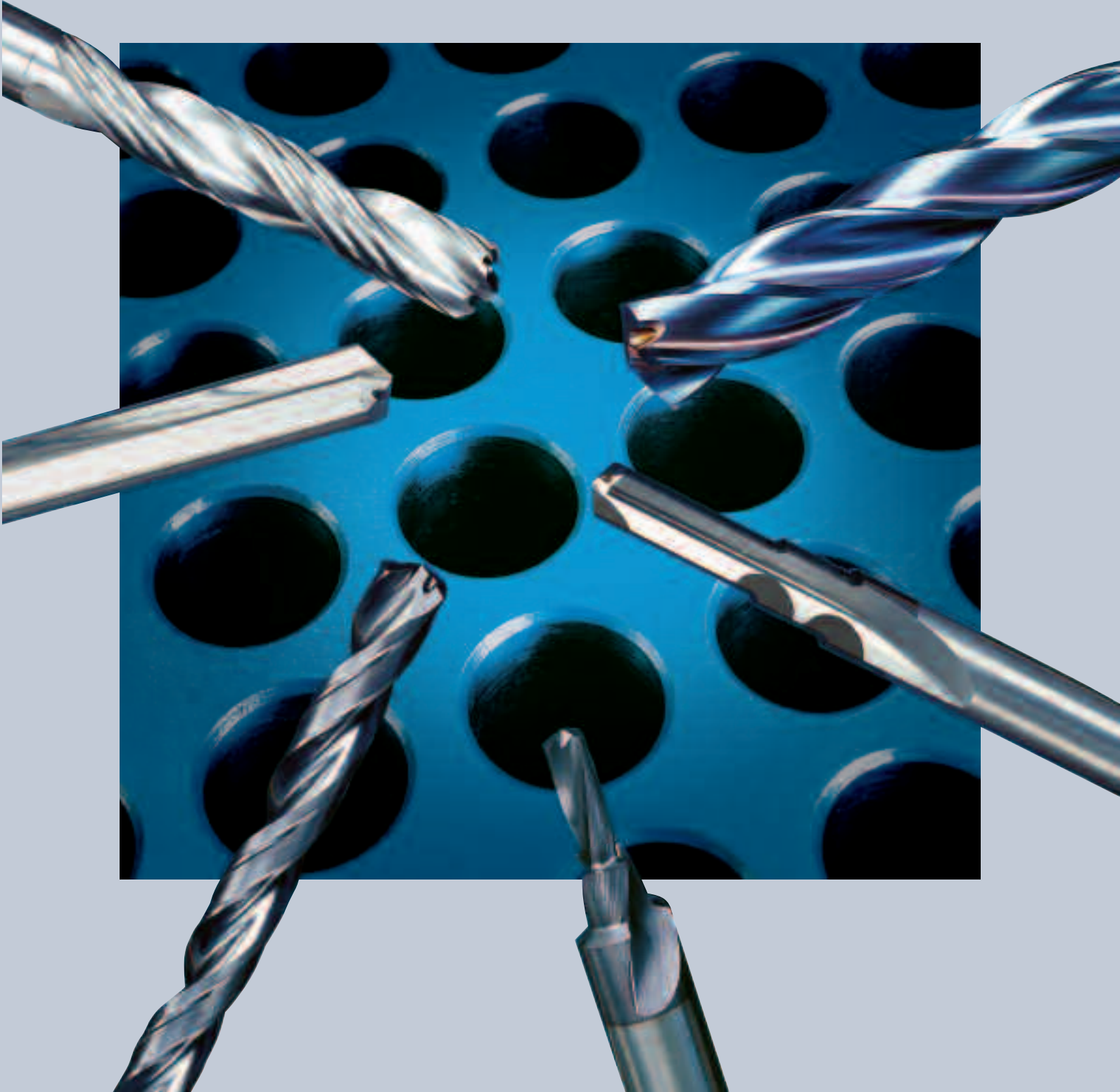


High performance drills

US-Version

MAPAL Competence – Drilling





MAPAL – wherever the customer is, we are there.

MAPAL Dr. Kress KG - the German medium-sized family company has been for decades one of the leading suppliers of precision tools for the metal machining industry. It is on this basis that MAPAL offers comprehensive knowledge of tools for machining bores, with a product range that extends from efficient and highly productive standard tools to complex special tools - with a strong focus on absolute precision for consistent production.

The comprehensive MAPAL product program consists of reaming and fine boring tools with adjustable blades and guide pads; reamers with fixed blades for high feed rates and small diameters; gun boring and milling tools brazed with PCD and PCBN or fitted with ISO elements and generating slide tools. An extensive line of solid carbide drills rounds off MAPAL's competence in bore machining. The product program is completed by a comprehensive range of clamping systems and setting devices.

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www.mapal.us

Quality, close customer contact and early identification of the developments and demands of the different markets are MAPAL's primary targets. More than 2,800 people employed by the MAPAL Group in 21 countries work on perfect solutions for customers' machining tasks day by day. Because of the ongoing general and advanced training of the personnel and the constant exchange of experience, MAPAL ensures high technical standards worldwide and guarantees MAPAL's legendary quality.

MAPAL brings this global network of resources, knowledge and experience to work one on one with customers in the local markets through sales and service groups throughout the United States. These knowledgeable and experienced people partner with our customers to optimize communication, product performance, application solutions and tooling programs in order to maximize the customer's total profitability.

MAPAL Inc. is the base of operations for the MAPAL Group in the United States. Located in Port Huron, MI, the facility offers comprehensive manufacturing, engineering, warehousing, sales and service through more than 100 employees dedicated to the United States market. About 70 people in the ISO certified manufacturing facility of MAPAL Inc. are dedicated to mainly producing and servicing solid carbide drills, tools for hard machining and PCD tools with the same quality found in all MAPAL products. This allows MAPAL to respond to the demands and needs of the US market on special and standard tooling in a very personal and efficient manner.

High performance drills nonstop – innovative products and a state of the art production strategy are the key to success

One main focus of the US activities is the solid carbide drill program that offers a complete range of solutions with unique proprietary designs dedicated to achieving advantages in specific application situations from demanding materials to challenging tolerances and finishes. Always designed and built to give the customers a competitive advantage.

Production of the solid carbide products started in 1991 in the German town Altenstadt and has had an outstanding success ever since. Besides the innovative power of the MAPAL Group, the main key to success is the state of the art equipment and the sophisticated and ISO certified manufacturing facility in Altenstadt. The machinery equipment necessary to produce high quality drills in an efficient manner has been used from the first day on 365 days per year and 24 hours per day. This is how the production of drills remains efficient and short delivery times can be met.

A comprehensive Solid Carbide Competency Group that continually investigates and evaluates the performance of current and future products and technologies in an advanced R&D facility supports the MAPAL technology.

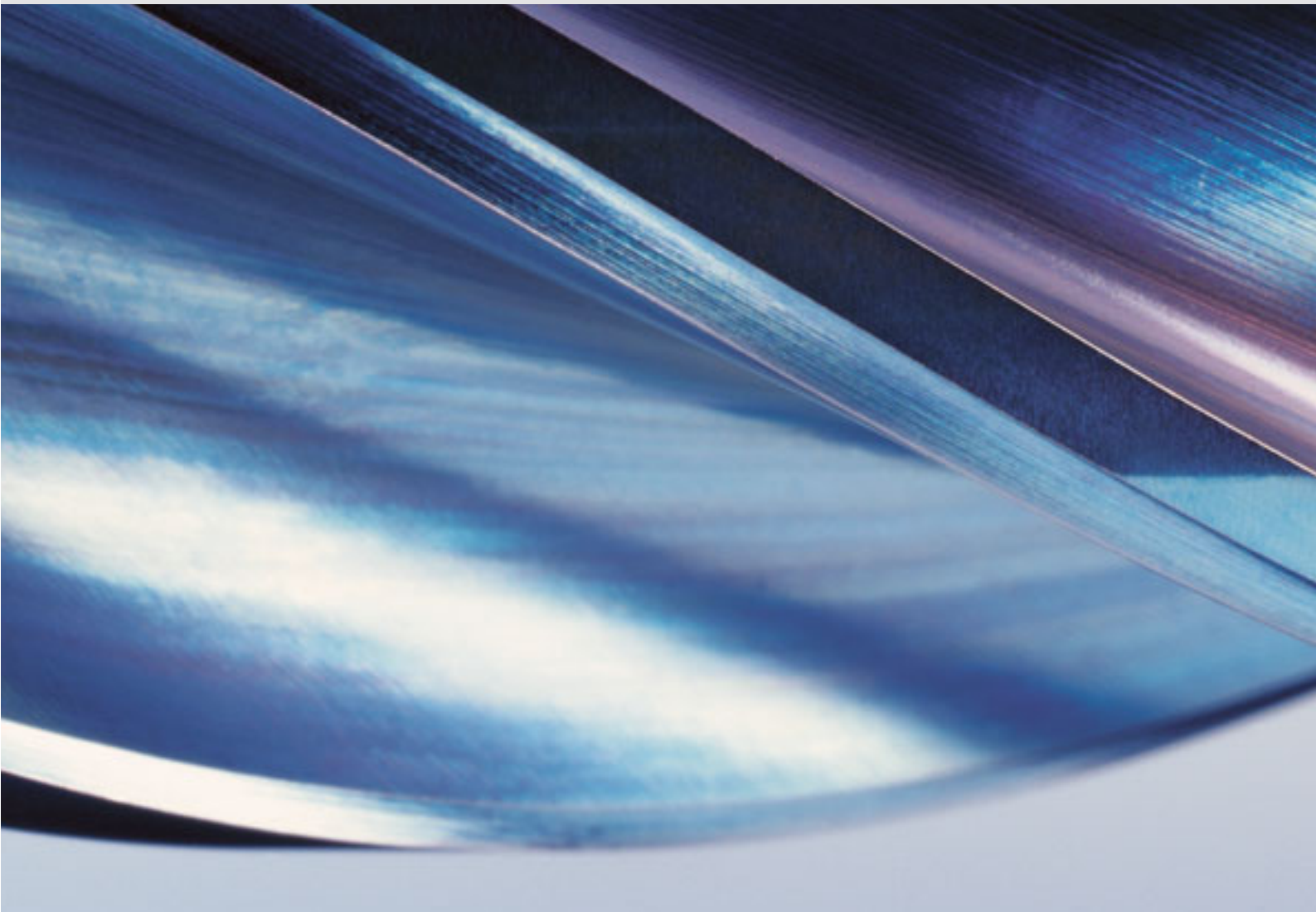
The US manufacturing site is used as backup to produce tailor-made drills for the US market with the shortest delay. Another large emphasize is put on the large topic of regrinding and re-coating. The drills are reconditioned in the US, so deliveries are kept very short.



The high performance solid carbide tools from the MAPAL program provide the ideal prerequisites for economic use in all areas of technology. Ongoing development and constant willingness to find special solutions to problems guarantee reliable tool designs both in the HSC area and for dry machining and machining with minimal lubrication. The use of super cutting materials PCD and PCBN for cutting edges is yet another means of increasing performance for machining nonferrous metals and cast materials.

Innovation

in the leads with ideas

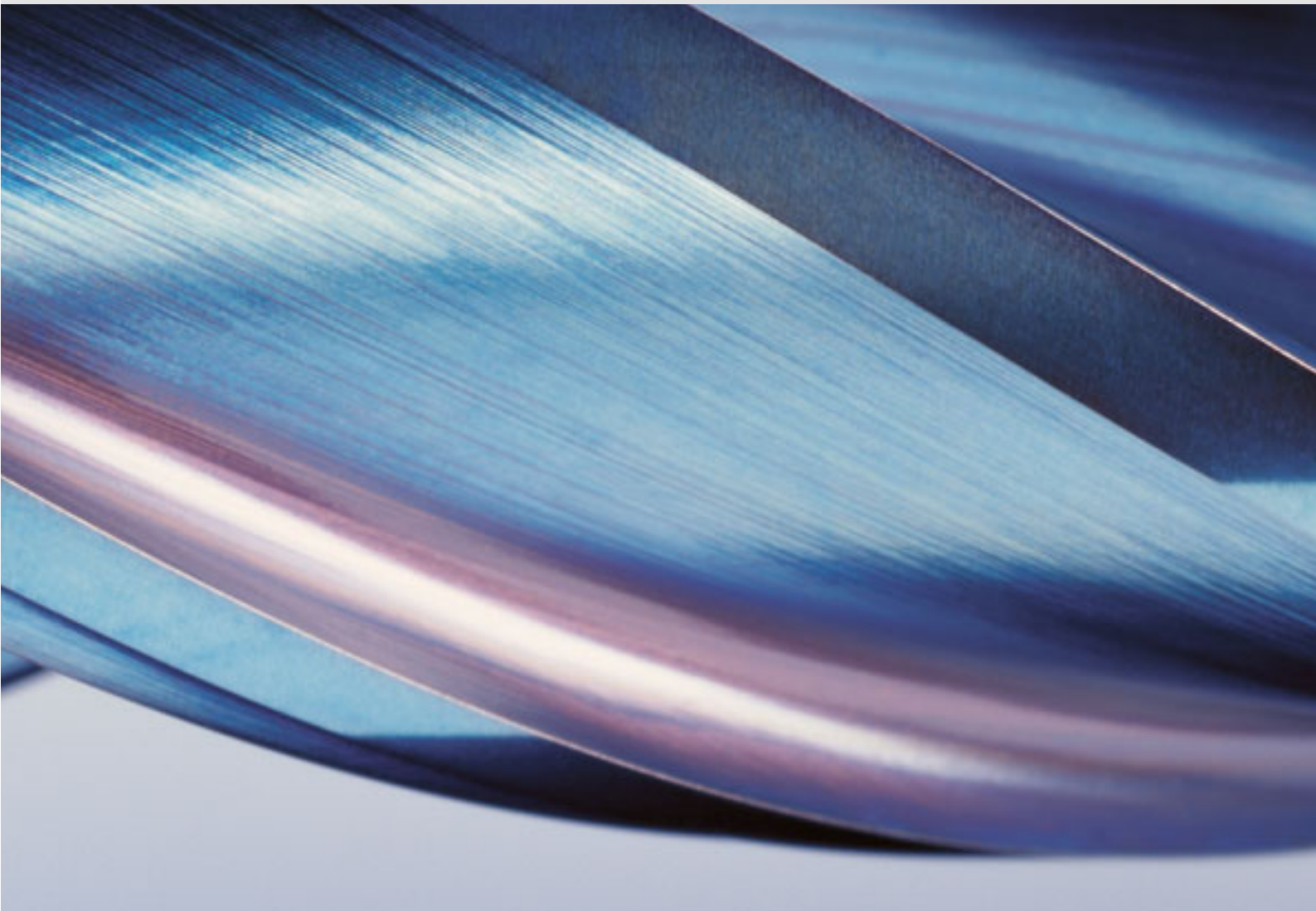


MAPAL proprietary coatings, which have been specially developed for drilling, such as the MxF and MxH coatings, guarantee special advantages. Tools with the MxF type of coating have also proven to be especially good for machining a variety of materials, including stainless steel materials, up to 65 HRC steels. An extremely low coefficient of friction on MAPAL drills helps to prevent material adhesion and reduce drilling torque.

One example of a successful innovation process is the solid carbide high precision GIGA-Drill. A total of four flutes produce significantly higher machining performances and better bore qualities from this drill. The increase in performance can be put to good use both in solid boring and gun boring. Two solid and two gun boring

flutes cut the material. This means four margins produce particularly good surface qualities, concentricity and dimensional stability.

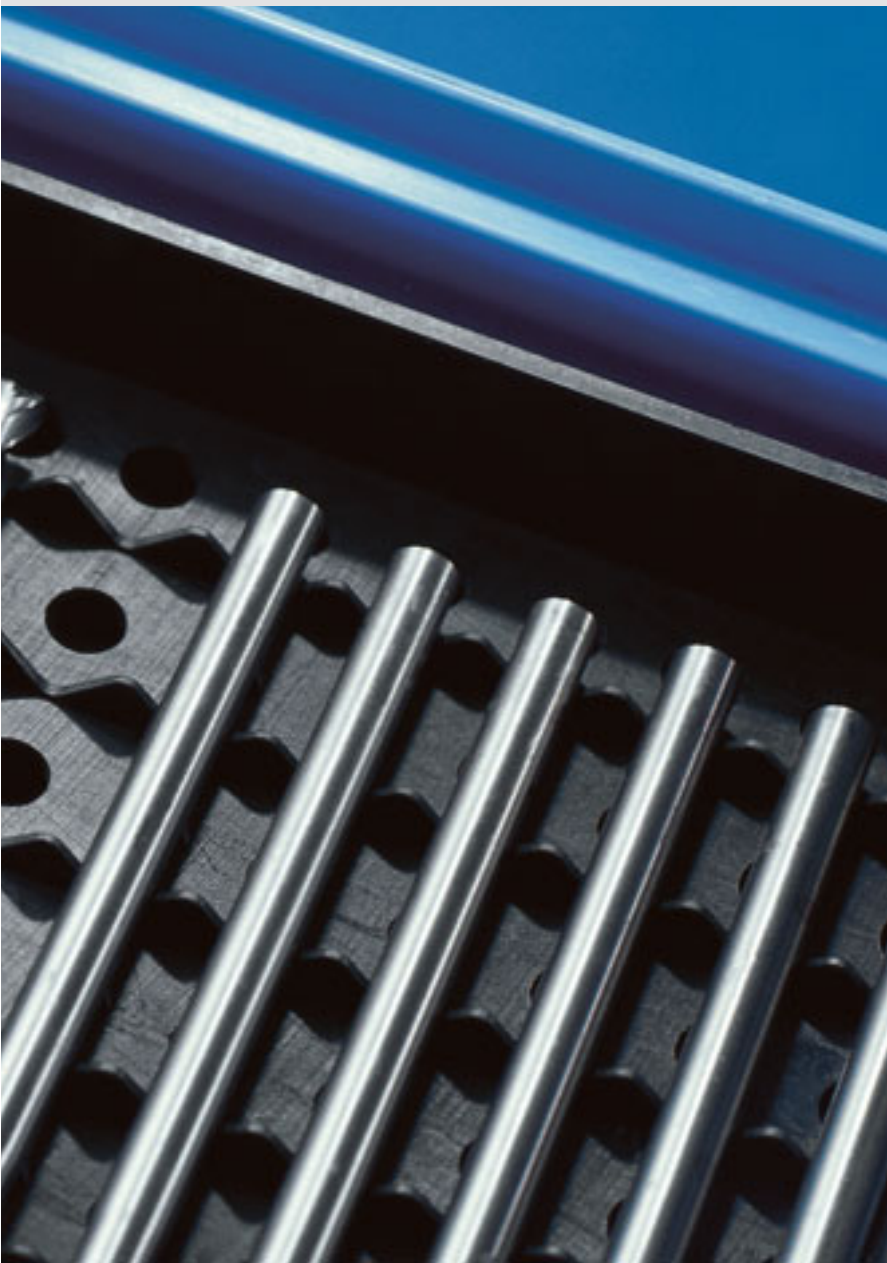
The high level of competence and decades of experience held by the specialists in solid carbide tools in the MAPAL Group, together with their proximity to customers and their inventiveness, guarantee that the right tool concept is always available for economic and reliable production.



Availability

In the lead with flexibility and precision





Right from the beginning, the key to success has been to use and fully utilize state of the art, highly precise machines that allow for flexible and cost-effective production. Every production step can rely on the most efficient machines and the latest production systems. To make production in Germany efficient, the site has been working 365 days a year, 24 hours a day right from the start.

This basic principle for organizing the business can be sensed and observed everywhere in the company. Some of the machines have been designed and produced specially for the company's work. In addition to this there is an excellent computer, logistics and information system. The production status of each tool can be precisely established at any time and the customer informed. The most important principle, from station to station, is precision and quality. Quality is produced here and production monitored and controlled without compromise.

Perfection

In the lead with the customer service



Solid carbide tools have a particularly positive effect in the area of MAPAL's comprehensive customer service package. The high performance tools exactly match the HPC philosophy (High Performance Cutting) by which the tool experts design the advantages to the customer. The close cooperation between technical consultants and product specialists guarantee reliable and fast proposals for optimization or rationalization of new or current production processes.
















A continuous performance of the solid carbide drills throughout the various tool lives is also a main focus of MAPAL's activities in the United States. MAPAL Inc. offers extensive and reliable reconditioning services. In the ISO-certified manufacturing facility in Port Huron, the expertise of the drill specialists ensures that the drills are re-ground and recoated to their original condition and with the shortest delay.

Please see page 114 for more detailed information on the MAPAL Reconditioning Program.

Selection guide for MAPAL High Performance Solid Carbide Drills

		MEGA-Drill-Steel					MEGA-Quadro-Drill			MEGA-Drill-Inox				GIGA-Drill			MEGA-Drill-Reamer		MEGA-Drill-Alu			Solid carbide drill, straight flutes					PCD-tipped drill, straight flutes					
Coolant supply		external		internal						external		internal					inter- nal		inter- nal		exter- nal			inter- nal		exter- nal			inter- nal			
																																
		M2003	M2005	M2103	M2105	M2108	M2175	M2175	M2182	M1703	M1705	M1803	M1805				M2195	M2263	M2265	M2705	M2805	M2812	M2503	M2603	M2605	M2608	M2612	M2903	M2905	M2913	M2915	M2918
	Depth/Diameter Ratio	3xD	5xD	3xD	5xD	8xD	5xD	8xD	12xD	3xD	5xD	3xD	5xD				5xD	3xD	5xD	5xD	5xD	12xD	3xD	3xD	5xD	8xD	12xD	3xD	3xD	3xD	5xD	8xD
	Diameter range (mm)	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20	3 – 20				6 – 20	Built to your specific requirements and available through short delivery between the diameters of 5.97 mm and 12.72 mm.		3 – 20	3 – 20	3 – 20	Built to your specific requirements and available through short delivery between the diameters of 3.00 mm and 20.00 mm.					Built to your specific requirements and available through short delivery between the diameters of 5.00 mm and 20.00 mm.				
	(inch)	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874	0.1181–0.7874				0.2362–0.7890			0.1181–0.7874	0.1181–0.7874	0.1181–0.7874										
	Achievable tolerance	IT9					IT8			IT9							IT9	IT7		IT9			IT9	IT9					IT8		IT8	
	Number of margins	2					2			2							4	2+4		2			2	2					2		2	
	Standard coating	MxF					MxF			MxF							MxF	MxF		-			MxF	MxF					-		-	
	see catalog page	16	20	16	20	24	56	60	64	32	36	32	36				72	81	82	44	44	48	88	88	89	89	89	90	91	90	91	91
P	Unalloyed steel, low-alloyed steel, high-alloyed steel, cast steel	○		○			○			○		○					○															
M	Stainless and acid resistant steel				○			○			○		○				○															
K₁	Grey cast iron, alloyed grey cast iron	○		○			○			○		○				○	○	○		○		○		○								
K₂	Modular iron CGI, malleable iron	○		○			○			○		○				○		○				○		○								
N	Non-ferrous metals									○		○				○	○	○		○		○		○			○		○		○	
S	Heat-resistant steel, titanium, nickel-alloys	○		○			○			○		○					○															
H	Hardened steel, chilled cast iron	○		○			○										○															

- Highly suitable
- Suitable
- Suitable for some applications

Instant delivery

a vast range of standard MAPAL High Performance Drills available and in stock

The demands of modern cutting technology are always wide-ranging and, along with the constant endeavour to rationalize and improve production processes, there are additional requirements and problem areas from the use of new materials and machining methods which must be expected and solved in the spirit of innovation.

As a result of this demanding area - both in work and solution - a broad-based range of standardized tools has been developed in the MAPAL Group, to meet the demands for drills to be used universally and special drilling tools for specific applications.

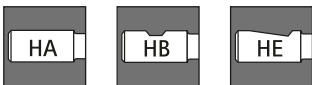
Many MAPAL High Performance Drills are available through stock. Each product is tailored according to the application, the material and the target. With the drills from the MEGA-Family MAPAL offers standardized drills to machine steels, stainless steel materials and aluminium. Besides the standard program includes the MEGA-Quadro-Drill with additional margins for extremely precise results. A selection of GIGA-Drills rounds up the standard programme, with four flutes and four margins, making it the suitable tool for high precision and high performance.

The MEGA-Drill-Reamer is a unique tool that combines drilling and reaming in one process. Finally, drills with straight flutes in both solid carbide and PCD round off the MAPAL standard product program. These tools, however, are designed to meet specific needs so they are built-to-order and available with a short delivery (4 weeks turnaround).

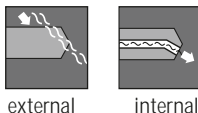
Besides the standard versions of the MAPAL solid carbide drills, we will be happy to alter the tools to meet your specific requirements, such as coatings, shank forms, or corner chamfers. These alterations can be made quickly and competitively with a short delivery. If we cannot alter a standard tool, we will be happy to build one as a special.

Icons and symbols used in this catalogue

Shank form



Coolant supply



Depth to diameter ratio



Material suitability

suitable



partly suitable



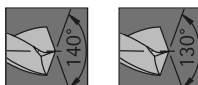
Direction of cut



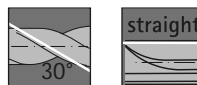
Coating



Point angle



Helix angle



Stock symbols

- available ex stock
- available within 2 weeks
- available within 4 weeks

Index

MEGA-Drill-Steel	15		MEGA-Drill-Steel
3xD – M2003 (ext. coolant) M2103 (int. coolant)	16		
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Alteration request form	30		
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	??		
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Note:
This catalog, including the enquiry forms and technical information are also available on CD-Rom or by visiting www.mapal.us.



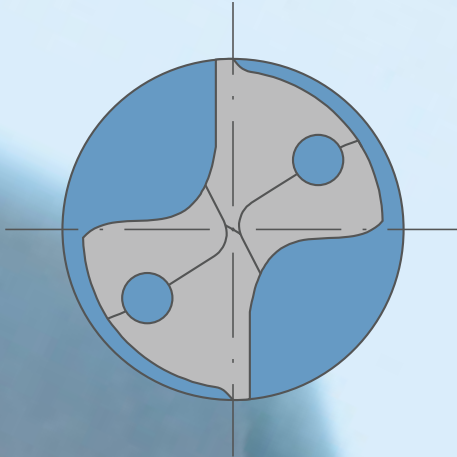
MEGA-Drill-Steel –

The best selection in carbon-based materials

The MEGA-Drill-Steel demonstrates its excellent efficiency in carbon-based materials with high cutting values and long tool life. In particular, the drill geometry excels in steels of various states and conditions.

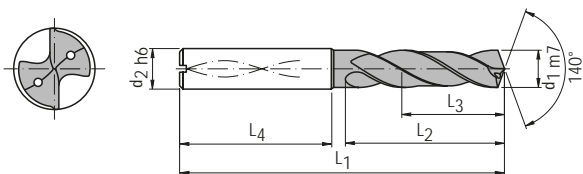
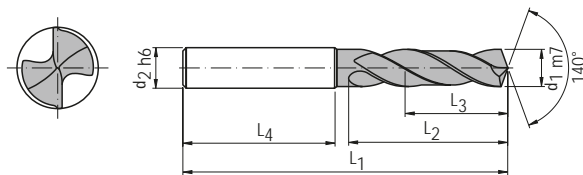
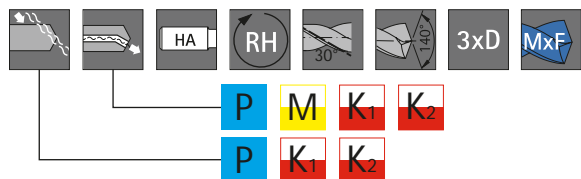
The special design of the cutting edge combined with the flute form allows the chip to curl and fracture effectively. Better chip control results in excellent chip clearance from the bore and improved drill performance.

Drilling depths of up to $5xD$ are achieved – and with internal coolant even up to $8xD$ with standard tools from stock.



MEGA-Drill-Steel

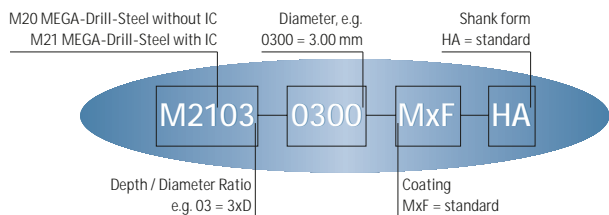
M2003 / M2103



Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT 9 (achievable)
No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:





Drill diameter			Dimensions					M2003		M2103	
mm	Inch / Wire / Letter	Dec. equiv. Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	Order code Form / Diameter	Order code Form / Diameter		
3.00		0.1181	6	62	20	14	36	M2003-0300	●	M2103-0300	●
3.10		0.1220	6	62	20	14	36	M2003-0310	●	M2103-0310	●
3.18	1/8	0.1250	6	62	20	14	36	M2003-0318	●	M2103-0318	●
3.20		0.1260	6	62	20	14	36	M2003-0320	○	M2103-0320	●
3.30		0.1299	6	62	20	14	36	M2003-0330	●	M2103-0330	●
3.40		0.1339	6	62	20	14	36	M2003-0340	○	M2103-0340	○
3.45	#29	0.1358	6	62	20	14	36	M2003-0345	●	M2103-0345	●
3.50		0.1378	6	62	20	14	36	M2003-0350	●	M2103-0350	●
3.57	9/64	0.1406	6	62	20	14	36	M2003-0357	●	M2103-0357	●
3.60		0.1417	6	62	20	14	36	M2003-0360	●	M2103-0360	●
3.70		0.1457	6	62	20	14	36	M2003-0370	●	M2103-0370	●
3.80	#25	0.1496	6	66	24	17	36	M2003-0380	●	M2103-0380	●
3.86	#24	0.1520	6	66	24	17	36	M2003-0386	●	M2103-0386	●
3.90		0.1535	6	66	24	17	36	M2003-0390	○	M2103-0390	○
3.97	5/32	0.1562	6	66	24	17	36	M2003-0397	●	M2103-0397	●
4.00		0.1575	6	66	24	17	36	M2003-0400	●	M2103-0400	●
4.04	#21	0.1591	6	66	24	17	36	M2003-0404	●	M2103-0404	●
4.10		0.1614	6	66	24	17	36	M2003-0410	●	M2103-0410	○
4.20		0.1654	6	66	24	17	36	M2003-0420	●	M2103-0420	●
4.30	#18	0.1693	6	66	24	17	36	M2003-0430	●	M2103-0430	●
4.37	11/64	0.1719	6	66	24	17	36	M2003-0437	●	M2103-0437	●
4.40		0.1732	6	66	24	17	36	M2003-0440	●	M2103-0440	●
4.50	#16	0.1772	6	66	24	17	36	M2003-0450	●	M2103-0450	●
4.60		0.1811	6	66	24	17	36	M2003-0460	●	M2103-0460	●
4.62	#14	0.1819	6	66	24	17	36	M2003-0462	●	M2103-0462	●

For machining values see Page 28.

MEGA-Drill-Steel

M2003 / M2103

3xD



mm	Drill diameter d ₁ m7		Shank diameter d ₂ h6 mm	Dimensions				 M2003	 M2103		
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			Order code Form / Diameter	Order code Form / Diameter
4.70	#13	0.1850	6	66	24	17	36	M2003-0470	●	M2103-0470	●
4.76	3/16	0.1875	6	66	28	20	36	M2003-0476	●	M2103-0476	●
4.80	#12	0.1890	6	66	28	20	36	M2003-0480	●	M2103-0480	●
4.90		0.1929	6	66	28	20	36	M2003-0490	○	M2103-0490	○
5.00		0.1969	6	66	28	20	36	M2003-0500	●	M2103-0500	●
5.10		0.2008	6	66	28	20	36	M2003-0510	●	M2103-0510	●
5.16	13/64	0.2031	6	66	28	20	36	M2003-0516	●	M2103-0516	●
5.20		0.2047	6	66	28	20	36	M2003-0520	●	M2103-0520	●
5.30		0.2087	6	66	28	20	36	M2003-0530	○	M2103-0530	○
5.40		0.2126	6	66	28	20	36	M2003-0540	○	M2103-0540	○
5.50		0.2165	6	66	28	20	36	M2003-0550	●	M2103-0550	●
5.56	7/32	0.2188	6	66	28	20	36	M2003-0556	●	M2103-0556	●
5.60		0.2205	6	66	28	20	36	M2003-0560	●	M2103-0560	●
5.70		0.2244	6	66	28	20	36	M2003-0570	●	M2103-0570	●
5.80		0.2283	6	66	28	20	36	M2003-0580	○	M2103-0580	○
5.90		0.2323	6	66	28	20	36	M2003-0590	●	M2103-0590	●
5.95	15/64	0.2344	6	66	28	20	36	M2003-0595	●	M2103-0595	●
6.00		0.2362	6	66	28	20	36	M2003-0600	●	M2103-0600	●
6.10		0.2402	8	79	34	24	36	M2003-0610	○	M2103-0610	○
6.15	C	0.2421	8	79	34	24	36	M2003-0615	●	M2103-0615	●
6.20		0.2441	8	79	34	24	36	M2003-0620	○	M2103-0620	○
6.30		0.2480	8	79	34	24	36	M2003-0630	○	M2103-0630	○
6.35	1/4	0.2500	8	79	34	24	36	M2003-0635	●	M2103-0635	●
6.40		0.2520	8	79	34	24	36	M2003-0640	○	M2103-0640	○
6.50		0.2559	8	79	34	24	36	M2003-0650	●	M2103-0650	●
6.53	F	0.2571	8	79	34	24	36	M2003-0653	●	M2103-0653	●
6.60		0.2598	8	79	34	24	36	M2003-0660	●	M2103-0660	●
6.63	G	0.2610	8	79	34	24	36	M2003-0663	●	M2103-0663	●
6.70		0.2638	8	79	34	24	36	M2003-0670	○	M2103-0670	○
6.75	17/64	0.2656	8	79	34	24	36	M2003-0675	●	M2103-0675	●
6.80		0.2677	8	79	34	24	36	M2003-0680	●	M2103-0680	●
6.90	I	0.2717	8	79	34	24	36	M2003-0690	●	M2103-0690	●
7.00		0.2756	8	79	34	24	36	M2003-0700	●	M2103-0700	●
7.10		0.2795	8	79	41	29	36	M2003-0710	○	M2103-0710	○
7.14	9/32	0.2812	8	79	41	29	36	M2003-0714	●	M2103-0714	●
7.20		0.2835	8	79	41	29	36	M2003-0720	●	M2103-0720	●
7.30		0.2874	8	79	41	29	36	M2003-0730	●	M2103-0730	●
7.40		0.2913	8	79	41	29	36	M2003-0740	●	M2103-0740	●
7.50		0.2953	8	79	41	29	36	M2003-0750	●	M2103-0750	●
7.54	19/64	0.2969	8	79	41	29	36	M2003-0754	●	M2103-0754	●
7.60		0.2992	8	79	41	29	36	M2003-0760	●	M2103-0760	●
7.70		0.3031	8	79	41	29	36	M2003-0770	●	M2103-0770	●
7.80		0.3071	8	79	41	29	36	M2003-0780	●	M2103-0780	●
7.90		0.3110	8	79	41	29	36	M2003-0790	○	M2103-0790	○
7.94	5/16	0.3125	8	79	41	29	36	M2003-0794	●	M2103-0794	●

For machining values see Page 28.

MEGA-Drill-Steel

M2003 / M2103

3xD

Drill diameter			Dimensions					M2003		M2103	
mm	d ₁ m7	Dec. equiv. Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	 M2003	 M2103	Order code Form / Diameter	Order code Form / Diameter
	Inch / Wire / Letter										
8.00		0.3150	8	79	41	29	36	M2003-0800	●	M2103-0800	●
8.10		0.3189	10	89	47	35	40	M2003-0810	○	M2103-0810	○
8.20	P	0.3228	10	89	47	35	40	M2003-0820	○	M2103-0820	○
8.30		0.3268	10	89	47	35	40	M2003-0830	○	M2103-0830	○
8.33	21/64	0.3281	10	89	47	35	40	M2003-0833	●	M2103-0833	●
8.40		0.3307	10	89	47	35	40	M2003-0840	○	M2103-0840	○
8.43	Q	0.3319	10	89	47	35	40	M2003-0843	●	M2103-0843	●
8.50		0.3346	10	89	47	35	40	M2003-0850	●	M2103-0850	●
8.60		0.3386	10	89	47	35	40	M2003-0860	○	M2103-0860	○
8.70		0.3425	10	89	47	35	40	M2003-0870	○	M2103-0870	○
8.73	11/32	0.3438	10	89	47	35	40	M2003-0873	●	M2103-0873	●
8.80		0.3465	10	89	47	35	40	M2003-0880	●	M2103-0880	●
8.90		0.3504	10	89	47	35	40	M2003-0890	○	M2103-0890	○
9.00		0.3543	10	89	47	35	40	M2003-0900	●	M2103-0900	●
9.10		0.3583	10	89	47	35	40	M2003-0910	○	M2103-0910	○
9.13	23/64	0.3594	10	89	47	35	40	M2003-0913	●	M2103-0913	●
9.20		0.3622	10	89	47	35	40	M2003-0920	○	M2103-0920	○
9.30		0.3661	10	89	47	35	40	M2003-0930	●	M2103-0930	●
9.35	U	0.3681	10	89	47	35	40	M2003-0935	●	M2103-0935	●
9.40		0.3701	10	89	47	35	40	M2003-0940	●	M2103-0940	●
9.50		0.3740	10	89	47	35	40	M2003-0950	●	M2103-0950	●
9.53	3/8	0.3750	10	89	47	35	40	M2003-0953	●	M2103-0953	●
9.60		0.3780	10	89	47	35	40	M2003-0960	●	M2103-0960	●
9.70		0.3819	10	89	47	35	40	M2003-0970	○	M2103-0970	○
9.80	W	0.3858	10	89	47	35	40	M2003-0980	○	M2103-0980	○
9.90		0.3898	10	89	47	35	40	M2003-0990	●	M2103-0990	●
9.92	25/64	0.3906	10	89	47	35	40	M2003-0992	●	M2103-0992	●
10.00		0.3937	10	89	47	35	40	M2003-1000	●	M2103-1000	●
10.10		0.3976	12	102	55	40	45	M2003-1010	○	M2103-1010	○
10.20		0.4016	12	102	55	40	45	M2003-1020	●	M2103-1020	●
10.26	Y	0.4039	12	102	55	40	45	M2003-1026	●	M2103-1026	●
10.30		0.4055	12	102	55	40	45	M2003-1030	●	M2103-1030	●
10.32	13/32	0.4062	12	102	55	40	45	M2003-1032	●	M2103-1032	●
10.40		0.4094	12	102	55	40	45	M2003-1040	○	M2103-1040	○
10.50		0.4134	12	102	55	40	45	M2003-1050	●	M2103-1050	●
10.60		0.4173	12	102	55	40	45	M2003-1060	○	M2103-1060	○
10.70		0.4213	12	102	55	40	45	M2003-1070	●	M2103-1070	●
10.72	27/64	0.4219	12	102	55	40	45	M2003-1072	●	M2103-1072	●
10.80		0.4252	12	102	55	40	45	M2003-1080	○	M2103-1080	○
10.90		0.4291	12	102	55	40	45	M2003-1090	○	M2103-1090	○
11.00		0.4331	12	102	55	40	45	M2003-1100	●	M2103-1100	●
11.10		0.4370	12	102	55	40	45	M2003-1110	○	M2103-1110	○
11.11	7/16	0.4375	12	102	55	40	45	M2003-1111	●	M2103-1111	●
11.20		0.4409	12	102	55	40	45	M2003-1120	●	M2103-1120	●
11.30		0.4449	12	102	55	40	45	M2003-1130	●	M2103-1130	●

For machining values see Page 28.

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M2003 / M2103

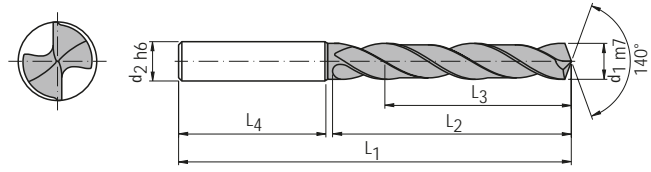
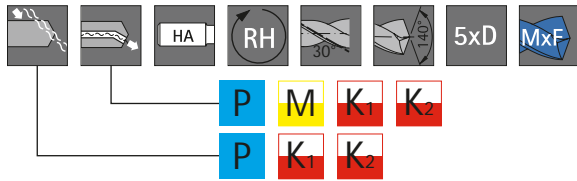
3xD

mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				M2003		M2103	
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm	Order code Form / Diameter	Order code Form / Diameter		
11.40		0.4488	12	102	55	40	45	M2003-1140	●	M2103-1140	●
11.50	29/64	0.4528	12	102	55	40	45	M2003-1150	●	M2103-1150	●
11.60		0.4567	12	102	55	40	45	M2003-1160	○	M2103-1160	○
11.70		0.4606	12	102	55	40	45	M2003-1170	○	M2103-1170	○
11.80		0.4646	12	102	55	40	45	M2003-1180	●	M2103-1180	●
11.90	15/32	0.4685	12	102	55	40	45	M2003-1190	●	M2103-1190	●
12.00		0.4724	12	102	55	40	45	M2003-1200	●	M2103-1200	●
12.30	31/64	0.4843	14	107	60	43	45	M2003-1230	●	M2103-1230	●
12.50		0.4921	14	107	60	43	45	M2003-1250	●	M2103-1250	●
12.70	1/2	0.5000	14	107	60	43	45	M2003-1270	●	M2103-1270	●
12.80		0.5039	14	107	60	43	45	M2003-1280	●	M2103-1280	●
13.00		0.5118	14	107	60	43	45	M2003-1300	●	M2103-1300	●
13.10	33/64	0.5157	14	107	60	43	45	M2003-1310	●	M2103-1310	●
13.30		0.5236	14	107	60	43	45	M2003-1330	●	M2103-1330	●
13.50		0.5315	14	107	60	43	45	M2003-1350	●	M2103-1350	●
13.80		0.5433	14	107	60	43	45	M2003-1380	○	M2103-1380	○
14.00		0.5512	14	107	60	43	45	M2003-1400	●	M2103-1400	●
14.30	9/16	0.5630	16	115	65	45	48	M2003-1430	●	M2103-1430	●
14.50		0.5709	16	115	65	45	48	M2003-1450	●	M2103-1450	●
14.68	37/64	0.5780	16	115	65	45	48	M2003-1468	●	M2103-1468	●
14.80		0.5827	16	115	65	45	48	M2003-1480	●	M2103-1480	●
15.00		0.5906	16	115	65	45	48	M2003-1500	●	M2103-1500	●
15.08	19/32	0.5937	16	115	65	45	48	M2003-1508	●	M2103-1508	●
15.50		0.6102	16	115	65	45	48	M2003-1550	●	M2103-1550	●
15.80		0.6220	16	115	65	45	48	M2003-1580	○	M2103-1580	○
15.88	5/8	0.6250	16	115	65	45	48	M2003-1588	●	M2103-1588	●
16.00		0.6299	16	115	65	45	48	M2003-1600	●	M2103-1600	●
16.50		0.6496	18	123	73	51	48	M2003-1650	●	M2103-1650	●
16.67	21/32	0.6563	18	123	73	51	48	M2003-1667	●	M2103-1667	●
16.80		0.6614	18	123	73	51	48	M2003-1680	●	M2103-1680	●
17.00		0.6693	18	123	73	51	48	M2003-1700	●	M2103-1700	●
17.46	11/16	0.6874	18	123	73	51	48	M2003-1746	●	M2103-1746	●
17.50		0.6890	18	123	73	51	48	M2003-1750	●	M2103-1750	●
17.80		0.7008	18	123	73	51	48	M2003-1780	○	M2103-1780	○
17.86	45/64	0.7031	18	123	73	51	48	M2003-1786	●	M2103-1786	●
18.00		0.7087	18	123	73	51	48	M2003-1800	●	M2103-1800	●
18.26	23/32	0.7189	20	131	79	55	50	M2003-1826	●	M2103-1826	●
18.50		0.7283	20	131	79	55	50	M2003-1850	●	M2103-1850	●
18.80		0.7402	20	131	79	55	50	M2003-1880	○	M2103-1880	○
19.00		0.7480	20	131	79	55	50	M2003-1900	●	M2103-1900	●
19.05	3/4	0.7500	20	131	79	55	50	M2003-1905	●	M2103-1905	●
19.50		0.7677	20	131	79	55	50	M2003-1950	●	M2103-1950	●
19.80		0.7795	20	131	79	55	50	M2003-1980	○	M2103-1980	○
20.00		0.7874	20	131	79	55	50	M2003-2000	●	M2103-2000	●

For machining values see Page 28.

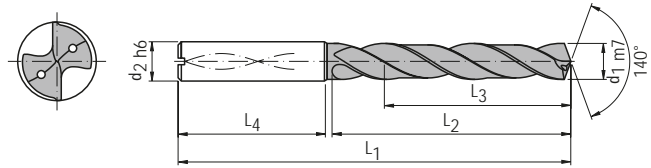
MEGA-Drill-Steel

M2005 / M2105

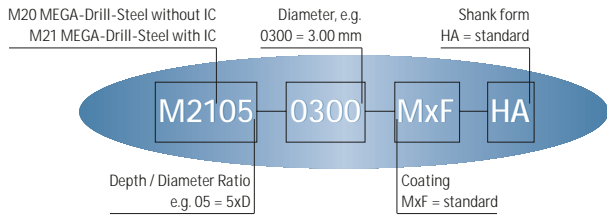


Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT 9 (achievable)
No. of margins: 2



To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:



Drill diameter		Dimensions						M2005	M2105
mm	d_1 m7	Shank diameter d_2 h6 mm	Total length L_1 mm	Margin length L_2 mm	Maximum drilling depth L_3 mm	Shank length L_4 mm	Order code Form / Diameter	Order code Form / Diameter	
	Inch / Wire / Letter								Dec. equiv. Inch
3.00		6	66	28	23	36	M2005-0300 ●	M2105-0300 ●	
3.10		6	66	28	23	36	M2005-0310 ●	M2105-0310 ●	
3.18	1/8	6	66	28	23	36	M2005-0318 ●	M2105-0318 ●	
3.20		6	66	28	23	36	M2005-0320 ○	M2105-0320 ●	
3.30		6	66	28	23	36	M2005-0330 ●	M2105-0330 ●	
3.40		6	66	28	23	36	M2005-0340 ○	M2105-0340 ○	
3.45	#29	6	66	28	23	36	M2005-0345 ●	M2105-0345 ●	
3.50		6	66	28	23	36	M2005-0350 ●	M2105-0350 ●	
3.57	9/64	6	66	28	23	36	M2005-0357 ●	M2105-0357 ●	
3.60		6	66	28	23	36	M2005-0360 ●	M2105-0360 ●	
3.70		6	66	28	23	36	M2005-0370 ●	M2105-0370 ●	
3.80	#25	6	74	36	29	36	M2005-0380 ●	M2105-0380 ●	
3.86	#24	6	74	36	29	36	M2005-0386 ●	M2105-0386 ●	
3.90		6	74	36	29	36	M2005-0390 ○	M2105-0390 ○	
3.97	5/32	6	74	36	29	36	M2005-0397 ●	M2105-0397 ●	
4.00		6	74	36	29	36	M2005-0400 ●	M2105-0400 ●	
4.04	#21	6	74	36	29	36	M2005-0404 ●	M2105-0404 ●	
4.10		6	74	36	29	36	M2005-0410 ●	M2105-0410 ●	
4.20		6	74	36	29	36	M2005-0420 ●	M2105-0420 ●	
4.30	#18	6	74	36	29	36	M2005-0430 ●	M2105-0430 ●	
4.37	11/64	6	74	36	29	36	M2005-0437 ●	M2105-0437 ●	
4.40		6	74	36	29	36	M2005-0440 ●	M2105-0440 ●	
4.50	#16	6	74	36	29	36	M2005-0450 ●	M2105-0450 ●	
4.60		6	74	36	29	36	M2005-0460 ●	M2105-0460 ●	
4.62	#14	6	74	36	29	36	M2005-0462 ●	M2105-0462 ●	

For machining values see Page 28.

MEGA-Drill-Steel

M2005 / M2105

5xD



mm	Drill diameter d ₁ m7		Shank diameter d ₂ h6 mm	Dimensions				Shank length L ₄ mm	M2005		M2105	
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Order code Form / Diameter		Order code Form / Diameter			
4.70	#13	0.1850	6	74	36	29	36	M2005-0470	●	M2105-0470	●	
4.76	3/16	0.1875	6	82	44	35	36	M2005-0476	●	M2105-0476	●	
4.80	#12	0.1890	6	82	44	35	36	M2005-0480	○	M2105-0480	●	
4.90		0.1929	6	82	44	35	36	M2005-0490	○	M2105-0490	○	
5.00		0.1969	6	82	44	35	36	M2005-0500	●	M2105-0500	●	
5.10		0.2008	6	82	44	35	36	M2005-0510	●	M2105-0510	●	
5.16	13/64	0.2031	6	82	44	35	36	M2005-0516	●	M2105-0516	●	
5.20		0.2047	6	82	44	35	36	M2005-0520	●	M2105-0520	●	
5.30		0.2087	6	82	44	35	36	M2005-0530	○	M2105-0530	○	
5.40		0.2126	6	82	44	35	36	M2005-0540	○	M2105-0540	○	
5.50		0.2165	6	82	44	35	36	M2005-0550	●	M2105-0550	●	
5.56	7/32	0.2188	6	82	44	35	36	M2005-0556	●	M2105-0556	●	
5.60		0.2205	6	82	44	35	36	M2005-0560	●	M2105-0560	●	
5.70		0.2244	6	82	44	35	36	M2005-0570	●	M2105-0570	●	
5.80		0.2283	6	82	44	35	36	M2005-0580	○	M2105-0580	○	
5.90		0.2323	6	82	44	35	36	M2005-0590	●	M2105-0590	●	
5.95	15/64	0.2344	6	82	44	35	36	M2005-0595	●	M2105-0595	●	
6.00		0.2362	6	82	44	35	36	M2005-0600	●	M2105-0600	●	
6.10		0.2402	8	91	53	43	36	M2005-0610	○	M2105-0610	○	
6.15	C	0.2421	8	91	53	43	36	M2005-0615	●	M2105-0615	●	
6.20		0.2441	8	91	53	43	36	M2005-0620	○	M2105-0620	○	
6.30		0.2480	8	91	53	43	36	M2005-0630	○	M2105-0630	○	
6.35	1/4	0.2500	8	91	53	43	36	M2005-0635	●	M2105-0635	●	
6.40		0.2520	8	91	53	43	36	M2005-0640	○	M2105-0640	○	
6.50		0.2559	8	91	53	43	36	M2005-0650	●	M2105-0650	●	
6.53	F	0.2571	8	91	53	43	36	M2005-0653	●	M2105-0653	●	
6.60		0.2598	8	91	53	43	36	M2005-0660	●	M2105-0660	●	
6.63	G	0.2610	8	91	53	43	36	M2005-0663	●	M2105-0663	●	
6.70		0.2638	8	91	53	43	36	M2005-0670	○	M2105-0670	○	
6.75	17/64	0.2656	8	91	53	43	36	M2005-0675	●	M2105-0675	●	
6.80		0.2677	8	91	53	43	36	M2005-0680	●	M2105-0680	●	
6.90	I	0.2717	8	91	53	43	36	M2005-0690	●	M2105-0690	●	
7.00		0.2756	8	91	53	43	36	M2005-0700	●	M2105-0700	●	
7.10		0.2795	8	91	53	43	36	M2005-0710	○	M2105-0710	○	
7.14	9/32	0.2812	8	91	53	43	36	M2005-0714	●	M2105-0714	●	
7.20		0.2835	8	91	53	43	36	M2005-0720	●	M2105-0720	●	
7.30		0.2874	8	91	53	43	36	M2005-0730	●	M2105-0730	●	
7.40		0.2913	8	91	53	43	36	M2005-0740	●	M2105-0740	●	
7.50		0.2953	8	91	53	43	36	M2005-0750	●	M2105-0750	●	
7.54	19/64	0.2969	8	91	53	43	36	M2005-0754	●	M2105-0754	●	
7.60		0.2992	8	91	53	43	36	M2005-0760	●	M2105-0760	○	
7.70		0.3031	8	91	53	43	36	M2005-0770	●	M2105-0770	●	
7.80		0.3071	8	91	53	43	36	M2005-0780	●	M2105-0780	●	
7.90		0.3110	8	91	53	43	36	M2005-0790	○	M2105-0790	○	
7.94	5/16	0.3125	8	91	53	43	36	M2005-0794	●	M2105-0794	●	

For machining values see Page 28.

MEGA-Drill-Steel

M2005 / M2105

5xD



Drill diameter			Dimensions					M2005		M2105	
mm	d ₁ m7	Dec. equiv. Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	 M2005	 M2105	Order code Form / Diameter	Order code Form / Diameter
	Inch / Wire / Letter										
8.00		0.3150	8	91	53	43	36	M2005-0800	●	M2105-0800	●
8.10		0.3189	10	103	61	49	40	M2005-0810	○	M2105-0810	○
8.20	P	0.3228	10	103	61	49	40	M2005-0820	○	M2105-0820	○
8.30		0.3268	10	103	61	49	40	M2005-0830	○	M2105-0830	○
8.33	21/64	0.3281	10	103	61	49	40	M2005-0833	●	M2105-0833	●
8.40		0.3307	10	103	61	49	40	M2005-0840	○	M2105-0840	○
8.43	Q	0.3319	10	103	61	49	40	M2005-0843	●	M2105-0843	●
8.50		0.3346	10	103	61	49	40	M2005-0850	●	M2105-0850	●
8.60		0.3386	10	103	61	49	40	M2005-0860	○	M2105-0860	○
8.70		0.3425	10	103	61	49	40	M2005-0870	○	M2105-0870	○
8.73	11/32	0.3438	10	103	61	49	40	M2005-0873	●	M2105-0873	●
8.80		0.3465	10	103	61	49	40	M2005-0880	●	M2105-0880	●
8.90		0.3504	10	103	61	49	40	M2005-0890	○	M2105-0890	○
9.00		0.3543	10	103	61	49	40	M2005-0900	●	M2105-0900	●
9.10		0.3583	10	103	61	49	40	M2005-0910	○	M2105-0910	○
9.13	23/64	0.3594	10	103	61	49	40	M2005-0913	●	M2105-0913	●
9.20		0.3622	10	103	61	49	40	M2005-0920	○	M2105-0920	○
9.30		0.3661	10	103	61	49	40	M2005-0930	●	M2105-0930	●
9.35	U	0.3681	10	103	61	49	40	M2005-0935	●	M2105-0935	●
9.40		0.3701	10	103	61	49	40	M2005-0940	●	M2105-0940	●
9.50		0.3740	10	103	61	49	40	M2005-0950	●	M2105-0950	●
9.53	3/8	0.3750	10	103	61	49	40	M2005-0953	●	M2105-0953	●
9.60		0.3780	10	103	61	49	40	M2005-0960	●	M2105-0960	●
9.70		0.3819	10	103	61	49	40	M2005-0970	○	M2105-0970	○
9.80	W	0.3858	10	103	61	49	40	M2005-0980	○	M2105-0980	○
9.90		0.3898	10	103	61	49	40	M2005-0990	●	M2105-0990	●
9.92	25/64	0.3906	10	103	61	49	40	M2005-0992	●	M2105-0992	●
10.00		0.3937	10	103	61	49	40	M2005-1000	●	M2105-1000	●
10.10		0.3976	12	118	71	56	45	M2005-1010	○	M2105-1010	○
10.20		0.4016	12	118	71	56	45	M2005-1020	●	M2105-1020	●
10.26	Y	0.4039	12	118	71	56	45	M2005-1026	●	M2105-1026	●
10.30		0.4055	12	118	71	56	45	M2005-1030	●	M2105-1030	●
10.32	13/32	0.4062	12	118	71	56	45	M2005-1032	●	M2105-1032	●
10.40		0.4094	12	118	71	56	45	M2005-1040	○	M2105-1040	○
10.50		0.4134	12	118	71	56	45	M2005-1050	●	M2105-1050	●
10.60		0.4173	12	118	71	56	45	M2005-1060	○	M2105-1060	○
10.70		0.4213	12	118	71	56	45	M2005-1070	●	M2105-1070	●
10.72	27/64	0.4219	12	118	71	56	45	M2005-1072	●	M2105-1072	●
10.80		0.4252	12	118	71	56	45	M2005-1080	○	M2105-1080	○
10.90		0.4291	12	118	71	56	45	M2005-1090	○	M2105-1090	○
11.00		0.4331	12	118	71	56	45	M2005-1100	●	M2105-1100	●
11.10		0.4370	12	118	71	56	45	M2005-1110	○	M2105-1110	○
11.11	7/16	0.4375	12	118	71	56	45	M2005-1111	●	M2105-1111	●
11.20		0.4409	12	118	71	56	45	M2005-1120	●	M2105-1120	●
11.30		0.4449	12	118	71	56	45	M2005-1130	●	M2105-1130	●

For machining values see Page 28.

MEGA-Drill-Steel

M2005 / M2105

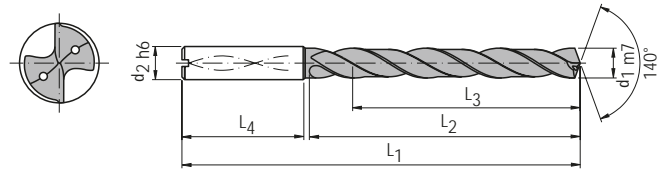
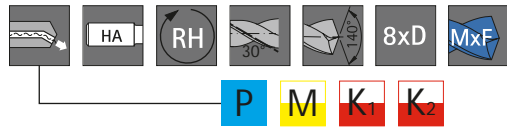
5xD

mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				 M2005	 M2105		
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm			Order code Form / Diameter	Order code Form / Diameter
11.40		0.4488	12	118	71	56	45	M2005-1140	●	M2105-1140	●
11.50	29/64	0.4528	12	118	71	56	45	M2005-1150	●	M2105-1150	●
11.60		0.4567	12	118	71	56	45	M2005-1160	○	M2105-1160	○
11.70		0.4606	12	118	71	56	45	M2005-1170	○	M2105-1170	○
11.80		0.4646	12	118	71	56	45	M2005-1180	●	M2105-1180	●
11.90	15/32	0.4685	12	118	71	56	45	M2005-1190	●	M2105-1190	●
12.00		0.4724	12	118	71	56	45	M2005-1200	●	M2105-1200	●
12.30	31/64	0.4843	14	124	77	60	45	M2005-1230	●	M2105-1230	●
12.50		0.4921	14	124	77	60	45	M2005-1250	●	M2105-1250	●
12.70	1/2	0.5000	14	124	77	60	45	M2005-1270	●	M2105-1270	●
12.80		0.5039	14	124	77	60	45	M2005-1280	●	M2105-1280	●
13.00		0.5118	14	124	77	60	45	M2005-1300	●	M2105-1300	●
13.10	33/64	0.5157	14	124	77	60	45	M2005-1310	●	M2105-1310	●
13.30		0.5236	14	124	77	60	45	M2005-1330	●	M2105-1330	●
13.50		0.5315	14	124	77	60	45	M2005-1350	●	M2105-1350	●
13.80		0.5433	14	124	77	60	45	M2005-1380	○	M2105-1380	○
14.00		0.5512	14	124	77	60	45	M2005-1400	●	M2105-1400	●
14.30	9/16	0.5630	16	133	83	63	48	M2005-1430	●	M2105-1430	●
14.50		0.5709	16	133	83	63	48	M2005-1450	●	M2105-1450	●
14.68	37/64	0.5780	16	133	83	63	48	M2005-1468	●	M2105-1468	●
14.80		0.5827	16	133	83	63	48	M2005-1480	●	M2105-1480	●
15.00		0.5906	16	133	83	63	48	M2005-1500	●	M2105-1500	●
15.08	19/32	0.5937	16	133	83	63	48	M2005-1508	●	M2105-1508	●
15.50		0.6102	16	133	83	63	48	M2005-1550	●	M2105-1550	●
15.80		0.6220	16	133	83	63	48	M2005-1580	○	M2105-1580	○
15.88	5/8	0.6250	16	133	83	63	48	M2005-1588	●	M2105-1588	●
16.00		0.6299	16	133	83	63	48	M2005-1600	●	M2105-1600	●
16.50		0.6496	18	143	93	71	48	M2005-1650	●	M2105-1650	●
16.67	21/32	0.6563	18	143	93	71	48	M2005-1667	●	M2105-1667	●
16.80		0.6614	18	143	93	71	48	M2005-1680	●	M2105-1680	●
17.00		0.6693	18	143	93	71	48	M2005-1700	●	M2105-1700	●
17.46	11/16	0.6874	18	143	93	71	48	M2005-1746	●	M2105-1746	●
17.50		0.6890	18	143	93	71	48	M2005-1750	●	M2105-1750	●
17.80		0.7008	18	143	93	71	48	M2005-1780	○	M2105-1780	○
17.86	45/64	0.7031	18	143	93	71	48	M2005-1786	●	M2105-1786	●
18.00		0.7087	18	143	93	71	48	M2005-1800	●	M2105-1800	●
18.26	23/32	0.7189	20	153	101	77	50	M2005-1826	●	M2105-1826	●
18.50		0.7283	20	153	101	77	50	M2005-1850	●	M2105-1850	●
18.80		0.7402	20	153	101	77	50	M2005-1880	○	M2105-1880	○
19.00		0.7480	20	153	101	77	50	M2005-1900	●	M2105-1900	●
19.05	3/4	0.7500	20	153	101	77	50	M2005-1905	●	M2105-1905	●
19.50		0.7677	20	153	101	77	50	M2005-1950	●	M2105-1950	●
19.80		0.7795	20	153	101	77	50	M2005-1980	○	M2105-1980	○
20.00		0.7874	20	153	101	77	50	M2005-2000	●	M2105-2000	●

For machining values see Page 28.

MEGA-Drill-Steel

M2108



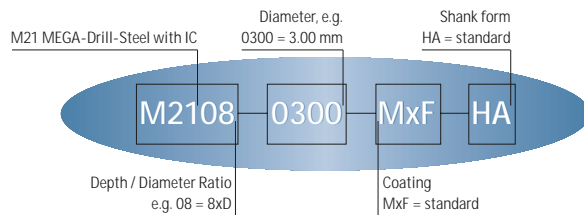
Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch

Bore tolerance: IT 9 (achievable)

No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:




Drill diameter		Shank diameter		Total length		Margin length		Maximum drilling depth		Shank length		M2108 Order code Form / Diameter
mm	Inch / Wire / Letter	Dec. equivalent Inch	d ₂ h ₆ mm	L ₁ mm	L ₂ mm	L ₃ mm	L ₄ mm	d ₁ m7	mm	mm		
3.00		0.1181	6	72	34	29	36				M2108-0300	●
3.10		0.1220	6	72	34	29	36				M2108-0310	●
3.18	1/8	0.1250	6	72	34	29	36				M2108-0318	●
3.20		0.1260	6	72	34	29	36				M2108-0320	●
3.30		0.1299	6	72	34	29	36				M2108-0330	●
3.40		0.1339	6	72	34	29	36				M2108-0340	○
3.45	#29	0.1358	6	72	34	29	36				M2108-0345	●
3.50		0.1378	6	72	34	29	36				M2108-0350	●
3.57	9/64	0.1406	6	72	34	29	36				M2108-0357	●
3.60		0.1417	6	72	34	29	36				M2108-0360	●
3.70		0.1457	6	72	34	29	36				M2108-0370	●
3.80	#25	0.1496	6	81	43	36	36				M2108-0380	●
3.86	#24	0.1520	6	81	43	36	36				M2108-0386	●
3.90		0.1535	6	81	43	36	36				M2108-0390	○
3.97	5/32	0.1562	6	81	43	36	36				M2108-0397	●
4.00		0.1575	6	81	43	36	36				M2108-0400	●
4.04	#21	0.1591	6	81	43	36	36				M2108-0404	●
4.10		0.1614	6	81	43	36	36				M2108-0410	●
4.20		0.1654	6	81	43	36	36				M2108-0420	●
4.30	#18	0.1693	6	81	43	36	36				M2108-0430	●
4.37	11/64	0.1719	6	81	43	36	36				M2108-0437	●
4.40		0.1732	6	81	43	36	36				M2108-0440	●
4.50	#16	0.1772	6	81	43	36	36				M2108-0450	●
4.60		0.1811	6	81	43	36	36				M2108-0460	●
4.62	#14	0.1819	6	81	43	36	36				M2108-0462	●

For machining values see Page 28.

MEGA-Drill-Steel M2108

8xD


Drill diameter d ₁ m7		Dimensions						 M2108 Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
4.70	#13	0.1850	6	81	43	36	36	M2108-0470	●
4.76	3/16	0.1875	6	95	57	48	36	M2108-0476	●
4.80	#12	0.1890	6	95	57	48	36	M2108-0480	○
4.90		0.1929	6	95	57	48	36	M2108-0490	○
5.00		0.1969	6	95	57	48	36	M2108-0500	●
5.10		0.2008	6	95	57	48	36	M2108-0510	●
5.16	13/64	0.2031	6	95	57	48	36	M2108-0516	●
5.20		0.2047	6	95	57	48	36	M2108-0520	●
5.30		0.2087	6	95	57	48	36	M2108-0530	○
5.40		0.2126	6	95	57	48	36	M2108-0540	○
5.50		0.2165	6	95	57	48	36	M2108-0550	●
5.56	7/32	0.2188	6	95	57	48	36	M2108-0556	●
5.60		0.2205	6	95	57	48	36	M2108-0560	●
5.70		0.2244	6	95	57	48	36	M2108-0570	●
5.80		0.2283	6	95	57	48	36	M2108-0580	○
5.90		0.2323	6	95	57	48	36	M2108-0590	●
5.95	15/64	0.2344	6	95	57	48	36	M2108-0595	●
6.00		0.2362	6	95	57	48	36	M2108-0600	●
6.10		0.2402	8	114	76	64	36	M2108-0610	○
6.15	C	0.2421	8	114	76	64	36	M2108-0615	●
6.20		0.2441	8	114	76	64	36	M2108-0620	○
6.30		0.2480	8	114	76	64	36	M2108-0630	○
6.35	1/4	0.2500	8	114	76	64	36	M2108-0635	●
6.40		0.2520	8	114	76	64	36	M2108-0640	○
6.50		0.2559	8	114	76	64	36	M2108-0650	●
6.53	F	0.2571	8	114	76	64	36	M2108-0653	●
6.60		0.2598	8	114	76	64	36	M2108-0660	●
6.63	G	0.2610	8	114	76	64	36	M2108-0663	●
6.70		0.2638	8	114	76	64	36	M2108-0670	○
6.75	17/64	0.2656	8	114	76	64	36	M2108-0675	●
6.80		0.2677	8	114	76	64	36	M2108-0680	●
6.90	I	0.2717	8	114	76	64	36	M2108-0690	●
7.00		0.2756	8	114	76	64	36	M2108-0700	●
7.10		0.2795	8	114	76	64	36	M2108-0710	○
7.14	9/32	0.2812	8	114	76	64	36	M2108-0714	●
7.20		0.2835	8	114	76	64	36	M2108-0720	●
7.30		0.2874	8	114	76	64	36	M2108-0730	●
7.40		0.2913	8	114	76	64	36	M2108-0740	●
7.50		0.2953	8	114	76	64	36	M2108-0750	●
7.54	19/64	0.2969	8	114	76	64	36	M2108-0754	●
7.60		0.2992	8	114	76	64	36	M2108-0760	●
7.70		0.3031	8	114	76	64	36	M2108-0770	●
7.80		0.3071	8	114	76	64	36	M2108-0780	●
7.90		0.3110	8	114	76	64	36	M2108-0790	○
7.94	5/16	0.3125	8	114	76	64	36	M2108-0794	●

For machining values see Page 28.

MEGA-Drill-Steel

M2108


8xD

Drill diameter		Dimensions						 M2108 Order code Form / Diameter	
mm	d ₁ m7 Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
8.00		0.3150	8	114	76	64	36	M2108-0800	●
8.10		0.3189	10	142	95	80	40	M2108-0810	○
8.20	P	0.3228	10	142	95	80	40	M2108-0820	○
8.30		0.3268	10	142	95	80	40	M2108-0830	○
8.33	21/64	0.3281	10	142	95	80	40	M2108-0833	●
8.40		0.3307	10	142	95	80	40	M2108-0840	○
8.43	Q	0.3319	10	142	95	80	40	M2108-0843	●
8.50		0.3346	10	142	95	80	40	M2108-0850	●
8.60		0.3386	10	142	95	80	40	M2108-0860	○
8.70		0.3425	10	142	95	80	40	M2108-0870	○
8.73	11/32	0.3438	10	142	95	80	40	M2108-0873	●
8.80		0.3465	10	142	95	80	40	M2108-0880	●
8.90		0.3504	10	142	95	80	40	M2108-0890	○
9.00		0.3543	10	142	95	80	40	M2108-0900	●
9.10		0.3583	10	142	95	80	40	M2108-0910	○
9.13	23/64	0.3594	10	142	95	80	40	M2108-0913	●
9.20		0.3622	10	142	95	80	40	M2108-0920	○
9.30		0.3661	10	142	95	80	40	M2108-0930	●
9.35	U	0.3681	10	142	95	80	40	M2108-0935	●
9.40		0.3701	10	142	95	80	40	M2108-0940	●
9.50		0.3740	10	142	95	80	40	M2108-0950	●
9.53	3/8	0.3750	10	142	95	80	40	M2108-0953	●
9.60		0.3780	10	142	95	80	40	M2108-0960	●
9.70		0.3819	10	142	95	80	40	M2108-0970	○
9.80	W	0.3858	10	142	95	80	40	M2108-0980	○
9.90		0.3898	10	142	95	80	40	M2108-0990	●
9.92	25/64	0.3906	10	142	95	80	40	M2108-0992	●
10.00		0.3937	10	142	95	80	40	M2108-1000	●
10.10		0.3976	12	162	114	96	45	M2108-1010	○
10.20		0.4016	12	162	114	96	45	M2108-1020	●
10.26	Y	0.4039	12	162	114	96	45	M2108-1026	●
10.30		0.4055	12	162	114	96	45	M2108-1030	●
10.32	13/32	0.4062	12	162	114	96	45	M2108-1032	●
10.40		0.4094	12	162	114	96	45	M2108-1040	○
10.50		0.4134	12	162	114	96	45	M2108-1050	●
10.60		0.4173	12	162	114	96	45	M2108-1060	○
10.70		0.4213	12	162	114	96	45	M2108-1070	●
10.72	27/64	0.4219	12	162	114	96	45	M2108-1072	●
10.80		0.4252	12	162	114	96	45	M2108-1080	○
10.90		0.4291	12	162	114	96	45	M2108-1090	○
11.00		0.4331	12	162	114	96	45	M2108-1100	●
11.10		0.4370	12	162	114	96	45	M2108-1110	○
11.11	7/16	0.4375	12	162	114	96	45	M2108-1111	●
11.20		0.4409	12	162	114	96	45	M2108-1120	●
11.30		0.4449	12	162	114	96	45	M2108-1130	●

For machining values see Page 28.

MEGA-Drill-Steel M2108

8xD

Drill diameter d ₁ m7		Dimensions						 M2108 Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
11.40		0.4488	12	162	114	96	45	M2108-1140	●
11.50	29/64	0.4528	12	162	114	96	45	M2108-1150	●
11.60		0.4567	12	162	114	96	45	M2108-1160	○
11.70		0.4606	12	162	114	96	45	M2108-1170	○
11.80		0.4646	12	162	114	96	45	M2108-1180	○
11.90	15/32	0.4685	12	162	114	96	45	M2108-1190	●
12.00		0.4724	12	162	114	96	45	M2108-1200	●
12.30	31/64	0.4843	14	178	133	112	45	M2108-1230	○
12.50		0.4921	14	178	133	112	45	M2108-1250	●
12.70	1/2	0.5000	14	178	133	112	45	M2108-1270	●
12.80		0.5039	14	178	133	112	45	M2108-1280	●
13.00		0.5118	14	178	133	112	45	M2108-1300	●
13.10	33/64	0.5157	14	178	133	112	45	M2108-1310	○
13.30		0.5236	14	178	133	112	45	M2108-1330	●
13.50		0.5315	14	178	133	112	45	M2108-1350	●
13.80		0.5433	14	178	133	112	45	M2108-1380	○
14.00		0.5512	14	178	133	112	45	M2108-1400	●
14.30	9/16	0.5630	16	203	152	128	48	M2108-1430	●
14.50		0.5709	16	203	152	128	48	M2108-1450	●
14.68	37/64	0.5780	16	203	152	128	48	M2108-1468	●
14.80		0.5827	16	203	152	128	48	M2108-1480	●
15.00		0.5906	16	203	152	128	48	M2108-1500	●
15.08	19/32	0.5937	16	203	152	128	48	M2108-1508	●
15.50		0.6102	16	203	152	128	48	M2108-1550	●
15.80		0.6220	16	203	152	128	48	M2108-1580	○
15.88	5/8	0.6250	16	203	152	128	48	M2108-1588	●
16.00		0.6299	16	203	152	128	48	M2108-1600	●
16.50		0.6496	18	222	171	144	48	M2108-1650	●
16.67	21/32	0.6563	18	222	171	144	48	M2108-1667	●
16.80		0.6614	18	222	171	144	48	M2108-1680	●
17.00		0.6693	18	222	171	144	48	M2108-1700	●
17.46	11/16	0.6874	18	222	171	144	48	M2108-1746	●
17.50		0.6890	18	222	171	144	48	M2108-1750	●
17.80		0.7008	18	222	171	144	48	M2108-1780	○
17.86	45/64	0.7031	18	222	171	144	48	M2108-1786	●
18.00		0.7087	18	222	171	144	48	M2108-1800	●
18.26	23/32	0.7189	20	243	190	160	50	M2108-1826	●
18.50		0.7283	20	243	190	160	50	M2108-1850	●
18.80		0.7402	20	243	190	160	50	M2108-1880	○
19.00		0.7480	20	243	190	160	50	M2108-1900	●
19.05	3/4	0.7500	20	243	190	160	50	M2108-1905	●
19.50		0.7677	20	243	190	160	50	M2108-1950	●
19.80		0.7795	20	243	190	160	50	M2108-1980	○
20.00		0.7874	20	243	190	160	50	M2108-2000	○

For machining values see Page 28.

Machining values for MEGA-Drill-Steel



M2003, M2005



M2103, M2105, M2108



M2003, M2005

	Material	Hardness Rockwell (HRc) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c)				
		HRc	BHN	N/mm ²	M2003 M2005		M2103 M2105 M2108		
				SFM	m/min	SFM	m/min		
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8	up to 178	up to 600	279-328	85-100	312-377	95-115	
		up to 15	up to 205	up to 700	246-295	75-90	279-344	85-105	
		over 15	over 205	over 700	213-262	65-80	246-295	75-90	
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27	up to 266	up to 900	180-246	55-75	197-279	60-85	
		up to 31	up to 297	up to 1000	147-197	45-60	164-230	50-70	
		over 31	over 297	over 1000	115-164	35-50	131-197	40-60	
M	Stainless steels Inox 17-4PH, 15-5PH						98-164	30-50	
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2						98-131	30-40	
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14	up to 200	up to 680	230-361	70-110	262-427	80-130	
		up to 24	up to 250	up to 850	197-312	60-95	230-377	70-115	
		over 24	over 250	over 850	164-262	50-80	197-328	60-100	
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8	up to 178	up to 600	213-279	65-85	246-295	75-90	
		over 8	over 178	over 600	180-230	55-70	213-262	65-80	
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360								
	Aluminium (Si content < 10%) 413, 385, A390								
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO								
S	Titanium alloys TiAl4V								
	Nickel alloys Inconel 718, Rene 41, Waspolloy								
H	Chilled cast iron	38-48	350-450	1173-1527	115-197	35-60	131-230	40-70	
	Hardened steel	50-55		1614-1870					
		56-60							
		61-65							

The guideline values for cutting speed v_c should be multiplied by the following correction factors KF_v according to the drilling depth:

Depth / Diameter ratio	KF _v
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8
8 x D	0.7



M2103, M2105, M2108

Recommended feed (f) for diameter ranges										
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm		
IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.012	0.20-0.30	0.010-0.016	0.25-0.40	
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.014	0.20-0.35	0.010-0.016	0.25-0.40	
0.004-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38	0.010-0.017	0.25-0.42	
0.004-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38	0.010-0.017	0.25-0.42	
0.004-0.006	0.10-0.15	0.005-0.008	0.12-0.20	0.005-0.010	0.14-0.25	0.006-0.012	0.16-0.30	0.007-0.013	0.18-0.32	
0.004-0.006	0.10-0.15	0.005-0.008	0.12-0.20	0.005-0.010	0.14-0.25	0.006-0.012	0.16-0.30	0.007-0.013	0.18-0.32	
0.002-0.005	0.06-0.12	0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.004-0.008	0.10-0.20	0.006-0.010	0.15-0.25	
0.002-0.005	0.06-0.12	0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.004-0.008	0.10-0.20	0.006-0.010	0.15-0.25	
0.004-0.010	0.10-0.25	0.006-0.012	0.15-0.30	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.008-0.014	0.20-0.35	0.012-0.016	0.30-0.40	0.014-0.020	0.35-0.50	
0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.007-0.012	0.18-0.30	0.010-0.014	0.25-0.35	0.012-0.016	0.30-0.40	
0.002-0.004	0.06-0.10	0.003-0.005	0.08-0.12	0.004-0.005	0.10-0.14	0.005-0.006	0.12-0.16	0.005-0.007	0.14-0.18	

MEGA-Drill-Steel, alteration to standard product



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Request Order

Company _____ Customer number (if available) _____
 Contact partner _____ Tel./Fax _____ E-Mail _____
 Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore:

- Through hole
 Blind bore

- Unalloyed steel
 Cast steel
 Alloyed steel
 Inox
 Stainless/acid-resistant steel
 Grey cast iron
 Alloyed grey cast iron
 Nodular iron
 CGI
 Malleable iron
- Chilled cast iron
 Hardened steel

Machining method:

- wet dry
 min. lubrication

Coolant supply:

- Ext. Int.
- 
- 

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

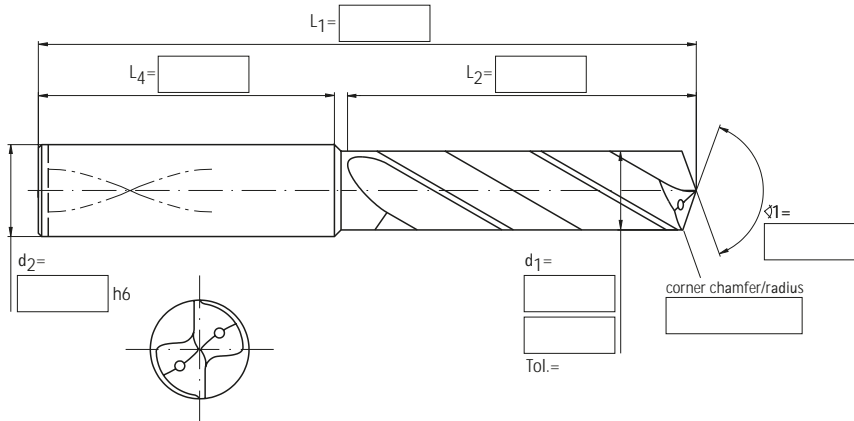
MAPAL code (e.g. M2003): _____

Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)




Coating:

(if you wish to choose yourself)

- MxF
 MxH
 TiAlN
 uncoated



Shank form:

- HA (DIN 6535) 
 HB (DIN 6535) 
 HE (DIN 6535) 

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

- Groove form: MEGA GG ALU INOX _____
- Coating: MxF MxH TiAlN uncoated _____
- Radial land on face: Radial land on taper surface Radial land on 4 faces Round point Spiral point

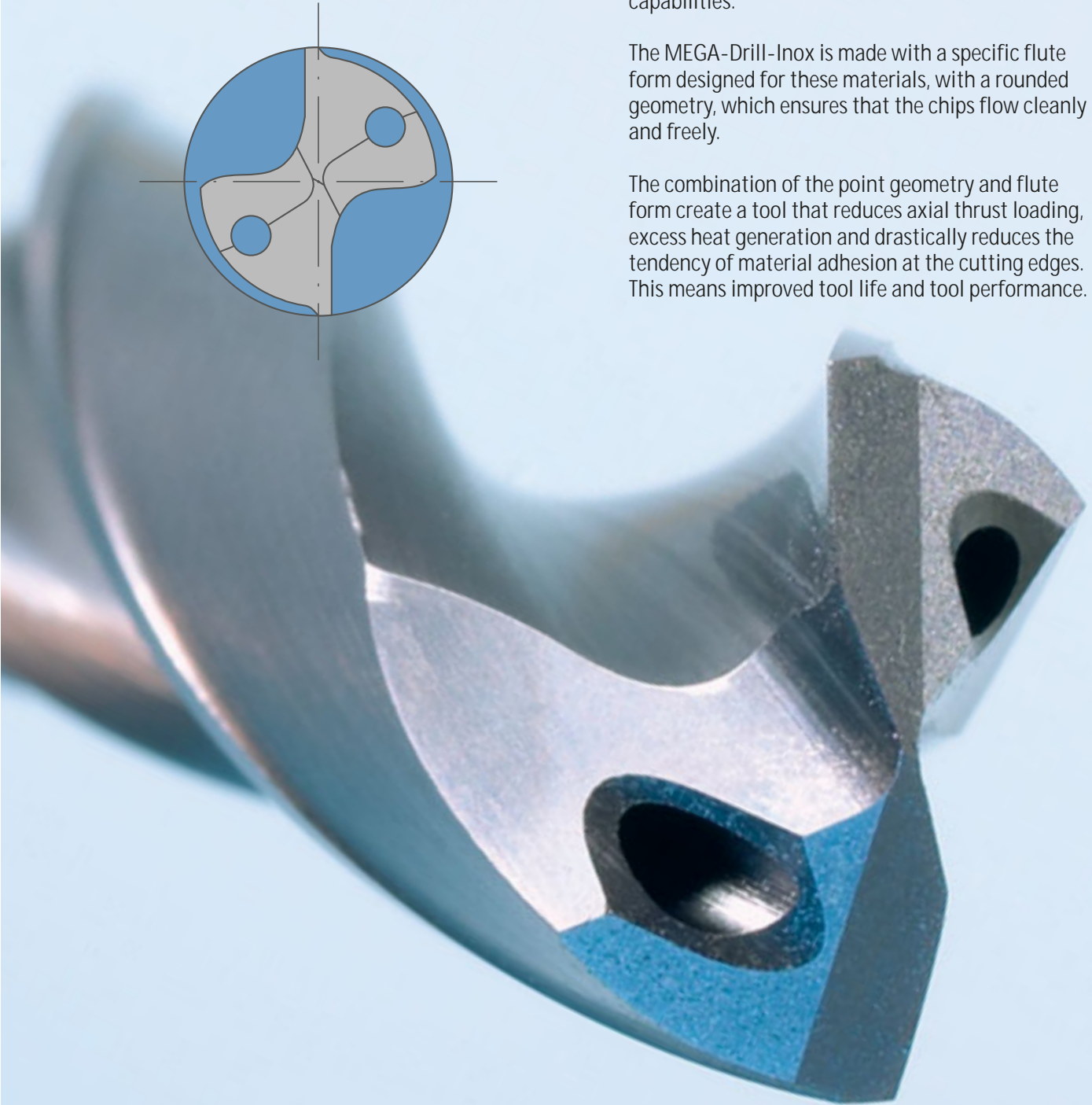
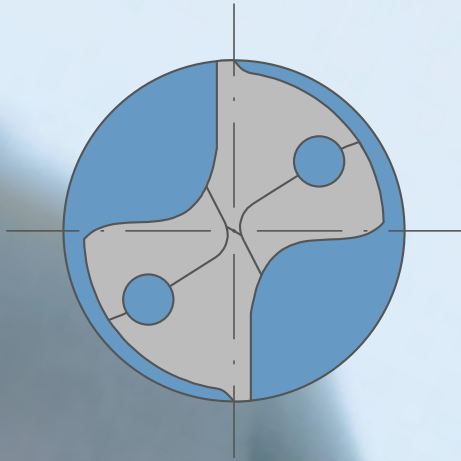
Blank (MC): _____

MEGA-Drill-Inox

The MEGA-Drill-Inox is specifically designed for the efficient drilling of difficult to machine materials e.g. stainless steels and high temperature alloys like those found in the aerospace industry. When machining these types of materials, the best results are achieved with drills, which have an optimized and sharp cutting edge that allows for improved shearing capabilities.

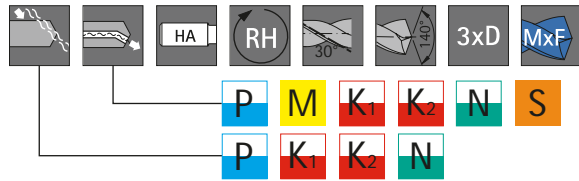
The MEGA-Drill-Inox is made with a specific flute form designed for these materials, with a rounded geometry, which ensures that the chips flow cleanly and freely.

The combination of the point geometry and flute form create a tool that reduces axial thrust loading, excess heat generation and drastically reduces the tendency of material adhesion at the cutting edges. This means improved tool life and tool performance.



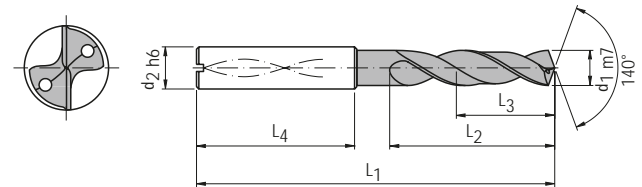
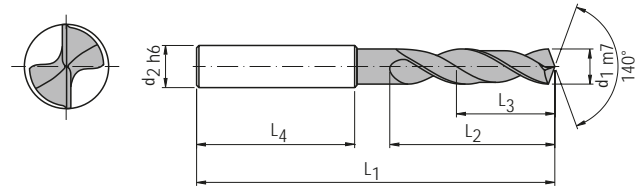
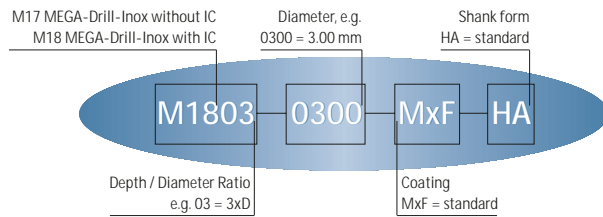
MEGA-Drill-Inox

M1703 / M1803



Design:
 Drill diameter: 3.00 – 20.00 mm
 0.1181 – 0.7874 Inch
 Bore tolerance: IT 9 (achievable)
 No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
 Complete order code:





Drill diameter			Dimensions					M1703	M1803		
mm	Inch / Wire / Letter	Dec. equiv. Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	Order code	Order code		
								Form / Diameter	Form / Diameter		
3.00		0.1181	6	62	22	14	36	M1703-0300	●	M1803-0300	●
3.10		0.1220	6	62	22	14	36	M1703-0310	●	M1803-0310	●
3.18	1/8	0.1250	6	62	22	14	36	M1703-0318	●	M1803-0318	●
3.20		0.1260	6	62	22	14	36	M1703-0320	●	M1803-0320	○
3.30		0.1299	6	62	22	14	36	M1703-0330	●	M1803-0330	●
3.40		0.1339	6	62	22	14	36	M1703-0340	○	M1803-0340	○
3.45	#29	0.1358	6	62	22	14	36	M1703-0345	●	M1803-0345	●
3.50		0.1378	6	62	22	14	36	M1703-0350	●	M1803-0350	●
3.57	9/64	0.1406	6	62	22	14	36	M1703-0357	●	M1803-0357	●
3.60		0.1417	6	62	22	14	36	M1703-0360	●	M1803-0360	●
3.70		0.1457	6	62	22	14	36	M1703-0370	○	M1803-0370	●
3.80	#25	0.1496	6	66	26	17	36	M1703-0380	●	M1803-0380	○
3.86	#24	0.1520	6	66	26	17	36	M1703-0386	●	M1803-0386	●
3.90		0.1535	6	66	26	17	36	M1703-0390	○	M1803-0390	○
3.97	5/32	0.1562	6	66	26	17	36	M1703-0397	●	M1803-0397	●
4.00		0.1575	6	66	26	17	36	M1703-0400	●	M1803-0400	●
4.04	#21	0.1591	6	66	26	17	36	M1703-0404	●	M1803-0404	●
4.10		0.1614	6	66	26	17	36	M1703-0410	●	M1803-0410	●
4.20		0.1654	6	66	26	17	36	M1703-0420	●	M1803-0420	●
4.30	#18	0.1693	6	66	26	17	36	M1703-0430	○	M1803-0430	●
4.37	11/64	0.1719	6	66	26	17	36	M1703-0437	●	M1803-0437	●
4.40		0.1732	6	66	26	17	36	M1703-0440	●	M1803-0440	●
4.50	#16	0.1772	6	66	26	17	36	M1703-0450	●	M1803-0450	●
4.60		0.1811	6	66	26	17	36	M1703-0460	○	M1803-0460	●
4.62	#14	0.1819	6	66	26	17	36	M1703-0462	●	M1803-0462	●

For machining values see Page 40.

MEGA-Drill-Inox

M1703 / M1803

3xD

mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				M1703 	M1803 		
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm			Order code Form / Diameter	Order code Form / Diameter
4.70	#13	0.1850	6	66	26	17	36	M1703-0470	●	M1803-0470	●
4.76	3/16	0.1875	6	66	30	20	36	M1703-0476	●	M1803-0476	●
4.80	#12	0.1890	6	66	30	20	36	M1703-0480	●	M1803-0480	○
4.90		0.1929	6	66	30	20	36	M1703-0490	○	M1803-0490	○
5.00		0.1969	6	66	30	20	36	M1703-0500	●	M1803-0500	●
5.10		0.2008	6	66	30	20	36	M1703-0510	●	M1803-0510	●
5.16	13/64	0.2031	6	66	30	20	36	M1703-0516	●	M1803-0516	●
5.20		0.2047	6	66	30	20	36	M1703-0520	○	M1803-0520	●
5.30		0.2087	6	66	30	20	36	M1703-0530	○	M1803-0530	○
5.40		0.2126	6	66	30	20	36	M1703-0540	○	M1803-0540	○
5.50		0.2165	6	66	30	20	36	M1703-0550	●	M1803-0550	●
5.56	7/32	0.2188	6	66	30	20	36	M1703-0556	●	M1803-0556	●
5.60		0.2205	6	66	30	20	36	M1703-0560	●	M1803-0560	●
5.70		0.2244	6	66	30	20	36	M1703-0570	○	M1803-0570	○
5.80		0.2283	6	66	30	20	36	M1703-0580	○	M1803-0580	○
5.90		0.2323	6	66	30	20	36	M1703-0590	○	M1803-0590	●
5.95	15/64	0.2344	6	66	30	20	36	M1703-0595	●	M1803-0595	●
6.00		0.2362	6	66	30	20	36	M1703-0600	●	M1803-0600	●
6.10		0.2402	8	79	38	24	36	M1703-0610	●	M1803-0610	○
6.15	C	0.2421	8	79	38	24	36			M1803-0615	●
6.20		0.2441	8	79	38	24	36	M1703-0620	○	M1803-0620	○
6.30		0.2480	8	79	38	24	36	M1703-0630	○	M1803-0630	○
6.35	1/4	0.2500	8	79	38	24	36	M1703-0635	●	M1803-0635	●
6.40		0.2520	8	79	38	24	36	M1703-0640	○	M1803-0640	○
6.50		0.2559	8	79	38	24	36	M1703-0650	●	M1803-0650	●
6.53	F	0.2571	8	79	38	24	36	M1703-0653	●	M1803-0653	●
6.60		0.2598	8	79	38	24	36	M1703-0660	○	M1803-0660	●
6.63	G	0.2610	8	79	38	24	36	M1703-0663	●	M1803-0663	●
6.70		0.2638	8	79	38	24	36	M1703-0670	○	M1803-0670	○
6.75	17/64	0.2656	8	79	38	24	36	M1703-0675	●	M1803-0675	●
6.80		0.2677	8	79	38	24	36	M1703-0680	●	M1803-0680	●
6.90	I	0.2717	8	79	38	24	36	M1703-0690	●	M1803-0690	●
7.00		0.2756	8	79	38	24	36	M1703-0700	●	M1803-0700	●
7.10		0.2795	8	79	42	29	36	M1703-0710	○	M1803-0710	○
7.14	9/32	0.2812	8	79	42	29	36	M1703-0714	●	M1803-0714	●
7.20		0.2835	8	79	42	29	36	M1703-0720	●	M1803-0720	●
7.30		0.2874	8	79	42	29	36	M1703-0730	○	M1803-0730	●
7.40		0.2913	8	79	42	29	36	M1703-0740	●	M1803-0740	●
7.50		0.2953	8	79	42	29	36	M1703-0750	●	M1803-0750	●
7.54	19/64	0.2969	8	79	42	29	36	M1703-0754	●	M1803-0754	●
7.60		0.2992	8	79	42	29	36	M1703-0760	○	M1803-0760	●
7.70		0.3031	8	79	42	29	36	M1703-0770	●	M1803-0770	●
7.80		0.3071	8	79	42	29	36	M1703-0780	●	M1803-0780	●
7.90		0.3110	8	79	42	29	36	M1703-0790	○	M1803-0790	○
7.94	5/16	0.3125	8	79	42	29	36	M1703-0794	●	M1803-0794	●

For machining values see Page 40.

MEGA-Drill-Inox

M1703 / M1803

3xD

Drill diameter		Dimensions						M1703		M1803	
mm	d ₁ m7	Dec. equiv. Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	Order code Form / Diameter	Order code Form / Diameter		
	Inch / Wire / Letter										
8.00		0.3150	8	79	42	29	36	M1703-0800	●	M1803-0800	●
8.10		0.3189	10	89	49	35	40	M1703-0810	○	M1803-0810	○
8.20	P	0.3228	10	89	49	35	40	M1703-0820	○	M1803-0820	○
8.30		0.3268	10	89	49	35	40	M1703-0830	○	M1803-0830	○
8.33	21/64	0.3281	10	89	49	35	40	M1703-0833	●	M1803-0833	●
8.40		0.3307	10	89	49	35	40	M1703-0840	○	M1803-0840	○
8.43	Q	0.3319	10	89	49	35	40	M1703-0843	●	M1803-0843	●
8.50		0.3346	10	89	49	35	40	M1703-0850	●	M1803-0850	●
8.60		0.3386	10	89	49	35	40	M1703-0860	○	M1803-0860	○
8.70		0.3425	10	89	49	35	40	M1703-0870	○	M1803-0870	○
8.73	11/32	0.3438	10	89	49	35	40	M1703-0873	●	M1803-0873	●
8.80		0.3465	10	89	49	35	40	M1703-0880	●	M1803-0880	●
8.90		0.3504	10	89	49	35	40	M1703-0890	○	M1803-0890	○
9.00		0.3543	10	89	49	35	40	M1703-0900	●	M1803-0900	●
9.10		0.3583	10	89	49	35	40	M1703-0910	○	M1803-0910	○
9.13	23/64	0.3594	10	89	49	35	40	M1703-0913	●	M1803-0913	●
9.20		0.3622	10	89	49	35	40	M1703-0920	○	M1803-0920	○
9.30		0.3661	10	89	49	35	40	M1703-0930	○	M1803-0930	○
9.35	U	0.3681	10	89	49	35	40	M1703-0935	●	M1803-0935	●
9.40		0.3701	10	89	49	35	40	M1703-0940	●	M1803-0940	●
9.50		0.3740	10	89	49	35	40	M1703-0950	●	M1803-0950	●
9.53	3/8	0.3750	10	89	49	35	40	M1703-0953	●	M1803-0953	●
9.60		0.3780	10	89	49	35	40	M1703-0960	○	M1803-0960	○
9.70		0.3819	10	89	49	35	40	M1703-0970	○	M1803-0970	○
9.80	W	0.3858	10	89	49	35	40	M1703-0980	○	M1803-0980	○
9.90		0.3898	10	89	49	35	40	M1703-0990	●	M1803-0990	●
9.92	25/64	0.3906	10	89	49	35	40	M1703-0992	●	M1803-0992	●
10.00		0.3937	10	89	49	35	40	M1703-1000	●	M1803-1000	●
10.10		0.3976	12	102	56	40	45	M1703-1010	○	M1803-1010	○
10.20		0.4016	12	102	56	40	45	M1703-1020	●	M1803-1020	●
10.26	Y	0.4039	12	102	56	40	45	M1703-1026	●	M1803-1026	●
10.30		0.4055	12	102	56	40	45	M1703-1030	○	M1803-1030	○
10.32	13/32	0.4062	12	102	56	40	45	M1703-1032	●	M1803-1032	●
10.40		0.4094	12	102	56	40	45	M1703-1040	○	M1803-1040	○
10.50		0.4134	12	102	56	40	45	M1703-1050	●	M1803-1050	●
10.60		0.4173	12	102	56	40	45	M1703-1060	○	M1803-1060	○
10.70		0.4213	12	102	56	40	45	M1703-1070	○	M1803-1070	○
10.72	27/64	0.4219	12	102	56	40	45	M1703-1072	●	M1803-1072	●
10.80		0.4252	12	102	56	40	45	M1703-1080	○	M1803-1080	○
10.90		0.4291	12	102	56	40	45	M1703-1090	○	M1803-1090	○
11.00		0.4331	12	102	56	40	45	M1703-1100	●	M1803-1100	●
11.10		0.4370	12	102	56	40	45	M1703-1110	○	M1803-1110	○
11.11	7/16	0.4375	12	102	56	40	45	M1703-1111	●	M1803-1111	●
11.20		0.4409	12	102	56	40	45	M1703-1120	●	M1803-1120	●
11.30		0.4449	12	102	56	40	45	M1703-1130	○	M1803-1130	○

For machining values see Page 40.

MEGA-Drill-Inox

M1703 / M1803

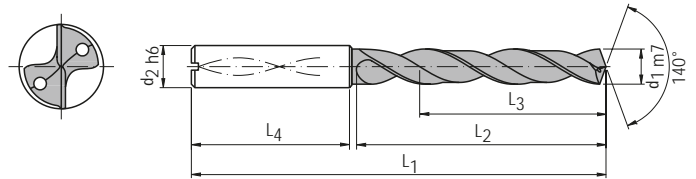
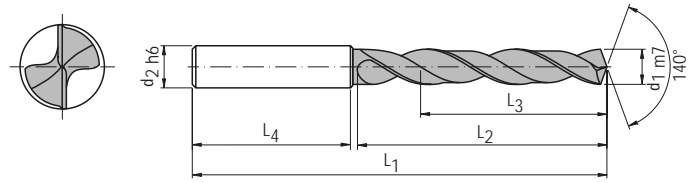
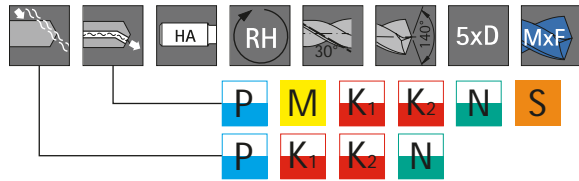
3xD

mm	Drill diameter		Dimensions					M1703		M1803	
	d1 m7	Dec. equiv. Inch	Shank diameter d2 h6 mm	Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm	Order code Form / Diameter	Order code Form / Diameter		
	Inch / Wire / Letter										
11.40		0.4488	12	102	56	40	45	M1703-1140	○	M1803-1140	●
11.50	29/64	0.4528	12	102	56	40	45	M1703-1150	●	M1803-1150	●
11.60		0.4567	12	102	56	40	45	M1703-1160	○	M1803-1160	○
11.70		0.4606	12	102	56	40	45	M1703-1170	○	M1803-1170	○
11.80		0.4646	12	102	56	40	45	M1703-1180	●	M1803-1180	○
11.90	15/32	0.4685	12	102	56	40	45	M1703-1190	○	M1803-1190	●
12.00		0.4724	12	102	56	40	45	M1703-1200	●	M1803-1200	●
12.30	31/64	0.4843	14	107	61	43	45	M1703-1230	●	M1803-1230	○
12.50		0.4921	14	107	61	43	45	M1703-1250	●	M1803-1250	●
12.70	1/2	0.5000	14	107	61	43	45	M1703-1270	●	M1803-1270	●
12.80		0.5039	14	107	61	43	45	M1703-1280	●	M1803-1280	●
13.00		0.5118	14	107	61	43	45	M1703-1300	●	M1803-1300	●
13.10	33/64	0.5157	14	107	61	43	45	M1703-1310	○	M1803-1310	●
13.30		0.5236	14	107	61	43	45	M1703-1330	●	M1803-1330	●
13.50		0.5315	14	107	61	43	45	M1703-1350	●	M1803-1350	●
13.80		0.5433	14	107	61	43	45	M1703-1380	○	M1803-1380	○
14.00		0.5512	14	107	61	43	45	M1703-1400	●	M1803-1400	●
14.30	9/16	0.5630	16	115	65	45	48	M1703-1430	○	M1803-1430	○
14.50		0.5709	16	115	65	45	48	M1703-1450	●	M1803-1450	●
14.68	37/64	0.5780	16	115	65	45	48	M1703-1468	●	M1803-1468	●
14.80		0.5827	16	115	65	45	48	M1703-1480	●	M1803-1480	●
15.00		0.5906	16	115	65	45	48	M1703-1500	●	M1803-1500	●
15.08	19/32	0.5937	16	115	65	45	48	M1703-1508	●	M1803-1508	●
15.50		0.6102	16	115	65	45	48	M1703-1550	●	M1803-1550	●
15.80		0.6220	16	115	65	45	48	M1703-1580	○	M1803-1580	○
15.88	5/8	0.6250	16	115	65	45	48	M1703-1588	●	M1803-1588	●
16.00		0.6299	16	115	65	45	48	M1703-1600	●	M1803-1600	●
16.50		0.6496	18	123	73	51	48	M1703-1650	●	M1803-1650	●
16.67	21/32	0.6563	18	123	73	51	48	M1703-1667	●	M1803-1667	●
16.80		0.6614	18	123	73	51	48	M1703-1680	●	M1803-1680	●
17.00		0.6693	18	123	73	51	48	M1703-1700	●	M1803-1700	●
17.46	11/16	0.6874	18	123	73	51	48	M1703-1746	●	M1803-1746	●
17.50		0.6890	18	123	73	51	48	M1703-1750	●	M1803-1750	●
17.80		0.7008	18	123	73	51	48	M1703-1780	○	M1803-1780	○
17.86	45/64	0.7031	18	123	73	51	48	M1703-1786	●	M1803-1786	●
18.00		0.7087	18	123	73	51	48	M1703-1800	●	M1803-1800	●
18.26	23/32	0.7189	20	131	79	55	50	M1703-1826	●	M1803-1826	●
18.50		0.7283	20	131	79	55	50	M1703-1850	●	M1803-1850	●
18.80		0.7402	20	131	79	55	50	M1703-1880	○	M1803-1880	○
19.00		0.7480	20	131	79	55	50	M1703-1900	●	M1803-1900	●
19.05	3/4	0.7500	20	131	79	55	50	M1703-1905	●	M1803-1905	●
19.50		0.7677	20	131	79	55	50	M1703-1950	○	M1803-1950	●
19.80		0.7795	20	131	79	55	50	M1703-1980	○	M1803-1980	○
20.00		0.7874	20	131	79	55	50	M1703-2000	●	M1803-2000	●

For machining values see Page 40.

MEGA-Drill-Inox

M1705 / M1805



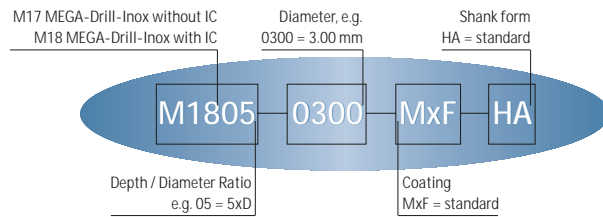
Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch

Bore tolerance: IT 9 (achievable)

No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:



Drill diameter			Dimensions					M1705		M1805	
mm	d ₁ m7		Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	Order code Form / Diameter	Order code Form / Diameter		
	Inch / Wire / Letter	Dec. equiv. Inch									
3.00		0.1181	6	66	28	23	36	M1705-0300	●	M1805-0300	●
3.10		0.1220	6	66	28	23	36	M1705-0310	●	M1805-0310	●
3.18	1/8	0.1250	6	66	28	23	36	M1705-0318	●	M1805-0318	●
3.20		0.1260	6	66	28	23	36	M1705-0320	○	M1805-0320	●
3.30		0.1299	6	66	28	23	36	M1705-0330	●	M1805-0330	●
3.40		0.1339	6	66	28	23	36	M1705-0340	○	M1805-0340	○
3.45	#29	0.1358	6	66	28	23	36	M1705-0345	●	M1805-0345	●
3.50		0.1378	6	66	28	23	36	M1705-0350	●	M1805-0350	●
3.57	9/64	0.1406	6	66	28	23	36	M1705-0357	●	M1805-0357	●
3.60		0.1417	6	66	28	23	36	M1705-0360	●	M1805-0360	●
3.70		0.1457	6	66	28	23	36	M1705-0370	●	M1805-0370	●
3.80	#25	0.1496	6	74	36	29	36	M1705-0380	●	M1805-0380	●
3.86	#24	0.1520	6	74	36	29	36	M1705-0386	●	M1805-0386	●
3.90		0.1535	6	74	36	29	36	M1705-0390	○	M1805-0390	○
3.97	5/32	0.1562	6	74	36	29	36	M1705-0397	●	M1805-0397	●
4.00		0.1575	6	74	36	29	36	M1705-0400	●	M1805-0400	●
4.04	#21	0.1591	6	74	36	29	36	M1705-0404	●	M1805-0404	●
4.10		0.1614	6	74	36	29	36	M1705-0410	●	M1805-0410	●
4.20		0.1654	6	74	36	29	36	M1705-0420	●	M1805-0420	●
4.30	#18	0.1693	6	74	36	29	36	M1705-0430	●	M1805-0430	●
4.37	11/64	0.1719	6	74	36	29	36	M1705-0437	●	M1805-0437	●
4.40		0.1732	6	74	36	29	36	M1705-0440	○	M1805-0440	●
4.50	#16	0.1772	6	74	36	29	36	M1705-0450	●	M1805-0450	●
4.60		0.1811	6	74	36	29	36	M1705-0460	●	M1805-0460	●
4.62	#14	0.1819	6	74	36	29	36	M1705-0462	●	M1805-0462	●

For machining values see Page 40.

MEGA-Drill-Inox

M1705 / M1805

5xD



mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				Shank length L4 mm	M1705		M1805	
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Order code Form / Diameter		Order code Form / Diameter			
4.70	#13	0.1850	6	74	36	29	36	M1705-0470	●	M1805-0470	●	
4.76	3/16	0.1875	6	82	44	35	36	M1705-0476	●	M1805-0476	●	
4.80	#12	0.1890	6	82	44	35	36	M1705-0480	○	M1805-0480	●	
4.90		0.1929	6	82	44	35	36	M1705-0490	○	M1805-0490	○	
5.00		0.1969	6	82	44	35	36	M1705-0500	●	M1805-0500	●	
5.10		0.2008	6	82	44	35	36	M1705-0510	●	M1805-0510	●	
5.16	13/64	0.2031	6	82	44	35	36	M1705-0516	●	M1805-0516	●	
5.20		0.2047	6	82	44	35	36	M1705-0520	●	M1805-0520	●	
5.30		0.2087	6	82	44	35	36	M1705-0530	○	M1805-0530	○	
5.40		0.2126	6	82	44	35	36	M1705-0540	○	M1805-0540	○	
5.50		0.2165	6	82	44	35	36	M1705-0550	●	M1805-0550	●	
5.56	7/32	0.2188	6	82	44	35	36	M1705-0556	●	M1805-0556	●	
5.60		0.2205	6	82	44	35	36	M1705-0560	○	M1805-0560	●	
5.70		0.2244	6	82	44	35	36	M1705-0570	○	M1805-0570	●	
5.80		0.2283	6	82	44	35	36	M1705-0580	○	M1805-0580	○	
5.90		0.2323	6	82	44	35	36	M1705-0590	○	M1805-0590	●	
5.95	15/64	0.2344	6	82	44	35	36	M1705-0595	●	M1805-0595	●	
6.00		0.2362	6	82	44	35	36	M1705-0600	●	M1805-0600	●	
6.10		0.2402	8	91	53	43	36	M1705-0610	○	M1805-0610	○	
6.15	C	0.2421	8	91	53	43	36	M1705-0615	●	M1805-0615	●	
6.20		0.2441	8	91	53	43	36	M1705-0620	○	M1805-0620	○	
6.30		0.2480	8	91	53	43	36	M1705-0630	○	M1805-0630	○	
6.35	1/4	0.2500	8	91	53	43	36	M1705-0635	●	M1805-0635	●	
6.40		0.2520	8	91	53	43	36	M1705-0640	○	M1805-0640	○	
6.50		0.2559	8	91	53	43	36	M1705-0650	●	M1805-0650	●	
6.53	F	0.2571	8	91	53	43	36	M1705-0653	●	M1805-0653	●	
6.60		0.2598	8	91	53	43	36	M1705-0660	●	M1805-0660	○	
6.63	G	0.2610	8	91	53	43	36	M1705-0663	●	M1805-0663	●	
6.70		0.2638	8	91	53	43	36	M1705-0670	○	M1805-0670	○	
6.75	17/64	0.2656	8	91	53	43	36	M1705-0675	●	M1805-0675	●	
6.80		0.2677	8	91	53	43	36	M1705-0680	●	M1805-0680	●	
6.90	I	0.2717	8	91	53	43	36	M1705-0690	●	M1805-0690	●	
7.00		0.2756	8	91	53	43	36	M1705-0700	●	M1805-0700	●	
7.10		0.2795	8	91	53	43	36	M1705-0710	○	M1805-0710	○	
7.14	9/32	0.2812	8	91	53	43	36	M1705-0714	●	M1805-0714	●	
7.20		0.2835	8	91	53	43	36	M1705-0720	●	M1805-0720	●	
7.30		0.2874	8	91	53	43	36	M1705-0730	○	M1805-0730	●	
7.40		0.2913	8	91	53	43	36	M1705-0740	○	M1805-0740	●	
7.50		0.2953	8	91	53	43	36	M1705-0750	●	M1805-0750	●	
7.54	19/64	0.2969	8	91	53	43	36	M1705-0754	●	M1805-0754	●	
7.60		0.2992	8	91	53	43	36	M1705-0760	●	M1805-0760	●	
7.70		0.3031	8	91	53	43	36	M1705-0770	●	M1805-0770	●	
7.80		0.3071	8	91	53	43	36	M1705-0780	●	M1805-0780	●	
7.90		0.3110	8	91	53	43	36	M1705-0790	○	M1805-0790	○	
7.94	5/16	0.3125	8	91	53	43	36	M1705-0794	●	M1805-0794	●	

For machining values see Page 40.

MEGA-Drill-Inox

M1705 / M1805

5xD



Drill diameter			Dimensions					M1705		M1805	
mm	d ₁ m7	Dec. equiv. Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	 M1705	 M1805	Order code	
	Inch / Wire / Letter									Form / Diameter	Form / Diameter
8.00		0.3150	8	91	53	43	36	M1705-0800	●	M1805-0800	●
8.10		0.3189	10	103	61	49	40	M1705-0810	○	M1805-0810	○
8.20	P	0.3228	10	103	61	49	40	M1705-0820	○	M1805-0820	○
8.30		0.3268	10	103	61	49	40	M1705-0830	○	M1805-0830	○
8.33	21/64	0.3281	10	103	61	49	40	M1705-0833	●	M1805-0833	●
8.40		0.3307	10	103	61	49	40	M1705-0840	○	M1805-0840	○
8.43	Q	0.3319	10	103	61	49	40	M1705-0843	●	M1805-0843	●
8.50		0.3346	10	103	61	49	40	M1705-0850	●	M1805-0850	●
8.60		0.3386	10	103	61	49	40	M1705-0860	○	M1805-0860	○
8.70		0.3425	10	103	61	49	40	M1705-0870	○	M1805-0870	○
8.73	11/32	0.3438	10	103	61	49	40	M1705-0873	●	M1805-0873	●
8.80		0.3465	10	103	61	49	40	M1705-0880	●	M1805-0880	●
8.90		0.3504	10	103	61	49	40	M1705-0890	○	M1805-0890	○
9.00		0.3543	10	103	61	49	40	M1705-0900	●	M1805-0900	●
9.10		0.3583	10	103	61	49	40	M1705-0910	○	M1805-0910	○
9.13	23/64	0.3594	10	103	61	49	40	M1705-0913	●	M1805-0913	●
9.20		0.3622	10	103	61	49	40	M1705-0920	○	M1805-0920	○
9.30		0.3661	10	103	61	49	40	M1705-0930	●	M1805-0930	●
9.35	U	0.3681	10	103	61	49	40	M1705-0935	●	M1805-0935	●
9.40		0.3701	10	103	61	49	40	M1705-0940	●	M1805-0940	●
9.50		0.3740	10	103	61	49	40	M1705-0950	●	M1805-0950	●
9.53	3/8	0.3750	10	103	61	49	40	M1705-0953	●	M1805-0953	●
9.60		0.3780	10	103	61	49	40	M1705-0960	○	M1805-0960	●
9.70		0.3819	10	103	61	49	40	M1705-0970	○	M1805-0970	○
9.80	W	0.3858	10	103	61	49	40	M1705-0980	○	M1805-0980	○
9.90		0.3898	10	103	61	49	40	M1705-0990	●	M1805-0990	●
9.92	25/64	0.3906	10	103	61	49	40	M1705-0992	●	M1805-0992	●
10.00		0.3937	10	103	61	49	40	M1705-1000	●	M1805-1000	●
10.10		0.3976	12	118	71	56	45	M1705-1010	○	M1805-1010	○
10.20		0.4016	12	118	71	56	45	M1705-1020	●	M1805-1020	●
10.26	Y	0.4039	12	118	71	56	45	M1705-1026	●	M1805-1026	●
10.30		0.4055	12	118	71	56	45	M1705-1030	●	M1805-1030	●
10.32	13/32	0.4062	12	118	71	56	45	M1705-1032	●	M1805-1032	●
10.40		0.4094	12	118	71	56	45	M1705-1040	○	M1805-1040	○
10.50		0.4134	12	118	71	56	45	M1705-1050	●	M1805-1050	●
10.60		0.4173	12	118	71	56	45	M1705-1060	○	M1805-1060	○
10.70		0.4213	12	118	71	56	45	M1705-1070	●	M1805-1070	●
10.72	27/64	0.4219	12	118	71	56	45	M1705-1072	●	M1805-1072	●
10.80		0.4252	12	118	71	56	45	M1705-1080	○	M1805-1080	○
10.90		0.4291	12	118	71	56	45	M1705-1090	○	M1805-1090	○
11.00		0.4331	12	118	71	56	45	M1705-1100	●	M1805-1100	●
11.10		0.4370	12	118	71	56	45	M1705-1110	○	M1805-1110	○
11.11	7/16	0.4375	12	118	71	56	45	M1705-1111	●	M1805-1111	●
11.20		0.4409	12	118	71	56	45	M1705-1120	●	M1805-1120	●
11.30		0.4449	12	118	71	56	45	M1705-1130	○	M1805-1130	●

For machining values see Page 40.

MEGA-Drill-Inox

M1705 / M1805

5xD

mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				 M1705	 M1805		
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm			Order code Form / Diameter	Order code Form / Diameter
11.40		0.4488	12	118	71	56	45	M1705-1140	●	M1805-1140	●
11.50	29/64	0.4528	12	118	71	56	45	M1705-1150	●	M1805-1150	●
11.60		0.4567	12	118	71	56	45	M1705-1160	○	M1805-1160	○
11.70		0.4606	12	118	71	56	45	M1705-1170	○	M1805-1170	○
11.80		0.4646	12	118	71	56	45	M1705-1180	●	M1805-1180	●
11.90	15/32	0.4685	12	118	71	56	45	M1705-1190	○	M1805-1190	●
12.00		0.4724	12	118	71	56	45	M1705-1200	●	M1805-1200	●
12.30	31/64	0.4843	14	124	77	60	45	M1705-1230	○	M1805-1230	●
12.50		0.4921	14	124	77	60	45	M1705-1250	●	M1805-1250	●
12.70	1/2	0.5000	14	124	77	60	45	M1705-1270	●	M1805-1270	●
12.80		0.5039	14	124	77	60	45	M1705-1280	●	M1805-1280	●
13.00		0.5118	14	124	77	60	45	M1705-1300	●	M1805-1300	●
13.10	33/64	0.5157	14	124	77	60	45	M1705-1310	●	M1805-1310	●
13.30		0.5236	14	124	77	60	45	M1705-1330	●	M1805-1330	●
13.50		0.5315	14	124	77	60	45	M1705-1350	●	M1805-1350	●
13.80		0.5433	14	124	77	60	45	M1705-1380	○	M1805-1380	○
14.00		0.5512	14	124	77	60	45	M1705-1400	●	M1805-1400	●
14.30	9/16	0.5630	16	133	83	63	48	M1705-1430	○	M1805-1430	●
14.50		0.5709	16	133	83	63	48	M1705-1450	●	M1805-1450	●
14.68	37/64	0.5780	16	133	83	63	48	M1705-1468	●	M1805-1468	●
14.80		0.5827	16	133	83	63	48	M1705-1480	●	M1805-1480	●
15.00		0.5906	16	133	83	63	48	M1705-1500	●	M1805-1500	●
15.08	19/32	0.5937	16	133	83	63	48	M1705-1508	●	M1805-1508	●
15.50		0.6102	16	133	83	63	48	M1705-1550	●	M1805-1550	●
15.80		0.6220	16	133	83	63	48	M1705-1580	○	M1805-1580	○
15.88	5/8	0.6250	16	133	83	63	48	M1705-1588	●	M1805-1588	●
16.00		0.6299	16	133	83	63	48	M1705-1600	●	M1805-1600	●
16.50		0.6496	18	143	93	71	48	M1705-1650	●	M1805-1650	●
16.67	21/32	0.6563	18	143	93	71	48	M1705-1667	●	M1805-1667	●
16.80		0.6614	18	143	93	71	48	M1705-1680	●	M1805-1680	●
17.00		0.6693	18	143	93	71	48	M1705-1700	●	M1805-1700	●
17.46	11/16	0.6874	18	143	93	71	48	M1705-1746	●	M1805-1746	●
17.50		0.6890	18	143	93	71	48	M1705-1750	●	M1805-1750	●
17.80		0.7008	18	143	93	71	48	M1705-1780	○	M1805-1780	○
17.86	45/64	0.7031	18	143	93	71	48	M1705-1786	●	M1805-1786	●
18.00		0.7087	18	143	93	71	48	M1705-1800	●	M1805-1800	●
18.26	23/32	0.7189	20	153	101	77	50	M1705-1826	●	M1805-1826	●
18.50		0.7283	20	153	101	77	50	M1705-1850	●	M1805-1850	●
18.80		0.7402	20	153	101	77	50	M1705-1880	○	M1805-1880	○
19.00		0.7480	20	153	101	77	50	M1705-1900	●	M1805-1900	●
19.05	3/4	0.7500	20	153	101	77	50	M1705-1905	●	M1805-1905	●
19.50		0.7677	20	153	101	77	50	M1705-1950	●	M1805-1950	●
19.80		0.7795	20	153	101	77	50	M1705-1980	○	M1805-1980	○
20.00		0.7874	20	153	101	77	50	M1705-2000	●	M1805-2000	●

For machining values see Page 40.

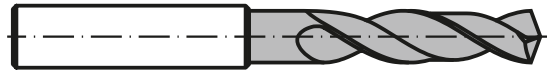
Machining values for MEGA-Drill-Inox



M1703, M1705



M1803, M1805

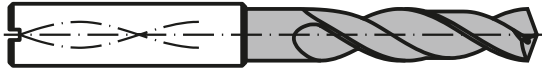


M1703, M1705

	Material	Hardness Rockwell (HRc) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c)			
		HRc	BHN	N/mm ²	M1703 M1705		M1803 M1805	
					SFM	m/min	SFM	m/min
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8 up to 15 over 15	up to 178 up to 205 over 205	up to 600 up to 700 over 700	279-328 246-295 213-262	85-100 75-90 65-80	312-377 279-344 246-295	95-115 85-105 75-90
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27 up to 31 over 31	up to 266 up to 297 over 297	up to 900 up to 1000 over 1000	180-246 147-197 115-164	55-75 45-60 35-50	197-279 164-230 131-197	60-85 50-70 40-60
M	Stainless steels inox 17-4PH, 15-5PH				131-197	40-60	164-230	50-70
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2				98-164	30-50	131-197	40-60
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14 up to 24 over 24	up to 200 up to 250 over 250	up to 680 up to 850 over 850	230-361 197-312 164-262	70-110 60-95 50-80	262-427 230-377 197-328	80-130 70-115 60-100
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8	up to 178	up to 600	213-279	65-85	246-295	75-90
		over 8	over 178	over 600	180-230	55-70	213-262	65-80
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360				361-1181	110-360	361-1181	110-360
	Aluminium (Si content < 10%) 413, 385, A390				394-1575	120-480	394-1575	120-480
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO				394-1575	120-480	394-1575	120-480
S	Titanium alloys TiAl4V				66-131	20-40	66-164	20-50
	Nickel alloys Inconel 718, Rene 41, Waspolloy				66-131	20-40	66-164	20-50
H	Chilled cast iron	38-48	350-450	1173-1527				
	Hardened steel	50-55		1614-1870				
		56-60						
		61-65						

The guideline values for cutting speed v_c should be multiplied by the following correction factors KF_v according to the drilling depth:

Depth / Diameter ratio	KF _v
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8



M1803, M1805

Recommended feed (f) for diameter ranges										
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm		
IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.012	0.20-0.35	0.010-0.016	0.25-0.40	
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.012	0.20-0.35	0.010-0.016	0.25-0.40	
0.004-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38	0.010-0.017	0.25-0.42	
0.004-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38	0.010-0.017	0.25-0.42	
0.004-0.006	0.10-0.15	0.005-0.008	0.12-0.20	0.005-0.010	0.14-0.25	0.006-0.012	0.16-0.30	0.007-0.013	0.18-0.32	
0.004-0.006	0.10-0.15	0.005-0.008	0.12-0.20	0.005-0.010	0.14-0.25	0.006-0.012	0.16-0.30	0.007-0.013	0.18-0.32	
0.001-0.004	0.04-0.10	0.002-0.005	0.06-0.12	0.003-0.006	0.08-0.15	0.005-0.008	0.12-0.20	0.006-0.010	0.15-0.25	
0.001-0.003	0.03-0.08	0.001-0.004	0.04-0.10	0.002-0.005	0.06-0.12	0.003-0.006	0.08-0.15	0.003-0.006	0.08-0.15	
0.004-0.010	0.10-0.25	0.006-0.012	0.15-0.30	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.008-0.014	0.20-0.35	0.012-0.016	0.30-0.40	0.014-0.020	0.35-0.50	
0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.007-0.012	0.18-0.30	0.010-0.014	0.25-0.35	0.012-0.016	0.30-0.40	
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55	
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55	
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55	
0.001-0.003	0.02-0.07	0.001-0.004	0.04-0.10	0.002-0.005	0.06-0.12	0.003-0.006	0.08-0.15	0.003-0.006	0.08-0.15	
0.001-0.003	0.02-0.07	0.001-0.004	0.04-0.10	0.002-0.005	0.06-0.12	0.003-0.006	0.08-0.15	0.003-0.006	0.08-0.18	

MEGA-Drill-Inox, alteration to standard product



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Request Order

Company _____ Customer number (if available) _____
 Contact partner _____ Tel./Fax _____ E-Mail _____
 Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore:

- Through hole
 Blind bore

Machining method:

- wet dry
 min.lubrication

Coolant supply:

- Ext. Int.
 

- Unalloyed steel
 Cast steel
 Alloyed steel
 Inox
 Stainless/acid-resistant steel
 Grey cast iron
 Alloyed grey cast iron
 Nodular iron
 CGI
 Malleable iron
- Aluminium (Si content > 10 %)
 Aluminium (Si content < 10 %)
 Copper
 Brass
 Bronze
 Titanium alloys
 Nickel alloys

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

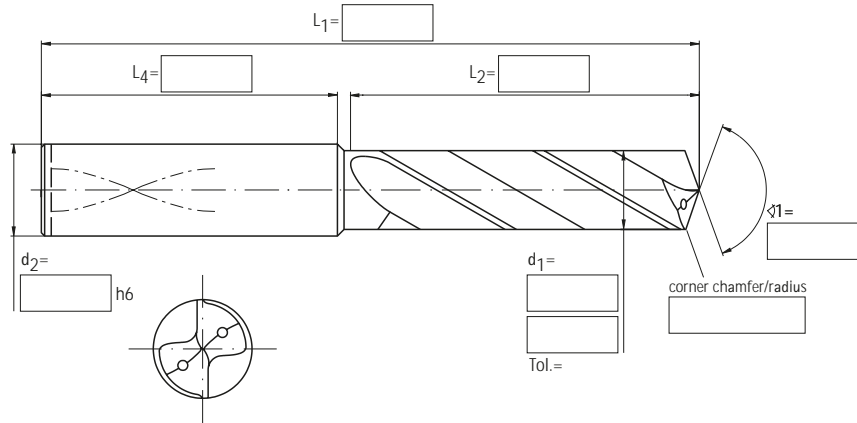
MAPAL code (e.g. M1803): _____

Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)




Coating:

(if you wish to choose yourself)

- MxF
 MxH
 TiAlN
 uncoated



Shank form:

- HA (DIN 6535) 
 HB (DIN 6535) 
 HE (DIN 6535) 

Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

- Groove form: MEGA GG ALU INOX _____
- Coating: MxF MxH TiAlN uncoated _____
- Radial land on face: Radial land on taper surface Radial land on 4 faces Round point Spiral point

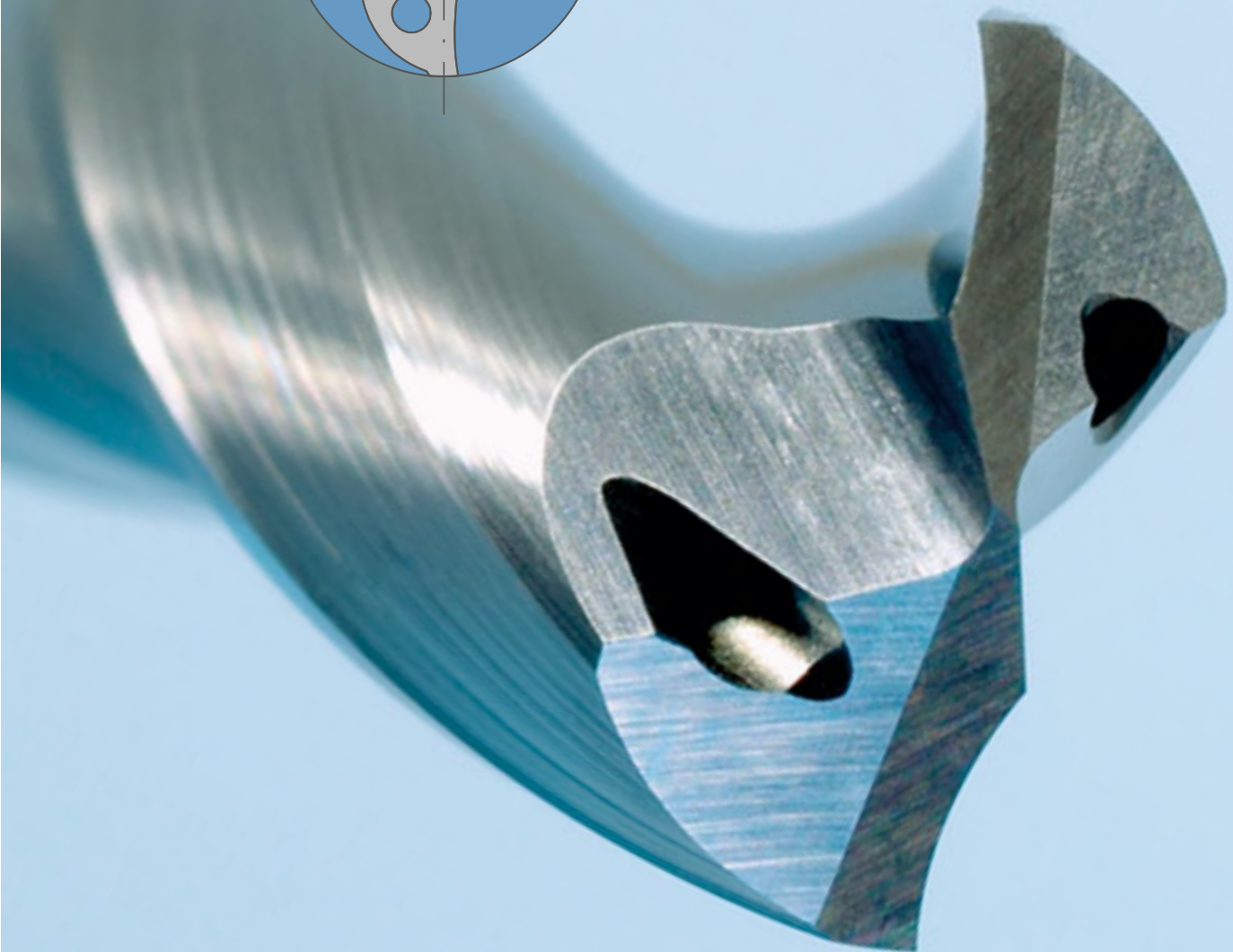
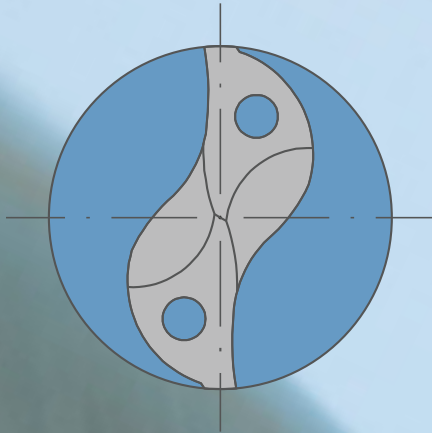
Blank (MC): _____

MEGA-Drill-Alu

The challenges of aluminium, aluminium alloys and other non-ferrous materials require a specialized geometry to handle the size and volume of chips often produced when machining these types of materials. The MEGA-Drill-Alu compliments the family of MEGA-Drills by addressing these applications' needs.

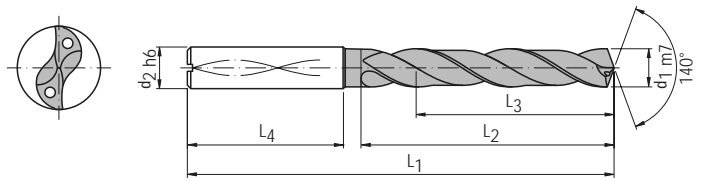
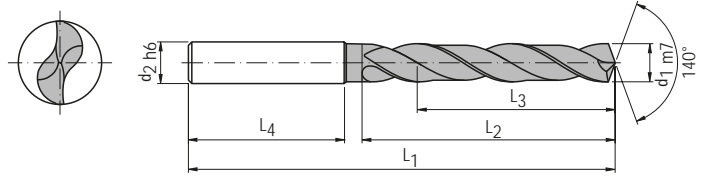
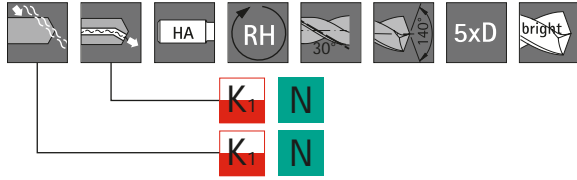
Special cutting edge geometry is used to allow for strong shearing capabilities and chip control drastically reducing the tendency of developing a built-up edge. An open flute design and a proprietary polishing process in the flute wall ensure appropriate chip transportation once created.

The results of the MEGA-Drill-Alu geometry is the effective machining of ductile materials translating into improved tool life and tool performance.



MEGA-Drill-Alu

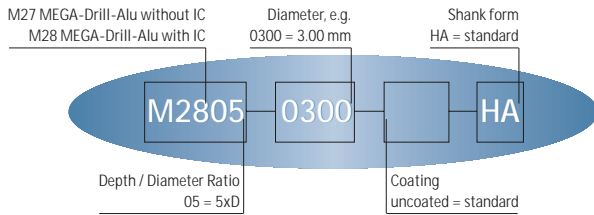
M2705 / M2805



Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT 9 (achievable)
No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form. Complete order code:





Drill diameter			Dimensions					M2705		M2805	
mm	Inch / Wire / Letter	Dec. equiv. Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	Order code Form / Diameter	Order code Form / Diameter		
3.00		0.1181	6	66	28	23	36	M2705-0300	●	M2805-0300	●
3.10		0.1220	6	66	28	23	36	M2705-0310	○	M2805-0310	●
3.18	1/8	0.1250	6	66	28	23	36	M2705-0318	●	M2805-0318	●
3.20		0.1260	6	66	28	23	36	M2705-0320	○	M2805-0320	●
3.30		0.1299	6	66	28	23	36	M2705-0330	●	M2805-0330	●
3.40		0.1339	6	66	28	23	36	M2705-0340	○	M2805-0340	○
3.45	#29	0.1358	6	66	28	23	36	M2705-0345	●	M2805-0345	●
3.50		0.1378	6	66	28	23	36	M2705-0350	●	M2805-0350	●
3.57	9/64	0.1406	6	66	28	23	36	M2705-0357	●	M2805-0357	●
3.60		0.1417	6	66	28	23	36	M2705-0360	○	M2805-0360	●
3.70		0.1457	6	66	28	23	36	M2705-0370	●	M2805-0370	●
3.80	#25	0.1496	6	74	36	29	36	M2705-0380	●	M2805-0380	●
3.86	#24	0.1520	6	74	36	29	36	M2705-0386	●	M2805-0386	●
3.90		0.1535	6	74	36	29	36	M2705-0390	○	M2805-0390	○
3.97	5/32	0.1562	6	74	36	29	36	M2705-0397	●	M2805-0397	●
4.00		0.1575	6	74	36	29	36	M2705-0400	●	M2805-0400	●
4.04	#21	0.1591	6	74	36	29	36	M2705-0404	●	M2805-0404	●
4.10		0.1614	6	74	36	29	36	M2705-0410	○	M2805-0410	●
4.20		0.1654	6	74	36	29	36	M2705-0420	●	M2805-0420	●
4.30	#18	0.1693	6	74	36	29	36	M2705-0430	○	M2805-0430	●
4.37	11/64	0.1719	6	74	36	29	36	M2705-0437	●	M2805-0437	●
4.40		0.1732	6	74	36	29	36	M2705-0440	●	M2805-0440	○
4.50	#16	0.1772	6	74	36	29	36	M2705-0450	●	M2805-0450	●
4.60		0.1811	6	74	36	29	36	M2705-0460	○	M2805-0460	●
4.62	#14	0.1819	6	74	36	29	36	M2705-0462	●	M2805-0462	●

For machining values see Page 52.

MEGA-Drill-Alu

M2705 / M2805

5xD



mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				M2705		M2805	
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm	 M2705	 M2805	Order code Form / Diameter	Order code Form / Diameter
4.70	#13	0.1850	6	74	36	29	36	M2705-0470	○	M2805-0470	●
4.76	3/16	0.1875	6	82	44	35	36	M2705-0476	●	M2805-0476	●
4.80	#12	0.1890	6	82	44	35	36	M2705-0480	●	M2805-0480	●
4.90		0.1929	6	82	44	35	36	M2705-0490	○	M2805-0490	○
5.00		0.1969	6	82	44	35	36	M2705-0500	●	M2805-0500	●
5.10		0.2008	6	82	44	35	36	M2705-0510	○	M2805-0510	●
5.16	13/64	0.2031	6	82	44	35	36	M2705-0516	●	M2805-0516	●
5.20		0.2047	6	82	44	35	36	M2705-0520	●	M2805-0520	●
5.30		0.2087	6	82	44	35	36	M2705-0530	○	M2805-0530	○
5.40		0.2126	6	82	44	35	36	M2705-0540	○	M2805-0540	○
5.50		0.2165	6	82	44	35	36	M2705-0550	●	M2805-0550	●
5.56	7/32	0.2188	6	82	44	35	36	M2705-0556	●	M2805-0556	●
5.60		0.2205	6	82	44	35	36	M2705-0560	○	M2805-0560	●
5.70		0.2244	6	82	44	35	36	M2705-0570	●	M2805-0570	●
5.80		0.2283	6	82	44	35	36	M2705-0580	○	M2805-0580	○
5.90		0.2323	6	82	44	35	36	M2705-0590	○	M2805-0590	○
5.95	15/64	0.2344	6	82	44	35	36	M2705-0595	●	M2805-0595	●
6.00		0.2362	6	82	44	35	36	M2705-0600	●	M2805-0600	●
6.10		0.2402	8	91	53	43	36	M2705-0610	○	M2805-0610	○
6.15	C	0.2421	8	91	53	43	36	M2705-0615	●	M2805-0615	●
6.20		0.2441	8	91	53	43	36	M2705-0620	○	M2805-0620	○
6.30		0.2480	8	91	53	43	36	M2705-0630	○	M2805-0630	○
6.35	1/4	0.2500	8	91	53	43	36	M2705-0635	●	M2805-0635	●
6.40		0.2520	8	91	53	43	36	M2705-0640	○	M2805-0640	○
6.50		0.2559	8	91	53	43	36	M2705-0650	●	M2805-0650	●
6.53	F	0.2571	8	91	53	43	36	M2705-0653	●	M2805-0653	●
6.60		0.2598	8	91	53	43	36	M2705-0660	●	M2805-0660	●
6.63	G	0.2610	8	91	53	43	36	M2705-0663	●	M2805-0663	●
6.70		0.2638	8	91	53	43	36	M2705-0670	○	M2805-0670	○
6.75	17/64	0.2656	8	91	53	43	36	M2705-0675	●	M2805-0675	●
6.80		0.2677	8	91	53	43	36	M2705-0680	●	M2805-0680	●
6.90	I	0.2717	8	91	53	43	36	M2705-0690	○	M2805-0690	●
7.00		0.2756	8	91	53	43	36	M2705-0700	●	M2805-0700	●
7.10		0.2795	8	91	53	43	36	M2705-0710	○	M2805-0710	○
7.14	9/32	0.2812	8	91	53	43	36	M2705-0714	●	M2805-0714	●
7.20		0.2835	8	91	53	43	36	M2705-0720	●	M2805-0720	●
7.30		0.2874	8	91	53	43	36	M2705-0730	●	M2805-0730	●
7.40		0.2913	8	91	53	43	36	M2705-0740	○	M2805-0740	○
7.50		0.2953	8	91	53	43	36	M2705-0750	●	M2805-0750	●
7.54	19/64	0.2969	8	91	53	43	36	M2705-0754	●	M2805-0754	●
7.60		0.2992	8	91	53	43	36	M2705-0760	○	M2805-0760	○
7.70		0.3031	8	91	53	43	36	M2705-0770	○	M2805-0770	●
7.80		0.3071	8	91	53	43	36	M2705-0780	●	M2805-0780	●
7.90		0.3110	8	91	53	43	36	M2705-0790	○	M2805-0790	○
7.94	5/16	0.3125	8	91	53	43	36	M2705-0794	●	M2805-0794	●

For machining values see Page 52.

MEGA-Drill-Alu

M2705 / M2805

5xD

Drill diameter			Dimensions					M2705		M2805	
mm	d ₁ m7	Dec. equiv. Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	 M2705	 M2805	Order code	Order code
	Inch / Wire / Letter										
8.00		0.3150	8	91	53	43	36	M2705-0800	●	M2805-0800	●
8.10		0.3189	10	103	61	49	40	M2705-0810	○	M2805-0810	○
8.20	P	0.3228	10	103	61	49	40	M2705-0820	○	M2805-0820	○
8.30		0.3268	10	103	61	49	40	M2705-0830	○	M2805-0830	○
8.33	21/64	0.3281	10	103	61	49	40	M2705-0833	●	M2805-0833	●
8.40		0.3307	10	103	61	49	40	M2705-0840	○	M2805-0840	○
8.43	Q	0.3319	10	103	61	49	40	M2705-0843	●	M2805-0843	●
8.50		0.3346	10	103	61	49	40	M2705-0850	●	M2805-0850	●
8.60		0.3386	10	103	61	49	40	M2705-0860	○	M2805-0860	○
8.70		0.3425	10	103	61	49	40	M2705-0870	○	M2805-0870	○
8.73	11/32	0.3438	10	103	61	49	40	M2705-0873	●	M2805-0873	●
8.80		0.3465	10	103	61	49	40	M2705-0880	●	M2805-0880	●
8.90		0.3504	10	103	61	49	40	M2705-0890	○	M2805-0890	○
9.00		0.3543	10	103	61	49	40	M2705-0900	●	M2805-0900	●
9.10		0.3583	10	103	61	49	40	M2705-0910	○	M2805-0910	○
9.13	23/64	0.3594	10	103	61	49	40	M2705-0913	●	M2805-0913	●
9.20		0.3622	10	103	61	49	40	M2705-0920	○	M2805-0920	○
9.30		0.3661	10	103	61	49	40	M2705-0930	●	M2805-0930	●
9.35	U	0.3681	10	103	61	49	40	M2705-0935	●	M2805-0935	●
9.40		0.3701	10	103	61	49	40	M2705-0940	●	M2805-0940	●
9.50		0.3740	10	103	61	49	40	M2705-0950	●	M2805-0950	●
9.53	3/8	0.3750	10	103	61	49	40	M2705-0953	●	M2805-0953	●
9.60		0.3780	10	103	61	49	40	M2705-0960	○	M2805-0960	○
9.70		0.3819	10	103	61	49	40	M2705-0970	○	M2805-0970	○
9.80	W	0.3858	10	103	61	49	40	M2705-0980	○	M2805-0980	○
9.90		0.3898	10	103	61	49	40	M2705-0990	○	M2805-0990	●
9.92	25/64	0.3906	10	103	61	49	40	M2705-0992	●	M2805-0995	●
10.00		0.3937	10	103	61	49	40	M2705-1000	●	M2805-1000	●
10.10		0.3976	12	118	71	56	45	M2705-1010	○	M2805-1010	○
10.20		0.4016	12	118	71	56	45	M2705-1020	●	M2805-1020	●
10.26	Y	0.4039	12	118	71	56	45	M2705-1026	●	M2805-1026	●
10.30		0.4055	12	118	71	56	45	M2705-1030	○	M2805-1030	●
10.32	13/32	0.4062	12	118	71	56	45	M2705-1032	●	M2805-1032	●
10.40		0.4094	12	118	71	56	45	M2705-1040	○	M2805-1040	○
10.50		0.4134	12	118	71	56	45	M2705-1050	●	M2805-1050	●
10.60		0.4173	12	118	71	56	45	M2705-1060	○	M2805-1060	○
10.70		0.4213	12	118	71	56	45	M2705-1070	○	M2805-1070	○
10.72	27/64	0.4219	12	118	71	56	45	M2705-1072	●	M2805-1072	●
10.80		0.4252	12	118	71	56	45	M2705-1080	○	M2805-1080	○
10.90		0.4291	12	118	71	56	45	M2705-1090	○	M2805-1090	○
11.00		0.4331	12	118	71	56	45	M2705-1100	●	M2805-1100	●
11.10		0.4370	12	118	71	56	45	M2705-1110	○	M2805-1110	○
11.11	7/16	0.4375	12	118	71	56	45	M2705-1111	●	M2805-1111	●
11.20		0.4409	12	118	71	56	45	M2705-1120	●	M2805-1120	●
11.30		0.4449	12	118	71	56	45	M2705-1130	●	M2805-1130	●

For machining values see Page 52.

MEGA-Drill-Alu

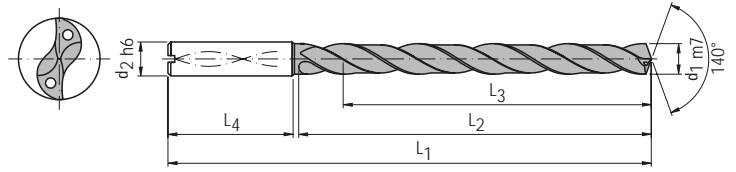
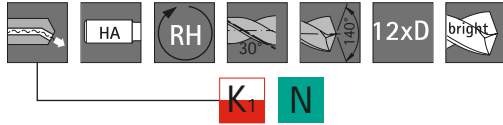
M2705 / M2805

5xD

mm	Drill diameter d1 m7		Shank diameter d2 h6 mm	Dimensions				M2705		M2805	
	Inch / Wire / Letter	Dec. equiv. Inch		Total length L1 mm	Margin length L2 mm	Maximum drilling depth L3 mm	Shank length L4 mm	Order code Form / Diameter	Order code Form / Diameter		
11.40		0.4488	12	118	71	56	45	M2705-1140	○	M2805-1140	○
11.50	29/64	0.4528	12	118	71	56	45	M2705-1150	●	M2805-1150	●
11.60		0.4567	12	118	71	56	45	M2705-1160	○	M2805-1160	○
11.70		0.4606	12	118	71	56	45	M2705-1170	○	M2805-1170	○
11.80		0.4646	12	118	71	56	45	M2705-1180	●	M2805-1180	●
11.90	15/32	0.4685	12	118	71	56	45	M2705-1190	○	M2805-1190	○
12.00		0.4724	12	118	71	56	45	M2705-1200	●	M2805-1200	●
12.30	31/64	0.4843	14	124	77	60	45	M2705-1230	●	M2805-1230	●
12.50		0.4921	14	124	77	60	45	M2705-1250	●	M2805-1250	●
12.70	1/2	0.5000	14	124	77	60	45	M2705-1270	●	M2805-1270	●
12.80		0.5039	14	124	77	60	45	M2705-1280	●	M2805-1280	●
13.00		0.5118	14	124	77	60	45	M2705-1300	●	M2805-1300	●
13.10	33/64	0.5157	14	124	77	60	45	M2705-1310	○	M2805-1310	●
13.30		0.5236	14	124	77	60	45	M2705-1330	●	M2805-1330	●
13.50		0.5315	14	124	77	60	45	M2705-1350	●	M2805-1350	●
13.80		0.5433	14	124	77	60	45	M2705-1380	○	M2805-1380	○
14.00		0.5512	14	124	77	60	45	M2705-1400	●	M2805-1400	●
14.30	9/16	0.5630	16	133	83	63	48	M2705-1430	●	M2805-1430	○
14.50		0.5709	16	133	83	63	48	M2705-1450	●	M2805-1450	●
14.68	37/64	0.5780	16	133	83	63	48	M2705-1468	●	M2805-1468	●
14.80		0.5827	16	133	83	63	48	M2705-1480	●	M2805-1480	●
15.00		0.5906	16	133	83	63	48	M2705-1500	●	M2805-1500	●
15.08	19/32	0.5937	16	133	83	63	48	M2705-1508	●	M2805-1508	●
15.50		0.6102	16	133	83	63	48	M2705-1550	●	M2805-1550	●
15.80		0.6220	16	133	83	63	48	M2705-1580	○	M2805-1580	○
15.88	5/8	0.6250	16	133	83	63	48	M2705-1588	●	M2805-1588	●
16.00		0.6299	16	133	83	63	48	M2705-1600	●	M2805-1600	●
16.50		0.6496	18	143	93	71	48	M2705-1650	●	M2805-1650	●
16.67	21/32	0.6563	18	143	93	71	48	M2705-1667	●	M2805-1667	●
16.80		0.6614	18	143	93	71	48	M2705-1680	●	M2805-1680	●
17.00		0.6693	18	143	93	71	48	M2705-1700	●	M2805-1700	●
17.46	11/16	0.6874	18	143	93	71	48	M2705-1746	●	M2805-1746	●
17.50		0.6890	18	143	93	71	48	M2705-1750	●	M2805-1750	●
17.80		0.7008	18	143	93	71	48	M2705-1780	○	M2805-1780	○
17.86	45/64	0.7031	18	143	93	71	48	M2705-1786	●	M2805-1786	●
18.00		0.7087	18	143	93	71	48	M2705-1800	●	M2805-1800	●
18.26	23/32	0.7189	20	153	101	77	50	M2705-1826	●	M2805-1826	●
18.50		0.7283	20	153	101	77	50	M2705-1850	●	M2805-1850	●
18.80		0.7402	20	153	101	77	50	M2705-1880	○	M2805-1880	○
19.00		0.7480	20	153	101	77	50	M2705-1900	●	M2805-1900	●
19.05	3/4	0.7500	20	153	101	77	50	M2705-1905	●	M2805-1905	●
19.50		0.7677	20	153	101	77	50	M2705-1950	●	M2805-1950	●
19.80		0.7795	20	153	101	77	50	M2705-1980	○	M2805-1980	○
20.00		0.7874	20	153	101	77	50	M2705-2000	●	M2805-2000	●

For machining values see Page 52.

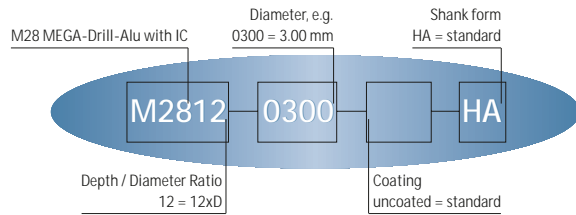
MEGA-Drill-Alu M2812



Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT 9 (achievable)
No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:




Drill diameter			Dimensions					M2812
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
3.00		0.1181	6	92	54	48	36	M2812-0300 ●
3.10		0.1220	6	92	54	48	36	M2812-0310 ●
3.18	1/8	0.1250	6	92	54	48	36	M2812-0318 ●
3.20		0.1260	6	92	54	48	36	M2812-0320 ○
3.30		0.1299	6	92	54	48	36	M2812-0330 ●
3.40		0.1339	6	92	54	48	36	M2812-0340 ○
3.45	#29	0.1358	6	92	54	48	36	M2812-0345 ●
3.50		0.1378	6	92	54	48	36	M2812-0350 ●
3.57	9/64	0.1406	6	92	54	48	36	M2812-0357 ●
3.60		0.1417	6	92	54	48	36	M2812-0360 ●
3.70		0.1457	6	92	54	48	36	M2812-0370 ●
3.80	#25	0.1496	6	102	64	58	36	M2812-0380 ●
3.86	#24	0.1520	6	102	64	58	36	M2812-0386 ●
3.90		0.1535	6	102	64	58	36	M2812-0390 ○
3.97	5/32	0.1562	6	102	64	58	36	M2812-0397 ●
4.00		0.1575	6	102	64	58	36	M2812-0400 ●
4.04	#21	0.1591	6	102	64	58	36	M2812-0404 ●
4.10		0.1614	6	102	64	58	36	M2812-0410 ○
4.20		0.1654	6	102	64	58	36	M2812-0420 ○
4.30	#18	0.1693	6	102	64	58	36	M2812-0430 ●
4.37	11/64	0.1719	6	102	64	58	36	M2812-0437 ●
4.40		0.1732	6	102	64	58	36	M2812-0440 ●
4.50	#16	0.1772	6	102	64	58	36	M2812-0450 ●
4.60		0.1811	6	102	64	58	36	M2812-0460 ●
4.62	#14	0.1819	6	102	64	58	36	M2812-0462 ●

For machining values see Page 52.

MEGA-Drill-Alu M2812

12xD


Drill diameter d ₁ m7		Dimensions						 M2812	Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			
4.70	#13	0.1850	6	102	64	58	36	M2812-0470	○	
4.76	3/16	0.1875	6	116	78	70	36	M2812-0476	●	
4.80	#12	0.1890	6	116	78	70	36	M2812-0480	○	
4.90		0.1929	6	116	78	70	36	M2812-0490	○	
5.00		0.1969	6	116	78	70	36	M2812-0500	●	
5.10		0.2008	6	116	78	70	36	M2812-0510	●	
5.16	13/64	0.2031	6	116	78	70	36	M2812-0516	●	
5.20		0.2047	6	116	78	70	36	M2812-0520	●	
5.30		0.2087	6	116	78	70	36	M2812-0530	○	
5.40		0.2126	6	116	78	70	36	M2812-0540	○	
5.50		0.2165	6	116	78	70	36	M2812-0550	●	
5.56	7/32	0.2188	6	116	78	70	36	M2812-0556	●	
5.60		0.2205	6	116	78	70	36	M2812-0560	●	
5.70		0.2244	6	116	78	70	36	M2812-0570	●	
5.80		0.2283	6	116	78	70	36	M2812-0580	○	
5.90		0.2323	6	116	78	70	36	M2812-0590	●	
5.95	15/64	0.2344	6	116	78	70	36	M2812-0595	●	
6.00		0.2362	6	116	78	70	36	M2812-0600	●	
6.10		0.2402	8	146	108	94	36	M2812-0610	○	
6.15	C	0.2421	8	146	108	94	36	M2812-0615	●	
6.20		0.2441	8	146	108	94	36	M2812-0620	○	
6.30		0.2480	8	146	108	94	36	M2812-0630	○	
6.35	1/4	0.2500	8	146	108	94	36	M2812-0635	●	
6.40		0.2520	8	146	108	94	36	M2812-0640	○	
6.50		0.2559	8	146	108	94	36	M2812-0650	●	
6.53	F	0.2571	8	146	108	94	36	M2812-0653	●	
6.60		0.2598	8	146	108	94	36	M2812-0660	●	
6.63	G	0.2610	8	146	108	94	36	M2812-0663	●	
6.70		0.2638	8	146	108	94	36	M2812-0670	○	
6.75	17/64	0.2656	8	146	108	94	36	M2812-0675	●	
6.80		0.2677	8	146	108	94	36	M2812-0680	●	
6.90	I	0.2717	8	146	108	94	36	M2812-0690	●	
7.00		0.2756	8	146	108	94	36	M2812-0700	●	
7.10		0.2795	8	146	108	94	36	M2812-0710	○	
7.14	9/32	0.2812	8	146	108	94	36	M2812-0714	●	
7.20		0.2835	8	146	108	94	36	M2812-0720	○	
7.30		0.2874	8	146	108	94	36	M2812-0730	●	
7.40		0.2913	8	146	108	94	36	M2812-0740	●	
7.50		0.2953	8	146	108	94	36	M2812-0750	●	
7.54	19/64	0.2969	8	146	108	94	36	M2812-0754	●	
7.60		0.2992	8	146	108	94	36	M2812-0760	●	
7.70		0.3031	8	146	108	94	36	M2812-0770	●	
7.80		0.3071	8	146	108	94	36	M2812-0780	○	
7.90		0.3110	8	146	108	94	36	M2812-0790	○	
7.94	5/16	0.3125	8	146	108	94	36	M2812-0794	●	

For machining values see Page 52.

MEGA-Drill-Alu

M2812


12xD

Drill diameter		Dimensions						 M2812 Order code Form / Diameter	
mm	d ₁ m7 Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
8.00		0.3150	8	146	108	94	36	M2812-0800	●
8.10		0.3189	10	162	120	110	40	M2812-0810	○
8.20	P	0.3228	10	162	120	110	40	M2812-0820	○
8.30		0.3268	10	162	120	110	40	M2812-0830	○
8.33	21/64	0.3281	10	162	120	110	40	M2812-0833	●
8.40		0.3307	10	162	120	110	40	M2812-0840	○
8.43	Q	0.3319	10	162	120	110	40	M2812-0843	●
8.50		0.3346	10	162	120	110	40	M2812-0850	●
8.60		0.3386	10	162	120	110	40	M2812-0860	○
8.70		0.3425	10	162	120	110	40	M2812-0870	○
8.73	11/32	0.3438	10	162	120	110	40	M2812-0873	●
8.80		0.3465	10	162	120	110	40	M2812-0880	●
8.90		0.3504	10	162	120	110	40	M2812-0890	○
9.00		0.3543	10	162	120	110	40	M2812-0900	●
9.10		0.3583	10	162	120	110	40	M2812-0910	○
9.13	23/64	0.3594	10	162	120	110	40	M2812-0913	●
9.20		0.3622	10	162	120	110	40	M2812-0920	○
9.30		0.3661	10	162	120	110	40	M2812-0930	●
9.35	U	0.3681	10	162	120	110	40	M2812-0935	●
9.40		0.3701	10	162	120	110	40	M2812-0940	○
9.50		0.3740	10	162	120	110	40	M2812-0950	●
9.53	3/8	0.3750	10	162	120	110	40	M2812-0953	●
9.60		0.3780	10	162	120	110	40	M2812-0960	●
9.70		0.3819	10	162	120	110	40	M2812-0970	○
9.80	W	0.3858	10	162	120	110	40	M2812-0980	○
9.90		0.3898	10	162	120	110	40	M2812-0990	●
9.92	25/64	0.3906	10	162	120	110	40	M2812-0992	●
10.00		0.3937	10	162	120	110	40	M2812-1000	●
10.10		0.3976	12	204	156	142	45	M2812-1010	○
10.20		0.4016	12	204	156	142	45	M2812-1020	●
10.26	Y	0.4039	12	204	156	142	45	M2812-1026	●
10.30		0.4055	12	204	156	142	45	M2812-1030	●
10.32	13/32	0.4062	12	204	156	142	45	M2812-1032	●
10.40		0.4094	12	204	156	142	45	M2812-1040	○
10.50		0.4134	12	204	156	142	45	M2812-1050	●
10.60		0.4173	12	204	156	142	45	M2812-1060	○
10.70		0.4213	12	204	156	142	45	M2812-1070	○
10.72	27/64	0.4219	12	204	156	142	45	M2812-1072	●
10.80		0.4252	12	204	156	142	45	M2812-1080	○
10.90		0.4291	12	204	156	142	45	M2812-1090	○
11.00		0.4331	12	204	156	142	45	M2812-1100	●
11.10		0.4370	12	204	156	142	45	M2812-1110	○
11.11	7/16	0.4375	12	204	156	142	45	M2812-1111	●
11.20		0.4409	12	204	156	142	45	M2812-1120	●
11.30		0.4449	12	204	156	142	45	M2812-1130	○

For machining values see Page 52.

MEGA-Drill-Alu M2812

12xD

Drill diameter d ₁ m7		Dec. equivalent Inch	Dimensions					Shank length L ₄ mm	 M2812 Order code Form / Diameter
mm	Inch / Wire / Letter		Shank diameter d ₂ h6 mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm			
11.40		0.4488	12	204	156	142	45	M2812-1140	○
11.50	29/64	0.4528	12	204	156	142	45	M2812-1150	●
11.60		0.4567	12	204	156	142	45	M2812-1160	○
11.70		0.4606	12	204	156	142	45	M2812-1170	○
11.80		0.4646	12	204	156	142	45	M2812-1180	●
11.90	15/32	0.4685	12	204	156	142	45	M2812-1190	○
12.00		0.4724	12	204	156	142	45	M2812-1200	●
12.30	31/64	0.4843	14	230	182	166	45	M2812-1230	○
12.50		0.4921	14	230	182	166	45	M2812-1250	●
12.70	1/2	0.5000	14	230	182	166	45	M2812-1270	●
12.80		0.5039	14	230	182	166	45	M2812-1280	●
13.00		0.5118	14	230	182	166	45	M2812-1300	●
13.10	33/64	0.5157	14	230	182	166	45	M2812-1310	○
13.50		0.5315	14	230	182	166	45	M2812-1350	●
13.80		0.5433	14	230	182	166	45	M2812-1380	○
14.00		0.5512	14	230	182	166	45	M2812-1400	●
14.30	9/16	0.5630	16	260	208	192	48	M2812-1430	○
14.50		0.5709	16	260	208	192	48	M2812-1450	●
14.68	37/64	0.5780	16	260	208	192	48	M2812-1468	●
14.80		0.5827	16	260	208	192	48	M2812-1480	○
15.00		0.5906	16	260	208	192	48	M2812-1500	●
15.08	19/32	0.5937	16	260	208	192	48	M2812-1508	●
15.50		0.6102	16	260	208	192	48	M2812-1550	●
15.80		0.6220	16	260	208	192	48	M2812-1580	○
15.88	5/8	0.6250	16	260	208	192	48	M2812-1588	●
16.00		0.6299	16	260	208	192	48	M2812-1600	●
16.50		0.6496	18	285	234	216	48	M2812-1650	○
16.67	21/32	0.6563	18	285	234	216	48	M2812-1667	●
16.80		0.6614	18	285	234	216	48	M2812-1680	●
17.00		0.6693	18	285	234	216	48	M2812-1700	○
17.46	11/16	0.6874	18	285	234	216	48	M2812-1746	●
17.50		0.6890	18	285	234	216	48	M2812-1750	○
17.80		0.7008	18	285	234	216	48	M2812-1780	○
17.86	45/64	0.7031	18	285	234	216	48	M2812-1786	●
18.00		0.7087	18	285	234	216	48	M2812-1800	○
18.26	23/32	0.7189	20	310	258	240	50	M2812-1826	●
18.50		0.7283	20	310	258	240	50	M2812-1850	○
18.80		0.7402	20	310	258	240	50	M2812-1880	○
19.00		0.7480	20	310	258	240	50	M2812-1900	○
19.05	3/4	0.7500	20	310	258	240	50	M2812-1905	●
19.50		0.7677	20	310	258	240	50	M2812-1950	○
19.80		0.7795	20	310	258	240	50	M2812-1980	○
20.00		0.7874	20	310	258	240	50	M2812-2000	○

For machining values see Page 52.

Machining values for MEGA-Drill-Alu



M2705



M2805, M2812



M2705

	Material	Hardness Rockwell (HRC) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c)			
		HRC	BHN	N/mm ²	M2705		M2805 M2812	
					SFM	m/min	SFM	m/min
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8	up to 178	up to 600				
		up to 15 over 15	up to 205 over 205	up to 700 over 700				
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27 up to 31 over 31	up to 266 up to 297 over 297	up to 900 up to 1000 over 1000				
M	Stainless steels inox 17-4PH, 15-5PH							
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2							
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14 up to 24 over 24	up to 200 up to 250 over 250	up to 680 up to 850 over 850	230-361 197-312 164-262	70-110 60-95 50-80	262-427 230-377 197-328	80-130 70-115 60-100
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8	up to 178	up to 600				
		over 8	over 178	over 600				
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360				230-656	70-200	295-984	90-300
	Aluminium (Si content < 10%) 413, 385, A390				262-984	80-300	328-1312	100-400
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO				197-722	60-220	230-984	70-300
S	Titanium alloys TiAl4V							
	Nickel alloys Inconel 718, Rene 41, Waspolloy							
H	Chilled cast iron	38-48	350-450	1173-1527				
	Hardened steel	50-55		1614-1870				
		56-60						
		61-65						

The guideline values for cutting speed v_c should be multiplied by the following correction factors KF_v according to the drilling depth:

Depth / Diameter ratio	KF _v
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8
8 x D	0.7
12 x D	0.6



M2805, M2812

Recommended feed (f) for diameter ranges									
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm	
IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev
0.004-0.010	0.10-0.25	0.006-0.012	0.15-0.30	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55
0.003-0.007	0.07-0.18	0.005-0.010	0.12-0.25	0.008-0.014	0.20-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50

MEGA-Drill-Alu, alteration to standard product



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Request Order

Company		Customer number (if available)
Contact partner	Tel./Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Stainless/acid-resistant steel
- Copper
- Brass
- Bronze
- _____

Coolant supply: Ext. Int.



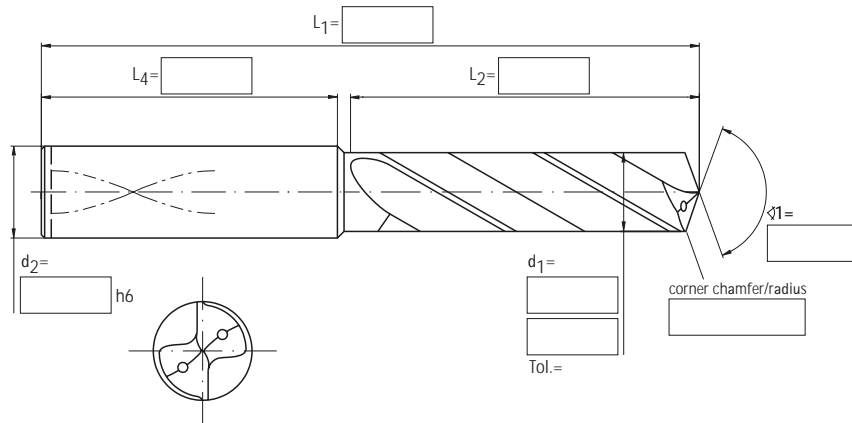
Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2812): _____



Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____



Shank form:

- HA (DIN 6535) 
- HB (DIN 6535) 
- HE (DIN 6535) 

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

- | | | |
|--|--|--|
| Groove form: <input type="checkbox"/> MEGA
<input type="checkbox"/> GG
<input type="checkbox"/> ALU
<input type="checkbox"/> INOX
<input type="checkbox"/> _____ | Coating: <input type="checkbox"/> MxF
<input type="checkbox"/> MxH
<input type="checkbox"/> TiAlN
<input type="checkbox"/> uncoated
<input type="checkbox"/> _____ | Radial land on face: <input type="checkbox"/> Radial land on taper surface
<input type="checkbox"/> Radial land on 4 faces
<input type="checkbox"/> Round point
<input type="checkbox"/> Spiral point |
|--|--|--|

Blank (MC): _____

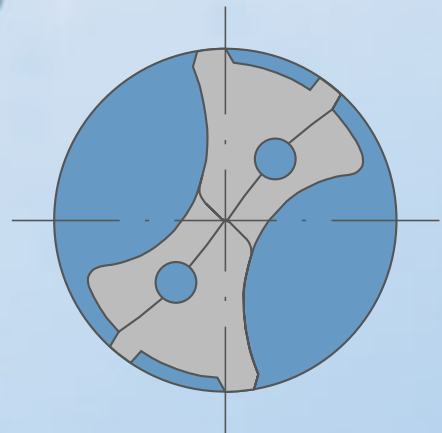
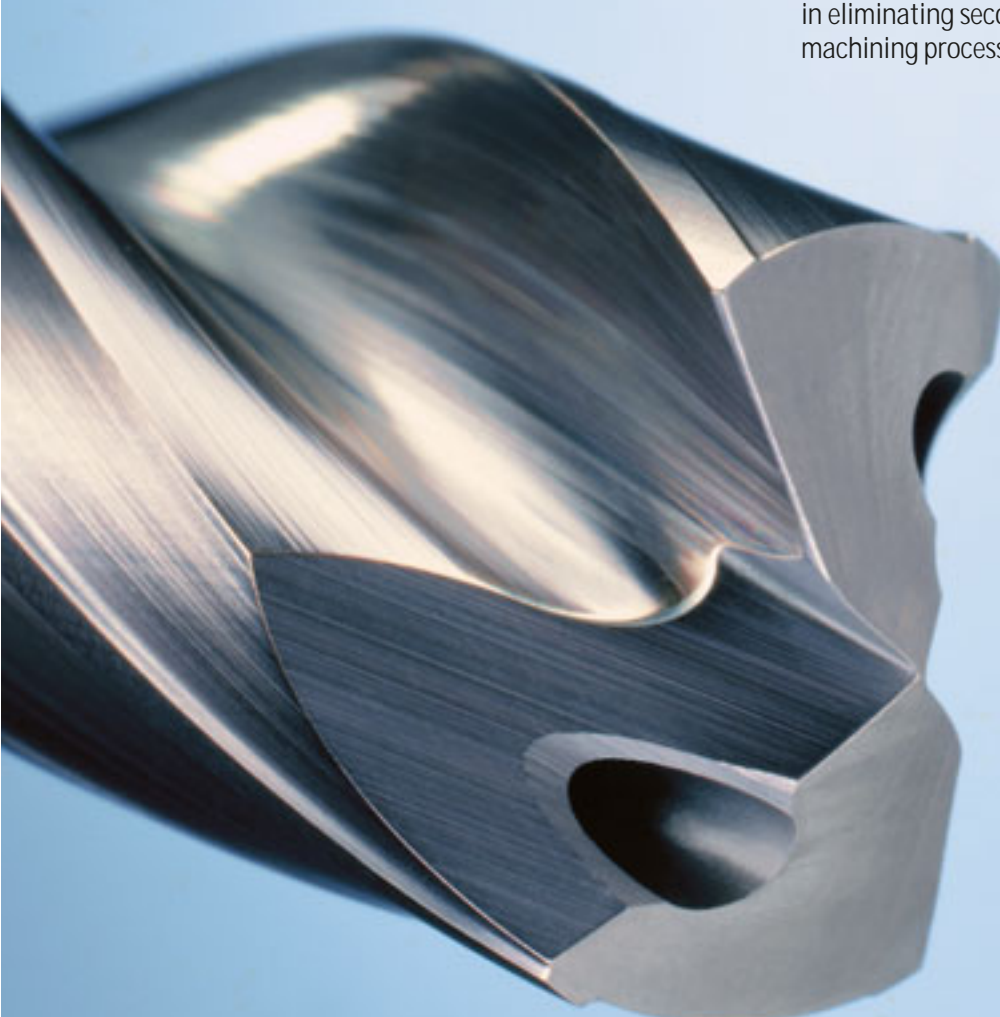
MEGA-Quadro-Drill –

greater accuracy and maximum performance with four margins

A high performance drill geometry complimented by a double margin design, allows the MEGA-Quadro-Drill to accomplish production hole making with absolute precision. The margins have constant contact with the wall of the hole created while drilling. This means that the margin has a tremendous impact on the hole size, quality and finish that is produced at the end of the drilling cycle.

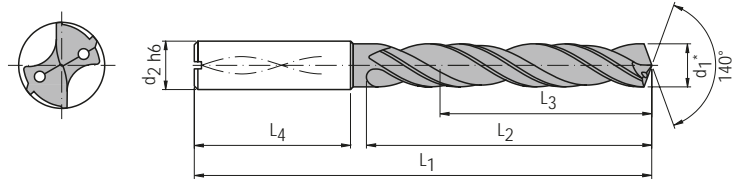
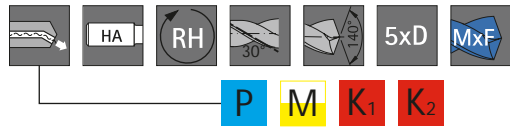
The MEGA-Quadro-Drill is built with two standard margins and two additional guiding margins that are strategically ground for optimum support and performance. The results of this MAPAL innovation is minimal deviation of the drill from the centerline and improved tool strength creating better alignment accuracy, concentricity and positional accuracy, together with the best possible roundness and diameter tolerance.

The double margin design helps to improve the rigidity and stability of the tools. The benefits of this allow for improved tool life, the ability to drill very deep depth to diameter ratios with excellent results and the ability to effectively handle cross holes or interruptions. Not to mention a significant improvement in the surface finish of the hole produced. This may often help in eliminating secondary operations in your machining process.



MEGA-Quadro-Drill

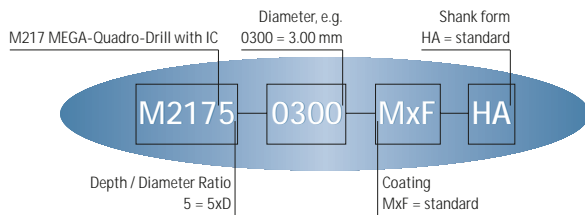
M2175



Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT 8 (achievable)
No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:



Drill diameter d_1^*		Shank diameter $d_2 h_6$		Total length L_1		Margin length L_2		Maximum drilling depth L_3		Shank length L_4		M2175 Order code Form / Diameter
mm	Inch / Wire / Letter	Dec. equivalent Inch	mm	mm	mm	mm	mm	mm	mm	mm		
3.00		0.1181	6	66	28	23	36	M2175-0300	●			
3.10		0.1220	6	66	28	23	36	M2175-0310	●			
3.18	1/8	0.1250	6	66	28	23	36	M2175-0318	●			
3.20		0.1260	6	66	28	23	36	M2175-0320	●			
3.30		0.1299	6	66	28	23	36	M2175-0330	●			
3.40		0.1339	6	66	28	23	36	M2175-0340	○			
3.45	#29	0.1358	6	66	28	23	36	M2175-0345	●			
3.50		0.1378	6	66	28	23	36	M2175-0350	●			
3.57	9/64	0.1406	6	66	28	23	36	M2175-0357	●			
3.60		0.1417	6	66	28	23	36	M2175-0360	●			
3.70		0.1457	6	66	28	23	36	M2175-0370	●			
3.80	#25	0.1496	6	74	36	29	36	M2175-0380	●			
3.86	#24	0.1520	6	74	36	29	36	M2175-0386	●			
3.90		0.1535	6	74	36	29	36	M2175-0390	○			
3.97	5/32	0.1562	6	74	36	29	36	M2175-0397	●			
4.00		0.1575	6	74	36	29	36	M2175-0400	●			
4.04	#21	0.1591	6	74	36	29	36	M2175-0404	●			
4.10		0.1614	6	74	36	29	36	M2175-0410	●			
4.20		0.1654	6	74	36	29	36	M2175-0420	●			
4.30	#18	0.1693	6	74	36	29	36	M2175-0430	●			
4.37	11/64	0.1719	6	74	36	29	36	M2175-0437	●			
4.40		0.1732	6	74	36	29	36	M2175-0440	●			
4.50	#16	0.1772	6	74	36	29	36	M2175-0450	●			
4.60		0.1811	6	74	36	29	36	M2175-0460	●			
4.62	#14	0.1819	6	74	36	29	36	M2175-0462	●			


For machining values see Page 68.

* The bore diameter tolerance d_1 is within the bore tolerance field H7.

MEGA-Quadro-Drill

M2175

5xD

Drill diameter d ₁ *		Dimensions						 M2175	Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			
4.70	#13	0.1850	6	74	36	29	36	M2175-0470	●	
4.76	3/16	0.1875	6	82	44	35	36	M2175-0476	●	
4.80	#12	0.1890	6	82	44	35	36	M2175-0480	●	
4.90		0.1929	6	82	44	35	36	M2175-0490	○	
5.00		0.1969	6	82	44	35	36	M2175-0500	●	
5.10		0.2008	6	82	44	35	36	M2175-0510	●	
5.16	13/64	0.2031	6	82	44	35	36	M2175-0516	●	
5.20		0.2047	6	82	44	35	36	M2175-0520	●	
5.30		0.2087	6	82	44	35	36	M2175-0530	○	
5.40		0.2126	6	82	44	35	36	M2175-0540	○	
5.50		0.2165	6	82	44	35	36	M2175-0550	●	
5.56	7/32	0.2188	6	82	44	35	36	M2175-0556	●	
5.60		0.2205	6	82	44	35	36	M2175-0560	●	
5.70		0.2244	6	82	44	35	36	M2175-0570	●	
5.80		0.2283	6	82	44	35	36	M2175-0580	○	
5.90		0.2323	6	82	44	35	36	M2175-0590	●	
5.95	15/64	0.2344	6	82	44	35	36	M2175-0595	●	
6.00		0.2362	6	82	44	35	36	M2175-0600	●	
6.10		0.2402	8	91	53	43	36	M2175-0610	○	
6.15	C	0.2421	8	91	53	43	36	M2175-0615	●	
6.20		0.2441	8	91	53	43	36	M2175-0620	○	
6.30		0.2480	8	91	53	43	36	M2175-0630	○	
6.35	1/4	0.2500	8	91	53	43	36	M2175-0635	●	
6.40		0.2520	8	91	53	43	36	M2175-0640	○	
6.50		0.2559	8	91	53	43	36	M2175-0650	●	
6.53	F	0.2571	8	91	53	43	36	M2175-0653	●	
6.60		0.2598	8	91	53	43	36	M2175-0660	●	
6.63	G	0.2610	8	91	53	43	36	M2175-0663	●	
6.70		0.2638	8	91	53	43	36	M2175-0670	○	
6.75	17/64	0.2656	8	91	53	43	36	M2175-0675	●	
6.80		0.2677	8	91	53	43	36	M2175-0680	●	
6.90	I	0.2717	8	91	53	43	36	M2175-0690	●	
7.00		0.2756	8	91	53	43	36	M2175-0700	●	
7.10		0.2795	8	91	53	43	36	M2175-0710	○	
7.14	9/32	0.2812	8	91	53	43	36	M2175-0714	●	
7.20		0.2835	8	91	53	43	36	M2175-0720	●	
7.30		0.2874	8	91	53	43	36	M2175-0730	●	
7.40		0.2913	8	91	53	43	36	M2175-0740	●	
7.50		0.2953	8	91	53	43	36	M2175-0750	●	
7.54	19/64	0.2969	8	91	53	43	36	M2175-0754	●	
7.60		0.2992	8	91	53	43	36	M2175-0760	●	
7.70		0.3031	8	91	53	43	36	M2175-0770	●	
7.80		0.3071	8	91	53	43	36	M2175-0780	●	
7.90		0.3110	8	91	53	43	36	M2175-0790	○	
7.94	5/16	0.3125	8	91	53	43	36	M2175-0794	●	


* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 68

MEGA-Quadro-Drill

M2175

5xD

Drill diameter d ₁ *		Dimensions						 M2175 Order code Form / Diameter	
		Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm		Shank length L ₄ mm
mm									
8.00		0.3150	8	91	53	43	36	M2175-0800	●
8.10		0.3189	10	103	61	49	40	M2175-0810	○
8.20	P	0.3228	10	103	61	49	40	M2175-0820	○
8.30		0.3268	10	103	61	49	40	M2175-0830	○
8.33	21/64	0.3281	10	103	61	49	40	M2175-0833	●
8.40		0.3307	10	103	61	49	40	M2175-0840	○
8.43	Q	0.3319	10	103	61	49	40	M2175-0843	●
8.50		0.3346	10	103	61	49	40	M2175-0850	●
8.60		0.3386	10	103	61	49	40	M2175-0860	○
8.70		0.3425	10	103	61	49	40	M2175-0870	○
8.73	11/32	0.3438	10	103	61	49	40	M2175-0873	●
8.80		0.3465	10	103	61	49	40	M2175-0880	●
8.90		0.3504	10	103	61	49	40	M2175-0890	○
9.00		0.3543	10	103	61	49	40	M2175-0900	●
9.10		0.3583	10	103	61	49	40	M2175-0910	○
9.13	23/64	0.3594	10	103	61	49	40	M2175-0913	●
9.20		0.3622	10	103	61	49	40	M2175-0920	○
9.30		0.3661	10	103	61	49	40	M2175-0930	●
9.35	U	0.3681	10	103	61	49	40	M2175-0935	●
9.40		0.3701	10	103	61	49	40	M2175-0940	●
9.50		0.3740	10	103	61	49	40	M2175-0950	●
9.53	3/8	0.3750	10	103	61	49	40	M2175-0953	●
9.60		0.3780	10	103	61	49	40	M2175-0960	●
9.70		0.3819	10	103	61	49	40	M2175-0970	○
9.80	W	0.3858	10	103	61	49	40	M2175-0980	○
9.90		0.3898	10	103	61	49	40	M2175-0990	●
9.92	25/64	0.3906	10	103	61	49	40	M2175-0992	●
10.00		0.3937	10	103	61	49	40	M2175-1000	●
10.10		0.3976	12	118	71	56	45	M2175-1010	○
10.20		0.4016	12	118	71	56	45	M2175-1020	●
10.26	Y	0.4039	12	118	71	56	45	M2175-1026	●
10.30		0.4055	12	118	71	56	45	M2175-1030	●
10.32	13/32	0.4062	12	118	71	56	45	M2175-1032	●
10.40		0.4094	12	118	71	56	45	M2175-1040	○
10.50		0.4134	12	118	71	56	45	M2175-1050	●
10.60		0.4173	12	118	71	56	45	M2175-1060	○
10.70		0.4213	12	118	71	56	45	M2175-1070	●
10.72	27/64	0.4219	12	118	71	56	45	M2175-1072	●
10.80		0.4252	12	118	71	56	45	M2175-1080	○
10.90		0.4291	12	118	71	56	45	M2175-1090	○
11.00		0.4331	12	118	71	56	45	M2175-1100	●
11.10		0.4370	12	118	71	56	45	M2175-1110	○
11.11	7/16	0.4375	12	118	71	56	45	M2175-1111	●
11.20		0.4409	12	118	71	56	45	M2175-1120	●
11.30		0.4449	12	118	71	56	45	M2175-1130	●


For machining values see Page 68.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

MEGA-Quadro-Drill

M2175

5xD

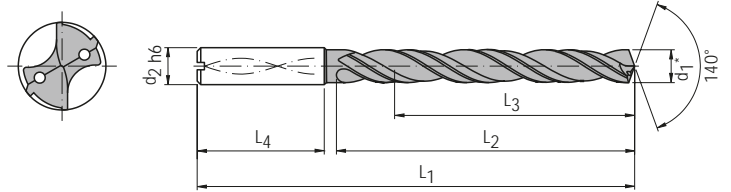
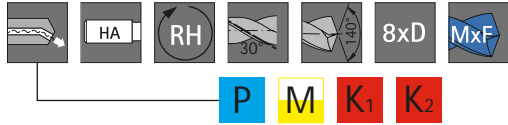
Drill diameter d ₁ *		Dimensions						 M2175	Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			
11.40		0.4488	12	118	71	56	45	M2175-1140	●	
11.50	29/64	0.4528	12	118	71	56	45	M2175-1150	●	
11.60		0.4567	12	118	71	56	45	M2175-1160	○	
11.70		0.4606	12	118	71	56	45	M2175-1170	○	
11.80		0.4646	12	118	71	56	45	M2175-1180	●	
11.90	15/32	0.4685	12	118	71	56	45	M2175-1190	●	
12.00		0.4724	12	118	71	56	45	M2175-1200	●	
12.30	31/64	0.4843	14	124	77	60	45	M2175-1230	●	
12.50		0.4921	14	124	77	60	45	M2175-1250	●	
12.70	1/2	0.5000	14	124	77	60	45	M2175-1270	●	
12.80		0.5039	14	124	77	60	45	M2175-1280	●	
13.00		0.5118	14	124	77	60	45	M2175-1300	●	
13.10	33/64	0.5157	14	124	77	60	45	M2175-1310	●	
13.30		0.5236	14	124	77	60	45	M2175-1330	●	
13.50		0.5315	14	124	77	60	45	M2175-1350	●	
13.80		0.5433	14	124	77	60	45	M2175-1380	○	
14.00		0.5512	14	124	77	60	45	M2175-1400	●	
14.29		0.5626	16	133	83	63	48	M2175-1429	●	
14.50		0.5709	16	133	83	63	48	M2175-1450	●	
14.68	37/64	0.5780	16	133	83	63	48	M2175-1468	●	
14.80		0.5827	16	133	83	63	48	M2175-1480	●	
15.00		0.5906	16	133	83	63	48	M2175-1500	●	
15.08	19/32	0.5937	16	133	83	63	48	M2175-1508	●	
15.50		0.6102	16	133	83	63	48	M2175-1550	●	
15.80		0.6220	16	133	83	63	48	M2175-1580	○	
15.88	5/8	0.6250	16	133	83	63	48	M2175-1588	●	
16.00		0.6299	16	133	83	63	48	M2175-1600	●	
16.50		0.6496	18	143	93	71	48	M2175-1650	●	
16.67	21/32	0.6563	18	143	93	71	48	M2175-1667	●	
16.80		0.6614	18	143	93	71	48	M2175-1680	●	
17.00		0.6693	18	143	93	71	48	M2175-1700	●	
17.46	11/16	0.6874	18	143	93	71	48	M2175-1746	●	
17.50		0.6890	18	143	93	71	48	M2175-1750	●	
17.80		0.7008	18	143	93	71	48	M2175-1780	○	
17.86	45/64	0.7031	18	143	93	71	48	M2175-1786	●	
18.00		0.7087	18	143	93	71	48	M2175-1800	●	
18.26	23/32	0.7189	20	153	101	77	50	M2175-1826	●	
18.50		0.7283	20	153	101	77	50	M2175-1850	●	
18.80		0.7402	20	153	101	77	50	M2175-1880	○	
19.00		0.7480	20	153	101	77	50	M2175-1900	●	
19.05	3/4	0.7500	20	153	101	77	50	M2175-1905	●	
19.50		0.7677	20	153	101	77	50	M2175-1950	●	
19.80		0.7795	20	153	101	77	50	M2175-1980	○	
20.00		0.7874	20	153	101	77	50	M2175-2000	●	

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 68.

MEGA-Quadro-Drill

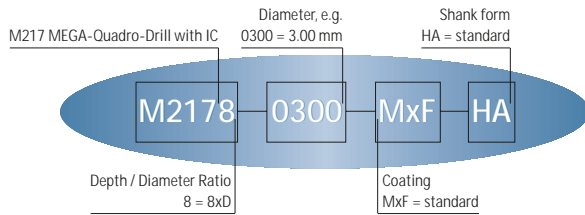
M2178



Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT 8 (achievable)
No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:



Drill diameter		Shank diameter		Total length		Margin length		Maximum drilling depth		Shank length		M2178 Order code Form / Diameter
mm	Inch / Wire / Letter	Dec. equivalent Inch	d ₂ h ₆ mm	L ₁ mm	L ₂ mm	L ₃ mm	L ₄ mm	L ₃ mm	L ₄ mm	L ₄ mm		
3.00		0.1181	6	72	34	29	36	M2178-0300	●			
3.10		0.1220	6	72	34	29	36	M2178-0310	●			
3.18	1/8	0.1250	6	72	34	29	36	M2178-0318	●			
3.20		0.1260	6	72	34	29	36	M2178-0320	●			
3.30		0.1299	6	72	34	29	36	M2178-0330	●			
3.40		0.1339	6	72	34	29	36	M2178-0340	○			
3.45	#29	0.1358	6	72	34	29	36	M2178-0345	●			
3.50		0.1378	6	72	34	29	36	M2178-0350	●			
3.57	9/64	0.1406	6	72	34	29	36	M2178-0357	●			
3.60		0.1417	6	72	34	29	36	M2178-0360	●			
3.70		0.1457	6	72	34	29	36	M2178-0370	●			
3.80	#25	0.1496	6	81	43	36	36	M2178-0380	●			
3.86	#24	0.1520	6	81	43	36	36	M2178-0386	●			
3.90		0.1535	6	81	43	36	36	M2178-0390	○			
3.97	5/32	0.1562	6	81	43	36	36	M2178-0397	●			
4.00		0.1575	6	81	43	36	36	M2178-0400	●			
4.04	#21	0.1591	6	81	43	36	36	M2178-0404	●			
4.10		0.1614	6	81	43	36	36	M2178-0410	●			
4.20		0.1654	6	81	43	36	36	M2178-0420	●			
4.30	#18	0.1693	6	81	43	36	36	M2178-0430	●			
4.37	11/64	0.1719	6	81	43	36	36	M2178-0437	●			
4.40		0.1732	6	81	43	36	36	M2178-0440	●			
4.50	#16	0.1772	6	81	43	36	36	M2178-0450	●			
4.60		0.1811	6	81	43	36	36	M2178-0460	●			
4.62	#14	0.1819	6	81	43	36	36	M2178-0462	●			


For machining values see Page 68.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

MEGA-Quadro-Drill

M2178

8xD

Drill diameter d ₁ *		Dimensions						 M2178	Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			
4.70	#13	0.1850	6	81	43	36	36	M2178-0470	●	
4.76	3/16	0.1875	6	95	57	48	36	M2178-0476	●	
4.80	#12	0.1890	6	95	57	48	36	M2178-0480	●	
4.90		0.1929	6	95	57	48	36	M2178-0490	○	
5.00		0.1969	6	95	57	48	36	M2178-0500	●	
5.10		0.2008	6	95	57	48	36	M2178-0510	●	
5.16	13/64	0.2031	6	95	57	48	36	M2178-0516	●	
5.20		0.2047	6	95	57	48	36	M2178-0520	●	
5.30		0.2087	6	95	57	48	36	M2178-0530	○	
5.40		0.2126	6	95	57	48	36	M2178-0540	○	
5.50		0.2165	6	95	57	48	36	M2178-0550	●	
5.56	7/32	0.2188	6	95	57	48	36	M2178-0556	●	
5.60		0.2205	6	95	57	48	36	M2178-0560	●	
5.70		0.2244	6	95	57	48	36	M2178-0570	●	
5.80		0.2283	6	95	57	48	36	M2178-0580	○	
5.90		0.2323	6	95	57	48	36	M2178-0590	●	
5.95	15/64	0.2344	6	95	57	48	36	M2178-0595	●	
6.00		0.2362	6	95	57	48	36	M2178-0600	●	
6.10		0.2402	8	114	76	64	36	M2178-0610	○	
6.15	C	0.2421	8	114	76	64	36	M2178-0615	●	
6.20		0.2441	8	114	76	64	36	M2178-0620	○	
6.30		0.2480	8	114	76	64	36	M2178-0630	○	
6.35	1/4	0.2500	8	114	76	64	36	M2178-0635	●	
6.40		0.2520	8	114	76	64	36	M2178-0640	○	
6.50		0.2559	8	114	76	64	36	M2178-0650	●	
6.53	F	0.2571	8	114	76	64	36	M2178-0653	●	
6.60		0.2598	8	114	76	64	36	M2178-0660	●	
6.63	G	0.2610	8	114	76	64	36	M2178-0663	●	
6.70		0.2638	8	114	76	64	36	M2178-0670	○	
6.75	17/64	0.2656	8	114	76	64	36	M2178-0675	●	
6.80		0.2677	8	114	76	64	36	M2178-0680	●	
6.90	I	0.2717	8	114	76	64	36	M2178-0690	●	
7.00		0.2756	8	114	76	64	36	M2178-0700	●	
7.10		0.2795	8	114	76	64	36	M2178-0710	○	
7.14	9/32	0.2812	8	114	76	64	36	M2178-0714	●	
7.20		0.2835	8	114	76	64	36	M2178-0720	●	
7.30		0.2874	8	114	76	64	36	M2178-0730	●	
7.40		0.2913	8	114	76	64	36	M2178-0740	●	
7.50		0.2953	8	114	76	64	36	M2178-0750	●	
7.54	19/64	0.2969	8	114	76	64	36	M2178-0754	●	
7.60		0.2992	8	114	76	64	36	M2178-0760	●	
7.70		0.3031	8	114	76	64	36	M2178-0770	●	
7.80		0.3071	8	114	76	64	36	M2178-0780	●	
7.90		0.3110	8	114	76	64	36	M2178-0790	○	
7.94	5/16	0.3125	8	114	76	64	36	M2178-0794	●	


* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 68.

MEGA-Quadro-Drill

M2178

8xD


Drill diameter d ₁ *		Dimensions						 M2178 Order code Form / Diameter	
		Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm		Shank length L ₄ mm
mm									
8.00		0.3150	8	114	76	64	36	M2178-0800	●
8.10		0.3189	10	142	95	80	40	M2178-0810	○
8.20	P	0.3228	10	142	95	80	40	M2178-0820	○
8.30		0.3268	10	142	95	80	40	M2178-0830	○
8.33	21/64	0.3281	10	142	95	80	40	M2178-0833	●
8.40		0.3307	10	142	95	80	40	M2178-0840	○
8.43	Q	0.3319	10	142	95	80	40	M2178-0843	●
8.50		0.3346	10	142	95	80	40	M2178-0850	●
8.60		0.3386	10	142	95	80	40	M2178-0860	○
8.70		0.3425	10	142	95	80	40	M2178-0870	○
8.73	11/32	0.3438	10	142	95	80	40	M2178-0873	●
8.80		0.3465	10	142	95	80	40	M2178-0880	●
8.90		0.3504	10	142	95	80	40	M2178-0890	○
9.00		0.3543	10	142	95	80	40	M2178-0900	●
9.10		0.3583	10	142	95	80	40	M2178-0910	○
9.13	23/64	0.3594	10	142	95	80	40	M2178-0913	●
9.20		0.3622	10	142	95	80	40	M2178-0920	○
9.30		0.3661	10	142	95	80	40	M2178-0930	●
9.35	U	0.3681	10	142	95	80	40	M2178-0935	●
9.40		0.3701	10	142	95	80	40	M2178-0940	●
9.50		0.3740	10	142	95	80	40	M2178-0950	●
9.53	3/8	0.3750	10	142	95	80	40	M2178-0953	●
9.60		0.3780	10	142	95	80	40	M2178-0960	●
9.70		0.3819	10	142	95	80	40	M2178-0970	○
9.80	W	0.3858	10	142	95	80	40	M2178-0980	○
9.90		0.3898	10	142	95	80	40	M2178-0990	●
9.92	25/64	0.3906	10	142	95	80	40	M2178-0992	●
10.00		0.3937	10	142	95	80	40	M2178-1000	●
10.10		0.3976	12	162	114	96	45	M2178-1010	○
10.20		0.4016	12	162	114	96	45	M2178-1020	●
10.26	Y	0.4039	12	162	114	96	45	M2178-1026	●
10.30		0.4055	12	162	114	96	45	M2178-1030	●
10.32	13/32	0.4062	12	162	114	96	45	M2178-1032	●
10.40		0.4094	12	162	114	96	45	M2178-1040	○
10.50		0.4134	12	162	114	96	45	M2178-1050	●
10.60		0.4173	12	162	114	96	45	M2178-1060	○
10.70		0.4213	12	162	114	96	45	M2178-1070	●
10.72	27/64	0.4219	12	162	114	96	45	M2178-1072	●
10.80		0.4252	12	162	114	96	45	M2178-1080	○
10.90		0.4291	12	162	114	96	45	M2178-1090	○
11.00		0.4331	12	162	114	96	45	M2178-1100	●
11.10		0.4370	12	162	114	96	45	M2178-1110	○
11.11	7/16	0.4375	12	162	114	96	45	M2178-1111	●
11.20		0.4409	12	162	114	96	45	M2178-1120	●
11.30		0.4449	12	162	114	96	45	M2178-1130	●

For machining values see Page 68.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

MEGA-Quadro-Drill M2178

8xD

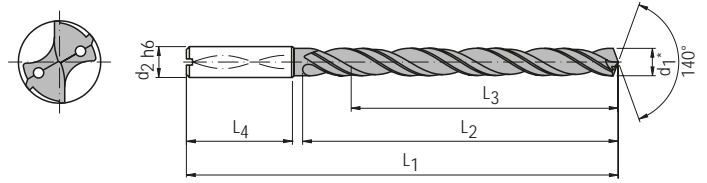
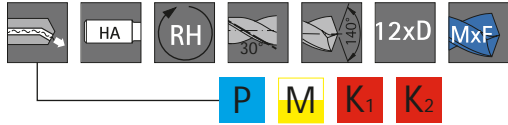
Drill diameter d ₁ *		Dimensions						 M2178 Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
11.40		0.4488	12	162	114	96	45	M2178-1140	●
11.50	29/64	0.4528	12	162	114	96	45	M2178-1150	●
11.60		0.4567	12	162	114	96	45	M2178-1160	○
11.70		0.4606	12	162	114	96	45	M2178-1170	○
11.80		0.4646	12	162	114	96	45	M2178-1180	●
11.90	15/32	0.4685	12	162	114	96	45	M2178-1190	●
12.00		0.4724	12	162	114	96	45	M2178-1200	●
12.30	31/64	0.4843	14	178	133	112	45	M2178-1230	●
12.50		0.4921	14	178	133	112	45	M2178-1250	●
12.70	1/2	0.5000	14	178	133	112	45	M2178-1270	●
12.80		0.5039	14	178	133	112	45	M2178-1280	●
13.00		0.5118	14	178	133	112	45	M2178-1300	●
13.10	33/64	0.5157	14	178	133	112	45	M2178-1310	●
13.50		0.5315	14	178	133	112	45	M2178-1350	●
13.80		0.5433	14	178	133	112	45	M2178-1380	○
14.00		0.5512	14	178	133	112	45	M2178-1400	●
14.29		0.5626	16	203	152	128	48	M2178-1429	●
14.50		0.5709	16	203	152	128	48	M2178-1450	●
14.68	37/64	0.5780	16	203	152	128	48	M2178-1468	●
14.80		0.5827	16	203	152	128	48	M2178-1480	●
15.00		0.5906	16	203	152	128	48	M2178-1500	●
15.08	19/32	0.5937	16	203	152	128	48	M2178-1508	●
15.50		0.6102	16	203	152	128	48	M2178-1550	●
15.80		0.6220	16	203	152	128	48	M2178-1580	○
15.88	5/8	0.6250	16	203	152	128	48	M2178-1588	●
16.00		0.6299	16	203	152	128	48	M2178-1600	●
16.50		0.6496	18	222	171	144	48	M2178-1650	●
16.67	21/32	0.6563	18	222	171	144	48	M2178-1667	●
16.80		0.6614	18	222	171	144	48	M2178-1680	●
17.00		0.6693	18	222	171	144	48	M2178-1700	●
17.46	11/16	0.6874	18	222	171	144	48	M2178-1746	●
17.50		0.6890	18	222	171	144	48	M2178-1750	●
17.80		0.7008	18	222	171	144	48	M2178-1780	○
17.86	45/64	0.7031	18	222	171	144	48	M2178-1786	●
18.00		0.7087	18	222	171	144	48	M2178-1800	●
18.26	23/32	0.7189	20	243	190	160	50	M2178-1826	●
18.50		0.7283	20	243	190	160	50	M2178-1850	○
18.80		0.7402	20	243	190	160	50	M2178-1880	○
19.00		0.7480	20	243	190	160	50	M2178-1900	○
19.05	3/4	0.7500	20	243	190	160	50	M2178-1905	●
19.50		0.7677	20	243	190	160	50	M2178-1950	○
19.80		0.7795	20	243	190	160	50	M2178-1980	○
20.00		0.7874	20	243	190	160	50	M2178-2000	○

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 68.

MEGA-Quadro-Drill

M2182



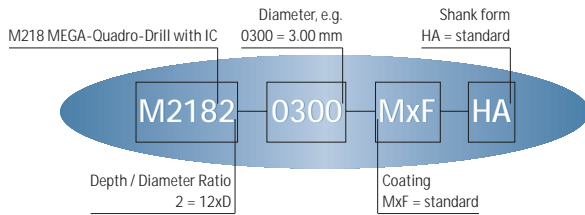
Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch

Bore tolerance: IT 8 (achievable)

No. of margins: 2

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:



Drill diameter		Shank diameter		Total length		Margin length		Maximum drilling depth		Shank length		M2182 Order code Form / Diameter
mm	Inch / Wire / Letter	Dec. equivalent Inch	d ₂ h ₆ mm	L ₁ mm	L ₂ mm	L ₃ mm	L ₄ mm	L ₃ mm	L ₄ mm	L ₄ mm		
3.00		0.1181	6	92	54	48	36	M2182-0300	●			
3.10		0.1220	6	92	54	48	36	M2182-0310	●			
3.18	1/8	0.1250	6	92	54	48	36	M2182-0318	●			
3.20		0.1260	6	92	54	48	36	M2182-0320	●			
3.30		0.1299	6	92	54	48	36	M2182-0330	●			
3.40		0.1339	6	92	54	48	36	M2182-0340	○			
3.45	#29	0.1358	6	92	54	48	36	M2182-0345	●			
3.50		0.1378	6	92	54	48	36	M2182-0350	●			
3.57	9/64	0.1406	6	92	54	48	36	M2182-0357	●			
3.60		0.1417	6	92	54	48	36	M2182-0360	●			
3.70		0.1457	6	92	54	48	36	M2182-0370	●			
3.80	#25	0.1496	6	102	64	58	36	M2182-0380	●			
3.86	#24	0.1520	6	102	64	58	36	M2182-0386	●			
3.90		0.1535	6	102	64	58	36	M2182-0390	○			
3.97	5/32	0.1562	6	102	64	58	36	M2182-0397	●			
4.00		0.1575	6	102	64	58	36	M2182-0400	●			
4.04	#21	0.1591	6	102	64	58	36	M2182-0404	●			
4.10		0.1614	6	102	64	58	36	M2182-0410	●			
4.20		0.1654	6	102	64	58	36	M2182-0420	●			
4.30	#18	0.1693	6	102	64	58	36	M2182-0430	●			
4.37	11/64	0.1719	6	102	64	58	36	M2182-0437	●			
4.40		0.1732	6	102	64	58	36	M2182-0440	●			
4.50	#16	0.1772	6	102	64	58	36	M2182-0450	●			
4.60		0.1811	6	102	64	58	36	M2182-0460	●			
4.62	#14	0.1819	6	102	64	58	36	M2182-0462	●			


For machining values see Page 68.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

MEGA-Quadro-Drill

M2182

12xD

Drill diameter d ₁ *		Dimensions						 M2182	Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			
4.70	#13	0.1850	6	102	64	58	36	M2182-0470	●	
4.76	3/16	0.1875	6	116	78	70	36	M2182-0476	●	
4.80	#12	0.1890	6	116	78	70	36	M2182-0480	●	
4.90		0.1929	6	116	78	70	36	M2182-0490	○	
5.00		0.1969	6	116	78	70	36	M2182-0500	●	
5.10		0.2008	6	116	78	70	36	M2182-0510	●	
5.16	13/64	0.2031	6	116	78	70	36	M2182-0516	●	
5.20		0.2047	6	116	78	70	36	M2182-0520	●	
5.30		0.2087	6	116	78	70	36	M2182-0530	○	
5.40		0.2126	6	116	78	70	36	M2182-0540	○	
5.50		0.2165	6	116	78	70	36	M2182-0550	●	
5.56	7/32	0.2188	6	116	78	70	36	M2182-0556	●	
5.60		0.2205	6	116	78	70	36	M2182-0560	●	
5.70		0.2244	6	116	78	70	36	M2182-0570	●	
5.80		0.2283	6	116	78	70	36	M2182-0580	○	
5.90		0.2323	6	116	78	70	36	M2182-0590	●	
5.95	15/64	0.2344	6	116	78	70	36	M2182-0595	●	
6.00		0.2362	6	116	78	70	36	M2182-0600	●	
6.10		0.2402	8	146	108	94	36	M2182-0610	○	
6.15	C	0.2421	8	146	108	94	36	M2182-0615	●	
6.20		0.2441	8	146	108	94	36	M2182-0620	○	
6.30		0.2480	8	146	108	94	36	M2182-0630	○	
6.35	1/4	0.2500	8	146	108	94	36	M2182-0635	●	
6.40		0.2520	8	146	108	94	36	M2182-0640	○	
6.50		0.2559	8	146	108	94	36	M2182-0650	●	
6.53	F	0.2571	8	146	108	94	36	M2182-0653	●	
6.60		0.2598	8	146	108	94	36	M2182-0660	●	
6.63	G	0.2610	8	146	108	94	36	M2182-0663	●	
6.70		0.2638	8	146	108	94	36	M2182-0670	○	
6.75	17/64	0.2656	8	146	108	94	36	M2182-0675	●	
6.80		0.2677	8	146	108	94	36	M2182-0680	●	
6.90	I	0.2717	8	146	108	94	36	M2182-0690	●	
7.00		0.2756	8	146	108	94	36	M2182-0700	●	
7.10		0.2795	8	146	108	94	36	M2182-0710	○	
7.14	9/32	0.2812	8	146	108	94	36	M2182-0714	●	
7.20		0.2835	8	146	108	94	36	M2182-0720	●	
7.30		0.2874	8	146	108	94	36	M2182-0730	●	
7.40		0.2913	8	146	108	94	36	M2182-0740	●	
7.50		0.2953	8	146	108	94	36	M2182-0750	●	
7.54	19/64	0.2969	8	146	108	94	36	M2182-0754	●	
7.60		0.2992	8	146	108	94	36	M2182-0760	●	
7.70		0.3031	8	146	108	94	36	M2182-0770	●	
7.80		0.3071	8	146	108	94	36	M2182-0780	●	
7.90		0.3110	8	146	108	94	36	M2182-0790	○	
7.94	5/16	0.3125	8	146	108	94	36	M2182-0794	●	


* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 76.

MEGA-Quadro-Drill

M2182

12xD

Drill diameter d ₁ *		Dimensions						 M2182 Order code Form / Diameter	
		Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm		Shank length L ₄ mm
mm									
8.00		0.3150	8	146	108	94	36	M2182-0800	●
8.10		0.3189	10	162	120	110	40	M2182-0810	○
8.20	P	0.3228	10	162	120	110	40	M2182-0820	○
8.30		0.3268	10	162	120	110	40	M2182-0830	○
8.33	21/64	0.3281	10	162	120	110	40	M2182-0833	●
8.40		0.3307	10	162	120	110	40	M2182-0840	○
8.43	Q	0.3319	10	162	120	110	40	M2182-0843	●
8.50		0.3346	10	162	120	110	40	M2182-0850	●
8.60		0.3386	10	162	120	110	40	M2182-0860	○
8.70		0.3425	10	162	120	110	40	M2182-0870	○
8.73	11/32	0.3438	10	162	120	110	40	M2182-0873	●
8.80		0.3465	10	162	120	110	40	M2182-0880	●
8.90		0.3504	10	162	120	110	40	M2182-0890	○
9.00		0.3543	10	162	120	110	40	M2182-0900	●
9.10		0.3583	10	162	120	110	40	M2182-0910	○
9.13	23/64	0.3594	10	162	120	110	40	M2182-0913	●
9.20		0.3622	10	162	120	110	40	M2182-0920	○
9.30		0.3661	10	162	120	110	40	M2182-0930	●
9.35	U	0.3681	10	162	120	110	40	M2182-0935	●
9.40		0.3701	10	162	120	110	40	M2182-0940	●
9.50		0.3740	10	162	120	110	40	M2182-0950	●
9.53	3/8	0.3750	10	162	120	110	40	M2182-0953	●
9.60		0.3780	10	162	120	110	40	M2182-0960	●
9.70		0.3819	10	162	120	110	40	M2182-0970	○
9.80	W	0.3858	10	162	120	110	40	M2182-0980	○
9.90		0.3898	10	162	120	110	40	M2182-0990	●
9.92	25/64	0.3906	10	162	120	110	40	M2182-0992	●
10.00		0.3937	10	162	120	110	40	M2182-1000	●
10.10		0.3976	12	204	156	142	45	M2182-1010	○
10.20		0.4016	12	204	156	142	45	M2182-1020	●
10.26	Y	0.4039	12	204	156	142	45	M2182-1026	●
10.30		0.4055	12	204	156	142	45	M2182-1030	●
10.32	13/32	0.4062	12	204	156	142	45	M2182-1032	●
10.40		0.4094	12	204	156	142	45	M2182-1040	○
10.50		0.4134	12	204	156	142	45	M2182-1050	●
10.60		0.4173	12	204	156	142	45	M2182-1060	○
10.70		0.4213	12	204	156	142	45	M2182-1070	●
10.72	27/64	0.4219	12	204	156	142	45	M2182-1072	●
10.80		0.4252	12	204	156	142	45	M2182-1080	○
10.90		0.4291	12	204	156	142	45	M2182-1090	○
11.00		0.4331	12	204	156	142	45	M2182-1100	●
11.10		0.4370	12	204	156	142	45	M2182-1110	○
11.11	7/16	0.4375	12	204	156	142	45	M2182-1111	●
11.20		0.4409	12	204	156	142	45	M2182-1120	●
11.30		0.4449	12	204	156	142	45	M2182-1130	●


For machining values see Page 76.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

MEGA-Quadro-Drill

M2182

12xD

Drill diameter d ₁ *		Dimensions						 M2182 Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
11.40		0.4488	12	204	156	142	45	M2182-1140	●
11.50	29/64	0.4528	12	204	156	142	45	M2182-1150	●
11.60		0.4567	12	204	156	142	45	M2182-1160	○
11.70		0.4606	12	204	156	142	45	M2182-1170	○
11.80		0.4646	12	204	156	142	45	M2182-1180	●
11.90	15/32	0.4685	12	204	156	142	45	M2182-1190	●
12.00		0.4724	12	204	156	142	45	M2182-1200	●
12.30	31/64	0.4843	14	230	182	166	45	M2182-1230	●
12.50		0.4921	14	230	182	166	45	M2182-1250	●
12.70	1/2	0.5000	14	230	182	166	45	M2182-1270	●
12.80		0.5039	14	230	182	166	45	M2182-1280	●
13.00		0.5118	14	230	182	166	45	M2182-1300	●
13.10	33/64	0.5157	14	230	182	166	45	M2182-1310	●
13.50		0.5315	14	230	182	166	45	M2182-1350	●
13.80		0.5433	14	230	182	166	45	M2182-1380	○
14.00		0.5512	14	230	182	166	45	M2182-1400	●
14.29		0.5626	16	260	208	192	48	M2182-1429	●
14.50		0.5709	16	260	208	192	48	M2182-1450	●
14.68	37/64	0.5780	16	260	208	192	48	M2182-1468	●
14.80		0.5827	16	260	208	192	48	M2182-1480	●
15.00		0.5906	16	260	208	192	48	M2182-1500	●
15.08	19/32	0.5937	16	260	208	192	48	M2182-1508	●
15.50		0.6102	16	260	208	192	48	M2182-1550	●
15.80		0.6220	16	260	208	192	48	M2182-1580	○
15.88	5/8	0.6250	16	260	208	192	48	M2182-1588	●
16.00		0.6299	16	260	208	192	48	M2182-1600	●
16.50		0.6496	18	285	234	216	48	M2182-1650	○
16.67	21/32	0.6563	18	285	234	216	48	M2182-1667	●
16.80		0.6614	18	285	234	216	48	M2182-1680	●
17.00		0.6693	18	285	234	216	48	M2182-1700	○
17.46	11/16	0.6874	18	285	234	216	48	M2182-1746	●
17.50		0.6890	18	285	234	216	48	M2182-1750	○
17.80		0.7008	18	285	234	216	48	M2182-1780	○
17.86	45/64	0.7031	18	285	234	216	48	M2182-1786	●
18.00		0.7087	18	285	234	216	48	M2182-1800	○
18.26	23/32	0.7189	20	310	258	240	50	M2182-1826	●
18.50		0.7283	20	310	258	240	50	M2182-1850	○
18.80		0.7402	20	310	258	240	50	M2182-1880	○
19.00		0.7480	20	310	258	240	50	M2182-1900	○
19.05	3/4	0.7500	20	310	258	240	50	M2182-1905	●
19.50		0.7677	20	310	258	240	50	M2182-1950	○
19.80		0.7795	20	310	258	240	50	M2182-1980	○
20.00		0.7874	20	310	258	240	50	M2182-2000	○

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 76.

Machining values for MEGA-Quadro-Drill



M2175, M2178, M2182



M2175, M2178, M2182

	Material	Hardness Rockwell (HRc) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c)		
		HRc	BHN	N/mm ²	M2175 M2178 M2182 SFM	m/min	
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8	up to 178	up to 600	262-328	80-100	
		up to 15 over 15	up to 205 over 205	up to 700 over 700	230-295 197-262	70-90 60-80	
P	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27	up to 266	up to 900	197-230	60-70	
		up to 31 over 31	up to 297 over 297	up to 1000 over 1000	131-197 131-164	40-60 40-50	
M	Stainless steels inox 17-4PH, 15-5PH				98-164	30-50	
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2				98-131	30-40	
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14	up to 200	up to 680	230-295	70-90	
		up to 24 over 24	up to 250 over 250	up to 850 over 850	197-262 197-230	60-80 60-70	
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8	up to 178	up to 600	246-295	75-90	
		over 8	over 178	over 600	213-262	65-80	
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360						
	Aluminium (Si content < 10%) 413, 385, A390						
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO						
S	Titanium alloys TiAl4V						
	Nickel alloys Inconel 718, Rene 41, Waspolloy						
H	Chilled cast iron	38-48	350-450	1173-1527	131-230	40-70	
	Hardened steel	50-55		1614-1870			
		56-60					
		61-65					

The guideline values for cutting speed v_c should be multiplied by the following correction factors KF_v according to the drilling depth

Depth / Diameter ratio	KF _v
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8
8 x D	0.7
12 x D	0.6

MEGA-Quadro-Drill, alteration to standard product



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Request Order

Company _____ Customer number (if available) _____

Contact partner _____ Tel./Fax _____ E-Mail _____

Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

- Unalloyed steel
- Cast steel
- Alloyed steel
- Inox
- Stainless/acid-resistant steel
- Grey cast iron
- Alloyed grey cast iron
- Nodular iron
- CGI
- Malleable iron
- _____

Coolant supply: Ext. Int.



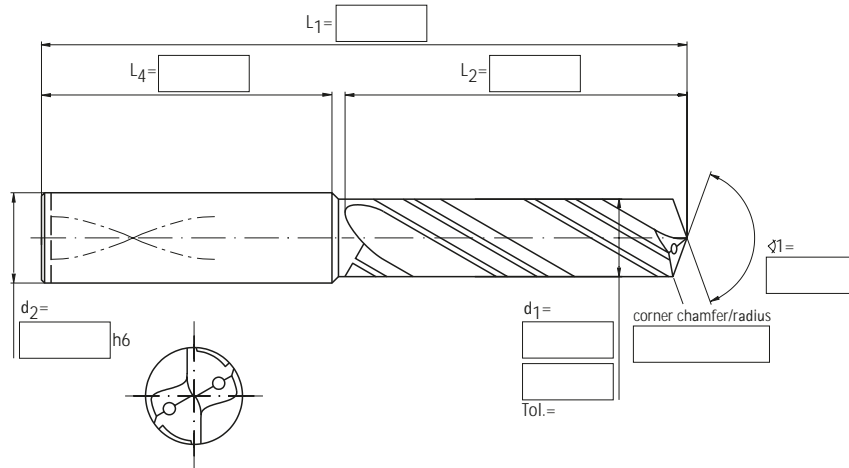

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2175): _____




Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____



Shank form:

- HA (DIN 6535) 
- HB (DIN 6535) 
- HE (DIN 6535) 

Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> MEGA <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> INOX <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point <input type="checkbox"/> Spiral point
--	--	--

Blank (MC): _____

GIGA-Drill –

The high precision drill with four margins

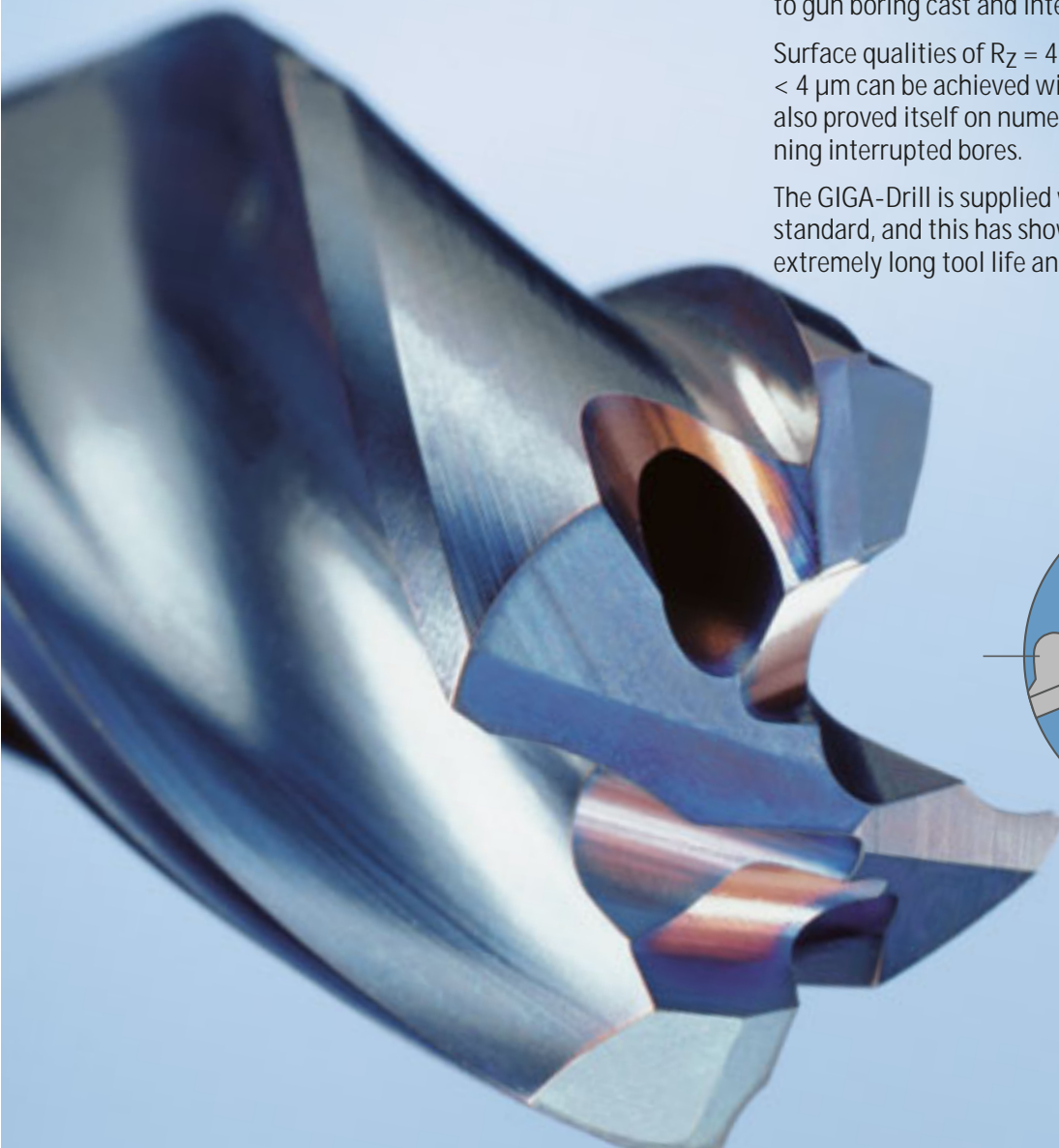
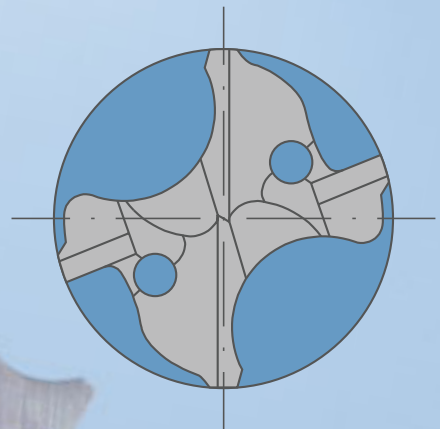
Drilling technology today is still mainly characterized by drills with two cutting edges reaching to the center of the tool and two margins along the body of the drill. With four cutting edges and four guide margins, the MAPAL GIGA-Drill represents a quantum-leap in performance and quality of the finished bore.

The advantages of the four margins which support the drill in the bore and produce greater accuracy and quality, are also one of the main features of this unique drill.

Distributing the cutting effort between two solid boring and two gun boring margins allows the feed rate and tool life to be doubled. In addition to drilling into the solid, the GIGA-Drill is also very well suited to gun boring cast and interrupted bores.

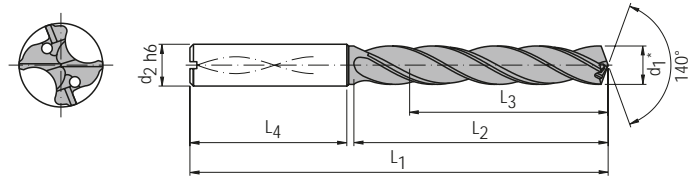
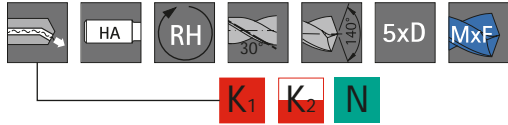
Surface qualities of $R_z = 4 \mu\text{m}$ and concentricities of $< 4 \mu\text{m}$ can be achieved with the GIGA-Drill. It has also proved itself on numerous occasions for machining interrupted bores.

The GIGA-Drill is supplied with the MxF coating as a standard, and this has shown to be excellent with extremely long tool life and low wear.



GIGA-Drill

M2195



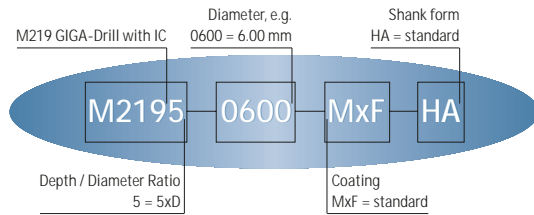
Design:

Drill diameter: 6.00 – 20.04 mm
0.2362 – 0.7890 Inch

Bore tolerance: IT 9 (achievable)

No. of margins: 4

To order, use the code given in the table and supplement it with the required coating and shank form.
Complete order code:




Drill diameter			Dimensions					M2195
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
6.00		0.2362	6	82	44	35	36	M2195-0600 ●
6.03		0.2374	6	82	44	35	36	M2195-0603 ○
6.10		0.2402	8	91	53	43	36	M2195-0610 ○
6.20		0.2441	8	91	53	43	36	M2195-0620 ●
6.30		0.2480	8	91	53	43	36	M2195-0630 ○
6.35	1/4	0.2500	8	91	53	43	36	M2195-0635 ●
6.40		0.2520	8	91	53	43	36	M2195-0640 ○
6.50		0.2559	8	91	53	43	36	M2195-0650 ●
6.60		0.2598	8	91	53	43	36	M2195-0660 ●
6.70		0.2638	8	91	53	43	36	M2195-0670 ○
6.75	17/64	0.2656	8	91	53	43	36	M2195-0675 ●
6.80		0.2677	8	91	53	43	36	M2195-0680 ●
6.90	I	0.2717	8	91	53	43	36	M2195-0690 ●
7.00		0.2756	8	91	53	43	36	M2195-0700 ●
7.10		0.2795	8	91	53	43	36	M2195-0710 ○
7.14	9/32	0.2812	8	91	53	43	36	M2195-0714 ●
7.20		0.2835	8	91	53	43	36	M2195-0720 ●
7.30		0.2874	8	91	53	43	36	M2195-0730 ●
7.40		0.2913	8	91	53	43	36	M2195-0740 ●
7.50		0.2953	8	91	53	43	36	M2195-0750 ●
7.54	19/64	0.2969	8	91	53	43	36	M2195-0754 ●
7.60		0.2992	8	91	53	43	36	M2195-0760 ●
7.70		0.3031	8	91	53	43	36	M2195-0770 ●
7.80		0.3071	8	91	53	43	36	M2195-0780 ○
7.90		0.3110	8	91	53	43	36	M2195-0790 ○

For machining values see Page 76.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

GIGA-Drill M2195

5xD

Drill diameter d ₁ *		Dimensions						 M2195	Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm			
7.94	5/16	0.3125	8	91	53	43	36	M2195-0794	●	
8.00		0.3150	8	91	53	43	36	M2195-0800	●	
8.03		0.3161	8	91	53	43	36	M2195-0803	○	
8.10		0.3189	10	103	61	49	40	M2195-0810	○	
8.20	P	0.3228	10	103	61	49	40	M2195-0820	●	
8.30		0.3268	10	103	61	49	40	M2195-0830	○	
8.33	21/64	0.3281	10	103	61	49	40	M2195-0833	●	
8.40		0.3307	10	103	61	49	40	M2195-0840	○	
8.50		0.3346	10	103	61	49	40	M2195-0850	●	
8.60		0.3386	10	103	61	49	40	M2195-0860	○	
8.70		0.3425	10	103	61	49	40	M2195-0870	○	
8.73	11/32	0.3438	10	103	61	49	40	M2195-0873	●	
8.80		0.3465	10	103	61	49	40	M2195-0880	●	
8.90		0.3504	10	103	61	49	40	M2195-0890	○	
9.00		0.3543	10	103	61	49	40	M2195-0900	●	
9.10		0.3583	10	103	61	49	40	M2195-0910	○	
9.13	23/64	0.3594	10	103	61	49	40	M2195-0913	●	
9.20		0.3622	10	103	61	49	40	M2195-0920	○	
9.30		0.3661	10	103	61	49	40	M2195-0930	●	
9.40		0.3701	10	103	61	49	40	M2195-0940	○	
9.50		0.3740	10	103	61	49	40	M2195-0950	●	
9.53	3/8	0.3750	10	103	61	49	40	M2195-0953	●	
9.60		0.3780	10	103	61	49	40	M2195-0960	●	
9.70		0.3819	10	103	61	49	40	M2195-0970	○	
9.80	W	0.3858	10	103	61	49	40	M2195-0980	○	
9.90		0.3898	10	103	61	49	40	M2195-0990	●	
9.92	25/64	0.3906	10	103	61	49	40	M2195-0992	●	
10.00		0.3937	10	103	61	49	40	M2195-1000	●	
10.03		0.3949	10	103	61	49	40	M2195-1003	○	
10.10		0.3976	12	118	71	56	45	M2195-1010	○	
10.20		0.4016	12	118	71	56	45	M2195-1020	●	
10.30		0.4055	12	118	71	56	45	M2195-1030	●	
10.32	13/32	0.4062	12	118	71	56	45	M2195-1032	●	
10.40		0.4094	12	118	71	56	45	M2195-1040	○	
10.50		0.4134	12	118	71	56	45	M2195-1050	●	
10.60		0.4173	12	118	71	56	45	M2195-1060	○	
10.70		0.4213	12	118	71	56	45	M2195-1070	●	
10.72	27/64	0.4219	12	118	71	56	45	M2195-1072	●	
10.80		0.4252	12	118	71	56	45	M2195-1080	○	
10.90		0.4291	12	118	71	56	45	M2195-1090	○	
11.00		0.4331	12	118	71	56	45	M2195-1100	●	
11.10		0.4370	12	118	71	56	45	M2195-1110	○	
11.11	7/16	0.4375	12	118	71	56	45	M2195-1111	●	
11.20		0.4409	12	118	71	56	45	M2195-1120	●	
11.30		0.4449	12	118	71	56	45	M2195-1130	●	


* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 84.

GIGA-Drill

M2195

5xD


Drill diameter d ₁ *		Dimensions						 M2195 Order code Form / Diameter	
		Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm		Shank length L ₄ mm
mm									
11.40		0.4488	12	118	71	56	45	M2195-1140	●
11.50	29/64	0.4528	12	118	71	56	45	M2195-1150	●
11.60		0.4567	12	118	71	56	45	M2195-1160	○
11.70		0.4606	12	118	71	56	45	M2195-1170	○
11.80		0.4646	12	118	71	56	45	M2195-1180	●
11.90	15/32	0.4685	12	118	71	56	45	M2195-1190	○
12.00		0.4724	12	118	71	56	45	M2195-1200	●
12.30	31/64	0.4843	14	124	77	60	45	M2195-1230	●
12.50		0.4921	14	124	77	60	45	M2195-1250	●
12.70	1/2	0.5000	14	124	77	60	45	M2195-1270	●
12.80		0.5039	14	124	77	60	45	M2195-1280	●
13.00		0.5118	14	124	77	60	45	M2195-1300	●
13.10	33/64	0.5157	14	124	77	60	45	M2195-1310	●
13.40		0.5276	14	124	77	60	45	M2195-1340	●
13.50		0.5315	14	124	77	60	45	M2195-1350	●
13.80		0.5433	14	124	77	60	45	M2195-1380	○
14.00		0.5512	14	124	77	60	45	M2195-1400	●
14.04		0.5528	14	124	77	60	45	M2195-1404	○
14.29		0.5626	16	133	83	63	48	M2195-1429	●
14.50		0.5709	16	133	83	63	48	M2195-1450	●
14.68	37/64	0.5780	16	133	83	63	48	M2195-1468	●
14.80		0.5827	16	133	83	63	48	M2195-1480	●
15.00		0.5906	16	133	83	63	48	M2195-1500	●
15.08	19/32	0.5937	16	133	83	63	48	M2195-1508	●
15.50		0.6102	16	133	83	63	48	M2195-1550	●
15.80		0.6220	16	133	83	63	48	M2195-1580	○
15.88	5/8	0.6250	16	133	83	63	48	M2195-1588	●
16.00		0.6299	16	133	83	63	48	M2195-1600	●
16.04		0.6315	16	133	83	63	48	M2195-1604	○
16.50		0.6496	18	143	93	71	48	M2195-1650	●
16.67	21/32	0.6563	18	143	93	71	48	M2195-1667	●
16.80		0.6614	18	143	93	71	48	M2195-1680	○
17.00		0.6693	18	143	93	71	48	M2195-1700	●
17.46	11/16	0.6874	18	143	93	71	48	M2195-1746	●
17.50		0.6890	18	143	93	71	48	M2195-1750	●
17.80		0.7008	18	143	93	71	48	M2195-1780	○
17.86	45/64	0.7031	18	143	93	71	48	M2195-1786	●
18.00		0.7087	18	143	93	71	48	M2195-1800	●
18.04		0.7102	18	143	93	71	48	M2195-1804	○
18.26	23/32	0.7189	20	153	101	77	50	M2195-1826	●
18.50		0.7283	20	153	101	77	50	M2195-1850	○
18.80		0.7402	20	153	101	77	50	M2195-1880	○
19.00		0.7480	20	153	101	77	50	M2195-1900	●
19.05	3/4	0.7500	20	153	101	77	50	M2195-1905	●
19.50		0.7677	20	153	101	77	50	M2195-1950	●

For machining values see Page 84.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

GIGA-Drill M2195

5xD

Drill diameter d_1^*		Dimensions						 M2195 Order code Form / Diameter	
mm	Inch / Wire / Letter	Dec. equivalent Inch	Shank diameter d_2 h6 mm	Total length L_1 mm	Margin length L_2 mm	Maximum drilling depth L_3 mm	Shank length L_4 mm		
19.80		0.7795	20	153	101	77	50	M2195-1980	○
20.00		0.7874	20	153	101	77	50	M2195-2000	●
20.04		0.7890	20	153	101	77	50	M2195-2004	○

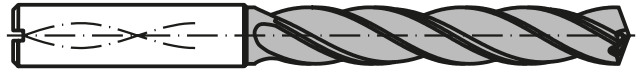
* The bore diameter tolerance d_1 is within the bore tolerance field H7.

For machining values see Page 84.

Machining values for GIGA-Drill



M2195



M2195

Material		Hardness Rockwell (HRc) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c) M2195	
		HRc	BHN	N/mm ²	SFM	m/min
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8 up to 15 over 15	up to 178 up to 205 over 205	up to 600 up to 700 over 700		
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27 up to 31 over 31	up to 266 up to 297 over 297	up to 900 up to 1000 over 1000		
M	Stainless steels inox 17-4PH, 15-5PH					
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2					
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14 up to 24 over 24	up to 200 up to 250 over 250	up to 680 up to 850 over 850	230-295 197-262 197-230	70-90 60-80 60-70
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8	up to 178	up to 600	246-295	75-90
		over 8	over 178	over 600	213-262	65-80
N	Alluminium (Si content > 10 %) 6061, 2025, 208, 360				295-984	90-300
	Aluminium (Si content < 10 %) 413, 385, A390				328-1312	100-400
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO				230-984	70-300
S	Titanium alloys TiAl4V					
	Nickel alloys Inconel 718, Rene 41, Waspolloy					
H	Chilled cast iron	38-48	350-450	1173-1527		
	Hardened steel	50-55		1614-1870		
		56-60				
		61-65				

The guideline values for cutting speed v_c should be multiplied by the following correction factors K_{Fv} according to the drilling depth

Depth / Diameter ratio	K _{Fv}
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8

Recommended feed (f) for diameter ranges										
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm		
IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	
		0.012-0.024	0.30-0.60	0.014-0.032	0.35-0.80	0.020-0.036	0.50-0.90	0.024-0.040	0.60-1.00	
		0.012-0.024	0.30-0.60	0.014-0.032	0.35-0.80	0.020-0.036	0.50-0.90	0.024-0.040	0.60-1.00	
		0.010-0.022	0.25-0.55	0.014-0.028	0.35-0.70	0.020-0.032	0.50-0.80	0.020-0.036	0.50-0.90	
		0.010-0.022	0.25-0.55	0.016-0.028	0.40-0.70	0.020-0.032	0.50-0.80	0.020-0.036	0.50-0.90	
		0.008-0.018	0.20-0.45	0.012-0.026	0.30-0.65	0.016-0.028	0.40-0.70	0.018-0.032	0.45-0.80	
		0.012-.026	0.30-0.65	0.016-0.036	0.40-0.90	0.024-0.040	0.60-1.00	0.024-0.040	0.60-1.00	
		0.014-.028	0.35-0.70	0.016-0.040	0.40-1.00	0.024-0.047	0.60-1.20	0.024-0.047	0.60-1.20	
		0.014-.028	0.35-0.70	0.016-0.040	0.40-1.00	0.024-0.047	0.60-1.20	0.024-0.047	0.60-1.20	

GIGA-Drill, alteration to standard product



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Request Order

Company _____ Customer number (if available) _____
 Contact partner _____ Tel./Fax _____ E-Mail _____
 Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

- Grey cast iron
- Alloyed grey cast iron
- Nodular iron
- CGI
- Malleable iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

Coolant supply: Ext. Int.



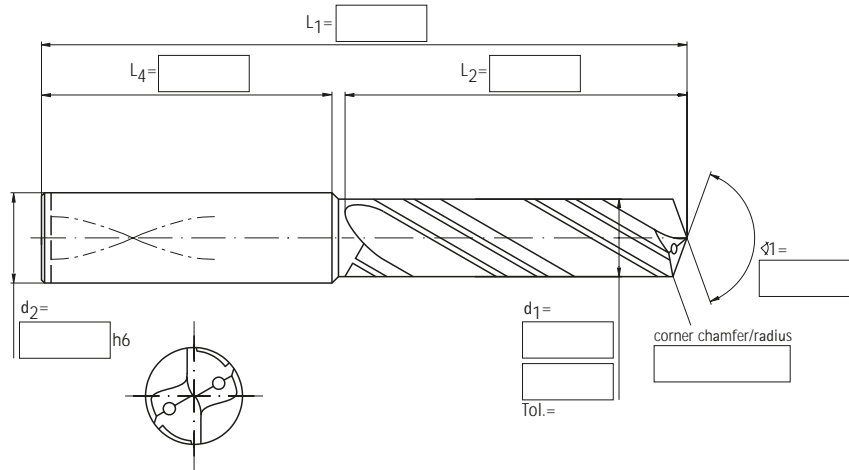
Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2195): _____




Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____



Shank form:

- HA (DIN 6535) 
- HB (DIN 6535) 
- HE (DIN 6535) 

Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> MEGA <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> INOX <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point <input type="checkbox"/> Spiral point
--	--	--

Blank (MC): _____

Built-to-order products –

Tailored to the needs of high precision applications

Besides the extensive standard product range for the US market, MAPAL offers drilling products for high precision applications. These tools must be produced with very specific tolerances and point geometries, therefore often according to customers' applications.

MAPAL Inc. does not have these products at stock in the US. They are produced as the customer orders them - many right in the Port Huron facility, others in the main production site in Altenstadt / Germany. A fast turnaround of four weeks is guaranteed.

The following pages display three important products which form the Built-to-order section of the MAPAL program. The MEGA-Drill-Reamer combines two operations by simultaneously drilling into the solid, while finish machining the bore. And straight fluted drilling tools, available in solid carbide and PCD, also have four guide chamfers to support the tool in the bore and generate smooth surfaces.



MEGA-Drill-Reamers –

Boring and reaming in one pass

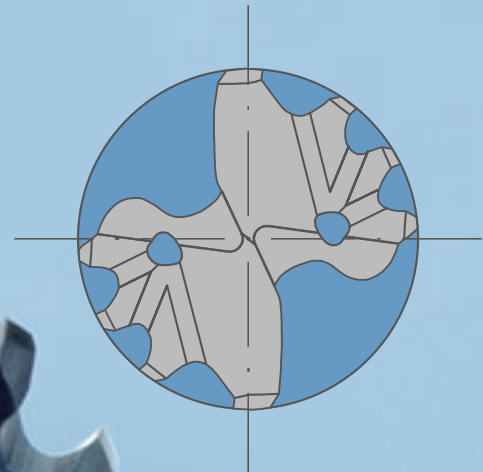
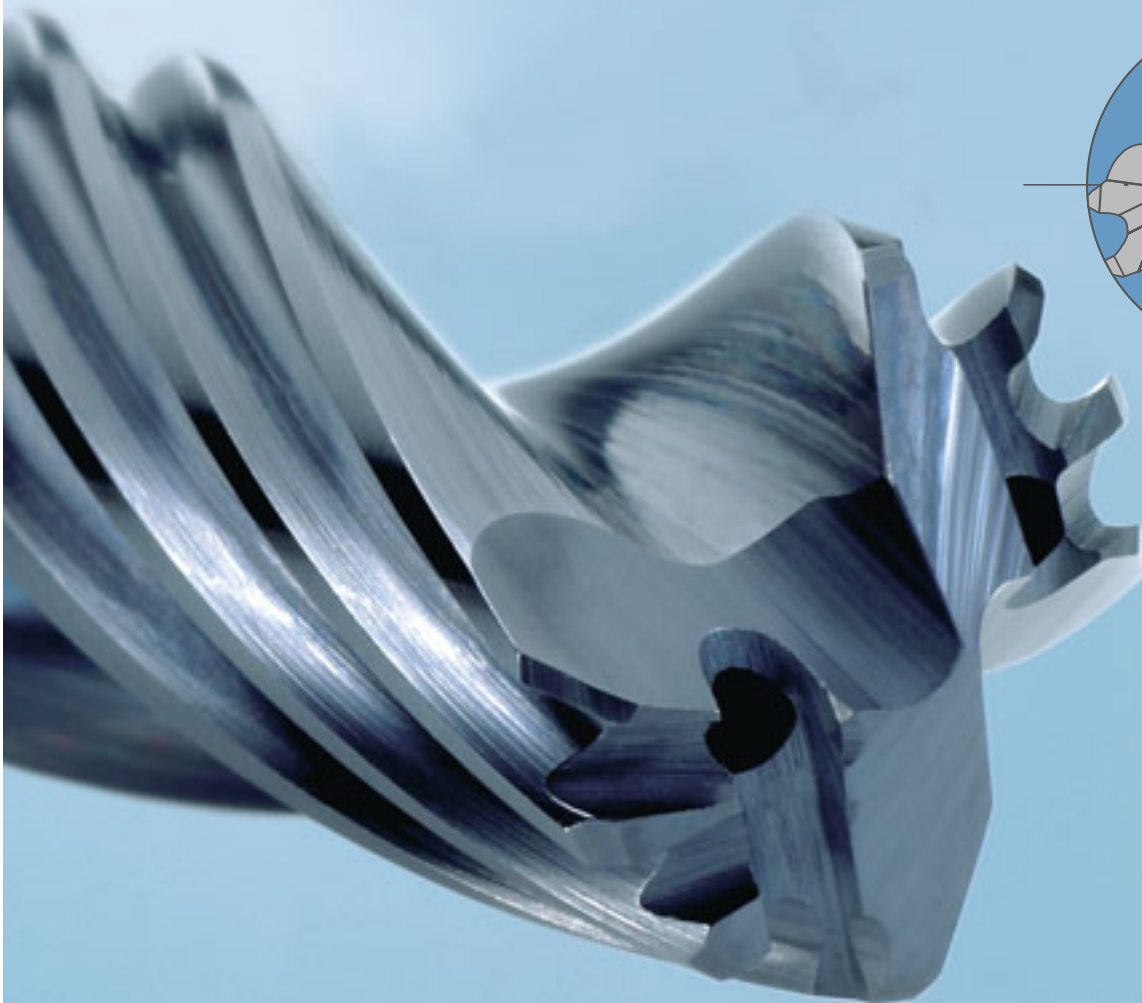
The combination of two tools, and as a result two operations opens up considerable saving potential. With the MAPAL MEGA-Drill-Reamers this idea has been successfully realized and the production of bores in reaming quality becomes more efficient and faster.

Drill-Reamers are highly effective both on machining centers where main and non-productive times can be significantly reduced and also on transfer lines, where a complete machining unit can be dispensed with. With drill reamers, two drilling margins take over the rough machining operation.

Directly behind the drilling margins, four or six reaming margins are responsible for finish machining the bore. They guarantee as good a surface finish, dimensional stability and concentricity as with reaming.

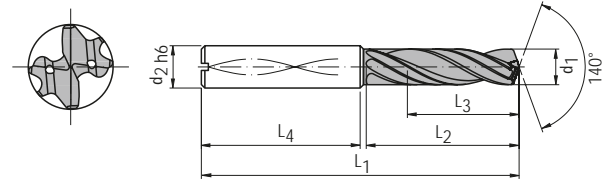
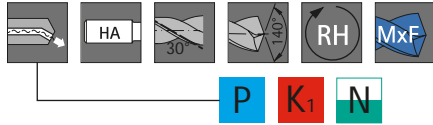
The MAPAL MEGA-Drill-Reamers are also coated with MxF and achieve high cutting values and tool life with maximum quality of the finished bore.

Despite the larger number of margins and guide chamfers, MAPAL MEGA-Drill-Reamers can be reground easily and to high precision.



MEGA-Drill-Reamer M2263 / M2265

Drill Reamer with four reaming margins

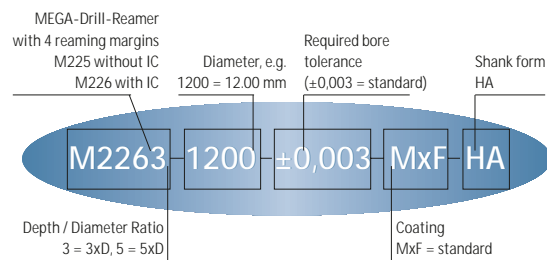


Design:

Drill diameter: 5.97 – 12.72 mm
0.2350 – 0.5008 Inch
Bore tolerance: ± 0.003 standard
No. of margins: 2+4

Product is built-to-order!

To order, use the following order code:



3xD

Drill diameter d_1 (± 0.003)		Recommended for bore diameter* min. – max.		Shank diameter d_2 h6 mm	Total length L_1 mm	Margin length L_2 mm	Maximum drilling depth L_3 mm	Shank length L_4 mm	Order code Form/Diameter	
mm	Inch	mm	Inch							
5,97	0,2350	5,965 - 5,985	0,2348 - 0,2356	6	79	34	24	36	M2263-0597	○
5,98	0,2354	5,975 - 5,995	0,2352 - 0,2360	6	79	34	24	36	M2263-0598	○
5,99	0,2358	5,985 - 6,005	0,2356 - 0,2364	6	79	34	24	36	M2263-0599	○
6,00	0,2362	5,995 - 6,015	0,2360 - 0,2368	6	79	34	24	36	M2263-0600	○
6,01	0,2366	6,005 - 6,025	0,2364 - 0,2372	6	79	34	24	36	M2263-0601	○
6,02	0,2370	6,015 - 6,035	0,2368 - 0,2376	6	79	34	24	36	M2263-0602	○
6,32	0,2488	6,315 - 6,335	0,2486 - 0,2494	8	79	34	24	36	M2263-0632	○
6,33	0,2492	6,325 - 6,345	0,2490 - 0,2498	8	79	34	24	36	M2263-0633	○
6,34	0,2496	6,335 - 6,355	0,2494 - 0,2502	8	79	34	24	36	M2263-0634	○
6,35	0,2500	6,345 - 6,365	0,2498 - 0,2506	8	79	34	24	36	M2263-0635	○
6,36	0,2504	6,355 - 6,375	0,2502 - 0,2510	8	79	34	24	36	M2263-0636	○
6,37	0,2508	6,365 - 6,385	0,2506 - 0,2514	8	79	34	24	36	M2263-0637	○
7,97	0,3138	7,964 - 7,986	0,3135 - 0,3144	8	79	34	24	36	M2263-0797	○
7,98	0,3142	7,974 - 7,996	0,3139 - 0,3148	8	79	34	24	36	M2263-0798	○
7,99	0,3146	7,984 - 8,006	0,3143 - 0,3152	8	79	34	24	36	M2263-0799	○
8,00	0,3150	7,994 - 8,016	0,3147 - 0,3156	8	79	34	24	36	M2263-0800	○
8,01	0,3154	8,004 - 8,026	0,3151 - 0,3160	8	79	34	24	36	M2263-0801	○
8,02	0,3157	8,014 - 8,036	0,3155 - 0,3164	8	79	34	24	36	M2263-0802	○

*The given bore diameters can only be guaranteed under perfect machining conditions and a run-out < 10 µm. Workpiece material and lubricant may also have an impact on the bore size. Other diameters and lengths can be offered on request at a minimum order quantity of three pieces per size.

For machining values see Page 84.

MEGA-Drill-Reamer

M2263 / M2265

Drill Reamer with four reaming margins

Drill diameter $d_1 (\pm 0.003)$		Recommended for bore diameter* min. – max.		Shank diameter $d_2 h_6$ mm	Total length L_1 mm	Margin length L_2 mm	Maximum drilling depth L_3 mm	Shank length L_4 mm	Order code Form/Diameter	M2263
mm	Inch	mm	Inch							
9,48	0,3732	9,473 - 9,497	0,3730 - 0,3739	10	89	47	35	40	M2263-0948	○
9,49	0,3736	9,483 - 9,507	0,3733 - 0,3743	10	89	47	35	40	M2263-0949	○
9,50	0,3740	9,493 - 9,517	0,3737 - 0,3747	10	89	47	35	40	M2263-0950	○
9,52	0,3748	9,513 - 9,537	0,3745 - 0,3755	10	89	47	35	40	M2263-0952	○
9,53	0,3752	9,523 - 9,547	0,3749 - 0,3759	10	89	47	35	40	M2263-0953	○
9,54	0,3756	9,533 - 9,557	0,3753 - 0,3763	10	89	47	35	40	M2263-0954	○
9,97	0,3925	9,963 - 9,987	0,3922 - 0,3932	10	89	47	35	40	M2263-0997	○
9,98	0,3929	9,973 - 9,997	0,3926 - 0,3936	10	89	47	35	40	M2263-0998	○
9,99	0,3933	9,983 - 10,007	0,3930 - 0,3940	10	89	47	35	40	M2263-0999	○
10,00	0,3937	9,993 - 10,017	0,3934 - 0,3944	10	89	47	35	40	M2263-1000	○
10,01	0,3941	10,003 - 10,027	0,3938 - 0,3948	10	89	47	35	40	M2263-1001	○
10,02	0,3945	10,013 - 10,037	0,3942 - 0,3952	10	89	47	35	40	M2263-1002	○
11,97	0,4713	11,962 - 11,988	0,4709 - 0,4720	12	102	55	40	45	M2263-1197	○
11,98	0,4717	11,972 - 11,998	0,4713 - 0,4724	12	102	55	40	45	M2263-1198	○
11,99	0,4720	11,982 - 12,008	0,4717 - 0,4728	12	102	55	40	45	M2263-1199	○
12,00	0,4724	11,992 - 12,018	0,4721 - 0,4731	12	102	55	40	45	M2263-1200	○
12,01	0,4728	12,002 - 12,028	0,4725 - 0,4735	12	102	55	40	45	M2263-1201	○
12,02	0,4732	12,012 - 12,038	0,4729 - 0,4739	12	102	55	40	45	M2263-1202	○
12,67	0,4988	12,662 - 12,688	0,4985 - 0,4995	14	107	60	43	45	M2263-1267	○
12,68	0,4992	12,672 - 12,698	0,4989 - 0,4999	14	107	60	43	45	M2263-1268	○
12,69	0,4996	12,682 - 12,708	0,4993 - 0,5003	14	107	60	43	45	M2263-1269	○
12,70	0,5000	12,692 - 12,718	0,4997 - 0,5007	14	107	60	43	45	M2263-1270	○
12,71	0,5004	12,702 - 12,728	0,5001 - 0,5011	14	107	60	43	45	M2263-1271	○
12,72	0,5008	12,712 - 12,738	0,5005 - 0,5015	14	107	60	43	45	M2263-1272	○

5xD

Drill diameter $d_1 (\pm 0.003)$		Recommended for bore diameter* min. – max.		Shank diameter $d_2 h_6$ mm	Total length L_1 mm	Margin length L_2 mm	Maximum drilling depth L_3 mm	Shank length L_4 mm	Order code Form/Diameter	M2265
mm	Inch	mm	Inch							
5,97	0,2350	5,965 - 5,985	0,2348 - 0,2356	6	91	53	43	36	M2265-0597	○
5,98	0,2354	5,975 - 5,995	0,2352 - 0,2360	6	91	53	43	36	M2265-0598	○
5,99	0,2358	5,985 - 6,005	0,2356 - 0,2364	6	91	53	43	36	M2265-0599	○
6,00	0,2362	5,995 - 6,015	0,2360 - 0,2368	6	91	53	43	36	M2265-0600	○
6,01	0,2366	6,005 - 6,025	0,2364 - 0,2372	6	91	53	43	36	M2265-0601	○
6,02	0,2370	6,015 - 6,035	0,2368 - 0,2376	6	91	53	43	36	M2265-0602	○


*The given bore diameters can only be guaranteed under perfect machining conditions and a run-out < 10 µm. Workpiece material and lubricant may also have an impact on the bore size. Other diameters and lengths can be offered on request at a minimum order quantity of three pieces per size.

For machining values see Page 84.

MEGA-Drill-Reamer

M2263 / M2265

Drill Reamer with four reaming margins

Drill diameter d ₁ (± 0.003)		Dimensions							 M2265 Order code Form/Diameter	
		Recommended for bore diameter* min. – max.		Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
mm	Inch	mm	Inch							
6,32	0,2488	6,315 - 6,335	0,2486 - 0,2494	8	91	53	43	36	M2265-0632	○
6,33	0,2492	6,325 - 6,345	0,2490 - 0,2498	8	91	53	43	36	M2265-0633	○
6,34	0,2496	6,335 - 6,355	0,2494 - 0,2502	8	91	53	43	36	M2265-0634	○
6,35	0,2500	6,345 - 6,365	0,2498 - 0,2506	8	91	53	43	36	M2265-0635	○
6,36	0,2504	6,355 - 6,375	0,2502 - 0,2510	8	91	53	43	36	M2265-0636	○
6,37	0,2508	6,365 - 6,385	0,2506 - 0,2514	8	91	53	43	36	M2265-0637	○
7,97	0,3138	7,964 - 7,986	0,3135 - 0,3144	8	91	53	43	36	M2265-0797	○
7,98	0,3142	7,974 - 7,996	0,3139 - 0,3148	8	91	53	43	36	M2265-0798	○
7,99	0,3146	7,984 - 8,006	0,3143 - 0,3152	8	91	53	43	36	M2265-0799	○
8,00	0,3150	7,994 - 8,016	0,3147 - 0,3156	8	91	53	43	36	M2265-0800	○
8,01	0,3154	8,004 - 8,026	0,3151 - 0,3160	8	91	53	43	36	M2265-0801	○
8,02	0,3157	8,014 - 8,036	0,3155 - 0,3164	8	91	53	43	36	M2265-0802	○
9,48	0,3732	9,473 - 9,497	0,3730 - 0,3739	10	103	61	49	40	M2265-0948	○
9,49	0,3736	9,483 - 9,507	0,3733 - 0,3743	10	103	61	49	40	M2265-0949	○
9,50	0,3740	9,493 - 9,517	0,3737 - 0,3747	10	103	61	49	40	M2265-0950	○
9,52	0,3748	9,513 - 9,537	0,3745 - 0,3755	10	103	61	49	40	M2265-0952	○
9,53	0,3752	9,523 - 9,547	0,3749 - 0,3759	10	103	61	49	40	M2265-0953	○
9,54	0,3756	9,533 - 9,557	0,3753 - 0,3763	10	103	61	49	40	M2265-0954	○
9,97	0,3925	9,963 - 9,987	0,3922 - 0,3932	10	103	61	49	40	M2265-0997	○
9,98	0,3929	9,973 - 9,997	0,3926 - 0,3936	10	103	61	49	40	M2265-0998	○
9,99	0,3933	9,983 - 10,007	0,3930 - 0,3940	10	103	61	49	40	M2265-0999	○
10,00	0,3937	9,993 - 10,017	0,3934 - 0,3944	10	103	61	49	40	M2265-1000	○
10,01	0,3941	10,003 - 10,027	0,3938 - 0,3948	10	103	61	49	40	M2265-1001	○
10,02	0,3945	10,013 - 10,037	0,3942 - 0,3952	10	103	61	49	40	M2265-1002	○
11,97	0,4713	11,962 - 11,988	0,4709 - 0,4720	12	118	71	56	45	M2265-1197	○
11,98	0,4717	11,972 - 11,998	0,4713 - 0,4724	12	118	71	56	45	M2265-1198	○
11,99	0,4720	11,982 - 12,008	0,4717 - 0,4728	12	118	71	56	45	M2265-1199	○
12,00	0,4724	11,992 - 12,018	0,4721 - 0,4731	12	118	71	56	45	M2265-1200	○
12,01	0,4728	12,002 - 12,028	0,4725 - 0,4735	12	118	71	56	45	M2265-1201	○
12,02	0,4732	12,012 - 12,038	0,4729 - 0,4739	12	118	71	56	45	M2265-1202	○
12,67	0,4988	12,662 - 12,688	0,4985 - 0,4995	14	124	77	60	45	M2265-1267	○
12,68	0,4992	12,672 - 12,698	0,4989 - 0,4999	14	124	77	60	45	M2265-1268	○
12,69	0,4996	12,682 - 12,708	0,4993 - 0,5003	14	124	77	60	45	M2265-1269	○
12,70	0,5000	12,692 - 12,718	0,4997 - 0,5007	14	124	77	60	45	M2265-1270	○
12,71	0,5004	12,702 - 12,728	0,5001 - 0,5011	14	124	77	60	45	M2265-1271	○
12,72	0,5008	12,712 - 12,738	0,5005 - 0,5015	14	124	77	60	45	M2265-1272	○

*The given bore diameters can only be guaranteed under perfect machining conditions and a run-out < 10 µm. Workpiece material and lubricant may also have an impact on the bore size. Other diameters and lengths can be offered on request at a minimum order quantity of three pieces per size.

For machining values see Page 84.

Machining values for MEGA-Drill-Reamer



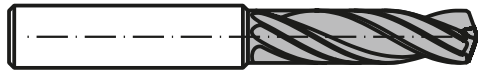
M2263, M2265

Material		Hardness Rockwell (HRc) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c) M2263, M2265		
		HRc	BHN	N/mm ²	m/min		
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8 up to 15	up to 178 up to 205	up to 600 up to 700	262-328 230-295	80-100 70-90	
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	over 15 up to 27 up to 31	over 205 up to 266 up to 297	over 700 up to 900 up to 1000	197-262 197-230 131-197	60-80 60-70 40-60	
M	Stainless steels inox 17-4PH, 15-5PH	over 31	over 297	over 1000	131-164	40-50	
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2						
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14 up to 24	up to 200 up to 250	up to 680 up to 850	230-295 197-262	70-90 60-80	
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	over 24 up to 8	over 250 up to 178	over 850 up to 600	197-230 180-230	60-70 55-70	
		over 8	over 178	over 600	147-197	45-60	
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360				262-328 ¹⁾	80-100 ¹⁾	
	Aluminium (Si content < 10%) 413, 385, A390				295-394 ¹⁾	90-120 ¹⁾	
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO						
S	Titanium alloys TiAl4V						
	Nickel alloys Inconel 718, Rene 41, Waspolloy						
H	Chilled cast iron	38-48	350-450	1173-1527			
	Hardened steel	50-55		1614-1870			
		56-60					
		61-65					

¹⁾ only M2263

The guideline values for cutting speed v_c should be multiplied by the following correction factors K_{Fv} according to the drilling depth

Depth / Diameter ratio	K _{Fv}
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8
8 x D	0.7
12 x D	0.6



M2263, M2265

Recommended feed (f) for diameter ranges									
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm	
IPR		mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.012	0.20-0.35		
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.012	0.20-0.35		
0.004-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38		
0.004-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38		
0.004-0.006	0.10-0.15	0.005-0.008	0.12-0.20	0.005-0.010	0.14-0.25	0.006-0.012	0.16-0.30		
0.004-0.006	0.10-0.15	0.005-0.008	0.12-0.20	0.005-0.010	0.14-0.25	0.006-0.012	0.16-0.30		
0.006-0.010	0.15-0.25	0.008-0.014	0.20-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50		
0.006-0.010	0.15-0.25	0.008-0.014	0.20-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50		
0.005-0.008	0.12-0.20	0.006-0.010	0.15-0.25	0.008-0.014	0.20-0.35	0.010-0.016	0.25-0.40		
0.004-0.007	0.10-0.18	0.006-0.010	0.15-0.25	0.007-0.012	0.18-0.30	0.008-0.014	0.20-0.35		
0.003-0.008	0.10-0.20	0.006-0.011	0.15-0.28	0.007-0.014	0.18-0.35	0.008-0.015	0.20-0.38		
0.003-0.008	0.10-0.20	0.006-0.010	0.15-0.25	0.008-0.012	0.20-0.30	0.010-0.014	0.25-0.35		
0.003-0.008	0.10-0.20	0.006-0.010	0.15-0.25	0.008-0.012	0.20-0.30	0.010-0.014	0.25-0.35		

MEGA-Drill-Reamer



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Request Order

Company _____ Customer number (if available) _____

Contact partner _____ Tel./Fax _____ E-Mail _____

Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole Blind bore

Machining method: wet dry
 min.lubrication

Coolant supply: Ext. Int.

Grey cast iron Alloyed grey cast iron Nodular iron CGI Malleable iron Aluminium (Si content > 10 %) Aluminium (Si content < 10 %)

Copper Brass Bronze _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2265): _____

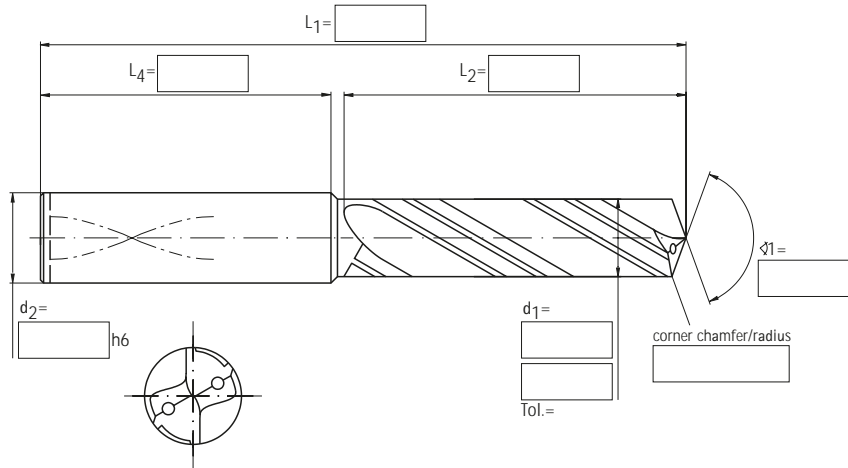
Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating: (if you wish to choose yourself)

MxF MxH TiAlN uncoated _____

Shank form:

HA (DIN 6535) HB (DIN 6535) HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: MEGA GG ALU INOX _____

Coating: MxF MxH TiAlN uncoated _____

Radial land on face: Radial land on taper surface Radial land on 4 faces Round point Spiral point

Blank (MC): _____

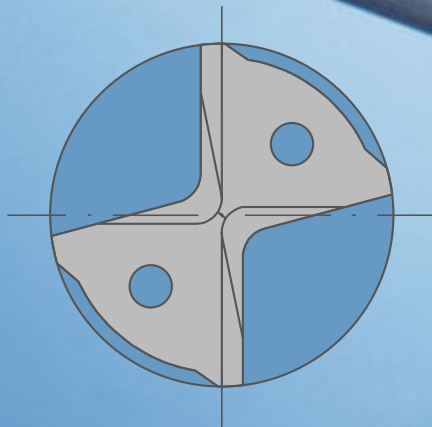
Drills with straight flutes –

... in solid carbide or PCD-tipped

In addition to spiral drills, MAPAL supplies drills with straight flutes. These tools have four margins as a supporting feature. The straight flute design significantly adds to the strength of the tool and helps to reduce the distance the chip must travel to escape the bore when compared to helical tools. With a polished flute and a strong design, these styles of tools perform extremely well in abrasive materials. It also allows the drill to be fed aggressively in key material groups, while maintaining hole straightness and accuracy with the help of four margins as a support feature.

The solid carbide version of the drills with straight flutes is specifically designed for use in grey cast iron, aluminium and aluminium alloys together with other non-ferrous metals.

Because of its excellent properties, MAPAL also offers drills with PCD-tipped cutting edges. The PCD-tips are in the center of a solid carbide drill. Drill center and chisel point are protected. Maximum tool life, cutting values for economic production and excellent surface qualities for best machining result from this cutting material.



Solid carbide drill with straight flutes

M2503 / M2603



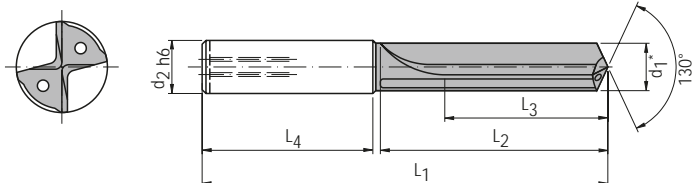
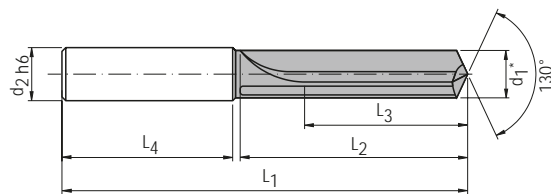
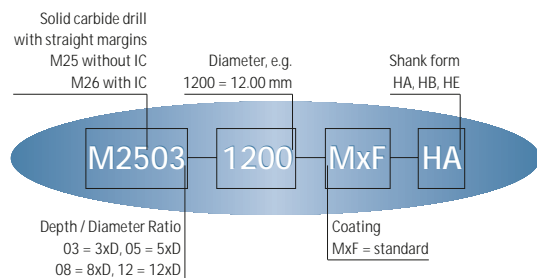
K₁ N
K₁ N

Design:

Drill diameter: 3.00 – 20.00 mm
0.1181 – 0.7874 Inch
Bore tolerance: IT9 (achievable)
No. of margins: 2

Product is built-to-order!

To order, use the following order code:



Drill diameter		Dimensions						
mm	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm		
3.00 – 3.70	0.1181 – 0.1457	6	62	20	14	36	<input type="checkbox"/>	
3.80 – 4.70	0.1496 – 0.1850	6	66	24	17	36	<input type="checkbox"/>	
4.80 – 6.00	0.1890 – 0.2362	6	66	28	20	36	<input type="checkbox"/>	
6.10 – 7.00	0.2402 – 0.2756	8	79	34	24	36	<input type="checkbox"/>	
7.10 – 8.00	0.2795 – 0.3150	8	79	41	29	36	<input type="checkbox"/>	
8.10 – 10.00	0.3189 – 0.3937	10	89	47	35	40	<input type="checkbox"/>	
10.10 – 12.00	0.3976 – 0.4724	12	102	55	40	45	<input type="checkbox"/>	
12.50 – 14.00	0.4921 – 0.5512	14	107	60	43	45	<input type="checkbox"/>	
14.50 – 16.00	0.5709 – 0.6299	16	115	65	45	48	<input type="checkbox"/>	
16.50 – 18.00	0.6496 – 0.7087	18	123	73	51	48	<input type="checkbox"/>	
18.50 – 20.00	0.7283 – 0.7874	20	131	79	55	50	<input type="checkbox"/>	

Solid carbide drill with straight flutes

M2605 / M2608 / M2612



M2605

5xD

Dimensions							
Drill diameter d ₁ *		Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
mm	Dec. equivalent Inch						
3.00 – 3.70	0.1181 – 0.1457	6	66	28	23	36	<input type="checkbox"/>
3.80 – 4.70	0.1496 – 0.1850	6	74	36	29	36	<input type="checkbox"/>
4.80 – 6.00	0.1890 – 0.2362	6	82	44	35	36	<input type="checkbox"/>
6.10 – 8.00	0.2402 – 0.3150	8	91	53	43	36	<input type="checkbox"/>
8.10 – 10.00	0.3189 – 0.3937	10	103	61	49	40	<input type="checkbox"/>
10.10 – 12.00	0.3976 – 0.4724	12	118	71	56	45	<input type="checkbox"/>
12.50 – 14.00	0.4921 – 0.5512	14	124	77	60	45	<input type="checkbox"/>
14.50 – 16.00	0.5709 – 0.6299	16	133	83	63	48	<input type="checkbox"/>
16.50 – 18.00	0.6496 – 0.7087	18	143	93	71	48	<input type="checkbox"/>
18.50 – 20.00	0.7283 – 0.7874	20	153	101	77	50	<input type="checkbox"/>



M2608

8xD

Dimensions							
Drill diameter d ₁ *		Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
mm	Dec. equivalent Inch						
3.00 – 3.70	0.1181 – 0.1457	6	72	34	29	36	<input type="checkbox"/>
3.80 – 4.70	0.1496 – 0.1850	6	81	43	36	36	<input type="checkbox"/>
4.80 – 6.00	0.1890 – 0.2362	6	95	57	48	36	<input type="checkbox"/>
6.10 – 8.00	0.2402 – 0.3150	8	114	76	64	36	<input type="checkbox"/>
8.10 – 10.00	0.3189 – 0.3937	10	142	95	80	40	<input type="checkbox"/>
10.10 – 12.00	0.3976 – 0.4724	12	162	114	96	45	<input type="checkbox"/>
12.50 – 14.00	0.4921 – 0.5512	14	178	133	112	45	<input type="checkbox"/>
14.50 – 16.00	0.5709 – 0.6299	16	203	152	128	48	<input type="checkbox"/>
16.50 – 18.00	0.6496 – 0.7087	18	222	171	144	48	<input type="checkbox"/>
18.50 – 20.00	0.7283 – 0.7874	20	243	190	160	50	<input type="checkbox"/>



M2612

12xD

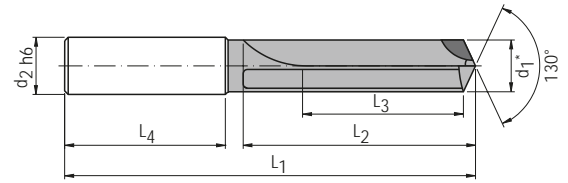
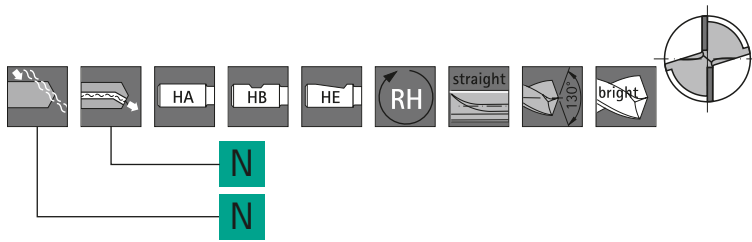
Dimensions							
Drill diameter d ₁ *		Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
mm	Dec. equivalent Inch						
3.00 – 3.70	0.1181 – 0.1457	6	92	54	48	36	<input type="checkbox"/>
3.80 – 4.70	0.1496 – 0.1850	6	102	64	58	36	<input type="checkbox"/>
4.80 – 6.00	0.1890 – 0.2362	6	116	78	70	36	<input type="checkbox"/>
6.10 – 8.00	0.2402 – 0.3150	8	146	108	94	36	<input type="checkbox"/>
8.10 – 10.00	0.3189 – 0.3937	10	162	120	110	40	<input type="checkbox"/>
10.10 – 12.00	0.3976 – 0.4724	12	204	156	142	45	<input type="checkbox"/>
12.50 – 14.00	0.4921 – 0.5512	14	230	182	166	45	<input type="checkbox"/>
14.50 – 16.00	0.5709 – 0.6299	16	260	208	192	48	<input type="checkbox"/>
16.50 – 18.00	0.6496 – 0.7087	18	285	234	216	48	<input type="checkbox"/>
18.50 – 20.00	0.7283 – 0.7874	20	310	258	240	50	<input type="checkbox"/>

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 92.

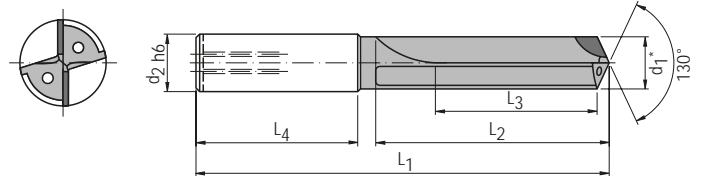
PCD drill with straight flutes

M2903 / M2913



Design:

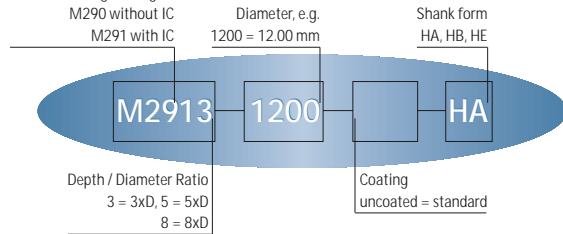
Drill diameter: 5.00 – 20.00 mm
0.1969 – 0.7874 Inch
Bore tolerance: IT8 (achievable)
No. of margins: 2



Product is built-to-order!

To order, use the following order code:

PCD high performance drill
with straight margins
M290 without IC
M291 with IC



Drill diameter		Dimensions						
d ₁ *		Shank diameter	Total length	Margin length	Maximum drilling depth	Shank length		
mm	Dec. equivalent Inch	d ₂ h ₆ mm	L ₁ mm	L ₂ mm	L ₃ mm	L ₄ mm		
5.00 – 6.00	0.1969 – 0.2362	6	66	28	20	36	<input type="checkbox"/>	
6.10 – 7.00	0.2402 – 0.2756	8	79	34	24	36	<input type="checkbox"/>	
7.10 – 8.00	0.2795 – 0.3150	8	79	41	29	36	<input type="checkbox"/>	
8.10 – 10.00	0.3189 – 0.3937	10	89	47	35	40	<input type="checkbox"/>	
10.10 – 12.00	0.3976 – 0.4724	12	102	55	40	45	<input type="checkbox"/>	
12.50 – 14.00	0.4921 – 0.5512	14	107	60	43	45	<input type="checkbox"/>	
14.50 – 16.00	0.5709 – 0.6299	16	115	65	45	48	<input type="checkbox"/>	
16.50 – 18.00	0.6496 – 0.7087	18	123	73	51	48	<input type="checkbox"/>	
18.50 – 20.00	0.7283 – 0.7874	20	131	79	55	50	<input type="checkbox"/>	

For machining values see Page 94.

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

PCD drill with straight flutes

M2905 / M2915 / M2918



M2905



M2915

5xD

Drill diameter d ₁ *		Dimensions					
mm	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
5.00 – 6.00	0.1969 – 0.2362	6	82	44	35	36	<input type="checkbox"/>
6.10 – 8.00	0.2402 – 0.3150	8	91	53	43	36	<input type="checkbox"/>
8.10 – 10.00	0.3189 – 0.3937	10	103	61	49	40	<input type="checkbox"/>
10.10 – 12.00	0.3976 – 0.4724	12	118	71	56	45	<input type="checkbox"/>
12.50 – 14.00	0.4921 – 0.5512	14	124	77	60	45	<input type="checkbox"/>
14.50 – 16.00	0.5709 – 0.6299	16	133	83	63	48	<input type="checkbox"/>
16.50 – 18.00	0.6496 – 0.7087	18	143	93	71	48	<input type="checkbox"/>
18.50 – 20.00	0.7283 – 0.7874	20	153	101	77	50	<input type="checkbox"/>



M2918

8xD

Drill diameter d ₁ *		Dimensions					
mm	Dec. equivalent Inch	Shank diameter d ₂ h ₆ mm	Total length L ₁ mm	Margin length L ₂ mm	Maximum drilling depth L ₃ mm	Shank length L ₄ mm	
5.00 – 6.00	0.1969 – 0.2362	6	95	57	48	36	<input type="checkbox"/>
6.10 – 8.00	0.2402 – 0.3150	8	114	76	64	36	<input type="checkbox"/>
8.10 – 10.00	0.3189 – 0.3937	10	142	95	80	40	<input type="checkbox"/>
10.10 – 12.00	0.3976 – 0.4724	12	162	114	96	45	<input type="checkbox"/>
12.50 – 14.00	0.4921 – 0.5512	14	178	133	112	45	<input type="checkbox"/>
14.50 – 16.00	0.5709 – 0.6299	16	203	152	128	48	<input type="checkbox"/>
16.50 – 18.00	0.6496 – 0.7087	18	222	171	144	48	<input type="checkbox"/>
18.50 – 20.00	0.7283 – 0.7874	20	243	190	160	50	<input type="checkbox"/>

* The bore diameter tolerance d₁ is within the bore tolerance field H7.

For machining values see Page 94.

Machining values for Solid Carbide Drills, straight flutes



M2603, M2605,
M2608, M2612



M2603, M2605, M2608, M2612

Material		Hardness Rockwell (HRC) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v _c)	
		HRC	BHN	N/mm ²	M2603 M2608 SFM	M2605 M2612 m/min
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8 up to 15 over 15	up to 178 up to 205 over 205	up to 600 up to 700 over 700		
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27 up to 31 over 31	up to 266 up to 297 over 297	up to 900 up to 1000 over 1000		
M	Stainless steels inox 17-4PH, 15-5PH					
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2					
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14 up to 24 over 24	up to 200 up to 250 over 250	up to 680 up to 850 over 850	230-361 197-312 164-262	70-110 60-95 50-80
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8	up to 178	up to 600	246-295	75-90
		over 8	over 178	over 600		
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360				394-984	120-300
	Aluminium (Si content < 10%) 413, 385, A390				656-1312	200-400
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO				197-984	60-300
S	Titanium alloys TiAl4V					
	Nickel alloys Inconel 718, Rene 41, Waspolloy					
H	Chilled cast iron	38-48	350-450	1173-1527		
	Hardened steel	50-55		1614-1870		
		56-60				
		61-65				

The guideline values for cutting speed v_c should be multiplied by the following correction factors KF_v according to the drilling depth:

Depth / Diameter ratio	KF _v
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8
8 x D	0.7
12 x D	0.6

Recommended feed (f) for diameter ranges										
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm		
IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	
0.004-0.010	0.10-0.25	0.006-0.012	0.15-0.30	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.006-0.014	0.15-0.35	0.008-0.016	0.20-0.40	0.010-0.018	0.25-0.45	
0.004-0.008	0.10-0.20	0.005-0.010	0.12-0.25	0.008-0.014	0.20-0.35	0.012-0.016	0.30-0.40	0.014-0.020	0.35-0.50	
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55	
0.004-0.010	0.10-0.25	0.006-0.014	0.15-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	0.014-0.022	0.35-0.55	
0.003-0.007	0.07-0.18	0.005-0.010	0.12-0.25	0.008-0.014	0.20-0.35	0.010-0.018	0.25-0.45	0.012-0.020	0.30-0.50	

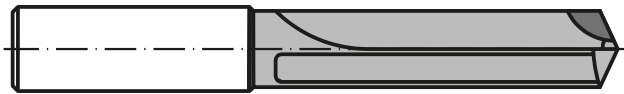
Machining values for PCD Drills, straight flutes



M2903, M2905



M2913, M2915, M2918

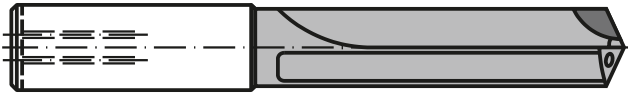


M2903, M2905

	Material	Hardness Rockwell (HRC) Hardness Brinell (BHN) Tensile strength (N/mm ²)			Cutting speed (v_c)					
		HRC	BHN	N/mm ²	M2903 M2905	M2913 M2915 M2918	SFM	m/min	IPR	mm/rev
P	Non-alloyed steels, cast steels 1018, 1108-1161, 12L14, 1522-1572	up to 8 up to 15 over 15	up to 178 up to 205 over 205	up to 600 up to 700 over 700						
	Alloyed steels 5132, 4130, 8620, 4140, 4340, 5140, 6150	up to 27 up to 31 over 31	up to 266 up to 297 over 297	up to 900 up to 1000 over 1000						
M	Stainless steels inox 17-4PH, 15-5PH									
	Stainless and acid resistant steels (Cr-Ni-Alloys) 304, 316, 17CrNi16-2									
K ₁	Grey cast iron, grey cast iron alloys GG10-GG40, A48	up to 14 up to 24 over 24	up to 200 up to 250 over 250	up to 680 up to 850 over 850						
K ₂	Spheroidal graphite cast iron, cast iron with vermicular graphite, malleable iron GGG40-GGG80	up to 8 over 8	up to 178 over 178	up to 600 over 600						
N	Alluminium (Si content > 10%) 6061, 2025, 208, 360				492-1476	150-450	984-1969	300-600		
	Aluminium (Si content < 10%) 413, 385, A390				492-1476	150-450	984-1969	300-600		
	Copper, brass, bronze Beryllium copper, naval brass, AMPCO				492-1476	150-450	984-1969	300-600		
S	Titanium alloys TiAl4V									
	Nickel alloys Inconel 718, Rene 41, Waspolloy									
H	Chilled cast iron	38-48	350-450	1173-1527						
	Hardened steel	50-55		1614-1870						
		56-60								
		61-65								

The guideline values for cutting speed v_c should be multiplied by the following correction factors K_{Fv} according to the drilling depth:

Depth / Diameter ratio	K_{Fv}
1 x D	1.3
2 x D	1.2
3 x D	1.0
4 x D	1.0
5 x D	0.8
8 x D	0.7
12 x D	0.6



M2913, M2915, M2918

Recommended feed (f) for diameter ranges									
0.118 to 0.197 in. 3 to 5 mm		0.197 to 0.316 in. 5 to 8 mm		0.316 to 0.472 in. 8 to 12 mm		0.472 to 0.630 in. 12 to 16 mm		0.630 to 0.787 in. 16 to 20 mm	
IPR	mm/rev	IPR	mm/rev	IPR	mm/rev	IPR	mm/rev		
0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.008-0.014	0.20-0.35	0.010-0.016	0.25-0.40	0.012-0.020	0.30-0.50
0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.008-0.014	0.20-0.35	0.010-0.016	0.25-0.40	0.012-0.020	0.30-0.50
0.003-0.006	0.08-0.15	0.004-0.008	0.10-0.20	0.008-0.014	0.20-0.35	0.010-0.016	0.25-0.40	0.012-0.020	0.30-0.50

Solid carbide drill with straight flutes



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Tel./Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:


Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubr.

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

Coolant supply: Ext. Int.



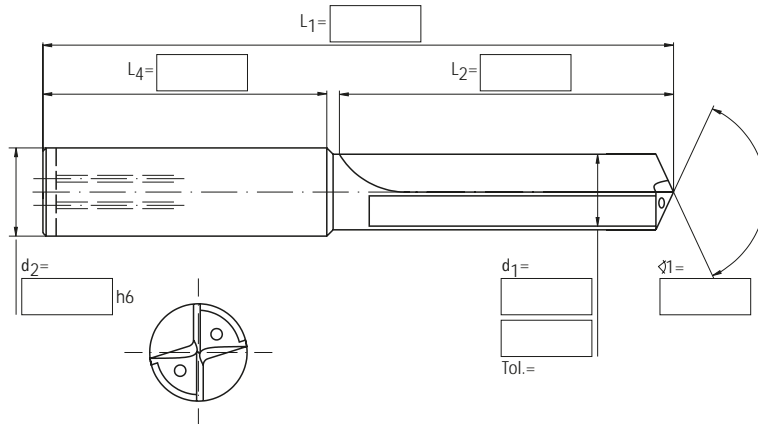

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2603, if known): _____




Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- TiAlN
- uncoated
- _____



Shank form:

- HA (DIN 6535) 
- HB (DIN 6535) 
- HE (DIN 6535) 

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point
Blank (MC): _____		

PCD drill with straight flutes



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Tel./Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 sc-tools@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubr.

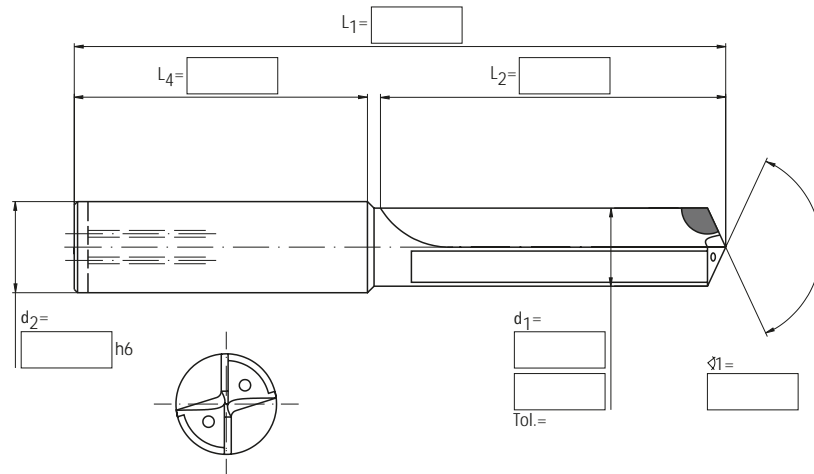
Aluminium (Si content > 10 %)
 Aluminium (Si content < 10 %)
 Brass
 Bronze

Coolant supply: Ext. Int.

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2913, if known): _____

Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)



Shank form:

HA (DIN 6535)

HB (DIN 6535)

HE (DIN 6535)

Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: ALU Radial land on face: Radial land on 4 faces
 _____ Round point

Blank (MC): _____



MAPAL, the drill specialist

Specials, reconditioning, technical information

The first part of this catalog is dedicated to our broad standard product range. After every section, you can find request forms for slight alterations to these standard products, such as different shank forms, length alterations or intermediate diameters. This way, MAPAL can easily adapt standard products from stock to customers' detailed requirements, if possible.

Should this not be the case, the following pages consist of various request forms for special designs of drills, including stepped tools which will then be produced within a short period of time. Simply copy the relevant form, fill it out and send it to the MAPAL Inc. Head Office in Port Huron, or hand it to your responsible sales representative.

You can also find these forms to download from our homepage at www.mapal.us.

MAPAL puts great emphasis on a consistent tool quality. Therefore, reconditioning is a major topic and one of the big assets of working with MAPAL. All drills can be reground and also recoated within a competitive timeframe, and MAPAL ensures that the drill will reach the original quality and performance. Please see pages 122 and 123 for further information.

Finally, this section contains technical information around the large topic of drilling, for example about coatings or the application of coolant. Reference and tolerance charts help you gather all the important information from one piece of literature.

Solid carbide twist drill (without step)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore:

- Through hole
 Blind bore

Machining method:

- wet dry
 min.lubrication

Coolant supply:

- Ext. Int.
 

- | | |
|---|--|
| <input type="checkbox"/> Unalloyed steel | <input type="checkbox"/> Aluminium (Si content > 10 %) |
| <input type="checkbox"/> Cast steel | <input type="checkbox"/> Aluminium (Si content < 10 %) |
| <input type="checkbox"/> Alloyed steel | <input type="checkbox"/> Copper |
| <input type="checkbox"/> Inox | <input type="checkbox"/> Brass |
| <input type="checkbox"/> Stainless/acid-resistant steel | <input type="checkbox"/> Bronze |
| <input type="checkbox"/> Grey cast iron | <input type="checkbox"/> Titanium alloys |
| <input type="checkbox"/> Alloyed grey cast iron | <input type="checkbox"/> Nickel alloys |
| <input type="checkbox"/> Nodular iron | <input type="checkbox"/> Chilled cast iron |
| <input type="checkbox"/> CGI | <input type="checkbox"/> Hardened steel |
| <input type="checkbox"/> Malleable iron | <input type="checkbox"/> _____ |

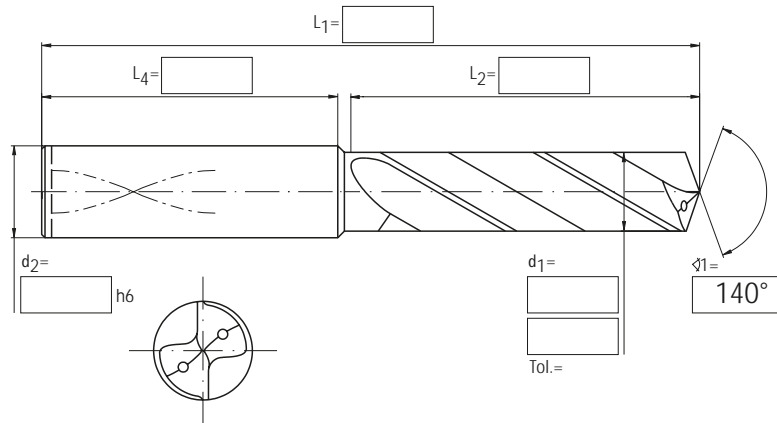
Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M1504, if known): _____


Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:

- (if you wish to choose yourself)
 MxF
 MxH
 TiAlN
 uncoated



Shank form:

- HA (DIN 6535) 
 HB (DIN 6535) 
 HE (DIN 6535) 

Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

- | | | |
|--|--|--|
| Groove form: <input type="checkbox"/> MEGA
<input type="checkbox"/> GG
<input type="checkbox"/> ALU
<input type="checkbox"/> INOX
<input type="checkbox"/> _____ | Coating: <input type="checkbox"/> MxF
<input type="checkbox"/> MxH
<input type="checkbox"/> TiAlN
<input type="checkbox"/> uncoated
<input type="checkbox"/> _____ | Radial land on face: <input type="checkbox"/> Radial land on taper surface
<input type="checkbox"/> Radial land on 4 faces
<input type="checkbox"/> Round point
<input type="checkbox"/> Spiral point |
|--|--|--|

Blank (MC): _____

Solid carbide twist drill (single diameter)



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Enquiry Order

Company _____ Customer number (if available) _____
 Contact partner _____ Phone/Fax _____ E-Mail _____
 Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Type of machining:

Bore: Through hole Blind bore

Machining method: wet dry min.lubrication

Coolant supply: Ext. Int.

Material to be machined:

<input type="checkbox"/> Unalloyed steel	<input type="checkbox"/> Aluminium (Si content > 10 %)
<input type="checkbox"/> Cast steel	<input type="checkbox"/> Aluminium (Si content < 10 %)
<input type="checkbox"/> Alloyed steel	<input type="checkbox"/> Copper
<input type="checkbox"/> Inox	<input type="checkbox"/> Brass
<input type="checkbox"/> Stainless/acid-resistant steel	<input type="checkbox"/> Bronze
<input type="checkbox"/> Grey cast iron	<input type="checkbox"/> Titanium alloys
<input type="checkbox"/> Alloyed grey cast iron	<input type="checkbox"/> Nickel alloys
<input type="checkbox"/> Nodular iron	<input type="checkbox"/> Chilled cast iron
<input type="checkbox"/> CGI	<input type="checkbox"/> Hardened steel
<input type="checkbox"/> Malleable iron	<input type="checkbox"/> _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2105, if known): _____

Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

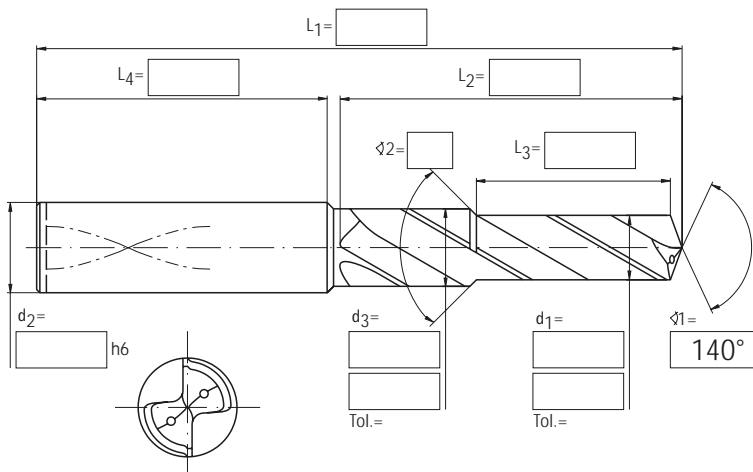
Coating:
 (if you wish to choose yourself)
 MxF
 MxH
 TiAlN
 uncoated

Shank form:

HA (DIN 6535)

HB (DIN 6535)

HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> MEGA <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> INOX <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point <input type="checkbox"/> Spiral point
--	--	--

Blank (MC): _____

Solid carbide twist drill (double diameter)



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Enquiry Order

MAPAL Inc.
4032 Dove Road
48060 Port Huron MI
USA
Phone +1 / 8 10 / 3 64 80 20
Fax +1 / 8 10 / 3 64 47 50
info@us.mapal.us

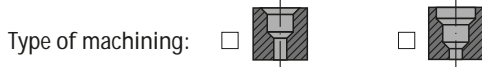
Company _____ Customer number (if available) _____

Contact partner _____ Phone/Fax _____ E-Mail _____

Address _____

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:



Material to be machined:

Bore: Through hole
 Blind bore

- Unalloyed steel
- Cast steel
- Alloyed steel
- Inox
- Stainless/acid-resistant steel
- Grey cast iron
- Alloyed grey cast iron
- Nodular iron
- CGI
- Malleable iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- Titanium alloys
- Nickel alloys
- Chilled cast iron
- Hardened steel
- _____

Machining method: wet dry
 min.lubrication

Coolant supply: Ext. Int.

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2105, if known): _____

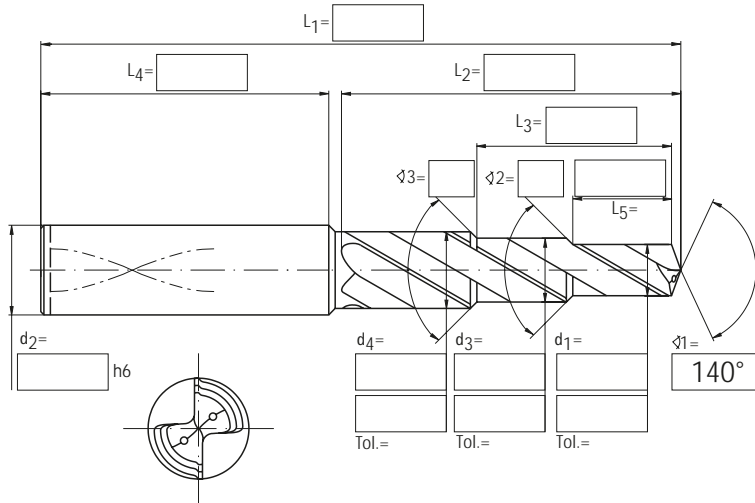
Cutting direction: R.H. L.H.
(if not stated we will assume R.H.)

Coating:
(if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: MEGA GG ALU INOX _____

Coating: MxF MxH TiAlN uncoated _____

Radial land on face: Radial land on taper surface Radial land on 4 faces Round point Spiral point

Blank (MC): _____

Solid carbide twist drill (without step – with four additional guide margins)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

- | | |
|---|--|
| <input type="checkbox"/> Unalloyed steel | <input type="checkbox"/> Aluminium (Si content > 10 %) |
| <input type="checkbox"/> Cast steel | <input type="checkbox"/> Aluminium (Si content < 10 %) |
| <input type="checkbox"/> Alloyed steel | <input type="checkbox"/> Copper |
| <input type="checkbox"/> Inox | <input type="checkbox"/> Brass |
| <input type="checkbox"/> Stainless/acid-resistant steel | <input type="checkbox"/> Bronze |
| <input type="checkbox"/> Grey cast iron | <input type="checkbox"/> Titanium alloys |
| <input type="checkbox"/> Alloyed grey cast iron | <input type="checkbox"/> Nickel alloys |
| <input type="checkbox"/> Nodular iron | <input type="checkbox"/> Chilled cast iron |
| <input type="checkbox"/> CGI | <input type="checkbox"/> Hardened steel |
| <input type="checkbox"/> Malleable iron | <input type="checkbox"/> _____ |

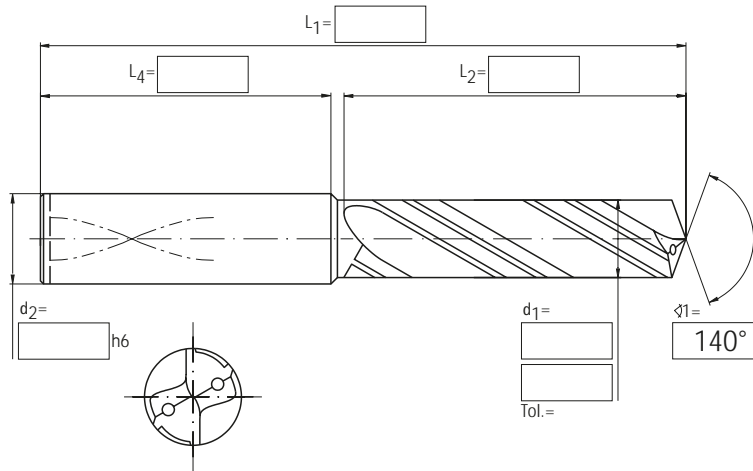
Coolant supply: Ext. Int.




Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2175, if known): _____


Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)





Coating:
 (if you wish to choose yourself)

MxF
 MxH
 TiAlN
 uncoated

Shank form:

HA (DIN 6535) 

HB (DIN 6535) 

HE (DIN 6535) 

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> MEGA <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> INOX <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point <input type="checkbox"/> Spiral point
---	---	---

Blank (MC): _____

Solid carbide twist drill (single diameter – with four additional guide margins)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Type of machining:

Bore: Through hole Blind bore

Machining method: wet dry min.lubrication

Coolant supply: Ext. Int.

Material to be machined:

<input type="checkbox"/> Unalloyed steel	<input type="checkbox"/> Aluminium (Si content > 10 %)
<input type="checkbox"/> Cast steel	<input type="checkbox"/> Aluminium (Si content < 10 %)
<input type="checkbox"/> Alloyed steel	<input type="checkbox"/> Copper
<input type="checkbox"/> Inox	<input type="checkbox"/> Brass
<input type="checkbox"/> Stainless/acid-resistant steel	<input type="checkbox"/> Bronze
<input type="checkbox"/> Grey cast iron	<input type="checkbox"/> Titanium alloys
<input type="checkbox"/> Alloyed grey cast iron	<input type="checkbox"/> Nickel alloys
<input type="checkbox"/> Nodular iron	<input type="checkbox"/> Chilled cast iron
<input type="checkbox"/> CGI	<input type="checkbox"/> Hardened steel
<input type="checkbox"/> Malleable iron	<input type="checkbox"/> _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2175, if known): _____

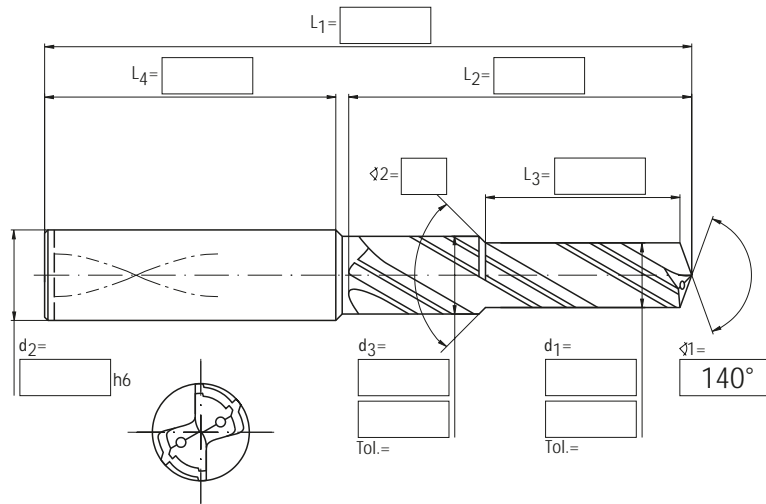
Cutting direction: R.H. L.H.
(if not stated we will assume R.H.)

Coating:
(if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> MEGA <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> INOX <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point <input type="checkbox"/> Spiral point
--	--	--

Blank (MC): _____

Solid carbide twist drill (double diameter – with four additional guide margins)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

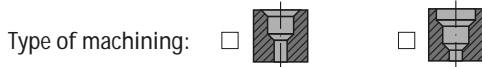
Enquiry Order

Company _____ Customer number (if available) _____
 Contact partner _____ Phone/Fax _____ E-Mail _____
 Address _____

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:



Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

Coolant supply: Ext. Int.

- Material to be machined:
- Unalloyed steel
 - Cast steel
 - Alloyed steel
 - Inox
 - Stainless/acid-resistant steel
 - Grey cast iron
 - Alloyed grey cast iron
 - Nodular iron
 - CGI
 - Malleable iron
 - Aluminium (Si content > 10 %)
 - Aluminium (Si content < 10 %)
 - Copper
 - Brass
 - Bronze
 - Titanium alloys
 - Nickel alloys
 - Chilled cast iron
 - Hardened steel
 - _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2175, if known): _____

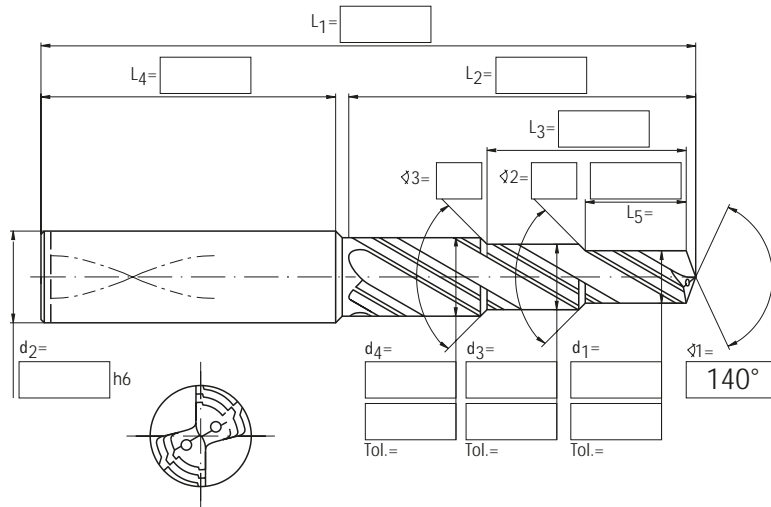
Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: MEGA GG ALU INOX _____

Coating: MxF MxH TiAlN uncoated _____

Radial land on face: Radial land on taper surface Radial land on 4 faces Round point Spiral point

Blank (MC): _____

Solid carbide drill, straight flutes (without step)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company _____		Customer number (if available) _____
Contact partner _____	Phone/Fax _____	E-Mail _____
Address _____		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:



Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

Coolant supply: Ext. Int.

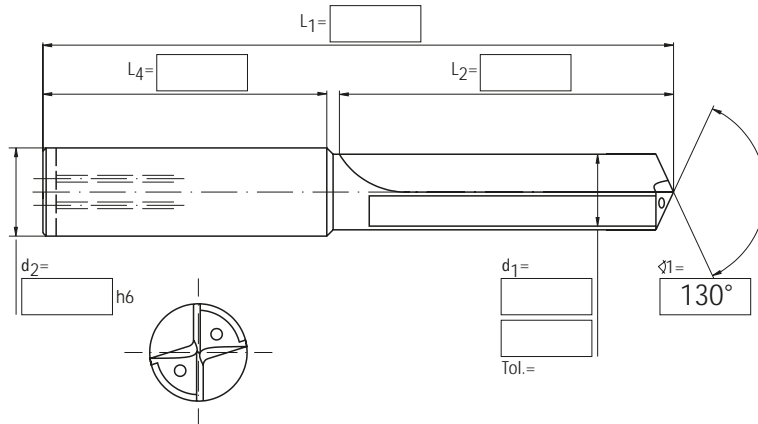
Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2603, if known): _____




Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____



Shank form:

- HA (DIN 6535) 
- HB (DIN 6535) 
- HE (DIN 6535) 

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point
Blank (MC): _____		

Solid carbide drill, straight flutes (single diameter)



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

MAPAL Inc.
4032 Dove Road
48060 Port Huron MI
USA
Phone +1 / 8 10 / 3 64 80 20
Fax +1 / 8 10 / 3 64 47 50
info@us.mapal.com
www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Type of machining:

Bore: Through hole Blind bore

Machining method: wet dry min.lubrication

Coolant supply: Ext. Int.

Material to be machined:

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2603, if known): _____

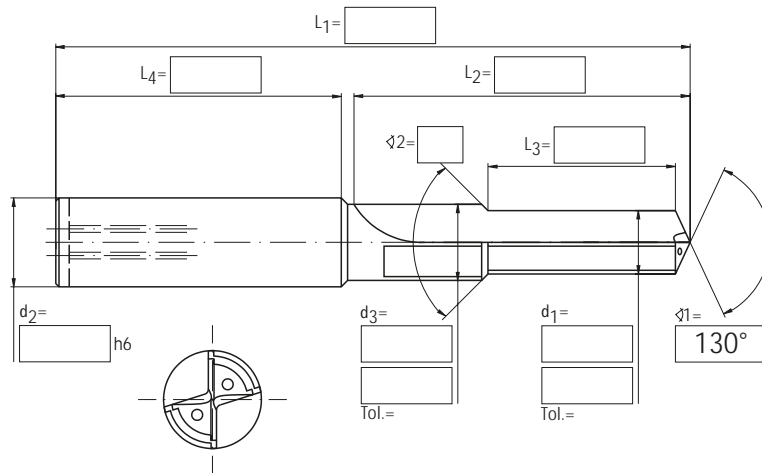
Cutting direction: R.H. L.H.
(if not stated we will assume R.H.)

Coating:
(if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point
--	--	---

Blank (MC): _____

Solid carbide drill, straight flutes (without step)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

MAPAL Inc.
 4032 Dove Road
 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week

Please describe your machining task for us and the special tool you require:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

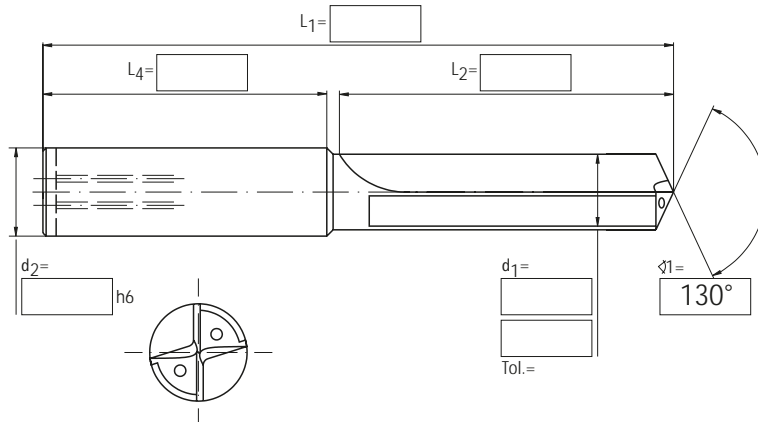
Coolant supply: Ext. Int.




Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2603, if known): _____




Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)



Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535) 
- HB (DIN 6535) 
- HE (DIN 6535) 

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point
Blank (MC): _____		

Solid carbide drill, straight flutes (single diameter)



Please copy, complete and return (only 1 tool per enquiry questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

MAPAL Inc.
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 48060 Port Huron MI
 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Type of machining:

Bore: Through hole Blind bore

Machining method: wet dry min.lubrication

Coolant supply: Ext. Int.

Material to be machined:

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2603, if known): _____

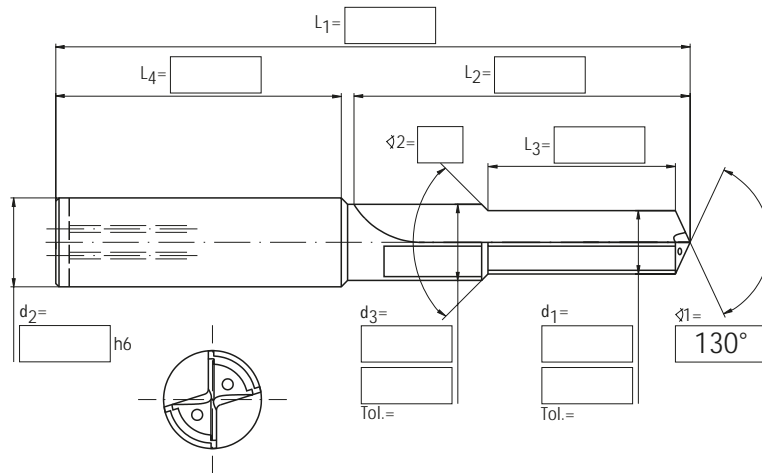
Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point
Blank (MC): _____		

Solid carbide drill, straight flutes (double diameter)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

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 48060 Port Huron MI
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 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week

Please describe your machining task for us and the special tool you require:

Type of machining:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

Coolant supply: Ext. Int.

Material to be machined:

- Grey cast iron
- Alloyed grey cast iron
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Copper
- Brass
- Bronze
- _____

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2603, if known):

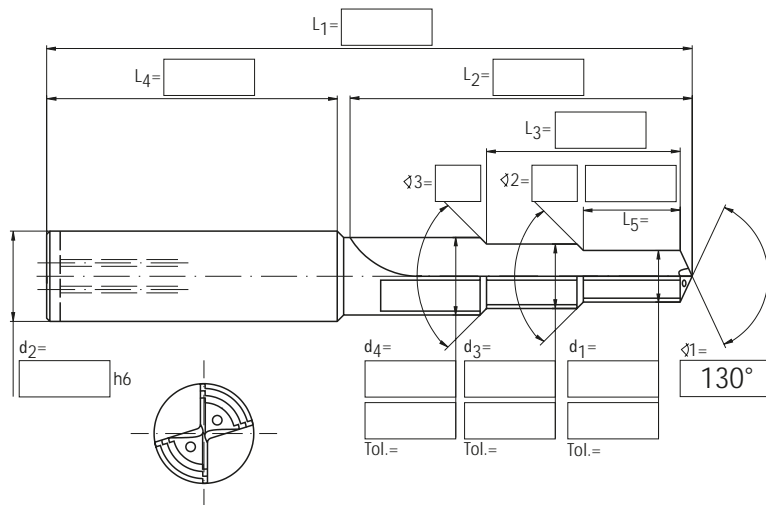
Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)

Coating:
 (if you wish to choose yourself)

- MxF
- MxH
- TiAlN
- uncoated
- _____

Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)



Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: <input type="checkbox"/> GG <input type="checkbox"/> ALU <input type="checkbox"/> _____	Coating: <input type="checkbox"/> MxF <input type="checkbox"/> MxH <input type="checkbox"/> TiAlN <input type="checkbox"/> uncoated <input type="checkbox"/> _____	Radial land on face: <input type="checkbox"/> Radial land on taper surface <input type="checkbox"/> Radial land on 4 faces <input type="checkbox"/> Round point
--	--	---

Blank (MC): _____

PCD high performance drill (without step)

Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).



Enquiry Order

Company _____		Customer number (if available) _____
Contact partner _____	Phone/Fax _____	E-Mail _____
Address _____		

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 USA
 Phone +1 / 8 10 / 3 64 80 20
 Fax +1 / 8 10 / 3 64 47 50
 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Material to be machined:

- Bore: Through hole
 Blind bore
- Machining method: wet dry
 min.lubrication
- Coolant supply: Ext. Int.

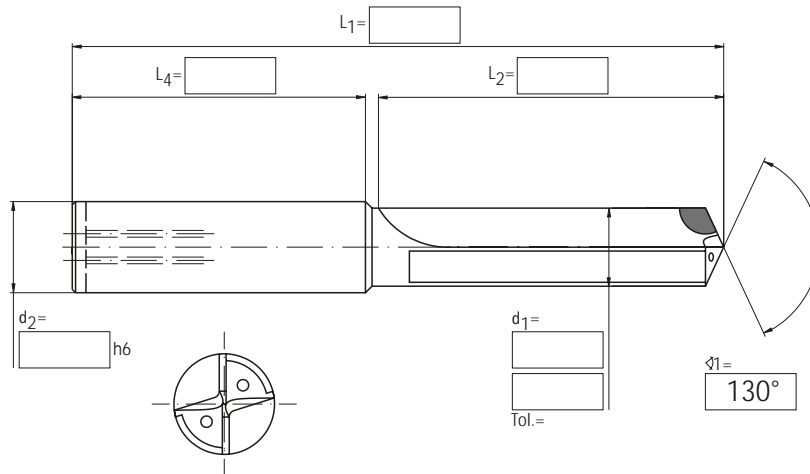
- Aluminium (Si content > 10 %)
 Aluminium (Si content < 10 %)
 Brass
 Bronze



Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2913, if known): _____

Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)



Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: ALU Radial land on face: Radial land on 4 faces
 _____ Round point

Blank (MC): _____

PCD high performance drill (single diameter)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company _____		Customer number (if available) _____
Contact partner _____	Phone/Fax _____	E-Mail _____
Address _____		

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 info@us.mapal.com
 www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week _____

Please describe your machining task for us and the special tool you require:

Type of machining:

Bore: Through hole Blind bore

Machining method: wet dry
 min.lubrication

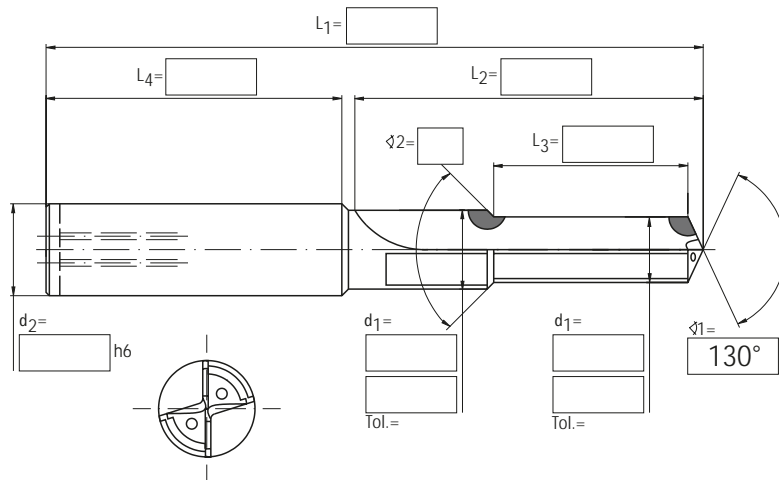
Coolant supply: Ext. Int.

Material to be machined:
 Aluminium (Si content > 10 %)
 Aluminium (Si content < 10 %)
 Brass
 Bronze

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2913, if known): _____

Cutting direction: R.H. L.H.
 (if not stated we will assume R.H.)



Shank form:

HA (DIN 6535)

HB (DIN 6535)

HE (DIN 6535)

 Date Signature

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: ALU _____

Radial land on face: Radial land on 4 faces
 Round point

Blank (MC): _____

PCD high performance drill (double diameter)



Please copy, complete and return (only 1 tool per enquiry/questionnaire/order).

Enquiry Order

Company		Customer number (if available)
Contact partner	Phone/Fax	E-Mail
Address		

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Fax +1 / 8 10 / 3 64 47 50
info@us.mapal.com
www.mapal.us

Number of drills _____ Delivery date required (non-binding) _____ Week

Please describe your machining task for us and the special tool you require:

Type of machining:

Material to be machined:

Bore: Through hole
 Blind bore

Machining method: wet dry
 min.lubrication

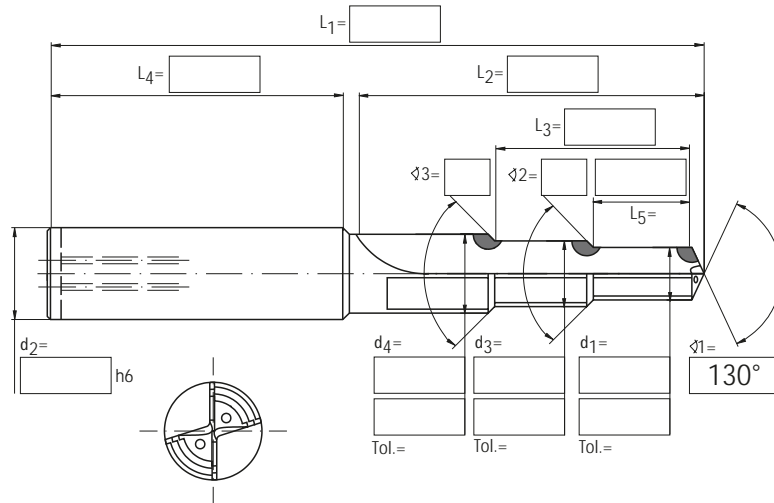
- Aluminium (Si content > 10 %)
- Aluminium (Si content < 10 %)
- Brass
- Bronze

Coolant supply: Ext. Int.

Hardness (HRC, HB, etc.): _____ Tensile strength (N/mm²): _____ Standard: _____ Standard No.: _____

MAPAL code (e.g. M2913, if known): _____

Cutting direction: R.H. L.H.
(if not stated we will assume R.H.)



Shank form:

- HA (DIN 6535)
- HB (DIN 6535)
- HE (DIN 6535)

Date _____ Signature _____

Please do not write in this box, which will be completed by MAPAL specialists.

Groove form: ALU _____

Radial land on face: Radial land on 4 faces
 Round point

Blank (MC): _____

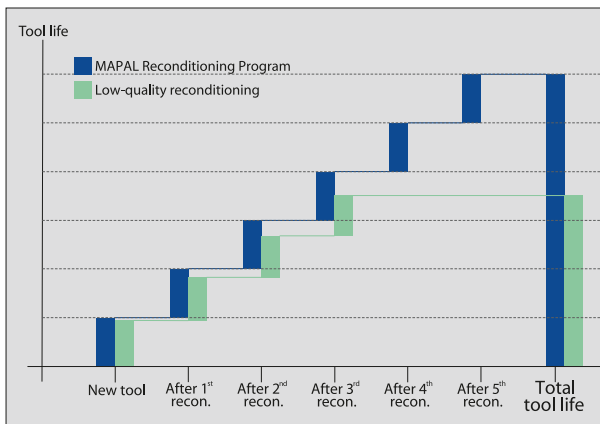
MAPAL Reconditioning Program – original quality and performance in a competitive time frame

A state of the art Program



Drill before reconditioning.

Drill after reconditioning.



The purchase decision of a solid carbide product is influenced by many factors, among which high quality is of course a very important factor. But economic efficiency also plays a major role and the customer expects to get the highest possible return on his investment by continuously long tool lives.

Therefore, high quality must be consistent throughout the various steps of reconditioning. The saving potentials arising from a high quality and complete reconditioning program tend to be neglected during the investment decision, but have a significant impact on a repeatably outstanding performance of the tool. Only the right technology, know how and standards put in place ensure a repeat performance grind after grind and coating after coating.

With the MAPAL Reconditioning Program the customer can rely on high quality tools and high quality reconditioning, ensuring the original geometry and coating of the drill.

State of the art Reconditioning



Many problems may arise - not only in tool life and performance, but also in part quality - if a tool is not properly reconditioned. MAPAL offers precision reconditioning in an ISO certified environment. Using state of the art multi-axis CNC grinding equipment, a reconditioned product from the MAPAL facility stands for continuous performance, customized service and support to manage a successful and economic production at the customers' site.

There is one more issue to consider: the geometries of MAPAL solid carbide drills are especially tailored to meet the applications' demands. Only MAPAL has the ability to guarantee the performance of the proprietary geometry of the product.

But MAPAL will provide top quality reconditioning to all carbide products - whether of their own brand or not - with absolute precision and quality at extremely competitive pricing.

State of the art service

MAPAL offers a large range of services along with the solid carbide products:

- Custom tool management programs and support is available to help reduce cost and keep the customer productive. These Tool Management Services are adapted to the customers' special needs and range from tool acquisition to the complete package with cost per part contracts.
- MAPAL optimizes machining conditions to maximize savings with new tools and also making sure that the reconditioning potential of the tools is used to the maximum.
- The products can be marked to meet special needs or according to identity requirements.
- Custom sterilization is always available.
- Of course, special time limits for pre-arranged and specified lots can be determined with MAPAL.



State of the art response

MAPAL provides a specialized container designed to store the used carbide products. This makes shipment to the facility safe and easy. The customer has the advantage that packaging and logistics of the tools to be reconditioned are kept in a defined cycle, and MAPAL can offer an extremely fast turnaround and service of 10 to 15 working days after receiving the tools.

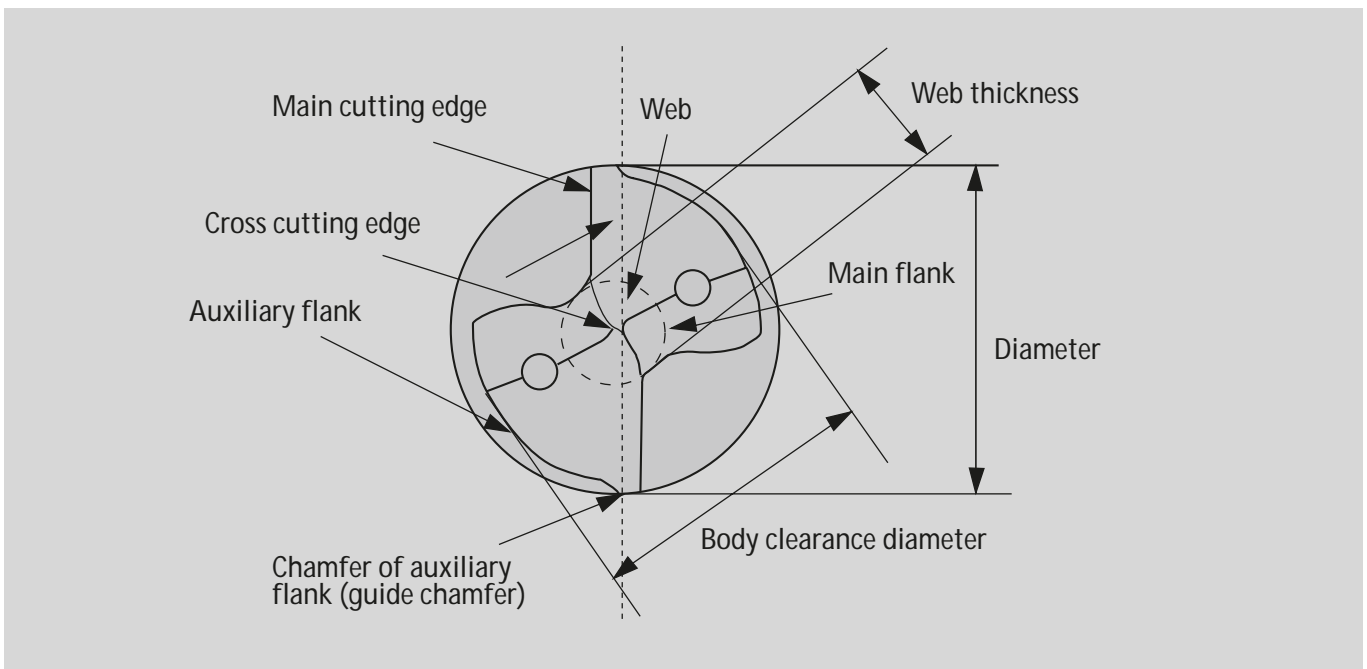
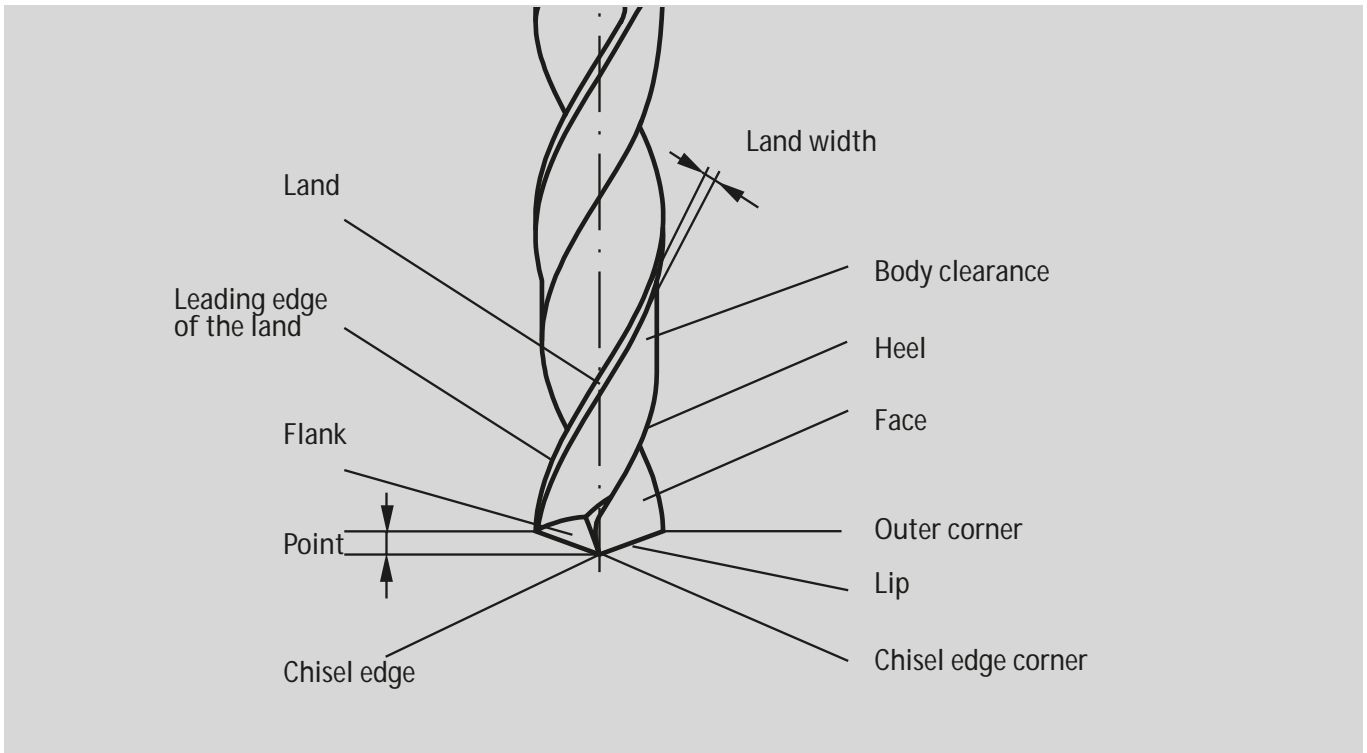
The used tools are simply packed into the container, the reconditioning order form is filled out and shipped with the container to the facility of MAPAL Inc., Port Huron.

The tools are shipped back to the customer in the same container in a „like new“ condition. MAPAL bears the shipping costs.

The reconditioning order form and the easy pricing system reduce any unnecessary delays in processing your order. The re-conditioning order form and information on standard pricing and terms & conditions can be obtained by visiting www.mapal.us, by contacting your local distributor or calling MAPAL at (8 10) 3 64 - 47 50.

A reconditioning order form with a table. The table has columns for 'Tool ID', 'Tool Description', 'Quantity', 'Reconditioning Method', 'Status', and 'Date'. The form is titled 'MAPAL reconditioning program - original quality and performance - 10 working days - 100% guarantee'.

Nomenclature or parts of the drill

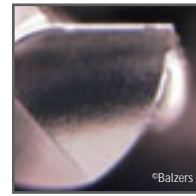


MAPAL high performance tool coatings – for noticeably improved performance

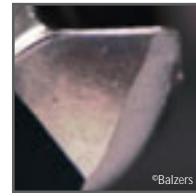
Today tools need to meet increasingly high demands and cope with current trends in metal cutting, such as HSC or hard machining, machining with minimal lubrication or even dry. Production reliability, reduction in costs, increase in productivity and environmental protection are further objectives to be met in modern production systems. Amongst other things a central and more and more important role is played by coating. For example, it has been state-of-the-art for quite some time to machine steels only with coated tools.

A high-quality coating has several tasks. First of all, it offers a good protection against tool wear. The smooth surface makes the chip clearance easier and faster. Finally, less heat arrives at the cutting edge.

All the arguments listed here obviously result in an increased tool life and higher cutting data in comparison to uncoated tools. As a consequence, coated tools contribute to greater economy and production reliability. But: not every coating guarantees these advantages.



MxF-Coating after 2,000 holes.



Uncoated, after 15 holes.

Example:
Drilling into solid material (1.1191) ø 6,8 mm,
34 mm deep, external cooling

MxF – advantages of the MAPAL standard coating for drills

- maximum tool life
- high feed rates
- low wear
- excellent chip flow even with deep bores
- excellent for dry machining
- excellent for hard machining up to 65 HRC
- can be recoated without loss of tool life

MAPAL offers a variety of coatings

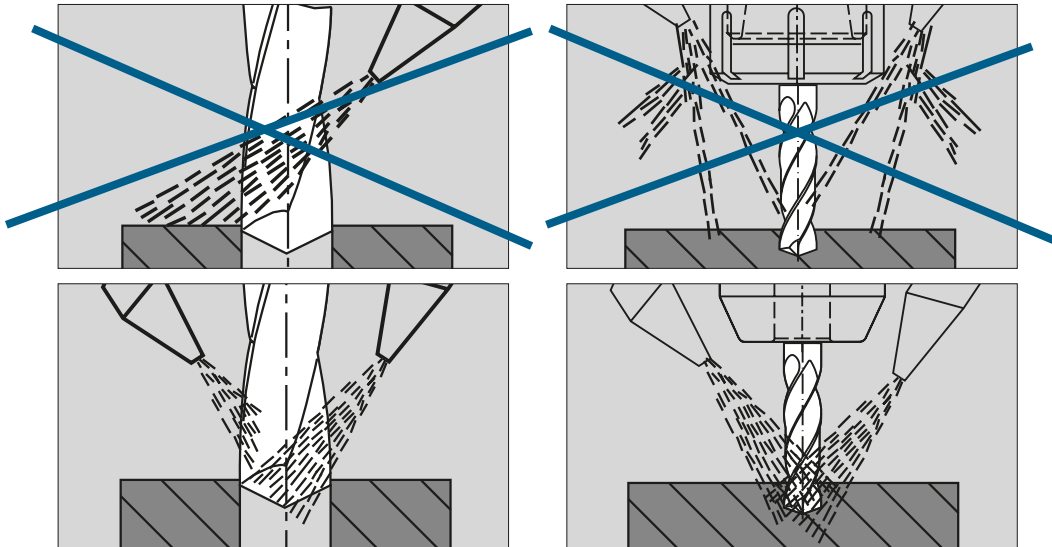
MAPAL offers a variety of coatings upon special request to meet the demands of every customer's needs and every application's unique demands. Through extensive testing, research and real world applications, MAPAL has worked to develop a full

range of high performance coatings to make available to the customers. These coating options allow us to address a multitude of situations with optimal results. Please refer to the chart below for the various coatings available.

	MxF	MxxF	MxH	TiN	TiCN	TiAlN	AluSpeed
Proprietary	TiAlN	TiAlN	Aluminium Chromium-based	Titanium Nitride	Titanium Carbonitride	Titanium Aluminium Nitride	Titanium Diboride
Coating process	PVD	PVD	PVD	PVD	PVD	PVD	PVD
Layer structure	Nano structure	Nano structure	Multilayer	Monolayer	Gradient	Nano structure	Monolayer
Hardness [HV]	3300	3300	3000	2300	3000	3300	3500
Coefficient of friction (Fetting)	0.25	0.20	0.20	0.40	0.35	0.30 - 0.35	0.40
Thermal stability [C]	900	900	1100	600	400	900	700
General information	Offers all the advantages of TiAlN with a reduced coefficient of friction. Therefore ideal coating for drills: excellent chip removal and reduced cutting forces.	MAPAL MxF coating processed further to help reduce the coefficient of friction even further. For extremely difficult drilling applications with a high tendency for material adhesion and built-up edges.	Innovative coating offering greater abrasion resistance, extra shear strength, lower adhesion tendency, maximum toughness and a very smooth surface to achieve improved drilling performance.	General purpose coating with good adhesion and abrasive resistant properties. Suitable for a wide variety of materials.	Very wear resistant coating with high toughness and shock resistance. Good in interrupted cuts found in applications like milling.	Excellent thermal and chemical resistance allows for dry cutting and improvements in performance of carbide drills. High hardness of the coating gives great protection against abrasive wear and erosion.	Offers a very smooth surface and low affinity to cold welding or built-up edges, which makes it optimal for Titanium, Aluminium (> 10%) and copper applications. High toughness and high hardness.

Coolant

Application of coolant



With cutting tools, not only is the quality and type of coolant important to the cutter reaction, but the application is equally important.

It is highly recommended when cooling carbide tools that it is applied to the cutting zone in a consistent pressure that directs chips away from the cutting edges.

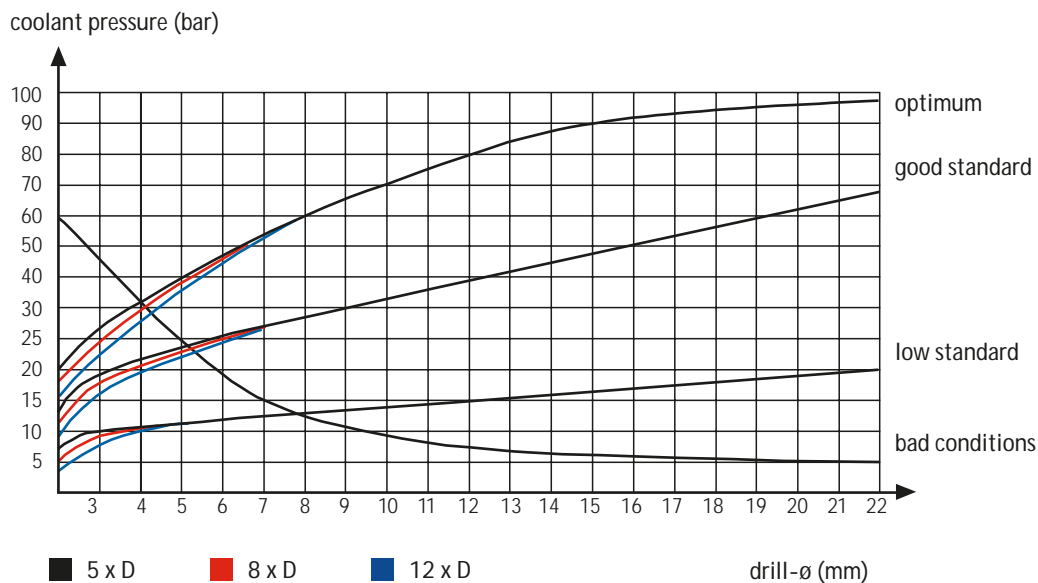
Pressure is important to assist in chip removal, but to carbide it is more important to avoid intermittent cooling. Intermittent cooling of carbide leads to thermal stressing of the material and the formation of „microcracks“.

This will eventually lead to a premature failure of the cutting tool.

Coolant pressure

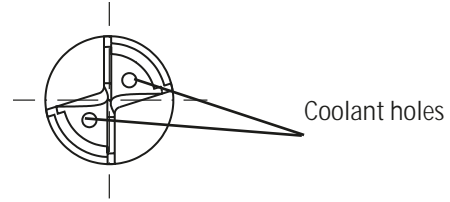
The coolant pressure must not be too high on tools with a small diameter and high drilling depths because the high coolant

pressure leads to an extreme reinforcement of the tool. This creates radial pressure and may lead to tool breakage.



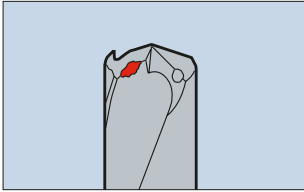
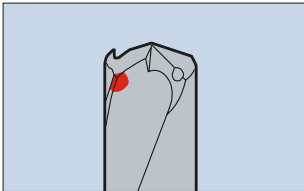
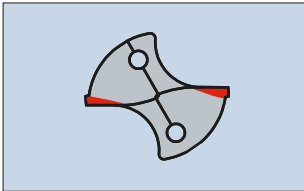
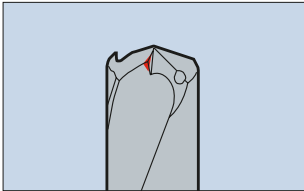
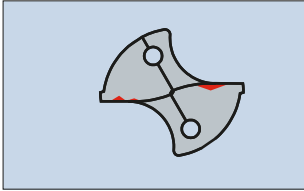
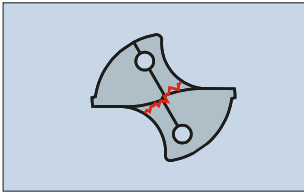
Coolant flow with drills with internal coolant supply

Flow depends on the diameter of the coolant bore and the pressure (bar).

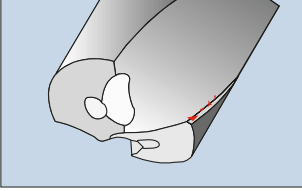
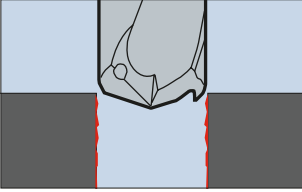
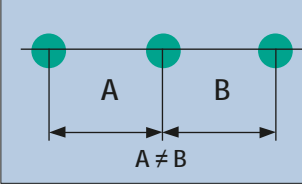
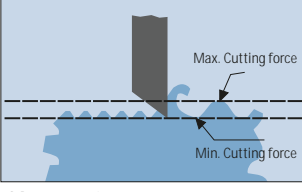


Tool parameters			Coolant volume V [gal / min]		
Shank diameter [mm]	Drill diameter [mm]	Coolant hole inside [mm]	at 10 bar (145 PSI)	at 20 bar (290 PSI)	at 30 bar (435 PSI)
6	3.0 - 6.0	0.5	238-291	317-370	478-528
8	6.1 - 8.0	0.9	528	740	1,057
10	8.1 - 10.0	1.2	951	1,347	1,902
12	10.1 - 12.0	1.3	1,110	1,585	2,245
14	12.1 - 14.0	1.6	1,691	2,378	3,302
16	14.1 - 16.0	2.0	2,642	3,698	5,283
18	16.1 - 18.0	2.2	3,170	4,491	6,340
20	18.1 - 20.0	2.5	4,095	5,812	7,925

Troubleshooting

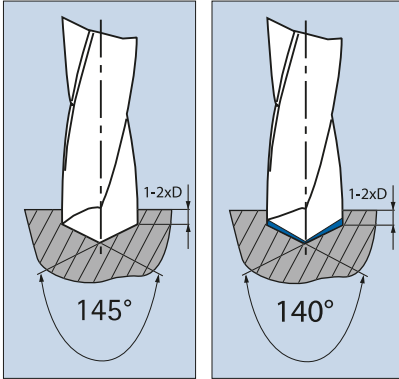
	Possible causes	Possible solutions
 <p>Cutting edge build up</p>	<ul style="list-style-type: none"> - Spindle speed too slow / feed too light - Cutting edge dull - Insufficient coolant - Hone width too large - Improper rake or clearance 	<ul style="list-style-type: none"> - Increase feed then RPM - Check tool wear - Improve coolant pressure or concentration - Decrease hone width - Choose tool with improved shearing properties - Change coating
 <p>Corner chipping</p>	<ul style="list-style-type: none"> - Spindle speed too high - Corner too sharp - Poor rigidity - Interrupted cut - Tool overhang - Clearance angle too high 	<ul style="list-style-type: none"> - Decrease RPM - Chamfer corner or use corner radius - Decrease feed rate - Check all holders and fixturing - Check spindle bearings - Reduce tool length - Reduce clearance angle
 <p>Flank wear</p>	<ul style="list-style-type: none"> - Heat build up - Chip load too light - Not enough clearance - Insufficient coolant 	<ul style="list-style-type: none"> - Reduce RPM - Increase feed rate - Increase clearance angle - Improve coolant application / concentration - Choose a proper coating
 <p>Chipping of cutting edge</p>	<ul style="list-style-type: none"> - Tool runout - Poor rigidity - Excessive vibration - Excessive feed rate - Material inclusions 	<ul style="list-style-type: none"> - Check fixturing and set-up - Check tool set-up for run-out - Check tool length - Check geometry to reduce vibration - Decrease feed rate - Check workpiece material
 <p>Cutting edge cratering</p>	<ul style="list-style-type: none"> - Feed rate too high - Relief too large - Improper or no coating - Spindle too slow - Built-up edge 	<ul style="list-style-type: none"> - Decrease feed rate - Decrease clearance angle - Select proper coating - Increase RPM - Improve coolant application
 <p>Chisel edge wear</p>	<ul style="list-style-type: none"> - Feed rate too high - Poor shearing properties - Spindle speed too low - Wrong point angle 	<ul style="list-style-type: none"> - Decrease feed rate - Decrease hone width - Increase RPM - Choose appropriate point angle

Troubleshooting

	Possible causes	Possible solutions
 <p>Land and body wear</p>	<ul style="list-style-type: none"> - Check spindle run-out - Interrupted cut - Non-rigid conditions - Abrasive workpiece - Insufficient coolant 	<ul style="list-style-type: none"> - Check spindle set-up - Decrease feed through interruption - Change machining conditions - Increase coolant lubricity - Choose a proper coating
 <p>Poor surface finish</p>	<ul style="list-style-type: none"> - Poor rigidity - Excessive vibration - Excessive feed rate - Excessive tool wear - Incorrect tool geometry - Chip packing 	<ul style="list-style-type: none"> - Check fixturing and set-up - Check tool length - Choose geometry to reduce vibration - Decrease feed rate - Choose a more appropriate geometry for material - Check workpiece material - Monitor tool wear
 <p>Poor dimensional accuracy</p>	<ul style="list-style-type: none"> - Feed rate too high - Poor rigidity - Tool overhang - Tool runout - Programming - Excessive tool wear 	<ul style="list-style-type: none"> - Decrease feed rate - Check fixturing and set-up - Secure shortest tool length possible - Indicate tool in spindle - Adjust parameters or approach - Monitor tool wear
 <p>Chattering</p>	<ul style="list-style-type: none"> - Speed too high - Tool is pushing not cutting - Poor rigidity - Tool diameter - Tool overhang 	<ul style="list-style-type: none"> - Decrease RPM - Increase tool shearing properties - Check fixturing and set-up - Choose largest diameter possible - Secure shortest tool length
<p>Catastrophic failure</p>	<ul style="list-style-type: none"> - Chips packing - Excessive wear - Insufficient coolant - Feed too high - Non-rigid conditions - Insufficient power 	<ul style="list-style-type: none"> - Reduce depth of cut - Monitor tool wear - Improve coolant pressure or concentration - Decrease feed rate - Check fixturing and set-up - Change coating - Adjust parameters

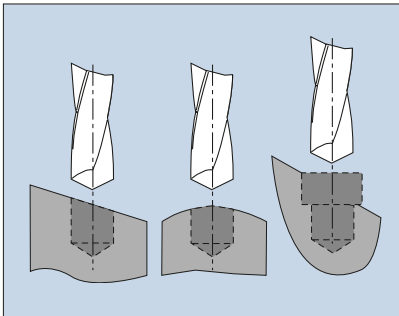
Troubleshooting

1. Pilot drills



- Pilot drills are recommended for drilling depths greater than $8 \times D$.
- Generally the pilot drill needs to drill $1-2 \times D$ deep.
- The angle of the pilot drill should be approximately 5° bigger than the following tool (this avoids the following drill starting with the corners instead of the center).
- The diameter of the pilot drill should be $\sim 0.02 \text{ mm}$ larger than the following tool to avoid engaging the corners of the following tool first as well as adding additional friction.

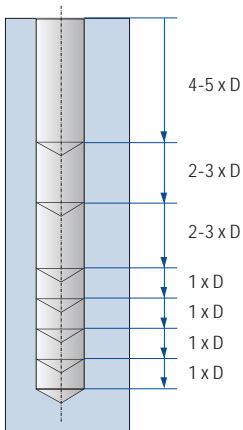
2. Angled, uneven surfaces



- When entering on an angled surfaces the feed rate of the drill should be reduced.
- If the drill is not able to start the drilling operation, a negative result and possible breakage may occur.
- For extremely uneven surfaces it is strongly suggested to start with a spot face of 180° .

	incline angle	straight flute	spiral flute
Feed rate	1°	80 %	100 %
Feed rate	2°	50 %	80 %
Feed rate	3°	30 %	65 %
Feed rate	4°	-	50 %
Feed rate	5°	-	30 %

3. Peck drilling



- Avoid pecking with a carbide drill if at all possible.
- Pecking leads to work hardening.
- Entering / exiting material is the most difficult part of the operation and may lead to fatigue wear.
- If a peck cycle is necessary try incorporating a dwell or quick peck before using a traditional peck cycle and do not completely withdraw the tool when pecking.

Reference charts

International tolerance grades

Basic Sizes		International tolerance grades																	
Over Up to		IT01	IT0	IT1	IT2	IT3	IT4	IT5	IT6	IT7	IT8	IT9	IT10	IT11	IT12	IT13	IT14	IT15	IT16
0	3	0.0003	0.0005	0.0008	0.0012	0.002	0.003	0.004	0.006	0.010	0.014	0.025	0.040	0.060	0.100	0.140	0.250	0.400	0.600
3	6	0.0004	0.0006	0.0010	0.0015	0.0025	0.004	0.005	0.006	0.012	0.018	0.030	0.040	0.075	0.120	0.180	0.300	0.480	0.750
6	10	0.0004	0.0006	0.001	0.0015	0.0025	0.004	0.006	0.009	0.016	0.022	0.036	0.058	0.090	0.160	0.220	0.380	0.580	0.900
10	18	0.0005	0.0008	0.0012	0.002	0.003	0.005	0.008	0.011	0.021	0.027	0.043	0.070	0.110	0.180	0.270	0.430	0.700	1.100
18	30	0.0008	0.001	0.0015	0.0026	0.004	0.006	0.009	0.013	0.021	0.032	0.062	0.084	0.130	0.210	0.330	0.520	0.840	1.300

Tolerance chart for round matching parts

Tolerance for Shank Sizes

Diameter d ₁ in mm		Tolerance class [µm]																				
over	up to	b9	c9	d8	d9	e7	e8	e9	f6	f7	f8	g5	g6	h5	h6	h7	h8	h9	m6	m7	m8	m9
-	3	-140 -165	-60 -55	-20 -34	-20 -45	-14 -24	-14 -28	-14 -39	-6 -12	-6 -16	-6 -20	-2 -6	-2 -8	0 -4	0 -6	0 -10	0 -14	0 -25	+8 +2	+12 +2	+16 +2	+27 +2
3	6	-140 -170	-70 -100	-30 -48	-30 -60	-20 -32	-20 -38	-20 -50	-10 -18	-10 -22	-10 -28	-4 -9	-4 -12	0 -5	0 -8	0 -12	0 -18	0 -30	+12 +4	+16 +4	+22 +4	+34 +4
6	10	-150 -186	-80 -116	-40 -62	-40 -76	-25 -40	-25 -47	-25 -61	-13 -22	-13 -28	-13 -35	-5 -11	-5 -14	0 -6	0 -9	0 -15	0 -22	0 -36	+15 +6	+21 +6	+28 +6	+42 +6
10	14	-150 -183	-95 -138	-50 -65	-50 -75	-32 -40	-32 -49	-32 -59	-16 -27	-16 -34	-16 -43	-6 -14	-6 -17	0 -8	0 -11	0 -18	0 -27	0 -43	+18 +7	+25 +7	+34 +7	+50 +7
14	18	-160 -193	-110 -138	-65 -83	-65 -93	-40 -50	-40 -59	-40 -75	-20 -27	-20 -34	-20 -43	-7 -14	-7 -17	0 -8	0 -11	0 -18	0 -27	0 -43	+21 +7	+29 +7	+41 +7	+60 +7
18	24	-160 -212	-110 -162	-65 -98	-65 -117	-40 -61	-40 -73	-40 -92	-20 -33	-20 -41	-20 -53	-7 -16	-7 -20	0 -9	0 -13	0 -21	0 -33	0 -52	+21 +8	+29 +8	+41 +8	+60 +8
24	30	-170 -232	-120 -182	-80 -119	-80 -142	-50 -75	-50 -89	-50 -112	-25 -41	-25 -50	-25 -64	-9 -20	-9 -25	0 -11	0 -16	0 -25	0 -39	0 -62	+25 +9	+34 +9	+48 +9	+71 +9
30	40	-180 -242	-130 -192	-119 -159	-119 -174	-80 -106	-80 -134	-80 -164	-41 -60	-41 -60	-41 -76	-20 -23	-20 -29	-11 -13	-11 -19	0 -30	0 -46	0 -74	+30 +11	+41 +11	+57 +11	+85 +11
40	50	-190 -264	-140 -214	-140 -174	-140 -207	-100 -126	-100 -159	-100 -199	-60 -83	-60 -83	-60 -106	-30 -32	-30 -39	-10 -14	-10 -18	0 -25	0 -40	0 -63	+30 +15	+41 +15	+57 +15	+85 +15
50	65	-200 -274	-150 -224	-150 -186	-150 -224	-110 -146	-110 -186	-110 -236	-80 -106	-80 -106	-80 -134	-40 -43	-40 -49	-13 -15	-13 -19	0 -30	0 -46	0 -74	+30 +11	+41 +11	+57 +11	+85 +11
65	80	-220 -307	-170 -257	-170 -214	-170 -257	-120 -159	-120 -199	-120 -259	-72 -98	-72 -98	-72 -126	-36 -36	-36 -43	-12 -15	-12 -22	0 -35	0 -54	0 -87	+35 +13	+48 +13	+67 +13	+100 +13
80	100	-240 -327	-190 -267	-190 -224	-190 -267	-140 -186	-140 -224	-140 -294	-58 -83	-58 -83	-58 -106	-43 -43	-43 -49	-15 -18	-15 -22	0 -35	0 -54	0 -87	+35 +13	+48 +13	+67 +13	+100 +13
100	120	-260 -360	-200 -300	-200 -246	-200 -284	-150 -207	-150 -246	-150 -316	-68 -93	-68 -93	-68 -126	-43 -43	-43 -49	-14 -18	-14 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15
120	140	-280 -380	-210 -310	-210 -257	-210 -307	-160 -214	-160 -257	-160 -327	-72 -98	-72 -98	-72 -126	-43 -43	-43 -49	-14 -18	-14 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15
140	160	-310 -410	-230 -330	-230 -274	-230 -327	-170 -224	-170 -267	-170 -337	-79 -104	-79 -104	-79 -134	-43 -43	-43 -49	-15 -18	-15 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15
160	180	-340 -455	-240 -355	-240 -284	-240 -327	-180 -236	-180 -274	-180 -344	-83 -108	-83 -108	-83 -134	-43 -43	-43 -49	-15 -18	-15 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15
180	200	-380 -495	-260 -375	-260 -307	-260 -350	-200 -257	-200 -307	-200 -377	-96 -121	-96 -121	-96 -151	-43 -43	-43 -49	-15 -18	-15 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15
200	225	-420 -535	-280 -395	-280 -327	-280 -370	-220 -274	-220 -317	-220 -387	-100 -125	-100 -125	-100 -155	-43 -43	-43 -49	-15 -18	-15 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15
225	250	-455 -570	-355 -470	-355 -395	-355 -430	-250 -307	-250 -350	-250 -420	-115 -140	-115 -140	-115 -170	-43 -43	-43 -49	-15 -18	-15 -22	0 -40	0 -63	0 -100	+40 +15	+55 +15	+78 +15	+115 +15

Tolerance for Hole Sizes

Diameter d ₁ in mm		Tolerance class [µm]																						
over	up to	B10	C9	C10	D8	D9	D10	E7	E8	E9	F6	F7	F8	G6	G7	H6	H7	H8	H9	H10	M6	M7	M8	M9
-	3	+180 +140	+85 +60	+100 +60	+34 +20	+45 +20	+60 +14	+24 +14	+28 +14	+39 +14	+12 +6	+16 +6	+20 +6	+8 +2	+12 +2	+60 0	+100 0	+140 0	+250 0	+400 0	-2 -8	-2 -12	-2 -16	-2 -27
3	6	+188 +140	+100 +70	+118 +30	+48 +30	+60 +30	+78 +20	+32 +20	+38 +20	+50 +20	+18 +10	+22 +10	+28 +10	+12 +4	+16 +4	+80 0	+120 0	+180 0	+300 0	+480 0	-1 -9	0 -12	+2 -16	-4 -34
6	10	+208 +150	+116 +80	+138 +40	+62 +40	+76 +40	+98 +40	+40 +25	+47 +25	+61 +25	+22 +13	+28 +13	+35 +13	+14 +5	+20 +5	+90 0	+150 0	+220 0	+360 0	+580 0	-3 -12	0 -15	+1 -21	-6 -42
10	14	+220 +150	+138 +95	+165 +50	+77 +50	+93 +50	+120 +32	+50 +32	+59 +32	+75 +32	+27 +16	+34 +16	+43 +16	+17 +6	+24 0	+110 0	+180 0	+270 0	+430 0	+700 0	-4 -15	0 -18	+2 -25	-7 -50
14	18	+244 +160	+162 +110	+194 +50	+98 +65	+117 +65	+149 +40	+61 +40	+73 +40	+92 +40	+33 +20	+41 +20	+53 +20	+20 +7	+28 +7	+130 0	+210 0	+330 0	+520 0	+840 0	-4 -17	0 -21	+4 -29	-8 -60
18	24	+270 +170	+182 +120	+220 +60	+119 +80	+142 +80	+180 +80	+75 +50	+89 +50	+112 +50	+41 +25	+50 +25	+64 +25	+25 +9	+34 +9	+160 0	+250 0	+390 0	+620 0	+1000 0	-4 -20	0 -25	+5 -34	-9 -71
24	30	+300 +180	+200 +130	+260 +60	+146 +100	+174 +100	+220 +100	+90 +60	+106 +60	+134 +60	+49 +30	+60 +30	+76 +30	+29 +10	+40 +10	+190 0	+300 0	+460 0	+740 0	+1200 0	-5 -24	0 -30	+5 -41	
30	40	+360 +220	+257 +170	+310 +140	+174 +120	+207 +120	+260 +120	+107 +72	+126 +72	+159 +72	+58 +36	+71 +36	+90 +36	+34 +12	+47 +12	+220 0	+350 0	+540 0	+870 0	+1400 0	-6 -28	0 -35	+6 -48	
40	50	+420 +260	+300 +200	+360 +150	+208 +145	+245 +145	+305 +145	+125 +85	+148 +85	+185 +85	+68 +43	+83 +43	+106 +43	+39 +14	+54 +14	+250 0	+400 0	+630 0	+1000 0	+1600 0	-8 -33	0 -40	+8 -55	
50	65	+525 +340	+355 +240	+425 +240	+210 +170	+245 +170	+305 +170	+125 +100	+148 +100	+185 +100	+68 +50	+83 +50	+106 +50	+39 +15	+54 +15	+250 0	+400 0	+630 0	+1000 0	+1600 0	-8 -37	0 -46	+9 -63	
65	80	+605 +420	+420 +280	+605 +420	+242 +170	+285 +170	+355 +170	+146 +100	+172 +100	+215 +100	+79 +50	+96 +50	+122 +50	+44 +15	+61 +15	+290 0	+460 0	+720 0	+1150 0	+1850 0	-8 -37	0 -46	+9 -63	
80	100	+705 +480	+480 +320	+705 +480	+284 +190	+337 +190	+420 +190	+164 +100	+196 +100	+249 +100	+96 +50	+122 +50	+158 +50	+54 +15	+71 +15	+330 0	+500 0	+750 0	+1150 0	+1750 0	-8 -37	0 -46	+9 -63	

Hardness scale comparison chart

Brinell Hardness 3.000 kgf (HB)	Rockwell Hardness				Vickers Hardness 50 kgf	Store Hardness	Traverse Rupture Strength (kg/mm ²)
	"A" Scale 60 kgf (Brale)	"B" Scale 100 kgf (Vor'Brale)	"C" Scale 150 kgf (Brale)	"D" Scale 100 kgf (Brale)			
--	85.6	--	68.0	76.9	940	97	--
--	85.3	--	67.5	76.5	920	96	--
--	85.0	--	67.0	76.1	900	95	--
767	84.7	--	66.4	75.7	880	93	--
757	84.4	--	65.9	75.3	860	92	--
745	84.1	--	65.3	74.8	840	91	--
733	83.8	--	64.7	74.3	820	90	--
722	83.4	--	64.0	73.8	800	88	--
712	--	--	--	--	--	--	--
710	83.0	--	63.3	73.3	780	87	--
698	82.6	--	62.5	72.6	760	86	--
684	82.2	--	61.8	72.1	740	--	--
982	82.2	--	61.7	72.0	737	84	--
670	81.8	--	61.0	71.5	720	83	--
656	81.3	--	60.1	70.8	700	--	--
653	81.2	--	60.0	70.7	697	81	--
647	81.1	--	59.7	70.5	690	--	--
638	80.8	--	59.2	70.1	680	80	--
630	80.6	--	58.8	69.8	670	--	--
627	80.5	--	58.7	69.7	667	79	--
601	79.8	--	57.3	68.7	640	77	--
578	79.1	--	56.0	67.7	615	75	--
555	78.4	--	54.7	66.7	591	73	210
534	77.8	--	53.5	65.8	569	71	202
514	76.9	--	52.1	64.7	547	70	193
495	76.3	--	51.0	63.8	528	68	186
477	75.6	--	49.6	62.7	508	66	177
461	74.9	--	48.5	61.7	491	65	170
444	74.2	--	47.1	60.8	472	63	162
429	73.4	--	45.7	59.7	455	61	154
415	72.8	--	44.5	58.8	440	59	149
401	72.0	--	43.1	57.8	425	58	142
388	71.4	--	41.8	56.6	410	56	136
375	70.6	--	40.4	55.7	396	54	129
363	70.0	--	39.1	54.6	383	52	124
352	69.3	(100.0)	37.9	53.6	372	51	120
341	68.7	(109.0)	36.6	52.8	360	50	115
331	68.1	(108.5)	35.5	51.9	350	48	112
321	67.5	(108.0)	34.3	50.1	339	47	108
311	66.9	(107.5)	33.1	50.0	328	46	105
302	66.3	(107.0)	32.1	49.3	319	45	103
293	65.7	(106.0)	30.9	48.3	309	43	99
285	65.3	(105.5)	29.9	47.6	301	--	97
277	64.8	(104.5)	28.8	46.7	292	41	94
269	64.1	(104.0)	27.6	45.9	284	40	91
262	63.6	(103.0)	26.6	45.0	276	39	89
255	63.0	(102.0)	25.4	44.2	269	38	86
248	62.5	(101.0)	24.2	43.2	261	37	84

Brinell Hardness 3.000 kgf (HB)	Rockwell Hardness				Vickers Hardness 50 kgf	Store Hardness	Traverse Rupture Strength (kg/mm ²)
	"A" Scale 60 kgf (Brale)	"B" Scale 100 kgf (Vor'Brale)	"C" Scale 150 kgf (Brale)	"D" Scale 100 kgf (Brale)			
241	61.8	100.0	22.8	42.0	253	36	82
235	61.4	99.0	21.7	41.4	247	35	80
229	60.8	92.8	20.5	40.5	241	34	78
223	--	97.3	(18.8)	--	234	--	--
217	--	96.4	(17.5)	--	228	33	74
212	--	95.5	(16.0)	--	222	--	72
207	--	94.6	(15.2)	--	218	32	70
201	--	93.8	(13.8)	--	212	31	69
197	--	92.8	(12.7)	--	207	30	67
192	--	91.9	(11.5)	--	202	29	65
187	--	90.7	(10.0)	--	196	--	63
183	--	90.0	(9.0)	--	192	28	63
179	--	89.0	(8.0)	--	188	27	61
174	--	87.8	(6.4)	--	182	--	60
170	--	86.8	(5.4)	--	178	26	58
167	--	86.0	(4.4)	--	175	--	57
163	--	85.0	(3.3)	--	171	25	56
156	--	82.9	(0.9)	--	163	--	53
149	--	80.8	--	--	156	23	51
143	--	78.7	--	--	150	22	50
137	--	76.4	--	--	143	21	47
131	--	74.0	--	--	137	--	46
126	--	72.0	--	--	132	20	44
121	--	69.8	--	--	127	19	42
116	--	67.6	--	--	122	18	41
111	--	65.7	--	--	117	15	39

Please note:
 Figures within the () are commonly used.
 Rockwell A, C and D scales utilise a diamond brale.

Workpiece Material Nomenclature

AISI/ASTM/SAE	W-No.	DIN	JIS
1015	1.0401	C15	S15C
1015	1.1141	Ck15	S15C
1020	1.0402	C22	--
1025	1.1158	Ck25	S25C
1035	1.0501	C35	--
1035	1.1183	Cf35	S35C
1039	1.1157	40Mn4	--
1045	1.0503	C45	--
1045	1.1191	Ck45	S45C
1050	1.1213	Cf53	S50C
1055	1.0535	C55	--
1055	1.1203	Ck55	S55C
1060	1.0601	C60	--
1060	1.1221	Ck60	S58C
1070	1.1231	Ck67	--
1078:1080	1.1248	Ck75	--
1086	1.1269	Ck85	--
1095	1.1274	Ck101	SUP4
1108	1.0721	10S20	--
11L08	1.7022	10SPb20	--
1140	1.0726	35S20	--
1146	1.0727	45S20	--
1212	1.0711	9S20	SUM12
1213	1.0715	9SMn28	SUM22
1215	1.0736	9SMn36	--
12L13	1.0718	9SMnPb28	SUM22L
12L14	1.0737	9SMnPb36	--
1330	1.1170	28Mn6	SMn433
1335	1.1167	36Mn5	SMn438(H),SCMn3
1518	1.1133	20Mn5	SMn420
2515	1.5680	12Ni19	--
3135	1.5710	36NiCr6	SNC236
3415	1.5732	14NiCr10	SNC415(H)
3415:3310	1.5752	14NiCr14	SNC815(H)
3435	1.5736	36NiCr10	SNC631(H)
350-LF5	1.5622	14Ni6	--
4130	1.7218	25CrMo4	SCM420:SCM430
4135	1.7220	34CrMo4	SCM432:SCM435
4137	1.7220	34CrMo4	SCM432:SCM435
4140	1.7225	42CrMo4	SCM440(H)
4140	1.7223	41CrMo4	SCM440
4142	1.7223	41CrMo4	SCM440
4150	1.7228	50CrMo4	SCM445(H)
4340	1.6582	34CrNiMo6	SNCM447
4520	1.5423	16Mo5	--
5015	1.7015	15Cr3	SCr415(H)
5045	1.7006	46Cr2	SMn443
5115	1.7131	16MnCr5	SCr415
5120	1.7147	20MnCr5	SMnC420(H)
5130	1.7030	28Cr4	--
5132	1.7033	34Cr4	SCr430(H)
5135	1.7034	37Cr4	SCr435(H)
5140	1.7035	41Cr4	SCr440(H)
5140	1.7045	42Cr4	SCr440
5155	1.7176	55Cr3	SUP9(A)
6150	1.8159	50CrV4	SUP10
7353	1.5662	X8Ni9	--
8620	1.6523	21NiCrMo2	SNCM220(H)
8740	1.6546	40NiCrMo2 2	SNCM240
9255	1.0904	55Si7	--
9260	1.0961	60SiCr7	SUP7
9840	1.6511	36CrNiMo4	--
52 100	1.3505	100Cr6	SUJ2
A182-F11:F12	1.7335	13CrMo4 4	--
A182-F22	1.7380	10CrMo9 10	--
A2	1.2363	X100CrMoV51	SKD12
A204 Gr. 4	1.5415	15Mo3	--

AISI/ASTM/SAE	W-No.	DIN	JIS
A350 LF5	1.5622	14Ni6	--
A355 Cl. A	1.8523	39CrMoV13 9	SACM645
A355 Cl. D	1.8507	34CrAlMo5	--
A537	1.0473	19Mn6	--
D2	1.2379	X155CrVMo121	SKD11
D3	1.2080	X210Cr12	SKD1
H10	1.2365	X32CrMoV33	SKD7
H11	1.2343	X38CrMoW5 1	SKD6
H13	1.2344	X40CrMoV5 1	SKD61
H21	1.2581	X30WCrV9 3	SKD5
L2	1.2210	11SCrV3	--
L3	1.2067	100Cr6	--
L6	1.2713	55NiCrMoV6	SKH1; SKT4
M2	1.3343	S 6-5-2	SKH9; SKH51
M3	1.3342	SC6-5-2	SKH9
M35	1.3243	S 6-5-2-5	SKH55
M41	1.3246	S7-4-2-5	--
M42	1.3247	S2-10-1-8	SKH51
M7	1.3348	S 2-9-2	--
O1	1.2510	100MnCrW4	SKS3
P6	1.2735	15NiCr14	SNC22
P20	1.2330	35CrMo4	--
P40	1.1186	Ck40	S40C
S1	1.2542	45WCrV7	--
T1	1.3355	S 18-0-1	SKH2
T4	1.3255	S 18-1-2-5	SKH3
T5	1.3265	S18-1-2-10	SKH4A
T15	1.3202	S12-1-4-5	--
W1	1.1625	C80W2	SKC3;SK5;SK6
W108	1.1525	C80W1	--
W 110	1.1545	C105W1	--
W 112	1.1663	C125W	SK2
W 210	1.2833	100V1	SKS43
--	1.0722	10SPb20	--
--	1.2419	105WCr6	SKS31
--	1.2436	X210CrW12	SKD2
--	1.2601	X165CrMoV12	--
--	1.4027	G-X20Cr14	SCS2
--	1.4034	X46Cr13	--
--	1.6587	17CrNiMo6	SNCM815
--	1.7262	15CrMo5	SCM415(H)
--	1.7361	32CrMo12	--
--	1.7715	14MoV6 3	--
--	1.8509	41CrAlMo7	SACM645
15-5 PH	1.4545	--	--
17-4 PH	1.4548	--	--
301	1.4310	X12CrNi17 7	SUS301
303	1.4305	X10CrNiS18 9	SUS303
304; 304H	1.4301	X5CrNi18 10	SUS304
304L	1.4306	X2CrNi19 11	SUS340L
304LN	1.4311	X2CrNi18 10	SUS304LN
305 / 308	1.4303	X5CrNi18 12	SUS305
309	1.4828	X15CrNiSi20 12	SUH309
310S	1.4845	X12CrNi25 21	SUH310;SUH310S
316	1.4401	X5CrNiMo17 12 2	SUS316
316L	1.4435	X2CrNiMo18 14 3	SUS316L
316LN	1.4429	X2CrNiMoN17 13 3	SUS316LN
316Ti	1.4571	X6CrNiMoTi17 12 2	--
317L	1.4438	X2CrNiMo18 16 4	SUS317L
318	1.4583	X10CrNiMoNb18 12	--
321	1.4541	X6CrNiTi18 10	SUS321
321H	1.4878	X12CrNiTi18 9	SUS321
329	1.4460	X4CrNiMo27 5 2	SUS329J1

Workpiece Material Nomenclature

M	AISI/ASTM/SAE	W-No.	DIN	JIS
		347	1.4550	X6CrNiNb18 10
	348	1.4546	X5CrNiNb18 10	
	3042	1.4308	G-X6CrNi18 9	SCS13
	403	1.4000	X6Cr13	SUS403
	405	1.4724	X10CrAl13	SUS405
	409	1.4512	X5CrTi12	SUH409
	410	1.4006	X10Cr13	SUS410
	430	1.4016	X6Cr17	SUS430
	430F	1.4104	X12CrMoS17	SUS430F
	430	1.4742	X10CrAl18	SUS430
	430 Ti: XM8	1.4510	X6CrTi17	SUS430LX
	431	1.4057	X20CrNi17 2	SUS431
	434	1.4113	X6CrMo17 1	SUS434
	440C	1.4125	X105CrMo17	SUS440C
	446	1.4762	X10CrAl24	SUH446
	630	1.4542	X5CrNiCuNb17 4	
	A 128(A)	1.3401	X120Mn12	
	CA6- NM	1.4313	G-X5CrNi134	SCS5
	CA 15	1.4008	G-X8CrNi13	--
	CF 8	1.4308	G-X6CrNi189	
	CF8M	1.4408	G-X6CrNiMo18 10	--
	EV8: S 63008	1.4871	X53CrMnNiN219	SUH35,SUH36
	HK	1.4848	G-X40CrNiSi2520	--
	HNV 3	1.4718	X45CrSi93	SUH1
	HNV 6	1.4747	X80CrNiSi20	
	XM 12	1.4545	--	
	--	1.4581	G-X5CrNiMoNb18 10	SCS22
	--	1.4865	G-X40NiCrSi38 18	SCH15; SCH16
	A48-20B	0.6010	GG-10	FC 100
	A48-25B	0.6015	GG-15	FC 150
	A48-30B	0.6020	GG-20	FC 200
	A48-40B	0.6025	GG-25	FC 250
	A48-45B	0.6030	GG-30	FC 300
	A48-50B	0.6035	GG-35	FC 350
	A48-60B	0.6040	GG-40	--
	A436 Type 1	0.6655	GGL-Ni-CuCr 15 6 2	
	A436 Type 1b	0.6656	GGL-Ni-CuCr 15 6 3	
	A436 Type 2	0.6660	GGL-NiCr 20 2	
	A436 Type 2b	0.6661	GGL-NiCr 20 3	
	A436 Type 3	0.6676	GGL-NiCr 30 3	
	A436 Type 4	0.6680	GGL-NiSiCr 30 5 5	
	A439 Type D-2	0.7660	GGG-NiCr 20 2	
	A439 Type D-2B	0.7661	GGG-NiCr 20 3	
	A439 Type D-2C	0.7670	GGG-Ni 22	
	A439 Type D3	0.7676	GGG-NiCr 30 3	
	A439 Type D-3A	0.7677	GGG-NiCr 30 1	
	A439 Type D-4	0.7680	GGG-NiSiCr 30 5 5	
	A439 Type D-5	0.7683	GGG-Ni 35	
	A439 Type D-5B	0.7685	GGG-NiCr 35 3	
	A532 I A NiCr-HC	0.9625	G-X330NiCr42	
	A532 I B NiCr-LC	0.9620	G-X260NiCr42	
	A532 I D NiHiCr	0.9630	G-X300CrNiSi952	
	A532 II D 20%CrMo	0.9645	G-X260CrMoNi2021	
	A532 III A 25%Cr	0.9650	G-X260Cr27	
	A571 Type D-2M	0.7673	GGG-NiMn 23 4	
	CGI	--	GGV 45	
	60-40-18	0.7040	GGG-40	FCD 400
	65-45-12	0.7050	GGG-50	FCD 500
	80-55-06	0.7060	GGG-60	FCD 600
	100-70-03	0.7070	GGG-70	FCD 700
	120-90-02	0.7080	GGG-80	FCD 800
	32510	0.8135	GTS-35-10	FCMP 340
	40010	0.8145	GTS-45-06	FCMP 440
	50005	0.8155	GTS-55-04	FCMP 540
	70003	0.8165	GTS-65-02	FCMP 590
	90001:80002	0.8170	GTS-70-02	FCMP 690
	--	0.7043	GGG-40.3	FCD 370

N	AISI/ASTM/SAE	W-No.	DIN	JIS
		1000	3.0255	Al99.5
	2025	--	AlCu4.5MnSi	--
	3004	3.0526	AlMnMg1	--
	380.1	3.2161	AlSi8Cu3	ADC10 / AC4B
	5005A	3.3315	AlMg1	--
	6061	3.3211	AlMg1SiCu	--
	6101B	3.2305	E-AlMgSi	--
	7020	3.4335	AlZn4.5Mg1	--
	7050	3.4345	AlZnMgCu0.5	--
	7075	3.4365	AlZnMgCu1.5	--
	8011A	3.0915	AlFeSi	--
	A413.0	3.2582	GD-AlSi12	--
	A413.1	3.2583	G-AlSi12 (Cu)	ADC1 (AK12)
	A413.2	3.2581	G-AlSi12	--
	A360	3.2381	G-AlSi10Mg	AC4A (AL4V)
	A360.2	3.2383	G-AlSi10Mg (Cu); GK-AlSi10Mg(Cu)	ADC3-(AL 4)
	A356.2	3.2371	G-AlSi7Mg	AC4 CH (AL 9)
	A413	3.2581	AlSi12	
	AMPCO	2.0978	CuAl11Ni6Fe5	
	AZ81	3.5812	G-MgAl8Zn1	--
	AZ91	3.5912	G-MgAl9Zn1	--
	B-148-52	2.0975	G-CuAl10Ni	--
	B240Al41A	2.2140	G-ZnAl4	
	B283	2.0380	AlBz10Fe	
	C 18200	3.1371	G-AlCu4TiMg; CuCrZr	--
	C 23000	2.0240	CuZn15	--
	C 26000	2.0265	CuZn30	--
	C 27200: C 27700	2.0321	CuZn37	--
	C 63000	2.0966	CuAl10Ni5Fe4	--
	C 81500	2.1292	G-CuCrF35	--
	C 83600	2.1096	C-CuSn5ZnPb	--
	C 86200	2.0596	G-CuZn34Al2	--
	C 86500	2.0592	G-CuZn35Al1	--
	C 90700	2.1050	G-CuSn10	--
	C 90800	2.1052	G-CuSn12	--
	C 93200	2.1090	G-CuSn7ZnPb	--
	C 93700	2.1176	G-CuPb10Sn	--
	C 93800	2.1182	G-CuPb15Sn	--
	C 94100	2.1188	G-CuPb20Sn	--
	CuAl8Fe8	2.0932	CuAl8Fe3	CuAl8Fe11
	DHP	2.0090	SF-Cu	--
	DLP	2.0076	SW-Cu	--
	EZ33	3.5103	G-MgSE3Zn2Zr1	--
	F/B 514.0	3.3241	AlMg3Si	--
	FRHC	2.0060	E-Cu57	--
	HTB3	2.0598	G-CuZn25Al5	--
	MA 3	3.5612	MgAl6Zn1	--
	OF	2.0040	OF-Cu	--
	OFS	2.1191	Cu-Ag0.1P	--
	OFXLP	2.0070	Se-Cu	--
	QBe2	2.1247	CuBe2	--
	QE22	3.5106	G-MgAg3SE2Zr1	--
	STP	2.1203	Cu-Ag0.1	--
	ZE41	3.5105	G-MgZn4SE1Zr1	--
	ZK40	3.5161	MgZn6Zr	--
	ZAMAC	2.2140	G-ZnAl4	--
	--	2.1098	G-CuSn2ZnPb	--
	--	3.1655	AlCuSiPb	--
	--	3.1754	G-AlCu5Ni1,5	--
	--	3.2373	G-AlSi9Mg	AC4A (AL4)
	--	3.2382	GD-AlSi10Mg	--
	--	3.3315	AlMg1	--
	--	3.3561	G-AlMg5	--

Workpiece Material Nomenclature

	AISI/ASTM/SAE	W-No.	DIN	JIS	Trade name
S	330	1.4864	X12NiCrSi3616	--	
	5391A	2.4670	G-NiCr13Al6MoNb	--	Nimocast 713
	5536E	2.4665	NiCr22Fe18Mo	--	Hastelloy X
	5660C	2.4662	NiFe35Cr14MoTi	--	Incoloy 901
	687	2.4636	NiCo15Cr15MoAlTi	--	Udimet 700
	AMS 5399	2.4973	NiCr19Co11MoTi	--	Rene 41
	N 04400	2.4360	NiCu30Fe	--	Monel 400
	N 05500	2.4375	NiCu30Al	--	Monel K500
	N 06075	2.4630	NiCr20Ti	--	Nimonic 75
	N 06600	2.4816	NiCr15Fe	NCF600	Inconel 600
	N 06601	2.4851	NiCr23Fe	--	Inconel 601
	N 06625	2.4856	NiCr22Mo9Nb	--	Inconel 625
	N 07263	2.4650	NiCr20Co19MoTi	--	Nimonic 263
	N 07718	2.4668	NiCr19FeNbMo	--	Inconel 718
	N 07750	2.4669	NiCr15Fe7TiAl	--	Inconel X-750
	N 08800	1.4876	X10NiCrAlTi3320	NCF 800	B 163
	N 08825	2.4858	NiCr21Mo	NCF825	Incoloy 825
	N 08330	1.4864	X12NiCrSi36 16	SUH330	
	NC 20 N13	2.4375	NiCu30Al	--	
	R30605	2.4964	CoCr20W15Ni	--	Haynes Alloy 25
	R 50250	3.7025	Ti1	--	
	R 52250	3.7225	Ti1Pd	--	
	R 52400	3.7235	Ti2Pd	--	
	R 5420	--	--	--	
	R 54560	--	--	--	
	R 54620	--	--	--	
	R 54810	--	--	--	
	R 56320	--	--	--	
	R 56400	3.7165	TiAl6V4	--	
	SB164	2.4360	NiCu30Fe		
	--	1.3912	Ni36	--	Invar
	--	1.3964	X2CrNiMnMoNb21	--	Nitronic 50
	--	2.4602	NiCr17Mo17FeW	--	Hastelloy C
	--	2.4631	NiCr20TiAl	--	Nimonic 80 / 80A
	--	2.4634	NiCo20Cr15MoAlTi	--	Nimonic 105
	--	2.4654	NiCr20Co14MoTi	--	Waspaloy
	--	2.4674	NiCo15Cr10MoAlTi	--	IN-100
	--	2.4674	NiCo15Cr10MoAlTi	--	Nimocast PK24
	--	2.4676	NiCo10W10Cr9AlTi	--	MAR-M 246
	--	2.4916	NiCr19Co11MoTi	--	M-252
	--	2.4983	NiCr18Co18MoAlTi	--	Udimet 500
	--	3.7124	TiCu2	--	
	--	--	NiCo28Cr15MoAlTi	--	Inconel 700
	--	--	--	--	Stellite 21
	--	--	--	--	Stellite 27
	--	--	--	--	Stellite 30
	H	300M	--	--	--
Cl. I, Type B		0.9620	G-X260NiCr4 2	--	
Cl. I, Type A		0.9625	G-X330NiCr4 2	--	
Cl. I, Type D		0.9630	G-X300NiCrSi9 5 2	--	
Cl. II, Type C		0.9635	G-X300CrMo15 3	--	
--		0.9640	G-X300CrMoNi15 2 1	--	
Cl. II, Type D		0.9645	G-X260CrMoNi20 2 1	--	
Cl. III, Type A		0.9650	G-X260Cr27	--	
Cl. III, Type A		0.9655	G-X300CrMo27 1	--	
--		3.7185	TiAlMo4Sn2	--	

Coolant formulas

Pressure:

$$1 \text{ [bar]} = 14.5 \text{ Pounds per Square Inch [PSI]}$$

Gallons:

$$1 \text{ [Liter]} = 0.254 \text{ [Gallons]}$$

Calculation of pressure:

$$\text{PSI} = \frac{(\text{Horsepower of pump} \times 1,460)}{\text{Gallons per minute [GPM]}}$$

Feed and speed formulas

$$\text{Inches per minute [IPM]} = \text{Inches per revolution [IPR]} \times \text{Revolutions per minute [RPM]}$$

$$\text{Revolutions per minute [RPM]} = \frac{\text{Surface feet per min. [SFM]}}{(\text{diameter} \times 0.262) \text{ [In.]}}$$

$$\text{Inches per rev. [IPR]} = \frac{(\text{Drill-}\phi \times \text{inches per min. [IPM]} \times 3.1416)}{(\text{Surface feet per minute [SFM]} \times 12)}$$

$$\text{Inches per revolution [IPR]} = \frac{\text{Inches per min. [IPM]}}{\text{Revolutions per minute [RPM]}}$$

$$\text{Surface feet per min. [SFM]} = 0.26 \times \text{Revolutions per min. [RPM]} \times \text{Drill-}\phi \text{ [In.]}$$

$$\text{Drilling time [min.]} = \frac{\text{Travel [In.]}}{(\text{Revolutions per minute [RPM]} \times \text{Inches per revolution [IPR]})}$$

Formulas to calculate drill sizes

Drill size on cut taps:

$$\text{Tap drill size} = \text{Major } \phi \text{ of top [mm]} - \frac{0.1299 \times \text{percent of full thread}}{\text{Number of threads per Inch}}$$

$$\text{Tap drill size} = \text{Basic major diameter [mm]} - \frac{\text{percent of thread} \times \text{pitch [mm]}}{76.98}$$

Drill size on forming taps:

$$\begin{aligned} \text{Max. drill size} &= \text{Basic major diameter} - (3/8N) \\ \text{Min. drill size} &= \text{Basic major diameter} - (1/2N) \\ N &= \text{numbers of threads per Inch} \end{aligned}$$

or

$$\begin{aligned} \text{Max. drill size} &= \text{Basic major diameter} - 0.375 P \\ \text{Min. drill size} &= \text{Basic major diameter} - 0.5 P \\ P &= \text{pitch} \end{aligned}$$

Other useful conversion formulas

$$\text{Inch} = \frac{\text{Millimeters}}{25.4} \quad \text{Millimeters} = \text{Inch} \times 25.4$$

$$\text{KW} = \frac{\text{Horsepower}}{1.341022}$$

$$\text{kn} = \text{lbs} \times 225$$

$$\text{Nm} = \frac{\text{ft.} \cdot \text{lbs.}}{0.7375621}$$

$$\text{Meters per minute} = \frac{\text{Surface feet per minute}}{3.28} \quad \text{Surface feet per minute} = \text{Meters per minute} \times 3.28$$

$$\text{Millimeters per revolution} = \text{Inches per revolution} \times 25.4$$

A Range of MAPAL's Competence

Reaming and Fine Boring

From the wide range of single and twin-bladed reamers with guide pads, together with fine boring tools with guide pads and WP or HX blades, to the HPR High Performance Reamers combined with the MAPAL HFS® Head Fitting System for exact concentricity and accurate changeover – to give you a general view of our complete knowledge and experience in precision machining bores.

PCD Tools

For pre-machining and finish machining, MAPAL also offers an extensive programme of precision tools with fixed PCD (polycrystalline diamond) blades. This includes precision gun boring tools plus circular and end milling tools. The programme of face milling heads from the PowerMill and EcoMill series is characterised by simple, sturdy design and rapid, accurate blade setting.

ISO Tools

This aspect of MAPAL competence is made up of special tools with ISO elements for gun boring and milling. This includes precision ground blades in the widest variety of cutting materials and coatings. The use of MAPAL's tried and tested adjustment system ensures that the blades are accurately matched to the task. MAPAL offers particular knowledge and experience in tangential technology.

Generating Slide Tools

Generating slide tools offer a high potential for rationalisation and optimisation on special machines and machining centres. In addition to the conventional facing heads, MAPAL also supplies EAT and LAT performance-enhanced actuating systems for generating slide tools. MAPAL TOOLTRONIC® tools with their extraordinary range of functions are the latest development.

Drilling

Yet another area is the product programme for drilling. MAPAL offers the right tool concept for every task, whether for machining aluminium, steel or cast iron, hard machining or dry machining or for use in HSC areas. Specially developed coatings and PCD blades complete the broad-based drilling programme.

Clamping

MAPAL's modern clamping systems, in conjunction with MAPAL's tried and tested reaming and fine boring tools, guarantee maximum productivity and economy. Whether HSK, ISO or HFS®, these high-precision connections and interfaces provide the concentricity and changeover accuracy essential to modern production.

Customer Services

Project planning, maintenance, management and optimisation – the complete CTS® service package from MAPAL will accompany you from process design to permanent process optimisation and will ensure optimum and cost-saving use of your tools with the best possible results.

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