	16.000	15.500	108.000	48.000	58.000	0.160	3
20.000	20.000	19.500	126.000	60.000	74.000	0.200	3

Order no.	
6730 5.000	6731 5.000
6730 6.000	6731 6.000
6730 8.000	6731 8.000
6730 10.000	6731 10.000
6730 12.000	6731 12.000
6730 16.000	6731 16.000
6730 20.000	6731 20.000



Ratio end mills Alu RF 100 A



P	
M	
K	
N	•
S	
H	

GÜHRING NAVIGATOR

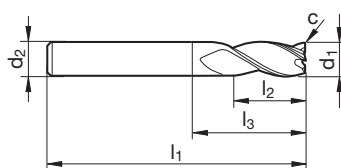
Cutting data page 157

- nano polished cutting edges
- re-inforced core
- centre cutting

Tool material	Solid carbide	
Surface	○	○
Type	W	W
Shank form	HA	HB



Milling tools



Article no.

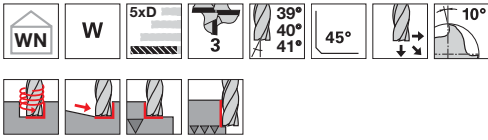
6732

6733

d1 e8	d2 h6	l1	l2	l4	c	Z
mm	mm	mm	mm	mm	mm x 45°	
6.000	6.00	65.00	24.00	29.0	0.060	3
8.000	8.00	75.00	32.00	39.0	0.080	3
10.000	10.00	100.00	40.00	60.0	0.100	3
12.000	12.00	100.00	48.00	55.0	0.120	3
16.000	16.00	125.00	64.00	77.0	0.160	3
20.000	20.00	150.00	80.00	100.0	0.200	3

Order no.	
6732 6.000	6733 6.000
6732 8.000	6733 8.000
6732 10.000	6733 10.000
6732 12.000	6733 12.000
6732 16.000	6733 16.000
6732 20.000	6733 20.000

Ratio end mills Alu RF 100 A

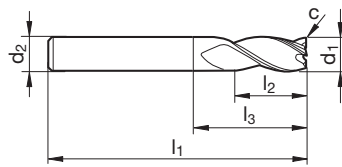


P	
M	
K	
N	•
S	
H	

GÜHRING NAVIGATOR
Cutting data page 157

- nano polished cutting edges
- re-inforced core
- centre cutting

Tool material	Solid carbide	
Surface	○	○
Type	W	W
Shank form	HA	HB

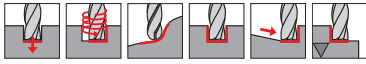


Article no. **6734** **6735**

d1 e8	d2 h6	l1	l2	l4	c	Z	Order no.	
mm	mm	mm	mm	mm	mm x 45°			
6.000	6.00	75.00	30.00	39.0	0.060	3	6734 6.000	6735 6.000
8.000	8.00	86.00	40.00	50.0	0.080	3	6734 8.000	6735 8.000
10.000	10.00	100.00	50.00	60.0	0.100	3	6734 10.000	6735 10.000
12.000	12.00	120.00	60.00	75.0	0.120	3	6734 12.000	6735 12.000
16.000	16.00	150.00	80.00	102.0	0.160	3	6734 16.000	6735 16.000
20.000	20.00	175.00	100.00	125.0	0.200	3	6734 20.000	6735 20.000



Ball nose slot drills (2-fluted)



P	
M	
K	
N	•
S	
H	

GÜHRING NAVIGATOR

Cutting data page 153

- for fibre composite plastics
- for graphite
- centre cutting

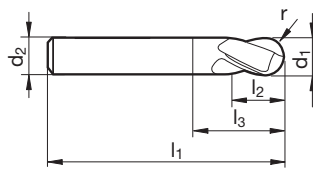
Tool material **Solid carbide**

Surface **Ⓧ**

Type **N**

Shank form **HA**

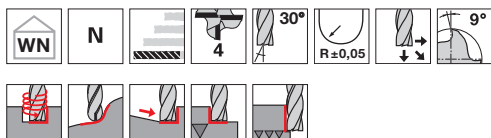
Milling tools



Article no. **6724**

d1 k12	d2 h6	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm		
3.00	6.00	57	7.0	11.9	1.500	2	6724 3.000
4.00	6.00	57	8.0	13.4	2.000	2	6724 4.000
5.00	6.00	57	10.0	16.9	2.500	2	6724 5.000
6.00	6.00	57	10.0	21.0	3.000	2	6724 6.000
8.00	8.00	63	16.0	27.0	4.000	2	6724 8.000
10.00	10.00	72	19.0	32.0	5.000	2	6724 10.000
12.00	12.00	83	22.0	38.0	6.000	2	6724 12.000

Ball nose end mills (4-fluted)



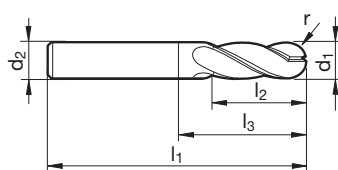
P	
M	
K	
N	•
S	
H	

GÜHRING NAVIGATOR

Cutting data page 153

- for fibre composite plastics
- for graphite
- centre cutting

Tool material	Solid carbide
Surface	Ⓟ
Type	N
Shank form	HA

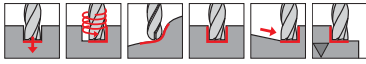


Article no. **6725**

d1 k12	d2 h6	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm		
3.000	3.000	75.000	20.000	47.000	1.500	4	6725 3.000
4.000	4.000	75.000	25.000	47.000	2.000	4	6725 4.000
5.000	5.000	75.000	30.000	47.000	2.500	4	6725 5.000
6.000	6.000	75.000	30.000	39.000	3.000	4	6725 6.000
8.000	8.000	100.000	40.000	64.000	4.000	4	6725 8.000
10.000	10.000	100.000	40.000	60.000	5.000	4	6725 10.000
12.000	12.000	150.000	45.000	105.000	6.000	4	6725 12.000



Slot drills with corner radius (2-fluted)



P **GÜHRING NAVIGATOR**

M Cutting data page 161

- K**
- N** •
- S**
- H**

- for fibre composite plastics
- for graphite
- centre cutting

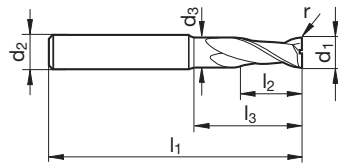
Tool material **Solid carbide**

Surface **Ⓧ**

Type **N**

Shank form **HA**

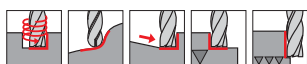
Milling tools



Article no. **6722**

d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
6.00	6.00	5.70	57	10.0	20.0	0.500	2	6722 6.005
6.00	6.00	5.70	57	10.0	20.0	1.000	2	6722 6.010
8.00	8.00	7.70	63	16.0	26.0	0.500	2	6722 8.005
8.00	8.00	7.70	63	16.0	26.0	1.000	2	6722 8.010
10.00	10.00	9.50	72	19.0	30.0	0.500	2	6722 10.005
10.00	10.00	9.50	72	19.0	30.0	1.000	2	6722 10.010
12.00	12.00	11.50	83	22.0	36.0	0.500	2	6722 12.005
12.00	12.00	11.50	83	22.0	36.0	1.000	2	6722 12.010

End mills with corner radius (4-fluted)



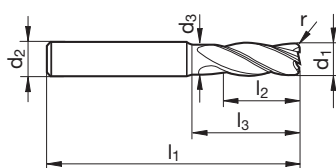
P **GÜHRING NAVIGATOR**

M Cutting data page 161

- K**
- N** •
- S**
- H**

- for fibre composite plastics
- for graphite
- neck clearance
- centre cutting

Tool material	Solid carbide
Surface	ⓓ
Type	N
Shank form	HA

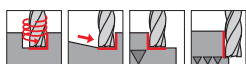


Article no. **6723**

d1 h10	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm	mm	mm	mm	mm	mm	mm		
6.000	6.000	5.700	57.000	13.000	20.000	0.500	4	6723 6.005
6.000	6.000	5.700	57.000	13.000	20.000	1.000	4	6723 6.010
8.000	8.000	7.700	63.000	19.000	26.000	0.500	4	6723 8.005
8.000	8.000	7.700	63.000	19.000	26.000	1.000	4	6723 8.010
10.000	10.000	9.500	72.000	22.000	30.000	0.500	4	6723 10.005
10.000	10.000	9.500	72.000	22.000	30.000	1.000	4	6723 10.010
12.000	12.000	11.500	83.000	26.000	36.000	0.500	4	6723 12.005
12.000	12.000	11.500	83.000	26.000	36.000	1.000	4	6723 12.010



Slot drills XL (3-fluted)



P **GÜHRING NAVIGATOR**

M Cutting data page 161

K

N •

S

H

- for fibre composite plastics
- for graphite
- centre cutting

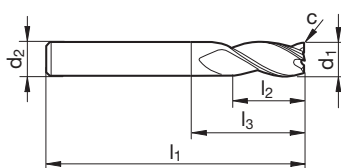
Tool material **Solid carbide**

Surface **Ⓟ**

Type **N**

Shank form **HA**

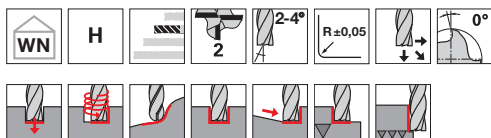
Milling tools



Article no. **6721**

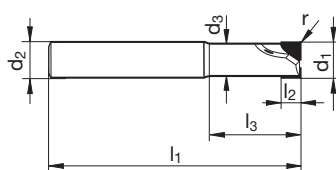
d1 h10	d2 h6	l1	l2	l3	c	Z	Order no.
mm	mm	mm	mm	mm	mm x 45°		
3.000	3.00	75.000	20.000	47.000	0.050	3	6721 3.000
4.000	4.00	75.000	25.000	47.000	0.050	3	6721 4.000
5.000	5.00	75.000	30.000	47.000	0.050	3	6721 5.000
6.000	6.00	75.000	30.000	39.000	0.050	3	6721 6.000
8.000	8.00	100.000	40.000	64.000	0.100	3	6721 8.000
10.000	10.00	100.000	40.000	60.000	0.100	3	6721 10.000
12.000	12.00	150.000	45.000	105.000	0.100	3	6721 12.000
16.000	16.00	150.000	65.000	102.000	0.150	3	6721 16.000

PCD slot drills (2-fluted)



P	GÜHRING NAVIGATOR
M	Cutting data page 161
K	• for fibre composite plastics
N	• for graphite
S	• with internal cooling
H	• neck clearance
	• centre cutting
	• other corner radii on request

Tool material	PCD
Surface	○
Type	H
Shank form	HA

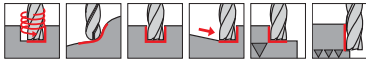


Article no. **5492**

d1	d1	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm		mm	mm	mm	mm	mm	mm		
4.00	± 0,02	6.00	3.70	51	6.0	14.0	0.1	2	5492 4.000
5.00	± 0,02	6.00	4.70	51	8.0	14.5	0.1	2	5492 5.000
6.00	± 0,02	6.00	5.70	57	8.0	20.0	0.1	2	5492 6.000
8.00	± 0,02	8.00	7.40	63	8.0	26.0	0.1	2	5492 8.000
8.00	± 0,02	8.00	7.40	63	12.0	26.0	0.1	2	5492 8.001
10.00	± 0,02	10.00	9.40	72	8.0	30.0	0.1	2	5492 10.000
10.00	± 0,02	10.00	9.40	72	16.0	30.0	0.1	2	5492 10.001
12.00	± 0,02	12.00	11.20	83	8.0	36.0	0.1	2	5492 12.000
12.00	± 0,02	12.00	11.20	83	16.0	36.0	0.1	2	5492 12.001
14.00	± 0,02	14.00	13.00	83	8.0	36.0	0.1	2	5492 14.000
14.00	± 0,02	14.00	13.00	83	16.0	36.0	0.1	2	5492 14.001
16.00	± 0,02	16.00	15.00	100	12.0	50.0	0.1	2	5492 16.000
16.00	± 0,02	16.00	15.00	100	20.0	50.0	0.1	2	5492 16.001
18.00	± 0,02	18.00	17.00	100	12.0	50.0	0.1	2	5492 18.000
18.00	± 0,02	18.00	17.00	100	20.0	50.0	0.1	2	5492 18.001
20.00	± 0,02	20.00	19.00	100	12.0	48.0	0.1	2	5492 20.000
20.00	± 0,02	20.00	19.00	100	20.0	48.0	0.1	2	5492 20.001



PCD slot drills (2-fluted)



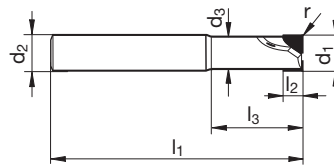
P **GÜHRING NAVIGATOR**

M Cutting data page 161

- K** • for fibre composite plastics
- N** • for graphite
- S** • with internal cooling
- H** • neck clearance
- centre cutting
- other corner radii on request

Tool material	PCD
Surface	○
Type	H
Shank form	cyl.

Milling tools



Article no. **5493**

d1	d1	d2 h6	d3	l1	l2	l3	r	Z	Order no.
mm		mm	mm	mm	mm	mm	mm		
4.000	± 0,02	6.000	3.700	70.000	6.000	14.000	0.100	2	5493 4.000
5.000	± 0,02	6.000	4.700	70.000	8.000	14.500	0.100	2	5493 5.000
6.000	± 0,02	6.000	5.700	75.000	8.000	20.000	0.100	2	5493 6.000
8.000	± 0,02	8.000	7.400	100.000	8.000	26.000	0.100	2	5493 8.000
8.000	± 0,02	8.000	7.400	100.000	12.000	26.000	0.100	2	5493 8.001
10.000	± 0,02	10.000	9.400	100.000	8.000	30.000	0.100	2	5493 10.000
10.000	± 0,02	10.000	9.400	100.000	16.000	30.000	0.100	2	5493 10.001
12.000	± 0,02	12.000	11.200	100.000	8.000	36.000	0.100	2	5493 12.000
12.000	± 0,02	12.000	11.200	100.000	16.000	36.000	0.100	2	5493 12.001
14.000	± 0,02	14.000	13.000	100.000	8.000	36.000	0.100	2	5493 14.000
14.000	± 0,02	14.000	13.000	100.000	16.000	36.000	0.100	2	5493 14.001
16.000	± 0,02	16.000	15.000	150.000	12.000	50.000	0.100	2	5493 16.000
16.000	± 0,02	16.000	15.000	150.000	20.000	50.000	0.100	2	5493 16.001
18.000	± 0,02	18.000	17.000	125.000	12.000	50.000	0.100	2	5493 18.000
18.000	± 0,02	18.000	17.000	125.000	20.000	50.000	0.100	2	5493 18.001
18.000	± 0,02	18.000	17.000	150.000	12.000	50.000	0.100	2	5493 18.002
18.000	± 0,02	18.000	17.000	150.000	20.000	50.000	0.100	2	5493 18.003
20.000	± 0,02	20.000	19.000	150.000	12.000	48.000	0.100	2	5493 20.000
20.000	± 0,02	20.000	19.000	150.000	20.000	48.000	0.100	2	5493 20.001

Milling conditions:

stable machining conditions
low cutting depth, high cutting values

long tools

Correction factors:

medium length tools

Vc -25% fz -25%
ap max. -20%

extra length tools

Vc -50% fz -50%
ap max. -50%





Table with 13 columns: Material, Hardness, Application, ae max., Vc, fz (mm/tooth) with nom. Ø (1-16). Rows include Struct/free-cutting steels, Free-cutting steels, Alloyed heat-treatable, Hardened steel, Stainless steel, Special alloys, Titanium alloys, and Cast/grey cast iron.



Table with 10 columns: Material, Hardness, ap max. (mm) with nom. Ø (1-16). Rows include P, K, H, M, and S materials with specific hardness levels.

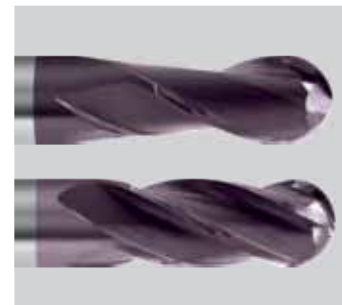


Milling conditions:

	stable machining conditions low cutting depth, high cutting values
	long tools

Correction factors:

	extra length tools	v_c -50%	f_z -50%
	uncoated tools	v_c -50%	f_z -25%



Milling tools

Material	Hardness	Type	Application	ap/ae max.	Vc	fz (mm/tooth) with nom. Ø										
						1	2	4	5	6	8	10	12	16		
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	Z2/Z4	Roughing	0.10xD	175	0.004	0.008	0.016	0.020	0.025	0.034	0.04	0.05	0.07		
		Z2/Z4	(Pre-)Finishing	0.03xD	250	0.003	0.006	0.011	0.014	0.018	0.024	0.03	0.04	0.05		
		Z2/Z4	Fine finishing	0.01xD	280	0.002	0.005	0.010	0.012	0.015	0.020	0.03	0.03	0.04		
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5710 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	Z2/Z4	Roughing	0xD	175	0.004	0.008	0.016	0.020	0.025	0.034	0.04	0.05	0.07		
		Z2/Z4	(Pre-)Finishing	0.03xD	250	0.003	0.006	0.011	0.014	0.018	0.024	0.03	0.04	0.05		
		Z2/Z4	Fine finishing	0.02xD	280	0.003	0.005	0.010	0.013	0.016	0.022	0.03	0.03	0.04		
Alloyed heat-treatable. tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	Z2/Z4	Roughing	0xD	140	0.004	0.008	0.015	0.019	0.024	0.032	0.04	0.05	0.06		
		Z2/Z4	(Pre-)Finishing	0.02xD	220	0.003	0.005	0.011	0.013	0.017	0.022	0.03	0.03	0.04		
		Z2/Z4	Fine finishing	0.02xD	220	0.002	0.005	0.010	0.012	0.016	0.021	0.03	0.03	0.04		
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2	≤ 55 HRC															
	55-65 HRC															
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	Z2/Z4	Roughing	0.10xD	120	0.004	0.007	0.014	0.018	0.023	0.030	0.04	0.05	0.06		
		Z2/Z4	(Pre-)Finishing	0.03xD	170	0.003	0.005	0.010	0.013	0.016	0.021	0.03	0.03	0.04		
		Z2/Z4	Fine finishing	0.01xD	190	0.002	0.004	0.009	0.011	0.014	0.018	0.02	0.03	0.04		
Stainless steel 1.4301 X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	Z2/Z4	Roughing	0.10xD	90	0.003	0.007	0.013	0.017	0.021	0.028	0.04	0.04	0.06		
		Z2/Z4	(Pre-)Finishing	0.03xD	130	0.002	0.005	0.009	0.012	0.015	0.020	0.02	0.03	0.04		
		Z2/Z4	Fine finishing	0.01xD	140	0.002	0.004	0.008	0.010	0.013	0.017	0.02	0.03	0.03		
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	Z2/Z4	Roughing	0.10xD	55	0.003	0.006	0.012	0.016	0.020	0.026	0.03	0.04	0.05		
		Z2/Z4	(Pre-)Finishing	0.02xD	80	0.002	0.004	0.009	0.011	0.014	0.018	0.02	0.03	0.04		
		Z2/Z4	Fine finishing	0.01xD	100	0.002	0.004	0.007	0.009	0.012	0.016	0.02	0.02	0.03		
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	Z2/Z4	Roughing	0.10xD	30	0.003	0.005	0.010	0.013	0.017	0.022	0.03	0.03	0.04		
		Z2/Z4	(Pre-)Finishing	0.02xD	40	0.002	0.004	0.007	0.009	0.012	0.016	0.02	0.02	0.03		
		Z2/Z4	Fine finishing	0.01xD	50	0.002	0.003	0.006	0.008	0.010	0.013	0.02	0.02	0.03		
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	Z2/Z4	Roughing	0.10xD	55	0.004	0.007	0.014	0.018	0.023	0.030	0.04	0.05	0.06		
		Z2/Z4	(Pre-)Finishing	0.02xD	80	0.003	0.005	0.010	0.013	0.016	0.021	0.03	0.03	0.04		
		Z2/Z4	Fine finishing	0.01xD	100	0.002	0.004	0.009	0.011	0.014	0.018	0.02	0.03	0.04		
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	≤ 240 HB	Z2/Z4	Roughing	0.10xD	140	0.004	0.008	0.016	0.020	0.025	0.034	0.04	0.05	0.07		
		Z2/Z4	(Pre-)Finishing	0.03xD	200	0.003	0.006	0.011	0.014	0.018	0.024	0.03	0.04	0.05		
		Z2/Z4	Fine finishing	0.01xD	230	0.002	0.005	0.010	0.012	0.015	0.020	0.03	0.03	0.04		
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	≥ 240 HB	Z2/Z4	Roughing	0.10xD	110	0.004	0.008	0.015	0.019	0.024	0.032	0.04	0.05	0.06		
		Z2/Z4	(Pre-)Finishing	0.02xD	170	0.003	0.005	0.011	0.013	0.017	0.022	0.03	0.03	0.04		
		Z2/Z4	Fine finishing	0.01xD	190	0.002	0.005	0.009	0.011	0.014	0.019	0.02	0.03	0.04		
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 7% Si															
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 7% Si	Z2/Z4	Roughing	0.10xD	200	0.005	0.010	0.019	0.024	0.030	0.040	0.05	0.06	0.08		
		Z2/Z4	(Pre-)Finishing	0.03xD	280	0.003	0.007	0.013	0.017	0.021	0.028	0.04	0.04	0.06		
		Z2/Z4	Fine finishing	0.01xD	400	0.003	0.006	0.012	0.014	0.018	0.024	0.03	0.04	0.05		
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-															
Non-ferr. met. (copper, short-/long-chipp., brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPB 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPB, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	Z2/Z4	Roughing	0.10xD	175	0.004	0.008	0.015	0.019	0.024	0.032	0.04	0.05	0.06		
		Z2/Z4	(Pre-)Finishing	0.03xD	250	0.003	0.005	0.011	0.013	0.017	0.022	0.03	0.03	0.04		
		Z2/Z4	Fine finishing	0.01xD	200	0.002	0.005	0.009	0.011	0.014	0.019	0.02	0.03	0.04		



SLOTING

Material/ISO material	Hardness	a _p max.	a _e max.	v _c	f _z (mm/tooth) with nom. Ø							
					4	5	6	8	10	12	16	20
Struct./free-cutting steels, unall. heat-treat./case hard. steels	≤ 850 N/mm ²	1xD	1xD	270	0.017	0.021	0.025	0.034	0.050	0.060	0.080	0.100
P Free-cutting steels, unalloyed case hard. steels, nitr. steels	850-1200 N/mm ²	1xD	1xD	230	0.017	0.021	0.025	0.034	0.050	0.060	0.080	0.100
Alloyed heat-treatable, tool and high speed steels	850-1400 N/mm ²	1xD	1xD	180	0.014	0.018	0.021	0.028	0.045	0.054	0.072	0.090
M Stainless steel - easy to machine / sulphured	≤ 750 N/mm ²	1xD	1xD	120	0.014	0.018	0.021	0.028	0.045	0.054	0.072	0.090
Stainless steel - moderately difficult to machine	750-950 N/mm ²	1xD	1xD	80	0.013	0.016	0.019	0.026	0.040	0.048	0.064	0.080
K Cast iron, grey cast iron, spher. graphite/malleable cast iron	≥ 240 HB	1xD	1xD	150	0.017	0.021	0.025	0.034	0.050	0.060	0.080	0.100
N Aluminium, Al-wrought alloys, Al-alloys	≤ 7% Si	1xD	1xD	500	0.022	0.028	0.033	0.044	0.065	0.078	0.104	0.130
Aluminium-cast alloys	≥ 7% Si	1xD	1xD	340	0.018	0.023	0.027	0.036	0.055	0.066	0.088	0.110
S Titanium, Titanium alloys	≤ 1300 N/mm ²	1xD	1xD	60	0.013	0.016	0.019	0.026	0.040	0.048	0.064	0.080

HPC ROUGHING

Material/ISO material	Hardness	a _p max.	a _e max.	v _c	f _z (mm/tooth) with nom. Ø							
					4	5	6	8	10	12	16	20
Struct./free-cutting steels, unall. heat-treat./case hard. steels	≤ 850 N/mm ²	1.5xD	0.40xD	350	0.021	0.026	0.032	0.042	0.063	0.075	0.100	0.125
P Free-cutting steels, unalloyed case hard. steels, nitr. steels	850-1200 N/mm ²	1.5xD	0.40xD	290	0.021	0.026	0.032	0.042	0.063	0.075	0.100	0.125
Alloyed heat-treatable, tool and high speed steels	850-1400 N/mm ²	1.5xD	0.33xD	260	0.018	0.023	0.027	0.036	0.059	0.070	0.094	0.117
M Stainless steel - easy to machine / sulphured	≤ 750 N/mm ²	1.5xD	0.33xD	160	0.018	0.023	0.027	0.036	0.059	0.070	0.094	0.117
Stainless steel - moderately difficult to machine	750-950 N/mm ²	1.5xD	0.25xD	120	0.019	0.024	0.029	0.038	0.060	0.072	0.096	0.120
K Cast iron, grey cast iron, spher. graphite/malleable cast iron	≥ 240 HB	1.5xD	0.40xD	190	0.021	0.026	0.032	0.042	0.063	0.075	0.100	0.125
N Aluminium, Al-wrought alloys, Al-alloys	≤ 7% Si	1.5xD	0.40xD	600	0.028	0.034	0.041	0.055	0.081	0.098	0.130	0.163
Aluminium-cast alloys	≥ 7% Si	1.5xD	0.40xD	440	0.023	0.028	0.034	0.045	0.069	0.083	0.110	0.138
S Titanium, Titanium alloys	≤ 1300 N/mm ²	1.5xD	0.33xD	110	0.017	0.021	0.025	0.033	0.052	0.062	0.083	0.104

HPC FINISHING

Material/ISO material	Hardness	a _p max.	a _e max.	v _c	f _z (mm/tooth) with nom. Ø							
					4	5	6	8	10	12	16	20
Struct./free-cutting steels, unall. heat-treat./case hard. steels	≤ 850 N/mm ²	2xD	0,02xD	540	0.018	0.023	0.028	0.037	0.055	0.066	0.088	0.110
P Free-cutting steels, unalloyed case hard. steels, nitr. steels	850-1200 N/mm ²	2xD	0,02xD	460	0.018	0.023	0.028	0.037	0.055	0.066	0.088	0.110
Alloyed heat-treatable, tool and high speed steels	850-1400 N/mm ²	2xD	0,02xD	350	0.015	0.019	0.023	0.031	0.050	0.059	0.079	0.099
M Stainless steel - easy to machine / sulphured	≤ 750 N/mm ²	2xD	0,02xD	220	0.015	0.019	0.023	0.031	0.050	0.059	0.079	0.099
Stainless steel - moderately difficult to machine	750-950 N/mm ²	2xD	0,02xD	160	0.014	0.018	0.021	0.028	0.044	0.053	0.070	0.088
K Cast iron, grey cast iron, spher. graphite/malleable cast iron	≥ 240 HB	2xD	0,02xD	300	0.018	0.023	0.028	0.037	0.055	0.066	0.088	0.110
N Aluminium, Al-wrought alloys, Al-alloys	≤ 7% Si	2xD	0,02xD	1000	0.024	0.030	0.036	0.048	0.072	0.086	0.114	0.143
Aluminium-cast alloys	≥ 7% Si	2xD	0,02xD	680	0.020	0.025	0.030	0.040	0.061	0.073	0.097	0.121
S Titanium, Titanium alloys	≤ 1300 N/mm ²	2xD	0,02xD	130	0.014	0.018	0.021	0.028	0.044	0.053	0.070	0.088

RAMPING, HELIX, GROOVING

Material/ISO material	Hardness	a _p	max. ramping angle	v _c	f _z (mm/tooth) with nom. Ø							
					4	5	6	8	10	12	16	20
Struct./free-cutting steels, unall. heat-treat./case hard. steels	≤ 850 N/mm ²	1xD	45°	270	0.015	0.019	0.023	0.030	0.045	0.054	0.072	0.090
P Free-cutting steels, unalloyed case hard. steels, nitr. steels	850-1200 N/mm ²	1xD	45°	230	0.013	0.017	0.020	0.026	0.040	0.048	0.064	0.080
Alloyed heat-treatable, tool and high speed steels	850-1400 N/mm ²	1xD	30°	180	0.011	0.014	0.017	0.022	0.030	0.036	0.048	0.060
M Stainless steel - easy to machine / sulphured	≤ 750 N/mm ²	1xD	10°	120	0.009	0.012	0.014	0.018	0.030	0.036	0.048	0.060
Stainless steel - moderately difficult to machine	750-950 N/mm ²	1xD	5°	80	0.007	0.009	0.011	0.014	0.025	0.030	0.040	0.050
K Cast iron, grey cast iron, spher. graphite/malleable cast iron	≥ 240 HB	1xD	45°	150	0.015	0.019	0.023	0.030	0.045	0.054	0.072	0.090
N Aluminium, Al-wrought alloys, Al-alloys	≤ 7% Si	1xD	30°	500	0.013	0.017	0.020	0.026	0.040	0.048	0.064	0.080
Aluminium-cast alloys	≥ 7% Si	1xD	45°	340	0.015	0.019	0.023	0.030	0.045	0.054	0.072	0.090
S Titanium, Titanium alloys	≤ 1300 N/mm ²	1xD	10°	60	0.007	0.009	0.011	0.014	0.025	0.030	0.040	0.050

DRILLING

Material/ISO material	Hardness	max. drilling depth without chip removal	v _c	f _z (mm/tooth) with nom. Ø							
				4	5	6	8	10	12	16	20
Struct./free-cutting steels, unall. heat-treat./case hard. steels	≤ 850 N/mm ²	1.5xD	270	0.014	0.018	0.021	0.028	0.040	0.048	0.064	0.080
P Free-cutting steels, unalloyed case hard. steels, nitr. steels	850-1200 N/mm ²	1.5xD	230	0.012	0.015	0.018	0.024	0.035	0.042	0.056	0.070
Alloyed heat-treatable, tool and high speed steels	850-1400 N/mm ²	1.0xD	180	0.008	0.010	0.012	0.016	0.025	0.030	0.040	0.050
K Cast iron, grey cast iron, spher. graphite/malleable cast iron	≥ 240 HB	1.5xD	150	0.014	0.018	0.021	0.028	0.040	0.048	0.064	0.080
N Aluminium, Al-wrought alloys, Al-alloys	≤ 7% Si	1.0xD	500	0.012	0.015	0.018	0.024	0.035	0.042	0.056	0.070
Aluminium-cast alloys	≥ 7% Si	1.0xD	340	0.014	0.018	0.021	0.028	0.040	0.048	0.064	0.080



Milling tools

SLOTING

Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HPC	P	light/medial difficult	0.80xD	1.00xD	180°	160	0.014	0.018	0.023	0.027	0.044	0.055	0.066	0.088	0.110
			0.80xD	1.00xD	180°	125	0.014	0.018	0.023	0.027	0.040	0.050	0.060	0.080	0.100
	M	light/medial difficult	0.80xD	1.00xD	180°	85	0.011	0.014	0.018	0.021	0.028	0.035	0.042	0.056	0.070
			0.80xD	1.00xD	180°	55	0.011	0.014	0.018	0.021	0.028	0.035	0.042	0.056	0.070
	S	medial/difficult very difficult	0.80xD	1.00xD	180°	45	0.011	0.014	0.018	0.021	0.028	0.035	0.042	0.056	0.070
			0.80xD	1.00xD	180°	30	0.009	0.012	0.015	0.018	0.024	0.030	0.036	0.048	0.060

ROUGHING

Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HPC	P	light/medial difficult	L2	0.20xD	53°	270	0.022	0.029	0.036	0.043	0.070	0.088	0.106	0.141	0.176
			L2	0.20xD	53°	210	0.022	0.029	0.036	0.043	0.064	0.080	0.096	0.128	0.160
	M	light/medial difficult	L2	0.15xD	46°	150	0.020	0.027	0.033	0.040	0.053	0.067	0.080	0.106	0.133
			L2	0.10xD	37°	100	0.024	0.032	0.040	0.048	0.064	0.081	0.097	0.129	0.161
	S	medial/difficult very difficult	L2	0.08xD	31°	90	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
			L2	0.08xD	31°	60	0.023	0.030	0.038	0.045	0.060	0.075	0.090	0.120	0.150

ROUGHING

Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HSC	P	light/medial difficult	L2	0.15xD	46°	290	0.026	0.034	0.043	0.051	0.084	0.105	0.125	0.167	0.209
			L2	0.15xD	46°	230	0.026	0.034	0.043	0.051	0.076	0.095	0.114	0.152	0.190
	M	light/medial difficult	L2	0.10xD	37°	170	0.024	0.032	0.040	0.048	0.064	0.081	0.097	0.129	0.161
			L2	0.08xD	31°	110	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
	S	medial/difficult very difficult	L2	0.05xD	26°	100	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
			L2	0.05xD	26°	70	0.023	0.030	0.038	0.045	0.060	0.075	0.090	0.120	0.150

FINISHING

Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HSC	P	light/medial difficult	L2	0.02xD	18°	320	0.019	0.025	0.032	0.038	0.062	0.077	0.092	0.123	0.154
			L2	0.02xD	18°	250	0.019	0.025	0.032	0.038	0.056	0.070	0.084	0.112	0.140
	M	light/medial difficult	L2	0.02xD	18°	170	0.015	0.020	0.025	0.029	0.039	0.049	0.059	0.078	0.098
			L2	0.01xD	11°	120	0.019	0.025	0.032	0.038	0.050	0.063	0.076	0.101	0.126
	S	medial/difficult very difficult	L2	0.01xD	11°	100	0.019	0.025	0.032	0.038	0.050	0.063	0.076	0.101	0.126
			L2	0.01xD	11°	70	0.016	0.022	0.027	0.032	0.043	0.054	0.065	0.086	0.108



ROUGHING

Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HPC	P	light/medial difficult	L2	0.15xD	46°	280	0.026	0.034	0.043	0.051	0.084	0.105	0.125	0.167	0.209
			L2	0.15xD	46°	220	0.026	0.034	0.043	0.051	0.076	0.095	0.114	0.152	0.190
	M	light/medial difficult	L2	0.10xD	37°	160	0.024	0.032	0.040	0.048	0.064	0.081	0.097	0.129	0.161
			L2	0.10xD	37°	100	0.024	0.032	0.040	0.048	0.064	0.081	0.097	0.129	0.161
	S	medial/difficult very difficult	L2	0.08xD	31°	90	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
			L2	0.08xD	31°	60	0.023	0.030	0.038	0.045	0.060	0.075	0.090	0.120	0.150

ROUGHING

Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HSC	P	light/medial difficult	L2	0.10xD	37°	310	0.031	0.041	0.052	0.062	0.101	0.127	0.152	0.202	0.253
			L2	0.10xD	37°	240	0.031	0.041	0.052	0.062	0.092	0.115	0.138	0.184	0.230
	M	light/medial difficult	L2	0.08xD	31°	170	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
			L2	0.08xD	31°	110	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
	S	medial/difficult very difficult	L2	0.05xD	26°	100	0.026	0.035	0.044	0.053	0.070	0.088	0.105	0.140	0.175
			L2	0.05xD	26°	70	0.023	0.030	0.038	0.045	0.060	0.075	0.090	0.120	0.150



FINISHING

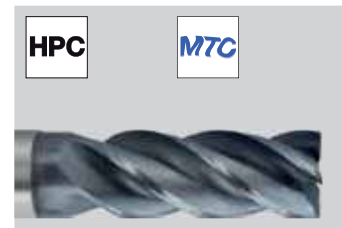
Milling conditions	Material	Machinability	ap max.	ae max.	max. pressure angle	vc	fz (mm/tooth) with nom. Ø								
							3	4	5	6	8	10	12	16	20
HSC	P	light/medial difficult	L2	0.01xD	11°	340	0.024	0.032	0.041	0.049	0.079	0.099	0.119	0.158	0.198
			L2	0.01xD	11°	270	0.024	0.032	0.041	0.049	0.072	0.090	0.108	0.144	0.180
	M	light/medial difficult	L2	0.01xD	11°	180	0.019	0.025	0.032	0.038	0.050	0.063	0.076	0.101	0.126
			L2	0.01xD	11°	120	0.019	0.025	0.032	0.038	0.050	0.063	0.076	0.101	0.126
	S	medial/difficult very difficult	L2	0.01xD	11°	100	0.019	0.025	0.032	0.038	0.050	0.063	0.076	0.101	0.126
			L2	0.01xD	11°	70	0.016	0.022	0.027	0.032	0.043	0.054	0.065	0.086	0.108

Milling conditions:

HPC	stable machining conditions high drive power
MTC	unstable machining conditions low drive power
+	long tools




Correction factors:

	a_p Roughing > 1.5 x D	v_c -25%	f_z -25%
	medium length tools	v_c -40%	f_z -40%







Material	Hardness	Application	a_e max.	v_c	f_z (mm/tooth) with nom. Ø								
					1	3	4	6	8	10	12	16	20
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	Slotting	1xD	180	0.010	0.016	0.021	0.031	0.042	0.060	0.072	0.10	0.12
		Roughing	0.75xD	210	0.011	0.018	0.024	0.036	0.048	0.069	0.083	0.11	0.14
		Finishing	0.02xD	360	0.011	0.017	0.023	0.034	0.046	0.066	0.079	0.11	0.13
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	Slotting	1xD	160	0.009	0.014	0.019	0.029	0.038	0.055	0.066	0.09	0.11
		Roughing	0.75xD	190	0.010	0.017	0.022	0.033	0.044	0.063	0.076	0.10	0.13
		Finishing	0.02xD	320	0.010	0.016	0.021	0.032	0.042	0.061	0.073	0.10	0.12
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	Slotting	1xD	135	0.008	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10
		Roughing	0.75xD	160	0.009	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12
		Finishing	0.02xD	270	0.009	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	Slotting	1xD	120	0.006	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10
		Roughing	0.75xD	140	0.008	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12
		Finishing	0.02xD	240	0.008	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	Slotting	1xD	80	0.005	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09
		Roughing	0.75xD	100	0.007	0.014	0.018	0.028	0.037	0.052	0.062	0.08	0.10
		Finishing	0.02xD	160	0.007	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	Slotting	1xD	60	0.004	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08
		Roughing	0.60xD	80	0.006	0.013	0.017	0.025	0.034	0.048	0.058	0.08	0.10
		Finishing	0.01xD	120	0.007	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	Slotting	1xD	30	0.004	0.008	0.011	0.017	0.022	0.032	0.038	0.05	0.06
		Roughing	0.60xD	40	0.006	0.010	0.013	0.020	0.027	0.038	0.046	0.06	0.08
		Finishing	0.01xD	60	0.006	0.008	0.011	0.017	0.022	0.032	0.038	0.05	0.06
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	Slotting	1xD	60	0.005	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09
		Roughing	0.60xD	80	0.007	0.014	0.019	0.029	0.038	0.054	0.065	0.09	0.11
		Finishing	0.02xD	120	0.007	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10
Aluminium, Alu-Knetlegierungen, Alulegierungen 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 7% Si	Slotting	1xD	500	0.011	0.020	0.026	0.039	0.052	0.080	0.096	0.13	0.16
		Roughing	0.75xD	600	0.012	0.022	0.030	0.045	0.060	0.092	0.110	0.15	0.18
		Finishing	0.02xD	1000	0.012	0.021	0.029	0.043	0.057	0.088	0.106	0.14	0.18
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 7% Si	Slotting	1xD	230	0.010	0.017	0.022	0.033	0.044	0.060	0.072	0.10	0.12
		Roughing	0.75xD	300	0.011	0.019	0.025	0.038	0.051	0.069	0.083	0.11	0.14
		Finishing	0.02xD	460	0.011	0.018	0.024	0.036	0.048	0.066	0.079	0.11	0.13
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Slotting	1xD	180	0.009	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11
		Roughing	0.75xD	210	0.010	0.017	0.023	0.035	0.046	0.063	0.076	0.10	0.13
		Finishing	0.02xD	360	0.010	0.017	0.022	0.033	0.044	0.061	0.073	0.10	0.12
Non-ferr. met. (copper, short-/long-chipp. brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	Slotting	1xD	250	0.010	0.017	0.022	0.033	0.044	0.060	0.072	0.10	0.12
		Roughing	0.75xD	290	0.011	0.019	0.025	0.038	0.051	0.069	0.083	0.11	0.14
		Finishing	0.02xD	500	0.010	0.018	0.024	0.036	0.048	0.066	0.079	0.11	0.13

Milling conditions:

	stable machining conditions high drive power
	short tools
	long tools



Correction factors:

	a_p Roughing > 1.5 x D	v_c -25%	f_z -25%
	medium length tools	v_c -40%	f_z -40%
	extra length tools	v_c -60%	f_z -55%
	uncoated tools	v_c -50%	f_z -25%







Material	Hardness	RF 100 Type	Application	a_e max.	v_c	f_z (mm/tooth) with nom. Ø								
						3	4	6	8	10	12	16	20	25
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	U Z3	Slotting	1xD		0.016	0.021	0.031	0.042	0.060	0.072	0.10	0.12	0.15
		F	Roughing	0.75xD	210	0.018	0.024	0.036	0.048	0.069	0.083	0.11	0.14	0.17
		SF	Finishing	0.02xD	360	0.017	0.023	0.034	0.046	0.066	0.079	0.11	0.13	0.17
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	U Z4	Slotting	1xD	160	0.014	0.019	0.029	0.038	0.055	0.066	0.09	0.11	0.14
		U Z4	Roughing	0.75xD	190	0.017	0.022	0.033	0.044	0.063	0.076	0.10	0.13	0.16
		SF	Finishing	0.02xD	320	0.016	0.021	0.032	0.042	0.061	0.073	0.10	0.12	0.15
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	U Z4	Slotting	1xD	135	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10	0.13
		U Z4	Roughing	0.75xD	160	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12	0.14
		SF	Finishing	0.02xD	270	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2	≤ 55 HRC	G-Mold 65 U	Slotting	1xD	70	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08	0.10
			Roughing	0.33xD	100	0.014	0.018	0.027	0.036	0.052	0.062	0.08	0.10	0.13
			Finishing	0.01xD	140	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08	0.10
	55-65 HRC	G-Mold 65 U	Roughing	0.03xD	80	0.021	0.028	0.042	0.056	0.075	0.090	0.12	0.15	0.19
			Finishing	0.005xD	100	0.008	0.010	0.015	0.020	0.027	0.032	0.04	0.05	0.07
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	VA	Slotting	1xD	120	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10	0.13
		VA	Roughing	0.75xD	140	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12	0.14
		SF	Finishing	0.02xD	240	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14
Stainless steel 1.4301 X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA/F	Slotting	1xD	80	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09	0.11
		VA/F	Roughing	0.75xD	100	0.014	0.018	0.028	0.037	0.052	0.062	0.08	0.10	0.13
		SF	Finishing	0.02xD	160	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10	0.12
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	VA/F	Slotting	1xD	60	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08	0.10
		VA/F	Roughing	0.60xD	80	0.013	0.017	0.025	0.034	0.048	0.058	0.08	0.10	0.12
		SF	Finishing	0.01xD	120	0.011	0.014	0.021	0.028	0.040	0.048	0.06	0.08	0.10
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	VA/F	Slotting	1xD	30	0.008	0.011	0.017	0.022	0.032	0.038	0.05	0.06	0.08
		VA/F	Roughing	0.60xD	40	0.010	0.013	0.020	0.027	0.038	0.046	0.06	0.08	0.10
		SF	Finishing	0.01xD	60	0.008	0.011	0.017	0.022	0.032	0.038	0.05	0.06	0.08
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	Ti/VA	Slotting	1xD	60	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09	0.11
		Ti/VA	Roughing	0.60xD	80	0.014	0.019	0.029	0.038	0.054	0.065	0.09	0.11	0.14
		SF	Finishing	0.02xD	120	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10	0.12
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	≤ 240 HB	U Z4	Slotting	1xD	160	0.017	0.022	0.033	0.044	0.065	0.078	0.10	0.13	0.16
		U Z4	Roughing	0.75xD	190	0.019	0.025	0.038	0.051	0.075	0.090	0.12	0.15	0.19
		SF	Finishing	0.02xD	320	0.018	0.024	0.036	0.048	0.072	0.086	0.11	0.14	0.18
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	≥ 240 HB	U Z4	Slotting	1xD	140	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14
		U Z4	Roughing	0.75xD	170	0.017	0.023	0.035	0.046	0.063	0.076	0.10	0.13	0.16
		SF	Finishing	0.02xD	280	0.017	0.022	0.033	0.044	0.061	0.073	0.10	0.12	0.15
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 7% Si	A	Slotting	1xD	500	0.020	0.026	0.039	0.052	0.080	0.096	0.13	0.16	0.20
		A	Roughing	0.75xD	600	0.022	0.030	0.045	0.060	0.092	0.110	0.15	0.18	0.23
		A/SF	Finishing	0.02xD	1000	0.021	0.029	0.043	0.057	0.088	0.106	0.14	0.18	0.22
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 7% Si	A	Slotting	1xD	230	0.017	0.022	0.033	0.044	0.060	0.072	0.10	0.12	0.15
		A	Roughing	0.75xD	300	0.019	0.025	0.038	0.051	0.069	0.083	0.11	0.14	0.17
		A/SF	Finishing	0.02xD	460	0.018	0.024	0.036	0.048	0.066	0.079	0.11	0.13	0.17
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A	Slotting	1xD	180	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14
		A	Roughing	0.75xD	210	0.017	0.023	0.035	0.046	0.063	0.076	0.10	0.13	0.16
		A/SF	Finishing	0.02xD	360	0.017	0.022	0.033	0.044	0.061	0.073	0.10	0.12	0.15
Non-ferr. met. (copper, short-/long-chipp., brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPB 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPB, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	A	Slotting	1xD	250	0.017	0.022	0.033	0.044	0.060	0.072	0.10	0.12	0.15
		A	Roughing	0.75xD	290	0.019	0.025	0.038	0.051	0.069	0.083	0.11	0.14	0.17
		A/SF	Finishing	0.02xD	500	0.018	0.024	0.036	0.048	0.066	0.079	0.11	0.13	0.17

Milling conditions:

 unstable machining conditions low drive power
 long tools



Correction factors:

 a_p Roughing > 1.5xD	v_c -25%	f_z -25%
 medium length tools	v_c -40%	f_z -40%
 extra length tools	v_c -60%	f_z -55%
 uncoated tools	v_c -50%	f_z -25%







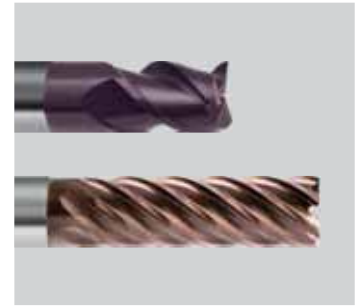
Material	Hardness	Type	Application	a_e max.	v_c	f_z (mm/tooth) with nom. Ø								
						3	4	6	8	10	12	16	20	25
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	VA/U	Slotting	1xD	135	0.009	0.012	0.018	0.024	0.032	0.038	0.05	0.06	0.08
		VA/U	Roughing	0.75xD	160	0.010	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5710 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	VA/U	Slotting	1xD	120	0.009	0.012	0.018	0.024	0.032	0.038	0.05	0.06	0.08
		VA/U	Roughing	0.75xD	140	0.010	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	U/F	Slotting	1xD	100	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		U/F	Roughing	0.75xD	120	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2	≤ 55 HRC	U/F	Slotting	1xD	55	0.006	0.008	0.012	0.016	0.022	0.026	0.04	0.04	0.06
		U/F	Roughing	0.33xD	80	0.008	0.010	0.016	0.021	0.029	0.034	0.05	0.06	0.07
	55-65 HRC													
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	VA/U	Slotting	1xD	90	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		VA/U	Roughing	0.75xD	110	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
Stainless steel 1.4301X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	VA/U	Slotting	1xD	65	0.008	0.010	0.015	0.020	0.028	0.034	0.04	0.06	0.07
		VA/U	Roughing	0.75xD	80	0.009	0.012	0.017	0.023	0.032	0.039	0.05	0.06	0.08
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	VA/U	Slotting	1xD	55	0.007	0.009	0.013	0.018	0.025	0.030	0.04	0.05	0.06
		VA/U	Roughing	0.60xD	70	0.008	0.011	0.016	0.021	0.030	0.036	0.05	0.06	0.08
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	VA/U	Slotting	1xD	25	0.006	0.008	0.012	0.016	0.022	0.026	0.04	0.04	0.06
		VA/U	Roughing	0.60xD	40	0.007	0.010	0.014	0.019	0.026	0.032	0.04	0.05	0.07
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	VA/U	Slotting	1xD	50	0.007	0.009	0.013	0.018	0.025	0.030	0.04	0.05	0.06
		VA/U	Roughing	0.60xD	70	0.008	0.011	0.016	0.021	0.030	0.036	0.05	0.06	0.08
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	≤ 240 HB	U/F	Slotting	1xD	120	0.009	0.012	0.018	0.024	0.032	0.038	0.05	0.06	0.08
		U/F	Roughing	0.75xD	140	0.010	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	≥ 240 HB	U/F	Slotting	1xD	105	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		U/F	Roughing	0.75xD	130	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
Aluminium, Al-wrought alloys, Al-alloys 3.0251 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 7% Si	A/WF	Slotting	1xD	375	0.011	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09
		A/WF	Roughing	0.75xD	440	0.012	0.016	0.024	0.032	0.043	0.051	0.07	0.09	0.11
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 7% Si	A/WF	Slotting	1xD	180	0.010	0.013	0.019	0.026	0.035	0.042	0.06	0.07	0.09
		A/WF	Roughing	0.75xD	210	0.011	0.015	0.022	0.029	0.040	0.048	0.06	0.08	0.10
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	VA/A	Slotting	1xD	140	0.010	0.013	0.019	0.026	0.035	0.042	0.06	0.07	0.09
		VA/A	Roughing	0.75xD	170	0.011	0.015	0.022	0.029	0.040	0.048	0.06	0.08	0.10
Non-ferr. met. (copper, short-/long-chipp., brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	VA/A	Slotting	1xD	200	0.010	0.013	0.019	0.026	0.035	0.042	0.06	0.07	0.09
		VA/A	Roughing	0.75xD	230	0.011	0.015	0.022	0.029	0.040	0.048	0.06	0.08	0.10

Milling conditions:

HPC	stable machining conditions high drive power
	short tools
	long tools



Correction factors:

	a_p Roughing > 1.5xD	v_c -25%	f_z -25%
	medium length tools	v_c -40%	f_z -40%
	extra length tools	v_c -60%	f_z -55%
	uncoated tools	v_c -50%	f_z -25%





Material	Hardness	Type	Application	a_e max.	v_c	f_z (mm/tooth) with nom. Ø								
						3	4	6	8	10	12	16	20	25
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	GH Z3	Slotting	1xD	120	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09	0.11
		GH Z3	Roughing	0.75xD	140	0.014	0.018	0.028	0.037	0.052	0.062	0.08	0.10	0.13
		G-Mold 48 F	Finishing	0.02xD	240	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10	0.12
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	GH Z3	Slotting	1xD	105	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09	0.11
		GH Z3	Roughing	0.75xD	130	0.014	0.018	0.028	0.037	0.052	0.062	0.08	0.10	0.13
		G-Mold 48 F	Finishing	0.02xD	210	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10	0.12
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	GH Z3	Slotting	1xD	90	0.011	0.015	0.023	0.030	0.042	0.050	0.07	0.08	0.11
		GH Z3	Roughing	0.75xD	110	0.013	0.017	0.026	0.035	0.048	0.058	0.08	0.10	0.12
		G-Mold 48 F	Finishing	0.02xD	180	0.013	0.017	0.025	0.033	0.046	0.055	0.07	0.09	0.12
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2	≤ 55 HRC	G-Mold 65 U	Slotting	1xD	52	0.010	0.013	0.019	0.026	0.035	0.042	0.06	0.07	0.09
		G-Mold 65 F	Roughing	0.03xD	100	0.024	0.032	0.048	0.064	0.088	0.105	0.14	0.18	0.22
			Finishing	0.01xD	110	0.010	0.013	0.019	0.026	0.035	0.042	0.06	0.07	0.09
	55-65 HRC	G-Mold 65 F	Roughing	0.03xD	70	0.019	0.025	0.038	0.050	0.070	0.084	0.11	0.14	0.18
			Finishing	0.005xD	80	0.007	0.009	0.014	0.018	0.025	0.030	0.04	0.05	0.06
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	GH Z3	Slotting	1xD	80	0.011	0.015	0.023	0.030	0.042	0.050	0.07	0.08	0.11
		GH Z3	Roughing	0.75xD	100	0.013	0.017	0.026	0.035	0.048	0.058	0.08	0.10	0.12
		G-Mold 48 F	Finishing	0.02xD	160	0.013	0.017	0.025	0.033	0.046	0.055	0.07	0.09	0.12
Stainless steel 1.4301 X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	GH Z3	Slotting	1xD	55	0.011	0.014	0.021	0.028	0.038	0.046	0.06	0.08	0.10
		GH Z3	Roughing	0.75xD	70	0.012	0.016	0.024	0.032	0.044	0.052	0.07	0.09	0.11
		G-Mold 48 F	Finishing	0.02xD	110	0.012	0.015	0.023	0.031	0.042	0.050	0.07	0.08	0.10
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	GH Z3	Slotting	1xD	40	0.010	0.013	0.020	0.026	0.035	0.042	0.06	0.07	0.09
		GH Z3	Roughing	0.60xD	50	0.012	0.016	0.024	0.032	0.042	0.050	0.07	0.08	0.11
		G-Mold 48 F	Finishing	0.01xD	80	0.010	0.013	0.020	0.026	0.035	0.042	0.06	0.07	0.09
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	GH Z3	Slotting	1xD	20	0.008	0.010	0.015	0.020	0.030	0.036	0.05	0.06	0.08
		GH Z3	Roughing	0.60xD	30	0.009	0.012	0.018	0.024	0.036	0.043	0.06	0.07	0.09
		G-Mold 48 F	Finishing	0.01xD	40	0.008	0.010	0.015	0.020	0.030	0.036	0.05	0.06	0.08
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	GH Z3	Slotting	1xD	40	0.010	0.013	0.020	0.026	0.038	0.046	0.06	0.08	0.10
		GH Z3	Roughing	0.60xD	50	0.012	0.016	0.024	0.032	0.046	0.055	0.07	0.09	0.11
		G-Mold 48 F	Finishing	0.02xD	80	0.011	0.015	0.022	0.029	0.042	0.050	0.07	0.08	0.10
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	≤ 240 HB	GH Z3	Slotting	1xD	105	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09	0.11
		GH Z3	Roughing	0.75xD	130	0.014	0.018	0.028	0.037	0.052	0.062	0.08	0.10	0.13
		G-Mold 48 F	Finishing	0.02xD	210	0.013	0.018	0.026	0.035	0.050	0.059	0.08	0.10	0.12
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	≥ 240 HB	GH Z3	Slotting	1xD	90	0.011	0.015	0.023	0.030	0.042	0.050	0.07	0.08	0.11
		GH Z3	Roughing	0.75xD	110	0.013	0.017	0.026	0.035	0.048	0.058	0.08	0.10	0.12
		G-Mold 48 F	Finishing	0.02xD	180	0.013	0.017	0.025	0.033	0.046	0.055	0.07	0.09	0.12
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 5% Si	GH Z3	Slotting	1xD	300	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14
		GH Z3	Roughing	0.75xD	400	0.017	0.023	0.035	0.046	0.063	0.076	0.10	0.13	0.16
		G-Mold 48 F	Finishing	0.02xD	600	0.017	0.022	0.033	0.044	0.061	0.073	0.10	0.12	0.15
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 5% Si	GH Z3	Slotting	1xD	180	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10	0.13
		GH Z3	Roughing	0.75xD	300	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12	0.14
		G-Mold 48 F	Finishing	0.02xD	360	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	GH Z3	Slotting	1xD	150	0.013	0.017	0.025	0.034	0.045	0.054	0.07	0.09	0.11
		GH Z3	Roughing	0.75xD	180	0.000	0.000	0.000	0.000	0.000	0.000	0.00	0.00	0.00
		G-Mold 48 F	Finishing	0.02xD	300	0.014	0.018	0.028	0.037	0.050	0.059	0.08	0.10	0.12
Non-ferr. met. (copper, short-/long-chipp., brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPB 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPB, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	GH Z3	Slotting	1xD	200	0.014	0.018	0.027	0.036	0.050	0.060	0.08	0.10	0.13
		GH Z3	Roughing	0.75xD	230	0.016	0.021	0.031	0.041	0.058	0.069	0.09	0.12	0.14
		G-Mold 48 F	Finishing	0.02xD	400	0.015	0.020	0.030	0.040	0.055	0.066	0.09	0.11	0.14

Milling conditions:

	unstable machining conditions low drive power
	long tools




Correction factors:

	a_p Roughing > 1.5xD	v_c -25%	f_z -25%
	uncoated tools	v_c -50%	f_z -25%






Material	Hardness	Type	Application	a_e max.	v_c	f_z (mm/tooth) with nom. Ø								
						3	4	6	8	10	12	16	20	25
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	U	Slotting	1xD	120	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		U	Roughing	0.75xD	140	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	U	Slotting	1xD	100	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		U	Roughing	0.75xD	120	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
Alloyed heat-treatable, tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	H	Slotting	1xD	90	0.008	0.010	0.015	0.020	0.028	0.034	0.04	0.06	0.07
		H	Roughing	0.75xD	110	0.009	0.012	0.017	0.023	0.032	0.039	0.05	0.06	0.08
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2	≤ 55 HRC	H	Slotting	1xD	50	0.005	0.007	0.011	0.014	0.020	0.024	0.03	0.04	0.05
	55-65 HRC	H	Roughing	0.33xD	70	0.007	0.009	0.014	0.019	0.026	0.031	0.04	0.05	0.07
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	U	Slotting	1xD	80	0.008	0.010	0.015	0.020	0.028	0.034	0.04	0.06	0.07
		U	Roughing	0.75xD	100	0.009	0.012	0.017	0.023	0.032	0.039	0.05	0.06	0.08
Stainless steel 1.4301 X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	U	Slotting	1xD	55	0.007	0.009	0.013	0.018	0.025	0.030	0.04	0.05	0.06
		U	Roughing	0.75xD	70	0.008	0.010	0.015	0.020	0.029	0.035	0.05	0.06	0.07
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	U	Slotting	1xD	50	0.006	0.008	0.012	0.016	0.022	0.026	0.04	0.04	0.06
		U	Roughing	0.60xD	70	0.007	0.010	0.014	0.019	0.026	0.032	0.04	0.05	0.07
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	U	Slotting	1xD	20	0.005	0.007	0.011	0.014	0.020	0.024	0.03	0.04	0.05
		U	Roughing	0.60xD	30	0.006	0.009	0.013	0.017	0.024	0.029	0.04	0.05	0.06
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	U	Slotting	1xD	45	0.006	0.008	0.012	0.016	0.022	0.026	0.04	0.04	0.06
		U	Roughing	0.60xD	60	0.007	0.010	0.014	0.019	0.026	0.032	0.04	0.05	0.07
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	≤ 240 HB	U	Slotting	1xD	100	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		U	Roughing	0.75xD	120	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	≥ 240 HB	H	Slotting	1xD	90	0.008	0.010	0.015	0.020	0.028	0.034	0.04	0.06	0.07
		H	Roughing	0.75xD	110	0.009	0.012	0.017	0.023	0.032	0.039	0.05	0.06	0.08
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 7% Si	A	Slotting	1xD	350	0.010	0.013	0.019	0.026	0.035	0.042	0.06	0.07	0.09
		A	Roughing	0.75xD	410	0.011	0.015	0.022	0.029	0.040	0.048	0.06	0.08	0.10
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 7% Si	A	Slotting	1xD	180	0.009	0.012	0.018	0.024	0.032	0.038	0.05	0.06	0.08
		A	Roughing	0.75xD	210	0.010	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	A	Slotting	1xD	120	0.009	0.012	0.018	0.024	0.032	0.038	0.05	0.06	0.08
		A	Roughing	0.75xD	140	0.010	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09
Non-ferr. met. (copper, short-/long-chipp., brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPB 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPB, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	A	Slotting	1xD	180	0.009	0.012	0.018	0.024	0.032	0.038	0.05	0.06	0.08
		A	Roughing	0.75xD	210	0.010	0.014	0.021	0.028	0.037	0.044	0.06	0.07	0.09

Milling conditions:

 HPC	stable machining conditions high drive power
	short tools
	long tools

Correction factors:

	a_p Roughing > 1.5xD	v_c -25%	f_z -25%
	extra length tools	v_c -60%	f_z -55%
	uncoated tools	v_c -50%	f_z -25%



Material	Hardness	Type	Application	a_e max.	v_c	f_z (mm/tooth) with nom. Ø								
						3	4	6	8	10	12	16	20	25
Struct./free-cutting steels, unall. heat-treat/case hard. steels 1.0035 S185, 1.0486 P275N, 1.0345 P235GH, 1.0050, 1.0070, 1.8937 1.0718 11SMnPb30, 1.0736 11SMn37 1.0402 C22, 1.1178 C30E 1.0503 C45, 1.1191 C30E 1.0301 C10, 1.1121 C10E 1.1750 C75W, 1.2076 102Cr6, 1.2307 29CrMoV9	≤ 850 N/mm ²	Z2/Z3	Slotting	1xD	120	0.012	0.016	0.024	0.032	0.042	0.050	0.07	0.08	0.11
		Z3/Z4	Roughing	0.75xD	140	0.014	0.018	0.028	0.037	0.048	0.058	0.08	0.10	0.12
		Z4	Finishing	0.02xD	240	0.013	0.018	0.026	0.035	0.046	0.055	0.07	0.09	0.12
Free-cutting steels, unall. case hard. steels, nitr. steels 1.0727 46 S20, 1.0728 60 S20, 1.0757 46SPb20 1.0601 C60, 1.1221 C60E 1.7043 38Cr4 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5 1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	850-1,200 N/mm ²	Z2/Z3	Slotting	1xD	110	0.012	0.016	0.024	0.032	0.042	0.050	0.07	0.08	0.11
		Z3/Z4	Roughing	0.75xD	130	0.014	0.018	0.028	0.037	0.048	0.058	0.08	0.10	0.12
		Z4	Finishing	0.02xD	220	0.013	0.018	0.026	0.035	0.046	0.055	0.07	0.09	0.12
Alloyed heat-treatable. tool and high speed steels 1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2379 X155CrVMo12-1 1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3 Spring steel = 1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4	850-1,400 N/mm ²	Z2/Z3	Slotting	1xD	90	0.011	0.014	0.021	0.028	0.039	0.047	0.06	0.08	0.10
		Z3/Z4	Roughing	0.75xD	110	0.012	0.016	0.024	0.032	0.045	0.054	0.07	0.09	0.11
		Z4	Finishing	0.02xD	180	0.012	0.015	0.023	0.031	0.043	0.051	0.07	0.09	0.11
Hardened steel Tool steel, heat-treatable steel, spring steel, high-speed steel, case hardened steel, etc. e.g.: 1.2344 X40CrMoV5-1; 1.2767 X45NiCrMo4; 1.2379 X155CrVMo12-1; 1.2080 X210Cr12; 1.3343 S 6-5-2	≤ 55 HRC	Z2/Z3	Slotting	1xD	35	0.007	0.009	0.013	0.018	0.024	0.029	0.04	0.05	0.06
		Z3/Z4	Roughing	0.33xD	50	0.009	0.011	0.017	0.023	0.031	0.037	0.05	0.06	0.08
		Z4	Finishing	0.01xD	70	0.007	0.009	0.013	0.018	0.024	0.029	0.04	0.05	0.06
Stainless steel 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X10CrNiS18-9 USA = 303, 410, 420F, 430, 430F	≤ 750 N/mm ²	Z2/Z3	Slotting	1xD	80	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		Z3/Z4	Roughing	0.75xD	100	0.010	0.013	0.019	0.026	0.035	0.041	0.06	0.07	0.09
		Z4	Finishing	0.02xD	160	0.009	0.012	0.018	0.025	0.033	0.040	0.05	0.07	0.08
Stainless steel 1.4301 X5CrNi18-10, 1.4303 X5CrNi18-12 1.4310 XCrNi18-8 USA = 304, 304L, 420	750-850 N/mm ²	Z2/Z3	Slotting	1xD	55	0.007	0.010	0.014	0.019	0.027	0.032	0.04	0.05	0.07
		Z3/Z4	Roughing	0.75xD	70	0.008	0.011	0.017	0.022	0.031	0.037	0.05	0.06	0.08
		Z4	Finishing	0.02xD	110	0.008	0.011	0.016	0.021	0.030	0.036	0.05	0.06	0.07
Stainless steel 1.4438 X2CrNiMo18-15-4, 1.4404 X2CrNiMo17-12-2, 1.4571 X6CrNiTi18-10 USA = 310, 316, 316B, 316L, 317	≥ 850 N/mm ²	Z2/Z3	Slotting	1xD	50	0.006	0.008	0.013	0.017	0.024	0.029	0.04	0.05	0.06
		Z3/Z4	Roughing	0.60xD	70	0.008	0.010	0.015	0.020	0.029	0.035	0.05	0.06	0.07
		Z4	Finishing	0.01xD	100	0.006	0.008	0.013	0.017	0.024	0.029	0.04	0.05	0.06
Special alloys (nickel based "Ni") Nimonic, Inconel, Monel, Hastelloy	≤ 1,300 N/mm ²	Z2/Z3	Slotting	1xD	25	0.005	0.006	0.009	0.012	0.018	0.022	0.03	0.04	0.05
		Z3/Z4	Roughing	0.60xD	40	0.005	0.007	0.011	0.014	0.022	0.026	0.03	0.04	0.05
		Z4	Finishing	0.01xD	50	0.005	0.006	0.009	0.012	0.018	0.022	0.03	0.04	0.05
Titanium alloys ("Ti") 3.7024 Ti99.5, 3.7114 TiAl5Sn2.5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7164 TiAl6V4, 3.7184 TiAl4Mo4Sn2.5	≤ 1,300 N/mm ²	Z2/Z3	Slotting	1xD	40	0.008	0.011	0.017	0.022	0.030	0.036	0.05	0.06	0.08
		Z3/Z4	Roughing	0.60xD	50	0.010	0.013	0.020	0.027	0.036	0.043	0.06	0.07	0.09
		Z4	Finishing	0.02xD	80	0.009	0.012	0.018	0.025	0.033	0.040	0.05	0.07	0.08
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6010 EN-GL100 (GG10), 0.6020 EN-GJL-200 (GG20), 0.7050 EN-GJS-500-7 (GGG50), 0.8535 EN-GJMW-350-4 (GTW35)	≤ 240 HB	Z2/Z3	Slotting	1xD	110	0.011	0.015	0.022	0.030	0.039	0.047	0.06	0.08	0.10
		Z3/Z4	Roughing	0.75xD	130	0.013	0.017	0.026	0.034	0.045	0.054	0.07	0.09	0.11
		Z4	Finishing	0.02xD	220	0.012	0.016	0.024	0.033	0.043	0.051	0.07	0.09	0.11
Cast/grey cast iron, spher.graphite/mall, cast iron 0.6025 EN-GL250 (GG25), 0.6035 EN-GJL-350 (GG35), 0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)	≥ 240 HB	Z2/Z3	Slotting	1xD	95	0.009	0.012	0.019	0.025	0.033	0.040	0.05	0.07	0.08
		Z3/Z4	Roughing	0.75xD	110	0.011	0.014	0.021	0.029	0.038	0.046	0.06	0.08	0.09
		Z4	Finishing	0.02xD	190	0.010	0.014	0.020	0.027	0.036	0.044	0.06	0.07	0.09
Aluminium, Al-wrought alloys, Al-alloys 3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤ 7% Si	Z2/Z3	Slotting	1xD	300	0.019	0.025	0.037	0.050	0.065	0.078	0.10	0.13	0.16
		Z2/Z3	Roughing	0.75xD	350	0.021	0.029	0.043	0.057	0.075	0.090	0.12	0.15	0.19
		Z3/Z4	Finishing	0.02xD	600	0.020	0.027	0.041	0.055	0.072	0.086	0.11	0.14	0.18
Aluminium-cast alloys 3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9 3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≥ 7% Si	Z2/Z3	Slotting	1xD	160	0.016	0.021	0.031	0.042	0.056	0.067	0.09	0.11	0.14
		Z2/Z3	Roughing	0.75xD	190	0.018	0.024	0.036	0.048	0.064	0.077	0.10	0.13	0.16
		Z3/Z4	Finishing	0.02xD	320	0.017	0.023	0.034	0.046	0.062	0.074	0.10	0.12	0.15
Magnesium-alloys MgMn2, G-MgAl8Zn1, G-MgAl6Zn3	-	Z2/Z3	Slotting	1xD	125	0.016	0.021	0.031	0.042	0.056	0.067	0.09	0.11	0.14
		Z2/Z3	Roughing	0.75xD	210	0.018	0.024	0.036	0.048	0.064	0.077	0.10	0.13	0.16
		Z3/Z4	Finishing	0.02xD	360	0.017	0.023	0.034	0.046	0.062	0.074	0.10	0.12	0.15
Non-ferr. met. (copper, short-/long-chipp., brass/bronze) 2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPB 2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 ... 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5 2.1090 CuSn7ZnPB, 2.1170 CuPb5Sn5, 2.1176 ... 2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤ 850 N/mm ²	Z2/Z3	Slotting	1xD	175	0.013	0.017	0.025	0.034	0.046	0.055	0.07	0.09	0.12
		Z2/Z3	Roughing	0.75xD	290	0.014	0.019	0.029	0.039	0.053	0.063	0.08	0.11	0.13
		Z3/Z4	Finishing	0.02xD	500	0.014	0.018	0.028	0.037	0.051	0.061	0.08	0.10	0.13

OPEN SLOTS AND HELIX

Art. no. 6808

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	1.00xD	1.00xD	140	0.0072	0.0090	0.0108	168	0.0135	0.0162	182	0.0180	0.0198	0.0225	196	0.0252	0.0270
P Low-alloyed steel	1.00xD	1.00xD	140	0.0064	0.0080	0.0096	168	0.0120	0.0144	182	0.0160	0.0176	0.0200	196	0.0224	0.0240
High-alloyed steel and tool steel	1.00xD	0.75xD	140	0.0048	0.0060	0.0072	168	0.0090	0.0108	182	0.0120	0.0132	0.0150	196	0.0168	0.0180
Stainless steel, ferritic, martensitic	1.00xD	1.00xD	140	0.0064	0.0080	0.0096	168	0.0120	0.0144	182	0.0160	0.0176	0.0200	196	0.0224	0.0240
M Stainless steel, austenitic	1.00xD	1.00xD	120	0.0056	0.0070	0.0084	144	0.0105	0.0126	156	0.0140	0.0154	0.0175	168	0.0196	0.0210
Duplex steel, high strength stainless steels	1.00xD	0.75xD	90	0.0049	0.0061	0.0073	108	0.0092	0.0110	117	0.0122	0.0135	0.0153	126	0.0171	0.0184
Grey cast iron	1.00xD	1.00xD	120	0.0056	0.0070	0.0084	144	0.0105	0.0126	156	0.0140	0.0154	0.0175	168	0.0196	0.0210
K Cast iron with spheroidal graphite iron	1.00xD	1.00xD	100	0.0050	0.0062	0.0075	120	0.0093	0.0112	130	0.0124	0.0137	0.0156	140	0.0174	0.0187
Malleable cast iron GJV & ADI	1.00xD	1.00xD	100	0.0050	0.0062	0.0075	120	0.0093	0.0112	130	0.0124	0.0137	0.0156	140	0.0174	0.0187
Aluminium-wrought alloys	1.00xD	1.00xD	170	0.0096	0.0120	0.0144	204	0.0180	0.0216	221	0.0240	0.0264	0.0300	238	0.0336	0.0360
N Aluminium-cast alloys	1.00xD	1.00xD	125	0.0088	0.0110	0.0133	150	0.0166	0.0199	162.5	0.0221	0.0243	0.0276	175	0.0309	0.0331
Copper and copper alloys	1.00xD	1.00xD	125	0.0088	0.0110	0.0133	150	0.0166	0.0199	162.5	0.0221	0.0243	0.0276	175	0.0309	0.0331
Heat-resistant alloys, Fe-based	1.00xD	0.50xD	100	0.0036	0.0045	0.0054	120	0.0068	0.0081	130	0.0090	0.0099	0.0113	140	0.0126	0.0135
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.50xD	60	0.0029	0.0037	0.0044	72	0.0055	0.0066	78	0.0073	0.0080	0.0091	84	0.0102	0.0110
Titanium alloys & pure titanium	1.00xD	0.75xD	100	0.0060	0.0075	0.0090	120	0.0113	0.0135	130	0.0150	0.0165	0.0188	140	0.0210	0.0225
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.25xD	35	0.0032	0.0040	0.0048	42	0.0060	0.0072	46	0.0080	0.0088	0.0100	49	0.0112	0.0120

RAMPING AND CLOSED SLOTS

Art. no. 6808

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	1.00xD	1.00xD	100	0.0043	0.0054	0.0065	120	0.0081	0.0097	130	0.0108	0.0119	0.0135	140	0.0151	0.0162
P Low-alloyed steel	1.00xD	1.00xD	100	0.0038	0.0048	0.0058	120	0.0072	0.0086	130	0.0096	0.0106	0.0120	140	0.0134	0.0144
High-alloyed steel and tool steel	1.00xD	0.75xD	100	0.0029	0.0036	0.0043	120	0.0054	0.0065	130	0.0072	0.0079	0.0090	140	0.0101	0.0108
Stainless steel, ferritic, martensitic	1.00xD	1.00xD	100	0.0038	0.0048	0.0058	120	0.0072	0.0086	130	0.0096	0.0106	0.0120	140	0.0134	0.0144
M Stainless steel, austenitic	1.00xD	1.00xD	90	0.0034	0.0042	0.0050	108	0.0063	0.0076	117	0.0084	0.0092	0.0105	126	0.0118	0.0126
Duplex steel, high strength stainless steels	1.00xD	0.75xD	65	0.0029	0.0037	0.0044	78	0.0055	0.0066	85	0.0073	0.0081	0.0092	91	0.0103	0.0110
Grey cast iron	1.00xD	1.00xD	90	0.0034	0.0042	0.0050	108	0.0063	0.0076	117	0.0084	0.0092	0.0105	126	0.0118	0.0126
K Cast iron with spheroidal graphite iron	1.00xD	1.00xD	75	0.0030	0.0037	0.0045	90	0.0056	0.0067	98	0.0075	0.0082	0.0093	105	0.0105	0.0112
Malleable cast iron GJV & ADI	1.00xD	1.00xD	75	0.0030	0.0037	0.0045	90	0.0056	0.0067	98	0.0075	0.0082	0.0093	105	0.0105	0.0112
Aluminium-wrought alloys	1.00xD	1.00xD	120	0.0058	0.0072	0.0086	144	0.0108	0.0130	156	0.0144	0.0158	0.0180	168	0.0202	0.0216
N Aluminium-cast alloys	1.00xD	1.00xD	90	0.0053	0.0066	0.0080	108	0.0099	0.0119	117	0.0133	0.0146	0.0166	126	0.0186	0.0199
Copper and copper alloys	1.00xD	1.00xD	90	0.0053	0.0066	0.0080	108	0.0099	0.0119	117	0.0133	0.0146	0.0166	126	0.0186	0.0199
Heat-resistant alloys, Fe-based	1.00xD	0.50xD	75	0.0022	0.0027	0.0032	90	0.0041	0.0049	98	0.0054	0.0059	0.0068	105	0.0076	0.0081
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.50xD	45	0.0018	0.0022	0.0026	54	0.0033	0.0039	59	0.0044	0.0048	0.0055	63	0.0061	0.0066
Titanium alloys & pure titanium	1.00xD	0.75xD	70	0.0036	0.0045	0.0054	84	0.0068	0.0081	91	0.0090	0.0099	0.0113	98	0.0126	0.0135
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.25xD	25	0.0019	0.0024	0.0029	30	0.0036	0.0043	33	0.0048	0.0053	0.0060	35	0.0067	0.0072

ROUGHING

Art. no. 6808

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	0.25xD	2.00xD	170	0.0113	0.0142	0.0170	204	0.0213	0.0255	221	0.0284	0.0312	0.0354	238	0.0397	0.0425
P Low-alloyed steel	0.25xD	2.00xD	170	0.0101	0.0126	0.0151	204	0.0189	0.0227	221	0.0252	0.0277	0.0315	238	0.0353	0.0378
High-alloyed steel and tool steel	0.20xD	2.00xD	170	0.0076	0.0095	0.0113	204	0.0142	0.0170	221	0.0189	0.0208	0.0236	238	0.0265	0.0284
Stainless steel, ferritic, martensitic	0.25xD	2.00xD	170	0.0101	0.0126	0.0151	204	0.0189	0.0227	221	0.0252	0.0277	0.0315	238	0.0353	0.0378
M Stainless steel, austenitic	0.20xD	2.00xD	145	0.0088	0.0110	0.0132	174	0.0165	0.0198	189	0.0221	0.0243	0.0276	203	0.0309	0.0331
Duplex steel, high strength stainless steels	0.20xD	2.00xD	105	0.0077	0.0096	0.0116	126	0.0145	0.0174	137	0.0193	0.0212	0.0241	147	0.0270	0.0289
Grey cast iron	0.25xD	2.00xD	145	0.0088	0.0110	0.0132	174	0.0165	0.0198	189	0.0221	0.0243	0.0276	203	0.0309	0.0331
K Cast iron with spheroidal graphite iron	0.25xD	2.00xD	120	0.0078	0.0098	0.0118	144	0.0147	0.0176	156	0.0196	0.0216	0.0245	168	0.0274	0.0294
Malleable cast iron GJV & ADI	0.25xD	2.00xD	120	0.0078	0.0098	0.0118	144	0.0147	0.0176	156	0.0196	0.0216	0.0245	168	0.0274	0.0294
Aluminium-wrought alloys	0.25xD	2.00xD	200	0.0151	0.0189	0.0227	240	0.0284	0.0340	260	0.0378	0.0416	0.0473	280	0.0529	0.0567
N Aluminium-cast alloys	0.25xD	2.00xD	150	0.0139	0.0174	0.0209	180	0.0261	0.0313	195	0.0348	0.0383	0.0435	210	0.0487	0.0522
Copper and copper alloys	0.25xD	2.00xD	150	0.0139	0.0174	0.0209	180	0.0261	0.0313	195	0.0348	0.0383	0.0435	210	0.0487	0.0522
Heat-resistant alloys, Fe-based	0.15xD	2.00xD	120	0.0057	0.0071	0.0085	144	0.0106	0.0128	156	0.0142	0.0156	0.0177	168	0.0198	0.0213
S Heat-resistant alloys, Ni-based, CO-based	0.15xD	2.00xD	70	0.0046	0.0058	0.0069	84	0.0086	0.0104	91	0.0115	0.0127	0.0144	98	0.0161	0.0173
Titanium alloys & pure titanium	0.20xD	2.00xD	115	0.0095	0.0118	0.0142	138	0.0177	0.0213	150	0.0236	0.0260	0.0295	161	0.0331	0.0354
H Hardened steel, hardened and tempered, < 55 HRC	0.05xD	2.00xD	45	0.0050	0.0063	0.0076	54	0.0095	0.0113	59	0.0126	0.0139	0.0158	63	0.0176	0.0189



FINISHING

Art. no. 6808

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
				0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	0.03xD	2.00xD	180	0.0086	0.0108	0.0130	216	0.0162	0.0194	234	0.0216	0.0238	0.0270	252	0.0302	0.0324
P Low-alloyed steel	0.03xD	2.00xD	180	0.0077	0.0096	0.0115	216	0.0144	0.0173	234	0.0192	0.0211	0.0240	252	0.0269	0.0288
High-alloyed steel and tool steel	0.03xD	2.00xD	180	0.0058	0.0072	0.0086	216	0.0108	0.0130	234	0.0144	0.0158	0.0180	252	0.0202	0.0216
Stainless steel, ferritic, martensitic	0.03xD	2.00xD	180	0.0077	0.0096	0.0115	216	0.0144	0.0173	234	0.0192	0.0211	0.0240	252	0.0269	0.0288
M Stainless steel, austenitic	0.03xD	2.00xD	155	0.0067	0.0084	0.0101	186	0.0126	0.0151	202	0.0168	0.0185	0.0210	217	0.0235	0.0252
Duplex steel, high strength stainless steels	0.03xD	2.00xD	115	0.0059	0.0073	0.0088	138	0.0110	0.0132	150	0.0147	0.0162	0.0184	161	0.0206	0.0220
Grey cast iron	0.03xD	2.00xD	155	0.0067	0.0084	0.0101	186	0.0126	0.0151	202	0.0168	0.0185	0.0210	217	0.0235	0.0252
K Cast iron with spheroidal graphite iron																
Malleable cast iron	0.03xD	2.00xD	130	0.0060	0.0075	0.0090	156	0.0112	0.0134	169	0.0149	0.0164	0.0187	182	0.0209	0.0224
GJV & ADI																
Aluminium-wrought alloys	0.03xD	2.00xD	220	0.0115	0.0144	0.0173	264	0.0216	0.0259	286	0.0288	0.0317	0.0360	308	0.0403	0.0432
N Aluminium-cast alloys																
Copper and copper alloys	0.03xD	2.00xD	160	0.0106	0.0133	0.0159	192	0.0199	0.0239	208	0.0265	0.0292	0.0331	224	0.0371	0.0398
Heat-resistant alloys, Fe-based	0.03xD	2.00xD	130	0.0043	0.0054	0.0065	156	0.0081	0.0097	169	0.0108	0.0119	0.0135	182	0.0151	0.0162
S Heat-resistant alloys, Ni-based, CO-based	0.03xD	2.00xD	75	0.0035	0.0044	0.0053	90	0.0066	0.0079	98	0.0088	0.0096	0.0110	105	0.0123	0.0132
Titanium alloys & pure titanium	0.03xD	2.00xD	120	0.0072	0.0090	0.0108	144	0.0135	0.0162	156	0.0180	0.0198	0.0225	168	0.0252	0.0270
H Hardened steel, hardened and tempered, < 55 HRC	0.02xD	2.00xD	45	0.0038	0.0048	0.0058	54	0.0072	0.0086	59	0.0096	0.0106	0.0120	63	0.0134	0.0144

Milling tools

DRILLING

Art. no. 6808

Material/ISO material	a _p max.	v _c	f _z /Ø			v _c	f _z /Ø		v _c	f _z /Ø			v _c	f _z /Ø	
			0.8	1.0	1.2		1.5	1.8		2.0	2.2	2.5		2.8	3.0
Unalloyed steel	1.00xD	100	0.0014	0.0018	0.0022	120	0.0027	0.0032	130	0.0036	0.0040	0.0045	140	0.0050	0.0054
P Low-alloyed steel	1.00xD	100	0.0013	0.0016	0.0019	120	0.0024	0.0029	130	0.0032	0.0035	0.0040	140	0.0045	0.0048
High-alloyed steel and tool steel	0.50xD	90	0.0010	0.0012	0.0014	108	0.0018	0.0022	117	0.0024	0.0026	0.0030	126	0.0034	0.0036
Stainless steel, ferritic, martensitic	0.75xD	90	0.0012	0.0015	0.0018	108	0.0023	0.0027	117	0.0030	0.0033	0.0038	126	0.0042	0.0045
M Stainless steel, austenitic	0.50xD	85	0.0011	0.0014	0.0017	102	0.0021	0.0025	111	0.0028	0.0031	0.0035	119	0.0039	0.0042
Duplex steel, high strength stainless steels	0.25xD	65	0.0010	0.0012	0.0014	78	0.0018	0.0022	85	0.0024	0.0026	0.0030	91	0.0034	0.0036
Grey cast iron	1.00xD	90	0.0011	0.0014	0.0017	108	0.0021	0.0025	117	0.0028	0.0031	0.0035	126	0.0039	0.0042
K Cast iron with spheroidal graphite iron															
Malleable cast iron	1.00xD	75	0.0010	0.0012	0.0014	90	0.0018	0.0022	98	0.0024	0.0026	0.0030	105	0.0034	0.0036
GJV & ADI															
Aluminium-wrought alloys	0.50xD	125	0.0019	0.0024	0.0029	150	0.0036	0.0043	163	0.0048	0.0053	0.0060	175	0.0067	0.0072
N Aluminium-cast alloys															
Copper and copper alloys	0.50xD	90	0.0018	0.0022	0.0026	108	0.0033	0.0040	117	0.0044	0.0048	0.0055	126	0.0062	0.0066
Heat-resistant alloys, Fe-based	0.25xD	75	0.0007	0.0009	0.0011	90	0.0014	0.0016	98	0.0018	0.0020	0.0023	105	0.0025	0.0027
S Heat-resistant alloys, Ni-based, CO-based	0.25xD	45	0.0006	0.0008	0.0009	54	0.0011	0.0014	59	0.0015	0.0017	0.0019	63	0.0021	0.0023
Titanium alloys & pure titanium	0.25xD	70	0.0012	0.0015	0.0018	84	0.0023	0.0027	91	0.0030	0.0033	0.0038	98	0.0042	0.0045

OPEN SLOTS AND HELIX

Art. no. 6809

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	1.00xD	0.50xD	112	0.0081	0.0097	134	0.0122	146	0.0162	0.0203	157	0.0227	0.0243
P Low-alloyed steel	1.00xD	0.50xD	112	0.0072	0.0086	134	0.0108	146	0.0144	0.0180	157	0.0202	0.0216
High-alloyed steel and tool steel	1.00xD	0.25xD	112	0.0054	0.0065	134	0.0081	146	0.0108	0.0135	157	0.0151	0.0162
Stainless steel, ferritic, martensitic	1.00xD	0.25xD	112	0.0072	0.0086	134	0.0108	146	0.0144	0.0180	157	0.0202	0.0216
M Stainless steel, austenitic	1.00xD	0.25xD	96	0.0063	0.0076	115	0.0095	125	0.0126	0.0158	134	0.0176	0.0189
Duplex steel, high strength stainless steels	1.00xD	0.25xD	71	0.0055	0.0066	85	0.0083	92	0.0110	0.0138	99	0.0154	0.0165
Grey cast iron	1.00xD	0.50xD	96	0.0063	0.0076	115	0.0095	125	0.0126	0.0158	134	0.0176	0.0189
K Cast iron with spheroidal graphite iron	1.00xD	0.50xD	80	0.0056	0.0067	96	0.0084	104	0.0112	0.0140	112	0.0157	0.0168
Malleable cast iron													
GJV & ADI													
Aluminium-wrought alloys	1.00xD	0.50xD	136	0.0108	0.0130	163	0.0162	177	0.0216	0.0270	190	0.0302	0.0324
N Aluminium-cast alloys	1.00xD	0.50xD	100	0.0099	0.0119	120	0.0149	130	0.0199	0.0249	140	0.0278	0.0298
Copper and copper alloys													
Heat-resistant alloys, Fe-based	1.00xD	0.25xD	80	0.0041	0.0049	96	0.0061	104	0.0081	0.0101	112	0.0113	0.0122
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.25xD	46	0.0033	0.0039	55	0.0049	60	0.0066	0.0082	64	0.0092	0.0099
Titanium alloys & pure titanium	1.00xD	0.25xD	72	0.0068	0.0081	86	0.0101	94	0.0135	0.0169	101	0.0189	0.0203
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.10xD	26	0.0036	0.0043	31	0.0054	34	0.0072	0.0090	36	0.0101	0.0108

RAMPING AND CLOSED SLOTS

Art. no. 6809

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	1.00xD	0.50xD	78	0.0049	0.0058	94	0.0073	102	0.0097	0.0122	110	0.0136	0.0146
P Low-alloyed steel	1.00xD	0.50xD	78	0.0043	0.0052	94	0.0065	102	0.0086	0.0108	110	0.0121	0.0130
High-alloyed steel and tool steel	1.00xD	0.25xD	78	0.0032	0.0039	94	0.0049	102	0.0065	0.0081	110	0.0091	0.0097
Stainless steel, ferritic, martensitic	1.00xD	0.25xD	78	0.0043	0.0052	94	0.0065	102	0.0086	0.0108	110	0.0121	0.0130
M Stainless steel, austenitic	1.00xD	0.25xD	67	0.0038	0.0045	81	0.0057	87	0.0076	0.0095	94	0.0106	0.0113
Duplex steel, high strength stainless steels	1.00xD	0.25xD	50	0.0033	0.0040	60	0.0050	65	0.0066	0.0083	70	0.0093	0.0099
Grey cast iron	1.00xD	0.50xD	67	0.0038	0.0045	81	0.0057	87	0.0076	0.0095	94	0.0106	0.0113
K Cast iron with spheroidal graphite iron	1.00xD	0.50xD	56	0.0034	0.0040	67	0.0050	73	0.0067	0.0084	78	0.0094	0.0101
Malleable cast iron													
GJV & ADI													
Aluminium-wrought alloys	1.00xD	0.50xD	95	0.0065	0.0078	114	0.0097	124	0.0130	0.0162	133	0.0181	0.0194
N Aluminium-cast alloys	1.00xD	0.50xD	70	0.0060	0.0072	84	0.0089	91	0.0119	0.0149	98	0.0167	0.0179
Copper and copper alloys													
Heat-resistant alloys, Fe-based	1.00xD	0.25xD	56	0.0024	0.0029	67	0.0036	73	0.0049	0.0061	78	0.0068	0.0073
S Heat-resistant alloys, Ni-based, CO-based	1.00xD	0.25xD	32	0.0020	0.0024	39	0.0030	42	0.0039	0.0049	45	0.0055	0.0059
Titanium alloys & pure titanium	1.00xD	0.25xD	50	0.0041	0.0049	60	0.0061	66	0.0081	0.0101	71	0.0113	0.0122
H Hardened steel, hardened and tempered, < 55 HRC	1.00xD	0.10xD	18	0.0022	0.0026	22	0.0032	24	0.0043	0.0054	25	0.0060	0.0065

ROUGHING

Art. no. 6809

Material/ISO material	a _e max.	a _p max.	v _c	f _z /Ø		v _c	f _z /Ø 1.5	v _c	f _z /Ø		v _c	f _z /Ø	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	0.10xD	5.00xD	134	0.0128	0.0153	161	0.0191	174	0.0255	0.0319	188	0.0357	0.0383
P Low-alloyed steel	0.10xD	5.00xD	134	0.0113	0.0136	161	0.0170	174	0.0227	0.0284	188	0.0318	0.0340
High-alloyed steel and tool steel													
Stainless steel, ferritic, martensitic	0.10xD	5.00xD	134	0.0113	0.0136	161	0.0170	174	0.0227	0.0284	188	0.0318	0.0340
M Stainless steel, austenitic	0.08xD	5.00xD	115	0.0099	0.0119	138	0.0149	150	0.0198	0.0248	161	0.0278	0.0298
Duplex steel, high strength stainless steels	0.05xD	5.00xD	86	0.0087	0.0104	103	0.0130	112	0.0174	0.0217	120	0.0243	0.0260
Grey cast iron	0.10xD	5.00xD	115	0.0099	0.0119	138	0.0149	150	0.0198	0.0248	161	0.0278	0.0298
K Cast iron with spheroidal graphite iron	0.10xD	5.00xD	96	0.0088	0.0106	115	0.0132	125	0.0176	0.0220	134	0.0247	0.0265
Malleable cast iron GJV & ADI													
Aluminium-wrought alloys	0.15xD	5.00xD	163	0.0170	0.0204	196	0.0255	212	0.0340	0.0425	228	0.0476	0.0510
N Aluminium-cast alloys	0.12xD	5.00xD	120	0.0157	0.0188	144	0.0235	156	0.0313	0.0392	168	0.0438	0.0470
Copper and copper alloys													
Heat-resistant alloys, Fe-based	0.08xD	5.00xD	96	0.0064	0.0077	115	0.0096	125	0.0128	0.0159	134	0.0179	0.0191
S Heat-resistant alloys, Ni-based, CO-based	0.05xD	5.00xD	55	0.0052	0.0062	66	0.0078	72	0.0104	0.0130	77	0.0145	0.0155
Titanium alloys & pure titanium	0.08xD	5.00xD	86	0.0106	0.0128	103	0.0159	112	0.0213	0.0266	120	0.0298	0.0319
H Hardened steel, hardened and tempered, < 55 HRC	0.03xD	5.00xD	31	0.0057	0.0068	37	0.0085	40	0.0113	0.0142	43	0.0159	0.0170



FINISHING

Art. no. 6809

Material/ISO material	a_e max.	a_p max.	v_c	f_z/\emptyset		v_c	f_z/\emptyset 1.5	v_c	f_z/\emptyset		v_c	f_z/\emptyset	
				1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	0.02xD	5.00xD	146	0.0097	0.0117	175	0.0146	190	0.0194	0.0243	204	0.0272	0.0292
P Low-alloyed steel	0.02xD	5.00xD	146	0.0086	0.0104	175	0.0130	190	0.0173	0.0216	204	0.0242	0.0259
High-alloyed steel and tool steel	0.02xD	5.00xD	146	0.0065	0.0078	175	0.0097	190	0.0130	0.0162	204	0.0181	0.0194
Stainless steel. ferritic. martensitic	0.02xD	5.00xD	146	0.0086	0.0104	175	0.0130	190	0.0173	0.0216	204	0.0242	0.0259
M Stainless steel. austenitic	0.02xD	5.00xD	125	0.0076	0.0091	150	0.0113	163	0.0151	0.0189	175	0.0212	0.0227
Duplex steel. high strength stainless steels	0.02xD	5.00xD	93	0.0066	0.0079	112	0.0099	121	0.0132	0.0165	130	0.0185	0.0198
Grey cast iron	0.02xD	5.00xD	125	0.0076	0.0091	150	0.0113	163	0.0151	0.0189	175	0.0212	0.0227
Cast iron with spheroidal graphite iron													
Malleable cast iron	0.02xD	5.00xD	104	0.0067	0.0081	125	0.0101	135	0.0134	0.0168	146	0.0188	0.0202
GJV & ADI													
Aluminium-wrought alloys	0.02xD	5.00xD	177	0.0130	0.0156	212	0.0194	230	0.0259	0.0324	248	0.0363	0.0389
N Aluminium-cast alloys													
Copper and copper alloys	0.02xD	5.00xD	130	0.0119	0.0143	156	0.0179	169	0.0239	0.0298	182	0.0334	0.0358
Heat-resistant alloys. Fe-based	0.02xD	5.00xD	104	0.0049	0.0058	125	0.0073	135	0.0097	0.0122	146	0.0136	0.0146
S Heat-resistant alloys. Ni-based. CO-based	0.02xD	5.00xD	60	0.0039	0.0047	72	0.0059	78	0.0079	0.0099	84	0.0111	0.0118
Titanium alloys & pure titanium	0.02xD	5.00xD	94	0.0081	0.0097	113	0.0122	122	0.0162	0.0203	132	0.0227	0.0243
H Hardened steel. hardened and tempered. < 55 HRC	0.01xD	5.00xD	34	0.0043	0.0052	41	0.0065	44	0.0086	0.0108	48	0.0121	0.0130

Milling tools

DRILLING

Art. no. 6809

Material/ISO material	a_p max.	v_c	f_z/\emptyset		v_c	f_z/\emptyset 1.5	v_c	f_z/\emptyset		v_c	f_z/\emptyset	
			1.0	1.2				2.0	2.5		2.8	3.0
Unalloyed steel	0.50xD	84	0.0014	0.0017	101	0.0022	109	0.0029	0.0036	118	0.0040	0.0043
P Low-alloyed steel	0.50xD	84	0.0013	0.0015	101	0.0019	109	0.0026	0.0032	118	0.0036	0.0038
High-alloyed steel and tool steel	0.25xD	84	0.0010	0.0012	101	0.0014	109	0.0019	0.0024	118	0.0027	0.0029
Stainless steel. ferritic. martensitic	0.25xD	84	0.0013	0.0015	101	0.0019	109	0.0026	0.0032	118	0.0036	0.0038
M Stainless steel. austenitic	0.25xD	72	0.0011	0.0013	86	0.0017	94	0.0022	0.0028	101	0.0031	0.0034
Duplex steel. high strength stainless steels	0.25xD	54	0.0010	0.0012	65	0.0015	70	0.0020	0.0024	76	0.0027	0.0029
Grey cast iron	0.50xD	72	0.0011	0.0013	86	0.0017	94	0.0022	0.0028	101	0.0031	0.0034
Cast iron with spheroidal graphite iron												
Malleable cast iron	0.50xD	60	0.0010	0.0012	72	0.0015	78	0.0020	0.0025	84	0.0028	0.0030
GJV & ADI												
Aluminium-wrought alloys	0.50xD	102	0.0019	0.0023	122	0.0029	133	0.0038	0.0048	143	0.0054	0.0058
N Aluminium-cast alloys												
Copper and copper alloys	0.50xD	75	0.0018	0.0021	90	0.0027	97.5	0.0035	0.0044	105	0.0049	0.0053
Heat-resistant alloys. Fe-based	0.25xD	60	0.0007	0.0009	72	0.0011	78	0.0014	0.0018	84	0.0020	0.0022
S Heat-resistant alloys. Ni-based. CO-based	0.25xD	34	0.0006	0.0007	41	0.0009	44	0.0012	0.0015	48	0.0016	0.0018
Titanium alloys & pure titanium	0.25xD	54	0.0012	0.0014	65	0.0018	70	0.0024	0.0030	76	0.0034	0.0036



Component courtesy of Langer GmbH & Co. KG

DRILLING

2

<i>Solid carbide drills</i>	<i>P. 176</i>
<i>ExclusiveLine micro-precision drills</i>	<i>P. 205</i>
<i>HT 800 WP interchangeable insert drilling system</i>	<i>P. 210</i>
<i>Single-fluted deep-hole drills EB, straight fluted</i>	<i>P. 234</i>
<i>HSS drills</i>	<i>P. 267</i>
<i>NC spotting drills</i>	<i>P. 289</i>
<i>Twist drills with 3-flats on shank</i>	<i>P. 294</i>

DRILLING OVERVIEW



Solid carbide drills



- ▶ With solid carbide drills, extremely good cutting parameters and long tool life with high process reliability can be achieved under stable machining conditions. The tools are designed for drilling up to 65 HRC. The comprehensive product range with proven geometries and application-specific layers ensures precise and economical machining in drilling depths of up to 40xD.

ExclusiveLine micro-precision drills



- ▶ The ExclusiveLine micro drills are designed for high-performance machining in almost all materials. With stable machine conditions and high machine performance, they showcase their full performance. The combination of 2-surface ground edge and cutting edge preparation enables high cutting values and ensures optimal chip breakage.

HT 800 WP interchangeable insert drilling system



- ▶ The ideal drilling system for producing large, high-precision holes in various materials for tool and mould making. The portfolio ranges from Ø 11.0-40.0 mm with a drilling depth of up to 10xD. The clamping principle allows the insert to be changed in the machine. This results in increased process reliability and shorter set-up times. The cutting material, geometry and surface of the interchangeable inserts are perfectly matched to the respective area of application.

Single-fluted deep-hole drills EB, straight fluted



- ▶ The single straight fluted deep hole drills achieve the best drilling results in areas above 40xD. The solid carbide version covers a diameter range of Ø 1.0-16.0 mm. 80xD hole depths can be achieved with just one tool. With the classic version with a brazed solid carbide head on a steel shank, drilling depths of up to 100xD are possible.

HSS drills



- ▶ Economical and process-reliable solution for small or medium lot sizes as well as for unstable machining conditions. The parabolic flutes enable safe chip removal even at large drilling depths in tool and mould making.

NC spotting drills



- ▶ The NC spotting drills generate the exact starting position for the subsequent deep-hole drilling tools and thus guarantee the best conditions for precise drilling in tool and mould making.



P. 176



P. 205



P. 210



P. 234



P. 267



P. 289





P	M	K	N	S	H	Tool illustration	Drilling depth	Hardness	Shank form	Type	Standard	Tool material	Surface	d1/mm	Article no.	Page
•	•	•	•	•	•		3xD	48 HRC	HA	RT 100 U	DIN 6537K	VHM	F	3.000 - 20.000	5510	176
•	•	•	•	•	•		3xD	48 HRC	HA	RT 100 XF	DIN 6537K	VHM	F	3.000 - 20.000	6498	178
•	•	•	•	•	•		3xD	65 HRC	HA	RT 100 HF	DIN 6537K	VHM	Y	3.000 - 20.000	8520	180
•	•	•	•	•	•		5xD	48 HRC	HA	RT 100 U	DIN 6537L	VHM	F	3.000 - 20.000	5511	182
•	•	•	•	•	•		5xD	48 HRC	HA	RT 100 XF	DIN 6537L	VHM	F	3.000 - 20.000	5498	184
•	•	•	•	•	•		5xD	65 HRC	HA	RT 100 HF	DIN 6537L	VHM	Y	3.000 - 20.000	8521	186
•	•	•	•	•	•		7xD	48 HRC	HA	RT 100 U	WN	VHM	F	3.000 - 20.000	5512	188
•	•	•	•	•	•		7xD	48 HRC	HA	RT 100 XF	WN	VHM	F	3.000 - 20.000	5499	190
•	•	•	•	•	•		7xD	65 HRC	HA	RT 100 HF	WN	VHM	Y	3.000 - 16.000	8522	192
•	•	•	•	•	•		12xD	48 HRC	HA	RT 100 U	WN	VHM	F	3.000 - 20.000	5525	193
•	•	•	•	•	•		15xD	48 HRC	HA	RT 100 T	WN	VHM	A	3.000 - 16.000	6509	195
•	•	•	•	•	•		20xD	48 HRC	HA	RT 100 T	WN	VHM	A	3.000 - 16.000	6511	196
•	•	•	•	•	•		25xD	48 HRC	HA	RT 100 T	WN	VHM	A	3.000 - 16.000	6512	197
•	•	•	•	•	•		30xD	48 HRC	HA	RT 100 T	WN	VHM	A	3.000 - 14.000	6513	198
•	•	•	•	•	•		40xD	48 HRC	HA	RT 100 T	WN	VHM	A	3.000 - 10.000	6514	199
Ratio drills without coolant ducts																
•	•	•	•	•	•		3xD	48 HRC	HA	RT 100 U	DIN 6537K	VHM	F	3.000 - 20.000	5514	200
•	•	•	•	•	•		3xD	65 HRC	HA	RT 100 HF	DIN 6537K	VHM	Y	3.000 - 20.000	8524	202
Twist drills with reinforced straight shank																
•	•	•	•	•	•		3xD	65 HRC	HA	H	DIN 6537K	VHM	A	2.600 - 14.100	1946	204
ExclusiveLine micro-precision drills without coolant ducts																
•	•	•	•	•	•		4xD	48 HRC	Cyl	N	WN	VHM	A	0.500 - 3.000	6400	205
•	•	•	•	•	•		7xD	48 HRC	Cyl	N	WN	VHM	A	0.500 - 3.000	6401	206
ExclusiveLine micro-precision drills with coolant ducts																
•	•	•	•	•	•		5xD	48 HRC	Cyl	N	WN	VHM	A	1.000 - 3.000	6405	207

Drilling tools



P	M	K	N	S	H	Tool illustration	Drilling depth	Hardness	Shank form	Type	Standard	Tool material	Surface	d1/mm	Article no.	Page
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ExclusiveLine micro-precision drills with coolant ducts

•	•	•	○	○			8xD	48 HRC	Cyl	N	WN	VHM	A	1.000 - 3.000	6408	208
•	•	•	○	○			15xD	48 HRC	Cyl	N	WN	VHM	A	1.000 - 3.000	6412	209

Tool holders for interchangeable inserts HT 800

							1,5xD		HE	HT 800 WP	WN		Ni		4106	210
							3xD		HE	HT 800 WP	WN		Ni		4107	212
							5xD		HE	HT 800 WP	WN		Ni		4108	214
							7xD		HE	HT 800 WP	WN		Ni		4109	216
							10xD		HE	HT 800 WP	WN		Ni		4110	218

Interchangeable inserts HT 800

○	○	○	○	○						HT 800 WP Pilot	WN	VHM	a	11.000 - 40.000	4111	220
•	○	○	○	○						HT 800 WP	WN	VHM	F	11.000 - 40.000	4112	223
			•							HT 800 WP	WN	VHM	○	11.000 - 40.000	4114	226
○	•		○	○						HT 800 WP	WN	VHM	a	11.000 - 40.000	4115	229
•										HT 800 WP	WN	VHM	F	12.000 - 40.000	4229	232

EB 100 M single-fluted gun drills

•	•	○	○	○	○		25xD	48 HRC	HA	EB 100 M	WN	VHM	a	1.000 - 16.000	5646	234
•	•	○	○	○	○		50xD	48 HRC	HA	EB 100 M	WN	VHM	a	1.000 - 10.000	5647	235
•	•	○	○	○	○		75xD	48 HRC	HA	EB 100 M	WN	VHM	a	1.000 - 7.144	5648	236

EB 80 single-fluted gun drills

○	•	○	○	•	○		20xD	48 HRC	HA	EB 80	WN	HM	C	3.969 - 16.000	5639	237
○	•	○	○	•	○		30xD	48 HRC	HA	EB 80	WN	HM	C	3.969 - 16.000	5640	238
○	•	○	○	•	○		40xD	48 HRC	HA	EB 80	WN	HM	C	3.969 - 16.000	5641	239
○	•	○	○	•	○		60xD	48 HRC	HA	EB 80	WN	HM	C	3.969 - 15.950	5669	240
○	•	○	○	•	○		80xD	48 HRC	HA	EB 80	WN	HM	C	3.969 - 15.950	5642	241

Drilling tools



P	M	K	N	S	H	Tool illustration	Drilling depth	Hardness	Shank form	Type	Standard	Tool material	Surface	d1/mm	Article no.	Page
EB 80 XXL single-fluted gun drills																
•	•	•	•	•	•		GL 600	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	3.000 - 25.000	5688	242
•	•	•	•	•	•		GL 800	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	3.000 - 25.000	5691	243
•	•	•	•	•	•		GL 1000	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	3.000 - 25.000	5164	244
•	•	•	•	•	•		GL 1200	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	3.000 - 25.000	5692	245
•	•	•	•	•	•		GL 1400	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	4.000 - 25.000	5681	246
•	•	•	•	•	•		GL 1600	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	4.000 - 25.000	5693	247
•	•	•	•	•	•		GL 1800	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	4.000 - 32.000	5682	248
•	•	•	•	•	•		GL 2000	48 HRC	TBM-SEH	EB 80 XXL	WN	HM	Ⓢ	4.000 - 32.000	5694	249
Drill bushes																
												WN	VHM	5748	250	
												WN	HSS	5747	251	
Moulded steady rest bushings for single-fluted gun drills																
												WN	5750	253		
												WN	5767	255		
Sealing disks for single-fluted gun drills																
												WN	5752	257		
												WN	5770	259		
												WN	5772	260		
Sealing plugs																
												WN	8.000 - 25.000	5766	261	
Torque wrenches set																
												WN	4966	262		

Drilling tools



P	M	K	N	S	H	Tool illustration	Drilling depth	Hardness	Shank form	Type	Standard	Tool material	Surface	d1/mm	Article no.	Page
Torque wrenches																
												WN			4915	263
Torx screwdrivers																
												WN			1612	264
Torx socket sets																
												WN			4917	265
Clamping screws																
												WN			4071	266
Stub drills																
•	•	•	•	•	•		~3xD		Cyl	GT 500 DZ	DIN 1897	HSS-E-PM	F	1.000 - 14.290	515	267
Jobber drills																
•	•	•	•	•	•		~5xD		Cyl	GT 100	DIN 338	HSCO	$\frac{0}{-0.2,36}$	1.000 - 16.000	622	269
•	•	•	•	•	•		~5xD		Cyl	GT 100	DIN 338	HSCO	F	1.000 - 16.000	2459	272
Long series twist drills																
•	•	•	•	•	•		~10xD		Cyl	GT 100	DIN 340	HSCO	$\frac{0}{-0.2,36}$	1.000 - 16.000	336	274
•	•	•	•	•	•		~10xD		Cyl	GT 100	DIN 340	HSCO	F	1.000 - 12.000	396	276
Extra length twist drills, series 1																
•	•	•	•	•	•		~15xD		Cyl	GT 100	DIN 1869	HSCO	$\frac{0}{-0.2,36}$	2.700 - 10.000	618	278
Extra length twist drills, series 2																
•	•	•	•	•	•		~20xD		Cyl	GT 100	DIN 1869	HSCO	$\frac{0}{-0.2,36}$	3.000 - 10.000	619	279
Extra length twist drills, series 3																
•	•	•	•	•	•		~25xD		Cyl	GT 100	DIN 1869	HSCO	$\frac{0}{-0.2,36}$	2.500 - 13.000	571	280
Extra length twist drills																
•	•	•	•	•	•		>25xD		Cyl	GT 100	WN	HSS	$\frac{0}{-0.2,36}$	6.000 - 12.000	242	281
•	•	•	•	•	•		>25xD		Cyl	GT 100	WN	HSS	$\frac{0}{-0.2,36}$	8.000 - 12.000	243	282
•	•	•	•	•	•		>25xD		Cyl	GT 100	WN	HSS	$\frac{0}{-0.2,36}$	10.000 - 12.000	244	283
Extra length twist drills, series 1																
•	•	•	•	•	•		~15xD		MK	GT 100	DIN 1870	HSCO	$\frac{0}{-0.160}$	9.520 - 30.000	620	284

Drilling tools



P	M	K	N	S	H	Tool illustration	Drilling depth	Hardness	Shank form	Type	Standard	Tool material	Surface	d1/mm	Article no.	Page
Extra length twist drills, series 2							~20xD		MK	GT 100	DIN 1870	HSCo	$\text{Ra} \leq 0.160$	10.000 - 29.500	621	285
Twist drills with coolant ducts							~10xD		Cyl	N	WN	HSS	○	3.000 - 13.000	390	286
							~5xD		HE	GT 80 IK	WN	HSCo	○	5.000 - 20.000	1131	287
							~5xD		HE	GT 80 IK	WN	HSCo	Ⓢ	5.000 - 20.000	1132	288
90° NC spotting drills									B	N	WN	HSCo	Ⓡ	3.000 - 25.400	5678	289
									HB	N	WN	VHM	Ⓡ	4.000 - 20.000	6027	290
120° NC spotting drills									B	N	WN	HSCo	Ⓡ	3.000 - 25.400	5679	291
									HB	N	WN	VHM	Ⓡ	3.000 - 20.000	6028	292
142° NC spotting drills									HA/ HB	N	WN	VHM	Ⓡ	1.000 - 20.000	6029	293
Jobber drills							~5xD		3	GU 3FS	DIN 338	HSCo	●	1.000 - 13.000	9000	294
Twist drill sets							~5xD		3	GU 3FS	DIN 338	HSCo	●		9001	295

Drilling tools

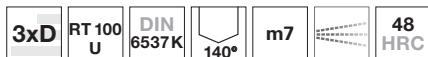
RT 100 HF

- + High-performance drill for precise drilling in high-strength materials*
- + perfect hole quality thanks to two guide and support chamfers*
- + Ø 3-20 mm and 3-7xD in stock*





Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **F**

Shank form HA

P ● web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry

M ○**K** ●

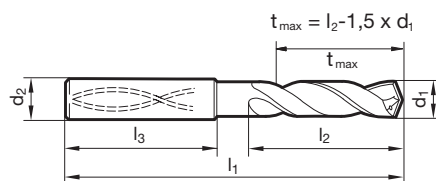
N ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials

S ○ • bronze, brass • high-alloyed AlSi alloys

H ○**GÜHRING** NAVIGATOR

Cutting data page 296

Drilling tools

Article no. **5510**

d1	inch	d2 h6	l1	l2	l3	Order no.	d1	inch	d2 h6	l1	l2	l3	Order no.
3.000		6.00	62.00	20.00	36.00	5510 3.000	5.700		6.00	66.00	28.00	36.00	5510 5.700
3.100		6.00	62.00	20.00	36.00	5510 3.100	5.800		6.00	66.00	28.00	36.00	5510 5.800
3.170	1/8	6.00	62.00	20.00	36.00	5510 3.170	5.900		6.00	66.00	28.00	36.00	5510 5.900
3.200		6.00	62.00	20.00	36.00	5510 3.200	5.950	15/64	6.00	66.00	28.00	36.00	5510 5.950
3.250		6.00	62.00	20.00	36.00	5510 3.250	6.000		6.00	66.00	28.00	36.00	5510 6.000
3.300		6.00	62.00	20.00	36.00	5510 3.300	6.100		8.00	79.00	34.00	36.00	5510 6.100
3.400		6.00	62.00	20.00	36.00	5510 3.400	6.200		8.00	79.00	34.00	36.00	5510 6.200
3.500		6.00	62.00	20.00	36.00	5510 3.500	6.300		8.00	79.00	34.00	36.00	5510 6.300
3.570	9/64	6.00	62.00	20.00	36.00	5510 3.570	6.350	1/4	8.00	79.00	34.00	36.00	5510 6.350
3.600		6.00	62.00	20.00	36.00	5510 3.600	6.400		8.00	79.00	34.00	36.00	5510 6.400
3.700		6.00	62.00	20.00	36.00	5510 3.700	6.500		8.00	79.00	34.00	36.00	5510 6.500
3.800		6.00	66.00	24.00	36.00	5510 3.800	6.530		8.00	79.00	34.00	36.00	5510 6.530
3.900		6.00	66.00	24.00	36.00	5510 3.900	6.600		8.00	79.00	34.00	36.00	5510 6.600
3.970	5/32	6.00	66.00	24.00	36.00	5510 3.970	6.700		8.00	79.00	34.00	36.00	5510 6.700
4.000		6.00	66.00	24.00	36.00	5510 4.000	6.750	17/64	8.00	79.00	34.00	36.00	5510 6.750
4.040		6.00	66.00	24.00	36.00	5510 4.040	6.800		8.00	79.00	34.00	36.00	5510 6.800
4.100		6.00	66.00	24.00	36.00	5510 4.100	6.900		8.00	79.00	34.00	36.00	5510 6.900
4.200		6.00	66.00	24.00	36.00	5510 4.200	7.000		8.00	79.00	34.00	36.00	5510 7.000
4.300		6.00	66.00	24.00	36.00	5510 4.300	7.100		8.00	79.00	41.00	36.00	5510 7.100
4.370	11/64	6.00	66.00	24.00	36.00	5510 4.370	7.140	9/32	8.00	79.00	41.00	36.00	5510 7.140
4.400		6.00	66.00	24.00	36.00	5510 4.400	7.200		8.00	79.00	41.00	36.00	5510 7.200
4.500		6.00	66.00	24.00	36.00	5510 4.500	7.300		8.00	79.00	41.00	36.00	5510 7.300
4.600		6.00	66.00	24.00	36.00	5510 4.600	7.400		8.00	79.00	41.00	36.00	5510 7.400
4.650		6.00	66.00	24.00	36.00	5510 4.650	7.450		8.00	79.00	41.00	36.00	5510 7.450
4.700		6.00	66.00	24.00	36.00	5510 4.700	7.500		8.00	79.00	41.00	36.00	5510 7.500
4.760	3/16	6.00	66.00	28.00	36.00	5510 4.760	7.540	19/64	8.00	79.00	41.00	36.00	5510 7.540
4.800		6.00	66.00	28.00	36.00	5510 4.800	7.600		8.00	79.00	41.00	36.00	5510 7.600
4.900		6.00	66.00	28.00	36.00	5510 4.900	7.700		8.00	79.00	41.00	36.00	5510 7.700
5.000		6.00	66.00	28.00	36.00	5510 5.000	7.800		8.00	79.00	41.00	36.00	5510 7.800
5.100		6.00	66.00	28.00	36.00	5510 5.100	7.900		8.00	79.00	41.00	36.00	5510 7.900
5.110		6.00	66.00	28.00	36.00	5510 5.110	7.940	5/16	8.00	79.00	41.00	36.00	5510 7.940
5.160	13/64	6.00	66.00	28.00	36.00	5510 5.160	8.000		8.00	79.00	41.00	36.00	5510 8.000
5.200		6.00	66.00	28.00	36.00	5510 5.200	8.100		10.00	89.00	47.00	40.00	5510 8.100
5.250		6.00	66.00	28.00	36.00	5510 5.250	8.200		10.00	89.00	47.00	40.00	5510 8.200
5.300		6.00	66.00	28.00	36.00	5510 5.300	8.300		10.00	89.00	47.00	40.00	5510 8.300
5.400		6.00	66.00	28.00	36.00	5510 5.400	8.330	21/64	10.00	89.00	47.00	40.00	5510 8.330
5.410		6.00	66.00	28.00	36.00	5510 5.410	8.400		10.00	89.00	47.00	40.00	5510 8.400
5.500		6.00	66.00	28.00	36.00	5510 5.500	8.500		10.00	89.00	47.00	40.00	5510 8.500
5.550		6.00	66.00	28.00	36.00	5510 5.550	8.550		10.00	89.00	47.00	40.00	5510 8.550
5.560	7/32	6.00	66.00	28.00	36.00	5510 5.560	8.600		10.00	89.00	47.00	40.00	5510 8.600
5.600		6.00	66.00	28.00	36.00	5510 5.600	8.700		10.00	89.00	47.00	40.00	5510 8.700
5.650		6.00	66.00	28.00	36.00	5510 5.650	8.730	11/32	10.00	89.00	47.00	40.00	5510 8.730

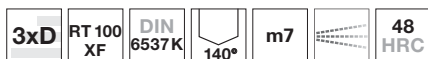


d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
8.800		10.00	89.00	47.00	40.00	5510 8.800	14.200		16.00	115.00	65.00	48.00	5510 14.200
8.900		10.00	89.00	47.00	40.00	5510 8.900	14.290	9/16	16.00	115.00	65.00	48.00	5510 14.290
9.000		10.00	89.00	47.00	40.00	5510 9.000	14.300		16.00	115.00	65.00	48.00	5510 14.300
9.100		10.00	89.00	47.00	40.00	5510 9.100	14.400		16.00	115.00	65.00	48.00	5510 14.400
9.130	23/64	10.00	89.00	47.00	40.00	5510 9.130	14.500		16.00	115.00	65.00	48.00	5510 14.500
9.200		10.00	89.00	47.00	40.00	5510 9.200	14.600		16.00	115.00	65.00	48.00	5510 14.600
9.250		10.00	89.00	47.00	40.00	5510 9.250	14.680	37/64	16.00	115.00	65.00	48.00	5510 14.680
9.300		10.00	89.00	47.00	40.00	5510 9.300	14.700		16.00	115.00	65.00	48.00	5510 14.700
9.340		10.00	89.00	47.00	40.00	5510 9.340	14.800		16.00	115.00	65.00	48.00	5510 14.800
9.400		10.00	89.00	47.00	40.00	5510 9.400	14.900		16.00	115.00	65.00	48.00	5510 14.900
9.500		10.00	89.00	47.00	40.00	5510 9.500	15.000		16.00	115.00	65.00	48.00	5510 15.000
9.520	3/8	10.00	89.00	47.00	40.00	5510 9.520	15.080	19/32	16.00	115.00	65.00	48.00	5510 15.080
9.600		10.00	89.00	47.00	40.00	5510 9.600	15.100		16.00	115.00	65.00	48.00	5510 15.100
9.700		10.00	89.00	47.00	40.00	5510 9.700	15.200		16.00	115.00	65.00	48.00	5510 15.200
9.800		10.00	89.00	47.00	40.00	5510 9.800	15.300		16.00	115.00	65.00	48.00	5510 15.300
9.900		10.00	89.00	47.00	40.00	5510 9.900	15.400		16.00	115.00	65.00	48.00	5510 15.400
9.920	25/64	10.00	89.00	47.00	40.00	5510 9.920	15.480	39/64	16.00	115.00	65.00	48.00	5510 15.480
10.000		10.00	89.00	47.00	40.00	5510 10.000	15.500		16.00	115.00	65.00	48.00	5510 15.500
10.100		12.00	102.00	55.00	45.00	5510 10.100	15.600		16.00	115.00	65.00	48.00	5510 15.600
10.200		12.00	102.00	55.00	45.00	5510 10.200	15.700		16.00	115.00	65.00	48.00	5510 15.700
10.300		12.00	102.00	55.00	45.00	5510 10.300	15.800		16.00	115.00	65.00	48.00	5510 15.800
10.320	13/32	12.00	102.00	55.00	45.00	5510 10.320	15.870	5/8	16.00	115.00	65.00	48.00	5510 15.870
10.400		12.00	102.00	55.00	45.00	5510 10.400	15.900		16.00	115.00	65.00	48.00	5510 15.900
10.500		12.00	102.00	55.00	45.00	5510 10.500	16.000		16.00	115.00	65.00	48.00	5510 16.000
10.600		12.00	102.00	55.00	45.00	5510 10.600	16.100		18.00	123.00	73.00	48.00	5510 16.100
10.700		12.00	102.00	55.00	45.00	5510 10.700	16.200		18.00	123.00	73.00	48.00	5510 16.200
10.720	27/64	12.00	102.00	55.00	45.00	5510 10.720	16.270	41/64	18.00	123.00	73.00	48.00	5510 16.270
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10.900		12.00	102.00	55.00	45.00	5510 10.900	16.670	21/32	18.00	123.00	73.00	48.00	5510 16.670
11.000		12.00	102.00	55.00	45.00	5510 11.000	16.900		18.00	123.00	73.00	48.00	5510 16.900
11.100		12.00	102.00	55.00	45.00	5510 11.100	17.000		18.00	123.00	73.00	48.00	5510 17.000
11.110	7/16	12.00	102.00	55.00	45.00	5510 11.110	17.070	43/64	18.00	123.00	73.00	48.00	5510 17.070
11.200		12.00	102.00	55.00	45.00	5510 11.200	17.200		18.00	123.00	73.00	48.00	5510 17.200
11.300		12.00	102.00	55.00	45.00	5510 11.300	17.300		18.00	123.00	73.00	48.00	5510 17.300
11.400		12.00	102.00	55.00	45.00	5510 11.400	17.400		18.00	123.00	73.00	48.00	5510 17.400
11.500		12.00	102.00	55.00	45.00	5510 11.500	17.460	11/16	18.00	123.00	73.00	48.00	5510 17.460
11.510	29/64	12.00	102.00	55.00	45.00	5510 11.510	17.500		18.00	123.00	73.00	48.00	5510 17.500
11.600		12.00	102.00	55.00	45.00	5510 11.600	17.600		18.00	123.00	73.00	48.00	5510 17.600
11.700		12.00	102.00	55.00	45.00	5510 11.700	17.700		18.00	123.00	73.00	48.00	5510 17.700
11.800		12.00	102.00	55.00	45.00	5510 11.800	17.860	45/64	18.00	123.00	73.00	48.00	5510 17.860
11.900		12.00	102.00	55.00	45.00	5510 11.900	17.900		18.00	123.00	73.00	48.00	5510 17.900
11.910	15/32	12.00	102.00	55.00	45.00	5510 11.910	18.000		18.00	123.00	73.00	48.00	5510 18.000
12.000		12.00	102.00	55.00	45.00	5510 12.000	18.260	23/32	20.00	131.00	79.00	50.00	5510 18.260
12.100		14.00	107.00	60.00	45.00	5510 12.100	18.300		20.00	131.00	79.00	50.00	5510 18.300
12.200		14.00	107.00	60.00	45.00	5510 12.200	18.500		20.00	131.00	79.00	50.00	5510 18.500
12.300	31/64	14.00	107.00	60.00	45.00	5510 12.300	18.900		20.00	131.00	79.00	50.00	5510 18.900
12.400		14.00	107.00	60.00	45.00	5510 12.400	19.000		20.00	131.00	79.00	50.00	5510 19.000
12.500		14.00	107.00	60.00	45.00	5510 12.500	19.050	3/4	20.00	131.00	79.00	50.00	5510 19.050
12.600		14.00	107.00	60.00	45.00	5510 12.600	19.250		20.00	131.00	79.00	50.00	5510 19.250
12.700	1/2	14.00	107.00	60.00	45.00	5510 12.700	19.300		20.00	131.00	79.00	50.00	5510 19.300
12.800		14.00	107.00	60.00	45.00	5510 12.800	19.446		20.00	131.00	79.00	50.00	5510 19.446
12.900		14.00	107.00	60.00	45.00	5510 12.900	19.500		20.00	131.00	79.00	50.00	5510 19.500
13.000		14.00	107.00	60.00	45.00	5510 13.000	19.840	25/32	20.00	131.00	79.00	50.00	5510 19.840
13.100	33/64	14.00	107.00	60.00	45.00	5510 13.100	19.900		20.00	131.00	79.00	50.00	5510 19.900
13.200		14.00	107.00	60.00	45.00	5510 13.200	20.000		20.00	131.00	79.00	50.00	5510 20.000
13.300		14.00	107.00	60.00	45.00	5510 13.300							
13.400		14.00	107.00	60.00	45.00	5510 13.400							
13.490	17/32	14.00	107.00	60.00	45.00	5510 13.490							
13.500		14.00	107.00	60.00	45.00	5510 13.500							
13.600		14.00	107.00	60.00	45.00	5510 13.600							
13.700		14.00	107.00	60.00	45.00	5510 13.700							
13.800		14.00	107.00	60.00	45.00	5510 13.800							
13.890	35/64	14.00	107.00	60.00	45.00	5510 13.890							
13.900		14.00	107.00	60.00	45.00	5510 13.900							
14.000		14.00	107.00	60.00	45.00	5510 14.000							
14.100		16.00	115.00	65.00	48.00	5510 14.100							

Drilling tools

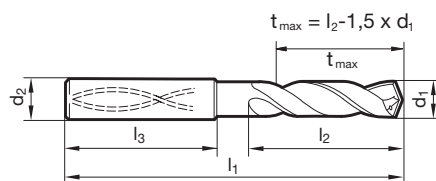


Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **F**Shank form **HA****P** ● relieved cone • main cutting edge form concave • optimised cutting geometry • maximum performance • double margin**M** ○**K** ○**N** structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1400 N/mm²**S** ○**H** ○**GÜHRING NAVIGATOR**

Cutting data page 296

Drilling tools

Article no. **6498**

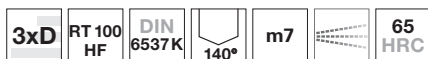
d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	62.00	20.00	36.00	6498 3.000	5.900		6.00	66.00	28.00	36.00	6498 5.900
3.100		6.00	62.00	20.00	36.00	6498 3.100	5.950	15/64	6.00	66.00	28.00	36.00	6498 5.950
3.170	1/8	6.00	62.00	20.00	36.00	6498 3.170	6.000		6.00	66.00	28.00	36.00	6498 6.000
3.200		6.00	62.00	20.00	36.00	6498 3.200	6.100		8.00	79.00	34.00	36.00	6498 6.100
3.250		6.00	62.00	20.00	36.00	6498 3.250	6.200		8.00	79.00	34.00	36.00	6498 6.200
3.300		6.00	62.00	20.00	36.00	6498 3.300	6.300		8.00	79.00	34.00	36.00	6498 6.300
3.400		6.00	62.00	20.00	36.00	6498 3.400	6.350	1/4	8.00	79.00	34.00	36.00	6498 6.350
3.500		6.00	62.00	20.00	36.00	6498 3.500	6.400		8.00	79.00	34.00	36.00	6498 6.400
3.570	9/64	6.00	62.00	20.00	36.00	6498 3.570	6.500		8.00	79.00	34.00	36.00	6498 6.500
3.600		6.00	62.00	20.00	36.00	6498 3.600	6.530		8.00	79.00	34.00	36.00	6498 6.530
3.700		6.00	62.00	20.00	36.00	6498 3.700	6.550		8.00	79.00	34.00	36.00	6498 6.550
3.800		6.00	66.00	24.00	36.00	6498 3.800	6.600		8.00	79.00	34.00	36.00	6498 6.600
3.900		6.00	66.00	24.00	36.00	6498 3.900	6.700		8.00	79.00	34.00	36.00	6498 6.700
3.970	5/32	6.00	66.00	24.00	36.00	6498 3.970	6.750	17/64	8.00	79.00	34.00	36.00	6498 6.750
4.000		6.00	66.00	24.00	36.00	6498 4.000	6.800		8.00	79.00	34.00	36.00	6498 6.800
4.040		6.00	66.00	24.00	36.00	6498 4.040	6.900		8.00	79.00	34.00	36.00	6498 6.900
4.100		6.00	66.00	24.00	36.00	6498 4.100	7.000		8.00	79.00	34.00	36.00	6498 7.000
4.200		6.00	66.00	24.00	36.00	6498 4.200	7.100		8.00	79.00	41.00	36.00	6498 7.100
4.300		6.00	66.00	24.00	36.00	6498 4.300	7.140	9/32	8.00	79.00	41.00	36.00	6498 7.140
4.370	11/64	6.00	66.00	24.00	36.00	6498 4.370	7.200		8.00	79.00	41.00	36.00	6498 7.200
4.400		6.00	66.00	24.00	36.00	6498 4.400	7.300		8.00	79.00	41.00	36.00	6498 7.300
4.500		6.00	66.00	24.00	36.00	6498 4.500	7.400		8.00	79.00	41.00	36.00	6498 7.400
4.600		6.00	66.00	24.00	36.00	6498 4.600	7.500		8.00	79.00	41.00	36.00	6498 7.500
4.650		6.00	66.00	24.00	36.00	6498 4.650	7.540	19/64	8.00	79.00	41.00	36.00	6498 7.540
4.700		6.00	66.00	24.00	36.00	6498 4.700	7.550		8.00	79.00	41.00	36.00	6498 7.550
4.760	3/16	6.00	66.00	28.00	36.00	6498 4.760	7.600		8.00	79.00	41.00	36.00	6498 7.600
4.800		6.00	66.00	28.00	36.00	6498 4.800	7.650		8.00	79.00	41.00	36.00	6498 7.650
4.900		6.00	66.00	28.00	36.00	6498 4.900	7.700		8.00	79.00	41.00	36.00	6498 7.700
5.000		6.00	66.00	28.00	36.00	6498 5.000	7.800		8.00	79.00	41.00	36.00	6498 7.800
5.100		6.00	66.00	28.00	36.00	6498 5.100	7.900		8.00	79.00	41.00	36.00	6498 7.900
5.110		6.00	66.00	28.00	36.00	6498 5.110	7.940	5/16	8.00	79.00	41.00	36.00	6498 7.940
5.160	13/64	6.00	66.00	28.00	36.00	6498 5.160	8.000		8.00	79.00	41.00	36.00	6498 8.000
5.200		6.00	66.00	28.00	36.00	6498 5.200	8.100		10.00	89.00	47.00	40.00	6498 8.100
5.300		6.00	66.00	28.00	36.00	6498 5.300	8.200		10.00	89.00	47.00	40.00	6498 8.200
5.400		6.00	66.00	28.00	36.00	6498 5.400	8.300		10.00	89.00	47.00	40.00	6498 8.300
5.410		6.00	66.00	28.00	36.00	6498 5.410	8.330	21/64	10.00	89.00	47.00	40.00	6498 8.330
5.500		6.00	66.00	28.00	36.00	6498 5.500	8.400		10.00	89.00	47.00	40.00	6498 8.400
5.550		6.00	66.00	28.00	36.00	6498 5.550	8.500		10.00	89.00	47.00	40.00	6498 8.500
5.560	7/32	6.00	66.00	28.00	36.00	6498 5.560	8.600		10.00	89.00	47.00	40.00	6498 8.600
5.600		6.00	66.00	28.00	36.00	6498 5.600	8.700		10.00	89.00	47.00	40.00	6498 8.700
5.700		6.00	66.00	28.00	36.00	6498 5.700	8.730	11/32	10.00	89.00	47.00	40.00	6498 8.730
5.800		6.00	66.00	28.00	36.00	6498 5.800	8.800		10.00	89.00	47.00	40.00	6498 8.800



d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
8.900		10.00	89.00	47.00	40.00	6498 8.900	14.100		16.00	115.00	65.00	48.00	6498 14.100
9.000		10.00	89.00	47.00	40.00	6498 9.000	14.200		16.00	115.00	65.00	48.00	6498 14.200
9.100		10.00	89.00	47.00	40.00	6498 9.100	14.290	9/16	16.00	115.00	65.00	48.00	6498 14.290
9.130	23/64	10.00	89.00	47.00	40.00	6498 9.130	14.300		16.00	115.00	65.00	48.00	6498 14.300
9.200		10.00	89.00	47.00	40.00	6498 9.200	14.400		16.00	115.00	65.00	48.00	6498 14.400
9.250		10.00	89.00	47.00	40.00	6498 9.250	14.500		16.00	115.00	65.00	48.00	6498 14.500
9.300		10.00	89.00	47.00	40.00	6498 9.300	14.600		16.00	115.00	65.00	48.00	6498 14.600
9.340		10.00	89.00	47.00	40.00	6498 9.340	14.680	37/64	16.00	115.00	65.00	48.00	6498 14.680
9.400		10.00	89.00	47.00	40.00	6498 9.400	14.700		16.00	115.00	65.00	48.00	6498 14.700
9.500		10.00	89.00	47.00	40.00	6498 9.500	14.800		16.00	115.00	65.00	48.00	6498 14.800
9.520	3/8	10.00	89.00	47.00	40.00	6498 9.520	14.900		16.00	115.00	65.00	48.00	6498 14.900
9.550		10.00	89.00	47.00	40.00	6498 9.550	15.000		16.00	115.00	65.00	48.00	6498 15.000
9.600		10.00	89.00	47.00	40.00	6498 9.600	15.080	19/32	16.00	115.00	65.00	48.00	6498 15.080
9.700		10.00	89.00	47.00	40.00	6498 9.700	15.100		16.00	115.00	65.00	48.00	6498 15.100
9.800		10.00	89.00	47.00	40.00	6498 9.800	15.200		16.00	115.00	65.00	48.00	6498 15.200
9.900		10.00	89.00	47.00	40.00	6498 9.900	15.300		16.00	115.00	65.00	48.00	6498 15.300
9.920	25/64	10.00	89.00	47.00	40.00	6498 9.920	15.400		16.00	115.00	65.00	48.00	6498 15.400
10.000		10.00	89.00	47.00	40.00	6498 10.000	15.480	39/64	16.00	115.00	65.00	48.00	6498 15.480
10.100		12.00	102.00	55.00	45.00	6498 10.100	15.500		16.00	115.00	65.00	48.00	6498 15.500
10.200		12.00	102.00	55.00	45.00	6498 10.200	15.550		16.00	115.00	65.00	48.00	6498 15.550
10.300		12.00	102.00	55.00	45.00	6498 10.300	15.600		16.00	115.00	65.00	48.00	6498 15.600
10.320	13/32	12.00	102.00	55.00	45.00	6498 10.320	15.700		16.00	115.00	65.00	48.00	6498 15.700
10.400		12.00	102.00	55.00	45.00	6498 10.400	15.800		16.00	115.00	65.00	48.00	6498 15.800
10.500		12.00	102.00	55.00	45.00	6498 10.500	15.870	5/8	16.00	115.00	65.00	48.00	6498 15.870
10.600		12.00	102.00	55.00	45.00	6498 10.600	15.900		16.00	115.00	65.00	48.00	6498 15.900
10.700		12.00	102.00	55.00	45.00	6498 10.700	16.000		16.00	115.00	65.00	48.00	6498 16.000
10.720	27/64	12.00	102.00	55.00	45.00	6498 10.720	16.270	41/64	18.00	123.00	73.00	48.00	6498 16.270
10.800		12.00	102.00	55.00	45.00	6498 10.800	16.300		18.00	123.00	73.00	48.00	6498 16.300
10.900		12.00	102.00	55.00	45.00	6498 10.900	16.500		18.00	123.00	73.00	48.00	6498 16.500
11.000		12.00	102.00	55.00	45.00	6498 11.000	16.670	21/32	18.00	123.00	73.00	48.00	6498 16.670
11.100		12.00	102.00	55.00	45.00	6498 11.100	16.700		18.00	123.00	73.00	48.00	6498 16.700
11.110	7/16	12.00	102.00	55.00	45.00	6498 11.110	16.900		18.00	123.00	73.00	48.00	6498 16.900
11.200		12.00	102.00	55.00	45.00	6498 11.200	17.000		18.00	123.00	73.00	48.00	6498 17.000
11.300		12.00	102.00	55.00	45.00	6498 11.300	17.070	43/64	18.00	123.00	73.00	48.00	6498 17.070
11.400		12.00	102.00	55.00	45.00	6498 11.400	17.460	11/16	18.00	123.00	73.00	48.00	6498 17.460
11.500		12.00	102.00	55.00	45.00	6498 11.500	17.500		18.00	123.00	73.00	48.00	6498 17.500
11.510	29/64	12.00	102.00	55.00	45.00	6498 11.510	17.550		18.00	123.00	73.00	48.00	6498 17.550
11.550		12.00	102.00	55.00	45.00	6498 11.550	17.700		18.00	123.00	73.00	48.00	6498 17.700
11.600		12.00	102.00	55.00	45.00	6498 11.600	17.860	45/64	18.00	123.00	73.00	48.00	6498 17.860
11.700		12.00	102.00	55.00	45.00	6498 11.700	18.000		18.00	123.00	73.00	48.00	6498 18.000
11.800		12.00	102.00	55.00	45.00	6498 11.800	18.260	23/32	20.00	131.00	79.00	50.00	6498 18.260
11.900		12.00	102.00	55.00	45.00	6498 11.900	18.500		20.00	131.00	79.00	50.00	6498 18.500
11.910	15/32	12.00	102.00	55.00	45.00	6498 11.910	18.700		20.00	131.00	79.00	50.00	6498 18.700
12.000		12.00	102.00	55.00	45.00	6498 12.000	18.900		20.00	131.00	79.00	50.00	6498 18.900
12.100		14.00	107.00	60.00	45.00	6498 12.100	19.000		20.00	131.00	79.00	50.00	6498 19.000
12.200		14.00	107.00	60.00	45.00	6498 12.200	19.050	3/4	20.00	131.00	79.00	50.00	6498 19.050
12.300	31/64	14.00	107.00	60.00	45.00	6498 12.300	19.250		20.00	131.00	79.00	50.00	6498 19.250
12.400		14.00	107.00	60.00	45.00	6498 12.400	19.300		20.00	131.00	79.00	50.00	6498 19.300
12.500		14.00	107.00	60.00	45.00	6498 12.500	19.450	49/64	20.00	131.00	79.00	50.00	6498 19.450
12.600		14.00	107.00	60.00	45.00	6498 12.600	19.500		20.00	131.00	79.00	50.00	6498 19.500
12.700	1/2	14.00	107.00	60.00	45.00	6498 12.700	19.550		20.00	131.00	79.00	50.00	6498 19.550
12.800		14.00	107.00	60.00	45.00	6498 12.800	19.700		20.00	131.00	79.00	50.00	6498 19.700
12.900		14.00	107.00	60.00	45.00	6498 12.900	19.800		20.00	131.00	79.00	50.00	6498 19.800
13.000		14.00	107.00	60.00	45.00	6498 13.000	19.840	25/32	20.00	131.00	79.00	50.00	6498 19.840
13.100	33/64	14.00	107.00	60.00	45.00	6498 13.100	20.000		20.00	131.00	79.00	50.00	6498 20.000
13.200		14.00	107.00	60.00	45.00	6498 13.200							
13.300		14.00	107.00	60.00	45.00	6498 13.300							
13.400		14.00	107.00	60.00	45.00	6498 13.400							
13.490	17/32	14.00	107.00	60.00	45.00	6498 13.490							
13.500		14.00	107.00	60.00	45.00	6498 13.500							
13.600		14.00	107.00	60.00	45.00	6498 13.600							
13.700		14.00	107.00	60.00	45.00	6498 13.700							
13.800		14.00	107.00	60.00	45.00	6498 13.800							
13.890	35/64	14.00	107.00	60.00	45.00	6498 13.890							
13.900		14.00	107.00	60.00	45.00	6498 13.900							
14.000		14.00	107.00	60.00	45.00	6498 14.000							



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **Y**Shank form **HA**

P • web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin

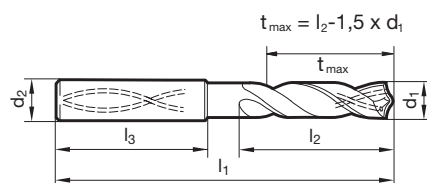
M**K**

N alloyed and high tensile steels up to 1600 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys

S •**H** ○**GÜHRING** NAVIGATOR

Cutting data page 296

Drilling tools

Article no. **8520**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	62.00	20.00	36.00	8520 3.000	6.100		8.00	79.00	34.00	36.00	8520 6.100
3.100		6.00	62.00	20.00	36.00	8520 3.100	6.200		8.00	79.00	34.00	36.00	8520 6.200
3.170	1/8	6.00	62.00	20.00	36.00	8520 3.170	6.300		8.00	79.00	34.00	36.00	8520 6.300
3.200		6.00	62.00	20.00	36.00	8520 3.200	6.350	1/4	8.00	79.00	34.00	36.00	8520 6.350
3.250		6.00	62.00	20.00	36.00	8520 3.250	6.400		8.00	79.00	34.00	36.00	8520 6.400
3.300		6.00	62.00	20.00	36.00	8520 3.300	6.500		8.00	79.00	34.00	36.00	8520 6.500
3.400		6.00	62.00	20.00	36.00	8520 3.400	6.600		8.00	79.00	34.00	36.00	8520 6.600
3.500		6.00	62.00	20.00	36.00	8520 3.500	6.700		8.00	79.00	34.00	36.00	8520 6.700
3.570	9/64	6.00	62.00	20.00	36.00	8520 3.570	6.750	17/64	8.00	79.00	34.00	36.00	8520 6.750
3.600		6.00	62.00	20.00	36.00	8520 3.600	6.800		8.00	79.00	34.00	36.00	8520 6.800
3.700		6.00	62.00	20.00	36.00	8520 3.700	6.900		8.00	79.00	34.00	36.00	8520 6.900
3.800		6.00	66.00	24.00	36.00	8520 3.800	7.000		8.00	79.00	34.00	36.00	8520 7.000
3.900		6.00	66.00	24.00	36.00	8520 3.900	7.100		8.00	79.00	41.00	36.00	8520 7.100
3.970	5/32	6.00	66.00	24.00	36.00	8520 3.970	7.140	9/32	8.00	79.00	41.00	36.00	8520 7.140
4.000		6.00	66.00	24.00	36.00	8520 4.000	7.200		8.00	79.00	41.00	36.00	8520 7.200
4.100		6.00	66.00	24.00	36.00	8520 4.100	7.300		8.00	79.00	41.00	36.00	8520 7.300
4.200		6.00	66.00	24.00	36.00	8520 4.200	7.400		8.00	79.00	41.00	36.00	8520 7.400
4.300		6.00	66.00	24.00	36.00	8520 4.300	7.500		8.00	79.00	41.00	36.00	8520 7.500
4.370	11/64	6.00	66.00	24.00	36.00	8520 4.370	7.540	19/64	8.00	79.00	41.00	36.00	8520 7.540
4.400		6.00	66.00	24.00	36.00	8520 4.400	7.600		8.00	79.00	41.00	36.00	8520 7.600
4.500		6.00	66.00	24.00	36.00	8520 4.500	7.700		8.00	79.00	41.00	36.00	8520 7.700
4.600		6.00	66.00	24.00	36.00	8520 4.600	7.800		8.00	79.00	41.00	36.00	8520 7.800
4.650		6.00	66.00	24.00	36.00	8520 4.650	7.900		8.00	79.00	41.00	36.00	8520 7.900
4.700		6.00	66.00	24.00	36.00	8520 4.700	7.940	5/16	8.00	79.00	41.00	36.00	8520 7.940
4.760	3/16	6.00	66.00	28.00	36.00	8520 4.760	8.000		8.00	79.00	41.00	36.00	8520 8.000
4.800		6.00	66.00	28.00	36.00	8520 4.800	8.100		10.00	89.00	47.00	40.00	8520 8.100
4.900		6.00	66.00	28.00	36.00	8520 4.900	8.200		10.00	89.00	47.00	40.00	8520 8.200
5.000		6.00	66.00	28.00	36.00	8520 5.000	8.300		10.00	89.00	47.00	40.00	8520 8.300
5.100		6.00	66.00	28.00	36.00	8520 5.100	8.330	21/64	10.00	89.00	47.00	40.00	8520 8.330
5.160	13/64	6.00	66.00	28.00	36.00	8520 5.160	8.400		10.00	89.00	47.00	40.00	8520 8.400
5.200		6.00	66.00	28.00	36.00	8520 5.200	8.500		10.00	89.00	47.00	40.00	8520 8.500
5.300		6.00	66.00	28.00	36.00	8520 5.300	8.600		10.00	89.00	47.00	40.00	8520 8.600
5.400		6.00	66.00	28.00	36.00	8520 5.400	8.700		10.00	89.00	47.00	40.00	8520 8.700
5.500		6.00	66.00	28.00	36.00	8520 5.500	8.730	11/32	10.00	89.00	47.00	40.00	8520 8.730
5.550		6.00	66.00	28.00	36.00	8520 5.550	8.800		10.00	89.00	47.00	40.00	8520 8.800
5.560	7/32	6.00	66.00	28.00	36.00	8520 5.560	8.900		10.00	89.00	47.00	40.00	8520 8.900
5.600		6.00	66.00	28.00	36.00	8520 5.600	9.000		10.00	89.00	47.00	40.00	8520 9.000
5.700		6.00	66.00	28.00	36.00	8520 5.700	9.100		10.00	89.00	47.00	40.00	8520 9.100
5.800		6.00	66.00	28.00	36.00	8520 5.800	9.130	23/64	10.00	89.00	47.00	40.00	8520 9.130
5.900		6.00	66.00	28.00	36.00	8520 5.900	9.200		10.00	89.00	47.00	40.00	8520 9.200
5.950	15/64	6.00	66.00	28.00	36.00	8520 5.950	9.250		10.00	89.00	47.00	40.00	8520 9.250
6.000		6.00	66.00	28.00	36.00	8520 6.000	9.300		10.00	89.00	47.00	40.00	8520 9.300

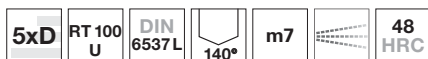


d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.400		10.00	89.00	47.00	40.00	8520 9.400	12.500		14.00	107.00	60.00	45.00	8520 12.500
9.500		10.00	89.00	47.00	40.00	8520 9.500	12.700	1/2	14.00	107.00	60.00	45.00	8520 12.700
9.520	3/8	10.00	89.00	47.00	40.00	8520 9.520	12.800		14.00	107.00	60.00	45.00	8520 12.800
9.600		10.00	89.00	47.00	40.00	8520 9.600	13.000		14.00	107.00	60.00	45.00	8520 13.000
9.700		10.00	89.00	47.00	40.00	8520 9.700	13.300		14.00	107.00	60.00	45.00	8520 13.300
9.800		10.00	89.00	47.00	40.00	8520 9.800	13.490	17/32	14.00	107.00	60.00	45.00	8520 13.490
9.900		10.00	89.00	47.00	40.00	8520 9.900	13.500		14.00	107.00	60.00	45.00	8520 13.500
9.920	25/64	10.00	89.00	47.00	40.00	8520 9.920	13.700		14.00	107.00	60.00	45.00	8520 13.700
10.000		10.00	89.00	47.00	40.00	8520 10.000	14.000		14.00	107.00	60.00	45.00	8520 14.000
10.100		12.00	102.00	55.00	45.00	8520 10.100	14.200		16.00	115.00	65.00	48.00	8520 14.200
10.200		12.00	102.00	55.00	45.00	8520 10.200	14.290	9/16	16.00	115.00	65.00	48.00	8520 14.290
10.300		12.00	102.00	55.00	45.00	8520 10.300	14.300		16.00	115.00	65.00	48.00	8520 14.300
10.320	13/32	12.00	102.00	55.00	45.00	8520 10.320	14.500		16.00	115.00	65.00	48.00	8520 14.500
10.400		12.00	102.00	55.00	45.00	8520 10.400	14.700		16.00	115.00	65.00	48.00	8520 14.700
10.500		12.00	102.00	55.00	45.00	8520 10.500	15.000		16.00	115.00	65.00	48.00	8520 15.000
10.600		12.00	102.00	55.00	45.00	8520 10.600	15.200		16.00	115.00	65.00	48.00	8520 15.200
10.700		12.00	102.00	55.00	45.00	8520 10.700	15.300		16.00	115.00	65.00	48.00	8520 15.300
10.720	27/64	12.00	102.00	55.00	45.00	8520 10.720	15.500		16.00	115.00	65.00	48.00	8520 15.500
10.800		12.00	102.00	55.00	45.00	8520 10.800	15.700		16.00	115.00	65.00	48.00	8520 15.700
10.900		12.00	102.00	55.00	45.00	8520 10.900	15.870	5/8	16.00	115.00	65.00	48.00	8520 15.870
11.000		12.00	102.00	55.00	45.00	8520 11.000	16.000		16.00	115.00	65.00	48.00	8520 16.000
11.100		12.00	102.00	55.00	45.00	8520 11.100	16.300		18.00	123.00	73.00	48.00	8520 16.300
11.110	7/16	12.00	102.00	55.00	45.00	8520 11.110	16.500		18.00	123.00	73.00	48.00	8520 16.500
11.200		12.00	102.00	55.00	45.00	8520 11.200	16.900		18.00	123.00	73.00	48.00	8520 16.900
11.300		12.00	102.00	55.00	45.00	8520 11.300	17.000		18.00	123.00	73.00	48.00	8520 17.000
11.400		12.00	102.00	55.00	45.00	8520 11.400	17.300		18.00	123.00	73.00	48.00	8520 17.300
11.500		12.00	102.00	55.00	45.00	8520 11.500	17.500		18.00	123.00	73.00	48.00	8520 17.500
11.510	29/64	12.00	102.00	55.00	45.00	8520 11.510	18.000		18.00	123.00	73.00	48.00	8520 18.000
11.600		12.00	102.00	55.00	45.00	8520 11.600	18.500		20.00	131.00	79.00	50.00	8520 18.500
11.700		12.00	102.00	55.00	45.00	8520 11.700	18.900		20.00	131.00	79.00	50.00	8520 18.900
11.800		12.00	102.00	55.00	45.00	8520 11.800	19.000		20.00	131.00	79.00	50.00	8520 19.000
11.900		12.00	102.00	55.00	45.00	8520 11.900	19.050	3/4	20.00	131.00	79.00	50.00	8520 19.050
11.910	15/32	12.00	102.00	55.00	45.00	8520 11.910	19.300		20.00	131.00	79.00	50.00	8520 19.300
12.000		12.00	102.00	55.00	45.00	8520 12.000	19.500		20.00	131.00	79.00	50.00	8520 19.500
12.200		14.00	107.00	60.00	45.00	8520 12.200	20.000		20.00	131.00	79.00	50.00	8520 20.000
12.300	31/64	14.00	107.00	60.00	45.00	8520 12.300							

Drilling tools



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **F**

Shank form HA

P • web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry

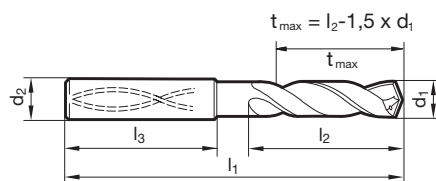
M ○**K** •

N ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials

S ○ • bronze, brass • high-alloyed AlSi alloys

H ○**GÜHRING** NAVIGATOR

Cutting data page 296

Article no. **5511**

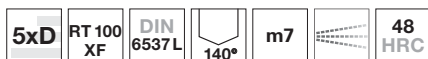
d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	66.00	28.00	36.00	5511 3.000	5.800		6.00	82.00	44.00	36.00	5511 5.800
3.100		6.00	66.00	28.00	36.00	5511 3.100	5.900		6.00	82.00	44.00	36.00	5511 5.900
3.170	1/8	6.00	66.00	28.00	36.00	5511 3.170	5.950	15/64	6.00	82.00	44.00	36.00	5511 5.950
3.200		6.00	66.00	28.00	36.00	5511 3.200	6.000		6.00	82.00	44.00	36.00	5511 6.000
3.250		6.00	66.00	28.00	36.00	5511 3.250	6.100		8.00	91.00	53.00	36.00	5511 6.100
3.300		6.00	66.00	28.00	36.00	5511 3.300	6.200		8.00	91.00	53.00	36.00	5511 6.200
3.400		6.00	66.00	28.00	36.00	5511 3.400	6.300		8.00	91.00	53.00	36.00	5511 6.300
3.500		6.00	66.00	28.00	36.00	5511 3.500	6.350	1/4	8.00	91.00	53.00	36.00	5511 6.350
3.570	9/64	6.00	66.00	28.00	36.00	5511 3.570	6.400		8.00	91.00	53.00	36.00	5511 6.400
3.600		6.00	66.00	28.00	36.00	5511 3.600	6.500		8.00	91.00	53.00	36.00	5511 6.500
3.700		6.00	66.00	28.00	36.00	5511 3.700	6.530		8.00	91.00	53.00	36.00	5511 6.530
3.800		6.00	74.00	36.00	36.00	5511 3.800	6.600		8.00	91.00	53.00	36.00	5511 6.600
3.900		6.00	74.00	36.00	36.00	5511 3.900	6.700		8.00	91.00	53.00	36.00	5511 6.700
3.970	5/32	6.00	74.00	36.00	36.00	5511 3.970	6.750	17/64	8.00	91.00	53.00	36.00	5511 6.750
4.000		6.00	74.00	36.00	36.00	5511 4.000	6.800		8.00	91.00	53.00	36.00	5511 6.800
4.040		6.00	74.00	36.00	36.00	5511 4.040	6.900		8.00	91.00	53.00	36.00	5511 6.900
4.100		6.00	74.00	36.00	36.00	5511 4.100	7.000		8.00	91.00	53.00	36.00	5511 7.000
4.200		6.00	74.00	36.00	36.00	5511 4.200	7.100		8.00	91.00	53.00	36.00	5511 7.100
4.300		6.00	74.00	36.00	36.00	5511 4.300	7.140	9/32	8.00	91.00	53.00	36.00	5511 7.140
4.370	11/64	6.00	74.00	36.00	36.00	5511 4.370	7.200		8.00	91.00	53.00	36.00	5511 7.200
4.400		6.00	74.00	36.00	36.00	5511 4.400	7.300		8.00	91.00	53.00	36.00	5511 7.300
4.500		6.00	74.00	36.00	36.00	5511 4.500	7.400		8.00	91.00	53.00	36.00	5511 7.400
4.600		6.00	74.00	36.00	36.00	5511 4.600	7.500		8.00	91.00	53.00	36.00	5511 7.500
4.650		6.00	74.00	36.00	36.00	5511 4.650	7.540	19/64	8.00	91.00	53.00	36.00	5511 7.540
4.700		6.00	74.00	36.00	36.00	5511 4.700	7.600		8.00	91.00	53.00	36.00	5511 7.600
4.760	3/16	6.00	82.00	44.00	36.00	5511 4.760	7.700		8.00	91.00	53.00	36.00	5511 7.700
4.800		6.00	82.00	44.00	36.00	5511 4.800	7.800		8.00	91.00	53.00	36.00	5511 7.800
4.900		6.00	82.00	44.00	36.00	5511 4.900	7.900		8.00	91.00	53.00	36.00	5511 7.900
5.000		6.00	82.00	44.00	36.00	5511 5.000	7.940	5/16	8.00	91.00	53.00	36.00	5511 7.940
5.100		6.00	82.00	44.00	36.00	5511 5.100	8.000		8.00	91.00	53.00	36.00	5511 8.000
5.110		6.00	82.00	44.00	36.00	5511 5.110	8.100		10.00	103.00	61.00	40.00	5511 8.100
5.160	13/64	6.00	82.00	44.00	36.00	5511 5.160	8.200		10.00	103.00	61.00	40.00	5511 8.200
5.200		6.00	82.00	44.00	36.00	5511 5.200	8.300		10.00	103.00	61.00	40.00	5511 8.300
5.250		6.00	82.00	44.00	36.00	5511 5.250	8.330	21/64	10.00	103.00	61.00	40.00	5511 8.330
5.300		6.00	82.00	44.00	36.00	5511 5.300	8.400		10.00	103.00	61.00	40.00	5511 8.400
5.400		6.00	82.00	44.00	36.00	5511 5.400	8.500		10.00	103.00	61.00	40.00	5511 8.500
5.410		6.00	82.00	44.00	36.00	5511 5.410	8.600		10.00	103.00	61.00	40.00	5511 8.600
5.500		6.00	82.00	44.00	36.00	5511 5.500	8.700		10.00	103.00	61.00	40.00	5511 8.700
5.550		6.00	82.00	44.00	36.00	5511 5.550	8.730	11/32	10.00	103.00	61.00	40.00	5511 8.730
5.560	7/32	6.00	82.00	44.00	36.00	5511 5.560	8.800		10.00	103.00	61.00	40.00	5511 8.800
5.600		6.00	82.00	44.00	36.00	5511 5.600	8.900		10.00	103.00	61.00	40.00	5511 8.900
5.700		6.00	82.00	44.00	36.00	5511 5.700	9.000		10.00	103.00	61.00	40.00	5511 9.000



d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.100		10.00	103.00	61.00	40.00	5511 9.100	13.900		14.00	124.00	77.00	45.00	5511 13.900
9.130	23/64	10.00	103.00	61.00	40.00	5511 9.130	14.000		14.00	124.00	77.00	45.00	5511 14.000
9.200		10.00	103.00	61.00	40.00	5511 9.200	14.100		16.00	133.00	83.00	48.00	5511 14.100
9.250		10.00	103.00	61.00	40.00	5511 9.250	14.200		16.00	133.00	83.00	48.00	5511 14.200
9.300		10.00	103.00	61.00	40.00	5511 9.300	14.290	9/16	16.00	133.00	83.00	48.00	5511 14.290
9.340		10.00	103.00	61.00	40.00	5511 9.340	14.300		16.00	133.00	83.00	48.00	5511 14.300
9.400		10.00	103.00	61.00	40.00	5511 9.400	14.400		16.00	133.00	83.00	48.00	5511 14.400
9.500		10.00	103.00	61.00	40.00	5511 9.500	14.500		16.00	133.00	83.00	48.00	5511 14.500
9.520	3/8	10.00	103.00	61.00	40.00	5511 9.520	14.600		16.00	133.00	83.00	48.00	5511 14.600
9.600		10.00	103.00	61.00	40.00	5511 9.600	14.680	37/64	16.00	133.00	83.00	48.00	5511 14.680
9.700		10.00	103.00	61.00	40.00	5511 9.700	14.700		16.00	133.00	83.00	48.00	5511 14.700
9.800		10.00	103.00	61.00	40.00	5511 9.800	14.800		16.00	133.00	83.00	48.00	5511 14.800
9.900		10.00	103.00	61.00	40.00	5511 9.900	14.900		16.00	133.00	83.00	48.00	5511 14.900
9.920	25/64	10.00	103.00	61.00	40.00	5511 9.920	15.000		16.00	133.00	83.00	48.00	5511 15.000
10.000		10.00	103.00	61.00	40.00	5511 10.000	15.080	19/32	16.00	133.00	83.00	48.00	5511 15.080
10.100		12.00	118.00	71.00	45.00	5511 10.100	15.100		16.00	133.00	83.00	48.00	5511 15.100
10.200		12.00	118.00	71.00	45.00	5511 10.200	15.200		16.00	133.00	83.00	48.00	5511 15.200
10.300		12.00	118.00	71.00	45.00	5511 10.300	15.300		16.00	133.00	83.00	48.00	5511 15.300
10.320	13/32	12.00	118.00	71.00	45.00	5511 10.320	15.400		16.00	133.00	83.00	48.00	5511 15.400
10.400		12.00	118.00	71.00	45.00	5511 10.400	15.480	39/64	16.00	133.00	83.00	48.00	5511 15.480
10.500		12.00	118.00	71.00	45.00	5511 10.500	15.500		16.00	133.00	83.00	48.00	5511 15.500
10.600		12.00	118.00	71.00	45.00	5511 10.600	15.600		16.00	133.00	83.00	48.00	5511 15.600
10.700		12.00	118.00	71.00	45.00	5511 10.700	15.700		16.00	133.00	83.00	48.00	5511 15.700
10.720	27/64	12.00	118.00	71.00	45.00	5511 10.720	15.800		16.00	133.00	83.00	48.00	5511 15.800
10.800		12.00	118.00	71.00	45.00	5511 10.800	15.870	5/8	16.00	133.00	83.00	48.00	5511 15.870
10.900		12.00	118.00	71.00	45.00	5511 10.900	15.900		16.00	133.00	83.00	48.00	5511 15.900
11.000		12.00	118.00	71.00	45.00	5511 11.000	16.000		16.00	133.00	83.00	48.00	5511 16.000
11.100		12.00	118.00	71.00	45.00	5511 11.100	16.080		18.00	143.00	93.00	48.00	5511 16.080
11.110	7/16	12.00	118.00	71.00	45.00	5511 11.110	16.270	41/64	18.00	143.00	93.00	48.00	5511 16.270
11.200		12.00	118.00	71.00	45.00	5511 11.200	16.500		18.00	143.00	93.00	48.00	5511 16.500
11.300		12.00	118.00	71.00	45.00	5511 11.300	16.670	21/32	18.00	143.00	93.00	48.00	5511 16.670
11.400		12.00	118.00	71.00	45.00	5511 11.400	16.700		18.00	143.00	93.00	48.00	5511 16.700
11.500		12.00	118.00	71.00	45.00	5511 11.500	16.900		18.00	143.00	93.00	48.00	5511 16.900
11.510	29/64	12.00	118.00	71.00	45.00	5511 11.510	17.000		18.00	143.00	93.00	48.00	5511 17.000
11.600		12.00	118.00	71.00	45.00	5511 11.600	17.070	43/64	18.00	143.00	93.00	48.00	5511 17.070
11.700		12.00	118.00	71.00	45.00	5511 11.700	17.460	11/16	18.00	143.00	93.00	48.00	5511 17.460
11.800		12.00	118.00	71.00	45.00	5511 11.800	17.500		18.00	143.00	93.00	48.00	5511 17.500
11.900		12.00	118.00	71.00	45.00	5511 11.900	17.700		18.00	143.00	93.00	48.00	5511 17.700
11.910	15/32	12.00	118.00	71.00	45.00	5511 11.910	17.860	45/64	18.00	143.00	93.00	48.00	5511 17.860
12.000		12.00	118.00	71.00	45.00	5511 12.000	18.000		18.00	143.00	93.00	48.00	5511 18.000
12.100		14.00	124.00	77.00	45.00	5511 12.100	18.500		20.00	153.00	101.00	50.00	5511 18.500
12.200		14.00	124.00	77.00	45.00	5511 12.200	18.700		20.00	153.00	101.00	50.00	5511 18.700
12.300	31/64	14.00	124.00	77.00	45.00	5511 12.300	18.900		20.00	153.00	101.00	50.00	5511 18.900
12.400		14.00	124.00	77.00	45.00	5511 12.400	19.000		20.00	153.00	101.00	50.00	5511 19.000
12.500		14.00	124.00	77.00	45.00	5511 12.500	19.050	3/4	20.00	153.00	101.00	50.00	5511 19.050
12.600		14.00	124.00	77.00	45.00	5511 12.600	19.160		20.00	153.00	101.00	50.00	5511 19.160
12.700	1/2	14.00	124.00	77.00	45.00	5511 12.700	19.250		20.00	153.00	101.00	50.00	5511 19.250
12.800		14.00	124.00	77.00	45.00	5511 12.800	19.300		20.00	153.00	101.00	50.00	5511 19.300
12.900		14.00	124.00	77.00	45.00	5511 12.900	19.446		20.00	153.00	101.00	50.00	5511 19.446
13.000		14.00	124.00	77.00	45.00	5511 13.000	19.500		20.00	153.00	101.00	50.00	5511 19.500
13.100	33/64	14.00	124.00	77.00	45.00	5511 13.100	19.700		20.00	153.00	101.00	50.00	5511 19.700
13.200		14.00	124.00	77.00	45.00	5511 13.200	19.840	25/32	20.00	153.00	101.00	50.00	5511 19.840
13.300		14.00	124.00	77.00	45.00	5511 13.300	20.000		20.00	153.00	101.00	50.00	5511 20.000
13.400		14.00	124.00	77.00	45.00	5511 13.400							
13.490	17/32	14.00	124.00	77.00	45.00	5511 13.490							
13.500		14.00	124.00	77.00	45.00	5511 13.500							
13.600		14.00	124.00	77.00	45.00	5511 13.600							
13.700		14.00	124.00	77.00	45.00	5511 13.700							
13.800		14.00	124.00	77.00	45.00	5511 13.800							
13.890	35/64	14.00	124.00	77.00	45.00	5511 13.890							



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **F**

Shank form HA

P ● web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge form concave • optimised cutting geometry • maximum performance • double margin

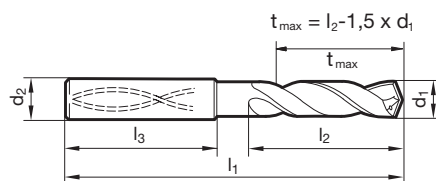
M ○**K** ○**N** ○**S** ○**H** ○

structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1400 N/mm²

GÜHRING NAVIGATOR

Cutting data page 296

Drilling tools

Article no. **5498**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	66.00	28.00	36.00	5498 3.000	5.900		6.00	82.00	44.00	36.00	5498 5.900
3.100		6.00	66.00	28.00	36.00	5498 3.100	5.950	15/64	6.00	82.00	44.00	36.00	5498 5.950
3.170	1/8	6.00	66.00	28.00	36.00	5498 3.170	6.000		6.00	82.00	44.00	36.00	5498 6.000
3.200		6.00	66.00	28.00	36.00	5498 3.200	6.100		8.00	91.00	53.00	36.00	5498 6.100
3.250		6.00	66.00	28.00	36.00	5498 3.250	6.200		8.00	91.00	53.00	36.00	5498 6.200
3.300		6.00	66.00	28.00	36.00	5498 3.300	6.300		8.00	91.00	53.00	36.00	5498 6.300
3.400		6.00	66.00	28.00	36.00	5498 3.400	6.350	1/4	8.00	91.00	53.00	36.00	5498 6.350
3.500		6.00	66.00	28.00	36.00	5498 3.500	6.400		8.00	91.00	53.00	36.00	5498 6.400
3.570	9/64	6.00	66.00	28.00	36.00	5498 3.570	6.500		8.00	91.00	53.00	36.00	5498 6.500
3.600		6.00	66.00	28.00	36.00	5498 3.600	6.530		8.00	91.00	53.00	36.00	5498 6.530
3.700		6.00	66.00	28.00	36.00	5498 3.700	6.550		8.00	91.00	53.00	36.00	5498 6.550
3.800		6.00	74.00	36.00	36.00	5498 3.800	6.600		8.00	91.00	53.00	36.00	5498 6.600
3.900		6.00	74.00	36.00	36.00	5498 3.900	6.700		8.00	91.00	53.00	36.00	5498 6.700
3.970	5/32	6.00	74.00	36.00	36.00	5498 3.970	6.750	17/64	8.00	91.00	53.00	36.00	5498 6.750
4.000		6.00	74.00	36.00	36.00	5498 4.000	6.800		8.00	91.00	53.00	36.00	5498 6.800
4.040		6.00	74.00	36.00	36.00	5498 4.040	6.900		8.00	91.00	53.00	36.00	5498 6.900
4.100		6.00	74.00	36.00	36.00	5498 4.100	7.000		8.00	91.00	53.00	36.00	5498 7.000
4.200		6.00	74.00	36.00	36.00	5498 4.200	7.100		8.00	91.00	53.00	36.00	5498 7.100
4.300		6.00	74.00	36.00	36.00	5498 4.300	7.140	9/32	8.00	91.00	53.00	36.00	5498 7.140
4.370	11/64	6.00	74.00	36.00	36.00	5498 4.370	7.200		8.00	91.00	53.00	36.00	5498 7.200
4.400		6.00	74.00	36.00	36.00	5498 4.400	7.300		8.00	91.00	53.00	36.00	5498 7.300
4.500		6.00	74.00	36.00	36.00	5498 4.500	7.400		8.00	91.00	53.00	36.00	5498 7.400
4.600		6.00	74.00	36.00	36.00	5498 4.600	7.500		8.00	91.00	53.00	36.00	5498 7.500
4.650		6.00	74.00	36.00	36.00	5498 4.650	7.540	19/64	8.00	91.00	53.00	36.00	5498 7.540
4.700		6.00	74.00	36.00	36.00	5498 4.700	7.550		8.00	91.00	53.00	36.00	5498 7.550
4.760	3/16	6.00	82.00	44.00	36.00	5498 4.760	7.600		8.00	91.00	53.00	36.00	5498 7.600
4.800		6.00	82.00	44.00	36.00	5498 4.800	7.650		8.00	91.00	53.00	36.00	5498 7.650
4.900		6.00	82.00	44.00	36.00	5498 4.900	7.700		8.00	91.00	53.00	36.00	5498 7.700
5.000		6.00	82.00	44.00	36.00	5498 5.000	7.800		8.00	91.00	53.00	36.00	5498 7.800
5.100		6.00	82.00	44.00	36.00	5498 5.100	7.900		8.00	91.00	53.00	36.00	5498 7.900
5.110		6.00	82.00	44.00	36.00	5498 5.110	7.940	5/16	8.00	91.00	53.00	36.00	5498 7.940
5.160	13/64	6.00	82.00	44.00	36.00	5498 5.160	8.000		8.00	91.00	53.00	36.00	5498 8.000
5.200		6.00	82.00	44.00	36.00	5498 5.200	8.100		10.00	103.00	61.00	40.00	5498 8.100
5.300		6.00	82.00	44.00	36.00	5498 5.300	8.200		10.00	103.00	61.00	40.00	5498 8.200
5.400		6.00	82.00	44.00	36.00	5498 5.400	8.300		10.00	103.00	61.00	40.00	5498 8.300
5.410		6.00	82.00	44.00	36.00	5498 5.410	8.330	21/64	10.00	103.00	61.00	40.00	5498 8.330
5.500		6.00	82.00	44.00	36.00	5498 5.500	8.400		10.00	103.00	61.00	40.00	5498 8.400
5.550		6.00	82.00	44.00	36.00	5498 5.550	8.500		10.00	103.00	61.00	40.00	5498 8.500
5.560	7/32	6.00	82.00	44.00	36.00	5498 5.560	8.600		10.00	103.00	61.00	40.00	5498 8.600
5.600		6.00	82.00	44.00	36.00	5498 5.600	8.700		10.00	103.00	61.00	40.00	5498 8.700
5.700		6.00	82.00	44.00	36.00	5498 5.700	8.730	11/32	10.00	103.00	61.00	40.00	5498 8.730
5.800		6.00	82.00	44.00	36.00	5498 5.800	8.800		10.00	103.00	61.00	40.00	5498 8.800

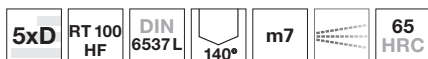


d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
8.900		10.00	103.00	61.00	40.00	5498 8.900
9.000		10.00	103.00	61.00	40.00	5498 9.000
9.100		10.00	103.00	61.00	40.00	5498 9.100
9.130	23/64	10.00	103.00	61.00	40.00	5498 9.130
9.200		10.00	103.00	61.00	40.00	5498 9.200
9.250		10.00	103.00	61.00	40.00	5498 9.250
9.300		10.00	103.00	61.00	40.00	5498 9.300
9.340		10.00	103.00	61.00	40.00	5498 9.340
9.400		10.00	103.00	61.00	40.00	5498 9.400
9.500		10.00	103.00	61.00	40.00	5498 9.500
9.520	3/8	10.00	103.00	61.00	40.00	5498 9.520
9.550		10.00	103.00	61.00	40.00	5498 9.550
9.600		10.00	103.00	61.00	40.00	5498 9.600
9.700		10.00	103.00	61.00	40.00	5498 9.700
9.800		10.00	103.00	61.00	40.00	5498 9.800
9.900		10.00	103.00	61.00	40.00	5498 9.900
9.920	25/64	10.00	103.00	61.00	40.00	5498 9.920
10.000		10.00	103.00	61.00	40.00	5498 10.000
10.100		12.00	118.00	71.00	45.00	5498 10.100
10.200		12.00	118.00	71.00	45.00	5498 10.200
10.300		12.00	118.00	71.00	45.00	5498 10.300
10.320	13/32	12.00	118.00	71.00	45.00	5498 10.320
10.400		12.00	118.00	71.00	45.00	5498 10.400
10.500		12.00	118.00	71.00	45.00	5498 10.500
10.600		12.00	118.00	71.00	45.00	5498 10.600
10.700		12.00	118.00	71.00	45.00	5498 10.700
10.720	27/64	12.00	118.00	71.00	45.00	5498 10.720
10.800		12.00	118.00	71.00	45.00	5498 10.800
10.900		12.00	118.00	71.00	45.00	5498 10.900
11.000		12.00	118.00	71.00	45.00	5498 11.000
11.100		12.00	118.00	71.00	45.00	5498 11.100
11.110	7/16	12.00	118.00	71.00	45.00	5498 11.110
11.200		12.00	118.00	71.00	45.00	5498 11.200
11.300		12.00	118.00	71.00	45.00	5498 11.300
11.400		12.00	118.00	71.00	45.00	5498 11.400
11.500		12.00	118.00	71.00	45.00	5498 11.500
11.510	29/64	12.00	118.00	71.00	45.00	5498 11.510
11.550		12.00	118.00	71.00	45.00	5498 11.550
11.600		12.00	118.00	71.00	45.00	5498 11.600
11.700		12.00	118.00	71.00	45.00	5498 11.700
11.800		12.00	118.00	71.00	45.00	5498 11.800
11.900		12.00	118.00	71.00	45.00	5498 11.900
11.910	15/32	12.00	118.00	71.00	45.00	5498 11.910
12.000		12.00	118.00	71.00	45.00	5498 12.000
12.100		14.00	124.00	77.00	45.00	5498 12.100
12.200		14.00	124.00	77.00	45.00	5498 12.200
12.300	31/64	14.00	124.00	77.00	45.00	5498 12.300
12.400		14.00	124.00	77.00	45.00	5498 12.400
12.500		14.00	124.00	77.00	45.00	5498 12.500
12.600		14.00	124.00	77.00	45.00	5498 12.600
12.700	1/2	14.00	124.00	77.00	45.00	5498 12.700
12.800		14.00	124.00	77.00	45.00	5498 12.800
12.900		14.00	124.00	77.00	45.00	5498 12.900
13.000		14.00	124.00	77.00	45.00	5498 13.000
13.100	33/64	14.00	124.00	77.00	45.00	5498 13.100
13.200		14.00	124.00	77.00	45.00	5498 13.200
13.300		14.00	124.00	77.00	45.00	5498 13.300
13.400		14.00	124.00	77.00	45.00	5498 13.400
13.490	17/32	14.00	124.00	77.00	45.00	5498 13.490
13.500		14.00	124.00	77.00	45.00	5498 13.500
13.600		14.00	124.00	77.00	45.00	5498 13.600
13.700		14.00	124.00	77.00	45.00	5498 13.700
13.800		14.00	124.00	77.00	45.00	5498 13.800
13.890	35/64	14.00	124.00	77.00	45.00	5498 13.890
13.900		14.00	124.00	77.00	45.00	5498 13.900
14.000		14.00	124.00	77.00	45.00	5498 14.000

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
14.100		16.00	133.00	83.00	48.00	5498 14.100
14.200		16.00	133.00	83.00	48.00	5498 14.200
14.290	9/16	16.00	133.00	83.00	48.00	5498 14.290
14.300		16.00	133.00	83.00	48.00	5498 14.300
14.400		16.00	133.00	83.00	48.00	5498 14.400
14.500		16.00	133.00	83.00	48.00	5498 14.500
14.600		16.00	133.00	83.00	48.00	5498 14.600
14.680	37/64	16.00	133.00	83.00	48.00	5498 14.680
14.700		16.00	133.00	83.00	48.00	5498 14.700
14.800		16.00	133.00	83.00	48.00	5498 14.800
14.900		16.00	133.00	83.00	48.00	5498 14.900
15.000		16.00	133.00	83.00	48.00	5498 15.000
15.080	19/32	16.00	133.00	83.00	48.00	5498 15.080
15.100		16.00	133.00	83.00	48.00	5498 15.100
15.200		16.00	133.00	83.00	48.00	5498 15.200
15.300		16.00	133.00	83.00	48.00	5498 15.300
15.400		16.00	133.00	83.00	48.00	5498 15.400
15.480	39/64	16.00	133.00	83.00	48.00	5498 15.480
15.500		16.00	133.00	83.00	48.00	5498 15.500
15.550		16.00	133.00	83.00	48.00	5498 15.550
15.600		16.00	133.00	83.00	48.00	5498 15.600
15.700		16.00	133.00	83.00	48.00	5498 15.700
15.800		16.00	133.00	83.00	48.00	5498 15.800
15.870	5/8	16.00	133.00	83.00	48.00	5498 15.870
15.900		16.00	133.00	83.00	48.00	5498 15.900
16.000		16.00	133.00	83.00	48.00	5498 16.000
16.270	41/64	18.00	143.00	93.00	48.00	5498 16.270
16.300		18.00	143.00	93.00	48.00	5498 16.300
16.500		18.00	143.00	93.00	48.00	5498 16.500
16.670	21/32	18.00	143.00	93.00	48.00	5498 16.670
16.700		18.00	143.00	93.00	48.00	5498 16.700
16.900		18.00	143.00	93.00	48.00	5498 16.900
17.000		18.00	143.00	93.00	48.00	5498 17.000
17.070	43/64	18.00	143.00	93.00	48.00	5498 17.070
17.460	11/16	18.00	143.00	93.00	48.00	5498 17.460
17.500		18.00	143.00	93.00	48.00	5498 17.500
17.550		18.00	143.00	93.00	48.00	5498 17.550
17.700		18.00	143.00	93.00	48.00	5498 17.700
17.860	45/64	18.00	143.00	93.00	48.00	5498 17.860
18.000		18.00	143.00	93.00	48.00	5498 18.000
18.260	23/32	20.00	153.00	101.00	50.00	5498 18.260
18.500		20.00	153.00	101.00	50.00	5498 18.500
18.700		20.00	153.00	101.00	50.00	5498 18.700
18.900		20.00	153.00	101.00	50.00	5498 18.900
19.000		20.00	153.00	101.00	50.00	5498 19.000
19.050	3/4	20.00	153.00	101.00	50.00	5498 19.050
19.250		20.00	153.00	101.00	50.00	5498 19.250
19.300		20.00	153.00	101.00	50.00	5498 19.300
19.450	49/64	20.00	153.00	101.00	50.00	5498 19.450
19.500		20.00	153.00	101.00	50.00	5498 19.500
19.550		20.00	153.00	101.00	50.00	5498 19.550
19.700		20.00	153.00	101.00	50.00	5498 19.700
19.800		20.00	153.00	101.00	50.00	5498 19.800
19.840	25/32	20.00	153.00	101.00	50.00	5498 19.840
20.000		20.00	153.00	101.00	50.00	5498 20.000



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **Y**Shank form **HA**

P • web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin

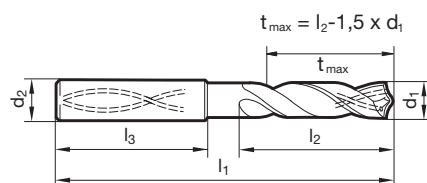
M**K**

N alloyed and high tensile steels up to 1600 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys

S •**H** ○**GÜHRING NAVIGATOR**

Cutting data page 296

Drilling tools

Article no. **8521**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	66.00	28.00	36.00	8521 3.000	6.100		8.00	91.00	53.00	36.00	8521 6.100
3.100		6.00	66.00	28.00	36.00	8521 3.100	6.200		8.00	91.00	53.00	36.00	8521 6.200
3.170	1/8	6.00	66.00	28.00	36.00	8521 3.170	6.300		8.00	91.00	53.00	36.00	8521 6.300
3.200		6.00	66.00	28.00	36.00	8521 3.200	6.350	1/4	8.00	91.00	53.00	36.00	8521 6.350
3.250		6.00	66.00	28.00	36.00	8521 3.250	6.400		8.00	91.00	53.00	36.00	8521 6.400
3.300		6.00	66.00	28.00	36.00	8521 3.300	6.500		8.00	91.00	53.00	36.00	8521 6.500
3.400		6.00	66.00	28.00	36.00	8521 3.400	6.600		8.00	91.00	53.00	36.00	8521 6.600
3.500		6.00	66.00	28.00	36.00	8521 3.500	6.700		8.00	91.00	53.00	36.00	8521 6.700
3.570	9/64	6.00	66.00	28.00	36.00	8521 3.570	6.750	17/64	8.00	91.00	53.00	36.00	8521 6.750
3.600		6.00	66.00	28.00	36.00	8521 3.600	6.800		8.00	91.00	53.00	36.00	8521 6.800
3.700		6.00	66.00	28.00	36.00	8521 3.700	6.900		8.00	91.00	53.00	36.00	8521 6.900
3.800		6.00	74.00	36.00	36.00	8521 3.800	7.000		8.00	91.00	53.00	36.00	8521 7.000
3.900		6.00	74.00	36.00	36.00	8521 3.900	7.100		8.00	91.00	53.00	36.00	8521 7.100
3.970	5/32	6.00	74.00	36.00	36.00	8521 3.970	7.140	9/32	8.00	91.00	53.00	36.00	8521 7.140
4.000		6.00	74.00	36.00	36.00	8521 4.000	7.200		8.00	91.00	53.00	36.00	8521 7.200
4.100		6.00	74.00	36.00	36.00	8521 4.100	7.300		8.00	91.00	53.00	36.00	8521 7.300
4.200		6.00	74.00	36.00	36.00	8521 4.200	7.400		8.00	91.00	53.00	36.00	8521 7.400
4.300		6.00	74.00	36.00	36.00	8521 4.300	7.500		8.00	91.00	53.00	36.00	8521 7.500
4.370	11/64	6.00	74.00	36.00	36.00	8521 4.370	7.540	19/64	8.00	91.00	53.00	36.00	8521 7.540
4.400		6.00	74.00	36.00	36.00	8521 4.400	7.600		8.00	91.00	53.00	36.00	8521 7.600
4.500		6.00	74.00	36.00	36.00	8521 4.500	7.700		8.00	91.00	53.00	36.00	8521 7.700
4.600		6.00	74.00	36.00	36.00	8521 4.600	7.800		8.00	91.00	53.00	36.00	8521 7.800
4.650		6.00	74.00	36.00	36.00	8521 4.650	7.900		8.00	91.00	53.00	36.00	8521 7.900
4.700		6.00	74.00	36.00	36.00	8521 4.700	7.940	5/16	8.00	91.00	53.00	36.00	8521 7.940
4.760	3/16	6.00	82.00	44.00	36.00	8521 4.760	8.000		8.00	91.00	53.00	36.00	8521 8.000
4.800		6.00	82.00	44.00	36.00	8521 4.800	8.100		10.00	103.00	61.00	40.00	8521 8.100
4.900		6.00	82.00	44.00	36.00	8521 4.900	8.200		10.00	103.00	61.00	40.00	8521 8.200
5.000		6.00	82.00	44.00	36.00	8521 5.000	8.300		10.00	103.00	61.00	40.00	8521 8.300
5.100		6.00	82.00	44.00	36.00	8521 5.100	8.330	21/64	10.00	103.00	61.00	40.00	8521 8.330
5.160	13/64	6.00	82.00	44.00	36.00	8521 5.160	8.400		10.00	103.00	61.00	40.00	8521 8.400
5.200		6.00	82.00	44.00	36.00	8521 5.200	8.500		10.00	103.00	61.00	40.00	8521 8.500
5.300		6.00	82.00	44.00	36.00	8521 5.300	8.600		10.00	103.00	61.00	40.00	8521 8.600
5.400		6.00	82.00	44.00	36.00	8521 5.400	8.700		10.00	103.00	61.00	40.00	8521 8.700
5.500		6.00	82.00	44.00	36.00	8521 5.500	8.730	11/32	10.00	103.00	61.00	40.00	8521 8.730
5.550		6.00	82.00	44.00	36.00	8521 5.550	8.800		10.00	103.00	61.00	40.00	8521 8.800
5.560	7/32	6.00	82.00	44.00	36.00	8521 5.560	8.900		10.00	103.00	61.00	40.00	8521 8.900
5.600		6.00	82.00	44.00	36.00	8521 5.600	9.000		10.00	103.00	61.00	40.00	8521 9.000
5.700		6.00	82.00	44.00	36.00	8521 5.700	9.100		10.00	103.00	61.00	40.00	8521 9.100
5.800		6.00	82.00	44.00	36.00	8521 5.800	9.130	23/64	10.00	103.00	61.00	40.00	8521 9.130
5.900		6.00	82.00	44.00	36.00	8521 5.900	9.200		10.00	103.00	61.00	40.00	8521 9.200
5.950	15/64	6.00	82.00	44.00	36.00	8521 5.950	9.250		10.00	103.00	61.00	40.00	8521 9.250
6.000		6.00	82.00	44.00	36.00	8521 6.000	9.300		10.00	103.00	61.00	40.00	8521 9.300

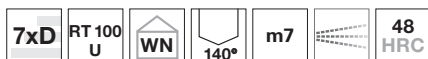


d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.400		10.00	103.00	61.00	40.00	8521 9.400	12.500		14.00	124.00	77.00	45.00	8521 12.500
9.500		10.00	103.00	61.00	40.00	8521 9.500	12.700	1/2	14.00	124.00	77.00	45.00	8521 12.700
9.520	3/8	10.00	103.00	61.00	40.00	8521 9.520	12.800		14.00	124.00	77.00	45.00	8521 12.800
9.600		10.00	103.00	61.00	40.00	8521 9.600	13.000		14.00	124.00	77.00	45.00	8521 13.000
9.700		10.00	103.00	61.00	40.00	8521 9.700	13.300		14.00	124.00	77.00	45.00	8521 13.300
9.800		10.00	103.00	61.00	40.00	8521 9.800	13.490	17/32	14.00	124.00	77.00	45.00	8521 13.490
9.900		10.00	103.00	61.00	40.00	8521 9.900	13.500		14.00	124.00	77.00	45.00	8521 13.500
9.920	25/64	10.00	103.00	61.00	40.00	8521 9.920	13.700		14.00	124.00	77.00	45.00	8521 13.700
10.000		10.00	103.00	61.00	40.00	8521 10.000	14.000		14.00	124.00	77.00	45.00	8521 14.000
10.100		12.00	118.00	71.00	45.00	8521 10.100	14.200		16.00	133.00	83.00	48.00	8521 14.200
10.200		12.00	118.00	71.00	45.00	8521 10.200	14.290	9/16	16.00	133.00	83.00	48.00	8521 14.290
10.300		12.00	118.00	71.00	45.00	8521 10.300	14.300		16.00	133.00	83.00	48.00	8521 14.300
10.320	13/32	12.00	118.00	71.00	45.00	8521 10.320	14.500		16.00	133.00	83.00	48.00	8521 14.500
10.400		12.00	118.00	71.00	45.00	8521 10.400	14.700		16.00	133.00	83.00	48.00	8521 14.700
10.500		12.00	118.00	71.00	45.00	8521 10.500	15.000		16.00	133.00	83.00	48.00	8521 15.000
10.600		12.00	118.00	71.00	45.00	8521 10.600	15.200		16.00	133.00	83.00	48.00	8521 15.200
10.700		12.00	118.00	71.00	45.00	8521 10.700	15.300		16.00	133.00	83.00	48.00	8521 15.300
10.720	27/64	12.00	118.00	71.00	45.00	8521 10.720	15.500		16.00	133.00	83.00	48.00	8521 15.500
10.800		12.00	118.00	71.00	45.00	8521 10.800	15.700		16.00	133.00	83.00	48.00	8521 15.700
10.900		12.00	118.00	71.00	45.00	8521 10.900	15.870	5/8	16.00	133.00	83.00	48.00	8521 15.870
11.000		12.00	118.00	71.00	45.00	8521 11.000	16.000		16.00	133.00	83.00	48.00	8521 16.000
11.100		12.00	118.00	71.00	45.00	8521 11.100	16.300		18.00	143.00	93.00	48.00	8521 16.300
11.110	7/16	12.00	118.00	71.00	45.00	8521 11.110	16.500		18.00	143.00	93.00	48.00	8521 16.500
11.200		12.00	118.00	71.00	45.00	8521 11.200	16.900		18.00	143.00	93.00	48.00	8521 16.900
11.300		12.00	118.00	71.00	45.00	8521 11.300	17.000		18.00	143.00	93.00	48.00	8521 17.000
11.400		12.00	118.00	71.00	45.00	8521 11.400	17.300		18.00	143.00	93.00	48.00	8521 17.300
11.500		12.00	118.00	71.00	45.00	8521 11.500	17.500		18.00	143.00	93.00	48.00	8521 17.500
11.510	29/64	12.00	118.00	71.00	45.00	8521 11.510	18.000		18.00	143.00	93.00	48.00	8521 18.000
11.600		12.00	118.00	71.00	45.00	8521 11.600	18.500		20.00	153.00	101.00	50.00	8521 18.500
11.700		12.00	118.00	71.00	45.00	8521 11.700	18.900		20.00	153.00	101.00	50.00	8521 18.900
11.800		12.00	118.00	71.00	45.00	8521 11.800	19.000		20.00	153.00	101.00	50.00	8521 19.000
11.900		12.00	118.00	71.00	45.00	8521 11.900	19.050	3/4	20.00	153.00	101.00	50.00	8521 19.050
11.910	15/32	12.00	118.00	71.00	45.00	8521 11.910	19.300		20.00	153.00	101.00	50.00	8521 19.300
12.000		12.00	118.00	71.00	45.00	8521 12.000	19.500		20.00	153.00	101.00	50.00	8521 19.500
12.200		14.00	124.00	77.00	45.00	8521 12.200	20.000		20.00	153.00	101.00	50.00	8521 20.000
12.300	31/64	14.00	124.00	77.00	45.00	8521 12.300							

Drilling tools



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **F**

Shank form HA

P ● web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry

M ○**K** ●

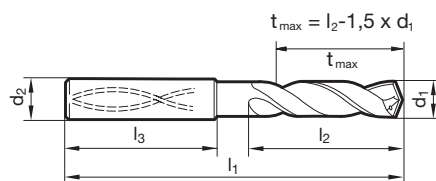
N ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials

S ○ • bronze, brass • high-alloyed AlSi alloys

H ○**GÜHRING** NAVIGATOR

Cutting data page 298

Drilling tools

Article no. **5512**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	70.00	30.00	36.00	5512 3.000	5.900		6.00	97.00	57.00	36.00	5512 5.900
3.100		6.00	70.00	30.00	36.00	5512 3.100	5.950	15/64	6.00	97.00	57.00	36.00	5512 5.950
3.170	1/8	6.00	70.00	30.00	36.00	5512 3.170	6.000		6.00	97.00	57.00	36.00	5512 6.000
3.200		6.00	70.00	30.00	36.00	5512 3.200	6.100		8.00	106.00	66.00	36.00	5512 6.100
3.250		6.00	70.00	30.00	36.00	5512 3.250	6.200		8.00	106.00	66.00	36.00	5512 6.200
3.300		6.00	70.00	30.00	36.00	5512 3.300	6.300		8.00	106.00	66.00	36.00	5512 6.300
3.400		6.00	75.00	35.50	36.00	5512 3.400	6.350	1/4	8.00	106.00	66.00	36.00	5512 6.350
3.500		6.00	75.00	35.50	36.00	5512 3.500	6.400		8.00	106.00	66.00	36.00	5512 6.400
3.570	9/64	6.00	75.00	35.50	36.00	5512 3.570	6.500		8.00	106.00	66.00	36.00	5512 6.500
3.600		6.00	75.00	35.50	36.00	5512 3.600	6.530		8.00	106.00	66.00	36.00	5512 6.530
3.700		6.00	75.00	35.50	36.00	5512 3.700	6.600		8.00	106.00	66.00	36.00	5512 6.600
3.800		6.00	75.00	37.50	36.00	5512 3.800	6.700		8.00	106.00	66.00	36.00	5512 6.700
3.900		6.00	75.00	37.50	36.00	5512 3.900	6.750	17/64	8.00	106.00	66.00	36.00	5512 6.750
3.970	5/32	6.00	75.00	37.50	36.00	5512 3.970	6.800		8.00	106.00	66.00	36.00	5512 6.800
4.000		6.00	75.00	37.50	36.00	5512 4.000	6.900		8.00	116.00	76.00	36.00	5512 6.900
4.040		6.00	75.00	37.50	36.00	5512 4.040	7.000		8.00	116.00	76.00	36.00	5512 7.000
4.100		6.00	75.00	37.50	36.00	5512 4.100	7.100		8.00	116.00	76.00	36.00	5512 7.100
4.200		6.00	75.00	37.50	36.00	5512 4.200	7.140	9/32	8.00	116.00	76.00	36.00	5512 7.140
4.300		6.00	85.00	45.00	36.00	5512 4.300	7.200		8.00	116.00	76.00	36.00	5512 7.200
4.370	11/64	6.00	85.00	45.00	36.00	5512 4.370	7.300		8.00	116.00	76.00	36.00	5512 7.300
4.400		6.00	85.00	45.00	36.00	5512 4.400	7.400		8.00	116.00	76.00	36.00	5512 7.400
4.500		6.00	85.00	45.00	36.00	5512 4.500	7.500		8.00	116.00	76.00	36.00	5512 7.500
4.600		6.00	85.00	45.00	36.00	5512 4.600	7.540	19/64	8.00	116.00	76.00	36.00	5512 7.540
4.650		6.00	85.00	45.00	36.00	5512 4.650	7.600		8.00	116.00	76.00	36.00	5512 7.600
4.700		6.00	85.00	45.00	36.00	5512 4.700	7.700		8.00	116.00	76.00	36.00	5512 7.700
4.760	3/16	6.00	90.00	50.00	36.00	5512 4.760	7.800		8.00	116.00	76.00	36.00	5512 7.800
4.800		6.00	90.00	50.00	36.00	5512 4.800	7.900		8.00	116.00	76.00	36.00	5512 7.900
4.900		6.00	90.00	50.00	36.00	5512 4.900	7.940	5/16	8.00	116.00	76.00	36.00	5512 7.940
5.000		6.00	90.00	50.00	36.00	5512 5.000	8.000		8.00	116.00	76.00	36.00	5512 8.000
5.100		6.00	90.00	50.00	36.00	5512 5.100	8.100		10.00	131.00	87.00	40.00	5512 8.100
5.110		6.00	90.00	50.00	36.00	5512 5.110	8.200		10.00	131.00	87.00	40.00	5512 8.200
5.160	13/64	6.00	90.00	50.00	36.00	5512 5.160	8.300		10.00	131.00	87.00	40.00	5512 8.300
5.200		6.00	90.00	50.00	36.00	5512 5.200	8.330	21/64	10.00	131.00	87.00	40.00	5512 8.330
5.250		6.00	90.00	50.00	36.00	5512 5.250	8.400		10.00	131.00	87.00	40.00	5512 8.400
5.300		6.00	90.00	50.00	36.00	5512 5.300	8.500		10.00	131.00	87.00	40.00	5512 8.500
5.400		6.00	97.00	57.00	36.00	5512 5.400	8.600		10.00	131.00	87.00	40.00	5512 8.600
5.410		6.00	97.00	57.00	36.00	5512 5.410	8.700		10.00	131.00	87.00	40.00	5512 8.700
5.500		6.00	97.00	57.00	36.00	5512 5.500	8.730	11/32	10.00	131.00	87.00	40.00	5512 8.730
5.560	7/32	6.00	97.00	57.00	36.00	5512 5.560	8.800		10.00	131.00	87.00	40.00	5512 8.800
5.600		6.00	97.00	57.00	36.00	5512 5.600	8.900		10.00	131.00	87.00	40.00	5512 8.900
5.700		6.00	97.00	57.00	36.00	5512 5.700	9.000		10.00	131.00	87.00	40.00	5512 9.000
5.800		6.00	97.00	57.00	36.00	5512 5.800	9.100		10.00	139.00	95.00	40.00	5512 9.100

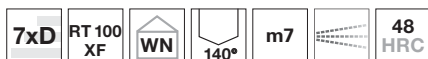


d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.130	23/64	10.00	139.00	95.00	40.00	5512 9.130	11.900		12.00	163.00	114.00	45.00	5512 11.900
9.200		10.00	139.00	95.00	40.00	5512 9.200	11.910	15/32	12.00	163.00	114.00	45.00	5512 11.910
9.250		10.00	139.00	95.00	40.00	5512 9.250	12.000		12.00	163.00	114.00	45.00	5512 12.000
9.300		10.00	139.00	95.00	40.00	5512 9.300	12.100		14.00	182.00	133.00	45.00	5512 12.100
9.340		10.00	139.00	95.00	40.00	5512 9.340	12.200		14.00	182.00	133.00	45.00	5512 12.200
9.400		10.00	139.00	95.00	40.00	5512 9.400	12.300	31/64	14.00	182.00	133.00	45.00	5512 12.300
9.500		10.00	139.00	95.00	40.00	5512 9.500	12.500		14.00	182.00	133.00	45.00	5512 12.500
9.520	3/8	10.00	139.00	95.00	40.00	5512 9.520	12.700	1/2	14.00	182.00	133.00	45.00	5512 12.700
9.600		10.00	139.00	95.00	40.00	5512 9.600	13.000		14.00	182.00	133.00	45.00	5512 13.000
9.700		10.00	139.00	95.00	40.00	5512 9.700	13.100	33/64	14.00	182.00	133.00	45.00	5512 13.100
9.800		10.00	139.00	95.00	40.00	5512 9.800	13.490	17/32	14.00	182.00	133.00	45.00	5512 13.490
9.900		10.00	139.00	95.00	40.00	5512 9.900	13.500		14.00	182.00	133.00	45.00	5512 13.500
9.920	25/64	10.00	139.00	95.00	40.00	5512 9.920	13.890	35/64	14.00	182.00	133.00	45.00	5512 13.890
10.000		10.00	139.00	95.00	40.00	5512 10.000	14.000		14.00	182.00	133.00	45.00	5512 14.000
10.100		12.00	155.00	106.00	45.00	5512 10.100	14.100		16.00	204.00	152.00	48.00	5512 14.100
10.200		12.00	155.00	106.00	45.00	5512 10.200	14.200		16.00	204.00	152.00	48.00	5512 14.200
10.300		12.00	155.00	106.00	45.00	5512 10.300	14.290	9/16	16.00	204.00	152.00	48.00	5512 14.290
10.320	13/32	12.00	155.00	106.00	45.00	5512 10.320	14.500		16.00	204.00	152.00	48.00	5512 14.500
10.400		12.00	155.00	106.00	45.00	5512 10.400	15.000		16.00	204.00	152.00	48.00	5512 15.000
10.500		12.00	155.00	106.00	45.00	5512 10.500	15.100		16.00	204.00	152.00	48.00	5512 15.100
10.600		12.00	155.00	106.00	45.00	5512 10.600	15.480	39/64	16.00	204.00	152.00	48.00	5512 15.480
10.700		12.00	155.00	106.00	45.00	5512 10.700	15.500		16.00	204.00	152.00	48.00	5512 15.500
10.720	27/64	12.00	155.00	106.00	45.00	5512 10.720	15.870	5/8	16.00	204.00	152.00	48.00	5512 15.870
10.800		12.00	155.00	106.00	45.00	5512 10.800	16.000		16.00	204.00	152.00	48.00	5512 16.000
10.900		12.00	155.00	106.00	45.00	5512 10.900	16.500		18.00	223.00	171.00	48.00	5512 16.500
11.000		12.00	155.00	106.00	45.00	5512 11.000	16.670	21/32	18.00	223.00	171.00	48.00	5512 16.670
11.100		12.00	163.00	114.00	45.00	5512 11.100	16.900		18.00	223.00	171.00	48.00	5512 16.900
11.110	7/16	12.00	163.00	114.00	45.00	5512 11.110	17.000		18.00	223.00	171.00	48.00	5512 17.000
11.200		12.00	163.00	114.00	45.00	5512 11.200	17.500		18.00	223.00	171.00	48.00	5512 17.500
11.300		12.00	163.00	114.00	45.00	5512 11.300	18.000		18.00	223.00	171.00	48.00	5512 18.000
11.400		12.00	163.00	114.00	45.00	5512 11.400	18.500		20.00	244.00	190.00	50.00	5512 18.500
11.500		12.00	163.00	114.00	45.00	5512 11.500	18.900		20.00	244.00	190.00	50.00	5512 18.900
11.510	29/64	12.00	163.00	114.00	45.00	5512 11.510	19.000		20.00	244.00	190.00	50.00	5512 19.000
11.600		12.00	163.00	114.00	45.00	5512 11.600	19.050	3/4	20.00	244.00	190.00	50.00	5512 19.050
11.700		12.00	163.00	114.00	45.00	5512 11.700	19.500		20.00	244.00	190.00	50.00	5512 19.500
11.800		12.00	163.00	114.00	45.00	5512 11.800	20.000		20.00	244.00	190.00	50.00	5512 20.000

Drilling tools



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **F**

Shank form HA

P ● web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge form concave • optimised cutting geometry • maximum performance • double margin

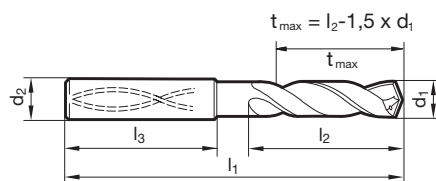
M ○**K** ○

N structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1400 N/mm²

S ○**H** ○**GÜHRING** NAVIGATOR

Cutting data page 298

Drilling tools

Article no. **5499**

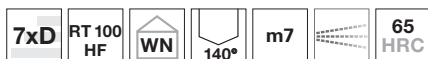
d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	70.00	30.00	36.00	5499 3.000	5.900		6.00	97.00	57.00	36.00	5499 5.900
3.100		6.00	70.00	30.00	36.00	5499 3.100	5.950	15/64	6.00	97.00	57.00	36.00	5499 5.950
3.170	1/8	6.00	70.00	30.00	36.00	5499 3.170	6.000		6.00	97.00	57.00	36.00	5499 6.000
3.200		6.00	70.00	30.00	36.00	5499 3.200	6.100		8.00	106.00	66.00	36.00	5499 6.100
3.250		6.00	70.00	30.00	36.00	5499 3.250	6.200		8.00	106.00	66.00	36.00	5499 6.200
3.300		6.00	70.00	30.00	36.00	5499 3.300	6.300		8.00	106.00	66.00	36.00	5499 6.300
3.400		6.00	75.00	35.50	36.00	5499 3.400	6.350	1/4	8.00	106.00	66.00	36.00	5499 6.350
3.500		6.00	75.00	35.50	36.00	5499 3.500	6.400		8.00	106.00	66.00	36.00	5499 6.400
3.570	9/64	6.00	75.00	35.50	36.00	5499 3.570	6.500		8.00	106.00	66.00	36.00	5499 6.500
3.600		6.00	75.00	35.50	36.00	5499 3.600	6.530		8.00	106.00	66.00	36.00	5499 6.530
3.700		6.00	75.00	35.50	36.00	5499 3.700	6.550		8.00	106.00	66.00	36.00	5499 6.550
3.800		6.00	75.00	37.50	36.00	5499 3.800	6.600		8.00	106.00	66.00	36.00	5499 6.600
3.900		6.00	75.00	37.50	36.00	5499 3.900	6.700		8.00	106.00	66.00	36.00	5499 6.700
3.970	5/32	6.00	75.00	37.50	36.00	5499 3.970	6.750	17/64	8.00	106.00	66.00	36.00	5499 6.750
4.000		6.00	75.00	37.50	36.00	5499 4.000	6.800		8.00	106.00	66.00	36.00	5499 6.800
4.040		6.00	75.00	37.50	36.00	5499 4.040	6.900		8.00	116.00	76.00	36.00	5499 6.900
4.100		6.00	75.00	37.50	36.00	5499 4.100	7.000		8.00	116.00	76.00	36.00	5499 7.000
4.200		6.00	75.00	37.50	36.00	5499 4.200	7.100		8.00	116.00	76.00	36.00	5499 7.100
4.300		6.00	85.00	45.00	36.00	5499 4.300	7.140	9/32	8.00	116.00	76.00	36.00	5499 7.140
4.370	11/64	6.00	85.00	45.00	36.00	5499 4.370	7.200		8.00	116.00	76.00	36.00	5499 7.200
4.400		6.00	85.00	45.00	36.00	5499 4.400	7.300		8.00	116.00	76.00	36.00	5499 7.300
4.500		6.00	85.00	45.00	36.00	5499 4.500	7.400		8.00	116.00	76.00	36.00	5499 7.400
4.600		6.00	85.00	45.00	36.00	5499 4.600	7.500		8.00	116.00	76.00	36.00	5499 7.500
4.650		6.00	85.00	45.00	36.00	5499 4.650	7.540	19/64	8.00	116.00	76.00	36.00	5499 7.540
4.700		6.00	85.00	45.00	36.00	5499 4.700	7.600		8.00	116.00	76.00	36.00	5499 7.600
4.760	3/16	6.00	90.00	50.00	36.00	5499 4.760	7.700		8.00	116.00	76.00	36.00	5499 7.700
4.800		6.00	90.00	50.00	36.00	5499 4.800	7.800		8.00	116.00	76.00	36.00	5499 7.800
4.900		6.00	90.00	50.00	36.00	5499 4.900	7.900		8.00	116.00	76.00	36.00	5499 7.900
5.000		6.00	90.00	50.00	36.00	5499 5.000	7.940	5/16	8.00	116.00	76.00	36.00	5499 7.940
5.100		6.00	90.00	50.00	36.00	5499 5.100	8.000		8.00	116.00	76.00	36.00	5499 8.000
5.110		6.00	90.00	50.00	36.00	5499 5.110	8.100		10.00	131.00	87.00	40.00	5499 8.100
5.160	13/64	6.00	90.00	50.00	36.00	5499 5.160	8.200		10.00	131.00	87.00	40.00	5499 8.200
5.200		6.00	90.00	50.00	36.00	5499 5.200	8.300		10.00	131.00	87.00	40.00	5499 8.300
5.300		6.00	90.00	50.00	36.00	5499 5.300	8.330	21/64	10.00	131.00	87.00	40.00	5499 8.330
5.400		6.00	97.00	57.00	36.00	5499 5.400	8.400		10.00	131.00	87.00	40.00	5499 8.400
5.410		6.00	97.00	57.00	36.00	5499 5.410	8.500		10.00	131.00	87.00	40.00	5499 8.500
5.500		6.00	97.00	57.00	36.00	5499 5.500	8.600		10.00	131.00	87.00	40.00	5499 8.600
5.550		6.00	97.00	57.00	36.00	5499 5.550	8.700		10.00	131.00	87.00	40.00	5499 8.700
5.560	7/32	6.00	97.00	57.00	36.00	5499 5.560	8.730	11/32	10.00	131.00	87.00	40.00	5499 8.730
5.600		6.00	97.00	57.00	36.00	5499 5.600	8.800		10.00	131.00	87.00	40.00	5499 8.800
5.700		6.00	97.00	57.00	36.00	5499 5.700	8.900		10.00	131.00	87.00	40.00	5499 8.900
5.800		6.00	97.00	57.00	36.00	5499 5.800	9.000		10.00	131.00	87.00	40.00	5499 9.000



d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.100		10.00	139.00	95.00	40.00	5499 9.100	12.900		14.00	182.00	133.00	45.00	5499 12.900
9.130	23/64	10.00	139.00	95.00	40.00	5499 9.130	13.000		14.00	182.00	133.00	45.00	5499 13.000
9.200		10.00	139.00	95.00	40.00	5499 9.200	13.100	33/64	14.00	182.00	133.00	45.00	5499 13.100
9.250		10.00	139.00	95.00	40.00	5499 9.250	13.490	17/32	14.00	182.00	133.00	45.00	5499 13.490
9.300		10.00	139.00	95.00	40.00	5499 9.300	13.500		14.00	182.00	133.00	45.00	5499 13.500
9.340		10.00	139.00	95.00	40.00	5499 9.340	13.700		14.00	182.00	133.00	45.00	5499 13.700
9.400		10.00	139.00	95.00	40.00	5499 9.400	13.890	35/64	14.00	182.00	133.00	45.00	5499 13.890
9.500		10.00	139.00	95.00	40.00	5499 9.500	14.000		14.00	182.00	133.00	45.00	5499 14.000
9.520	3/8	10.00	139.00	95.00	40.00	5499 9.520	14.100		16.00	204.00	152.00	48.00	5499 14.100
9.600		10.00	139.00	95.00	40.00	5499 9.600	14.200		16.00	204.00	152.00	48.00	5499 14.200
9.700		10.00	139.00	95.00	40.00	5499 9.700	14.290	9/16	16.00	204.00	152.00	48.00	5499 14.290
9.800		10.00	139.00	95.00	40.00	5499 9.800	14.300		16.00	204.00	152.00	48.00	5499 14.300
9.900		10.00	139.00	95.00	40.00	5499 9.900	14.500		16.00	204.00	152.00	48.00	5499 14.500
9.920	25/64	10.00	139.00	95.00	40.00	5499 9.920	14.700		16.00	204.00	152.00	48.00	5499 14.700
10.000		10.00	139.00	95.00	40.00	5499 10.000	14.800		16.00	204.00	152.00	48.00	5499 14.800
10.100		12.00	155.00	106.00	45.00	5499 10.100	15.000		16.00	204.00	152.00	48.00	5499 15.000
10.200		12.00	155.00	106.00	45.00	5499 10.200	15.100		16.00	204.00	152.00	48.00	5499 15.100
10.300		12.00	155.00	106.00	45.00	5499 10.300	15.300		16.00	204.00	152.00	48.00	5499 15.300
10.320	13/32	12.00	155.00	106.00	45.00	5499 10.320	15.480	39/64	16.00	204.00	152.00	48.00	5499 15.480
10.400		12.00	155.00	106.00	45.00	5499 10.400	15.500		16.00	204.00	152.00	48.00	5499 15.500
10.500		12.00	155.00	106.00	45.00	5499 10.500	15.700		16.00	204.00	152.00	48.00	5499 15.700
10.600		12.00	155.00	106.00	45.00	5499 10.600	15.800		16.00	204.00	152.00	48.00	5499 15.800
10.700		12.00	155.00	106.00	45.00	5499 10.700	15.870	5/8	16.00	204.00	152.00	48.00	5499 15.870
10.720	27/64	12.00	155.00	106.00	45.00	5499 10.720	16.000		16.00	204.00	152.00	48.00	5499 16.000
10.800		12.00	155.00	106.00	45.00	5499 10.800	16.300		18.00	223.00	171.00	48.00	5499 16.300
10.900		12.00	155.00	106.00	45.00	5499 10.900	16.500		18.00	223.00	171.00	48.00	5499 16.500
11.000		12.00	155.00	106.00	45.00	5499 11.000	16.700		18.00	223.00	171.00	48.00	5499 16.700
11.100		12.00	163.00	114.00	45.00	5499 11.100	16.900		18.00	223.00	171.00	48.00	5499 16.900
11.110	7/16	12.00	163.00	114.00	45.00	5499 11.110	17.000		18.00	223.00	171.00	48.00	5499 17.000
11.200		12.00	163.00	114.00	45.00	5499 11.200	17.500		18.00	223.00	171.00	48.00	5499 17.500
11.300		12.00	163.00	114.00	45.00	5499 11.300	17.700		18.00	223.00	171.00	48.00	5499 17.700
11.400		12.00	163.00	114.00	45.00	5499 11.400	18.000		18.00	223.00	171.00	48.00	5499 18.000
11.500		12.00	163.00	114.00	45.00	5499 11.500	18.500		20.00	244.00	190.00	50.00	5499 18.500
11.510	29/64	12.00	163.00	114.00	45.00	5499 11.510	18.900		20.00	244.00	190.00	50.00	5499 18.900
11.600		12.00	163.00	114.00	45.00	5499 11.600	19.000		20.00	244.00	190.00	50.00	5499 19.000
11.700		12.00	163.00	114.00	45.00	5499 11.700	19.050	3/4	20.00	244.00	190.00	50.00	5499 19.050
11.800		12.00	163.00	114.00	45.00	5499 11.800	19.500		20.00	244.00	190.00	50.00	5499 19.500
11.900		12.00	163.00	114.00	45.00	5499 11.900	19.800		20.00	244.00	190.00	50.00	5499 19.800
11.910	15/32	12.00	163.00	114.00	45.00	5499 11.910	20.000		20.00	244.00	190.00	50.00	5499 20.000
12.000		12.00	163.00	114.00	45.00	5499 12.000							
12.100		14.00	182.00	133.00	45.00	5499 12.100							
12.200		14.00	182.00	133.00	45.00	5499 12.200							
12.300	31/64	14.00	182.00	133.00	45.00	5499 12.300							
12.400		14.00	182.00	133.00	45.00	5499 12.400							
12.500		14.00	182.00	133.00	45.00	5499 12.500							
12.600		14.00	182.00	133.00	45.00	5499 12.600							
12.700	1/2	14.00	182.00	133.00	45.00	5499 12.700							
12.800		14.00	182.00	133.00	45.00	5499 12.800							



Ratio drills with coolant ducts

Tool material **Solid carbide**Surface **Y**Shank form **HA**

P • web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin

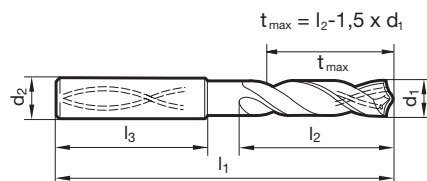


N alloyed and high tensile steels up to 1600 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys

GÜHRING NAVIGATOR

Cutting data page 298

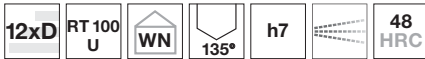
Drilling tools

Article no. **8522**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	70.00	30.00	36.00	8522 3.000	8.730	11/32	10.00	131.00	87.00	40.00	8522 8.730
3.170	1/8	6.00	70.00	30.00	36.00	8522 3.170	8.800		10.00	131.00	87.00	40.00	8522 8.800
3.250		6.00	70.00	30.00	36.00	8522 3.250	9.000		10.00	131.00	87.00	40.00	8522 9.000
3.300		6.00	70.00	30.00	36.00	8522 3.300	9.130	23/64	10.00	139.00	95.00	40.00	8522 9.130
3.400		6.00	75.00	35.50	36.00	8522 3.400	9.250		10.00	139.00	95.00	40.00	8522 9.250
3.500		6.00	75.00	35.50	36.00	8522 3.500	9.340		10.00	139.00	95.00	40.00	8522 9.340
3.570	9/64	6.00	75.00	35.50	36.00	8522 3.570	9.400		10.00	139.00	95.00	40.00	8522 9.400
3.700		6.00	75.00	35.50	36.00	8522 3.700	9.500		10.00	139.00	95.00	40.00	8522 9.500
3.970	5/32	6.00	75.00	37.50	36.00	8522 3.970	9.520	3/8	10.00	139.00	95.00	40.00	8522 9.520
4.000		6.00	75.00	37.50	36.00	8522 4.000	9.920	25/64	10.00	139.00	95.00	40.00	8522 9.920
4.200		6.00	75.00	37.50	36.00	8522 4.200	10.000		10.00	139.00	95.00	40.00	8522 10.000
4.300		6.00	85.00	45.00	36.00	8522 4.300	10.200		12.00	155.00	106.00	45.00	8522 10.200
4.370	11/64	6.00	85.00	45.00	36.00	8522 4.370	10.320	13/32	12.00	155.00	106.00	45.00	8522 10.320
4.500		6.00	85.00	45.00	36.00	8522 4.500	10.400		12.00	155.00	106.00	45.00	8522 10.400
4.650		6.00	85.00	45.00	36.00	8522 4.650	10.500		12.00	155.00	106.00	45.00	8522 10.500
4.760	3/16	6.00	90.00	50.00	36.00	8522 4.760	10.720	27/64	12.00	155.00	106.00	45.00	8522 10.720
5.000		6.00	90.00	50.00	36.00	8522 5.000	10.800		12.00	155.00	106.00	45.00	8522 10.800
5.100		6.00	90.00	50.00	36.00	8522 5.100	11.000		12.00	155.00	106.00	45.00	8522 11.000
5.160	13/64	6.00	90.00	50.00	36.00	8522 5.160	11.110	7/16	12.00	163.00	114.00	45.00	8522 11.110
5.200		6.00	90.00	50.00	36.00	8522 5.200	11.300		12.00	163.00	114.00	45.00	8522 11.300
5.500		6.00	97.00	57.00	36.00	8522 5.500	11.400		12.00	163.00	114.00	45.00	8522 11.400
5.550		6.00	97.00	57.00	36.00	8522 5.550	11.500		12.00	163.00	114.00	45.00	8522 11.500
5.560	7/32	6.00	97.00	57.00	36.00	8522 5.560	11.510	29/64	12.00	163.00	114.00	45.00	8522 11.510
5.950	15/64	6.00	97.00	57.00	36.00	8522 5.950	11.910	15/32	12.00	163.00	114.00	45.00	8522 11.910
6.000		6.00	97.00	57.00	36.00	8522 6.000	12.000		12.00	163.00	114.00	45.00	8522 12.000
6.350	1/4	8.00	106.00	66.00	36.00	8522 6.350	12.300	31/64	14.00	182.00	133.00	45.00	8522 12.300
6.500		8.00	106.00	66.00	36.00	8522 6.500	12.500		14.00	182.00	133.00	45.00	8522 12.500
6.530		8.00	106.00	66.00	36.00	8522 6.530	12.700	1/2	14.00	182.00	133.00	45.00	8522 12.700
6.750	17/64	8.00	106.00	66.00	36.00	8522 6.750	13.000		14.00	182.00	133.00	45.00	8522 13.000
6.800		8.00	106.00	66.00	36.00	8522 6.800	13.100	33/64	14.00	182.00	133.00	45.00	8522 13.100
6.900		8.00	116.00	76.00	36.00	8522 6.900	13.490	17/32	14.00	182.00	133.00	45.00	8522 13.490
7.000		8.00	116.00	76.00	36.00	8522 7.000	13.500		14.00	182.00	133.00	45.00	8522 13.500
7.140	9/32	8.00	116.00	76.00	36.00	8522 7.140	14.000		14.00	182.00	133.00	45.00	8522 14.000
7.400		8.00	116.00	76.00	36.00	8522 7.400	14.290	9/16	16.00	204.00	152.00	48.00	8522 14.290
7.500		8.00	116.00	76.00	36.00	8522 7.500	14.500		16.00	204.00	152.00	48.00	8522 14.500
7.540	19/64	8.00	116.00	76.00	36.00	8522 7.540	15.000		16.00	204.00	152.00	48.00	8522 15.000
7.800		8.00	116.00	76.00	36.00	8522 7.800	15.100		16.00	204.00	152.00	48.00	8522 15.100
7.940	5/16	8.00	116.00	76.00	36.00	8522 7.940	15.500		16.00	204.00	152.00	48.00	8522 15.500
8.000		8.00	116.00	76.00	36.00	8522 8.000	15.870	5/8	16.00	204.00	152.00	48.00	8522 15.870
8.330	21/64	10.00	131.00	87.00	40.00	8522 8.330	16.000		16.00	204.00	152.00	48.00	8522 16.000
8.500		10.00	131.00	87.00	40.00	8522 8.500							
8.600		10.00	131.00	87.00	40.00	8522 8.600							



Ratio drills with coolant ducts



Tool material **Solid carbide**

Surface **F**

Shank form **HA**

P • web thinning ≥ Ø 3.000 • facet point grind • main cutting edge form straight • optimised cutting geometry

M ○

K •

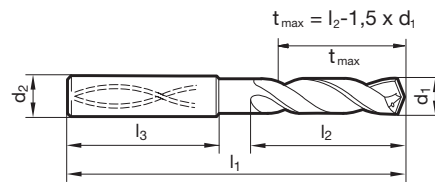
N ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • cast materials • bronze, brass

S ○

H ○

GÜHRING NAVIGATOR

Cutting data page 298



Drilling tools

Article no. **5525**

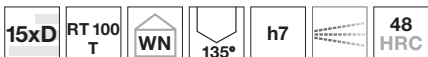
d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	90.00	50.00	36.00	5525 3.000	6.200		8.00	146.00	108.00	36.00	5525 6.200
3.100		6.00	90.00	50.00	36.00	5525 3.100	6.300		8.00	146.00	108.00	36.00	5525 6.300
3.170	1/8	6.00	90.00	50.00	36.00	5525 3.170	6.350	1/4	8.00	146.00	108.00	36.00	5525 6.350
3.200		6.00	90.00	50.00	36.00	5525 3.200	6.400		8.00	146.00	108.00	36.00	5525 6.400
3.250		6.00	90.00	50.00	36.00	5525 3.250	6.500		8.00	146.00	108.00	36.00	5525 6.500
3.300		6.00	90.00	50.00	36.00	5525 3.300	6.600		8.00	146.00	108.00	36.00	5525 6.600
3.400		6.00	90.00	50.00	36.00	5525 3.400	6.700		8.00	146.00	108.00	36.00	5525 6.700
3.500		6.00	90.00	50.00	36.00	5525 3.500	6.750	17/64	8.00	146.00	108.00	36.00	5525 6.750
3.570	9/64	6.00	90.00	50.00	36.00	5525 3.570	6.800		8.00	146.00	108.00	36.00	5525 6.800
3.600		6.00	90.00	50.00	36.00	5525 3.600	6.900		8.00	146.00	108.00	36.00	5525 6.900
3.700		6.00	90.00	50.00	36.00	5525 3.700	7.000		8.00	146.00	108.00	36.00	5525 7.000
3.800		6.00	102.00	64.00	36.00	5525 3.800	7.100		8.00	146.00	108.00	36.00	5525 7.100
3.900		6.00	102.00	64.00	36.00	5525 3.900	7.140	9/32	8.00	146.00	108.00	36.00	5525 7.140
3.970	5/32	6.00	102.00	64.00	36.00	5525 3.970	7.200		8.00	146.00	108.00	36.00	5525 7.200
4.000		6.00	102.00	64.00	36.00	5525 4.000	7.300		8.00	146.00	108.00	36.00	5525 7.300
4.100		6.00	102.00	64.00	36.00	5525 4.100	7.400		8.00	146.00	108.00	36.00	5525 7.400
4.200		6.00	102.00	64.00	36.00	5525 4.200	7.500		8.00	146.00	108.00	36.00	5525 7.500
4.300		6.00	102.00	64.00	36.00	5525 4.300	7.540	19/64	8.00	146.00	108.00	36.00	5525 7.540
4.370	11/64	6.00	102.00	64.00	36.00	5525 4.370	7.600		8.00	146.00	108.00	36.00	5525 7.600
4.400		6.00	102.00	64.00	36.00	5525 4.400	7.700		8.00	146.00	108.00	36.00	5525 7.700
4.500		6.00	102.00	64.00	36.00	5525 4.500	7.800		8.00	146.00	108.00	36.00	5525 7.800
4.600		6.00	102.00	64.00	36.00	5525 4.600	7.900		8.00	146.00	108.00	36.00	5525 7.900
4.650		6.00	102.00	64.00	36.00	5525 4.650	7.940	5/16	8.00	146.00	108.00	36.00	5525 7.940
4.700		6.00	102.00	64.00	36.00	5525 4.700	8.000		8.00	146.00	108.00	36.00	5525 8.000
4.760	3/16	6.00	116.00	78.00	36.00	5525 4.760	8.100		10.00	162.00	120.00	40.00	5525 8.100
4.800		6.00	116.00	78.00	36.00	5525 4.800	8.200		10.00	162.00	120.00	40.00	5525 8.200
4.900		6.00	116.00	78.00	36.00	5525 4.900	8.300		10.00	162.00	120.00	40.00	5525 8.300
5.000		6.00	116.00	78.00	36.00	5525 5.000	8.330	21/64	10.00	162.00	120.00	40.00	5525 8.330
5.100		6.00	116.00	78.00	36.00	5525 5.100	8.400		10.00	162.00	120.00	40.00	5525 8.400
5.160	13/64	6.00	116.00	78.00	36.00	5525 5.160	8.500		10.00	162.00	120.00	40.00	5525 8.500
5.200		6.00	116.00	78.00	36.00	5525 5.200	8.600		10.00	162.00	120.00	40.00	5525 8.600
5.300		6.00	116.00	78.00	36.00	5525 5.300	8.700		10.00	162.00	120.00	40.00	5525 8.700
5.400		6.00	116.00	78.00	36.00	5525 5.400	8.730	11/32	10.00	162.00	120.00	40.00	5525 8.730
5.500		6.00	116.00	78.00	36.00	5525 5.500	8.800		10.00	162.00	120.00	40.00	5525 8.800
5.560	7/32	6.00	116.00	78.00	36.00	5525 5.560	8.900		10.00	162.00	120.00	40.00	5525 8.900
5.600		6.00	116.00	78.00	36.00	5525 5.600	9.000		10.00	162.00	120.00	40.00	5525 9.000
5.700		6.00	116.00	78.00	36.00	5525 5.700	9.100		10.00	162.00	120.00	40.00	5525 9.100
5.800		6.00	116.00	78.00	36.00	5525 5.800	9.130	23/64	10.00	162.00	120.00	40.00	5525 9.130
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5.950	15/64	6.00	116.00	78.00	36.00	5525 5.950	9.250		10.00	162.00	120.00	40.00	5525 9.250
6.000		6.00	116.00	78.00	36.00	5525 6.000	9.300		10.00	162.00	120.00	40.00	5525 9.300
6.100		8.00	146.00	108.00	36.00	5525 6.100	9.400		10.00	162.00	120.00	40.00	5525 9.400



d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.500		10.00	162.00	120.00	40.00	5525 9.500	12.300	31/64	14.00	230.00	182.00	45.00	5525 12.300
9.520	3/8	10.00	162.00	120.00	40.00	5525 9.520	12.500		14.00	230.00	182.00	45.00	5525 12.500
9.600		10.00	162.00	120.00	40.00	5525 9.600	12.700	1/2	14.00	230.00	182.00	45.00	5525 12.700
9.700		10.00	162.00	120.00	40.00	5525 9.700	13.000		14.00	230.00	182.00	45.00	5525 13.000
9.800		10.00	162.00	120.00	40.00	5525 9.800	13.490	17/32	14.00	230.00	182.00	45.00	5525 13.490
9.900		10.00	162.00	120.00	40.00	5525 9.900	13.500		14.00	230.00	182.00	45.00	5525 13.500
9.920	25/64	10.00	162.00	120.00	40.00	5525 9.920	13.890	35/64	14.00	230.00	182.00	45.00	5525 13.890
10.000		10.00	162.00	120.00	40.00	5525 10.000	14.000		14.00	230.00	182.00	45.00	5525 14.000
10.100		12.00	204.00	156.00	45.00	5525 10.100	14.500		16.00	260.00	208.00	48.00	5525 14.500
10.200		12.00	204.00	156.00	45.00	5525 10.200	15.000		16.00	260.00	208.00	48.00	5525 15.000
10.300		12.00	204.00	156.00	45.00	5525 10.300	15.480	39/64	16.00	260.00	208.00	48.00	5525 15.480
10.320	13/32	12.00	204.00	156.00	45.00	5525 10.320	15.500		16.00	260.00	208.00	48.00	5525 15.500
10.500		12.00	204.00	156.00	45.00	5525 10.500	16.000		16.00	260.00	208.00	48.00	5525 16.000
10.600		12.00	204.00	156.00	45.00	5525 10.600	16.500		18.00	285.00	234.00	48.00	5525 16.500
10.700		12.00	204.00	156.00	45.00	5525 10.700	17.000		18.00	285.00	234.00	48.00	5525 17.000
10.720	27/64	12.00	204.00	156.00	45.00	5525 10.720	17.500		18.00	285.00	234.00	48.00	5525 17.500
10.800		12.00	204.00	156.00	45.00	5525 10.800	18.000		18.00	285.00	234.00	48.00	5525 18.000
10.900		12.00	204.00	156.00	45.00	5525 10.900	18.500		20.00	310.00	258.00	50.00	5525 18.500
11.000		12.00	204.00	156.00	45.00	5525 11.000	19.000		20.00	310.00	258.00	50.00	5525 19.000
11.110	7/16	12.00	204.00	156.00	45.00	5525 11.110	19.050	3/4	20.00	310.00	258.00	50.00	5525 19.050
11.500		12.00	204.00	156.00	45.00	5525 11.500	19.500		20.00	310.00	258.00	50.00	5525 19.500
11.510	29/64	12.00	204.00	156.00	45.00	5525 11.510	20.000		20.00	310.00	258.00	50.00	5525 20.000
11.910	15/32	12.00	204.00	156.00	45.00	5525 11.910							
12.000		12.00	204.00	156.00	45.00	5525 12.000							



Ratio drills with coolant ducts



Tool material **Solid carbide**

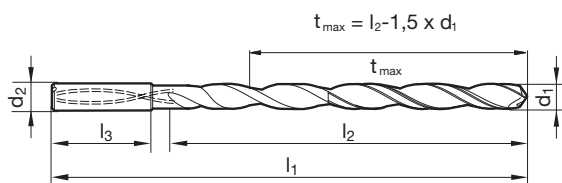
Surface **A**

Shank form **HA**

- P** • web thinning ≥ Ø 3.000 • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure
- M** • pressure
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H** ○

GÜHRING NAVIGATOR

Cutting data page 302



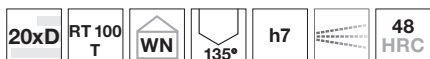
Drilling tools

Article no. **6509**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	95.00	55.00	36.00	6509 3.000	8.500		10.00	204.00	160.00	40.00	6509 8.500
3.100		6.00	106.00	66.00	36.00	6509 3.100	8.730	11/32	10.00	204.00	160.00	40.00	6509 8.730
3.170	1/8	6.00	106.00	66.00	36.00	6509 3.170	8.800		10.00	204.00	160.00	40.00	6509 8.800
3.200		6.00	106.00	66.00	36.00	6509 3.200	9.000		10.00	204.00	160.00	40.00	6509 9.000
3.300		6.00	106.00	66.00	36.00	6509 3.300	9.130	23/64	10.00	221.00	177.00	40.00	6509 9.130
3.500		6.00	116.00	76.00	36.00	6509 3.500	9.500		10.00	221.00	177.00	40.00	6509 9.500
3.570	9/64	6.00	116.00	76.00	36.00	6509 3.570	9.520	3/8	10.00	221.00	177.00	40.00	6509 9.520
3.700		6.00	116.00	76.00	36.00	6509 3.700	9.800		10.00	221.00	177.00	40.00	6509 9.800
3.800		6.00	116.00	76.00	36.00	6509 3.800	9.920	25/64	10.00	221.00	177.00	40.00	6509 9.920
3.970	5/32	6.00	116.00	76.00	36.00	6509 3.970	10.000		10.00	221.00	177.00	40.00	6509 10.000
4.000		6.00	116.00	76.00	36.00	6509 4.000	10.200		12.00	247.00	198.00	45.00	6509 10.200
4.100		6.00	133.00	93.00	36.00	6509 4.100	10.320	13/32	12.00	247.00	198.00	45.00	6509 10.320
4.200		6.00	133.00	93.00	36.00	6509 4.200	10.500		12.00	247.00	198.00	45.00	6509 10.500
4.300		6.00	133.00	93.00	36.00	6509 4.300	10.720	27/64	12.00	247.00	198.00	45.00	6509 10.720
4.370	11/64	6.00	133.00	93.00	36.00	6509 4.370	11.000		12.00	247.00	198.00	45.00	6509 11.000
4.500		6.00	133.00	93.00	36.00	6509 4.500	11.110	7/16	12.00	263.00	214.00	45.00	6509 11.110
4.600		6.00	133.00	93.00	36.00	6509 4.600	11.510	29/64	12.00	263.00	214.00	45.00	6509 11.510
4.760	3/16	6.00	133.00	93.00	36.00	6509 4.760	11.800		12.00	263.00	214.00	45.00	6509 11.800
4.800		6.00	133.00	93.00	36.00	6509 4.800	11.910	15/32	12.00	263.00	214.00	45.00	6509 11.910
5.000		6.00	133.00	93.00	36.00	6509 5.000	12.000		12.00	263.00	214.00	45.00	6509 12.000
5.100		6.00	150.00	110.00	36.00	6509 5.100	12.300	31/64	14.00	297.00	248.00	45.00	6509 12.300
5.160	13/64	6.00	150.00	110.00	36.00	6509 5.160	12.500		14.00	297.00	248.00	45.00	6509 12.500
5.410		6.00	150.00	110.00	36.00	6509 5.410	12.700	1/2	14.00	297.00	248.00	45.00	6509 12.700
5.500		6.00	150.00	110.00	36.00	6509 5.500	13.000		14.00	297.00	248.00	45.00	6509 13.000
5.560	7/32	6.00	150.00	110.00	36.00	6509 5.560	13.100	33/64	14.00	297.00	248.00	45.00	6509 13.100
5.600		6.00	150.00	110.00	36.00	6509 5.600	13.490	17/32	14.00	297.00	248.00	45.00	6509 13.490
5.800		6.00	150.00	110.00	36.00	6509 5.800	13.890	35/64	14.00	297.00	248.00	45.00	6509 13.890
5.950	15/64	6.00	150.00	110.00	36.00	6509 5.950	14.000		14.00	297.00	248.00	45.00	6509 14.000
6.000		6.00	150.00	110.00	36.00	6509 6.000	14.290	9/16	16.00	333.00	281.00	48.00	6509 14.290
6.300		8.00	167.00	127.00	36.00	6509 6.300	15.000		16.00	333.00	281.00	48.00	6509 15.000
6.350	1/4	8.00	167.00	127.00	36.00	6509 6.350	15.870	5/8	16.00	333.00	281.00	48.00	6509 15.870
6.500		8.00	167.00	127.00	36.00	6509 6.500	16.000		16.00	333.00	281.00	48.00	6509 16.000
6.750	17/64	8.00	167.00	127.00	36.00	6509 6.750							
6.800		8.00	167.00	127.00	36.00	6509 6.800							
7.000		8.00	167.00	127.00	36.00	6509 7.000							
7.140	9/32	8.00	183.00	143.00	36.00	6509 7.140							
7.500		8.00	183.00	143.00	36.00	6509 7.500							
7.540	19/64	8.00	183.00	143.00	36.00	6509 7.540							
7.800		8.00	183.00	143.00	36.00	6509 7.800							
7.940	5/16	8.00	183.00	143.00	36.00	6509 7.940							
8.000		8.00	183.00	143.00	36.00	6509 8.000							
8.330	21/64	10.00	204.00	160.00	40.00	6509 8.330							



Ratio drills with coolant ducts

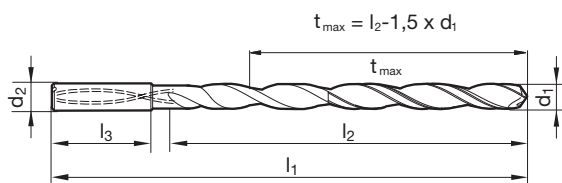


Tool material	Solid carbide
Surface	
Shank form	HA

- P** • web thinning $\geq \varnothing 3.000$ • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H** ○

GÜHRING NAVIGATOR

Cutting data page 302

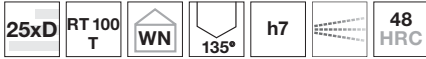


Article no. **6511**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	110.00	70.00	36.00	6511 3.000	7.540	19/64	8.00	223.00	183.00	36.00	6511 7.540
3.100		6.00	123.00	83.00	36.00	6511 3.100	7.800		8.00	223.00	183.00	36.00	6511 7.800
3.170	1/8	6.00	123.00	83.00	36.00	6511 3.170	7.940	5/16	8.00	223.00	183.00	36.00	6511 7.940
3.200		6.00	123.00	83.00	36.00	6511 3.200	8.000		8.00	223.00	183.00	36.00	6511 8.000
3.300		6.00	123.00	83.00	36.00	6511 3.300	8.330	21/64	10.00	249.00	205.00	40.00	6511 8.330
3.500		6.00	136.00	96.00	36.00	6511 3.500	8.500		10.00	249.00	205.00	40.00	6511 8.500
3.570	9/64	6.00	136.00	96.00	36.00	6511 3.570	8.730	11/32	10.00	249.00	205.00	40.00	6511 8.730
3.700		6.00	136.00	96.00	36.00	6511 3.700	8.800		10.00	249.00	205.00	40.00	6511 8.800
3.800		6.00	136.00	96.00	36.00	6511 3.800	9.000		10.00	249.00	205.00	40.00	6511 9.000
3.970	5/32	6.00	136.00	96.00	36.00	6511 3.970	9.130	23/64	10.00	271.00	227.00	40.00	6511 9.130
4.000		6.00	136.00	96.00	36.00	6511 4.000	9.520	3/8	10.00	271.00	227.00	40.00	6511 9.520
4.100		6.00	158.00	118.00	36.00	6511 4.100	9.920	25/64	10.00	271.00	227.00	40.00	6511 9.920
4.200		6.00	158.00	118.00	36.00	6511 4.200	10.000		10.00	271.00	227.00	40.00	6511 10.000
4.300		6.00	158.00	118.00	36.00	6511 4.300	10.200		12.00	302.00	253.00	45.00	6511 10.200
4.370	11/64	6.00	158.00	118.00	36.00	6511 4.370	10.320	13/32	12.00	302.00	253.00	45.00	6511 10.320
4.500		6.00	158.00	118.00	36.00	6511 4.500	10.500		12.00	302.00	253.00	45.00	6511 10.500
4.600		6.00	158.00	118.00	36.00	6511 4.600	10.720	27/64	12.00	302.00	253.00	45.00	6511 10.720
4.760	3/16	6.00	158.00	118.00	36.00	6511 4.760	11.000		12.00	302.00	253.00	45.00	6511 11.000
4.800		6.00	158.00	118.00	36.00	6511 4.800	11.110	7/16	12.00	323.00	274.00	45.00	6511 11.110
5.000		6.00	158.00	118.00	36.00	6511 5.000	11.510	29/64	12.00	323.00	274.00	45.00	6511 11.510
5.100		6.00	180.00	140.00	36.00	6511 5.100	11.800		12.00	323.00	274.00	45.00	6511 11.800
5.160	13/64	6.00	180.00	140.00	36.00	6511 5.160	11.910	15/32	12.00	323.00	274.00	45.00	6511 11.910
5.410		6.00	180.00	140.00	36.00	6511 5.410	12.000		12.00	323.00	274.00	45.00	6511 12.000
5.500		6.00	180.00	140.00	36.00	6511 5.500	12.300	31/64	14.00	367.00	318.00	45.00	6511 12.300
5.560	7/32	6.00	180.00	140.00	36.00	6511 5.560	12.500		14.00	367.00	318.00	45.00	6511 12.500
5.800		6.00	180.00	140.00	36.00	6511 5.800	12.700	1/2	14.00	367.00	318.00	45.00	6511 12.700
5.950	15/64	6.00	180.00	140.00	36.00	6511 5.950	13.000		14.00	367.00	318.00	45.00	6511 13.000
6.000		6.00	180.00	140.00	36.00	6511 6.000	13.100	33/64	14.00	367.00	318.00	45.00	6511 13.100
6.300		8.00	202.00	162.00	36.00	6511 6.300	13.490	17/32	14.00	367.00	318.00	45.00	6511 13.490
6.350	1/4	8.00	202.00	162.00	36.00	6511 6.350	13.890	35/64	14.00	367.00	318.00	45.00	6511 13.890
6.500		8.00	202.00	162.00	36.00	6511 6.500	14.000		14.00	367.00	318.00	45.00	6511 14.000
6.750	17/64	8.00	202.00	162.00	36.00	6511 6.750	14.290	9/16	16.00	413.00	361.00	48.00	6511 14.290
6.800		8.00	202.00	162.00	36.00	6511 6.800	15.000		16.00	413.00	361.00	48.00	6511 15.000
7.000		8.00	202.00	162.00	36.00	6511 7.000	15.870	5/8	16.00	413.00	361.00	48.00	6511 15.870
7.140	9/32	8.00	223.00	183.00	36.00	6511 7.140	16.000		16.00	413.00	361.00	48.00	6511 16.000
7.500		8.00	223.00	183.00	36.00	6511 7.500							



Ratio drills with coolant ducts



Tool material **Solid carbide**

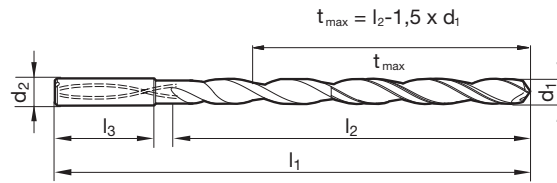
Surface **A**

Shank form **HA**

- P** • web thinning ≥ Ø 3.000 • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H** ○

GÜHRING NAVIGATOR

Cutting data page 302



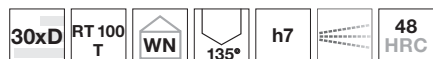
Drilling tools

Article no. **6512**

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3.000		6.00	125.00	85.00	36.00	6512 3.000	7.540	19/64	8.00	263.00	223.00	36.00	6512 7.540
3.100		6.00	141.00	101.00	36.00	6512 3.100	7.940	5/16	8.00	263.00	223.00	36.00	6512 7.940
3.170	1/8	6.00	141.00	101.00	36.00	6512 3.170	8.000		8.00	263.00	223.00	36.00	6512 8.000
3.200		6.00	141.00	101.00	36.00	6512 3.200	8.330	21/64	10.00	294.00	250.00	40.00	6512 8.330
3.300		6.00	141.00	101.00	36.00	6512 3.300	8.500		10.00	294.00	250.00	40.00	6512 8.500
3.500		6.00	156.00	116.00	36.00	6512 3.500	8.730	11/32	10.00	294.00	250.00	40.00	6512 8.730
3.570	9/64	6.00	156.00	116.00	36.00	6512 3.570	8.800		10.00	294.00	250.00	40.00	6512 8.800
3.700		6.00	156.00	116.00	36.00	6512 3.700	9.000		10.00	294.00	250.00	40.00	6512 9.000
3.800		6.00	156.00	116.00	36.00	6512 3.800	9.130	23/64	10.00	321.00	277.00	40.00	6512 9.130
3.970	5/32	6.00	156.00	116.00	36.00	6512 3.970	9.520	3/8	10.00	321.00	277.00	40.00	6512 9.520
4.000		6.00	156.00	116.00	36.00	6512 4.000	9.920	25/64	10.00	321.00	277.00	40.00	6512 9.920
4.100		6.00	183.00	143.00	36.00	6512 4.100	10.000		10.00	321.00	277.00	40.00	6512 10.000
4.200		6.00	183.00	143.00	36.00	6512 4.200	10.320	13/32	12.00	359.00	310.00	45.00	6512 10.320
4.300		6.00	183.00	143.00	36.00	6512 4.300	10.720	27/64	12.00	359.00	310.00	45.00	6512 10.720
4.370	11/64	6.00	183.00	143.00	36.00	6512 4.370	11.000		12.00	359.00	310.00	45.00	6512 11.000
4.500		6.00	183.00	143.00	36.00	6512 4.500	11.110	7/16	12.00	386.00	337.00	45.00	6512 11.110
4.600		6.00	183.00	143.00	36.00	6512 4.600	11.510	29/64	12.00	386.00	337.00	45.00	6512 11.510
4.760	3/16	6.00	183.00	143.00	36.00	6512 4.760	11.910	15/32	12.00	386.00	337.00	45.00	6512 11.910
4.800		6.00	183.00	143.00	36.00	6512 4.800	12.000		12.00	386.00	337.00	45.00	6512 12.000
5.000		6.00	183.00	143.00	36.00	6512 5.000	12.300	31/64	14.00	437.00	388.00	45.00	6512 12.300
5.100		6.00	210.00	170.00	36.00	6512 5.100	12.700	1/2	14.00	437.00	388.00	45.00	6512 12.700
5.160	13/64	6.00	210.00	170.00	36.00	6512 5.160	13.000		14.00	437.00	388.00	45.00	6512 13.000
5.410		6.00	210.00	170.00	36.00	6512 5.410	13.100	33/64	14.00	437.00	388.00	45.00	6512 13.100
5.500		6.00	210.00	170.00	36.00	6512 5.500	13.490	17/32	14.00	437.00	388.00	45.00	6512 13.490
5.560	7/32	6.00	210.00	170.00	36.00	6512 5.560	13.890	35/64	14.00	437.00	388.00	45.00	6512 13.890
5.800		6.00	210.00	170.00	36.00	6512 5.800	14.000		14.00	437.00	388.00	45.00	6512 14.000
5.950	15/64	6.00	210.00	170.00	36.00	6512 5.950	14.290	9/16	16.00	493.00	441.00	48.00	6512 14.290
6.000		6.00	210.00	170.00	36.00	6512 6.000	15.000		16.00	493.00	441.00	48.00	6512 15.000
6.300		8.00	237.00	197.00	36.00	6512 6.300	15.870	5/8	16.00	493.00	441.00	48.00	6512 15.870
6.350	1/4	8.00	237.00	197.00	36.00	6512 6.350	16.000		16.00	493.00	441.00	48.00	6512 16.000
6.500		8.00	237.00	197.00	36.00	6512 6.500							
6.750	17/64	8.00	237.00	197.00	36.00	6512 6.750							
6.800		8.00	237.00	197.00	36.00	6512 6.800							
7.000		8.00	237.00	197.00	36.00	6512 7.000							
7.140	9/32	8.00	263.00	223.00	36.00	6512 7.140							
7.500		8.00	263.00	223.00	36.00	6512 7.500							



Ratio drills with coolant ducts

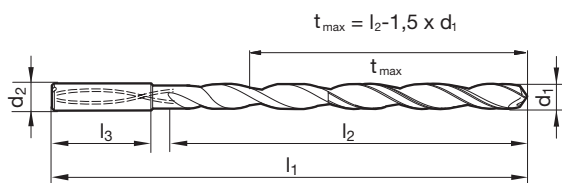


Tool material	Solid carbide
Surface	A
Shank form	HA

- P** • web thinning $\geq \varnothing 3.000$ • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H** ○

GÜHRING NAVIGATOR

Cutting data page 302

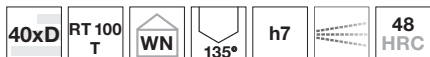


Article no. **6513**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	140.00	100.00	36.00	6513 3.000	7.140	9/32	8.00	303.00	263.00	36.00	6513 7.140
3.100		6.00	158.00	118.00	36.00	6513 3.100	7.500		8.00	303.00	263.00	36.00	6513 7.500
3.170	1/8	6.00	158.00	118.00	36.00	6513 3.170	7.540	19/64	8.00	303.00	263.00	36.00	6513 7.540
3.200		6.00	158.00	118.00	36.00	6513 3.200	7.940	5/16	8.00	303.00	263.00	36.00	6513 7.940
3.300		6.00	158.00	118.00	36.00	6513 3.300	8.000		8.00	303.00	263.00	36.00	6513 8.000
3.500		6.00	176.00	136.00	36.00	6513 3.500	8.330	21/64	10.00	339.00	295.00	40.00	6513 8.330
3.570	9/64	6.00	176.00	136.00	36.00	6513 3.570	8.500		10.00	339.00	295.00	40.00	6513 8.500
3.700		6.00	176.00	136.00	36.00	6513 3.700	8.730	11/32	10.00	339.00	295.00	40.00	6513 8.730
3.800		6.00	176.00	136.00	36.00	6513 3.800	8.800		10.00	339.00	295.00	40.00	6513 8.800
3.970	5/32	6.00	176.00	136.00	36.00	6513 3.970	9.000		10.00	339.00	295.00	40.00	6513 9.000
4.000		6.00	176.00	136.00	36.00	6513 4.000	9.130	23/64	10.00	371.00	327.00	40.00	6513 9.130
4.100		6.00	208.00	168.00	36.00	6513 4.100	9.520	3/8	10.00	371.00	327.00	40.00	6513 9.520
4.200		6.00	208.00	168.00	36.00	6513 4.200	9.920	25/64	10.00	371.00	327.00	40.00	6513 9.920
4.370	11/64	6.00	208.00	168.00	36.00	6513 4.370	10.000		10.00	371.00	327.00	40.00	6513 10.000
4.500		6.00	208.00	168.00	36.00	6513 4.500	10.320	13/32	12.00	412.00	363.00	45.00	6513 10.320
4.760	3/16	6.00	208.00	168.00	36.00	6513 4.760	10.720	27/64	12.00	412.00	363.00	45.00	6513 10.720
5.000		6.00	208.00	168.00	36.00	6513 5.000	11.000		12.00	412.00	363.00	45.00	6513 11.000
5.100		6.00	240.00	200.00	36.00	6513 5.100	11.110	7/16	12.00	443.00	394.00	45.00	6513 11.110
5.160	13/64	6.00	240.00	200.00	36.00	6513 5.160	11.510	29/64	12.00	443.00	394.00	45.00	6513 11.510
5.410		6.00	240.00	200.00	36.00	6513 5.410	11.910	15/32	12.00	443.00	394.00	45.00	6513 11.910
5.500		6.00	240.00	200.00	36.00	6513 5.500	12.000		12.00	443.00	394.00	45.00	6513 12.000
5.560	7/32	6.00	240.00	200.00	36.00	6513 5.560	12.300	31/64	14.00	507.00	458.00	45.00	6513 12.300
5.950	15/64	6.00	240.00	200.00	36.00	6513 5.950	12.700	1/2	14.00	507.00	458.00	45.00	6513 12.700
6.000		6.00	240.00	200.00	36.00	6513 6.000	13.000		14.00	507.00	458.00	45.00	6513 13.000
6.300		8.00	272.00	232.00	36.00	6513 6.300	13.100	33/64	14.00	507.00	458.00	45.00	6513 13.100
6.350	1/4	8.00	272.00	232.00	36.00	6513 6.350	13.490	17/32	14.00	507.00	458.00	45.00	6513 13.490
6.500		8.00	272.00	232.00	36.00	6513 6.500	13.890	35/64	14.00	507.00	458.00	45.00	6513 13.890
6.750	17/64	8.00	272.00	232.00	36.00	6513 6.750	14.000		14.00	507.00	458.00	45.00	6513 14.000
6.800		8.00	272.00	232.00	36.00	6513 6.800							
7.000		8.00	272.00	232.00	36.00	6513 7.000							



Ratio drills with coolant ducts

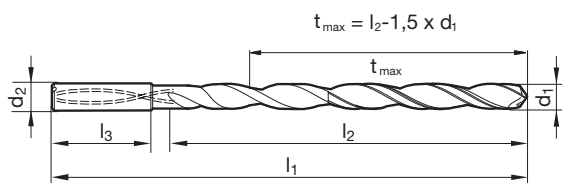


Tool material	Solid carbide
Surface	A
Shank form	HA

- P** • web thinning ≥ Ø 3.000 • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H** ○

GÜHRING NAVIGATOR

Cutting data page 302



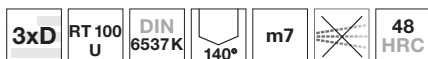
Drilling tools

Article no. 6514

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	170.00	130.00	36.00	6514 3.000	5.500		6.00	280.00	240.00	36.00	6514 5.500
3.100		6.00	193.00	153.00	36.00	6514 3.100	5.560	7/32	6.00	300.00	260.00	36.00	6514 5.560
3.170	1/8	6.00	193.00	153.00	36.00	6514 3.170	5.950	15/64	6.00	300.00	260.00	36.00	6514 5.950
3.200		6.00	193.00	153.00	36.00	6514 3.200	6.000		6.00	300.00	260.00	36.00	6514 6.000
3.300		6.00	193.00	153.00	36.00	6514 3.300	6.300		8.00	322.00	282.00	36.00	6514 6.300
3.500		6.00	193.00	153.00	36.00	6514 3.500	6.350	1/4	8.00	322.00	282.00	36.00	6514 6.350
3.570	9/64	6.00	216.00	176.00	36.00	6514 3.570	6.500		8.00	322.00	282.00	36.00	6514 6.500
3.800		6.00	216.00	176.00	36.00	6514 3.800	6.750	17/64	8.00	342.00	302.00	36.00	6514 6.750
3.970	5/32	6.00	216.00	176.00	36.00	6514 3.970	6.800		8.00	342.00	302.00	36.00	6514 6.800
4.000		6.00	216.00	176.00	36.00	6514 4.000	7.000		8.00	342.00	302.00	36.00	6514 7.000
4.200		6.00	238.00	198.00	36.00	6514 4.200	7.140	9/32	8.00	363.00	323.00	36.00	6514 7.140
4.370	11/64	6.00	238.00	198.00	36.00	6514 4.370	7.500		8.00	363.00	323.00	36.00	6514 7.500
4.500		6.00	238.00	198.00	36.00	6514 4.500	7.540	19/64	8.00	383.00	343.00	36.00	6514 7.540
4.760	3/16	6.00	258.00	218.00	36.00	6514 4.760	7.940	5/16	8.00	383.00	343.00	36.00	6514 7.940
5.000		6.00	258.00	218.00	36.00	6514 5.000	8.000		8.00	383.00	343.00	36.00	6514 8.000
5.100		6.00	280.00	240.00	36.00	6514 5.100	8.500		10.00	409.00	365.00	40.00	6514 8.500
5.160	13/64	6.00	280.00	240.00	36.00	6514 5.160	9.000		10.00	429.00	386.00	40.00	6514 9.000
5.410		6.00	280.00	240.00	36.00	6514 5.410	10.000		10.00	471.00	427.00	40.00	6514 10.000



Ratio drills without coolant ducts

Tool material **Solid carbide**Surface **F**Shank form **HA**

P • web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry

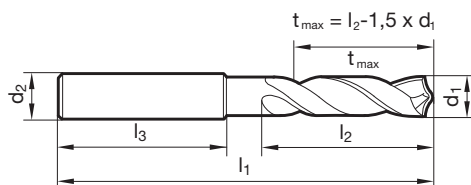
M ○**K** •

N ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials

S ○ • bronze, brass • high-alloyed AlSi alloys

H ○**GÜHRING** NAVIGATOR

Cutting data page 296

Article no. **5514**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	62.00	20.00	36.00	5514 3.000	5.800		6.00	66.00	28.00	36.00	5514 5.800
3.100		6.00	62.00	20.00	36.00	5514 3.100	5.900		6.00	66.00	28.00	36.00	5514 5.900
3.170	1/8	6.00	62.00	20.00	36.00	5514 3.170	5.950	15/64	6.00	66.00	28.00	36.00	5514 5.950
3.200		6.00	62.00	20.00	36.00	5514 3.200	6.000		6.00	66.00	28.00	36.00	5514 6.000
3.250		6.00	62.00	20.00	36.00	5514 3.250	6.100		8.00	79.00	34.00	36.00	5514 6.100
3.300		6.00	62.00	20.00	36.00	5514 3.300	6.200		8.00	79.00	34.00	36.00	5514 6.200
3.400		6.00	62.00	20.00	36.00	5514 3.400	6.300		8.00	79.00	34.00	36.00	5514 6.300
3.500		6.00	62.00	20.00	36.00	5514 3.500	6.350	1/4	8.00	79.00	34.00	36.00	5514 6.350
3.570	9/64	6.00	62.00	20.00	36.00	5514 3.570	6.400		8.00	79.00	34.00	36.00	5514 6.400
3.600		6.00	62.00	20.00	36.00	5514 3.600	6.500		8.00	79.00	34.00	36.00	5514 6.500
3.700		6.00	62.00	20.00	36.00	5514 3.700	6.530		8.00	79.00	34.00	36.00	5514 6.530
3.800		6.00	66.00	24.00	36.00	5514 3.800	6.600		8.00	79.00	34.00	36.00	5514 6.600
3.900		6.00	66.00	24.00	36.00	5514 3.900	6.700		8.00	79.00	34.00	36.00	5514 6.700
3.970	5/32	6.00	66.00	24.00	36.00	5514 3.970	6.750	17/64	8.00	79.00	34.00	36.00	5514 6.750
4.000		6.00	66.00	24.00	36.00	5514 4.000	6.800		8.00	79.00	34.00	36.00	5514 6.800
4.040		6.00	66.00	24.00	36.00	5514 4.040	6.900		8.00	79.00	34.00	36.00	5514 6.900
4.100		6.00	66.00	24.00	36.00	5514 4.100	7.000		8.00	79.00	34.00	36.00	5514 7.000
4.200		6.00	66.00	24.00	36.00	5514 4.200	7.100		8.00	79.00	41.00	36.00	5514 7.100
4.300		6.00	66.00	24.00	36.00	5514 4.300	7.140	9/32	8.00	79.00	41.00	36.00	5514 7.140
4.370	11/64	6.00	66.00	24.00	36.00	5514 4.370	7.200		8.00	79.00	41.00	36.00	5514 7.200
4.400		6.00	66.00	24.00	36.00	5514 4.400	7.300		8.00	79.00	41.00	36.00	5514 7.300
4.500		6.00	66.00	24.00	36.00	5514 4.500	7.400		8.00	79.00	41.00	36.00	5514 7.400
4.600		6.00	66.00	24.00	36.00	5514 4.600	7.500		8.00	79.00	41.00	36.00	5514 7.500
4.650		6.00	66.00	24.00	36.00	5514 4.650	7.540	19/64	8.00	79.00	41.00	36.00	5514 7.540
4.700		6.00	66.00	24.00	36.00	5514 4.700	7.600		8.00	79.00	41.00	36.00	5514 7.600
4.760	3/16	6.00	66.00	28.00	36.00	5514 4.760	7.700		8.00	79.00	41.00	36.00	5514 7.700
4.800		6.00	66.00	28.00	36.00	5514 4.800	7.800		8.00	79.00	41.00	36.00	5514 7.800
4.900		6.00	66.00	28.00	36.00	5514 4.900	7.900		8.00	79.00	41.00	36.00	5514 7.900
5.000		6.00	66.00	28.00	36.00	5514 5.000	7.940	5/16	8.00	79.00	41.00	36.00	5514 7.940
5.100		6.00	66.00	28.00	36.00	5514 5.100	8.000		8.00	79.00	41.00	36.00	5514 8.000
5.110		6.00	66.00	28.00	36.00	5514 5.110	8.100		10.00	89.00	47.00	40.00	5514 8.100
5.160	13/64	6.00	66.00	28.00	36.00	5514 5.160	8.200		10.00	89.00	47.00	40.00	5514 8.200
5.200		6.00	66.00	28.00	36.00	5514 5.200	8.300		10.00	89.00	47.00	40.00	5514 8.300
5.250		6.00	66.00	28.00	36.00	5514 5.250	8.330	21/64	10.00	89.00	47.00	40.00	5514 8.330
5.300		6.00	66.00	28.00	36.00	5514 5.300	8.400		10.00	89.00	47.00	40.00	5514 8.400
5.400		6.00	66.00	28.00	36.00	5514 5.400	8.500		10.00	89.00	47.00	40.00	5514 8.500
5.410		6.00	66.00	28.00	36.00	5514 5.410	8.600		10.00	89.00	47.00	40.00	5514 8.600
5.500		6.00	66.00	28.00	36.00	5514 5.500	8.700		10.00	89.00	47.00	40.00	5514 8.700
5.550		6.00	66.00	28.00	36.00	5514 5.550	8.730	11/32	10.00	89.00	47.00	40.00	5514 8.730
5.560	7/32	6.00	66.00	28.00	36.00	5514 5.560	8.800		10.00	89.00	47.00	40.00	5514 8.800
5.600		6.00	66.00	28.00	36.00	5514 5.600	8.900		10.00	89.00	47.00	40.00	5514 8.900
5.700		6.00	66.00	28.00	36.00	5514 5.700	9.000		10.00	89.00	47.00	40.00	5514 9.000

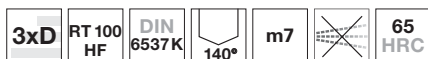


d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.100		10.00	89.00	47.00	40.00	5514 9.100	13.490	17/32	14.00	107.00	60.00	45.00	5514 13.490
9.130	23/64	10.00	89.00	47.00	40.00	5514 9.130	13.500		14.00	107.00	60.00	45.00	5514 13.500
9.200		10.00	89.00	47.00	40.00	5514 9.200	13.600		14.00	107.00	60.00	45.00	5514 13.600
9.250		10.00	89.00	47.00	40.00	5514 9.250	13.700		14.00	107.00	60.00	45.00	5514 13.700
9.300		10.00	89.00	47.00	40.00	5514 9.300	13.800		14.00	107.00	60.00	45.00	5514 13.800
9.340		10.00	89.00	47.00	40.00	5514 9.340	13.890	35/64	14.00	107.00	60.00	45.00	5514 13.890
9.400		10.00	89.00	47.00	40.00	5514 9.400	13.900		14.00	107.00	60.00	45.00	5514 13.900
9.500		10.00	89.00	47.00	40.00	5514 9.500	14.000		14.00	107.00	60.00	45.00	5514 14.000
9.520	3/8	10.00	89.00	47.00	40.00	5514 9.520	14.100		16.00	115.00	65.00	48.00	5514 14.100
9.600		10.00	89.00	47.00	40.00	5514 9.600	14.200		16.00	115.00	65.00	48.00	5514 14.200
9.700		10.00	89.00	47.00	40.00	5514 9.700	14.290	9/16	16.00	115.00	65.00	48.00	5514 14.290
9.800		10.00	89.00	47.00	40.00	5514 9.800	14.300		16.00	115.00	65.00	48.00	5514 14.300
9.900		10.00	89.00	47.00	40.00	5514 9.900	14.400		16.00	115.00	65.00	48.00	5514 14.400
9.920	25/64	10.00	89.00	47.00	40.00	5514 9.920	14.500		16.00	115.00	65.00	48.00	5514 14.500
10.000		10.00	89.00	47.00	40.00	5514 10.000	14.600		16.00	115.00	65.00	48.00	5514 14.600
10.100		12.00	102.00	55.00	45.00	5514 10.100	14.680	37/64	16.00	115.00	65.00	48.00	5514 14.680
10.200		12.00	102.00	55.00	45.00	5514 10.200	14.700		16.00	115.00	65.00	48.00	5514 14.700
10.300		12.00	102.00	55.00	45.00	5514 10.300	14.800		16.00	115.00	65.00	48.00	5514 14.800
10.320	13/32	12.00	102.00	55.00	45.00	5514 10.320	14.900		16.00	115.00	65.00	48.00	5514 14.900
10.400		12.00	102.00	55.00	45.00	5514 10.400	15.000		16.00	115.00	65.00	48.00	5514 15.000
10.500		12.00	102.00	55.00	45.00	5514 10.500	15.080	19/32	16.00	115.00	65.00	48.00	5514 15.080
10.600		12.00	102.00	55.00	45.00	5514 10.600	15.100		16.00	115.00	65.00	48.00	5514 15.100
10.700		12.00	102.00	55.00	45.00	5514 10.700	15.200		16.00	115.00	65.00	48.00	5514 15.200
10.720	27/64	12.00	102.00	55.00	45.00	5514 10.720	15.300		16.00	115.00	65.00	48.00	5514 15.300
10.800		12.00	102.00	55.00	45.00	5514 10.800	15.400		16.00	115.00	65.00	48.00	5514 15.400
10.900		12.00	102.00	55.00	45.00	5514 10.900	15.480	39/64	16.00	115.00	65.00	48.00	5514 15.480
11.000		12.00	102.00	55.00	45.00	5514 11.000	15.500		16.00	115.00	65.00	48.00	5514 15.500
11.100		12.00	102.00	55.00	45.00	5514 11.100	15.600		16.00	115.00	65.00	48.00	5514 15.600
11.110	7/16	12.00	102.00	55.00	45.00	5514 11.110	15.700		16.00	115.00	65.00	48.00	5514 15.700
11.200		12.00	102.00	55.00	45.00	5514 11.200	15.800		16.00	115.00	65.00	48.00	5514 15.800
11.300		12.00	102.00	55.00	45.00	5514 11.300	15.870	5/8	16.00	115.00	65.00	48.00	5514 15.870
11.400		12.00	102.00	55.00	45.00	5514 11.400	15.900		16.00	115.00	65.00	48.00	5514 15.900
11.500		12.00	102.00	55.00	45.00	5514 11.500	16.000		16.00	115.00	65.00	48.00	5514 16.000
11.510	29/64	12.00	102.00	55.00	45.00	5514 11.510	16.270	41/64	18.00	123.00	73.00	48.00	5514 16.270
11.600		12.00	102.00	55.00	45.00	5514 11.600	16.500		18.00	123.00	73.00	48.00	5514 16.500
11.700		12.00	102.00	55.00	45.00	5514 11.700	16.670	21/32	18.00	123.00	73.00	48.00	5514 16.670
11.800		12.00	102.00	55.00	45.00	5514 11.800	17.000		18.00	123.00	73.00	48.00	5514 17.000
11.900		12.00	102.00	55.00	45.00	5514 11.900	17.070	43/64	18.00	123.00	73.00	48.00	5514 17.070
11.910	15/32	12.00	102.00	55.00	45.00	5514 11.910	17.460	11/16	18.00	123.00	73.00	48.00	5514 17.460
12.000		12.00	102.00	55.00	45.00	5514 12.000	17.500		18.00	123.00	73.00	48.00	5514 17.500
12.100		14.00	107.00	60.00	45.00	5514 12.100	17.860	45/64	18.00	123.00	73.00	48.00	5514 17.860
12.200		14.00	107.00	60.00	45.00	5514 12.200	18.000		18.00	123.00	73.00	48.00	5514 18.000
12.300	31/64	14.00	107.00	60.00	45.00	5514 12.300	18.260	23/32	20.00	131.00	79.00	50.00	5514 18.260
12.400		14.00	107.00	60.00	45.00	5514 12.400	18.500		20.00	131.00	79.00	50.00	5514 18.500
12.500		14.00	107.00	60.00	45.00	5514 12.500	19.000		20.00	131.00	79.00	50.00	5514 19.000
12.600		14.00	107.00	60.00	45.00	5514 12.600	19.050	3/4	20.00	131.00	79.00	50.00	5514 19.050
12.700	1/2	14.00	107.00	60.00	45.00	5514 12.700	19.250		20.00	131.00	79.00	50.00	5514 19.250
12.800		14.00	107.00	60.00	45.00	5514 12.800	19.446		20.00	131.00	79.00	50.00	5514 19.446
12.900		14.00	107.00	60.00	45.00	5514 12.900	19.500		20.00	131.00	79.00	50.00	5514 19.500
13.000		14.00	107.00	60.00	45.00	5514 13.000	19.840	25/32	20.00	131.00	79.00	50.00	5514 19.840
13.100	33/64	14.00	107.00	60.00	45.00	5514 13.100	20.000		20.00	131.00	79.00	50.00	5514 20.000
13.200		14.00	107.00	60.00	45.00	5514 13.200							
13.300		14.00	107.00	60.00	45.00	5514 13.300							
13.400		14.00	107.00	60.00	45.00	5514 13.400							

Drilling tools



Ratio drills without coolant ducts

Tool material **Solid carbide**Surface **Y**Shank form **HA**

P • web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin

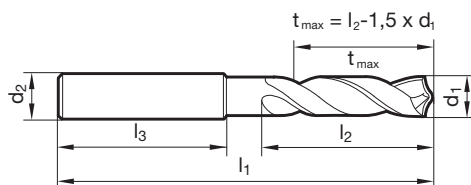
M**K**

N alloyed and high tensile steels up to 1600 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys

S •**H** ○**GÜHRING** NAVIGATOR

Cutting data page 296

Drilling tools

Article no. **8524**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
3.000		6.00	62.00	20.00	36.00	8524 3.000	6.100		8.00	79.00	34.00	36.00	8524 6.100
3.100		6.00	62.00	20.00	36.00	8524 3.100	6.200		8.00	79.00	34.00	36.00	8524 6.200
3.170	1/8	6.00	62.00	20.00	36.00	8524 3.170	6.300		8.00	79.00	34.00	36.00	8524 6.300
3.200		6.00	62.00	20.00	36.00	8524 3.200	6.350	1/4	8.00	79.00	34.00	36.00	8524 6.350
3.250		6.00	62.00	20.00	36.00	8524 3.250	6.400		8.00	79.00	34.00	36.00	8524 6.400
3.300		6.00	62.00	20.00	36.00	8524 3.300	6.500		8.00	79.00	34.00	36.00	8524 6.500
3.400		6.00	62.00	20.00	36.00	8524 3.400	6.600		8.00	79.00	34.00	36.00	8524 6.600
3.500		6.00	62.00	20.00	36.00	8524 3.500	6.700		8.00	79.00	34.00	36.00	8524 6.700
3.570	9/64	6.00	62.00	20.00	36.00	8524 3.570	6.750	17/64	8.00	79.00	34.00	36.00	8524 6.750
3.600		6.00	62.00	20.00	36.00	8524 3.600	6.800		8.00	79.00	34.00	36.00	8524 6.800
3.700		6.00	62.00	20.00	36.00	8524 3.700	6.900		8.00	79.00	34.00	36.00	8524 6.900
3.800		6.00	66.00	24.00	36.00	8524 3.800	7.000		8.00	79.00	34.00	36.00	8524 7.000
3.900		6.00	66.00	24.00	36.00	8524 3.900	7.100		8.00	79.00	41.00	36.00	8524 7.100
3.970	5/32	6.00	66.00	24.00	36.00	8524 3.970	7.140	9/32	8.00	79.00	41.00	36.00	8524 7.140
4.000		6.00	66.00	24.00	36.00	8524 4.000	7.200		8.00	79.00	41.00	36.00	8524 7.200
4.100		6.00	66.00	24.00	36.00	8524 4.100	7.300		8.00	79.00	41.00	36.00	8524 7.300
4.200		6.00	66.00	24.00	36.00	8524 4.200	7.400		8.00	79.00	41.00	36.00	8524 7.400
4.300		6.00	66.00	24.00	36.00	8524 4.300	7.500		8.00	79.00	41.00	36.00	8524 7.500
4.370	11/64	6.00	66.00	24.00	36.00	8524 4.370	7.540	19/64	8.00	79.00	41.00	36.00	8524 7.540
4.400		6.00	66.00	24.00	36.00	8524 4.400	7.600		8.00	79.00	41.00	36.00	8524 7.600
4.500		6.00	66.00	24.00	36.00	8524 4.500	7.700		8.00	79.00	41.00	36.00	8524 7.700
4.600		6.00	66.00	24.00	36.00	8524 4.600	7.800		8.00	79.00	41.00	36.00	8524 7.800
4.650		6.00	66.00	24.00	36.00	8524 4.650	7.900		8.00	79.00	41.00	36.00	8524 7.900
4.700		6.00	66.00	24.00	36.00	8524 4.700	7.940	5/16	8.00	79.00	41.00	36.00	8524 7.940
4.760	3/16	6.00	66.00	28.00	36.00	8524 4.760	8.000		8.00	79.00	41.00	36.00	8524 8.000
4.800		6.00	66.00	28.00	36.00	8524 4.800	8.100		10.00	89.00	47.00	40.00	8524 8.100
4.900		6.00	66.00	28.00	36.00	8524 4.900	8.200		10.00	89.00	47.00	40.00	8524 8.200
5.000		6.00	66.00	28.00	36.00	8524 5.000	8.300		10.00	89.00	47.00	40.00	8524 8.300
5.100		6.00	66.00	28.00	36.00	8524 5.100	8.330	21/64	10.00	89.00	47.00	40.00	8524 8.330
5.160	13/64	6.00	66.00	28.00	36.00	8524 5.160	8.400		10.00	89.00	47.00	40.00	8524 8.400
5.200		6.00	66.00	28.00	36.00	8524 5.200	8.500		10.00	89.00	47.00	40.00	8524 8.500
5.300		6.00	66.00	28.00	36.00	8524 5.300	8.600		10.00	89.00	47.00	40.00	8524 8.600
5.400		6.00	66.00	28.00	36.00	8524 5.400	8.700		10.00	89.00	47.00	40.00	8524 8.700
5.500		6.00	66.00	28.00	36.00	8524 5.500	8.730	11/32	10.00	89.00	47.00	40.00	8524 8.730
5.550		6.00	66.00	28.00	36.00	8524 5.550	8.800		10.00	89.00	47.00	40.00	8524 8.800
5.560	7/32	6.00	66.00	28.00	36.00	8524 5.560	8.900		10.00	89.00	47.00	40.00	8524 8.900
5.600		6.00	66.00	28.00	36.00	8524 5.600	9.000		10.00	89.00	47.00	40.00	8524 9.000
5.700		6.00	66.00	28.00	36.00	8524 5.700	9.100		10.00	89.00	47.00	40.00	8524 9.100
5.800		6.00	66.00	28.00	36.00	8524 5.800	9.130	23/64	10.00	89.00	47.00	40.00	8524 9.130
5.900		6.00	66.00	28.00	36.00	8524 5.900	9.200		10.00	89.00	47.00	40.00	8524 9.200
5.950	15/64	6.00	66.00	28.00	36.00	8524 5.950	9.250		10.00	89.00	47.00	40.00	8524 9.250
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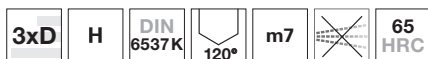


d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
9.400		10.00	89.00	47.00	40.00	8524 9.400	12.500		14.00	107.00	60.00	45.00	8524 12.500
9.500		10.00	89.00	47.00	40.00	8524 9.500	12.700	1/2	14.00	107.00	60.00	45.00	8524 12.700
9.520	3/8	10.00	89.00	47.00	40.00	8524 9.520	12.800		14.00	107.00	60.00	45.00	8524 12.800
9.600		10.00	89.00	47.00	40.00	8524 9.600	13.000		14.00	107.00	60.00	45.00	8524 13.000
9.700		10.00	89.00	47.00	40.00	8524 9.700	13.300		14.00	107.00	60.00	45.00	8524 13.300
9.800		10.00	89.00	47.00	40.00	8524 9.800	13.490	17/32	14.00	107.00	60.00	45.00	8524 13.490
9.900		10.00	89.00	47.00	40.00	8524 9.900	13.500		14.00	107.00	60.00	45.00	8524 13.500
9.920	25/64	10.00	89.00	47.00	40.00	8524 9.920	13.700		14.00	107.00	60.00	45.00	8524 13.700
10.000		10.00	89.00	47.00	40.00	8524 10.000	14.000		14.00	107.00	60.00	45.00	8524 14.000
10.100		12.00	102.00	55.00	45.00	8524 10.100	14.200		16.00	115.00	65.00	48.00	8524 14.200
10.200		12.00	102.00	55.00	45.00	8524 10.200	14.290	9/16	16.00	115.00	65.00	48.00	8524 14.290
10.300		12.00	102.00	55.00	45.00	8524 10.300	14.300		16.00	115.00	65.00	48.00	8524 14.300
10.320	13/32	12.00	102.00	55.00	45.00	8524 10.320	14.500		16.00	115.00	65.00	48.00	8524 14.500
10.400		12.00	102.00	55.00	45.00	8524 10.400	14.700		16.00	115.00	65.00	48.00	8524 14.700
10.500		12.00	102.00	55.00	45.00	8524 10.500	15.000		16.00	115.00	65.00	48.00	8524 15.000
10.600		12.00	102.00	55.00	45.00	8524 10.600	15.200		16.00	115.00	65.00	48.00	8524 15.200
10.700		12.00	102.00	55.00	45.00	8524 10.700	15.300		16.00	115.00	65.00	48.00	8524 15.300
10.720	27/64	12.00	102.00	55.00	45.00	8524 10.720	15.500		16.00	115.00	65.00	48.00	8524 15.500
10.800		12.00	102.00	55.00	45.00	8524 10.800	15.700		16.00	115.00	65.00	48.00	8524 15.700
10.900		12.00	102.00	55.00	45.00	8524 10.900	15.870	5/8	16.00	115.00	65.00	48.00	8524 15.870
11.000		12.00	102.00	55.00	45.00	8524 11.000	16.000		16.00	115.00	65.00	48.00	8524 16.000
11.100		12.00	102.00	55.00	45.00	8524 11.100	16.300		18.00	123.00	73.00	48.00	8524 16.300
11.110	7/16	12.00	102.00	55.00	45.00	8524 11.110	16.500		18.00	123.00	73.00	48.00	8524 16.500
11.200		12.00	102.00	55.00	45.00	8524 11.200	16.900		18.00	123.00	73.00	48.00	8524 16.900
11.300		12.00	102.00	55.00	45.00	8524 11.300	17.000		18.00	123.00	73.00	48.00	8524 17.000
11.400		12.00	102.00	55.00	45.00	8524 11.400	17.300		18.00	123.00	73.00	48.00	8524 17.300
11.500		12.00	102.00	55.00	45.00	8524 11.500	17.500		18.00	123.00	73.00	48.00	8524 17.500
11.510	29/64	12.00	102.00	55.00	45.00	8524 11.510	18.000		18.00	123.00	73.00	48.00	8524 18.000
11.600		12.00	102.00	55.00	45.00	8524 11.600	18.500		20.00	131.00	79.00	50.00	8524 18.500
11.700		12.00	102.00	55.00	45.00	8524 11.700	18.900		20.00	131.00	79.00	50.00	8524 18.900
11.800		12.00	102.00	55.00	45.00	8524 11.800	19.000		20.00	131.00	79.00	50.00	8524 19.000
11.900		12.00	102.00	55.00	45.00	8524 11.900	19.050	3/4	20.00	131.00	79.00	50.00	8524 19.050
11.910	15/32	12.00	102.00	55.00	45.00	8524 11.910	19.300		20.00	131.00	79.00	50.00	8524 19.300
12.000		12.00	102.00	55.00	45.00	8524 12.000	19.500		20.00	131.00	79.00	50.00	8524 19.500
12.200		14.00	107.00	60.00	45.00	8524 12.200	20.000		20.00	131.00	79.00	50.00	8524 20.000
12.300	31/64	14.00	107.00	60.00	45.00	8524 12.300							

Drilling tools

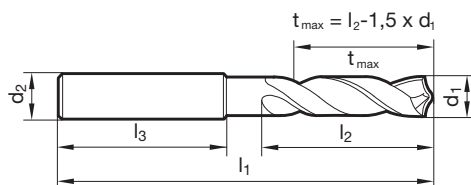


Twist drills with reinforced straight shank

Tool material **Solid carbide**Surface **A**Shank form **HA****P** ○ web thinning $\geq \varnothing 2.600$ • facet point grind • main cutting edge form straight (after correction)**M****K** ○**N****S****H** •**GÜHRING** NAVIGATOR

Cutting data page 298

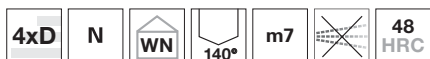
Drilling tools

Article no. **1946**

d1	d2 h6	l1	l2	l3	Order no.	d1	d2 h6	l1	l2	l3	Order no.
mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	
2.600	6.000	62.00	20.00	36.00	1946 2.600	8.600	10.000	89.00	47.00	40.00	1946 8.600
3.000	6.000	62.00	20.00	36.00	1946 3.000	9.100	10.000	89.00	47.00	40.00	1946 9.100
3.400	6.000	62.00	20.00	36.00	1946 3.400	10.000	10.000	89.00	47.00	40.00	1946 10.000
4.000	6.000	66.00	24.00	36.00	1946 4.000	10.400	12.000	102.00	55.00	45.00	1946 10.400
4.300	6.000	66.00	24.00	36.00	1946 4.300	10.600	12.000	102.00	55.00	45.00	1946 10.600
5.000	6.000	66.00	28.00	36.00	1946 5.000	11.100	12.000	102.00	55.00	45.00	1946 11.100
5.100	6.000	66.00	28.00	36.00	1946 5.100	12.000	12.000	102.00	55.00	45.00	1946 12.000
5.600	6.000	66.00	28.00	36.00	1946 5.600	14.100	16.000	115.00	65.00	48.00	1946 14.100
6.000	6.000	66.00	28.00	36.00	1946 6.000						
6.900	8.000	79.00	34.00	36.00	1946 6.900						
7.100	8.000	79.00	41.00	36.00	1946 7.100						
8.000	8.000	79.00	41.00	36.00	1946 8.000						



ExclusiveLine micro-precision drills without coolant ducts

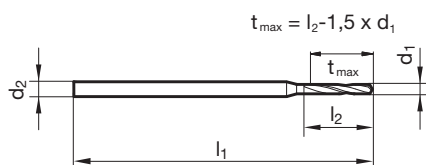


Tool material	Solid carbide
Surface	A
Shank form	cyl.

- P** • web thinning ≥ Ø 0.500 • facet point grind • main cutting edge form straight • edge preparation
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H**

GÜHRING NAVIGATOR

Cutting data page 300



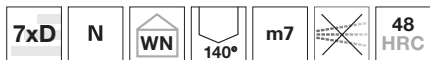
Drilling tools

Article no. 6400

d1	d2	l1	l2	Order no.	d1	d2	l1	l2	Order no.
mm	mm	mm	mm		mm	mm	mm	mm	
0.500	3.000	47.00	3.00	6400 0.500	1.950	3.000	52.00	11.70	6400 1.950
0.550	3.000	47.00	3.30	6400 0.550	1.980	4.000	59.00	12.00	6400 1.980
0.600	3.000	47.00	3.60	6400 0.600	2.000	4.000	59.00	12.00	6400 2.000
0.650	3.000	47.00	3.90	6400 0.650	2.050	4.000	59.00	12.30	6400 2.050
0.700	3.000	47.00	4.20	6400 0.700	2.100	4.000	59.00	12.60	6400 2.100
0.750	3.000	47.00	4.50	6400 0.750	2.150	4.000	59.00	12.90	6400 2.150
0.800	3.000	47.00	4.80	6400 0.800	2.200	4.000	59.00	13.20	6400 2.200
0.850	3.000	47.00	5.10	6400 0.850	2.250	4.000	59.00	13.50	6400 2.250
0.900	3.000	47.00	5.40	6400 0.900	2.300	4.000	59.00	13.80	6400 2.300
0.950	3.000	47.00	5.70	6400 0.950	2.350	4.000	59.00	14.10	6400 2.350
1.000	3.000	47.00	6.00	6400 1.000	2.380	4.000	59.00	14.40	6400 2.380
1.050	3.000	47.00	6.30	6400 1.050	2.400	4.000	59.00	14.40	6400 2.400
1.100	3.000	47.00	6.60	6400 1.100	2.450	4.000	59.00	14.70	6400 2.450
1.150	3.000	47.00	6.90	6400 1.150	2.500	4.000	59.00	15.00	6400 2.500
1.200	3.000	47.00	7.20	6400 1.200	2.550	4.000	59.00	15.30	6400 2.550
1.250	3.000	47.00	7.50	6400 1.250	2.600	4.000	59.00	15.60	6400 2.600
1.300	3.000	47.00	7.80	6400 1.300	2.650	4.000	59.00	15.90	6400 2.650
1.350	3.000	47.00	8.10	6400 1.350	2.700	4.000	59.00	16.20	6400 2.700
1.400	3.000	47.00	8.40	6400 1.400	2.750	4.000	59.00	16.50	6400 2.750
1.450	3.000	47.00	8.70	6400 1.450	2.780	4.000	59.00	16.80	6400 2.780
1.500	3.000	47.00	9.00	6400 1.500	2.800	4.000	59.00	16.80	6400 2.800
1.550	3.000	47.00	9.30	6400 1.550	2.850	4.000	59.00	17.10	6400 2.850
1.590	3.000	47.00	9.60	6400 1.590	2.900	4.000	59.00	17.40	6400 2.900
1.600	3.000	47.00	9.60	6400 1.600	2.950	4.000	59.00	17.70	6400 2.950
1.650	3.000	47.00	9.90	6400 1.650	3.000	4.000	59.00	18.00	6400 3.000
1.700	3.000	47.00	10.20	6400 1.700					
1.750	3.000	47.00	10.50	6400 1.750					
1.800	3.000	52.00	10.80	6400 1.800					
1.850	3.000	52.00	11.10	6400 1.850					
1.900	3.000	52.00	11.40	6400 1.900					



ExclusiveLine micro-precision drills without coolant ducts



Tool material	Solid carbide
Surface	A
Shank form	cyl.

P • web thinning $\geq \varnothing 0.500$ • facet point grind • main cutting edge form straight • edge preparation

M •

K •

N ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials

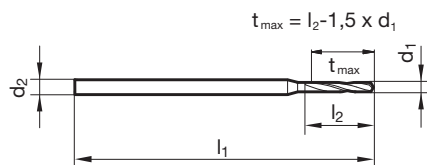
S ○

H

GÜHRING NAVIGATOR

Cutting data page 300

Drilling tools

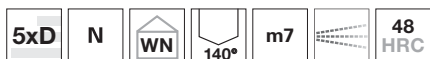


Article no. **6401**

d1	d2	l1	l2	Order no.	d1	d2	l1	l2	Order no.
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0.500	3.000	47.00	4.00	6401 0.500	1.950	3.000	52.00	17.60	6401 1.950
0.550	3.000	47.00	4.40	6401 0.550	1.980	4.000	63.00	18.00	6401 1.980
0.600	3.000	47.00	4.80	6401 0.600	2.000	4.000	63.00	18.00	6401 2.000
0.650	3.000	47.00	5.20	6401 0.650	2.050	4.000	63.00	18.50	6401 2.050
0.700	3.000	47.00	5.60	6401 0.700	2.100	4.000	63.00	18.90	6401 2.100
0.750	3.000	47.00	6.00	6401 0.750	2.150	4.000	63.00	19.40	6401 2.150
0.800	3.000	47.00	6.40	6401 0.800	2.200	4.000	63.00	19.80	6401 2.200
0.850	3.000	47.00	6.80	6401 0.850	2.250	4.000	63.00	20.30	6401 2.250
0.900	3.000	47.00	7.20	6401 0.900	2.300	4.000	63.00	20.70	6401 2.300
0.950	3.000	47.00	7.60	6401 0.950	2.350	4.000	63.00	21.20	6401 2.350
1.000	3.000	47.00	8.00	6401 1.000	2.380	4.000	63.00	21.60	6401 2.380
1.050	3.000	47.00	8.40	6401 1.050	2.400	4.000	63.00	21.60	6401 2.400
1.100	3.000	47.00	8.80	6401 1.100	2.450	4.000	63.00	22.10	6401 2.450
1.150	3.000	47.00	9.20	6401 1.150	2.500	4.000	63.00	22.50	6401 2.500
1.200	3.000	52.00	10.80	6401 1.200	2.550	4.000	63.00	23.00	6401 2.550
1.250	3.000	52.00	11.30	6401 1.250	2.600	4.000	67.00	23.40	6401 2.600
1.300	3.000	52.00	11.70	6401 1.300	2.650	4.000	67.00	23.90	6401 2.650
1.350	3.000	52.00	12.20	6401 1.350	2.700	4.000	67.00	24.30	6401 2.700
1.400	3.000	52.00	12.60	6401 1.400	2.750	4.000	67.00	24.80	6401 2.750
1.450	3.000	52.00	13.10	6401 1.450	2.780	4.000	67.00	25.20	6401 2.780
1.500	3.000	52.00	13.50	6401 1.500	2.800	4.000	67.00	25.20	6401 2.800
1.550	3.000	52.00	14.00	6401 1.550	2.850	4.000	67.00	25.70	6401 2.850
1.590	3.000	52.00	14.40	6401 1.590	2.900	4.000	67.00	26.10	6401 2.900
1.600	3.000	52.00	14.40	6401 1.600	2.950	4.000	67.00	26.60	6401 2.950
1.650	3.000	52.00	14.90	6401 1.650	3.000	4.000	67.00	27.00	6401 3.000
1.700	3.000	52.00	15.30	6401 1.700					
1.750	3.000	52.00	15.80	6401 1.750					
1.800	3.000	52.00	16.20	6401 1.800					
1.850	3.000	52.00	16.70	6401 1.850					
1.900	3.000	52.00	17.10	6401 1.900					



ExclusiveLine micro-precision drills with coolant ducts

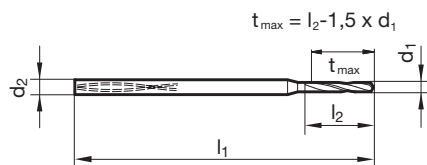


Tool material	Solid carbide
Surface	A
Shank form	cyl.

- P** • web thinning ≥ Ø 1.000 • facet point grind • main cutting edge form straight • with cutting lip honing
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H**

GÜHRING NAVIGATOR

Cutting data page 300



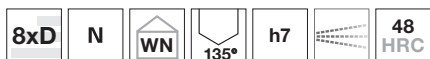
Drilling tools

Article no. 6405

d1	d2 h6	l1	l2	Order no.	d1	d2 h6	l1	l2	Order no.
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1.000	3.000	48.00	8.00	6405 1.000	2.200	4.000	62.00	18.00	6405 2.200
1.020	3.000	48.00	8.50	6405 1.020	2.250	4.000	62.00	18.00	6405 2.250
1.050	3.000	48.00	8.50	6405 1.050	2.300	4.000	62.00	18.00	6405 2.300
1.100	3.000	48.00	9.00	6405 1.100	2.350	4.000	62.00	19.00	6405 2.350
1.150	3.000	48.00	9.50	6405 1.150	2.380	4.000	62.00	19.00	6405 2.380
1.180	3.000	48.00	9.50	6405 1.180	2.400	4.000	62.00	19.00	6405 2.400
1.190	3.000	48.00	10.00	6405 1.190	2.450	4.000	62.00	20.00	6405 2.450
1.200	3.000	48.00	10.00	6405 1.200	2.500	4.000	62.00	20.00	6405 2.500
1.250	3.000	48.00	10.00	6405 1.250	2.550	4.000	62.00	20.00	6405 2.550
1.280	3.000	48.00	10.50	6405 1.280	2.600	4.000	66.00	21.00	6405 2.600
1.300	3.000	48.00	10.50	6405 1.300	2.650	4.000	66.00	21.00	6405 2.650
1.350	3.000	48.00	11.00	6405 1.350	2.700	4.000	66.00	22.00	6405 2.700
1.400	4.000	52.00	11.00	6405 1.400	2.750	4.000	66.00	22.00	6405 2.750
1.450	4.000	52.00	12.00	6405 1.450	2.780	4.000	66.00	22.00	6405 2.780
1.500	4.000	52.00	12.00	6405 1.500	2.800	4.000	66.00	22.00	6405 2.800
1.550	4.000	52.00	12.00	6405 1.550	2.850	4.000	66.00	23.00	6405 2.850
1.590	4.000	52.00	13.00	6405 1.590	2.900	4.000	66.00	23.00	6405 2.900
1.600	4.000	52.00	13.00	6405 1.600	2.950	4.000	66.00	24.00	6405 2.950
1.650	4.000	52.00	13.00	6405 1.650	3.000	4.000	66.00	24.00	6405 3.000
1.700	4.000	56.00	14.00	6405 1.700					
1.750	4.000	56.00	14.00	6405 1.750					
1.800	4.000	56.00	14.00	6405 1.800					
1.850	4.000	56.00	15.00	6405 1.850					
1.900	4.000	56.00	15.00	6405 1.900					
1.950	4.000	56.00	16.00	6405 1.950					
1.980	4.000	56.00	16.00	6405 1.980					
2.000	4.000	56.00	16.00	6405 2.000					
2.050	4.000	56.00	16.00	6405 2.050					
2.100	4.000	62.00	17.00	6405 2.100					
2.150	4.000	62.00	17.00	6405 2.150					



ExclusiveLine micro-precision drills with coolant ducts



Tool material	Solid carbide
Surface	A
Shank form	cyl.

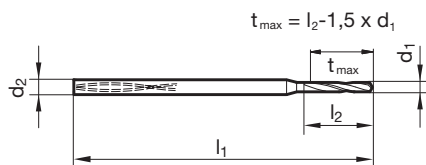
P • web thinning ≥ Ø 1.000 • facet point grind • main cutting edge form straight • with cutting lip honing

- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H** ○

GÜHRING NAVIGATOR

Cutting data page 300

Drilling tools

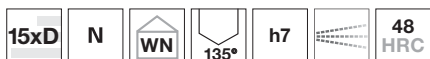


Article no. **6408**

d1	d2 h6	l1	l2	Order no.	d1	d2 h6	l1	l2	Order no.
mm	mm	mm	mm		mm	mm	mm	mm	
1.000	3.000	48.00	11.00	6408 1.000	2.200	4.000	62.00	24.00	6408 2.200
1.020	3.000	48.00	11.50	6408 1.020	2.250	4.000	62.00	25.00	6408 2.250
1.050	3.000	48.00	12.00	6408 1.050	2.300	4.000	62.00	25.00	6408 2.300
1.100	3.000	48.00	12.50	6408 1.100	2.320	4.000	62.00	26.00	6408 2.320
1.150	3.000	48.00	13.00	6408 1.150	2.350	4.000	62.00	26.00	6408 2.350
1.180	3.000	48.00	13.00	6408 1.180	2.380	4.000	62.00	26.00	6408 2.380
1.190	3.000	48.00	13.50	6408 1.190	2.400	4.000	62.00	26.00	6408 2.400
1.200	3.000	48.00	13.50	6408 1.200	2.450	4.000	62.00	27.00	6408 2.450
1.250	3.000	48.00	14.00	6408 1.250	2.500	4.000	62.00	28.00	6408 2.500
1.280	3.000	48.00	14.50	6408 1.280	2.550	4.000	62.00	28.00	6408 2.550
1.300	3.000	48.00	14.50	6408 1.300	2.600	4.000	66.00	29.00	6408 2.600
1.350	3.000	48.00	15.00	6408 1.350	2.650	4.000	66.00	29.00	6408 2.650
1.400	4.000	52.00	15.00	6408 1.400	2.700	4.000	66.00	30.00	6408 2.700
1.450	4.000	52.00	16.00	6408 1.450	2.750	4.000	66.00	30.00	6408 2.750
1.500	4.000	52.00	17.00	6408 1.500	2.780	4.000	66.00	31.00	6408 2.780
1.550	4.000	52.00	17.00	6408 1.550	2.800	4.000	66.00	31.00	6408 2.800
1.590	4.000	52.00	18.00	6408 1.590	2.850	4.000	66.00	31.00	6408 2.850
1.600	4.000	52.00	18.00	6408 1.600	2.900	4.000	66.00	32.00	6408 2.900
1.650	4.000	52.00	18.00	6408 1.650	2.950	4.000	66.00	32.00	6408 2.950
1.700	4.000	56.00	19.00	6408 1.700	3.000	4.000	66.00	33.00	6408 3.000
1.750	4.000	56.00	19.00	6408 1.750					
1.800	4.000	56.00	20.00	6408 1.800					
1.850	4.000	56.00	20.00	6408 1.850					
1.900	4.000	56.00	21.00	6408 1.900					
1.950	4.000	56.00	21.00	6408 1.950					
1.980	4.000	56.00	22.00	6408 1.980					
2.000	4.000	56.00	22.00	6408 2.000					
2.050	4.000	56.00	23.00	6408 2.050					
2.100	4.000	62.00	23.00	6408 2.100					
2.150	4.000	62.00	24.00	6408 2.150					



ExclusiveLine micro-precision drills with coolant ducts

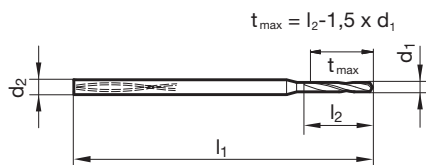


Tool material	Solid carbide
Surface	A
Shank form	cyl.

- P** • web thinning ≥ Ø 1.000 • facet point grind • main cutting edge form straight • with cutting lip honing
- M** •
- K** •
- N** ○ structural and case hardened steels • free-cutting steels, heat-treatable steels • alloyed steels up to 1200 N/mm² • stainless steels • cast materials
- S** ○
- H**

GÜHRING NAVIGATOR

Cutting data page 300



Drilling tools

Article no. **6412**

d1	d2 h6	l1	l2	Order no.	d1	d2 h6	l1	l2	Order no.
mm	mm	mm	mm		mm	mm	mm	mm	
1.000	3.000	56.00	18.00	6412 1.000	1.800	4.000	70.00	32.00	6412 1.800
1.020	3.000	56.00	18.50	6412 1.020	1.900	4.000	70.00	34.00	6412 1.900
1.050	3.000	56.00	19.00	6412 1.050	1.980	4.000	70.00	36.00	6412 1.980
1.100	3.000	56.00	20.00	6412 1.100	2.000	4.000	70.00	36.00	6412 2.000
1.150	3.000	56.00	21.00	6412 1.150	2.100	4.000	78.00	38.00	6412 2.100
1.180	3.000	56.00	21.50	6412 1.180	2.200	4.000	78.00	40.00	6412 2.200
1.190	3.000	56.00	21.50	6412 1.190	2.300	4.000	78.00	42.00	6412 2.300
1.200	3.000	56.00	22.00	6412 1.200	2.380	4.000	78.00	44.00	6412 2.380
1.250	3.000	56.00	22.50	6412 1.250	2.400	4.000	78.00	44.00	6412 2.400
1.280	3.000	56.00	23.50	6412 1.280	2.500	4.000	78.00	45.00	6412 2.500
1.300	3.000	56.00	23.50	6412 1.300	2.600	4.000	87.00	47.00	6412 2.600
1.350	3.000	56.00	24.50	6412 1.350	2.700	4.000	87.00	48.00	6412 2.700
1.400	4.000	62.00	25.00	6412 1.400	2.780	4.000	87.00	50.00	6412 2.780
1.500	4.000	62.00	27.00	6412 1.500	2.800	4.000	87.00	50.00	6412 2.800
1.590	4.000	62.00	29.00	6412 1.590	2.900	4.000	87.00	52.00	6412 2.900
1.600	4.000	62.00	29.00	6412 1.600	3.000	4.000	87.00	54.00	6412 3.000
1.700	4.000	70.00	31.00	6412 1.700					
1.750	4.000	70.00	32.00	6412 1.750					



Tool holders for interchangeable inserts HT 800



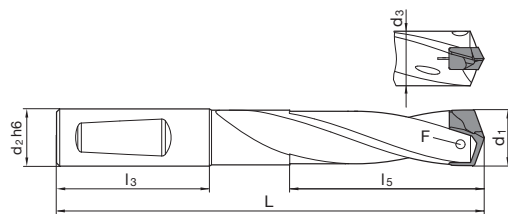
Surface	Ni
Shank form	HE

especially high wear resistance • optimised coolant duct exit • optimised flute design • nickel-plated • screwdriver art. no. 1612 included • clamping screws art. no. 4071 included

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 308



Article no. **4106**

d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
11.00-11.49	12.000	10.70	84.00	45.00	19.30	4071 2.200	4106 11.000
11.00-11.49	12.700	10.70	84.00	45.00	19.30	4071 2.200	4106 11.005
11.50-11.99	12.000	11.20	85.00	45.00	20.10	4071 2.200	4106 11.500
11.50-11.99	12.700	11.20	85.00	45.00	20.10	4071 2.200	4106 11.505
12.00-12.49	12.000	11.70	87.00	45.00	21.00	4071 2.201	4106 12.000
12.00-12.49	12.700	11.70	87.00	45.00	21.00	4071 2.201	4106 12.005
12.50-12.99	14.000	12.20	89.00	45.00	21.90	4071 2.201	4106 12.500
12.50-12.99	15.875	12.20	89.00	45.00	21.90	4071 2.201	4106 12.505
13.00-13.49	14.000	12.70	90.00	45.00	22.60	4071 2.500	4106 13.000
13.00-13.49	15.875	12.70	90.00	45.00	22.60	4071 2.500	4106 13.005
13.50-13.99	14.000	13.20	92.00	45.00	23.60	4071 2.500	4106 13.500
13.50-13.99	15.875	13.20	92.00	45.00	23.60	4071 2.500	4106 13.505
14.00-14.49	14.000	13.70	93.00	45.00	24.50	4071 3.000	4106 14.000
14.00-14.49	15.875	13.70	93.00	45.00	24.50	4071 3.000	4106 14.005
14.50-14.99	16.000	14.20	98.00	48.00	25.30	4071 3.000	4106 14.500
14.50-14.99	15.875	14.20	98.00	48.00	25.30	4071 3.000	4106 14.505
15.00-15.49	16.000	14.70	100.00	48.00	26.10	4071 3.001	4106 15.000
15.00-15.49	15.875	14.70	100.00	48.00	26.10	4071 3.001	4106 15.005
15.50-15.99	16.000	15.20	101.00	48.00	27.00	4071 3.001	4106 15.500
15.50-15.99	15.875	15.20	101.00	48.00	27.00	4071 3.001	4106 15.505
16.00-16.49	16.000	15.70	102.00	48.00	27.80	4071 3.500	4106 16.000
16.00-16.49	15.875	15.70	102.00	48.00	27.80	4071 3.500	4106 16.005
16.50-16.99	18.000	16.20	105.00	48.00	28.70	4071 3.500	4106 16.500
16.50-16.99	19.050	16.20	105.00	48.00	28.70	4071 3.500	4106 16.505
17.00-17.49	18.000	16.70	106.00	48.00	29.60	4071 3.500	4106 17.000
17.00-17.49	19.050	16.70	106.00	48.00	29.60	4071 3.500	4106 17.005
17.50-17.99	18.000	17.20	107.00	48.00	30.40	4071 3.500	4106 17.500
17.50-17.99	19.050	17.20	107.00	48.00	30.40	4071 3.500	4106 17.505
18.00-18.49	18.000	17.70	109.00	48.00	31.20	4071 4.000	4106 18.000
18.00-18.49	19.050	17.70	109.00	48.00	31.20	4071 4.000	4106 18.005
18.50-18.99	20.000	18.20	113.00	50.00	32.10	4071 4.000	4106 18.500
18.50-18.99	19.050	18.20	113.00	50.00	32.10	4071 4.000	4106 18.505
19.00-19.49	20.000	18.70	114.00	50.00	32.90	4071 4.000	4106 19.000
19.00-19.49	19.050	18.70	114.00	50.00	32.90	4071 4.000	4106 19.005
19.50-19.99	20.000	19.20	116.00	50.00	33.70	4071 4.000	4106 19.500
19.50-19.99	19.050	19.20	116.00	50.00	33.70	4071 4.000	4106 19.505
20.00-20.49	20.000	19.70	117.00	50.00	34.60	4071 4.500	4106 20.000
20.00-20.49	19.050	19.70	117.00	50.00	34.60	4071 4.500	4106 20.005
20.50-20.99	25.000	20.20	128.00	56.00	35.50	4071 4.500	4106 20.500
20.50-20.99	25.400	20.20	128.00	56.00	35.50	4071 4.500	4106 20.505
21.00-21.49	25.000	20.70	129.00	56.00	36.40	4071 4.500	4106 21.000
21.00-21.49	25.400	20.70	129.00	56.00	36.40	4071 4.500	4106 21.005



d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
21.50-21.99	25.000	21.20	130.00	56.00	37.20	4071 4.500	4106 21.500
21.50-21.99	25.400	21.20	130.00	56.00	37.20	4071 4.500	4106 21.505
22.00-22.49	25.000	21.70	131.00	56.00	38.00	4071 5.000	4106 22.000
22.00-22.49	25.400	21.70	131.00	56.00	38.00	4071 5.000	4106 22.005
22.50-22.99	25.000	22.20	134.00	56.00	38.90	4071 5.000	4106 22.500
22.50-22.99	25.400	22.20	134.00	56.00	38.90	4071 5.000	4106 22.505
23.00-23.49	25.000	22.70	135.00	56.00	39.80	4071 5.000	4106 23.000
23.00-23.49	25.400	22.70	135.00	56.00	39.80	4071 5.000	4106 23.005
23.50-23.99	25.000	23.20	137.00	56.00	40.60	4071 5.000	4106 23.500
23.50-23.99	25.400	23.20	137.00	56.00	40.60	4071 5.000	4106 23.505
24.00-24.49	25.000	23.70	138.00	56.00	41.50	4071 5.001	4106 24.000
24.00-24.49	25.400	23.70	138.00	56.00	41.50	4071 5.001	4106 24.005
24.50-24.99	25.000	24.20	140.00	56.00	42.30	4071 5.001	4106 24.500
24.50-24.99	25.400	24.20	140.00	56.00	42.30	4071 5.001	4106 24.505
25.00-25.49	25.000	24.70	142.00	56.00	43.20	4071 5.001	4106 25.000
25.00-25.49	25.400	24.70	142.00	56.00	43.20	4071 5.001	4106 25.005
25.50-25.99	32.000	25.20	148.00	60.00	44.00	4071 5.001	4106 25.500
25.50-25.99	31.750	25.20	148.00	60.00	44.00	4071 5.001	4106 25.505
26.00-26.49	32.000	25.70	151.00	60.00	44.30	4071 5.003	4106 26.000
26.00-26.49	31.750	25.70	151.00	60.00	44.30	4071 5.003	4106 26.005
26.50-26.99	32.000	26.20	153.00	60.00	45.10	4071 5.003	4106 26.500
26.50-26.99	31.750	26.20	153.00	60.00	45.10	4071 5.003	4106 26.505
27.00-27.49	32.000	26.70	155.00	60.00	46.00	4071 5.003	4106 27.000
27.00-27.49	31.750	26.70	155.00	60.00	46.00	4071 5.003	4106 27.005
27.50-27.99	32.000	27.20	156.00	60.00	46.80	4071 5.003	4106 27.500
27.50-27.99	31.750	27.20	156.00	60.00	46.80	4071 5.003	4106 27.505
28.00-28.49	32.000	27.70	157.00	60.00	47.70	4071 5.003	4106 28.000
28.00-28.49	31.750	27.70	157.00	60.00	47.70	4071 5.003	4106 28.005
28.50-28.99	32.000	28.20	159.00	60.00	48.50	4071 5.003	4106 28.500
28.50-28.99	31.750	28.20	159.00	60.00	48.50	4071 5.003	4106 28.505
29.00-29.49	32.000	28.70	161.00	60.00	49.40	4071 5.003	4106 29.000
29.00-29.49	31.750	28.70	161.00	60.00	49.40	4071 5.003	4106 29.005
29.50-29.99	32.000	29.20	162.00	60.00	50.20	4071 5.003	4106 29.500
29.50-29.99	31.750	29.20	162.00	60.00	50.20	4071 5.003	4106 29.505
30.00-30.49	32.000	29.70	164.00	60.00	50.90	4071 6.000	4106 30.000
30.00-30.49	31.750	29.70	164.00	60.00	50.90	4071 6.000	4106 30.005
30.50-30.99	32.000	30.20	166.00	60.00	51.70	4071 6.000	4106 30.500
30.50-30.99	31.750	30.20	166.00	60.00	51.70	4071 6.000	4106 30.505
31.00-31.49	32.000	30.70	167.00	60.00	52.60	4071 6.000	4106 31.000
31.00-31.49	31.750	30.70	167.00	60.00	52.60	4071 6.000	4106 31.005
31.50-31.99	32.000	31.20	168.00	60.00	53.40	4071 6.000	4106 31.500
31.50-31.99	31.750	31.20	168.00	60.00	53.40	4071 6.000	4106 31.505
32.00-32.99	32.000	31.70	172.00	60.00	55.10	4071 6.001	4106 32.000
32.00-32.99	31.750	31.70	172.00	60.00	55.10	4071 6.001	4106 32.005
33.00-33.99	32.000	32.70	175.00	60.00	56.80	4071 6.001	4106 33.000
33.00-33.99	31.750	32.70	175.00	60.00	56.80	4071 6.001	4106 33.005
34.00-34.99	32.000	33.70	178.00	60.00	58.50	4071 6.001	4106 34.000
34.00-34.99	31.750	33.70	178.00	60.00	58.50	4071 6.001	4106 34.005
35.00-35.99	32.000	34.70	181.00	60.00	60.20	4071 6.001	4106 35.000
35.00-35.99	31.750	34.70	181.00	60.00	60.20	4071 6.001	4106 35.005
36.00-36.99	32.000	35.70	184.00	60.00	61.80	4071 6.002	4106 36.000
36.00-36.99	31.750	35.70	184.00	60.00	61.80	4071 6.002	4106 36.005
37.00-37.99	32.000	36.70	188.00	60.00	63.50	4071 6.002	4106 37.000
37.00-37.99	31.750	36.70	188.00	60.00	63.50	4071 6.002	4106 37.005
38.00-38.99	32.000	37.70	191.00	60.00	65.20	4071 6.002	4106 38.000
38.00-38.99	31.750	37.70	191.00	60.00	65.20	4071 6.002	4106 38.005
39.00-40.00	32.000	38.70	194.00	60.00	66.90	4071 6.002	4106 39.000
39.00-40.00	31.750	38.70	194.00	60.00	66.90	4071 6.002	4106 39.005



Tool holders for interchangeable inserts HT 800

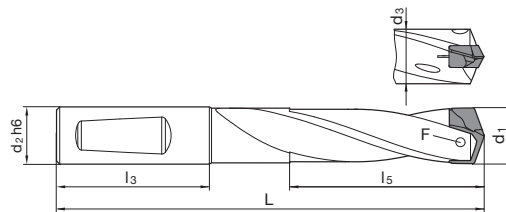


Surface	Ni
Shank form	HE

especially high wear resistance • optimised coolant duct exit • optimised flute design • nickel-plated • screwdriver art. no. 1612 included • clamping screws art. no. 4071 included

GÜHRING NAVIGATOR

Cutting data page 308



Article no. 4107

d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
11.00-11.49	12.000	10.70	101.00	45.00	36.60	4071 2.200	4107 11.000
11.00-11.49	12.700	10.70	101.00	45.00	36.60	4071 2.200	4107 11.005
11.50-11.99	12.000	11.20	103.00	45.00	38.10	4071 2.200	4107 11.500
11.50-11.99	12.700	11.20	103.00	45.00	38.10	4071 2.200	4107 11.505
12.00-12.49	12.000	11.70	106.00	45.00	39.70	4071 2.201	4107 12.000
12.00-12.49	12.700	11.70	106.00	45.00	39.70	4071 2.201	4107 12.005
12.50-12.99	14.000	12.20	108.00	45.00	41.30	4071 2.201	4107 12.500
12.50-12.99	15.875	12.20	108.00	45.00	41.30	4071 2.201	4107 12.505
13.00-13.49	14.000	12.70	110.00	45.00	42.90	4071 2.500	4107 13.000
13.00-13.49	15.875	12.70	110.00	45.00	42.90	4071 2.500	4107 13.005
13.50-13.99	14.000	13.20	113.00	45.00	44.60	4071 2.500	4107 13.500
13.50-13.99	15.875	13.20	113.00	45.00	44.60	4071 2.500	4107 13.505
14.00-14.49	14.000	13.70	115.00	45.00	46.20	4071 3.000	4107 14.000
14.00-14.49	15.875	13.70	115.00	45.00	46.20	4071 3.000	4107 14.005
14.50-14.99	16.000	14.20	120.00	48.00	47.80	4071 3.000	4107 14.500
14.50-14.99	15.875	14.20	120.00	48.00	47.80	4071 3.000	4107 14.505
15.00-15.49	16.000	14.70	123.00	48.00	49.30	4071 3.001	4107 15.000
15.00-15.49	15.875	14.70	123.00	48.00	49.30	4071 3.001	4107 15.005
15.50-15.99	16.000	15.20	125.00	48.00	50.90	4071 3.001	4107 15.500
15.50-15.99	15.875	15.20	125.00	48.00	50.90	4071 3.001	4107 15.505
16.00-16.49	16.000	15.70	127.00	48.00	52.90	4071 3.500	4107 16.000
16.00-16.49	15.875	15.70	127.00	48.00	52.90	4071 3.500	4107 16.005
16.50-16.99	18.000	16.20	130.00	48.00	54.10	4071 3.500	4107 16.500
16.50-16.99	19.050	16.20	130.00	48.00	54.10	4071 3.500	4107 16.505
17.00-17.49	18.000	16.70	132.00	48.00	55.80	4071 3.500	4107 17.000
17.00-17.49	19.050	16.70	132.00	48.00	55.80	4071 3.500	4107 17.005
17.50-17.99	18.000	17.20	134.00	48.00	57.40	4071 3.500	4107 17.500
17.50-17.99	19.050	17.20	134.00	48.00	57.40	4071 3.500	4107 17.505
18.00-18.49	18.000	17.70	137.00	48.00	58.90	4071 4.000	4107 18.000
18.00-18.49	19.050	17.70	137.00	48.00	58.90	4071 4.000	4107 18.005
18.50-18.99	20.000	18.20	141.00	50.00	60.50	4071 4.000	4107 18.500
18.50-18.99	19.050	18.20	141.00	50.00	60.50	4071 4.000	4107 18.505
19.00-19.49	20.000	18.70	143.00	50.00	62.10	4071 4.000	4107 19.000
19.00-19.49	19.050	18.70	143.00	50.00	62.10	4071 4.000	4107 19.005
19.50-19.99	20.000	19.20	146.00	50.00	63.70	4071 4.000	4107 19.500
19.50-19.99	19.050	19.20	146.00	50.00	63.70	4071 4.000	4107 19.505
20.00-20.49	20.000	19.70	148.00	50.00	65.30	4071 4.500	4107 20.000
20.00-20.49	19.050	19.70	148.00	50.00	65.30	4071 4.500	4107 20.005
20.50-20.99	25.000	20.20	159.00	56.00	67.00	4071 4.500	4107 20.500
20.50-20.99	25.400	20.20	159.00	56.00	67.00	4071 4.500	4107 20.505
21.00-21.49	25.000	20.70	161.00	56.00	68.60	4071 4.500	4107 21.000
21.00-21.49	25.400	20.70	161.00	56.00	68.60	4071 4.500	4107 21.005



d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
21.50-21.99	25.000	21.20	163.00	56.00	70.10	4071 4.500	4107 21.500
21.50-21.99	25.400	21.20	163.00	56.00	70.10	4071 4.500	4107 21.505
22.00-22.49	25.000	21.70	165.00	56.00	71.70	4071 5.000	4107 22.000
22.00-22.49	25.400	21.70	165.00	56.00	71.70	4071 5.000	4107 22.005
22.50-22.99	25.000	22.20	168.00	56.00	73.30	4071 5.000	4107 22.500
22.50-22.99	25.400	22.20	168.00	56.00	73.30	4071 5.000	4107 22.505
23.00-23.49	25.000	22.70	170.00	56.00	74.90	4071 5.000	4107 23.000
23.00-23.49	25.400	22.70	170.00	56.00	74.90	4071 5.000	4107 23.005
23.50-23.99	25.000	23.20	173.00	56.00	76.50	4071 5.000	4107 23.500
23.50-23.99	25.400	23.20	173.00	56.00	76.50	4071 5.000	4107 23.505
24.00-24.49	25.000	23.70	175.00	56.00	78.10	4071 5.001	4107 24.000
24.00-24.49	25.400	23.70	175.00	56.00	78.10	4071 5.001	4107 24.005
24.50-24.99	25.000	24.20	177.00	56.00	79.70	4071 5.001	4107 24.500
24.50-24.99	25.400	24.20	177.00	56.00	79.70	4071 5.001	4107 24.505
25.00-25.49	25.000	24.70	180.00	56.00	81.30	4071 5.001	4107 25.000
25.00-25.49	25.400	24.70	180.00	56.00	81.30	4071 5.001	4107 25.005
25.50-25.99	32.000	25.20	187.00	60.00	82.90	4071 5.001	4107 25.500
25.50-25.99	31.750	25.20	187.00	60.00	82.90	4071 5.001	4107 25.505
26.00-26.49	32.000	25.70	191.00	60.00	84.00	4071 5.003	4107 26.000
26.00-26.49	31.750	25.70	191.00	60.00	84.00	4071 5.003	4107 26.005
26.50-26.99	32.000	26.20	193.00	60.00	86.10	4071 5.003	4107 26.500
26.50-26.99	31.750	26.20	193.00	60.00	86.10	4071 5.003	4107 26.505
27.00-27.49	32.000	26.70	196.00	60.00	87.20	4071 5.003	4107 27.000
27.00-27.49	31.750	26.70	196.00	60.00	87.20	4071 5.003	4107 27.005
27.50-27.99	32.000	27.20	198.00	60.00	88.90	4071 5.003	4107 27.500
27.50-27.99	31.750	27.20	198.00	60.00	88.90	4071 5.003	4107 27.505
28.00-28.49	32.000	27.70	200.00	60.00	90.40	4071 5.003	4107 28.000
28.00-28.49	31.750	27.70	200.00	60.00	90.40	4071 5.003	4107 28.005
28.50-28.99	32.000	28.20	202.00	60.00	92.50	4071 5.003	4107 28.500
28.50-28.99	31.750	28.20	202.00	60.00	92.50	4071 5.003	4107 28.505
29.00-29.49	32.000	28.70	205.00	60.00	94.60	4071 5.003	4107 29.000
29.00-29.49	31.750	28.70	205.00	60.00	94.60	4071 5.003	4107 29.005
29.50-29.99	32.000	29.20	207.00	60.00	95.10	4071 5.003	4107 29.500
29.50-29.99	31.750	29.20	207.00	60.00	95.10	4071 5.003	4107 29.505
30.00-30.49	32.000	29.70	210.00	60.00	96.70	4071 6.000	4107 30.000
30.00-30.49	31.750	29.70	210.00	60.00	96.70	4071 6.000	4107 30.005
30.50-30.99	32.000	30.20	212.00	60.00	98.30	4071 6.000	4107 30.500
30.50-30.99	31.750	30.20	212.00	60.00	98.30	4071 6.000	4107 30.505
31.00-31.49	32.000	30.70	214.00	60.00	99.80	4071 6.000	4107 31.000
31.00-31.49	31.750	30.70	214.00	60.00	99.80	4071 6.000	4107 31.005
31.50-31.99	32.000	31.20	216.00	60.00	101.40	4071 6.000	4107 31.500
31.50-31.99	31.750	31.20	216.00	60.00	101.40	4071 6.000	4107 31.505
32.00-32.99	32.000	31.70	221.00	60.00	104.60	4071 6.001	4107 32.000
32.00-32.99	31.750	31.70	221.00	60.00	104.60	4071 6.001	4107 32.005
33.00-33.99	32.000	32.70	226.00	60.00	107.80	4071 6.001	4107 33.000
33.00-33.99	31.750	32.70	226.00	60.00	107.80	4071 6.001	4107 33.005
34.00-34.99	32.000	33.70	230.00	60.00	111.00	4071 6.001	4107 34.000
34.00-34.99	31.750	33.70	230.00	60.00	111.00	4071 6.001	4107 34.005
35.00-35.99	32.000	34.70	235.00	60.00	114.20	4071 6.001	4107 35.000
35.00-35.99	31.750	34.70	235.00	60.00	114.20	4071 6.001	4107 35.005
36.00-36.99	32.000	35.70	240.00	60.00	117.30	4071 6.002	4107 36.000
36.00-36.99	31.750	35.70	240.00	60.00	117.30	4071 6.002	4107 36.005
37.00-37.99	32.000	36.70	245.00	60.00	120.50	4071 6.002	4107 37.000
37.00-37.99	31.750	36.70	245.00	60.00	120.50	4071 6.002	4107 37.005
38.00-38.99	32.000	37.70	249.00	60.00	123.70	4071 6.002	4107 38.000
38.00-38.99	31.750	37.70	249.00	60.00	123.70	4071 6.002	4107 38.005
39.00-40.00	32.000	38.70	254.00	60.00	126.90	4071 6.002	4107 39.000
39.00-40.00	31.750	38.70	254.00	60.00	126.90	4071 6.002	4107 39.005



Tool holders for interchangeable inserts HT 800



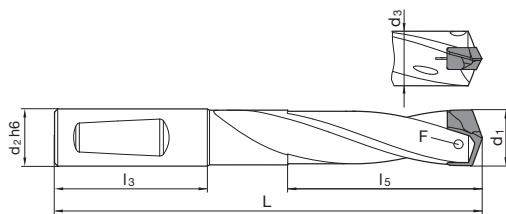
Surface	Ni
Shank form	HE

especially high wear resistance • optimised coolant duct exit • optimised flute design • nickel-plated • screwdriver art. no. 1612 included • clamping screws art. no. 4071 included

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 310



Article no. **4108**

d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
11.00-11.49	12.000	10.70	124.00	45.00	59.60	4071 2.200	4108 11.000
11.00-11.49	12.700	10.70	124.00	45.00	59.60	4071 2.200	4108 11.005
11.50-11.99	12.000	11.20	127.00	45.00	62.10	4071 2.200	4108 11.500
11.50-11.99	12.700	11.20	127.00	45.00	62.10	4071 2.200	4108 11.505
12.00-12.49	12.000	11.70	131.00	45.00	64.70	4071 2.201	4108 12.000
12.00-12.49	12.700	11.70	131.00	45.00	64.70	4071 2.201	4108 12.005
12.50-12.99	14.000	12.20	134.00	45.00	67.30	4071 2.201	4108 12.500
12.50-12.99	15.875	12.20	134.00	45.00	67.30	4071 2.201	4108 12.505
13.00-13.49	14.000	12.70	137.00	45.00	69.90	4071 2.500	4108 13.000
13.00-13.49	15.875	12.70	137.00	45.00	69.90	4071 2.500	4108 13.005
13.50-13.99	14.000	13.20	141.00	45.00	72.60	4071 2.500	4108 13.500
13.50-13.99	15.875	13.20	141.00	45.00	72.60	4071 2.500	4108 13.505
14.00-14.49	14.000	13.70	144.00	45.00	75.20	4071 3.000	4108 14.000
14.00-14.49	15.875	13.70	144.00	45.00	75.20	4071 3.000	4108 14.005
14.50-14.99	16.000	14.20	150.00	48.00	77.80	4071 3.000	4108 14.500
14.50-14.99	15.875	14.20	150.00	48.00	77.80	4071 3.000	4108 14.505
15.00-15.49	16.000	14.70	154.00	48.00	80.30	4071 3.001	4108 15.000
15.00-15.49	15.875	14.70	154.00	48.00	80.30	4071 3.001	4108 15.005
15.50-15.99	16.000	15.20	157.00	48.00	82.90	4071 3.001	4108 15.500
15.50-15.99	15.875	15.20	157.00	48.00	82.90	4071 3.001	4108 15.505
16.00-16.49	16.000	15.70	160.00	48.00	85.90	4071 3.500	4108 16.000
16.00-16.49	15.875	15.70	160.00	48.00	85.90	4071 3.500	4108 16.005
16.50-16.99	18.000	16.20	164.00	48.00	88.10	4071 3.500	4108 16.500
16.50-16.99	19.050	16.20	164.00	48.00	88.10	4071 3.500	4108 16.505
17.00-17.49	18.000	16.70	167.00	48.00	90.80	4071 3.500	4108 17.000
17.00-17.49	19.050	16.70	167.00	48.00	90.80	4071 3.500	4108 17.005
17.50-17.99	18.000	17.20	170.00	48.00	93.40	4071 3.500	4108 17.500
17.50-17.99	19.050	17.20	170.00	48.00	93.40	4071 3.500	4108 17.505
18.00-18.49	18.000	17.70	174.00	48.00	95.90	4071 4.000	4108 18.000
18.00-18.49	19.050	17.70	174.00	48.00	95.90	4071 4.000	4108 18.005
18.50-18.99	20.000	18.20	179.00	50.00	98.50	4071 4.000	4108 18.500
18.50-18.99	19.050	18.20	179.00	50.00	98.50	4071 4.000	4108 18.505
19.00-19.49	20.000	18.70	182.00	50.00	101.10	4071 4.000	4108 19.000
19.00-19.49	19.050	18.70	182.00	50.00	101.10	4071 4.000	4108 19.005
19.50-19.99	20.000	19.20	186.00	50.00	103.70	4071 4.000	4108 19.500
19.50-19.99	19.050	19.20	186.00	50.00	103.70	4071 4.000	4108 19.505
20.00-20.49	20.000	19.70	189.00	50.00	106.30	4071 4.500	4108 20.000
20.00-20.49	19.050	19.70	189.00	50.00	106.30	4071 4.500	4108 20.005
20.50-20.99	25.000	20.20	201.00	56.00	109.00	4071 4.500	4108 20.500
20.50-20.99	25.400	20.20	201.00	56.00	109.00	4071 4.500	4108 20.505
21.00-21.49	25.000	20.70	204.00	56.00	111.60	4071 4.500	4108 21.000
21.00-21.49	25.400	20.70	204.00	56.00	111.60	4071 4.500	4108 21.005



d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
21.50-21.99	25.000	21.20	207.00	56.00	114.10	4071 4.500	4108 21.500
21.50-21.99	25.400	21.20	207.00	56.00	114.10	4071 4.500	4108 21.505
22.00-22.49	25.000	21.70	210.00	56.00	116.70	4071 5.000	4108 22.000
22.00-22.49	25.400	21.70	210.00	56.00	116.70	4071 5.000	4108 22.005
22.50-22.99	25.000	22.20	214.00	56.00	119.30	4071 5.000	4108 22.500
22.50-22.99	25.400	22.20	214.00	56.00	119.30	4071 5.000	4108 22.505
23.00-23.49	25.000	22.70	217.00	56.00	121.90	4071 5.000	4108 23.000
23.00-23.49	25.400	22.70	217.00	56.00	121.90	4071 5.000	4108 23.005
23.50-23.99	25.000	23.20	221.00	56.00	124.50	4071 5.000	4108 23.500
23.50-23.99	25.400	23.20	221.00	56.00	124.50	4071 5.000	4108 23.505
24.00-24.49	25.000	23.70	224.00	56.00	127.10	4071 5.001	4108 24.000
24.00-24.49	25.400	23.70	224.00	56.00	127.10	4071 5.001	4108 24.005
24.50-24.99	25.000	24.20	227.00	56.00	129.70	4071 5.001	4108 24.500
24.50-24.99	25.400	24.20	227.00	56.00	129.70	4071 5.001	4108 24.505
25.00-25.49	25.000	24.70	231.00	56.00	132.30	4071 5.001	4108 25.000
25.00-25.49	25.400	24.70	231.00	56.00	132.30	4071 5.001	4108 25.005
25.50-25.99	32.000	25.20	239.00	60.00	134.90	4071 5.001	4108 25.500
25.50-25.99	31.750	25.20	239.00	60.00	134.90	4071 5.001	4108 25.505
26.00-26.49	32.000	25.70	244.00	60.00	137.00	4071 5.003	4108 26.000
26.00-26.49	31.750	25.70	244.00	60.00	137.00	4071 5.003	4108 26.005
26.50-26.99	32.000	26.20	247.00	60.00	140.00	4071 5.003	4108 26.500
26.50-26.99	31.750	26.20	247.00	60.00	140.00	4071 5.003	4108 26.505
27.00-27.49	32.000	26.70	251.00	60.00	142.20	4071 5.003	4108 27.000
27.00-27.49	31.750	26.70	251.00	60.00	142.20	4071 5.003	4108 27.005
27.50-27.99	32.000	27.20	254.00	60.00	144.80	4071 5.003	4108 27.500
27.50-27.99	31.750	27.20	254.00	60.00	144.80	4071 5.003	4108 27.505
28.00-28.49	32.000	27.70	257.00	60.00	147.40	4071 5.003	4108 28.000
28.00-28.49	31.750	27.70	257.00	60.00	147.40	4071 5.003	4108 28.005
28.50-28.99	32.000	28.20	260.00	60.00	150.40	4071 5.003	4108 28.500
28.50-28.99	31.750	28.20	260.00	60.00	150.40	4071 5.003	4108 28.505
29.00-29.49	32.000	28.70	264.00	60.00	153.50	4071 5.003	4108 29.000
29.00-29.49	31.750	28.70	264.00	60.00	153.50	4071 5.003	4108 29.005
29.50-29.99	32.000	29.20	267.00	60.00	155.10	4071 5.003	4108 29.500
29.50-29.99	31.750	29.20	267.00	60.00	155.10	4071 5.003	4108 29.505
30.00-30.49	32.000	29.70	271.00	60.00	157.60	4071 6.000	4108 30.000
30.00-30.49	31.750	29.70	271.00	60.00	157.60	4071 6.000	4108 30.005
30.50-30.99	32.000	30.20	274.00	60.00	160.20	4071 6.000	4108 30.500
30.50-30.99	31.750	30.20	274.00	60.00	160.20	4071 6.000	4108 30.505
31.00-31.49	32.000	30.70	277.00	60.00	162.80	4071 6.000	4108 31.000
31.00-31.49	31.750	30.70	277.00	60.00	162.80	4071 6.000	4108 31.005
31.50-31.99	32.000	31.20	280.00	60.00	165.40	4071 6.000	4108 31.500
31.50-31.99	31.750	31.20	280.00	60.00	165.40	4071 6.000	4108 31.505
32.00-32.99	32.000	31.70	287.00	60.00	170.60	4071 6.001	4108 32.000
32.00-32.99	31.750	31.70	287.00	60.00	170.60	4071 6.001	4108 32.005
33.00-33.99	32.000	32.70	294.00	60.00	175.80	4071 6.001	4108 33.000
33.00-33.99	31.750	32.70	294.00	60.00	175.80	4071 6.001	4108 33.005
34.00-34.99	32.000	33.70	300.00	60.00	181.00	4071 6.001	4108 34.000
34.00-34.99	31.750	33.70	300.00	60.00	181.00	4071 6.001	4108 34.005
35.00-35.99	32.000	34.70	307.00	60.00	186.20	4071 6.001	4108 35.000
35.00-35.99	31.750	34.70	307.00	60.00	186.20	4071 6.001	4108 35.005
36.00-36.99	32.000	35.70	314.00	60.00	191.30	4071 6.002	4108 36.000
36.00-36.99	31.750	35.70	314.00	60.00	191.30	4071 6.002	4108 36.005
37.00-37.99	32.000	36.70	321.00	60.00	196.50	4071 6.002	4108 37.000
37.00-37.99	31.750	36.70	321.00	60.00	196.50	4071 6.002	4108 37.005
38.00-38.99	32.000	37.70	327.00	60.00	201.70	4071 6.002	4108 38.000
38.00-38.99	31.750	37.70	327.00	60.00	201.70	4071 6.002	4108 38.005
39.00-40.00	32.000	38.70	334.00	60.00	206.90	4071 6.002	4108 39.000
39.00-40.00	31.750	38.70	334.00	60.00	206.90	4071 6.002	4108 39.005



Tool holders for interchangeable inserts HT 800



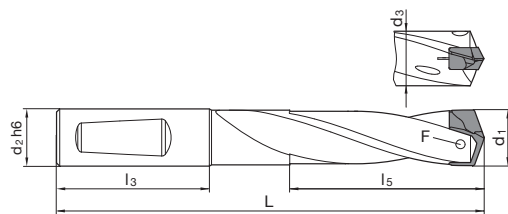
Surface	Ni
Shank form	HE

especially high wear resistance • optimised coolant duct exit • optimised flute design • nickel-plated • screwdriver art. no. 1612 included • clamping screws art. no. 4071 included

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 310



Article no. **4109**

d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
11.00-11.49	12.000	10.70	147.00	45.00	82.60	4071 2.200	4109 11.000
11.00-11.49	12.700	10.70	147.00	45.00	82.60	4071 2.200	4109 11.005
11.50-11.99	12.000	11.20	151.00	45.00	86.10	4071 2.200	4109 11.500
11.50-11.99	12.700	11.20	151.00	45.00	86.10	4071 2.200	4109 11.505
12.00-12.49	12.000	11.70	156.00	45.00	89.70	4071 2.201	4109 12.000
12.00-12.49	12.700	11.70	156.00	45.00	89.70	4071 2.201	4109 12.005
12.50-12.99	14.000	12.20	160.00	45.00	93.30	4071 2.201	4109 12.500
12.50-12.99	15.875	12.20	160.00	45.00	93.30	4071 2.201	4109 12.505
13.00-13.49	14.000	12.70	164.00	45.00	96.90	4071 2.500	4109 13.000
13.00-13.49	15.875	12.70	164.00	45.00	96.90	4071 2.500	4109 13.005
13.50-13.99	14.000	13.20	169.00	45.00	100.60	4071 2.500	4109 13.500
13.50-13.99	15.875	13.20	169.00	45.00	100.60	4071 2.500	4109 13.505
14.00-14.49	14.000	13.70	173.00	45.00	104.20	4071 3.000	4109 14.000
14.00-14.49	15.875	13.70	173.00	45.00	104.20	4071 3.000	4109 14.005
14.50-14.99	16.000	14.20	180.00	48.00	107.80	4071 3.000	4109 14.500
14.50-14.99	15.875	14.20	180.00	48.00	107.80	4071 3.000	4109 14.505
15.00-15.49	16.000	14.70	185.00	48.00	111.30	4071 3.001	4109 15.000
15.00-15.49	15.875	14.70	185.00	48.00	111.30	4071 3.001	4109 15.005
15.50-15.99	16.000	15.20	189.00	48.00	114.90	4071 3.001	4109 15.500
15.50-15.99	15.875	15.20	189.00	48.00	114.90	4071 3.001	4109 15.505
16.00-16.49	16.000	15.70	193.00	48.00	118.90	4071 3.500	4109 16.000
16.00-16.49	15.875	15.70	193.00	48.00	118.90	4071 3.500	4109 16.005
16.50-16.99	18.000	16.20	198.00	48.00	122.10	4071 3.500	4109 16.500
16.50-16.99	19.050	16.20	198.00	48.00	122.10	4071 3.500	4109 16.505
17.00-17.49	18.000	16.70	202.00	48.00	125.80	4071 3.500	4109 17.000
17.00-17.49	19.050	16.70	202.00	48.00	125.80	4071 3.500	4109 17.005
17.50-17.99	18.000	17.20	206.00	48.00	129.40	4071 3.500	4109 17.500
17.50-17.99	19.050	17.20	206.00	48.00	129.40	4071 3.500	4109 17.505
18.00-18.49	18.000	17.70	211.00	48.00	132.90	4071 4.000	4109 18.000
18.00-18.49	19.050	17.70	211.00	48.00	132.90	4071 4.000	4109 18.005
18.50-18.99	20.000	18.20	217.00	50.00	136.50	4071 4.000	4109 18.500
18.50-18.99	19.050	18.20	217.00	50.00	136.50	4071 4.000	4109 18.505
19.00-19.49	20.000	18.70	221.00	50.00	140.10	4071 4.000	4109 19.000
19.00-19.49	19.050	18.70	221.00	50.00	140.10	4071 4.000	4109 19.005
19.50-19.99	20.000	19.20	226.00	50.00	143.70	4071 4.000	4109 19.500
19.50-19.99	19.050	19.20	226.00	50.00	143.70	4071 4.000	4109 19.505
20.00-20.49	20.000	19.70	230.00	50.00	147.30	4071 4.500	4109 20.000
20.00-20.49	19.050	19.70	230.00	50.00	147.30	4071 4.500	4109 20.005
20.50-20.99	25.000	20.20	243.00	56.00	151.00	4071 4.500	4109 20.500
20.50-20.99	25.400	20.20	243.00	56.00	151.00	4071 4.500	4109 20.505
21.00-21.49	25.000	20.70	247.00	56.00	154.60	4071 4.500	4109 21.000
21.00-21.49	25.400	20.70	247.00	56.00	154.60	4071 4.500	4109 21.005



d1	d2 h6	d3	L	I3	I5	F	Order no.
	mm	mm	mm	mm	mm		
21.50-21.99	25.000	21.20	251.00	56.00	158.10	4071 4.500	4109 21.500
21.50-21.99	25.400	21.20	251.00	56.00	158.10	4071 4.500	4109 21.505
22.00-22.49	25.000	21.70	255.00	56.00	161.70	4071 5.000	4109 22.000
22.00-22.49	25.400	21.70	255.00	56.00	161.70	4071 5.000	4109 22.005
22.50-22.99	25.000	22.20	260.00	56.00	165.30	4071 5.000	4109 22.500
22.50-22.99	25.400	22.20	260.00	56.00	165.30	4071 5.000	4109 22.505
23.00-23.49	25.000	22.70	264.00	56.00	168.90	4071 5.000	4109 23.000
23.00-23.49	25.400	22.70	264.00	56.00	168.90	4071 5.000	4109 23.005
23.50-23.99	25.000	23.20	269.00	56.00	172.50	4071 5.000	4109 23.500
23.50-23.99	25.400	23.20	269.00	56.00	172.50	4071 5.000	4109 23.505
24.00-24.49	25.000	23.70	273.00	56.00	176.10	4071 5.001	4109 24.000
24.00-24.49	25.400	23.70	273.00	56.00	176.10	4071 5.001	4109 24.005
24.50-24.99	25.000	24.20	277.00	56.00	179.70	4071 5.001	4109 24.500
24.50-24.99	25.400	24.20	277.00	56.00	179.70	4071 5.001	4109 24.505
25.00-25.49	25.000	24.70	282.00	56.00	183.30	4071 5.001	4109 25.000
25.00-25.49	25.400	24.70	282.00	56.00	183.30	4071 5.001	4109 25.005
25.50-25.99	32.000	25.20	291.00	60.00	186.90	4071 5.001	4109 25.500
25.50-25.99	31.750	25.20	291.00	60.00	186.90	4071 5.001	4109 25.505
26.00-26.49	32.000	25.70	297.00	60.00	190.00	4071 5.003	4109 26.000
26.00-26.49	31.750	25.70	297.00	60.00	190.00	4071 5.003	4109 26.005
26.50-26.99	32.000	26.20	301.00	60.00	194.00	4071 5.003	4109 26.500
26.50-26.99	31.750	26.20	301.00	60.00	194.00	4071 5.003	4109 26.505
27.00-27.49	32.000	26.70	306.00	60.00	197.20	4071 5.003	4109 27.000
27.00-27.49	31.750	26.70	306.00	60.00	197.20	4071 5.003	4109 27.005
27.50-27.99	32.000	27.20	310.00	60.00	200.80	4071 5.003	4109 27.500
27.50-27.99	31.750	27.20	310.00	60.00	200.80	4071 5.003	4109 27.505
28.00-28.49	32.000	27.70	314.00	60.00	204.40	4071 5.003	4109 28.000
28.00-28.49	31.750	27.70	314.00	60.00	204.40	4071 5.003	4109 28.005
28.50-28.99	32.000	28.20	318.00	60.00	208.40	4071 5.003	4109 28.500
28.50-28.99	31.750	28.20	318.00	60.00	208.40	4071 5.003	4109 28.505
29.00-29.49	32.000	28.70	323.00	60.00	212.50	4071 5.003	4109 29.000
29.00-29.49	31.750	28.70	323.00	60.00	212.50	4071 5.003	4109 29.005
29.50-29.99	32.000	29.20	327.00	60.00	215.10	4071 5.003	4109 29.500
29.50-29.99	31.750	29.20	327.00	60.00	215.10	4071 5.003	4109 29.505
30.00-30.49	32.000	29.70	332.00	60.00	218.60	4071 6.000	4109 30.000
30.00-30.49	31.750	29.70	332.00	60.00	218.60	4071 6.000	4109 30.005
30.50-30.99	32.000	30.20	336.00	60.00	222.20	4071 6.000	4109 30.500
30.50-30.99	31.750	30.20	336.00	60.00	222.20	4071 6.000	4109 30.505
31.00-31.49	32.000	30.70	340.00	60.00	225.80	4071 6.000	4109 31.000
31.00-31.49	31.750	30.70	340.00	60.00	225.80	4071 6.000	4109 31.005
31.50-31.99	32.000	31.20	344.00	60.00	229.40	4071 6.000	4109 31.500
31.50-31.99	31.750	31.20	344.00	60.00	229.40	4071 6.000	4109 31.505
33.00-33.99	32.000	32.70	362.00	60.00	244.60	4071 6.001	4109 33.000
36.00-36.99	32.000	35.70	387.00	60.00	265.80	4071 6.002	4109 36.000
39.00-40.00	32.000	38.70	413.00	60.00	287.40	4071 6.002	4109 39.000



Tool holders for interchangeable inserts HT 800



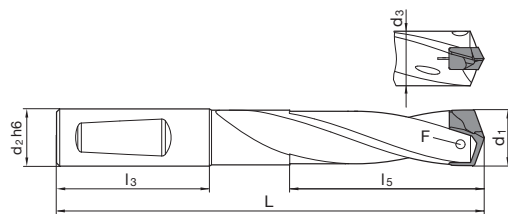
Surface	Ni
Shank form	HE

especially high wear resistance • optimised coolant duct exit • optimised flute design • nickel-plated • screwdriver art. no. 1612 included • clamping screws art. no. 4071 included

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 312



Article no. **4110**

d1	d2 h6	d3	L	l3	l5	F	Order no.
	mm	mm	mm	mm	mm		
11.00-11.49	12.000	10.70	182.00	45.00	117.10	4071 2.200	4110 11.000
11.00-11.49	12.700	10.70	182.00	45.00	117.10	4071 2.200	4110 11.005
11.50-11.99	12.000	11.20	187.00	45.00	122.10	4071 2.200	4110 11.500
11.50-11.99	12.700	11.20	187.00	45.00	122.10	4071 2.200	4110 11.505
12.00-12.49	12.000	11.70	194.00	45.00	127.20	4071 2.201	4110 12.000
12.00-12.49	12.700	11.70	194.00	45.00	127.20	4071 2.201	4110 12.005
12.50-12.99	14.000	12.20	199.00	45.00	132.30	4071 2.201	4110 12.500
12.50-12.99	15.875	12.20	199.00	45.00	132.30	4071 2.201	4110 12.505
13.00-13.49	14.000	12.70	205.00	45.00	137.50	4071 2.500	4110 13.000
13.00-13.49	15.875	12.70	205.00	45.00	137.50	4071 2.500	4110 13.005
13.50-13.99	14.000	13.20	211.00	45.00	142.50	4071 2.500	4110 13.500
13.50-13.99	15.875	13.20	211.00	45.00	142.50	4071 2.500	4110 13.505
14.00-14.49	14.000	13.70	217.00	45.00	147.70	4071 3.000	4110 14.000
14.00-14.49	15.875	13.70	217.00	45.00	147.70	4071 3.000	4110 14.005
14.50-14.99	16.000	14.20	225.00	48.00	152.80	4071 3.000	4110 14.500
14.50-14.99	15.875	14.20	225.00	48.00	152.80	4071 3.000	4110 14.505
15.00-15.49	16.000	14.70	232.00	48.00	157.80	4071 3.001	4110 15.000
15.00-15.49	15.875	14.70	232.00	48.00	157.80	4071 3.001	4110 15.005
15.50-15.99	16.000	15.20	237.00	48.00	162.90	4071 3.001	4110 15.500
15.50-15.99	15.875	15.20	237.00	48.00	162.90	4071 3.001	4110 15.505
16.00-16.49	16.000	15.70	243.00	48.00	168.00	4071 3.500	4110 16.000
16.00-16.49	15.875	15.70	243.00	48.00	168.00	4071 3.500	4110 16.005
16.50-16.99	18.000	16.20	249.00	48.00	170.00	4071 3.500	4110 16.500
16.50-16.99	19.050	16.20	249.00	48.00	170.00	4071 3.500	4110 16.505
17.00-17.49	18.000	16.70	255.00	48.00	178.30	4071 3.500	4110 17.000
17.00-17.49	19.050	16.70	255.00	48.00	178.30	4071 3.500	4110 17.005
17.50-17.99	18.000	17.20	260.00	48.00	183.50	4071 3.500	4110 17.500
17.50-17.99	19.050	17.20	260.00	48.00	183.50	4071 3.500	4110 17.505
18.00-18.49	18.000	17.70	267.00	48.00	188.40	4071 4.000	4110 18.000
18.00-18.49	19.050	17.70	267.00	48.00	188.40	4071 4.000	4110 18.005
18.50-18.99	20.000	18.20	274.00	50.00	193.50	4071 4.000	4110 18.500
18.50-18.99	19.050	18.20	274.00	50.00	193.50	4071 4.000	4110 18.505
19.00-19.49	20.000	18.70	280.00	50.00	198.70	4071 4.000	4110 19.000
19.00-19.49	19.050	18.70	280.00	50.00	198.70	4071 4.000	4110 19.005
19.50-19.99	20.000	19.20	286.00	50.00	203.70	4071 4.000	4110 19.500
19.50-19.99	19.050	19.20	286.00	50.00	203.70	4071 4.000	4110 19.505
20.00-20.49	20.000	19.70	292.00	50.00	208.90	4071 4.500	4110 20.000
20.00-20.49	19.050	19.70	292.00	50.00	208.90	4071 4.500	4110 20.005
20.50-20.99	25.000	20.20	306.00	56.00	214.00	4071 4.500	4110 20.500
20.50-20.99	25.400	20.20	306.00	56.00	214.00	4071 4.500	4110 20.505
21.00-21.49	25.000	20.70	312.00	56.00	219.10	4071 4.500	4110 21.000
21.00-21.49	25.400	20.70	312.00	56.00	219.10	4071 4.500	4110 21.005



d1	d2 h6	d3	L	I3	I5	F	Order no.
	mm	mm	mm	mm	mm		
21.50-21.99	25.000	21.20	317.00	56.00	224.20	4071 4.500	4110 21.500
21.50-21.99	25.400	21.20	317.00	56.00	224.20	4071 4.500	4110 21.505
22.00-22.49	25.000	21.70	323.00	56.00	229.30	4071 5.000	4110 22.000
22.00-22.49	25.400	21.70	323.00	56.00	229.30	4071 5.000	4110 22.005
22.50-22.99	25.000	22.20	329.00	56.00	234.40	4071 5.000	4110 22.500
22.50-22.99	25.400	22.20	329.00	56.00	234.40	4071 5.000	4110 22.505
23.00-23.49	25.000	22.70	335.00	56.00	239.50	4071 5.000	4110 23.000
23.00-23.49	25.400	22.70	335.00	56.00	239.50	4071 5.000	4110 23.005
23.50-23.99	25.000	23.20	341.00	56.00	244.60	4071 5.000	4110 23.500
23.50-23.99	25.400	23.20	341.00	56.00	244.60	4071 5.000	4110 23.505
24.00-24.49	25.000	23.70	347.00	56.00	249.70	4071 5.001	4110 24.000
24.00-24.49	25.400	23.70	347.00	56.00	249.70	4071 5.001	4110 24.005
24.50-24.99	25.000	24.20	352.00	56.00	254.80	4071 5.001	4110 24.500
24.50-24.99	25.400	24.20	352.00	56.00	254.80	4071 5.001	4110 24.505
25.00-25.49	25.000	24.70	359.00	56.00	259.90	4071 5.001	4110 25.000
25.00-25.49	25.400	24.70	359.00	56.00	259.90	4071 5.001	4110 25.005
25.50-25.99	32.000	25.20	369.00	60.00	265.00	4071 5.001	4110 25.500
25.50-25.99	31.750	25.20	369.00	60.00	265.00	4071 5.001	4110 25.505
26.00-26.49	32.000	25.70	377.00	60.00	270.00	4071 5.003	4110 26.000
26.00-26.49	31.750	25.70	377.00	60.00	270.00	4071 5.003	4110 26.005
26.50-26.99	32.000	26.20	382.00	60.00	275.00	4071 5.003	4110 26.500
26.50-26.99	31.750	26.20	382.00	60.00	275.00	4071 5.003	4110 26.505
27.00-27.49	32.000	26.70	388.00	60.00	280.10	4071 5.003	4110 27.000
27.00-27.49	31.750	26.70	388.00	60.00	280.10	4071 5.003	4110 27.005
27.50-27.99	32.000	27.20	394.00	60.00	285.20	4071 5.003	4110 27.500
27.50-27.99	31.750	27.20	394.00	60.00	285.20	4071 5.003	4110 27.505
28.00-28.49	32.000	27.70	400.00	60.00	290.30	4071 5.003	4110 28.000
28.00-28.49	31.750	27.70	400.00	60.00	290.30	4071 5.003	4110 28.005
28.50-28.99	32.000	28.20	405.00	60.00	295.40	4071 5.003	4110 28.500
28.50-28.99	31.750	28.20	405.00	60.00	295.40	4071 5.003	4110 28.505
29.00-29.49	32.000	28.70	412.00	60.00	300.50	4071 5.003	4110 29.000
29.00-29.49	31.750	28.70	412.00	60.00	300.50	4071 5.003	4110 29.005
29.50-29.99	32.000	29.20	418.00	60.00	305.60	4071 5.003	4110 29.500
29.50-29.99	31.750	29.20	418.00	60.00	305.60	4071 5.003	4110 29.505
30.00-30.49	32.000	29.70	424.00	60.00	310.60	4071 6.000	4110 30.000
30.00-30.49	31.750	29.70	424.00	60.00	310.60	4071 6.000	4110 30.005
30.50-30.99	32.000	30.20	429.00	60.00	315.70	4071 6.000	4110 30.500
30.50-30.99	31.750	30.20	429.00	60.00	315.70	4071 6.000	4110 30.505
31.00-31.49	32.000	30.70	435.00	60.00	320.80	4071 6.000	4110 31.000
31.00-31.49	31.750	30.70	435.00	60.00	320.80	4071 6.000	4110 31.005
31.50-31.99	32.000	31.20	441.00	60.00	325.90	4071 6.000	4110 31.500
31.50-31.99	31.750	31.20	441.00	60.00	325.90	4071 6.000	4110 31.505

Drilling tools



Interchangeable inserts HT 800

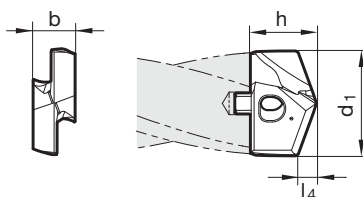
Tool material **Solid carbide**Surface **a**

P ◦ web thinning $\geq \varnothing 11.000$ • facet point grind • main cutting edge form straight (after correction) • clamping screws art. no. 4071 included • piloting in all materials

M ◦**K** ◦**N** ◦**S** ◦**H** ◦**GÜHRING** NAVIGATOR

Cutting data page 308-313

Drilling tools

Article no. **4111**

Article no. 4111					Order no.
d1		l4	b	h	
mm	inch	mm	mm	mm	
11.000		1.80	4.50	7.20	4111 11.000
11.200		1.80	4.50	7.20	4111 11.200
11.500		1.90	4.50	7.20	4111 11.500
11.510	29/64	1.90	4.50	7.20	4111 11.510
11.700		1.90	4.50	7.20	4111 11.700
11.800		1.90	4.50	7.20	4111 11.800
11.910	15/32	1.90	4.50	7.20	4111 11.910
12.000		1.90	5.00	7.40	4111 12.000
12.100		2.00	5.00	7.40	4111 12.100
12.200		2.00	5.00	7.40	4111 12.200
12.300	31/64	2.00	5.00	7.40	4111 12.300
12.500		2.00	5.00	7.40	4111 12.500
12.600		2.00	5.00	7.40	4111 12.600
12.700	1/2	2.10	5.00	7.40	4111 12.700
12.800		2.10	5.00	7.40	4111 12.800
12.900		2.10	5.00	7.40	4111 12.900
13.000		2.10	5.50	8.20	4111 13.000
13.100	33/64	2.10	5.50	8.20	4111 13.100
13.490	17/32	2.20	5.50	8.20	4111 13.490
13.500		2.20	5.50	8.20	4111 13.500
13.600		2.20	5.50	8.20	4111 13.600
13.700		2.20	5.50	8.20	4111 13.700
13.800		2.20	5.50	8.20	4111 13.800
13.890	35/64	2.20	5.50	8.20	4111 13.890
14.000		2.30	6.00	9.40	4111 14.000
14.100		2.30	6.00	9.40	4111 14.100
14.290	9/16	2.30	6.00	9.40	4111 14.290
14.400		2.30	6.00	9.40	4111 14.400
14.500		2.30	6.00	9.40	4111 14.500
14.600		2.40	6.00	9.40	4111 14.600
14.680	37/64	2.40	6.00	9.40	4111 14.680
14.700		2.40	6.00	9.40	4111 14.700
14.800		2.40	6.00	9.40	4111 14.800
15.000		2.40	6.00	9.40	4111 15.000
15.080	19/32	2.40	6.00	9.40	4111 15.080
15.100		2.40	6.00	9.40	4111 15.100
15.200		2.40	6.00	9.40	4111 15.200
15.300		2.50	6.00	9.40	4111 15.300
15.480	39/64	2.50	6.00	9.40	4111 15.480
15.500		2.50	6.00	9.40	4111 15.500
15.600		2.50	6.00	9.40	4111 15.600
15.700		2.50	6.00	9.40	4111 15.700



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
15.800		2.50	6.00	9.40	4111 15.800
15.870	5/8	2.60	6.00	9.40	4111 15.870
16.000		2.60	7.00	10.60	4111 16.000
16.270	41/64	2.60	7.00	10.60	4111 16.270
16.500		2.70	7.00	10.60	4111 16.500
16.670	21/32	2.70	7.00	10.60	4111 16.670
17.000		2.70	7.00	10.60	4111 17.000
17.070	43/64	2.70	7.00	10.60	4111 17.070
17.460	11/16	2.80	7.00	10.60	4111 17.460
17.500		2.80	7.00	10.60	4111 17.500
17.600		2.80	7.00	10.60	4111 17.600
17.860	45/64	2.90	7.00	10.60	4111 17.860
18.000		2.90	8.00	12.10	4111 18.000
18.260	23/32	2.90	8.00	12.10	4111 18.260
18.500		3.00	8.00	12.10	4111 18.500
18.650	47/64	3.00	8.00	12.10	4111 18.650
19.000		3.00	8.00	12.10	4111 19.000
19.050	3/4	3.10	8.00	12.10	4111 19.050
19.450	49/64	3.10	8.00	12.10	4111 19.450
19.500		3.10	8.00	12.10	4111 19.500
19.600		3.10	8.00	12.10	4111 19.600
19.840	25/32	3.20	8.00	12.10	4111 19.840
20.000		3.20	9.00	13.30	4111 20.000
20.240	51/64	3.20	9.00	13.30	4111 20.240
20.500		3.30	9.00	13.30	4111 20.500
20.640	13/16	3.30	9.00	13.30	4111 20.640
21.000		3.40	9.00	13.30	4111 21.000
21.030	53/64	3.40	9.00	13.30	4111 21.030
21.100		3.40	9.00	13.30	4111 21.100
21.430	27/32	3.40	9.00	13.30	4111 21.430
21.500		3.40	9.00	13.30	4111 21.500
21.830	55/64	3.50	9.00	13.30	4111 21.830
22.000		3.50	10.00	14.80	4111 22.000
22.220	7/8	3.60	10.00	14.80	4111 22.220
22.500		3.60	10.00	14.80	4111 22.500
22.620	57/64	3.60	10.00	14.80	4111 22.620
23.000		3.70	10.00	14.80	4111 23.000
23.020	29/32	3.70	10.00	14.80	4111 23.020
23.420	59/64	3.70	10.00	14.80	4111 23.420
23.500		3.80	10.00	14.80	4111 23.500
23.810	15/16	3.80	10.00	14.80	4111 23.810
24.000		3.80	11.00	15.30	4111 24.000
24.100		3.80	11.00	15.30	4111 24.100
24.210	61/64	3.90	11.00	15.30	4111 24.210
24.500		3.90	11.00	15.30	4111 24.500
24.610	31/32	3.90	11.00	15.30	4111 24.610
25.000	63/64	4.00	11.00	15.30	4111 25.000
25.400	1	4.10	11.00	15.30	4111 25.400
25.500		4.10	11.00	15.30	4111 25.500
25.700		4.10	11.00	15.30	4111 25.700
26.000		4.10	12.00	19.40	4111 26.000
26.190	1 1/32	4.20	12.00	19.40	4111 26.190
26.500		4.20	12.00	19.40	4111 26.500
26.590	1 3/64	4.20	12.00	19.40	4111 26.590
27.000		4.30	12.00	19.40	4111 27.000
27.500		4.40	12.00	19.40	4111 27.500
27.700		4.40	12.00	19.40	4111 27.700
27.780	1 3/32	4.40	12.00	19.40	4111 27.780
28.000		4.50	13.00	20.10	4111 28.000
28.180	1 7/64	4.50	13.00	20.10	4111 28.180
28.500		4.50	13.00	20.10	4111 28.500
28.580	1 1/8	4.60	13.00	20.10	4111 28.580
29.000		4.60	13.00	20.10	4111 29.000
29.370	1 5/32	4.70	13.00	20.10	4111 29.370
29.500		4.70	13.00	20.10	4111 29.500
29.770	1 11/64	4.70	13.00	20.10	4111 29.770
30.000		4.80	14.00	21.70	4111 30.000
30.160	1 3/16	4.80	14.00	21.70	4111 30.160
30.500		4.90	14.00	21.70	4111 30.500
30.960	1 7/32	4.90	14.00	21.70	4111 30.960
31.000		4.90	14.00	21.70	4111 31.000
31.500		5.00	14.00	21.70	4111 31.500



d1		l4	b	h	Order no.	
mm	inch	mm	mm	mm		
31.750	1 1/4	5.10	14.00	21.70	4111 31.750	
32.000		5.10	15.00	22.40	4111 32.000	
32.500		5.20	15.00	22.40	4111 32.500	
32.540	1 9/32	5.20	15.00	22.40	4111 32.540	
32.940	1 19/64	5.20	15.00	22.40	4111 32.940	
33.000		5.30	15.00	22.40	4111 33.000	
33.340	1 5/16	5.30	15.00	22.40	4111 33.340	
33.500		5.30	15.00	22.40	4111 33.500	
34.000		5.40	15.00	22.40	4111 34.000	
34.130	1 11/32	5.40	15.00	22.40	4111 34.130	
34.500		5.50	15.00	22.40	4111 34.500	
34.930	1 3/8	5.60	15.00	22.40	4111 34.930	
35.000		5.60	15.00	22.40	4111 35.000	
35.500		5.60	15.00	22.40	4111 35.500	
35.720	1 13/32	5.70	15.00	22.40	4111 35.720	
36.000		5.70	16.00	23.20	4111 36.000	
36.500	1 7/16	5.80	16.00	23.20	4111 36.500	
36.510		5.80	16.00	23.20	4111 36.510	
37.000		5.90	16.00	23.20	4111 37.000	
37.310	1 15/32	5.90	16.00	23.20	4111 37.310	
37.500		6.00	16.00	23.20	4111 37.500	
38.000	1 1/2	6.00	16.00	23.20	4111 38.000	
38.100		6.10	16.00	23.20	4111 38.100	
38.500		1 33/64	6.10	16.00	23.20	4111 38.500
39.000			6.20	16.00	23.20	4111 39.000
39.500	1 13/16	6.30	16.00	23.20	4111 39.500	
40.000		6.40	16.00	23.20	4111 40.000	



Interchangeable inserts HT 800

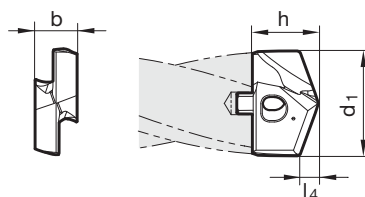


Tool material **Solid carbide**
Surface **F**

- P** ● web thinning $\geq \varnothing 11.000$ • facet point grind • main cutting edge form straight (after correction) • clamping screws art. no. 4071 included
- M** ○
- K** ○
- N** ○
- S** ○ free-cutting steels, heat-treatable steels • structural and case hardened steels • alloyed steels up to 1200 N/mm²
- H** ○

GÜHRING NAVIGATOR

Cutting data page 308-313



Article no. **4112**

Article no. 4112					Order no.
d1		l4	b	h	
mm	inch	mm	mm	mm	
11.000		2.10	4.50	7.50	4112 11.000
11.200		2.10	4.50	7.50	4112 11.200
11.500		2.10	4.50	7.50	4112 11.500
11.510	29/64	2.10	4.50	7.50	4112 11.510
11.700		2.20	4.50	7.50	4112 11.700
11.800		2.20	4.50	7.50	4112 11.800
11.910	15/32	2.20	4.50	7.50	4112 11.910
12.000		2.20	5.00	7.70	4112 12.000
12.100		2.30	5.00	7.70	4112 12.100
12.200		2.30	5.00	7.70	4112 12.200
12.300	31/64	2.30	5.00	7.70	4112 12.300
12.500		2.30	5.00	7.70	4112 12.500
12.600		2.30	5.00	7.70	4112 12.600
12.700	1/2	2.40	5.00	7.70	4112 12.700
12.800		2.40	5.00	7.70	4112 12.800
12.900		2.40	5.00	7.70	4112 12.900
13.000		2.40	5.50	8.50	4112 13.000
13.100	33/64	2.40	5.50	8.50	4112 13.100
13.300		2.50	5.50	8.50	4112 13.300
13.490	17/32	2.50	5.50	8.50	4112 13.490
13.500		2.50	5.50	8.50	4112 13.500
13.600		2.50	5.50	8.50	4112 13.600
13.700		2.50	5.50	8.50	4112 13.700
13.800		2.60	5.50	8.50	4112 13.800
13.890	35/64	2.60	5.50	8.50	4112 13.890
14.000		2.60	6.00	9.60	4112 14.000
14.100		2.60	6.00	9.60	4112 14.100
14.290	9/16	2.70	6.00	9.60	4112 14.290
14.400		2.70	6.00	9.60	4112 14.400
14.500		2.70	6.00	9.60	4112 14.500
14.600		2.70	6.00	9.60	4112 14.600
14.680	37/64	2.70	6.00	9.60	4112 14.680
14.700		2.70	6.00	9.60	4112 14.700
14.800		2.70	6.00	9.60	4112 14.800
15.000		2.80	6.00	9.80	4112 15.000
15.080	19/32	2.80	6.00	9.80	4112 15.080
15.100		2.80	6.00	9.80	4112 15.100
15.200		2.80	6.00	9.80	4112 15.200
15.300		2.80	6.00	9.80	4112 15.300
15.480	39/64	2.90	6.00	9.80	4112 15.480
15.500		2.90	6.00	9.80	4112 15.500
15.600		2.90	6.00	9.80	4112 15.600

Drilling tools



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
15.700		2.90	6.00	9.80	4112 15.700
15.800		2.90	6.00	9.80	4112 15.800
15.870	5/8	2.90	6.00	9.80	4112 15.870
16.000		3.00	7.00	11.00	4112 16.000
16.270	41/64	3.00	7.00	11.00	4112 16.270
16.500		3.10	7.00	11.00	4112 16.500
16.670	21/32	3.10	7.00	11.00	4112 16.670
17.000		3.10	7.00	11.00	4112 17.000
17.070	43/64	3.20	7.00	11.00	4112 17.070
17.250		3.20	7.00	11.00	4112 17.250
17.300		3.20	7.00	11.00	4112 17.300
17.460	11/16	3.20	7.00	11.00	4112 17.460
17.500		3.20	7.00	11.00	4112 17.500
17.600		3.30	7.00	11.00	4112 17.600
17.860	45/64	3.30	7.00	11.00	4112 17.860
18.000		3.30	8.00	12.60	4112 18.000
18.260	23/32	3.40	8.00	12.60	4112 18.260
18.500		3.40	8.00	12.60	4112 18.500
18.650	47/64	3.40	8.00	12.60	4112 18.650
18.900		3.50	8.00	12.60	4112 18.900
19.000		3.50	8.00	12.60	4112 19.000
19.050	3/4	3.50	8.00	12.60	4112 19.050
19.250		3.60	8.00	12.60	4112 19.250
19.300		3.60	8.00	12.60	4112 19.300
19.450	49/64	3.60	8.00	12.60	4112 19.450
19.500		3.60	8.00	12.60	4112 19.500
19.600		3.60	8.00	12.60	4112 19.600
19.840	25/32	3.70	8.00	12.60	4112 19.840
20.000		3.70	9.00	13.90	4112 20.000
20.240	51/64	3.70	9.00	13.90	4112 20.240
20.500		3.80	9.00	13.90	4112 20.500
20.640	13/16	3.80	9.00	13.90	4112 20.640
20.900		3.90	9.00	13.90	4112 20.900
21.000		3.90	9.00	13.90	4112 21.000
21.030	53/64	3.90	9.00	13.90	4112 21.030
21.100		3.90	9.00	13.90	4112 21.100
21.430	27/32	3.90	9.00	13.90	4112 21.430
21.500		4.00	9.00	13.90	4112 21.500
21.700		4.00	9.00	13.90	4112 21.700
21.830	55/64	4.00	9.00	13.90	4112 21.830
22.000		4.10	10.00	15.30	4112 22.000
22.220	7/8	4.10	10.00	15.30	4112 22.220
22.500		4.10	10.00	15.30	4112 22.500
22.620	57/64	4.20	10.00	15.30	4112 22.620
22.700		4.20	10.00	15.30	4112 22.700
23.000		4.20	10.00	15.30	4112 23.000
23.020	29/32	4.20	10.00	15.30	4112 23.020
23.420	59/64	4.30	10.00	15.30	4112 23.420
23.500		4.30	10.00	15.30	4112 23.500
23.700		4.40	10.00	15.30	4112 23.700
23.810	15/16	4.40	10.00	15.30	4112 23.810
24.000		4.40	11.00	15.80	4112 24.000
24.100		4.40	11.00	15.80	4112 24.100
24.210	61/64	4.50	11.00	15.80	4112 24.210
24.500		4.50	11.00	15.80	4112 24.500
24.610	31/32	4.50	11.00	15.80	4112 24.610
25.000	63/64	4.60	11.00	15.80	4112 25.000
25.250		4.60	11.00	15.80	4112 25.250
25.400	1	4.70	11.00	15.80	4112 25.400
25.500		4.70	11.00	15.80	4112 25.500
25.650		4.70	11.00	15.80	4112 25.650
25.670		4.70	11.00	15.80	4112 25.670
25.700		4.70	11.00	15.80	4112 25.700
25.810		4.70	11.00	15.80	4112 25.810
26.000		4.80	12.00	20.00	4112 26.000
26.190	1 1/32	4.80	12.00	20.00	4112 26.190
26.500		4.90	12.00	20.00	4112 26.500
26.590	1 3/64	4.90	12.00	20.00	4112 26.590
27.000		5.00	12.00	20.00	4112 27.000
27.500		5.10	12.00	20.00	4112 27.500
27.700		5.10	12.00	20.00	4112 27.700
27.780	1 3/32	5.10	12.00	20.00	4112 27.780



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
28.000		5.10	13.00	20.70	4112 28.000
28.180	1 7/64	5.20	13.00	20.70	4112 28.180
28.500		5.20	13.00	20.70	4112 28.500
28.580		5.30	13.00	20.70	4112 28.580
29.000		5.30	13.00	20.70	4112 29.000
29.370	1 5/32	5.40	13.00	20.70	4112 29.370
29.500		5.40	13.00	20.70	4112 29.500
29.600		5.40	13.00	20.70	4112 29.600
29.770	1 11/64	5.50	13.00	20.70	4112 29.770
30.000		5.50	14.00	22.30	4112 30.000
30.160	1 3/16	5.50	14.00	22.30	4112 30.160
30.500		5.60	14.00	22.30	4112 30.500
30.960	1 7/32	5.70	14.00	22.30	4112 30.960
31.000		5.70	14.00	22.30	4112 31.000
31.500		5.80	14.00	22.30	4112 31.500
31.750	1 1/4	5.80	14.00	22.30	4112 31.750
32.000		5.90	15.00	23.10	4112 32.000
32.500		6.00	15.00	23.10	4112 32.500
32.540	1 9/32	6.00	15.00	23.10	4112 32.540
32.940	1 19/64	6.00	15.00	23.10	4112 32.940
33.000		6.10	15.00	23.10	4112 33.000
33.340	1 5/16	6.10	15.00	23.10	4112 33.340
33.500		6.10	15.00	23.10	4112 33.500
34.000		6.20	15.00	23.10	4112 34.000
34.130	1 11/32	6.30	15.00	23.10	4112 34.130
34.500		6.30	15.00	23.10	4112 34.500
34.930		6.40	15.00	23.10	4112 34.930
35.000		6.40	15.00	23.10	4112 35.000
35.500		6.50	15.00	23.10	4112 35.500
35.720	1 13/32	6.60	15.00	23.10	4112 35.720
36.000		6.60	16.00	23.90	4112 36.000
36.500		6.70	16.00	23.90	4112 36.500
36.510	1 7/16	6.70	16.00	23.90	4112 36.510
37.000		6.80	16.00	23.90	4112 37.000
37.310	1 15/32	6.80	16.00	23.90	4112 37.310
37.500		6.90	16.00	23.90	4112 37.500
38.000		7.00	16.00	23.90	4112 38.000
38.100	1 1/2	7.00	16.00	23.90	4112 38.100
38.500	1 33/64	7.10	16.00	23.90	4112 38.500
39.000		7.10	16.00	23.90	4112 39.000
39.500		7.20	16.00	23.90	4112 39.500
40.000		7.30	16.00	23.90	4112 40.000

Drilling tools



Interchangeable inserts HT 800



Tool material **Solid carbide**

Surface

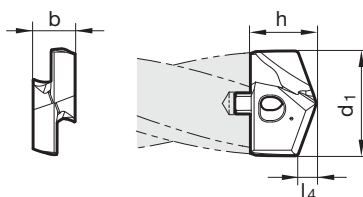
P web thinning $\geq \varnothing 11.000$ • relieved cone • main cutting edge form concave • clamping screws art. no. 4071 included

- M**
- K**
- N** •
- S** aluminium and Al alloys • non-ferrous metals
- H**

GÜHRING NAVIGATOR

Cutting data page 308-313

Drilling tools



Article no. **4114**

					Order no.
d1		l4	b	h	
mm	inch	mm	mm	mm	
11.000		2.10	4.50	7.50	4114 11.000
11.200		2.10	4.50	7.50	4114 11.200
11.500		2.10	4.50	7.50	4114 11.500
11.510	29/64	2.10	4.50	7.50	4114 11.510
11.700		2.20	4.50	7.50	4114 11.700
11.800		2.20	4.50	7.50	4114 11.800
11.910	15/32	2.20	4.50	7.50	4114 11.910
12.000		2.20	5.00	7.70	4114 12.000
12.100		2.30	5.00	7.70	4114 12.100
12.200		2.30	5.00	7.70	4114 12.200
12.300	31/64	2.30	5.00	7.70	4114 12.300
12.500		2.30	5.00	7.70	4114 12.500
12.600		2.30	5.00	7.70	4114 12.600
12.700	1/2	2.40	5.00	7.70	4114 12.700
12.800		2.40	5.00	7.70	4114 12.800
12.900		2.40	5.00	7.70	4114 12.900
13.000		2.40	5.50	8.50	4114 13.000
13.100	33/64	2.40	5.50	8.50	4114 13.100
13.490	17/32	2.50	5.50	8.50	4114 13.490
13.500		2.50	5.50	8.50	4114 13.500
13.600		2.50	5.50	8.50	4114 13.600
13.700		2.50	5.50	8.50	4114 13.700
13.800		2.60	5.50	8.50	4114 13.800
13.890	35/64	2.60	5.50	8.50	4114 13.890
14.000		2.60	6.00	9.60	4114 14.000
14.100		2.60	6.00	9.60	4114 14.100
14.290	9/16	2.70	6.00	9.60	4114 14.290
14.400		2.70	6.00	9.60	4114 14.400
14.500		2.70	6.00	9.60	4114 14.500
14.600		2.70	6.00	9.60	4114 14.600
14.680	37/64	2.70	6.00	9.60	4114 14.680
14.700		2.70	6.00	9.60	4114 14.700
14.800		2.70	6.00	9.60	4114 14.800
15.000		2.80	6.00	9.80	4114 15.000
15.080	19/32	2.80	6.00	9.80	4114 15.080
15.100		2.80	6.00	9.80	4114 15.100
15.200		2.80	6.00	9.80	4114 15.200
15.300		2.80	6.00	9.80	4114 15.300
15.480	39/64	2.90	6.00	9.80	4114 15.480
15.500		2.90	6.00	9.80	4114 15.500
15.600		2.90	6.00	9.80	4114 15.600
15.700		2.90	6.00	9.80	4114 15.700



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
15.800		2.90	6.00	9.80	4114 15.800
15.870	5/8	2.90	6.00	9.80	4114 15.870
16.000		3.00	7.00	11.00	4114 16.000
16.270	41/64	3.00	7.00	11.00	4114 16.270
16.500		3.10	7.00	11.00	4114 16.500
16.670	21/32	3.10	7.00	11.00	4114 16.670
17.000		3.10	7.00	11.00	4114 17.000
17.070	43/64	3.20	7.00	11.00	4114 17.070
17.460	11/16	3.20	7.00	11.00	4114 17.460
17.500		3.20	7.00	11.00	4114 17.500
17.600		3.30	7.00	11.00	4114 17.600
17.860	45/64	3.30	7.00	11.00	4114 17.860
18.000		3.30	8.00	12.60	4114 18.000
18.260	23/32	3.40	8.00	12.60	4114 18.260
18.500		3.40	8.00	12.60	4114 18.500
18.650	47/64	3.40	8.00	12.60	4114 18.650
19.000		3.50	8.00	12.60	4114 19.000
19.050	3/4	3.50	8.00	12.60	4114 19.050
19.250		3.60	8.00	12.60	4114 19.250
19.450	49/64	3.60	8.00	12.60	4114 19.450
19.500		3.60	8.00	12.60	4114 19.500
19.600		3.60	8.00	12.60	4114 19.600
19.840	25/32	3.70	8.00	12.60	4114 19.840
20.000		3.70	9.00	13.90	4114 20.000
20.240	51/64	3.70	9.00	13.90	4114 20.240
20.500		3.80	9.00	13.90	4114 20.500
20.640	13/16	3.80	9.00	13.90	4114 20.640
21.000		3.90	9.00	13.90	4114 21.000
21.030	53/64	3.90	9.00	13.90	4114 21.030
21.100		3.90	9.00	13.90	4114 21.100
21.430	27/32	3.90	9.00	13.90	4114 21.430
21.500		4.00	9.00	13.90	4114 21.500
21.830	55/64	4.00	9.00	13.90	4114 21.830
22.000		4.10	10.00	15.30	4114 22.000
22.220	7/8	4.10	10.00	15.30	4114 22.220
22.500		4.10	10.00	15.30	4114 22.500
22.620	57/64	4.20	10.00	15.30	4114 22.620
23.000		4.20	10.00	15.30	4114 23.000
23.020	29/32	4.20	10.00	15.30	4114 23.020
23.420	59/64	4.30	10.00	15.30	4114 23.420
23.500		4.30	10.00	15.30	4114 23.500
23.810	15/16	4.40	10.00	15.30	4114 23.810
24.000		4.40	11.00	15.80	4114 24.000
24.100		4.40	11.00	15.80	4114 24.100
24.210	61/64	4.50	11.00	15.80	4114 24.210
24.500		4.50	11.00	15.80	4114 24.500
24.610	31/32	4.50	11.00	15.80	4114 24.610
25.000	63/64	4.60	11.00	15.80	4114 25.000
25.400	1	4.70	11.00	15.80	4114 25.400
25.500		4.70	11.00	15.80	4114 25.500
25.670		4.70	11.00	15.80	4114 25.670
25.700		4.70	11.00	15.80	4114 25.700
25.810		4.70	11.00	15.80	4114 25.810
26.000		4.80	12.00	20.00	4114 26.000
26.190	1 1/32	4.80	12.00	20.00	4114 26.190
26.500		4.90	12.00	20.00	4114 26.500
26.590	1 3/64	4.90	12.00	20.00	4114 26.590
27.000		5.00	12.00	20.00	4114 27.000
27.500		5.10	12.00	20.00	4114 27.500
27.700		5.10	12.00	20.00	4114 27.700
27.780	1 3/32	5.10	12.00	20.00	4114 27.780
28.000		5.10	13.00	20.70	4114 28.000
28.180	1 7/64	5.20	13.00	20.70	4114 28.180
28.500		5.20	13.00	20.70	4114 28.500
28.580		5.30	13.00	20.70	4114 28.580
29.000		5.30	13.00	20.70	4114 29.000
29.370	1 5/32	5.40	13.00	20.70	4114 29.370
29.500		5.40	13.00	20.70	4114 29.500
29.770	1 11/64	5.50	13.00	20.70	4114 29.770
30.000		5.50	14.00	22.30	4114 30.000
30.160	1 3/16	5.50	14.00	22.30	4114 30.160
30.500		5.60	14.00	22.30	4114 30.500



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
30.960	1 7/32	5.70	14.00	22.30	4114 30.960
31.000		5.70	14.00	22.30	4114 31.000
31.500		5.80	14.00	22.30	4114 31.500
31.750	1 1/4	5.80	14.00	22.30	4114 31.750
32.000		5.90	15.00	23.10	4114 32.000
32.500		6.00	15.00	23.10	4114 32.500
32.540	1 9/32	6.00	15.00	23.10	4114 32.540
32.940	1 19/64	6.00	15.00	23.10	4114 32.940
33.000		6.10	15.00	23.10	4114 33.000
33.340	1 5/16	6.10	15.00	23.10	4114 33.340
33.500		6.10	15.00	23.10	4114 33.500
34.000		6.20	15.00	23.10	4114 34.000
34.130	1 11/32	6.30	15.00	23.10	4114 34.130
34.500		6.30	15.00	23.10	4114 34.500
34.930		6.40	15.00	23.10	4114 34.930
35.000	1 13/32	6.40	15.00	23.10	4114 35.000
35.500		6.50	15.00	23.10	4114 35.500
35.720		6.60	15.00	23.10	4114 35.720
36.000		6.60	16.00	23.90	4114 36.000
36.500	1 7/16	6.70	16.00	23.90	4114 36.500
36.510		6.70	16.00	23.90	4114 36.510
37.000		6.80	16.00	23.90	4114 37.000
37.310	1 15/32	6.80	16.00	23.90	4114 37.310
37.500		6.90	16.00	23.90	4114 37.500
38.000		7.00	16.00	23.90	4114 38.000
38.100	1 1/2	7.00	16.00	23.90	4114 38.100
38.500	1 33/64	7.10	16.00	23.90	4114 38.500
39.000		7.10	16.00	23.90	4114 39.000
39.500	1 33/64	7.20	16.00	23.90	4114 39.500
40.000		7.30	16.00	23.90	4114 40.000



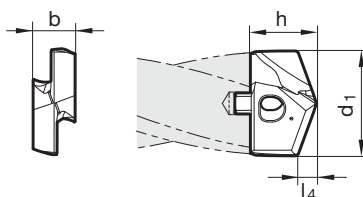
Interchangeable inserts HT 800

Tool material **Solid carbide**Surface **a**

P	○	web thinning $\geq \varnothing 11.000$ • relieved cone • main cutting edge form straight (after correction) • clamping screws art. no. 4071
M	●	included
K		
N		
S	○	stainless steels
H	○	

GÜHRING NAVIGATOR

Cutting data page 308-313

Article no. **4115**

Article no. 4115					Order no.
d1		l4	b	h	
mm	inch	mm	mm	mm	
11.000		2.10	4.50	7.50	4115 11.000
11.200		2.10	4.50	7.50	4115 11.200
11.500		2.10	4.50	7.50	4115 11.500
11.510	29/64	2.10	4.50	7.50	4115 11.510
11.700		2.20	4.50	7.50	4115 11.700
11.800		2.20	4.50	7.50	4115 11.800
11.910	15/32	2.20	4.50	7.50	4115 11.910
12.000		2.20	5.00	7.70	4115 12.000
12.100		2.30	5.00	7.70	4115 12.100
12.200		2.30	5.00	7.70	4115 12.200
12.300	31/64	2.30	5.00	7.70	4115 12.300
12.500		2.30	5.00	7.70	4115 12.500
12.600		2.30	5.00	7.70	4115 12.600
12.700	1/2	2.40	5.00	7.70	4115 12.700
12.800		2.40	5.00	7.70	4115 12.800
12.900		2.40	5.00	7.70	4115 12.900
13.000		2.40	5.50	8.50	4115 13.000
13.100	33/64	2.40	5.50	8.50	4115 13.100
13.490	17/32	2.50	5.50	8.50	4115 13.490
13.500		2.50	5.50	8.50	4115 13.500
13.600		2.50	5.50	8.50	4115 13.600
13.700		2.50	5.50	8.50	4115 13.700
13.800		2.60	5.50	8.50	4115 13.800
13.890	35/64	2.60	5.50	8.50	4115 13.890
14.000		2.60	6.00	9.60	4115 14.000
14.100		2.60	6.00	9.60	4115 14.100
14.290	9/16	2.70	6.00	9.60	4115 14.290
14.400		2.70	6.00	9.60	4115 14.400
14.500		2.70	6.00	9.60	4115 14.500
14.600		2.70	6.00	9.60	4115 14.600
14.680	37/64	2.70	6.00	9.60	4115 14.680
14.700		2.70	6.00	9.60	4115 14.700
14.800		2.70	6.00	9.60	4115 14.800
15.000		2.80	6.00	9.80	4115 15.000
15.080	19/32	2.80	6.00	9.80	4115 15.080
15.100		2.80	6.00	9.80	4115 15.100
15.200		2.80	6.00	9.80	4115 15.200
15.300		2.80	6.00	9.80	4115 15.300
15.480	39/64	2.90	6.00	9.80	4115 15.480
15.500		2.90	6.00	9.80	4115 15.500
15.600		2.90	6.00	9.80	4115 15.600
15.700		2.90	6.00	9.80	4115 15.700



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
15.800		2.90	6.00	9.80	4115 15.800
15.870	5/8	2.90	6.00	9.80	4115 15.870
16.000		3.00	7.00	11.00	4115 16.000
16.270	41/64	3.00	7.00	11.00	4115 16.270
16.500		3.10	7.00	11.00	4115 16.500
16.670	21/32	3.10	7.00	11.00	4115 16.670
17.000		3.10	7.00	11.00	4115 17.000
17.070	43/64	3.20	7.00	11.00	4115 17.070
17.250		3.20	7.00	11.00	4115 17.250
17.460	11/16	3.20	7.00	11.00	4115 17.460
17.500		3.20	7.00	11.00	4115 17.500
17.600		3.30	7.00	11.00	4115 17.600
17.860	45/64	3.30	7.00	11.00	4115 17.860
18.000		3.30	8.00	12.60	4115 18.000
18.260	23/32	3.40	8.00	12.60	4115 18.260
18.500		3.40	8.00	12.60	4115 18.500
18.650	47/64	3.40	8.00	12.60	4115 18.650
19.000		3.50	8.00	12.60	4115 19.000
19.050	3/4	3.50	8.00	12.60	4115 19.050
19.250		3.60	8.00	12.60	4115 19.250
19.450	49/64	3.60	8.00	12.60	4115 19.450
19.500		3.60	8.00	12.60	4115 19.500
19.600		3.60	8.00	12.60	4115 19.600
19.840	25/32	3.70	8.00	12.60	4115 19.840
20.000		3.70	9.00	13.90	4115 20.000
20.240	51/64	3.70	9.00	13.90	4115 20.240
20.500		3.80	9.00	13.90	4115 20.500
20.640	13/16	3.80	9.00	13.90	4115 20.640
21.000		3.90	9.00	13.90	4115 21.000
21.030	53/64	3.90	9.00	13.90	4115 21.030
21.100		3.90	9.00	13.90	4115 21.100
21.430	27/32	3.90	9.00	13.90	4115 21.430
21.500		4.00	9.00	13.90	4115 21.500
21.830	55/64	4.00	9.00	13.90	4115 21.830
22.000		4.10	10.00	15.30	4115 22.000
22.220	7/8	4.10	10.00	15.30	4115 22.220
22.500		4.10	10.00	15.30	4115 22.500
22.620	57/64	4.20	10.00	15.30	4115 22.620
23.000		4.20	10.00	15.30	4115 23.000
23.020	29/32	4.20	10.00	15.30	4115 23.020
23.420	59/64	4.30	10.00	15.30	4115 23.420
23.500		4.30	10.00	15.30	4115 23.500
23.810	15/16	4.40	10.00	15.30	4115 23.810
24.000		4.40	11.00	15.80	4115 24.000
24.100		4.40	11.00	15.80	4115 24.100
24.210	61/64	4.50	11.00	15.80	4115 24.210
24.500		4.50	11.00	15.80	4115 24.500
24.610	31/32	4.50	11.00	15.80	4115 24.610
25.000	63/64	4.60	11.00	15.80	4115 25.000
25.250		4.60	11.00	15.80	4115 25.250
25.400	1	4.70	11.00	15.80	4115 25.400
25.500		4.70	11.00	15.80	4115 25.500
25.650		4.70	11.00	15.80	4115 25.650
25.700		4.70	11.00	15.80	4115 25.700
26.000		4.80	12.00	20.00	4115 26.000
26.190	1 1/32	4.80	12.00	20.00	4115 26.190
26.500		4.90	12.00	20.00	4115 26.500
26.590	1 3/64	4.90	12.00	20.00	4115 26.590
27.000		5.00	12.00	20.00	4115 27.000
27.500		5.10	12.00	20.00	4115 27.500
27.700		5.10	12.00	20.00	4115 27.700
27.780	1 3/32	5.10	12.00	20.00	4115 27.780
28.000		5.10	13.00	20.70	4115 28.000
28.180	1 7/64	5.20	13.00	20.70	4115 28.180
28.500		5.20	13.00	20.70	4115 28.500
28.580		5.30	13.00	20.70	4115 28.580
29.000		5.30	13.00	20.70	4115 29.000
29.370	1 5/32	5.40	13.00	20.70	4115 29.370
29.500		5.40	13.00	20.70	4115 29.500
29.600		5.40	13.00	20.70	4115 29.600
29.770	1 11/64	5.50	13.00	20.70	4115 29.770
30.000		5.50	14.00	22.30	4115 30.000



d1		l4	b	h	Order no.
mm	inch	mm	mm	mm	
30.160	1 3/16	5.50	14.00	22.30	4115 30.160
30.500		5.60	14.00	22.30	4115 30.500
30.960	1 7/32	5.70	14.00	22.30	4115 30.960
31.000		5.70	14.00	22.30	4115 31.000
31.500	1 1/4	5.80	14.00	22.30	4115 31.500
31.750		5.80	14.00	22.30	4115 31.750
32.000		5.90	15.00	23.10	4115 32.000
32.500	1 9/32	6.00	15.00	23.10	4115 32.500
32.540		6.00	15.00	23.10	4115 32.540
32.940		6.00	15.00	23.10	4115 32.940
33.000	1 19/64	6.10	15.00	23.10	4115 33.000
33.340		6.10	15.00	23.10	4115 33.340
33.500	1 5/16	6.10	15.00	23.10	4115 33.500
34.000		6.20	15.00	23.10	4115 34.000
34.130		6.30	15.00	23.10	4115 34.130
34.500	1 11/32	6.30	15.00	23.10	4115 34.500
34.930		6.40	15.00	23.10	4115 34.930
35.000		6.40	15.00	23.10	4115 35.000
35.500	1 13/32	6.50	15.00	23.10	4115 35.500
35.720		6.60	15.00	23.10	4115 35.720
36.000		6.60	16.00	23.90	4115 36.000
36.500	1 7/16	6.70	16.00	23.90	4115 36.500
36.510		6.70	16.00	23.90	4115 36.510
37.000		6.80	16.00	23.90	4115 37.000
37.310	1 15/32	6.80	16.00	23.90	4115 37.310
37.500		6.90	16.00	23.90	4115 37.500
38.000	1 1/2	7.00	16.00	23.90	4115 38.000
38.100		7.00	16.00	23.90	4115 38.100
38.500		7.10	16.00	23.90	4115 38.500
39.000	1 33/64	7.10	16.00	23.90	4115 39.000
39.500		7.20	16.00	23.90	4115 39.500
40.000		7.30	16.00	23.90	4115 40.000

Drilling tools



Interchangeable inserts HT 800

Tool material **Solid carbide**Surface **F**

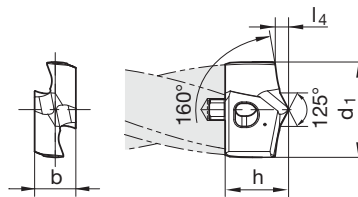
P • facet point grind • main cutting edge form concave • special point geometry with 160° point angle and 125° centre point
M • clamping screws art. no. 4071 included

K
N
S application for the machining of structural steel components
H

GÜHRING NAVIGATOR

Cutting data page 308-313

Drilling tools

Article no. **4229**

					Order no.
d1		l4	b	h	
mm	inch	mm	mm	mm	
12.000		1.70	5.00	7.50	4229 12.000
12.700	1/2	2.00	5.00	7.50	4229 12.700
14.000		2.00	6.00	9.50	4229 14.000
14.290	9/16	2.30	6.00	9.50	4229 14.290
15.870	5/8	2.30	6.00	9.60	4229 15.870
16.000		2.30	7.00	10.80	4229 16.000
17.460	11/16	2.60	7.00	10.80	4229 17.460
18.000		2.60	8.00	12.30	4229 18.000
19.050	3/4	2.90	8.00	12.30	4229 19.050
20.000		2.90	9.00	13.60	4229 20.000
20.640	13/16	3.00	9.00	13.60	4229 20.640
21.000		3.00	9.00	13.60	4229 21.000
22.000		3.20	10.00	14.90	4229 22.000
22.220	7/8	3.50	10.00	14.90	4229 22.220
23.810	15/16	3.50	10.00	15.00	4229 23.810
24.000		3.50	11.00	15.50	4229 24.000
25.000	63/64	3.60	11.00	15.50	4229 25.000
25.400	1	3.80	11.00	15.50	4229 25.400
26.000		3.80	12.00	18.50	4229 26.000
27.000		3.90	12.00	18.60	4229 27.000
28.000		4.10	13.00	19.80	4229 28.000
28.580	1 1/8	4.20	13.00	19.80	4229 28.580
29.000		4.20	13.00	19.80	4229 29.000
30.000		4.40	14.00	19.90	4229 30.000
30.160	1 3/16	4.60	14.00	19.90	4229 30.160
31.750	1 1/4	4.60	14.00	20.60	4229 31.750
32.000		4.60	15.00	21.30	4229 32.000
33.000		4.80	15.00	21.70	4229 33.000
33.340	1 5/16	4.90	15.00	21.70	4229 33.340
34.000		4.90	15.00	22.20	4229 34.000
34.930	1 3/8	5.20	15.00	22.20	4229 34.930
36.000		5.20	16.00	22.50	4229 36.000
36.510	1 7/16	5.50	16.00	22.50	4229 36.510
38.000		5.50	16.00	23.00	4229 38.000
38.100	1 1/2	5.80	16.00	23.00	4229 38.100
40.000		5.80	16.00	23.10	4229 40.000

EB 80 XXL

- + large selection of solid carbide and carbide-tipped deep hole drills for all common materials*
- + polished, long flute for use in steel and non-ferrous metals with excellent chip control and excellent wear protection*





EB 100 M single-fluted gun drills



Tool material **Solid carbide**

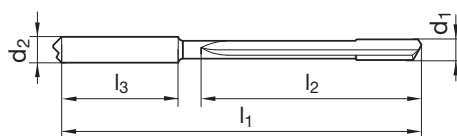
Surface **a**

Shank form **HA**

P	•	solid carbide shank with MQL shank end • head form G
M	•	
K	○	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Article no. **5646**

d1		d2 h6		l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	mm	
1.000		3.00	65.00	32.00	28.00	5646 1.000	
1.191	3/64	3.00	70.00	39.00	28.00	5646 1.190	
1.500		4.00	80.00	49.00	28.00	5646 1.500	
1.588	1/16	4.00	85.00	51.00	28.00	5646 1.590	
1.984	5/64	4.00	95.00	64.00	28.00	5646 1.980	
2.000		4.00	95.00	65.00	28.00	5646 2.000	
2.381	3/32	4.00	100.00	70.00	28.00	5646 2.380	
2.500		4.00	115.00	85.00	28.00	5646 2.500	
2.778	7/64	4.00	115.00	85.00	28.00	5646 2.780	
3.000		6.00	145.00	105.00	36.00	5646 3.000	
3.175	1/8	6.00	145.00	105.00	36.00	5646 3.170	
3.500		6.00	145.00	105.00	36.00	5646 3.500	
3.572	9/64	6.00	160.00	120.00	36.00	5646 3.570	
3.969	5/32	6.00	160.00	120.00	36.00	5646 3.970	
4.000		6.00	160.00	120.00	36.00	5646 4.000	
4.366	11/64	6.00	220.00	180.00	36.00	5646 4.370	
4.763	3/16	6.00	220.00	180.00	36.00	5646 4.760	
5.000		6.00	220.00	180.00	36.00	5646 5.000	
5.159	13/64	6.00	220.00	180.00	36.00	5646 5.160	
5.556	7/32	6.00	220.00	180.00	36.00	5646 5.560	
5.953	15/64	6.00	220.00	180.00	36.00	5646 5.950	
6.000		6.00	220.00	180.00	36.00	5646 6.000	
6.350	1/4	8.00	260.00	210.00	36.00	5646 6.350	
6.500		8.00	260.00	210.00	36.00	5646 6.500	
6.747	17/64	8.00	260.00	210.00	36.00	5646 6.750	
7.000		8.00	260.00	210.00	36.00	5646 7.000	
7.144	9/32	8.00	285.00	240.00	36.00	5646 7.140	
7.541	19/64	8.00	285.00	240.00	36.00	5646 7.540	
7.938	5/16	8.00	285.00	240.00	36.00	5646 7.940	
8.000		8.00	285.00	240.00	36.00	5646 8.000	
9.000		10.00	350.00	300.00	40.00	5646 9.000	
10.000		10.00	350.00	300.00	40.00	5646 10.000	
11.000		12.00	420.00	360.00	45.00	5646 11.000	
11.113	7/16	12.00	420.00	360.00	45.00	5646 11.113	
12.000		12.00	420.00	360.00	45.00	5646 12.000	
12.700	1/2	14.00	455.00	396.00	45.00	5646 12.700	
14.000		14.00	500.00	437.00	45.00	5646 14.000	
15.000		16.00	535.00	468.00	48.00	5646 15.000	
15.875	5/8	16.00	560.00	495.00	48.00	5646 15.875	
16.000		16.00	565.00	499.00	48.00	5646 16.000	



EB 100 M single-fluted gun drills

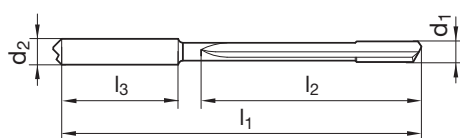
Tool material **Solid carbide**Surface **a**

Shank form HA

P	•	solid carbide shank with MQL shank end • head form G
M	•	
K	○	
N	○	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. **5647**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
1.000		3.00	90.00	57.00	28.00	5647 1.000
1.191	3/64	3.00	100.00	68.00	28.00	5647 1.190
1.500		4.00	120.00	86.00	28.00	5647 1.500
1.588	1/16	4.00	125.00	91.00	28.00	5647 1.590
1.984	5/64	4.00	145.00	114.00	28.00	5647 1.980
2.000		4.00	145.00	115.00	28.00	5647 2.000
2.381	3/32	4.00	160.00	130.00	28.00	5647 2.380
2.500		4.00	185.00	155.00	28.00	5647 2.500
2.778	7/64	4.00	185.00	155.00	28.00	5647 2.780
3.000		6.00	230.00	190.00	36.00	5647 3.000
3.175	1/8	6.00	230.00	190.00	36.00	5647 3.170
3.500		6.00	230.00	190.00	36.00	5647 3.500
3.572	9/64	6.00	260.00	220.00	36.00	5647 3.570
3.969	5/32	6.00	260.00	220.00	36.00	5647 3.970
4.000		6.00	260.00	220.00	36.00	5647 4.000
4.366	11/64	6.00	290.00	245.00	36.00	5647 4.370
4.763	3/16	6.00	310.00	268.00	36.00	5647 4.760
5.000		6.00	370.00	330.00	36.00	5647 5.000
5.159	13/64	6.00	370.00	330.00	36.00	5647 5.160
5.556	7/32	6.00	370.00	330.00	36.00	5647 5.560
5.953	15/64	6.00	370.00	330.00	36.00	5647 5.950
6.000		6.00	370.00	330.00	36.00	5647 6.000
6.350	1/4	8.00	430.00	385.00	36.00	5647 6.350
6.500		8.00	430.00	385.00	36.00	5647 6.500
6.747	17/64	8.00	430.00	385.00	36.00	5647 6.750
7.000		8.00	430.00	385.00	36.00	5647 7.000
7.144	9/32	8.00	485.00	440.00	36.00	5647 7.140
7.541	19/64	8.00	485.00	440.00	36.00	5647 7.540
7.938	5/16	8.00	485.00	440.00	36.00	5647 7.940
8.000		8.00	485.00	440.00	36.00	5647 8.000
9.000		10.00	555.00	506.00	40.00	5647 9.000
10.000		10.00	615.00	562.00	40.00	5647 10.000



EB 100 M single-fluted gun drills



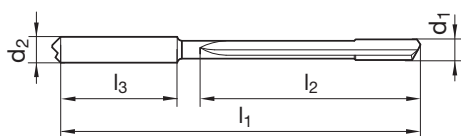
Tool material	Solid carbide
Surface	a
Shank form	HA

P	•	solid carbide shank with MQL shank end • head form G
M	•	
K	○	
N	○	
S	○	
H	○	

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 304



Article no. **5648**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
1.000		3.00	115.00	82.00	28.00	5648 1.000
1.191	3/64	3.00	130.00	98.00	28.00	5648 1.190
1.500		4.00	155.00	124.00	28.00	5648 1.500
1.588	1/16	4.00	165.00	131.00	28.00	5648 1.590
1.984	5/64	4.00	195.00	163.00	28.00	5648 1.980
2.000		4.00	195.00	165.00	28.00	5648 2.000
2.381	3/32	4.00	220.00	190.00	28.00	5648 2.380
2.500		4.00	255.00	220.00	28.00	5648 2.500
2.778	7/64	4.00	255.00	220.00	28.00	5648 2.780
3.000		6.00	290.00	247.00	36.00	5648 3.000
3.175	1/8	6.00	320.00	280.00	36.00	5648 3.170
3.500		6.00	320.00	280.00	36.00	5648 3.500
3.572	9/64	6.00	360.00	320.00	36.00	5648 3.570
3.969	5/32	6.00	360.00	320.00	36.00	5648 3.970
4.000		6.00	360.00	320.00	36.00	5648 4.000
4.366	11/64	6.00	395.00	355.00	36.00	5648 4.370
4.763	3/16	6.00	430.00	387.00	36.00	5648 4.760
5.000		6.00	450.00	406.00	36.00	5648 5.000
5.159	13/64	6.00	465.00	419.00	36.00	5648 5.160
5.556	7/32	6.00	525.00	485.00	36.00	5648 5.560
5.953	15/64	6.00	525.00	485.00	36.00	5648 5.950
6.000		6.00	525.00	485.00	36.00	5648 6.000
6.350	1/4	8.00	560.00	516.00	36.00	5648 6.350
6.500		8.00	575.00	528.00	36.00	5648 6.500
6.747	17/64	8.00	595.00	548.00	36.00	5648 6.750
7.000		8.00	615.00	568.00	36.00	5648 7.000
7.144	9/32	8.00	625.00	580.00	36.00	5648 7.140



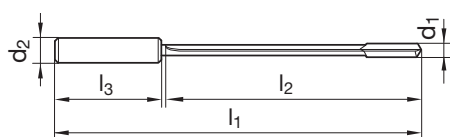
EB 80 single-fluted gun drills

Tool material **Carbide**Surface **C**Shank form **HA**

P	○	head form G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. **5639**

						Order no.
d1		d2 h6	l1	l2	l3	
mm	inch	mm	mm	mm	mm	
3.969	5/32	10.00	150.00	100.00	40.00	5639 3.970
4.000		12.00	150.00	100.00	45.00	5639 4.000
4.200		12.00	160.00	110.00	45.00	5639 4.200
4.500		12.00	170.00	120.00	45.00	5639 4.500
5.000		16.00	180.00	130.00	48.00	5639 5.000
5.159	13/64	16.00	180.00	130.00	48.00	5639 5.156
5.500		16.00	190.00	140.00	48.00	5639 5.500
6.000		16.00	210.00	160.00	48.00	5639 6.000
6.350	1/4	16.00	220.00	170.00	48.00	5639 6.350
6.500		16.00	220.00	170.00	48.00	5639 6.500
7.000		16.00	235.00	185.00	48.00	5639 7.000
7.500		16.00	245.00	195.00	48.00	5639 7.500
7.938	5/16	16.00	260.00	210.00	48.00	5639 7.938
8.000		16.00	260.00	210.00	48.00	5639 8.000
8.500		16.00	275.00	220.00	48.00	5639 8.500
9.000		16.00	280.00	230.00	48.00	5639 9.000
9.500		16.00	300.00	245.00	48.00	5639 9.500
9.525	3/8	16.00	290.00	240.00	48.00	5639 9.525
10.000		20.00	320.00	260.00	50.00	5639 10.000
10.500		20.00	330.00	275.00	50.00	5639 10.500
11.000		20.00	340.00	290.00	50.00	5639 11.000
11.113	7/16	20.00	340.00	290.00	50.00	5639 11.113
11.500		20.00	355.00	300.00	50.00	5639 11.500
12.000		20.00	370.00	310.00	50.00	5639 12.000
12.500		20.00	380.00	325.00	50.00	5639 12.500
12.700	1/2	20.00	385.00	330.00	50.00	5639 12.700
13.000		20.00	390.00	335.00	50.00	5639 13.000
13.500		20.00	395.00	340.00	50.00	5639 13.500
14.000		20.00	400.00	345.00	50.00	5639 14.000
14.500		25.00	420.00	355.00	56.00	5639 14.500
15.000		25.00	430.00	370.00	56.00	5639 15.000
15.500		25.00	445.00	380.00	56.00	5639 15.500
16.000		25.00	455.00	395.00	56.00	5639 16.000



EB 80 single-fluted gun drills



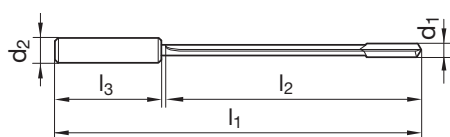
Tool material	Carbide
Surface	C
Shank form	HA

P	○	head form G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304

Drilling tools



Article no. **5640**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.969	5/32	10.00	200.00	155.00	40.00	5640 3.970
4.000		12.00	200.00	155.00	45.00	5640 4.000
4.200		12.00	210.00	165.00	45.00	5640 4.200
4.500		12.00	220.00	175.00	45.00	5640 4.500
5.000		16.00	230.00	182.00	48.00	5640 5.000
5.159	13/64	16.00	230.00	182.00	48.00	5640 5.156
5.500		16.00	245.00	197.00	48.00	5640 5.500
6.000		16.00	260.00	212.00	48.00	5640 6.000
6.350	1/4	16.00	275.00	227.00	48.00	5640 6.350
6.500		16.00	275.00	227.00	48.00	5640 6.500
7.000		16.00	290.00	242.00	48.00	5640 7.000
7.500		16.00	320.00	270.00	48.00	5640 7.500
7.938	5/16	16.00	320.00	272.00	48.00	5640 7.938
8.000		16.00	320.00	272.00	48.00	5640 8.000
8.500		16.00	360.00	305.00	48.00	5640 8.500
9.000		16.00	350.00	302.00	48.00	5640 9.000
9.500		16.00	395.00	340.00	48.00	5640 9.500
9.525	3/8	16.00	380.00	330.00	48.00	5640 9.525
10.000		20.00	400.00	350.00	50.00	5640 10.000
10.500		20.00	435.00	380.00	50.00	5640 10.500
11.000		20.00	430.00	380.00	50.00	5640 11.000
11.113	7/16	20.00	430.00	380.00	50.00	5640 11.113
11.500		20.00	470.00	415.00	50.00	5640 11.500
12.000		20.00	450.00	400.00	50.00	5640 12.000
12.500		20.00	505.00	450.00	50.00	5640 12.500
12.700	1/2	20.00	500.00	450.00	50.00	5640 12.700
13.000		20.00	520.00	465.00	50.00	5640 13.000
13.500		20.00	530.00	475.00	50.00	5640 13.500
14.000		20.00	540.00	485.00	50.00	5640 14.000
14.500		25.00	565.00	500.00	56.00	5640 14.500
15.000		25.00	580.00	520.00	56.00	5640 15.000
15.500		25.00	600.00	535.00	56.00	5640 15.500
16.000		25.00	615.00	555.00	56.00	5640 16.000



EB 80 single-fluted gun drills



Tool material **Carbide**

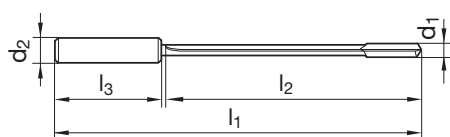
Surface **C**

Shank form HA

P	○	head form G
M	●	
K	○	
N	○	
S	●	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. **5641**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.969	5/32	10.00	230.00	185.00	40.00	5641 3.970
4.000		12.00	230.00	185.00	45.00	5641 4.000
4.200		12.00	240.00	195.00	45.00	5641 4.200
4.500		12.00	250.00	205.00	45.00	5641 4.500
5.000		16.00	280.00	232.00	48.00	5641 5.000
5.159	13/64	16.00	280.00	232.00	48.00	5641 5.156
5.500		16.00	300.00	252.00	48.00	5641 5.500
6.000		16.00	320.00	272.00	48.00	5641 6.000
6.350	1/4	16.00	340.00	292.00	48.00	5641 6.350
6.500		16.00	340.00	292.00	48.00	5641 6.500
7.000		16.00	370.00	322.00	48.00	5641 7.000
7.500		16.00	395.00	345.00	48.00	5641 7.500
7.938	5/16	16.00	420.00	372.00	48.00	5641 7.938
8.000		16.00	420.00	372.00	48.00	5641 8.000
8.500		16.00	445.00	390.00	48.00	5641 8.500
9.000		16.00	450.00	402.00	48.00	5641 9.000
9.500		16.00	490.00	435.00	48.00	5641 9.500
9.525	3/8	16.00	480.00	432.00	48.00	5641 9.525
10.000		20.00	510.00	460.00	50.00	5641 10.000
10.500		20.00	540.00	485.00	50.00	5641 10.500
11.000		20.00	550.00	500.00	50.00	5641 11.000
11.113	7/16	20.00	550.00	500.00	50.00	5641 11.113
11.500		20.00	585.00	530.00	50.00	5641 11.500
12.000		20.00	600.00	550.00	50.00	5641 12.000
12.500		20.00	630.00	575.00	50.00	5641 12.500
12.700	1/2	20.00	635.00	585.00	50.00	5641 12.700
13.000		20.00	650.00	595.00	50.00	5641 13.000
13.500		20.00	660.00	605.00	50.00	5641 13.500
14.000		20.00	680.00	625.00	50.00	5641 14.000
14.500		25.00	710.00	645.00	56.00	5641 14.500
15.000		25.00	730.00	670.00	56.00	5641 15.000
15.500		25.00	755.00	690.00	56.00	5641 15.500
16.000		25.00	775.00	715.00	56.00	5641 16.000



EB 80 single-fluted gun drills

Tool material **Carbide**

Surface

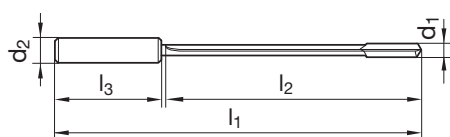
Shank form HA

P	○	head form G
M	●	
K	○	
N	○	max. flute length per tool 40xD, for larger drilling depths apply art. no. 5641 as first tool
S	●	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304

Drilling tools

Article no. **5669**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.969	5/32	10.00	310.00	265.00	40.00	5669 3.970
4.150		12.00	325.00	275.00	45.00	5669 4.150
4.450		12.00	345.00	295.00	45.00	5669 4.450
4.950		16.00	375.00	325.00	48.00	5669 4.950
5.106		16.00	390.00	335.00	48.00	5669 5.106
5.450		16.00	410.00	360.00	48.00	5669 5.450
5.953	15/64	16.00	445.00	390.00	48.00	5669 5.950
6.300		16.00	470.00	415.00	48.00	5669 6.300
6.450		16.00	480.00	425.00	48.00	5669 6.450
6.950		16.00	510.00	460.00	48.00	5669 6.950
7.450		16.00	545.00	490.00	48.00	5669 7.450
7.888		16.00	575.00	520.00	48.00	5669 7.888
7.950		16.00	575.00	525.00	48.00	5669 7.950
8.450		16.00	610.00	555.00	48.00	5669 8.450
8.950		16.00	645.00	590.00	48.00	5669 8.950
9.450		16.00	675.00	625.00	48.00	5669 9.450
9.475		16.00	680.00	625.00	48.00	5669 9.475
9.950		20.00	710.00	655.00	50.00	5669 9.950
10.450		20.00	745.00	690.00	50.00	5669 10.450
10.950		20.00	780.00	725.00	50.00	5669 10.950
11.063		20.00	785.00	730.00	50.00	5669 11.063
11.450		20.00	810.00	755.00	50.00	5669 11.450
11.950		20.00	845.00	790.00	50.00	5669 11.950
12.450		20.00	875.00	820.00	50.00	5669 12.450
12.650		20.00	890.00	835.00	50.00	5669 12.650
12.950		20.00	910.00	855.00	50.00	5669 12.950
13.450		20.00	925.00	870.00	50.00	5669 13.450
13.950		20.00	955.00	900.00	50.00	5669 13.950
14.450		25.00	995.00	935.00	56.00	5669 14.450
14.950		25.00	1025.00	965.00	56.00	5669 14.950
15.450		25.00	1060.00	1000.00	56.00	5669 15.450
15.950		25.00	1090.00	1030.00	56.00	5669 15.950



EB 80 single-fluted gun drills

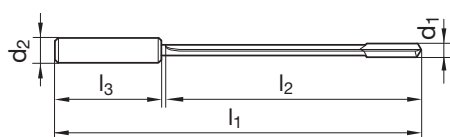


Tool material	Carbide
Surface	C
Shank form	HA

P	○	head form G
M	●	
K	○	
N	○	max. flute length per tool 40xD, for larger drilling depths apply art. no. 5641 as first tool
S	●	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. **5642**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.969	5/32	10.00	390.00	345.00	40.00	5642 3.970
4.150		12.00	405.00	355.00	45.00	5642 4.150
4.450		12.00	430.00	380.00	45.00	5642 4.450
4.950		16.00	480.00	432.00	48.00	5642 4.950
5.106		16.00	480.00	432.00	48.00	5642 5.106
5.450		16.00	520.00	470.00	48.00	5642 5.450
5.953	15/64	16.00	560.00	512.00	48.00	5642 5.950
6.300		16.00	590.00	542.00	48.00	5642 6.300
6.450		16.00	605.00	556.00	48.00	5642 6.450
6.950		16.00	650.00	602.00	48.00	5642 6.950
7.450		16.00	695.00	640.00	48.00	5642 7.450
7.888		16.00	740.00	692.00	48.00	5642 7.888
7.950		16.00	740.00	692.00	48.00	5642 7.950
8.450		16.00	780.00	725.00	48.00	5642 8.450
8.950		16.00	820.00	772.00	48.00	5642 8.950
9.450		16.00	865.00	815.00	48.00	5642 9.450
9.475		16.00	870.00	822.00	48.00	5642 9.475
9.950		20.00	910.00	860.00	50.00	5642 9.950
10.450		20.00	955.00	900.00	50.00	5642 10.450
10.950		20.00	995.00	945.00	50.00	5642 10.950
11.063		20.00	995.00	945.00	50.00	5642 11.063
11.450		20.00	1040.00	985.00	50.00	5642 11.450
11.950		20.00	1080.00	1030.00	50.00	5642 11.950
12.450		20.00	1125.00	1070.00	50.00	5642 12.450
12.650		20.00	1140.00	1090.00	50.00	5642 12.650
12.950		20.00	1170.00	1115.00	50.00	5642 12.950
13.450		20.00	1195.00	1140.00	50.00	5642 13.450
13.950		20.00	1235.00	1180.00	50.00	5642 13.950
14.450		25.00	1285.00	1225.00	56.00	5642 14.450
14.950		25.00	1325.00	1265.00	56.00	5642 14.950
15.450		25.00	1370.00	1310.00	56.00	5642 15.450
15.950		25.00	1410.00	1350.00	56.00	5642 15.950



EB 80 XXL single-fluted gun drills



Tool material **Carbide**
 Surface **S**
 Shank form **TBM-SEH**



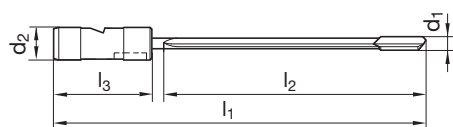
bright flute • head form G • driver for deep drilling machines

P	•
M	○
K	•
N	•
S	○
H	○

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 304



Article no. **5688**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.000		25.00	600.00	500.00	70.00	5688 3.000
4.000		25.00	600.00	500.00	70.00	5688 4.000
5.000		25.00	600.00	500.00	70.00	5688 5.000
6.000		25.00	600.00	500.00	70.00	5688 6.000
7.000		25.00	600.00	500.00	70.00	5688 7.000
8.000		25.00	600.00	500.00	70.00	5688 8.000
9.000		25.00	600.00	500.00	70.00	5688 9.000
10.000		25.00	600.00	500.00	70.00	5688 10.000
11.000		25.00	600.00	500.00	70.00	5688 11.000
11.500		25.00	600.00	500.00	70.00	5688 11.500
12.000		25.00	600.00	500.00	70.00	5688 12.000
13.000		25.00	600.00	500.00	70.00	5688 13.000
14.000		25.00	600.00	500.00	70.00	5688 14.000
15.000		25.00	600.00	500.00	70.00	5688 15.000
16.000		25.00	600.00	500.00	70.00	5688 16.000
17.000		25.00	600.00	500.00	70.00	5688 17.000
18.000		25.00	600.00	500.00	70.00	5688 18.000
19.000		25.00	600.00	500.00	70.00	5688 19.000
20.000		25.00	600.00	500.00	70.00	5688 20.000
21.000		25.00	600.00	500.00	70.00	5688 21.000
22.000		25.00	600.00	500.00	70.00	5688 22.000
23.000		25.00	600.00	500.00	70.00	5688 23.000
24.000		25.00	600.00	500.00	70.00	5688 24.000
25.000	63/64	25.00	600.00	500.00	70.00	5688 25.000



EB 80 XXL single-fluted gun drills

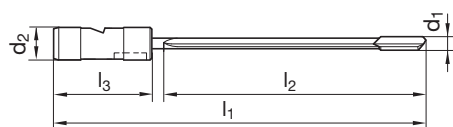


Tool material	Carbide
Surface	S
Shank form	TBM-SEH

P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. 5691						
d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.000		25.00	800.00	700.00	70.00	5691 3.000
4.000		25.00	800.00	700.00	70.00	5691 4.000
5.000		25.00	800.00	700.00	70.00	5691 5.000
6.000		25.00	800.00	700.00	70.00	5691 6.000
7.000		25.00	800.00	700.00	70.00	5691 7.000
8.000		25.00	800.00	700.00	70.00	5691 8.000
9.000		25.00	800.00	700.00	70.00	5691 9.000
10.000		25.00	800.00	700.00	70.00	5691 10.000
11.000		25.00	800.00	700.00	70.00	5691 11.000
11.500		25.00	800.00	700.00	70.00	5691 11.500
12.000		25.00	800.00	700.00	70.00	5691 12.000
13.000		25.00	800.00	700.00	70.00	5691 13.000
14.000		25.00	800.00	700.00	70.00	5691 14.000
15.000		25.00	800.00	700.00	70.00	5691 15.000
16.000		25.00	800.00	700.00	70.00	5691 16.000
17.000		25.00	800.00	700.00	70.00	5691 17.000
18.000		25.00	800.00	700.00	70.00	5691 18.000
19.000		25.00	800.00	700.00	70.00	5691 19.000
20.000		25.00	800.00	700.00	70.00	5691 20.000
21.000		25.00	800.00	700.00	70.00	5691 21.000
22.000		25.00	800.00	700.00	70.00	5691 22.000
23.000		25.00	800.00	700.00	70.00	5691 23.000
24.000		25.00	800.00	700.00	70.00	5691 24.000
25.000	63/64	25.00	800.00	700.00	70.00	5691 25.000



EB 80 XXL single-fluted gun drills



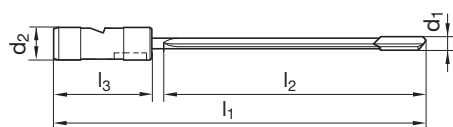
Tool material	Carbide
Surface	S
Shank form	TBM-SEH

P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 304



Article no. **5164**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
3.000		25.00	1000.00	900.00	70.00	5164 3.000
4.000		25.00	1000.00	900.00	70.00	5164 4.000
5.000		25.00	1000.00	900.00	70.00	5164 5.000
6.000		25.00	1000.00	900.00	70.00	5164 6.000
7.000		25.00	1000.00	900.00	70.00	5164 7.000
8.000		25.00	1000.00	900.00	70.00	5164 8.000
9.000		25.00	1000.00	900.00	70.00	5164 9.000
10.000		25.00	1000.00	900.00	70.00	5164 10.000
11.000		25.00	1000.00	900.00	70.00	5164 11.000
11.500		25.00	1000.00	900.00	70.00	5164 11.500
12.000		25.00	1000.00	900.00	70.00	5164 12.000
13.000		25.00	1000.00	900.00	70.00	5164 13.000
14.000		25.00	1000.00	900.00	70.00	5164 14.000
15.000		25.00	1000.00	900.00	70.00	5164 15.000
16.000		25.00	1000.00	900.00	70.00	5164 16.000
17.000		25.00	1000.00	900.00	70.00	5164 17.000
18.000		25.00	1000.00	900.00	70.00	5164 18.000
19.000		25.00	1000.00	900.00	70.00	5164 19.000
20.000		25.00	1000.00	900.00	70.00	5164 20.000
21.000		25.00	1000.00	900.00	70.00	5164 21.000
22.000		25.00	1000.00	900.00	70.00	5164 22.000
23.000		25.00	1000.00	900.00	70.00	5164 23.000
24.000		25.00	1000.00	900.00	70.00	5164 24.000
25.000	63/64	25.00	1000.00	900.00	70.00	5164 25.000



EB 80 XXL single-fluted gun drills

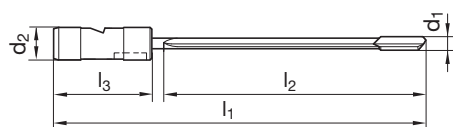


Tool material	Carbide
Surface	S
Shank form	TBM-SEH

P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. 5692						Order no.
d1		d2 h6	l1	l2	l3	
mm	inch	mm	mm	mm	mm	
3.000		25.00	1200.00	1100.00	70.00	5692 3.000
4.000		25.00	1200.00	1100.00	70.00	5692 4.000
5.000		25.00	1200.00	1100.00	70.00	5692 5.000
6.000		25.00	1200.00	1100.00	70.00	5692 6.000
7.000		25.00	1200.00	1100.00	70.00	5692 7.000
8.000		25.00	1200.00	1100.00	70.00	5692 8.000
9.000		25.00	1200.00	1100.00	70.00	5692 9.000
10.000		25.00	1200.00	1100.00	70.00	5692 10.000
11.000		25.00	1200.00	1100.00	70.00	5692 11.000
11.500		25.00	1200.00	1100.00	70.00	5692 11.500
12.000		25.00	1200.00	1100.00	70.00	5692 12.000
13.000		25.00	1200.00	1100.00	70.00	5692 13.000
14.000		25.00	1200.00	1100.00	70.00	5692 14.000
15.000		25.00	1200.00	1100.00	70.00	5692 15.000
16.000		25.00	1200.00	1100.00	70.00	5692 16.000
17.000		25.00	1200.00	1100.00	70.00	5692 17.000
18.000		25.00	1200.00	1100.00	70.00	5692 18.000
19.000		25.00	1200.00	1100.00	70.00	5692 19.000
20.000		25.00	1200.00	1100.00	70.00	5692 20.000
21.000		25.00	1200.00	1100.00	70.00	5692 21.000
22.000		25.00	1200.00	1100.00	70.00	5692 22.000
23.000		25.00	1200.00	1100.00	70.00	5692 23.000
24.000		25.00	1200.00	1100.00	70.00	5692 24.000
25.000	63/64	25.00	1200.00	1100.00	70.00	5692 25.000



EB 80 XXL single-fluted gun drills



Tool material	Carbide
Surface	S
Shank form	TBM-SEH

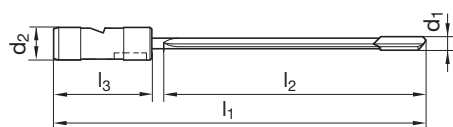


P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 304



Article no. **5681**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
4.000		25.00	1400.00	1300.00	70.00	5681 4.000
5.000		25.00	1400.00	1300.00	70.00	5681 5.000
6.000		25.00	1400.00	1300.00	70.00	5681 6.000
7.000		25.00	1400.00	1300.00	70.00	5681 7.000
8.000		25.00	1400.00	1300.00	70.00	5681 8.000
9.000		25.00	1400.00	1300.00	70.00	5681 9.000
10.000		25.00	1400.00	1300.00	70.00	5681 10.000
11.000		25.00	1400.00	1300.00	70.00	5681 11.000
11.500		25.00	1400.00	1300.00	70.00	5681 11.500
12.000		25.00	1400.00	1300.00	70.00	5681 12.000
13.000		25.00	1400.00	1300.00	70.00	5681 13.000
14.000		25.00	1400.00	1300.00	70.00	5681 14.000
15.000		25.00	1400.00	1300.00	70.00	5681 15.000
16.000		25.00	1400.00	1300.00	70.00	5681 16.000
17.000		25.00	1400.00	1300.00	70.00	5681 17.000
18.000		25.00	1400.00	1300.00	70.00	5681 18.000
19.000		25.00	1400.00	1300.00	70.00	5681 19.000
20.000		25.00	1400.00	1300.00	70.00	5681 20.000
21.000		25.00	1400.00	1300.00	70.00	5681 21.000
22.000		25.00	1400.00	1300.00	70.00	5681 22.000
23.000		25.00	1400.00	1300.00	70.00	5681 23.000
24.000		25.00	1400.00	1300.00	70.00	5681 24.000
25.000	63/64	25.00	1400.00	1300.00	70.00	5681 25.000



EB 80 XXL single-fluted gun drills

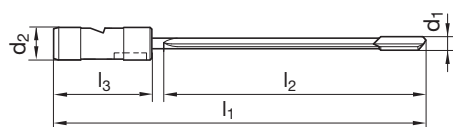


Tool material	Carbide
Surface	S
Shank form	TBM-SEH

P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. 5693						
d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
4.000		25.00	1600.00	1500.00	70.00	5693 4.000
5.000		25.00	1600.00	1500.00	70.00	5693 5.000
5.500		25.00	1600.00	1500.00	70.00	5693 5.500
6.000		25.00	1600.00	1500.00	70.00	5693 6.000
6.500		25.00	1600.00	1500.00	70.00	5693 6.500
7.000		25.00	1600.00	1500.00	70.00	5693 7.000
7.500		25.00	1600.00	1500.00	70.00	5693 7.500
8.000		25.00	1600.00	1500.00	70.00	5693 8.000
9.000		25.00	1600.00	1500.00	70.00	5693 9.000
9.500		25.00	1600.00	1500.00	70.00	5693 9.500
10.000		25.00	1600.00	1500.00	70.00	5693 10.000
11.000		25.00	1600.00	1500.00	70.00	5693 11.000
11.500		25.00	1600.00	1500.00	70.00	5693 11.500
12.000		25.00	1600.00	1500.00	70.00	5693 12.000
13.000		25.00	1600.00	1500.00	70.00	5693 13.000
14.000		25.00	1600.00	1500.00	70.00	5693 14.000
15.000		25.00	1600.00	1500.00	70.00	5693 15.000
16.000		25.00	1600.00	1500.00	70.00	5693 16.000
17.000		25.00	1600.00	1500.00	70.00	5693 17.000
18.000		25.00	1600.00	1500.00	70.00	5693 18.000
19.000		25.00	1600.00	1500.00	70.00	5693 19.000
20.000		25.00	1600.00	1500.00	70.00	5693 20.000
21.000		25.00	1600.00	1500.00	70.00	5693 21.000
22.000		25.00	1600.00	1500.00	70.00	5693 22.000
23.000		25.00	1600.00	1500.00	70.00	5693 23.000
24.000		25.00	1600.00	1500.00	70.00	5693 24.000
25.000	63/64	25.00	1600.00	1500.00	70.00	5693 25.000



EB 80 XXL single-fluted gun drills



Tool material	Carbide
Surface	S
Shank form	TBM-SEH

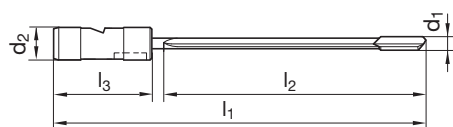


P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

Drilling tools

GÜHRING NAVIGATOR

Cutting data page 304



Article no. **5682**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
4.000		25.00	1800.00	1700.00	70.00	5682 4.000
5.000		25.00	1800.00	1700.00	70.00	5682 5.000
6.000		25.00	1800.00	1700.00	70.00	5682 6.000
7.000		25.00	1800.00	1700.00	70.00	5682 7.000
8.000		25.00	1800.00	1700.00	70.00	5682 8.000
9.000		25.00	1800.00	1700.00	70.00	5682 9.000
10.000		25.00	1800.00	1700.00	70.00	5682 10.000
11.000		25.00	1800.00	1700.00	70.00	5682 11.000
11.500		25.00	1800.00	1700.00	70.00	5682 11.500
12.000		25.00	1800.00	1700.00	70.00	5682 12.000
13.000		25.00	1800.00	1700.00	70.00	5682 13.000
14.000		25.00	1800.00	1700.00	70.00	5682 14.000
15.000		25.00	1800.00	1700.00	70.00	5682 15.000
16.000		25.00	1800.00	1700.00	70.00	5682 16.000
17.000		25.00	1800.00	1700.00	70.00	5682 17.000
18.000		25.00	1800.00	1700.00	70.00	5682 18.000
19.000		25.00	1800.00	1700.00	70.00	5682 19.000
20.000		25.00	1800.00	1700.00	70.00	5682 20.000
21.000		25.00	1800.00	1700.00	70.00	5682 21.000
22.000		25.00	1800.00	1700.00	70.00	5682 22.000
23.000		25.00	1800.00	1700.00	70.00	5682 23.000
24.000		25.00	1800.00	1700.00	70.00	5682 24.000
25.000	63/64	25.00	1800.00	1700.00	70.00	5682 25.000
26.000		25.00	1800.00	1695.00	75.00	5682 26.000
27.000		25.00	1800.00	1695.00	75.00	5682 27.000
28.000		25.00	1800.00	1695.00	75.00	5682 28.000
29.000		25.00	1800.00	1695.00	75.00	5682 29.000
30.000		25.00	1800.00	1695.00	75.00	5682 30.000
31.000		25.00	1800.00	1695.00	75.00	5682 31.000
32.000		25.00	1800.00	1695.00	75.00	5682 32.000



EB 80 XXL single-fluted gun drills

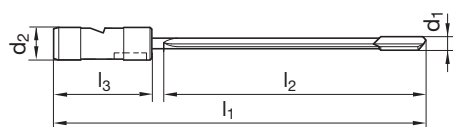


Tool material	Carbide
Surface	S
Shank form	TBM-SEH

P	•	bright flute • head form G • driver for deep drilling machines
M	○	
K	•	
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 304



Drilling tools

Article no. **5694**

d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm	
4.000		25.00	2000.00	1900.00	70.00	5694 4.000
5.000		25.00	2000.00	1900.00	70.00	5694 5.000
6.000		25.00	2000.00	1900.00	70.00	5694 6.000
7.000		25.00	2000.00	1900.00	70.00	5694 7.000
8.000		25.00	2000.00	1900.00	70.00	5694 8.000
9.000		25.00	2000.00	1900.00	70.00	5694 9.000
10.000		25.00	2000.00	1900.00	70.00	5694 10.000
11.000		25.00	2000.00	1900.00	70.00	5694 11.000
11.500		25.00	2000.00	1900.00	70.00	5694 11.500
12.000		25.00	2000.00	1900.00	70.00	5694 12.000
13.000		25.00	2000.00	1900.00	70.00	5694 13.000
14.000		25.00	2000.00	1900.00	70.00	5694 14.000
15.000		25.00	2000.00	1900.00	70.00	5694 15.000
16.000		25.00	2000.00	1900.00	70.00	5694 16.000
17.000		25.00	2000.00	1900.00	70.00	5694 17.000
18.000		25.00	2000.00	1900.00	70.00	5694 18.000
19.000		25.00	2000.00	1900.00	70.00	5694 19.000
20.000		25.00	2000.00	1900.00	70.00	5694 20.000
21.000		25.00	2000.00	1900.00	70.00	5694 21.000
22.000		25.00	2000.00	1900.00	70.00	5694 22.000
23.000		25.00	2000.00	1900.00	70.00	5694 23.000
24.000		25.00	2000.00	1900.00	70.00	5694 24.000
25.000	63/64	25.00	2000.00	1900.00	70.00	5694 25.000
26.000		25.00	2000.00	1895.00	75.00	5694 26.000
27.000		25.00	2000.00	1895.00	75.00	5694 27.000
28.000		25.00	2000.00	1895.00	75.00	5694 28.000
29.000		25.00	2000.00	1895.00	75.00	5694 29.000
30.000		25.00	2000.00	1895.00	75.00	5694 30.000
31.000		25.00	2000.00	1895.00	75.00	5694 31.000
32.000		25.00	2000.00	1895.00	75.00	5694 32.000



Drill bushes



Tool material

Solid carbide

special dimensions on request



Article no.

5748

d2 F7 mm	d1 n6 mm	l1 mm	Order no.	d2 F7 mm	d1 n6 mm	l1 mm	Order no.
0.900	3.000	9.00	5748 0.900	14.020	22.000	28.00	5748 14.020
1.590	4.000	9.00	5748 1.590	14.030	22.000	28.00	5748 14.030
1.600	4.000	9.00	5748 1.600	14.400	22.000	28.00	5748 14.400
1.605	4.000	9.00	5748 1.605	15.020	22.000	28.00	5748 15.020
2.000	5.000	9.00	5748 2.000	16.000	26.000	28.00	5748 16.000
2.030	5.000	9.00	5748 2.030	16.030	26.000	28.00	5748 16.030
2.040	5.000	9.00	5748 2.040	16.200	26.000	28.00	5748 16.200
2.500	5.000	9.00	5748 2.500	18.000	26.000	28.00	5748 18.000
3.000	6.000	12.00	5748 3.000	18.030	26.000	28.00	5748 18.030
3.500	7.000	12.00	5748 3.500	18.050	26.000	28.00	5748 18.050
3.750	7.000	12.00	5748 3.750	18.100	30.000	36.00	5748 18.100
4.000	7.000	12.00	5748 4.000	20.000	30.000	36.00	5748 20.000
4.500	8.000	12.00	5748 4.500	20.030	30.000	36.00	5748 20.030
5.000	8.000	12.00	5748 5.000	22.000	30.000	36.00	5748 22.000
5.200	10.000	16.00	5748 5.200	22.030	30.000	36.00	5748 22.030
5.500	10.000	16.00	5748 5.500	22.120	35.000	36.00	5748 22.120
5.515	10.000	16.00	5748 5.515	23.500	35.000	36.00	5748 23.500
5.525	10.000	16.00	5748 5.525	24.000	35.000	36.00	5748 24.000
6.000	10.000	16.00	5748 6.000	24.030	35.000	36.00	5748 24.030
6.100	12.000	16.00	5748 6.100	25.000	35.000	36.00	5748 25.000
6.900	12.000	16.00	5748 6.900	26.000	35.000	36.00	5748 26.000
7.100	12.000	16.00	5748 7.100	28.000	42.000	45.00	5748 28.000
8.000	12.000	16.00	5748 8.000	30.000	42.000	45.00	5748 30.000
8.015	12.000	16.00	5748 8.015	34.000	48.000	45.00	5748 34.000
8.510	15.000	20.00	5748 8.510	35.000	48.000	45.00	5748 35.000
10.000	15.000	20.00	5748 10.000	40.000	55.000	55.00	5748 40.000
10.100	18.000	20.00	5748 10.100				
10.920	18.000	20.00	5748 10.920				
11.000	18.000	20.00	5748 11.000				
12.000	18.000	20.00	5748 12.000				
12.030	18.000	20.00	5748 12.030				
12.100	22.000	28.00	5748 12.100				
12.600	22.000	28.00	5748 12.600				
13.000	22.000	28.00	5748 13.000				
13.020	22.000	28.00	5748 13.020				
14.000	22.000	28.00	5748 14.000				



Drill bushes



Tool material

HSS

special dimensions on request



Article no.

5747

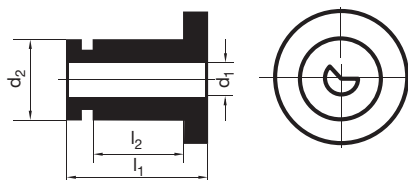
d2 F7 mm	d1 n6 mm	l1 mm	Order no.	d2 F7 mm	d1 n6 mm	l1 mm	Order no.
0.900	3.000	9.00	5747 0.900	5.400	10.000	16.00	5747 5.400
1.110	4.000	9.00	5747 1.110	5.500	10.000	16.00	5747 5.500
1.200	4.000	9.00	5747 1.200	5.600	10.000	16.00	5747 5.600
1.210	4.000	9.00	5747 1.210	5.800	10.000	16.00	5747 5.800
1.310	4.000	9.00	5747 1.310	5.950	10.000	16.00	5747 5.950
1.400	4.000	9.00	5747 1.400	6.000	10.000	16.00	5747 6.000
1.410	4.000	9.00	5747 1.410	6.050	10.000	16.00	5747 6.050
1.510	4.000	9.00	5747 1.510	6.100	12.000	16.00	5747 6.100
1.600	4.000	9.00	5747 1.600	6.300	12.000	16.00	5747 6.300
1.650	4.000	9.00	5747 1.650	6.350	12.000	16.00	5747 6.350
1.710	4.000	9.00	5747 1.710	6.370	12.000	16.00	5747 6.370
1.810	4.000	9.00	5747 1.810	6.450	12.000	16.00	5747 6.450
2.000	5.000	9.00	5747 2.000	6.502	12.000	16.00	5747 6.502
2.200	5.000	9.00	5747 2.200	6.600	12.000	16.00	5747 6.600
2.300	5.000	9.00	5747 2.300	6.730	12.000	16.00	5747 6.730
2.340	5.000	9.00	5747 2.340	6.731	12.000	16.00	5747 6.731
2.500	5.000	9.00	5747 2.500	6.750	12.000	16.00	5747 6.750
2.700	6.000	12.00	5747 2.700	6.800	12.000	16.00	5747 6.800
2.800	6.000	12.00	5747 2.800	6.950	12.000	16.00	5747 6.950
3.000	6.000	12.00	5747 3.000	7.000	12.000	16.00	5747 7.000
3.100	6.000	12.00	5747 3.100	7.100	12.000	16.00	5747 7.100
3.255	6.000	12.00	5747 3.255	7.400	12.000	16.00	5747 7.400
3.300	6.000	12.00	5747 3.300	7.500	12.000	16.00	5747 7.500
3.400	7.000	12.00	5747 3.400	7.550	12.000	16.00	5747 7.550
3.500	7.000	12.00	5747 3.500	7.600	12.000	16.00	5747 7.600
3.650	7.000	12.00	5747 3.650	7.800	12.000	16.00	5747 7.800
3.700	7.000	12.00	5747 3.700	7.830	12.000	16.00	5747 7.830
3.710	7.000	12.00	5747 3.710	7.850	12.000	16.00	5747 7.850
3.800	7.000	12.00	5747 3.800	7.938	12.000	16.00	5747 7.938
4.000	7.000	12.00	5747 4.000	8.000	12.000	16.00	5747 8.000
4.100	8.000	12.00	5747 4.100	8.020	12.000	16.00	5747 8.020
4.300	8.000	12.00	5747 4.300	8.050	12.000	16.00	5747 8.050
4.500	8.000	12.00	5747 4.500	8.100	15.000	20.00	5747 8.100
4.600	8.000	12.00	5747 4.600	8.500	15.000	20.00	5747 8.500
4.760	8.000	12.00	5747 4.760	8.530	15.000	20.00	5747 8.530
4.763	8.000	12.00	5747 4.763	8.800	15.000	20.00	5747 8.800
4.800	8.000	12.00	5747 4.800	8.950	15.000	20.00	5747 8.950
5.000	8.000	12.00	5747 5.000	9.000	15.000	20.00	5747 9.000
5.020	8.000	12.00	5747 5.020	9.100	15.000	20.00	5747 9.100
5.100	10.000	16.00	5747 5.100	9.200	15.000	20.00	5747 9.200
5.200	10.000	16.00	5747 5.200	9.300	15.000	20.00	5747 9.300
5.300	10.000	16.00	5747 5.300	9.500	15.000	20.00	5747 9.500



d2 F7	d1 n6	l1	Order no.	d2 F7	d1 n6	l1	Order no.
mm	mm	mm		mm	mm	mm	
9.525	15.000	20.00	5747 9.525	16.330	26.000	28.00	5747 16.330
9.530	15.000	20.00	5747 9.530	17.040	26.000	28.00	5747 17.040
9.570	15.000	20.00	5747 9.570	17.080	26.000	28.00	5747 17.080
9.652	15.000	20.00	5747 9.652	18.000	26.000	28.00	5747 18.000
9.800	15.000	20.00	5747 9.800	18.100	30.000	36.00	5747 18.100
10.000	15.000	20.00	5747 10.000	18.255	30.000	36.00	5747 18.255
10.100	18.000	20.00	5747 10.100	18.450	30.000	36.00	5747 18.450
10.420	18.000	20.00	5747 10.420	19.000	30.000	36.00	5747 19.000
10.600	18.000	20.00	5747 10.600	19.050	30.000	36.00	5747 19.050
10.725	18.000	20.00	5747 10.725	19.300	30.000	36.00	5747 19.300
11.000	18.000	20.00	5747 11.000	19.500	30.000	36.00	5747 19.500
11.080	18.000	20.00	5747 11.080	19.700	30.000	36.00	5747 19.700
11.100	18.000	20.00	5747 11.100	20.000	30.000	36.00	5747 20.000
11.113	18.000	20.00	5747 11.113	21.050	30.000	36.00	5747 21.050
11.500	18.000	20.00	5747 11.500	22.000	30.000	36.00	5747 22.000
11.600	18.000	20.00	5747 11.600	22.100	35.000	36.00	5747 22.100
12.000	18.000	20.00	5747 12.000	22.120	35.000	36.00	5747 22.120
12.020	18.000	20.00	5747 12.020	22.225	35.000	36.00	5747 22.225
12.100	22.000	28.00	5747 12.100	23.500	35.000	36.00	5747 23.500
12.530	22.000	28.00	5747 12.530	24.000	35.000	36.00	5747 24.000
12.600	22.000	28.00	5747 12.600	24.500	35.000	36.00	5747 24.500
12.700	22.000	28.00	5747 12.700	25.000	35.000	36.00	5747 25.000
12.800	22.000	28.00	5747 12.800	25.250	35.000	36.00	5747 25.250
12.954	22.000	28.00	5747 12.954	25.400	35.000	36.00	5747 25.400
13.000	22.000	28.00	5747 13.000	26.000	35.000	36.00	5747 26.000
13.400	22.000	28.00	5747 13.400	28.000	42.000	45.00	5747 28.000
13.500	22.000	28.00	5747 13.500	28.169	42.000	45.00	5747 28.169
13.700	22.000	28.00	5747 13.700	30.000	42.000	45.00	5747 30.000
13.800	22.000	28.00	5747 13.800	30.100	48.000	45.00	5747 30.100
14.000	22.000	28.00	5747 14.000	32.000	48.000	45.00	5747 32.000
14.310	22.000	28.00	5747 14.310	34.000	48.000	45.00	5747 34.000
14.620	22.000	28.00	5747 14.620	35.000	48.000	45.00	5747 35.000
14.770	22.000	28.00	5747 14.770	38.100	55.000	56.00	5747 38.100
15.000	22.000	28.00	5747 15.000	39.000	55.000	56.00	5747 39.000
15.875	26.000	28.00	5747 15.875	40.000	55.000	56.00	5747 40.000
16.000	26.000	28.00	5747 16.000				


Moulded steady rest bushings for single-fluted gun drills


special dimensions on request • d1 = gun drill nominal diameter


 Article no. **5750**

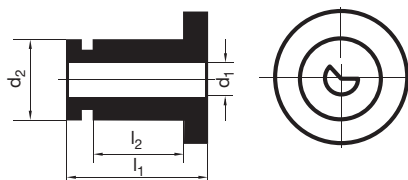
d1	d2 n6	l1	l2	Order no.	d1	d2 n6	l1	l2	Order no.
	mm	mm	mm			mm	mm	mm	
2.000-2.099	20	20	12	5750 201.900	3.960-4.259	30	26	14	5750 303.700
2.100-2.199	20	20	12	5750 202.000	4.260-4.499	30	26	14	5750 304.000
2.200-2.299	20	20	12	5750 202.100	4.500-4.749	30	26	14	5750 304.200
2.300-2.399	20	20	12	5750 202.200	4.750-4.999	30	26	14	5750 304.500
2.400-2.499	20	20	12	5750 202.300	5.000-5.249	30	26	14	5750 304.700
2.500-2.599	20	20	12	5750 202.400	5.250-5.499	30	26	14	5750 305.000
2.600-2.699	20	20	12	5750 202.500	5.500-5.749	30	26	14	5750 305.200
2.700-2.799	20	20	12	5750 202.600	5.750-5.999	30	26	14	5750 305.500
2.800-2.899	20	20	12	5750 202.700	6.000-6.249	30	26	14	5750 305.700
2.900-3.099	20	20	12	5750 202.800	6.250-6.449	30	26	14	5750 306.000
3.100-3.359	20	20	12	5750 203.000	6.450-6.749	30	26	14	5750 306.200
3.360-3.459	20	20	12	5750 203.200	6.750-6.999	30	26	14	5750 306.500
3.460-3.559	20	20	12	5750 203.300	7.000-7.299	30	26	14	5750 306.700
3.560-3.799	20	20	12	5750 203.400	7.300-7.599	30	26	14	5750 307.000
3.800-3.959	20	20	12	5750 203.600	7.600-7.799	30	26	14	5750 307.300
3.960-4.259	20	20	12	5750 203.700	7.800-7.999	30	26	14	5750 307.500
4.260-4.499	20	20	12	5750 204.000	8.000-8.299	30	26	14	5750 307.700
4.500-4.749	20	20	12	5750 204.200	8.300-8.699	30	26	14	5750 308.000
4.750-4.999	20	20	12	5750 204.500	8.700-8.999	30	26	14	5750 308.400
5.000-5.249	20	20	12	5750 204.700	9.000-9.299	30	26	14	5750 308.700
5.250-5.499	20	20	12	5750 205.000	9.300-9.699	30	26	14	5750 309.000
5.500-5.749	20	20	12	5750 205.200	9.700-9.999	30	26	14	5750 309.400
5.750-5.999	20	20	12	5750 205.500	10.000-10.299	30	26	14	5750 309.700
6.000-6.249	20	20	12	5750 205.700	10.300-10.799	30	26	14	5750 310.000
6.250-6.449	20	20	12	5750 206.000	10.800-11.299	30	26	14	5750 310.500
6.450-6.749	20	20	12	5750 206.200	11.300-11.799	30	26	14	5750 311.000
6.750-6.999	20	20	12	5750 206.500	11.800-12.399	30	26	14	5750 311.500
7.000-7.299	20	20	12	5750 206.700	12.400-12.899	30	26	14	5750 312.000
7.300-7.599	20	20	12	5750 207.000	12.900-13.399	30	26	14	5750 312.500
7.600-7.799	20	20	12	5750 207.300	13.400-13.899	30	26	14	5750 313.000
7.800-7.999	20	20	12	5750 207.500	13.900-14.399	30	26	14	5750 313.500
8.000-8.299	20	20	12	5750 207.700	14.400-14.899	30	26	14	5750 314.000
8.300-8.699	20	20	12	5750 208.000	14.900-15.399	30	26	14	5750 314.500
8.700-8.999	20	20	12	5750 208.400	15.400-15.899	30	26	14	5750 315.000
9.000-9.299	20	20	12	5750 208.700	15.900-16.399	30	26	14	5750 315.500
9.300-9.699	20	20	12	5750 209.000	16.400-16.899	30	26	14	5750 316.000
9.700-9.999	20	20	12	5750 209.400	16.900-17.399	30	26	14	5750 316.500
10.000-10.299	20	20	12	5750 209.700	17.400-17.899	30	26	14	5750 317.000
10.300-10.799	20	20	12	5750 210.000	17.900-18.399	30	26	14	5750 317.500
10.800-11.299	20	20	12	5750 210.500	18.400-19.509	30	26	14	5750 318.000
11.300-11.799	20	20	12	5750 211.000	19.510-20.509	30	26	14	5750 319.000
11.800-12.399	20	20	12	5750 211.500	20.510-21.509	30	26	14	5750 320.000
2.900-3.099	30	26	14	5750 302.800	21.510-22.609	30	26	14	5750 321.000
3.100-3.359	30	26	14	5750 303.000	22.610-23.609	30	26	14	5750 322.000
3.360-3.459	30	26	14	5750 303.200	23.610-24.609	30	26	14	5750 323.000
3.460-3.559	30	26	14	5750 303.300	24.610-25.609	30	26	14	5750 324.000
3.560-3.799	30	26	14	5750 303.400	3.100-3.359	45	26	16	5750 403.000
3.800-3.959	30	26	14	5750 303.600	3.360-3.459	45	26	16	5750 403.200



d1	d2 n6	l1	l2	Order no.	d1	d2 n6	l1	l2	Order no.
	mm	mm	mm			mm	mm	mm	
3.460-3.559	45	26	16	5750 403.300	15.400-15.899	45	26	16	5750 415.000
3.560-3.799	45	26	16	5750 403.400	15.900-16.399	45	26	16	5750 415.500
3.800-3.959	45	26	16	5750 403.600	16.400-16.899	45	26	16	5750 416.000
3.960-4.259	45	26	16	5750 403.700	16.900-17.399	45	26	16	5750 416.500
4.260-4.499	45	26	16	5750 404.000	17.400-17.899	45	26	16	5750 417.000
4.500-4.749	45	26	16	5750 404.200	17.900-18.399	45	26	16	5750 417.500
4.750-4.999	45	26	16	5750 404.500	18.400-19.509	45	26	16	5750 418.000
5.000-5.249	45	26	16	5750 404.700	19.510-20.509	45	26	16	5750 419.000
5.250-5.499	45	26	16	5750 405.000	20.510-21.509	45	26	16	5750 420.000
5.500-5.749	45	26	16	5750 405.200	21.510-22.609	45	26	16	5750 421.000
5.750-5.999	45	26	16	5750 405.500	22.610-23.609	45	26	16	5750 422.000
6.000-6.249	45	26	16	5750 405.700	23.610-24.609	45	26	16	5750 423.000
6.250-6.449	45	26	16	5750 406.000	24.610-25.609	45	26	16	5750 424.000
6.450-6.749	45	26	16	5750 406.200	25.610-26.609	45	26	16	5750 425.000
6.750-6.999	45	26	16	5750 406.500	26.610-27.609	45	26	16	5750 426.000
7.000-7.299	45	26	16	5750 406.700	27.610-28.609	45	26	16	5750 427.000
7.300-7.599	45	26	16	5750 407.000	28.610-29.609	45	26	16	5750 428.000
7.600-7.799	45	26	16	5750 407.300	29.610-30.609	45	26	16	5750 429.000
7.800-7.999	45	26	16	5750 407.500	30.610-32.609	45	26	16	5750 430.000
8.000-8.299	45	26	16	5750 407.700	32.610-34.699	45	26	16	5750 432.000
8.300-8.699	45	26	16	5750 408.000	34.700-36.699	45	26	16	5750 434.000
8.700-8.999	45	26	16	5750 408.400	34.700-36.699	55	26	14	5750 534.000
9.000-9.299	45	26	16	5750 408.700	36.700-38.699	55	26	14	5750 536.000
9.300-9.699	45	26	16	5750 409.000	38.700-42.699	55	26	14	5750 538.000
9.700-9.999	45	26	16	5750 409.400	42.700-45.699	55	26	14	5750 542.000
10.000-10.299	45	26	16	5750 409.700	45.700-48.999	55	26	14	5750 545.000
10.300-10.799	45	26	16	5750 410.000					
10.800-11.299	45	26	16	5750 410.500					
11.300-11.799	45	26	16	5750 411.000					
11.800-12.399	45	26	16	5750 411.500					
12.400-12.899	45	26	16	5750 412.000					
12.900-13.399	45	26	16	5750 412.500					
13.400-13.899	45	26	16	5750 413.000					
13.900-14.399	45	26	16	5750 413.500					
14.400-14.899	45	26	16	5750 414.000					
14.900-15.399	45	26	16	5750 414.500					


Moulded steady rest bushings for single-fluted gun drills


with metal chip protection • special dimensions on request • d1 = gun drill nominal diameter



Article no. **5767**

d1	d2 n6	l1	l2	Order no.	d1	d2 n6	l1	l2	Order no.
	mm	mm	mm			mm	mm	mm	
2.000-2.099	20	20	12	5767 201.900	4.260-4.499	30	26	14	5767 304.000
2.100-2.199	20	20	12	5767 202.000	4.500-4.749	30	26	14	5767 304.200
2.200-2.299	20	20	12	5767 202.100	4.750-4.999	30	26	14	5767 304.500
2.300-2.399	20	20	12	5767 202.200	5.000-5.249	30	26	14	5767 304.700
2.400-2.499	20	20	12	5767 202.300	5.250-5.499	30	26	14	5767 305.000
2.500-2.599	20	20	12	5767 202.400	5.500-5.749	30	26	14	5767 305.200
2.600-2.699	20	20	12	5767 202.500	5.750-5.999	30	26	14	5767 305.500
2.700-2.799	20	20	12	5767 202.600	6.000-6.249	30	26	14	5767 305.700
2.800-2.899	20	20	12	5767 202.700	6.250-6.449	30	26	14	5767 306.000
2.900-3.099	20	20	12	5767 202.800	6.450-6.749	30	26	14	5767 306.200
3.100-3.359	20	20	12	5767 203.000	6.750-6.999	30	26	14	5767 306.500
3.360-3.459	20	20	12	5767 203.200	7.000-7.299	30	26	14	5767 306.700
3.460-3.559	20	20	12	5767 203.300	7.300-7.599	30	26	14	5767 307.000
3.560-3.799	20	20	12	5767 203.400	7.600-7.799	30	26	14	5767 307.300
3.800-3.959	20	20	12	5767 203.600	7.800-7.999	30	26	14	5767 307.500
3.960-4.259	20	20	12	5767 203.700	8.000-8.299	30	26	14	5767 307.700
4.260-4.499	20	20	12	5767 204.000	8.300-8.699	30	26	14	5767 308.000
4.500-4.749	20	20	12	5767 204.200	8.700-8.999	30	26	14	5767 308.400
4.750-4.999	20	20	12	5767 204.500	9.000-9.299	30	26	14	5767 308.700
5.000-5.249	20	20	12	5767 204.700	9.300-9.699	30	26	14	5767 309.000
5.250-5.499	20	20	12	5767 205.000	9.700-9.999	30	26	14	5767 309.400
5.500-5.749	20	20	12	5767 205.200	10.000-10.299	30	26	14	5767 309.700
5.750-5.999	20	20	12	5767 205.500	10.300-10.799	30	26	14	5767 310.000
6.000-6.249	20	20	12	5767 205.700	10.800-11.299	30	26	14	5767 310.500
6.250-6.449	20	20	12	5767 206.000	11.300-11.799	30	26	14	5767 311.000
6.450-6.749	20	20	12	5767 206.200	11.800-12.399	30	26	14	5767 311.500
6.750-6.999	20	20	12	5767 206.500	12.400-12.899	30	26	14	5767 312.000
7.000-7.299	20	20	12	5767 206.700	12.900-13.399	30	26	14	5767 312.500
7.300-7.599	20	20	12	5767 207.000	13.400-13.899	30	26	14	5767 313.000
7.600-7.799	20	20	12	5767 207.300	13.900-14.399	30	26	14	5767 313.500
7.800-7.999	20	20	12	5767 207.500	14.400-14.899	30	26	14	5767 314.000
8.000-8.299	20	20	12	5767 207.700	14.900-15.399	30	26	14	5767 314.500
8.300-8.699	20	20	12	5767 208.000	15.400-15.899	30	26	14	5767 315.000
8.700-8.999	20	20	12	5767 208.400	15.900-16.399	30	26	14	5767 315.500
9.000-9.299	20	20	12	5767 208.700	16.400-16.899	30	26	14	5767 316.000
9.300-9.699	20	20	12	5767 209.000	16.900-17.399	30	26	14	5767 316.500
9.700-9.999	20	20	12	5767 209.400	17.400-17.899	30	26	14	5767 317.000
10.000-10.299	20	20	12	5767 209.700	17.900-18.399	30	26	14	5767 317.500
10.300-10.799	20	20	12	5767 210.000	18.400-19.509	30	26	14	5767 318.000
10.800-11.299	20	20	12	5767 210.500	19.510-20.509	30	26	14	5767 319.000
11.300-11.799	20	20	12	5767 211.000	20.510-21.509	30	26	14	5767 320.000
11.800-12.399	20	20	12	5767 211.500	21.510-22.609	30	26	14	5767 321.000
3.100-3.359	30	26	14	5767 303.000	22.610-23.609	30	26	14	5767 322.000
3.360-3.459	30	26	14	5767 303.200	23.610-24.609	30	26	14	5767 323.000
3.460-3.559	30	26	14	5767 303.300	20.510-21.509	45	26	16	5767 420.000
3.560-3.799	30	26	14	5767 303.400	21.510-22.609	45	26	16	5767 421.000
3.800-3.959	30	26	14	5767 303.600	22.610-23.609	45	26	16	5767 422.000
3.960-4.259	30	26	14	5767 303.700	23.610-24.609	45	26	16	5767 423.000



d1	d2 n6	l1	l2	Order no.
	mm	mm	mm	
24.610-25.609	45	26	16	5767 424.000
25.610-26.609	45	26	16	5767 425.000
26.610-27.609	45	26	16	5767 426.000
27.610-28.609	45	26	16	5767 427.000
28.610-29.609	45	26	16	5767 428.000
29.610-30.609	45	26	16	5767 429.000

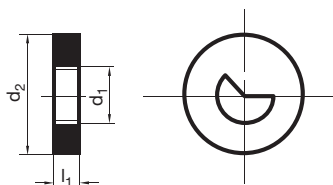
d1	d2 n6	l1	l2	Order no.
	mm	mm	mm	
30.610-32.609	45	26	16	5767 430.000
32.610-34.699	45	26	16	5767 432.000
34.700-36.699	45	26	16	5767 434.000
36.700-38.699	45	26	16	5767 436.000



Sealing disks for single-fluted gun drills



special dimensions on request • d1 = gun drill nominal diameter



Article no. 5752

d1	d2 n6	l1	Order no.	d1	d2 n6	l1	Order no.
	mm	mm			mm	mm	
1,850-1,999	20	3	5752 101.800	13,900-14,399	32	4	5752 313.500
2,000-2,099	20	3	5752 101.900	14,400-14,899	32	4	5752 314.000
2,100-2,199	20	3	5752 102.000	14,900-15,399	32	4	5752 314.500
2,200-2,299	20	3	5752 102.100	15,400-15,899	32	4	5752 315.000
2,300-2,399	20	3	5752 102.200	15,900-16,399	32	4	5752 315.500
2,400-2,499	20	3	5752 102.300	16,400-16,899	32	4	5752 316.000
2,500-2,599	20	3	5752 102.400	16,900-17,399	32	4	5752 316.500
2,600-2,699	20	3	5752 102.500	17,400-17,899	32	4	5752 317.000
2,700-2,799	20	3	5752 102.600	17,900-18,399	32	4	5752 317.500
2,800-2,899	20	3	5752 102.700	18,400-19,509	32	4	5752 318.000
2,900-3,099	20	3	5752 102.800	19,510-20,509	32	4	5752 319.000
3,100-3,359	20	3	5752 103.000	5,500-5,749	40	4	5752 405.200
3,360-3,459	20	3	5752 103.200	5,750-5,999	40	4	5752 405.500
3,460-3,559	20	3	5752 103.300	6,000-6,249	40	4	5752 405.700
3,560-3,799	20	3	5752 103.400	6,250-6,499	40	4	5752 406.000
3,800-3,959	20	3	5752 103.600	6,450-6,749	40	4	5752 406.200
3,960-4,259	20	3	5752 103.700	6,750-6,999	40	4	5752 406.500
4,260-4,499	20	3	5752 104.000	7,000-7,299	40	4	5752 406.700
4,500-4,749	20	3	5752 104.200	7,300-7,599	40	4	5752 407.000
4,750-4,999	20	3	5752 104.500	7,600-7,799	40	4	5752 407.300
5,000-5,249	20	3	5752 104.700	7,800-7,999	40	4	5752 407.500
5,250-5,499	20	3	5752 105.000	8,000-8,299	40	4	5752 407.700
5,000-5,249	32	3	5752 204.700	8,300-8,699	40	4	5752 408.000
5,250-5,499	32	3	5752 205.000	8,700-8,999	40	4	5752 408.400
5,500-5,749	32	4	5752 305.200	9,000-9,299	40	4	5752 408.700
5,750-5,999	32	4	5752 305.500	9,300-9,699	40	4	5752 409.000
6,000-6,249	32	4	5752 305.700	9,700-9,999	40	4	5752 409.400
6,250-6,449	32	4	5752 306.000	10,000-10,299	40	4	5752 409.700
6,450-6,749	32	4	5752 306.200	10,300-10,799	40	4	5752 410.000
6,750-6,999	32	4	5752 306.500	10,800-11,299	40	4	5752 410.500
7,000-7,299	32	4	5752 306.700	11,300-11,799	40	4	5752 411.000
7,300-7,599	32	4	5752 307.000	11,800-12,399	40	4	5752 411.500
7,600-7,799	32	4	5752 307.300	12,400-12,899	40	4	5752 412.000
7,800-7,999	32	4	5752 307.500	12,900-13,399	40	4	5752 412.500
8,000-8,299	32	4	5752 307.700	13,400-13,899	40	4	5752 413.000
8,300-8,699	32	4	5752 308.000	13,900-14,399	40	4	5752 413.500
8,700-8,999	32	4	5752 308.400	14,400-14,899	40	4	5752 414.000
9,000-9,299	32	4	5752 308.700	14,900-15,399	40	4	5752 414.500
9,300-9,699	32	4	5752 309.000	15,400-15,899	40	4	5752 415.000
9,700-9,999	32	4	5752 309.400	15,900-16,399	40	4	5752 415.500
10,000-10,299	32	4	5752 309.700	16,400-16,899	40	4	5752 416.000
10,300-10,799	32	4	5752 310.000	16,900-17,399	40	4	5752 416.500
10,800-11,299	32	4	5752 310.500	17,400-17,899	40	4	5752 417.000
11,300-11,799	32	4	5752 311.000	17,900-18,399	40	4	5752 417.500
11,800-12,399	32	4	5752 311.500	18,400-19,509	40	4	5752 418.000
12,400-12,899	32	4	5752 312.000	19,510-20,509	40	4	5752 419.000
12,900-13,399	32	4	5752 312.500	20,510-21,509	40	4	5752 420.000
13,400-13,899	32	4	5752 313.000	21,510-22,609	40	4	5752 421.000



d1	d2 n6	l1	Order no.
	mm	mm	
22.610-23.609	40	4	5752 422.000
23.610-24.609	40	4	5752 423.000
23.610-24.609	90	4	5752 923.000
24.610-25.609	90	4	5752 924.000
25.610-26.609	90	4	5752 925.000
26.610-27.609	90	4	5752 926.000
27.610-28.609	90	4	5752 927.000
28.610-29.609	90	4	5752 928.000
29.610-30.609	90	4	5752 929.000
30.610-32.609	90	4	5752 930.000
32.610-34.699	90	4	5752 932.000
34.700-36.699	90	4	5752 934.000

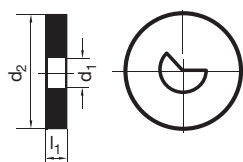
d1	d2 n6	l1	Order no.
	mm	mm	
36.700-38.699	90	4	5752 936.000
38,700-42,699	90	4	5752 938.000
42,700-45,699	90	4	5752 942.000
45,700-48,999	90	4	5752 945.000



Sealing disks for single-fluted gun drills



with metal chip protection • special dimensions on request • d1 = gun drill nominal diameter



Article no. 5770

d1	d2 n6	l1	Order no.	d1	d2 n6	l1	Order no.
	mm	mm			mm	mm	
4,000-4,259	26	4	5770 203.700	22.610-23.609	56	4	5770 522.000
4.260-4.499	26	4	5770 204.000	23.610-24.609	56	4	5770 523.000
4.500-4.749	26	4	5770 204.200	24.610-25.609	56	4	5770 524.000
4.750-4.999	26	4	5770 204.500	25.610-26.609	56	4	5770 525.000
5.000-5.249	26	4	5770 204.700	26.610-27.609	56	4	5770 526.000
5.250-5.499	26	4	5770 205.000	27.610-28.609	56	4	5770 527.000
5.500-5.749	26	4	5770 205.200	28.610-29.609	56	4	5770 528.000
5.750-5.999	26	4	5770 205.500	29.610-30.609	56	4	5770 529.000
6.000-6.249	26	4	5770 205.700	30.610-32.609	56	4	5770 530.000
6.250-6.449	26	4	5770 206.000	32.610-34.699	56	4	5770 532.000
6.450-6.749	26	4	5770 206.200	34.700-36.699	56	4	5770 534.000
6.750-6.999	26	4	5770 206.500	6.000-6.249	65	4	5770 605.700
7.000-7.299	26	4	5770 206.700	8.000-8.299	65	4	5770 607.700
7.300-7.599	26	4	5770 207.000	9.000-9.299	65	4	5770 608.700
7.600-7.799	26	4	5770 207.300	10.000-10.299	65	4	5770 609.700
7.800-7.999	26	4	5770 207.500	10.800-11.299	65	4	5770 610.500
8.000-8.299	26	4	5770 207.700	12.400-12.899	65	4	5770 612.000
6.000-6.249	46	4	5770 405.700	12.900-13.399	65	4	5770 612.500
6.450-6.749	46	4	5770 406.200	13.900-14.399	65	4	5770 613.500
7.000-7.299	46	4	5770 406.700	14.400-14.899	65	4	5770 614.000
8.000-8.299	46	4	5770 407.700	14.900-15.399	65	4	5770 614.500
9.000-9.299	46	4	5770 408.700	15.900-16.399	65	4	5770 615.500
9.300-9.699	46	4	5770 409.000	16,400-16,899	65	4	5770 616.000
9.700-9.999	46	4	5770 409.400	16.900-17.399	65	4	5770 616.500
10.000-10.299	46	4	5770 409.700	17.900-18.399	65	4	5770 617.500
10.300-10.799	46	4	5770 410.000	20.510-21.509	65	4	5770 620.000
10.800-11.299	46	4	5770 410.500	21.510-22.609	65	4	5770 621.000
11.300-11.799	46	4	5770 411.000	7.000-7.299	76	4	5770 706.700
11.800-12.399	46	4	5770 411.500	21.510-22.609	76	4	5770 721.000
12.400-12.899	46	4	5770 412.000	22.610-23.609	76	4	5770 722.000
12.900-13.399	46	4	5770 412.500	25.610-26.609	76	4	5770 725.000
13,400-13,899	46	4	5770 413.000	26.610-27.609	76	4	5770 726.000
13.900-14.399	46	4	5770 413.500	27.610-28.609	76	4	5770 727.000
14.400-14.899	46	4	5770 414.000	28.610-29.609	76	4	5770 728.000
14.900-15.399	46	4	5770 414.500	29.610-30.609	76	4	5770 729.000
15.400-15.899	46	4	5770 415.000	34.700-36.699	76	4	5770 734.000
15.900-16.399	46	4	5770 415.500	36.700-38.699	76	4	5770 736.000
16,400-16,899	46	4	5770 416.000	38,700-42,699	76	4	5770 738.000
16.900-17.399	46	4	5770 416.500				
17.400-17.899	46	4	5770 417.000				
17.900-18.399	46	4	5770 417.500				
18.400-19.509	46	4	5770 418.000				
19.510-20.509	46	4	5770 419.000				
20.510-21.509	46	4	5770 420.000				
21.510-22.609	46	4	5770 421.000				
12.400-12.899	56	4	5770 512.000				
20.510-21.509	56	4	5770 520.000				
21.510-22.609	56	4	5770 521.000				

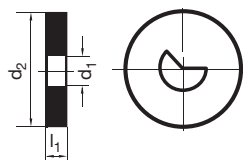


Sealing disks for single-fluted gun drills



with metal chip protection on both sides • special dimensions on request • d1 = gun drill nominal diameter

Drilling tools



Article no. **5772**

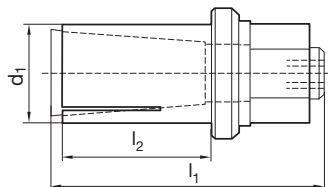
d1	d2 n6	l1	Order no.	d1	d2 n6	l1	Order no.
	mm	mm			mm	mm	
2,900-3,599	20	7	5772 2.800	16,400-17,999	40	12	5772 16.500
3,600-4,399	20	7	5772 3.600	18,000-19,799	40	12	5772 18.000
4,400-5,249	20	7	5772 4.500	19,800-21,799	40	12	5772 20.000
5,250-5,999	32	11	5772 5.200	21,800-23,799	40	12	5772 22.000
6,000-6,799	32	11	5772 6.000	23,800-25,999	40	12	5772 24.000
6,800-7,699	32	11	5772 6.700	26,000-27,999	90	12	5772 26.000
7,700-8,699	32	11	5772 7.700	28,000-29,999	90	12	5772 28.000
8,700-9,999	32	11	5772 8.700	30,000-31,999	90	12	5772 30.000
10,000-11,399	32	11	5772 10.000	32,000-34,999	90	12	5772 32.000
11,400-12,949	32	11	5772 11.500	35,000-36,999	90	12	5772 36.000
12,950-14,449	32	11	5772 13.000	37,000-38,999	90	12	5772 38.000
14,450-16,399	32	11	5772 14.500	39,000-40,999	90	12	5772 42.000



Sealing plugs



sealing plugs for sealing coolant bores • special dimensions on request



Article no. 5766

d1	l1	l2	Order no.	d1	l1	l2	Order no.
mm	mm	mm		mm	mm	mm	
8.000	28.00	15.00	5766 108.000	8.000	71.00	58.00	5766 208.000
9.000	30.00	15.00	5766 109.000	9.000	76.00	63.00	5766 209.000
10.000	30.00	15.00	5766 110.000	10.000	89.00	73.00	5766 210.000
11.000	34.00	18.00	5766 111.000	11.000	89.00	73.00	5766 211.000
12.000	34.00	18.00	5766 112.000	12.000	99.00	83.00	5766 212.000
13.000	37.00	20.00	5766 113.000	13.000	110.00	93.00	5766 213.000
14.000	37.00	20.00	5766 114.000	14.000	110.00	93.00	5766 214.000
15.000	37.00	20.00	5766 115.000	15.000	115.00	98.00	5766 215.000
16.000	37.00	20.00	5766 116.000	16.000	115.00	98.00	5766 216.000
17.000	37.00	20.00	5766 117.000	17.000	115.00	98.00	5766 217.000
18.000	37.00	20.00	5766 118.000	18.000	120.00	98.00	5766 218.000
19.000	44.00	20.00	5766 119.000	19.000	120.00	98.00	5766 219.000
20.000	44.00	20.00	5766 120.000	20.000	120.00	98.00	5766 220.000
21.000	44.00	20.00	5766 121.000	21.000	120.00	98.00	5766 221.000
22.000	44.00	20.00	5766 122.000	22.000	120.00	98.00	5766 222.000
23.000	44.00	20.00	5766 123.000	23.000	120.00	98.00	5766 223.000
24.000	44.00	20.00	5766 124.000	24.000	120.00	98.00	5766 224.000
25.000	44.00	20.00	5766 125.000	25.000	120.00	98.00	5766 225.000



Torque wrenches set



with torque wrench
incl. torque setting tool, bit holder and bits



Drilling tools

Article no. **4966**

Drive	Bit sizes	Torque	Order no.
		Nm	
1/4	T5/T7/T8	0,4-1	4966 1.000
1/4	T8/T9/T15/T20	1-5	4966 2.000



Torque wrenches



incl. torque setting tool and bit holder



Drilling tools

Article no. **4915**

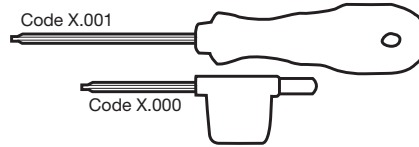
Key size	Torx	Torque	Type	Order no.
		Nm		
hexagonal	1/4	0,4-1	A	4915 1.001
hexagonal	1/4	0,8-5	A	4915 5.001



Torx screwdrivers



Drilling tools

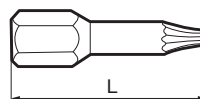


Article no. 1612

Size	Order no.
T5	1612 5.001
T7	1612 7.001
T8	1612 8.001
T9	1612 9.001
T15	1612 15.001
T20	1612 20.001



Torx socket sets



Article no. 4917

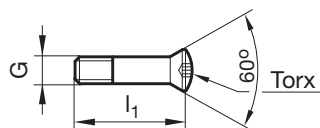
Key size	Drive	Torx	L	Order no.	Key size	Drive	Torx	L	Order no.
			mm					mm	
hexagonal	1/4	T5	25	4917 5.000					
hexagonal	1/4	T7	25	4917 7.000					
hexagonal	1/4	T8	25	4917 8.000					
hexagonal	1/4	T9	25	4917 9.000					
hexagonal	1/4	T15	25	4917 15.000					
hexagonal	1/4	T20	25	4917 20.000					



Clamping screws



Drilling tools



Article no. **4071**

G	l1	Torx	Order no.	G	l1	Torx	Order no.
	mm				mm		
M1,6	4.40	T5 Plus	4071 1.601	M3	8.00	T9 Plus	4071 3.003
M2,2	5.60	T7 Plus	4071 2.202	M4	7.70	T15 Plus	4071 4.001
M2,2	4.60	T7 Plus	4071 2.203	M4	10.60	T15 Plus	4071 4.002
M2,5	6.40	T8 Plus	4071 2.501	M4,5	11.80	T15 Plus	4071 4.501
M2,5	5.20	T8 Plus	4071 2.502	M5	14.20	T20 Plus	4071 5.002
M3	6.40	T9 Plus	4071 3.002				

Stub drills

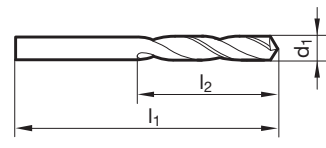


Tool material	HSS-E-PM
Surface	F
Shank form	cyl.

- P** ● web thinning ≥ Ø 1.000 • relieved cone point geometry with special type B web thinning • PM-Co-alloyed high speed steel • especially high rigidity • especially high wear resistance
- M** ○
- K** ●
- N** ○ high-tensile materials, high-alloyed steels • heat treatable and case hardened steels • cast iron, brass, bronze
- S** ●
- H** ○

GÜHRING NAVIGATOR

Cutting data page 314



Drilling tools

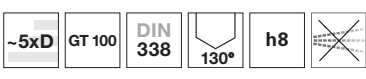
Article no. **515**


d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
1.000		26.00	6.00	515 1.000	2.640		43.00	14.00	515 2.640
1.020		26.00	6.00	515 1.020	2.700		46.00	16.00	515 2.700
1.040		26.00	6.00	515 1.040	2.710		46.00	16.00	515 2.710
1.070		28.00	7.00	515 1.070	2.780	7/64	46.00	16.00	515 2.780
1.090		28.00	7.00	515 1.090	2.790		46.00	16.00	515 2.790
1.100		28.00	7.00	515 1.100	2.800		46.00	16.00	515 2.800
1.180		28.00	7.00	515 1.180	2.820		46.00	16.00	515 2.820
1.190	3/64	30.00	8.00	515 1.190	2.870		46.00	16.00	515 2.870
1.200		30.00	8.00	515 1.200	2.900		46.00	16.00	515 2.900
1.300		30.00	8.00	515 1.300	2.950		46.00	16.00	515 2.950
1.320		30.00	8.00	515 1.320	3.000		46.00	16.00	515 3.000
1.400		32.00	9.00	515 1.400	3.050		49.00	18.00	515 3.050
1.500		32.00	9.00	515 1.500	3.100		49.00	18.00	515 3.100
1.510		34.00	10.00	515 1.510	3.170	1/8	49.00	18.00	515 3.170
1.590	1/16	34.00	10.00	515 1.590	3.200		49.00	18.00	515 3.200
1.600		34.00	10.00	515 1.600	3.260		49.00	18.00	515 3.260
1.610		34.00	10.00	515 1.610	3.300		49.00	18.00	515 3.300
1.700		34.00	10.00	515 1.700	3.400		52.00	20.00	515 3.400
1.780		36.00	11.00	515 1.780	3.450		52.00	20.00	515 3.450
1.800		36.00	11.00	515 1.800	3.500		52.00	20.00	515 3.500
1.850		36.00	11.00	515 1.850	3.570	9/64	52.00	20.00	515 3.570
1.900		36.00	11.00	515 1.900	3.600		52.00	20.00	515 3.600
1.930		38.00	12.00	515 1.930	3.660		52.00	20.00	515 3.660
1.980	5/64	38.00	12.00	515 1.980	3.700		52.00	20.00	515 3.700
1.990		38.00	12.00	515 1.990	3.730		52.00	20.00	515 3.730
2.000		38.00	12.00	515 2.000	3.800		55.00	22.00	515 3.800
2.060		38.00	12.00	515 2.060	3.860		55.00	22.00	515 3.860
2.080		38.00	12.00	515 2.080	3.900		55.00	22.00	515 3.900
2.100		38.00	12.00	515 2.100	3.910		55.00	22.00	515 3.910
2.180		40.00	13.00	515 2.180	3.970	5/32	55.00	22.00	515 3.970
2.200		40.00	13.00	515 2.200	3.990		55.00	22.00	515 3.990
2.260		40.00	13.00	515 2.260	4.000		55.00	22.00	515 4.000
2.300		40.00	13.00	515 2.300	4.040		55.00	22.00	515 4.040
2.370		43.00	14.00	515 2.370	4.090		55.00	22.00	515 4.090
2.380	3/32	43.00	14.00	515 2.380	4.100		55.00	22.00	515 4.100
2.400		43.00	14.00	515 2.400	4.200		55.00	22.00	515 4.200
2.440		43.00	14.00	515 2.440	4.220		55.00	22.00	515 4.220
2.490		43.00	14.00	515 2.490	4.300		58.00	24.00	515 4.300
2.500		43.00	14.00	515 2.500	4.370	11/64	58.00	24.00	515 4.370
2.530		43.00	14.00	515 2.530	4.390		58.00	24.00	515 4.390
2.580		43.00	14.00	515 2.580	4.400		58.00	24.00	515 4.400
2.600		43.00	14.00	515 2.600	4.500		58.00	24.00	515 4.500



d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
4.570		58.00	24.00	515 4.570	7.940	5/16	79.00	37.00	515 7.940
4.600		58.00	24.00	515 4.600	8.000		79.00	37.00	515 8.000
4.620		58.00	24.00	515 4.620	8.030		79.00	37.00	515 8.030
4.650		58.00	24.00	515 4.650	8.100		79.00	37.00	515 8.100
4.700		58.00	24.00	515 4.700	8.200		79.00	37.00	515 8.200
4.760	3/16	62.00	26.00	515 4.760	8.300		79.00	37.00	515 8.300
4.800		62.00	26.00	515 4.800	8.330	21/64	79.00	37.00	515 8.330
4.850		62.00	26.00	515 4.850	8.400		79.00	37.00	515 8.400
4.900		62.00	26.00	515 4.900	8.430		79.00	37.00	515 8.430
4.920		62.00	26.00	515 4.920	8.500		79.00	37.00	515 8.500
4.980		62.00	26.00	515 4.980	8.600		84.00	40.00	515 8.600
5.000		62.00	26.00	515 5.000	8.610		84.00	40.00	515 8.610
5.060		62.00	26.00	515 5.060	8.700		84.00	40.00	515 8.700
5.100		62.00	26.00	515 5.100	8.730	11/32	84.00	40.00	515 8.730
5.110		62.00	26.00	515 5.110	8.800		84.00	40.00	515 8.800
5.160	13/64	62.00	26.00	515 5.160	8.840		84.00	40.00	515 8.840
5.180		62.00	26.00	515 5.180	8.900		84.00	40.00	515 8.900
5.200		62.00	26.00	515 5.200	9.000		84.00	40.00	515 9.000
5.220		62.00	26.00	515 5.220	9.090		84.00	40.00	515 9.090
5.300		62.00	26.00	515 5.300	9.100		84.00	40.00	515 9.100
5.310		66.00	28.00	515 5.310	9.130	23/64	84.00	40.00	515 9.130
5.400		66.00	28.00	515 5.400	9.200		84.00	40.00	515 9.200
5.410		66.00	28.00	515 5.410	9.300		84.00	40.00	515 9.300
5.500		66.00	28.00	515 5.500	9.340		84.00	40.00	515 9.340
5.560	7/32	66.00	28.00	515 5.560	9.350		84.00	40.00	515 9.350
5.600		66.00	28.00	515 5.600	9.400		84.00	40.00	515 9.400
5.610		66.00	28.00	515 5.610	9.500		84.00	40.00	515 9.500
5.700		66.00	28.00	515 5.700	9.520	3/8	89.00	43.00	515 9.520
5.790		66.00	28.00	515 5.790	9.580		89.00	43.00	515 9.580
5.800		66.00	28.00	515 5.800	9.600		89.00	43.00	515 9.600
5.900		66.00	28.00	515 5.900	9.700		89.00	43.00	515 9.700
5.940		66.00	28.00	515 5.940	9.800		89.00	43.00	515 9.800
5.950	15/64	66.00	28.00	515 5.950	9.900		89.00	43.00	515 9.900
6.000		66.00	28.00	515 6.000	9.920	25/64	89.00	43.00	515 9.920
6.040		70.00	31.00	515 6.040	10.000		89.00	43.00	515 10.000
6.100		70.00	31.00	515 6.100	10.080		89.00	43.00	515 10.080
6.150		70.00	31.00	515 6.150	10.200		89.00	43.00	515 10.200
6.200		70.00	31.00	515 6.200	10.260		89.00	43.00	515 10.260
6.250		70.00	31.00	515 6.250	10.320	13/32	89.00	43.00	515 10.320
6.300		70.00	31.00	515 6.300	10.490		89.00	43.00	515 10.490
6.350	1/4	70.00	31.00	515 6.350	10.500		89.00	43.00	515 10.500
6.400		70.00	31.00	515 6.400	10.720	27/64	95.00	47.00	515 10.720
6.500		70.00	31.00	515 6.500	11.000		95.00	47.00	515 11.000
6.530		70.00	31.00	515 6.530	11.110	7/16	95.00	47.00	515 11.110
6.600		70.00	31.00	515 6.600	11.500		95.00	47.00	515 11.500
6.630		70.00	31.00	515 6.630	11.510	29/64	95.00	47.00	515 11.510
6.700		70.00	31.00	515 6.700	11.800		95.00	47.00	515 11.800
6.750	17/64	74.00	34.00	515 6.750	11.910	15/32	102.00	51.00	515 11.910
6.800		74.00	34.00	515 6.800	12.000		102.00	51.00	515 12.000
6.900		74.00	34.00	515 6.900	12.300	31/64	102.00	51.00	515 12.300
7.000		74.00	34.00	515 7.000	12.500		102.00	51.00	515 12.500
7.030		74.00	34.00	515 7.030	12.700	1/2	102.00	51.00	515 12.700
7.100		74.00	34.00	515 7.100	13.000		102.00	51.00	515 13.000
7.140	9/32	74.00	34.00	515 7.140	13.100	33/64	102.00	51.00	515 13.100
7.200		74.00	34.00	515 7.200	13.490	17/32	107.00	54.00	515 13.490
7.300		74.00	34.00	515 7.300	13.500		107.00	54.00	515 13.500
7.370		74.00	34.00	515 7.370	14.000		107.00	54.00	515 14.000
7.400		74.00	34.00	515 7.400	14.290	9/16	111.00	56.00	515 14.290
7.490		74.00	34.00	515 7.490					
7.500		74.00	34.00	515 7.500					
7.540	19/64	79.00	37.00	515 7.540					
7.600		79.00	37.00	515 7.600					
7.670		79.00	37.00	515 7.670					
7.700		79.00	37.00	515 7.700					
7.800		79.00	37.00	515 7.800					
7.900		79.00	37.00	515 7.900					

Jobber drills

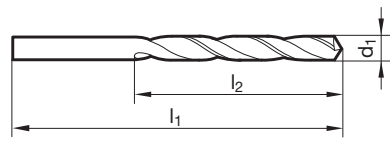


Tool material	HSC0
Surface	 $>0.2_{36}$
Shank form	cyl.

- P** ● web thinning $\geq \varnothing 1.000$ • relieved cone • Co-alloyed high speed steel • wide flutes • increased wear resistance • especially for drilling depths $> 3xD$
- M** ○
- K** ●
- N** ● alloyed/unalloyed steel • cast materials over 800 N/mm² • hot and cold rolled steels • antifriction bearing steels • high-alloyed steels • heat treatable and case hardened steels
- S** ●
- H** ●

GÜHRING NAVIGATOR

Cutting data page 314



Drilling tools

Article no. **622**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
1.000		34.00	12.00	622 1.000	2.080		49.00	24.00	622 2.080
1.020		34.00	12.00	622 1.020	2.100		49.00	24.00	622 2.100
1.040		34.00	12.00	622 1.040	2.150		53.00	27.00	622 2.150
1.050		34.00	12.00	622 1.050	2.180		53.00	27.00	622 2.180
1.070		36.00	14.00	622 1.070	2.200		53.00	27.00	622 2.200
1.090		36.00	14.00	622 1.090	2.250		53.00	27.00	622 2.250
1.100		36.00	14.00	622 1.100	2.260		53.00	27.00	622 2.260
1.130		36.00	14.00	622 1.130	2.300		53.00	27.00	622 2.300
1.150		36.00	14.00	622 1.150	2.350		53.00	27.00	622 2.350
1.180		36.00	14.00	622 1.180	2.370		57.00	30.00	622 2.370
1.190	3/64	38.00	16.00	622 1.190	2.380	3/32	57.00	30.00	622 2.380
1.200		38.00	16.00	622 1.200	2.400		57.00	30.00	622 2.400
1.250		38.00	16.00	622 1.250	2.420		57.00	30.00	622 2.420
1.270		38.00	16.00	622 1.270	2.440		57.00	30.00	622 2.440
1.300		38.00	16.00	622 1.300	2.450		57.00	30.00	622 2.450
1.320		38.00	16.00	622 1.320	2.490		57.00	30.00	622 2.490
1.350		40.00	18.00	622 1.350	2.500		57.00	30.00	622 2.500
1.400		40.00	18.00	622 1.400	2.530		57.00	30.00	622 2.530
1.430		40.00	18.00	622 1.430	2.550		57.00	30.00	622 2.550
1.440		40.00	18.00	622 1.440	2.580		57.00	30.00	622 2.580
1.450		40.00	18.00	622 1.450	2.600		57.00	30.00	622 2.600
1.500		40.00	18.00	622 1.500	2.640		57.00	30.00	622 2.640
1.510		43.00	20.00	622 1.510	2.650		57.00	30.00	622 2.650
1.550		43.00	20.00	622 1.550	2.700		61.00	33.00	622 2.700
1.590	1/16	43.00	20.00	622 1.590	2.710		61.00	33.00	622 2.710
1.600		43.00	20.00	622 1.600	2.750		61.00	33.00	622 2.750
1.610		43.00	20.00	622 1.610	2.780	7/64	61.00	33.00	622 2.780
1.650		43.00	20.00	622 1.650	2.790		61.00	33.00	622 2.790
1.700		43.00	20.00	622 1.700	2.800		61.00	33.00	622 2.800
1.780		46.00	22.00	622 1.780	2.820		61.00	33.00	622 2.820
1.800		46.00	22.00	622 1.800	2.850		61.00	33.00	622 2.850
1.850		46.00	22.00	622 1.850	2.870		61.00	33.00	622 2.870
1.900		46.00	22.00	622 1.900	2.900		61.00	33.00	622 2.900
1.920		49.00	24.00	622 1.920	2.950		61.00	33.00	622 2.950
1.930		49.00	24.00	622 1.930	3.000		61.00	33.00	622 3.000
1.950		49.00	24.00	622 1.950	3.050		65.00	36.00	622 3.050
1.960		49.00	24.00	622 1.960	3.100		65.00	36.00	622 3.100
1.980	5/64	49.00	24.00	622 1.980	3.150		65.00	36.00	622 3.150
1.990		49.00	24.00	622 1.990	3.170	1/8	65.00	36.00	622 3.170
2.000		49.00	24.00	622 2.000	3.200		65.00	36.00	622 3.200
2.050		49.00	24.00	622 2.050	3.250		65.00	36.00	622 3.250
2.060		49.00	24.00	622 2.060	3.260		65.00	36.00	622 3.260



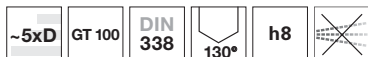
d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
3.300		65.00	36.00	622 3.300	6.150		101.00	63.00	622 6.150
3.400		70.00	39.00	622 3.400	6.200		101.00	63.00	622 6.200
3.450		70.00	39.00	622 3.450	6.250		101.00	63.00	622 6.250
3.500		70.00	39.00	622 3.500	6.300		101.00	63.00	622 6.300
3.570	9/64	70.00	39.00	622 3.570	6.350	1/4	101.00	63.00	622 6.350
3.600		70.00	39.00	622 3.600	6.400		101.00	63.00	622 6.400
3.650		70.00	39.00	622 3.650	6.500		101.00	63.00	622 6.500
3.660		70.00	39.00	622 3.660	6.530		101.00	63.00	622 6.530
3.700		70.00	39.00	622 3.700	6.600		101.00	63.00	622 6.600
3.730		70.00	39.00	622 3.730	6.630		101.00	63.00	622 6.630
3.800		75.00	43.00	622 3.800	6.650		101.00	63.00	622 6.650
3.860		75.00	43.00	622 3.860	6.700		101.00	63.00	622 6.700
3.900		75.00	43.00	622 3.900	6.750	17/64	109.00	69.00	622 6.750
3.910		75.00	43.00	622 3.910	6.800		109.00	69.00	622 6.800
3.970	5/32	75.00	43.00	622 3.970	6.900		109.00	69.00	622 6.900
3.990		75.00	43.00	622 3.990	7.000		109.00	69.00	622 7.000
4.000		75.00	43.00	622 4.000	7.030		109.00	69.00	622 7.030
4.020		75.00	43.00	622 4.020	7.100		109.00	69.00	622 7.100
4.040		75.00	43.00	622 4.040	7.140	9/32	109.00	69.00	622 7.140
4.050		75.00	43.00	622 4.050	7.200		109.00	69.00	622 7.200
4.090		75.00	43.00	622 4.090	7.300		109.00	69.00	622 7.300
4.100		75.00	43.00	622 4.100	7.370		109.00	69.00	622 7.370
4.150		75.00	43.00	622 4.150	7.400		109.00	69.00	622 7.400
4.200		75.00	43.00	622 4.200	7.450		109.00	69.00	622 7.450
4.220		75.00	43.00	622 4.220	7.490		109.00	69.00	622 7.490
4.250		75.00	43.00	622 4.250	7.500		109.00	69.00	622 7.500
4.300		80.00	47.00	622 4.300	7.540	19/64	117.00	75.00	622 7.540
4.370	11/64	80.00	47.00	622 4.370	7.600		117.00	75.00	622 7.600
4.390		80.00	47.00	622 4.390	7.670		117.00	75.00	622 7.670
4.400		80.00	47.00	622 4.400	7.700		117.00	75.00	622 7.700
4.500		80.00	47.00	622 4.500	7.750		117.00	75.00	622 7.750
4.550		80.00	47.00	622 4.550	7.800		117.00	75.00	622 7.800
4.570		80.00	47.00	622 4.570	7.900		117.00	75.00	622 7.900
4.600		80.00	47.00	622 4.600	7.940	5/16	117.00	75.00	622 7.940
4.620		80.00	47.00	622 4.620	8.000		117.00	75.00	622 8.000
4.650		80.00	47.00	622 4.650	8.030		117.00	75.00	622 8.030
4.700		80.00	47.00	622 4.700	8.100		117.00	75.00	622 8.100
4.750		80.00	47.00	622 4.750	8.200		117.00	75.00	622 8.200
4.760	3/16	86.00	52.00	622 4.760	8.300		117.00	75.00	622 8.300
4.800		86.00	52.00	622 4.800	8.330	21/64	117.00	75.00	622 8.330
4.850		86.00	52.00	622 4.850	8.400		117.00	75.00	622 8.400
4.900		86.00	52.00	622 4.900	8.430		117.00	75.00	622 8.430
4.920		86.00	52.00	622 4.920	8.500		117.00	75.00	622 8.500
4.980		86.00	52.00	622 4.980	8.600		125.00	81.00	622 8.600
5.000		86.00	52.00	622 5.000	8.610		125.00	81.00	622 8.610
5.060		86.00	52.00	622 5.060	8.700		125.00	81.00	622 8.700
5.100		86.00	52.00	622 5.100	8.730	11/32	125.00	81.00	622 8.730
5.110		86.00	52.00	622 5.110	8.800		125.00	81.00	622 8.800
5.160	13/64	86.00	52.00	622 5.160	8.840		125.00	81.00	622 8.840
5.180		86.00	52.00	622 5.180	8.900		125.00	81.00	622 8.900
5.200		86.00	52.00	622 5.200	9.000		125.00	81.00	622 9.000
5.220		86.00	52.00	622 5.220	9.090		125.00	81.00	622 9.090
5.250		86.00	52.00	622 5.250	9.100		125.00	81.00	622 9.100
5.300		86.00	52.00	622 5.300	9.130	23/64	125.00	81.00	622 9.130
5.310		93.00	57.00	622 5.310	9.200		125.00	81.00	622 9.200
5.400		93.00	57.00	622 5.400	9.300		125.00	81.00	622 9.300
5.410		93.00	57.00	622 5.410	9.340		125.00	81.00	622 9.340
5.500		93.00	57.00	622 5.500	9.400		125.00	81.00	622 9.400
5.560	7/32	93.00	57.00	622 5.560	9.500		125.00	81.00	622 9.500
5.600		93.00	57.00	622 5.600	9.520	3/8	133.00	87.00	622 9.520
5.610		93.00	57.00	622 5.610	9.580		133.00	87.00	622 9.580
5.700		93.00	57.00	622 5.700	9.600		133.00	87.00	622 9.600
5.750		93.00	57.00	622 5.750	9.700		133.00	87.00	622 9.700
5.790		93.00	57.00	622 5.790	9.800		133.00	87.00	622 9.800
5.800		93.00	57.00	622 5.800	9.900		133.00	87.00	622 9.900
5.900		93.00	57.00	622 5.900	9.920	25/64	133.00	87.00	622 9.920
5.940		93.00	57.00	622 5.940	10.000		133.00	87.00	622 10.000
5.950	15/64	93.00	57.00	622 5.950	10.080		133.00	87.00	622 10.080
6.000		93.00	57.00	622 6.000	10.100		133.00	87.00	622 10.100
6.040		101.00	63.00	622 6.040	10.200		133.00	87.00	622 10.200
6.050		101.00	63.00	622 6.050	10.250		133.00	87.00	622 10.250
6.100		101.00	63.00	622 6.100	10.260		133.00	87.00	622 10.260



d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
10.300		133.00	87.00	622 10.300	11.700		142.00	94.00	622 11.700
10.320	13/32	133.00	87.00	622 10.320	11.800		142.00	94.00	622 11.800
10.400		133.00	87.00	622 10.400	11.910	15/32	151.00	101.00	622 11.910
10.500		133.00	87.00	622 10.500	12.000		151.00	101.00	622 12.000
10.600		133.00	87.00	622 10.600	12.500		151.00	101.00	622 12.500
10.700		142.00	94.00	622 10.700	12.700	1/2	151.00	101.00	622 12.700
10.720	27/64	142.00	94.00	622 10.720	12.800		151.00	101.00	622 12.800
10.800		142.00	94.00	622 10.800	13.000		151.00	101.00	622 13.000
10.900		142.00	94.00	622 10.900	13.500		160.00	108.00	622 13.500
11.000		142.00	94.00	622 11.000	13.800		160.00	108.00	622 13.800
11.100		142.00	94.00	622 11.100	14.000		160.00	108.00	622 14.000
11.110	7/16	142.00	94.00	622 11.110	14.500		169.00	114.00	622 14.500
11.200		142.00	94.00	622 11.200	14.800		169.00	114.00	622 14.800
11.300		142.00	94.00	622 11.300	15.000		169.00	114.00	622 15.000
11.400		142.00	94.00	622 11.400	15.500		178.00	120.00	622 15.500
11.500		142.00	94.00	622 11.500	16.000		178.00	120.00	622 16.000
11.510	29/64	142.00	94.00	622 11.510					
11.600		142.00	94.00	622 11.600					



Jobber drills

Tool material **HSC0**Surface **F**

Shank form cyl.

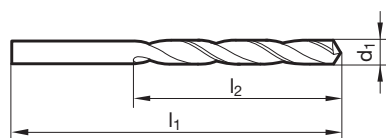
P ● web thinning $\geq \varnothing 1.000$ • relieved cone • Co-alloyed high speed steel
 ● wide flutes • increased wear resistance • especially for drilling depths
M ○ $> 3xD$

K ●
N ● alloyed and unalloyed steel • cast materials over 800 N/mm^2 • hot and cold rolled steels • antifriction bearing steels • high-alloyed steels • heat treatable and case hardened steels
S ●
H ○

GÜHRING NAVIGATOR

Cutting data page 314

Drilling tools

Article no. **2459**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
1.000		34.00	12.00	2459 1.000	5.200		86.00	52.00	2459 5.200
1.100		36.00	14.00	2459 1.100	5.300		86.00	52.00	2459 5.300
1.200		38.00	16.00	2459 1.200	5.400		93.00	57.00	2459 5.400
1.300		38.00	16.00	2459 1.300	5.500		93.00	57.00	2459 5.500
1.400		40.00	18.00	2459 1.400	5.600		93.00	57.00	2459 5.600
1.500		40.00	18.00	2459 1.500	5.700		93.00	57.00	2459 5.700
1.600		43.00	20.00	2459 1.600	5.800		93.00	57.00	2459 5.800
1.700		43.00	20.00	2459 1.700	5.900		93.00	57.00	2459 5.900
1.800		46.00	22.00	2459 1.800	6.000		93.00	57.00	2459 6.000
1.900		46.00	22.00	2459 1.900	6.100		101.00	63.00	2459 6.100
2.000		49.00	24.00	2459 2.000	6.200		101.00	63.00	2459 6.200
2.100		49.00	24.00	2459 2.100	6.300		101.00	63.00	2459 6.300
2.200		53.00	27.00	2459 2.200	6.400		101.00	63.00	2459 6.400
2.300		53.00	27.00	2459 2.300	6.500		101.00	63.00	2459 6.500
2.400		57.00	30.00	2459 2.400	6.600		101.00	63.00	2459 6.600
2.500		57.00	30.00	2459 2.500	6.700		101.00	63.00	2459 6.700
2.600		57.00	30.00	2459 2.600	6.800		109.00	69.00	2459 6.800
2.700		61.00	33.00	2459 2.700	6.900		109.00	69.00	2459 6.900
2.800		61.00	33.00	2459 2.800	7.000		109.00	69.00	2459 7.000
2.900		61.00	33.00	2459 2.900	7.100		109.00	69.00	2459 7.100
3.000		61.00	33.00	2459 3.000	7.200		109.00	69.00	2459 7.200
3.100		65.00	36.00	2459 3.100	7.400		109.00	69.00	2459 7.400
3.200		65.00	36.00	2459 3.200	7.500		109.00	69.00	2459 7.500
3.300		65.00	36.00	2459 3.300	7.600		117.00	75.00	2459 7.600
3.400		70.00	39.00	2459 3.400	7.700		117.00	75.00	2459 7.700
3.500		70.00	39.00	2459 3.500	7.800		117.00	75.00	2459 7.800
3.600		70.00	39.00	2459 3.600	7.900		117.00	75.00	2459 7.900
3.700		70.00	39.00	2459 3.700	8.000		117.00	75.00	2459 8.000
3.800		75.00	43.00	2459 3.800	8.100		117.00	75.00	2459 8.100
3.900		75.00	43.00	2459 3.900	8.200		117.00	75.00	2459 8.200
4.000		75.00	43.00	2459 4.000	8.300		117.00	75.00	2459 8.300
4.100		75.00	43.00	2459 4.100	8.400		117.00	75.00	2459 8.400
4.200		75.00	43.00	2459 4.200	8.500		117.00	75.00	2459 8.500
4.300		80.00	47.00	2459 4.300	8.600		125.00	81.00	2459 8.600
4.400		80.00	47.00	2459 4.400	8.700		125.00	81.00	2459 8.700
4.500		80.00	47.00	2459 4.500	8.800		125.00	81.00	2459 8.800
4.600		80.00	47.00	2459 4.600	8.900		125.00	81.00	2459 8.900
4.700		80.00	47.00	2459 4.700	9.000		125.00	81.00	2459 9.000
4.800		86.00	52.00	2459 4.800	9.100		125.00	81.00	2459 9.100
4.900		86.00	52.00	2459 4.900	9.200		125.00	81.00	2459 9.200
5.000		86.00	52.00	2459 5.000	9.300		125.00	81.00	2459 9.300
5.100		86.00	52.00	2459 5.100	9.400		125.00	81.00	2459 9.400



d1		l1	l2	Order no.
mm	inch	mm	mm	
9.500		125.00	81.00	2459 9.500
9.700		133.00	87.00	2459 9.700
9.800		133.00	87.00	2459 9.800
9.900		133.00	87.00	2459 9.900
10.000		133.00	87.00	2459 10.000
10.100		133.00	87.00	2459 10.100
10.200		133.00	87.00	2459 10.200
10.300		133.00	87.00	2459 10.300
10.400		133.00	87.00	2459 10.400
10.500		133.00	87.00	2459 10.500
10.700		142.00	94.00	2459 10.700
10.800		142.00	94.00	2459 10.800

d1		l1	l2	Order no.
mm	inch	mm	mm	
11.000		142.00	94.00	2459 11.000
11.500		142.00	94.00	2459 11.500
11.700		142.00	94.00	2459 11.700
12.000		151.00	101.00	2459 12.000
12.500		151.00	101.00	2459 12.500
13.000		151.00	101.00	2459 13.000
13.500		160.00	108.00	2459 13.500
14.000		160.00	108.00	2459 14.000
15.000		169.00	114.00	2459 15.000
16.000		178.00	120.00	2459 16.000



Long series twist drills

Tool material **HSC0**

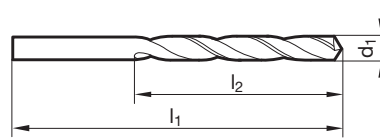
Surface

Shank form cyl.

P	•	web thinning $\geq \varnothing 1.000$ • relieved cone • Co-alloyed high speed steel • wide flutes • increased wear resistance • in case of poor chip evacuation
M	•	evacuation
K	•	
N	•	alloyed/unalloyed steels and castings over 800 N/mm ² • hot and cold rolled steels • antifriction bearing steels • high-alloyed steels • heat treatable and case hardened steels
S	•	
H	○	

GÜHRING NAVIGATOR

Cutting data page 316

Article no. **336**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
1.000		56.00	33.00	336 1.000	2.440		95.00	62.00	336 2.440
1.020		56.00	33.00	336 1.020	2.450		95.00	62.00	336 2.450
1.040		56.00	33.00	336 1.040	2.490		95.00	62.00	336 2.490
1.070		60.00	37.00	336 1.070	2.500		95.00	62.00	336 2.500
1.090		60.00	37.00	336 1.090	2.530		95.00	62.00	336 2.530
1.100		60.00	37.00	336 1.100	2.550		95.00	62.00	336 2.550
1.180		60.00	37.00	336 1.180	2.580		95.00	62.00	336 2.580
1.190	3/64	65.00	41.00	336 1.190	2.600		95.00	62.00	336 2.600
1.200		65.00	41.00	336 1.200	2.640		95.00	62.00	336 2.640
1.250		65.00	41.00	336 1.250	2.700		100.00	66.00	336 2.700
1.300		65.00	41.00	336 1.300	2.710		100.00	66.00	336 2.710
1.320		65.00	41.00	336 1.320	2.750		100.00	66.00	336 2.750
1.400		70.00	45.00	336 1.400	2.780	7/64	100.00	66.00	336 2.780
1.500		70.00	45.00	336 1.500	2.790		100.00	66.00	336 2.790
1.510		76.00	50.00	336 1.510	2.800		100.00	66.00	336 2.800
1.550		76.00	50.00	336 1.550	2.820		100.00	66.00	336 2.820
1.590	1/16	76.00	50.00	336 1.590	2.850		100.00	66.00	336 2.850
1.600		76.00	50.00	336 1.600	2.870		100.00	66.00	336 2.870
1.610		76.00	50.00	336 1.610	2.900		100.00	66.00	336 2.900
1.700		76.00	50.00	336 1.700	2.950		100.00	66.00	336 2.950
1.750		80.00	53.00	336 1.750	3.000		100.00	66.00	336 3.000
1.780		80.00	53.00	336 1.780	3.050		106.00	69.00	336 3.050
1.800		80.00	53.00	336 1.800	3.100		106.00	69.00	336 3.100
1.850		80.00	53.00	336 1.850	3.170	1/8	106.00	69.00	336 3.170
1.900		80.00	53.00	336 1.900	3.200		106.00	69.00	336 3.200
1.930		85.00	56.00	336 1.930	3.260		106.00	69.00	336 3.260
1.980	5/64	85.00	56.00	336 1.980	3.300		106.00	69.00	336 3.300
1.990		85.00	56.00	336 1.990	3.400		112.00	73.00	336 3.400
2.000		85.00	56.00	336 2.000	3.440		112.00	73.00	336 3.440
2.050		85.00	56.00	336 2.050	3.450		112.00	73.00	336 3.450
2.060		85.00	56.00	336 2.060	3.500		112.00	73.00	336 3.500
2.080		85.00	56.00	336 2.080	3.570	9/64	112.00	73.00	336 3.570
2.100		85.00	56.00	336 2.100	3.600		112.00	73.00	336 3.600
2.180		90.00	59.00	336 2.180	3.660		112.00	73.00	336 3.660
2.200		90.00	59.00	336 2.200	3.700		112.00	73.00	336 3.700
2.250		90.00	59.00	336 2.250	3.730		112.00	73.00	336 3.730
2.260		90.00	59.00	336 2.260	3.800		119.00	78.00	336 3.800
2.300		90.00	59.00	336 2.300	3.860		119.00	78.00	336 3.860
2.350		90.00	59.00	336 2.350	3.900		119.00	78.00	336 3.900
2.370		95.00	62.00	336 2.370	3.910		119.00	78.00	336 3.910
2.380	3/32	95.00	62.00	336 2.380	3.970	5/32	119.00	78.00	336 3.970
2.400		95.00	62.00	336 2.400	3.990		119.00	78.00	336 3.990



d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
4.000		119.00	78.00	336 4.000	7.370		156.00	102.00	336 7.370
4.040		119.00	78.00	336 4.040	7.400		156.00	102.00	336 7.400
4.090		119.00	78.00	336 4.090	7.490		156.00	102.00	336 7.490
4.100		119.00	78.00	336 4.100	7.500		156.00	102.00	336 7.500
4.200		119.00	78.00	336 4.200	7.540	19/64	165.00	109.00	336 7.540
4.220		119.00	78.00	336 4.220	7.600		165.00	109.00	336 7.600
4.300		126.00	82.00	336 4.300	7.670		165.00	109.00	336 7.670
4.370	11/64	126.00	82.00	336 4.370	7.700		165.00	109.00	336 7.700
4.390		126.00	82.00	336 4.390	7.800		165.00	109.00	336 7.800
4.400		126.00	82.00	336 4.400	7.900		165.00	109.00	336 7.900
4.500		126.00	82.00	336 4.500	7.940	5/16	165.00	109.00	336 7.940
4.570		126.00	82.00	336 4.570	8.000		165.00	109.00	336 8.000
4.600		126.00	82.00	336 4.600	8.030		165.00	109.00	336 8.030
4.620		126.00	82.00	336 4.620	8.100		165.00	109.00	336 8.100
4.700		126.00	82.00	336 4.700	8.200		165.00	109.00	336 8.200
4.760	3/16	132.00	87.00	336 4.760	8.300		165.00	109.00	336 8.300
4.800		132.00	87.00	336 4.800	8.400		165.00	109.00	336 8.400
4.850		132.00	87.00	336 4.850	8.500		165.00	109.00	336 8.500
4.900		132.00	87.00	336 4.900	8.600		175.00	115.00	336 8.600
4.920		132.00	87.00	336 4.920	8.610		175.00	115.00	336 8.610
4.980		132.00	87.00	336 4.980	8.700		175.00	115.00	336 8.700
5.000		132.00	87.00	336 5.000	8.730	11/32	175.00	115.00	336 8.730
5.060		132.00	87.00	336 5.060	8.800		175.00	115.00	336 8.800
5.100		132.00	87.00	336 5.100	8.840		175.00	115.00	336 8.840
5.110		132.00	87.00	336 5.110	8.900		175.00	115.00	336 8.900
5.160	13/64	132.00	87.00	336 5.160	9.000		175.00	115.00	336 9.000
5.180		132.00	87.00	336 5.180	9.090		175.00	115.00	336 9.090
5.200		132.00	87.00	336 5.200	9.100		175.00	115.00	336 9.100
5.220		132.00	87.00	336 5.220	9.200		175.00	115.00	336 9.200
5.300		132.00	87.00	336 5.300	9.300		175.00	115.00	336 9.300
5.310		139.00	91.00	336 5.310	9.340		175.00	115.00	336 9.340
5.400		139.00	91.00	336 5.400	9.350		175.00	115.00	336 9.350
5.410		139.00	91.00	336 5.410	9.400		175.00	115.00	336 9.400
5.500		139.00	91.00	336 5.500	9.500		175.00	115.00	336 9.500
5.560	7/32	139.00	91.00	336 5.560	9.520	3/8	184.00	121.00	336 9.520
5.600		139.00	91.00	336 5.600	9.700		184.00	121.00	336 9.700
5.610		139.00	91.00	336 5.610	9.750		184.00	121.00	336 9.750
5.700		139.00	91.00	336 5.700	9.800		184.00	121.00	336 9.800
5.790		139.00	91.00	336 5.790	9.900		184.00	121.00	336 9.900
5.800		139.00	91.00	336 5.800	10.000		184.00	121.00	336 10.000
5.900		139.00	91.00	336 5.900	10.200		184.00	121.00	336 10.200
5.940		139.00	91.00	336 5.940	10.500		184.00	121.00	336 10.500
5.950	15/64	139.00	91.00	336 5.950	10.750		195.00	128.00	336 10.750
6.000		139.00	91.00	336 6.000	10.800		195.00	128.00	336 10.800
6.040		148.00	97.00	336 6.040	10.900		195.00	128.00	336 10.900
6.100		148.00	97.00	336 6.100	11.000		195.00	128.00	336 11.000
6.150		148.00	97.00	336 6.150	11.500		195.00	128.00	336 11.500
6.200		148.00	97.00	336 6.200	11.800		195.00	128.00	336 11.800
6.250		148.00	97.00	336 6.250	11.910	15/32	205.00	134.00	336 11.910
6.300		148.00	97.00	336 6.300	12.000		205.00	134.00	336 12.000
6.350	1/4	148.00	97.00	336 6.350	12.500		205.00	134.00	336 12.500
6.400		148.00	97.00	336 6.400	13.000		205.00	134.00	336 13.000
6.500		148.00	97.00	336 6.500	13.500		214.00	140.00	336 13.500
6.530		148.00	97.00	336 6.530	14.000		214.00	140.00	336 14.000
6.600		148.00	97.00	336 6.600	14.500		220.00	144.00	336 14.500
6.630		148.00	97.00	336 6.630	15.000		220.00	144.00	336 15.000
6.700		148.00	97.00	336 6.700	15.500		227.00	149.00	336 15.500
6.750	17/64	156.00	102.00	336 6.750	16.000		227.00	149.00	336 16.000
6.800		156.00	102.00	336 6.800					
6.900		156.00	102.00	336 6.900					
7.000		156.00	102.00	336 7.000					
7.030		156.00	102.00	336 7.030					
7.100		156.00	102.00	336 7.100					
7.140	9/32	156.00	102.00	336 7.140					
7.200		156.00	102.00	336 7.200					
7.300		156.00	102.00	336 7.300					



Long series twist drills



Tool material **HSC0**

Surface **F**

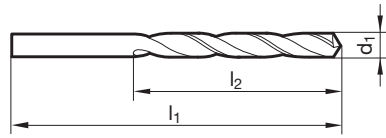
Shank form cyl.

- P** • web thinning $\geq \varnothing 1.000$ • relieved cone • Co-alloyed high speed steel • wide flutes • especially high wear resistance • in case of poor chip evacuation
- M** •
- K** •
- N** • alloyed/unalloyed steels and castings over 800 N/mm² • hot and cold rolled steels • antifriction bearing steels • high-alloyed steels • heat treatable and case hardened steels
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 316

Drilling tools



Article no. **396**

d1	inch	l1	l2	Order no.	d1	inch	l1	l2	Order no.
mm		mm	mm		mm		mm	mm	
1.000		56.00	33.00	396 1.000	5.400		139.00	91.00	396 5.400
1.100		60.00	37.00	396 1.100	5.500		139.00	91.00	396 5.500
1.200		65.00	41.00	396 1.200	5.600		139.00	91.00	396 5.600
1.300		65.00	41.00	396 1.300	5.800		139.00	91.00	396 5.800
1.400		70.00	45.00	396 1.400	6.000		139.00	91.00	396 6.000
1.500		70.00	45.00	396 1.500	6.100		148.00	97.00	396 6.100
1.600		76.00	50.00	396 1.600	6.200		148.00	97.00	396 6.200
1.700		76.00	50.00	396 1.700	6.400		148.00	97.00	396 6.400
1.800		80.00	53.00	396 1.800	6.500		148.00	97.00	396 6.500
1.900		80.00	53.00	396 1.900	6.600		148.00	97.00	396 6.600
2.000		85.00	56.00	396 2.000	6.700		148.00	97.00	396 6.700
2.100		85.00	56.00	396 2.100	6.800		156.00	102.00	396 6.800
2.200		90.00	59.00	396 2.200	6.900		156.00	102.00	396 6.900
2.300		90.00	59.00	396 2.300	7.000		156.00	102.00	396 7.000
2.400		95.00	62.00	396 2.400	7.200		156.00	102.00	396 7.200
2.500		95.00	62.00	396 2.500	7.300		156.00	102.00	396 7.300
2.700		100.00	66.00	396 2.700	7.400		156.00	102.00	396 7.400
2.800		100.00	66.00	396 2.800	7.500		156.00	102.00	396 7.500
2.900		100.00	66.00	396 2.900	7.600		165.00	109.00	396 7.600
3.000		100.00	66.00	396 3.000	7.700		165.00	109.00	396 7.700
3.100		106.00	69.00	396 3.100	7.800		165.00	109.00	396 7.800
3.200		106.00	69.00	396 3.200	7.900		165.00	109.00	396 7.900
3.300		106.00	69.00	396 3.300	8.000		165.00	109.00	396 8.000
3.400		112.00	73.00	396 3.400	8.100		165.00	109.00	396 8.100
3.500		112.00	73.00	396 3.500	8.200		165.00	109.00	396 8.200
3.600		112.00	73.00	396 3.600	8.300		165.00	109.00	396 8.300
3.700		112.00	73.00	396 3.700	8.400		165.00	109.00	396 8.400
3.800		119.00	78.00	396 3.800	8.500		165.00	109.00	396 8.500
3.900		119.00	78.00	396 3.900	8.600		175.00	115.00	396 8.600
4.000		119.00	78.00	396 4.000	8.700		175.00	115.00	396 8.700
4.100		119.00	78.00	396 4.100	8.800		175.00	115.00	396 8.800
4.200		119.00	78.00	396 4.200	8.900		175.00	115.00	396 8.900
4.300		126.00	82.00	396 4.300	9.000		175.00	115.00	396 9.000
4.400		126.00	82.00	396 4.400	9.100		175.00	115.00	396 9.100
4.500		126.00	82.00	396 4.500	9.200		175.00	115.00	396 9.200
4.700		126.00	82.00	396 4.700	9.300		175.00	115.00	396 9.300
4.800		132.00	87.00	396 4.800	9.400		175.00	115.00	396 9.400
4.900		132.00	87.00	396 4.900	9.500		175.00	115.00	396 9.500
5.000		132.00	87.00	396 5.000	9.600		184.00	121.00	396 9.600
5.100		132.00	87.00	396 5.100	9.700		184.00	121.00	396 9.700
5.200		132.00	87.00	396 5.200	9.800		184.00	121.00	396 9.800
5.300		132.00	87.00	396 5.300	9.900		184.00	121.00	396 9.900

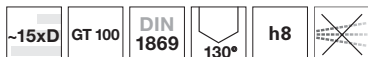


d1		l1	l2	Order no.
mm	inch	mm	mm	
10.000		184.00	121.00	396 10.000
10.200		184.00	121.00	396 10.200
10.500		184.00	121.00	396 10.500
11.000		195.00	128.00	396 11.000
11.500		195.00	128.00	396 11.500
12.000		205.00	134.00	396 12.000

d1		l1	l2	Order no.
mm	inch	mm	mm	



Extra length twist drills, series 1

Tool material **HSCO**

Surface

Shank form cyl.

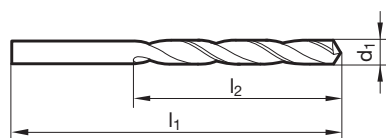
- P** • web thinning $\geq \varnothing 2.700$ • relieved cone • Co-alloyed high speed steel
 • wide flutes • increased wear resistance • for extremely deep holes • in case of poor chip evacuation

- M** •
K •
N • high tensile steels and cast steels • grey cast iron, malleable and spheroidal iron
S •

H ○**GÜHRING** NAVIGATOR

Cutting data page 316


Drilling tools

Article no. **618**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
2.700		150.00	100.00	618 2.700	5.800		205.00	140.00	618 5.800
2.900		150.00	100.00	618 2.900	6.000		205.00	140.00	618 6.000
3.000		150.00	100.00	618 3.000	6.100		215.00	150.00	618 6.100
3.100		155.00	105.00	618 3.100	6.200		215.00	150.00	618 6.200
3.170	1/8	155.00	105.00	618 3.170	6.300		215.00	150.00	618 6.300
3.200		155.00	105.00	618 3.200	6.350	1/4	215.00	150.00	618 6.350
3.300		155.00	105.00	618 3.300	6.400		215.00	150.00	618 6.400
3.400		165.00	115.00	618 3.400	6.500		215.00	150.00	618 6.500
3.500		165.00	115.00	618 3.500	6.600		215.00	150.00	618 6.600
3.570	9/64	165.00	115.00	618 3.570	6.700		215.00	150.00	618 6.700
3.600		165.00	115.00	618 3.600	6.750	17/64	225.00	155.00	618 6.750
3.700		165.00	115.00	618 3.700	6.800		225.00	155.00	618 6.800
3.750		165.00	115.00	618 3.750	7.000		225.00	155.00	618 7.000
3.800		175.00	120.00	618 3.800	7.140	9/32	225.00	155.00	618 7.140
3.970	5/32	175.00	120.00	618 3.970	7.400		225.00	155.00	618 7.400
4.000		175.00	120.00	618 4.000	7.500		225.00	155.00	618 7.500
4.100		175.00	120.00	618 4.100	7.540	19/64	240.00	165.00	618 7.540
4.200		175.00	120.00	618 4.200	7.700		240.00	165.00	618 7.700
4.300		185.00	125.00	618 4.300	7.800		240.00	165.00	618 7.800
4.370	11/64	185.00	125.00	618 4.370	7.940	5/16	240.00	165.00	618 7.940
4.400		185.00	125.00	618 4.400	8.000		240.00	165.00	618 8.000
4.500		185.00	125.00	618 4.500	8.200		240.00	165.00	618 8.200
4.600		185.00	125.00	618 4.600	8.330	21/64	240.00	165.00	618 8.330
4.760	3/16	195.00	135.00	618 4.760	8.500		240.00	165.00	618 8.500
4.800		195.00	135.00	618 4.800	8.700		250.00	175.00	618 8.700
4.850		195.00	135.00	618 4.850	8.730	11/32	250.00	175.00	618 8.730
5.000		195.00	135.00	618 5.000	8.800		250.00	175.00	618 8.800
5.100		195.00	135.00	618 5.100	9.000		250.00	175.00	618 9.000
5.160	13/64	195.00	135.00	618 5.160	9.130	23/64	250.00	175.00	618 9.130
5.200		195.00	135.00	618 5.200	9.400		250.00	175.00	618 9.400
5.300		195.00	135.00	618 5.300	9.500		250.00	175.00	618 9.500
5.400		205.00	140.00	618 5.400	9.520	3/8	265.00	185.00	618 9.520
5.500		205.00	140.00	618 5.500	9.700		265.00	185.00	618 9.700
5.560	7/32	205.00	140.00	618 5.560	10.000		265.00	185.00	618 10.000
5.600		205.00	140.00	618 5.600					
5.700		205.00	140.00	618 5.700					

Extra length twist drills, series 2

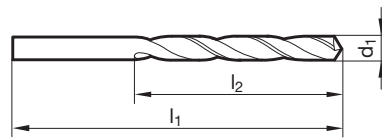


Tool material	HSC0
Surface	
Shank form	cyl.

- P** • web thinning ≥ Ø 3.000 • relieved cone • Co-alloyed high speed steel
- M** • wide flutes • increased wear resistance • for extremely deep holes • in case of poor chip evacuation
- K** •
- N** • high tensile steels and cast steels • grey cast iron, malleable and spheroidal iron
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 316



Drilling tools

Article no. **619**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
3.000		190.00	130.00	619 3.000	6.500		275.00	190.00	619 6.500
3.170	1/8	200.00	135.00	619 3.170	6.750	17/64	290.00	200.00	619 6.750
3.200		200.00	135.00	619 3.200	6.800		290.00	200.00	619 6.800
3.300		200.00	135.00	619 3.300	7.000		290.00	200.00	619 7.000
3.500		210.00	145.00	619 3.500	7.140	9/32	290.00	200.00	619 7.140
3.570	9/64	210.00	145.00	619 3.570	7.500		290.00	200.00	619 7.500
3.970	5/32	220.00	150.00	619 3.970	7.540	19/64	305.00	210.00	619 7.540
4.000		220.00	150.00	619 4.000	7.600		305.00	210.00	619 7.600
4.100		220.00	150.00	619 4.100	7.940	5/16	305.00	210.00	619 7.940
4.200		220.00	150.00	619 4.200	8.000		305.00	210.00	619 8.000
4.370	11/64	235.00	160.00	619 4.370	8.200		305.00	210.00	619 8.200
4.500		235.00	160.00	619 4.500	8.500		305.00	210.00	619 8.500
4.760	3/16	245.00	170.00	619 4.760	8.730	11/32	320.00	220.00	619 8.730
4.800		245.00	170.00	619 4.800	9.000		320.00	220.00	619 9.000
4.900		245.00	170.00	619 4.900	9.130	23/64	320.00	220.00	619 9.130
5.000		245.00	170.00	619 5.000	9.500		320.00	220.00	619 9.500
5.200		245.00	170.00	619 5.200	9.520	3/8	340.00	235.00	619 9.520
5.500		260.00	180.00	619 5.500	9.600		340.00	235.00	619 9.600
5.560	7/32	260.00	180.00	619 5.560	10.000		340.00	235.00	619 10.000
5.950	15/64	260.00	180.00	619 5.950					
6.000		260.00	180.00	619 6.000					
6.100		275.00	190.00	619 6.100					
6.200		275.00	190.00	619 6.200					
6.350	1/4	275.00	190.00	619 6.350					



Extra length twist drills, series 3

Tool material **HSC0**

Surface

Shank form cyl.

P • web thinning $\geq \varnothing 2.500$ • relieved cone • Co-alloyed high speed steel
 • wide flutes • increased wear resistance • for extremely deep holes • in case of poor chip evacuation

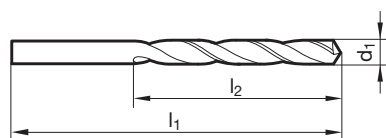
M •**K** •**N** •**S** •**H** ○

high tensile steels and cast steels • grey cast iron, malleable and spheroidal iron

GÜHRING NAVIGATOR

Cutting data page 316

Drilling tools

Article no. **571**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
2.500		225.00	150.00	571 2.500	6.750	17/64	370.00	250.00	571 6.750
3.000		240.00	160.00	571 3.000	6.800		370.00	250.00	571 6.800
3.100		250.00	170.00	571 3.100	7.000		370.00	250.00	571 7.000
3.170	1/8	250.00	170.00	571 3.170	7.140	9/32	370.00	250.00	571 7.140
3.200		250.00	170.00	571 3.200	7.200		370.00	250.00	571 7.200
3.300		250.00	170.00	571 3.300	7.500		370.00	250.00	571 7.500
3.400		265.00	180.00	571 3.400	7.750		390.00	265.00	571 7.750
3.500		265.00	180.00	571 3.500	7.800		390.00	265.00	571 7.800
3.700		265.00	180.00	571 3.700	7.940	5/16	390.00	265.00	571 7.940
3.800		280.00	190.00	571 3.800	8.000		390.00	265.00	571 8.000
3.900		280.00	190.00	571 3.900	8.200		390.00	265.00	571 8.200
3.970	5/32	280.00	190.00	571 3.970	8.500		390.00	265.00	571 8.500
4.000		280.00	190.00	571 4.000	8.600		410.00	280.00	571 8.600
4.100		280.00	190.00	571 4.100	8.730	11/32	410.00	280.00	571 8.730
4.200		280.00	190.00	571 4.200	8.800		410.00	280.00	571 8.800
4.300		295.00	200.00	571 4.300	9.000		410.00	280.00	571 9.000
4.500		295.00	200.00	571 4.500	9.500		410.00	280.00	571 9.500
4.600		295.00	200.00	571 4.600	9.520	3/8	430.00	295.00	571 9.520
4.760	3/16	315.00	210.00	571 4.760	10.000		430.00	295.00	571 10.000
4.800		315.00	210.00	571 4.800	10.320	13/32	430.00	295.00	571 10.320
4.900		315.00	210.00	571 4.900	10.500		430.00	295.00	571 10.500
5.000		315.00	210.00	571 5.000	10.720	27/64	455.00	310.00	571 10.720
5.100		315.00	210.00	571 5.100	11.000		455.00	310.00	571 11.000
5.200		315.00	210.00	571 5.200	11.110	7/16	455.00	310.00	571 11.110
5.500		330.00	225.00	571 5.500	11.500		455.00	310.00	571 11.500
5.560	7/32	330.00	225.00	571 5.560	12.000		480.00	330.00	571 12.000
5.800		330.00	225.00	571 5.800	12.200		480.00	330.00	571 12.200
5.950	15/64	330.00	225.00	571 5.950	12.500		480.00	330.00	571 12.500
6.000		330.00	225.00	571 6.000	13.000		480.00	330.00	571 13.000
6.100		350.00	235.00	571 6.100					
6.200		350.00	235.00	571 6.200					
6.300		350.00	235.00	571 6.300					
6.350	1/4	350.00	235.00	571 6.350					
6.400		350.00	235.00	571 6.400					
6.500		350.00	235.00	571 6.500					
6.700		350.00	235.00	571 6.700					

Extra length twist drills

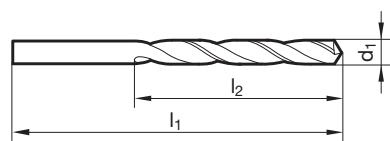


Tool material	HSS
Surface	
Shank form	cyl.

- P** • web thinning $\geq \varnothing 6.000$ • relieved cone • wide flutes • for extremely deep holes • in case of poor chip evacuation
- M**
- K** •
- N** • grey cast iron and steels up to 1000 N/mm^2 • Not recommended for: CrNi steels, stainless steels
- S**
- H**

GÜHRING NAVIGATOR

Cutting data page 316



Drilling tools

Article no. **242**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
6.000		500.00	400.00	242 6.000					
8.000		500.00	400.00	242 8.000					
10.000		600.00	500.00	242 10.000					
11.000		600.00	500.00	242 11.000					
12.000		600.00	500.00	242 12.000					



Extra length twist drills

Tool material **HSS**

Surface ○

Shank form cyl.

P • web thinning $\geq \varnothing 8.000$ • relieved cone • wide flutes • for extremely deep holes • in case of poor chip evacuation

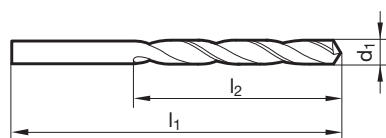
M**K** •

N • grey cast iron and steels up to 1000 N/mm^2 • Not recommended for: CrNi steels, stainless steels

S**H****GÜHRING NAVIGATOR**

Cutting data page 316

Drilling tools

Article no. **243**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
8.000		750.00	650.00	243 8.000					
10.000		750.00	650.00	243 10.000					
11.000		750.00	650.00	243 11.000					
12.000		750.00	650.00	243 12.000					

Extra length twist drills

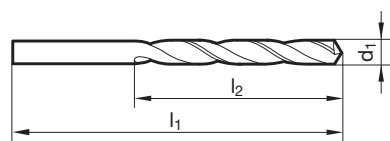


Tool material	HSS
Surface	○
Shank form	cyl.

- P** • web thinning ≥ Ø 10.000 • relieved cone • wide flutes • for extremely deep holes • in case of poor chip evacuation
- M**
- K** •
- N** • grey cast iron and steels up to 1000 N/mm² • Not recommended for: CrNi steels, stainless steels
- S**
- H**

GÜHRING NAVIGATOR

Cutting data page 316



Drilling tools

Article no. **244**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
10.000		1000.00	850.00	244 10.000					
11.000		1000.00	850.00	244 11.000					
12.000		1000.00	850.00	244 12.000					



Extra length twist drills, series 1

Tool material **HSCO**

Surface

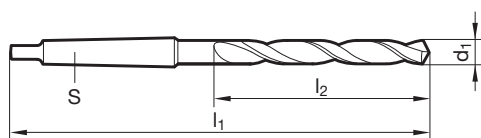
Shank form **MT**

P • web thinning $\geq \varnothing 9.520$ • relieved cone • Co-alloyed high speed steel
 • wide flutes • increased wear resistance • for extremely deep holes • in case of poor chip evacuation

M •
K •
N • high tensile steels and cast steels • grey cast iron, malleable and spheroidal iron
S •

H ○**GÜHRING** NAVIGATOR

Cutting data page 316

Article no. **620**

d1		S	l1	l2	Order no.	d1		S	l1	l2	Order no.
mm	inch		mm	mm		mm	inch		mm	mm	
9.520	3/8	MK-1	285.00	185.00	620 9.520	15.080	19/32	MK-2	355.00	230.00	620 15.080
10.000		MK-1	285.00	185.00	620 10.000	15.500		MK-2	355.00	230.00	620 15.500
10.200		MK-1	285.00	185.00	620 10.200	16.000		MK-2	355.00	230.00	620 16.000
10.320	13/32	MK-1	285.00	185.00	620 10.320	16.500		MK-2	355.00	230.00	620 16.500
10.500		MK-1	285.00	185.00	620 10.500	17.000		MK-2	355.00	230.00	620 17.000
11.000		MK-1	300.00	195.00	620 11.000	17.500		MK-2	370.00	245.00	620 17.500
11.110	7/16	MK-1	300.00	195.00	620 11.110	18.000		MK-2	370.00	245.00	620 18.000
11.500		MK-1	300.00	195.00	620 11.500	18.500		MK-2	370.00	245.00	620 18.500
12.000		MK-1	310.00	205.00	620 12.000	19.000		MK-2	370.00	245.00	620 19.000
12.300	31/64	MK-1	310.00	205.00	620 12.300	20.000		MK-2	385.00	260.00	620 20.000
12.500		MK-1	310.00	205.00	620 12.500	21.000		MK-2	385.00	260.00	620 21.000
12.700	1/2	MK-1	310.00	205.00	620 12.700	22.000		MK-2	405.00	270.00	620 22.000
13.000		MK-1	310.00	205.00	620 13.000	23.000		MK-2	405.00	270.00	620 23.000
13.500		MK-1	325.00	220.00	620 13.500	25.500		MK-3	440.00	290.00	620 25.500
14.000		MK-1	325.00	220.00	620 14.000	26.000		MK-3	440.00	290.00	620 26.000
14.290	9/16	MK-2	340.00	220.00	620 14.290	29.370	1 5/32	MK-3	460.00	305.00	620 29.370
14.500		MK-2	340.00	220.00	620 14.500	30.000		MK-3	460.00	305.00	620 30.000
15.000		MK-2	340.00	220.00	620 15.000						

Extra length twist drills, series 2



Tool material **HSCO**

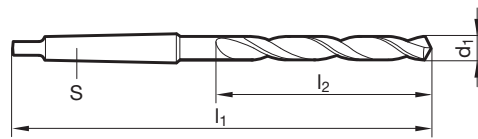
Surface  $> \frac{\sigma}{160}$

Shank form **MT**

- P** • web thinning $\geq \varnothing 9.520$ • relieved cone • Co-alloyed high speed steel • wide flutes • increased wear resistance • in case of poor chip evacuation • for extremely deep holes
- M** •
- K** •
- N** • high tensile steels and cast steels • grey cast iron, malleable and spheroidal iron
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 316



Drilling tools

Article no. **621**

d1		S	l1	l2	Order no.	d1		S	l1	l2	Order no.
mm	inch		mm	mm		mm	inch		mm	mm	
10.000		MK-1	360.00	235.00	621 10.000	14.500		MK-2	425.00	275.00	621 14.500
10.500		MK-1	360.00	235.00	621 10.500	15.000		MK-2	425.00	275.00	621 15.000
10.720	27/64	MK-1	375.00	250.00	621 10.720	16.000		MK-2	445.00	295.00	621 16.000
11.000		MK-1	375.00	250.00	621 11.000	18.000		MK-2	465.00	310.00	621 18.000
11.500		MK-1	375.00	250.00	621 11.500	18.500		MK-2	465.00	310.00	621 18.500
11.510	29/64	MK-1	375.00	250.00	621 11.510	18.650	47/64	MK-2	465.00	310.00	621 18.650
12.000		MK-1	395.00	260.00	621 12.000	19.000		MK-2	465.00	310.00	621 19.000
12.500		MK-1	395.00	260.00	621 12.500	20.000		MK-2	490.00	325.00	621 20.000
12.700	1/2	MK-1	395.00	260.00	621 12.700	21.430	27/32	MK-2	515.00	345.00	621 21.430
13.000		MK-1	395.00	260.00	621 13.000	23.420	59/64	MK-3	535.00	345.00	621 23.420
13.500		MK-1	410.00	275.00	621 13.500	29.500		MK-3	580.00	385.00	621 29.500
14.000		MK-1	410.00	275.00	621 14.000						



Twist drills with coolant ducts

Tool material **HSS**

Surface ○

Shank form cyl.

P • web thinning $\geq \varnothing 3.000$ • relieved cone • also for drilling through drill bushes • especially for drilling depths $> 5xD$

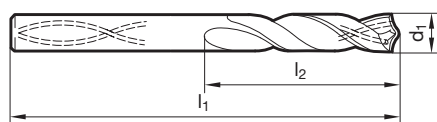
M ○**K** •

N • laminated sheet metal • steel and cast steel, grey cast iron • austenitic steels up to 800 N/mm²

S •**H****GÜHRING** NAVIGATOR

Cutting data page 316

Drilling tools

Article no. **390**

d1	l1	l2	Order no.	d1	l1	l2	Order no.
mm	mm	mm		mm	mm	mm	
3.000	100.00	66.00	390 3.000	7.500	156.00	102.00	390 7.500
3.300	106.00	69.00	390 3.300	8.000	165.00	109.00	390 8.000
3.500	112.00	73.00	390 3.500	8.500	165.00	109.00	390 8.500
4.000	119.00	78.00	390 4.000	9.000	175.00	115.00	390 9.000
4.200	119.00	78.00	390 4.200	9.500	175.00	115.00	390 9.500
4.500	126.00	82.00	390 4.500	10.000	184.00	121.00	390 10.000
5.000	132.00	87.00	390 5.000	10.200	184.00	121.00	390 10.200
5.500	139.00	91.00	390 5.500	10.500	184.00	121.00	390 10.500
6.000	139.00	91.00	390 6.000	11.000	195.00	128.00	390 11.000
6.500	148.00	97.00	390 6.500	11.500	195.00	128.00	390 11.500
6.800	156.00	102.00	390 6.800	12.000	205.00	134.00	390 12.000
7.000	156.00	102.00	390 7.000	13.000	205.00	134.00	390 13.000

Twist drills with coolant ducts



Tool material **HSC0**

Surface ○

Shank form HE

P • web thinning ≥ Ø 5.000 • relieved cone • Co-alloyed high speed steel

M •

K •

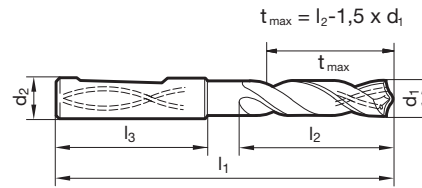
N • long chipping materials up to 1000 N/mm² • stainless steels • cast materials • non-ferrous metals

S •

H ○

GÜHRING NAVIGATOR

Cutting data page 314



Drilling tools

Article no. **1131**

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
5.000		6.00	82.00	44.00	36.00	1131 5.000	12.500		14.00	124.00	77.00	45.00	1131 12.500
5.500		6.00	82.00	44.00	36.00	1131 5.500	12.700		14.00	124.00	77.00		1131 12.700
6.000		6.00	82.00	44.00	36.00	1131 6.000	13.000		14.00	124.00	77.00	45.00	1131 13.000
6.350	1/4	8.00	91.00	53.00	36.00	1131 6.350	13.500		14.00	124.00	77.00	45.00	1131 13.500
6.500		8.00	91.00	53.00	36.00	1131 6.500	14.000		14.00	124.00	77.00	45.00	1131 14.000
6.800		8.00	91.00	53.00	36.00	1131 6.800	14.290	9/16	16.00	133.00	83.00	48.00	1131 14.290
7.000		8.00	91.00	53.00	36.00	1131 7.000	14.500		16.00	133.00	83.00	48.00	1131 14.500
7.140	9/32	8.00	91.00	53.00	36.00	1131 7.140	15.000		16.00	133.00	83.00	48.00	1131 15.000
7.500		8.00	91.00	53.00		1131 7.500	15.080		16.00	133.00	83.00	48.00	1131 15.080
7.800		8.00	91.00	53.00	36.00	1131 7.800	15.500		16.00	133.00	83.00	48.00	1131 15.500
7.940		8.00	91.00	53.00	36.00	1131 7.940	15.870	5/8	16.00	133.00	83.00	48.00	1131 15.870
8.000		8.00	91.00	53.00	36.00	1131 8.000	16.000		16.00	133.00	83.00	48.00	1131 16.000
8.500		10.00	103.00	61.00	40.00	1131 8.500	16.500		18.00	143.00	93.00	48.00	1131 16.500
8.730		10.00	103.00	61.00		1131 8.730	17.000		18.00	143.00	93.00	48.00	1131 17.000
9.000		10.00	103.00	61.00	40.00	1131 9.000	17.500		18.00	143.00	93.00	48.00	1131 17.500
9.500		10.00	103.00	61.00	40.00	1131 9.500	18.000		18.00	143.00	93.00	48.00	1131 18.000
10.000		10.00	103.00	61.00	40.00	1131 10.000	18.500		20.00	153.00	101.00	50.00	1131 18.500
10.200		12.00	118.00	71.00	45.00	1131 10.200	19.000		20.00	153.00	101.00		1131 19.000
10.320	13/32	12.00	118.00	71.00	45.00	1131 10.320	19.500		20.00	153.00	101.00	50.00	1131 19.500
10.500		12.00	118.00	71.00	45.00	1131 10.500	20.000		20.00	153.00	101.00	50.00	1131 20.000
11.000		12.00	118.00	71.00	45.00	1131 11.000							
11.110		12.00	118.00	71.00		1131 11.110							
11.500		12.00	118.00	71.00	45.00	1131 11.500							
12.000		12.00	118.00	71.00	45.00	1131 12.000							



Twist drills with coolant ducts



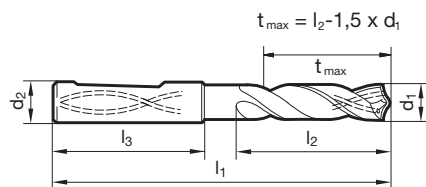
Tool material	HSCO
Surface	S
Shank form	HE

- P** • web thinning ≥ Ø 5.000 • relieved cone • Co-alloyed high speed steel • increased wear resistance
- M** •
- K** •
- N** • long chipping materials up to 1000 N/mm² • stainless steels • cast materials • non-ferrous metals
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 314

Drilling tools



Article no. 1132

d1		d2 h6	l1	l2	l3	Order no.	d1		d2 h6	l1	l2	l3	Order no.
mm	inch	mm	mm	mm	mm		mm	inch	mm	mm	mm	mm	
5.000		6.00	82.00	44.00	36.00	1132 5.000	13.500		14.00	124.00	77.00	45.00	1132 13.500
5.500		6.00	82.00	44.00	36.00	1132 5.500	14.000		14.00	124.00	77.00	45.00	1132 14.000
6.000		6.00	82.00	44.00	36.00	1132 6.000	14.500		16.00	133.00	83.00	48.00	1132 14.500
6.350		8.00	91.00	53.00	36.00	1132 6.350	15.000		16.00	133.00	83.00	48.00	1132 15.000
6.500		8.00	91.00	53.00	36.00	1132 6.500	15.500		16.00	133.00	83.00	48.00	1132 15.500
6.800		8.00	91.00	53.00	36.00	1132 6.800	15.870	5/8	16.00	133.00	83.00	48.00	1132 15.870
7.000		8.00	91.00	53.00	36.00	1132 7.000	16.000		16.00	133.00	83.00	48.00	1132 16.000
7.500		8.00	91.00	53.00	36.00	1132 7.500	16.500		18.00	143.00	93.00	48.00	1132 16.500
7.800		8.00	91.00	53.00	36.00	1132 7.800	17.000		18.00	143.00	93.00	48.00	1132 17.000
8.000		8.00	91.00	53.00	36.00	1132 8.000	17.500		18.00	143.00	93.00	48.00	1132 17.500
8.500		10.00	103.00	61.00	40.00	1132 8.500	18.000		18.00	143.00	93.00	48.00	1132 18.000
8.730	11/32	10.00	103.00	61.00	40.00	1132 8.730	19.000		20.00	153.00	101.00	50.00	1132 19.000
9.000		10.00	103.00	61.00	40.00	1132 9.000	19.500		20.00	153.00	101.00	50.00	1132 19.500
9.500		10.00	103.00	61.00	40.00	1132 9.500	20.000		20.00	153.00	101.00	50.00	1132 20.000
10.000		10.00	103.00	61.00	40.00	1132 10.000							
10.200		12.00	118.00	71.00	45.00	1132 10.200							
10.320	13/32	12.00	118.00	71.00	45.00	1132 10.320							
10.500		12.00	118.00	71.00	45.00	1132 10.500							
11.000		12.00	118.00	71.00	45.00	1132 11.000							
11.500		12.00	118.00	71.00	45.00	1132 11.500							
12.000		12.00	118.00	71.00	45.00	1132 12.000							
12.500		14.00	124.00	77.00	45.00	1132 12.500							
12.700		14.00	124.00	77.00	45.00	1132 12.700							
13.000		14.00	124.00	77.00	45.00	1132 13.000							



90° NC spotting drills



Tool material **HSCO**

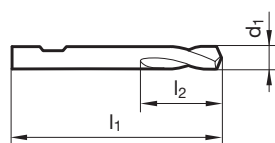
Surface **F**

Shank form **B**

- P** • relieved cone • only suitable for spotting • $\geq \varnothing 6.0$ mm with driving face to DIN 1835-B • inch dimensions are without clamping surface • Co-
- M** • alloyed high speed steel • increased wear resistance
- K** •
- N** •
- S** ○
- H**

GÜHRING NAVIGATOR

Cutting data page 306



Drilling tools

Article no. **5678**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
3.000		46.00	12.00	5678 3.000	16.000		115.00	37.50	5678 16.000
4.000		55.00	12.00	5678 4.000	19.050	3/4	131.00	45.00	5678 19.050
5.000		62.00	14.00	5678 5.000	20.000		131.00	45.00	5678 20.000
6.000		66.00	16.00	5678 6.000	25.000	63/64	151.00	53.00	5678 25.000
6.350	1/4	70.00	17.00	5678 6.350	25.400	1	156.00	53.00	5678 25.400
8.000		79.00	21.00	5678 8.000					
9.520	3/8	89.00	25.00	5678 9.520					
10.000		89.00	25.00	5678 10.000					
12.000		102.00	30.00	5678 12.000					
12.700	1/2	102.00	30.00	5678 12.700					
14.000		107.00	33.50	5678 14.000					
15.870	5/8	115.00	37.50	5678 15.870					



90° NC spotting drills



Tool material **Solid carbide**

Surface **F**

Shank form **HB**

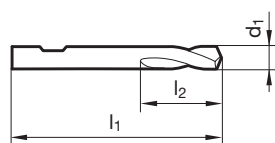
P • facet point grind • only suitable for spotting • $\geq \varnothing 6.0$ mm with clamping surface shank form HB • inch dimensions are without clamping surface

- M** •
- K** •
- N** ○ universal material suitability
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 306

Drilling tools

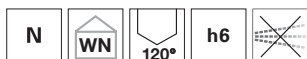


Article no. **6027**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
4.000		55.00	12.00	6027 4.000	20.000		131.00	45.00	6027 20.000
5.000		62.00	14.00	6027 5.000					
6.000		66.00	16.00	6027 6.000					
6.350	1/4	70.00	17.00	6027 6.350					
8.000		79.00	21.00	6027 8.000					
9.520	3/8	89.00	25.00	6027 9.520					
10.000		89.00	25.00	6027 10.000					
12.000		102.00	30.00	6027 12.000					
12.700	1/2	102.00	30.00	6027 12.700					
15.870	5/8	115.00	37.50	6027 15.870					
16.000		115.00	37.50	6027 16.000					
19.050	3/4	131.00	45.00	6027 19.050					



120° NC spotting drills



Tool material **HSCO**

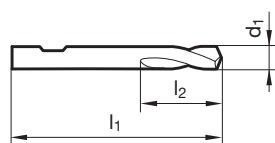
Surface **F**

Shank form **B**

- P** • relieved cone • only suitable for spotting • $\geq \varnothing 6.0$ mm with driving face to DIN 1835-B • inch dimensions are without clamping surface • Co-
- M** • alloyed high speed steel • increased wear resistance
- K** •
- N** •
- S** ○
- H**

GÜHRING NAVIGATOR

Cutting data page 306



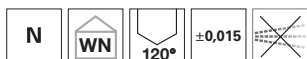
Drilling tools

Article no. **5679**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
3.000		46.00	12.00	5679 3.000	19.050	3/4	131.00	45.00	5679 19.050
4.000		55.00	12.00	5679 4.000	20.000		131.00	45.00	5679 20.000
5.000		62.00	14.00	5679 5.000	25.000	63/64	151.00	53.00	5679 25.000
6.000		66.00	16.00	5679 6.000	25.400	1	156.00	53.00	5679 25.400
6.350	1/4	70.00	17.00	5679 6.350					
8.000		79.00	21.00	5679 8.000					
9.520	3/8	89.00	25.00	5679 9.520					
10.000		89.00	25.00	5679 10.000					
12.000		102.00	30.00	5679 12.000					
12.700	1/2	102.00	30.00	5679 12.700					
15.870	5/8	115.00	37.50	5679 15.870					
16.000		115.00	37.50	5679 16.000					



120° NC spotting drills



Tool material **Solid carbide**

Surface **F**

Shank form **HB**

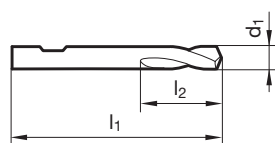
P • facet point grind • only suitable for spotting • $\geq \varnothing 6.0$ mm with clamping surface shank form HB • inch dimensions are without clamping surface

- M** •
- K** •
- N** ○ universal material suitability
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 306

Drilling tools

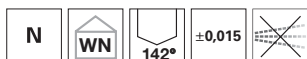


Article no. **6028**

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
3.000		46.00	12.00	6028 3.000	20.000		131.00	45.00	6028 20.000
5.000		62.00	14.00	6028 5.000					
6.000		66.00	16.00	6028 6.000					
6.350	1/4	70.00	17.00	6028 6.350					
8.000		79.00	21.00	6028 8.000					
9.520	3/8	89.00	25.00	6028 9.520					
10.000		89.00	25.00	6028 10.000					
12.000		102.00	30.00	6028 12.000					
12.700	1/2	102.00	30.00	6028 12.700					
15.870	5/8	115.00	37.50	6028 15.870					
16.000		115.00	37.50	6028 16.000					
19.050	3/4	131.00	45.00	6028 19.050					



142° NC spotting drills



Tool material **Solid carbide**

Surface **F**

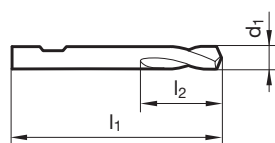
Shank form HA/HB

P • facet point grind • only suitable for spotting • $\geq \varnothing 6.0$ mm with clamping surface shank form HB • $\leq \varnothing 3.0$ mm shank- $\varnothing 4.0$ mm with HA shank

- M** •
- K** •
- N** ○ universal material suitability
- S** •
- H** ○

GÜHRING NAVIGATOR

Cutting data page 306



Drilling tools

Article no. **6029**

d1		l1	l2	Order no.
mm	inch	mm	mm	
1.000		50.00	3.00	6029 1.000
2.000		50.00	6.00	6029 2.000
3.000		50.00	9.00	6029 3.000
4.000		55.00	12.00	6029 4.000
5.000		62.00	14.00	6029 5.000
6.000		66.00	16.00	6029 6.000

d1		l1	l2	Order no.
mm	inch	mm	mm	
8.000		79.00	21.00	6029 8.000
10.000		89.00	25.00	6029 10.000
12.000		102.00	30.00	6029 12.000
16.000		115.00	37.50	6029 16.000
20.000		131.00	45.00	6029 20.000



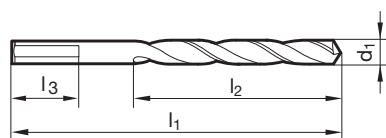
Jobber drills



Tool material	HSC0
Surface	
Shank form	3-flats

- P** • $\geq \varnothing 4.00$ mm with 3-flats on shank • 3-flats on shank prevent slipping in the chuck • for use in drilling machines with 3-jaw chucks • optimally suited for hand drilling machines and pillar drill machines • 4-facet point grind with split point $\geq \varnothing 1.000$ • low feed force • fastest drilling progress
- M** •
- K** •
- N** •
- S** ○
- H**

Drilling tools

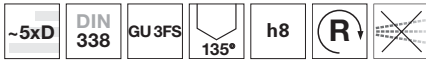


Article no. 9000

d1		l1	l2	Order no.	d1		l1	l2	Order no.
mm	inch	mm	mm		mm	inch	mm	mm	
1.000		34.00	12.00	9000 1.000	7.940	5/16	117.00	75.00	9000 7.940
1.500		40.00	18.00	9000 1.500	8.000		117.00	75.00	9000 8.000
1.590	1/16	43.00	20.00	9000 1.590	8.330	21/64	117.00	75.00	9000 8.330
1.980	5/64	49.00	24.00	9000 1.980	8.500		117.00	75.00	9000 8.500
2.000		49.00	24.00	9000 2.000	8.730	11/32	125.00	81.00	9000 8.730
2.380	3/32	57.00	30.00	9000 2.380	9.000		125.00	81.00	9000 9.000
2.500		57.00	30.00	9000 2.500	9.130	23/64	125.00	81.00	9000 9.130
2.780	7/64	61.00	33.00	9000 2.780	9.500		125.00	81.00	9000 9.500
3.000		61.00	33.00	9000 3.000	9.530		133.00	87.00	9000 9.531
3.180		65.00	36.00	9000 3.180	9.530	3/8	133.00	87.00	9000 9.530
3.200		65.00	36.00	9000 3.200	9.920	25/64	133.00	87.00	9000 9.920
3.300		65.00	36.00	9000 3.300	10.000		133.00	87.00	9000 10.000
3.500		70.00	39.00	9000 3.500	10.200		133.00	87.00	9000 10.200
3.570	9/64	70.00	39.00	9000 3.570	10.320	13/32	133.00	87.00	9000 10.320
3.970	5/32	75.00	43.00	9000 3.970	10.500		133.00	87.00	9000 10.500
4.000		75.00	43.00	9000 4.000	10.720	27/64	142.00	94.00	9000 10.720
4.200		75.00	43.00	9000 4.200	11.000		142.00	94.00	9000 11.000
4.370	11/64	80.00	47.00	9000 4.370	11.110	7/16	142.00	94.00	9000 11.110
4.500		80.00	47.00	9000 4.500	11.500		142.00	94.00	9000 11.500
4.760	3/16	86.00	52.00	9000 4.760	11.510	29/64	142.00	94.00	9000 11.510
5.000		86.00	52.00	9000 5.000	11.910	15/32	151.00	101.00	9000 11.910
5.100		86.00	52.00	9000 5.100	12.000		151.00	101.00	9000 12.000
5.160	13/64	86.00	52.00	9000 5.160	12.300	31/64	151.00	101.00	9000 12.300
5.200		86.00	52.00	9000 5.200	12.500		151.00	101.00	9000 12.500
5.500		93.00	57.00	9000 5.500	12.700	1/2	151.00	101.00	9000 12.700
5.560	7/32	93.00	57.00	9000 5.560	13.000		151.00	101.00	9000 13.000
5.950	15/64	93.00	57.00	9000 5.950					
6.000		93.00	57.00	9000 6.000					
6.350	1/4	101.00	63.00	9000 6.350					
6.500		101.00	63.00	9000 6.500					
6.750	17/64	109.00	69.00	9000 6.750					
6.800		109.00	69.00	9000 6.800					
7.000		109.00	69.00	9000 7.000					
7.150		109.00	69.00	9000 7.150					
7.500		109.00	69.00	9000 7.500					
7.540	19/64	117.00	75.00	9000 7.540					



Twist drill sets



P	•	≥ Ø 4.00 mm with 3-flats on shank • 3-flats on shank prevent slipping in the chuck • for use in drilling machines with 3-jaw chucks
M	•	• for use in drilling machines with 3-jaw chucks • optimally suited for hand drilling machines and pillar drill machines
K	•	• 4-facet point grind with split point ≥ Ø 1.000 • low feed force • fastest drilling progress
N	•	• for universal application
S	○	
H		

Tool material	HSCO
Surface	
Shank form	3-flats



Drilling tools

Article no.			9001
d1	increasing by	Pieces/set	Order no.
mm	mm	mm	
1.0-10.0	0.5	19	9001 0.013
1.0-13.0	0.5	25	9001 0.014

GUHRING NAVIGATOR Ratio drills

Generally recommendations:

For safety reasons it is very important, that a drill does not exceed a speed of $n = 6,000 \text{ rev./min}$ when unsupported. The centrifugal forces can break these long tools before reaching the workpiece surface!

Application recommendations for 7xD, 10xD and 12xD drills: Pilot holes are necessary for extra length SL drills 7xD:
 1.) The pilot hole can be produced with a short, rigid drill. The diameter should be 0.01-0.02 mm larger than the diameter of the solid carbide drill, the drilling depth > 1xD.

2.) Alternatively solid carbide drills can produce their own pilot hole. Cutting speed and feed rate should be reduced by 30-40 %.

The recommended **minimum coolant pressure** is 40 bar.

- Article no.
- Standard/DIN
- Tool material
- Carbide grade
- Type
- Surface
- Cooling
- Std. range page

Tools with bold feed column no. are preferred choice.

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Cooling:
 without coolant ducts
 with coolant ducts

Coolant:
 ○ Air
 ● Neat oil
 ● Soluble oil

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		○
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Hardened steels	-		≤48 HRC ≤66 HRC	○
Stainless steels, sulphured austenitic martensitic	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		○
Cast iron	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	○
Spheroidal graphite iron and malleable cast iron	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	○
Chilled cast iron	-		≤350 HB	○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Ti and Ti alloys	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 and Al alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤650		○
Al cast alloys ≤ 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		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○



≤3xD

5514
6537K
Solid carbide
K/P
RT 100 U
F
⊗
200

≤3xD

8524
6537K
Solid carbide
K/P
RT 100 HF
Y
⊗
202

≤3xD ≤5xD

5510	5511
6537K	6537L
Solid carbide	
K/P	
RT 100 U	
F	
⊗	
176	182

≤3xD ≤5xD

8520	8521
6537K	6537L
Solid carbide	
K/P	
RT 100 HF	
Y	
⊗	
180	186

≤3xD ≤5xD

6498	5498
6537K	6537L
Solid carbide	
K/P	
RT 100 XF	
F	
⊗	⊗
178	184



V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.		V _c m/min	Feed col. no.		V _c m/min	Feed col. no.	
130	7	130	7	145	7	7	145	7	7	200	8	8
110	6	110	6	120	6	6	120	6	6	200	7	7
145	8	145	8	170	8	8	170	8	8	200	8	8
110	7	110	7	145	8	8	145	8	8	200	8	8
120	7	120	7	130	8	8	130	8	8	180	8	8
110	7	110	7	125	7	7	125	7	7	160	8	8
105	7	105	7	120	7	7	120	7	7	130	8	8
105	7	105	7	120	7	7	120	7	7	120	8	8
100	6	100	6	105	7	7	105	7	7	120	7	7
130	8	130	8	145	8	8	145	8	8	180	8	8
120	7	120	7	120	7	7	120	7	7	120	8	8
85	5	85	5	85	5	5	85	5	5	110	7	7
100	6	100	6	110	7	7	110	7	7	110	7	7
90	5	90	5	105	5	5	105	5	5	100	5	5
65	6	65	6	80	6	6	80	6	6	90	7	7
55	5	55	5	65	5	5	65	5	5	65	6	6
		55	4	60	4	5	60	4	4	60	5	5
45	3	45	3	60	3	3	60	3	3	60	5	5
40	1	40	1	55	3	2	55	3	3	55	3	3
20	1	20	1	35	2	2	35	2	2			
40	2	40	2	60	5	5				80	5	5
15	1	15	1	55	2	2						
35	2	35	2	45	5	5				60	5	5
210	8			210	9	9				180	9	9
155	8			160	9	9				160	9	9
155	7			140	9	9				140	9	9
125	7			130	8	8				140	8	8
35	3			40	3	3						
										140	8	8
										140	8	8
										80	7	7
										80	7	7
25	4	25	4	35	4	4	35	4	4	30	4	4
15	1	15	1	45	4	4	45	4	4	40	4	4
15	1	15	1	40	3	3	40	3	3	35	3	3
260	9			310	9	9						
260	9			310	9	9						
220	9			260	9	9						
180	8			220	9	9						
260	8			280	8	8						
105	7			125	7	7						
270	8			325	8	8						
180	7			220	7	7						
105	6			125	7	7						
85	6			105	6	6						
80	5			90	6	6						
60	5			80	6	6						

Drilling tools



GUHRING NAVIGATOR Ratio drills

Generally recommendations:

For safety reasons it is very important, that a drill does not exceed a speed of $n = 6,000 \text{ rev./min}$ when unsupported. The centrifugal forces can break these long tools before reaching the workpiece surface!

Application recommendations for 7xD, 10xD and 12xD drills:

Pilot holes are necessary for extra length SL drills 7xD:
 1.) The pilot hole can be produced with a short, rigid drill. The diameter should be 0.01-0.02 mm larger than the diameter of the solid carbide drill, the drilling depth > 1xD.

2.) Alternatively solid carbide drills can produce their own pilot hole. Cutting speed and feed rate should be reduced by 30-40 %.

The recommended **minimum coolant pressure** is 40 bar.

Article no.
Standard/DIN
Tool material
Carbide grade
Type
Surface
Cooling
Std. range page

Tools with bold feed column no. are preferred choice.

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Cooling:

- without coolant ducts
- with coolant ducts

Coolant:

- Air
- Neat oil
- Soluble oil

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		●
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		●
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		●
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		●
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		●
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Hardened steels	-		≤48 HRC ≤66 HRC	●
Stainless steels, sulphured austenitic martensitic	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		●
Cast iron	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	●
Spheroidal graphite iron and malleable cast iron	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	●
Chilled cast iron	-		≤350 HB	●
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	●
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		●
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Ti and Ti alloys	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 and Al alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤650		●
Al cast alloys ≤ 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		●
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		●
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		●
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		●
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		●
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		●
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		●
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		●
Kevlar	Kevlar	≤1000		●
Glass, carbon concentr. plastics	GFK/CFK	≤1000		●



≤7xD

5512
Company standard
Solid carbide
K/P
RT 100 U
F
188

≤7xD

8522
Company standard
Solid carbide
K/P
RT 100 HF
Y
192

≤7xD

5499
Company standard
Solid carbide
K/P
RT 100 XF
F
190

≤12xD

5525
Company standard
Solid carbide
K/P
RT 100 U
F
193

≤3xD

1946
6537K
Solid carbide
K/P
N
F
204



V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
145	6	145	6	180	8	110	6		
120	5	120	5	180	7	110	5		
170	7	170	7	180	8	110	7		
145	7	145	7	180	8	100	7		
130	7	130	7	160	8	110	7		
125	6	125	6	140	8	110	6		
120	6	120	6	120	8	100	6		
120	6	120	6	110	8	110	6		
105	6	105	6	110	7	105	6	80	6
145	7	145	7	160	8	110	7		
120	6	120	6	110	8	110	6		
85	4	85	4	100	7	85	4	65	4
110	6	110	6	100	7	100	6		
105	4	105	4	90	5	80	4	80	4
80	5	80	5	80	7	80	5		
65	4	65	4	60	6	65	4		
60	4	60	3	55	5	50	4		
60	2	60	2	55	5	50	2		
55	2	55	2	45	3			40	2
35	1	35	1					30	1
60	4			70	5	60	4		
55	2					55	2		
45	4			50	5	45	4		
195	8			165	9	120	8	90	8
160	8			145	9	120	8	80	8
140	8			130	9	100	8	80	8
130	7			130	8	90	7	70	7
40	2							30	2
				130	8				
				130	8				
				70	7				
				70	7				
35	3	35	3	25	4				
40	3	45	3	35	4				
40	2	40	4	30	3				
310	8					150	8		
310	8					150	8		
260	8					150	8		
220	8					120	8		
280	7					150	7		
125	6					80	6		
325	7					120	7		
220	6					120	6		
125	6					40	6		
105	5								
90	5								
80	5					40	5		

Drilling tools



GUHRINGNAVIGATOR

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

- Article no.
- Standard/DIN
- Tool material
- Carbide grade
- Type
- Drilling depth/Point angle
- Surface
- Cooling
- Std. range page

Drilling tools

Drill Ø mm	Feed column no. NC spotting drills								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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	0.200
4.00	0.040	0.050	0.063	0.080	0.100	0.125	0.160	0.200	0.250
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

Drill Ø mm	Feed column no. Micro-precision drills												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/rev.)												
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

- Coolant:
- Air
 - Neat oil
 - Soluble oil
- Cutting direction:
- right-hand cutting

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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"/>
Free-cutting steels	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"/>
Unalloyed heat-treatable steels	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"/>
Alloyed heat-treatable steels	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"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		<input type="radio"/>
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		<input type="radio"/>
Nitriding steels	1.8504 34CrAl6	≤1000		<input type="radio"/>
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		<input type="radio"/>
Tool steels	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"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Hardened steels	-		≤48 HRC	<input type="radio"/>
			≤66 HRC	<input type="radio"/>
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		<input type="radio"/>
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		<input type="radio"/>
martensitic	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		<input type="radio"/>
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	<input type="radio"/>
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	<input type="radio"/>
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	<input type="radio"/>
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	<input type="radio"/>
Chilled cast iron	-		≤350 HB	<input type="radio"/>
New cast materials 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"/>
New cast materials 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"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Ti and Ti alloys	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 and Al alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤650		<input type="radio"/>
Al cast alloys ≤ 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"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		<input type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		<input type="radio"/>
	2.0790 CuNi18Zn19Pb	≤850		<input type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		<input type="radio"/>
	2.0980 CuAl1Ni, 2.1247 CuBe2	≤1000		<input type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Kevlar	Kevlar	≤1000		<input type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤1000		<input type="radio"/>



ExclusiveLine micro-precision drills

6400	6401
Company standard	Company standard
Solid carbide	Solid carbide
K/P	K/P
N	N
≤4xD	≤7xD
205	206

6405	6408	6412
Company standard	Company standard	Company standard
Solid carbide	Solid carbide	Solid carbide
K/P	K/P	K/P
N	N	N
≤5xD	≤5xD	≤15xD
207	208	209



v _c m/min	Feed col. no.	
100	64	62
100	64	62
100	64	62
90	63	61
90	64	62
90	64	62
90	63	61
90	63	61
70	62	60
100	63	61
85	63	61
70	62	60
70	62	60
60	62	60
50	62	60
60	62	60
60	57	57
60	57	57
30	57	57
15	56	56
30	57	57
130	68	66
130	68	66
130	68	66
120	67	65
10	56	56
15	56	56
15	56	56
70	68	68
70	68	68
135	59	59
135	59	59

v _c m/min	Feed col. no.	
105	62	58
100	62	58
105	62	59
90	61	59
95	62	58
95	62	58
90	61	58
90	61	58
70	60	58
100	61	57
85	61	58
70	60	58
70	60	57
60	60	57
60	60	58
60	60	58
60	57	57
60	57	57
70	57	57
60	56	56
70	57	57
150	60	60
140	60	60
140	60	60
130	60	60
25	56	56
35	56	56
35	56	56
100	68	68
100	68	68
135	59	59
135	59	59

Drilling tools

**GUHRINGNAVIGATOR Ratio drills****Generally recommendations:**

For safety reasons it is very important, that a drill does not exceed a speed of $n = 6,000 \text{ rev./min}$ when unsupported. The centrifugal forces can break these long tools before reaching the workpiece surface!

Application recommendations for 7xD, 10xD and 12xD drills: Pilot holes are necessary for extra length SL drills 7xD:
1.) The pilot hole can be produced with a short, rigid drill. The diameter should be 0.01-0.02 mm larger than the diameter of the solid carbide drill, the drilling depth > 1xD.

2.) Alternatively solid carbide drills can produce their own pilot hole. Cutting speed and feed rate should be reduced by 30-40 %.

The recommended **minimum coolant pressure** is 40 bar.

Article no.
Standard/DIN
Tool material
Carbide grade
Type
Surface
Cooling
Std. range page

Tools with bold feed column no. are preferred choice.

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Cooling:

without coolant ducts
 with coolant ducts

Coolant:

Air
 Neat oil
 Soluble oil

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	
Hardened steels	-		≤48 HRC ≤66 HRC	
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		
Cast iron	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	
Spheroidal graphite iron and malleable cast iron	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	
Chilled cast iron	-		≤350 HB	
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		
Ti and Ti alloys	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 and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		
Al cast alloys ≤ 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		
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		
Kevlar	Kevlar	≤1000		
Glass, carbon concentr. plastics	GFK/CFK	≤1000		



≤ 15xD

6509
Company standard
Solid carbide
K/P
RT 100 T
A
40 bar MQL
195



≤ 20xD

6511
Company standard
Solid carbide
K/P
RT 100 T
A
40 bar MQL
196



≤ 25xD

6512
Company standard
Solid carbide
K/P
RT 100 T
A
40 bar MQL
197



≤ 30xD

6513
Company standard
Solid carbide
K/P
RT 100 T
A
40 bar MQL
198



≤ 40xD

6514
Company standard
Solid carbide
K/P
RT 100 T
A
40 bar
199



Drilling tools

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
110	8		
110	8		
120	8		
120	8		
110	6		
110	8		
100	7		
110	7	80	7
110	6	80	7
110	8		
110	7	80	6-7
110	6	80	6-7
100	5		
80	5		
100	6-7		
80	5		
50	5		
50	5		
50	4		
100	5		
70	2-3		
100	5		
140	8		
100	8		
140	8		
100	8		
100	6		
100	6		
90	8	90	8
30	2		
120	1		
120	8		

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
110	8		
110	8		
120	8		
120	8		
110	6		
110	8		
100	7		
110	7	80	7
110	6	80	7
110	8		
110	7	80	6-7
110	6	80	6-7
100	5		
80	5		
100	6		
80	5		
50	5		
50	5		
50	4		
100	5		
60	3		
100	5		
140	8		
100	8		
140	8		
100	8		
100	6		
100	6		
90	8	90	8
30	2		
120	1		
120	8		

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
100	8		
100	8		
120	8		
100	8		
110	6		
100	8		
100	7		
100	7	70	7
100	6	70	7
100	8		
100	7	70	6-7
100	6	70	6-7
80	5		
60	5		
90	6		
70	4		
50	4		
50	4		
50	4		
100	5		
60	3		
100	5		
130	8		
90	8		
130	8		
90	8		
90	6		
90	6		
80	8	80	8
30	2		
120	1		
110	8		

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
80	7		
80	7		
100	8		
100	8		
110	6		
80	7		
80	7		
80	7	60	7
80	7	60	7
80	7		
80	6	60	6-7
80	6	60	6-7
80	5		
60	5		
80	6		
70	4		
50	4		
50	4		
50	4		
80	5		
60	3		
80	5		
120	8		
80	8		
120	8		
80	8	65	8
80	6		
80	6		
70	8	70	8
30	2		
120	1		
100	8		

V _c m/min	Feed col. no.
80	7
80	7
100	8
100	8
110	6
80	7
80	7
80	6-7
80	6
80	7
80	6
80	6
80	6
80	5
60	5
80	6-7
70	4
50	4
50	4
50	4
80	5
70	2-3
80	5
120	8
80	8
120	8
80	8
80	6
80	6
70	8
30	2
120	1
100	8



Drill Ø mm	Feed column no.							
	11	12	13	14	15	16	17	18
	f (mm/rev.)							
1.50	0.002	0.004	0.006	0.008	0.012	0.020	0.032	0.045
2.00	0.003	0.005	0.007	0.010	0.016	0.028	0.046	0.055
2.50	0.004	0.006	0.008	0.012	0.018	0.030	0.054	0.070
4.00	0.005	0.007	0.010	0.016	0.025	0.043	0.065	0.085
6.00	0.007	0.009	0.013	0.024	0.035	0.061	0.085	0.120
8.00	0.010	0.014	0.022	0.032	0.045	0.068	0.100	0.150
10.00	0.012	0.016	0.028	0.040	0.055	0.075	0.120	0.160
14.00	0.020	0.025	0.035	0.050	0.065	0.085	0.130	0.180
18.00	0.025	0.030	0.040	0.055	0.070	0.095	0.145	0.200
20.00	0.026	0.035	0.045	0.060	0.080	0.110	0.180	0.250
24.00	0.027	0.036	0.047	0.065	0.085	0.130	0.185	0.300
28.00	0.028	0.038	0.049	0.068	0.090	0.140	0.195	0.350
30.00	0.030	0.040	0.050	0.070	0.100	0.150	0.200	0.400
35.00	0.035	0.045	0.055	0.075	0.120	0.180	0.250	0.450
40.00	0.040	0.050	0.060	0.080	0.150	0.200	0.300	0.500

* The feed rates always relate to tools with the recommended coating.
In some cases the successful application of un-coated tools cannot be guaranteed.

Material dependent coolants:

- Air
- Neat oil
- ◐ Soluble oil



All deep hole drills must have support for the pilot hole.
Deep hole drills must never operate at full speed without support in the machine shop.

Application advice

- For drilling depths in excess than 40 x D we recommend the use of two or more gun drills, e. g. Ø 10 x 400 mm and Ø 9.95 x 800 mm.
- Gun drills for drilling depths of more than 40 x D should enter the pilot hole revolving in the left hand direction.
- When changing tools for drilling depths of more than 40 x D, the tool can be damped by switching on coolant supply for just one second.
- For machining of long-chipping materials we recommend the use of gun drills with polished flutes.
- Generally we recommend the use of soluble oil with a minimum oil content of 10%.
- Single-fluted gun drills for long-chipping aluminium should be supplied with point grind 180° and coolant chamber.
- When spotting in aluminium with an Si-content of less than 1%, i.e. with recommended cutting rates $v_c > 160$ m/min we recommend to advance to the final speed in several steps. In addition, a deeper pilot hole of approximately 3 x D should be produced.

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Hardened steels	-		≤48 HRC ≤66 HRC	●
Stainless steels, sulphured austenitic martensitic	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		●
Cast iron	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	○
Spheroidal graphite iron and malleable cast iron	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	○
Chilled cast iron	-		≤350 HB	○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Ti and Ti alloys	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 and Al alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1 3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤400 ≤650		○
Al cast alloys ≤ 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		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○

Procedure

In order to achieve optimal machining results when producing deep holes with type RT 100 T especially spotting on radii or on an uneven surface structure, we recommend the following machining steps:

1. Initial milling of surface, i.e. with Guhring's centre cutting Ratio end mill RF 100 U. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Production of a cylindrical pilot hole (tolerance G9) with a minimum drilling depth of 1 x D. For this operation we recommend our Ratio drills RT 100 U or RT 100 F respectively. Thanks to a 140° point angle and a m7 tolerance on diameter these Ratio drills are especially suitable for this machining task.
3. Entry of spiral-flute deep hole drill RT 100 T in the pilot hole at a speed of approx. 300 rev./min and with a feed rate of approx. 500 mm/min.
4. Setting of coolant pressure and speed.
5. Continuous drilling to complete hole depth without wood pecking.
6. For through holes with plain - i.e. 90° - exit, reduce feed rate v_f to 50 % approx. 1 mm prior to break-through.
7. For through holes with oblique exit, reduce the feed rate v_f to 40% approx. 1 mm prior to break-through.
8. After reaching hole depth stop machine spindle and coolant supply, withdrawal in top gear.



Ratio end mill RF 100 U, Article no. 5735

Thanks to its unequal helix angle, Guhring's FIRE-coated Ratio end mill RF 100 U offers highest feed rates and tool life for finishing and roughing operations in steel and cast materials as well as Ti- and Ni-alloys.



Ratio drill RT 100 F, Article no. 5510

Thanks to their special cutting edge geometry, Guhring's Ratio drills excel with very good self-centering characteristics and alignment accurate holes. Type U is especially suitable for the machining of steel and high-alloyed AISi-alloys, type F for high-alloyed, stainless, acid- and heat-resistant steels, Al and Al-alloys, Mg and Mg-alloys as well as Ti and Ti-alloys.

Drilling tools

EB100

Single-fluted gun drill
Solid carbide

1.0 ... 16.0



EB80

Single-fluted gun drill
Solid carbide head

3.0 ... 32.0



recom. coating	≤35xD		>35xD	
	V_c m/min	Feed col. no.	V_c m/min	Feed col. no.
A	100	15	100	15
	85	15	85	15
	90	15	90	15
	80	15	80	15
	80	14	80	14
	75	14	75	14
	75	14	75	14
	75	14	75	14
	65	14	65	14
	80	15	80	15
	75	14	75	14
	65	14	65	14
	75	14	75	14
	65	14	65	14
	75	13	75	13
65	13	65	13	
55	12	55	12	
65	13	65	13	
30	13	30	13	
25	10	25	14	
40	14	40	14	
35	14	35	14	
35	14	35	14	
85	16	85	16	
80	16	80	16	
80	15	80	15	
70	15	70	15	
55	14	55	14	
20	12	20	12	
35	12	35	12	
30	12	30	12	
150	17	150	17	
120	19	120	19	
120	20	120	20	
130	18	130	18	
110	17	110	17	
75	15	75	15	
120	18	120	18	
90	18	90	18	
95	17	95	17	
75	17	75	17	
70	17	70	17	
60	17	60	17	
75	15	75	15	
70	15	70	15	
60	14	60	14	
50	14	50	14	

recom. coating	≤35xD		>35xD	
	V_c m/min	Feed col. no.	V_c m/min	Feed col. no.
S	100	14	95	13
S	85	14	80	13
S	90	14	85	13
S	80	14	75	13
S	90	13	85	12
S	80	13	75	12
S	75	13	70	12
S	65	13	60	12
S	80	14	75	13
S	75	13	70	12
S	65	13	60	12
C	75	13	70	12
C	65	13	60	12
C	75	12	70	11
C	65	12	60	11
C	55	11	50	11
C	65	12	60	12
C	30	12	25	11
C	25	11	20	11
C	55	13	50	12
C	45	13	40	12
C	35	13	35	12
C	85	15	80	14
C	80	15	75	14
C	80	14	75	13
C	70	14	65	13
C	55	13	50	12
C	20	11	20	11
C	35	11	30	11
C	30	11	25	11
C	150	16	140	15
C	120	15	115	14
C	150	16	140	15
C	130	16	120	15
C	110	16	100	15
C	75	14	70	13
C	120	17	115	16
C	90	17	85	16
C	95	16	90	15
C	75	16	70	15
C	70	16	65	15
C	60	16	55	15
C	75	14	70	13
C	70	14	65	13
C	60	13	55	12
C	50	13	45	12



GUHRING NAVIGATOR

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Drilling tools

- Article no.
- Standard/DIN
- Tool material
- Carbide grade
- Type
- Drilling depth/Point angle
- Surface
- Cooling
- Std. range page

Drill Ø mm	Feed column no. NC spotting drills								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Drill Ø mm	Feed column no. Micro-precision drills												
	56	57	58	59	60	61	62	63	64	65	66	67	68
	f (mm/rev.)												
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



Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		●●
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		●●
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		●●
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		●●
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		●●
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		●●
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●●
Hardened steels	-		≤48 HRC ≤66 HRC	●●
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		●●
 austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		●●
 martensitic	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		●●
Cast iron	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	●○
Spheroidal graphite iron and malleable cast iron	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	●○
Chilled cast iron	-		≤350 HB	●○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	●○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		●○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●○
Ti and Ti alloys	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 and Al alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		●○
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤650		●○
Al cast alloys ≤ 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		●○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		●○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		●○
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		●○
 long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600		●○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		●○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl1Ni, 2.1247 CuBe2	≤850 ≤1000		●○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○



NC spotting drills

5678
Company standard
HSCO
N
90°
F
⊗
289

6027
Company standard
Solid carbide
K10/K20
N
90°
F
⊗
290

5679
Company standard
HSCO
N
120°
F
⊗
291

6028
Company standard
Solid carbide
K10/K20
N
120°
F
⊗
292

6029
Company standard
Solid carbide
K10/K20
N
142°
F
⊗
293



v_c m/min	Feed col. no.	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.	v_c m/min	Feed col. no.
42	6	100	6	42	6	100	6	100	6
36	5	85	5	36	5	85	5	85	5
48	6	105	6	48	6	105	6	105	6
42	6	100	5	42	6	100	5	100	5
44	6	85	5	44	6	85	5	85	5
44	6	85	5	44	6	85	5	85	5
40	5	70	4	40	5	70	4	70	4
27	4	55	4	27	4	55	4	55	4
22	3	45	3	22	3	45	3	45	3
37	6	100	6	37	6	100	6	100	6
22	4	55	4	22	4	55	4	55	4
18	3	30	3	18	3	30	3	30	3
19	4			19	4				
15	3			15	3				
21	4	55	4	21	4	55	4	55	4
16	3			16	3				
12	3			12	3				
10	2			10	2				
		30	2			30	2		
18	3	35	3	18	3	35	3	35	3
15	3	25	3	15	3	25	3	25	3
12	3	30	3	12	3	30	3	30	3
38	6	100	6	38	6	100	6	100	6
35	6	100	6	35	6	100	6	100	6
33	6	85	6	33	6	85	6	85	6
28	6	70	6	28	6	70	6	70	6
7	1	25	2	7	1	25	2	25	2
10	2	25	1	10	2	25	1	25	1
8	2	25	1	8	2	25	1	25	1
		230	7			230	7		
85	7	230	7	85	7	230	7	230	7
65	7	165	7	65	7	165	7	165	7
65	6	165	6	65	6	165	6	165	6
80	6	230	6	80	6	230	6	230	6
70	5	200	5	70	5	200	5	200	5
75	5	200	5	75	5	200	5	200	5
50	5	135	5	50	5	135	5	135	5
45	5	100	4	45	5	100	4	100	4
40	4	85	4	40	4	85	4	85	4
25	4	55	4	25	4	55	4	55	4
20	4	45	4	20	4	45	4	45	4
25	4	65	4	25	4	65	4	65	4
40	4	95	5	40	4	95	5	95	5

Drilling tools

**GUHRINGNAVIGATOR**

All data are approximate values. The actually achievable cutting speeds and feed rates depend on the respective machining conditions. We recommend suitable drilling trials.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Article no.
Standard/DIN
Tool material
Carbide grade
in combination with holder
Surface
Application
Std. range page

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

- Coolant:
- Air
 - Neat oil
 - ◐ Soluble oil

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Hardened steels	-		≤48 HRC ≤66 HRC	●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Cast iron	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	○
Spheroidal graphite iron and malleable cast iron	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	○
Chilled cast iron	-		≤350 HB	○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Ti and Ti alloys	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 and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Al cast alloys ≤ 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		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤600		○
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○



$\leq 1 \times D / \leq 1.5 \times D$

$\leq 3 \times D$

4112 Co. std. Sol. car. K/P 4106 223	4115 Co. std. Sol. car. K/P 4106 229	4114 Co. std. Sol. car. K/P 4106 226	4111 Co. std. Sol. car. K/P 4106 pil./ counters. 220	4229 Co. std. Sol. car. K/P 4106 steel beams 232	4112 Co. std. Sol. car. K/P 4107 223	4115 Co. std. Sol. car. K/P 4107 229	4114 Co. std. Sol. car. K/P 4107 226	4111 Co. std. Sol. car. K/P 4107 pil./ counters. 220	4229 Co. std. Sol. car. K/P 4107 steel beams 232
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Drilling tools

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
130	6				130	6				130	6	130	6	90	5				
110	5				110	5			80	5				75	5				
130	7				130	7								130	7				
110	6				110	6								110	6				
130	6				130	6								130	6				
125	6				125	6								125	6				
110	5				110	5								110	5				
110	6				110	6								110	6				
90	5				90	5								90	5				
130	7				130	7								130	7				
110	6				110	6								110	6				
70	4				70	4								70	4				
105	5				105	5								105	5				
70	4				70	4								70	4				
60	5				60	5								60	5				
55	4				55	4								55	4				
55	3				55	3								55	3				
50	2				50	2								50	2				
		25	2		25	2						25	2		25	2			
		55	3		55	3						55	3		55	3			
		40	3		40	3						40	3		40	3			
		35	3		35	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						90	6		90	6			
					80	5								80	5				
					80	5								80	5				
					80	5								80	5				
					80	5								80	5				
					80	5								80	5				
		25	2		25	2						25	2		25	2			
		40	3		40	3						40	3		40	3			
		35	2		35	2						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				

**GUHRINGNAVIGATOR**

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Article no.
Standard/DIN
Tool material
Carbide grade
in combination with holder
Surface
Application
Std. range page

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Coolant:

- Air
● Neat oil
● Soluble oil

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Hardened steels	-		≤48 HRC ≤66 HRC	●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Cast iron	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	○
Spheroidal graphite iron and malleable cast iron	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	○
Chilled cast iron	-		≤350 HB	○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Ti and Ti alloys	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 and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Al cast alloys ≤ 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		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		○
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○



≤5xD

≤7xD

4112 Co. std. Sol. car. K/P 4108 223	4115 Co. std. Sol. car. K/P 4108 229	4114 Co. std. Sol. car. K/P 4108 226	4111 Co. std. Sol. car. K/P 4108 pil./ counters. 220	4229 Co. std. Sol. car. K/P 4108 steel beams 232	4112 Co. std. Sol. car. K/P 4109 223	4115 Co. std. Sol. car. K/P 4109 229	4114 Co. std. Sol. car. K/P 4109 226	4111 Co. std. Sol. car. K/P 4109 pil./ counters. 220	4229 Co. std. Sol. car. K/P 4109 steel beams 232
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Drilling tools

V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
125	6					130	6	90	5	120	5					130	6	90	5
105	5					110	5	75	5	105	4					110	5	75	5
125	7					130	7			120	6					130	7		
105	6					110	6			105	5					110	6		
125	6					130	6			120	5					130	6		
120	6					125	6			110	5					125	6		
105	5					110	5			100	4					110	5		
105	6					110	6			100	5					110	6		
85	5					90	5			85	4					90	5		
125	7					130	7			120	6					130	7		
105	6					110	6			100	5					110	6		
70	4					70	4			70	4					70	4		
105	5					105	5			105	4					105	5		
70	4					70	4			70	3					70	4		
55	5					60	5			55	4					60	5		
50	4					55	4			50	3					55	4		
55	3					55	3			55	2					55	3		
50	2					50	2			50	2					50	2		
		25	2			25	2					25	1			25	2		
		55	3			55	3					55	2			55	3		
		40	3			40	3					40	2			40	3		
		35	3			35	3					35	2			35	3		
						100	6									100	6		
						90	6									90	6		
						120	7									120	7		
						100	6									100	6		
		90	6			90	6					70	6			90	6		
						80	5									80	5		
						80	5									80	5		
						80	5									80	5		
						80	5									80	5		
		25	2			25	2					25	1			25	2		
		40	3			40	3					40	2			40	3		
		35	2			35	2					35	1			35	2		
				180	7	200	7							180	6	200	7		
				180	7	180	7							180	6	180	7		
				140	7	150	7							140	6	150	7		
				110	7	120	7							110	6	120	7		
				180	7	180	7							180	6	180	7		
				70	6	70	6							70	5	70	6		
				180	7	180	7							180	6	180	7		
				120	6	120	6							120	5	120	6		
				70	6	70	6							70	5	70	6		
				50	6	50	6							50	5	50	6		
				45	6	45	6							45	5	45	6		
				35	5	35	5							35	4	35	5		

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Article no.
Standard/DIN
Tool material
Carbide grade
in combination with holder
Surface
Application
Std. range page

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Coolant:

- Air
- Neat oil
- Soluble oil

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
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Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		●
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		●
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		●
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	●
Hardened steels	-		≤48 HRC ≤66 HRC	●
Stainless steels, sulphured austenitic martensitic	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9 1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi17-12-2 (V4A) 1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤900 ≤1100 ≤1500		●
Cast iron	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	○
Spheroidal graphite iron and malleable cast iron	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	○
Chilled cast iron	-		≤350 HB	○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		●
Ti and Ti alloys	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 and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		○
Al cast alloys ≤ 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		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤600		○
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600 ≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○



≤ 10xD

4112	4115	4114	4111	4229
Co. std.	Co. std.	Co. std.	Co. std.	Co. std.
Sol. car.	Sol. car.	Sol. car.	Sol. car.	Sol. car.
K/P	K/P	K/P	K/P	K/P
4110	4110	4110	4110	4110
			pil./ counters.	steel beams
223	229	226	220	232

Drilling tools



V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
100	5					130	6	85	4
95	4					110	5	70	4
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		
						100	6		
						90	6		
						120	7		
						100	6		
		70	6			90	6		
						80	5		
						80	5		
						80	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		



GUHRINGNAVIGATOR

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Article no.
Standard/DIN
Tool material
Surface
Type
Cooling
Std. range page

Drilling tools

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Coolant:

- Air
- Neat oil
- Soluble oil

Cutting direction:

- Ⓜ right-hand cutting
- Ⓛ left-hand cutting

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		○
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		○
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		○
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		○
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		○
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		○
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		○
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		○
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		○
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	○
Hardened steels	-		≤48 HRC ≤66 HRC	○
Stainless steels, sulphured austenitic martensitic	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		○
Cast iron	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	○
Spheroidal graphite iron and malleable cast iron	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	○
Chilled cast iron	-		≤350 HB	○
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	○
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		○
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		○
Ti and Ti alloys	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 and Al alloys	3.0255 Al99.5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		○
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1.5	≤650		○
Al cast alloys ≤ 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		○
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		○
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		○
Brass, short-chipping long-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2 2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0.5	≤600 ≤600		○
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		○
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		○
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		○
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		○
Kevlar	Kevlar	≤1000		○
Glass, carbon concentr. plastics	GFK/CFK	≤1000		○



≤3xD

515
1897
HSS-E-PM
F
GT 500
267

≤5xD

622
338
HSCO
GT 100
269

2459
338
HSCO
F
GT 100
272

1131
Company standard
HSCO
GT 80 IK
287

1132
Company standard
HSCO
S
GT 80 IK
288



V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.	V _c m/min	Feed col. no.
30	6	35	5	42	6	48	7	60	7
24	5	30	5	36	5	38	6	48	6
33	6	40	5	48	6	48	7	60	7
33	5	40	5	42	6	38	6	48	6
28	5	40	5	48	6	48	6	60	6
28	5	40	5	48	6	48	6	60	6
25	4	35	4	42	5	38	5	50	5
22	4	20	4	30	5	28	5	33	5
		16	3	34	4	26	4	31	4
33	6	36	6	48	6	43	7	55	7
20	4	20	4	24	5	25	5	31	5
		15	3	20	4	24	4	31	4
14	4	16	4	24	5	25	5	30	5
		12	3	20	4	20	4	24	4
18	4	15	4	21	5	24	5	30	5
		12	3	16	4	16	4	20	4
		15	3	17	4	14	4	18	4
		8		11	3	12	3	15	3
				6	1	4	3	5	3
		18	4	22	5	20	5	25	5
		14	2	17	4	14	4	18	4
		16	3	20	4	16	4	20	4
33	6	35	6	45	7	48	7	60	7
33	6	30	6	40	7	38	7	48	7
28	6	30	6	36	7	42	7	52	7
22	6	28	6	29	7	32	7	40	7
		10	3	14	4	12	4	15	4
		8		7		10	2	12	2
		10		12		14	3	18	3
		6		8		10	3	12	3
		80	7	85	8	95	7	120	7
		70	6	72	7	75	8	95	8
80	6								
65	5	40	5	96	6	90	6	100	6
75	5								
45	5	40	4			45	6	55	6
33	4								
27	4			40		48	5	60	5
16	4	20	4	25	5	45	5	55	5
15	4	15	4	20	5	38	5	45	5
22	4	20	4	24	5				
36	5					38	6	48	6

Drilling tools



GUHRINGNAVIGATOR

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Article no.

Standard/DIN

Tool material

Surface

Type

Cooling

Std. range page

Drilling tools

Drill Ø mm	Feed column no.								
	1	2	3	4	5	6	7	8	9
	f (mm/rev.)								
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

Coolant:

- Air
- Neat oil
- Soluble oil

Cutting direction:

- right-hand cutting
- left-hand cutting

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	1.0035 S185(St33), 1.0486 P275N(StE285), 1.0345 P235GH(H1), 1.0425 P265GH(H2)	≤500		<input checked="" type="radio"/>
	1.0050 E295 (St50-2), 1.0070 E360 (St70-2), 1.8937 P500NH (WStE500)	≤1000		<input checked="" type="radio"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36)	≤850		<input checked="" type="radio"/>
	1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤1000		<input checked="" type="radio"/>
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30)	≤700		<input checked="" type="radio"/>
	1.0503 C45, 1.1191 C45E (Ck45)	≤850		<input checked="" type="radio"/>
	1.0601 C60, 1.1221 C60E (Ck60)	≤1000		<input checked="" type="radio"/>
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4	≤1000		<input checked="" type="radio"/>
	1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1400		<input checked="" type="radio"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input checked="" type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6	≤1000		<input checked="" type="radio"/>
	1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1400		<input checked="" type="radio"/>
Nitriding steels	1.8504 34CrAl6	≤1000		<input checked="" type="radio"/>
	1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1400		<input checked="" type="radio"/>
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9	≤850		<input checked="" type="radio"/>
	1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤1400		<input checked="" type="radio"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input checked="" type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input checked="" type="radio"/>
Hardened steels	-		≤48 HRC ≤66 HRC	<input checked="" type="radio"/>
Stainless steels, sulphured	1.4005 X12CrS13, 1.4104 X14CrMoS17, 1.4105 X6CrMoS17, 1.4305 X8CrNiS18-9	≤900		<input checked="" type="radio"/>
austenitic	1.4301 X5CrNi18-10 (V2A), 1.4541 X6CrNiTi18-10, 1.4571 X6CrNiMoTi 17-12-2 (V4A)	≤1100		<input checked="" type="radio"/>
martensitic	1.4057 X20CrNi172 (X17CrNi16-2), 1.4122 X39CrMo17-1, 1.4521 X2CrMoTi18-2	≤1500		<input checked="" type="radio"/>
Cast iron	0.6010 EN-GJL-100 (GG10), 0.6020 EN-GJL-200 (GG20)		≤240 HB	<input checked="" type="radio"/>
	0.6025 EN-GJL-250 (GG25), 0.6035 EN-GJL-350 (GG35)		≤350 HB	<input checked="" type="radio"/>
Spheroidal graphite iron and malleable cast iron	0.7050 EN-GJS-500-7 (GGG50), 0.8035 EN-GJMW-350-4 (GTW35)		≤240 HB	<input checked="" type="radio"/>
	0.7070 EN-GJS-700-2 (GGG70), 0.8170 EN-GJMB-700-2 (GTS70)		≤350 HB	<input checked="" type="radio"/>
Chilled cast iron	-		≤350 HB	<input checked="" type="radio"/>
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35)		≤220 HB	<input checked="" type="radio"/>
	EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤300 HB	<input checked="" type="radio"/>
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000)	≤1000		<input checked="" type="radio"/>
	EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1400		<input checked="" type="radio"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input checked="" type="radio"/>
Ti and Ti alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2	≤850		<input checked="" type="radio"/>
	3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤1400		<input checked="" type="radio"/>
Aluminium and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input checked="" type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input checked="" type="radio"/>
Al cast alloys ≤ 10 % Si	3.2131 G-AlSi5Cu1, 3.2153 G-AlSi7Cu3, 3.2573 G-AlSi9	≤600		<input checked="" type="radio"/>
≤ 24 % Si	3.2581 G-AlSi12, 3.2583 G-AlSi12Cu, - G-AlSi12CuNiMg	≤600		<input checked="" type="radio"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input checked="" type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input checked="" type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input checked="" type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input checked="" type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn	≤600		<input checked="" type="radio"/>
	2.0790 CuNi18Zn19Pb	≤850		<input checked="" type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10	≤850		<input checked="" type="radio"/>
	2.0980 CuAl11Ni, 2.1247 CuBe2	≤1000		<input checked="" type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		<input checked="" type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		<input checked="" type="radio"/>
Kevlar	Kevlar	≤1000		<input checked="" type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤1000		<input checked="" type="radio"/>



> 10xD

242	243	244
Co. std.	Co. std.	Co. std.
HSS	HSS	HSS
GT 100	GT 100	GT 100
281	282	283

618	619	620	621
1869 R1	1869 R2	1870 R1	1870 R2
HSCO	HSCO	HSCO	HSCO
GT 100	GT 100	GT 100	GT 100
278	279	284	285

571
1869 R3
HSCO
GT 100
280

≤ 10xD

390
Co. std.
HSS
N
286

336
340
HSCO
GT 100
274

396
340
HSCO
GT 100
276



V _c m/min	Feed col. no.		
22	5	5	5
18	4	4	4
22	5	5	5
18	4	4	4
22	4	4	4
18	4	4	4
22	5	5	5
12	3	3	3
6	2	2	2

V _c m/min	Feed col. no.			
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

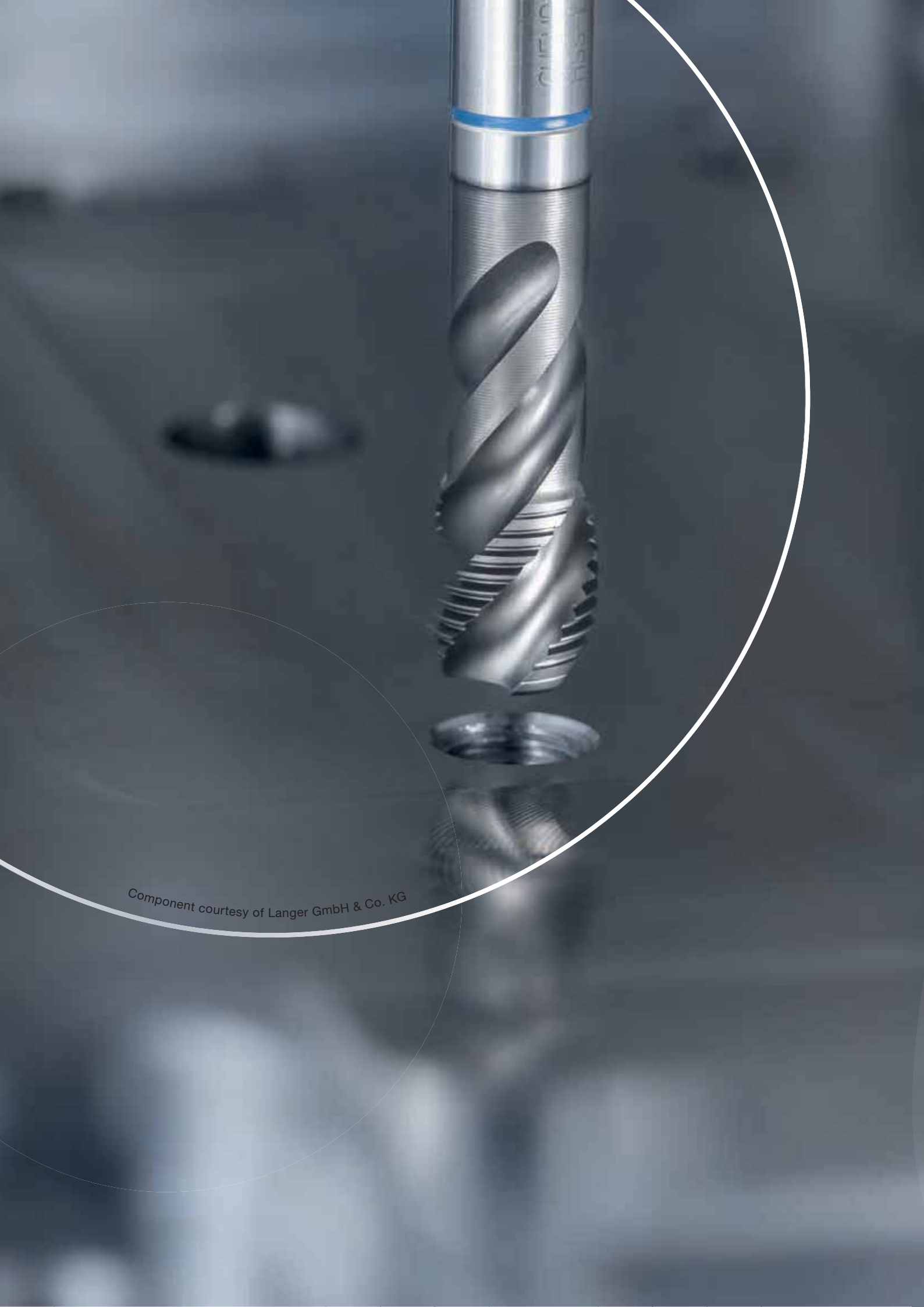
V _c m/min	Feed col. no.
30	4
25	4
33	4
30	4
33	4
33	4
20	3
14	3
10	2
29	4
14	3
10	2
10	3
8	2
11	3
8	2
8	2
5	1
3	1
10	3
8	2
10	2
20	5
16	5
5	2
5	1
6	1
5	1
50	6
40	5
30	4
45	4
30	4
25	4
20	4
16	3
10	3
14	3
20	3

V _c m/min	Feed col. no.
26	6
22	5
30	6
30	5
24	5
24	5
22	4
20	4
14	3
30	6
17	4
12	3
14	4
10	3
15	4
10	3
10	3
7	2
80	6
50	7
50	6
60	5
40	5
24	4
24	4
22	4
24	5

V _c m/min	Feed col. no.
33	5
27	5
36	5
32	5
36	5
36	5
22	4
18	4
14	3
32	5
18	4
13	3
14	4
10	3
13	4
10	3
12	3
6	2
4	1
12	4
8	2
10	3
70	7
60	6
60	6
36	5
54	5
36	5
30	5
24	5
18	4
13	4
16	4
26	6

V _c m/min	Feed col. no.
36	5
30	4
40	5
36	5
40	5
40	5
26	4
18	4
15	3
32	5
20	4
18	3
18	4
12	3
15	4
12	3
14	3
9	3
5	1
14	4
10	3
12	3
35	6
30	6
30	6
26	6
12	3
77	7
66	6
40	6
40	6
21	5
15	5
30	5

Drilling tools



Component courtesy of Langer GmbH & Co. KG

THREADING

3

<i>Circular thread milling cutters</i>	<i>P. 336</i>
<i>Thread milling cutters</i>	<i>P. 338</i>
<i>Taps for hard machining</i>	<i>P. 351</i>
<i>Pionex high-performance taps</i>	<i>P. 357</i>
<i>High-performance taps for steel</i>	<i>P. 368</i>
<i>Pionex high-performance fluteless taps</i>	<i>P. 376</i>

THREADING OVERVIEW



Circular thread milling cutters

- ▶ Circular thread milling cutters for high-strength and hardened steels combine core hole and thread production with one tool. The MTMH3-Z guarantees process reliability and gauge-containing threads in almost all materials up to 66 HRC.

Thread milling cutters



- ▶ Thread milling cutters are suitable for both right-hand and left-hand threads and allow different thread tolerances to be produced with just one tool. Thanks to the low cutting pressure, Gühring thread milling cutters are also ideally suited for higher-strength materials. In addition to specially designed thread milling cutters for hard machining up to 66 HRC, the range also includes tools for universal use. Within their machining areas, the thread milling cutters promise absolute process reliability and high productivity.

Taps for hard machining



- ▶ Due to their negative rake angle, solid carbide taps are suitable for machining hardened steels between 55 and 62 HRC. The PM HSS-E taps, on the other hand, are designed for use in steels with a hardness between 45 and 55 HRC.

Pionex high-performance taps



- ▶ The high-performance Pionex taps for blind and through-hole machining impress with versatile designs. The taps promise high cutting speeds and a long service life.

High-performance taps for steel



- ▶ The high-performance taps are specially designed for high-strength steels up to 1200 N/mm².

Pionex high-performance fluteless taps



- ▶ High-performance fluteless taps that significantly reduce the temperature during fluteless tapping thanks to an optimised lubrication groove and polygon shape. In addition, the torque and axial force are reduced by up to 30%, which greatly increases the tool life of the fluteless tap.



P. 336



P. 338



P. 351



P. 357



P. 368



P. 376





BLIND HOLES

	Thread depth	≤3xD			≤1.5xD	
	Tool material	HSS-E			HSS-E-PM	
Form	C	C	C	C	C	
Surface						
Cutting direction						
Coolant delivery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	
Shank tolerance	h9	h9	h9	h9	h9 + HB	



	Thread type	Tolerance	Article no./page		
	M	6H		1916/1917 P.368/9	1577/1578 P.370/1
6HX		393 P. 357	4633 P. 359		
6GX		4625 P. 358			
7GX		4626 P. 358			
6H+0,1		4627 P. 358			
MF	6H				
	6HX	394 P. 364			
	6GX	4628 P. 364			
G	- X	395 P. 366			
NPT	-				1088 P. 374
RC „BSPT“	-				

- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

Suitable lubricant: / / / /

Threading tools

Group of materials		Tensile strength	Material example	Material no.	Recommended cutting speed v _c [m/min]					
P	P1 Structural and free cutting steels, heat-treatable steels unalloyed	≤800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	20	20			15	
	P2 Free-cutting steels, unalloyed case hardened steels, nitriding steels	800 - 1000 N/mm ²	S355J2 C60 31CrMo12	1.0577 1.0601 1.8515	15	15	10	8	12	
	P3 Alloyed heat-treatable steels, tool steels, high speed steels	800 - 1200 N/mm ²	42CrMo4 36CrNiMo4 X36CrMo17 HS 6-5-2	1.7225 1.6511 1.2316 1.3343	10	10	12	8	8	
M	M1 Stainless steels, sulphured, austenitic	≤1000 N/mm ²	X5CrNi18-10 X6CrNiTi18-10 X8CrNiS18-9	1.4301 1.4571 1.4305	12	12			8	
	M2 Stainless- and acidresistant steels, martensitic	≤1000 N/mm ²	X17CrNi16-2 X90CrMoV18 X2CrTi12	1.4057 1.4112 1.4512	10	10			6	
	M3 Duplex and Super Duplex	≤1300 N/mm ²	X2CrNiMoN22-5-3 X2CrNiMoN25-7-4 X2CrNiMoCuWN25-7-4	1.4462 1.4410 1.4501	6	6				
K	K1 Cast Iron	300 HB	EN-GJL-150 EN-GJL-250 EN-GJL-300	0.6015 0.6025 0.6030	20	20			15	
	K2 Spheroidal graphite iron and malleable cast iron	350 HB	EN-GJS-400-15 EN-GJS-600-3 EN-GJS-700-2	0.7040 0.7060 0.7070	20	20			10	
	K3 ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		10	10			6	
N	N1 Aluminium and wrought alloys	≤450 N/mm ²	Al99,5H AlMgSi1 AlZn4,5Mg	3.0250 3.2315 3.4335	10	10			8	
	N2 Al cast alloys	≤600 N/mm ²	GD-AlSi5Cu1Mg GD-AlSi8Cu3 G-AlSi9Mg G-AlSi12	3.2134 3.2162 3.2373 3.2581	20	20			15	
	N3 Magnesium alloys	≤500 N/mm ²	GDMgAl8Zn1	3.5812.08						
	N4 Copper and copper alloys	long-chipping		CuZn20 CuZn37Pb0,5	2.0250 2.0332	20	20			
		short-chipping		CuZn39Pb2 CuZn43Pb2	2.0380 2.0410	20	20			
	N5 Copper special alloys	≤1400 N/mm ²	Ampco		10	10				
N6 Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping		PMMA, POM, PVC Pertinax							
S	S1 Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165	3	3				
	S2 Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105	2.4610 2.4668 2.4634	2	2				
H	H1 High tensile steels, hardened steels	45 - 55 HRC								
	H2	55 - 62 HRC								



THROUGH HOLES

Thread depth	$\leq 3 \times D$		
Tool material	HSS-E		
Form	B	B	B
Surface			
Cutting direction			
Coolant delivery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Shank tolerance	h9	h9	h9

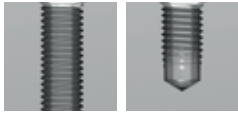


- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

Thread type	Tolerance	Article no./page	
M	6H		1914/1915 P. 372/373
	6HX	4218 P. 360	4645 P. 362
	6GX	4638 P. 361	
	7GX	4639 P. 361	
	6H+0,1	4640 P. 361	
MF	6H		
	6HX	4219 P. 365	
	6GX	4641 P. 365	
G	- X	4220 P. 367	
NPT	-		
RC „BSPT“	-		
Suitable lubricant:			

	Group of materials	Tensile strength	Material example	Material no.	Recommended cutting speed v_c [m/min]			
P	P1 Structural and free cutting steels, heat-treatable steels unalloyed	≤ 800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	20	20		
	P2 Free-cutting steels, unalloyed case hardened steels, nitriding steels	800 - 1000 N/mm ²	S355J2 C60 31CrMo12	1.0577 1.0601 1.8515	15	15	10	
	P3 Alloyed heat-treatable steels, tool steels, high speed steels	800 - 1200 N/mm ²	42CrMo4 36CrNiMo4 X36CrMo17 HS 6-5-2	1.7225 1.6511 1.2316 1.3343	10	10	12	
M	M1 Stainless steels, sulphured, austenitic	≤ 1000 N/mm ²	X5CrNi18-10 X6CrNiTi18-10 X8CrNiS18-9	1.4301 1.4571 1.4305	12	12		
	M2 Stainless- and acidresistant steels, martensitic	≤ 1000 N/mm ²	X17CrNi16-2 X90CrMoV18 X2CrTi12	1.4057 1.4112 1.4512	10	10		
	M3 Duplex and Super Duplex	≤ 1300 N/mm ²	X2CrNiMoN22-5-3 X2CrNiMoN25-7-4 X2CrNiMoCuWN25-7-4	1.4462 1.4410 1.4501	6	6		
K	K1 Cast Iron	300 HB	EN-GJL-150 EN-GJL-250 EN-GJL-300	0.6015 0.6025 0.6030	20	20		
	K2 Spheroidal graphite iron and malleable cast iron	350 HB	EN-GJS-400-15 EN-GJS-600-3 EN-GJS-700-2	0.7040 0.7060 0.7070	20	20		
	K3 ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		10	10		
N	N1 Aluminium and wrought alloys	≤ 450 N/mm ²	Al99,5H AlMgSi1 AlZn4,5Mg	3.0250 3.2315 3.4335	10	10		
	N2 Al cast alloys	≤ 600 N/mm ²	GD-AlSi5Cu1Mg GD-AlSi8Cu3 G-AlSi9Mg G-AlSi12	3.2134 3.2162 3.2373 3.2581	20	20		
	N3 Magnesium alloys	≤ 500 N/mm ²	GDMgAl8Zn1	3.5812.08				
	N4 Copper and copper alloys	long-chipping		CuZn20 CuZn37Pb0,5	2.0250 2.0332	20	20	
		short-chipping		CuZn39Pb2 CuZn43Pb2	2.0380 2.0410	20	20	
	N5 Copper special alloys	≤ 1400 N/mm ²	Ampco		10	10		
N6 Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping		PMMA, POM, PVC Pertinax					
S	S1 Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165	3	3		
	S2 Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105	2.4610 2.4668 2.4634	2	2		
H	H1 High tensile steels, hardened steels	45 - 55 HRC						
	H2	55 - 62 HRC						

Threading tools



THROUGH AND BLIND HOLES

Thread depth	≤1.5xD		
Tool material	PM HSS-E		Solid carbide
Form	C	D	D
Surface			
Cutting direction			
Coolant delivery	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Shank tolerance	h9	h9	h6

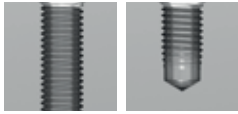


- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

Thread type	Tolerance	Article no./page	
M	6H		2944 P. 351
	6HX	1201 P. 354	
	6GX		
	7GX		
	6H+0,1		
MF	6H		1161 P. 352
	6HX	4161 P. 355	
	6GX		
G	- X	4607 P. 356	4599 P. 353
NPT	-		
RC „BSPT“	-	4683 P. 375	
Suitable lubricant:			

Threading tools

Group of materials	Tensile strength	Material example	Material no.	Recommended cutting speed v _c [m/min]			
P	P1 Structural and free cutting steels, heat-treatable steels unalloyed	≤800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	15		
		800 - 1000 N/mm ²	S355J2 C60 31CrMo12	1.0577 1.0601 1.8515			
	P3 Alloyed heat-treatable steels, tool steels, high speed steels	800 - 1200 N/mm ²	42CrMo4 36CrNiMo4 X36CrMo17 HS 6-5-2	1.7225 1.6511 1.2316 1.3343	12		
M	M1 Stainless steels, sulphured, austenitic	≤1000 N/mm ²	X5CrNi18-10 X6CrNiTi18-10 X8CrNiS18-9	1.4301 1.4571 1.4305			
		M2 Stainless- and acidresistant steels, martensitic	≤1000 N/mm ²	X17CrNi16-2 X90CrMoV18 X2CrTi12			1.4057 1.4112 1.4512
	M3 Duplex and Super Duplex		≤1300 N/mm ²	X2CrNiMoN22-5-3 X2CrNiMoN25-7-4 X2CrNiMoCuWN25-7-4			1.4462 1.4410 1.4501
K	K1 Cast Iron	300 HB	EN-GJL-150 EN-GJL-250 EN-GJL-300	0.6015 0.6025 0.6030	25	25 35	
		K2 Spheroidal graphite iron and malleable cast iron	350 HB	EN-GJS-400-15 EN-GJS-600-3 EN-GJS-700-2	0.7040 0.7060 0.7070	20	20 25
	K3 ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		15	15 20	
N	N1 Aluminium and wrought alloys	≤450 N/mm ²	Al99,5H AlMgSi1 AlZn4,5Mg	3.0250 3.2315 3.4335	30		
		N2 Al cast alloys	≤600 N/mm ²	GD-AlSi5Cu1Mg GD-AlSi8Cu3 G-AlSi9Mg G-AlSi12			3.2134 3.2162 3.2373 3.2581
			N3 Magnesium alloys	≤500 N/mm ²			GDMgAl8Zn1
	N4 Copper and copper alloys	long-chipping	CuZn20 CuZn37Pb0,5	2.0250 2.0332			
		short-chipping	CuZn39Pb2 CuZn43Pb2	2.0380 2.0410			
	N5 Copper special alloys	≤1400 N/mm ²	Ampco		2	2	
N6 Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping	PMMA, PVC Pertinax					
S	S1 Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165			
		S2 Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105			2.4610 2.4668 2.4634
H	H1 H2 High tensile steels, hardened steels	45 - 55 HRC			3	2	
		55 - 62 HRC					



THROUGH AND BLIND HOLES

Thread depth	≤3xD
Tool material	PM HSS-E
Form	C
Surface	
Cutting direction	
Coolant delivery	<input checked="" type="checkbox"/>
Shank tolerance	h6



- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

Thread type	Tolerance	Article no./page
M	6H	
	6HX	4487 P. 376
	6GX	4488 P. 376
	7GX	
	6H+0,1	
MF	6H	
	6HX	4489 P. 377
	6GX	4490 P. 377
G	- X	4493 P. 378
NPT	-	
RC „BSPT“	-	
Suitable lubricant:		

	Group of materials	Tensile strength	Material example	Material no.	Recommended cutting speed v _c [m/min]	
P	P1 Structural and free cutting steels, heat-treatable steels unalloyed	≤800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	25	
	P2 Free-cutting steels, unalloyed case hardened steels, nitriding steels	800 - 1000 N/mm ²	S355J2 C60 31CrMo12	1.0577 1.0601 1.8515	25	
	P3 Alloyed heat-treatable steels, tool steels, high speed steels	800 - 1200 N/mm ²	42CrMo4 36CrNiMo4 X36CrMo17 HS 6-5-2	1.7225 1.6511 1.2316 1.3343	15	
M	M1 Stainless steels, sulphured, austenitic	≤1000 N/mm ²	X5CrNi18-10 X6CrNiTi18-10 X8CrNiS18-9	1.4301 1.4571 1.4305	10	
	M2 Stainless- and acidresistant steels, martensitic	≤1000 N/mm ²	X17CrNi16-2 X90CrMoV18 X2CrTi12	1.4057 1.4112 1.4512	8	
	M3 Duplex and Super Duplex	≤1300 N/mm ²	X2CrNiMoN22-5-3 X2CrNiMoN25-7-4 X2CrNiMoCuWN25-7-4	1.4462 1.4410 1.4501	6	
K	K1 Cast Iron	300 HB	EN-GJL-150 EN-GJL-250 EN-GJL-300	0.6015 0.6025 0.6030		
	K2 Spheroidal graphite iron and malleable cast iron	350 HB	EN-GJS-400-15 EN-GJS-600-3 EN-GJS-700-2	0.7040 0.7060 0.7070	30	
	K3 ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		25	
N	N1 Aluminium and wrought alloys	≤450 N/mm ²	Al99,5H AlMgSi1 AlZn4,5Mg	3.0250 3.2315 3.4335	15	
	N2 Al cast alloys	≤600 N/mm ²	GD-AlSi5Cu1Mg GD-AlSi8Cu3 G-AlSi9Mg G-AlSi12	3.2134 3.2162 3.2373 3.2581	30	
	N3 Magnesium alloys	≤500 N/mm ²	GDMgAl8Zn1	3.5812.08		
	N4 Copper and copper alloys	long-chipping		CuZn20 CuZn37Pb0,5	2.0250 2.0332	30
		short-chipping		CuZn39Pb2 CuZn43Pb2	2.0380 2.0410	
	N5 Copper special alloys	≤1400 N/mm ²	Ampco			
N6 Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping		PMMA, POM, PVC Pertinax			
S	S1 Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165	8	
	S2 Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105	2.4610 2.4668 2.4634	8	
H	H1 High tensile steels, hardened steels	45 - 55 HRC				
	H2	55 - 62 HRC				

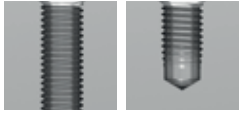
Threading tools

**General recommendations:**

- 1.) From 2.5xD [thread depth], the thread Ø should be programmed in 2 passes. [2/31/3 in opposite direction]
- 2.) In general, for stainless steel and hard machining from > HRC40, it is recommended that we program the thread Ø in 2 passes. [2/31/3 in opposite direction]

optimal suitability ●●
suited ●
not suitable ○

		Group of materials	Tensile strength	Material example	Material no.	Cutting speed
P	P1	Structural and free cutting steels, heat-treatable steels unalloyed	≤800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	90
	P2	Free-cutting steels, unalloyed case hardened steels, nitriding steels	800 - 1000 N/mm ²	S355J2 C60 31CrMo12	1.0577 1.0601 1.8515	80
	P3	Alloyed heat-treatable steels, tool steels, high speed steels	800 - 1200 N/mm ²	42CrMo4 36CrNiMo4 X36CrMo17 HS 6-5-2	1.7225 1.6511 1.2316 1.3343	70
M	M1	Stainless steels, sulphured, austenitic	≤1000 N/mm ²	X5CrNi18-10 X6CrNiTi18-10 X8CrNiS18-9	1.4301 1.4571 1.4305	55
	M2	Stainless- and acidresistant steels, martensitic	≤1000 N/mm ²	X17CrNi16-2 X90CrMoV18 X2CrTi12	1.4057 1.4112 1.4512	50
	M3	Duplex and Super Duplex	≤1300 N/mm ²	X2CrNiMoN22-5-3 X2CrNiMoN25-7-4 X2CrNiMoCuWN25-7-4	1.4462 1.4410 1.4501	45
K	K1	Cast Iron	300 HB	EN-GJL-150 EN-GJL-250 EN-GJL-300	0.6015 0.6025 0.6030	120
	K2	Spheroidal graphite iron and malleable cast iron	350 HB	EN-GJS-400-15 EN-GJS-600-3 EN-GJS-700-2	0.7040 0.7060 0.7070	100
	K3	ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		80
N	N1	Aluminium and wrought alloys	≤450 N/mm ²	Al99,5H AlMgSi1 AlZn4,5Mg	3.0250 32315 3.4335	250
	N2	Al cast alloys	≤600 N/mm ²	GD-AlSi5Cu1Mg GD-AlSi8Cu3 G-AlSi9Mg G-AlSi12	3.2134 3.2162 3.2373 3.2581	230
	N3	Magnesium alloys	≤500 N/mm ²	GDMgAl8Zn1	3.5812.08	180
	N4	Copper and copper alloys	long-chipping short-chipping	CuZn20 CuZn37Pb0,5 CuZn39Pb2 CuZn43Pb2	2.0250 2.0332 2.0380 2.0410	130 130
	N5	Copper special alloys	≤1400 N/mm ²	Ampco		160
	N6	Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping	PMMA, POM,PVC Pertinax		300
S	S1	Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165	40
	S2	Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105	2.4610 2.4668 2.4634	30
H	H1	High tensile steels, hardened steels	45 - 55 HRC	Hardox		45
	H2		55 - 62 HRC	PM30		40



THROUGH AND BLIND HOLES

Thread depth	≤2xD	universal	≤3xD	
Tool material	Solid carbide			
Type	TM SP	TMU SP	MTM3 SP	MTMH3 SP
Surface	Ⓢ	Ⓢ	Ⓢ	Ⓢ
Coolant delivery	axial	axial	⊠	⊠
Shank form	HB	HB	HA	HA
Spiral	27°	15°	15°	15°
Cutting direction	right-hand	right-hand	right-hand	right-hand



- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

Thread type	Article no./page			
M	3743 P. 343	3556 P. 346	4226 P. 340	4227 P. 339
MF	3743 P. 343	3556 P. 346		
G (BSP)	3748 P. 344	3557 P. 347	4228 P. 341	
Rp (BSPP)	3748 P. 344	3557 P. 347	4228 P. 341	
NPT	3754 P. 345	3769 P. 348		
Rc (BSPT)		4770 P. 349		
Suitable lubricant:	●/●	○/●	○/●	○/□

Milling part diameter [d ₁] / Feed per tooth [f _z] [Reverse rotation]															Tool suitability			
Ø1 mm	Ø2 mm	Ø3 mm	Ø4 mm	Ø5 mm	Ø6 mm	Ø7 mm	Ø8 mm	Ø9 mm	Ø10 mm	Ø12 mm	Ø14 mm	Ø16 mm	Ø18 mm	Ø20 mm				
0.01	0.02	0.02	0.025	0.03	0.035	0.045	0.05	0.055	0.06	0.06	0.065	0.065	0.07	0.08	●●	●●	●●	○
0.01	0.02	0.02	0.025	0.03	0.035	0.045	0.05	0.055	0.06	0.06	0.065	0.065	0.07	0.08	●●	●●	●●	○
0.01	0.02	0.02	0.025	0.03	0.035	0.045	0.05	0.055	0.06	0.06	0.065	0.065	0.07	0.08	●	●●	●●	●
0.01	0.02	0.025	0.03	0.03	0.03	0.035	0.04	0.05	0.055	0.06	0.065	0.065	0.07	0.075	●	●●	●●	○
0.01	0.02	0.025	0.03	0.03	0.03	0.035	0.04	0.05	0.055	0.06	0.065	0.065	0.07	0.075	●	●●	●●	○
0.01	0.02	0.025	0.03	0.03	0.03	0.035	0.04	0.05	0.055	0.06	0.065	0.065	0.07	0.075	●	●●	●●	○
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.065	0.07	0.08	0.09	0.1	0.12	●●	●●	●●	○
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.065	0.07	0.08	0.09	0.1	0.12	●●	●●	●●	○
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.06	0.065	0.07	0.08	0.09	0.1	0.12	●●	●●	●●	●
0.02	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.08	0.085	0.09	0.1	0.12	●●	●●	●●	○
0.02	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.08	0.085	0.09	0.1	0.12	●●	●●	●●	○
0.02	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.08	0.085	0.09	0.1	0.12	●●	●●	●●	○
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	0.08	0.09	●●	●●	●●	○
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	0.08	0.09	●●	●●	●●	○
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.06	0.065	0.07	0.075	0.08	●●	●●	●●	○
0.02	0.03	0.04	0.045	0.05	0.055	0.06	0.07	0.08	0.09	0.09	0.1	0.12	0.13	0.15	●●	●●	●●	○
0.01	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.04	0.045	0.05	0.055	0.06	0.065	0.07	●●	●●	●●	○
0.01	0.01	0.015	0.02	0.025	0.03	0.035	0.04	0.04	0.045	0.05	0.055	0.06	0.065	0.07	●●	●●	●●	●●
x	0.01	0.015	0.02	0.025	0.03	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	●	●	●●	●●
x	0.01	0.015	0.02	0.025	0.03	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	○	○	○	●●

Threading tools



optimal suitability ●●
suited ●
not suitable ○

		Group of materials	Tensile strength	Material example	Material no.	Cutting speed
P	P1	Structural and free cutting steels, heat-treatable steels unalloyed	≤800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	90
	P2	Free-cutting steels, unalloyed case hardened steels, nitriding steels	800 - 1000 N/mm ²	S355J2 C60 31CrMo12	1.0577 1.0601 1.8515	80
	P3	Alloyed heat-treatable steels, tool steels, high speed steels	800 - 1200 N/mm ²	42CrMo4 36CrNiMo4 X36CrMo17 HS 6-5-2	1.7225 1.6511 1.2316 1.3343	70
M	M1	Stainless steels, sulphured, austenitic	≤1000 N/mm ²	X5CrNi18-10 X6CrNiTi18-10 X8CrNiS18-9	1.4301 1.4571 1.4305	55
	M2	Stainless- and acidresistant steels, martensitic	≤1000 N/mm ²	X17CrNi16-2 X90CrMoV18 X2CrTi12	1.4057 1.4112 1.4512	50
	M3	Duplex and Super Duplex	≤1300 N/mm ²	X2CrNiMoN22-5-3 X2CrNiMoN25-7-4 X2CrNiMoCuWN25-7-4	1.4462 1.4410 1.4501	45
K	K1	Cast Iron	300 HB	EN-GJL-150 EN-GJL-250 EN-GJL-300	0.6015 0.6025 0.6030	120
	K2	Spheroidal graphite iron and malleable cast iron	350 HB	EN-GJS-400-15 EN-GJS-600-3 EN-GJS-700-2	0.7040 0.7060 0.7070	100
	K3	ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		80
N	N1	Aluminium and wrought alloys	≤450 N/mm ²	Al99,5H AlMgSi1 AlZn4,5Mg	3.0250 32315 3.4335	250
	N2	Al cast alloys	≤600 N/mm ²	GD-ALSi8Cu1Mg GD-ALSi8Cu3 G-ALSi9Mg G-ALSi12	3.2134 3.2162 3.2373 3.2581	230
	N3	Magnesium alloys	≤500 N/mm ²	GDMgAl8Zn1	3.5812.08	180
	N4	Copper and copper alloys	long-chipping short-chipping	CuZn20 CuZn37Pb0,5 CuZn39Pb2 CuZn43Pb2	2.0250 2.0332 2.0380 2.0410	130 130
	N5	Copper special alloys	≤1400 N/mm ²	Ampco		160
	N6	Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping	PMMA, POM,PVC Pertinax		300
S	S1	Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165	40
	S2	Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105	2.4610 2.4668 2.4634	30
H	H1	High tensile steels, hardened steels	45 - 55 HRC	Hardox		45
	H2		55 - 62 HRC	PM30		40



THROUGH AND BLIND HOLES



Thread depth	SC-LINE
Tool material	Solid carbide
Type	SC-MTM3SP
Surface	
Coolant delivery	axial
Shank form	HA
Spiral	15°
Rotating direction	left-hand

- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

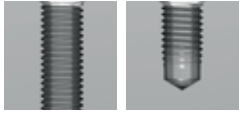
Thread type	Article no./page
M	4001 P. 342
MF	
G (BSP)	
Rp (BSPP)	
NPT	
Rc (BSPT)	
Suitable lubricant:	
	● ●

Milling part diameter [d1] / Feed per tooth [f _z]													Tool suitability
Ø1 mm	Ø2 mm	Ø3 mm	Ø4 mm	Ø5 mm	Ø6 mm	Ø7 mm	Ø8 mm	[Climb milling process]			Ø14 mm	Ø16 mm	
0.01	0.02	0.02	0.025	0.03	0.03	0.035	0.035	0.04	0.045	0.05	0.055	0.06	● ●
0.01	0.02	0.02	0.025	0.03	0.03	0.035	0.035	0.04	0.045	0.05	0.055	0.06	● ●
0.01	0.02	0.02	0.025	0.03	0.03	0.035	0.035	0.04	0.045	0.05	0.055	0.06	● ●
0.008	0.015	0.02	0.025	0.03	0.03	0.03	0.035	0.04	0.04	0.045	0.05	0.055	● ●
0.008	0.015	0.02	0.025	0.03	0.03	0.03	0.035	0.04	0.04	0.045	0.05	0.055	● ●
0.008	0.015	0.02	0.025	0.03	0.03	0.03	0.035	0.04	0.04	0.045	0.05	0.055	● ●
0.01	0.02	0.02	0.025	0.03	0.03	0.035	0.035	0.04	0.045	0.05	0.055	0.06	● ●
0.01	0.02	0.02	0.025	0.03	0.03	0.035	0.035	0.04	0.045	0.05	0.055	0.06	● ●
0.01	0.02	0.02	0.025	0.03	0.03	0.035	0.035	0.04	0.045	0.05	0.055	0.06	● ●
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	● ●
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	● ●
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	● ●
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	● ●
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	● ●
0.01	0.02	0.025	0.03	0.035	0.04	0.045	0.05	0.055	0.06	0.065	0.07	0.075	● ●
0.005	0.007	0.012	0.015	0.02	0.025	0.03	0.035	0.035	0.04	0.045	0.045	0.05	● ●
0.005	0.007	0.012	0.015	0.02	0.025	0.03	0.035	0.035	0.04	0.045	0.045	0.05	● ●
0.005	0.008	0.01	0.012	0.015	0.02	0.025	0.025	0.03	0.03	0.035	0.04	0.045	● ●
x	x	x	x	x	x	x	x	x	x	x	x	x	○

Threading tools


 optimal suitability ●●
 suited ●
 not suitable ○

		Group of materials	Tensile strength	Material example	Material no.	Cutting speed
P	P1	Structural and free cutting steels, heat-treatable steels unalloyed	≤800 N/mm ²	S235JR C15 11SMnPb30	1.0037 1.0401 1.0718	90
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	K3	ADI GGV	1000 N/mm ² 350 HB	EN-GJS1000-5 EN-GJV250 EN-GJV400		80
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	N2	Al cast alloys	≤600 N/mm ²	GD-AlSi5Cu1Mg GD-AlSi8Cu3 G-AlSi9Mg G-AlSi12	3.2134 3.2162 3.2373 3.2581	230
	N3	Magnesium alloys	≤500 N/mm ²	GDMgAl8Zn1	3.5812.08	180
	N4	Copper and copper alloys	long-chipping short-chipping	CuZn20 CuZn37Pb0,5 CuZn39Pb2 CuZn43Pb2	2.0250 2.0332 2.0380 2.0410	130 130
	N5	Copper special alloys	≤1400 N/mm ²	Ampco		160
	N6	Plastics [Thermoplastics, Duroplastics]	long-chipping short-chipping	PMMA, POM,PVC Pertinax		300
S	S1	Titanium and Titanium alloys	≤ 1200 N/mm ²	Titanium TiAl5Sn2 TiAl6V4	3.702<5 3.7115 3.7165	40
	S2	Nickel, cobalt, iron alloys	≤ 1400 N/mm ²	Hastelloy C4 Inconel 718 Nimonic 105	2.4610 2.4668 2.4634	30
H	H1	High tensile steels, hardened steels	45 - 55 HRC	Hardox		45
	H2		55 - 66 HRC	PM30		40



THROUGH AND BLIND HOLES

Thread depth	≤2.5xD	
Tool material	Solid carbide	Solid carbide
Type	MTMH3-Z	MTMH3SP
Surface		
Coolant delivery	with cooling grooves	
Shank form	HA	HA
Spiral	15°	15°
Rotating direction	left-hand	left-hand



- = Neat oil
- = Soluble oil
- △ = Paste
- = Minimal quantity lubrication (MQL)

Thread type	Article no./page	
M	4002 P. 336	4496 P. 338
MF	4002 P. 336	
G (BSP)	4780 P. 337	
Rp (BSPP)	4780 P. 337	
NPT		
Rc (BSPT)		
Suitable lubricant:	○●●□	○□

Milling part diameter [d1] / Feed per tooth [fz]											Tool suitability	
Ø1-1.8 mm	Ø1.81-2.4 mm	Ø2.41-2.7 mm	Ø2.71-3.1 mm	Ø3.11-3.8 mm	Ø3.81-4.6 mm	Ø4.61-6.2 mm	Ø6.21-7.5 mm	Ø7.51-9.0 mm	Ø9.01-16 mm			
0.008	0.008	0.012	0.014	0.018	0.026	0.028	0.030	0.035	0.040	0.048	●●	○
0.008	0.008	0.012	0.014	0.018	0.026	0.028	0.030	0.035	0.040	0.048	●●	○
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.044	●●	●
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.044	●●	○
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.044	●●	○
0.005	0.005	0.007	0.008	0.010	0.014	0.016	0.018	0.020	0.026	0.033	●●	○
0.008	0.008	0.012	0.014	0.016	0.020	0.024	0.030	0.036	0.040	0.048	●●	○
0.008	0.008	0.012	0.014	0.016	0.020	0.024	0.030	0.036	0.040	0.048	●●	○
0.007	0.007	0.011	0.013	0.015	0.018	0.022	0.028	0.033	0.038	0.046	●●	●
x	x	x	x	x	x	x	x	x	x	x	●	○
0.007	0.007	0.011	0.013	0.015	0.018	0.022	0.028	0.033	0.038	0.046	●	○
x	x	x	x	x	x	x	x	x	x	x	●	○
0.008	0.008	0.012	0.014	0.016	0.020	0.024	0.030	0.036	0.040	0.048	●●	○
0.008	0.008	0.012	0.014	0.016	0.020	0.024	0.030	0.036	0.040	0.048	●●	○
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.048	●●	○
x	x	x	x	x	x	x	x	x	x	x	○	○
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.044	●●	○
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.044	●●	●●
0.007	0.007	0.010	0.011	0.012	0.016	0.020	0.025	0.030	0.036	0.044	●●	●●
0.005	0.005	0.008	0.009	0.010	0.014	0.018	0.022	0.028	0.033	0.042	●●	●●

Threading tools

P	M	K	N	S	H	Tool illustration	Standard	Hardness	Type	Form	Tolerance on Ø	Tool material	Surface	d1/mm	Article no.	Page
Micro thread milling cutters																
•	•	•	•	•	•		WN	66 HRC	MTMH3-Z			VHM	●	M 2 - M20	4002	336
•	•	•	•	•	•		WN	66 HRC	MTMH3-Z			VHM	●	M 2 - M20	4780	337
○	•	•	•	•	•		WN	66 HRC	MTMH3-SP			VHM	⊗	M 2 - M16	4496	338
○	•	•	•	•	•		WN	66 HRC	MTMH3-SP			VHM	⊗	M 2 - M16	4227	339
•	•	•	•	•	○		WN	55 HRC	MTM3-SP			VHM	⊙	M1,6 - M20	4226	340
•	•	•	•	•	○		WN	55 HRC	MTM3-SP			VHM	⊙	M1,6 - M20	4228	341
•	•	•	•	•	○		WN	55 HRC	SC MTM3-SP			VHM	⊙	M1,6 - M20	4001	342
Thread milling cutters without chamfer for ISO metric threads																
•	○	•	•	○	○		WN	55 HRC	TM SP			VHM	⊙	M4 - M20 x 1,5	3743	343
Thread milling cutters without chamfer for BSP threads																
•	○	•	•	○	○		WN	55 HRC	TM SP			VHM	⊙	G1/8 - G3/8	3748	344
Thread milling cutters without chamfer for NPT threads																
•	•	•	•	•	○		WN	55 HRC	TM SP			VHM	⊙	1/16 - 3/8	3754	345
Universal thread milling cutters for ISO metric threads																
•	•	•	•	•	○		WN	55 HRC	TMU SP			VHM	⊙	> 10 - > 30	3556	346
Universal thread milling cutters for BSP threads																
•	•	•	•	•	○		WN	55 HRC	TMU SP			VHM	⊙	≥ 1/4 - ≥ 1	3557	347
Universal thread milling cutters for NPT threads																
•	•	•	•	•	○		WN	55 HRC	TMU SP			VHM	⊙	≥ 1 - ≥ 1/2	3769	348
Universal thread milling cutters for Rc threads																
•	•	•	•	•	○		WN	55 HRC	TMU SP			VHM	⊙	Rc1/8 - Rc 1-Rc 2	4770	349
Taps for ISO metric threads																
•	•	•	•	•	•		~DIN 371	62 HRC	H	D	ISO2/6H	VHM	⊙	M3 - M16	2944	351
Taps for ISO metric fine threads																
•	•	•	•	•	•		~DIN 371	62 HRC	H	D	ISO2/6H	VHM	⊙	M6 x 0,5 - M16 x 1,5	1161	352
Taps for BSP threads																
•	•	•	•	•	•		~DIN 371	62 HRC	H	D		VHM	⊙	G1/8 - G1/2	4599	353



P	M	K	N	S	H	Tool illustration	Standard	Hardness	Type	Form	Tolerance on Ø	Tool material	Surface	d1/mm	Article no.	Page
Taps for ISO metric threads							DIN 371	55 HRC	H	D	6HX	HSS-E-PM	C	M3 - M16	1201	354
Taps for ISO metric fine threads							~DIN 371	55 HRC	H	D	6HX	HSS-E-PM	C	M6 x 0,75 - M16 x 1,5	4161	355
Taps for BSP threads							DIN 371	55 HRC	H	D		HSS-E-PM	C	G1/8 - G1/2	4607	356
Taps for ISO metric threads							DIN 371/376		VA R45	C	6HX	HSS-E	A	M 2 - M42	393	357
Taps for ISO metric threads							DIN 371/376		VA R45	C	6GX	HSS-E	A	M 2 - M30	4625	358
Taps for ISO metric threads							DIN 371/376		VA R45	C	7GX	HSS-E	A	M 2 - M30	4626	358
Taps for ISO metric threads							DIN 371/376		VA R45	C	6H +0,1	HSS-E	A	M 2 - M30	4627	358
Taps for ISO metric threads							WN		VA R45	C	6HX	HSS-E	A	M3 - M20	4633	359
Taps for ISO metric threads							DIN 371/376		VA	B	6HX	HSS-E	S	M 2 - M42	4218	360
Taps for ISO metric threads							DIN 371/376		VA	B	6GX	HSS-E	S	M 2 - M30	4638	361
Taps for ISO metric threads							DIN 371/376		VA	B	7GX	HSS-E	S	M 2 - M30	4639	361
Taps for ISO metric threads							DIN 371/376		VA	B	6H +0,1	HSS-E	S	M 2 - M30	4640	361
Taps for ISO metric threads							WN		VA	B	6HX	HSS-E	S	M3 - M20	4645	362
Taps for ISO metric fine threads							DIN 374		VA R45	C	6HX	HSS-E	A	M3 x 0,35 - M24 x 2	394	364
Taps for ISO metric fine threads							DIN 374		VA R45	C	6GX	HSS-E	A	M3 x 0,35 - M24 x 2	4628	364
Taps for ISO metric fine threads							DIN 374		VA	B	6HX	HSS-E	S	M3 x 0,35 - M24 x 2	4219	365
Taps for ISO metric fine threads							DIN 374		VA	B	6GX	HSS-E	S	M3 x 0,35 - M24 x 2	4641	365
Taps for BSP threads							DIN 5156		VA R45	C		HSS-E	A	G1/16 - G1	395	366
Taps for BSP threads							DIN 5156		VA	B		HSS-E	S	G1/16 - G1	4220	367
Taps for ISO metric threads							DIN 371		HR40	C	ISO2/6H	HSS-E	C	M 2 - M10	1916	368

Threading tools

P	M	K	N	S	H	Tool illustration	Standard	Hardness	Type	Form	Tolerance on Ø	Tool material	Surface	d1/mm	Article no.	Page
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Taps for ISO metric threads

≤ 1200	•	•	•	•	•		DIN 376	HR40	N	C	ISO2/6H	HSS-E	C	M3 - M30	1917	369
≤ 1200	•	•	•	•	•		DIN 371	HR15	N	C	ISO2/6H	HSS-E-PM	A	M3 - M10	1577	370
≤ 1200	•	•	•	•	•		DIN 376	HR15	N	C	ISO2/6H	HSS-E-PM	A	M12 - M20	1578	371
≤ 1200	•	•	•	•	•		DIN 371	H	H	B	ISO2/6H	HSS-E	C	M2,2 - M10	1914	372
≤ 1200	•	•	•	•	•		DIN 376	H	H	B	ISO2/6H	HSS-E	C	M3 - M24	1915	373

Taps for NPT threads

1000	•	•	•	•	•		WN		N	C		HSS-E	S	1/16 - 1	1088	374
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Taps for Rc (BSPT) threads

≤ 1200	•	•	•	•	•		DIN 5156		H	C		HSS-E-PM	A	Rc1/8 - Rc1	4683	375
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Fluteless taps for ISO metric threads

•	•	•	•	•	•		~DIN 371/376		N	C	4HX/6HX	HSS-E-PM	C	M1 - M20	4487	376
•	•	•	•	•	•		~DIN 371/376		N	C	6GX	HSS-E-PM	C	M1 - M20	4488	376

Fluteless taps for ISO metric fine threads

•	•	•	•	•	•		~DIN 374		N	C	6HX	HSS-E-PM	C	M3 x 0,35 - M24 x 2	4489	377
•	•	•	•	•	•		~DIN 374		N	C	6GX	HSS-E-PM	C	M3 x 0,35 - M24 x 2	4490	377

Fluteless taps for BSP threads

•	•	•	•	•	•		DIN 2189		N	C		HSS-E-PM	C	G1/8 - G1/2	4493	378
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MTMH3-Z

*helical drill thread
milling into solid
material up to 66 HRC*

- + guaranteed process reliability and threads with gauges*
- + core hole and thread in a single step: significantly shorter cycle and setting time*
- + universally usable in unhardened and hardened materials up to 66 HRC*



Micro thread milling cutters



- P** •
- M** •
- K** •
- N** •
- S** •
- H** •

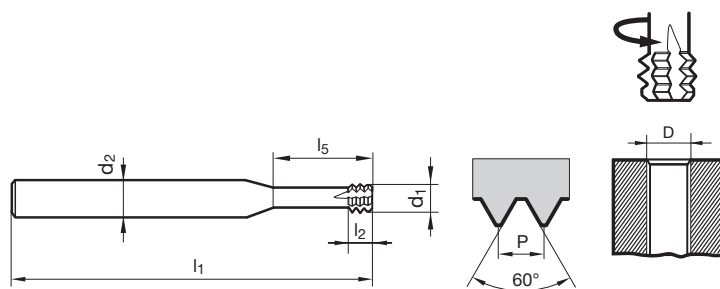
You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- with cooling grooves
- rotating direction left-hand

Tool material	Solid carbide
Surface	
Type	MTMH3-Z
Internal cooling	
Shank form	-HB



Threading tools



Article no. **4002**

D	P	d1	d2	l1	l2	l5	Z	Order no.
	mm	mm	mm	mm	mm	mm		
M2	0.400	1.40	3.00	39.00	1.20	5.00	4	4002 2.000
M2,5	0.450	1.80	3.00	39.00	1.30	6.50	4	4002 2.500
M3	0.500	2.40	6.00	58.00	1.50	7.50	4	4002 3.000
M3,5	0.600	2.70	6.00	58.00	1.80	9.00	4	4002 3.500
M4	0.700	3.10	6.00	58.00	2.10	10.00	4	4002 4.000
M5	0.800	3.80	6.00	58.00	2.40	12.50	4	4002 5.000
M6	1.000	4.60	8.00	64.00	3.00	15.00	4	4002 6.000
M5x0,5/M6x0,5	0.500	3.80	6.00	58.00	1.50	15.00	4	4002 6.003
M8	1.250	6.20	8.00	64.00	3.60	20.00	4	4002 8.000
M6x0,75/M8x0,75	0.750	4.60	8.00	64.00	2.30	20.00	4	4002 8.004
M10	1.500	7.50	10.00	73.00	4.50	25.00	4	4002 10.000
M12	1.750	9.00	10.00	73.00	5.20	30.00	4	4002 12.000
M10x1/M12x1	1.000	7.50	8.00	64.00	3.00	25.00	4	4002 12.005
M16	2.000	11.50	12.00	90.00	6.00	40.00	4	4002 16.000
M14x1,5/M16x1,5	1.500	11.50	12.00	90.00	4.50	40.00	4	4002 16.007
M20	2.500	14.50	16.00	105.00	7.50	50.00	4	4002 20.000

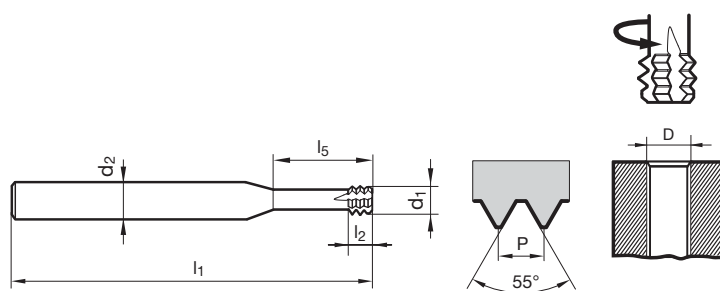


Micro thread milling cutters



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** •
- K** •
- N** •
- S** •
- H** •
 - with cooling grooves
 - rotating direction left-hand

Tool material	Solid carbide
Surface	
Type	MTMH3-Z
Internal cooling	
Shank form	~HB



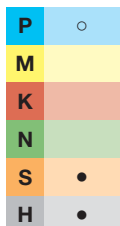
Threading tools

Article no. **4780**

D	P	d1	d2	l1	l2	l5	Z
	G/inch	mm	mm	mm	mm	mm	
G1/16-G1/8	28	6.10	8.00	64.00	2.70	24.00	4
G1/4-G3/8	19	10.30	12.00	90.00	4.00	40.00	4
G1/2-G5/8-G3/4	14	15.70	16.00	105.00	5.40	50.00	4

Order no.
4780 9.728
4780 16.662
4780 26.441

Micro thread milling cutters



You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- suitable for hardened steels up to HRC 66
- M4 counter clockwise

Tool material **Solid carbide**

Surface

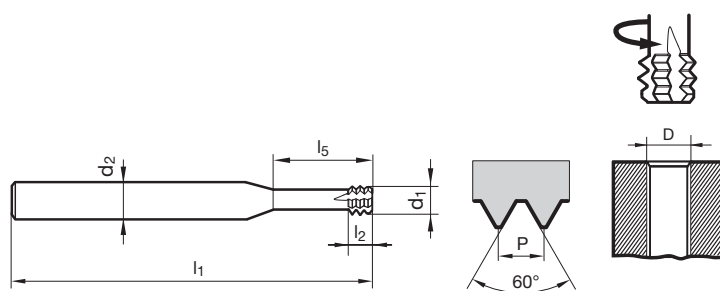
Type **MTMH3 SP**

Internal cooling

Shank form **-HA**



Threading tools

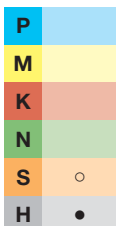


Article no. **4496**

D	P	d1	d2	l1	l2	l5	Z	Order no.
	mm	mm	mm	mm	mm	mm		
M2	0.400	1.55	3.00	39.00	1.20	5.00	4	4496 2.000
M2,5	0.450	1.95	3.00	39.00	1.40	6.50	4	4496 2.500
M3	0.500	2.35	6.00	58.00	1.50	7.50	4	4496 3.000
M3,5	0.600	2.80	6.00	58.00	1.80	9.00	4	4496 3.500
M4	0.700	3.10	6.00	58.00	2.10	10.00	4	4496 4.000
M5	0.800	3.80	6.00	58.00	2.40	12.50	4	4496 5.000
M6	1.000	4.80	6.00	58.00	3.00	15.00	4	4496 6.000
M8	1.250	5.95	6.00	58.00	3.80	20.00	5	4496 8.000
M10	1.500	7.80	8.00	64.00	4.50	25.00	5	4496 10.000
M12	1.750	9.00	10.00	73.00	5.30	30.00	6	4496 12.000
M16	2.000	11.80	12.00	84.00	6.00	35.00	6	4496 16.000



Micro thread milling cutters



You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

• for hard machining 45-65 HRC

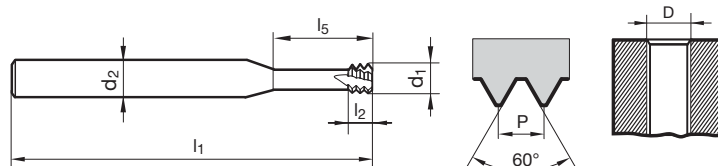
Tool material **Solid carbide**

Surface

Type **MTMH3 SP**

Internal cooling

Shank form **HA**



Threading tools

Company std.

Article no.

4227

D	P	d1	d2	l1	l2	l5	Z	Order no.
	mm	mm	mm	mm	mm	mm		
M2	0.400	1.55	3.00	39.00	1.20	6.00	4	4227 2.000
M2,5	0.450	1.95	3.00	39.00	1.40	7.50	4	4227 2.500
M3	0.500	2.35	6.00	58.00	1.50	9.50	4	4227 3.000
M4	0.700	3.10	6.00	58.00	2.10	12.50	4	4227 4.000
M5	0.800	3.80	6.00	58.00	2.40	16.00	4	4227 5.000
M6	1.000	4.80	6.00	58.00	3.00	20.00	4	4227 6.000
M8	1.250	5.95	6.00	58.00	3.80	24.00	4	4227 8.000
M10	1.500	7.80	8.00	64.00	4.50	23.00	4	4227 10.000
M12	1.750	9.00	10.00	73.00	5.30	26.00	5	4227 12.000
M16	2.000	11.80	12.00	90.00	6.00	40.00	5	4227 16.000

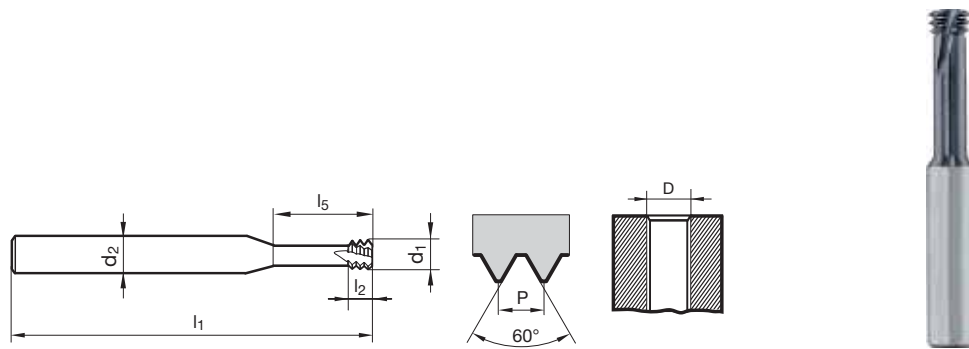
Micro thread milling cutters



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** •
- K** •
- N** •
- S** •
- H** ○

Tool material	Solid carbide
Surface	
Type	MTM3 SP
Internal cooling	
Shank form	HA

Threading tools



Company std.	Article no.	4226
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D	P	d1	d2	l1	l2	l5	Z	Order no.
	mm	mm	mm	mm	mm	mm		
M1,6	0.350	1.20	3.00	39.00	1.10	4.80	3	4226 1.600
M1,8	0.350	1.40	3.00	39.00	1.10	5.40	3	4226 1.800
M2	0.400	1.55	3.00	39.00	1.20	6.00	4	4226 2.000
M2,5	0.450	1.95	3.00	39.00	1.40	7.50	4	4226 2.500
M3	0.500	2.40	6.00	58.00	1.50	9.50	4	4226 3.000
M3,5	0.600	2.80	6.00	58.00	1.80	11.00	4	4226 3.500
M4	0.700	3.20	6.00	58.00	2.10	12.50	4	4226 4.000
M5	0.800	4.00	6.00	58.00	2.40	16.00	4	4226 5.000
M6	1.000	4.80	6.00	58.00	3.00	20.00	4	4226 6.000
M8	1.250	5.95	6.00	58.00	3.80	24.00	4	4226 8.000
M10	1.500	7.80	8.00	73.00	4.50	33.00	4	4226 10.000
M12	1.750	9.00	10.00	84.00	5.30	38.00	4	4226 12.000
M16	2.000	11.80	12.00	84.00	6.00	35.00	5	4226 16.000
M20	2.500	15.00	16.00	109.00	7.50	56.00	5	4226 20.000



Micro thread milling cutters

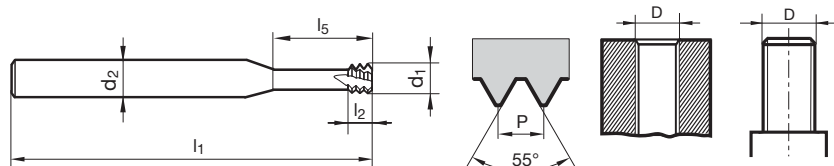


P • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- M** •
- K** •
- N** •
- S** •
- H** ○

• thread milling cutters for internal and external threads

Tool material	Solid carbide
Surface	
Type	MTM3 SP
Internal cooling	
Shank form	HA

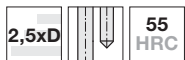


Threading tools

Company std.	Article no.	4228
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D	P	d1	d2	l1	l2	l5	Z	Order no.
	mm	mm	mm	mm	mm	mm		
G1/16-G1/8	0.907	6.20	8.00	64.00	2.70	19.50	4	4228 9.728
G1/4-G3/8	1.337	9.95	10.00	73.00	4.00	25.00	4	4228 16.662
G1/2-G7/8	1.814	11.95	12.00	84.00	5.40	37.00	4	4228 30.201
G1-G2	2.309	15.95	16.00	105.00	6.90	44.00	5	4228 59.614

Micro thread milling cutters



P	•
M	•
K	•
N	•
S	•
H	○

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- M1.6 - M3 with 2 cooling grooves
- with internal cooling \geq M3.5
- M4 counter clockwise

Tool material **Solid carbide**

Surface

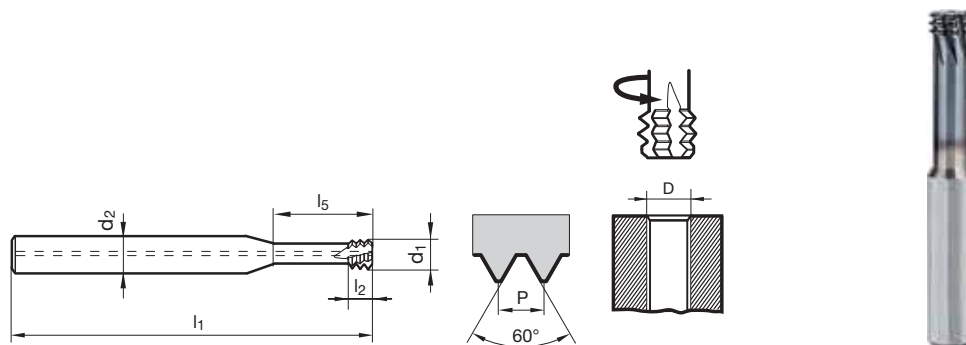
Type SC-MTM3-SP

Internal cooling

Shank form ~HA



Threading tools



Article no. **4001**

D	P	d1	d2	l1	l2	l5	Z	Order no.
	mm	mm	mm	mm	mm	mm		
M1,6	0.350	1.20	3.00	39.00	1.10	4.00	3	4001 1.600
M1,8	0.350	1.40	3.00	39.00	1.10	4.50	4	4001 1.800
M2	0.400	1.55	3.00	39.00	1.20	5.00	4	4001 2.000
M2,5	0.450	1.95	3.00	39.00	1.40	6.50	4	4001 2.500
M3	0.500	2.40	3.00	39.00	1.50	8.00	5	4001 3.000
M3,5	0.600	2.80	6.00	58.00	1.80	9.00	5	4001 3.500
M4	0.700	3.20	6.00	58.00	2.10	11.00	5	4001 4.000
M5	0.800	4.00	6.00	58.00	2.40	13.50	6	4001 5.000
M6	1.000	4.80	6.00	58.00	3.00	16.00	6	4001 6.000
M8	1.250	5.95	6.00	58.00	3.80	21.00	7	4001 8.000
M10	1.500	7.80	8.00	73.00	4.50	26.00	7	4001 10.000
M12	1.750	9.00	10.00	84.00	5.30	31.00	7	4001 12.000
M16	2.000	11.80	12.00	90.00	6.00	41.00	8	4001 16.000
M20	2.500	15.00	16.00	105.00	7.50	51.00	8	4001 20.000



Thread milling cutters without chamfer for ISO metric threads

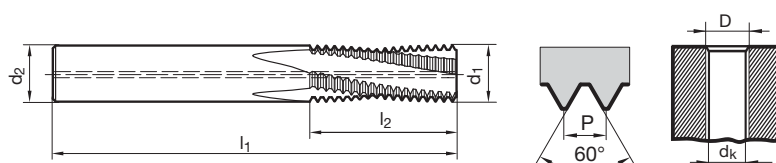


P	•	You can find the cutting data in our online navigator at https://webnavigator.guehring.de .
M	○	
K	•	
N	•	
S	○	
H	○	

• without chamfer

Tool material **Solid carbide**Surface **C**Type **TM SP**

Internal cooling

Shank form **HB**

Threading tools

Company std.

Article no.

3743

D	P	d1	d2	dk	l1	l2	Z	Order no.
	mm	mm	mm	mm	mm	mm		
M4	0.700	3.00	6.00	3.30	48.00	8.80	3	3743 4.000
M5	0.800	4.00	6.00	4.20	54.00	10.80	3	3743 5.000
M6	1.000	4.80	6.00	5.00	54.00	13.50	3	3743 6.000
M8	1.250	6.40	8.00	6.80	62.00	18.10	3	3743 8.000
M8 x 1	1.000	6.40	8.00	7.00	62.00	17.50	3	3743 8.005
M10	1.500	7.95	10.00	8.50	74.00	21.80	3	3743 10.000
M10 x 1	1.000	7.95	10.00	9.00	74.00	21.50	3	3743 10.005
M10 x 1,25	1.250	7.95	10.00	8.80	74.00	21.90	3	3743 10.006
M12	1.750	9.95	10.00	10.20	74.00	25.40	4	3743 12.000
M12 x 1,5	1.500	9.95	10.00	10.50	74.00	26.30	4	3743 12.007
M14	2.000	11.20	12.00	12.00	90.00	31.00	4	3743 14.000
M14 x 1,5	1.500	11.20	12.00	12.50	90.00	30.80	4	3743 14.007
M16	2.000	12.80	14.00	14.00	90.00	35.00	4	3743 16.000
M16 x 1,5	1.500	12.80	14.00	14.50	90.00	33.80	4	3743 16.007
M20	2.500	14.95	16.00	17.50	102.00	41.30	4	3743 20.000
M20 x 1,5	1.500	14.95	16.00	18.50	102.00	42.80	4	3743 20.007

Thread milling cutters without chamfer for BSP threads

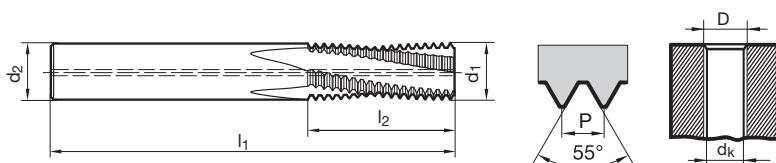


- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** ○
- K** •
- N** •
- S** ○
- H** ○ • without chamfer

Tool material	Solid carbide
Surface	
Type	TM SP
Internal cooling	
Shank form	HB



Threading tools



Company std.

Article no.

3748

D	P	d1	d2	dk	l1	l2	Z
	G/inch	mm	mm	mm	mm	mm	
G1/8	28	7.95	8.00	8.80	64.00	21.30	3
G1/4	19	10.50	12.00	11.80	90.00	28.70	4
G3/8	19	13.60	14.00	15.25	90.00	35.40	4

Order no.

3748 9.728
3748 13.157
3748 16.662

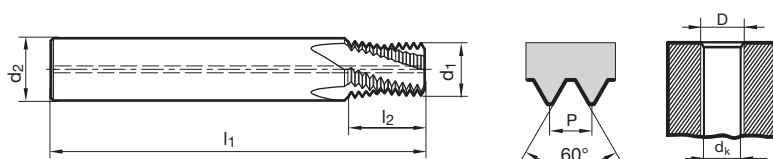


Thread milling cutters without chamfer for NPT threads



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** •
- K** •
- N** •
- S** •
- H** ○ • without chamfer

Tool material	Solid carbide
Surface	
Type	TM SP
Internal cooling	
Shank form	HB



Threading tools

Company std.								Article no.	3754					
D	P	d1	d2	dk	l1	l2	Z	<table border="1"> <thead> <tr> <th>Order no.</th> </tr> </thead> <tbody> <tr> <td>3754 8.190</td> </tr> <tr> <td>3754 10.620</td> </tr> <tr> <td>3754 14.140</td> </tr> <tr> <td>3754 17.570</td> </tr> </tbody> </table>		Order no.	3754 8.190	3754 10.620	3754 14.140	3754 17.570
Order no.														
3754 8.190														
3754 10.620														
3754 14.140														
3754 17.570														
	G/inch	mm	mm	mm	mm	mm								
1/16	27	5.90	8.00	6.15	54.00	9.90	3							
1/8	27	7.30	8.00	8.40	64.00	9.90	3							
1/4	18	9.95	12.00	11.10	72.00	19.00	4							
3/8	18	12.50	14.00	14.30	80.00	14.80	4							

Universal thread milling cutters for ISO metric threads



P • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>

- M** •
- K** •
- N** •
- S** •
- H** ○

• universal thread milling cutters for internal threads M / MF

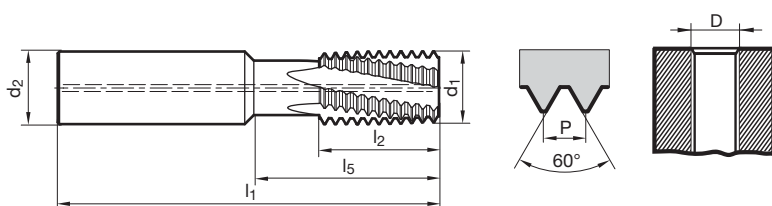
Tool material **Solid carbide**

Surface **C**

Type **TMU SP**

Internal cooling

Shank form **HB**



Threading tools

Company std.

Article no.

3556

P	D	d1	d2	l1	l5	l2	Z	Order no.
mm		mm	mm	mm	mm	mm		
0.500	> 10	7.95	8.00	64.00		20.00	4	3556 8.050
1.500	> 14	9.95	10.00	70.00	25.00	16.00	4	3556 10.150
1.000	> 12	9.95	10.00	70.00	25.00	16.00	4	3556 10.100
1.250	> 14	9.95	10.00	70.00	25.00	16.00	4	3556 10.125
1.250	> 16	11.95	12.00	80.00	31.00	20.00	4	3556 12.125
1.000	> 16	11.95	12.00	80.00	31.00	20.00	4	3556 12.100
1.500	> 16	11.95	12.00	80.00	31.00	20.00	4	3556 12.150
1.500	> 20	15.95	16.00	90.00	40.00	25.00	5	3556 16.150
1.000	> 18	15.95	16.00	90.00	40.00	25.00	5	3556 16.100
2.000	> 22	15.95	16.00	90.00	40.00	25.00	5	3556 16.200
3.000	> 24	17.95	18.00	102.00	50.00	33.00	5	3556 18.300
2.000	> 26	19.95	20.00	105.00	50.00	33.00	5	3556 20.200
1.000	> 24	19.95	20.00	105.00	50.00	33.00	5	3556 20.100
1.500	> 26	19.95	20.00	105.00	50.00	33.00	5	3556 20.150
2.500	> 26	19.95	20.00	105.00	50.00	33.00	5	3556 20.250
3.000	> 27	19.95	20.00	105.00	50.00	33.00	5	3556 20.300
3.500	> 30	19.95	20.00	105.00	50.00	33.00	5	3556 20.350



Universal thread milling cutters for BSP threads

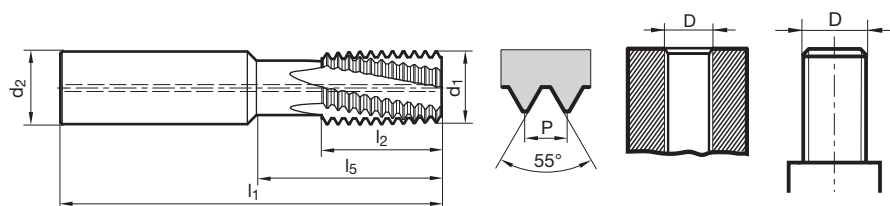


- P** •
- M** •
- K** •
- N** •
- S** •
- H** ○

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

• universal thread milling cutters for internal and external threads

Tool material	Solid carbide
Surface	
Type	TMU SP
Internal cooling	
Shank form	HB



Threading tools

Company std.	Article no.	3557
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P	D	d1	d2	l1	l5	l2	Z
G/inch		mm	mm	mm	mm	mm	
19	≥ 1/4	9.95	10.00	70.00	25.00	16.00	4
14	≥ 1/2	15.95	16.00	90.00	40.00	25.00	5
11	≥ 1	19.95	20.00	105.00	50.00	33.00	5

Order no.
3557 10.190
3557 16.140
3557 20.110

Universal thread milling cutters for NPT threads

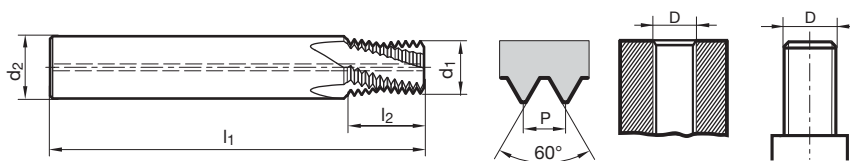


- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** •
- K** •
- N** •
- S** •
- H** ○ • universal thread milling cutters for internal and external threads

Tool material	Solid carbide
Surface	
Type	TMU SP
Internal cooling	
Shank form	HB



Threading tools



Company std. Article no. **3769**

P	D	d1	d2	l1	l2	Z
G/inch		mm	mm	mm	mm	
11	≥ 1	18.50	20.00	90.00	23.19	5
14	≥ 1/2	14.50	16.00	90.00	19.05	5

Order no.
3769 34.180
3769 21.900

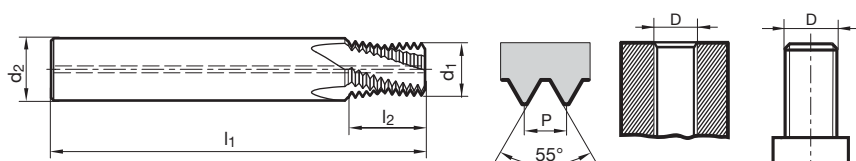


Universal thread milling cutters for Rc threads



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** •
- K** •
- N** •
- S** •
- H** ○ • universal thread milling cutters for internal and external threads

Tool material	Solid carbide
Surface	
Type	TMU SP
Internal cooling	
Shank form	~HB



Threading tools

Article no. **4770**

P	D	d1	d2	l1	l2	Z	Order no.
G/inch		mm	mm	mm	mm		
28	Rc1/8	7.40	8.00	64.00	8.60	3	4770 9.728
19	Rc1/4-Rc3/8	9.12	10.00	74.00	14.04	4	4770 13.157
14	Rc1/2-Rc3/4	14.80	16.00	90.00	19.05	5	4770 20.955
11	Rc 1-Rc 2	18.00	20.00	105.00	33.40	5	4770 33.249

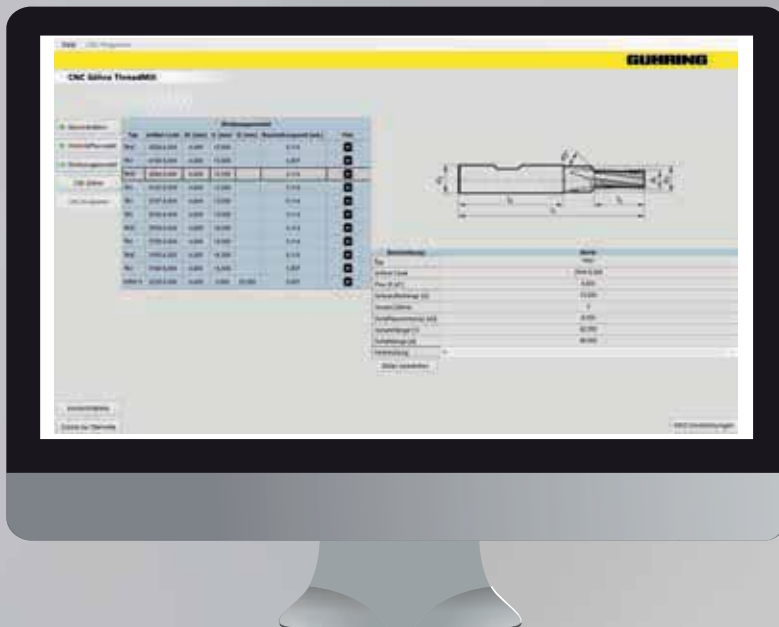
CNC Gühro ThreadMill



Free programming software

for thread milling cutters and drill thread milling cutters

Threading tools



In order to make the machining with Gühring thread milling cutters even more user friendly, we have developed the intuitive "CNC Gühro ThreadMill".

"CNC Gühro ThreadMill" is available free-of-charge. Simply download it from our homepage www.guehring.com!

To the optimal CNC programme in five steps

1. Specify the thread data
Select from all current thread standards
2. Select the material
You are always referred to the optimal parameters
3. Select the tool
Technical data, drawing, machining time and video simplify selection
4. Record CNC data
Enter required milling strategy and parameters
5. Receive CNC programme with code and data sheet
Programming data (Sinumerik, Haidenhain, Fanuc, Philips, Mazatrol or Hurco) are imported and automatically recognised



Taps for ISO metric threads



P	
M	
K	
N	
S	
H	•

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

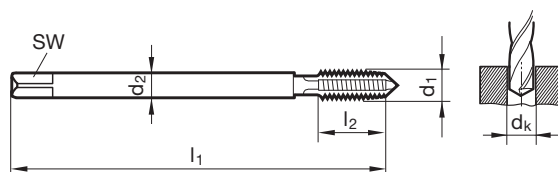
Tool material **Solid carbide**

Tolerance on Ø ISO2/6H

Surface **C**

Type H

Form D

Internal cooling 

Threading tools

Company std. ~DIN 371

Article no.

2944

d1	P	d2	SW	dk	l1	l2	Order no.
	mm	mm	mm	mm	mm	mm	
M3	0.500	3.50	2.70	2.60	56.00	12.00	2944 3.000
M4	0.700	4.50	3.40	3.40	63.00	14.00	2944 4.000
M5	0.800	6.00	4.90	4.30	70.00	17.00	2944 5.000
M6	1.000	6.00	4.90	5.10	80.00	20.00	2944 6.000
M8	1.250	8.00	6.20	6.90	90.00	20.00	2944 8.000
M10	1.500	10.00	8.00	8.60	100.00	24.00	2944 10.000
M12	1.750	12.00	9.00	10.40	110.00	28.00	2944 12.000
M16	2.000	16.00	12.00	14.10	110.00	40.00	2944 16.000

Taps for ISO metric fine threads

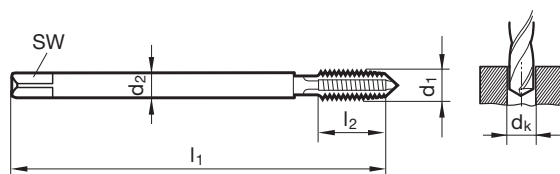


P You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- M**
- K**
- N**
- S**
- H** •

• with internal cooling ≥ M12

Tool material	Solid carbide
Tolerance on Ø	ISO2/6H
Surface	C
Type	H
Form	D
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

Company std. ~DIN 371

Article no.

1161

d1	d2	SW	dk	l1	l2	Order no.
	mm	mm	mm	mm	mm	
M6 x 0,5	6.00	4.90	5.60	80.00	15.00	1161 6.003
M6 x 0,75	6.00	4.90	5.30	80.00	20.00	1161 6.004
M8 x 1	8.00	6.20	7.10	90.00	18.00	1161 8.005
M10 x 1	10.00	8.00	9.10	90.00	22.00	1161 10.005
M10 x 1,25	10.00	8.00	8.90	100.00	28.00	1161 10.006
M12 x 1	12.00	9.00	11.10	100.00	25.00	1161 12.005
M12 x 1,25	12.00	9.00	10.90	100.00	28.00	1161 12.006
M12 x 1,5	12.00	9.00	10.60	100.00	28.00	1161 12.007
M14 x 1,5	14.00	11.00	12.60	100.00	30.00	1161 14.007
M16 x 1,5	16.00	12.00	14.60	100.00	40.00	1161 16.007



Taps for BSP threads



P You can find the cutting data in our online navigator
at <https://webnavigator.guehring.de>.

M	
K	
N	
S	
H	•

• for hard machining 55-62 HRC

Tool material **Solid carbide**

Tolerance on Ø

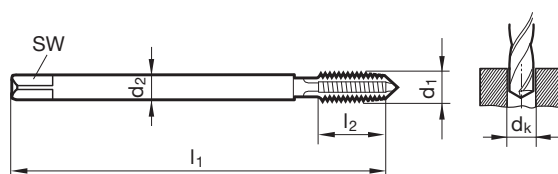
Surface **C**

Type **H**

Form **D**

Internal cooling

NEW



Threading tools

~DIN 371

Article no.

4599

d1	P	d2	SW	dk	l1	l2	Order no.
	G/inch	mm	mm	mm	mm	mm	
G1/8	28	10.00	8.00	8.90	90.00	22.00	4599 9.728
G1/4	19	14.00	11.00	11.90	100.00	30.00	4599 13.157
G3/8	19	16.00	12.00	15.35	100.00	40.00	4599 16.662
G1/2	14	20.00	16.00	19.00	125.00	40.00	4599 20.955

Taps for ISO metric threads

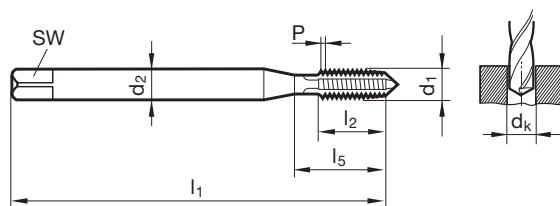


P You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- M**
- K**
- N**
- S**
- H** ○

• for hard machining 45-55 HRC

Tool material	HSS-E-PM
Tolerance on Ø	6HX
Surface	C
Type	H
Form	D
Internal cooling	<input type="checkbox"/>



Threading tools

DIN 2184-1 DIN 371

Article no.

1201

d1	P	d2	SW	dk	l1	l2	l5	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	
M3	0.500	3.50	2.70	2.60	56.00	10.00	18.00	1201 3.000
M4	0.700	4.50	3.40	3.40	63.00	12.00	21.00	1201 4.000
M5	0.800	6.00	4.90	4.30	70.00	14.00	25.00	1201 5.000
M6	1.000	6.00	4.90	5.10	80.00	16.00	30.00	1201 6.000
M8	1.250	8.00	6.20	6.90	90.00	17.00	35.00	1201 8.000
M10	1.500	10.00	8.00	8.60	100.00	20.00	39.00	1201 10.000
M12	1.750	12.00	9.00	10.40	110.00	24.00	49.00	1201 12.000
M14	2.000	14.00	11.00	12.10	110.00	26.00	53.00	1201 14.000
M16	2.000	16.00	12.00	14.10	110.00	26.00	54.00	1201 16.000



Taps for ISO metric fine threads



P You can find the cutting data in our online navigator
at <https://webnavigator.guehring.de>.

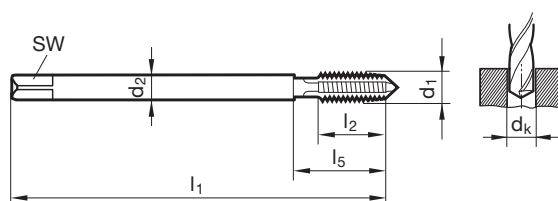


• for hard machining 45-55 HRC

Tool material **HSS-E-PM**Tolerance on \varnothing 6HXSurface **C**

Type H

Form D

Internal cooling 

Threading tools

DIN 2184-1 -DIN 371

Article no.

4161

d1	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	
M6 x 0,75	6.00	4.90	5.30	80.00	13.00	30.00	4161 6.004
M8 x 1	8.00	6.20	7.10	90.00	17.00	35.00	4161 8.005
M10 x 1	10.00	8.00	9.10	90.00	16.00	35.00	4161 10.005
M10 x 1,25	10.00	8.00	8.90	100.00	20.00	39.00	4161 10.006
M12 x 1	12.00	9.00	11.10	100.00	20.00	40.00	4161 12.005
M12 x 1,25	12.00	9.00	10.90	100.00	20.00	40.00	4161 12.006
M12 x 1,5	12.00	9.00	10.60	100.00	20.00	40.00	4161 12.007
M14 x 1,5	14.00	11.00	12.60	100.00	20.00	40.00	4161 14.007
M16 x 1,5	16.00	12.00	14.60	100.00	22.00	44.00	4161 16.007

Taps for BSP threads



P You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

- M**
- K**
- N**
- S**
- H** ○

• for hard machining 45-55 HRC

Tool material **HSS-E-PM**

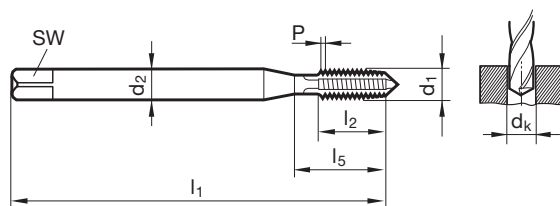
Tolerance on Ø

Surface **C**

Type **H**

Form **D**

Internal cooling



Threading tools

DIN 2184-1 DIN 371

Article no. **4607**

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	G/inch	mm	mm	mm	mm	mm	mm	
G1/8	28	10.00	8.00	8.90	100.00	19.00	39.00	4607 9.728
G1/4	19	14.00	11.00	11.90	110.00	28.00	49.00	4607 13.157
G3/8	19	16.00	12.00	15.35	125.00	28.00	54.00	4607 16.662
G1/2	14	20.00	16.00	19.00	140.00	35.00	62.00	4607 20.955



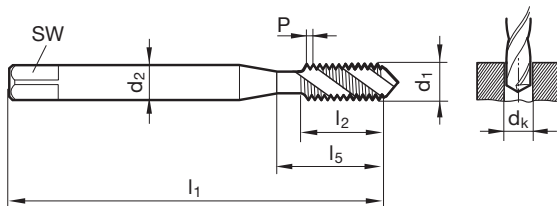
Taps for ISO metric threads



P	•
M	•
K	○
N	○
S	○
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E
Tolerance on Ø	6HX
Surface	A
Type	VA R45
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 371/DIN 376

Article no.

393

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M2	0.400	2.80	2.10	1.60	45.00	4.50	13.50	393 2.000
M2,5	0.450	2.80	2.10	2.05	50.00	5.00	14.50	393 2.500
M3	0.500	3.50	2.70	2.50	56.00	6.00	18.00	393 3.000
M3,5	0.600	4.00	3.00	2.90	56.00	7.00	20.00	393 3.500
M4	0.700	4.50	3.40	3.30	63.00	7.50	21.00	393 4.000
M4,5	0.750	6.00	4.90	3.70	70.00	8.50	25.00	393 4.500
M5	0.800	6.00	4.90	4.20	70.00	8.50	25.00	393 5.000
M6	1.000	6.00	4.90	5.00	80.00	11.00	30.00	393 6.000
M7	1.000	7.00	5.50	6.00	80.00	11.00	30.00	393 7.000
M8	1.250	8.00	6.20	6.80	90.00	14.00	35.00	393 8.000
M9	1.250	9.00	7.00	7.80	90.00	14.00	35.00	393 9.000
M10	1.500	10.00	8.00	8.50	100.00	16.00	39.00	393 10.000
M11	1.500	8.00	6.20	9.50	100.00	16.00	42.00	393 11.000
M12	1.750	9.00	7.00	10.20	110.00	18.50	49.00	393 12.000
M14	2.000	11.00	9.00	12.00	110.00	20.00	53.00	393 14.000
M16	2.000	12.00	9.00	14.00	110.00	20.00	54.00	393 16.000
M18	2.500	14.00	11.00	15.50	125.00	25.00	62.00	393 18.000
M20	2.500	16.00	12.00	17.50	140.00	25.00	62.00	393 20.000
M22	2.500	18.00	14.50	19.50	140.00	27.00	62.00	393 22.000
M24	3.000	18.00	14.50	21.00	160.00	30.00	73.00	393 24.000
M27	3.000	20.00	16.00	24.00	160.00	30.00	73.00	393 27.000
M30	3.500	22.00	18.00	26.50	180.00	35.00	85.00	393 30.000
M33	3.500	25.00	20.00	29.50	180.00	40.00	91.00	393 33.000
M36	4.000	28.00	22.00	32.00	200.00	40.00	102.00	393 36.000
M39	4.000	32.00	24.00	35.00	200.00	50.00	107.00	393 39.000
M42	4.500	32.00	24.00	37.50	200.00	45.00	112.00	393 42.000

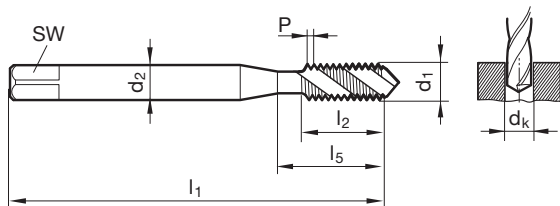
Taps for ISO metric threads



P	•	You can find the cutting data in our online navigator at https://webnavigator.guehring.de .
M	•	
K	○	
N	○	
S	○	
H		

Tool material	HSS-E		
Tolerance on Ø	6GX	7GX	6H+0,1
Surface	A	A	A
Type	VA R45	VA R45	VA R45
Form	C	C	C
Internal cooling			

Threading tools



DIN 2184-1

Article no.

4625

4626

4627

d1	P	d2	SW	dk	l1	l2	l5	Order no.		
								mm	mm	mm
M2	0.400	2.80	2.10	1.60	45.00	4.50	13.50	4625 2.000	4626 2.000	4627 2.000
M2,5	0.450	2.80	2.10	2.05	50.00	5.00	14.50	4625 2.500	4626 2.500	4627 2.500
M3	0.500	3.50	2.70	2.50	56.00	6.00	18.00	4625 3.000	4626 3.000	4627 3.000
M3,5	0.600	4.00	3.00	2.90	56.00	7.00	20.00	4625 3.500	4626 3.500	4627 3.500
M4	0.700	4.50	3.40	3.30	63.00	7.50	21.00	4625 4.000	4626 4.000	4627 4.000
M5	0.800	6.00	4.90	4.20	70.00	8.50	25.00	4625 5.000	4626 5.000	4627 5.000
M6	1.000	6.00	4.90	5.00	80.00	11.00	30.00	4625 6.000	4626 6.000	4627 6.000
M8	1.250	8.00	6.20	6.80	90.00	14.00	35.00	4625 8.000	4626 8.000	4627 8.000
M10	1.500	10.00	8.00	8.50	100.00	16.00	39.00	4625 10.000	4626 10.000	4627 10.000
M12	1.750	9.00	7.00	10.20	110.00	18.50	49.00	4625 12.000	4626 12.000	4627 12.000
M14	2.000	11.00	9.00	12.00	110.00	20.00	53.00	4625 14.000	4626 14.000	4627 14.000
M16	2.000	12.00	9.00	14.00	110.00	20.00	54.00	4625 16.000	4626 16.000	4627 16.000
M18	2.500	14.00	11.00	15.50	125.00	25.00	62.00	4625 18.000	4626 18.000	4627 18.000
M20	2.500	16.00	12.00	17.50	140.00	25.00	62.00	4625 20.000	4626 20.000	4627 20.000
M24	3.000	18.00	14.50	21.00	160.00	30.00	73.00	4625 24.000	4626 24.000	4627 24.000
M30	3.500	22.00	18.00	26.50	180.00	35.00	85.00	4625 30.000	4626 30.000	4627 30.000

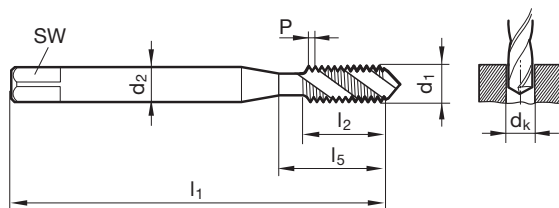


Taps for ISO metric threads



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.
- M** •
- K** ○
- N** ○
- S** ○
- H** • long version

Tool material	HSS-E
Tolerance on Ø	6HX
Surface	A
Type	VA R45
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

Company std.	Article no.	4633
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d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M3	0.500	3.50	2.70	2.50	90.00	6.00	18.00	4633 3.000
M4	0.700	4.50	3.40	3.30	125.00	7.50	21.00	4633 4.000
M5	0.800	6.00	4.90	4.20	140.00	8.50	25.00	4633 5.000
M6	1.000	6.00	4.90	5.00	160.00	11.00	30.00	4633 6.000
M8	1.250	8.00	6.20	6.80	180.00	14.00	35.00	4633 8.010
M10	1.500	10.00	8.00	8.50	200.00	16.00	39.00	4633 10.010
M12	1.750	9.00	7.00	10.20	220.00	18.50	158.00	4633 12.000
M14	2.000	11.00	9.00	12.00	220.00	20.00	160.00	4633 14.000
M16	2.000	12.00	9.00	14.00	220.00	20.00	160.00	4633 16.000
M20	2.500	16.00	12.00	17.50	280.00	25.00	217.00	4633 20.000

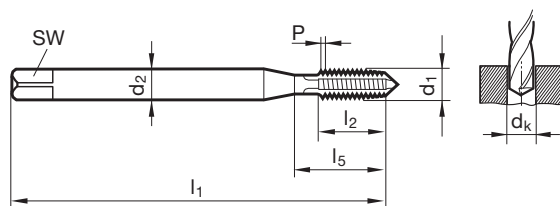
Taps for ISO metric threads



P	•
M	•
K	○
N	○
S	○
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E
Tolerance on Ø	6HX
Surface	S
Type	VA
Form	B
Internal cooling	☒



Threading tools

DIN 2184-1 DIN 371/DIN 376

Article no.

4218

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M2	0.400	2.80	2.10	1.60	45.00	8.00	13.50	4218 2.000
M2,5	0.450	2.80	2.10	2.05	50.00	9.00	14.50	4218 2.500
M3	0.500	3.50	2.70	2.50	56.00	10.00	18.00	4218 3.000
M4	0.700	4.50	3.40	3.30	63.00	12.00	21.00	4218 4.000
M4,5	0.750	6.00	4.90	3.70	70.00	14.00	25.00	4218 4.500
M5	0.800	6.00	4.90	4.20	70.00	14.00	25.00	4218 5.000
M6	1.000	6.00	4.90	5.00	80.00	16.00	30.00	4218 6.000
M7	1.000	7.00	5.50	6.00	80.00	16.00	30.00	4218 7.000
M8	1.250	8.00	6.20	6.80	90.00	17.00	35.00	4218 8.000
M9	1.250	9.00	7.00	7.80	90.00	17.00	35.00	4218 9.000
M10	1.500	10.00	8.00	8.50	100.00	20.00	39.00	4218 10.000
M11	1.500	8.00	6.20	9.50	100.00	20.00	42.00	4218 11.000
M12	1.750	9.00	7.00	10.20	110.00	24.00	49.00	4218 12.000
M14	2.000	11.00	9.00	12.00	110.00	26.00	53.00	4218 14.000
M16	2.000	12.00	9.00	14.00	110.00	26.00	54.00	4218 16.000
M18	2.500	14.00	11.00	15.50	125.00	30.00	62.00	4218 18.000
M20	2.500	16.00	12.00	17.50	140.00	32.00	62.00	4218 20.000
M22	2.500	18.00	14.50	19.50	140.00	32.00	62.00	4218 22.000
M24	3.000	18.00	14.50	21.00	160.00	36.00	73.00	4218 24.000
M27	3.000	20.00	16.00	24.00	160.00	36.00	73.00	4218 27.000
M30	3.500	22.00	18.00	26.50	180.00	40.00	85.00	4218 30.000
M33	3.500	25.00	20.00	29.50	180.00	40.00	91.00	4218 33.000
M36	4.000	28.00	22.00	32.00	200.00	50.00	102.00	4218 36.000
M39	4.000	32.00	24.00	35.00	200.00	50.00	107.00	4218 39.000
M42	4.500	32.00	24.00	37.50	200.00	56.00	112.00	4218 42.000



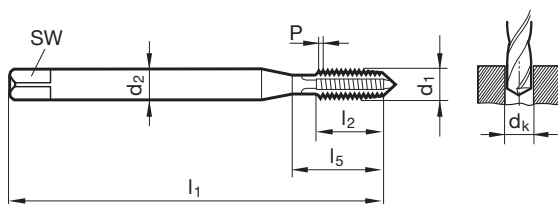
Taps for ISO metric threads



P	•
M	•
K	○
N	○
S	○
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E		
Tolerance on Ø	6GX	7GX	6H+0,1
Surface	S	S	S
Type	VA	VA	VA
Form	B	B	B
Internal cooling			



Threading tools

DIN 2184-1	Article no.	4638	4639	4640
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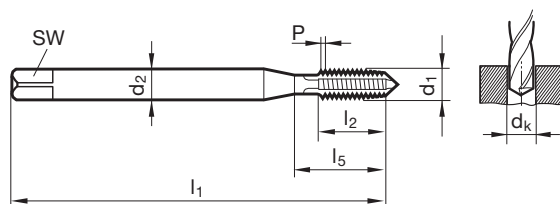
d1	P	d2	SW	dk	l1	l2	l5	Order no.		
								mm	mm	mm
M2	0.400	2.80	2.10	1.60	45.00	8.00	13.50	4638 2.000	4639 2.000	4640 2.000
M2,5	0.450	2.80	2.10	2.05	50.00	9.00	14.50	4638 2.500	4639 2.500	4640 2.500
M3	0.500	3.50	2.70	2.50	56.00	10.00	18.00	4638 3.000	4639 3.000	4640 3.000
M4	0.700	4.50	3.40	3.30	63.00	12.00	21.00	4638 4.000	4639 4.000	4640 4.000
M5	0.800	6.00	4.90	4.20	70.00	14.00	25.00	4638 5.000	4639 5.000	4640 5.000
M6	1.000	6.00	4.90	5.00	80.00	16.00	30.00	4638 6.000	4639 6.000	4640 6.000
M8	1.250	8.00	6.20	6.80	90.00	17.00	35.00	4638 8.000	4639 8.000	4640 8.000
M10	1.500	10.00	8.00	8.50	100.00	20.00	39.00	4638 10.000	4639 10.000	4640 10.000
M12	1.750	9.00	7.00	10.20	110.00	24.00	49.00	4638 12.000	4639 12.000	4640 12.000
M14	2.000	11.00	9.00	12.00	110.00	26.00	53.00	4638 14.000	4639 14.000	4640 14.000
M16	2.000	12.00	9.00	14.00	110.00	26.00	54.00	4638 16.000	4639 16.000	4640 16.000
M18	2.500	14.00	11.00	15.50	125.00	30.00	62.00	4638 18.000	4639 18.000	4640 18.000
M20	2.500	16.00	12.00	17.50	140.00	32.00	62.00	4638 20.000	4639 20.000	4640 20.000
M24	3.000	18.00	14.50	21.00	160.00	36.00	73.00	4638 24.000	4639 24.000	4640 24.000
M30	3.500	22.00	18.00	26.50	180.00	40.00	85.00	4638 30.000	4639 30.000	4640 30.000

Taps for ISO metric threads



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>
- M** •
- K** ○
- N** ○
- S** ○
- H** ○ • long version

Tool material	HSS-E
Tolerance on Ø	6HX
Surface	S
Type	VA
Form	B
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

Company std.	Article no.	4645
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d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M3	0.500	3.50	2.70	2.50	90.00	10.00	18.00	4645 3.000
M4	0.700	4.50	3.40	3.30	125.00	12.00	21.00	4645 4.000
M5	0.800	6.00	4.90	4.20	140.00	14.00	25.00	4645 5.000
M6	1.000	6.00	4.90	5.00	160.00	16.00	30.00	4645 6.000
M8	1.250	8.00	6.20	6.80	180.00	17.00	35.00	4645 8.010
M10	1.500	10.00	8.00	8.50	200.00	20.00	39.00	4645 10.010
M12	1.750	9.00	7.00	10.20	220.00	24.00	158.00	4645 12.000
M14	2.000	11.00	9.00	12.00	220.00	26.00	160.00	4645 14.000
M16	2.000	12.00	9.00	14.00	220.00	26.00	160.00	4645 16.000
M20	2.500	16.00	12.00	17.50	280.00	32.00	217.00	4645 20.000

XL lengths

for deep-set threads

- + bridging of interfering edges
or pre-drilled holes*
- + process-reliable chip removal
even with difficult machining*
- + outstanding service life
in almost all materials*

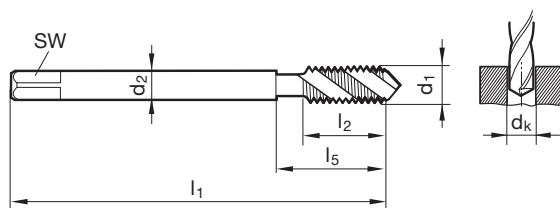


Taps for ISO metric fine threads



P	•	You can find the cutting data in our online navigator at https://webnavigator.guehring.de .
M	•	
K	○	
N	○	
S	○	
H		

Tool material	HSS-E	
Tolerance on Ø	6HX	6GX
Surface	A	A
Type	VA R45	VA R45
Form	C	C
Internal cooling		



Threading tools

DIN 2184-1 DIN 374

Article no.

394

4628

d1	d2	SW	dk	l1	l2	l5	Order no.	
							mm	mm
M3 x 0,35	2.20	1.80	2.65	56.00	4.00	18.00	394 3.002	
M4 x 0,35	2.80	2.10	3.65	63.00	5.00	21.00	394 4.002	
M4 x 0,5	2.80	2.10	3.50	63.00	5.00	21.00	394 4.003	
M5 x 0,5	3.50	2.70	4.50	70.00	5.00	25.00	394 5.003	
M6 x 0,5	4.50	3.40	5.50	80.00	5.00	30.00	394 6.003	
M6 x 0,75	4.50	3.40	5.20	80.00	8.00	30.00	394 6.004	4628 6.004
M8 x 0,75	6.00	4.90	7.20	80.00	8.00	30.00	394 8.004	4628 8.004
M8 x 1	6.00	4.90	7.00	90.00	11.00	35.00	394 8.005	4628 8.005
M9 x 1	7.00	5.50	8.00	90.00	11.00	35.00	394 9.005	
M10 x 0,75	7.00	5.50	9.20	90.00	11.00	35.00	394 10.004	
M10 x 1	7.00	5.50	9.00	90.00	11.00	35.00	394 10.005	4628 10.005
M10 x 1,25	7.00	5.50	8.80	100.00	14.00	39.00	394 10.006	4628 10.006
M11 x 1	8.00	6.20	10.00	90.00	11.00	33.00	394 11.005	
M12 x 1	9.00	7.00	11.00	100.00	11.00	40.00	394 12.005	4628 12.005
M12 x 1,25	9.00	7.00	10.80	100.00	15.00	40.00	394 12.006	4628 12.006
M12 x 1,5	9.00	7.00	10.50	100.00	15.00	40.00	394 12.007	4628 12.007
M14 x 1	11.00	9.00	13.00	100.00	11.00	40.00	394 14.005	
M14 x 1,25	11.00	9.00	12.80	100.00	15.00	40.00	394 14.006	
M14 x 1,5	11.00	9.00	12.50	100.00	15.00	40.00	394 14.007	4628 14.007
M16 x 1	12.00	9.00	15.00	100.00	11.00	44.00	394 16.005	
M16 x 1,5	12.00	9.00	14.50	100.00	15.00	44.00	394 16.007	4628 16.007
M18 x 1	14.00	11.00	17.00	110.00	12.00	44.00	394 18.005	
M18 x 1,5	14.00	11.00	16.50	110.00	16.00	44.00	394 18.007	4628 18.007
M18 x 2	14.00	11.00	16.00	125.00	20.00	58.00	394 18.008	
M20 x 1	16.00	12.00	19.00	125.00	12.00	44.00	394 20.005	
M20 x 1,5	16.00	12.00	18.50	125.00	16.00	44.00	394 20.007	4628 20.007
M20 x 2	16.00	12.00	18.00	140.00	20.00	60.00	394 20.008	
M22 x 1	18.00	14.50	21.00	125.00	12.00	44.00	394 22.005	
M22 x 1,5	18.00	14.50	20.50	125.00	16.00	44.00	394 22.007	
M22 x 2	18.00	14.50	20.00	140.00	22.00	62.00	394 22.008	
M24 x 1	18.00	14.50	23.00	140.00	15.00	48.00	394 24.005	
M24 x 1,5	18.00	14.50	22.50	140.00	16.00	48.00	394 24.007	4628 24.007
M24 x 2	18.00	14.50	22.00	140.00	22.00	48.00	394 24.008	



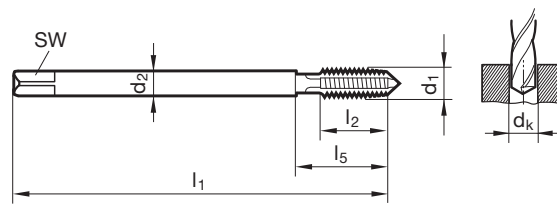
Taps for ISO metric fine threads



P	•
M	•
K	○
N	○
S	○
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E	
Tolerance on Ø	6HX	6GX
Surface	S	S
Type	VA	VA
Form	B	B
Internal cooling		



Threading tools

DIN 2184-1 DIN 374 Article no. **4219** **4641**

d1	d2	SW	dk	l1	l2	l5	Order no.	
	mm	mm	mm	mm	mm	mm		
M3 x 0,35	2.20	1.80	2.65	56.00	7.00	18.00	4219 3.002	
M4 x 0,35	2.80	2.10	3.65	63.00	8.00	21.00	4219 4.002	
M4 x 0,5	2.80	2.10	3.50	63.00	8.00	21.00	4219 4.003	
M5 x 0,5	3.50	2.70	4.50	70.00	10.00	25.00	4219 5.003	
M6 x 0,5	4.50	3.40	5.50	80.00	13.00	30.00	4219 6.003	
M6 x 0,75	4.50	3.40	5.20	80.00	13.00	30.00	4219 6.004	4641 6.004
M8 x 0,75	6.00	4.90	7.20	80.00	14.00	30.00	4219 8.004	4641 8.004
M8 x 1	6.00	4.90	7.00	90.00	17.00	35.00	4219 8.005	4641 8.005
M9 x 1	7.00	5.50	8.00	90.00	16.00	35.00	4219 9.005	
M10 x 0,75	7.00	5.50	9.20	90.00	16.00	35.00	4219 10.004	
M10 x 1	7.00	5.50	9.00	90.00	16.00	35.00	4219 10.005	4641 10.005
M10 x 1,25	7.00	5.50	8.80	100.00	20.00	39.00	4219 10.006	4641 10.006
M11 x 1	8.00	6.20	10.00	90.00	20.00	33.00	4219 11.005	
M12 x 1	9.00	7.00	11.00	100.00	20.00	40.00	4219 12.005	4641 12.005
M12 x 1,25	9.00	7.00	10.80	100.00	20.00	40.00	4219 12.006	4641 12.006
M12 x 1,5	9.00	7.00	10.50	100.00	20.00	40.00	4219 12.007	4641 12.007
M14 x 1	11.00	9.00	13.00	100.00	20.00	40.00	4219 14.005	
M14 x 1,25	11.00	9.00	12.80	100.00	20.00	40.00	4219 14.006	
M14 x 1,5	11.00	9.00	12.50	100.00	20.00	40.00	4219 14.007	4641 14.007
M16 x 1	12.00	9.00	15.00	100.00	22.00	44.00	4219 16.005	
M16 x 1,5	12.00	9.00	14.50	100.00	22.00	44.00	4219 16.007	4641 16.007
M18 x 1	14.00	11.00	17.00	110.00	25.00	44.00	4219 18.005	
M18 x 1,5	14.00	11.00	16.50	110.00	25.00	44.00	4219 18.007	4641 18.007
M18 x 2	14.00	11.00	16.00	125.00	30.00	58.00	4219 18.008	
M20 x 1	16.00	12.00	19.00	125.00	25.00	44.00	4219 20.005	
M20 x 1,5	16.00	12.00	18.50	125.00	25.00	44.00	4219 20.007	4641 20.007
M20 x 2	16.00	12.00	18.00	140.00	32.00	60.00	4219 20.008	
M22 x 1	18.00	14.50	21.00	125.00	25.00	44.00	4219 22.005	
M22 x 1,5	18.00	14.50	20.50	125.00	25.00	44.00	4219 22.007	
M22 x 2	18.00	14.50	20.00	140.00	32.00	62.00	4219 22.008	
M24 x 1	18.00	14.50	23.00	140.00	28.00	48.00	4219 24.005	
M24 x 1,5	18.00	14.50	22.50	140.00	28.00	48.00	4219 24.007	4641 24.007
M24 x 2	18.00	14.50	22.00	140.00	28.00	48.00	4219 24.008	

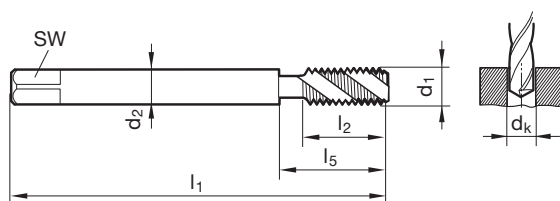
Taps for BSP threads



P	•
M	•
K	○
N	○
S	○
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E
Tolerance on Ø	
Surface	A
Type	VA R45
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 5156

Article no.

395

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	G/inch	mm	mm	mm	mm	mm	mm	
G1/16	28	6.00	4.90	6.80	90.00	11.00	30.00	395 7.723
G1/8	28	7.00	5.50	8.80	90.00	11.00	35.00	395 9.728
G1/4	19	11.00	9.00	11.80	100.00	14.00	40.00	395 13.157
G3/8	19	12.00	9.00	15.25	100.00	14.00	44.00	395 16.662
G1/2	14	16.00	12.00	19.00	125.00	18.00	44.00	395 20.955
G5/8	14	18.00	14.50	21.00	125.00	18.00	48.00	395 22.911
G3/4	14	20.00	16.00	24.50	140.00	20.00	53.00	395 26.441
G7/8	14	22.00	18.00	28.25	150.00	22.00	53.00	395 30.201
G1	11	25.00	20.00	30.75	160.00	24.00	56.00	395 33.249



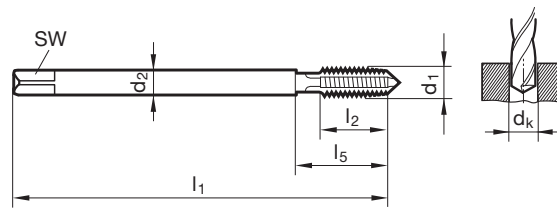
Taps for BSP threads



P	•
M	•
K	○
N	○
S	○
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E
Tolerance on Ø	
Surface	S
Type	VA
Form	B
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 5156								Article no.	4220
d1	P	d2	SW	dk	l1	l2	l5	Order no.	
	G/inch	mm	mm	mm	mm	mm	mm		
G1/16	28	6.00	4.90	6.80	90.00	18.00	30.00	4220 7.723	
G1/8	28	7.00	5.50	8.80	90.00	18.00	35.00	4220 9.728	
G1/4	19	11.00	9.00	11.80	100.00	20.00	40.00	4220 13.157	
G3/8	19	12.00	9.00	15.25	100.00	22.00	44.00	4220 16.662	
G1/2	14	16.00	12.00	19.00	125.00	25.00	44.00	4220 20.955	
G5/8	14	18.00	14.50	21.00	125.00	25.00	48.00	4220 22.911	
G3/4	14	20.00	16.00	24.50	140.00	28.00	53.00	4220 26.441	
G7/8	14	22.00	18.00	28.25	150.00	28.00	53.00	4220 30.201	
G1	11	25.00	20.00	30.75	160.00	30.00	56.00	4220 33.249	

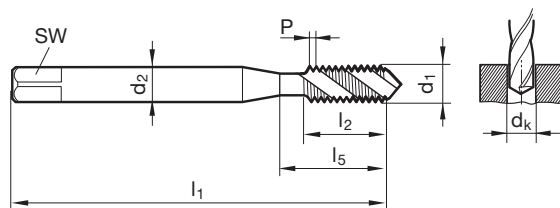
Taps for ISO metric threads



P ≤ 1200 You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

M	
K	
N	
S	
H	

Tool material	HSS-E
Tolerance on Ø	ISO2/6H
Surface	C
Type	H R40
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 371

Article no.

1916

d1	P	d2	SW	dk	l1	l2	l5	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	
M2	0.400	2.80	2.10	1.60	45.00	4.50	13.50	1916 2.000
M3	0.500	3.50	2.70	2.50	56.00	6.00	18.00	1916 3.000
M3,5	0.600	4.00	3.00	2.90	56.00	7.00	20.00	1916 3.500
M4	0.700	4.50	3.40	3.30	63.00	7.50	21.00	1916 4.000
M5	0.800	6.00	4.90	4.20	70.00	8.50	25.00	1916 5.000
M6	1.000	6.00	4.90	5.00	80.00	11.00	30.00	1916 6.000
M7	1.000	7.00	5.50	6.00	80.00	11.00	30.00	1916 7.000
M8	1.250	8.00	6.20	6.80	90.00	14.00	35.00	1916 8.000
M10	1.500	10.00	8.00	8.50	100.00	16.00	39.00	1916 10.000



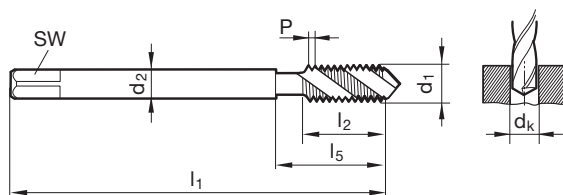
Taps for ISO metric threads



P	≤ 1200
M	
K	
N	
S	
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E
Tolerance on Ø	ISO2/6H
Surface	C
Type	H R40
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 376

Article no.

1917

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M3	0.500	2.20	1.80	2.50	56.00	6.00	18.00	1917 3.000
M4	0.700	2.80	2.10	3.30	63.00	7.50	21.00	1917 4.000
M5	0.800	3.50	2.70	4.20	70.00	8.50	25.00	1917 5.000
M6	1.000	4.50	3.40	5.00	80.00	11.00	30.00	1917 6.000
M8	1.250	6.00	4.90	6.80	90.00	14.00	35.00	1917 8.000
M10	1.500	7.00	5.50	8.50	100.00	16.00	39.00	1917 10.000
M12	1.750	9.00	7.00	10.20	110.00	18.50	49.00	1917 12.000
M14	2.000	11.00	9.00	12.00	110.00	20.00	53.00	1917 14.000
M16	2.000	12.00	9.00	14.00	110.00	20.00	54.00	1917 16.000
M18	2.500	14.00	11.00	15.50	125.00	25.00	62.00	1917 18.000
M20	2.500	16.00	12.00	17.50	140.00	25.00	62.00	1917 20.000
M22	2.500	18.00	14.50	19.50	140.00	27.00	62.00	1917 22.000
M24	3.000	18.00	14.50	21.00	160.00	30.00	73.00	1917 24.000
M30	3.500	22.00	18.00	26.50	180.00	35.00	85.00	1917 30.000

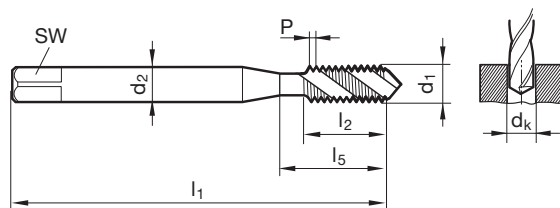
Taps for ISO metric threads



P ≤ 1200 You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

M	
K	
N	
S	
H	

Tool material	HSS-E-PM
Tolerance on Ø	ISO2/6H
Surface	A
Type	H R15
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 371

Article no.

1577

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M3	0.500	3.50	2.70	2.50	56.00	6.00	18.00	1577 3.000
M4	0.700	4.50	3.40	3.30	63.00	7.50	21.00	1577 4.000
M5	0.800	6.00	4.90	4.20	70.00	8.50	25.00	1577 5.000
M6	1.000	6.00	4.90	5.00	80.00	11.00	30.00	1577 6.000
M8	1.250	8.00	6.20	6.80	90.00	14.00	35.00	1577 8.000
M10	1.500	10.00	8.00	8.50	100.00	16.00	39.00	1577 10.000



Taps for ISO metric threads



P ≤ 1200 You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

M

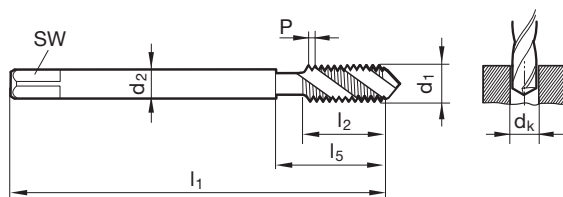
K

N

S

H

Tool material	HSS-E-PM
Tolerance on Ø	ISO2/6H
Surface	A
Type	H R15
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 376 Article no. **1578**

d1	P	d2	SW	dk	l1	l2	l5	Order no.
mm	mm	mm	mm	mm	mm	mm	mm	
M12	1.750	9.00	7.00	10.20	110.00	18.50	49.00	1578 12.000
M16	2.000	12.00	9.00	14.00	110.00	20.00	54.00	1578 16.000
M20	2.500	16.00	12.00	17.50	140.00	25.00	62.00	1578 20.000

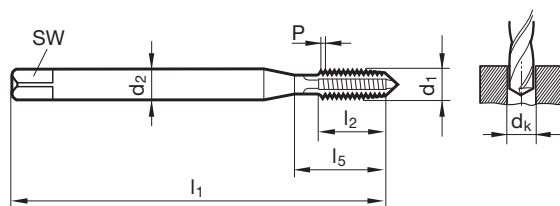
Taps for ISO metric threads



P ≤ 1200 You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

M	
K	
N	
S	
H	

Tool material	HSS-E
Tolerance on Ø	ISO2/6H
Surface	C
Type	H
Form	B
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 371

Article no.

1914

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M2,2	0.450	2.80	2.10	1.75	45.00	9.00	14.50	1914 2.200
M2,3	0.400	2.80	2.10	1.90	45.00	9.00	14.50	1914 2.300
M2	0.400	2.80	2.10	1.60	45.00	8.00	13.50	1914 2.000
M2,5	0.450	2.80	2.10	2.05	50.00	9.00	14.50	1914 2.500
M2,6	0.450	2.80	2.10	2.15	50.00	9.00	14.50	1914 2.600
M3	0.500	3.50	2.70	2.50	56.00	10.00	18.00	1914 3.000
M3,5	0.600	4.00	3.00	2.90	56.00	12.00	20.00	1914 3.500
M4	0.700	4.50	3.40	3.30	63.00	12.00	21.00	1914 4.000
M5	0.800	6.00	4.90	4.20	70.00	14.00	25.00	1914 5.000
M6	1.000	6.00	4.90	5.00	80.00	16.00	30.00	1914 6.000
M8	1.250	8.00	6.20	6.80	90.00	17.00	35.00	1914 8.000
M10	1.500	10.00	8.00	8.50	100.00	20.00	39.00	1914 10.000



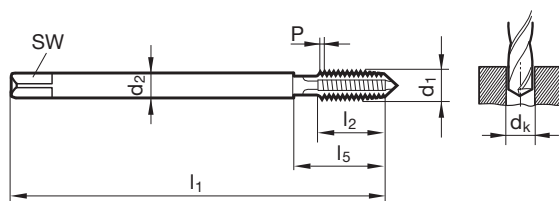
Taps for ISO metric threads



P	≤ 1200
M	
K	
N	
S	
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E
Tolerance on Ø	ISO2/6H
Surface	C
Type	H
Form	B
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 376

Article no.

1915

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	mm	mm	mm	mm	mm	mm	mm	
M3	0.500	2.20	1.80	2.50	56.00	10.00	18.00	1915 3.000
M4	0.700	2.80	2.10	3.30	63.00	12.00	21.00	1915 4.000
M5	0.800	3.50	2.70	4.20	70.00	14.00	25.00	1915 5.000
M6	1.000	4.50	3.40	5.00	80.00	16.00	30.00	1915 6.000
M8	1.250	6.00	4.90	6.80	90.00	17.00	35.00	1915 8.000
M10	1.500	7.00	5.50	8.50	100.00	20.00	39.00	1915 10.000
M12	1.750	9.00	7.00	10.20	110.00	24.00	49.00	1915 12.000
M14	2.000	11.00	9.00	12.00	110.00	26.00	53.00	1915 14.000
M16	2.000	12.00	9.00	14.00	110.00	26.00	54.00	1915 16.000
M18	2.500	14.00	11.00	15.50	125.00	30.00	62.00	1915 18.000
M20	2.500	16.00	12.00	17.50	140.00	32.00	62.00	1915 20.000
M24	3.000	18.00	14.50	21.00	160.00	36.00	73.00	1915 24.000

Taps for NPT threads

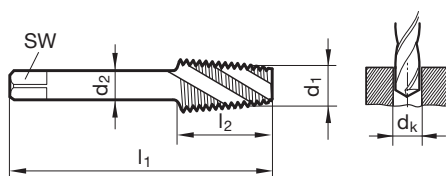


P ≤ 1000 You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

M	•
K	○
N	○
S	
H	

Tool material	HSS-E
Tolerance on Ø	
Surface	S
Type	N
Form	C
Internal cooling	

Threading tools



Company std.	Article no.	1088
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d1	P	d2	SW	dk	l1	l2	Order no.
	G/inch	mm	mm	mm	mm	mm	
1/16	27	8.00	6.20	6.25	90.00	14.00	1088 8.190
1/8	27	11.00	9.00	8.50	90.00	15.00	1088 10.620
1/4	18	14.00	11.00	11.20	100.00	21.00	1088 14.140
3/8	18	16.00	12.00	14.40	110.00	21.00	1088 17.570
1/2	14	18.00	14.50	18.00	125.00	27.00	1088 21.900
3/4	14	22.00	18.00	23.40	140.00	27.00	1088 27.230
1	11	25.00	20.00	29.10	170.00	32.00	1088 34.180

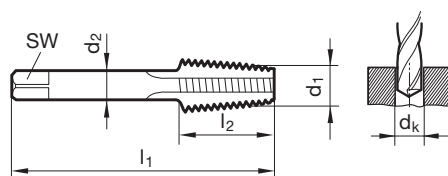


Taps for Rc (BSPT) threads



P	≤ 1200	You can find the cutting data in our online navigator at https://webnavigator.guehring.de .
M		
K	•	
N	≥ 7	
S		
H		

Tool material	HSS-E-PM
Tolerance on Ø	
Surface	A
Type	H
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 5156 Article no. **4683**

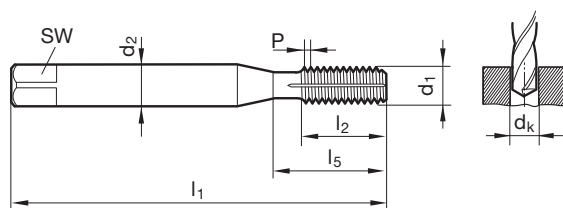
D	P	d2	SW	dk	l1	l2	l5	Order no.
	G/inch							
Rc1/8	28	7.00	5.50	8.20	90.00	18.00	35.00	4683 9.728
Rc1/4	19	11.00	9.00	10.85	100.00	20.00	40.00	4683 13.157
Rc3/8	19	12.00	9.00	14.30	100.00	22.00	44.00	4683 16.662
Rc1/2	14	16.00	12.00	17.80	125.00	25.00	44.00	4683 20.955
Rc3/4	14	20.00	16.00	23.20	140.00	28.00	53.00	4683 26.441
Rc1	11	25.00	20.00	29.20	160.00	30.00	56.00	4683 33.249

Fluteless taps for ISO metric threads



- P** • You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>
- M** •
- K** •
- N** ○
- S** •
- H** □

Tool material	HSS-E-PM	
Tolerance on Ø	4HX/6HX	6GX
Surface	Ⓢ	Ⓢ
Type	N	N
Form	C	C
Internal cooling	☒	☒



Threading tools

DIN 2174 ~DIN 371/~DIN 376

Article no. 4487 4488

d1	P	d2	SW	dk	l1	l2	l5	Order no.	
mm	mm	mm	mm	mm	mm	mm	mm		
M1	0.250	2.50	2.10	0.90	40.00	4.00	4.00	4487 1.000	
M1,2	0.250	2.50	2.10	1.10	40.00	4.80	4.80	4487 1.200	
M1,4	0.300	2.50	2.10	1.25	40.00	5.60	5.60	4487 1.400	
M1,6	0.350	2.50	2.10	1.45	40.00	6.40	6.40	4487 1.600	
M1,7	0.350	2.50	2.10	1.55	40.00	6.80	6.80	4487 1.700	
M1,8	0.350	2.50	2.10	1.65	40.00	7.30	7.30	4487 1.800	
M2	0.400	2.80	2.10	1.85	45.00	8.00	13.50	4487 2.000	4488 2.000
M2,5	0.450	2.80	2.10	2.30	50.00	9.00	14.50	4487 2.500	4488 2.500
M3	0.500	3.50	2.70	2.80	56.00	10.00	18.00	4487 3.000	4488 3.000
M3,5	0.600	4.00	3.00	3.25	56.00	12.00	20.00	4487 3.500	
M4	0.700	4.50	3.40	3.70	63.00	12.00	21.00	4487 4.000	4488 4.000
M4,5	0.750	6.00	4.90	4.20	70.00	14.00	25.00	4487 4.500	
M5	0.800	6.00	4.90	4.65	70.00	14.00	25.00	4487 5.000	4488 5.000
M6	1.000	6.00	4.90	5.55	80.00	16.00	30.00	4487 6.000	4488 6.000
M7	1.000	7.00	5.50	6.55	80.00	16.00	30.00	4487 7.000	
M8	1.250	8.00	6.20	7.40	90.00	17.00	35.00	4487 8.000	4488 8.000
M9	1.250	9.00	7.00	8.40	90.00	17.00	35.00	4487 9.000	
M10	1.500	10.00	8.00	9.30	100.00	20.00	39.00	4487 10.000	4488 10.000
M11	1.500	8.00	6.20	10.30	100.00	20.00	42.00	4487 11.000	
M12	1.750	9.00	7.00	11.20	110.00	24.00	49.00	4487 12.000	4488 12.000
M14	2.000	11.00	9.00	13.10	110.00	26.00	53.00	4487 14.000	4488 14.000
M16	2.000	12.00	9.00	15.10	110.00	26.00	54.00	4487 16.000	4488 16.000
M20	2.500	16.00	12.00	18.90	140.00	32.00	62.00	4487 20.000	4488 20.000

Article no. 4487 from Ø M2 with oil grooves, Ø tolerance ≤ M1.4 = 4HX



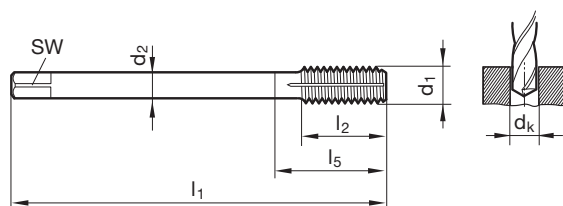
Fluteless taps for ISO metric fine threads



P	•
M	•
K	•
N	○
S	•
H	

You can find the cutting data in our online navigator at <https://webnavigator.guehring.de>.

Tool material	HSS-E-PM	
Tolerance on Ø	6HX	6GX
Surface	Ⓢ	Ⓢ
Type	N	N
Form	C	C
Internal cooling	⊗	⊗



Threading tools

DIN 2174 ~DIN 374 Article no. 4489 4490

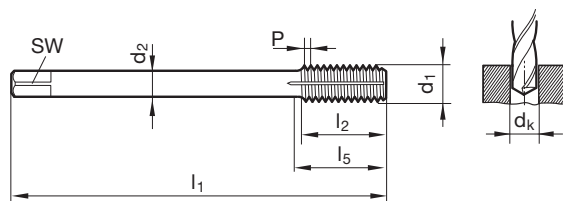
d1	d2	SW	dk	l1	l2	l5	Order no.	
	mm	mm	mm	mm	mm	mm		
M3 x 0,35	2.20	1.80	2.85	56.00	7.00	18.00	4489 3.002	
M4 x 0,35	2.80	2.10	3.85	63.00	8.00	21.00	4489 4.002	
M4 x 0,5	2.80	2.10	3.80	63.00	8.00	21.00	4489 4.003	
M5 x 0,5	3.50	2.70	4.80	70.00	10.00	25.00	4489 5.003	
M6 x 0,5	4.50	3.40	5.75	80.00	13.00	30.00	4489 6.003	
M6 x 0,75	4.50	3.40	5.65	80.00	13.00	30.00	4489 6.004	
M8 x 0,75	6.00	4.90	7.65	80.00	14.00	30.00	4489 8.004	
M8 x 1	6.00	4.90	7.55	90.00	17.00	35.00	4489 8.005	4490 8.005
M9 x 1	7.00	5.50	8.55	90.00	16.00	35.00	4489 9.005	
M10 x 0,75	7.00	5.50	9.65	90.00	16.00	35.00	4489 10.004	
M10 x 1	7.00	5.50	9.55	90.00	16.00	35.00	4489 10.005	4490 10.005
M10 x 1,25	7.00	5.50	9.40	100.00	20.00	39.00	4489 10.006	4490 10.006
M11 x 1	8.00	6.20	10.55	90.00	20.00	33.00	4489 11.005	
M12 x 1	9.00	7.00	11.55	100.00	20.00	40.00	4489 12.005	
M12 x 1,25	9.00	7.00	11.40	100.00	20.00	40.00	4489 12.006	4490 12.006
M12 x 1,5	9.00	7.00	11.30	100.00	20.00	40.00	4489 12.007	4490 12.007
M14 x 1	11.00	9.00	13.55	100.00	20.00	40.00	4489 14.005	
M14 x 1,25	11.00	9.00	13.40	100.00	20.00	40.00	4489 14.006	4490 14.006
M14 x 1,5	11.00	9.00	13.30	100.00	20.00	40.00	4489 14.007	4490 14.007
M16 x 1	12.00	9.00	15.55	100.00	22.00	44.00	4489 16.005	
M16 x 1,5	12.00	9.00	15.30	100.00	22.00	44.00	4489 16.007	4490 16.007
M18 x 1	14.00	11.00	17.55	110.00	25.00	44.00	4489 18.005	
M18 x 1,5	14.00	11.00	17.30	110.00	25.00	44.00	4489 18.007	
M18 x 2	14.00	11.00	17.10	125.00	30.00	58.00	4489 18.008	
M20 x 1	16.00	12.00	19.55	125.00	25.00	44.00	4489 20.005	
M20 x 1,5	16.00	12.00	19.30	125.00	25.00	44.00	4489 20.007	4490 20.007
M20 x 2	16.00	12.00	19.10	140.00	32.00	60.00	4489 20.008	
M22 x 1	18.00	14.50	21.55	125.00	25.00	44.00	4489 22.005	
M22 x 1,5	18.00	14.50	21.30	125.00	25.00	44.00	4489 22.007	
M22 x 2	18.00	14.50	21.10	140.00	32.00	62.00	4489 22.008	
M24 x 1	18.00	14.50	23.55	140.00	28.00	48.00	4489 24.005	
M24 x 1,5	18.00	14.50	23.30	140.00	28.00	48.00	4489 24.007	
M24 x 2	18.00	14.50	23.10	140.00	28.00	48.00	4489 24.008	

Fluteless taps for BSP threads



P	•	You can find the cutting data in our online navigator at https://webnavigator.guehring.de .
M	•	
K	•	
N	○	
S	•	
H		

Tool material	HSS-E-PM
Tolerance on Ø	
Surface	C
Type	N
Form	C
Internal cooling	<input checked="" type="checkbox"/>



Threading tools

DIN 2184-1 DIN 2189

Article no. **4493**

d1	P	d2	SW	dk	l1	l2	l5	Order no.
	G/inch	mm	mm	mm	mm	mm	mm	
G1/8	28	7.00	5.50	9.30	90.00	18.00	35.00	4493 9.728
G1/4	19	11.00	9.00	12.50	100.00	20.00	40.00	4493 13.157
G3/8	19	12.00	9.00	16.00	100.00	22.00	44.00	4493 16.662
G1/2	14	16.00	12.00	20.00	125.00	25.00	44.00	4493 20.955



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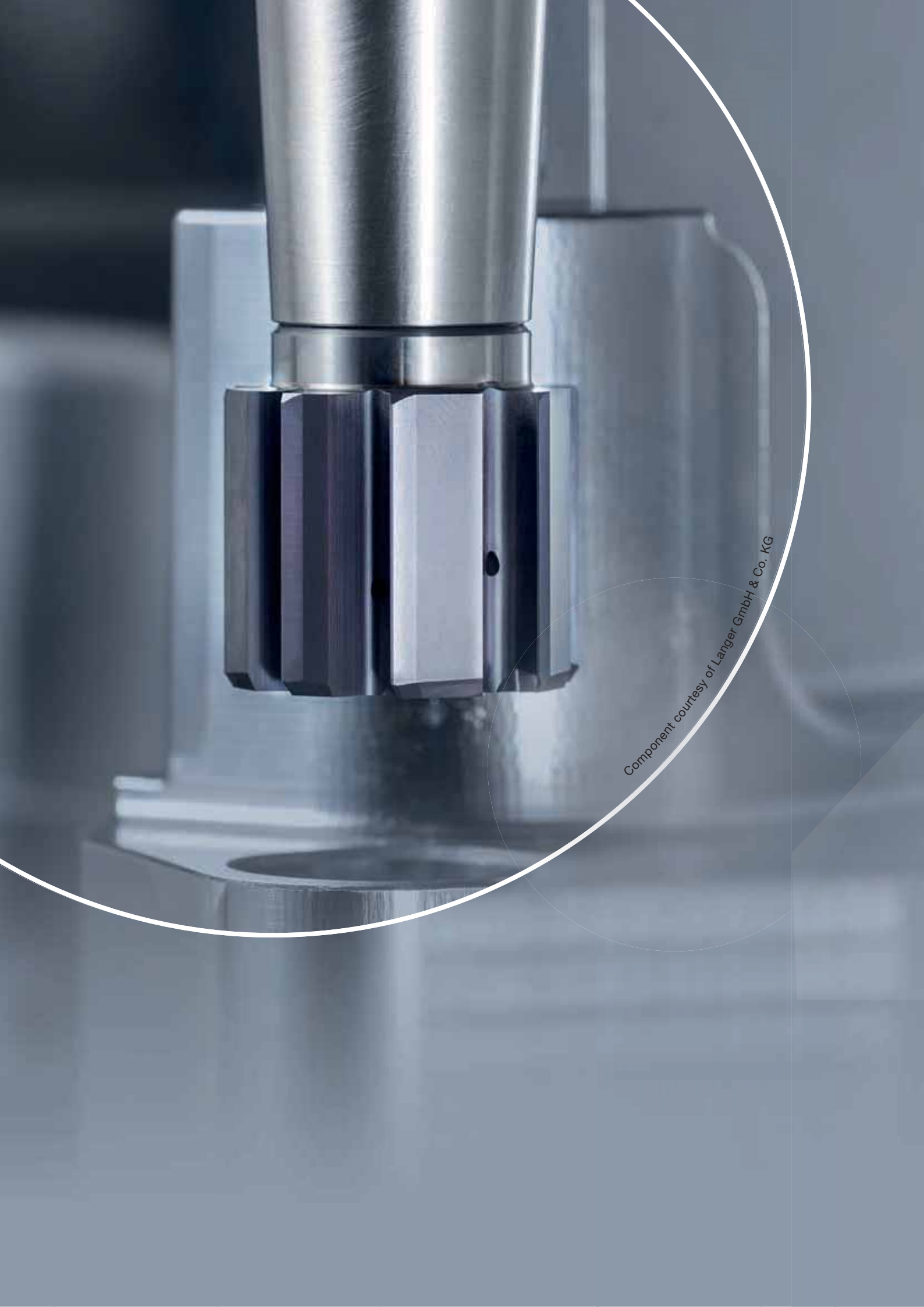
The Gühring Online Academy is available round the clock.
You decide when and where you would like to study.



Benefit from application recommendations directly from the tool manufacturer.



The Gühring Academy is free of charge. Register now!



Component courtesy of Langer GmbH & Co. KG

REAMING & COUNTER- SINKING

4

Solid carbide reamers

P. 388

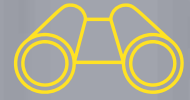
HSS reamers

P. 407

Countersinks

P. 415

REAMING & COUNTERSINKING OVERVIEW



Solid carbide reamers



- ▶ High-performance reaming in both high-strength and hardened tool steels of H7 fits or 0.01 over/undersizes with perfect surfaces. Time-saving and reliable with internal cooling for the highest cutting values and perfect chip removal in blind and through-holes. Many dimensions and lengths available as standard. Excess lengths for large machining depths can be flexibly achieved with our HR 500 T and various shrink extensions.

HSS reamers



- ▶ Universal reaming of H7 fits or 0.01 over/undersizes in tool steels and many other materials. Can be used on NC and conventional machines without internal cooling. Many dimensions are available with cylindrical shank and morse taper adaptor as standard.

Countersinks



- ▶ SpyroTec spiral countersinks are used to produce perfectly round, rattle-free countersinks with 60°, 82° and 90°. Thanks to reduced cutting forces, even large countersinks can be produced with manual machines. Extra-long versions enable bridging of interfering contours and machining of deeper recesses.



P. 388



P. 407



P. 415



Reaming and countersinking
tools



P	M	K	N	S	H	Tool illustration	Shank form	Hardness	Standard	Form	Cutting direction	Tool material	Surface	d1/mm	Article no.	Page
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High-performance reamers

•	•	○	•	•			HA	65 HRC	WN		R	VHM	a	2.000 - 20.000	1685	388
•	•	○	•	•			HA	65 HRC	WN		R	VHM	a	2.000 - 20.000	1686	389
•	•	○	•	•			HA	65 HRC	WN		R	VHM	a	1.970 - 12.030	1675	390
•	•	○	•	•			HA	65 HRC	WN		R	VHM	a	1.970 - 12.030	1676	392
•	•	○	•	•			HA	65 HRC	WN		R	VHM	a	14.000 - 42.000	1548	394
•	•	○	•	•			HA	65 HRC	WN		R	VHM	a	14.000 - 42.000	1549	395
•	•	•	○	○	○		HA	48 HRC	WN		R	HM	a	22.000 - 40.000	1680	396
•	•	•	○	○	○		HA	48 HRC	WN		R	HM	a	22.000 - 40.000	1681	397

NC machine reamers

Reaming and countersinking tools

•	○	•	○	○			HA	48 HRC	WN	B	R	VHM	○	3.000 - 20.000	6016	400
•	•	•	•	•			HA	55 HRC	WN	B	R	VHM	a	3.000 - 20.000	6017	401
•	○	•	○	○			HA	48 HRC	WN	B	R	VHM	○	0.980 - 12.050	5527	402
•	•	•	•	•			HA	55 HRC	WN	B	R	VHM	a	0.980 - 12.050	6018	404

Machine reamers

•	○	•	•	○			MK	48 HRC	~DIN 8094	B	R	HM	○	5.000 - 40.000	1411	406
---	---	---	---	---	--	--	----	--------	-----------	---	---	----	---	----------------	------	-----

NC machine reamers

•	○	•	•	○			HA		DIN 212-3	B	R	HSS-E	○	1.500 - 20.000	6019	407
•	○	•	•	○			HA		DIN 212-3	B	R	HSS-E	○	1.000 - 12.030	6020	408

Machine reamers

•	○	•	•	•			MK		DIN 208	B	R	HSS-E	○	3.000 - 50.000	405	410
---	---	---	---	---	--	--	----	--	---------	---	---	-------	---	----------------	-----	-----

Hand reamers

•	•	•	•	•			Cyl		DIN 206	B	R	HSS	○	1.000 - 60.000	413	412
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P	M	K	N	S	H	Tool illustration	Shank form	Standard	Form	Cutting direction	Tool material	Surface	d1/mm	Article no.	Page
90° Countersinks, spiral-fluted															
•	•	•	○	○			Cyl	DIN 335	C	R	HSCO	A	6.300 - 40.000	5500	415
•	•	•	○	○			3	DIN 335	C	R	HSCO	A	6.300 - 40.000	5501	416
•	○	•	○	○			Cyl	WN	C	R	HSS	A	6.300 - 31.000	5503	417
90° Countersink sets, spiral-fluted															
•	•	•	○	○			Cyl	DIN 335	C	R	HSCO	A		5538	418
•	•	•	○	○			3	DIN 335	C	R	HSCO	A		5539	419
60° Countersinks, spiral-fluted															
•	•	•	○	○			Cyl	DIN 334	C	R	HSS	A	6.300 - 25.000	5670	420
•	•	•	○	○			3	DIN 334	C	R	HSS	A	6.300 - 25.000	5671	421
60° Countersink sets, spiral-fluted															
•	•	•	○	○			Cyl	DIN 334	C	R	HSS	A		5672	422
•	•	•	○	○			3	DIN 334	C	R	HSS	A		5673	423
82° Countersinks, spiral-fluted															
•	•	•	○	○			Cyl	WN	C	R	HSCO	A	6.350 - 31.750	5674	424

Reaming and countersinking tools



P	M	K	N	S	H	Tool illustration	Shank form	Standard	Form	Cutting direction	Tool material	Surface	d1/mm	Article no.	Page
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82° Countersinks, spiral-fluted

•	•	•	○	○			3	WN	C	R	HSCO	A	6.350 - 31.750	5675	425
---	---	---	---	---	--	--	---	----	---	---	------	---	----------------	------	-----

82° Countersink sets, spiral-fluted

•	•	•	○	○			Cyl	WN	C	R	HSCO	A		5676	426
---	---	---	---	---	--	--	-----	----	---	---	------	---	--	------	-----

•	•	•	○	○			3	WN	C	R	HSCO	A		5677	427
---	---	---	---	---	--	--	---	----	---	---	------	---	--	------	-----

Reaming and countersinking tools

HR 500

High-performance reaming up to 65 HRC

- + universally usable in unhardened and hardened materials up to 65 HRC*
- + create perfect fits with process reliability*
- + High-performance reaming with internal cooling in H7 tolerance or in 0.01 increments possible*



High-performance reamers

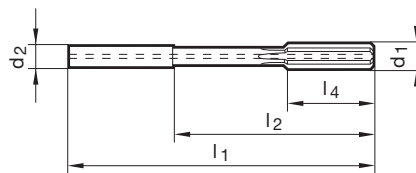


P	•	• with axial coolant duct • for clamping in hydraulic chucks or shrink fit chucks
M	•	
K	○	
N		
S	•	
H	•	

GÜHRING NAVIGATOR

Cutting data page 428

Tool material	Solid carbide
Surface	a
Form	
Type	HR 500 S



Article no. 1685

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
2.000	4.000	50.000	22.000	8.000	4	1685 2.000
2.500	4.000	50.000	22.000	8.000	4	1685 2.500
3.000	4.000	68.000	40.000	12.000	4	1685 3.000
3.500	4.000	68.000	40.000	12.000	4	1685 3.500
4.000	4.000	68.000	40.000	12.000	4	1685 4.000
4.500	6.000	76.000	40.000	12.000	4	1685 4.500
5.000	6.000	76.000	40.000	12.000	4	1685 5.000
5.500	6.000	76.000	40.000	12.000	4	1685 5.500
6.000	6.000	76.000	40.000	12.000	4	1685 6.000
6.500	8.000	101.000	65.000	16.000	6	1685 6.500
7.000	8.000	101.000	65.000	16.000	6	1685 7.000
7.500	8.000	101.000	65.000	16.000	6	1685 7.500
8.000	8.000	101.000	65.000	16.000	6	1685 8.000
8.500	10.000	101.000	61.000	19.000	6	1685 8.500
9.000	10.000	101.000	61.000	19.000	6	1685 9.000
9.500	10.000	101.000	61.000	19.000	6	1685 9.500
10.000	10.000	101.000	61.000	19.000	6	1685 10.000
10.500	12.000	130.000	85.000	19.000	6	1685 10.500
11.000	12.000	130.000	85.000	19.000	6	1685 11.000
11.500	12.000	130.000	85.000	19.000	6	1685 11.500
12.000	12.000	130.000	85.000	19.000	6	1685 12.000
13.000	14.000	130.000	85.000	22.000	6	1685 13.000
14.000	14.000	130.000	85.000	22.000	6	1685 14.000
15.000	16.000	150.000	102.000	22.000	6	1685 15.000
16.000	16.000	150.000	102.000	22.000	6	1685 16.000
17.000	18.000	150.000	102.000	25.000	6	1685 17.000
18.000	18.000	150.000	102.000	25.000	6	1685 18.000
19.000	20.000	150.000	100.000	25.000	6	1685 19.000
20.000	20.000	150.000	100.000	25.000	6	1685 20.000

Reaming tools



High-performance reamers



P	•	• \varnothing 2.950 with axial, off-centre coolant ducts through the shank
M	•	• $\geq \varnothing$ 2.950 with longitudinal flutes on the shank for coolant supply
K	○	• for clamping in hydraulic chucks or shrink fit chucks
N		
S	•	
H	•	

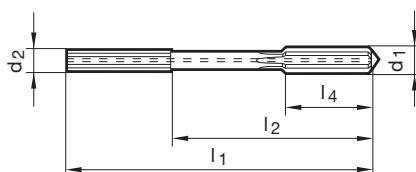
Tool material **Solid carbide**Surface **a**

Form

Type HR 500 D

GÜHRING NAVIGATOR

Cutting data page 428

Article no. **1686**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
2.000	4.000	50.000	22.000	8.000	4	1686 2.000
2.500	4.000	50.000	22.000	8.000	4	1686 2.500
3.000	4.000	68.000	40.000	12.000	4	1686 3.000
3.500	4.000	68.000	40.000	12.000	4	1686 3.500
4.000	4.000	68.000	40.000	12.000	4	1686 4.000
4.500	6.000	76.000	40.000	12.000	4	1686 4.500
5.000	6.000	76.000	40.000	12.000	4	1686 5.000
5.500	6.000	76.000	40.000	12.000	4	1686 5.500
6.000	6.000	76.000	40.000	12.000	4	1686 6.000
6.500	8.000	101.000	65.000	16.000	6	1686 6.500
7.000	8.000	101.000	65.000	16.000	6	1686 7.000
7.500	8.000	101.000	65.000	16.000	6	1686 7.500
8.000	8.000	101.000	65.000	16.000	6	1686 8.000
8.500	10.000	101.000	61.000	19.000	6	1686 8.500
9.000	10.000	101.000	61.000	19.000	6	1686 9.000
9.500	10.000	101.000	61.000	19.000	6	1686 9.500
10.000	10.000	101.000	61.000	19.000	6	1686 10.000
10.500	12.000	130.000	85.000	19.000	6	1686 10.500
11.000	12.000	130.000	85.000	19.000	6	1686 11.000
11.500	12.000	130.000	85.000	19.000	6	1686 11.500
12.000	12.000	130.000	85.000	19.000	6	1686 12.000
13.000	14.000	130.000	85.000	22.000	6	1686 13.000
14.000	14.000	130.000	85.000	22.000	6	1686 14.000
15.000	16.000	150.000	102.000	22.000	6	1686 15.000
16.000	16.000	150.000	102.000	22.000	6	1686 16.000
17.000	18.000	150.000	102.000	25.000	6	1686 17.000
18.000	18.000	150.000	102.000	25.000	6	1686 18.000
19.000	20.000	150.000	100.000	25.000	6	1686 19.000
20.000	20.000	150.000	100.000	25.000	6	1686 20.000

Reaming tools

High-performance reamers

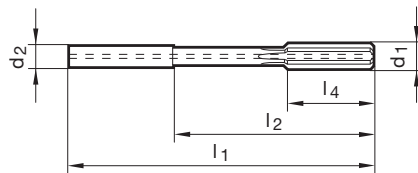


P	•	• with axial coolant duct • for clamping in hydraulic chucks or shrink fit chucks
M	•	
K	○	
N		
S	•	
H	•	

GÜHRING NAVIGATOR

Cutting data page 428

Tool material	Solid carbide
Surface	a
Form	
Type	HR 500 S



Article no. **1675**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
1.970	4.000	50.000	22.000	8.000	4	1675 1.970
1.980	4.000	50.000	22.000	8.000	4	1675 1.980
1.990	4.000	50.000	22.000	8.000	4	1675 1.990
2.000	4.000	50.000	22.000	8.000	4	1675 2.000
2.010	4.000	50.000	22.000	8.000	4	1675 2.010
2.020	4.000	50.000	22.000	8.000	4	1675 2.020
2.030	4.000	50.000	22.000	8.000	4	1675 2.030
2.970	4.000	68.000	40.000	12.000	4	1675 2.970
2.980	4.000	68.000	40.000	12.000	4	1675 2.980
2.990	4.000	68.000	40.000	12.000	4	1675 2.990
3.000	4.000	68.000	40.000	12.000	4	1675 3.000
3.010	4.000	68.000	40.000	12.000	4	1675 3.010
3.020	4.000	68.000	40.000	12.000	4	1675 3.020
3.030	4.000	68.000	40.000	12.000	4	1675 3.030
3.970	4.000	68.000	40.000	12.000	4	1675 3.970
3.980	4.000	68.000	40.000	12.000	4	1675 3.980
3.990	4.000	68.000	40.000	12.000	4	1675 3.990
4.000	4.000	68.000	40.000	12.000	4	1675 4.000
4.010	4.000	68.000	40.000	12.000	4	1675 4.010
4.020	4.000	68.000	40.000	12.000	4	1675 4.020
4.030	4.000	68.000	40.000	12.000	4	1675 4.030
4.970	6.000	76.000	40.000	12.000	4	1675 4.970
4.980	6.000	76.000	40.000	12.000	4	1675 4.980
4.990	6.000	76.000	40.000	12.000	4	1675 4.990
5.000	6.000	76.000	40.000	12.000	4	1675 5.000
5.010	6.000	76.000	40.000	12.000	4	1675 5.010
5.020	6.000	76.000	40.000	12.000	4	1675 5.020
5.030	6.000	76.000	40.000	12.000	4	1675 5.030
5.970	6.000	76.000	40.000	12.000	4	1675 5.970
5.980	6.000	76.000	40.000	12.000	4	1675 5.980
5.990	6.000	76.000	40.000	12.000	4	1675 5.990
6.000	6.000	76.000	40.000	12.000	4	1675 6.000
6.010	6.000	76.000	40.000	12.000	4	1675 6.010
6.020	6.000	76.000	40.000	12.000	4	1675 6.020
6.030	6.000	76.000	40.000	12.000	4	1675 6.030
7.000	8.000	101.000	65.000	16.000	6	1675 7.000

Reaming tools



Article no.

1675

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
7.970	8.000	101.000	65.000	16.000	6	1675 7.970
7.980	8.000	101.000	65.000	16.000	6	1675 7.980
7.990	8.000	101.000	65.000	16.000	6	1675 7.990
8.000	8.000	101.000	65.000	16.000	6	1675 8.000
8.010	8.000	101.000	65.000	16.000	6	1675 8.010
8.020	8.000	101.000	65.000	16.000	6	1675 8.020
8.030	8.000	101.000	65.000	16.000	6	1675 8.030
9.000	10.000	101.000	61.000	19.000	6	1675 9.000
9.970	10.000	101.000	61.000	19.000	6	1675 9.970
9.980	10.000	101.000	61.000	19.000	6	1675 9.980
9.990	10.000	101.000	61.000	19.000	6	1675 9.990
10.000	10.000	101.000	61.000	19.000	6	1675 10.000
10.010	10.000	101.000	61.000	19.000	6	1675 10.010
10.020	10.000	101.000	61.000	19.000	6	1675 10.020
10.030	10.000	101.000	61.000	19.000	6	1675 10.030
11.000	12.000	130.000	85.000	19.000	6	1675 11.000
11.970	12.000	130.000	85.000	19.000	6	1675 11.970
11.980	12.000	130.000	85.000	19.000	6	1675 11.980
11.990	12.000	130.000	85.000	19.000	6	1675 11.990
12.000	12.000	130.000	85.000	19.000	6	1675 12.000
12.010	12.000	130.000	85.000	19.000	6	1675 12.010
12.020	12.000	130.000	85.000	19.000	6	1675 12.020
12.030	12.000	130.000	85.000	19.000	6	1675 12.030

High-performance reamers

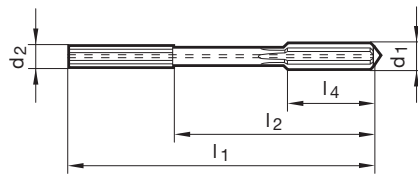


P	•	• $\lt; \varnothing 2.950$ with axial, off-centre coolant ducts through the shank
M	•	• >= $\varnothing 2.950$ with longitudinal flutes on the shank for coolant supply
K	○	• for clamping in hydraulic chucks or shrink fit chucks
N		
S	•	
H	•	

GÜHRING NAVIGATOR

Cutting data page 428

Tool material	Solid carbide
Surface	a
Form	
Type	HR 500 D



Article no. **1676**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
1.970	4.000	50.000	22.000	8.000	4	1676 1.970
1.980	4.000	50.000	22.000	8.000	4	1676 1.980
1.990	4.000	50.000	22.000	8.000	4	1676 1.990
2.000	4.000	50.000	22.000	8.000	4	1676 2.000
2.010	4.000	50.000	22.000	8.000	4	1676 2.010
2.020	4.000	50.000	22.000	8.000	4	1676 2.020
2.030	4.000	50.000	22.000	8.000	4	1676 2.030
2.970	4.000	68.000	40.000	12.000	4	1676 2.970
2.980	4.000	68.000	40.000	12.000	4	1676 2.980
2.990	4.000	68.000	40.000	12.000	4	1676 2.990
3.000	4.000	68.000	40.000	12.000	4	1676 3.000
3.010	4.000	68.000	40.000	12.000	4	1676 3.010
3.020	4.000	68.000	40.000	12.000	4	1676 3.020
3.030	4.000	68.000	40.000	12.000	4	1676 3.030
3.970	4.000	68.000	40.000	12.000	4	1676 3.970
3.980	4.000	68.000	40.000	12.000	4	1676 3.980
3.990	4.000	68.000	40.000	12.000	4	1676 3.990
4.000	4.000	68.000	40.000	12.000	4	1676 4.000
4.010	4.000	68.000	40.000	12.000	4	1676 4.010
4.020	4.000	68.000	40.000	12.000	4	1676 4.020
4.030	4.000	68.000	40.000	12.000	4	1676 4.030
4.970	6.000	76.000	40.000	12.000	4	1676 4.970
4.980	6.000	76.000	40.000	12.000	4	1676 4.980
4.990	6.000	76.000	40.000	12.000	4	1676 4.990
5.000	6.000	76.000	40.000	12.000	4	1676 5.000
5.010	6.000	76.000	40.000	12.000	4	1676 5.010
5.020	6.000	76.000	40.000	12.000	4	1676 5.020
5.030	6.000	76.000	40.000	12.000	4	1676 5.030
5.970	6.000	76.000	40.000	12.000	4	1676 5.970
5.980	6.000	76.000	40.000	12.000	4	1676 5.980
5.990	6.000	76.000	40.000	12.000	4	1676 5.990
6.000	6.000	76.000	40.000	12.000	4	1676 6.000
6.010	6.000	76.000	40.000	12.000	4	1676 6.010
6.020	6.000	76.000	40.000	12.000	4	1676 6.020
6.030	6.000	76.000	40.000	12.000	4	1676 6.030
7.000	8.000	101.000	65.000	16.000	6	1676 7.000

Reaming tools



Article no.

1676

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
7.970	8.000	101.000	65.000	16.000	6	1676 7.970
7.980	8.000	101.000	65.000	16.000	6	1676 7.980
7.990	8.000	101.000	65.000	16.000	6	1676 7.990
8.000	8.000	101.000	65.000	16.000	6	1676 8.000
8.010	8.000	101.000	65.000	16.000	6	1676 8.010
8.020	8.000	101.000	65.000	16.000	6	1676 8.020
8.030	8.000	101.000	65.000	16.000	6	1676 8.030
9.000	10.000	101.000	61.000	19.000	6	1676 9.000
9.970	10.000	101.000	61.000	19.000	6	1676 9.970
9.980	10.000	101.000	61.000	19.000	6	1676 9.980
9.990	10.000	101.000	61.000	19.000	6	1676 9.990
10.000	10.000	101.000	61.000	19.000	6	1676 10.000
10.010	10.000	101.000	61.000	19.000	6	1676 10.010
10.020	10.000	101.000	61.000	19.000	6	1676 10.020
10.030	10.000	101.000	61.000	19.000	6	1676 10.030
11.000	12.000	130.000	85.000	19.000	6	1676 11.000
11.970	12.000	130.000	85.000	19.000	6	1676 11.970
11.980	12.000	130.000	85.000	19.000	6	1676 11.980
11.990	12.000	130.000	85.000	19.000	6	1676 11.990
12.000	12.000	130.000	85.000	19.000	6	1676 12.000
12.010	12.000	130.000	85.000	19.000	6	1676 12.010
12.020	12.000	130.000	85.000	19.000	6	1676 12.020
12.030	12.000	130.000	85.000	19.000	6	1676 12.030

High-performance reamers



P	•	• for clamping in hydraulic and shrink fit chucks • for extension, shrink extensions e.g. art. no. 4719 are recommended
M	•	
K	○	
N		
S	•	
H	•	

Tool material **Solid carbide**

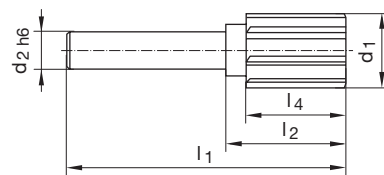
Surface **a**

Form

Type **HR 500 TS**

GÜHRING NAVIGATOR

Cutting data page 428



Article no. **1548**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
14.000	6.000	66.000	30.000	25.000	8	1548 14.000
15.000	6.000	66.000	30.000	25.000	8	1548 15.000
16.000	8.000	66.000	30.000	25.000	8	1548 16.000
18.000	8.000	66.000	30.000	25.000	8	1548 18.000
20.000	10.000	70.000	30.000	25.000	8	1548 20.000
22.000	10.000	70.000	30.000	25.000	8	1548 22.000
24.000	12.000	75.000	30.000	25.000	8	1548 24.000
25.000	12.000	75.000	30.000	25.000	8	1548 25.000
26.000	12.000	75.000	30.000	25.000	8	1548 26.000
28.000	12.000	75.000	30.000	25.000	8	1548 28.000
30.000	16.000	78.000	30.000	25.000	8	1548 30.000
32.000	16.000	78.000	30.000	25.000	8	1548 32.000
34.000	20.000	80.000	30.000	25.000	8	1548 34.000
36.000	20.000	80.000	30.000	25.000	8	1548 36.000
38.000	20.000	80.000	30.000	25.000	8	1548 38.000
40.000	20.000	80.000	30.000	25.000	8	1548 40.000
42.000	20.000	80.000	30.000	25.000	8	1548 42.000

Reaming tools



High-performance reamers



P	•	• for clamping in hydraulic and shrink fit chucks • for extension, shrink extensions e.g. art. no. 4719 are recommended
M	•	
K	○	
N		
S	•	
H	•	

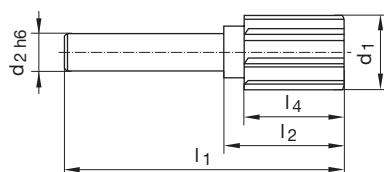
Tool material **Solid carbide**Surface **a**

Form

Type **HR 500 TD**

GÜHRING NAVIGATOR

Cutting data page 428

Article no. **1549**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
14.000	6.000	66.000	30.000	25.000	8	1549 14.000
15.000	6.000	66.000	30.000	25.000	8	1549 15.000
16.000	8.000	66.000	30.000	25.000	8	1549 16.000
18.000	8.000	66.000	30.000	25.000	8	1549 18.000
20.000	10.000	70.000	30.000	25.000	8	1549 20.000
22.000	10.000	70.000	30.000	25.000	8	1549 22.000
24.000	12.000	75.000	30.000	25.000	8	1549 24.000
25.000	12.000	75.000	30.000	25.000	8	1549 25.000
26.000	12.000	75.000	30.000	25.000	8	1549 26.000
28.000	12.000	75.000	30.000	25.000	8	1549 28.000
30.000	16.000	78.000	30.000	25.000	8	1549 30.000
32.000	16.000	78.000	30.000	25.000	8	1549 32.000
34.000	20.000	80.000	30.000	25.000	8	1549 34.000
36.000	20.000	80.000	30.000	25.000	8	1549 36.000
38.000	20.000	80.000	30.000	25.000	8	1549 38.000
40.000	20.000	80.000	30.000	25.000	8	1549 40.000
42.000	20.000	80.000	30.000	25.000	8	1549 42.000

Reaming tools

High-performance reamers

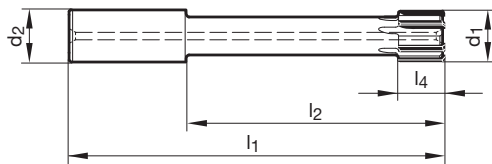


P	•	• The carbide-tipped high-performance reamer is preferred for cast iron grades GG, GGG60-GG70,GGV and ADI.
M	•	
K	•	• Carbide-tipped tools with Signum coating for machining of castings with the highest surface finish requirements can be obtained as special tools.
N	○	
S	○	
H	○	

Tool material	Carbide
Surface	a
Form	
Type	HR 500 G S

GÜHRING NAVIGATOR

Cutting data page 428



Article no. **1680**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
22.000	20.000	160.000	110.000	22.000	6	1680 22.000
24.000	25.000	180.000	124.000	22.000	6	1680 24.000
25.000	25.000	180.000	124.000	22.000	6	1680 25.000
26.000	25.000	180.000	124.000	22.000	6	1680 26.000
28.000	25.000	180.000	124.000	25.000	6	1680 28.000
30.000	25.000	180.000	124.000	25.000	6	1680 30.000
32.000	32.000	200.000	140.000	25.000	6	1680 32.000
34.000	32.000	200.000	140.000	25.000	6	1680 34.000
36.000	32.000	200.000	140.000	25.000	8	1680 36.000
38.000	32.000	200.000	140.000	25.000	8	1680 38.000
40.000	32.000	200.000	140.000	25.000	8	1680 40.000

Reaming tools



High-performance reamers

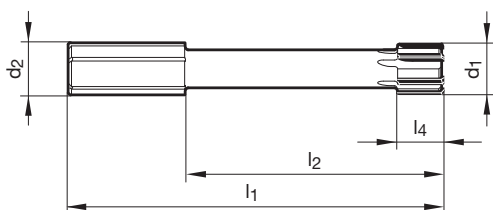


- | | | |
|----------|---|---|
| P | • | • The carbide-tipped high-performance reamer is preferred for cast iron grades GG, GGG60-GG70,GGV and ADI. |
| M | • | |
| K | • | • Carbide-tipped tools with Signum coating for machining of castings with the highest surface finish requirements can be obtained as special tools. |
| N | ○ | |
| S | ○ | |
| H | ○ | |

Tool material	Carbide
Surface	a
Form	
Type	HR 500 G D

GÜHRING NAVIGATOR

Cutting data page 428



Article no. **1681**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
22.000	20.000	160.000	110.000	22.000	6	1681 22.000
24.000	25.000	180.000	124.000	22.000	6	1681 24.000
25.000	25.000	180.000	124.000	22.000	6	1681 25.000
26.000	25.000	180.000	124.000	22.000	6	1681 26.000
28.000	25.000	180.000	124.000	25.000	6	1681 28.000
30.000	25.000	180.000	124.000	25.000	6	1681 30.000
32.000	32.000	200.000	140.000	25.000	6	1681 32.000
34.000	32.000	200.000	140.000	25.000	6	1681 34.000
36.000	32.000	200.000	140.000	25.000	8	1681 36.000
38.000	32.000	200.000	140.000	25.000	8	1681 38.000
40.000	32.000	200.000	140.000	25.000	8	1681 40.000

Reaming tools

HR 500 T

the solid carbide head solution

+ High-performance reamer for particularly cost-effective production

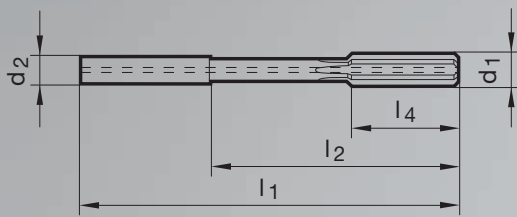
+ flexible mounting options thanks to rear axle shaft

+ easy extension with shrink extension or hydraulic expansion chuck



HR 500 XL

for reaming deep or sunken holes



HR 500 L & XL

d1 (Nom.-Ø)	d2 (Shank-Ø)	l1 (Overall length)	l2 (Overhang length)	l4 (Cutting edge length)
4H7 - L	4h6	101	73	12.00
4H7 - XL	4h6	150	122	12.00
5H7 - L	6h6	101	65	12.00
5H7 - XL	6h6	150	114	12.00
6H7 - L	6h6	101	94	12.00
6H7 - XL	6h6	150	124	12.00
8H7 - L	8h6	130	94	16.00
8H7 - XL	8h6	200	164	16.00
10H7 - L	10h6	130	90	19.00
10H7 - XL	10h6	200	160	19.00
12H7 - L	12h6	160	115	19.00
12H7 - XL	12h6	200	155	19.00

*+ longer versions also
available on request*



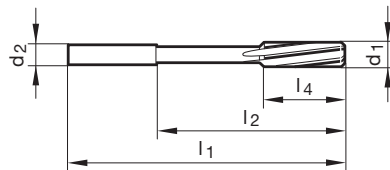
NC machine reamers



P	•	• > Ø 3.75 mm with extremely unequal flute spacing
M	○	
K	•	
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 430



Tool material **Solid carbide**

Surface ○

Form B

Type

Article no. **6016**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
3.000	4.000	64.000	36.000	17.000	6	6016 3.000
3.500	4.000	74.000	46.000	20.000	6	6016 3.500
4.000	4.000	77.000	45.000	21.000	6	6016 4.000
4.500	6.000	82.000	50.000	23.000	6	6016 4.500
5.000	6.000	93.000	59.000	26.000	6	6016 5.000
5.500	6.000	93.000	57.000	26.000	6	6016 5.500
6.000	6.000	93.000	57.000	26.000	6	6016 6.000
6.500	8.000	101.000	63.000	28.000	6	6016 6.500
7.000	8.000	109.000	69.000	31.000	6	6016 7.000
7.500	8.000	109.000	69.000	31.000	6	6016 7.500
8.000	8.000	117.000	75.000	33.000	6	6016 8.000
8.500	10.000	117.000	75.000	33.000	6	6016 8.500
9.000	10.000	125.000	81.000	36.000	6	6016 9.000
9.500	10.000	125.000	81.000	36.000	6	6016 9.500
10.000	10.000	133.000	87.000	38.000	6	6016 10.000
10.500	10.000	133.000	87.000	38.000	6	6016 10.500
11.000	10.000	142.000	96.000	41.000	6	6016 11.000
11.500	10.000	142.000	96.000	41.000	6	6016 11.500
12.000	12.000	151.000	105.000	44.000	6	6016 12.000
13.000	14.000	160.000	114.000	44.000	6	6016 13.000
14.000	14.000	160.000	110.000	47.000	6	6016 14.000
15.000	16.000	170.000	120.000	50.000	6	6016 15.000
16.000	16.000	170.000	120.000	52.000	6	6016 16.000
17.000	18.000	182.000	130.000	52.000	6	6016 17.000
18.000	18.000	182.000	130.000	52.000	6	6016 18.000
19.000	20.000	195.000	137.000	52.000	6	6016 19.000
20.000	20.000	195.000	137.000	52.000	6	6016 20.000

Reaming tools



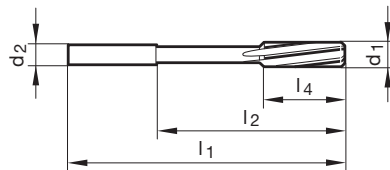
NC machine reamers



P	•	• > Ø 3.75 mm with extremely unequal flute spacing
M	•	
K	•	
N		
S	•	
H	•	

GÜHRING NAVIGATOR

Cutting data page 430

Tool material **Solid carbide**Surface **a**Form **B**

Type

Article no. **6017**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
3.000	4.000	64.000	36.000	17.000	6	6017 3.000
3.500	4.000	74.000	46.000	20.000	6	6017 3.500
4.000	4.000	77.000	45.000	21.000	6	6017 4.000
4.500	6.000	82.000	50.000	23.000	6	6017 4.500
5.000	6.000	93.000	59.000	26.000	6	6017 5.000
5.500	6.000	93.000	57.000	26.000	6	6017 5.500
6.000	6.000	93.000	57.000	26.000	6	6017 6.000
6.500	8.000	101.000	63.000	28.000	6	6017 6.500
7.000	8.000	109.000	69.000	31.000	6	6017 7.000
7.500	8.000	109.000	69.000	31.000	6	6017 7.500
8.000	8.000	117.000	75.000	33.000	6	6017 8.000
8.500	10.000	117.000	75.000	33.000	6	6017 8.500
9.000	10.000	125.000	81.000	36.000	6	6017 9.000
9.500	10.000	125.000	81.000	36.000	6	6017 9.500
10.000	10.000	133.000	87.000	38.000	6	6017 10.000
10.500	10.000	133.000	87.000	38.000	6	6017 10.500
11.000	10.000	142.000	96.000	41.000	6	6017 11.000
11.500	10.000	142.000	96.000	41.000	6	6017 11.500
12.000	12.000	151.000	105.000	44.000	6	6017 12.000
13.000	14.000	160.000	114.000	44.000	6	6017 13.000
14.000	14.000	160.000	110.000	47.000	6	6017 14.000
15.000	16.000	170.000	120.000	50.000	6	6017 15.000
16.000	16.000	170.000	120.000	52.000	6	6017 16.000
17.000	18.000	182.000	130.000	52.000	6	6017 17.000
18.000	18.000	182.000	130.000	52.000	6	6017 18.000
19.000	20.000	195.000	137.000	52.000	6	6017 19.000
20.000	20.000	195.000	137.000	52.000	6	6017 20.000

Reaming tools

NC machine reamers

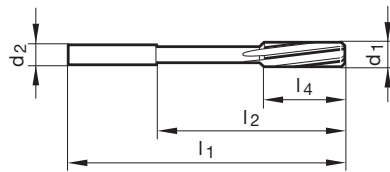


P	•	• > Ø 3.75 mm with extremely unequal flute spacing
M	○	• ≤ Ø 5.50 mm: 0.000/+0.004
K	•	• > Ø 5.50 mm: 0.000/+0.005
N	•	
S	○	
H	○	

GÜHRING NAVIGATOR

Cutting data page 430

Tool material	Solid carbide
Surface	○
Form	B
Type	



Article no. **5527**

Reaming tools

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
0.980	4.000	50.000	22.000	6.000	3	5527 0.980
0.990	4.000	50.000	22.000	6.000	3	5527 0.990
1.000	4.000	50.000	22.000	6.000	3	5527 1.000
1.010	4.000	50.000	22.000	6.000	3	5527 1.010
1.020	4.000	50.000	22.000	6.000	3	5527 1.020
1.030	4.000	50.000	22.000	9.000	3	5527 1.030
1.480	4.000	50.000	22.000	9.000	3	5527 1.480
1.490	4.000	50.000	22.000	9.000	3	5527 1.490
1.500	4.000	50.000	22.000	9.000	3	5527 1.500
1.510	4.000	50.000	22.000	9.000	3	5527 1.510
1.520	4.000	50.000	22.000	9.000	3	5527 1.520
1.530	4.000	50.000	22.000	9.000	3	5527 1.530
1.980	4.000	50.000	22.000	12.000	4	5527 1.980
1.990	4.000	50.000	22.000	12.000	4	5527 1.990
2.000	4.000	50.000	22.000	12.000	4	5527 2.000
2.010	4.000	50.000	22.000	12.000	4	5527 2.010
2.020	4.000	50.000	22.000	12.000	4	5527 2.020
2.030	4.000	50.000	22.000	12.000	4	5527 2.030
2.480	4.000	60.000	32.000	16.000	4	5527 2.480
2.490	4.000	60.000	32.000	16.000	4	5527 2.490
2.500	4.000	60.000	32.000	16.000	4	5527 2.500
2.510	4.000	60.000	32.000	16.000	4	5527 2.510
2.520	4.000	60.000	32.000	16.000	4	5527 2.520
2.530	4.000	60.000	32.000	16.000	4	5527 2.530
2.970	4.000	64.000	36.000	17.000	6	5527 2.970
2.980	4.000	64.000	36.000	17.000	6	5527 2.980
2.990	4.000	64.000	36.000	17.000	6	5527 2.990
3.000	4.000	64.000	36.000	17.000	6	5527 3.000
3.010	4.000	64.000	36.000	17.000	6	5527 3.010
3.020	4.000	64.000	36.000	17.000	6	5527 3.020
3.030	4.000	64.000	36.000	17.000	6	5527 3.030
3.970	4.000	77.000	45.000	21.000	6	5527 3.970
3.980	4.000	77.000	45.000	21.000	6	5527 3.980
3.990	4.000	77.000	45.000	21.000	6	5527 3.990
4.000	4.000	77.000	45.000	21.000	6	5527 4.000
4.010	4.000	77.000	45.000	21.000	6	5527 4.010



Article no.

5527

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
4.020	4.000	77.000	45.000	21.000	6	5527 4.020
4.030	4.000	77.000	45.000	21.000	6	5527 4.030
4.970	6.000	93.000	59.000	26.000	6	5527 4.970
4.980	6.000	93.000	59.000	26.000	6	5527 4.980
4.990	6.000	93.000	59.000	26.000	6	5527 4.990
5.000	6.000	93.000	59.000	26.000	6	5527 5.000
5.010	6.000	93.000	59.000	26.000	6	5527 5.010
5.020	6.000	93.000	59.000	26.000	6	5527 5.020
5.030	6.000	93.000	59.000	26.000	6	5527 5.030
5.970	6.000	93.000	57.000	26.000	6	5527 5.970
5.980	6.000	93.000	57.000	26.000	6	5527 5.980
5.990	6.000	93.000	57.000	26.000	6	5527 5.990
6.000	6.000	93.000	57.000	26.000	6	5527 6.000
6.010	6.000	93.000	57.000	26.000	6	5527 6.010
6.020	6.000	93.000	57.000	26.000	6	5527 6.020
6.030	6.000	93.000	57.000	26.000	6	5527 6.030
7.000	8.000	109.000	69.000	31.000	6	5527 7.000
7.970	8.000	117.000	75.000	33.000	6	5527 7.970
7.980	8.000	117.000	75.000	33.000	6	5527 7.980
7.990	8.000	117.000	75.000	33.000	6	5527 7.990
8.000	8.000	117.000	75.000	33.000	6	5527 8.000
8.010	8.000	117.000	75.000	33.000	6	5527 8.010
8.020	8.000	117.000	75.000	33.000	6	5527 8.020
8.030	8.000	117.000	75.000	33.000	6	5527 8.030
8.040	8.000	117.000	75.000	33.000	6	5527 8.040
9.000	10.000	125.000	81.000	36.000	6	5527 9.000
9.970	10.000	133.000	87.000	38.000	6	5527 9.970
9.980	10.000	133.000	87.000	38.000	6	5527 9.980
9.990	10.000	133.000	87.000	38.000	6	5527 9.990
10.000	10.000	133.000	87.000	38.000	6	5527 10.000
10.010	10.000	133.000	87.000	38.000	6	5527 10.010
10.020	10.000	133.000	87.000	38.000	6	5527 10.020
10.030	10.000	133.000	87.000	38.000	6	5527 10.030
10.040	10.000	133.000	87.000	38.000	6	5527 10.040
10.050	10.000	133.000	87.000	38.000	6	5527 10.050
11.970	12.000	151.000	105.000	44.000	6	5527 11.970
11.980	12.000	151.000	105.000	44.000	6	5527 11.980
11.990	12.000	151.000	105.000	44.000	6	5527 11.990
12.000	12.000	151.000	105.000	44.000	6	5527 12.000
12.010	12.000	151.000	105.000	44.000	6	5527 12.010
12.020	12.000	151.000	105.000	44.000	6	5527 12.020
12.030	12.000	151.000	105.000	44.000	6	5527 12.030
12.040	12.000	151.000	105.000	44.000	6	5527 12.040
12.050	12.000	151.000	105.000	44.000	6	5527 12.050

Reaming tools

NC machine reamers



P	•	• > Ø 3.75 mm with extremely unequal flute spacing
M	•	• ≤ Ø 5.50 mm: 0.000/+0.004
K	•	• > Ø 5.50 mm: 0.000/+0.005
N		
S	•	
H	•	

Tool material **Solid carbide**

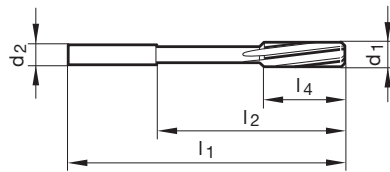
Surface **a**

Form **B**

Type

GÜHRING NAVIGATOR

Cutting data page 430



Article no. **6018**

Reaming tools

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
0.980	4.000	50.000	22.000	6.000	3	6018 0.980
0.990	4.000	50.000	22.000	6.000	3	6018 0.990
1.000	4.000	50.000	22.000	6.000	3	6018 1.000
1.010	4.000	50.000	22.000	6.000	3	6018 1.010
1.020	4.000	50.000	22.000	6.000	3	6018 1.020
1.030	4.000	50.000	22.000	9.000	3	6018 1.030
1.480	4.000	50.000	22.000	9.000	3	6018 1.480
1.490	4.000	50.000	22.000	9.000	3	6018 1.490
1.500	4.000	50.000	22.000	9.000	3	6018 1.500
1.510	4.000	50.000	22.000	9.000	3	6018 1.510
1.520	4.000	50.000	22.000	9.000	3	6018 1.520
1.530	4.000	50.000	22.000	9.000	3	6018 1.530
1.980	4.000	50.000	22.000	12.000	4	6018 1.980
1.990	4.000	50.000	22.000	12.000	4	6018 1.990
2.000	4.000	50.000	22.000	12.000	4	6018 2.000
2.010	4.000	50.000	22.000	12.000	4	6018 2.010
2.020	4.000	50.000	22.000	12.000	4	6018 2.020
2.030	4.000	50.000	22.000	12.000	4	6018 2.030
2.480	4.000	60.000	32.000	16.000	4	6018 2.480
2.490	4.000	60.000	32.000	16.000	4	6018 2.490
2.500	4.000	60.000	32.000	16.000	4	6018 2.500
2.510	4.000	60.000	32.000	16.000	4	6018 2.510
2.520	4.000	60.000	32.000	16.000	4	6018 2.520
2.530	4.000	60.000	32.000	16.000	4	6018 2.530
2.970	4.000	64.000	36.000	17.000	6	6018 2.970
2.980	4.000	64.000	36.000	17.000	6	6018 2.980
2.990	4.000	64.000	36.000	17.000	6	6018 2.990
3.000	4.000	64.000	36.000	17.000	6	6018 3.000
3.010	4.000	64.000	36.000	17.000	6	6018 3.010
3.020	4.000	64.000	36.000	17.000	6	6018 3.020
3.030	4.000	64.000	36.000	17.000	6	6018 3.030
3.970	4.000	77.000	45.000	21.000	6	6018 3.970
3.980	4.000	77.000	45.000	21.000	6	6018 3.980
3.990	4.000	77.000	45.000	21.000	6	6018 3.990
4.000	4.000	77.000	45.000	21.000	6	6018 4.000
4.010	4.000	77.000	45.000	21.000	6	6018 4.010



Article no.

6018

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
4.020	4.000	77.000	45.000	21.000	6	6018 4.020
4.030	4.000	77.000	45.000	21.000	6	6018 4.030
4.970	6.000	93.000	59.000	26.000	6	6018 4.970
4.980	6.000	93.000	59.000	26.000	6	6018 4.980
4.990	6.000	93.000	59.000	26.000	6	6018 4.990
5.000	6.000	93.000	59.000	26.000	6	6018 5.000
5.010	6.000	93.000	59.000	26.000	6	6018 5.010
5.020	6.000	93.000	59.000	26.000	6	6018 5.020
5.030	6.000	93.000	59.000	26.000	6	6018 5.030
5.970	6.000	93.000	57.000	26.000	6	6018 5.970
5.980	6.000	93.000	57.000	26.000	6	6018 5.980
5.990	6.000	93.000	57.000	26.000	6	6018 5.990
6.000	6.000	93.000	57.000	26.000	6	6018 6.000
6.010	6.000	93.000	57.000	26.000	6	6018 6.010
6.020	6.000	93.000	57.000	26.000	6	6018 6.020
6.030	6.000	93.000	57.000	26.000	6	6018 6.030
7.000	8.000	109.000	69.000	31.000	6	6018 7.000
7.970	8.000	117.000	75.000	33.000	6	6018 7.970
7.980	8.000	117.000	75.000	33.000	6	6018 7.980
7.990	8.000	117.000	75.000	33.000	6	6018 7.990
8.000	8.000	117.000	75.000	33.000	6	6018 8.000
8.010	8.000	117.000	75.000	33.000	6	6018 8.010
8.020	8.000	117.000	75.000	33.000	6	6018 8.020
8.030	8.000	117.000	75.000	33.000	6	6018 8.030
8.040	8.000	117.000	75.000	33.000	6	6018 8.040
9.000	10.000	125.000	81.000	36.000	6	6018 9.000
9.970	10.000	133.000	87.000	38.000	6	6018 9.970
9.980	10.000	133.000	87.000	38.000	6	6018 9.980
9.990	10.000	133.000	87.000	38.000	6	6018 9.990
10.000	10.000	133.000	87.000	38.000	6	6018 10.000
10.010	10.000	133.000	87.000	38.000	6	6018 10.010
10.020	10.000	133.000	87.000	38.000	6	6018 10.020
10.030	10.000	133.000	87.000	38.000	6	6018 10.030
10.040	10.000	133.000	87.000	38.000	6	6018 10.040
10.050	10.000	133.000	87.000	38.000	6	6018 10.050
11.970	12.000	151.000	105.000	44.000	6	6018 11.970
11.980	12.000	151.000	105.000	44.000	6	6018 11.980
11.990	12.000	151.000	105.000	44.000	6	6018 11.990
12.000	12.000	151.000	105.000	44.000	6	6018 12.000
12.010	12.000	151.000	105.000	44.000	6	6018 12.010
12.020	12.000	151.000	105.000	44.000	6	6018 12.020
12.030	12.000	151.000	105.000	44.000	6	6018 12.030
12.040	12.000	151.000	105.000	44.000	6	6018 12.040
12.050	12.000	151.000	105.000	44.000	6	6018 12.050

Reaming tools

Machine reamers



P	•	• ≤ Ø 9.50 mm: solid carbide
M	○	• > Ø 9.50 mm: carbide inserts
K	•	• allocation to company standard
N	•	• ≤ Ø 9.50 mm with external centre on cutting end
S	•	• internal centre on shank end
H	○	• > Ø 9.50 mm with internal centres on both ends

Tool material **Carbide**

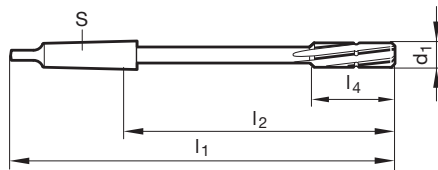
Surface ○

Form B

Type

GÜHRING NAVIGATOR

Cutting data page 430



Article no. **1411**

d1	S	l1	l2	l4	Z	Order no.
mm		mm	mm	mm		
5.000	MK-1	133.000	67.500	23.000	6	1411 5.000
6.000	MK-1	138.000	72.500	26.000	6	1411 6.000
7.000	MK-1	150.000	84.500	31.000	6	1411 7.000
8.000	MK-1	156.000	90.500	33.000	6	1411 8.000
9.000	MK-1	162.000	96.500	36.000	6	1411 9.000
10.000	MK-1	168.000	102.500	38.000	6	1411 10.000
11.000	MK-1	175.000	109.500	41.000	6	1411 11.000
12.000	MK-1	182.000	116.500	44.000	6	1411 12.000
13.000	MK-1	182.000	116.500	44.000	6	1411 13.000
14.000	MK-1	189.000	123.500	47.000	6	1411 14.000
15.000	MK-2	204.000	124.000	50.000	6	1411 15.000
16.000	MK-2	210.000	130.000	52.000	6	1411 16.000
17.000	MK-2	214.000	134.000	54.000	6	1411 17.000
18.000	MK-2	219.000	139.000	56.000	6	1411 18.000
19.000	MK-2	223.000	143.000	58.000	6	1411 19.000
20.000	MK-2	228.000	148.000	60.000	6	1411 20.000
21.000	MK-2	232.000	152.000	62.000	6	1411 21.000
22.000	MK-2	237.000	157.000	64.000	6	1411 22.000
23.000	MK-2	241.000	161.000	66.000	6	1411 23.000
24.000	MK-3	268.000	169.000	68.000	8	1411 24.000
25.000	MK-3	268.000	169.000	68.000	8	1411 25.000
26.000	MK-3	273.000	174.000	70.000	8	1411 26.000
27.000	MK-3	277.000	178.000	71.000	8	1411 27.000
28.000	MK-3	277.000	178.000	71.000	8	1411 28.000
30.000	MK-3	281.000	182.000	73.000	8	1411 30.000
34.000	MK-4	321.000	197.000	78.000	8	1411 34.000
35.000	MK-4	321.000	197.000	78.000	8	1411 35.000
36.000	MK-4	325.000	201.000	79.000	8	1411 36.000
40.000	MK-4	329.000	205.000	81.000	8	1411 40.000

Reaming tools



NC machine reamers



P	•	• ≤ Ø 3.75 mm with external centres on both ends
M	○	• > Ø 3.75 mm with internal centres on both ends
K	•	
N	•	
S	○	
H		

Tool material **HSS-E**

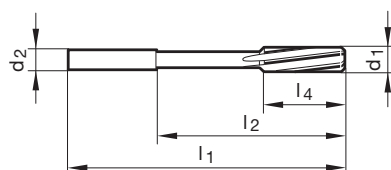
Surface ○

Form **B**

Type

GÜHRING NAVIGATOR

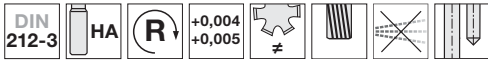
Cutting data page 430

Article no. **6019**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
1.500	2.000	40.000	12.000	8.000	3	6019 1.500
2.000	2.000	49.000	21.000	11.000	4	6019 2.000
2.500	3.000	57.000	27.000	14.000	4	6019 2.500
3.000	3.000	61.000	31.000	15.000	6	6019 3.000
3.500	4.000	70.000	38.000	18.000	6	6019 3.500
4.000	4.000	75.000	43.000	19.000	6	6019 4.000
4.500	5.000	80.000	47.000	21.000	6	6019 4.500
5.000	5.000	86.000	52.000	23.000	6	6019 5.000
5.500	6.000	93.000	57.000	26.000	6	6019 5.500
6.000	6.000	93.000	57.000	26.000	6	6019 6.000
6.500	6.000	101.000	63.000	28.000	6	6019 6.500
7.000	8.000	109.000	69.000	31.000	6	6019 7.000
7.500	8.000	109.000	69.000	31.000	6	6019 7.500
8.000	8.000	117.000	75.000	33.000	6	6019 8.000
8.500	8.000	117.000	75.000	33.000	6	6019 8.500
9.000	10.000	125.000	81.000	36.000	6	6019 9.000
9.500	10.000	125.000	81.000	36.000	6	6019 9.500
10.000	10.000	133.000	87.000	38.000	6	6019 10.000
11.000	10.000	142.000	96.000	41.000	6	6019 11.000
12.000	10.000	151.000	105.000	44.000	6	6019 12.000
13.000	10.000	151.000	105.000	44.000	6	6019 13.000
14.000	14.000	160.000	110.000	47.000	8	6019 14.000
15.000	14.000	162.000	112.000	50.000	8	6019 15.000
16.000	14.000	170.000	120.000	52.000	8	6019 16.000
17.000	14.000	175.000	123.000	54.000	8	6019 17.000
18.000	14.000	182.000	130.000	56.000	8	6019 18.000
19.000	16.000	189.000	131.000	58.000	8	6019 19.000
20.000	16.000	195.000	137.000	60.000	8	6019 20.000

Reaming tools

NC machine reamers

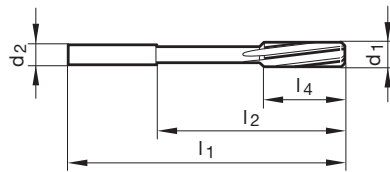


P	•	• ≤ Ø 3.75 mm with external centres on both ends
M	○	• > Ø 3.75 mm with internal centres on both ends
K	•	• ≤ Ø 5.50 mm: 0.000/+0.004
N	•	• > Ø 5.50 mm: 0.000/+0.005
S	○	
H		

Tool material	HSS-E
Surface	○
Form	B
Type	

GÜHRING NAVIGATOR

Cutting data page 430



Article no. **6020**

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
1.000	1.000	34.000	6.500	5.500	3	6020 1.000
1.010	1.000	34.000	6.500	5.500	3	6020 1.010
1.020	1.000	34.000	6.500	5.500	3	6020 1.020
1.030	1.000	34.000	6.500	5.500	3	6020 1.030
1.500	2.000	40.000	12.000	8.000	3	6020 1.500
1.510	2.000	43.000	15.000	9.000	3	6020 1.510
1.520	2.000	43.000	15.000	9.000	3	6020 1.520
1.530	2.000	43.000	15.000	9.000	3	6020 1.530
1.970	2.000	49.000	21.000	11.000	4	6020 1.970
1.980	2.000	49.000	21.000	11.000	4	6020 1.980
1.990	2.000	49.000	21.000	11.000	4	6020 1.990
2.000	2.000	49.000	21.000	11.000	4	6020 2.000
2.010	2.000	49.000	21.000	11.000	4	6020 2.010
2.020	2.000	49.000	21.000	11.000	4	6020 2.020
2.030	2.000	49.000	21.000	11.000	4	6020 2.030
2.470	3.000	57.000	27.000	14.000	4	6020 2.470
2.480	3.000	57.000	27.000	14.000	4	6020 2.480
2.490	3.000	57.000	27.000	14.000	4	6020 2.490
2.500	3.000	57.000	27.000	14.000	4	6020 2.500
2.510	3.000	57.000	27.000	14.000	4	6020 2.510
2.520	3.000	57.000	27.000	14.000	4	6020 2.520
2.530	3.000	57.000	27.000	14.000	4	6020 2.530
2.970	3.000	61.000	31.000	15.000	6	6020 2.970
2.980	3.000	61.000	31.000	15.000	6	6020 2.980
2.990	3.000	61.000	31.000	15.000	6	6020 2.990
3.000	3.000	61.000	31.000	15.000	6	6020 3.000
3.010	4.000	65.000	34.000	16.000	6	6020 3.010
3.020	4.000	65.000	34.000	16.000	6	6020 3.020
3.030	4.000	65.000	34.000	16.000	6	6020 3.030
3.970	4.000	75.000	43.000	19.000	6	6020 3.970
3.980	4.000	75.000	43.000	19.000	6	6020 3.980
3.990	4.000	75.000	43.000	19.000	6	6020 3.990
4.000	4.000	75.000	43.000	19.000	6	6020 4.000
4.010	4.000	75.000	43.000	19.000	6	6020 4.010
4.020	4.000	75.000	43.000	19.000	6	6020 4.020
4.030	4.000	75.000	43.000	19.000	6	6020 4.030

Reaming tools



Article no.

6020

d1	d2 h6	l1	l2	l4	Z	Order no.
mm	mm	mm	mm	mm		
4.970	5.000	86.000	52.000	23.000	6	6020 4.970
4.980	5.000	86.000	52.000	23.000	6	6020 4.980
4.990	5.000	86.000	52.000	23.000	6	6020 4.990
5.000	5.000	86.000	52.000	23.000	6	6020 5.000
5.010	5.000	86.000	52.000	23.000	6	6020 5.010
5.020	5.000	86.000	52.000	23.000	6	6020 5.020
5.030	5.000	86.000	52.000	23.000	6	6020 5.030
5.970	6.000	93.000	57.000	26.000	6	6020 5.970
5.980	6.000	93.000	57.000	26.000	6	6020 5.980
5.990	6.000	93.000	57.000	26.000	6	6020 5.990
6.000	6.000	93.000	57.000	26.000	6	6020 6.000
6.010	6.000	101.000	63.000	28.000	6	6020 6.010
6.020	6.000	101.000	63.000	28.000	6	6020 6.020
6.030	6.000	101.000	63.000	28.000	6	6020 6.030
7.970	8.000	117.000	75.000	33.000	6	6020 7.970
7.980	8.000	117.000	75.000	33.000	6	6020 7.980
7.990	8.000	117.000	75.000	33.000	6	6020 7.990
8.000	8.000	117.000	75.000	33.000	6	6020 8.000
8.010	8.000	117.000	75.000	33.000	6	6020 8.010
8.020	8.000	117.000	75.000	33.000	6	6020 8.020
8.030	8.000	117.000	75.000	33.000	6	6020 8.030
9.000	10.000	125.000	81.000	36.000	6	6020 9.000
9.010	10.000	125.000	81.000	36.000	6	6020 9.010
9.020	10.000	125.000	81.000	36.000	6	6020 9.020
9.030	10.000	125.000	81.000	36.000	6	6020 9.030
9.970	10.000	133.000	87.000	38.000	6	6020 9.970
9.980	10.000	133.000	87.000	38.000	6	6020 9.980
9.990	10.000	133.000	87.000	38.000	6	6020 9.990
10.000	10.000	133.000	87.000	38.000	6	6020 10.000
10.010	10.000	133.000	87.000	38.000	6	6020 10.010
10.020	10.000	133.000	87.000	38.000	6	6020 10.020
10.030	10.000	133.000	87.000	38.000	6	6020 10.030
11.970	10.000	151.000	105.000	44.000	6	6020 11.970
11.980	10.000	151.000	105.000	44.000	6	6020 11.980
11.990	10.000	151.000	105.000	44.000	6	6020 11.990
12.000	10.000	151.000	105.000	44.000	6	6020 12.000
12.010	10.000	151.000	105.000	44.000	6	6020 12.010
12.020	10.000	151.000	105.000	44.000	6	6020 12.020
12.030	10.000	151.000	105.000	44.000	6	6020 12.030

Reaming tools

Machine reamers



P	•	• > Ø 3.00 mm with internal centres on both ends
M	○	• Ø 3.00 mm with external centre on cutting end, with internal centre on shank end
K	•	• ≤ Ø 4.00 mm to company standard
N	•	
S	•	
H		

Tool material **HSS-E**

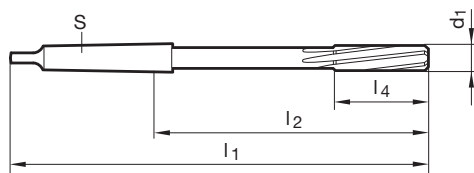
Surface ○

Form B

Type

GÜHRING NAVIGATOR

Cutting data page 430



Article no. **405**

Reaming tools

d1	S	l1	l2	l4	Z	Order no.
mm		mm	mm	mm		
3.000	MK-1	115.000	49.500	15.000	6	405 3.000
4.000	MK-1	125.000	59.500	19.000	6	405 4.000
5.000	MK-1	133.000	67.500	23.000	6	405 5.000
6.000	MK-1	138.000	72.500	26.000	6	405 6.000
7.000	MK-1	150.000	84.500	31.000	6	405 7.000
8.000	MK-1	156.000	90.500	33.000	6	405 8.000
9.000	MK-1	162.000	96.500	36.000	6	405 9.000
10.000	MK-1	168.000	102.500	38.000	6	405 10.000
11.000	MK-1	175.000	109.500	41.000	6	405 11.000
12.000	MK-1	182.000	116.500	44.000	6	405 12.000
13.000	MK-1	182.000	116.500	44.000	6	405 13.000
14.000	MK-1	189.000	123.500	47.000	8	405 14.000
15.000	MK-2	204.000	124.000	50.000	8	405 15.000
16.000	MK-2	210.000	130.000	52.000	8	405 16.000
17.000	MK-2	214.000	134.000	54.000	8	405 17.000
18.000	MK-2	219.000	139.000	56.000	8	405 18.000
19.000	MK-2	223.000	143.000	58.000	8	405 19.000
20.000	MK-2	228.000	148.000	60.000	8	405 20.000
21.000	MK-2	232.000	152.000	62.000	8	405 21.000
22.000	MK-2	237.000	157.000	64.000	8	405 22.000
23.000	MK-2	241.000	161.000	66.000	8	405 23.000
24.000	MK-3	268.000	169.000	68.000	8	405 24.000
25.000	MK-3	268.000	169.000	68.000	8	405 25.000
26.000	MK-3	273.000	174.000	70.000	8	405 26.000
27.000	MK-3	277.000	178.000	71.000	10	405 27.000
28.000	MK-3	277.000	178.000	71.000	10	405 28.000
29.000	MK-3	281.000	182.000	73.000	10	405 29.000
30.000	MK-3	281.000	182.000	73.000	10	405 30.000
31.000	MK-3	285.000	186.000	75.000	10	405 31.000
32.000	MK-4	317.000	193.000	77.000	10	405 32.000
33.000	MK-4	317.000	193.000	77.000	10	405 33.000
34.000	MK-4	321.000	197.000	78.000	10	405 34.000
35.000	MK-4	321.000	197.000	78.000	10	405 35.000
36.000	MK-4	325.000	201.000	79.000	10	405 36.000
37.000	MK-4	325.000	201.000	79.000	10	405 37.000
38.000	MK-4	329.000	205.000	81.000	10	405 38.000



Article no.

405

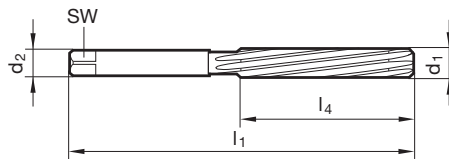
d1	S	l1	l2	l4	Z	Order no.
mm		mm	mm	mm		
40.000	MK-4	329.000	205.000	81.000	10	405 40.000
42.000	MK-4	333.000	209.000	82.000	12	405 42.000
44.000	MK-4	336.000	212.000	83.000	12	405 44.000
45.000	MK-4	336.000	212.000	83.000	12	405 45.000
46.000	MK-4	340.000	216.000	84.000	12	405 46.000
47.000	MK-4	340.000	216.000	84.000	12	405 47.000
48.000	MK-4	344.000	220.000	86.000	12	405 48.000
50.000	MK-4	344.000	220.000	86.000	12	405 50.000

Hand reamers



P	•	• > Ø 3.75 mm with internal centres on both ends
M		• with square to DIN 10
K	•	• ≤ Ø 3.75 mm with external centres on both ends
N	•	• ≤ 1.75 mm to company standard
S		
H		

Tool material	HSS
Surface	○
Form	B
Type	



Article no. **413**

d1	d2	l1	l4	SW	Z	Order no.
mm	mm	mm	mm	mm		
1.000	1.000	34.000	13.000		3	413 1.000
1.400	1.400	41.000	20.000	1.120	3	413 1.400
1.500	1.500	41.000	20.000	1.120	3	413 1.500
1.600	1.600	44.000	21.000	1.250	3	413 1.600
2.000	2.000	50.000	25.000	1.600	4	413 2.000
2.200	2.200	54.000	27.000	1.800	4	413 2.200
2.500	2.500	58.000	29.000	2.100	4	413 2.500
2.800	2.800	62.000	31.000	2.100	6	413 2.800
3.000	3.000	62.000	31.000	2.400	6	413 3.000
3.200	3.200	66.000	33.000	2.400	6	413 3.200
3.500	3.500	71.000	35.000	2.700	6	413 3.500
4.000	4.000	76.000	38.000	3.000	6	413 4.000
4.500	4.500	81.000	41.000	3.400	6	413 4.500
5.000	5.000	87.000	44.000	3.800	6	413 5.000
5.500	5.500	93.000	47.000	4.300	6	413 5.500
6.000	6.000	93.000	47.000	4.900	6	413 6.000
6.500	6.500	100.000	50.000	4.900	6	413 6.500
7.000	7.000	107.000	54.000	5.500	6	413 7.000
7.500	7.500	107.000	54.000	6.200	6	413 7.500
8.000	8.000	115.000	58.000	6.200	6	413 8.000
8.500	8.500	115.000	58.000	7.000	6	413 8.500
9.000	9.000	124.000	62.000	7.000	6	413 9.000
9.500	9.500	124.000	62.000	8.000	6	413 9.500
10.000	10.000	133.000	66.000	8.000	6	413 10.000
10.500	10.500	133.000	66.000	8.000	6	413 10.500
11.000	11.000	142.000	71.000	9.000	6	413 11.000
11.500	11.500	142.000	71.000	9.000	6	413 11.500
12.000	12.000	152.000	76.000	9.000	6	413 12.000
12.500	12.500	152.000	76.000	10.000	6	413 12.500
13.000	13.000	152.000	76.000	10.000	6	413 13.000
13.500	13.500	163.000	81.000	11.000	8	413 13.500
14.000	14.000	163.000	81.000	11.000	8	413 14.000
14.500	14.500	163.000	81.000	11.000	8	413 14.500
15.000	15.000	163.000	81.000	12.000	8	413 15.000
15.500	15.500	175.000	87.000	12.000	8	413 15.500
16.000	16.000	175.000	87.000	12.000	8	413 16.000

Reaming tools



Article no.

413

d1	d2	l1	l4	SW	Z	Order no.
mm	mm	mm	mm	mm		
16.500	16.500	175.000	87.000	13.000	8	413 16.500
17.000	17.000	175.000	87.000	13.000	8	413 17.000
17.500	17.500	188.000	93.000	14.500	8	413 17.500
18.000	18.000	188.000	93.000	14.500	8	413 18.000
18.500	18.500	188.000	93.000	14.500	8	413 18.500
19.000	19.000	188.000	93.000	14.500	8	413 19.000
19.500	19.500	201.000	100.000	16.000	8	413 19.500
20.000	20.000	201.000	100.000	16.000	8	413 20.000
21.000	21.000	201.000	100.000	16.000	8	413 21.000
22.000	22.000	215.000	107.000	18.000	8	413 22.000
23.000	23.000	215.000	107.000	18.000	8	413 23.000
24.000	24.000	231.000	115.000	18.000	8	413 24.000
25.000	25.000	231.000	115.000	20.000	8	413 25.000
26.000	26.000	231.000	115.000	20.000	8	413 26.000
28.000	28.000	247.000	124.000	22.000	10	413 28.000
30.000	30.000	247.000	124.000	24.000	10	413 30.000
31.000	31.000	265.000	133.000	24.000	10	413 31.000
32.000	32.000	265.000	133.000	24.000	10	413 32.000
33.000	33.000	265.000	133.000	26.000	10	413 33.000
34.000	34.000	284.000	142.000	26.000	10	413 34.000
35.000	35.000	284.000	142.000	29.000	10	413 35.000
37.000	37.000	284.000	142.000	29.000	10	413 37.000
38.000	38.000	305.000	152.000	29.000	10	413 38.000
39.000	39.000	305.000	152.000	32.000	10	413 39.000
40.000	40.000	305.000	152.000	32.000	10	413 40.000
41.000	41.000	305.000	152.000	32.000	12	413 41.000
43.000	43.000	326.000	163.000	35.000	12	413 43.000
44.000	44.000	326.000	163.000	35.000	12	413 44.000
45.000	45.000	326.000	163.000	35.000	12	413 45.000
48.000	48.000	347.000	174.000	39.000	12	413 48.000
60.000	60.000	367.000	184.000	49.000	12	413 60.000

Reaming tools

SpyroTec

Countersinks with convex cutting edges



- + round, precise and
chatter-free countersinking*
- + significantly reduced cutting forces*
- + convenient countersinking
also possible with handheld drills*
- + large selection of countersink angles,
lengths and shank versions*



90° Countersinks, spiral-fluted

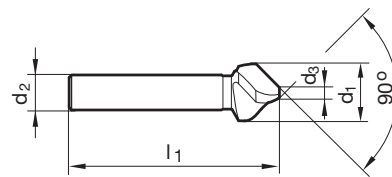
Tool material **HSC0**Surface **A**

Shank form cyl.

P	•	• 3 different convex cutting edges • low-vibration cutting processes
M	•	• for round and chatter-free countersinking • considerably lower feed force required
K	•	• for universal application
N	○	
S	○	
H		

GÜHRING NAVIGATOR

Cutting data page 433

Article no. **5500**

d1	d2	d3	l1	Z	Order no.
mm	mm	mm	mm		
6.300	5.000	1.500	45.000	3	5500 6.300
8.000	6.000	2.000	50.000	3	5500 8.000
8.300	6.000	2.000	50.000	3	5500 8.300
10.000	6.000	2.500	50.000	3	5500 10.000
10.400	6.000	2.500	50.000	3	5500 10.400
11.500	8.000	2.800	56.000	3	5500 11.500
12.400	8.000	2.800	56.000	3	5500 12.400
15.000	10.000	3.200	60.000	3	5500 15.000
16.500	10.000	3.200	60.000	3	5500 16.500
19.000	10.000	3.500	63.000	3	5500 19.000
20.500	10.000	3.500	63.000	3	5500 20.500
23.000	10.000	3.800	67.000	3	5500 23.000
25.000	10.000	3.800	67.000	3	5500 25.000
31.000	12.000	4.200	71.000	3	5500 31.000
40.000	12.000	10.000	75.000	3	5500 40.000

Countersinking tools



90° Countersinks, spiral-fluted



Tool material HSCo

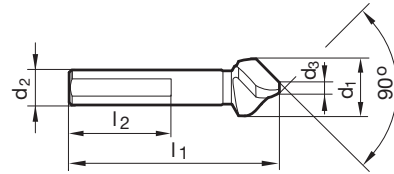
Surface

Shank form 3-flats

P	•	• 3 different convex cutting edges
M	•	• 3-flats on shank prevent slipping in the chuck
K	•	• perfect for hand drills
N	○	• low-vibration cutting processes
S	○	• for round and chatter-free countersinking
H		• considerably lower feed force required
		• for universal application

GÜHRING NAVIGATOR

Cutting data page 433

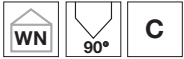


Article no. 5501

d1	d2	d3	l1	l2	Z	Order no.
mm	mm	mm	mm	mm		
6.300	5.000	1.500	45.000	30.000	3	5501 6.300
8.000	6.000	2.000	50.000	30.000	3	5501 8.000
8.300	6.000	2.000	50.000	30.000	3	5501 8.300
10.000	6.000	2.500	50.000	30.000	3	5501 10.000
10.400	6.000	2.500	50.000	30.000	3	5501 10.400
11.500	8.000	2.800	56.000	30.000	3	5501 11.500
12.400	8.000	2.800	56.000	30.000	3	5501 12.400
15.000	10.000	3.200	60.000	30.000	3	5501 15.000
16.500	10.000	3.200	60.000	30.000	3	5501 16.500
19.000	10.000	3.500	63.000	30.000	3	5501 19.000
20.500	10.000	3.500	63.000	30.000	3	5501 20.500
23.000	10.000	3.800	67.000	30.000	3	5501 23.000
25.000	10.000	3.800	67.000	30.000	3	5501 25.000
31.000	12.000	4.200	71.000	30.000	3	5501 31.000
40.000	12.000	10.000	75.000	30.000	3	5501 40.000



90° Countersinks, spiral-fluted

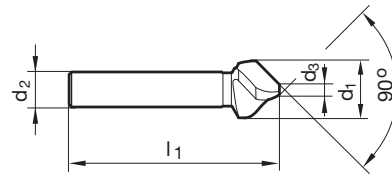
Tool material **HSS**Surface **A**

Shank form cyl.

P	•	• long version for recessed machining points • 3 different convex cutting edges
M	○	• low-vibration cutting processes • for round and chatter-free countersinking
K	•	• considerably lower feed force required • for universal application
N	○	
S	○	
H		

GÜHRING NAVIGATOR

Cutting data page 433

Article no. **5503**

d1	d2	d3	l1	Z	Order no.
mm	mm	mm	mm		
6.300	5.000	1.500	104.000	3	5503 6.300
8.300	6.000	2.000	105.000	3	5503 8.300
10.400	6.000	2.500	107.000	3	5503 10.400
12.400	8.000	2.800	108.000	3	5503 12.400
16.500	10.000	3.200	111.000	3	5503 16.500
20.500	10.000	3.500	114.000	3	5503 20.500
25.000	10.000	3.800	118.000	3	5503 25.000
31.000	12.000	4.200	140.000	3	5503 31.000

Countersinking tools



90° Countersink sets, spiral-fluted



- P** • • consisting of art. no. 5500
- M** • • 3 different convex cutting edges
- K** • • low-vibration cutting processes
- N** ○ • for round and chatter-free countersinking
- S** ○ • considerably lower feed force required
- H** ○ • for universal application

GÜHRING NAVIGATOR

Cutting data page 433

Tool material	HSCO
Surface	A
Shank form	cyl.



Article no. **5538**

Ø-range mm	Pieces/set	Order no.
6.3/8.3/10.4/12.4/16.5/20.5	6	5538 1.000
6.3/10.4/16.5/20.5/25.0	5	5538 2.000

Countersinking tools



90° Countersink sets, spiral-fluted



P	•	• consisting of art. no. 5501
M	•	• 3 different convex cutting edges
K	•	• 3-flats on shank prevent slipping in the chuck
N	○	• perfect for hand drills
S	○	• low-vibration cutting processes
H		• for round and chatter-free countersinking
		• considerably lower feed force required
		• for universal application

GÜHRING NAVIGATOR

Cutting data page 433

Tool material	HSCO
Surface	A
Shank form	3-flats



Article no.		5539
Ø-range	Pieces/set	Order no.
mm		
6.3/8.3/10.4/12.4/16.5/20.5	6	5539 1.000
6.3/10.4/16.5/20.5/25.0	5	5539 2.000



60° Countersinks, spiral-fluted



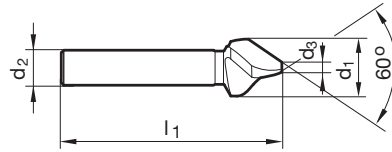
- P** • 3 different convex cutting edges
- low-vibration cutting processes
- M** • for round and chatter-free countersinking
- considerably lower feed force required
- K** • for universal application
- N** ○
- S** ○
- H** ○

Tool material	HSS
Surface	A
Shank form	cyl.



GÜHRING NAVIGATOR

Cutting data page 435



Article no. **5670**

d1	d2	d3	l1	Z	Order no.
mm	mm	mm	mm		
6.300	5.000	1.600	45.000	3	5670 6.300
8.000	6.000	2.000	50.000	3	5670 8.000
10.000	6.000	3.200	56.000	3	5670 10.000
12.500	8.000	3.200	56.000	3	5670 12.500
16.000	10.000	4.000	63.000	3	5670 16.000
20.000	10.000	5.000	67.000	3	5670 20.000
25.000	10.000	6.300	71.000	3	5670 25.000

Countersinking tools



60° Countersinks, spiral-fluted

Tool material **HSS**Surface **A**

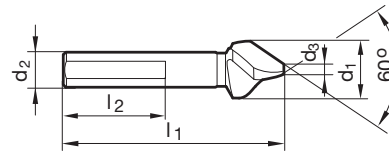
Shank form 3-flats



P	•	• 3-flats on shank prevent slipping in the chuck
M	•	• 3 different convex cutting edges
K	•	• perfect for hand drills
N	○	• low-vibration cutting processes
S	○	• for round and chatter-free countersinking
H		• considerably lower feed force required
		• for universal application

GÜHRING NAVIGATOR

Cutting data page 435

Article no. **5671**

d1	d2	d3	l1	l2	Z	Order no.
mm	mm	mm	mm	mm		
6.300	5.000	1.600	45.000	30.000	3	5671 6.300
8.000	6.000	2.000	50.000	30.000	3	5671 8.000
10.000	6.000	3.200	56.000	30.000	3	5671 10.000
12.500	8.000	3.200	56.000	30.000	3	5671 12.500
16.000	10.000	4.000	63.000	30.000	3	5671 16.000
20.000	10.000	5.000	67.000	30.000	3	5671 20.000
25.000	10.000	6.300	71.000	30.000	3	5671 25.000

Countersinking tools



60° Countersink sets, spiral-fluted



- P** • • consisting of art. no. 5670
- M** • • 3 different convex cutting edges
- K** • • low-vibration cutting processes
- N** ○ • for round and chatter-free countersinking
- S** ○ • considerably lower feed force required
- H** ○ • for universal application

GÜHRING NAVIGATOR

Cutting data page 435

Tool material	HSS
Surface	A
Shank form	cyl.



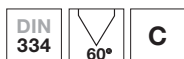
Article no. **5672**

Ø-range mm	Pieces/set	Order no.
6.3/8.0/10.0/12.5/16.0/20.0	6	5672 1.000

Countersinking tools



60° Countersink sets, spiral-fluted



P	•	• consisting of art. no. 5671
M	•	• 3 different convex cutting edges
K	•	• 3-flats on shank prevent slipping in the chuck
N	○	• perfect for hand drills
S	○	• low-vibration cutting processes
H		• for round and chatter-free countersinking
		• considerably lower feed force required
		• for universal application

GÜHRING NAVIGATOR

Cutting data page 435

Tool material **HSS**Surface **A**

Shank form 3-flats

Article no. **5673**

Ø-range mm	Pieces/set	Order no.
6.3/8.0/10.0/12.5/16.0/20.0	6	5673 1.000



82° Countersinks, spiral-fluted



Tool material HSCo

Surface A

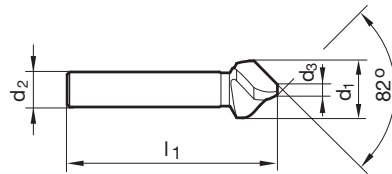
Shank form cyl.



- P** • 3 different convex cutting edges
- low-vibration cutting processes
- M** • for round and chatter-free countersinking
- considerably lower feed force required
- K** • for universal application
- N** ○
- S** ○
- H**

GÜHRING NAVIGATOR

Cutting data page 437



Article no. 5674

Countersinking tools

d1	d2	d3	l1	Z	Order no.
mm	mm	mm	mm		
6.350	6.350	1.520	50.800	3	5674 6.350
7.938	6.350	2.030	50.800	3	5674 7.938
9.525	6.350	2.290	50.800	3	5674 9.525
12.700	9.525	3.810	57.150	3	5674 12.700
15.875	9.525	4.570	57.150	3	5674 15.875
19.050	12.700	5.330	69.850	3	5674 19.050
22.225	12.700	5.840	69.850	3	5674 22.225
25.400	12.700	6.350	69.850	3	5674 25.400
31.750	12.700	9.400	76.200	3	5674 31.750



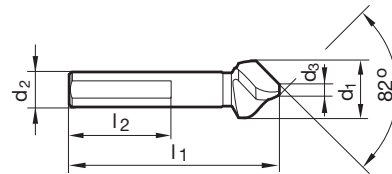
82° Countersinks, spiral-fluted

Tool material **HSCO**Surface **A**Shank form **3-flats**

P	•	• 3 different convex cutting edges
M	•	• 3-flats on shank prevent slipping in the chuck
K	•	• perfect for hand drills
N	○	• low-vibration cutting processes
S	○	• for round and chatter-free countersinking
H		• considerably lower feed force required
		• for universal application

GÜHRING NAVIGATOR

Cutting data page 437

Article no. **5675**

d1	d2	d3	l1	l2	Z	Order no.
mm	mm	mm	mm	mm		
6.350	6.350	1.520	50.800	30.000	3	5675 6.350
7.938	6.350	2.030	50.800	30.000	3	5675 7.938
9.525	6.350	2.290	50.800	30.000	3	5675 9.525
12.700	9.525	3.810	57.150	30.000	3	5675 12.700
15.875	9.525	4.570	57.150	30.000	3	5675 15.875
19.050	12.700	5.330	69.850	30.000	3	5675 19.050
22.225	12.700	5.840	69.850	30.000	3	5675 22.225
25.400	12.700	6.350	69.850	30.000	3	5675 25.400
31.750	12.700	9.400	76.200	30.000	3	5675 31.750



82° Countersink sets, spiral-fluted



- P** • • consisting of art. no. 5674
- M** • • 3 different convex cutting edges
- K** • • low-vibration cutting processes
- N** ○ • for round and chatter-free countersinking
- S** ○ • considerably lower feed force required
- H** ○ • for universal application

GÜHRING NAVIGATOR

Cutting data page 437

Tool material	HSCO
Surface	A
Shank form	cyl.



Article no. **5676**

Ø-range mm	Pieces/set	Order no.
1/4, 5/16.3/8.1/2.5/8.3/4	6	5676 1.000

Countersinking tools



82° Countersink sets, spiral-fluted



P	•	• consisting of art. no. 5675
M	•	• 3 different convex cutting edges
K	•	• 3-flats on shank prevent slipping in the chuck
N	○	• perfect for hand drills
S	○	• low-vibration cutting processes
H		• for round and chatter-free countersinking
		• considerably lower feed force required
		• for universal application

GÜHRING NAVIGATOR

Cutting data page 437

Tool material	HSCO
Surface	A
Shank form	3-flats


Article no. **5677**

Ø-range mm	Pieces/set	Order no.
1/4, 5/16.3/8.1/2.5/8.3/4	6	5677 1.000

GUHRING NAVIGATOR

Tools with bold feed column no. are preferred choice.
For blind holes with close diameter tolerances choose straight-fluted reamers.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.



Article no. 
Standard/DIN
Tool material
Surface
Type
Cooling
Std. range page

Tool Ø mm	Feed column no.						
	71	72	73	74	75	76	77
	f (mm/rev.)						
< 4.00	0.080	0.100	0.125	0.300	0.500	0.800	1.000
4.00	0.100	0.125	0.160	0.300	0.500	1.000	1.200
5.00	0.100	0.125	0.160	0.400	0.600	1.000	1.400
6.30	0.125	0.160	0.200	0.400	0.700	1.200	1.600
8.00	0.160	0.200	0.250	0.600	1.000	1.800	2.400
10.00	0.200	0.250	0.315	0.600	1.200	1.800	2.400
12.50	0.200	0.250	0.315	0.800	1.200	2.000	2.500
16.00	0.250	0.315	0.400	0.800	1.400	2.200	2.600
20.00	0.315	0.400	0.500	0.800	1.400	2.200	2.600
25.00	0.400	0.500	0.630	1.000	1.600	2.500	3.000
31.50	0.400	0.500	0.630	1.000	2.000	3.000	3.600
40.00	0.500	0.630	0.800	1.200	2.000	3.000	3.600
50.00	0.630	0.800	1.000	1.400	2.200	3.200	3.600
> 50.00	0.800	1.000	1.250	1.600	2.200	3.200	3.600

Coolant:

- Air
- Neat oil
- Soluble oil

Cutting direction:

-  right-hand cutting
-  left-hand cutting

Reaming tools

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		<input type="radio"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤ 850 ≤ 1000		<input type="radio"/>
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 ≤ 850 ≤ 1000		<input type="radio"/>
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤ 1000 ≤ 1400		<input type="radio"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤ 850		<input type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤ 1000 ≤ 1400		<input checked="" type="radio"/>
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤ 1000 ≤ 1400		<input checked="" type="radio"/>
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤ 850 ≤ 1400		<input type="radio"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤ 1400		<input checked="" type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤ 350 HB	<input checked="" type="radio"/>
Hardened steels	-		≤ 48 HRC ≤ 65 HRC	<input checked="" type="radio"/>
Stainless steels, sulphured austenitic martensitic	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		<input checked="" type="radio"/>
Cast iron	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	<input type="radio"/>
Spheroidal graphite iron and malleable cast iron	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	<input type="radio"/>
Chilled cast iron	-		≤ 350 HB	<input type="radio"/>
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤ 220 HB ≤ 300 HB	<input type="radio"/>
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤ 1000 ≤ 1400		<input type="radio"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤ 2000		<input checked="" type="radio"/>
Ti and Ti alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤ 850 ≤ 1400		<input checked="" type="radio"/>
Aluminium and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤ 400		<input type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤ 650		<input type="radio"/>
Al cast alloys ≤ 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"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤ 400		<input type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤ 500		<input type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤ 600		<input type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤ 600		<input type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤ 600 ≤ 850		<input checked="" type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤ 850 ≤ 1000		<input checked="" type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤ 150		<input type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤ 100		<input type="radio"/>
Kevlar	Kevlar	≤ 1000		<input type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤ 1000		<input type="radio"/>



High-performance reamers

1685 / 1675	1686 / 1676
Company std.	Company std.
Solid carbide	Solid carbide
a	a
HR 500 S	HR 500 D
axial	axial
388/390	389/392

1548	1549
Company std.	Company std.
Solid carbide	Solid carbide
a	a
HR 500 TS	HR 500 TD
axial	radial
394	395

1680	1681
Company std.	Company std.
Solid carbide	Solid carbide
a	a
HR 500 GS	HR 500 GD
axial	axial
396	397



V _c m/min	Feed col. no.	
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
60-120	75-76	75-76
30-60	73-74	73-74
40-60	73-74	73-74
30-60	73-74	73-74
60-120	74-75	74-75
40-80	74-75	74-75
60-120	74-75	74-75
60-140	75-76	75-76
60-140	75-76	75-76
120-250	74-75	74-75
60-120	74-75	74-75
30-50	74-75	74-75
80	75-76	75-76
80	75-76	75-76
40-60	74-75	74-75
40-60	74	74
40-60	74	74
80-160	75-76	75-76
100-250	75-76	75-76
100-250	75-76	75-76
100-250	75-76	75-76
80-200	75-76	75-76
80-200	75-76	75-76
80	71	71
80	71	71

V _c m/min	Feed col. no.	
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
120-250	75-76	75-76
60-120	75-76	75-76
30-60	73-74	73-74
40-60	73-74	73-74
30-60	73-74	73-74
60-120	74-75	74-75
40-80	74-75	74-75
60-120	74-75	74-75
60-140	75-76	75-76
60-140	75-76	75-76
120-250	74-75	74-75
60-120	74-75	74-75
30-50	74-75	74-75
80	75-76	75-76
80	75-76	75-76
40-60	74-75	74-75
40-60	74	74
40-60	74	74
80-160	75-76	75-76
100-250	75-76	75-76
100-250	75-76	75-76
100-250	75-76	75-76
80-200	75-76	75-76
80-200	75-76	75-76
80	71	71
80	71	71

V _c m/min	Feed col. no.	
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74	74
25-40	74-75	74-75
25-40	74-75	74-75
25-40	74-75	74-75
20-30	74	74
20-30	74-75	74-75
10-20	72-73	72-73
30-60	74-75	74-75
20-30	74-75	74-75
20-30	74-75	74-75
40-100	75-76	75-76
40-100	75-76	75-76
50-120	75-76	75-76
50-100	75-76	75-76
20-40	74-75	74-75
60-80	74-75	74-75
40-80	74-75	74-75
20-30	73-74	73-74
20-40	73-74	73-74
20-40	73-74	73-74
80-160	75-76	75-76
40-120	74-75	74-75
50-120	74-75	74-75
50-120	74-75	74-75
40-120	74-75	74-75
40-120	74-75	74-75
80	71	71
80	71	71

Reaming tools

GUHRING NAVIGATOR

Tools with bold feed column no. are preferred choice.
For blind holes with close diameter tolerances choose straight-fluted reamers.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

- Article no.
- Standard/DIN
- Tool material
- Carbide grade
- Surface
- Form
- Std. range page

Tool Ø mm	Feed column no.						
	71	72	73	74	75	76	77
	f (mm/rev.)						
< 4.00	0.080	0.100	0.125	0.300	0.500	0.800	1.000
4.00	0.100	0.125	0.160	0.300	0.500	1.000	1.200
5.00	0.100	0.125	0.160	0.400	0.600	1.000	1.400
6.30	0.125	0.160	0.200	0.400	0.700	1.200	1.600
8.00	0.160	0.200	0.250	0.600	1.000	1.800	2.400
10.00	0.200	0.250	0.315	0.600	1.200	1.800	2.400
12.50	0.200	0.250	0.315	0.800	1.200	2.000	2.500
16.00	0.250	0.315	0.400	0.800	1.400	2.200	2.600
20.00	0.315	0.400	0.500	0.800	1.400	2.200	2.600
25.00	0.400	0.500	0.630	1.000	1.600	2.500	3.000
31.50	0.400	0.500	0.630	1.000	2.000	3.000	3.600
40.00	0.500	0.630	0.800	1.200	2.000	3.000	3.600
50.00	0.630	0.800	1.000	1.400	2.200	3.200	3.600
> 50.00	0.800	1.000	1.250	1.600	2.200	3.200	3.600

Coolant:

- Air
- Neat oil
- Soluble oil

Cutting direction:

- right-hand cutting
- left-hand cutting

Reaming tools

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		<input type="radio"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤ 850 ≤ 1000		<input type="radio"/>
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 ≤ 850 ≤ 1000		<input type="radio"/>
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤ 1000 ≤ 1400		<input type="radio"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤ 850		<input type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤ 1000 ≤ 1400		<input checked="" type="radio"/>
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤ 1000 ≤ 1400		<input checked="" type="radio"/>
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤ 850 ≤ 1400		<input checked="" type="radio"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤ 1400		<input checked="" type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤ 350 HB	<input checked="" type="radio"/>
Hardened steels	-		≤ 48 HRC ≤ 65 HRC	<input checked="" type="radio"/>
Stainless steels, sulphured austenitic martensitic	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		<input checked="" type="radio"/>
Cast iron	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	<input type="radio"/>
Spheroidal graphite iron and malleable cast iron	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	<input type="radio"/>
Chilled cast iron	-		≤ 350 HB	<input type="radio"/>
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤ 220 HB ≤ 300 HB	<input type="radio"/>
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤ 1000 ≤ 1400		<input type="radio"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤ 2000		<input checked="" type="radio"/>
Ti and Ti alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤ 850 ≤ 1400		<input checked="" type="radio"/>
Aluminium and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤ 400		<input type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤ 650		<input type="radio"/>
Al cast alloys ≤ 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"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤ 400		<input type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤ 500		<input type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤ 600		<input type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤ 600		<input type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤ 600 ≤ 850		<input checked="" type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤ 850 ≤ 1000		<input checked="" type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤ 150		<input type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤ 100		<input type="radio"/>
Kevlar	Kevlar	≤ 1000		<input type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤ 1000		<input type="radio"/>



NC reamers

6019	6020
212-3	212-3
HSS-E	HSS-E
B	B
407	408

6016	5527
Com. std.	Com. std.
Sol. carb.	Sol. carb.
K10	K10
B	B
400	402

6017	6018
Com. std.	Com. std.
Sol. carb.	Sol. carb.
K10/K20	K10/K20
B	B
401	404

Machine reamers

405
208
HSS-E
B
410

1411
~8094
Carbide
B
406



V _c m/min	Feed col. no.		V _c m/min	Feed col. no.		V _c m/min	Feed col. no.		V _c m/min	Feed col. no.		
16	72	72	18	72	72	20	73	73	16	72	18	72
12	72	72	16	72	72	18	73	73	12	72	16	72
12	72	72	18	72	72	20	73	73	12	72	18	72
10	71	71	16	72	72	18	73	73	10	71	16	72
14	72	72	18	71	71	20	72	72	14	72	18	71
12	71	71	16	72	72	18	72	72	12	71	16	72
10	71	71	14	71	71	15	72	72	10	71	14	71
10	71	71	14	71	71	15	72	72	10	71	14	71
8	71	71	12	71	71	13	71	71	8	71	12	71
16	72	72	18	71	71	20	73	73	16	72	18	71
10	71	71	14	71	71	15	72	72	10	71	14	71
8	71	71	12	71	71	13	72	72	8	71	12	71
10	71	71	14	71	71	15	71	71	10	71	14	71
8	71	71	12	71	71	13	71	71	8	71	12	71
14	72	72	12	71	71	13	71	71	14	72	12	71
10	71	71	10	71	71	11	71	71	10	71	10	71
10	71	71	10	71	71	11	71	71	10	71	10	71
			6	71	71	8	71	71				
6	72	72	8	71	71	9	71	71	6	72	8	71
6	72	72	6	71	71	7	71	71	6	72	6	71
4	72	72	6	71	71	7	71	71	4	72	6	71
14	71	71	20	71	71	22	73	73	14	71	20	71
12	71	71	18	71	71	20	73	73	12	71	18	71
12	71	71	20	71	71	22	73	73	12	71	20	71
10	71	71	18	71	71	20	73	73	10	71	18	71
						4	71	71				
8	71	71	16	71	71	16	71	71	8	71	16	71
8	71	71	16	71	71	16	71	71	8	71	16	71
			12	71	71							
			12	71	71							
4	71	71	6	71	71	7	71	71	4	71	6	71
6	71	71	10	71	71	11	71	71	6	71	10	71
4	71	71	10	71	71	11	71	71	4	71	10	71
18	73	73	30	73	73				18	73	30	73
18	73	73	30	73	73				18	73	30	73
20	72	72	40	72	72				20	72	40	72
18	72	72	30	72	72				18	72	30	72
20	72	72	25	72	72	28	73	73	20	72	25	72
18	72	72	25	72	72	28	73	73	18	72	25	72
18	72	72	35	72	72	39	73	73	18	72	35	72
16	72	72	30	72	72	33	73	73	16	72	30	72
20	72	72	35	72	72	39	73	73	20	72	35	72
18	72	72	30	72	72	33	73	73	18	72	30	72
18	72	72	30	72	72	33	73	73	18	72	30	72
14	72	72	25	72	72	28	73	73	14	72	25	72
12	73	73	20	73	73	22	73	73	12	73	20	73
14	73	73	20	73	73	22	73	73	14	73	20	73

Reaming tools

GÜHRING NAVIGATOR Spiral countersinks

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Article no.	
Standard/DIN	
Tool material	
Surface	
Countersink angle	
Shank form	
Std. range page	

Tool Ø mm	Feed column no.					
	81	82	83	84	85	86
	f (mm/rev.)					
2.00	0.03	0.04	0.06	0.08	0.10	0.13
2.50	0.03	0.05	0.07	0.10	0.13	0.16
3.15	0.03	0.05	0.08	0.11	0.15	0.20
4.00	0.04	0.06	0.09	0.13	0.17	0.22
5.00	0.04	0.07	0.10	0.14	0.18	0.23
6.30	0.04	0.07	0.12	0.15	0.19	0.24
8.00	0.05	0.08	0.13	0.16	0.20	0.25
10.00	0.06	0.09	0.14	0.17	0.22	0.26
12.50	0.06	0.10	0.15	0.19	0.23	0.28
16.00	0.07	0.11	0.17	0.21	0.26	0.31
20.00	0.08	0.13	0.18	0.23	0.28	0.33
25.00	0.09	0.15	0.21	0.26	0.30	0.38
31.50	0.12	0.17	0.24	0.30	0.36	0.42
40.00	0.14	0.21	0.28	0.34	0.40	0.46

- Coolant:
- Air
 - Neat oil
 - Soluble oil

Countersinking tools

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		<input type="radio"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input checked="" type="radio"/>
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input checked="" type="radio"/>
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input checked="" type="radio"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input checked="" type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input checked="" type="radio"/>
Hardened steels	-		≤48 HRC ≤65 HRC	<input checked="" type="radio"/>
Stainless steels, sulphured austenitic martensitic	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		<input checked="" type="radio"/>
Cast iron	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	<input type="radio"/>
Spheroidal graphite iron and malleable cast iron	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	<input type="radio"/>
Chilled cast iron	-		≤350 HB	<input type="radio"/>
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input checked="" type="radio"/>
Ti and Ti alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input checked="" type="radio"/>
Aluminium and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Al cast alloys ≤ 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"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input checked="" type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input checked="" type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Kevlar	Kevlar	≤1000		<input type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤1000		<input type="radio"/>



5500	5538
DIN 335	DIN 335
HSCO	HSCO
A	A
90°	90°
cyl.	cyl.
415	418

5501	5539
DIN 335	DIN 335
HSCO	HSCO
A	A
90°	90°
3 surface	3 surface
416	419

5503
Company standard
HSS
A
90°
cyl.
417



V _c m/min	Feed col. no.	
41	83	83
39	82	82
41	83	83
39	82	82
41	83	83
39	83	83
25	82	82
19	83	83
15	82	82
32	83	83
19	83	83
13	82	82
19	82	82
15	81	81
22	82	82
19	81	81
19	81	81
13	81	81
20	82	82
15	81	81
18	81	81
32	83	83
20	83	83
28	83	83
25	83	83
10	81	81
28	83	83
18	83	83
10	81	81
19	82	82
13	81	81
114	84	84
89	84	84
51	83	83
39	83	83
127	84	84
76	84	84
101	84	84
64	84	84
39	84	84
33	84	84
31	84	84
25	84	84
39	84	84
51	84	84

V _c m/min	Feed col. no.	
41	83	83
39	82	82
41	83	83
39	82	82
41	83	83
39	83	83
25	82	82
19	83	83
15	82	82
32	83	83
19	83	83
13	82	82
19	82	82
15	81	81
22	82	82
19	81	81
19	81	81
13	81	81
20	82	82
15	81	81
18	81	81
32	83	83
20	83	83
28	83	83
25	83	83
10	81	81
28	83	83
18	83	83
10	81	81
19	82	82
13	81	81
114	84	84
89	84	84
51	83	83
39	83	83
127	84	84
76	84	84
101	84	84
64	84	84
39	84	84
33	84	84
31	84	84
25	84	84
39	84	84
51	84	84

V _c m/min	Feed col. no.
37	83
35	82
37	83
35	82
37	83
35	83
23	82
17	83
14	82
29	83
17	83
12	82
17	82
14	81
20	82
17	81
17	81
12	81
18	82
14	81
16	81
29	83
18	83
25	83
23	83
9	81
25	83
16	83
9	81
17	82
12	81
104	84
81	84
46	83
35	83
115	84
69	84
92	84
58	84
35	84
30	84
28	84
23	84
35	84
46	84

GUHRING NAVIGATOR Spiral countersinks

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Article no.	
Standard/DIN	
Tool material	
Surface	
Countersink angle	
Shank form	
Std. range page	

Tool Ø mm	Feed column no.					
	81	82	83	84	85	86
	f (mm/rev.)					
2.00	0.03	0.04	0.06	0.08	0.10	0.13
2.50	0.03	0.05	0.07	0.10	0.13	0.16
3.15	0.03	0.05	0.08	0.11	0.15	0.20
4.00	0.04	0.06	0.09	0.13	0.17	0.22
5.00	0.04	0.07	0.10	0.14	0.18	0.23
6.30	0.04	0.07	0.12	0.15	0.19	0.24
8.00	0.05	0.08	0.13	0.16	0.20	0.25
10.00	0.06	0.09	0.14	0.17	0.22	0.26
12.50	0.06	0.10	0.15	0.19	0.23	0.28
16.00	0.07	0.11	0.17	0.21	0.26	0.31
20.00	0.08	0.13	0.18	0.23	0.28	0.33
25.00	0.09	0.15	0.21	0.26	0.30	0.38
31.50	0.12	0.17	0.24	0.30	0.36	0.42
40.00	0.14	0.21	0.28	0.34	0.40	0.46

- Coolant:
- Air
 - Neat oil
 - Soluble oil

Countersinking tools

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		<input type="radio"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤ 850 ≤ 1000		<input type="radio"/>
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤ 700 ≤ 850 ≤ 1000		<input type="radio"/>
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤ 1000 ≤ 1400		<input type="radio"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤ 850		<input type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤ 1000 ≤ 1400		<input type="radio"/>
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤ 1000 ≤ 1400		<input type="radio"/>
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤ 850 ≤ 1400		<input type="radio"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤ 1400		<input type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤ 350 HB	<input type="radio"/>
Hardened steels	-		≤ 48 HRC ≤ 65 HRC	<input type="radio"/>
Stainless steels, sulphured austenitic martensitic	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		<input type="radio"/>
Cast iron	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	<input type="radio"/>
Spheroidal graphite iron and malleable cast iron	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	<input type="radio"/>
Chilled cast iron	-		≤ 350 HB	<input type="radio"/>
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤ 220 HB ≤ 300 HB	<input type="radio"/>
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤ 1000 ≤ 1400		<input type="radio"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤ 2000		<input type="radio"/>
Ti and Ti alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤ 850 ≤ 1400		<input type="radio"/>
Aluminium and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤ 400		<input type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤ 650		<input type="radio"/>
Al cast alloys ≤ 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"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤ 400		<input type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤ 500		<input type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤ 600		<input type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤ 600		<input type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤ 600 ≤ 850		<input type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤ 850 ≤ 1000		<input type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤ 150		<input type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤ 100		<input type="radio"/>
Kevlar	Kevlar	≤ 1000		<input type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤ 1000		<input type="radio"/>



5670	5672
DIN 334	DIN 334
HSS	HSS
A	A
60°	60°
cyl.	cyl.
420	422

5671	5673
DIN 334	DIN 334
HSS	HSS
A	A
60°	60°
3 surface	3 surface
421	423



V _c m/min	Feed col. no.	
37	83	83
35	82	82
37	83	83
35	82	82
37	83	83
35	83	83
23	82	82
17	83	83
14	82	82
29	83	83
17	83	83
12	82	82
17	82	82
14	81	81
20	82	82
17	81	81
17	81	81
12	81	81
18	82	82
14	81	81
16	81	81
29	83	83
18	83	83
25	83	83
23	83	83
9	81	81
25	83	83
16	83	83
9	81	81
17	82	82
12	81	81
104	84	84
81	84	84
46	83	83
35	83	83
115	84	84
69	84	84
92	84	84
58	84	84
35	84	84
30	84	84
28	84	84
23	84	84
35	84	84
46	84	84

V _c m/min	Feed col. no.	
37	83	83
35	82	82
37	83	83
35	82	82
37	83	83
35	83	83
23	82	82
17	83	83
14	82	82
29	83	83
17	83	83
12	82	82
17	82	82
14	81	81
20	82	82
17	81	81
17	81	81
12	81	81
18	82	82
14	81	81
16	81	81
29	83	83
18	83	83
25	83	83
23	83	83
9	81	81
25	83	83
16	83	83
9	81	81
17	82	82
12	81	81
104	84	84
81	84	84
46	83	83
35	83	83
115	84	84
69	84	84
92	84	84
58	84	84
35	84	84
30	84	84
28	84	84
23	84	84
35	84	84
46	84	84

Countersinking tools

GÜHRING NAVIGATOR Spiral countersinks

Tools with bold feed column no. are preferred choice.

To select the optimal tool and the recommended machining parameters for your application, please also use the electronic version of the Gühring Navigator on the internet: www.guehring.com.

Article no.	
Standard/DIN	
Tool material	
Surface	
Countersink angle	
Shank form	
Std. range page	

Tool Ø mm	Feed column no.					
	81	82	83	84	85	86
	f (mm/rev.)					
2.00	0.03	0.04	0.06	0.08	0.10	0.13
2.50	0.03	0.05	0.07	0.10	0.13	0.16
3.15	0.03	0.05	0.08	0.11	0.15	0.20
4.00	0.04	0.06	0.09	0.13	0.17	0.22
5.00	0.04	0.07	0.10	0.14	0.18	0.23
6.30	0.04	0.07	0.12	0.15	0.19	0.24
8.00	0.05	0.08	0.13	0.16	0.20	0.25
10.00	0.06	0.09	0.14	0.17	0.22	0.26
12.50	0.06	0.10	0.15	0.19	0.23	0.28
16.00	0.07	0.11	0.17	0.21	0.26	0.31
20.00	0.08	0.13	0.18	0.23	0.28	0.33
25.00	0.09	0.15	0.21	0.26	0.30	0.38
31.50	0.12	0.17	0.24	0.30	0.36	0.42
40.00	0.14	0.21	0.28	0.34	0.40	0.46

- Coolant:
- Air
 - Neat oil
 - Soluble oil

Countersinking tools

Material group	Material examples Figures in bold = material no. to DIN EN 10 027	Tensile strength MPa (N/mm ²)	Hardness	Coolant
Common structural steels	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		<input type="radio"/>
Free-cutting steels	1.0718 11SMnPb30 (9SMnPb28), 1.0736 11SMn37 (9SMn36) 1.0727 46S20 (45S20), 1.0728 (60S20), 1.0757 46SPb20 (45SPb20)	≤850 ≤1000		<input type="radio"/>
Unalloyed heat-treatable steels	1.0402 C22, 1.1178 C30E (Ck30) 1.0503 C45, 1.1191 C45E (Ck45) 1.0601 C60, 1.1221 C60E (Ck60)	≤700 ≤850 ≤1000		<input type="radio"/>
Alloyed heat-treatable steels	1.5131 50MnSi4, 1.7003 38Cr2, 1.7030 28Cr4 1.5710 36NiCr6, 1.7035 41Cr4, 1.7225 42CrMo4	≤1000 ≤1400		<input type="radio"/>
Unalloyed case hardened steels	1.0301 (C10), 1.1121 C10E (Ck10)	≤850		<input type="radio"/>
Alloyed case hardened steels	1.7276 10CrMo11, 1.5125 11MnSi6 1.5752 15NiCr13, 1.7131 16MnCr5, 1.7264 20CrMo5	≤1000 ≤1400		<input type="radio"/>
Nitriding steels	1.8504 34CrAl6 1.8519 31CrMoV9, 1.8550 34CrAlNi7	≤1000 ≤1400		<input type="radio"/>
Tool steels	1.1750 C75W, 1.2067 102Cr6, 1.2307 29CrMoV9 1.2080 X210Cr12, 1.2083 X42Cr13, 1.2419 105WCr6, 1.2767 X45NiCrMo4	≤850 ≤1400		<input type="radio"/>
High speed steels	1.3243 S 6-5-2-5, 1.3343 S 6-5-2, 1.3344 S 6-5-3	≤1400		<input type="radio"/>
Spring steels	1.5026 55Si7, 1.7176 55Cr3, 1.8159 51CrV4 (51CrV4)		≤350 HB	<input type="radio"/>
Hardened steels	-		≤48 HRC ≤65 HRC	<input type="radio"/>
Stainless steels, sulphured austenitic martensitic	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		<input type="radio"/>
Cast iron	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	<input type="radio"/>
Spheroidal graphite iron and malleable cast iron	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	<input type="radio"/>
Chilled cast iron	-		≤350 HB	<input type="radio"/>
New cast materials GGV	EN-GJV250 (GGV25), EN-GJV350 (GGV35) EN-GJV400 (GGV40), EN-GJV500 (GGV50), SiMo 6		≤220 HB ≤300 HB	<input type="radio"/>
New cast materials ADI	EN-GJS-800-8 (ADI800), EN-GJS-1000-5 (ADI1000) EN-GJS-1200-2 (ADI1200), EN-GJS-1400-1 (ADI1400)	≤1000 ≤1400		<input type="radio"/>
Special alloys	Nimonic, Inconel, Monel, Hastelloy	≤2000		<input type="radio"/>
Ti and Ti alloys	3.7024 Ti99,5, 3.7114 TiAl5Sn2,5, 3.7124 TiCu2 3.7154 TiAl6Zr5, 3.7165 TiAl6V4, 3.7184 TiAl4Mo4Sn2,5, - TiAl8Mo1V1	≤850 ≤1400		<input type="radio"/>
Aluminium and Al alloys	3.0255 Al99,5, 3.2315 AlMgSi1, 3.3515 AlMg1	≤400		<input type="radio"/>
Al wrought alloys	3.0615 AlMgSiPb, 3.1325 AlCuMg1, 3.3245 AlMg3Si, 3.4365 AlZnMgCu1,5	≤650		<input type="radio"/>
Al cast alloys ≤ 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"/>
Magnesium alloys	3.5200 MgMn2, 3.5812.05 G-MgAl8Zn1, 3.5612.05 G-MgAl6Zn1	≤400		<input type="radio"/>
Copper, low-alloyed	2.0070 SE-Cu, 2.1020 CuSn6, 2.1096 G-CuSn5ZnPb	≤500		<input type="radio"/>
Brass, short-chipping	2.0380 CuZn39Pb2, 2.0401 CuZn39Pb3, 2.0410 CuZn43Pb2	≤600		<input type="radio"/>
long-chipping	2.0250 CuZn20, 2.0280 CuZn33, 2.0332 CuZn37Pb0,5	≤600		<input type="radio"/>
Bronze, short-chipping	2.1090 CuSn7ZnPb, 2.1170 CuPb5Sn5, 2.1176 CuPb10Sn 2.0790 CuNi18Zn19Pb	≤600 ≤850		<input type="radio"/>
Bronze, long-chipping	2.0916 CuAl5, 2.0960 CuAl9Mn, 2.1050 CuSn10 2.0980 CuAl11Ni, 2.1247 CuBe2	≤850 ≤1000		<input type="radio"/>
Duroplastics	Bakelit, Resopal, Pertinax, Moltopren	≤150		<input type="radio"/>
Thermoplastics	Plexiglass, Hostalen, Novodur, Makralon	≤100		<input type="radio"/>
Kevlar	Kevlar	≤1000		<input type="radio"/>
Glass, carbon concentr. plastics	GFK/CFK	≤1000		<input type="radio"/>



5674	5676
Company standard	Company standard
HSCO	HSCO
A	A
82°	82°
cyl.	cyl.
424	426

5675	5677
Company standard	Company standard
HSCO	HSCO
A	A
82°	82°
3 surface	3 surface
425	427



V _c m/min	Feed col. no.	
41	83	83
39	82	82
41	83	83
39	82	82
41	83	83
39	83	83
25	82	82
19	83	83
15	82	82
32	83	83
19	83	83
13	82	82
19	82	82
15	81	81
22	82	82
19	81	81
19	81	81
13	81	81
20	82	82
15	81	81
18	81	81
32	83	83
20	83	83
28	83	83
25	83	83
10	81	81
28	83	83
18	83	83
10	81	81
19	82	82
13	81	81
114	84	84
89	84	84
51	83	83
39	83	83
127	84	84
76	84	84
101	84	84
64	84	84
39	84	84
33	84	84
31	84	84
25	84	84
39	84	84
51	84	84

V _c m/min	Feed col. no.	
41	83	83
39	82	82
41	83	83
39	82	82
41	83	83
39	83	83
25	82	82
19	83	83
15	82	82
32	83	83
19	83	83
13	82	82
19	82	82
15	81	81
22	82	82
19	81	81
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13	81	81
20	82	82
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18	81	81
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20	83	83
28	83	83
25	83	83
10	81	81
28	83	83
18	83	83
10	81	81
19	82	82
13	81	81
114	84	84
89	84	84
51	83	83
39	83	83
127	84	84
76	84	84
101	84	84
64	84	84
39	84	84
33	84	84
31	84	84
25	84	84
39	84	84
51	84	84

Countersinking tools



Component courtesy of Langer GmbH & Co. KG

CLAMPING SYSTEMS GM 300

5

<i>Shrink fit chucks</i>	<i>P. 451</i>
<i>Hydraulic chucks</i>	<i>P. 469</i>
<i>Precision clamping chucks</i>	<i>P. 476</i>
<i>Precision collet holders</i>	<i>P. 483</i>
<i>Side lock holders</i>	<i>P. 491</i>
<i>Tapping chucks</i>	<i>P. 495</i>

CLAMPING SYSTEMS OVERVIEW



Shrink fit chucks



- ▶ Shrink chucks are characterised by high concentricity, rigidity and high clamping force and are therefore ideally suited for HSC applications such as piloting (drilling), countersinking and milling.

New: long, slim design with optimised interference contour for improved accessibility, ideal for 5-axis machining

Hydraulic chucks



- ▶ Hydraulic expansion chucks are characterised by their easy handling, high damping and repeatable concentricity. They are ideal for drilling and reaming applications.

New: long, slim design with optimised interference contour for improved accessibility, ideal for 5-axis machining

Precision clamping chucks



- ▶ HPC chucks offer extreme clamping force, rigidity and high concentricity. They are therefore ideally suited for heavy HPC milling and fast, precise HSC milling.

New: long, slim design for improved accessibility, ideal for 5-axis machining

Precision collet holders



- ▶ Precision collet chuck holders are characterised by their rotational symmetrical design, high flexibility and the best concentric accuracy. They are ideal for applications in the high speed range, such as for microprocessing.

New: Collet chuck holders with HSK-A and HSK-E interface

Side lock holders



- ▶ Due to the simple handling and safe clamping of the tools, side lock holders are ideally suited for applications in the low speed and accuracy range, such as in roughing.

Tapping chucks



- ▶ The Gührosync tapping chucks are characterised by the perfect combination of hydraulic expansion chuck and synchro chuck. They reduce axial and radial forces during thread cutting and forming thanks to the optimal combination of durable metal springs and damping elements made of polymer. The advantages are higher tool life, excellent thread quality and high process reliability.



P. 451



P. 469



P. 476



P. 483



P. 491



P. 495

Tool holders






Application-specific selection of tool holders

Shrink fit chucks/ shrink fit extensions	Hydraulic chucks/ HMC 3000/reduction bushes	GÜHROSYNC Hydraulic synchro tapping chucks
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Main feature	For applications requiring slim interference contours and precision with good clamping force and rigidity at a moderate price.	Easy handling when stiffness and damping are required.	Combines the advantages of hydraulic expansion and synchro-clamping technology, compensates deviations of the machine optimally.
Main application	HSC – universal Drilling, countersinking, milling, reaming	Reaming and drilling Countersinking, HSC application, light milling	Synchronized thread cutting and thread forming
Characteristics	<ul style="list-style-type: none"> highest concentricity accuracy thanks to patented damping screw high stiffness and clamping force modularly extendable 	<ul style="list-style-type: none"> high damping with high concentricity accuracy simple handling flexible use thanks to reducing bushes also with GÜHROJet 	<ul style="list-style-type: none"> perfect combination of hydraulic expansion chuck and synchro tapping chuck simple handling flexible use thanks to reducing bushes also with GÜHROJet long-lasting axial and radial balancing
Interfaces			
Clamping diameter range	3-32 mm	3-32 mm	Holder Ø 12: M2 - M12 (Mt max.: 26 Nm) Holder Ø 20: M4.5 - M20 (Mt max.: 90 Nm)
Concentricity	< 3 µm	< 3 µm	< 50 µm
Balance quality	G 2.5 with 25,000 1/min or U < 1 gmm	G 2.5 with 25,000 1/min or U < 1 gmm	G 6.3 with 15,000 1/min
Concentricity with 5xD	< 5 µm	< 5 µm	-
Clamping force	very high	very high	very high
Rigidity	very high	high	medium
Dampening	low	very high	very high
Interference contour	small/minimal	medium	medium
Handling	good	very good/very flexible	very good/very flexible
Actuation	Shrink fit device e.g. GSS 2000 article no. 4742	Hexagon key e.g. article no. 4912	Hexagon key e.g. article no. 4912



Main feature	Provides extreme clamping force and rigidity to compensate lateral forces acting on the tool during HPC milling.	All-rounder for universal use in the low accuracy range.	Simple handling with safe clamping for applications involving large machining volumes.
Main application	HPC milling heavy HPC and fast, accurate HSC milling, drilling, universal application	Flexible – universal light machining, centering, chamfering, drilling, threading; intermediate shank dimensions	Roughing Milling, drilling
Characteristics	<ul style="list-style-type: none"> extreme clamping force and stability thanks to mechanical clamping transmission high precision and balancing quality flexible use thanks to reducing bushes also with GÜHROJet 	<ul style="list-style-type: none"> flexible chuck for various shank dimensions and tolerances for conventional machining operations 	<ul style="list-style-type: none"> robust, low cost chuck for heavy machining in the lower speed and accuracy range
Interfaces			
Clamping diameter range	3-32 mm 1-6 mm (HPC extensions)	ER 11: 0.5-7.0 mm ER 16: 0.5-10.0 mm ER 20: 0.5-13.0 mm ER 25: 0.5-16.0 mm ER 32: 1.0-20.0 mm ER 40: 3.0-26.0 mm	6-40 mm
Concentricity	< 3 µm	< 10 µm	< 10 µm
Balance quality	G 2.5 with 20,000 1/min or U < 1.2 gmm	G 2.5 with 25,000 1/min or U < 1 gmm	G 6.3 with 15,000 1/min
Concentricity with 5xD	< 8 µm	< 20 µm	< 25 µm
Clamping force	extremely high	medium	very safe thanks to threaded pin
Rigidity	extremely high	medium	very high
Dampening	high	high	low
Interference contour	medium	large	large
Handling	very good/very flexible	good	good
Actuation	Hexagon key/torque wrench e.g. article no. 4987 + 4916 Type D	Hook spanner max. torque: information at GM 300 catalogue at clamping screw article no. 4903	Hexagon key max. torque: information at GM 300 catalogue at clamping screw article no. 4903



GÜHROSync

Shrink fit chucks

4736 HSK-A

4726 TSG 3000 HSK-A

4758 HSK-C

4738 SK

Hydraulic chucks with increased clamping force

4221 MAS-BT

4299 HSK-A

4267 HSK-C

4213 SK

4949 Coolant supply set HSK-A for conventional cooling



Hydraulic synchro tapping chucks

4601 HSK-A

4925 Pull studs for ISO taper
4926



Hydraulic synchro tapping chucks

4576 ISO taper

4927 Pull studs for MAS/BT
4928



Hydraulic synchro tapping chucks

4577 MAS-BT



4525
Hydro Ø 12/Ø 20
Cylindrical hydraulic synchro tapping chucks Ø 20 with internal cooling



4364
Setting screws "face" synchro tapping chucks, with conventional int. cooling



4605 Reduction bush sealed

4606 GÜHROJet reduction bush



Threading tool:
shank diameter x square

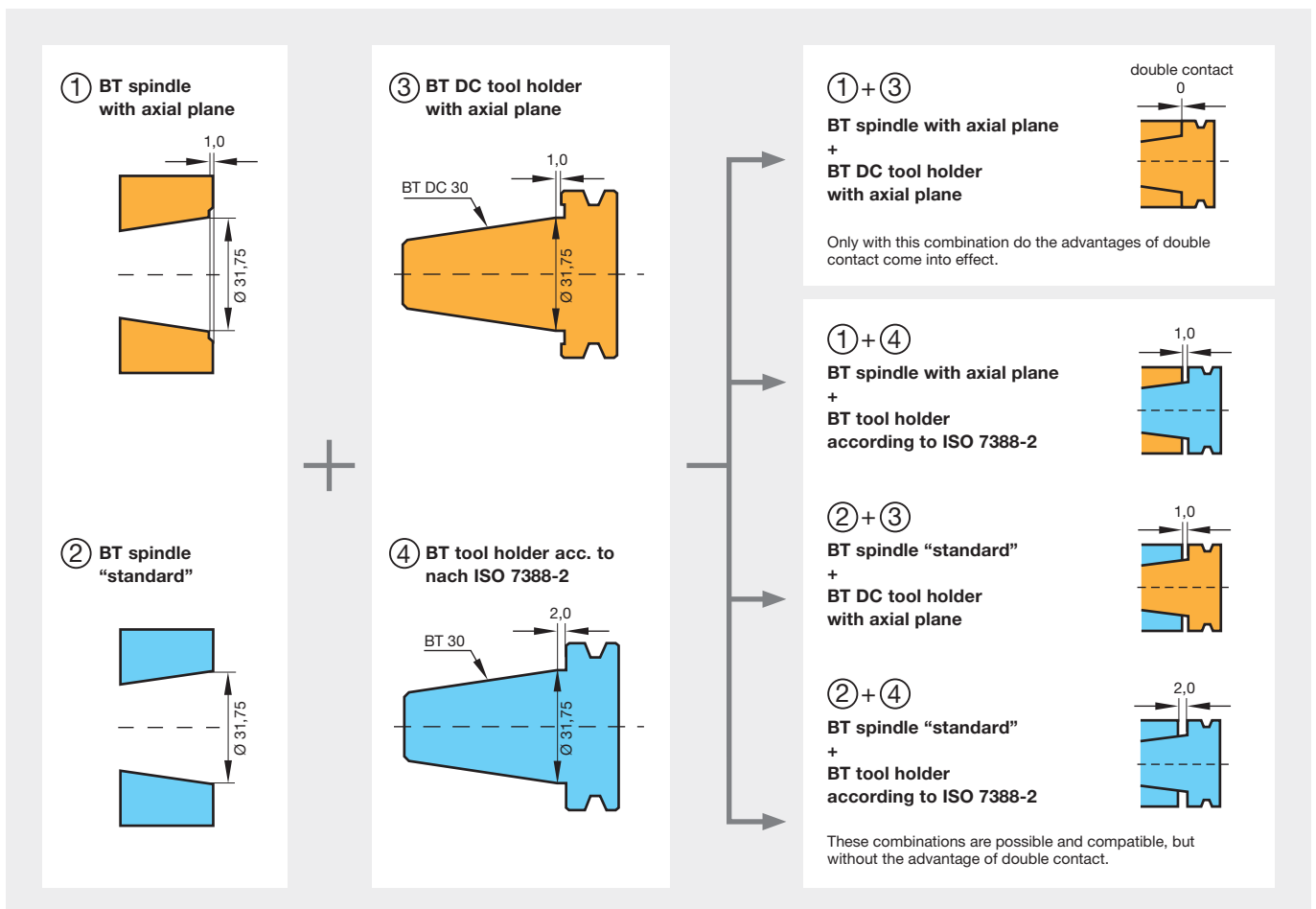
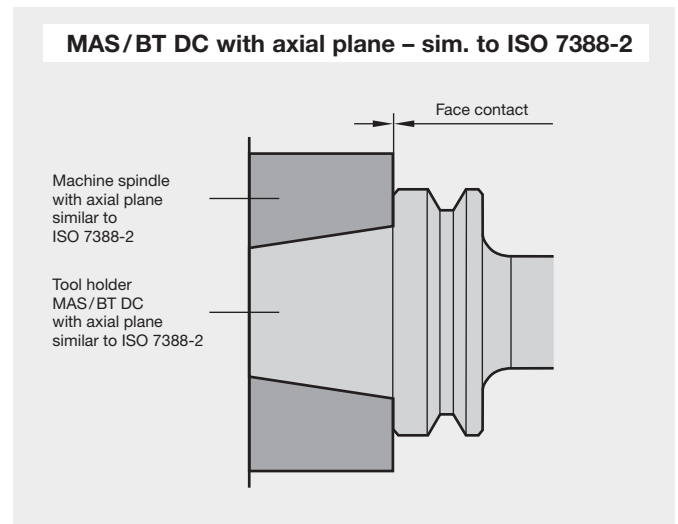
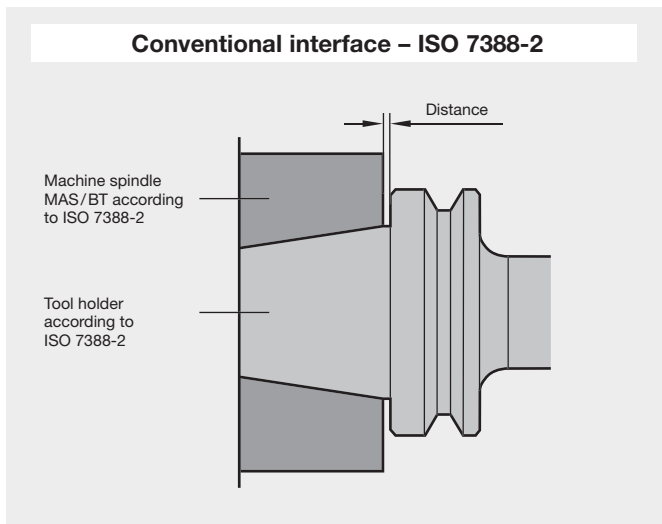
MAS/BT DC with axial plane

Gühring tool holders: MAS/BT DC = double contact

- suitable for machine spindles with MAS/BT spindle with axial plane as well as conventional machine spindles with MAS/BT interface according to ISO 7388-2 (JIS B 6339)
- additional axial plane compared to conventional MAS/BT tool holders according to ISO 7388-2

The combination of MAS/BT machine spindles and MAS/BT DC tool holders with axial plane ensures:

- optimised accuracy and repeatability
- better rigidity
- no axial displacing at high speeds


























Tool holders



Tool illustration	Interface	Standard	Article no.	Page
Shrink fit chucks HSK-A, slim design 3°			4787	451
HSK-A shrink fit chucks				
HSK-A shrink fit chucks			4736	452
HSK-A shrink fit chucks GÜHROJET with peripheral cooling				
HSK-A shrink fit chucks			4755	455
Shrink fit chucks HSK-E, slim design 3°				
HSK-E shrink fit chucks			4789	457
HSK-E shrink fit chucks				
ISO taper shrink fit chucks, slim design 3°			4788	460
ISO taper shrink fit chucks				
ISO taper shrink fit chucks			4738	461
ISO taper shrink fit chucks GÜHROJET				
ISO taper shrink fit chucks			4729	463
MAS/BT shrink fit chucks				
MAS/BT shrink fit chucks			4739	464
MAS/BT DC shrink fit chucks with axial plane				
MAS/BT DC shrink fit chucks			4790	466
Shrink fit extensions				
Shrink fit extensions			4719	467
HSK-A hydraulic chucks, slim design 3°				
HSK-A hydraulic chucks			4596	469













Tool illustration	Interface	Standard	Article no.	Page
HSK-A hydraulic chucks with increased clamping force			4299	470
ISO taper hydraulic chucks, slim design 3°			4597	472
ISO taper hydraulic chucks with increased clamping force			4213	473
MAS/BT hydraulic chucks with increased clamping force			4221	474
MAS/BT DC hydraulic chucks with axial plane			4598	475
HSK-A precision clamping chucks			4300	476
ISO taper precision clamping chucks			4301	477
MAS/BT precision clamping chucks			4244	478
Extensions HPC			4208	479
GÜHROJET clamping sleeves, for precision clamping chucks			4302	480
Clamping sleeves for precision clamping chucks, sealed version			4235	481
HSK-A precision collet holders			4476	483



Tool illustration	Interface	Standard	Article no.	Page	
HSK-E precision collet holders			4475	484	
					
Precision collets for precision collet holders			4574	485	
					
Precision collets for precision collet holders, sealed version			4575	486	
					
Retaining nut for precision collet holders			4573	487	
					
Roller bearing wrenches for precision collet holders			4994	488	
					
Roller bearing wrenches head for torque wrenches			4995	489	
					
Torque wrenches			4981	490	
					
GÜHROJET HSK-A Weldon side lock holders		DIN 69882-4	4232	491	
					
GÜHROJET ISO taper Weldon side lock holders				4317	493
					
GÜHROJET MAS/BT Weldon side lock holders			4234	494	
					
HSK-A hydraulic synchro tapping chucks with internal coolant			4601	495	
					
ISO taper hydraulic synchro tapping chucks with internal coolant			4576	496	
					



Tool illustration	Interface	Standard	Article no.	Page
<p>MAS/BT hydraulic synchro tapping chucks with internal coolant</p> 			4577	497
<p>Straight shank hydraulic synchro tapping chucks for internal coolant</p> 			4525	498
<p>GÜHROJET reduction bushes for hydraulic synchro tapping chucks</p> 			4606	499
<p>Adjustment screws "faces" for synchro tapping chucks with int. coolant</p> 			4364	501

Tool holders

Slim design



*+ slim interference contour
for improved accessibility*

*+ maximum stability
and concentricity
for the best service life
and surfaces*

*+ ideal accessibility,
especially in 5-axis machining*



Shrink fit chucks HSK-A, slim design 3°



NEW

Product information:

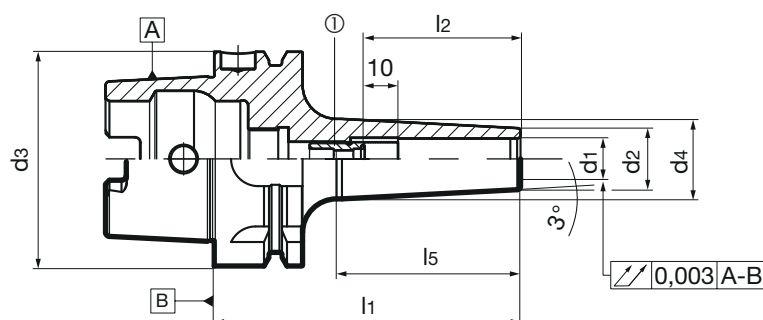
- HSK-A to ISO 12164-1 / DIN 69893-1
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for carbide tool shanks in tolerance h6 (from d1 14 mm also HSS possible)
- axial length adjustment
- concentricity:
l1 up to 120 mm: max. 4 µm
l1 up to 160 mm: max. 5 µm

Scope of delivery:

- incl. setting screw (1) with axial force art. no. 4941 or 4904

Suitable accessories separately available:

- coolant supply set art. no. 4949
- for MQL application on request
- special dimensions on request



Article no.

4787

d3	d1 h6	d2	d4	l1	l2	l5	①	kg	Order no.
	mm	mm	mm	mm	mm	mm			
HSK-A 63	3	9	13.0	80	30	40	4904 5.016	0.6	4787 3.063
HSK-A 63	4	10	14.0	80	35	41	4904 6.016	0.7	4787 4.063
HSK-A 63	5	11	15.0	80	40	41	4904 8.018	0.7	4787 5.063
HSK-A 63	6	12	16.0	80	36	42	4941 6.100	0.7	4787 6.063
HSK-A 63	8	14	18.0	80	36	42	4941 8.100	0.7	4787 8.063
HSK-A 63	10	16	21.0	85	41	49	4941 10.100	0.7	4787 10.063
HSK-A 63	12	18	23.5	90	46	54	4941 12.100	0.7	4787 12.063
HSK-A 63	14	20	25.5	90	46	54	4941 14.100	0.7	4787 14.063
HSK-A 63	16	22	28.0	95	49	59	4941 16.100	0.8	4787 16.063
HSK-A 63	18	24	30.0	95	49	59	4941 18.100	0.8	4787 18.063
HSK-A 63	20	26	32.5	100	51	64	4941 20.100	0.9	4787 20.063
HSK-A 63	3	9	17.0	120	30	80	4904 5.016	0.7	4787 3.163
HSK-A 63	4	10	18.0	120	35	81	4904 6.016	0.7	4787 4.163
HSK-A 63	5	11	19.0	120	40	81	4904 8.018	0.7	4787 5.163
HSK-A 63	6	12	20.5	120	36	82	4941 6.041	0.8	4787 6.163
HSK-A 63	8	14	22.5	120	36	82	4941 8.040	0.8	4787 8.163
HSK-A 63	10	16	24.5	120	41	82	4941 10.050	0.8	4787 10.163
HSK-A 63	12	18	26.5	120	46	83	4941 12.100	0.9	4787 12.163
HSK-A 63	14	20	28.5	120	46	83	4941 14.100	0.9	4787 14.163
HSK-A 63	16	22	30.5	120	49	83	4941 16.100	0.9	4787 16.163
HSK-A 63	18	24	32.7	120	49	84	4941 18.100	1.0	4787 18.163
HSK-A 63	20	26	34.7	120	51	85	4941 20.100	1.0	4787 20.163
HSK-A 63	3	9	21.5	160	30	121	4904 5.016	0.8	4787 3.263
HSK-A 63	4	10	22.5	160	35	121	4904 6.016	0.8	4787 4.263
HSK-A 63	5	11	23.5	160	40	121	4904 8.018	0.9	4787 5.263
HSK-A 63	6	12	24.5	160	36	122	4941 6.041	0.9	4787 6.263
HSK-A 63	8	14	26.5	160	36	122	4941 8.040	1.0	4787 8.263
HSK-A 63	10	16	28.5	160	41	122	4941 10.050	1.0	4787 10.263
HSK-A 63	12	18	30.5	160	46	123	4941 12.100	1.1	4787 12.263
HSK-A 63	14	20	32.8	160	46	124	4941 14.100	1.1	4787 14.263
HSK-A 63	16	22	34.8	160	49	125	4941 16.100	1.2	4787 16.263
HSK-A 63	18	24	37.0	160	49	126	4941 18.100	1.3	4787 18.263
HSK-A 63	20	26	39.0	160	51	127	4941 20.100	1.3	4787 20.263

Tool holders



HSK-A shrink fit chucks



Product information:

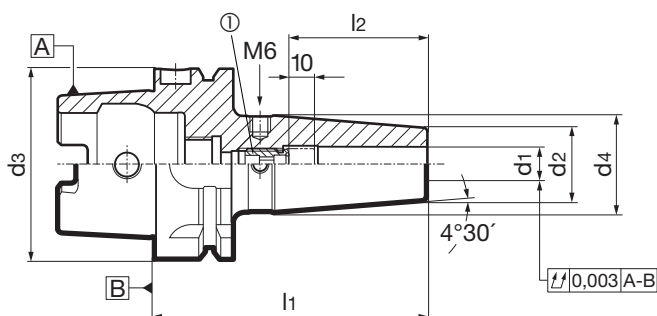
- HSK-A to ISO 12164-1 / DIN 69893-1
- dimensions to DIN 69882-8
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- incl. balancing thread 4xM6/6xM6
- for tool shank tolerance h6
- axial length adjustment
- concentricity: 3 µm
l1 from 120 mm = 4 µm
l1 from 160 mm = 5 µm
l1 from 200 mm = 7 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4977 or 4904

Suitable accessories separately available:

- coolant supply set art. no. 4949
- special dimensions on request



Article no. **4736**

d3	d1 h6 mm	d2 mm	d4 mm	l1 mm	l2 mm	①	kg	Order no.
HSK-A 32	6	21	26.0	70	36	4977 6.014	0.2	4736 6.032
HSK-A 32	8	21	26.0	70	36	4977 8.014	0.2	4736 8.032
HSK-A 32	10	24	30.0	75	41	4977 10.014	0.3	4736 10.032
HSK-A 32	12	24	30.0	80	46	4977 12.014	0.3	4736 12.032
HSK-A 40	6	21	27.0	80	36	4977 6.014	0.4	4736 6.040
HSK-A 40	8	21	27.0	80	36	4977 8.014	0.4	4736 8.040
HSK-A 40	10	24	32.0	80	41	4977 10.014	0.4	4736 10.040
HSK-A 40	12	24	32.0	90	46	4977 12.014	0.5	4736 12.040
HSK-A 40	14	27	34.0	90	46	4977 12.014	0.5	4736 14.040
HSK-A 40	16	27	34.0	90	49	4977 16.014	0.5	4736 16.040
HSK-A 40	18	33	42.0	95	49	4977 16.014	0.7	4736 18.040
HSK-A 40	20	33	42.0	100	51	4977 20.114	0.7	4736 20.040
HSK-A 50	6	21	27.0	80	36	4977 6.014	0.5	4736 6.050
HSK-A 50	8	21	27.0	80	36	4977 8.014	0.5	4736 8.050
HSK-A 50	10	24	32.0	85	41	4977 10.014	0.6	4736 10.050
HSK-A 50	12	24	32.0	90	46	4977 12.014	0.6	4736 12.050
HSK-A 50	14	27	34.0	90	46	4977 12.014	0.7	4736 14.050
HSK-A 50	16	27	34.0	95	49	4977 16.014	0.7	4736 16.050
HSK-A 50	18	33	42.0	95	49	4977 16.014	0.8	4736 18.050
HSK-A 50	20	33	42.0	100	51	4977 20.114	0.9	4736 20.050
HSK-A 63	3	10	18.0	80	30	4904 5.016	0.7	4736 3.063
HSK-A 63	4	10	18.0	80	35	4904 6.016	0.7	4736 4.063
HSK-A 63	5	10	18.0	80	40	4904 8.018	0.7	4736 5.063
HSK-A 63	6	21	27.0	80	36	4977 6.014	0.8	4736 6.063
HSK-A 63	8	21	27.0	80	36	4977 8.014	0.8	4736 8.063
HSK-A 63	10	24	32.0	85	41	4977 10.014	0.9	4736 10.063
HSK-A 63	12	24	32.0	90	46	4977 12.014	0.9	4736 12.063
HSK-A 63	14	27	34.0	90	46	4977 12.014	0.9	4736 14.063
HSK-A 63	16	27	34.0	95	49	4977 16.014	0.9	4736 16.063
HSK-A 63	18	33	42.0	95	49	4977 16.014	1.1	4736 18.063
HSK-A 63	20	33	42.0	100	51	4977 20.114	1.1	4736 20.063
HSK-A 63	25	44	53.0	115	57	4977 20.114	1.7	4736 25.063
HSK-A 63	32	44	53.0	120	61	4977 20.114	1.6	4736 32.063
HSK-A 63	3	10	31.1	160	30	4904 5.016	0.9	4736 103.063
HSK-A 63	4	10	31.1	160	35	4904 6.016	0.9	4736 104.063
HSK-A 63	5	10	31.1	160	40	4904 8.018	0.9	4736 105.063

Tool holders



Article no.

4736

d3	d1 h6	d2	d4	l1	l2	①		Order no.
	mm	mm	mm	mm	mm		kg	
HSK-A 63	6	21	27.0	160	36	4977 6.014	1.1	4736 106.063
HSK-A 63	8	21	27.0	160	36	4977 8.014	1.1	4736 108.063
HSK-A 63	10	24	32.0	160	41	4977 10.014	1.3	4736 110.063
HSK-A 63	12	24	32.0	160	46	4977 12.014	1.3	4736 112.063
HSK-A 63	14	27	34.0	160	46	4977 12.014	1.4	4736 114.063
HSK-A 63	16	27	34.0	160	49	4977 16.014	1.4	4736 116.063
HSK-A 63	18	33	42.0	160	49	4977 16.014	1.8	4736 118.063
HSK-A 63	20	33	42.0	160	51	4977 20.114	1.7	4736 120.063
HSK-A 63	25	44	53.0	160	57	4977 20.114	2.4	4736 125.063
HSK-A 63	32	44	53.0	160	61	4977 20.114	2.3	4736 132.063
HSK-A 63	3	10	25.0	120	30	4904 5.016	0.8	4736 203.063
HSK-A 63	4	10	25.0	120	35	4904 6.016	0.8	4736 204.063
HSK-A 63	5	10	25.0	120	40	4904 8.018	0.8	4736 205.063
HSK-A 63	6	21	27.0	120	36	4977 6.014	0.9	4736 206.063
HSK-A 63	8	21	27.0	120	36	4977 8.014	0.9	4736 208.063
HSK-A 63	10	24	32.0	120	41	4977 10.014	1.1	4736 210.063
HSK-A 63	12	24	32.0	120	46	4977 12.014	1.0	4736 212.063
HSK-A 63	14	27	34.0	120	46	4977 12.014	1.1	4736 214.063
HSK-A 63	16	27	34.0	120	49	4977 16.014	1.1	4736 216.063
HSK-A 63	18	33	42.0	120	49	4977 16.014	1.4	4736 218.063
HSK-A 63	20	33	42.0	120	51	4977 20.114	1.3	4736 220.063
HSK-A 63	6	21	27.0	200	36	4977 6.014	1.3	4736 306.063
HSK-A 63	8	21	27.0	200	36	4977 8.014	1.3	4736 308.063
HSK-A 63	10	24	32.0	200	41	4977 10.014	1.5	4736 310.063
HSK-A 63	12	24	32.0	200	46	4977 12.014	1.5	4736 312.063
HSK-A 63	14	27	34.0	200	46	4977 12.014	1.7	4736 314.063
HSK-A 63	16	27	34.0	200	49	4977 16.014	1.6	4736 316.063
HSK-A 63	18	33	42.0	200	49	4977 16.014	2.2	4736 318.063
HSK-A 63	20	33	42.0	200	51	4977 20.114	2.2	4736 320.063
HSK-A 63	25	44	53.0	200	57	4977 20.114	3.1	4736 325.063
HSK-A 63	32	44	53.0	200	61	4977 20.114	2.9	4736 332.063
HSK-A 80	6	21	27.0	85	36	4977 6.014	1.2	4736 6.080
HSK-A 80	8	21	27.0	85	36	4977 8.014	1.2	4736 8.080
HSK-A 80	10	24	32.0	90	41	4977 10.014	1.3	4736 10.080
HSK-A 80	12	24	32.0	95	46	4977 12.014	1.3	4736 12.080
HSK-A 80	14	27	34.0	95	46	4977 12.014	1.4	4736 14.080
HSK-A 80	16	27	34.0	100	49	4977 16.014	1.4	4736 16.080
HSK-A 80	18	33	42.0	100	49	4977 16.014	1.6	4736 18.080
HSK-A 80	20	33	42.0	105	51	4977 20.114	1.6	4736 20.080
HSK-A 80	25	44	53.0	115	57	4977 20.114	2.2	4736 25.080
HSK-A 80	32	44	53.0	120	61	4977 20.114	2.1	4736 32.080
HSK-A 80	6	21	27.0	160	36	4977 6.014	1.5	4736 106.080
HSK-A 80	8	21	27.0	160	36	4977 8.014	1.5	4736 108.080
HSK-A 80	10	24	32.0	160	41	4977 10.014	1.7	4736 110.080
HSK-A 80	12	24	32.0	160	46	4977 12.014	1.7	4736 112.080
HSK-A 80	14	27	34.0	160	46	4977 12.014	1.8	4736 114.080
HSK-A 80	16	27	34.0	160	49	4977 16.014	1.8	4736 116.080
HSK-A 80	18	33	42.0	160	49	4977 16.014	2.2	4736 118.080
HSK-A 80	20	33	42.0	160	51	4977 20.114	2.2	4736 120.080
HSK-A 80	25	44	53.0	160	57	4977 20.114	2.9	4736 125.080
HSK-A 80	32	44	53.0	160	61	4977 20.114	2.7	4736 132.080
HSK-A 100	6	21	27.0	85	36	4977 6.014	2.1	4736 6.100
HSK-A 100	8	21	27.0	85	36	4977 8.014	2.1	4736 8.100
HSK-A 100	10	24	32.0	90	41	4977 10.014	2.2	4736 10.100
HSK-A 100	12	24	32.0	95	46	4977 12.014	2.2	4736 12.100
HSK-A 100	14	27	34.0	95	46	4977 12.014	2.3	4736 14.100
HSK-A 100	16	27	34.0	100	49	4977 16.014	2.3	4736 16.100
HSK-A 100	18	33	42.0	100	49	4977 16.014	2.5	4736 18.100
HSK-A 100	20	33	42.0	105	51	4977 20.114	2.5	4736 20.100
HSK-A 100	25	44	53.0	115	57	4977 20.114	3.0	4736 25.100
HSK-A 100	32	44	53.0	120	61	4977 20.114	2.9	4736 32.100
HSK-A 100	6	21	27.0	160	36	4977 6.014	2.4	4736 106.100
HSK-A 100	8	21	27.0	160	36	4977 8.014	2.4	4736 108.100
HSK-A 100	10	24	32.0	160	41	4977 10.014	2.6	4736 110.100
HSK-A 100	12	24	32.0	160	46	4977 12.014	2.6	4736 112.100
HSK-A 100	14	27	34.0	160	46	4977 12.014	2.7	4736 114.100



d3	d1 h6	d2	d4	l1	l2	①		Order no.
	mm	mm	mm	mm	mm		kg	
HSK-A 100	16	27	34.0	160	49	4977 16.014	2.7	4736 116.100
HSK-A 100	18	33	42.0	160	49	4977 16.014	3.1	4736 118.100
HSK-A 100	20	33	42.0	160	51	4977 20.114	3.1	4736 120.100
HSK-A 100	25	44	53.0	160	57	4977 20.114	3.8	4736 125.100
HSK-A 100	32	44	53.0	160	61	4977 20.114	3.6	4736 132.100
HSK-A 100	6	21	27.0	200	36	4977 6.014	2.6	4736 306.100
HSK-A 100	8	21	27.0	200	36	4977 8.014	2.6	4736 308.100
HSK-A 100	10	24	32.0	200	41	4977 10.014	2.9	4736 310.100
HSK-A 100	12	24	32.0	200	46	4977 12.014	2.9	4736 312.100
HSK-A 100	14	27	34.0	200	46	4977 12.014	3.0	4736 314.100
HSK-A 100	16	27	34.0	200	49	4977 16.014	3.0	4736 316.100
HSK-A 100	18	33	42.0	200	49	4977 16.014	3.5	4736 318.100
HSK-A 100	20	33	42.0	200	51	4977 20.114	3.5	4736 320.100
HSK-A 100	25	44	53.0	200	57	4977 20.114	4.5	4736 325.100
HSK-A 100	32	44	53.0	200	61	4977 20.114	4.3	4736 332.100


HSK-A shrink fit chucks GÜHROJET with peripheral cooling

Product information:

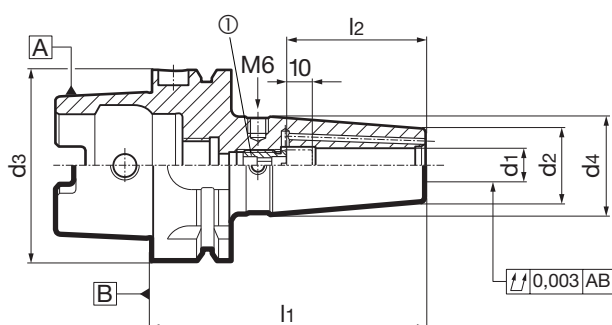
- HSK-A to ISO 12164-1 / DIN 69893-1
- dimensions to DIN 69882-8
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- incl. balancing thread 4xM6/6xM6
- for tool shank tolerance h6
- axial length adjustment
- optimised cooling for tools without internal coolant
- good chip evacuation and increased process reliability
- coolant ducts: d1 = 6 - 10 mm with two coolant ducts
d1 = 12 - 32 mm with four coolant ducts
- concentricity: 3 µm
l1 from 120 mm: = 4 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4938

Suitable accessories separately available:

- coolant supply set art. no. 4949
- special dimensions on request

GÜHROJET


Article no.

4755

d3	d1 h6 mm	d2 mm	d4 mm	l1 mm	l2 mm	①	kg	Order no.
HSK-A 40	6	21	27.0	80	36	4938 6.000	0.5	4755 6.040
HSK-A 40	8	21	27.0	80	36	4938 8.000	0.5	4755 8.040
HSK-A 40	10	24	32.0	80	41	4938 10.000	0.5	4755 10.040
HSK-A 40	12	24	32.0	90	46	4938 12.000	0.5	4755 12.040
HSK-A 40	14	27	33.5	90	46	4938 12.000	0.5	4755 14.040
HSK-A 40	16	27	33.5	90	49	4938 16.000	0.5	4755 16.040
HSK-A 50	6	21	27.0	80	36	4938 6.000	0.6	4755 6.050
HSK-A 50	8	21	27.0	80	36	4938 8.000	0.6	4755 8.050
HSK-A 50	10	24	32.0	85	41	4938 10.000	0.6	4755 10.050
HSK-A 50	12	24	32.0	90	46	4938 12.000	0.7	4755 12.050
HSK-A 50	14	27	34.0	90	46	4938 12.000	0.7	4755 14.050
HSK-A 50	16	27	34.0	95	49	4938 16.000	0.7	4755 16.050
HSK-A 50	18	33	41.5	95	49	4938 16.000	0.9	4755 18.050
HSK-A 50	20	33	41.5	100	51	4938 20.000	0.9	4755 20.050
HSK-A 63	6	21	27.0	80	36	4938 6.000	0.8	4755 6.063
HSK-A 63	8	21	27.0	80	36	4938 8.000	0.8	4755 8.063
HSK-A 63	10	24	32.0	85	41	4938 10.000	0.9	4755 10.063
HSK-A 63	12	24	32.0	90	46	4938 12.000	0.9	4755 12.063
HSK-A 63	14	27	34.0	90	46	4938 12.000	1.0	4755 14.063
HSK-A 63	16	27	34.0	95	49	4938 16.000	1.0	4755 16.063
HSK-A 63	18	33	42.0	95	49	4938 16.000	1.2	4755 18.063
HSK-A 63	20	33	42.0	100	51	4938 20.000	1.2	4755 20.063
HSK-A 63	6	21	27.0	120	36	4938 6.000	0.9	4755 206.063
HSK-A 63	8	21	27.0	120	36	4938 8.000	1.0	4755 208.063
HSK-A 63	10	24	32.0	120	41	4938 10.000	1.1	4755 210.063
HSK-A 63	12	24	32.0	120	46	4938 12.000	1.2	4755 212.063
HSK-A 63	14	27	34.0	120	46	4938 12.000	1.2	4755 214.063
HSK-A 63	16	27	34.0	120	49	4938 16.000	1.1	4755 216.063
HSK-A 63	18	33	42.0	120	49	4938 16.000	1.2	4755 218.063
HSK-A 63	20	33	42.0	120	51	4938 20.000	1.4	4755 220.063
HSK-A 100	6	21	27.0	85	36	4938 6.000	2.2	4755 6.100
HSK-A 100	8	21	27.0	85	36	4938 8.000	2.2	4755 8.100
HSK-A 100	10	24	32.0	90	41	4938 10.000	2.3	4755 10.100
HSK-A 100	12	24	32.0	95	46	4938 12.000	2.3	4755 12.100
HSK-A 100	14	27	34.0	95	46	4938 12.000	2.3	4755 14.100
HSK-A 100	16	27	34.0	100	49	4938 16.000	2.3	4755 16.100



d3	d1 h6	d2	d4	l1	l2	①		Order no.
	mm	mm	mm	mm	mm		kg	
HSK-A 100	18	33	42.0	100	49	4938 16.000	2.5	4755 18.100
HSK-A 100	20	33	42.0	105	51	4938 20.000	2.5	4755 20.100
HSK-A 100	25	44	53.0	115	57	4938 20.000	3.0	4755 25.100
HSK-A 100	32	44	53.0	120	61	4938 20.000	3.0	4755 32.100



Shrink fit chucks HSK-E, slim design 3°



NEW

Product information:

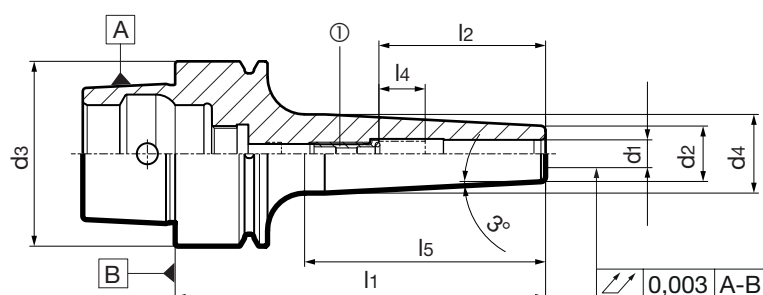
- HSK-E according to DIN 69893-5 with access hole in taper for manual tool change
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for carbide tool shanks in tolerance h6 (from d1 14 mm also HSS possible)
- axial length adjustment
- concentricity 3 μm

Scope of delivery:

- incl. setting screw (1) art. no. 4904 or 4977

Suitable accessories separately available:

- coolant supply set art. no. 4949
- special dimensions on request



Article no.

4789

d3	d1 h6	d2	d4	l1	l5	l4	l2	①	kg	Order no.
	mm	mm	mm	mm	mm	mm	mm			
HSK-E 40	3	9	12.0	60	30.0	10	30	4904 5.007	0.2	4789 3.040
HSK-E 40	4	10	13.0	60	31.0	10	35	4904 5.007	0.2	4789 4.040
HSK-E 40	5	11	14.0	60	31.0	10	36	4904 6.007	0.2	4789 5.040
HSK-E 40	6	12	15.0	60	32.0	5	36	4977 5.009	0.2	4789 6.040
HSK-E 40	8	14	17.0	60	32.0	5	36	4977 5.009	0.2	4789 8.040
HSK-E 40	10	16	19.5	60	34.0	5	38	4904 5.007	0.2	4789 10.040
HSK-E 40	12	18	21.5	60	34.5	3	40	4904 5.005	0.2	4789 12.040
HSK-E 40	3	9	14.0	80	50.0	10	30	4904 5.016	0.2	4789 3.140
HSK-E 40	4	10	15.0	80	51.0	10	35	4904 5.016	0.2	4789 4.140
HSK-E 40	5	11	16.0	80	51.0	10	40	4904 6.016	0.2	4789 5.140
HSK-E 40	6	12	17.0	80	52.0	10	36	4977 6.014	0.2	4789 6.140
HSK-E 40	8	14	19.0	80	52.5	10	36	4977 8.014	0.8	4789 8.140
HSK-E 40	10	16	21.5	80	54.0	10	41	4977 10.014	0.3	4789 10.140
HSK-E 40	12	18	23.5	80	55.0	10	46	4977 8.014	0.3	4789 12.140
HSK-E 50	3	9	13.0	80	40.0	10	30	4904 5.016	0.4	4789 3.050
HSK-E 50	4	10	14.0	80	41.0	10	35	4904 6.016	0.4	4789 4.050
HSK-E 50	5	11	15.0	80	41.0	10	40	4904 6.016	0.4	4789 5.050
HSK-E 50	6	12	16.0	80	42.0	10	36	4977 6.014	0.4	4789 6.050
HSK-E 50	8	14	18.0	80	42.0	10	36	4977 8.014	0.5	4789 8.050
HSK-E 50	10	16	20.5	80	44.0	10	41	4977 10.014	0.5	4789 10.050
HSK-E 50	12	18	22.5	80	44.5	10	46	4977 8.014	0.5	4789 12.050
HSK-E 50	14	20	24.5	80	45.5	10	46	4977 8.014	0.5	4789 14.050
HSK-E 50	16	22	26.5	80	46.5	10	49	4977 8.014	0.5	4789 16.050

Tool holders



HSK-E shrink fit chucks



Product information:

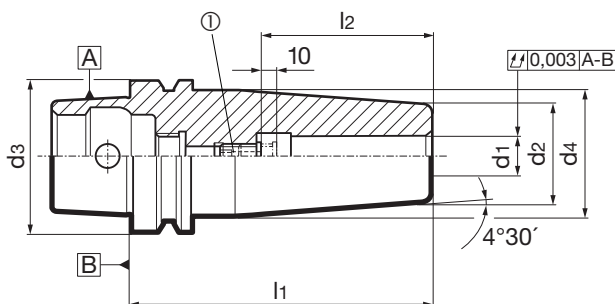
- HSK-E according to DIN 69893-5 with access hole in taper for manual tool change
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment
- concentricity 3 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4977 or 4904

Suitable accessories separately available:

- coolant supply set art. no. 4949
- special dimensions on request



Article no. **4737**

d3	d1 h6	d2	d4	l1	l2	①	kg	Order no.
	mm	mm	mm	mm	mm			
HSK-E 32	3	10	15.9	60			0.1	4737 3.032
HSK-E 32	4	10	15.9	60			0.1	4737 4.032
HSK-E 32	5	10	15.9	60			0.1	4737 5.032
HSK-E 32	6	21	26.0	70	36	4977 6.014	0.1	4737 6.032
HSK-E 32	8	21	26.0	70	36	4977 8.014	0.2	4737 8.032
HSK-E 32	10	24	29.0	75	41	4977 10.014	0.2	4737 10.032
HSK-E 32	12	24	29.0	80	46	4977 12.014	0.2	4737 12.032
HSK-E 40	3	10	19.0	80			0.2	4737 3.040
HSK-E 40	4	10	19.0	80			0.2	4737 4.040
HSK-E 40	5	10	19.0	80			0.2	4737 5.040
HSK-E 40	6	21	27.0	80	36	4977 6.014	0.4	4737 6.040
HSK-E 40	8	21	27.0	80	36	4977 8.014	0.4	4737 8.040
HSK-E 40	10	24	32.0	80	41	4977 10.014	0.4	4737 10.040
HSK-E 40	12	24	32.0	90	46	4977 12.014	0.5	4737 12.040
HSK-E 40	14	27	34.0	90	46	4977 12.014	0.5	4737 14.040
HSK-E 40	16	27	34.0	90	49	4977 16.014	0.5	4737 16.040
HSK-E 50	3	10	18.0	80	30	4904 5.016	0.4	4737 3.050
HSK-E 50	4	10	18.0	80	35	4904 6.016	0.4	4737 4.050
HSK-E 50	5	10	18.0	80			0.4	4737 5.050
HSK-E 50	6	21	27.0	80	36	4977 6.014	0.5	4737 6.050
HSK-E 50	8	21	27.0	80	36	4977 8.014	0.5	4737 8.050
HSK-E 50	10	24	32.0	85	41	4977 10.014	0.5	4737 10.050
HSK-E 50	12	24	32.0	90	46	4977 12.014	0.6	4737 12.050
HSK-E 50	14	27	34.0	90	46	4977 12.014	0.7	4737 14.050
HSK-E 50	16	27	34.0	95	49	4977 16.014	0.7	4737 16.050
HSK-E 50	18	33	42.0	95	49	4977 16.014	0.9	4737 18.050
HSK-E 50	20	33	42.0	100	51	4977 20.114	0.9	4737 20.050
HSK-E 63	6	21	27.0	80	36	4977 6.014	0.8	4737 6.063
HSK-E 63	8	21	27.0	80	36	4977 8.014	0.8	4737 8.063
HSK-E 63	10	24	32.0	85	41	4977 10.014	0.9	4737 10.063
HSK-E 63	12	24	32.0	90	46	4977 12.014	0.9	4737 12.063
HSK-E 63	14	27	34.0	90	46	4977 12.014	1.0	4737 14.063
HSK-E 63	16	27	34.0	95	49	4977 16.014	1.0	4737 16.063
HSK-E 63	18	33	42.0	95	49	4977 16.014	1.1	4737 18.063
HSK-E 63	20	33	42.0	100	51	4977 20.114	1.2	4737 20.063
HSK-E 63	25	44	53.0	115	57	4977 20.114	1.8	4737 25.063

Tool holders



Article no.

4737

d3	d1 h6	d2	d4	l1	l2	①		Order no.
	mm	mm	mm	mm	mm		kg	
HSK-E 63	32	44	53.0	120	61	4977 20.114	1.7	4737 32.063



ISO taper shrink fit chucks, slim design 3°



Product information:

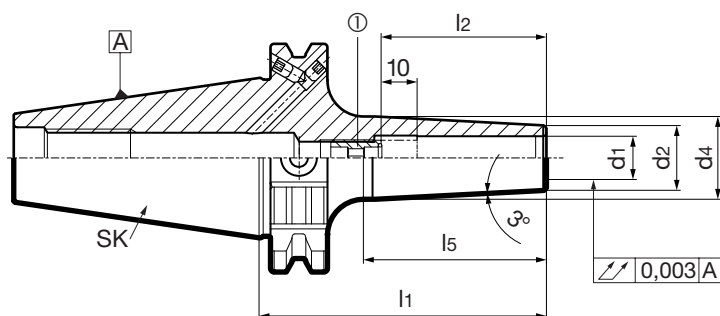
- SK to DIN ISO 7388-1 form AD/AF
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for carbide tool shanks in tolerance h6 (from d1 14 mm also HSS possible)
- axial length adjustment
- concentricity: 3 µm
l1 up to 120 mm: max. 4 µm
l1 up to 160 mm: max. 5 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4904 or 4977

Suitable accessories separately available:

- ISO pull studs art. no. 4925, 4926



Article no. **4788**

SK	d1 h6 mm	d2 mm	d4 mm	l1 mm	l2 mm	l5 mm	①	kg	Order no.
SK 40	3	9	13.5	80	30	46	4904 5.016	0.8	4788 3.040
SK 40	4	10	14.5	80	35	46	4904 6.016	0.8	4788 4.040
SK 40	5	11	15.5	80	40	47	4904 8.018	0.8	4788 5.040
SK 40	6	12	16.5	80	36	48	4977 6.014	0.8	4788 6.040
SK 40	8	14	19.0	80	36	49	4977 8.014	0.8	4788 8.040
SK 40	10	16	21.0	80	41	50	4977 10.014	0.9	4788 10.040
SK 40	12	18	23.0	80	46	51	4977 12.014	0.9	4788 12.040
SK 40	14	20	25.0	80	46	52	4977 12.014	0.9	4788 14.040
SK 40	16	22	27.0	80	49	53	4977 16.014	0.9	4788 16.040
SK 40	18	24	29.5	80	49	54	4977 16.014	0.9	4788 18.040
SK 40	20	26	31.5	80	51	55	4977 20.114	0.9	4788 20.040
SK 40	3	9	18.0	120	30	88	4904 5.016	0.9	4788 3.140
SK 40	4	10	19.0	120	35	88	4904 6.016	0.9	4788 4.140
SK 40	5	11	20.0	120	40	89	4904 8.018	0.9	4788 5.140
SK 40	6	12	21.0	120	36	90	4977 6.014	0.9	4788 6.140
SK 40	8	14	23.5	120	36	92	4977 8.014	1.0	4788 8.140
SK 40	10	16	25.5	120	41	92	4977 10.014	1.0	4788 10.140
SK 40	12	18	27.5	120	46	93	4977 12.014	1.0	4788 12.140
SK 40	14	20	29.5	120	46	94	4977 12.014	1.1	4788 14.140
SK 40	16	22	31.5	120	49	95	4977 16.014	1.1	4788 16.140
SK 40	18	24	33.5	120	49	96	4977 16.014	1.1	4788 18.140
SK 40	20	26	36.0	120	51	97	4977 20.114	1.2	4788 20.140
SK 40	3	9	22.5	160	30	130	4904 5.016	1.0	4788 3.240
SK 40	4	10	23.5	160	35	130	4904 6.016	1.0	4788 4.240
SK 40	5	11	24.5	160	40	131	4904 8.018	1.0	4788 5.240
SK 40	6	12	25.5	160	36	132	4977 6.014	1.1	4788 6.240
SK 40	8	14	27.5	160	36	132	4977 8.014	1.1	4788 8.240
SK 40	10	16	30.0	160	41	134	4977 10.014	1.2	4788 10.240
SK 40	12	18	32.0	160	46	135	4977 12.014	1.2	4788 12.240
SK 40	14	20	34.0	160	46	136	4977 12.014	1.3	4788 14.240
SK 40	16	22	36.0	160	49	137	4977 16.014	1.4	4788 16.240
SK 40	18	24	38.0	160	49	137	4977 16.014	1.4	4788 18.240
SK 40	20	26	40.5	160	51	139	4977 20.114	1.5	4788 20.240

Tool holders



ISO taper shrink fit chucks



Product information:

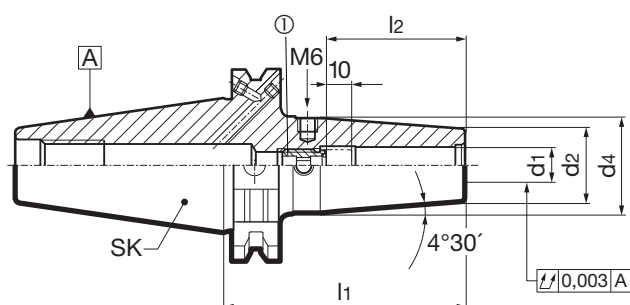
- SK to DIN ISO 7388-1 form AD/AF
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- incl. balancing thread 4xM6/6xM6
- for tool shank tolerance h6
- axial length adjustment
- concentricity: 3 µm
- l1 from 120 mm = 4 µm
- l1 from 160 mm = 5 µm
- l1 from 200 mm = 7 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4977 or 4904

Suitable accessories separately available:

- ISO pull studs art. no. 4925, 4926



Article no.

4738

SK	d1 h6	d2	d4	l1	l2	①	kg	Order no.
	mm							
SK 40	3	10	18.0	80	30	4904 5.016	0.9	4738 3.040
SK 40	4	10	18.0	80	35	4904 6.016	0.9	4738 4.040
SK 40	5	10	18.0	80	40	4904 8.018	0.9	4738 5.040
SK 40	6	21	27.0	80	36	4977 6.014	1.0	4738 6.040
SK 40	8	21	27.0	80	36	4977 8.014	1.0	4738 8.040
SK 40	10	24	32.0	80	41	4977 10.014	1.1	4738 10.040
SK 40	12	24	32.0	80	46	4977 12.014	1.0	4738 12.040
SK 40	14	27	34.0	80	46	4977 12.014	1.1	4738 14.040
SK 40	16	27	34.0	80	49	4977 16.014	1.1	4738 16.040
SK 40	18	33	42.0	80	49	4977 16.014	1.2	4738 18.040
SK 40	20	33	42.0	80	51	4977 20.114	1.5	4738 20.040
SK 40	25	44	53.0	100	57	4977 20.114	1.5	4738 25.040
SK 40	32	44	53.0	100	61	4977 20.114	1.5	4738 32.040
SK 40	3	10	31.0	160	30	4904 5.016	1.1	4738 103.040
SK 40	4	10	31.0	160	35	4904 6.016	1.1	4738 104.040
SK 40	5	10	31.0	160	40	4904 8.018	1.1	4738 105.040
SK 40	6	21	27.0	160	36	4977 6.014	1.3	4738 106.040
SK 40	8	21	27.0	160	36	4977 8.014	1.3	4738 108.040
SK 40	10	24	32.0	160	41	4977 10.014	1.5	4738 110.040
SK 40	12	24	32.0	160	46	4977 12.014	1.5	4738 112.040
SK 40	14	27	34.0	160	46	4977 12.014	1.7	4738 114.040
SK 40	16	27	34.0	160	49	4977 16.014	1.7	4738 116.040
SK 40	18	33	42.0	160	49	4977 16.014	1.9	4738 118.040
SK 40	20	33	42.0	160	51	4977 20.114	1.9	4738 120.040
SK 40	25	44	53.0	160	57	4977 20.114	2.2	4738 125.040
SK 40	3	10	24.0	120	30	4904 5.016	1.0	4738 203.040
SK 40	4	10	24.0	120	35	4904 6.016	1.0	4738 204.040
SK 40	5	10	24.0	120	40	4904 8.018	1.0	4738 205.040
SK 40	6	21	27.0	120	36	4977 6.014	1.1	4738 206.040
SK 40	8	21	27.0	120	36	4977 8.014	1.1	4738 208.040
SK 40	10	24	32.0	120	41	4977 10.014	1.2	4738 210.040
SK 40	12	24	32.0	120	46	4977 12.014	1.2	4738 212.040
SK 40	14	27	34.0	120	46	4977 12.014	1.4	4738 214.040
SK 40	16	27	34.0	120	49	4977 16.014	1.4	4738 216.040
SK 40	18	33	42.0	120	49	4977 16.014	1.5	4738 218.040
SK 40	20	33	42.0	120	51	4977 20.114	1.5	4738 220.040



SK	d1 h6	d2	d4	l1	l2	①	kg	Order no.
	mm	mm	mm	mm	mm			
SK 40	6	21	27.0	200	36	4977 6.014	1.6	4738 306.040
SK 40	8	21	27.0	200	36	4977 8.014	1.6	4738 308.040
SK 40	10	24	32.0	200	41	4977 10.014	1.8	4738 310.040
SK 40	12	24	32.0	200	46	4977 12.014	1.8	4738 312.040
SK 40	14	27	34.0	200	46	4977 12.014	2.1	4738 314.040
SK 40	16	27	34.0	200	49	4977 16.014	2.1	4738 316.040
SK 40	18	33	42.0	200	49	4977 16.014	2.3	4738 318.040
SK 40	20	33	42.0	200	51	4977 20.114	2.3	4738 320.040
SK 40	25	44	53.0	200	57	4977 20.114	2.6	4738 325.040
SK 40	32	44	53.0	200	61	4977 20.114	2.5	4738 332.040
SK 50	3	10	18.0	80	30	4904 5.016	2.6	4738 3.050
SK 50	4	10	18.0	80	35	4904 6.016	2.6	4738 4.050
SK 50	5	10	18.0	80	40	4904 8.018	2.6	4738 5.050
SK 50	6	21	27.0	80	36	4977 6.014	2.9	4738 6.050
SK 50	8	21	27.0	80	36	4977 8.014	2.9	4738 8.050
SK 50	10	24	32.0	80	41	4977 10.014	2.9	4738 10.050
SK 50	12	24	32.0	80	46	4977 12.014	2.9	4738 12.050
SK 50	14	27	34.0	80	46	4977 12.014	3.0	4738 14.050
SK 50	16	27	34.0	80	49	4977 16.014	3.0	4738 16.050
SK 50	18	33	42.0	80	49	4977 16.014	3.0	4738 18.050
SK 50	20	33	42.0	80	51	4977 20.114	3.0	4738 20.050
SK 50	25	44	53.0	100	57	4977 20.114	3.6	4738 25.050
SK 50	32	44	53.0	100	61	4977 20.114	3.5	4738 32.050
SK 50	6	21	27.0	160	36	4977 6.014	3.1	4738 106.050
SK 50	8	21	27.0	160	36	4977 8.014	3.1	4738 108.050
SK 50	10	24	32.0	160	41	4977 10.014	3.4	4738 110.050
SK 50	12	24	32.0	160	46	4977 12.014	3.4	4738 112.050
SK 50	14	27	34.0	160	46	4977 12.014	3.7	4738 114.050
SK 50	16	27	34.0	160	49	4977 16.014	3.7	4738 116.050
SK 50	18	33	42.0	160	49	4977 16.014	4.1	4738 118.050
SK 50	20	33	42.0	160	51	4977 20.114	4.1	4738 120.050
SK 50	25	44	53.0	160	57	4977 20.114	4.7	4738 125.050
SK 50	32	44	53.0	160	61	4977 20.114	4.6	4738 132.050
SK 50	6	21	27.0	200	36	4977 6.014	3.4	4738 306.050
SK 50	8	21	27.0	200	36	4977 8.014	3.4	4738 308.050
SK 50	10	24	32.0	200	41	4977 10.014	3.7	4738 310.050
SK 50	12	24	32.0	200	46	4977 12.014	3.7	4738 312.050
SK 50	14	27	34.0	200	46	4977 12.014	4.0	4738 314.050
SK 50	16	27	34.0	200	49	4977 16.014	4.0	4738 316.050
SK 50	18	33	42.0	200	49	4977 16.014	4.4	4738 318.050
SK 50	20	33	42.0	200	51	4977 20.114	4.4	4738 320.050
SK 50	25	44	53.0	200	57	4977 20.114	5.0	4738 325.050
SK 50	32	44	53.0	200	61	4977 20.114	4.9	4738 332.050



ISO taper shrink fit chucks GÜHROJET



Product information:

- SK to DIN ISO 7388-1 form AD/AF
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- incl. balancing thread 4xM6/6xM6
- for tool shank tolerance h6
- axial length adjustment
- optimised cooling for tools without internal coolant
- good chip evacuation and increased process reliability
- coolant ducts: d1 = 6 - 10 mm with two coolant ducts
d1 = 12 - 32 mm with four coolant ducts
- concentricity 3 µm

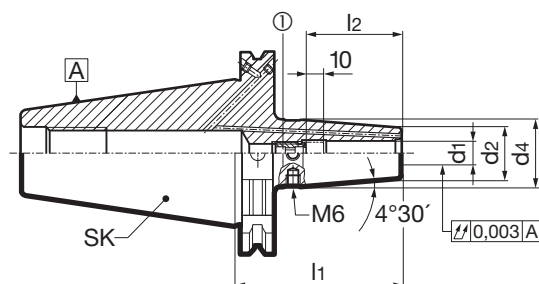
Scope of delivery:

- incl. setting screw (1) art. no. 4977

Suitable accessories separately available:

- ISO pull studs art. no. 4925, 4926

GÜHROJET



Article no.

4729

SK	d1 h6 mm	d2 mm	d4 mm	l1 mm	l2 mm	①	kg	Order no.
SK 40	6	21	27.0	80	36	4977 6.014	1.0	4729 6.040
SK 40	8	21	27.0	80	36	4977 8.014	1.0	4729 8.040
SK 40	10	24	32.0	80	41	4977 10.014	1.1	4729 10.040
SK 40	12	24	32.0	80	46	4977 12.014	1.0	4729 12.040
SK 40	14	27	34.0	80	46	4977 12.014	1.1	4729 14.040
SK 40	16	27	34.0	80	49	4977 16.014	1.1	4729 16.040
SK 40	18	33	42.0	80	49	4977 16.014	1.2	4729 18.040
SK 40	20	33	42.0	80	51	4977 20.114	1.5	4729 20.040
SK 50	6	21	27.0	80	36	4977 6.014	2.8	4729 6.050
SK 50	8	21	27.0	80	36	4977 8.014	2.8	4729 8.050
SK 50	10	24	32.0	80	41	4977 10.014	2.8	4729 10.050
SK 50	12	24	32.0	80	46	4977 12.014	2.8	4729 12.050
SK 50	14	27	34.0	80	46	4977 12.014	2.8	4729 14.050
SK 50	16	27	34.0	80	49	4977 16.014	2.8	4729 16.050
SK 50	18	33	42.0	80	49	4977 16.014	3.0	4729 18.050
SK 50	20	33	42.0	80	51	4977 20.114	3.0	4729 20.050
SK 50	25	44	53.0	100	57	4977 20.114	3.5	4729 25.050
SK 50	32	44	53.0	100	61	4977 20.114	3.3	4729 32.050

Tool holders



MAS/BT shrink fit chucks



Product information:

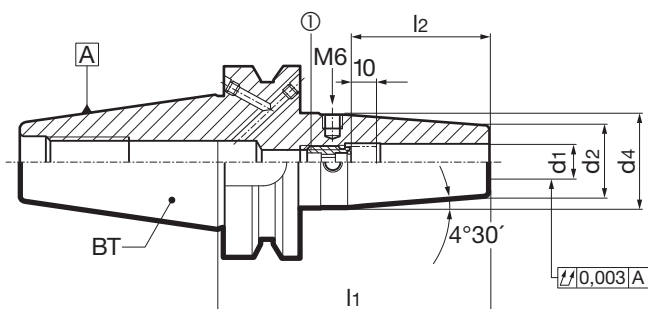
- MAS/BT to DIN ISO 7388-2 form JD/JF
- BT30 in JD design without coolant supply via the collar
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- incl. balancing thread 4xM6/6xM6
- for tool shank tolerance h6
- axial length adjustment
- concentricity: 3 µm
l1 from 130 mm = 4 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4977 or 4904

Suitable accessories separately available:

- BT pull studs art. no. 4927, 4928
- special dimensions on request



Article no. **4739**

BT	d1	d2	d4	l1	l2	①	kg	Order no.
	mm	mm	mm	mm	mm			
BT 30	3	10	18	80	30	4904 5.016	0.6	4739 3.030
BT 30	4	10	18	80	35	4904 6.016	0.6	4739 4.030
BT 30	5	10	18	80	40	4904 8.018	0.6	4739 5.030
BT 30	6	21	27	80	36	4977 6.014	0.7	4739 6.030
BT 30	8	21	27	80	36	4977 8.014	0.7	4739 8.030
BT 30	10	24	32	80	41	4977 10.014	0.8	4739 10.030
BT 30	12	24	32	80	46	4977 12.014	0.8	4739 12.030
BT 30	14	27	34	80	46	4977 12.014	0.8	4739 14.030
BT 30	16	27	34	80	49	4977 16.014	0.8	4739 16.030
BT 30	18	33	42	90	49	4977 16.014	0.9	4739 18.030
BT 30	20	33	42	90	51	4977 20.114	0.9	4739 20.030
BT 40	3	10	18	85	30	4904 5.016	1.0	4739 3.040
BT 40	4	10	18	85	35	4904 6.016	1.0	4739 4.040
BT 40	5	10	18	85	40	4904 8.018	1.0	4739 5.040
BT 40	6	21	27	90	36	4977 6.014	1.2	4739 6.040
BT 40	8	21	27	90	36	4977 8.014	1.2	4739 8.040
BT 40	10	24	32	90	41	4977 10.014	1.2	4739 10.040
BT 40	12	24	32	90	46	4977 12.014	1.2	4739 12.040
BT 40	14	27	34	90	46	4977 12.014	6.0	4739 14.040
BT 40	16	27	34	90	49	4977 16.014	1.4	4739 16.040
BT 40	18	33	42	90	49	4977 16.014	1.7	4739 18.040
BT 40	20	33	42	90	51	4977 20.114	1.7	4739 20.040
BT 40	25	44	53	100	57	4977 20.114	1.8	4739 25.040
BT 40	32	44	53	100	61	4977 20.114	1.7	4739 32.040
BT 40	6	21	27	130	36	4977 6.014	1.3	4739 6.140
BT 40	8	21	27	130	36	4977 8.014	1.2	4739 8.140
BT 40	10	24	32	130	41	4977 10.014	1.4	4739 10.140
BT 40	12	24	32	130	46	4977 12.014	1.3	4739 12.140
BT 40	14	27	34	130	46	4977 12.014	1.4	4739 14.140
BT 40	16	27	34	130	49	4977 16.014	6.3	4739 16.140
BT 40	18	33	42	130	49	4977 16.014	1.5	4739 18.140
BT 40	20	33	42	130	51	4977 20.114	1.8	4739 20.140
BT 40	25	44	53	130	57	4977 20.114	2.0	4739 25.140
BT 40	32	44	53	130	61	4977 20.114	2.2	4739 32.140
BT 50	6	21	27	100	36	4977 6.014	2.9	4739 6.050
BT 50	8	21	27	100	36	4977 8.014	2.9	4739 8.050

Tool holders



Article no.

4739

BT	d1	d2	d4	l1	l2	①		Order no.
	mm	mm	mm	mm	mm		kg	
BT 50	10	24	32	100	41	4977 10.014	8.9	4739 10.050
BT 50	12	24	32	100	46	4977 12.014	2.9	4739 12.050
BT 50	14	27	34	100	46	4977 12.014	3.3	4739 14.050
BT 50	16	27	34	100	49	4977 16.014	3.0	4739 16.050
BT 50	18	33	42	100	49	4977 16.014	1.9	4739 18.050
BT 50	20	33	42	100	51	4977 20.114	3.5	4739 20.050
BT 50	25	44	53	110	57	4977 20.114	9.1	4739 25.050
BT 50	32	44	53	110	61	4977 20.114	3.7	4739 32.050



MAS/BT DC shrink fit chucks with axial plane



Product information:

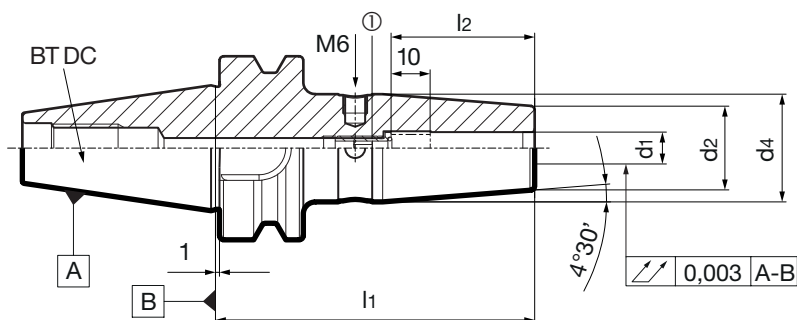
- MAS/BT DC with axial plane, sim. ISO 7388-2, form JD
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- incl. balancing thread 4xM6
- for tool shank tolerance h6
- axial length adjustment
- concentricity 3 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4904 or 4977

Suitable accessories separately available:

- BT pull studs art. no. 4927, 4928



Article no. **4790**

BT DC	d1	d2	d4	l1	l2	①	kg	Order no.
	mm	mm	mm	mm	mm			
BT 30	3	10	18	80	30	4904 5.016	0.6	4790 3.030
BT 30	4	10	18	80	35	4904 6.016	0.6	4790 4.030
BT 30	5	10	18	80	40	4904 8.018	0.6	4790 5.030
BT 30	6	21	27	80	36	4977 6.014	0.7	4790 6.030
BT 30	8	21	27	80	36	4977 8.014	0.7	4790 8.030
BT 30	10	24	32	80	41	4977 10.014	0.8	4790 10.030
BT 30	12	24	32	80	46	4977 12.014	0.8	4790 12.030
BT 30	14	27	34	80	46	4977 12.014	0.8	4790 14.030
BT 30	16	27	34	80	49	4977 16.014	0.8	4790 16.030
BT 30	18	33	42	90	49	4977 16.014	0.9	4790 18.030
BT 30	20	33	42	90	51	4977 20.114	0.9	4790 20.030

Tool holders



Shrink fit extensions



Product information:

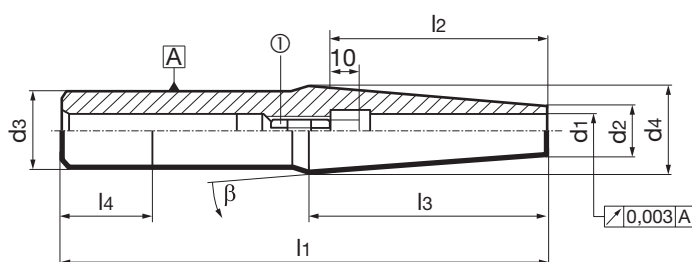
- for clamping in hydraulic chucks or shrink fit chucks
- suitable for internal cooling
- we recommend the use of special cooling adaptors art. no. 4419
- for carbide tool shanks in tolerance h6 (from d1 14 mm also HSS possible)
- with adjustment screw 10 mm adjustment range
- concentricity: 3 μ m
l1 from 115 mm = 5 μ m
l1 from 150 mm = 7 μ m
l1 from 200 mm = 9 μ m

Scope of delivery:

- incl. setting screw (1) art. no. 4977 or 4904

Suitable accessories separately available:

- special dimensions on request



Article no.

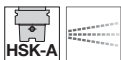
4719

d1	d2	d3	d4	l1	l2	l3	l4	①	β	kg	Order no.
mm	mm	mm	mm	mm	mm	mm	mm		°		
3	7	16	16	115	30	64.4	50	4904 5.016	4	0.120	4719 3.016
4	7	16	16	115	35	64.4	50	4904 6.016	4	0.110	4719 4.016
5	8	16	16	115	40	57.2	57	4904 8.018	4	0.110	4719 5.016
6	10	16	16	115	36	42.9	72	4977 6.014	4	0.130	4719 6.016
8	12	16	16	115	36	28.6	86	4977 8.014	4	0.130	4719 8.016
10	14	16	16	115	41	14.3	100	4977 10.014	4	0.130	4719 10.016
12	16	16	23	115	46	51.5	55	4977 12.014	4	0.160	4719 12.016
3	7	20	16	115	30	65.0	48	4904 5.016	4	0.160	4719 3.020
4	8	20	17	115	35	65.0	48	4904 6.016	4	0.170	4719 4.020
5	9	20	18	115	40	65.0	49	4904 8.018	4	0.160	4719 5.020
6	10	20	19	115	36	65.0	49	4977 6.014	4	0.180	4719 6.020
8	12	20	20	115	36	57.2	57	4977 8.014	4	0.190	4719 8.020
10	14	20	20	115	41	42.9	72	4977 10.014	4	0.200	4719 10.020
12	16	20	20	115	46	28.6	86	4977 12.014	4	0.200	4719 12.020
14	20	20	28	150	46	62.9	82	4977 12.014	4	0.360	4719 14.020
14	20	25	28	150	46	62.9	85	4977 12.014	4	0.470	4719 14.025
16	24	25	33	150	49	64.4	81	4977 16.014	4	0.540	4719 16.025
3	10	20	20	160	30	71.5	88	4904 5.016	4	0.290	4719 3.120
4	10	20	20	160	35	71.5	88	4904 6.016	4	0.290	4719 4.120
5	10	20	20	160	40	71.5	88	4904 8.018	4	0.270	4719 5.120
6	14	20	20	160	36	42.9	117	4977 6.014	4	0.310	4719 6.120
8	14	20	20	160	36	42.9	117	4977 8.014	4	0.310	4719 8.120
10	20	25	25	160	41	35.8	124	4977 10.014	4	0.520	4719 10.125
12	20	25	25	160	46	35.8	124	4977 12.014	4	0.470	4719 12.125
14	20	25	29	160	46	62.9	85	4977 12.014	4	0.480	4719 14.125
16	22	25	33	160	49	78.7	77	4977 16.014	4	0.570	4719 16.125
18	27	32	32	160	49	35.8	124	4977 16.014	4	0.830	4719 18.132
20	27	32	32	160	51	35.8	124	4977 20.114	4	0.800	4719 20.132
3	10	20	20	200	30	71.5	128	4904 5.016	4	0.380	4719 3.220
4	10	20	20	200	35	71.5	128	4904 6.016	4	0.370	4719 4.220
5	10	20	20	200	40	71.5	128	4904 8.018	4	0.350	4719 5.220
6	14	20	20	200	36	42.9	157	4977 6.014	4	0.400	4719 6.220
8	14	20	20	200	36	42.9	157	4977 8.014	4	0.390	4719 8.220
10	20	25	25	200	41	35.8	164	4977 10.014	4	0.650	4719 10.225
12	20	25	25	200	46	35.8	164	4977 12.014	4	0.600	4719 12.225
14	20	32	32	200	46	85.8	114	4977 12.014	4	0.920	4719 14.232

Tool holders



d1	d2	d3	d4	l1	l2	l3	l4	①	β		Order no.
mm	mm	mm	mm	mm	mm	mm	mm		°	kg	
16	24	32	32	200	49	57.2	142	4977 16.014	4	1.040	4719 16.232
18	27	32	32	200	49	35.8	164	4977 16.014	4	1.070	4719 18.232
20	27	32	32	200	51	35.8	164	4977 20.114	4	1.030	4719 20.232
6	10	12	12	125	38	19.1	105		3	0.090	4719 6.012
8	12	14	14	125	38	19.1	105		3	0.120	4719 8.014
10	14	16	16	160	42	19.1	140		3	0.210	4719 10.116
12	16	20	20	160	47	38.2	121		3	0.320	4719 12.120
16	22	25	25	160	50	28.6	131		3	0.510	4719 16.225
20	27	32	32	160	52	47.7	112		3	0.820	4719 20.332
6	10	12	12	200	38	21.0	47		3	0.150	4719 6.312
8	12	14	14	200	38	21.0	47		3	0.190	4719 8.314
10	14	16	16	250	42	21.0	50		3	0.330	4719 10.316
12	16	20	20	250	47	40.1	52		3	0.480	4719 12.320
16	22	25	25	250	50	30.5	58		3	0.800	4719 16.325
20	27	32	32	250	52	49.6	62		3	1.330	4719 20.432


HSK-A hydraulic chucks, slim design 3°

NEW
Product information:

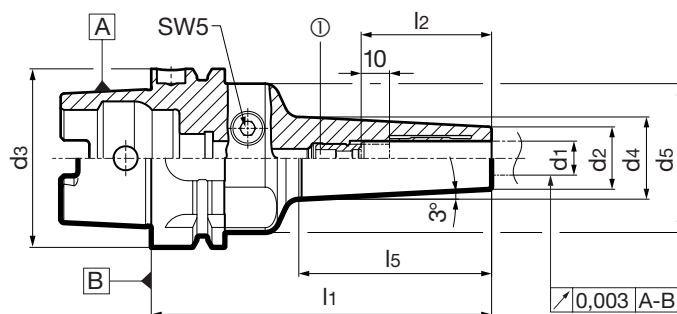
- HSK-A to ISO 12164-1 / DIN 69893-1
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment
- concentricity: 3 μm
l1 = 160 mm: max. 5 μm

Scope of delivery:

- incl. setting screw (1) art. no. 4941
- incl. clamping key art. no. 4912

Suitable accessories separately available:

- coolant supply set art. no. 4949
- replacement clamping screws art. no. 4241
- for MQL application on request
- special dimensions on request



Article no.

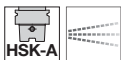
4596

d3	d1 h6	d2	d4	d5	l1	l2	l5	①	kg	Order no.
	mm	mm	mm	mm	mm	mm	mm			
HSK-A 63	6	16	23.0	52.5	120	37	67.5	4941 6.041	1.1	4596 6.163
HSK-A 63	8	18	25.0	52.5	120	37	67.5	4941 8.040	1.1	4596 8.163
HSK-A 63	10	20	27.0	52.5	120	41	67.5	4941 10.050	1.1	4596 10.163
HSK-A 63	12	22	29.0	52.5	120	46	68.0	4941 12.100	1.2	4596 12.163
HSK-A 63	14	24	31.0	52.5	120	46	68.4	4941 14.100	1.2	4596 14.163
HSK-A 63	16	26	33.0	52.5	120	49	68.9	4941 16.100	1.2	4596 16.163
HSK-A 63	18	28	35.0	52.5	120	49	69.4	4941 18.100	1.2	4596 18.163
HSK-A 63	20	30	37.0	52.5	120	51	69.7	4941 20.100	1.3	4596 20.163
HSK-A 63	6	16	27.2	52.5	160	37	108.4	4941 6.041	1.2	4596 6.263
HSK-A 63	8	18	29.2	52.5	160	37	108.4	4941 8.040	1.3	4596 8.263
HSK-A 63	10	20	31.2	52.5	160	41	108.4	4941 10.050	1.3	4596 10.263
HSK-A 63	12	22	33.3	52.5	160	46	109.0	4941 12.100	1.4	4596 12.263
HSK-A 63	14	24	35.3	52.5	160	46	109.4	4941 14.100	1.5	4596 14.263
HSK-A 63	16	26	37.4	52.5	160	49	110.0	4941 16.100	1.5	4596 16.263
HSK-A 63	18	28	39.4	52.5	160	49	110.4	4941 18.100	1.6	4596 18.263
HSK-A 63	20	30	41.5	52.5	160	51	112.0	4941 20.100	1.6	4596 20.263

Tool holders



HSK-A hydraulic chucks with increased clamping force



Product information:

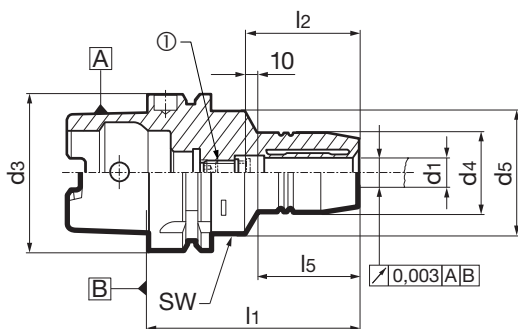
- HSK-A to ISO 12164-1 / DIN 69893-1
- dimensions to DIN 69882-7
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment
- concentricity: 3 µm
l1 from 120 mm: max. 4 µm,
l1 from 150/160 mm: max. 5 µm,
l1 from 200 mm: max. 7 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4900
- incl. clamping key art. no. 4912
- incl. clamping key

Suitable accessories separately available:

- coolant supply set art. no. 4949
- replacement clamping screws art. no. 4241



Article no. **4299**

d3	d1 h6	d4	d5	l1	l2	l5	SW	①	kg	Order no.
	mm	mm	mm	mm	mm	mm	mm			
HSK-A 32	6	26.0	40.0	80	37	29.0	4	4900 6.014	0.4	4299 6.032
HSK-A 32	8	28.0	40.0	80	37	29.0	4	4900 8.014	0.4	4299 8.032
HSK-A 32	10	30.0	40.0	85	41	35.0	4	4900 8.014	0.4	4299 10.032
HSK-A 32	12	32.0	40.0	90	46	40.0	4	4900 8.014	0.4	4299 12.032
HSK-A 40	6	26.0	33.5	70	37	36.0	4	4900 6.014	0.6	4299 6.040
HSK-A 40	8	28.0	33.5	70	37	36.0	4	4900 8.014	0.6	4299 8.040
HSK-A 40	10	30.0	33.5	75	41	42.0	4	4900 8.014	0.6	4299 10.040
HSK-A 40	12	32.0	33.5	80	46	48.0	4	4900 8.014	0.6	4299 12.040
HSK-A 50	6	26.0	40.0	70	37	28.0	4	4900 6.014	0.8	4299 6.050
HSK-A 50	8	28.0	40.0	70	37	28.0	4	4900 8.014	0.8	4299 8.050
HSK-A 50	10	30.0	40.0	75	41	34.0	4	4900 10.014	0.8	4299 10.050
HSK-A 50	12	32.0	40.0	85	46	44.0	4	4900 12.014	0.8	4299 12.050
HSK-A 50	14	34.0	40.0	85	46	44.0	4	4900 12.014	0.8	4299 14.050
HSK-A 50	16	38.0	53.0	90	49	30.0	5	4900 16.014	1.1	4299 16.050
HSK-A 50	18	40.0	57.0	90	49	30.0	5	4900 16.014	1.1	4299 18.050
HSK-A 50	20	42.0	60.0	90	51	29.0	5	4900 20.114	1.1	4299 20.050
HSK-A 63	6	26.0	50.0	70	37	24.5	5	4900 6.014	1.1	4299 6.063
HSK-A 63	8	28.0	50.0	70	37	25.5	5	4900 8.014	1.1	4299 8.063
HSK-A 63	10	30.0	50.0	80	41	35.5	5	4900 10.014	1.1	4299 10.063
HSK-A 63	12	32.0	50.0	85	46	41.5	5	4900 12.014	1.1	4299 12.063
HSK-A 63	14	34.0	50.0	85	46	41.5	5	4900 12.014	1.2	4299 14.063
HSK-A 63	16	38.0	50.0	90	49	45.5	5	4900 16.014	1.3	4299 16.063
HSK-A 63	18	40.0	50.0	90	49	48.5	5	4900 16.014	1.3	4299 18.063
HSK-A 63	20	42.0	50.0	90	51	47.5	5	4900 20.114	1.3	4299 20.063
HSK-A 63	25	57.0	63.0	120	57	55.3	6	4900 20.114	2.3	4299 25.063
HSK-A 63	32	64.0	75.0	125	61	63.0	6	4900 20.114	2.9	4299 32.063
HSK-A 63	6	26.0	50.0	150	37	103.0	5	4900 6.014	1.5	4299 6.163
HSK-A 63	8	28.0	50.0	150	37	104.0	5	4900 8.014	1.5	4299 8.163
HSK-A 63	10	30.0	50.0	150	41	104.0	5	4900 10.014	1.5	4299 10.163
HSK-A 63	12	32.0	50.0	150	46	105.0	5	4900 12.014	1.5	4299 12.163
HSK-A 63	14	34.0	50.0	150	46	105.0	5	4900 12.014	1.7	4299 14.163
HSK-A 63	16	38.0	50.0	150	49	106.0	5	4900 16.014	1.8	4299 16.163
HSK-A 63	18	40.0	50.0	150	49	107.0	5	4900 16.014	1.9	4299 18.163
HSK-A 63	20	42.0	50.0	150	51	108.0	5	4900 20.114	1.9	4299 20.163
HSK-A 63	6	26.0	50.0	200	37	153.0	5	4900 6.014	1.7	4299 6.263
HSK-A 63	8	28.0	50.0	200	37	154.0	5	4900 8.014	1.7	4299 8.263

Tool holders



Article no.

4299

d3	d1 h6	d4	d5	l1	l2	l5	SW	①		Order no.
	mm	mm	mm	mm	mm	mm	mm		kg	
HSK-A 63	10	30.0	50.0	200	41	154.0	5	4900 10.014	1.8	4299 10.263
HSK-A 63	12	32.0	50.0	200	46	155.0	5	4900 12.014	1.8	4299 12.263
HSK-A 63	14	34.0	50.0	200	46	155.0	5	4900 12.014	2.1	4299 14.263
HSK-A 63	16	38.0	50.0	200	49	156.0	5	4900 16.014	2.2	4299 16.263
HSK-A 63	18	40.0	50.0	200	49	157.0	5	4900 16.014	2.3	4299 18.263
HSK-A 63	20	42.0	50.0	200	51	158.0	5	4900 20.114	2.5	4299 20.263
HSK-A 80	6	26.0	50.0	70	37	24.0	5	4900 6.014	1.5	4299 6.080
HSK-A 80	8	28.0	50.0	70	37	24.0	5	4900 8.014	1.5	4299 8.080
HSK-A 80	10	30.0	50.0	80	41	35.0	5	4900 10.014	1.5	4299 10.080
HSK-A 80	12	32.0	50.0	85	46	40.0	5	4900 12.014	1.6	4299 12.080
HSK-A 80	14	34.0	50.0	85	46	40.0	5	4900 12.014	1.6	4299 14.080
HSK-A 80	16	38.0	50.0	95	49	51.0	5	4900 16.014	1.7	4299 16.080
HSK-A 80	18	40.0	50.0	95	49	51.0	5	4900 16.014	1.8	4299 18.080
HSK-A 80	20	42.0	50.0	95	51	52.0	5	4900 20.114	1.8	4299 20.080
HSK-A 80	25	57.0	63.0	110	57	65.0	6	4900 20.114	2.6	4299 25.080
HSK-A 80	32	64.0	75.0	125	61	63.0	6	4900 20.114	3.2	4299 32.080
HSK-A 100	6	26.0	50.0	75	37	24.0	5	4900 6.014	2.4	4299 6.100
HSK-A 100	8	28.0	50.0	75	37	26.0	5	4900 8.014	2.4	4299 8.100
HSK-A 100	10	30.0	50.0	90	41	42.0	5	4900 10.014	2.5	4299 10.100
HSK-A 100	12	32.0	50.0	95	46	47.0	5	4900 12.014	2.5	4299 12.100
HSK-A 100	14	34.0	50.0	95	46	47.0	5	4900 12.014	2.5	4299 14.100
HSK-A 100	16	38.0	50.0	100	49	53.0	5	4900 16.014	2.7	4299 16.100
HSK-A 100	18	40.0	50.0	100	49	53.0	5	4900 16.014	2.7	4299 18.100
HSK-A 100	20	42.0	50.0	105	51	59.0	5	4900 20.114	3.2	4299 20.100
HSK-A 100	25	57.0	63.0	110	57	62.0	6	4900 20.114	3.3	4299 25.100
HSK-A 100	32	64.0	75.0	110	61	62.0	6	4900 20.114	3.8	4299 32.100
HSK-A 100	6	26.0	50.0	160	37	104.0	5	4900 6.014	2.8	4299 106.100
HSK-A 100	8	28.0	50.0	160	37	104.0	5	4900 8.014	2.8	4299 108.100
HSK-A 100	10	30.0	50.0	160	41	105.0	5	4900 10.014	2.9	4299 110.100
HSK-A 100	12	32.0	50.0	160	46	105.0	5	4900 12.014	2.9	4299 112.100
HSK-A 100	14	34.0	50.0	160	46	107.0	5	4900 12.014	2.9	4299 114.100
HSK-A 100	16	38.0	50.0	160	49	107.0	5	4900 16.014	3.2	4299 116.100
HSK-A 100	18	40.0	50.0	160	49	108.0	5	4900 16.014	3.2	4299 118.100
HSK-A 100	20	42.0	50.0	160	51	108.0	5	4900 20.114	3.6	4299 120.100
HSK-A 100	25	57.0	63.0	160	57	110.0	6	4900 20.114	3.7	4299 125.100
HSK-A 100	32	64.0	75.0	160	61	110.0	6	4900 20.114	4.2	4299 132.100
HSK-A 100	6	26.0	50.0	200	37	144.0	5	4900 6.014	3.0	4299 206.100
HSK-A 100	8	28.0	50.0	200	37	144.0	5	4900 8.014	3.0	4299 208.100
HSK-A 100	10	30.0	50.0	200	41	145.0	5	4900 10.014	3.1	4299 210.100
HSK-A 100	12	32.0	50.0	200	46	145.0	5	4900 12.014	3.1	4299 212.100
HSK-A 100	14	34.0	50.0	200	46	147.0	5	4900 12.014	3.1	4299 214.100
HSK-A 100	16	38.0	50.0	200	49	147.0	5	4900 16.014	3.4	4299 216.100
HSK-A 100	18	40.0	50.0	200	49	148.0	5	4900 16.014	3.4	4299 218.100
HSK-A 100	20	42.0	50.0	200	51	148.0	5	4900 20.114	3.8	4299 220.100
HSK-A 100	25	57.0	63.0	200	57	150.0	6	4900 20.114	3.9	4299 225.100
HSK-A 100	32	64.0	75.0	200	61	150.0	6	4900 20.114	4.4	4299 232.100

Tool holders



ISO taper hydraulic chucks, slim design 3°



Product information:

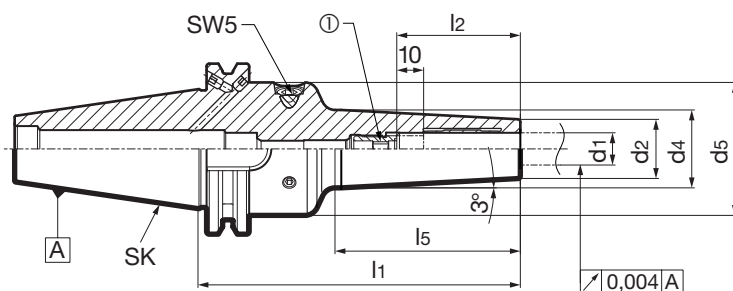
- SK to DIN ISO 7388-1 form AD/AF
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment
- concentricity: 4 µm
l1 from 160 mm: = 5 µm

Scope of delivery:

- incl. setting screw (1) art. no. 4941
- incl. clamping key art. no. 4912

Suitable accessories separately available:

- ISO pull studs art. no. 4925, 4926
- replacement clamping screws art. no. 4241



Article no. **4597**

SK	d1 h6	d2	d4	d5	l1	l2	l5	①	kg	Order no.
	mm	mm	mm	mm	mm	mm	mm			
SK 40	6	16	23.0	49.5	120	37	68.0	4941 6.041	1.3	4597 6.140
SK 40	8	18	25.0	49.5	120	37	68.0	4941 8.040	1.3	4597 8.140
SK 40	10	20	27.0	49.5	120	41	68.5	4941 10.050	1.3	4597 10.140
SK 40	12	22	29.0	49.5	120	46	69.0	4941 12.100	1.4	4597 12.140
SK 40	14	24	31.0	49.5	120	46	69.0	4941 14.100	1.4	4597 14.140
SK 40	16	26	33.0	49.5	120	49	69.5	4941 16.100	1.4	4597 16.140
SK 40	18	28	35.0	49.5	120	49	70.0	4941 18.100	1.4	4597 18.140
SK 40	20	30	37.0	49.5	120	51	70.0	4941 20.100	1.5	4597 20.140
SK 40	6	16	27.3	49.5	160	37	109.0	4941 6.041	1.4	4597 6.240
SK 40	8	18	29.3	49.5	160	37	109.0	4941 8.040	1.5	4597 8.240
SK 40	10	20	31.4	49.5	160	41	110.0	4941 10.050	1.5	4597 10.240
SK 40	12	22	33.5	49.5	160	46	111.0	4941 12.100	1.6	4597 12.240
SK 40	14	24	35.6	49.5	160	46	112.0	4941 14.100	1.7	4597 14.240
SK 40	16	26	37.6	49.5	160	49	112.0	4941 16.100	1.7	4597 16.240
SK 40	18	28	39.8	49.5	160	49	114.0	4941 18.100	1.8	4597 18.240
SK 40	20	30	41.8	49.5	160	51	114.0	4941 20.100	1.8	4597 20.240

Tool holders



ISO taper hydraulic chucks with increased clamping force



Product information:

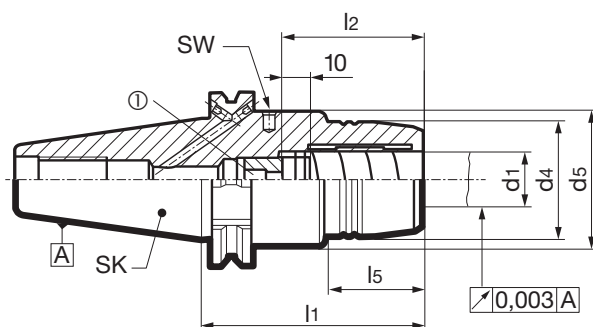
- SK to DIN ISO 7388-1 form AD/AF
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment

Scope of delivery:

- incl. setting screw (1) art. no. 4900
- incl. clamping key art. no. 4912

Suitable accessories separately available:

- ISO pull studs art. no. 4925, 4926
- replacement clamping screws art. no. 4241



Article no.

4213

SK	d1 h6	d4	d5	l1	l2	l5	SW	①	kg	Order no.
	mm	mm	mm	mm	mm	mm	mm			
SK 40	6	26.0	49.5	80.5	37	29.5	5	4900 6.014	1.2	4213 6.040
SK 40	8	28.0	49.5	80.5	37	30.0	5	4900 8.014	1.2	4213 8.040
SK 40	10	30.0	49.5	80.5	41	31.0	5	4900 10.014	1.3	4213 10.040
SK 40	12	32.0	49.5	80.5	46	31.5	5	4900 12.014	1.3	4213 12.040
SK 40	14	34.0	49.5	80.5	46	31.5	5	4900 12.014	1.3	4213 14.040
SK 40	16	38.0	49.5	80.5	49	33.0	5	4900 16.014	1.3	4213 16.040
SK 40	18	40.0	49.5	80.5	49	33.0	5	4900 16.014	1.3	4213 18.040
SK 40	20	49.5	49.5	64.5	51	45.4	5	4900 20.114	1.7	4213 20.040
SK 40	20	42.0	49.5	80.5	51	34.0	5	4900 20.114	1.3	4213 20.140
SK 40	20	42.0	49.5	110.0	51	34.0	5	4900 20.114	1.7	4213 20.240
SK 40	25	49.5	49.5	80.5	57	61.4	6	4900 20.114	1.3	4213 25.040
SK 40	32	63.0	80.0	80.5	61	25.5	6	4900 20.114	1.8	4213 32.040
SK 50	12	32.0	49.5	80.5	46	31.5	5	4900 12.014	3.1	4213 12.050
SK 50	20	42.0	49.5	80.5	51	34.0	5	4900 20.114	3.1	4213 20.050
SK 50	20	42.0	49.5	110.0	51	34.0	5	4900 20.114	3.6	4213 20.150
SK 50	32	72.0	72.0	81.0	61	61.9	6	4900 20.114	3.8	4213 32.050

Tool holders



MAS/BT hydraulic chucks with increased clamping force



Product information:

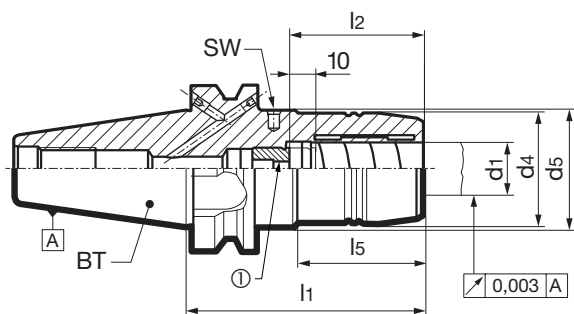
- MAS/BT to DIN ISO 7388-2 Form JD/JF
- BT30 in JD design without coolant supply via the collar
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment

Scope of delivery:

- incl. setting screw (1) art. no. 4900
- incl. clamping key art. no. 4912

Suitable accessories separately available:

- BT pull studs art. no. 4927, 4928
- replacement clamping screws art. no. 4241



Article no. **4221**

BT	d1 h6	d4	d5	l1	l2	l5	SW	①	kg	Order no.
BT 30	6	26.0	26.0	51.0	37		4	4900 6.014	0.4	4221 6.030
BT 30	8	28.0	28.0	51.0	37		4	4900 8.014	0.4	4221 8.030
BT 30	10	30.0	30.0	51.0	41		4	4900 10.014	0.4	4221 10.030
BT 30	12	32.0	32.0	51.0	46	19.5	4	4900 12.014	0.5	4221 12.030
BT 30	16	38.0	38.0	90.0	49	50.0	4	4900 16.014	0.8	4221 16.030
BT 30	20	42.0	42.0	90.0	51	50.0	5	4900 8.014	0.9	4221 20.030
BT 40	6	26.0	44.5	90.0	37	43.0	5	4900 6.014	1.2	4221 6.040
BT 40	8	28.0	44.5	90.0	37	44.5	5	4900 8.014	1.3	4221 8.040
BT 40	10	30.0	44.5	90.0	41	44.5	5	4900 10.014	1.3	4221 10.040
BT 40	12	32.0	44.5	90.0	46	44.5	5	4900 12.014	1.3	4221 12.040
BT 40	14	34.0	44.5	90.0	46	44.5	5	4900 12.014	1.3	4221 14.040
BT 40	16	38.0	44.5	90.0	49	47.5	5	4900 16.014	1.3	4221 16.040
BT 40	18	40.0	44.5	90.0	49	47.5	5	4900 16.014	1.4	4221 18.040
BT 40	20	49.5	49.5	72.5	51		5	4900 20.114	1.4	4221 20.040
BT 40	20	42.0	44.5	90.0	51	47.5	5	4900 20.114	1.4	4221 20.140
BT 40	25	49.5	49.5	83.0	57		6	4900 20.114	1.4	4221 25.040
BT 40	32	63.0	80.0	83.0	61	25.5	6	4900 20.114	1.9	4221 32.040
BT 50	12	32.0	44.5	90.0	46	34.0	5	4900 12.014	3.9	4221 12.050
BT 50	20	42.0	44.5	90.0	51	34.0	5	4900 20.114	3.9	4221 20.050
BT 50	32	72.0	72.0	90.0	61		6	4900 20.114	4.6	4221 32.050

Tool holders


MAS/BT DC hydraulic chucks with axial plane

NEW
Product information:

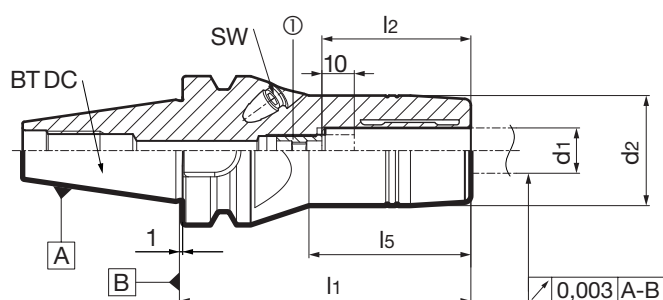
- MAS/BT DC with axial plane, sim. ISO 7388-2, form JD
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment

Scope of delivery:

- incl. setting screw (1) art. no. 4900
- incl. clamping key art. no. 4912

Suitable accessories separately available:

- BT pull studs art. no. 4927, 4928
- replacement clamping screws art. no. 4241



Article no.

4598

BT DC	d1	d2	l1	l2	l5	SW	①	kg	Order no.
	mm	mm	mm	mm	mm	mm			
BT 30	6	26	51	37	29	4	4900 6.014	0.4	4598 6.030
BT 30	8	28	51	37	29	4	4900 8.014	0.4	4598 8.030
BT 30	10	30	51	41	29	4	4900 10.014	0.5	4598 10.030
BT 30	12	32	51	46	19	4	4900 12.014	0.5	4598 12.030
BT 30	14	34	90	46	50	4	4900 12.014	0.8	4598 14.030
BT 30	16	38	90	49	50	4	4900 16.014	0.8	4598 16.030
BT 30	18	40	90	49	50	5	4900 16.014	0.9	4598 18.030
BT 30	20	42	90	51	50	5	4900 20.114	0.9	4598 20.030

Tool holders



HSK-A precision clamping chucks



Product information:

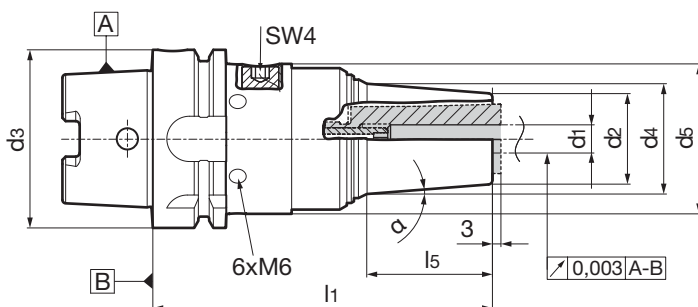
- HSK-A to ISO 12164-1 / DIN 69893-1
- balance quality values: G 2.5 / 20,000 U/min or U < 1.2 gmm
- incl. balancing thread 6xM6
- for tool shank tolerance h6
- axial length adjustment
- for heavy-duty cutting as well as HSC and HPC
- highest clamping force and stability thanks to mech. tension gearing
- actuation torque for clamping initiation 10 Nm
- suitable for internal cooling up to 80 bar

Scope of delivery:

- hexagon clamping key art. no. 4912 4,600

Suitable accessories separately available:

- coolant supply set art. no. 4949
- clamping sleeves art. no. 4302, 4235, 4236, 4237
- torque wrench 10 Nm art. no. 4987 10,000
- sockets art. no. 4916 4,000 for optimal operation



Article no. **4300**

d3	Nominal size	d1 h6 mm	d2 mm	d4 mm	d5 mm	l1 mm	l5 mm	α °	Order no.
HSK-A 63	20	3.0-20.0	40	40	53	92	20		4300 20.063
HSK-A 63	20	3.0-20.0	32	39	53	120	44	4	4300 20.163
HSK-A 63	20	3.0-20.0	32	40	53	142	69	4	4300 20.263
HSK-A 100	20	3.0-20.0	40	40	70	100	18		4300 20.100
HSK-A 100	25	16.0-32.0	52	70	70	139	15		4300 25.100



ISO taper precision clamping chucks

**Product information:**

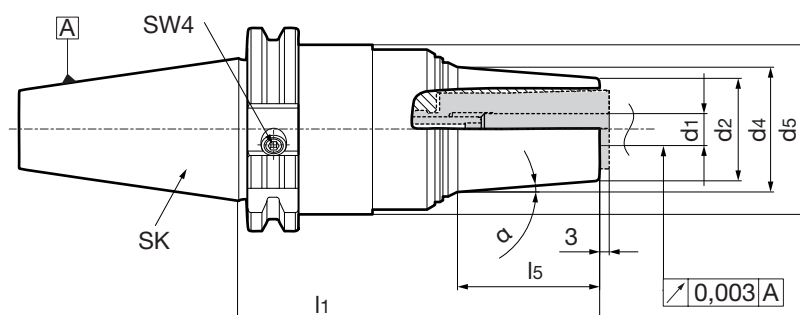
- SK to DIN ISO 7388-1 Form AD
- balance quality values: G 2.5 / 20,000 U/min or U < 1.2 gmm
- for tool shank tolerance h6
- axial length adjustment
- for heavy-duty cutting as well as HSC and HPC
- highest clamping force and stability thanks to mech. tension gearing
- actuation torque for clamping initiation 10 Nm
- suitable for internal cooling up to 80 bar

Scope of delivery:

- hexagon clamping key art. no. 4912 4,600

Suitable accessories separately available:

- clamping sleeves art. no. 4302, 4235, 4236, 4237
- ISO pull studs art. no. 4925, 4926
- torque wrench 10 Nm art. no. 4987 10.000
- sockets art. no. 4916 4.000 for optimal operation
- form AD/AF on request



Article no.

4301

SK	Nominal size	d1 h6	d2	d4	d5	l1	l5	α	Order no.
		mm	mm	mm	mm				
SK 40	20	3.0-20.0	40	40	50	62	20		4301 20.040
SK 40	20	3.0-20.0	32	39	50	91	44	4	4301 20.140
SK 40	20	3.0-20.0	32	40	50	112	69	4	4301 20.240
SK 50	20	3.0-20.0	40	40	63	62	18		4301 20.050
SK 50	25	16.0-32.0	52	70	70	101	15		4301 25.050



MAS/BT precision clamping chucks



Product information:

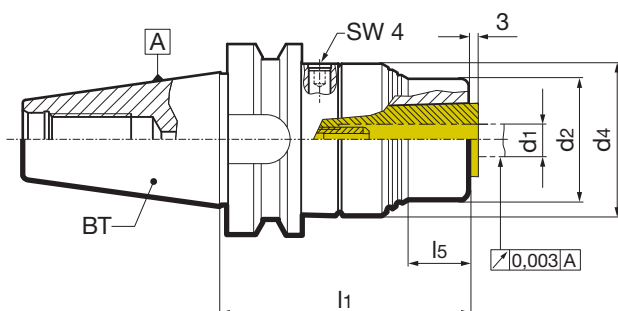
- MAS/BT to DIN ISO 7388-2 form JD
- balancing quality: G 2.5 / 25,000 rev./min or rev. < 1 gmm
- for tool shank tolerance h6
- axial length adjustment
- for heavy-duty cutting as well as HSC and HPC
- highest clamping force and stability thanks to mech. tension gearing
- actuation torque for clamping initiation 10 Nm
- suitable for internal cooling up to 80 bar

Scope of delivery:

- hexagon clamping key art. no. 4912 4,600

Suitable accessories separately available:

- clamping sleeves art. no. 4302, 4235, 4236, 4237
- BT pull studs art. no. 4927, 4928
- torque wrench 10 Nm art. no. 4987 10.000
- sockets art. no. 4916 4.000 for optimal operation
- form JD/JF on request



Article no. **4244**

BT	Nominal size	d1 h6		d2	d4	l1	l5	Order no.
		mm						
BT 30	20	3.0-20.0		40.0	53	82.0	20	4244 20.030
BT 40	20	3.0-20.0		40.0	63	70.4	18	4244 20.040
BT 40	25	16.0-32.0		53.0	63	109.5	14	4244 25.040
BT 40	20	3.0-20.0		40.0	63	120.0	48	4244 120.040
BT 50	20	3.0-20.0		40.0	63	81.4	18	4244 20.050
BT 50	25	16.0-32.0		52.5	70	120.5	10	4244 25.050
BT 50	20	3.0-20.0		40.0	63	167.4	84	4244 120.050



Extensions HPC



Product information:

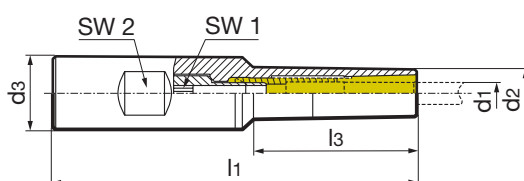
- for tool shank tolerance h6
- slim extension for holding in HPC chuck or hydraulic chuck
- high clamping force
- actuation from the rear using the hexagonal key provided (SW1)
- actuation torque for clamping initiation 3 Nm

Scope of delivery:

- hexagon clamping key art. no. 4912 4,000

Suitable accessories separately available:

- clamping sleeves art. no. 4302, 4235
- torque wrench art. no. 4915 3,000 for optimal operation



Article no.

4208

d3	Size	d1	d2	l1	l3	SW1	SW2	kg	Order no.
mm		mm	mm	mm	mm	mm	mm		
14	6	1.0-6.0	14	100	29	4	13	0.260	4208 6.014
20	6	1.0-6.0	14	100	45	4	16	0.340	4208 6.020
14	6	1.0-6.0	14	150	29	4	13	0.320	4208 6.114
20	6	1.0-6.0	14	150	67	4	16	0.460	4208 6.120



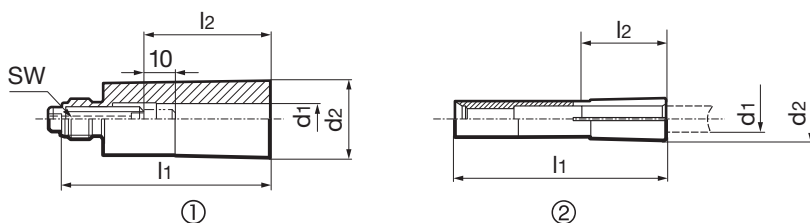
GÜHROJET clamping sleeves, for precision clamping chucks

Product information:

- for clamping tools with straight shank
- for maximum holding torque
- design with peripheral cooling thanks to long slots
- for tool shank tolerance h6
- Type 1: for HPC power chuck
- Type 2: for HPC extensions
- Type P: PinLock pull-out safety device incl. 3 securing pins and assembly tool (design without adjustment track)

Scope of delivery:

- incl. adjustment screw for type 1 and type P



Article no. **4302**

Nominal size	d1 h6 mm	d2 mm	l1 mm	l2 mm	Type	SW mm	Order no.
6	1	10.0	50.0	28	2		4302 1.006
6	2	10.0	50.0	28	2		4302 2.006
6	3	10.0	50.0	28	2		4302 3.006
6	4	10.0	50.0	28	2		4302 4.006
6	5	10.0	50.0	28	2		4302 5.006
6	6	10.0	50.0	28	2		4302 6.006
20	6	24.6	66.0	36	1&P	4	4302 6.120
20	8	24.6	66.0	36	1&P	4	4302 8.120
20	10	24.6	66.0	40	1&P	4	4302 10.120
20	12	24.6	66.0	45	1&P	4	4302 12.120
20	14	24.6	66.0	45	1&P	4	4302 14.120
20	16	24.6	66.0	48	1&P	4	4302 16.120
20	18	24.6	66.0	48	1&P	4	4302 18.120
20	20	24.6	66.0	50	1&P	4	4302 20.120
25	16	39.0	87.5	48	1&P	5	4302 16.125
25	20	39.0	87.5	50	1&P	5	4302 20.125
25	22	39.0	87.5	50	1&P	5	4302 22.125
25	25	39.0	87.5	56	1&P	5	4302 25.125
20	3	24.6	66.0	28	1	4	4302 3.020
20	4	24.6	66.0	28	1	4	4302 4.020
20	5	24.6	66.0	28	1	4	4302 5.020
20	6	24.6	66.0	36	1	4	4302 6.020
20	8	24.6	66.0	36	1	4	4302 8.020
20	10	24.6	66.0	40	1	4	4302 10.020
20	12	24.6	66.0	45	1	4	4302 12.020
20	14	24.6	66.0	45	1	4	4302 14.020
20	16	24.6	66.0	48	1	4	4302 16.020
20	18	24.6	66.0	48	1	4	4302 18.020
20	20	24.6	66.0	50	1	4	4302 20.020
25	16	39.0	87.5	48	1	5	4302 16.025
25	20	39.0	87.5	50	1	5	4302 20.025
25	22	39.0	87.5	50	1	5	4302 22.025
25	25	39.0	87.5	56	1	5	4302 25.025
25	32	39.0	87.5	59	1	5	4302 32.025

Tool holders



Clamping sleeves for precision clamping chucks, sealed version

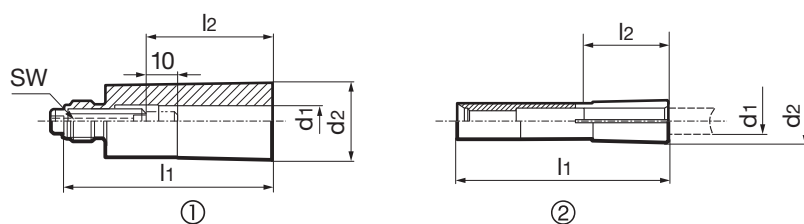


Product information:

- for clamping tools with straight shank
- high holding torque
- sealed design with short slots
- for tool shank tolerance h6
- Type 1: for HPC power chuck
- Type 2: for HPC extensions

Scope of delivery:

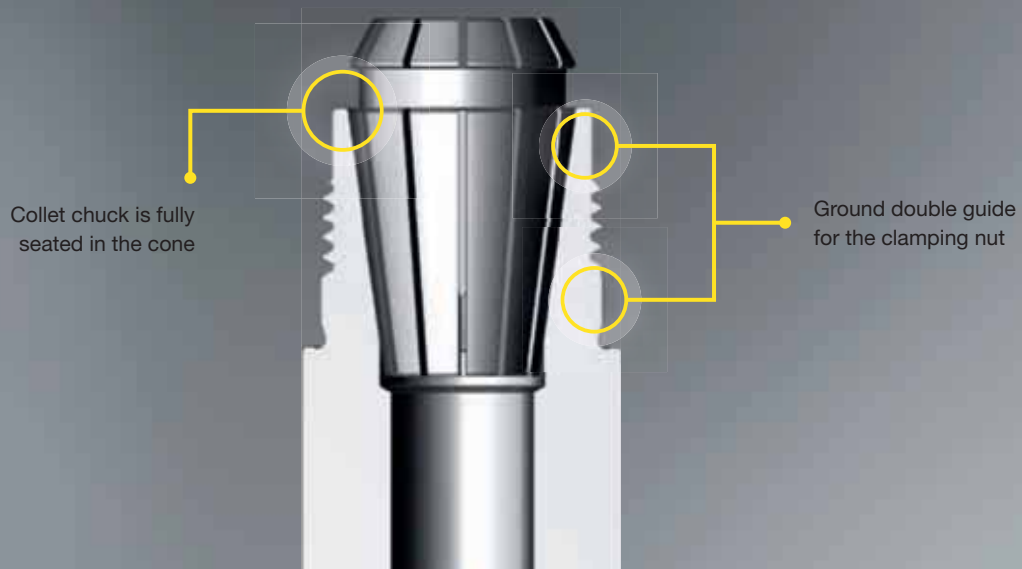
- incl. adjustment screw



Article no. **4235**

Nominal size	d1 h6 mm	d2 mm	l1 mm	l2 mm	Type	SW mm	Order no.
6	1	10.0	50.0	28	2		4235 1.006
6	2	10.0	50.0	28	2		4235 2.006
6	3	10.0	50.0	28	2		4235 3.006
6	4	10.0	50.0	28	2		4235 4.006
6	5	10.0	50.0	28	2		4235 5.006
6	6	10.0	50.0	28	2		4235 6.006
20	3	24.6	66.0	28	1	4	4235 3.020
20	4	24.6	66.0	28	1	4	4235 4.020
20	5	24.6	66.0	28	1	4	4235 5.020
20	6	24.6	66.0	36	1	4	4235 6.020
20	8	24.6	66.0	36	1	4	4235 8.020
20	10	24.6	66.0	40	1	4	4235 10.020
20	12	24.6	66.0	45	1	4	4235 12.020
20	14	24.6	66.0	45	1	4	4235 14.020
20	16	24.6	66.0	48	1	4	4235 16.020
20	18	24.6	66.0	48	1	4	4235 18.020
20	20	24.6	66.0	50	1	4	4235 20.020
25	16	39.0	87.5	48	1	5	4235 16.025
25	20	39.0	87.5	50	1	5	4235 20.025
25	22	39.0	87.5	50	1	5	4235 22.025
25	25	39.0	87.5	56	1	5	4235 25.025
25	32	39.0	87.5	59	1	5	4235 32.025

Precision collet holders



Precision collet chuck with 2 μm concentricity, standard



Precision collet chuck with 2 μm concentricity, sealed



- + maximum concentricity and minimum imbalance for highest speeds, especially for the micro tool range
- + easy handling for quick tool change
- + low imbalance, protects the machine and ensures perfect surfaces during machining
- + completely rotation-symmetrical structure
- + holder with HSK-A or HSK-E



HSK-A precision collet holders



NEW

Product information:

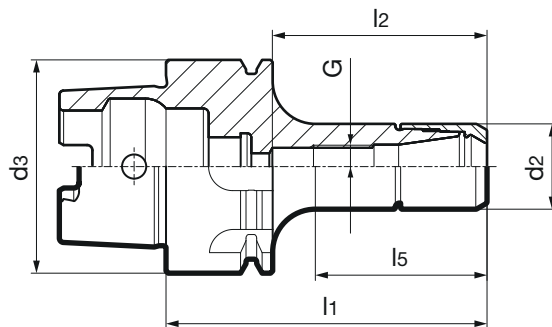
- HSK-A to ISO 12164-1 / DIN 69893-1
- balancing quality: G 2.5 / 25,000 rev./min or rev. \leq 1 gmm
- für precision collets art. no. 4574 and 4575
- concentricity overall system max. 3 μ m (at 3 x clamping- \varnothing max. 50 mm)
- observe maximum torque values of clamping nut
clamping \varnothing 1.0 - 2.5 = 7 Nm
clamping \varnothing 3.0 - 7.5 = 10 Nm

Scope of delivery:

- incl. retaining nut art. no. 4573
- without setting screws

Suitable accessories separately available:

- coolant supply set art. no. 4949
- order collets art. no. 4574 or 4575 (sealed version) separately
- roller bearing wrench art. no. 4994
- torque wrench art. no. 4981 5.025
- roller bearing wrench head art. no. 4995 for optimal operation



Article no. **4476**

d3	Size	\varnothing -range	d2	l1	l2	l5		G	Order no.
			mm	mm	mm	mm	1/min		
HSK-A 32	ER11	1.0-7.0	16	40	24	20	50000		4476 11.032
HSK-A 40	ER11	1.0-7.0	16	60	40	40	42000	M 8 X1	4476 11.040
HSK-A 40	ER11	1.0-7.0	16	130	75	110	27000	M 8 X1	4476 11.140
HSK-A 50	ER11	1.0-7.0	16	130	60	104	27000	M 8 X1	4476 11.050
HSK-A 63	ER11	1.0-7.0	16	70	48	34	25000	M 8 X1	4476 11.063
HSK-A 63	ER11	1.0-7.0	16	100	78	64	25000	M 8 X1	4476 11.163
HSK-A 63	ER11	1.0-7.0	16	130	108	94	25000	M 8 X1	4476 11.263
HSK-A 63	ER11	1.0-7.0	16	160	138	124	25000	M 8 X1	4476 11.363



HSK-E precision collet holders



Product information:

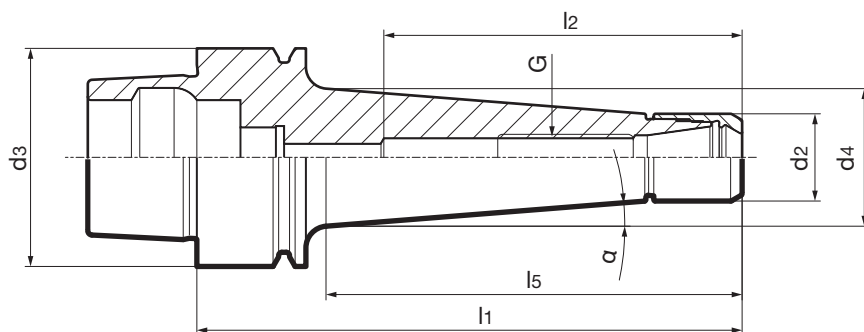
- HSK-E to DIN 69893-5, without access hole in taper
- balancing quality: G 2.5 / 25,000 rev./min or rev. \leq 1 gmm
- für precision collets art. no. 4574 and 4575
- concentricity overall system max. 3 μ m (at 3 x clamping- \varnothing max. 50 mm)
- observe maximum torque values of clamping nut
clamping \varnothing 1.0 - 2.5 = 7 Nm
clamping \varnothing 3.0 - 7.5 = 10 Nm

Scope of delivery:

- incl. retaining nut art. no. 4573
- without setting screws

Suitable accessories separately available:

- coolant supply set art. no. 4949
- order collets art. no. 4574 or 4575 (sealed version) separately
- roller bearing wrench art. no. 4994
- torque wrench art. no. 4981 5.025
- roller bearing wrench head art. no. 4995 for optimal operation



Article no. **4475**

d3	Size	\varnothing -range	d2 mm	d4 mm	l1 mm	l2 mm	l5 mm	α $^\circ$	1/min	G	Order no.
HSK-E 25	ER11	1,0-7,5	16	20.0	35	22	22.0		60000		4475 11.025
HSK-E 32	ER11	1,0-7,5	16	17.5	50	34	27.5	4.5	50000	M 8 X1	4475 11.032
HSK-E 40	ER11	1,0-7,5	16	17.0	50	31	22.5	4.5	42000	M 8 X1	4475 11.040
HSK-E 40	ER11	1,0-7,5	16	25.5	100	65	75.5	4.5	40000	M 8 X1	4475 11.140
HSK-E 40	ER11	1,0-7,5	16	30.5	130	65	108.0	4.5	35000	M 8 X1	4475 11.240
HSK-E 40	ER11	1,0-7,5	16	32.0	160	65	139.0	4.5	27000	M 8 X1	4475 11.340
HSK-E 50	ER11	1,0-7,5	16	18.0	60	37	30.0	4.5	30000	M 8 X1	4475 11.050
HSK-E 50	ER11	1,0-7,5	16	24.5	100	73	70.0	4.5	30000	M 8 X1	4475 11.150

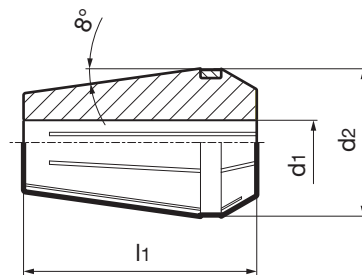


Precision collets for precision collet holders



Product information:

- for tool shank tolerance h10
- precision collet holders ER11 sim. ISO 15488
- especially for precision collet holders
art. no. 4475 and 4476
- concentricity 2 μm
- no clamping bridging
- observe maximum torque values of clamping nut
clamping \varnothing 1.0 - 2.5 = 7 Nm
clamping \varnothing 3.0 - 7.5 = 10 Nm
- sealed design art. no. 4575



Article no.

4574

Size	d1	d2	l1	Order no.
	mm	mm	mm	
ER11	1.00	11.3	18.00	4574 1.011
ER11	1.50	11.3	18.00	4574 1.511
ER11	2.00	11.3	18.00	4574 2.011
ER11	2.50	11.3	18.00	4574 2.511
ER11	3.00	11.3	18.00	4574 3.011
ER11	3.50	11.3	18.00	4574 3.511
ER11	4.00	11.3	18.00	4574 4.011
ER11	4.50	11.3	18.00	4574 4.511
ER11	5.00	11.3	18.00	4574 5.011
ER11	5.50	11.3	18.00	4574 5.511
ER11	6.00	11.3	18.00	4574 6.011
ER11	6.50	11.3	18.00	4574 6.511
ER11	7.00	11.3	18.00	4574 7.011

Tool holders

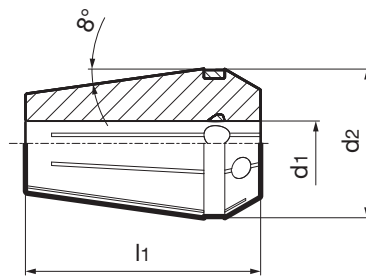


Precision collets for precision collet holders, sealed version



Product information:

- for tool shank tolerance h8
- precision collet holders, sealed version ER11
sim. ISO 15488
- especially for precision collet holders
art. no. 4475 and 4476
- concentricity 2 µm
- no clamping bridging
- observe maximum torque values of clamping nut
clamping Ø 1.0 - 2.5 = 7 Nm
clamping Ø 3.0 - 7.5 = 10 Nm



Article no. **4575**

Size	d1	d2	l1	Order no.
	mm	mm	mm	
ER11	3.00	11.3	18.00	4575 3.011
ER11	4.00	11.3	18.00	4575 4.011
ER11	5.00	11.3	18.00	4575 5.011
ER11	6.00	11.3	18.00	4575 6.011



Retaining nut for precision collet holders

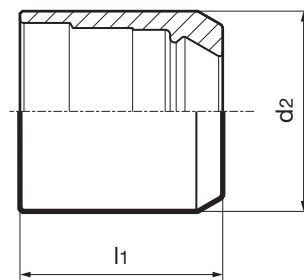
NEW

Product information:

- especially for precision collet holders art. no. 4475 and 4476
- for precision collet holders ER11 (sim. ISO 15488) art. no. 4574 and 4575

Suitable accessories separately available:

- roller bearing wrench art. no. 4994 11.000
- torque wrench art. no. 4981 5.025
- roller bearing wrench head art. no. 4995 for optimal operation



Article no.

4573

Nominal size	d2 mm	l1 mm	Ø-range	Order no.
ER11	16.00	16.200	1.0-7.0	4573 11.000

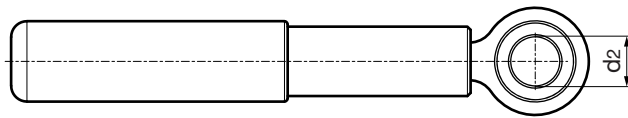


Roller bearing wrenches for precision collet holders



Product information:

- especially for precision collet holders
art. no. 4475 and 4476
- observe maximum torque values of clamping nut
clamping \varnothing 1.0 - 2.5 = 7 Nm
clamping \varnothing 3.0 - 7.5 = 10 Nm



Article no. 4994

Nominal size		d2	Order no.
		mm	
ER11		16	4994 11.000



Roller bearing wrenches head for torque wrenches

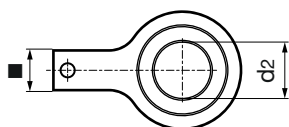


Product information:

- especially for precision collet holders art. no. 4475 and 4476
- roller bearing wrench head for torque wrench
- observe maximum torque values of clamping nut
clamping Ø 1.0 - 2.5 = 7 Nm
clamping Ø 3.0 - 7.5 = 10 Nm

Suitable accessories separately available:

- torque wrench art. no. 4981 5.025



Article no. **4995**

Nominal size	d2	Drive	Order no.
	mm	■	
ER11	16	9x12	4995 11.000

Tool holders

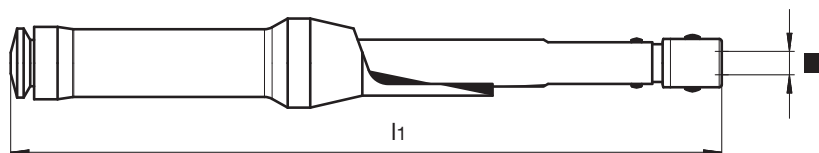


Torque wrenches



Product information:

- torque adjustable: 5-25 Nm
- with square socket
- release accuracy $\pm 4\%$ of the scale value



Article no. 4981

Drive	Torque	l1	Order no.
■	Nm	mm	
9x12	5-25	273	


GÜHROJET HSK-A Weldon side lock holders

Product information:

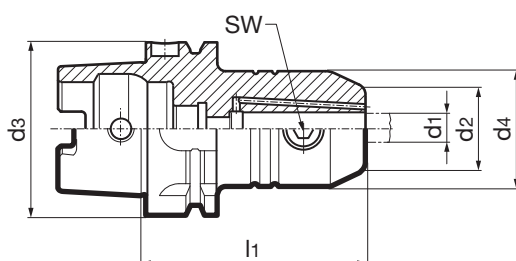
- HSK-A to ISO 12164-1 / DIN 69893-1
- with locating bore DIN 1835-2 Form B "Weldon"
- dimensions to DIN 69882-4
- balancing quality: G 6.3 / 15,000 rev./min
- for tool shank tolerance h6
- from holder d1 = 25 with two clamping screws
- with coolant ducts for peripheral cooling, therefore process and tool life improvement
- coolant ducts: d1 = 6 - 14 mm with two coolant ducts, d1 = 16 - 40 mm with four coolant ducts

Scope of delivery:

- incl. clamping screw art. no. 4903

Suitable accessories separately available:

- coolant supply set art. no. 4949

GÜHROJET


Article no.

4232

d3	d1 H5 mm	d2 mm	d4 mm	l1 mm	SW mm	kg	Order no.
HSK-A 32	6	15	25	60	3	0.24	4232 6.032
HSK-A 32	8	20	28	60	4	0.27	4232 8.032
HSK-A 32	10	25	35	65	5	0.31	4232 10.032
HSK-A 32	12	30	42	65	6	0.41	4232 12.032
HSK-A 40	6	15	25	60	3	0.32	4232 6.040
HSK-A 40	8	20	28	60	4	0.35	4232 8.040
HSK-A 40	10	25	35	60	5	0.47	4232 10.040
HSK-A 40	12	30	42	70	6	0.58	4232 12.040
HSK-A 40	14	32	44	75	6	0.59	4232 14.040
HSK-A 40	16	36	48	75	6	0.64	4232 16.040
HSK-A 50	6	15	25	65	3	0.50	4232 6.050
HSK-A 50	8	20	28	65	4	0.60	4232 8.050
HSK-A 50	10	25	35	65	5	0.60	4232 10.050
HSK-A 50	12	30	42	80	6	0.90	4232 12.050
HSK-A 50	14	32	44	80	6	0.90	4232 14.050
HSK-A 50	16	36	48	80	6	1.00	4232 16.050
HSK-A 50	18	38	50	80	6	1.00	4232 18.050
HSK-A 50	20	40	52	80	8	1.00	4232 20.050
HSK-A 63	6	15	25	65	3	0.80	4232 6.063
HSK-A 63	8	20	28	65	4	0.80	4232 8.063
HSK-A 63	10	25	35	65	5	0.90	4232 10.063
HSK-A 63	12	30	42	80	6	1.20	4232 12.063
HSK-A 63	14	32	44	80	6	1.20	4232 14.063
HSK-A 63	16	36	48	80	6	1.30	4232 16.063
HSK-A 63	18	38	50	80	6	1.40	4232 18.063
HSK-A 63	20	40	52	80	8	1.40	4232 20.063
HSK-A 63	25	45	65	110	10	2.40	4232 25.063
HSK-A 63	32	56	72	110	10	2.70	4232 32.063
HSK-A 80	6	15	25	80	3	1.75	4232 6.080
HSK-A 80	8	20	28	80	4	1.90	4232 8.080
HSK-A 80	10	25	35	80	5	2.10	4232 10.080
HSK-A 80	12	30	42	80	6	2.10	4232 12.080
HSK-A 80	14	32	44	80	6	2.30	4232 14.080
HSK-A 80	16	36	48	100	6	2.50	4232 16.080
HSK-A 80	18	38	50	100	6	2.50	4232 18.080
HSK-A 80	20	40	52	100	8	2.70	4232 20.080



d3	d1 H5	d2	d4	l1	SW		Order no.
	mm	mm	mm	mm	mm	kg	
HSK-A 80	25	45	65	100	10	2.80	4232 25.080
HSK-A 80	32	56	72	110	10	2.85	4232 32.080
HSK-A 80	40	60	80	120	10	2.98	4232 40.080
HSK-A 100	6	15	25	80	3	3.00	4232 6.100
HSK-A 100	8	20	28	80	4	3.20	4232 8.100
HSK-A 100	10	25	35	80	5	3.40	4232 10.100
HSK-A 100	12	30	42	80	6	3.40	4232 12.100
HSK-A 100	14	32	44	80	6	3.50	4232 14.100
HSK-A 100	16	36	48	100	6	3.80	4232 16.100
HSK-A 100	18	38	50	100	6	3.80	4232 18.100
HSK-A 100	20	40	52	100	8	3.90	4232 20.100
HSK-A 100	25	45	65	100	10	3.90	4232 25.100
HSK-A 100	32	56	72	100	10	4.20	4232 32.100
HSK-A 100	40	60	80	110	10	4.60	4232 40.100


GÜHROJET ISO taper Weldon side lock holders

Product information:

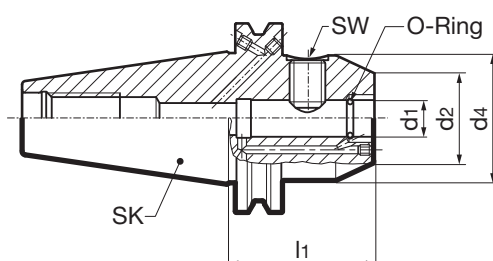
- SK to DIN ISO 7388-1 form AD/AF
- with locating bore DIN 1835-2 Form B "Weldon"
- coolant supply form AD/B (* version AD without coolant supply over collar and without GÜHROJET)
- bores for form B closed when supplied with set screws
- balancing quality: G 6.3 / 15,000 rev./min
- for tool shank tolerance h6
- with coolant ducts in the clamping bore for peripheral cooling, therefore process and tool life improvement
- coolant ducts: d1 = 6 - 14 mm with two coolant ducts, d1 = 16 - 32 mm with four coolant ducts

Scope of delivery:

- incl. clamping screw art. no. 4903
- incl. O-ring for sealing

Suitable accessories separately available:

- ISO pull studs art. no. 4925, 4926

GÜHROJET


Article no.

4317

SK	d1 h5	d2	d4	l1	SW	kg	Order no.
	mm						
SK 40	6	15	25	50	3	0.89	4317 6.040
SK 40	8	20	28	50	4	0.90	4317 8.040
SK 40	10	25	35	50	5	0.96	4317 10.040
SK 40	12	30	42	50	6	1.20	4317 12.040
SK 40	14	32	44	50	6	1.20	4317 14.040
SK 40	16	36	48	63	6	1.27	4317 16.040
SK 40	18	38	50	63	6	1.29	4317 18.040
SK 40	20	40	52	63	8	1.29	4317 20.040
SK 40	25	45	63	100	10	2.30	4317 25.040
SK 40	32	56	72	100	10	2.50	4317 32.040
SK 40	6	15	25	100	3	1.20	4317 106.040
SK 40	8	20	28	100	4	1.20	4317 108.040
SK 40	10	25	35	100	5	1.30	4317 110.040
SK 40	12	30	42	100	6	1.40	4317 112.040
SK 40	14	32	44	100	6	1.50	4317 114.040
SK 40	16	36	48	100	6	1.60	4317 116.040
SK 40	18	38	50	100	6	1.60	4317 118.040
SK 40	20	40	52	100	8	1.70	4317 120.040
SK 40	16	36	45	35	6	0.70	4317 916.040
SK 40	20	40	45	35	8	1.20	4317 920.040
SK 40	25	45	50	35	10	0.80	4317 925.040
SK 50	6	15	25	63	3	2.70	4317 6.050
SK 50	8	20	28	63	4	2.70	4317 8.050
SK 50	10	25	35	63	5	2.90	4317 10.050
SK 50	12	30	42	63	6	3.00	4317 12.050
SK 50	14	32	44	63	6	3.00	4317 14.050
SK 50	16	36	48	63	6	3.10	4317 16.050
SK 50	18	38	50	63	6	3.00	4317 18.050
SK 50	20	40	52	63	8	3.10	4317 20.050
SK 50	25	45	65	80	10	3.70	4317 25.050
SK 50	32	56	72	100	10	4.50	4317 32.050



GÜHROJET MAS/BT Weldon side lock holders



Product information:

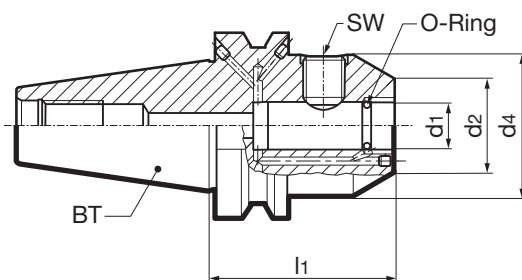
- MAS/BT in accordance with DIN ISO 7388-2 form JD/JF, (BT30 in JD design without internal coolant supply via the collar and without GÜHROJET)
- with locating bore DIN 1835-2 Form B "Weldon"
- balancing quality: G 6.3 / 15,000 rev./min
- with coolant ducts in the clamping bore for peripheral cooling, therefore process and tool life improvement
- coolant ducts: d1 = 6 - 18 mm with two coolant ducts
d1 = 20 - 32 mm with four coolant ducts

Scope of delivery:

- incl. clamping screw
- incl. O-ring for sealing

Suitable accessories separately available:

- BT pull studs art. no. 4927, 4928



Article no. **4234**

BT	d1 H5 mm	d2 mm	d4 mm	l1 mm	SW mm	kg	Order no.
BT 30	6	15	25	50	3	0.46	4234 6.030
BT 30	8	20	28	50	4	0.49	4234 8.030
BT 30	10	25	35	50	5	0.54	4234 10.030
BT 30	12	30	42	50	6	0.60	4234 12.030
BT 30	14	32	44	50	6	0.61	4234 14.030
BT 30	16	36	48	63	6	0.81	4234 16.030
BT 30	18	38	50	63	6	0.82	4234 18.030
BT 30	20	40	52	63	8	0.81	4234 20.030
BT 40	6	15	25	50	3	1.00	4234 6.040
BT 40	8	20	28	50	4	1.09	4234 8.040
BT 40	10	25	35	63	5	1.20	4234 10.040
BT 40	12	30	42	63	6	1.01	4234 12.040
BT 40	14	32	44	63	6	1.30	4234 14.040
BT 40	16	36	48	63	6	1.30	4234 16.040
BT 40	18	38	50	63	6	1.30	4234 18.040
BT 40	20	40	52	63	8	1.40	4234 20.040
BT 40	25	45	63	90	10	2.10	4234 25.040
BT 40	32	56	72	100	10	2.78	4234 32.040
BT 40	6	15	25	100	3	1.20	4234 106.040
BT 40	8	20	28	100	4	1.27	4234 108.040
BT 40	10	25	35	100	5	1.41	4234 110.040
BT 40	12	30	42	100	6	1.62	4234 112.040
BT 40	14	32	44	100	6	1.68	4234 114.040
BT 40	16	36	48	100	6	1.81	4234 116.040
BT 40	18	38	50	100	6	1.87	4234 118.040
BT 40	20	40	52	100	8	1.92	4234 120.040
BT 40	16	36	45	35	6	0.97	4234 916.040
BT 40	20	40	45	35	8	0.92	4234 920.040
BT 40	25	45	45	35	10	0.84	4234 925.040

Tool holders



HSK-A hydraulic synchro tapping chucks with internal coolant



Product information:

- HSK-A to ISO 12164-1 / DIN 69893-1
- balancing quality: G 6.3 / 15,000 rev./min
- setting screw enables 3 mm axial length readjustment
- minimal length compensation ± 0.3 mm in pushing and drawing direction between synchro spindle and threading tool
- reduces high frictional forces on the thread flanks
- reduces an increase in axial forces during the cutting cycle to a minimum
- coolant pressure up to max. 80 bar

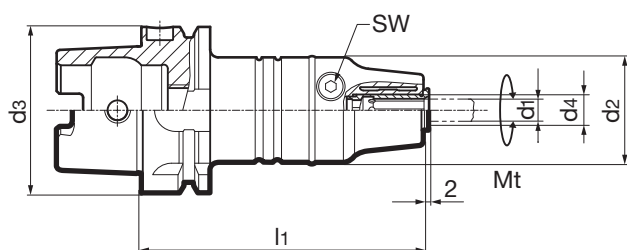
Scope of delivery:

- incl. clamping key art. no. 4912
- incl. adjustment key for adjustment screws

Suitable accessories separately available:

- setting screw "face" art. no. 4364
- replacement clamping screws art. no. 4241
- reduction bushes art. no. 4605 or 4606
- coolant supply set art. no. 4949

GÜHROSYNC



Article no.

4601

d3	G	d1	d2	d4	l1	Mt max.	SW		Order no.
		mm	mm	mm	mm	Nm	mm	kg	
HSK-A 63	M2-M12	2.8-10.0	40.0	12	106.5	26	4.0	1.2	4601 12.063
HSK-A 63	M4,5-M20	6.0-16.0	40.0	20	120.5	90	5.0	1.3	4601 20.063
HSK-A 100	M2-M12	2.8-10.0	40.0	12	113.0	26	4.0	2.6	4601 12.100
HSK-A 100	M4,5-M20	6.0-16.0	40.0	20	127.0	90	5.0	2.7	4601 20.100



ISO taper hydraulic synchro tapping chucks with internal coolant



Product information:

- SK30 to DIN ISO 7388-1 form AD without coolant supply over collar
- SK40 to DIN ISO 7388-1 form AD/AF
- balancing quality: G 6.3 / 15,000 rev./min
- setting screw enables 3 mm axial length readjustment
- minimal length compensation ± 0.3 mm in pushing and drawing direction between synchro spindle and threading tool
- reduces high frictional forces on the thread flanks
- reduces an increase in axial forces during the cutting cycle to a minimum
- coolant pressure up to max. 80 bar

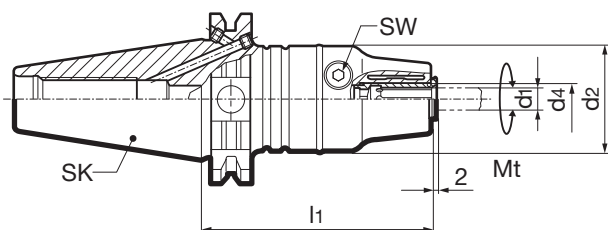
Scope of delivery:

- incl. clamping key art. no. 4912
- incl. adjustment key for adjustment screws

Suitable accessories separately available:

- setting screw "face" art. no. 4364
- replacement clamping screws art. no. 4241
- reduction bushes art. no. 4605 or 4606
- coolant supply set art. no. 4949

GÜHROSYNC



Article no. **4576**

SK	G	d1	d2	d4	l1	Mt max.	SW	kg	Order no.
		mm	mm	mm		Nm	mm		
SK 30	M2-M12	2.8-10.0	40.0	12	81.0	26	4.0	0.8	4576 12.030
SK 30	M4,5-M20	6.0-16.0	40.0	20	95.0	90	5.0	0.9	4576 20.030
SK 40	M2-M12	2.8-10.0	40.0	12	85.0	26	4.0	1.3	4576 12.040
SK 40	M4,5-M20	6.0-16.0	40.0	20	99.0	90	5.0	1.5	4576 20.040


MAS/BT hydraulic synchro tapping chucks with internal coolant

Product information:

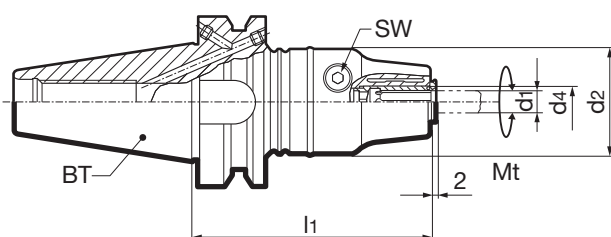
- MAS/BT30 to DIN ISO 7388-2 form JD without coolant supply over collar
- MAS/BT40 to DIN ISO 7388-2 form JD/JF
- balancing quality: G 6.3 / 15,000 rev./min
- setting screw enables 3 mm axial length readjustment
- minimal length compensation ± 0.3 mm in pushing and drawing direction between synchro spindle and threading tool
- reduces high frictional forces on the thread flanks
- reduces an increase in axial forces during the cutting cycle to a minimum
- coolant pressure up to max. 80 bar

Scope of delivery:

- incl. clamping key art. no. 4912
- incl. adjustment key for adjustment screws

Suitable accessories separately available:

- setting screw "face" art. no. 4364
- replacement clamping screws art. no. 4241
- reduction bushes art. no. 4605 or 4606
- coolant supply set art. no. 4949

GÜHROSYNC


Article no.

4577

BT	G	d1	d2	d4	l1	Mt max.	SW		kg	Order no.
										mm
BT 30	M2-M12	2.8-10.0	40.0	12	81.0	26	4.0	0.9		4577 12.030
BT 30	M4,5-M20	6.0-16.0	40.0	20	95.0	90	5.0	0.9		4577 20.030
BT 40	M2-M12	2.8-10.0	40.0	12	85.0	26	4.0	1.3		4577 12.040
BT 40	M4,5-M20	6.0-16.0	40.0	20	99.0	90	5.0	1.4		4577 20.040



Straight shank hydraulic synchro tapping chucks for internal coolant



Product information:

- holder shank similar DIN 1835 or holding in precision chucks (hydraulic, shrink fit or power clamping chucks)
- setting screw enables 3 mm axial length readjustment
- minimal length compensation ± 0.3 mm in pushing and drawing direction between synchro spindle and threading tool
- reduces high frictional forces on the thread flanks
- reduces an increase in axial forces during the cutting cycle to a minimum
- coolant pressure up to max. 80 bar

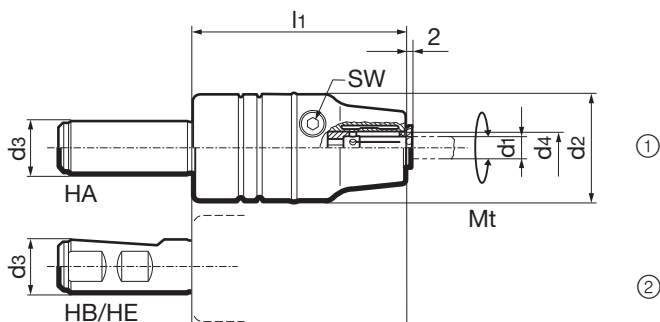
Scope of delivery:

- incl. clamping key art. no. 4912
- incl. adjustment key for adjustment screws

Suitable accessories separately available:

- setting screw "face" art. no. 4364
- replacement clamping screws art. no. 4241
- reduction bushes art. no. 4605 or 4606

GÜHROSYNC



Article no. **4525**

d3 h6	Shank	G	d1	d2	d4	l1	Mt max.	SW		Order no.
mm				mm	mm	mm	Nm	mm	kg	
20	HA	M2-M12	2.8-10.0	40	12	80	26	4	0.7	4525 12.020
20	HA	M4,5-M20	6.0-16.0	40	20	94	90	5	5.8	4525 20.020
25	HB	M2-M12	2.8-10.0	40	12	80	26	4	0.7	4525 12.025
25	HB	M4,5-M20	6.0-16.0	40	20	94	90	5	1.0	4525 20.025

GÜHROJET reduction bushes for hydraulic synchro tapping chucks

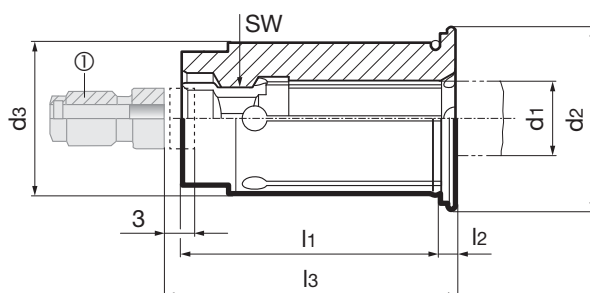


Product information:

- for clamping taps with square shank in GÜHROSync synchro tapping chucks
- clamping-Ø for tool shank tolerance h6-h9
- positive drive of reduction bush in Gührsync synchro chuck
- position setting screw on the shank of the tap
- setting screw enables 3 mm axial length readjustment
- with coolant slots for peripheral cooling, therefore process and tool life improvement
- coiled swarf is consistently washed away

Scope of delivery:

- setting screw "face" art. no. 4364
- MQL setting screws art. no. 4305



Article no. **4606**

d3	d1	SW		d2	l1	l2	l3	①	G	Order no.
mm	mm	mm		mm	mm	mm	mm			
12	2.800	2.100	DIN	16.5	29	2			M2/M2,2/M2,5/M4	4606 2.812
12	3.500	2.700	DIN	16.5	29	2			M3/M4/M5	4606 3.512
12	3.581	2.794	ANSI	16.5	29	2			6-32 / 6-40	4606 3.612
12	4.000	3.200	JIS	16.5	29	2			M3/M3,5	4606 4.012
12	4.267	3.327	ANSI	16.5	29	2			8-32 / 8-36	4606 4.312
12	4.500	3.400	DIN	16.5	29	2	26	4364 5.020	M4/M6	4606 4.512
12	4.928	3.861	ANSI	16.5	29	2	26	4364 5.020	10-24 / 10-32	4606 4.912
12	5.000	4.000	JIS	16.5	29	2	26	4364 5.020	M4/M4,5/M5	4606 5.012
12	5.500	4.500	JIS	16.5	29	2	26	4364 5.020	M5	4606 5.512
12	5.588	4.191	ANSI	16.5	29	2	26	4364 5.020	12-24 / 12-28	4606 15.512
12	6.000	4.500	JIS	16.5	29	2	26	4364 6.020	M6	4606 16.012
12	6.000	4.900	DIN	16.5	29	2	26	4364 6.020	M4,5/M5/M6/M7/M8	4606 6.012
12	6.200	5.000	JIS	16.5	29	2	26	4364 6.020	M7/M8	4606 6.212
12	6.477	4.851	ANSI	16.5	29	2	26	4364 6.020	1/4-20 / 1/4-28	4606 6.412
12	7.000	5.500	DIN/JIS	16.5	29	2	26	4364 7.020	M7/M9/M10	4606 7.012
12	7.938	5.944	ANSI	16.5	29	2	31	4364 8.020	1/16-27 / 1/8-27	4606 7.912
12	8.000	6.500	JIS	16.5	29	2	31	4364 8.020	M11	4606 18.012
12	8.000	6.200	DIN	16.5	29	2	31	4364 8.020	M8/M11	4606 8.012
12	8.077	6.045	ANSI	16.5	29	2	31	4364 8.020	5/16-18 / 5/16-24	4606 28.012
12	8.204	6.147	ANSI	16.5	29	2	31	4364 8.020	7/16-14 / 7/16-20	4606 8.212
12	8.500	6.500	JIS	16.5	29	2	31	4364 8.020	M12	4606 8.512
12	9.000	7.000	DIN	16.5	29	2	32	4364 9.020	M9/M12	4606 9.012
12	9.322	6.985	ANSI	16.5	29	2	32	4364 9.020	1/2-13 / 1/2-20	4606 9.312
12	9.677	7.264	ANSI	16.5	29	2	33	4364 9.020	3/8-16 / 3/8-24	4606 9.612
12	10.000	8.000	DIN	16.5	29	2	36	4364 10.020	M10	4606 10.012
20	6.000	4.500	JIS	24.1	34	2	26	4364 6.032	M6	4606 26.020
20	6.000	4.900	DIN	24.1	34	2	26	4364 6.032	M4,5/M5/M6/M7/M8	4606 6.020
20	6.200	5.000	JIS	24.1	34	2	26	4364 6.032	M7/M8	4606 6.220
20	6.477	4.851	ANSI	24.1	34	2	26	4364 6.032	1/4-20 / 1/4-28	4606 6.420
20	7.000	5.500	DIN/JIS	24.1	34	2	26	4364 7.032	M7/M9/M10	4606 7.020
20	7.938	5.944	ANSI	24.1	34	2	31	4364 8.032	1/16-27 / 1/8-27	4606 7.920
20	8.000	6.500	JIS	24.1	34	2	31	4364 8.032	M11	4606 18.020
20	8.000	6.200	DIN	24.1	34	2	31	4364 8.032	M8/M11	4606 8.020
20	8.077	6.045	ANSI	24.1	34	2	31	4364 8.032	5/16-18 / 5/16-24	4606 28.020
20	8.204	6.147	ANSI	24.1	34	2	31	4364 8.032	7/16-14 / 7/16-20	4606 8.220
20	8.500	6.500	JIS	24.1	34	2	31	4364 8.032	M12	4606 8.520

Tool holders



d3	d1	SW		d2	l1	l2	l3	①	G	Order no.
mm	mm	mm		mm	mm	mm	mm			
20	9.000	7.000	DIN	24.1	34	2	32	4364 9.032	M9/M12	4606 9.020
20	9.322	6.985	ANSI	24.1	34	2	32	4364 9.032	1/2-13 / 1/2-20	4606 9.320
20	9.677	7.264	ANSI	24.1	34	2	33	4364 9.032	3/8-16 / 3/8-24	4606 9.620
20	10.000	8.000	DIN	24.1	34	2	36	4364 10.032	M10	4606 10.020
20	10.500	8.000	JIS	24.1	34	2	36	4364 10.032	M14	4606 10.520
20	10.897	8.179	ANSI	24.1	34	2	35	4364 10.032	9/16-12 / 9/16-18	4606 10.820
20	11.000	9.000	DIN	24.1	34	2	37	4364 11.032	M14	4606 11.020
20	12.000	9.000	DIN	24.1	34	2	37	4364 11.032	M16	4606 12.020
20	12.192	9.144	ANSI	24.1	34	2	36	4364 11.032	5/8-11 / 5/8-18	4606 12.120
20	12.500	10.000	JIS	24.1	34	2	38	4364 11.032	M16	4606 12.520
20	13.000	10.000	JIS	24.1	34	2	38	4364 11.032	M17	4606 13.020
20	14.000	11.000	DIN/JIS	24.1	34	2	39	4364 14.032	M18	4606 14.020
20	14.288	10.693	ANSI	24.1	34	2	38	4364 14.032	1/4-18	4606 14.220
20	14.986	11.227	ANSI	24.1	34	2	39	4364 14.032	3/4-10 / 3/4-16	4606 14.920
20	15.000	12.000	JIS	24.1	34	2	40	4364 16.032	M20	4606 15.020
20	16.000	12.000	DIN	24.1	34	2	41	4364 16.032	M20	4606 16.020

Adjustment screws “faces” for synchro tapping chucks with int. coolant

AB

Product information:

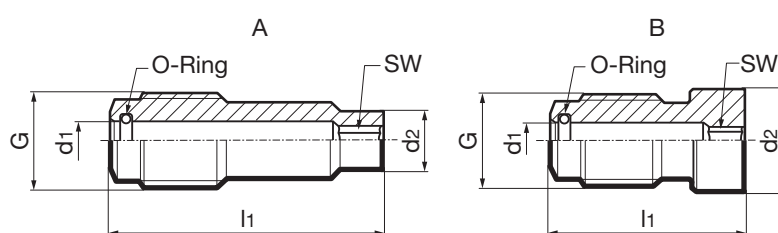
- for hydro-synchro tapping chucks art. no. 4601, 4576, 4577 and 4525
- for synchro tapping chucks art. no. 4326 and 4327
- for conventional internal cooling
- with plane stop for standard shank ends
- position setting screw on the shank of the tap
- setting screw enables 3 mm axial length readjustment

Scope of delivery:

- with O-ring for secure seal

Suitable accessories separately available:

- hexagon clamping key art. no. 4912 type “B”


 Article no. **4364**

Size	G	d1	d2	l1	SW	Type	Order no.
		mm	mm	mm	mm		
ER20	M8 x 1	3.6	3.3	23.7	2.0	A	4364 5.020
ER20	M8 x 1	3.6	4.8	23.7	2.5	A	4364 6.020
ER20	M8 x 1	3.6	5.4	23.7	2.5	A	4364 7.020
ER20	M8 x 1	3.6	5.8	18.7	2.5	A	4364 8.020
ER20	M8 x 1	3.6	6.9	17.7	2.5	A	4364 9.020
ER20	M8 x 1	3.6	7.8	13.7	2.5	B	4364 10.020
ER20	M8 x 1	3.6	8.8	14.8	2.5	B	4364 11.020
ER32	M10X1	4.1	3.3	33.0	2.0	A	4364 5.032
ER32	M10X1	4.1	4.8	34.0	3.0	A	4364 6.032
ER32	M10X1	4.1	5.4	33.8	3.0	A	4364 7.032
ER32	M10X1	4.1	6.1	28.8	3.0	A	4364 8.032
ER32	M10X1	4.1	6.9	28.2	3.0	A	4364 9.032
ER32	M10X1	4.1	7.8	23.8	3.0	A	4364 10.032
ER32	M10X1	4.1	8.8	22.9	3.0	A	4364 11.032
ER32	M10X1	4.1	10.8	20.6	3.0	B	4364 14.032
ER32	M10X1	4.1	11.8	19.6	3.0	B	4364 16.032
ER32	M10X1	4.1	14.3	18.0	3.0	B	4364 18.032

Tool holders



TECHNICAL SECTION

6

Milling

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Drilling

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Threading

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Reaming & countersinking

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Milling

GTC milling strategies

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Plunging

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Application / Troubleshooting

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Drilling

Basics

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HSS / HSCD spiral-fluted deep hole drills

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Threading

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Reaming & countersinking

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Efficient milling with the correct strategies

GTC milling strategies

These milling strategies belong to the state-of-the-art and most effective application methods for current solid carbide milling tools. When applied, an enormously high metal removal rate ensures a considerable increase in productivity. Very high cutting parameters can be achieved even with less powerful machines or unstable machining conditions. With difficult-to-machine materials or unfavourable diameter-length-ratios of the tools a massive increase of process reliability can be achieved.


HPC

HIGH PERFORMANCE CUTTING

max. metal removal rate/time → stable conditions; short de-clamping; high performance; good cooling

HSC

HIGH SPEED CUTTING

at high speed/high feed rate → high dynamics; low cutting depth; low drive power

Principles and objectives

Maximum tool utilisation

- utilisation of entire cutting edge length
- full power delivery
- increased tool life
- balanced wear

Modification of cutting distribution

- low cutting widths a_e
- high cutting depths a_p

High process reliability

- low tool wrapping
- improved thermal conditions at tool cutting edge
- low mechanical stress

Maximum metal removal rate

- saving time/machine costs





Foundations for economically efficient milling

Peripheral requirements

Applicable in every material group

-
- easy to machine materials = increase in productivity
- difficult to machine materials = increase in process reliability

High-dynamic machining centres

- short acceleration distances
- higher speed range
- small to medium tool diameters

Heavy machines

- stable feed axes
- high spindle torque
- medium to large tool diameters

Unstable to stable workpiece clamping

- stable = vibration-free machining = maximum metal removal rate
- unstable = reduction of radial forces = increased process reliability

Application parameters

Low cutting width a_e to $0.33 \times D$

- low angle of engagement $< 70^\circ$
- short time of contact between cutting edge and component

Very high tooth feed f_z

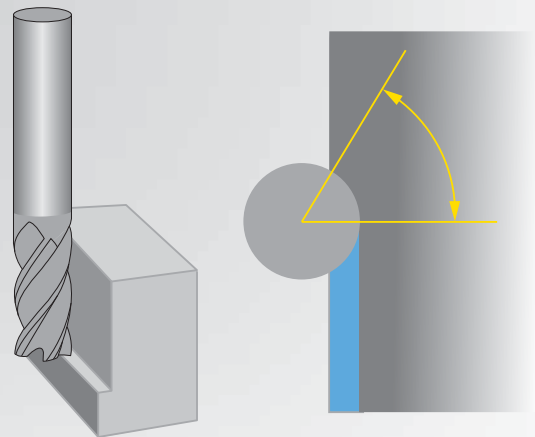
- reduced chip thickness allows considerably higher f_z

Very high cutting speed v_c

- reduced heating up and prolonged cooling down allow very high v_c values

High cutting depth a_p

- improved leverage effect
- high metal removal rate
- increase in contact points between tool and component



Tool angle of engagement & tool contact time

Metal removal rate

The metal removal rate specifies how high the actual chip removal is per minute. It is especially suitable for comparing different machining strategies.

$$a_p \text{ (mm)} \times a_e \text{ (mm)} \times v_f \text{ (m/min)} = Q \text{ (cm}^3\text{/min)}$$

Influence on process through tool engagement

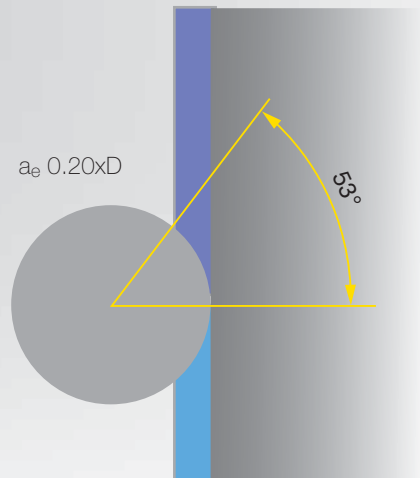
Angle of engagement

The angle of engagement inscribes the cutting range of the tool from start of chip formation to exit from the material. With these parameters the stress impacting on the tool can be assessed. With straight milling paths the angle is constant, with concave milling paths it increases and with convex milling paths it decreases.

Straight milling path

- constant angle of engagement
- constant tool stress

Example: $a_e 0.20xD = 53^\circ$ engagement
Engagement remains a constant 53°



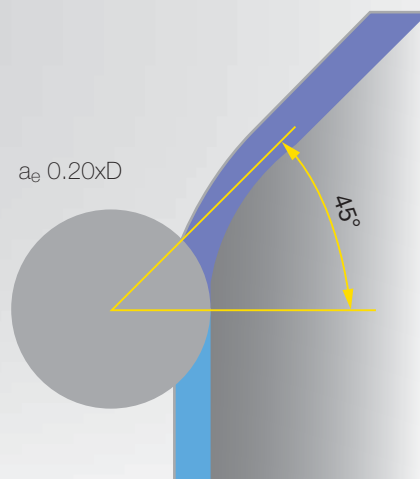
Angle of engagement with convex contour radii

Convex milling path

- decreasing angle of engagement
- reduced tool stress

Example: $a_e 0.20xD = 53^\circ$ engagement
Engagement reduces to 45°

Measures: a_e may be increased
 f_z can be increased



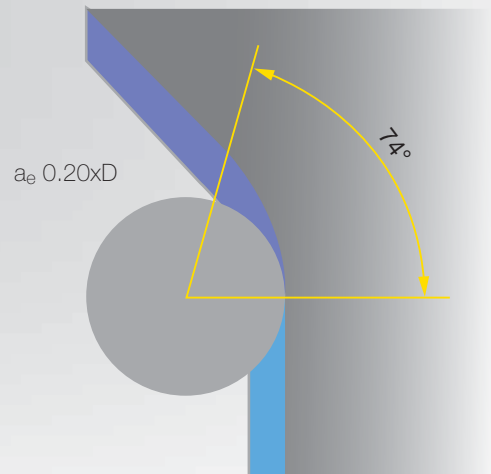
Angle of engagement with concave contour radii

Concave milling path

- increasing angle of engagement
- increased tool stress

Example: $a_e 0.20xD = 53^\circ$ engagement
Engagement increases to 74°

Measures: a_e must be reduced
 f_z must be reduced in radius





Influence on process through tool engagement

Angle of engagement with 90° corner radii

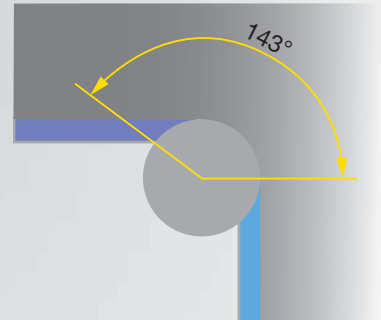
Tool radius = Corner radius

- very unfavourable for tool dynamics
- change of stress direction
- abrupt increase in tool stress

Example: Increase of engagement angle from 53° to 143° (270 %)

Measures: v_c and f_z must be heavily reduced

a_e 0.20xD



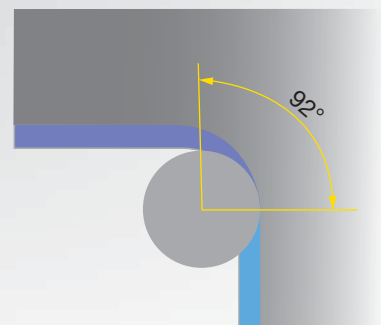
Tool radius < Corner radius

- machine can interpolate the path
- no "impact" on tool
- lower increase of tool stress

Example: Increase of engagement angle from 53° to 92° (174 %)

Measures: a_e must be reduced
 f_z must be heavily reduced in radius

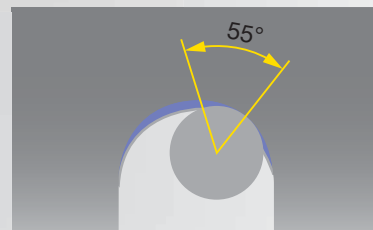
a_e 0.20xD



Ratio of flute width to tool diameter with trochoidal milling

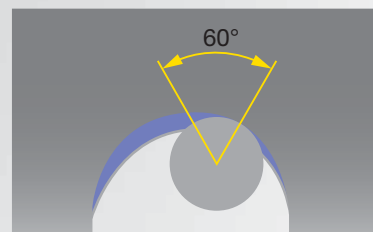
Flute width 1.7-2.0xD

- cut in C-arc
- a_e max. 0.10xD (theor. 37°)
- increase of angles of engagement by up to 50 %



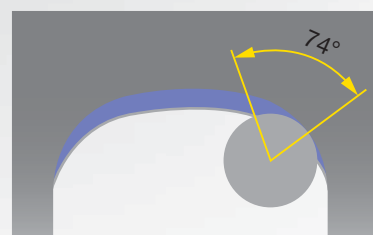
Flute width 2.1-3.0xD

- cut in C-arc
- a_e max. 0.15xD (theor. 46°)
- increase of angles of engagement by up to 30 %



Flute width 3.1xD

- cut in D-arc
- a_e max. 0.20xD (theor. 53°)
- increase of angles of engagement by up to 40 %





Guide values for increasing the cutting values with cutting edge lengths up to 3xD					
GTC HPC HSC Roughing and HSC finishing					
Material	Application	radial feed in % of Ø	v _c factor *	f _z factor *	Angle of engagement
	Slotting	100 %	1	1	180°
	HPC Roughing	33%	1.5	1.3	70°
	HPC Roughing	25%	1.6	1.5	60°
	HPC Roughing	20%	1.7	1.6	53°
	HPC Roughing	15%	1.8	1.9	46°
	HSC Roughing	10%	1.9	2.3	37°
	HSC Roughing	8%	2.0	2.5	31°
	HSC Roughing	5%	2.1	2.5	26°
	HSC Finishing	3%	2.0	1.2	20°
	HSC Finishing	2%	2.0	1.1	18°
	HSC Finishing	1%	2.0	1.0	11°
	HSC Fine finishing	0.5%	2.2	0.9	8°

* base value for the calculation with v_c and f_z factors is the value specified in the Gühring Navigator for "slotting" in the respective material group.



Base cutting values slotting – RF 100 tools – smooth cutting

Material	Hardness	Application	v _c	f _z (mm/tooth) with nom. Ø									
				3	4	5	6	8	10	12	16	20	25
P1	≤ 850N/mm ²	Slotting	180	0.015	0.020	0.025	0.030	0.040	0.060	0.072	0.096	0.120	0.150
P2	850-1200N/mm ²	Slotting	160	0.014	0.019	0.024	0.029	0.038	0.055	0.066	0.088	0.110	0.138
P3	850-1400N/mm ²	Slotting	135	0.014	0.018	0.023	0.027	0.036	0.050	0.060	0.080	0.100	0.125
M1	< 750N/mm ²	Slotting	120	0.014	0.018	0.023	0.027	0.036	0.050	0.060	0.080	0.100	0.125
M2	750-850N/mm ²	Slotting	80	0.012	0.016	0.020	0.024	0.032	0.045	0.054	0.072	0.090	0.113
M3	> 850N/mm ²	Slotting	70	0.011	0.014	0.018	0.021	0.028	0.040	0.048	0.064	0.080	0.100
S-Ni	≤ 1300N/mm ²	Slotting	30	0.008	0.011	0.014	0.017	0.022	0.032	0.038	0.051	0.064	0.080
S-Ti	≤ 1300N/mm ²	Slotting	60	0.012	0.016	0.020	0.024	0.032	0.045	0.054	0.072	0.090	0.113
K1	≤ 240HB	Slotting	160	0.017	0.022	0.028	0.033	0.044	0.065	0.078	0.104	0.130	0.163
K2	> 240HB	Slotting	140	0.015	0.020	0.025	0.030	0.040	0.055	0.066	0.088	0.110	0.138
Wr. al. alloy	≤ 5 % Si	Slotting	500	0.020	0.026	0.033	0.039	0.052	0.075	0.090	0.120	0.150	0.188
Cast al. alloy	> 5 % Si	Slotting	230	0.017	0.022	0.028	0.033	0.044	0.060	0.072	0.096	0.120	0.150
Non-fer. metals	≤ 850N/mm ²	Slotting	250	0.017	0.022	0.028	0.033	0.044	0.060	0.072	0.096	0.120	0.150

Metal removal rate a_p (mm) × a_e (mm) × v_f (m/min) = Q (cm³/min)

Example:	HPC Roughing: 15% a _e ; 2xD a _p ; C45
Tool:	RF 100 U Ø12 mm - 4 flutes
Feed:	radial feed a _e 1.8 mm = 15% of D
Base value slotting	v _c slotting = 180m/min, f _z slotting = 0.072 mm
Conversion:	v _c factor = 1.8 → v _c : 180m/min x 1.8 = v _c 324m/min f _z factor = 1.9 → f _z : 0.072 mm x 1.9 = f _z 0.137
Increased values:	v _c : 324m/min / f _z : 0.137 mm n: 8594 U/min / v _f : 4710mm/min
Metal removal rate:	Q = 203 cm ³ /min

Technical section



GTC milling – fully optimised application examples

Application example – material 16MnCr5

RF 100 Speed, #6761, Ø16 mm,
HPC clamping chuck + PINLock-safety
 v_c 410 m/min f_z 0.450 mm h_m 0.123 mm
 a_e 1.2 mm a_p 45 mm v_f 14690 mm/min
Q = 793 cm³/min



Application example – material Hardox 400®

RF 100 U, #3871, Ø20 mm,
Weldon clamping chuck
 v_c 200 m/min f_z 0.180 mm h_m 0.049 mm
 a_e 1.5 mm a_p 55 mm v_f 2290 mm/min
Q = 189 cm³/min



GTC milling – Strategy comparison

Application comparison – material 42CrMo4

Gühring

RF 100 Diver, #6736, Ø12-Z4,
Weldon clamping chuck
 v_c 300 m/min f_z 0.120 mm
 n 7960 U/min v_f 3820 mm/min
 a_e 1.5 mm a_p 24 mm
Q = 138 cm³/min

5 radial cuts per 1200 mm path
Machining time = **1.34 min**



Application comparison – material 42CrMo4

Competition

HPC milling cutter, Ø16-Z4
Weldon clamping chuck
 v_c 140 m/min f_z 0.070 mm
 n 2790 U/min v_f 780 mm/min
 a_e 7.5 mm a_p 12 mm
Q = 70 cm³/min

2 axial cuts per 1200 mm path
Machining time = 3.05 min



Application comparison – material 1.4301

Gühring

RF 100 SF, #3632, Ø16-Z6,
Weldon clamping chuck
 v_c 160 m/min f_z 0.100 mm
 n 3185 U/min v_f 1910 mm/min
 a_e 1.2 mm a_p 30 mm
Q = 69 cm³/min

10 radial cuts per 900 mm path
Machining time = **4.43 min**

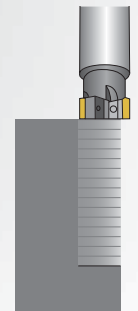


Application comparison – material 1.4301

Competition

Indexable inserted milling cutter Ø25-Z3
 v_c 200 m/min f_z 0.120 mm
 n 2550 U/min v_f 920 mm/min
 a_e 12 mm a_p 2 mm
Q = 22 cm³/min

15 axial cuts per 900 mm path
Machining time = 14.40 min



Plunging strategies and guide values

General plunging with standard face geometries

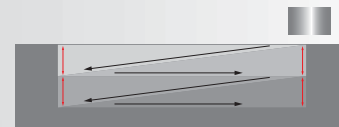
Base $f_z = f_z$ slotting



Ramping

- ramping angle = $2^\circ - 5^\circ$ to max. $a_p 1 \times D$
- even load increase

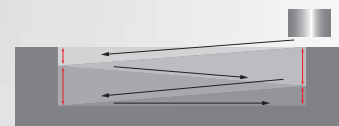
$f_z 75\%$



Oscillating

- ramping angle = $1^\circ - 4^\circ$ to max. $a_p 1 \times D$
- results in load peaks

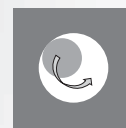
$f_z 75\%$



Helix

- feed = $0.05 - 0.1 \times D$ per revolution
- smallest diameter to be produced = $1.7 \times D$

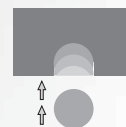
$f_z 100\%$



Grooving

- alternative when problems through excess. radial forces
- $a_e 0.25 \times D - a_p$ cutting edge length / clearance ground length

$f_z 100\%$



Drilling / pilot drilling

- max. depth feed $0.5 \times D$ then pecking

$f_z 50\%$

Special plunging – tools with special plunging geometry



RF 100 Diver - #6736 / #6737

- h10 cutting edge tolerance
- $36^\circ/37^\circ/38^\circ$ helix
- reduced and nominal diameter
- good drilling characteristics
- very good milling characteristics

First choice: Milling and plunging



Ramping

- ramping angle = $15^\circ - 45^\circ$ to max. $a_p 1 \times D$



Oscillating

- ramping angle = $10^\circ - 20^\circ$ bis max. $a_p 1 \times D$



Helix

- feed = $0.10 - 0.30 \times D$ pro Umdrehung
- smallest diameter to be produced = $1.7 \times D$



Grooving

- altern. when problems through excessive radial forces
- $a_e 0.25 \times D - a_p$ cutting edge length/ clearance grind



Drilling / pilot drilling

- max. depth feed $1.0 \times D$ then pecking



Pilot milling cutter RF 100 P - #6716







- m8 cutting edge tolerance
- 30° helix
- a multitude of individual dimensions
- very good drilling characteristics
- sufficient milling characteristics

First choice: Drilling and pilot drilling

Cutting values "special plunging"
to cutting value tables RF 100 Diver & RF 100 P



General recommendation for tool cooling

Steel			<ul style="list-style-type: none"> • Avoid thermal shock
Cast iron		Dry machining, compressed air, MQL:	<ul style="list-style-type: none"> • Dissipate machining temperature via chip • Supporting chip evacuation
Hardened			
Stainless			<ul style="list-style-type: none"> • Cooling of tool cutting edge
Special alloy		Soluble oil, neat oil:	<ul style="list-style-type: none"> • Preventing built-up edge • Supporting chip evacuation
Non-ferrous metals		Soluble oil, neat oil:	<ul style="list-style-type: none"> • Preventing built-up edge • Supporting chip evacuation

Exceptions for material ranges



When **coolant** is not available the cutting speed (v_c) and/or the radial feed (a_e) should be reduced. The resulting reduced temperature reduces the risk of thermal shock.

If there are **chip evacuation problems** the application of coolant should be taken into consideration, poor evacuation of chips can lead to massive tool wear and even tool breakage.

When **heat is being generated due to poor chip evacuation**, it should be checked if through coolant is available. By using a specifically directed "coolant jet", coolant can be supplied where congested without hitting the cutting area. Alternatively, the application of coolant for the entire machining operation is recommended.

Other notes

Finishing

The application of coolant is principally an advantage as a better surface finish can be achieved.

Very long tools

Coolant can result in a smoother process, as the lubricant has a vibration-reducing effect.

Alignment of coolant

- as accurate as possible in the cutting area from at least three directions
- no flushing back of small chips to the cutting area



Solid carbide milling cutters with internal cooling

- optimal chip evacuation, very good cutting edge cooling, very effective against built-up edges
- to be recommended especially for larger tool diameters and tough materials

Peripheral cooling / Gührojet

Best external option: Optimal tool cooling and chip evacuation thanks to the direct route from coolant exit to cutting area



GÜHROJET

General notes

All the cutting rate recommendations specified in this catalogue are standard values valid exclusively for new tools or tools re-ground to Gühring specifications. Pre-requisites are stable machines, optimal cooling, optimal tool clamping and maximum concentricity of the tool and the machine spindle. Our recommended cutting rates

must be reduced if the conditions deviate. The values may also be adjusted to influence surface quality, machining rate or tool life.

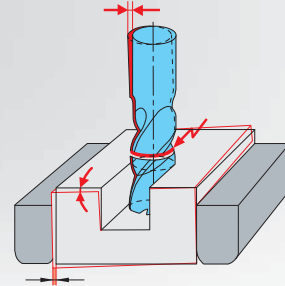
1. Workpiece clamping

Loss of tool life or tool breakage through unstable clamping

- improve workpiece clamping

Alternative:

- reduce feed
- reduce cutting width or depth
- modify milling strategy



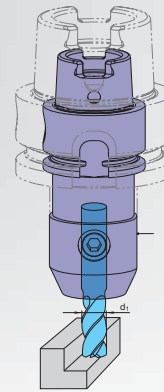
2. Tool clamping

Loss of tool life or tool breakage through unstable, worn or too small/long/thin tool holder

- apply new or larger tool holder or holder with increased clamping force and increased concentricity

Alternative:

- reduce cutting rates
- reduce clamping length
- apply tool with smaller diameter
- check clamping screws for wear



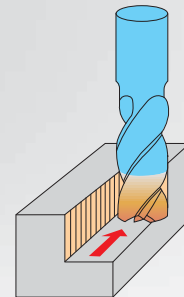
3. Surface quality

Excessive peak-to-valley height R_a/R_z at the tool surface through excessive feed and feed rates or vibrations

- improve workpiece clamping and tool clamping (see points 1 and 2)

Alternative:

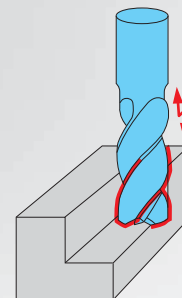
- reduce feed and feed rate
- increase cutting speed
- use/improve cooling



4. Vibrations

High tool wear, insufficient workpiece surface quality and insufficient dimensional accuracy through vibration

- improve workpiece and tool clamping (see points 1 and 2)
- increase tooth feed, because the chip centre thickness is too small
- modify speed
- modify milling strategy, i.e. select alternative cutting distribution
- change tool selection, i.e. reduce no. of teeth or spiral





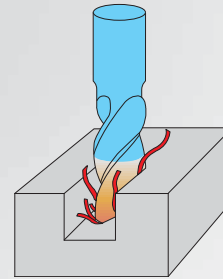
5. Chip congestion/cooling

Significant reduction in tool life, crumbling on cutting lips, edge build-up or conglutination of flutes through insufficient chip evacuation

- select milling cutters with internal cooling

Alternative:

- peripheral cooling via GM 300 chuck
- increase volume flow
- adjust coolant flow
- apply compressed air cooling (according to tool and material)
- reduce feed rate
- modify cutting distribution



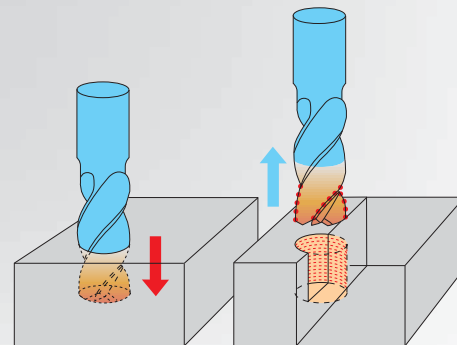
6. Pecking when drilling

Significant reduction in tool life as well as crumbling of cutting lips through insufficient chip evacuation and thermal stresses

- select milling cutter with internal cooling
- with drilling depths $> 0.5 \times D$ pecking in stages

Alternative:

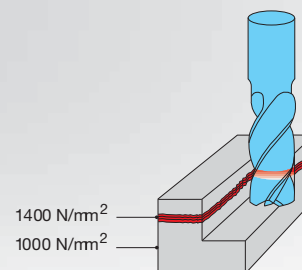
- peripheral cooling via GM 300 chuck
- increase volume flow
- adjust coolant flow
- reduce feed rate



7. Thermal influence on materials

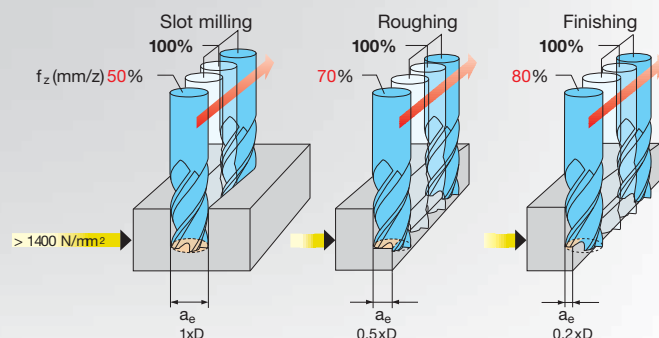
Through welding or torch cutting, the material characteristics at the parting line do not correspond with the specified material class

- reduce cutting rates
- select tool for materials with a higher tensile strength
- climb milling with solid carbide milling cutters



8. Entry in hardened materials

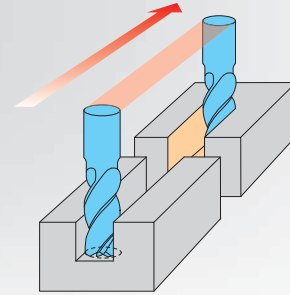
For entering materials over 1400 N/mm^2 (44HRC), reduce the feed rate v_f (mm/min) in accordance with the illustration on the right



9. Loss in tool life with interrupted cutting

Significant loss in tool life through interrupted cutting (especially with milling angles of 90°)

- modify cutting distribution
- reduce feed rate for entry and exit
- reduce approach angle



10. Feed rate adjustment: Modifying the cutting width

- when modifying the cutting width a_e , the feed rate must be reduced in accordance with the illustration on the right
- select cutting speed in accordance with cutting value tables
- for slotting and roughing with a feed of $a_p > 1.5 \times D$, v_c and f_z should be reduced by 25%



$a_e = 1 \times D$
 $f_z = 100 \%$



$a_e = 0,66 \times D$
 $f_z = 115 \%$



$a_e = 0,25 \times D$
 $f_z = 150 \%$

11. Feed rate adjustment: Modifying the cutting depth

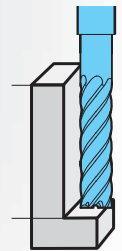
- when modifying the cutting depth a_p , the feed rate must be reduced in accordance with the illustration on the right
- cutting speed or revolutions remain unchanged up to cutting depths of $2 \times D$, must only be adapted over $2 \times D$
- for longer tools revolutions and feed must be reduced in accordance with vibration



$a_p = 1 \times D$
 $f_z = 100 \%$



$a_p = 2 \times D$
 $f_z = 50 \%$



$a_p = 3 \times D$
 $f_z = 25 \%$

12. Plunging strategies: for drilling

- reduce feed rate v_f (mm/min.)
 - additional pecking for drilling depths $> 0.5 \times D$ or transition to radial machining
- Attention: Danger of breakage through abrupt load increase!

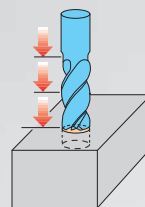
Oblique plunging up to 5°:

- reduce feed rate v_f (mm/min.) in accordance with the illustration on the right

Helical plunging:

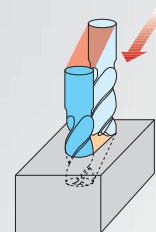
- for helical plunging on a milling cycle, we recommend a feed of 0.1 to 0.2 per cycle
- reduce feed rate v_f (mm/min.) in accordance with the illustration on the right
- select preferred hole diameter $1.7 \times D$

Drilling



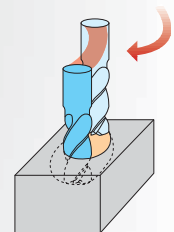
90°
 $f_z = 50 \%$

Oblique plunging



5°
 $f_z = 75 \%$

Helical plunging



$f_z = 100 \%$



13. HSC milling with ball nosed copy milling cutters



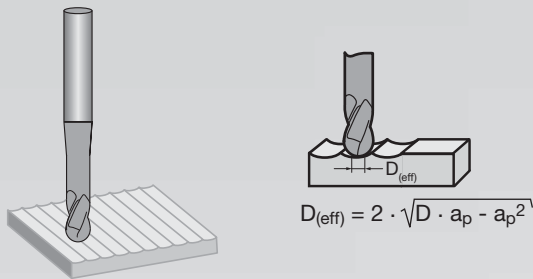
HSC = High Speed Cutting:

Milling operations with very low metal removal but with consideration of the effective tool diameter.

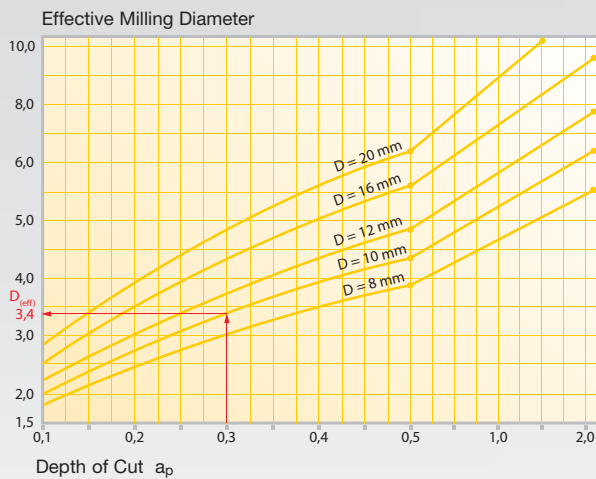
3D machining with ball or Torus milling.

- low cutting width (a_e)
- low cutting depth (a_p)
- high feed rate per tooth (f_z)
- very high cutting speed (v_c)

At cutting depths $a_p < 0.2 \times D$ the actual engaged effective diameter $D_{(eff)}$ must be used to calculate the speed. It is derived from the graphic below with the spindle not engaged. To increase the tool life, we recommend machining with a tilted spindle.



The ball-nosed milling cutter is perpendicular to the machining surface. In the centre of the tool is the cutting speed = 0. Tool life and surface quality are not optimal.



Example: For a full copy milling radius \varnothing 10 mm and a depth of cut a_p of 0.3 mm results in an effective diameter $D_{(eff)} = 3.4$ mm. This $D_{(eff)}$ shall be used to calculate the cutting speed v_c .

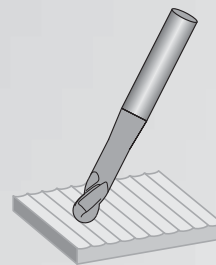
Function and Advantages

Calculation of the effective tool diameter

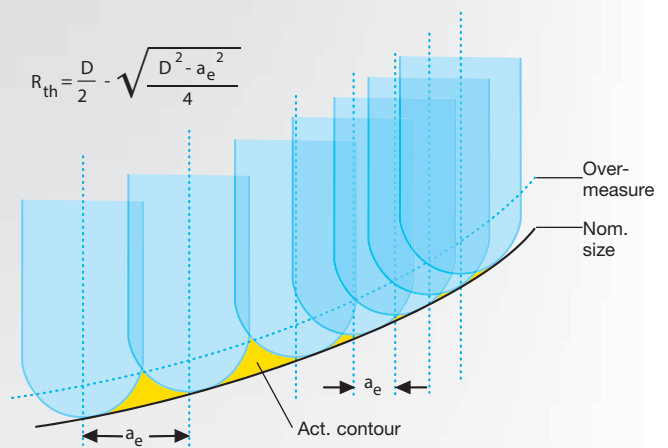
- adjusting speed to effective tool diameter
- Increasing the overall feed rate
- Improving the surface quality

Consideration of the pressure angle / width

- adjusting the tooth feed to achieve the required surface quality

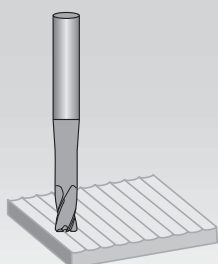


The ball-nosed milling cutter is oblique to the machining surface. The centre of the tool is not engaged. Tool life and surface quality are improved.




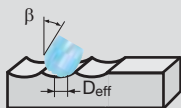
The reduction of the cutting width, a_e , leads to an improvement of the surface quality of the workpiece (reduced peak-to-valley height).

14. HSC milling with corner radius - copy milling cutters / Torus milling



HSC milling & Torus milling

3D-machining with Torus milling cutters. Engagement of the tool predominantly on the corner radius. Improves the surface quality and the tool life. Of advantage when 3D-machining flat contour areas on 3-axis machines.

Symbol	Description	metric	Formula
z	No. of teeth		
D	Milling cutter diameter	mm	
a_p	Depth of cut	mm	
a_e	Width of cut	mm	
l_f	Milling length	mm	
n	Revolution per min.	U/min	$n = \frac{v_c \cdot 1000}{\pi \cdot D}$
v_c	Cutting speed	m/min	$v_c = \frac{\pi \cdot D \cdot n}{1000}$
v_f	Feed per min.	mm	$v_f = n \cdot z \cdot f_z$
f_z	Feed per tooth	mm	$f_z = \frac{v_f}{n \cdot z}$
f/U	Feed per revolution	mm	$f/U = \frac{v_f}{n}$
f/U	Feed per revolution	mm	$f/U = f_z \cdot z$
Q	Chip volume	cm ³ /min	$Q = \frac{a_p \cdot a_e \cdot v_f}{1000}$
T	Milling time	min	$T = \frac{l_f}{v_f}$
hm	Average chip thickness	mm	$hm = f_z \cdot \sqrt{\frac{a_e}{D}}$
D_(eff)	Effective diameter 	mm	$D_{(eff)} = 2 \cdot \sqrt{D \cdot a_p - a_p^2}$
	Effective diameter with approach angle 	mm	$D_{(eff)} = D \cdot \sin \left[\beta + \arccos \left(\frac{D - 2a_p}{D} \right) \right]$
R_{th}	Peak-to-valley height	mm	$R_{th} = \frac{D}{2} = \sqrt{\frac{D^2 - a_e^2}{4}}$
Z_b	Optimal step over for torus milling	mm	$Z_b = \frac{D - 2 \times R}{2}$

Technical section



Tens. strength (N/mm ²)	HRC	HB30	HV10
240		71	75
255		76	80
270		81	85
285		86	90
305		90	95
320		95	100
335		100	105
350		105	110
370		109	115
385		114	120
400		119	125
415		124	130
430		128	135
450		133	140
465		138	145
480		143	150
495		147	155
510		152	160
530		157	165
545		162	170
560		166	175
575		171	180
595		176	185
610		181	190
625		185	195
640		190	200
660		195	205
675		199	210
690		204	215
705		209	220
720		214	225
740		219	230
755		223	235
770		228	240
785		233	245
800	22	238	250
820	23	242	255
835	24	247	260
860	25	255	268
870	26	258	272
900	27	266	280
920	28	273	287
940	29	278	293
970	30	287	302
995	31	295	310
1020	32	301	317
1050	33	311	327
1080	34	319	336
1110	35	328	345
1140	36	337	355
1170	37	346	364

Tens. strength (N/mm ²)	HRC	HB30	HV10
1200	38	354	373
1230	39	363	382
1260	40	372	392
1300	41	383	403
1330	42	393	413
1360	43	402	423
1400	44	413	434
1440	45	424	446
1480	46	435	458
1530	47	449	473
1570	48	460	484
1620	49	472	497
1680	50	488	514
1730	51	501	527
1790	52	517	544
1845	53	532	560
1910	54	549	578
1980	55	567	596
2050	56	584	615
2140	57	607	639
2180	58	622	655
	59		675
	60		698
	61		720
	62		745
	63		773
	64		800
	65		829
	66		864
	67		900
	68		940

Technical section



Materials in mould making (selection)

Material nos.	Abbreviation	Tensile str.: N/mm ²	Hardened: HRC	Material nos.	Abbreviation	Tensile str.: N/mm ²	Hardened: HRC
1.1520	C70W1	650 - 1100		1.2603	45CrVMoW5-8	810	48-51
1.1525	C80W1	650 - 1100		1.2604	75WCrMoV2-2	760	48-56
1.1554	C110W	660		1.2606	X37CrMoW5.1	775	48-56
1.1645	C105W2	640		1.2622	X60WCrMoV9.4	910	53-56
1.1654	C110W	660		1.2631	X50MoW9.11	775	55-58
1.1730	C45W3	640	46-56	1.2662	X30WCrCoV9-3	840	48-52
1.1740	C60W3	700		1.2678	X45CoCrWV5.5.5	875	48-56
1.1744	C67W	730		1.2703	74NiCr2	830	60
1.1750	C75W	700		1.2706	X3NiCrMo18.8.5	500 - 1100	48-56
1.2003	75Cr1	680	50-61	1.2709	X3NiCoMoTi18.9.5	910	42-55
1.2004	85Cr1	710		1.2710	45NiCr6	810	
1.2008	140Cr3	790	58-61	1.2711	54NiCrMoV6	760	42-50
1.2060	105Cr5	700 - 1100		1.2713	55NiCrMoV6	810	42-50
1.2067	100Cr6	775	60-64	1.2714	56NiCrMoV7	840	42-48
1.2080	X210Cr12	840	52-56	1.2718	55NiCr10	840	48-59
1.2082	X21Cr13	680	52-57	1.2721	50NiCr13	840	55-59
1.2083	X42Cr13	850	52-56	1.2726	26NiCrMoV5	810	
1.2085	X33CrS16	950 - 1100	46-50	1.2731	X50NiCrWV13.13	800 - 1000	
1.2101	62SiMnCr4	760	40-64	1.2737	28NiCrV5	810	
1.2103	58SiCr8	775		1.2738	40CrMnNiMo8	980-1100	51-55
1.2127	105MnCr4	745	49-63	1.2740	28NiCrMoV10	810	51-56
1.2162	21MnCr5	745	58-62	1.2743	60NiCrMo12.4	780	48-59
1.2201	X165CrV12	775	54-64	1.2744	57NiCrMoV7.7	840	45-52
1.2206	140CrV1	710	58-65	1.2746	45NiCrMoV16-6	995	48-55
1.2210	115CrV3	745	58-62	1.2747	28NiMo17	965	48-56
1.2235	80CrV2	840	56-61	1.2762	75CrMoNiW6.7	710	58-62
1.2241	51CrMnV4	760	45-56	1.2764	X19NiCrMo4	860	58-62
1.2242	59CrV4	760	50-60	1.2766	35NiCrMo16	875	
1.2243	61CrSiV5	745	40-62	1.2767	X45NiCrMo4	880	52-56
1.2248	38SiCrV6	720	42-56	1.2782	X16CrNiSi25.20	500 - 1100	
1.2303	100CrMo5	775		1.2786	X13NiCrSi36.16	500 - 1100	
1.2307	29CrMoV9	810		1.2838	145V33	775	
1.2311	40CrMnMo8-6	980 - 1120	33-50	1.2842	90MnCrV8	775	60-64
1.2312	40CrMnMoS8-6	980 - 1120	33-50	1.2880	X165CrCoMo12	875	60-65
1.2313	21CrMo10	680		1.2884	X210CrCoW12	875	60-66
1.2316	X36CrMo17	840	46-50	1.2885	X32CrMoCoV3.3.3	775	48-54
1.2343	X37CrMoV5-1	780	48-54	1.2886	X15CrCoMoV10.10.5	1075	44-53
1.2343	G-X38CrMoV5.1	780	52-54	1.3253	S-4-3-8	875	62-66
1.2344	X40CrMoV5-1	625	50-55	1.3343	S 6-5-2	875	62-66
1.2345	X50CrVMo5.1	800 - 1100	53-59	1.3401	X120Mn12	780 - 1130	
1.2346	G-X35CrMoV5.1	700 - 1100		1.3402	X110Mn14	850 - 1000	
1.2347	X40CrMoVS5.1	700 - 1100		1.3405	X90Mn18	1400	
1.2353	27CrMoV6-12	750		1.4005	X12CrS13	650 - 850	
1.2360	X48CrMoV8-1-1	810	50-56	1.4006	X12Cr13	590 - 780	
1.2361	X91CrMoV18	890	59-61	1.4021	X20Cr13	750 - 950	
1.2362	X63CrMoV5-1	760	59-62	1.4105	X4CrMoS18	430 - 630	
1.2363	X100CrMoV5	775	59-63	1.4109	X65CrMo14	800 - 900	56-58
1.2365	X32CrMoV3.3	775	42-52	1.4112	X90CrMoV18	780 - 840	55-58
1.2367	X38CrMoV5.3	780	45-55	1.4117	X38CrMoV15	800 - 900	
1.2369	81CrMoV42.16	840	58-62	1.4301	X5CrNi18.10	580 - 760	
1.2376	X96CrMoV12	840	57-62	1.4305	X10CrNiS18.9	490 - 690	
1.2378	X20CrVMo12-2	860	59-62	1.4404	X2CrNiMo17.13.2	700	
1.2379	X155CrMoV12-1	840	58-63	1.4541	X6CrNiTi18.10	500 - 700	
1.2380	X220CrVMo13.4	900 - 1100	58-64	1.4571	X6CrNiMoTi17.12.2	500 - 730	
1.2381	73MoV5.2	950	54-60	1.6580	30CrNiMo8	1000 - 1450	
1.2392	G-X28CrMoV5.1	500 - 1100		1.6582	34CrNiMo6	900 - 1400	
1.2414	120W4	745		1.6587	17CrNiMo6	650	
1.2419	105WCr6	775	54-63	1.7131	16MnCr5	875	58-62
1.2436	X210CrW12	860	60-64	1.7139	16MnCrS5	780 - 1080	
1.2442	115W8	745	58-66	1.7147	20MnCr5	980 - 1270	
1.2453	X130W5	760	60-67	1.7149	20MnCrS5	980 - 1270	
1.2510	100MnCrV4	775	57-64	1.7220	34CrMo4	800 - 1200	
1.2516	120WV4	775	58-62	1.7223	41CrMo4	800 - 1000	
1.2519	110WCrV5	760	58-62	1.7225	42CrMo4	900 - 1050	53-57
1.2542	45WCrV7	760	48-57	1.7227	42CrMoS4	900 - 1100	
1.2550	60WCrV7	760	52-60	1.7228	50CrMo4	900 - 1100	
1.2552	80WCrV8	775	52-60	1.8159	50CrV4	900 - 1100	
1.2562	142WV13	810	60-66				
1.2564	X30WCrV4.1	775	46-50				
1.2567	X30WCrV5.3	810	46-50				
1.2581	X30WCrV9.3	810	46-50				
1.2601	X165CrMoV12	860	58-63				



Online shop

- check prices and see if an item is in stock in real time
- download tool data
- automatic reordering thanks to subscription function

-  Individual authorisation management and maximum access security for your account
-  Personal purchasing conditions are stored in the system
-  Provision of CAD data and cutting values
-  Information on tool availability and stock information
-  Intelligent search function thanks to advanced search criteria and ordering via own material numbers
-  Detailed documentation and history of your order processes along with a watch list for future purchases
-  Easy forwarding of shopping carts for approval and release
-  OCI interface, data interface

Technical section

Quality features

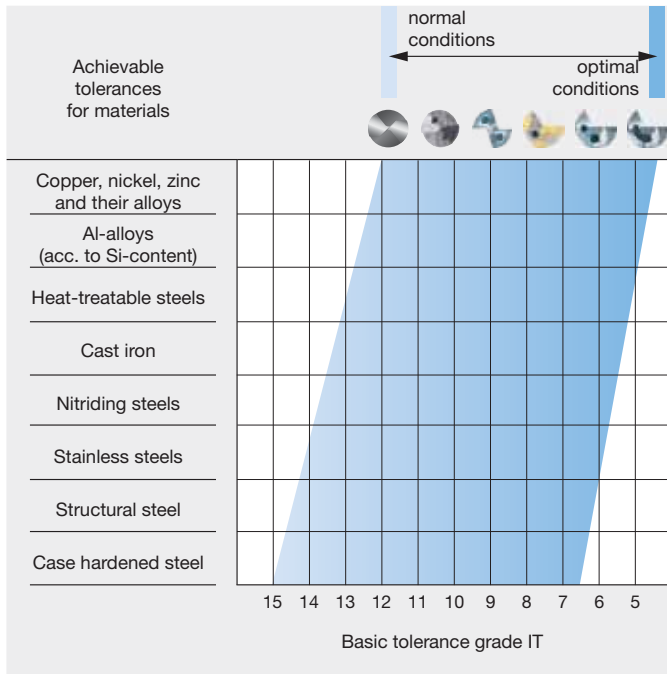
In machining technology, if the drilling depth is 15xD or deeper, this is referred to as deep hole drilling. Today, Gühring's range comprises:

- classical single-fluted gun drills made of solid carbide or with a brazed carbide head
- classical two-fluted gun drills with a brazed carbide head
- replacement system with replaceable solid carbide cutting edges and supporting strips
- spiralled solid carbide or HSS/HSCO deep hole drills

The right tool is selected depending on the type of application and the required quality of the drilled hole. The following diagrams provide guidance on which tool to choose:

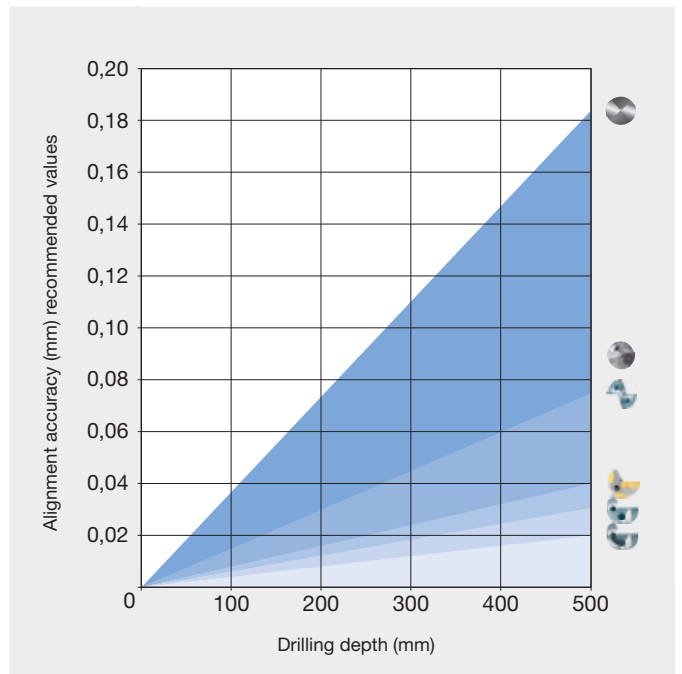
Basic tolerances

Depending on their shape and design, different types of tools result in different basic tolerances. The single-fluted drill creates extremely precise drilled holes. Under optimum conditions, it is possible to achieve tolerance grades of up to IT5 with a single-fluted gun drill.



Alignment accuracy

The straightness of hole describes a deviation in direction. This is influenced by the centring of the tool during spot drilling and depends on the shape and position of the pilot hole or drill bush. The properties of the material or workpiece as well as the stability of the tool and machine also influence the straightness.



Peak-to-valley height class	N12	N11	N10	N9	N8	N7	N6	N5	N4	N3	
EB 100/EB 80 deep hole drilling											
EB 800 deep hole drilling											
ZB 80/RT 100T deep hole drilling											
HSS/HSCO deep hole drilling											
EB 100/80/800 Pilot drilling											
Surface values	Rz (µm)	160	100	63	40	15,6	7,87	4,65	2,60	1,74	0,81
Roughness values	Ra (µm)	50	25	12,5	6,3	3,2	1,6	0,8	0,4	0,2	0,1

■ normal conditions (recommended values)
 ■ ideal conditions

Surface quality

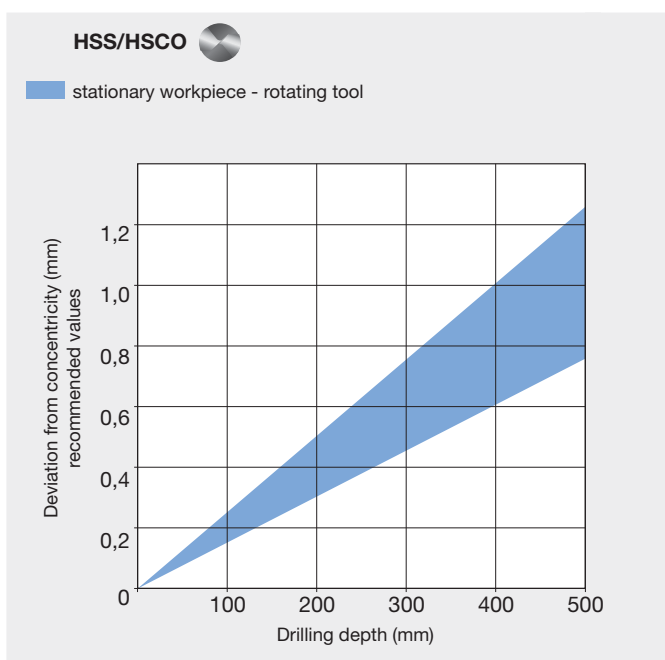
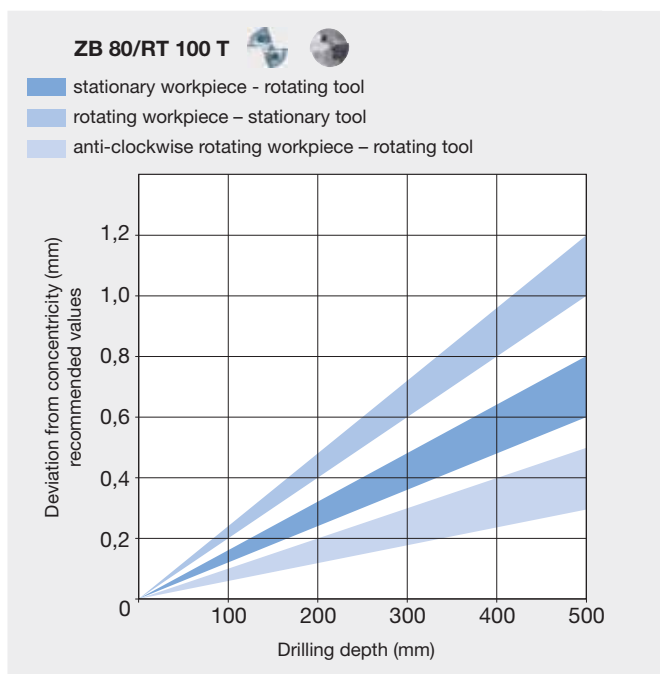
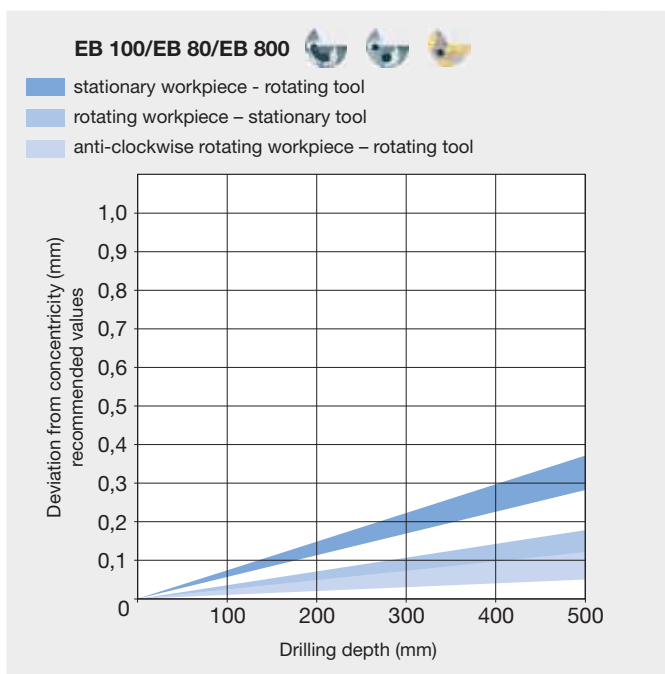
The roughness of the drilled hole is influenced by many factors. The most important of these are the material, the cooling lubricant and the type and geometry of the tool. When drilling with single-fluted drills, the guide pads smooth the bore wall further. This is not the case for drills with several cutting edges. The final quality of the surface is dependent on the surfaces of the tool (e.g. coating) or edge conditions (wear) on the primary and secondary cutting edges.

Technical section

Deviation from concentricity

The deviation from concentricity describes a continuous displacement of the tool with increasing drilling depth. This curve is affected not only by the drill's geometric properties, but also by the cutting conditions, the material structure and the temperatures. Optimum results are achieved when machining

with counter-rotating speeds of the workpiece and tool. A single-fluted drill achieves lower deviation from concentricity values than drills with several cutting edges.



Technical section



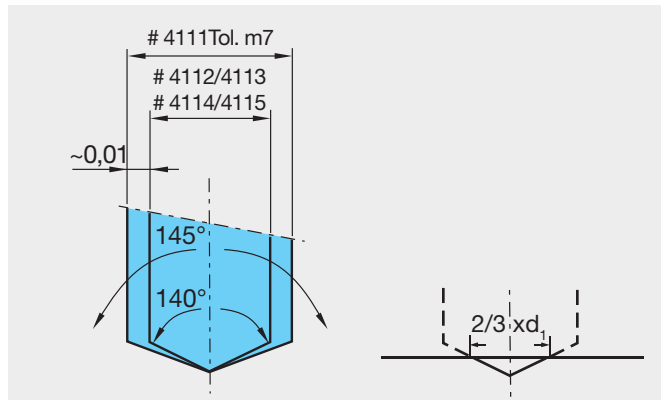
Centring and pilot drilling

Centring and pilot drilling for HT 800

Generally we recommend centring/pilot drilling for HT 800 with drilling depths above 5xD.

When centring, the drilling diameter should be approximately 2/3 of the hole diameter to be produced. With pilot drilling we recommend a drilling depth of 1xD. In addition, the point angle as well as the diameter of the pilot drill should be larger than the point angle and the diameter of the following drill.

To ensure this, we recommend the application of the adapted pilot drilling inserts art. no 4111 with 145° point angle and m7 diameter tolerance in an extra short, rigid holder art. no. 4105.



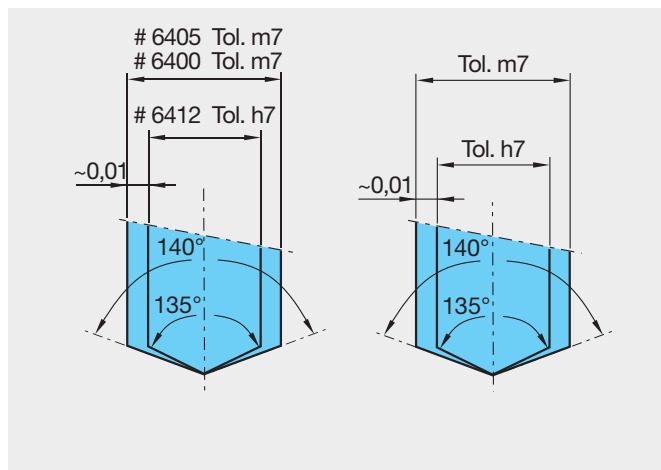
Centring and pilot drilling for solid carbide

When applying solid carbide drills for drilling depths 7xD to 12xD we recommend centring or the production of a pilot hole with a depth of 1xD to 2xD.

With drilling depths larger than 12xD a pilot hole with a depth of 1xD to 2xD is imperative.

With pilot drilling for the Exclusive Line micro-precision drill with 15xD (art. no. 6412) we recommend the application of Exclusive Line micro-precision drill 4xD without internal cooling (art. no. 6400) or 5xD with internal cooling (art. no. 6405), as they are optimally adapted regarding point angle and diameter tolerance.

When pilot drilling for deep hole drills eg. type RT100T, a Ratio drill type RT100U with internal cooling, 3xD (e.g. art. no. 5510) can be applied, as it is optimally suited regarding point angle and diameter tolerance.



Centring and pilot drilling for HSS

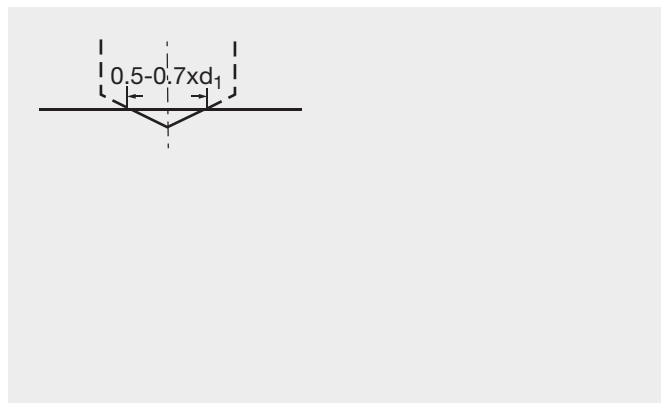
Centring with drill lengths to DIN 340

When using long series drills (DIN340) in HSS/HSCO, we recommend spot drilling with a spotting diameter of 0.5 to 0.7xD (D = drill diameter). HSS NC spotting drills are optimally suited for this process. Detailed information regarding NC spotting drills can be found in the NC spot drilling section.

Pilot drilling with drill lengths to DIN 1869

When applying extra length HSS/HSCO drills to DIN 1869 we recommend the production of a pilot hole with a depth of 1xD to 2xD.

Stub drills type GV 120 to DIN 1897 are optimally suited.



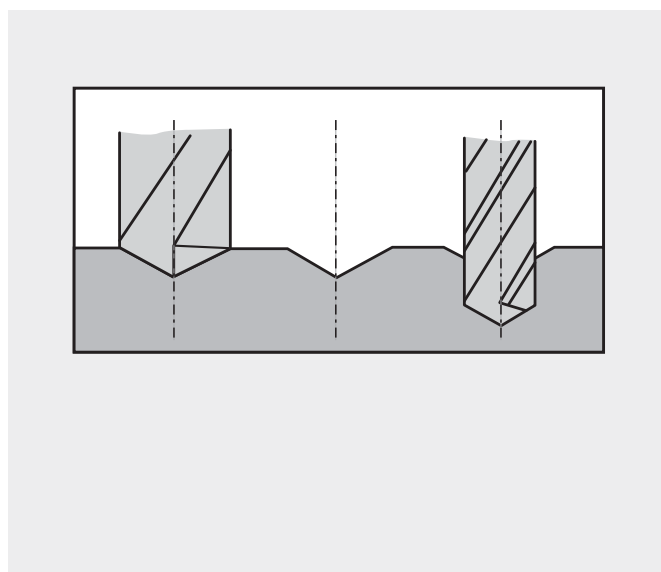
Spotting strategies

NC spotting drills

When producing accurately positioned holes, holes with close diameter tolerances, deep holes or generally with unfavourably shaped workpieces (round, rough, etc.) it's recommended to use a NC spotting drill. This ensures the following drill, drills accurately and prevents the drill from running off.

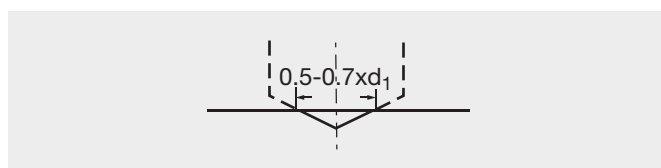
NC spotting drills can also be used to produce chamfers or countersinks (when using a spot drill with a larger diameter than the actual hole) and centring in one operation.

NC spotting drills are designed with a very short flute length and without body clearance to ensure a very rigid design and therefore accurately positioned spotting. Due to the design, NC spot drills are only suitable for spotting, drilling depths must not exceed the length of the point geometry.



Selecting an NC spotting drill

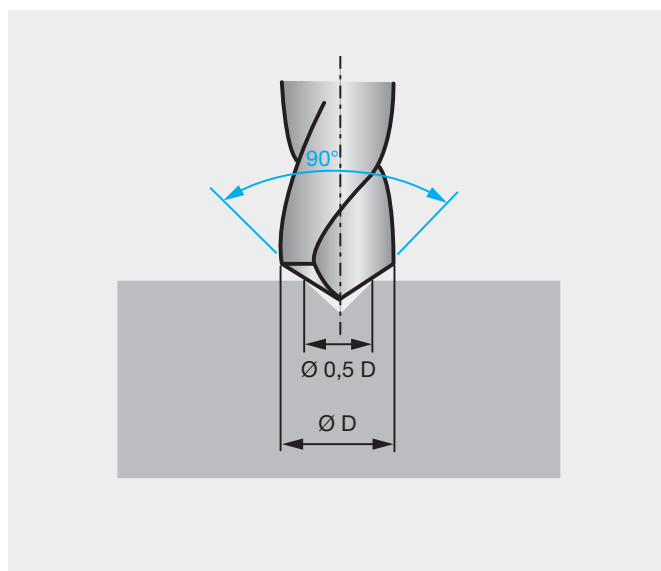
Ideally, the spotting diameter should be chosen between 0.5 to $0.7 \times D$.



90° NC spotting drills

NC spotting drills with a 90° point angle are ideally suited for spotting if the following HSS/HSCO drills have a relatively large chisel edge. This ensures that the following HSS/HSCO drill drills with the cutting lip first and is guided by the most stable points of the cutting edge.

In addition, NC spotting drills with a 90° point angle are used to produce a 90° countersink and centre in one operation if the spotting diameter is larger than the actual hole diameter.

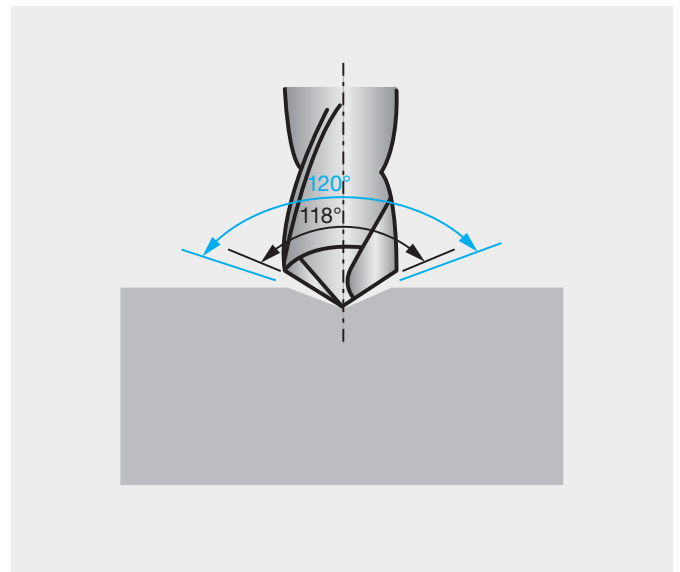




Spotting strategies

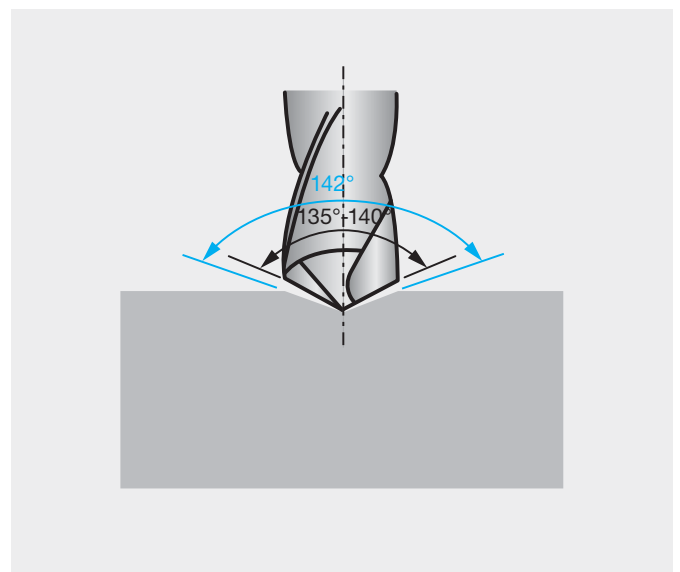
120° NC-spotting drills

NC-spotting drills with a 120° point angle are specially suited for spotting operations if the actual hole is subsequently produced with HSS/HSCO drills with a 118° point angle. This ensures the following HSS/HSCO drill spots with the point first and is well guided.



142° NC-spotting drills

NC-spotting drills with 142° point angle are specially suited for spotting operations if the actual hole is subsequently produced with carbide drills with a 135° - 140° point angle. This ensures the following carbide drill spots with the point first, centers and is well guided. If the cutting corners of the carbide drill meet the material to be machined before the point, there is the risk of corner crumbling with carbide drills.



Technical section

NC spotting drills

90°	120°	142°



A brief introduction to the subject of deep hole drilling

In the machining world, drilling depths of $15 \times D$ and deeper are regarded as deep hole drilling operations, whereby smaller drilling depths can naturally also be produced with gun drills. Advantage is taken of the positive side effects, as for example good surface quality, low deviation from concentricity and optimised alignment accuracy.

High pressure cooling - has become a matter of course.

In recent years, internal cooling has established itself for all drilling tools. Coolants are now living up to their name and being supplied via coolant ducts to where they are urgently required. Considerable improvements in tool life and less breakages have been achieved by this measure for twist drills, taps etc. Every conventional machine tool currently on the market can be supplied with high pressure internal cooling and is therefore also suitable for deep hole drilling. The share of gun drills on machining centres, lathes etc. is forever gaining more importance. The process is therefore increasing in popularity in the machining world.

Application advice

- When using classical deep hole drills with a steel shank, EB 80, EB 800 and ZB 80, to drill to depths greater than $40 \times D$, we recommend the use of two or more deep hole drills, e.g. $\varnothing 10 \times 400$ mm und $\varnothing 9,95 \times 800$ mm.
- The EB 100 M solid carbide deep hole drills and the brazed EB 100 can achieve a maximum drilling depth of $80 \times D$ with only one tool.
- Deep hole drills for drilling to depths greater than $40 \times D$ should be introduced into the pilot hole with anti-clockwise rotation.
- When changing tools at a depth greater than $40 \times D$, the tool can be damped by switching on the high-pressure internal cooling for approximately one second.
- For machining long-chipping materials, we recommend the use of Deep hole drills with polished flutes.
- As a general rule, we recommend setting the oil content of the emulsion to at least 8%.
- Single-fluted gun drills for long-chipping aluminium should be ordered with a 180° point grind and coolant chamber.
- Firmly seated steady rest bushings dampen the drilling process and improve the quality of the bore.
- To avoid a step between the pilot hole and the deep hole, a smooth transition can be achieved with head form G and a pilot hole that is slightly undersized.
- In the case of long chip formation, a periodic interruption in the feed (without withdrawal) can facilitate the machining process.



All gun drills must have support for the pilot hole. Gun drills must never operate at full speed without support in the machine shop.

Deep hole drilling is not a closed book, but can be mastered by anybody as long as certain conditions are adhered to. Recommended cutting rates for the application of Guhring gun drills can be found in the chapter GÜHRINGNAVIGATOR.

The drilling process on conventional machines (BAZ)

The work steps for deep hole drilling

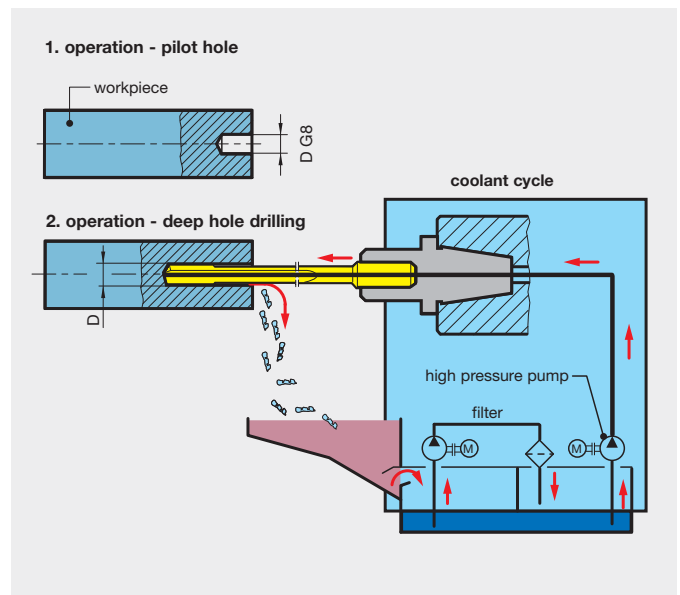
- production of pilot hole
- enter at low revolutions
- setting of coolant pressure and speed
- continuous drilling to required drilling depth without pecking
- switching off coolant supply after reaching the required hole depth
- retraction of the tool from the hole

Cutting parameters can be reduced if cooling parameters are insufficient. Pressure increase systems are also an option.

Procedure

In order to achieve optimal machining results when producing deep holes especially spotting on radii and/or on an uneven surface structure, we recommend the following machining steps:

1. Initial milling of the surface, e.g. with the RF 100 Diver including centre cut. The surface must be machined at right angles to the entry angle of the drilling operation.
2. Drilling of a cylindrical pilot hole, e.g. with the RT 100 U. Thanks to its point angle of 140° and its Ø tolerance m7, this drill is ideally suited for this machining step.
3. Drilling into the pilot hole with a speed of approximately 200rpm and a feed rate of approximately 500mm/min with anti-clockwise rotation.
4. Adjustment of the cooling lubricant pressure and the rotational speed.
5. Uninterrupted drilling to the required drilling depth without chip removal. When using deep hole drills with a very large length/diameter ratio (e.g. solid carbide single-fluted drills with flute lengths greater than 160mm), we recommend drilling with reduced cutting parameters (approx. 75% of the optimal cutting speed) to a drilling depth of around 25 mm.
6. For through holes with a straight exit, i.e. 90°, reduce the feed speed v_f to 50% approximately 1 mm before breaking through.
7. For through holes with an inclined exit, reduce the feed speed v_f to 40% approximately 1 mm before breaking through.
8. After reaching the required drilling depth, switch off the speed and cooling lubricant and retract the drill at a speed of no more than 5,000mm/min.

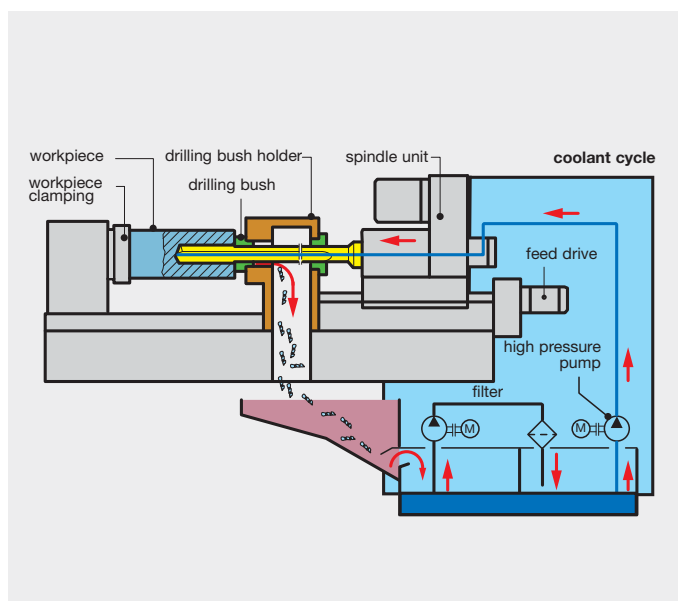




The drilling process on deep hole drilling machines

Where mass production, milling of very deep holes and high quality surface finishes are required, deep-hole drilling machines are used. A nearly endless range of drilling depth becomes available. The gun drill is guided by steady rest bushes. The accordion-like movement of the bushes allows a continuous drilling. „Drilling without pecking“.

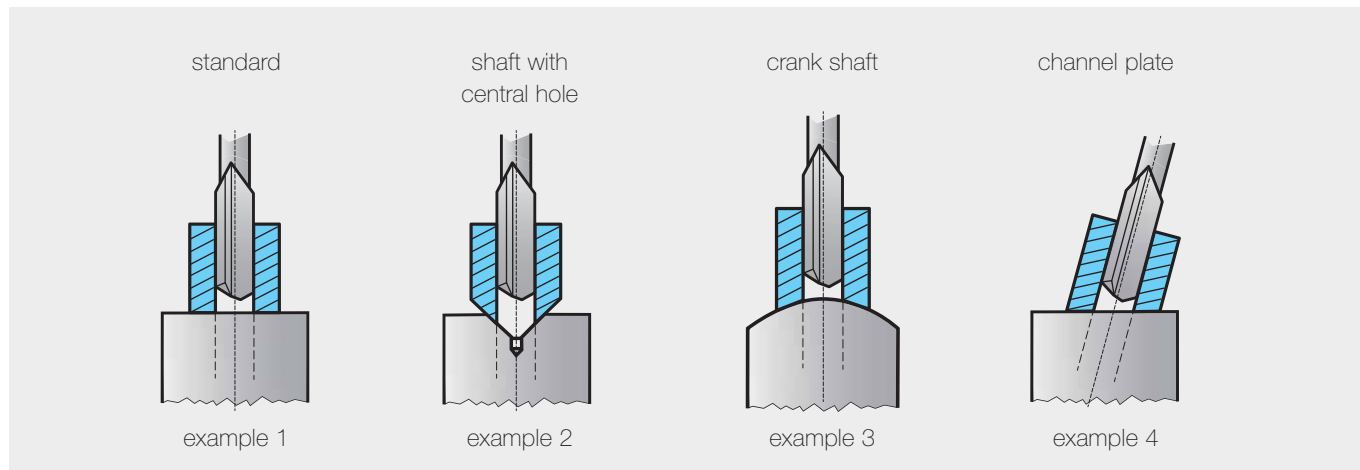
Pilot holes are not needed, thus reducing, time and costs for tool change. Offering a greater drilling depth (up to a couple of meters), and at the same time, an excellent drilling quality. High pressure pumps and a coolant filter system guarantee maximum process security. The total length of the steady rest bushings and the drill bush support equals the so-called length loss, which is decisive for calculating the length of the tool.



Pilot hole and drill bush

Since the single-fluted gun drill is a tool with only one cutting edge and cannot centre itself automatically, the tool must be guided with a drill bush or pilot hole. Self-centering two-fluted drills also have to be guided by drill bushes or pilot holes, however, as they could otherwise start to vibrate.

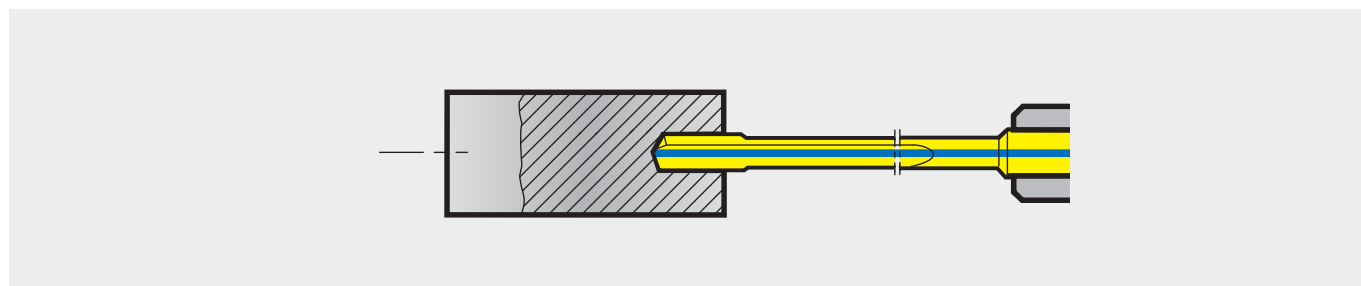
Example drill bush with art. no. 5747 (HSS) / 5748 (solid carbide)



To take into account when using drill bushes

- The drill bush must be in positive contact with the spot drilling contour.
- There should be as little play as possible between the drill bush and the tool.
- If the deep hole drill has a guide diameter, the drill bush should be at least long enough to guide both head types when spot drilling.
- The condition of the drill bush must be regularly checked to prevent any negative effects on the tool.
- We recommend HSS drill bushes for small series and solid carbide drill bushes for large series.

Example Pilot drilling



Guide values for the pilot hole depth

conv. deep hole drills	Ø nom. follow-on tool				
drilling depth	Ø 0.900-1.799	Ø 1.800-3.999	Ø 4.000-7.999	Ø 8.000-11.999	Ø 12.000-52.000
up to 20xD	3.0xD	2.5xD	2.0xD	1.5xD	1.5xD
up to 30xD		3.0xD	2.5xD	2.0xD	
up to 40xD		4.0xD	3.0xD	2.5xD	



Pilot hole and drill bush

Range of applications for pilot tools

	Diameter range [mm]																			
	0.9	1.0	1.4	2.0	3.0	6.0	8.0	11.0	12.0	15.5	16.0	19.5	20.0	25.0	30.0	35.0	40.0	45.0	50.0	52.0
ExclusiveLine Micro-precision drills	art. no. 6400 without IC																			
	6405 with IC																			
RT 100 U	art. no. 5511 with IC																			
HT 800	art. no. 4111 insert for pilot drilling																			
RF 100 P	art. no. 6716 4-fluted without IC																			
RF 100 Diver	art. no. 6737 4-fluted without IC																			
GV 120	art. no. 571 HSCO without IC																			

ExclusiveLine Micro-precision drills

- for pilot holes \varnothing3.000/EB 100, EB 80
- for standard situations/flat spotting surface

RT 100 U

- universal pilot tool \varnothing 3.000-19.500/EB 100, EB 80, ZB 80, EB 800, RT 100 T
- for standard situations/flat spotting surface

HT 800

- insert pilot tool \varnothing 11.000-40.000/EB 100, EB 80, ZB 80, EB 800, RT 100 T
- for standard situations/flat spotting surface

RF 100 P

- milling cutter for high-precision pilot holes \varnothing 1.400-12.000/EB 100, EB 80, ZB 80, EB 800, RT 100 T
- for standard and special situations/flat, angled, cubic or other spot drilling surfaces

RF 100 Diver

- milling cutter for high-precision pilot holes \varnothing 4.000-52.000/EB 100, EB 80, ZB 80, EB 800, RT 100 T
- for standard and special situations/flat, angled, cubic or other spot drilling surfaces

GT 100

- HSS pilot drills \varnothing 2.500-13.000/HSS deep hole drills
- for standard situations/flat spotting surface

Please observe the following for pilot holes

- The pilot hole diameter tolerance should be G8 and the nominal tool tolerance always \varnothing m7.
- If the single-fluted gun drill has a guide diameter, the pilot hole should be at least deep enough to support both head forms when spot drilling.
- Depending on the application, it may be advantageous if the pilot hole has an entry chamfer.
- If there are strict requirements regarding the position and concentricity of the deep drilled hole, then the pilot hole should be milled or be drilled on a lathe.

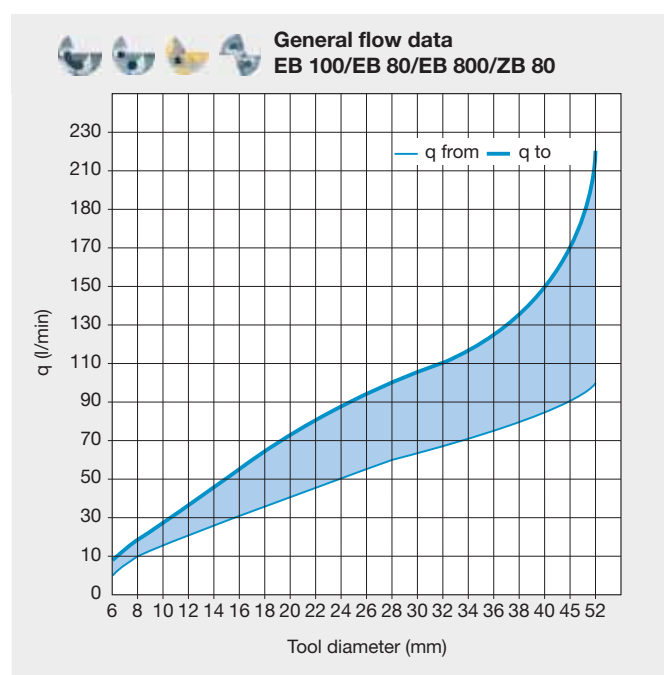
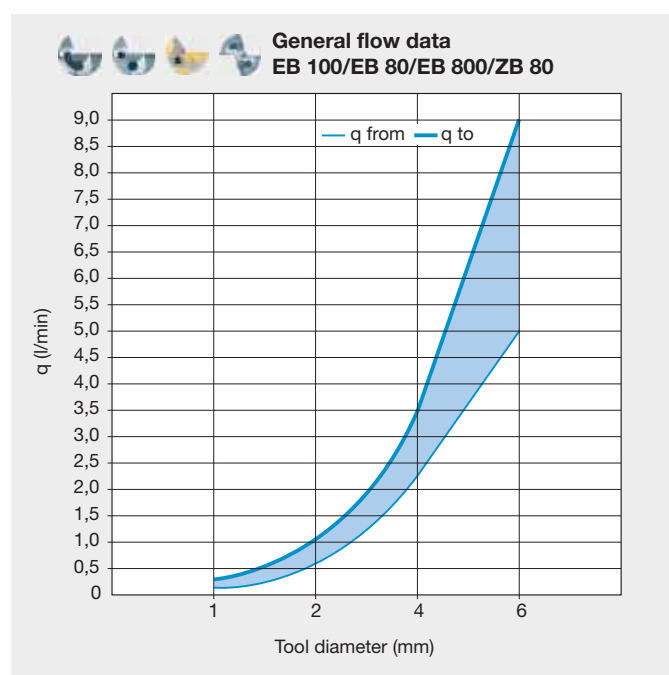
Important:

The quality of the drill bush and of the pilot hole has a very large influence on the deviation from concentricity and the tool life of the follow-on tool.

Cooling lubricant data

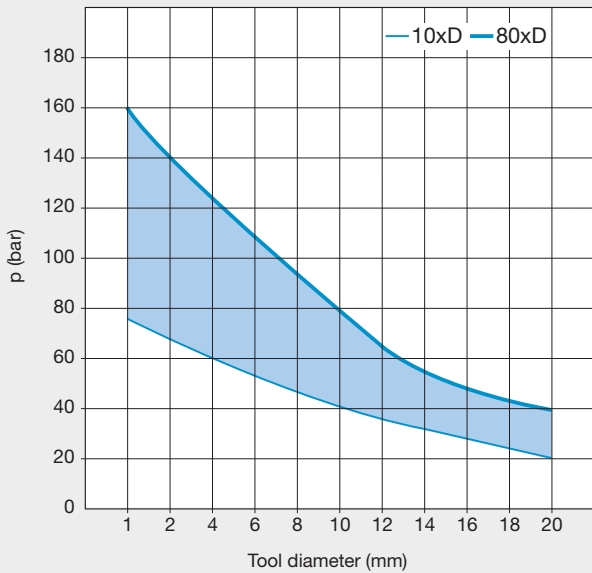
Please note:

- All gun drills must be applied with internal cooling, either air, water or oil. Internal cooling ensures better chip removal.
- All gun drills can be applied with oil as the medium for internal cooling. In this case, however, a higher pressure is required than with emulsions in order to obtain the same amount of coolant.
- When MQL is applied with gun drills an increase in pressure may be necessary for smaller nominal diameters dependent on the pressure of the MQL system.
- If the cooling lubricant data is insufficient the cutting parameters may be reduced. Pressure boosting systems are also possible.
- With increased gun drill length a pressure increase has to be expected to transport the required coolant volume through the coolant ducts.

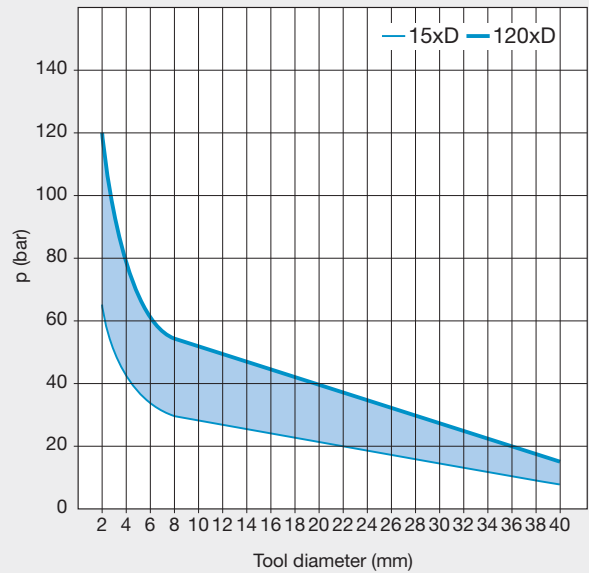




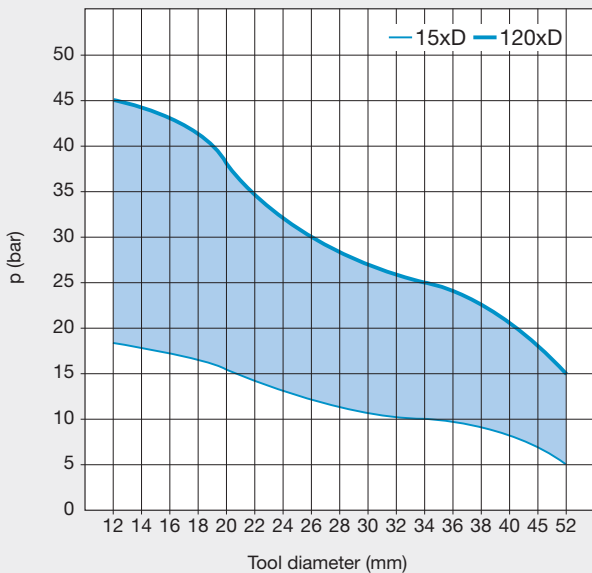
EB 100 Pressure specifications
depending on tool length



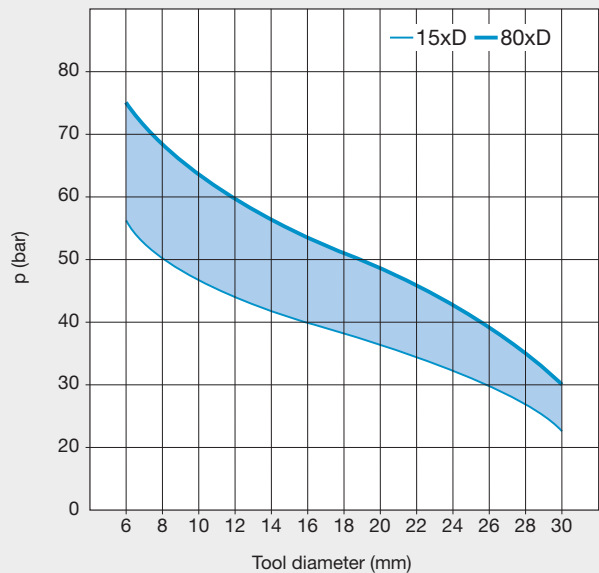
EB 80 Pressure specifications
depending on tool length



EB 800 Pressure specifications
depending on tool length



ZB 80 Pressure specifications
depending on tool length



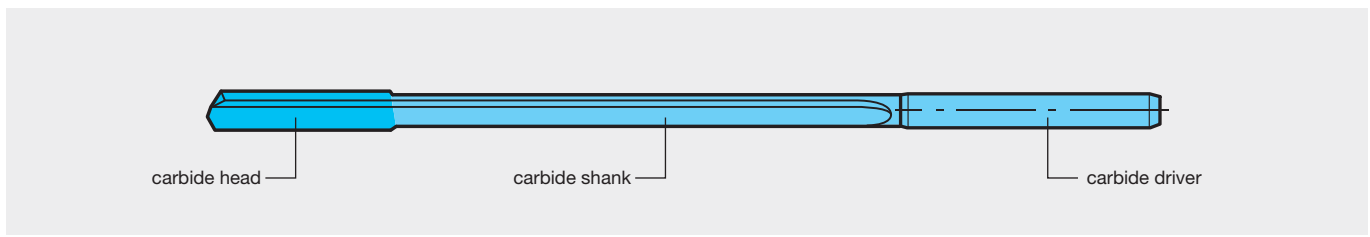


Characteristics

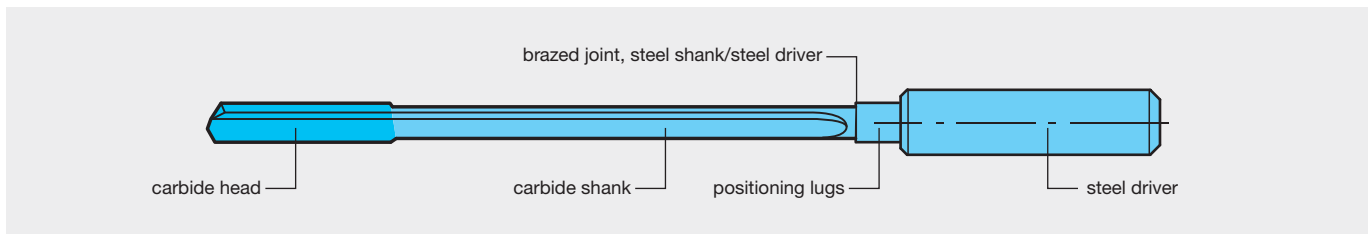
Range of applications

	Diameter range																	
	0.9	1.0	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0	30.0	35.0	40.0	45.0	50.0
EB 100 M	max. total length 615 mm																	
EB 100	max. total length 615 mm																	
EB 80	max. total length 3.600 mm																	
ZB 80	max. total length 1.000 mm																	
EB 800	max. total length 3.600 mm																	

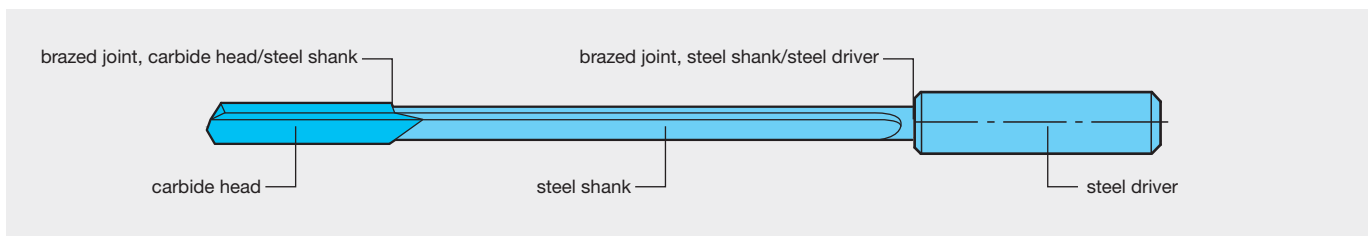
EB 100 M



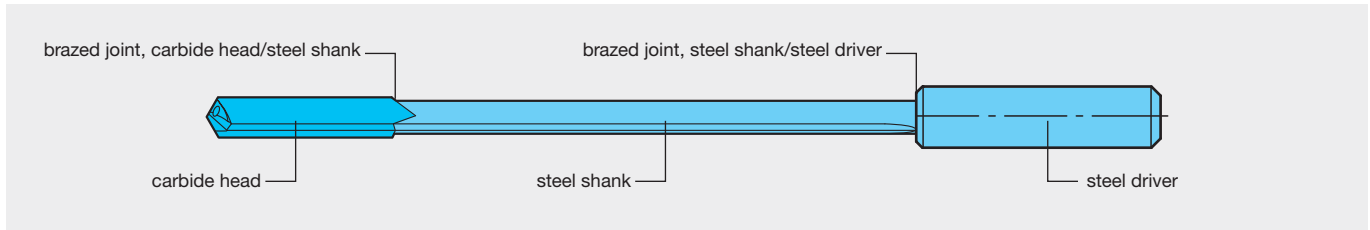
EB 100



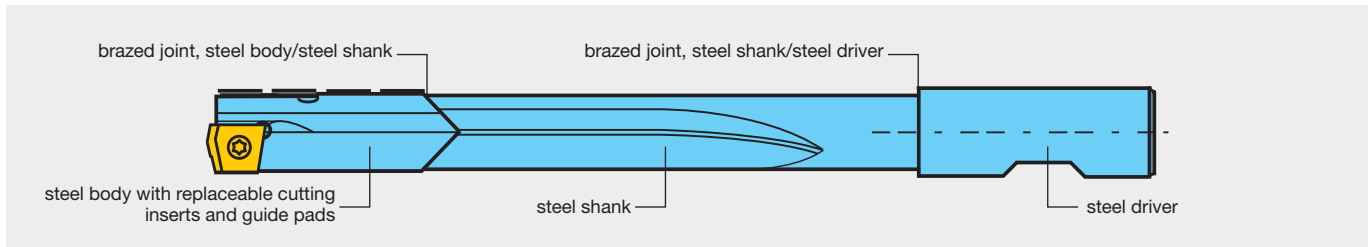
EB 80



ZB 80



EB 800



Technical section



The range of drivers introduced below is available ex stock. However, it only represents a small selection of drivers from our complete range. We naturally also produce individual drivers of the highest precision to customer drawings.

Attention! EB 100 requires drivers with positioning lugs. Further information on request.

Drivers for EB 80

Drivers for deep drilling machines

1
TBM-SEV

Code no.	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
TBM-SGI

Code no.	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	20
5.5	10	110	24

2
TBM-SV

Code no.	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
TBM-SKM

Code no.	d ₁	l ₁
6.1	12.7	38
6.2	19.05	70
6.3	38.1	70

3
TBM-SEH

Code no.	d ₁	l ₁	l ₂	l ₃
3.1	25	70	34	-
3.2	25	70	34	100
3.3	25	70	34	105

7
TBM-TRG

Code no.	d ₁	l ₁	l ₂
7.1	16	112	73
7.2	20	126	82

4
TBM-SFM

Code no.	d ₁	l ₁
4.1	19,05	70
4.2	12,7	70
4.3	25,4	70
4.4	31,75	70
4.5	38,1	70

Drivers to DIN 1835

form HE

9
TBM-SEV

Code no.	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

Drivers to VDI-drafterf

12
TBM-VDI

Code no.	d ₁	l ₁	l ₂
12.1	10	68	40
12.2	16	90	40
12.3	25	112	50

also be used for deep hole drilling machines

Drivers to Speed-Bit-System

13
TBM-SPB

Code no.	d ₁	l ₁	l ₂
13.1	16	40	14
13.2	25	50	25
13.3	35	60	20

also be used for deep hole drilling machines

Technical section

Drivers for EB 80

Drivers to DIN 6535

10 form HA

Code no.	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

11 form HE

Code no.	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

8 form HB

from code no. 8.6

Code no.	d ₁	l ₁	l ₂
8.1	8	36	-
8.2	10	40	-
8.3	12	45	-
8.4	16	48	-
8.5	20	50	-
8.6	25	56	17
8.7	32	60	19
8.8	40	70	19
8.9	50	80	23
8.10	63	90	23

16 sim. form HA (shrinkable)

Code no.	d ₁	l ₁
16.1	10	50
16.2	16	64
16.3	20	70
16.4	25	81
16.5	32	92

17 sim. form HE

Code no.	d ₁	l ₁
17.1	19.05	70
17.2	25.4	70
17.3	31.75	70
17.4	38.1	70

also be used for deep hole drilling machines

Drivers for EB 100

Drivers with positioning lugs to DIN 6535

18 form HA

Code no.	d ₁	l ₁	l ₂
4	4	28	40
6	6	36	51
10	10	40	55
12	12	45	60
16	16	48	63

19 form HB

Code no.	d ₁	l ₁	l ₂
4	4	28	40
6	6	36	51
10	10	40	55
12	12	45	60
16	16	48	63

20 form HE

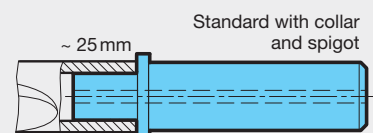
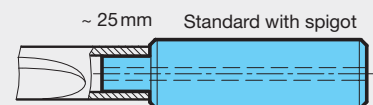
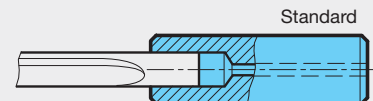
Code no.	d ₁	l ₁	l ₂
4	4	28	40
6	6	36	51
10	10	40	55
12	12	45	60
16	16	48	63

Driver variations to suit gun drill tubes

Solution for nom.-Ø < driver-Ø
(difference must be appr. 6 mm):
tube shank installed in driver

Solution for nom.-Ø ≠ driver-Ø
(close to parallel):
tube shank installed over spigot

Solution for nom.-Ø > driver-Ø:
tube shank installed over spigot,
inside-Ø of tube shank > driver-Ø,
tube shank fits against collar shoulder.





Application recommendations

Pilot holes for drill lengths greater than DIN 1869

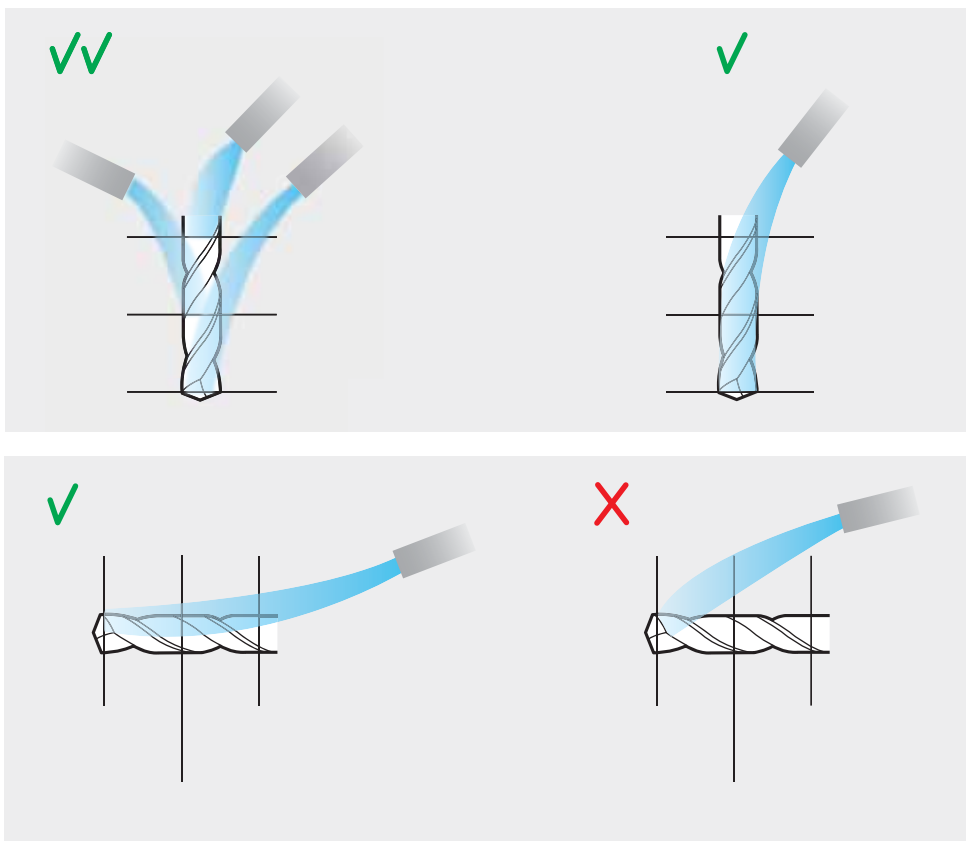
Before using the extra long HSS/HSCO drills according to DIN 1869 and factory standard, we recommend drilling a pilot hole.

The following must be observed:

- The depth of the pilot hole should be 2-3xD.
- The point angle of the pilot drill should be at least as large or larger than the point angle of the deep hole drill.
- The diameter of the pilot drill should be equal to or up to 0.1 mm larger than the diameter of the deep hole drill.
- We recommend the use of an extra short twist drill according to DIN 1897 to drill the pilot hole, or alternatively a short twist drill according to DIN 338.

Procedure

- The cooling lubricant supply must be adjusted in such a way that the entire cutting section of the deep hole drill is supplied with coolant.
- The approach to the component should be made with reduced rapid traverse, to avoid vibration of the deep hole drill.
- When introducing the deep hole drill into the pilot hole, we recommend reducing the rotational speed and feed speed by 50%.
- As soon as the deep hole drill has reached 2/3 of the pilot hole depth, the rotational speed should be increased to the full working speed.
- Depending on the machining situation (vertical/horizontal machining) and the material to be machined, the chip removal cycles should be selected to allow optimum chip removal and avoid chip jams.
- The chip removal cycles can be run at working rotational speed and with an increased feed rate, making sure that a part of the deep hole drill – at least 1xD – always remains in the hole to keep it guided. Afterwards it is possible to advance to a depth of 2 mm before the previously drilled depth with the increased feed rate and the working rotational speed. The next drilling cycle is then started with the working feed rate and the working rotational speed.
- After the full drilling depth has been reached, it is possible to withdraw from the hole at the working speed and increased feed rate, provided that the hole was drilled with chip removal cycles. If drilling was carried out without chip removal cycles, we recommend reducing the rotational speed to 25% of the working speed and slightly increasing the feed rate when withdrawing from the full drilling depth.



Tapping size holes for thread cutting

Std. ISO metric threads DIN 13					ISO metric fine threads DIN 13					
nom. Ø	pitch P	tapping size hole Ø DIN 336	core diameter of int. thread 6H*		nom. Ø	x	pitch P	tapping size hole Ø DIN 336	core diameter of int. thread 6H*	
	mm	mm	min. mm	max. mm			mm	mm	min. mm	max. mm
M 1	0.25	0.75	0.729	0.785	M 2.5	x	0.35	2.15	2.121	2.221
M 1.1	0.25	0.85	0.829	0.885	M 3.0	x	0.35	2.65	2.621	2.721
M 1.2	0.25	0.95	0.929	0.985	M 3.5	x	0.35	3.15	3.121	3.221
M 1.4	0.30	1.10	1.075	1.142	M 4.0	x	0.50	3.50	3.459	3.599
M 1.6	0.35	1.25	1.221	1.321	M 4.5	x	0.50	4.00	3.959	4.099
M 1.8	0.35	1.45	1.421	1.521	M 5.0	x	0.50	4.50	4.459	4.599
M 2	0.40	1.60	1.567	1.679	M 5.5	x	0.50	5.00	4.959	5.099
M 2.2	0.45	1.75	1.713	1.838	M 6.0	x	0.75	5.20	5.188	5.378
M 2.5	0.45	2.05	2.013	2.138	M 7.0	x	0.75	6.20	6.188	6.378
M 3	0.50	2.50	2.459	2.599	M 8.0	x	0.50	7.50	7.459	7.599
M 3.5	0.60	2.90	2.850	3.010	M 8.0	x	0.75	7.20	7.188	7.378
M 4	0.70	3.30	3.242	3.422	M 8.0	x	1.00	7.00	6.917	7.153
M 4.5	0.75	3.70	3.688	3.878	M 9.0	x	0.75	8.20	8.188	8.378
M 5	0.80	4.20	4.134	4.334	M 9.0	x	1.00	8.00	7.917	8.153
M 6	1.00	5.00	4.917	5.153	M 10	x	0.75	9.20	9.188	9.378
M 7	1.00	6.00	5.917	6.153	M 10	x	1.00	9.00	8.917	9.153
M 8	1.25	6.80	6.647	6.912	M 10	x	1.25	8.80	8.647	8.912
M 9	1.25	7.80	7.647	7.912	M 11	x	0.75	10.20	10.188	10.378
M 10	1.50	8.50	8.376	8.676	M 11	x	1.00	10.00	9.917	10.153
M 11	1.50	9.50	9.376	9.676	M 12	x	1.00	11.00	10.917	11.153
M 12	1.75	10.20	10.106	10.441	M 12	x	1.25	10.80	10.647	10.912
M 14	2.00	12.00	11.835	12.210	M 12	x	1.50	10.50	10.376	10.676
M 16	2.00	14.00	13.835	14.210	M 14	x	1.00	13.00	12.917	13.153
M 18	2.50	15.50	15.294	15.744	M 14	x	1.25	12.80	12.647	12.912
M 20	2.50	17.50	17.294	17.744	M 14	x	1.50	12.50	12.376	12.676
M 22	2.50	19.50	19.294	19.744	M 15	x	1.00	14.00	13.917	14.153
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 22	x	1.00	21.00	20.917	21.153

* M 1.1 up to M 1.4 tapping size hole of int. thread 5H

Technical section

NPT ANSI B 2.1 American tapered pipe thread 1:16						
Version A (avoid if possible)	Version B	nom. threads per inch	tapp. size hole Ø cylindrical (A) d ₁	tapp. size hole Ø conical (B) D ₁	cutting depth ET mm	cutting depth 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



Tapping size holes for thread cutting

(Whitworth) threads (DIN-ISO 228-1)				
nom. Ø	threads	tapping size hole Ø	core diameter of int. thread	
inch	per inch	mm	min. mm	max. mm
G 1/16	28	6.80	6.561	6.843
G 1/8	28	8.80	8.566	8.848
G 1/4	19	11.80	11.445	11.890
G 3/8	19	15.25	14.950	15.395
G 1/2	14	19.00	18.631	19.172
G 5/8	14	21.00	20.587	21.128
G 3/4	14	24.50	24.117	24.658
G 7/8	14	28.25	27.877	28.418
G 1	11	30.75	30.291	30.931
G 1 1/8	11	35.50	34.939	35.579
G 1 1/4	11	39.50	38.952	39.592
G 1 1/2	11	45.25	44.845	45.485
G 1 3/4	11	51.00	50.788	51.428
G 2	11	57.00	56.656	57.296

Rc (BSPT) DIN EN 10226-2 and ISO 7/1 tapered Whitworth pipe thread 1:16							
Version A (avoid if possible)	Version B	nom. Ø	threads per inch	tapp. size hole Ø cylindrical (A) d ₁	tapp. size hole Ø conical (B) D ₁	cutting depth ET mm	cutting depth BT (min) mm
		1/8	28	8.20	8.57	9.5	11.1
		1/4	19	10.85	11.45	14.0	16.3
		3/8	19	14.30	14.95	14.4	16.7
		1/2	14	17.80	18.63	19.1	22.3
		3/4	14	23.20	24.12	20.4	23.6
		1	11	29.20	30.29	24.3	28.3

Recommended tapping size holes for thread forming

Std. ISO metric threads DIN 13						ISO metric fine threads DIN 13														
nom. Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*		nom. x Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*		nom. x Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread 7H*	
			min. mm	max. mm	min. mm	max. mm				min. mm	max. mm	min. mm	max. mm				min. mm	max. mm	min. mm	max. mm
mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm	mm
M1	0.25	0.90	0.89	0.92	0.729	0.819	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		
M1.2	0.25	1.10	1.09	1.12	0.929	1.019	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		
M1.4	0.30	1.28	1.27	1.30	1.075	1.181	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		
M1.6	0.35	1.46	1.45	1.48	1.221	1.346	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		
M1.7	0.35	1.56	1.55	1.58	1.321	1.446	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		
M1.8	0.35	1.66	1.65	1.68	1.421	1.546	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 2	0.40	1.85	1.84	1.88	1.567	1.679	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 2.2	0.45	2.00	2.01	2.05	1.713	1.838	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 2.5	0.45	2.30	2.28	2.32	2.013	2.138	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 3	0.50	2.80	2.78	2.85	2.459	2.639	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 3.5	0.60	3.25	3.23	3.30	2.850	3.050	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 4	0.70	3.70	3.68	3.76	3.242	3.466	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 4.5	0.75	4.20					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 5	0.80	4.65	4.62	4.71	4.134	4.384	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 6	1.00	5.55	5.52	5.62	4.917	5.217	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 7	1.00	6.55	6.52	6.62	5.917	6.217	M 11 x 0.75	10.65	10.62	10.70	10.188	10.424								
M 8	1.25	7.40	7.36	7.47	6.647	6.982	M 11 x 1.00	10.55	10.52	10.62	9.917	10.217								
M 9	1.25	8.40	8.36	8.47	7.647	7.982	M 12 x 1.00	11.55	11.52	11.62	10.917	11.217								
M 10	1.50	9.30	9.26	9.38	8.376	8.751	M 12 x 1.25	11.40	11.36	11.47	10.647	10.982								
M 11	1.50	10.30	10.26	10.38	9.376	9.751	M 12 x 1.50	11.30	11.26	11.38	10.376	10.751								
M 12	1.75	11.20	11.15	11.29	10.106	10.531	M 14 x 1.00	13.55	13.52	13.62	12.917	13.217								
M 14	2.00	13.10	13.05	13.20	11.835	12.310	M 14 x 1.25	13.40	13.36	13.47	12.647	12.982								
M 16	2.00	15.10	15.05	15.20	13.835	14.310	M 14 x 1.50	13.30	13.26	13.38	12.376	12.751								
M 18	2.50	16.90	16.83	17.02	15.294	15.854	M 15 x 1.00	14.55	14.52	14.62	13.917	14.217								
M 20	2.50	18.90	18.83	19.02	17.294	17.854	M 15 x 1.50	14.30	14.26	14.38	13.376	13.751								
M 22	2.50	20.90	20.83	21.02	19.294	19.854	M 16 x 1.00	15.55	15.52	15.62	14.917	15.217								
M 24	3.00	22.70	22.62	22.80	20.752	21.382	M 16 x 1.50	15.30	15.26	15.38	14.376	14.751								
M 27	3.00	25.70	25.62	25.80	23.752	24.382	M 17 x 1.00	16.55	16.52	16.62	15.917	16.217								
M 30	3.50	28.50	28.40	28.60	26.211	26.921														
M 33	3.50	31.50	31.40	31.60	29.211	29.921														
M 36	4.00	34.30	34.17	34.40	31.670	32.420														
M 39	4.00	37.30	37.17	37.40	34.670	35.420														
M 42	4.50	40.10	39.95	40.20	37.129	37.979														

* M 2.5 x 0.35 up to M 4 x 0.35 tapping size hole of int. thread 6H

* M 2 up to M 2.5 tapping size hole of int. thread 6H

Tapping size hole diameter tolerance zone for thread forming (to DIN 13, section 50)

Due to the tensile strength it is not necessary to adhere to the tapping size hole diameter tolerance class 6H; tolerance class 7H satisfies the requirement that the flank coverage of external and internal threads should not fall below 0.32 x P. In addition, formed threads generally possess a higher tensile strength in comparison to cut threads thanks to an uninterrupted grain flow and subsequent work hardening.

**(Whitworth-) pipe thread G
DIN EN ISO 228-1**

nom. Ø	pitch	tapp. size hole Ø	tapp. size hole Ø		core Ø of int. thread	
			min. mm	max. mm	min. mm	max. mm
inch	per inch	mm	mm	mm	mm	mm
G 1/16	28	7.30	7.28	7.35	6.561	6.843
G 1/8	28	9.30	9.28	9.35	8.566	8.848
G 1/4	19	12.50	12.48	12.55	11.445	11.890
G 3/8	19	16.00	15.98	16.05	14.950	15.395
G 1/2	14	20.00	19.98	20.12	18.631	19.172
G 5/8	14	22.00	21.98	22.12	20.587	21.128
G 3/4	14	25.50	25.48	25.62	24.117	24.658
G 7/8	14	29.25	29.23	29.37	27.877	28.418
G 1	11	32.00	31.98	32.15	30.291	30.931
G 1 1/4	11	40.75	40.70	40.85	38.952	39.592

Technical section



TM SP – Thread milling cutter w/o countersink step



- simple and cost-efficient tool for the milling of internal threads
- 2-3 thread sizes with the same pitch can be produced over the specified nominal dimension
- application in materials $\leq 1000 \text{ N/mm}^2$
- available with or without internal cooling

Thread types: M, MF, UNC, UNF, G, NPT

TMCP SP – Thread milling cutter with 45° countersinking step



- countersinking and thread milling with only one tool
- very smooth running and low lateral forces
- designed for the application of difficult-to-machine materials also available w/o countersinking step
- 2-3 thread sizes with the same pitch can be produced over the specified nominal dimension
- only available with internal cooling

Thread types: M, MF, G

TMU SP – Universal milling cutter with collar recess



- universal application possibilities
- for various thread sizes with the same pitch, i.e. thread M30x1.5 with milling cutter $\varnothing 12 \times M1.5$, $\varnothing 16 \times M1.5$ or $\varnothing 20 \times M1.5$
- only available with internal cooling

Thread types: M, MF, G, UN, NPT and external thread M, MF, G

MTM 3 SP – Micro-thread milling cutter



- thread size and pitch are predetermined
- excellent characteristics with high-tensile materials such as titanium, stainless steel etc.
- suitable for the machining of hardened steel 45HRC - 65HRC
- threads up to 3xD
- available with or without internal cooling

Thread types: M, MF, G, UNC, UNF, MJ, UNJC, UNJF

MTMH3-Z – Helical drill thread milling cutter

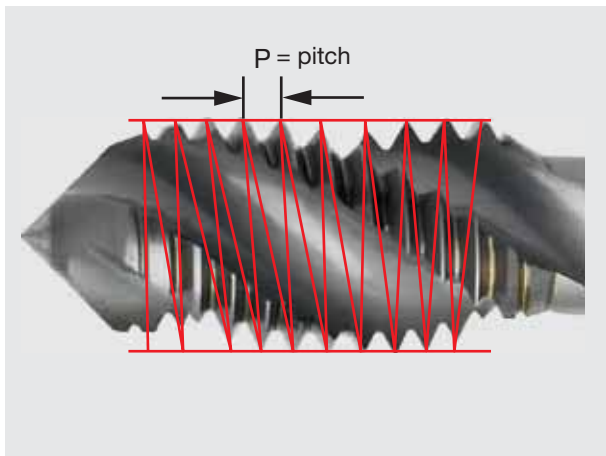


- core holes and threads in one step: significantly shorter cycle and setting time
- universally applicable in unhardened and hardened materials up to 66 HRC
- process reliability guaranteed
- with cooling grooves up to max. 2.5xD

Thread types: M, MF; G; UNC, UNF

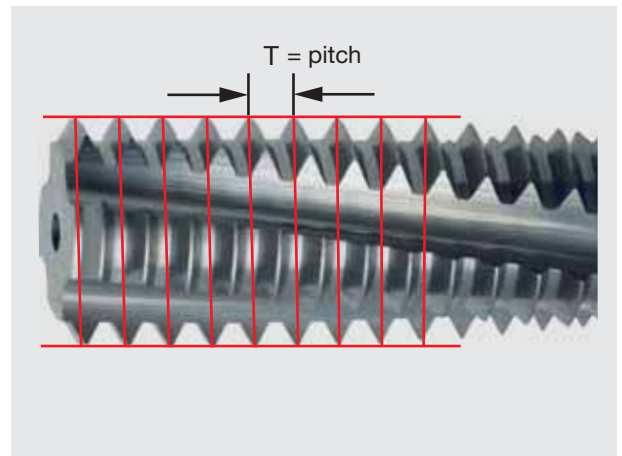
Difference between taps/fluteless taps and thread milling cutters

Taps/fluteless taps



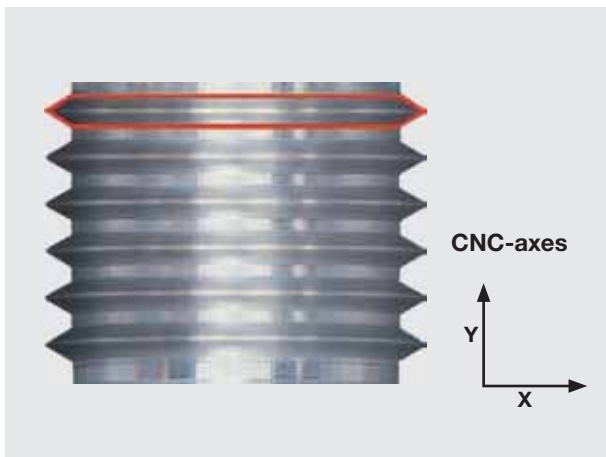
The red lines show the pitch angle of the thread that is ground into the tool. This means the pitch is cut into the workpiece by the tool.

Thread milling cutter

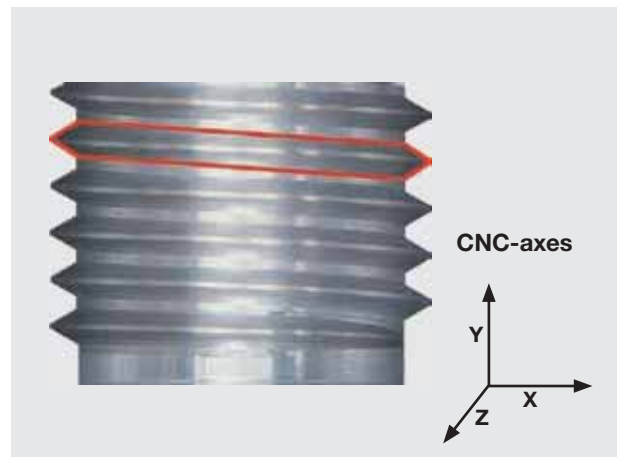


The red lines show that the tool does not possess a pitch angle. The pitch is produced by the Z-axis of a CNC machine.

Creation of the thread with thread milling



Thread profile without axial feed (Z-axis) of the machine. A groove profile is created without pitch. A functioning thread is not created.



Through the additional programming of the Z-axis the necessary pitch is produced.

Note:

Due to diagonal milling in the pitch angle (**Z-axis**) the thread profile of the tool is **transferred onto the component distorted**.

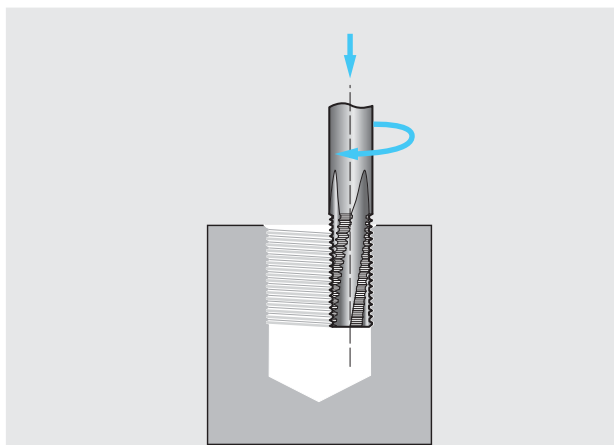
The more the milling cutter diameter (80 % of nom. Ø) approaches the nominal thread diameter and the higher the thread pitch the more pronounced the profile distortion is.



Differentiating between two milling processes

Conventional milling

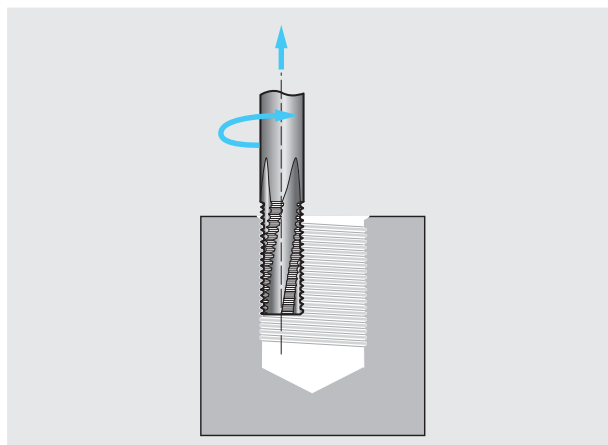
clockwise, with G02



Conventional milling is preferentially applied for the machining of harder materials or to remedy taper threads.

Climb milling

anticlockwise, with G03

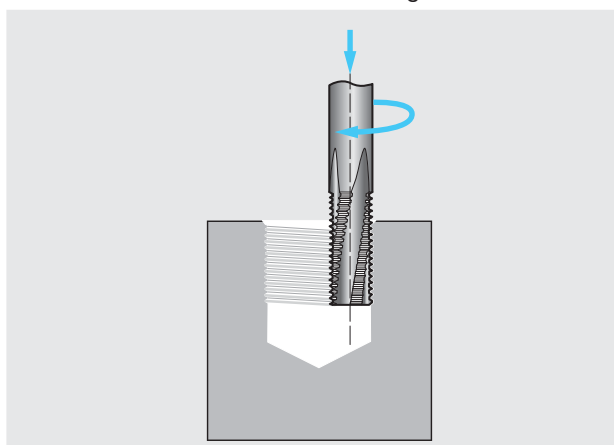


Climb milling is applied with thread depths smaller than $1.5 \times D$.
Advantage: A better surface finish is achieved.

Thread production with one tool

Right-hand thread

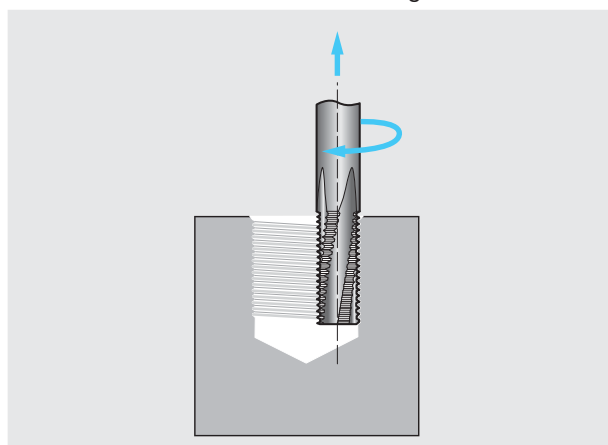
Conventional milling



Tool rotates clockwise from top to bottom

Left-hand thread

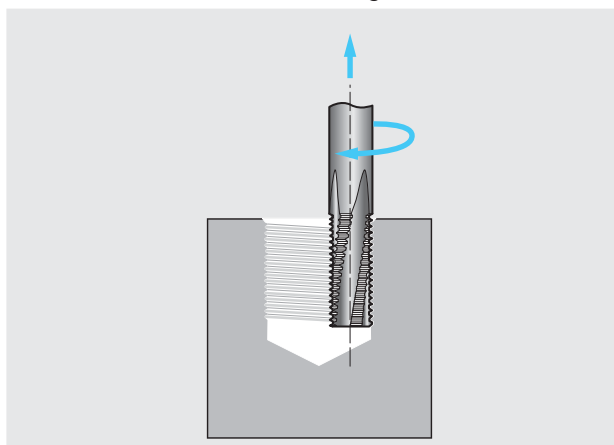
Conventional milling



Tool rotates clockwise from bottom to top

Right-hand thread

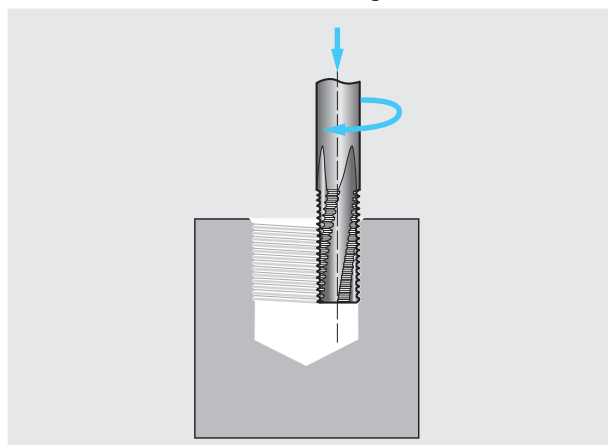
Climb milling



Tool rotates clockwise from bottom to top

Left-hand thread

Climb milling



Tool rotates clockwise from top to bottom

Thread milling programming

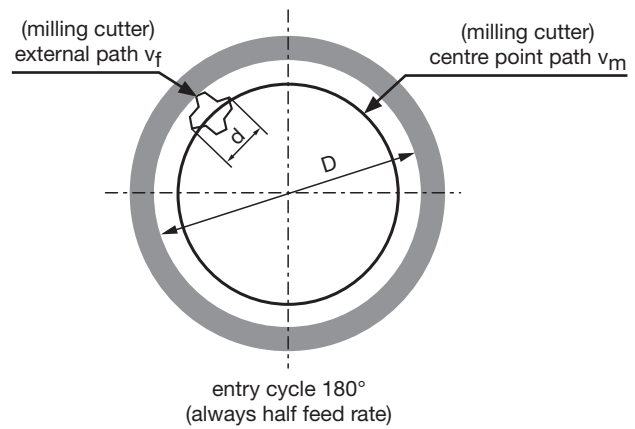
Program specifications

Thread milling functions

G00 Rapid movement	G90 Absolute dimension
G01 Feed	G91 Incremental dimension
G02 Circular interpolation (clockwise)	M03 Spindle on (clockwise rotation)
G03 Circular interpolation (anti-clockwise)	M05 Spindle stop
G17 Layer selection x-y axis	M08 Coolant on
G18 Layer selection z-x axis	X Axis
G19 Layer selection y-z axis	Y Axis
G40 Cancel tool correction	Z Axis
G41 Tool path correction (left of contour)	I Thread pitch parallel to X-axis
G42 Tool path correction (right of contour)	J Thread pitch parallel to Y-axis
G43 Tool length compensation (call-up)	S Spindle speed
G49 Tool length compensation (deselect)	F Feed
G54 Work offset	

CNC internal thread milling

1. Moving to start position
2. Moving to thread depth in bore
3. 180° descending loop to contour
4. 360° full circular movement of thread milling cutter
5. 180° exit loop to centre of bore
6. Rapid movement from bore to start position



Formula of calculation

$$v_c = \frac{d \cdot \pi \cdot n}{1000}$$

$$n = \frac{v_c \cdot 1000}{d \cdot \pi}$$

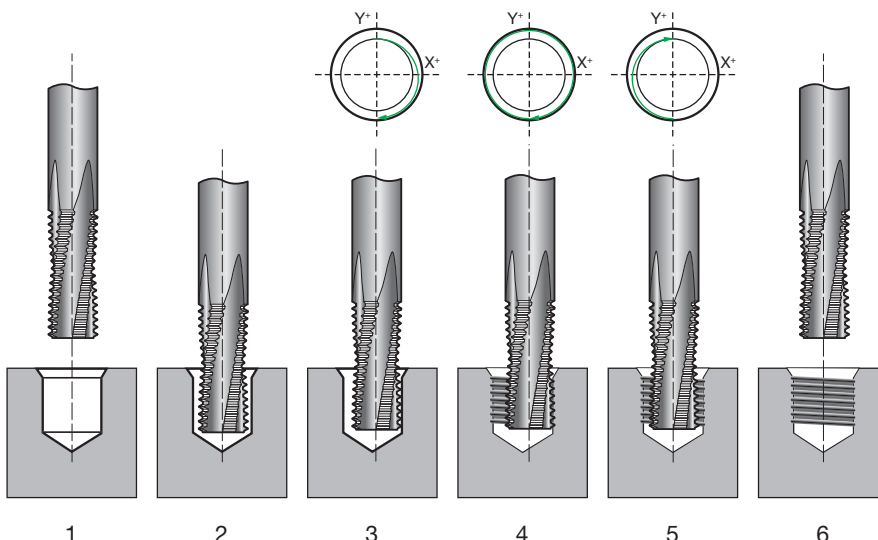
$$v_f = n \cdot z \cdot f_z$$

$$v_m = \frac{v_f \cdot (D - d)}{D}$$

$$v_b = n \cdot f_b$$

v_c = cutting speed
 v_f = contour feed
 v_m = centre point path feed
 n = revolutions
 z = number of teeth
 f_z = feed per tooth
 f_b = feed per drill per revolution*
 v_b = drill feed rate*
 D = Ø nom. of thread [mm]
 d = milling cutter nom. Ø [mm]
 * for drill/thread milling

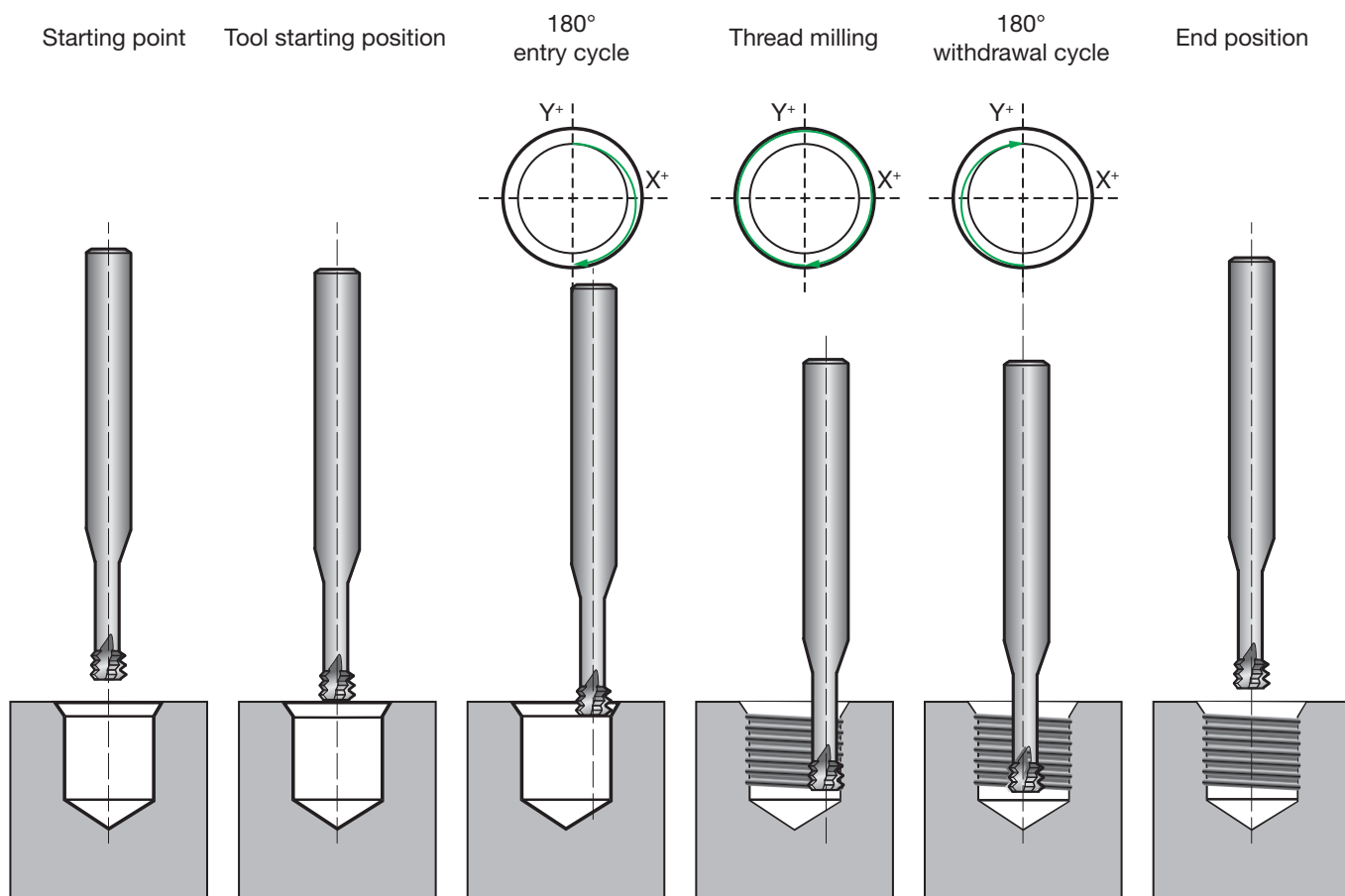
Technical section





Thread milling programming

Programming process for micro-thread milling (right-hand thread in reverse rotation)



Possibilities to reduce radial forces

To reduce radial forces cut distribution can be undertaken:

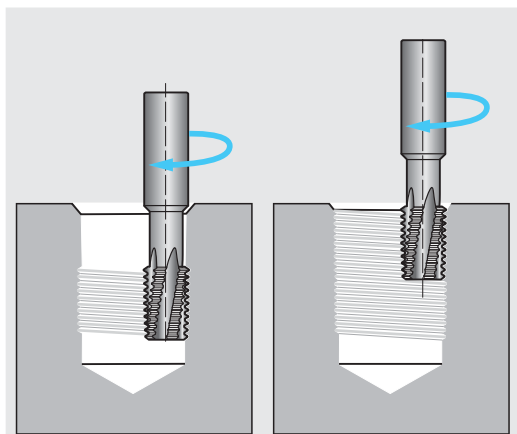
Advantage:

- for larger thread depths
- counteracts taper threads
- for unstable clamping conditions

Disadvantage:

- increased tool wear
- longer production time

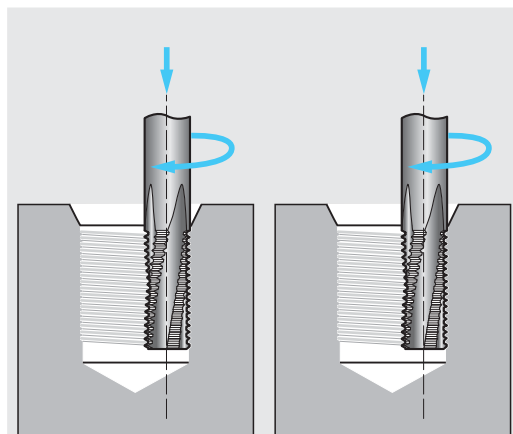
Axial distribution of cut



1st step

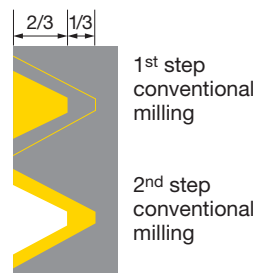
2nd step

Radial distribution of cut



1st step

2nd step



Technical section

Correct tool clamping also plays an essential role with thread milling. Thread milling cutters should as a rule be clamped as short as possible. A compact and mechanical clamping force is preferable. The error in concentricity should not exceed 0.02 millimetres.

Power chucks



max. permissible error in concentricity: 0.003 mm

A power chuck excels thanks to extremely accurate concentricity. The high clamping forces and optimal smooth running are a perfect prerequisite for the production of threads in all materials including a high pitch.

Side lock holders



max. permissible error in concentricity: 0.002 mm

A side lock holder for HB and HE shanks is a robust, cost-efficient clamping chuck with a maximum clamping force. The clamping surface prevents the tool twisting or being pulled out during machining. Therefore, side lock holders are suitable for the production in all materials including a high pitch.

Shrink fit chucks



max. permissible error in concentricity: 0.005 mm

A shrink fit chuck creates a rigid connection with the shrink fitted tool. Incorrect shrink fitting or older shrink fit chucks can result in the pulling out of the tool. Tool breakage and possible loss of the component would be the consequence. Therefore, the shrink fit chuck is only suitable for a thread pitch $< P=1.5$ mm.

Hydraulic chucks



max. permissible error in concentricity: 0.005 mm

A hydraulic chuck, similar to the shrink fit chuck, has only limited suitability for thread milling. Especially with high radial forces this clamping chuck reaches its limits. Therefore, the hydraulic chuck is recommended for softer materials such as aluminium and a thread pitch $< P=1.5$ mm.

Collet holders



max. permissible error in concentricity: 0.01 mm

Collet chucks are very well suited for micro-thread milling because only axial stresses are created. The low clamping forces only permit the milling of softer materials. Consequently, collet holders are not suitable for conventional thread milling.

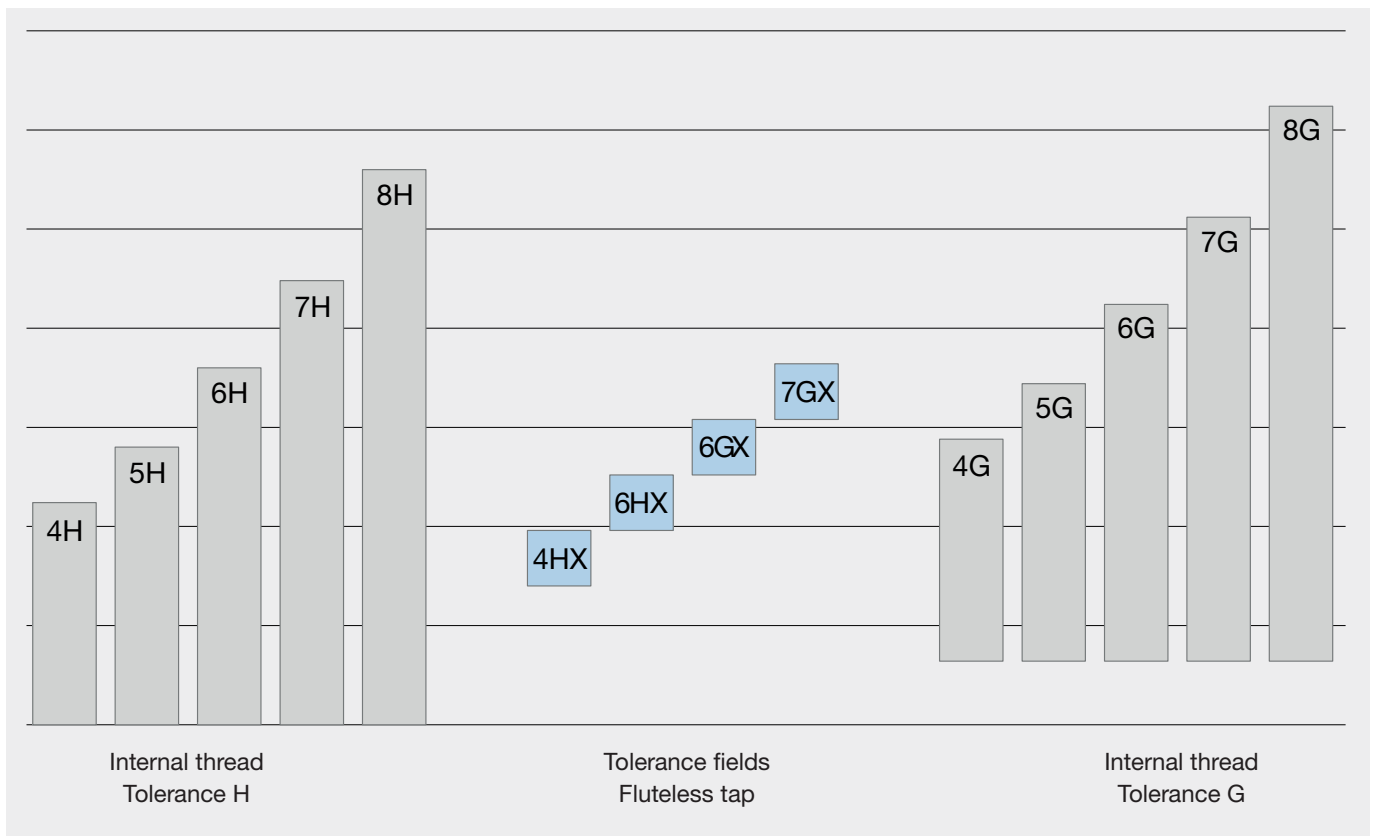
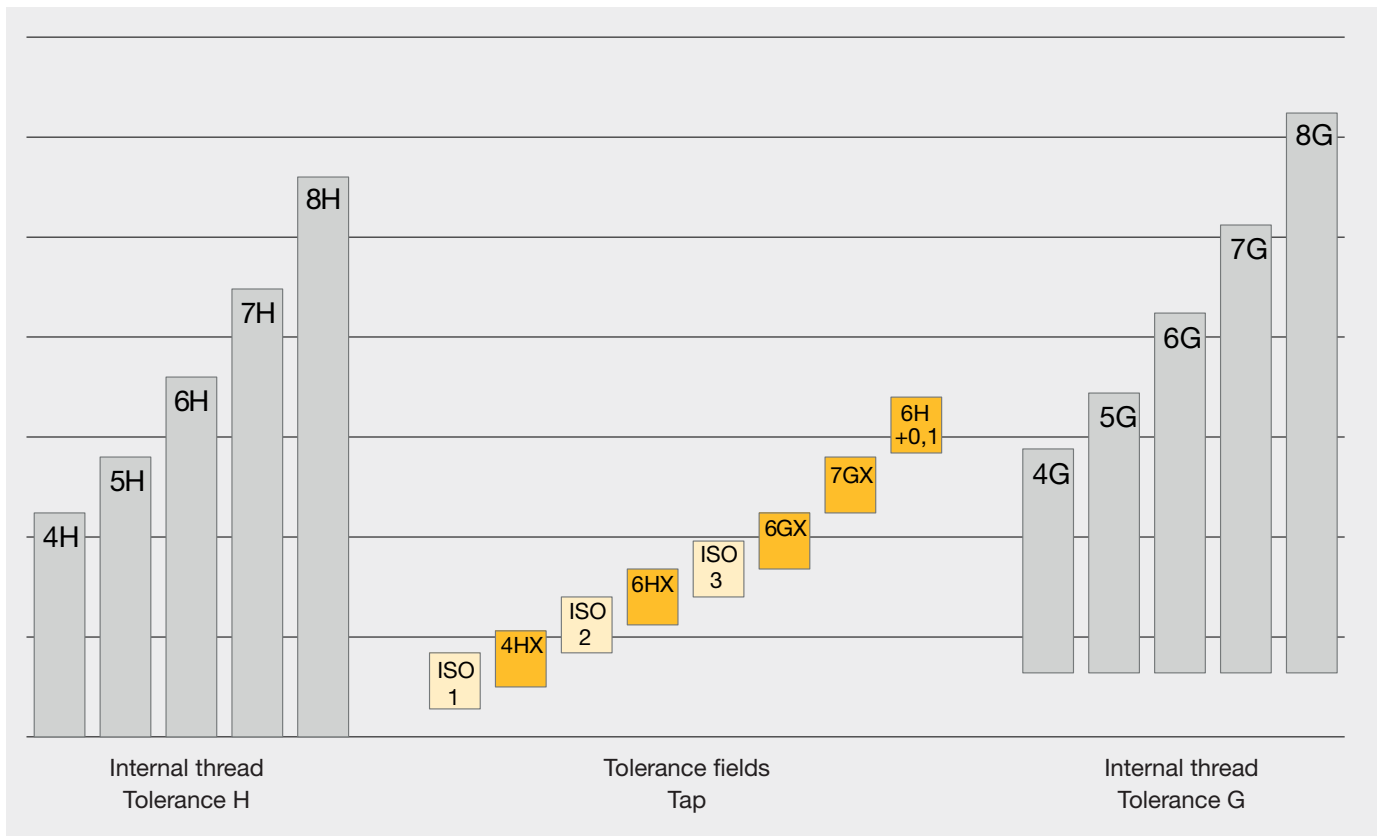


Geometry drawing	Standard	Application
M ISO-metric thread		
	DIN 13-1	General standard thread
G Cylindrical Pipe Thread without thread sealing connections		
	DIN EN ISO 228-1	Threads for pipes, pipe connections and fittings
Rc Whitworth pipe thread tapered internal thread		
	DIN ISO 10226-2 (hardly used in Europe, replaceable with pipe threads to ISO 7-1)	Internal thread for pipe threads and fittings (for in the thread sealing connections)

Geometry drawing	Standard	Application
MF ISO-metric fine thread		
	DIN 13-2 to DIN 13-11	General fine thread
NPT American Standard Pipe Threads tapered for sealing		
	ANSI/ASME B1.20.1	Pipe threads and fittings

- external thread
- internal thread
- play

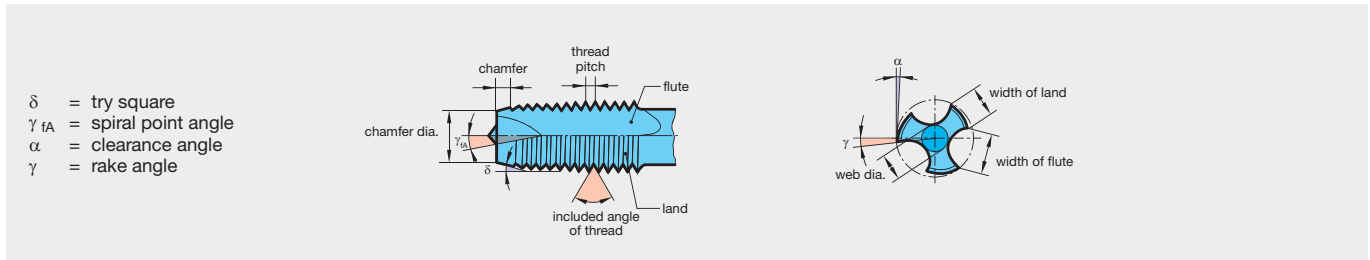
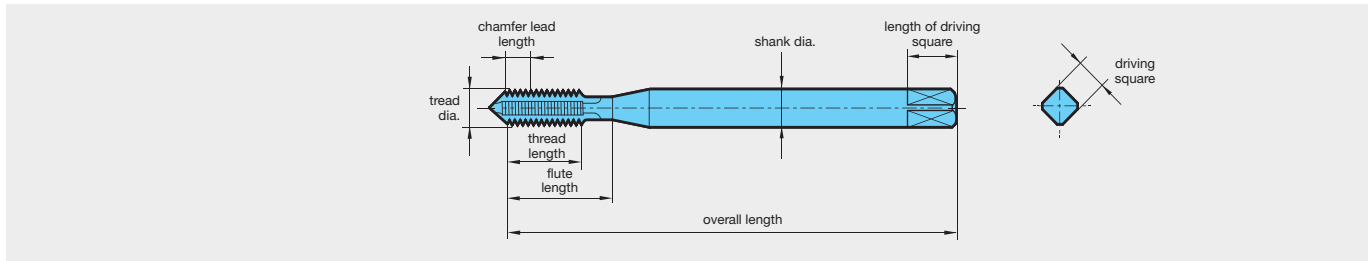
Tolerance fields to DIN EN 22857



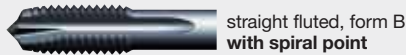
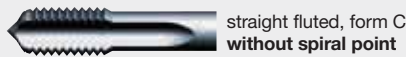
Technical section



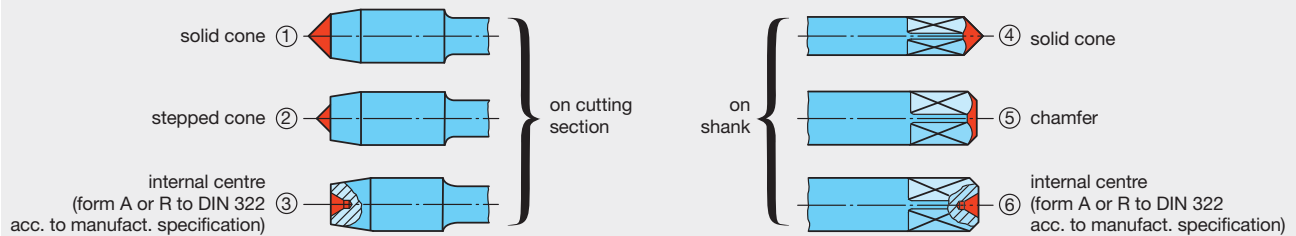
Definitions and angles, centres and flute forms



Flute forms



Types of centres (standard, to DIN 2197/DIN 2175)



Thread dia. range mm	Centre on cutting section		Centre on shank
	with chamfer forms A, C, D, E	with chamfer form B	
≤ 4.2	①	①	④⑤⑥
> 4.2 ... 5.6	①②	①	④⑤⑥
> 5.6 ... 10.0	①②③	①②③	④⑤⑥
> 10.0	③	③	⑥

Coolant duct geometries

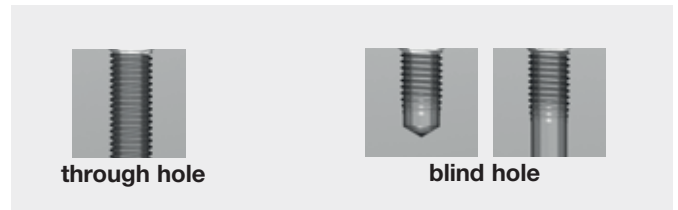


Chamfer forms, selection and application

When cutting internal threads, all the machining is carried out by the cutting teeth of the chamfer. Therefore, a decision on the best type of chamfer form has to be carefully made as both tool life and quality of thread are thereby greatly affected.

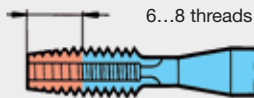
Generally speaking, the form and length of chamfer depend on the type of hole to be tapped. The tapping of through holes does not normally give rise to any difficulties whereas the production of blind holes can create certain problems associated with the need to evacuate swarf in the reverse direction to the feed, i.e. up to the flutes of the tap and then cut off such swarf when the tap is reversed out of the hole.

The length of chamfer is determined by taking into account various conflicting factors. To avoid overloading, premature bluntness and oversize threads the number of chamfer cutting threads must not be kept too low. A too long chamfer lead, however, increases the torque and thus the danger of breakage. The spiral point with form B ensures a chip removal always in the direction of feed.



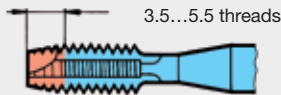
Chamfer forms to DIN 2197

Form A



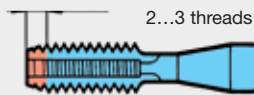
long, 6 - 8 threads
for short
through holes

Form B



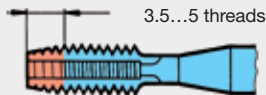
medium, 3.5 - 5.5 threads,
with spiral point,
for all through holes
and deep tapping holes in medium
and long-chipping materials

Form C



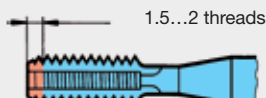
short, 2 - 3 threads
for blind holes
and generally for
aluminium, grey cast iron
and brass

Form D



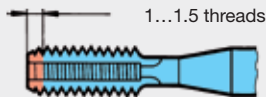
medium, 3.5 - 5 threads
for short
through holes

Form E



extremely short, 1.5-2 threads,
for blind holes with
extremely short thread runout.

Form F



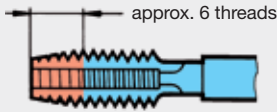
extremely short, 1-1.5 threads,
for blind holes with
extremely short thread runout.
Avoid use if possible.



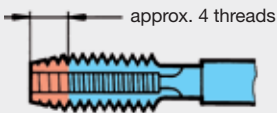
Chamfer forms, selection and application

Chamfer lead length for sets of 3 taps

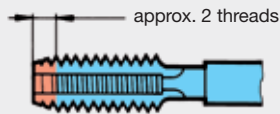
Form A
first tap



Form D
second tap

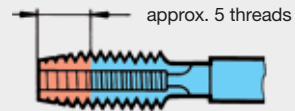


Form C
bottoming tap

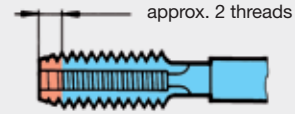


Chamfer lead length for sets of 2 taps

Form D
first tap



Form C
bottoming tap



Application recommendations

While in the first instance, the type of tapped hole required determines the chamfer, generally the tap geometry - i.e. form, number and direction of flutes, cutting angle, etc. - depend on the material to be machined and on the application. Basically, taps up to M16 for tapping ISO metric threads or for the engineering industry in general, have 3 flutes, and above this size 4 or more flutes.

Taps with left-hand flutes and taps with spiral points remove the chips in the cutting direction or direction of feed and are therefore especially suitable for tapping through holes. Taps with straight flutes and long chamfer lead (form D) also give good results.

As far as blind holes are concerned we recommend taps with right-hand spiral flutes or straight fluted taps with a short chamfer lead length. Tools with right-hand spiral flutes have the chip flow in the backward direction, i.e. up the flutes. The

chamfer lead length is designed in such a way so that during the return movement chips do not jam and are reliably sheared off.

The tapping of aluminium, grey cast iron and brass requires taps with a short chamfer lead length, regardless of whether through or blind holes are required. In these materials a long chamfer lead length would act as a core drill with chip breaker grooves and would only drill the tapping size hole to the major diameter instead of cutting a thread.

Straight fluted taps without spiral point are general purpose tools and have the disadvantage of not showing optimum results in particular materials. It's well worth the effort to take the trouble of ascertaining the most suitable tool for any given metal-cutting task.



Through hole



Blind hole



Straight fluted tap with spiral point



Right-hand spiral fluted tap



Left-hand spiral fluted tap



Straight fluted tap with short chamfer lead



Straight fluted tap with long chamfer lead

Thread production by pressure deformation

Fluteless taps are used for the forming of internal threads without chip removal. In contrast to conventional tapping where material is cut from the workpiece, thread forming is a pressure deformation process without chip removal for the production of internal threads. During the process the material is cold formed without interrupting the grain flow.

According to DIN 8583, thread forming is described as “pressing the thread into the workpiece with a tool possessing a spiral working area”. The spiral threaded, polygonal portion of the fluteless tap is “screwed” into the pre-drilled workpiece with an appropriate constant feed rate equal to the thread pitch. Hereby the thread profile is pressed gradually via the forming lead into the material of the workpiece so to speak. Subsequently, the pressure in the deformation zone exceeds the compression limit, the workpiece becomes ductile and is deformed. The material yields radially, “flows” along the thread profile in the unoccupied base of the tool and forms the minor diameter of the internal thread. The flow process creates the process specific form pockets (claws).

The tapping size hole diameter is heavily dependent on the formability of the material, the workpiece geometry and the required effective depth of the thread. In comparison to conventional tapping, a larger diameter tapping size hole should be selected. With a larger diameter tapping size hole the load on the tool is reduced whilst increasing the tool life. Thanks to the uninterrupted grain flow, the loading capacity of the thread remains sufficient with a 50% effective thread depth.

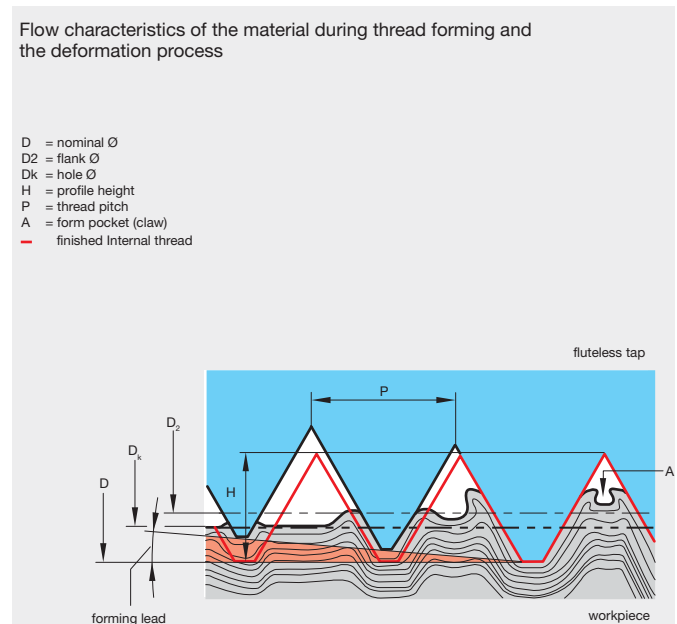
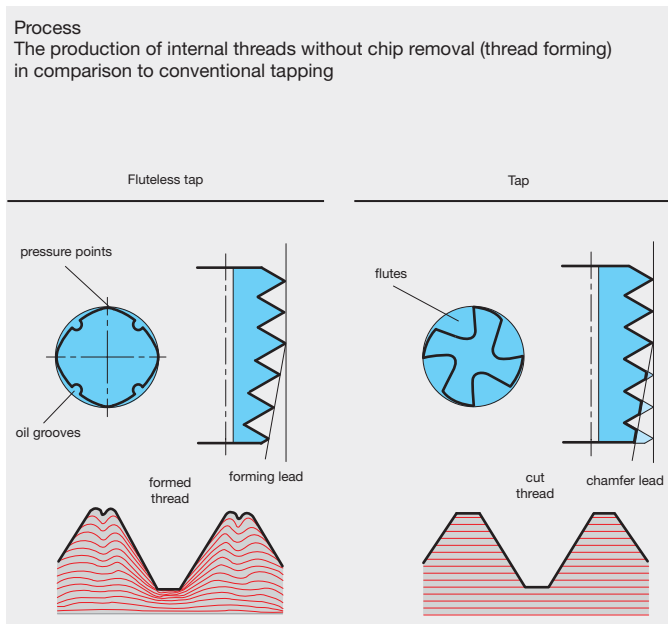
The partially formed crests of the thread with decreasing effective thread depth are a typical characteristic of threads produced by the thread forming process. With the flanks of the thread fully formed, they have no influence on the tensile strength of the thread. If necessary, the required deformation level of the thread should be determined by performing a test.

Lubrication is of significant importance. The lubrication prevents material from building up on the thread flanks and ensures that the necessary torque for the forming process is not too high. Therefore, under no circumstances should there ever be a break-down in lubrication! Preference should be given to lubricants such as cooling agents or oils containing graphite such as those used in rolling processes. Always follow the rule: “The better the lubrication the easier the thread forming process!”

It offers the following advantages

- no chip formation.
- one tool for the production of threads in through and blind holes.
- application in wide range of materials.
- no cutting errors.
- pitch and angle of thread errors that can occur with thread cutting are eliminated.
- internal threads produced by thread forming possess a higher tensile strength particularly at the thread flanks thanks to the so-called “uninterrupted grain flow” and the cold forming process.
- the surface of the thread is improved.
- fluteless taps can be applied at higher speeds because the formability of many materials increases with the forming speed. This does not have a negative effect on the tool life.
- reduced danger of breakage through rigid design

Technical section





“Profile“ – Gühring’s new fluteless tap generation

Characteristics and advantages

Conventional fluteless taps, produced by a grinding process only, show traces of microscopic, very fine grinding marks on the surface of the tool. This also applies to the threaded portion of the tool required to perform the thread forming operation.

This surface topography (structure) has a negative effect on the friction between the tool and the material to be re-formed as well as on the herewith associated heat development, on the necessary torque and last but not least on the wear of the pressure points of the fluteless tap. In addition, the “grinding marks” encourage the build-up of the material to be re-formed in the thread flanks of the fluteless tap. This is also called cold welding.

Thanks to a special process to improve the surface topography (structure), Gühring’s new Profile fluteless taps no longer possess these “grinding marks”. This has been confirmed in research and tool life studies in varying materials under production conditions.

For the user, a longer tool life and increased cutting speeds are the benefits of this special process. The tool life can be increased considerably depending on the material to be machined and the application conditions. A 100% increase in tool life is not unusual.

The improved surface topography is not only of benefit to tools with bright finish. Particularly coated tools also benefit from the new process. Outer contour and forming lead greatly determine the performance of the fluteless tap. Numerous tests have shown that fluteless taps with optimal pressure point geometry and quantity achieve increased tool life and dimensional accuracy.

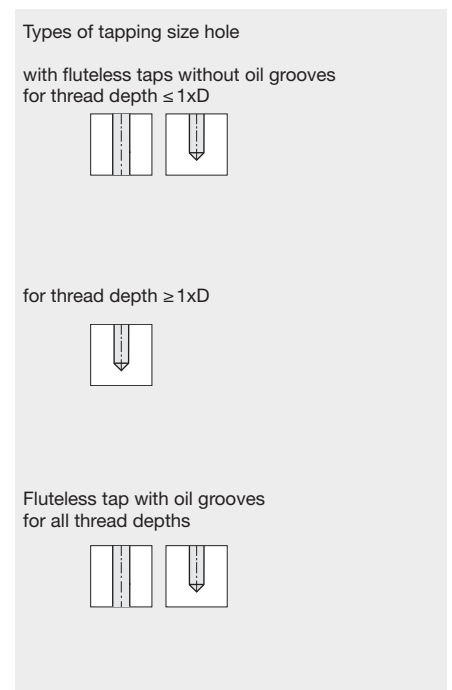
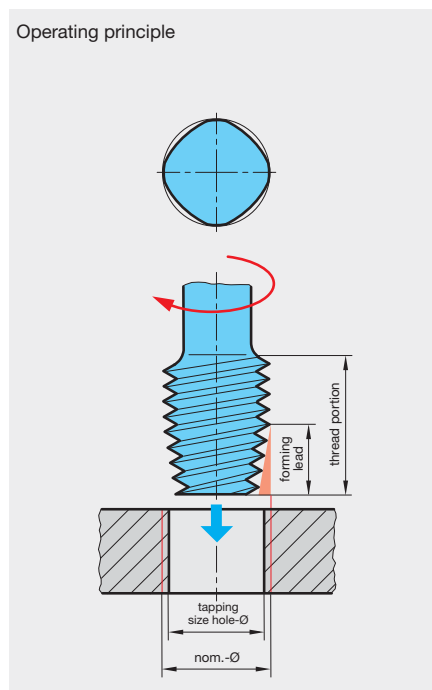
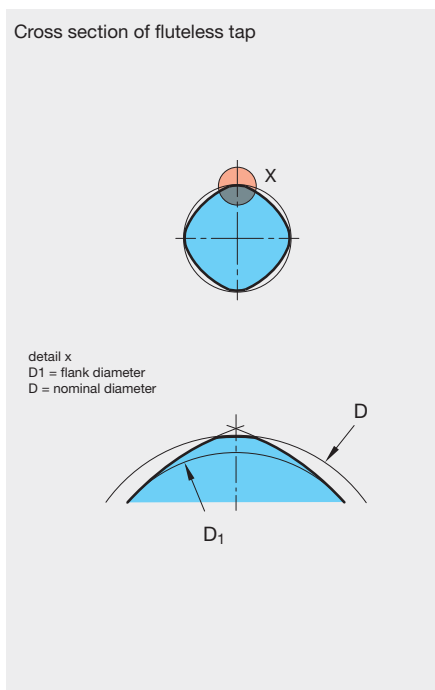
Further improvements in quality are achieved when the fluteless tap is produced completely in one setting and with one grinding wheel - set-up with a special roll. Pitch errors between the thread crests and former lead transition area do not occur as with the conventional grinding process.



Tooth of a conventional fluteless tap

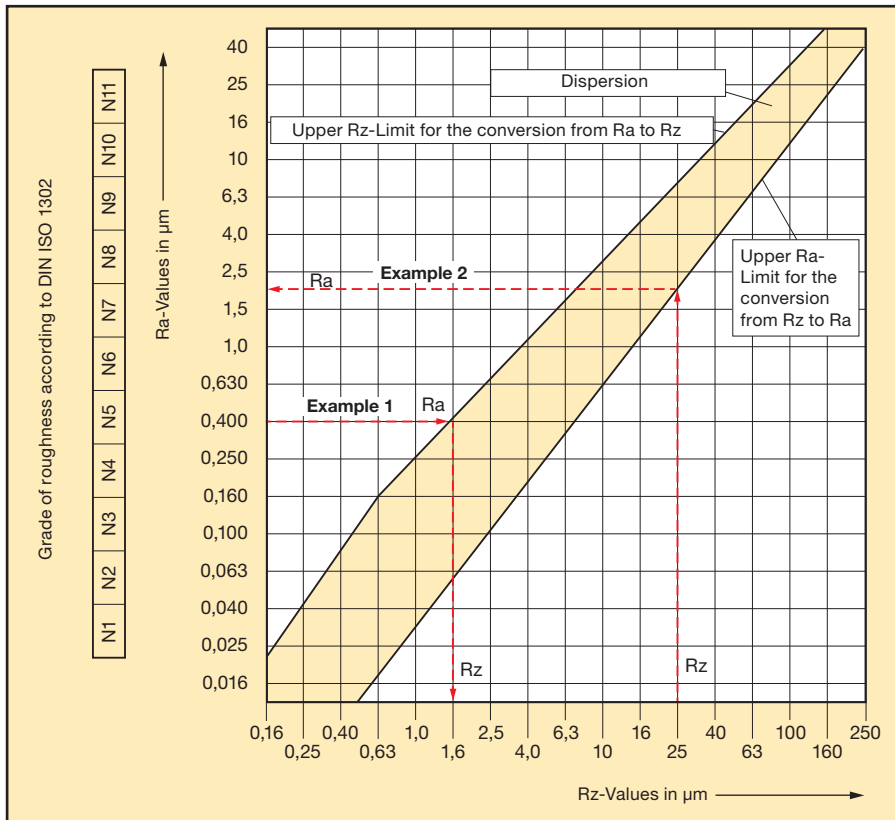


Optimised surface of a Gühring profile fluteless tap



Technical section

Conversion ratio to DIN 47



Example 1: R_a in R_z

When comparing the average roughness index $R_a = 0.4 \mu\text{m}$ to the average roughness R_z we achieve a value of $R_z = 1.6 \mu\text{m}$.

Example 2: R_z in R_a

When comparing the average roughness $R_z = 25 \mu\text{m}$ to the average roughness index R_a we achieve a value of $R_a = 2 \mu\text{m}$.

Optimal diameters of pre-drilled holes

Recommended stock allowance, in mm		up to Ø6	up to Ø10	up to Ø16	up to Ø25	up to Ø40	above Ø40
all materials:		Ø 0.1-0.2	Ø 0.2	Ø 0.2-0.3	Ø 0.3	Ø 0.3-0.4	Ø 0.4-0.5
hardened steel	H	up to 48 HRC	Ø 0.1-0.2	Ø 0.2	Ø 0.2	Ø 0.3	Ø 0.3
		up to 63 HRC	Ø 0.1	Ø 0.1	Ø 0.1-0.2	Ø 0.2	Ø 0.2

Example: Correcting off-set

Technical section

Ø 9.75

Ø 9.85 - Ø 9.90

min. 5.0 mm

With deep holes, deeper pilot drilling maybe necessary.

Off-set of pilot hole to reamer position
Correction with milling cutter or Hollfelder fine machining tool.

Ø 10 H7

The reamer follows the pilot setting and corrects the positioning error.



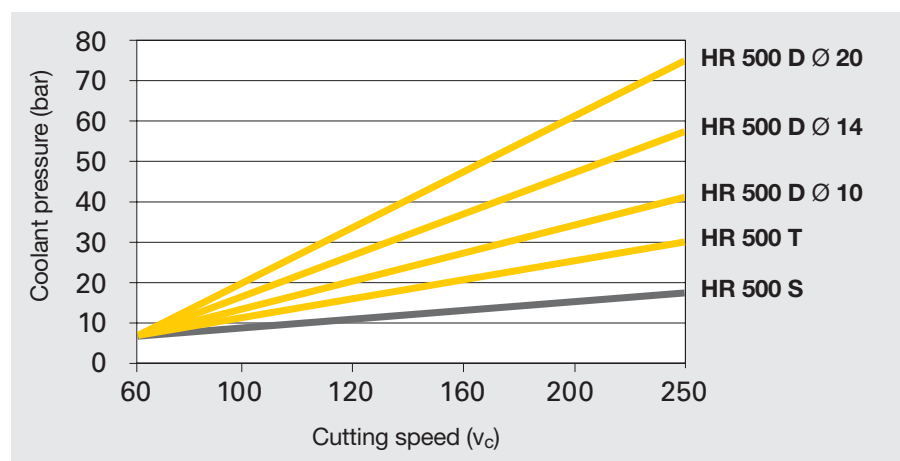
Achievable surface quality for reaming operations

Roughness classes		N11	N10	N9	N8	N7	N6	N5	N4	N3	N2	N1		
Average roughness R_a		25	12.5	6.3	3.2	1.6	0.8	0.4	0.2	0.1	0.05	0.025		
Average peak-to-valley height R_z		100	63	40	25	16	10	6.3	4	2.5	1.6	1	0.63	0.25
P	Struct. steel, low-alloyed steels: Case-hard. and heat-treat. steels													
M	Stainless steels Heat-resistant steels													
K	Grey cast iron, ferritic													
	Grey cast iron, pearlitic													
	Spheroidal graphite iron, ferritic													
	Spheroidal graphite iron, pearlitic													
N	Copper-alloy, brass													
	Aluminium wrought alloy													
	Aluminium cast alloy: Si-content < 10 %													
	Aluminium cast alloy: Si-content > 10 %													
S	Special alloy: Inconel													
	Titanium, titanium alloys													
H	Hardened steel < 45 HRC													
	Hardened steel > 45 HRC, <= 63 HRC													

achievable

limited achievability

Optimal cooling lubricant supply to HR 500



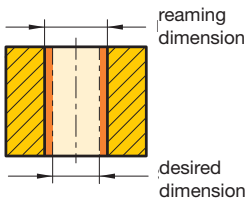
For an optimal cooling lubricant supply to HR 500 type D reamer cutting edges for through holes we recommend clamping in hydraulic or shrink fit chucks to the maximum clamping depth.

Adapted cutting speed, an appropriate feed rate and good cooling and lubricating agents should always be a top priority for reaming operations. A further point to be considered is that the reamer always follows the direction of the pre-drilled hole. An exception is the machine bottoming reamer or a very small reamer. Consequently reamers do not correct alignment errors of pre-drilled holes. Errors between the spindle axis and the axis of a pre-drilled hole can be adjusted with the aid of floating holders. The following fault finding chart will be found useful in tracing the cause of some common reaming problems.

Wording:

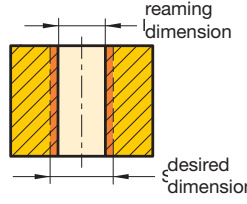
Desired dim. Required finish dimension of bore hole, defined as max./min. dimension of tolerance zone
Reaming dim. the finish dimension reached in fact
 „Bore hole“ The reached bore hole after reaming

1
Holes too large



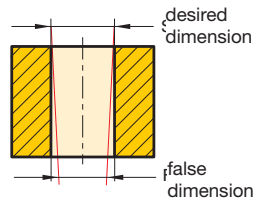
- Tool diameter too large
- Cutting speed too high
- Concentricity error of machine spindle
- Bevel lead of tool too short/uneven
- Cutting edge build up due to wrong cutting speeds oder schlechte Schmierung
- Lubricating agent unsuitable, holes too large due to lubrication

2
Holes too small



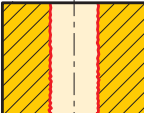
- Reamer blunt. Does not cut, scrapes
- Cutting speed too low
- Component is thin-walled, springs back
- Insufficient stock removal allowance, tool seizes in hole
- Hole is not round due to distortion

3
Conical hole malformation



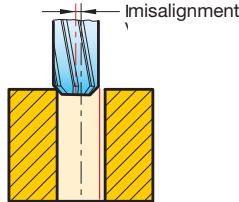
- Tool knocks in spindle
- Bevel lead incorrect
- Axis shifting between tool and pre-drilled hole. Application of floating holders
- Pre-machining inaccurate

4
Unsatisfactory surface finish




- Cutting speed too low
- No/insufficient lubrication. Cutting edge build-up.
- Tool damaged, i. e. broken cutting edge
- Material has a tendency to cause build up on cutting edges.
- Concentricity bevel lead incorrect
- Chip evacuation restricted

5
Misalignment of hole



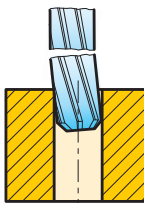
- Pre-drilled hole misaligned
- Concentricity bevel lead incorrect
- Apply floating holder if necessary
- If necessary pilot drill to correct pre-drilled position

6
Hole has chatter marks




- Feed too low
- Cutting edge build-up
- Grease content in coolant too low
- Circular lands too small
- Stock removal allowance insufficient
- Tool incorrectly clamped in tool holder
- Machine spindle not concentric

7
Reamer seizes and breaks



- Position to pilot hole incorrect
- Back taper incorrect
- Circular lands too wide
- Pre-drilled hole is too small
- Bevel lead blunt/ground unevenly
- Feed rate too high
- Chip congestion – increase feed rate to produce shorter chips

8
Feed scoring marks in hole

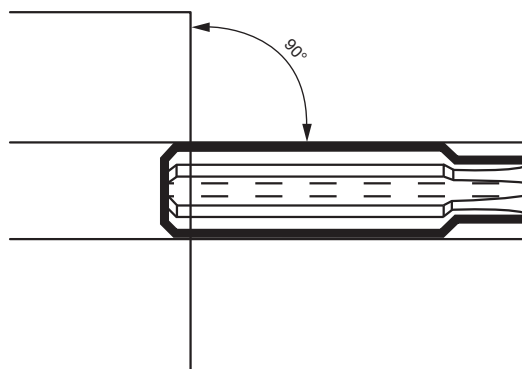


- Cutting speed too low
- Worn cutting edges
- Crumbling on cutting edges
- Build up on cutting edges
- Position to pilot hole incorrect
- Insufficient lubrication



Working with the HR 500 L and HR 500 XL reamers

Reamers can only be used if the hole entry is vertical without any interruptions:



The HR 500 L and HR 500 XL may only be used with a pilot hole.

The pilot hole should be at least 5 mm deep.

The pilot hole diameter should be 0.005 to 0.010 mm larger than the diameter of the reamer.

The pilot hole can be produced by turning, milling or with a pilot reamer.

The reamer is easier to insert if the pilot hole is countersunk.

The quality of the reaming is determined by the pre-machining. For better position accuracy, the pilot hole should be created by milling or turning with the shortest possible tool.

Drill the pilot hole (according to the previous page)

Approach with reduced rapid traverse.

Drill into the pilot hole:

$n = 500$ rpm anti-clockwise (M04)

$v_f = 300$ mm/min

The cooling medium is activated 0.5 mm before the bottom of the pilot hole.

The reamer's rotation direction is changed to clockwise (M03) and increased to the working speed.

The working feed rate is activated.

After reaching full reaming depth, pull out at $n = 500$ rpm and double the working feed rate.

Selection of carbide grades with specified strip thickness and tensile strength in the cutting and punching area

Tensile strength of the material	Strip thickness of the material			
	< 0.2	0.2 - 0.5	0.5 - 0.8	0.8 - 1.2
< 500	GC070S	GC070S	GC100S	GC100S
	GC100S	GC100S	GC060F	GC110MC
	GC060F	GC060F		
500 - 900	GC070S	GC070S	GC100S	GC110MC
	GC100S	GC100S	GC060F	
	GC060F	GC060F		
900 - 1400	GC100S	GC100S	GC100S	GC110MC
	GC060F	GC060F	GC110MC	
1400 - 2000	GC100S	GC110MC	GC150MC	GC200MC
	GC110MC	GC150MC	GC200MC	GC150EC
> 2000	GC150MC	GC200MC	GC200MC	
	GC200MC	GC150EC	GC150EC	
	GC150EC			

Grades with a C at the end are corrosion resistant.

Grade	Classification	Medium grain size [µm]	Medium grain size	Hardness
GC150EC	G30	8.00	extra coarse	1050
GC110MC	G20	2.50	medium	1310
GC150MC	G30	2.50	medium	1170
GC200MC	G40	2.50	medium	1020
GC060F	K15-K20	1.20	fine	1620
GC070S	K10	0.70	finest	1850
GC100S	K30-K40	0.60	finest	1620

1.2 - 1.5	1.5 - 2.0	2.0 - 3.0	3.0 - 6.0	6.0 - 10.0	> 10.0
GC110MC	GC110MC	GC110MC	GC110MC	GC150MC	GC200MC
			GC150MC	GC200MC	GC150EC
			GC200MC	GC150EC	
GC110MC	GC110MC	GC110MC	GC150MC	GC200MC	GC200MC
	GC150MC	GC150MC	GC200MC	GC150EC	GC150EC
	GC200MC	GC200MC	GC150EC		
GC110MC	GC150MC	GC150MC	GC200MC	GC200MC	
GC150MC	GC200MC	GC200MC	GC150EC	GC150EC	
GC200MC	GC150EC	GC150EC			
GC200MC	GC200MC				
GC150EC	GC150EC				

Bending strength [N/mm ²]	Density [g/cm ³]	WC incl. doping [%]	Co [%]	Fracture toughness K _{1c} [MPa*m ^{1/2}]
2800	14.00	85.0	15.0	*
2900	14.40	89.0	11.0	14.5
3000	14.00	85.0	15.0	*
3100	13.55	80.0	20.0	*
3200	14.95	94.0	6.0	9.9
3500	14.70	93.0	7.0	9.6
4100	14.45	90.0	10.0	10.6



ARTICLE NO. INDEX

7

Article no.	Page	Drilling depth	Standard	Description	Tool material	Type	Form
242	281	>25xD	Company std.	Extra length twist drills	HSS	GT 100	
243	282	>25xD	Company std.	Extra length twist drills	HSS	GT 100	
244	283	>25xD	Company std.	Extra length twist drills	HSS	GT 100	
336	274	~10xD	DIN 340	Long series twist drills	HSCO	GT 100	
390	286	~10xD	Company std.	Twist drills with coolant ducts	HSS	N	
393	357	3xD	DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA R45	C
394	364	3xD	DIN 374	Taps for ISO metric fine threads	HSS-E	VA R45	C
395	366	3xD	DIN 5156	Taps for BSP threads	HSS-E	VA R45	C
396	276	~10xD	DIN 340	Long series twist drills	HSCO	GT 100	
405	410		DIN 208	Machine reamers	HSS-E		B
413	412		DIN 206	Hand reamers	HSS		B
495	129		Company std.	Front/back deburrer 90°	Solid carbide	EW 100 VR	
515	267	~3xD	DIN 1897	Stub drills	HSS-E-PM	GT 500 DZ	
571	280	~25xD	DIN 1869	Extra length twist drills, series 3	HSCO	GT 100	
618	278	~15xD	DIN 1869	Extra length twist drills, series 1	HSCO	GT 100	
619	279	~20xD	DIN 1869	Extra length twist drills, series 2	HSCO	GT 100	
620	284	~15xD	DIN 1870	Extra length twist drills, series 1	HSCO	GT 100	
621	285	~20xD	DIN 1870	Extra length twist drills, series 2	HSCO	GT 100	
622	269	~5xD	DIN 338	Jobber drills	HSCO	GT 100	
1088	374	1.5xD	Company std.	Taps for NPT threads	HSS-E	N	C
1131	287	~5xD	Company std.	Twist drills with coolant ducts	HSCO	GT 80 IK	
1132	288	~5xD	Company std.	Twist drills with coolant ducts	HSCO	GT 80 IK	
1161	352	3xD	~DIN 371	Taps for ISO metric fine threads	Solid carbide	H	D
1201	354	1.5xD	DIN 371	Taps for ISO metric threads	HSS-E-PM	H	D
1411	406		~DIN 8094	Machine reamers	Carbide		B
1548	394		Company std.	High-performance reamers	Solid carbide	HR 500 TS	
1549	395		Company std.	High-performance reamers	Solid carbide	HR 500 TD	
1577	370	1.5xD	DIN 371	Taps for ISO metric threads	HSS-E-PM	H R15	C
1578	371	1.5xD	DIN 376	Taps for ISO metric threads	HSS-E-PM	H R15	C
1612	54, 264		Company std.	Torx screwdrivers			
1675	390		Company std.	High-performance reamers	Solid carbide	HR 500 S	
1676	392		Company std.	High-performance reamers	Solid carbide	HR 500 D	
1680	396		Company std.	High-performance reamers	Carbide	HR 500 G S	
1681	397		Company std.	High-performance reamers	Carbide	HR 500 G D	
1685	388		Company std.	High-performance reamers	Solid carbide	HR 500 S	
1686	389		Company std.	High-performance reamers	Solid carbide	HR 500 D	
1691	53		Company std.	Clamping screws for die sinking cutter holders			
1914	372	3xD	DIN 371	Taps for ISO metric threads	HSS-E	H	B
1915	373	3xD	DIN 376	Taps for ISO metric threads	HSS-E	H	B
1916	368	3xD	DIN 371	Taps for ISO metric threads	HSS-E	H R40	C
1917	369	3xD	DIN 376	Taps for ISO metric threads	HSS-E	H R40	C
1941	50		Company std.	Die sinking cutter holders GF 200 WP		GF 200	
1942	51		Company std.	Die sinking cutter holders GF 200 WP		GF 200	
1946	204	3xD	DIN 6537K	Twist drills with reinforced straight shank	Solid carbide	H	
1947	52		Company std.	Indexable inserts round	Cermet	GF 200	
2459	272	~5xD	DIN 338	Jobber drills	HSCO	GT 100	
2520	52		Company std.	Indexable inserts round	Solid carbide	GF 200	
2944	351	3xD	~DIN 371	Taps for ISO metric threads	Solid carbide	H	D
3030	46		Company std.	XL ball nose slot drills (2-fluted)	Solid carbide	N	
3043	49		Company std.	XL ball nose end mills (4-fluted)	Solid carbide	N	
3049	45		DIN 6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	B
3472	138		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	
3473	139		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	
3556	346		Company std.	Universal thread milling cutters for ISO metric threads	Solid carbide	TMU SP	
3557	347		Company std.	Universal thread milling cutters for BSP threads	Solid carbide	TMU SP	
3561	74		DIN 6527L	Slot drills with corner radius (2-fluted)	Solid carbide	N	A
3562	75		DIN 6527L	End mills with corner radius (4-fluted)	Solid carbide	N	A
3563	76		DIN 6527L	Multi-tooth end mills with corner radius GH 100 U	Solid carbide	NH	A
3599	136		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
3679	45		DIN 6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	A
3682	122		DIN 6527L	Hard roughing end mills GS 100 H (fine teeth)	Solid carbide	HR	B
3691	127		Company std.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3693	128		Company std.	Multi-tooth end mills GH 100 U	Solid carbide	NH	
3723	123		DIN 6527L	Roughing end mills GS 100 U (fine teeth)	Solid carbide	NRf	B
3727	47		DIN 6528	Ball nose end mills (4-fluted)	Solid carbide	N	
3743	343	2xD	Company std.	Thread milling cutters without chamfer for ISO metric threads	Solid carbide	TM SP	
3748	344	2xD	Company std.	Thread milling cutters without chamfer for BSP threads	Solid carbide	TM SP	
3754	345	2xD	Company std.	Thread milling cutters without chamfer for NPT threads	Solid carbide	TM SP	
3769	348		Company std.	Universal thread milling cutters for NPT threads	Solid carbide	TMU SP	
3837	112		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3838	112		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3839	113		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	N	

Article no.	Page	Drilling depth	Standard	Description	Tool material	Type	Form
3871	113		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	N	
3872	109		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	A
3873	109		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	B
3897	125		Company std.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
3898	125		Company std.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
4001	342	2.5xD	Company std.	Micro thread milling cutters	Solid carbide	SC-MTM3-SP	
4002	336	2.5xD	Company std.	Micro thread milling cutters	Solid carbide	MTMH3-Z	
4071	266		Company std.	Clamping screws			
4106	210	1.5xD	Company std.	Tool holders for interchangeable inserts HT 800		HT 800 WP	
4107	212	3xD	Company std.	Tool holders for interchangeable inserts HT 800		HT 800 WP	
4108	214	5xD	Company std.	Tool holders for interchangeable inserts HT 800		HT 800 WP	
4109	216	7xD	Company std.	Tool holders for interchangeable inserts HT 800		HT 800 WP	
4110	218	10xD	Company std.	Tool holders for interchangeable inserts HT 800		HT 800 WP	
4111	220		Company std.	Interchangeable inserts HT 800	Solid carbide	HT 800 WP	
4112	223		Company std.	Interchangeable inserts HT 800	Solid carbide	HT 800 WP	
4114	226		Company std.	Interchangeable inserts HT 800	Solid carbide	HT 800 WP	
4115	229		Company std.	Interchangeable inserts HT 800	Solid carbide	HT 800 WP	
4161	355	1.5xD	~DIN 371	Taps for ISO metric fine threads	HSS-E-PM	H	D
4208	479		Company std.	Extensions HPC			
4213	473		Company std.	ISO taper hydraulic chucks with increased clamping force			
4218	360	3xD	DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA	B
4219	365	1.5xD	DIN 374	Taps for ISO metric fine threads	HSS-E	VA	B
4220	367	1.5xD	DIN 5156	Taps for BSP threads	HSS-E	VA	B
4221	474		Company std.	MAS/BT hydraulic chucks with increased clamping force			
4226	340	3xD	Company std.	Micro thread milling cutters	Solid carbide	MTM3 SP	
4227	339	3xD	Company std.	Micro thread milling cutters	Solid carbide	MTMH3 SP	
4228	341	3xD	Company std.	Micro thread milling cutters	Solid carbide	MTM3 SP	
4229	232		Company std.	Interchangeable inserts HT 800	Solid carbide	HT 800 WP	
4232	491		DIN 69882-4	GÜHROJET HSK-A Weldon side lock holders			
4234	494		Company std.	GÜHROJET MAS/BT Weldon side lock holders			
4235	481		Company std.	Clamping sleeves for precision clamping chucks, sealed version			
4244	478		Company std.	MAS/BT precision clamping chucks			
4299	470		DIN 69882-7	HSK-A hydraulic chucks with increased clamping force			
4300	476		Company std.	HSK-A precision clamping chucks			
4301	477		Company std.	ISO taper precision clamping chucks			
4302	480		Company std.	GÜHROJET clamping sleeves, for precision clamping chucks			
4317	493		Company std.	GÜHROJET ISO taper Weldon side lock holders			
4364	501		Company std.	Adjustment screws "faces" for synchro tapping chucks with int. coolant		A/B	
4475	484		Company std.	HSK-E precision collet holders			
4476	483		Company std.	HSK-A precision collet holders			
4487	376		~DIN 371/~DIN 376	Fluteless taps for ISO metric threads	HSS-E-PM	N	C
4488	376		~DIN 371/~DIN 376	Fluteless taps for ISO metric threads	HSS-E-PM	N	C
4489	377		~DIN 374	Fluteless taps for ISO metric fine threads	HSS-E-PM	N	C
4490	377		~DIN 374	Fluteless taps for ISO metric fine threads	HSS-E-PM	N	C
4493	378		DIN 2189	Fluteless taps for BSP threads	HSS-E-PM	N	C
4496	338	2.5xD	Company std.	Micro thread milling cutters	Solid carbide	MTMH3 SP	
4525	498		Company std.	Straight shank hydraulic synchro tapping chucks for internal coolant			
4573	487		Company std.	Retaining nut for precision collet holders			
4574	485		Company std.	Precision collets for precision collet holders			
4575	486		Company std.	Precision collets for precision collet holders, sealed version			
4576	496		Company std.	ISO taper hydraulic synchro tapping chucks with internal coolant			
4577	497		Company std.	MAS/BT hydraulic synchro tapping chucks with internal coolant			
4596	469		Company std.	HSK-A hydraulic chucks, slim design 3°			
4597	472		Company std.	ISO taper hydraulic chucks, slim design 3°			
4598	475		Company std.	MAS/BT DC hydraulic chucks with axial plane			
4599	353	3xD	~DIN 371	Taps for BSP threads	Solid carbide	H	D
4601	495		Company std.	HSK-A hydraulic synchro tapping chucks with internal coolant			
4606	499		Company std.	GÜHROJET reduction bushes for hydraulic synchro tapping chucks			
4607	356	1.5xD	DIN 371	Taps for BSP threads	HSS-E-PM	H	D
4625	358		DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA R45	C
4626	358		DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA R45	C
4627	358		DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA R45	C
4628	364		DIN 374	Taps for ISO metric fine threads	HSS-E	VA R45	C
4633	359		Company std.	Taps for ISO metric threads	HSS-E	VA R45	C
4638	361		DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA	B
4639	361		DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA	B
4640	361		DIN 371/DIN 376	Taps for ISO metric threads	HSS-E	VA	B
4641	365		DIN 374	Taps for ISO metric fine threads	HSS-E	VA	B
4645	362		Company std.	Taps for ISO metric threads	HSS-E	VA	B
4683	375		DIN 5156	Taps for Rc (BSPT) threads	HSS-E-PM	H	C
4719	467		Company std.	Shrink fit extensions			
4729	463		Company std.	ISO taper shrink fit chucks GÜHROJET			

Article no.	Page	Drilling depth	Standard	Description	Tool material	Type	Form
4736	452		DIN 69882-8	HSK-A shrink fit chucks			
4737	458		Company std.	HSK-E shrink fit chucks			
4738	461		Company std.	ISO taper shrink fit chucks			
4739	464		Company std.	MAS/BT shrink fit chucks			
4755	455		Company std.	HSK-A shrink fit chucks GÜHROJET with peripheral cooling			
4770	349		Company std.	Universal thread milling cutters for Rc threads	Solid carbide	TMU SP	
4780	337	2.5xD	Company std.	Micro thread milling cutters	Solid carbide	MTMH3-Z	
4787	451		Company std.	Shrink fit chucks HSK-A, slim design 3°			
4788	460		Company std.	ISO taper shrink fit chucks, slim design 3°			
4789	457		Company std.	Shrink fit chucks HSK-E, slim design 3°			
4790	466		Company std.	MAS/BT DC shrink fit chucks with axial plane			
4915	263		Company std.	Torque wrenches		A	
4917	265		Company std.	Torx socket sets			
4966	262		Company std.	Torque wrenches set			
4981	490		Company std.	Torque wrenches			
4994	488		Company std.	Roller bearing wrenches for precision collet holders			
4995	489		Company std.	Roller bearing wrenches head for torque wrenches			
5164	244	GL1000	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5492	148		Company std.	PCD slot drills (2-fluted)	PCD	H	AX
5493	149		Company std.	PCD slot drills (2-fluted)	PCD	H	AX
5498	184	5xD	DIN 6537L	Ratio drills with coolant ducts	Solid carbide	RT 100 XF	
5499	190	7xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 XF	
5500	415		DIN 335	90° Countersinks, spiral-fluted	HSCO		C
5501	416		DIN 335	90° Countersinks, spiral-fluted	HSCO		C
5503	417		Company std.	90° Countersinks, spiral-fluted	HSS		C
5510	176	3xD	DIN 6537K	Ratio drills with coolant ducts	Solid carbide	RT 100 U	
5511	182	5xD	DIN 6537L	Ratio drills with coolant ducts	Solid carbide	RT 100 U	
5512	188	7xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 U	
5514	200	3xD	DIN 6537K	Ratio drills without coolant ducts	Solid carbide	RT 100 U	
5525	193	12xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 U	
5527	402		Company std.	NC machine reamers	Solid carbide		B
5534	110		DIN 6527K	Standard Ratio end mills RF 100 U	Solid carbide	N	B
5535	111		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	B
5538	418		DIN 335	90° Countersink sets, spiral-fluted	HSCO		C
5539	419		DIN 335	90° Countersink sets, spiral-fluted	HSCO		C
5578	131		Company std.	Chamfering milling cutters 90°	Solid carbide	N	
5579	131		Company std.	Chamfering milling cutters 90°	Solid carbide	N	
5582	114		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	N	
5639	237	20xD	Company std.	EB 80 single-fluted gun drills	Carbide	EB 80	
5640	238	30xD	Company std.	EB 80 single-fluted gun drills	Carbide	EB 80	
5641	239	40xD	Company std.	EB 80 single-fluted gun drills	Carbide	EB 80	
5642	241	80xD	Company std.	EB 80 single-fluted gun drills	Carbide	EB 80	
5646	234	25xD	Company std.	EB 100 M single-fluted gun drills	Solid carbide	EB 100 M	
5647	235	50xD	Company std.	EB 100 M single-fluted gun drills	Solid carbide	EB 100 M	
5648	236	75xD	Company std.	EB 100 M single-fluted gun drills	Solid carbide	EB 100 M	
5669	240	60xD	Company std.	EB 80 single-fluted gun drills	Carbide	EB 80	
5670	420		DIN 334	60° Countersinks, spiral-fluted	HSS		C
5671	421		DIN 334	60° Countersinks, spiral-fluted	HSS		C
5672	422		DIN 334	60° Countersink sets, spiral-fluted	HSS		C
5673	423		DIN 334	60° Countersink sets, spiral-fluted	HSS		C
5674	424		Company std.	82° Countersinks, spiral-fluted	HSCO		C
5675	425		Company std.	82° Countersinks, spiral-fluted	HSCO		C
5676	426		Company std.	82° Countersink sets, spiral-fluted	HSCO		C
5677	427		Company std.	82° Countersink sets, spiral-fluted	HSCO		C
5678	289		Company std.	90° NC spotting drills	HSCO	N	
5679	291		Company std.	120° NC spotting drills	HSCO	N	
5681	246	GL1400	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5682	248	GL1800	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5688	242	GL 600	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5691	243	GL 800	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5692	245	GL1200	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5693	247	GL1600	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5694	249	GL2000	Company std.	EB 80 XXL single-fluted gun drills	Carbide	EB 80 XXL	
5735	111		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	A
5747	251		Company std.	Drill bushes	HSS		
5748	250		Company std.	Drill bushes	Solid carbide		
5750	253		Company std.	Moulded steady rest bushings for single-fluted gun drills	Plastic		
5752	257		Company std.	Sealing disks for single-fluted gun drills	Plastic		
5766	261		Company std.	Sealing plugs	Steel		
5767	255		Company std.	Moulded steady rest bushings for single-fluted gun drills	Plastic		
5770	259		Company std.	Sealing disks for single-fluted gun drills	Plastic-metal		
5772	260		Company std.	Sealing disks for single-fluted gun drills	Plastic		

Article no.	Page	Drilling depth	Standard	Description	Tool material	Type	Form
6013	130		Company std.	Front/back deburrer 90°, sets	Solid carbide	EW 100 VR	
6016	400		Company std.	NC machine reamers	Solid carbide		B
6017	401		Company std.	NC machine reamers	Solid carbide		B
6018	404		Company std.	NC machine reamers	Solid carbide		B
6019	407		DIN 212-3	NC machine reamers	HSS-E		B
6020	408		DIN 212-3	NC machine reamers	HSS-E		B
6027	290		Company std.	90° NC spotting drills	Solid carbide	N	
6028	292		Company std.	120° NC spotting drills	Solid carbide	N	
6029	293		Company std.	142° NC spotting drills	Solid carbide	N	
6400	205	4xD	Company std.	ExclusiveLine micro-precision drills without coolant ducts	Solid carbide	N	
6401	206	7xD	Company std.	ExclusiveLine micro-precision drills without coolant ducts	Solid carbide	N	
6405	207	5xD	Company std.	ExclusiveLine micro-precision drills with coolant ducts	Solid carbide	N	
6408	208	8xD	Company std.	ExclusiveLine micro-precision drills with coolant ducts	Solid carbide	N	
6412	209	15xD	Company std.	ExclusiveLine micro-precision drills with coolant ducts	Solid carbide	N	
6478	105		Company std.	Ratio end mills RF 100 Sharp	Solid carbide	N	
6479	105		Company std.	Ratio end mills RF 100 Sharp	Solid carbide	N	B
6480	106		Company std.	Ratio end mills RF 100 Sharp	Solid carbide	N	
6481	106		Company std.	Ratio end mills RF 100 Sharp	Solid carbide	N	B
6498	178	3xD	DIN 6537K	Ratio drills with coolant ducts	Solid carbide	RT 100 XF	
6509	195	15xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 T	
6511	196	20xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 T	
6512	197	25xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 T	
6513	198	30xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 T	
6514	199	40xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 T	
6702	138		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6703	139		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6707	48		DIN 6527L	Ratio end mills RF 100 VA	Solid carbide	N	A
6708	48		DIN 6527L	Ratio end mills RF 100 VA	Solid carbide	N	B
6709	124		Company std.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
6710	124		Company std.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
6716	95		~DIN 6527L	Pilot end mills RF 100 P	Solid carbide	NH	A
6721	147		Company std.	Slot drills XL (3-fluted)	Solid carbide	N	
6722	145		DIN 6527L	Slot drills with corner radius (2-fluted)	Solid carbide	N	A
6723	146		DIN 6527L	End mills with corner radius (4-fluted)	Solid carbide	N	A
6724	143		DIN 6527L	Ball nose slot drills (2-fluted)	Solid carbide	N	A
6725	144		Company std.	Ball nose end mills (4-fluted)	Solid carbide	N	
6726	108		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	N	A
6727	126		Company std.	Ratio end mills Superfinish RF 100 SF	Solid carbide	NH	
6728	107		~DIN 6527L	Standard Ratio end mills RF 100 U (3-fluted)	Solid carbide	N	
6729	136		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6730	140		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6731	140		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6732	141		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6733	141		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6734	142		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6735	142		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	A
6736	94		DIN 6527L	Ratio end mills RF 100 Diver	Solid carbide	NH	B
6737	94		DIN 6527L	Ratio end mills RF 100 Diver	Solid carbide	NH	A
6760	99		Company std.	Ratio end mills RF 100 Speed M	Solid carbide	NH	B
6761	100		Company std.	Ratio end mills RF 100 Speed M	Solid carbide	NH	B
6765	99		Company std.	Ratio end mills RF 100 Speed M	Solid carbide	NH	A
6766	100		Company std.	Ratio end mills RF 100 Speed M	Solid carbide	NH	A
6767	115		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	NH	A
6768	115		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	NH	B
6784	132		Company std.	Chamfering milling cutters 90°	Solid carbide	H	
6785	132		Company std.	Chamfering milling cutters 90°	Solid carbide	H	
6786	133		Company std.	90° Chamfering milling cutters SpyroTec	Solid carbide	N	
6787	133		Company std.	90° Chamfering milling cutters SpyroTec	Solid carbide	N	
6797	92		~DIN 6527L	Ratio end mills RF 100 Diver (3-fluted)	Solid carbide	NH	
6798	92		~DIN 6527L	Ratio end mills RF 100 Diver (3-fluted)	Solid carbide	NH	
6803	93		DIN 6527K	Ratio end mills RF 100 Diver	Solid carbide	N	
6804	93		DIN 6527K	Ratio end mills RF 100 Diver	Solid carbide	N	
6808	90	2.5xD	Company std.	Ratio end mills RF 100 Microdiver	Solid carbide	NH	
6809	91	5xD	Company std.	Ratio end mills RF 100 Microdiver	Solid carbide	NH	
6814	72		Company std.	High feed end mills G-Mold 65 HF	Solid carbide	H	
6815	29		Company std.	Ball nose end mills G-Mold μ 65 B	Solid carbide	H	
6816	30		Company std.	Ball nose end mills G-Mold μ 65 B	Solid carbide	H	
6817	31		Company std.	Ball nose end mills G-Mold μ 65 B	Solid carbide	H	
6818	32		Company std.	Ball nose end mills G-Mold μ 65 B	Solid carbide	H	
6819	33		Company std.	Ball nose end mills G-Mold μ 65 B	Solid carbide	H	
6820	55		Company std.	Torus end mills G-Mold μ 65 T	Solid carbide	NH	
6821	56		Company std.	Torus end mills G-Mold μ 65 T	Solid carbide	NH	

Article no.	Page	Drilling depth	Standard	Description	Tool material	Type	Form
6822	57		Company std.	Torus end mills G-Mold μ 65 T	Solid carbide	N	
6823	58		Company std.	Torus end mills G-Mold μ 65 T	Solid carbide	N	
6824	59		Company std.	Torus end mills G-Mold μ 65 T	Solid carbide	N	
6825	78		Company std.	Finishing end mills G-Mold μ 48 F	Solid carbide	NH	
6826	79		Company std.	Finishing end mills G-Mold μ 48 F	Solid carbide	NH	
6827	80		Company std.	Finishing end mills G-Mold μ 65 F	Solid carbide	H	
6828	81		Company std.	Finishing end mills G-Mold μ 65 F	Solid carbide	H	
6829	88		Company std.	Micro-precision milling cutters MicroMill μ 55	Solid carbide	N	
6830	71		Company std.	High feed end mills G-Mold 65 HF	Solid carbide	H	
6831	73		Company std.	High feed end mills G-Mold 65 HF	Solid carbide	H	
6832	34		Company std.	Ball nose end mills G-Mold 65 B	Solid carbide	H	
6833	35		Company std.	Ball nose end mills G-Mold 65 B	Solid carbide	H	
6834	36		Company std.	Ball nose end mills G-Mold 65 B	Solid carbide	N	
6835	37		Company std.	Ball nose end mills G-Mold 65 B	Solid carbide	H	
6836	38		Company std.	Ball nose end mills G-Mold 65 B	Solid carbide	H	
6837	60		Company std.	Torus end mills G-Mold 65 T	Solid carbide	H	
6838	62		Company std.	Torus end mills G-Mold 65 T	Solid carbide	NH	
6844	39		Company std.	Ball nose end mills G-Mold 55 B	Solid carbide	N	
6845	40		Company std.	Ball nose end mills G-Mold 55 B	Solid carbide	N	
6846	41		Company std.	Ball nose end mills G-Mold 55 B	Solid carbide	N	
6847	42		Company std.	Ball nose end mills G-Mold 55 B	Solid carbide	N	
6848	43		Company std.	Ball nose end mills G-Mold 55 B	Solid carbide	N	
6849	44		Company std.	Ball nose end mills G-Mold 55 B	Solid carbide	N	
6850	63		Company std.	Torus end mills G-Mold 55 T	Solid carbide	NH	
6851	65		Company std.	Torus end mills G-Mold 55 T	Solid carbide	NH	
6852	67		Company std.	Torus end mills G-Mold 55 T	Solid carbide	NH	
6853	68		Company std.	Torus end mills G-Mold 55 T	Solid carbide	NH	
6854	69		Company std.	Torus end mills G-Mold 55 T	Solid carbide	N	
6855	70		Company std.	Torus end mills G-Mold 55 T	Solid carbide	N	
6858	101		Company std.	Ratio end mills RF 100 5 Speed	Solid carbide	N	
6859	101		Company std.	Ratio end mills RF 100 5 Speed	Solid carbide	N	B
6860	102		Company std.	Ratio end mills RF 100 5 Speed	Solid carbide	N	
6861	102		Company std.	Ratio end mills RF 100 5 Speed	Solid carbide	N	B
6881	118		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	HF	
6882	118		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	HF	B
6883	119		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
6884	119		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
6885	120		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
6886	120		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	HF	
6889	121		DIN 6527L	High-performance roughing end mills RS 100 F	Solid carbide	NF	
6890	121		DIN 6527L	High-performance roughing end mills RS 100 F	Solid carbide	NF	B
6943	86		DIN 6527L	Ratio end mills G-Mold 65 U	Solid carbide	H	B
6944	86		DIN 6527L	Ratio end mills G-Mold 65 U	Solid carbide	H	B
6945	82		Company std.	Finishing end mills G-Mold 65 F	Solid carbide	H	
6946	83		Company std.	Finishing end mills G-Mold 65 F	Solid carbide	H	
6947	84		Company std.	Finishing end mills with corner radius G-Mold 65 FR	Solid carbide	H	
6948	85		Company std.	Finishing end mills with corner radius G-Mold 65 FR	Solid carbide	H	
6958	96		Company std.	Ratio end mills RF 100 Speed P	Solid carbide	NH	
6959	96		Company std.	Ratio end mills RF 100 Speed P	Solid carbide	NH	B
6960	97		Company std.	Ratio end mills RF 100 Speed P	Solid carbide	NH	
6961	97		Company std.	Ratio end mills RF 100 Speed P	Solid carbide	NH	B
6964	103		DIN 6527L	Ratio end mills RF 100 iMill	Solid carbide	N	
6965	103		DIN 6527L	Ratio end mills RF 100 iMill	Solid carbide	N	B
6969	77		DIN 6527L	Multi-tooth end mills GH 100 U	Solid carbide	NH	
6970	116		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	HRf	
6971	116		DIN 6527L	Standard Ratio end mills RF 100 U	Solid carbide	HRf	B
6972	117		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	HRf	
6973	117		Company std.	Standard Ratio end mills RF 100 U	Solid carbide	HRf	B
6978	137		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6979	137		Company std.	Ratio end mills Alu RF 100 A	Solid carbide	W	
6984	135		Company std.	Ball nose end mills GA 200 A	Solid carbide	W	
6992	134		Company std.	90° Chamfering milling cutters SpyroTec	Solid carbide	N	
6993	134		Company std.	90° Chamfering milling cutters SpyroTec	Solid carbide	N	
8520	180	3xD	DIN 6537K	Ratio drills with coolant ducts	Solid carbide	RT 100 HF	
8521	186	5xD	DIN 6537L	Ratio drills with coolant ducts	Solid carbide	RT 100 HF	
8522	192	7xD	Company std.	Ratio drills with coolant ducts	Solid carbide	RT 100 HF	
8524	202	3xD	DIN 6537K	Ratio drills without coolant ducts	Solid carbide	RT 100 HF	
9000	294	~5xD	DIN 338	Jobber drills	HSCO	GU 3FS	
9001	295	~5xD	DIN 338	Twist drill sets	HSCO	GU 3FS	







ISO codes

P	Steel, high-alloyed steel
M	Stainless steel
K	Grey cast iron, spheroidal graphite iron and malleable cast iron
N	Aluminium and other non-ferrous metals
S	Special, super and titanium alloys
H	Hardened steel and chilled cast iron

On the programme pages you will find for every tool recommendations regarding suitability for the application groups and details of max. tensile strength and hardness.

- optimal suitability
- limited suitability

Surfaces

- | | | | | | |
|------------------------|-----------------|-----------------|---------------------|-------------------------|----------------------|
| P AlCrN | ○ bright | Cb Carbo | D Cristall C | X Durox | ● nitrided lands |
| F FIRE/nanoFIRE | X Perrox | R Raptor | Y Signum | A TiAlN | a TiAlN nanoA |
| A TiAlN SuperA | C TiCN | ● TiSiN | S TiN | Ni nickel-plated | |

Pictograms

Tool material	VHM Solid carbide	HM Carbide	HSS High-speed steel	HSCO	HSS-E	HSS-E-PM	Cermet Cermet	PKD Polycrystalline diamond														
Machining depth	3xD	5xD	7xD	8xD	10xD	12xD	15xD	20xD	25xD	80xD	~5xD	~10xD	>25xD	GL 600	GL 1200	GL 2000	...					
Tolerance on Ø	m7	h5	h6	h7	H7	h8	ISO2/6H	6HX	ISO3/6G	6GX	7GX	6H +0,1	±0,015	+0,004 +0,005								
Shank form	HA to DIN 6535	HB	HE	B	-HA	Cyl cylindrical	MK Morse taper	3 3-flats on shank	TBM-SEH Standard groove rear													
Standard	DIN 208	DIN 338	DIN 340	DIN 371	DIN 376	DIN 371/376	DIN 1897	DIN 6527K	DIN 6527L	DIN 6537K	DIN 6537L	DIN 5156	DIN 6528	~DIN 8094	WN to Gühring Standard							
Type	N	H	W	VA	NRf	RT 100 HF	RT 100 U	RT 100 T	RT 100 XF	GU 3FS	GT 500 DZ	EB 80 XXL	HT 800 WP	MTMH3-Z	TM SP	EW 100 VR	...					
Internal coolant	with internal coolant		without internal coolant																			
Cutting direction	right-hand																					
Hole type	Through-hole threads		Blind-hole threads		Through-hole and blind-hole threads																	
Form	B	C	D																			
Application	Slotting	Roughing	Ramping	Helix	Drilling	Finishing	Copying															
Length	short (DIN)		long (DIN)		medium length			extra length														
No. of cutting edges	2	3	4	5	6	6+	2-4	3-4	4-5	5-6	...	Spacing		unequal	extremely unequal							
Helix angle	2-4°	0°	7°	20°	30°	45°	35° 38°	36° 38° 37°	40° 42°	44° 45° 46°	...	straight-fluted		left-hand helix								
Rake angle	-2°	-3°	-7°	0°	3°	4°	7°	9°	10°	12°	...	Rake angle of circumference cutting edges										
Cutting edge form	45°	R±0,01		R±0,02		R±0,01	R±0,03	R±0,05	...	90°		Chamfer end mill angles					82°	120°	135°	140°	160° 125°	...
Feed	for lateral feed		for lateral feed and oblique plunging				for lateral feed, oblique plunging and drilling															
Hardness	48 HRC	55 HRC	62 HRC	63 HRC	65 HRC	66 HRC	workable material hardness in HRC															
Interfaces	HSK-A	HSK-E	SK	MAS-BT																		
Interfaces for tool holders																						

MOULD & DIE



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