

A close-up photograph of a Gühring micro-precision drill bit. The drill bit is long and thin, with a double-flute design, and is positioned vertically, ready to drill into a dark metal workpiece. The workpiece has several pre-drilled holes of varying sizes. The background is blurred, showing the industrial environment of a machine tool.

GÜHRING

***ExclusiveLine micro-
precision drill XL***

30xD deep hole drilling to the highest standard



ExclusiveLine
micro-precision drill XL

30xD deep hole drilling to the highest standard

The tool that raises the bar

The internally cooled twist drill from the Gühring ExclusiveLine is designed for deep hole drilling from a diameter of 1.0 mm.

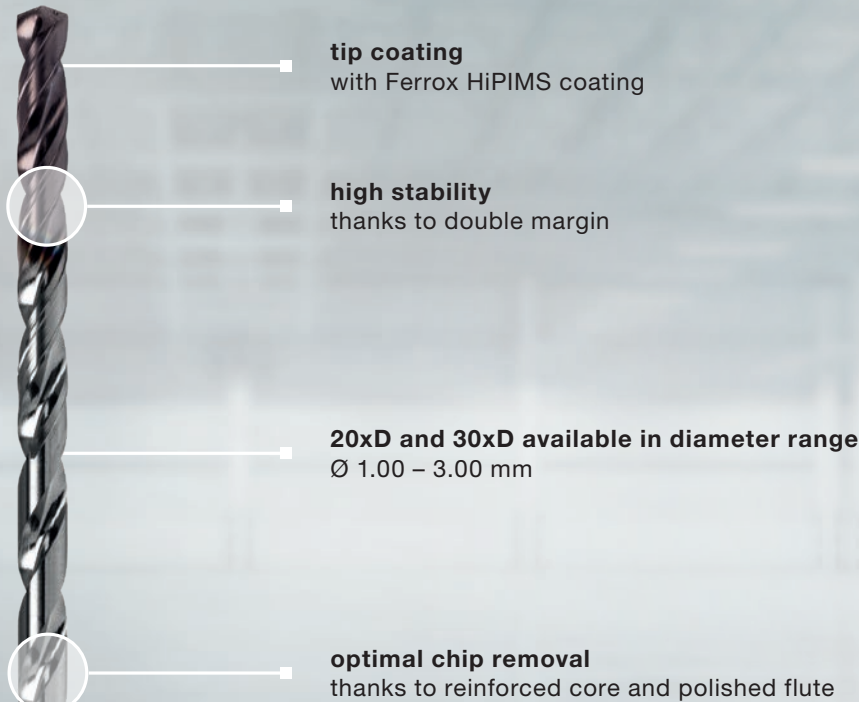
It has been specially developed for universal applications with drilling depths up to 30xD in long-chipping and short-chipping materials. The tool's geometry is designed for reliable chip removal. We have achieved this thanks to an optimised point and flute profile geometry, double margin and a polished flute.

The HiPIMS FerroX tip coating with an extra smooth surface reduces friction and supports consistently high performance for universal use.

The integrated internal cooling ensures effective heat dissipation at the cutting edge and contributes to process reliability and tool life stability.

- X **Tool life** increased by up to 40 %
- X **Maximum process reliability** thanks to short chips

- X** drilling up to 30xD with standard tools available from stock
- X** significantly shorter machining times
- X** universal application in almost all long- and short-chipping materials



Application example

Component:	Manifold block / food industry, high-grade steel 1.4301, drilling depth: 42.5 mm	
Tool:	#6494, Ø 1.5 mm, 30xD	
Customer target:	Process reliability & increased tool life	
Difficulty:	Poor chip removal, low tool lives & uncontrolled breakages	
Cutting data:	Gühring	Competitor
	v_c 55 m/min	v_c 45 m/min
	n 11,671 U/min	n 9,549 U/min
	vf 350 mm/min	vf 229 mm/min
Tool life:	2,800 holes, approx. 120 m	2,000 holes, approx. 85 m

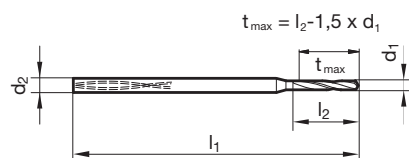


Cutting data page 6



facet point grind • main cutting edge form straight • with main cutting edge preparation

P	M	K	N	S	H
●	●	●	○	○	



$$t_{\max} = l_2 - 1,5 \times d_1$$

Article no.

6493

Article no.

6493

d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.0	59.0	23.0
1.050	3.0	59.0	24.2
1.100	3.0	59.0	25.3
1.150	3.0	63.0	26.5
1.190	3.0	63.0	27.4
1.200	3.0	63.0	27.6
1.250	3.0	63.0	28.8
1.300	3.0	68.0	29.9
1.350	3.0	68.0	31.1
1.400	4.0	70.0	32.2
1.450	4.0	70.0	33.4
1.500	4.0	70.0	34.5
1.550	4.0	70.0	35.7
1.590	4.0	70.0	36.6
1.600	4.0	70.0	36.8
1.650	4.0	70.0	38.0
1.700	4.0	79.0	39.4
1.750	4.0	79.0	40.3
1.800	4.0	79.0	41.4
1.850	4.0	79.0	42.6
1.900	4.0	79.0	43.7
1.950	4.0	79.0	44.9
1.980	4.0	79.0	45.6
2.000	4.0	79.0	46.0

Order no.
6493 1.000
6493 1.050
6493 1.100
6493 1.150
6493 1.190
6493 1.200
6493 1.250
6493 1.300
6493 1.350
6493 1.400
6493 1.450
6493 1.500
6493 1.550
6493 1.590
6493 1.600
6493 1.650
6493 1.700
6493 1.750
6493 1.800
6493 1.850
6493 1.900
6493 1.950
6493 1.980
6493 2.000

d1 mm	d2 h6 mm	l1 mm	l2 mm
2.050	4.0	79.0	47.2
2.100	4.0	91.0	48.3
2.150	4.0	91.0	49.5
2.200	4.0	91.0	50.6
2.250	4.0	91.0	51.8
2.300	4.0	91.0	52.9
2.320	4.0	91.0	54.1
2.350	4.0	91.0	54.1
2.380	4.0	91.0	54.8
2.400	4.0	91.0	55.2
2.450	4.0	91.0	56.4
2.500	4.0	91.0	57.5
2.550	4.0	91.0	58.7
2.600	4.0	102.0	59.8
2.650	4.0	102.0	61.0
2.700	4.0	102.0	62.1
2.750	4.0	102.0	63.3
2.780	4.0	102.0	64.0
2.800	4.0	102.0	64.4
2.850	4.0	102.0	65.6
2.900	4.0	102.0	66.7
2.950	4.0	102.0	67.9
3.000	4.0	102.0	69.0

Order no.
6493 2.050
6493 2.100
6493 2.150
6493 2.200
6493 2.250
6493 2.300
6493 2.320
6493 2.350
6493 2.380
6493 2.400
6493 2.450
6493 2.500
6493 2.550
6493 2.600
6493 2.650
6493 2.700
6493 2.750
6493 2.780
6493 2.800
6493 2.850
6493 2.900
6493 2.950
6493 3.000



ExclusiveLine micro-precision drills XL with coolant ducts

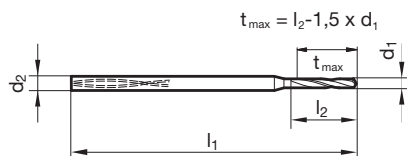
Article no. **6494**

Cutting data page 7



facet point grind • main cutting edge form straight • with main cutting edge preparation

P	M	K	N	S	H
●	●	●	○	○	



$$t_{\max} = l_2 - 1,5 \times d_1$$

Article no.

6494

Article no.

6494

d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.0	70.0	33.0
1.050	3.0	70.0	34.7
1.100	3.0	70.0	36.3
1.150	3.0	76.0	38.0
1.190	3.0	76.0	39.3
1.200	3.0	76.0	39.6
1.250	3.0	76.0	41.3
1.300	3.0	76.0	42.9
1.350	3.0	83.0	44.6
1.400	4.0	86.0	46.2
1.450	4.0	86.0	47.9
1.500	4.0	86.0	49.5
1.550	4.0	86.0	51.2
1.590	4.0	86.0	52.5
1.600	4.0	86.0	52.8
1.650	4.0	86.0	54.5
1.700	4.0	99.0	56.1
1.750	4.0	99.0	57.8
1.800	4.0	99.0	59.4
1.850	4.0	99.0	61.1
1.900	4.0	99.0	62.7
1.950	4.0	99.0	64.4
1.980	4.0	99.0	65.4
2.000	4.0	99.0	66.0

Order no.
6494 1.000
6494 1.050
6494 1.100
6494 1.150
6494 1.190
6494 1.200
6494 1.250
6494 1.300
6494 1.350
6494 1.400
6494 1.450
6494 1.500
6494 1.550
6494 1.590
6494 1.600
6494 1.650
6494 1.700
6494 1.750
6494 1.800
6494 1.850
6494 1.900
6494 1.950
6494 1.980
6494 2.000

d1 mm	d2 h6 mm	l1 mm	l2 mm
2.050	4.0	99.0	67.7
2.100	4.0	116.0	69.3
2.150	4.0	116.0	71.0
2.200	4.0	116.0	72.6
2.250	4.0	116.0	74.3
2.300	4.0	116.0	75.9
2.320	4.0	116.0	76.6
2.350	4.0	116.0	77.6
2.380	4.0	116.0	78.6
2.400	4.0	116.0	79.2
2.450	4.0	116.0	80.9
2.500	4.0	116.0	82.5
2.550	4.0	116.0	84.2
2.600	4.0	132.0	85.8
2.650	4.0	132.0	87.5
2.700	4.0	132.0	89.1
2.750	4.0	132.0	90.8
2.780	4.0	132.0	91.8
2.800	4.0	132.0	92.4
2.850	4.0	132.0	94.1
2.900	4.0	132.0	95.7
2.950	4.0	132.0	97.4
3.000	4.0	132.0	99.0

Order no.
6494 2.050
6494 2.100
6494 2.150
6494 2.200
6494 2.250
6494 2.300
6494 2.320
6494 2.350
6494 2.380
6494 2.400
6494 2.450
6494 2.500
6494 2.550
6494 2.600
6494 2.650
6494 2.700
6494 2.750
6494 2.780
6494 2.800
6494 2.850
6494 2.900
6494 2.950
6494 3.000



ExclusiveLine micro-precision drills XL with coolant ducts, 20xD



Machining group		f (mm/rev) with nom. Ø							
	v _c (m/min)	1	1.2	1.5	1.8	2	2.2	2.5	3
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	0.0450	0.0540	0.0675	0.0810	0.0900	0.0990	0.1125	0.1350
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.0405	0.0485	0.0610	0.0730	0.0810	0.0890	0.1015	0.1215
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.0405	0.0485	0.0610	0.0730	0.0810	0.0890	0.1015	0.1215
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.0385	0.0460	0.0575	0.0690	0.0765	0.0840	0.0955	0.1145
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.0385	0.0460	0.0575	0.0690	0.0765	0.0840	0.0955	0.1145
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.0360	0.0430	0.0540	0.0650	0.0720	0.0790	0.0900	0.1080
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.0340	0.0405	0.0505	0.0610	0.0675	0.0745	0.0845	0.1015
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.0350	0.0420	0.0525	0.0630	0.0700	0.0770	0.0875	0.1050
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.0350	0.0420	0.0525	0.0630	0.0700	0.0770	0.0875	0.1050
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.0300	0.0355	0.0445	0.0535	0.0595	0.0655	0.0745	0.0895
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.0265	0.0315	0.0395	0.0475	0.0525	0.0580	0.0655	0.0790
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.0250	0.0300	0.0375	0.0450	0.0500	0.0550	0.0625	0.0750
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.0215	0.0255	0.0320	0.0385	0.0425	0.0470	0.0530	0.0640
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	80	0.0200	0.0240	0.0300	0.0360	0.0400	0.0440	0.0500	0.0600
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	70	0.0180	0.0215	0.0270	0.0325	0.0360	0.0395	0.0450	0.0540
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	70	0.0170	0.0205	0.0255	0.0305	0.0340	0.0375	0.0425	0.0510
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	80	0.0200	0.0240	0.0300	0.0360	0.0400	0.0440	0.0500	0.0600
M2.2.1 Duplex steel, high-strength stainless steels	70	0.0170	0.0205	0.0255	0.0305	0.0340	0.0375	0.0425	0.0510
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	140	0.0600	0.0720	0.0900	0.1080	0.1200	0.1320	0.1500	0.1800
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	120	0.0510	0.0610	0.0765	0.0920	0.1020	0.1120	0.1275	0.1530
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	120	0.0510	0.0610	0.0765	0.0920	0.1020	0.1120	0.1275	0.1530
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	110	0.0480	0.0575	0.0720	0.0865	0.0960	0.1055	0.1200	0.1440
K1.3.1 Malleable cast iron, ferritic, 130 HB	110	0.0480	0.0575	0.0720	0.0865	0.0960	0.1055	0.1200	0.1440
K1.3.2 Malleable cast iron, pearlitic, 230 HB	100	0.0420	0.0505	0.0630	0.0755	0.0840	0.0925	0.1050	0.1260
K2.1.1 Vermicular graphite cast iron (GJV)									
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)									
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	135	0.0600	0.0720	0.0900	0.1080	0.1200	0.1320	0.1500	0.1800
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	135	0.0600	0.0720	0.0900	0.1080	0.1200	0.1320	0.1500	0.1800
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	135	0.0800	0.0960	0.1200	0.1440	0.1600	0.1760	0.2000	0.2400
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	135	0.0800	0.0960	0.1200	0.1440	0.1600	0.1760	0.2000	0.2400
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	115	0.0680	0.0815	0.1020	0.1225	0.1360	0.1495	0.1700	0.2040
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.0350	0.0420	0.0525	0.0630	0.0700	0.0770	0.0875	0.1050
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.0300	0.0355	0.0445	0.0535	0.0595	0.0655	0.0745	0.0895
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.0280	0.0335	0.0420	0.0505	0.0560	0.0615	0.0700	0.0840
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics									
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.									
N4.1.3 Non-metallic materials: Graphite									
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB	40	0.0150	0.0180	0.0225	0.0270	0.0300	0.0330	0.0375	0.0450
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.0120	0.0145	0.0180	0.0215	0.0240	0.0265	0.0300	0.0360
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.0150	0.0180	0.0225	0.0270	0.0300	0.0330	0.0375	0.0450
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.0105	0.0125	0.0160	0.0190	0.0210	0.0230	0.0260	0.0315
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.0105	0.0125	0.0160	0.0190	0.0210	0.0230	0.0260	0.0315
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	35	0.0120	0.0145	0.0180	0.0215	0.0240	0.0265	0.0300	0.0360
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	25	0.0095	0.0115	0.0145	0.0175	0.0190	0.0210	0.0240	0.0290
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC									
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC									
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC									
H2.1.1 Chilled cast iron, 400 HB									
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC									



ExclusiveLine micro-precision drills XL with coolant ducts, 30xD



Machining group		f (mm/rev) with nom. Ø				
	v _c (m/min)	0.5	1	2	2.5	3
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	0.0340	0.0505	0.0675	0.0845	0.1015
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.0305	0.0455	0.0610	0.0760	0.0910
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.0305	0.0455	0.0610	0.0760	0.0910
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.0285	0.0430	0.0575	0.0715	0.0860
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.0285	0.0430	0.0575	0.0715	0.0860
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.0270	0.0405	0.0540	0.0675	0.0810
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.0255	0.0380	0.0505	0.0635	0.0760
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.0265	0.0395	0.0525	0.0655	0.0790
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.0265	0.0395	0.0525	0.0655	0.0790
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.0225	0.0335	0.0445	0.0560	0.0670
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.0195	0.0295	0.0395	0.0490	0.0590
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.0190	0.0280	0.0375	0.0470	0.0565
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.0160	0.0240	0.0320	0.0400	0.0480
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	55	0.0150	0.0225	0.0300	0.0375	0.0450
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	50	0.0135	0.0205	0.0270	0.0340	0.0405
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	45	0.0130	0.0190	0.0255	0.0320	0.0385
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	55	0.0150	0.0225	0.0300	0.0375	0.0450
M2.2.1 Duplex steel, high-strength stainless steels	45	0.0130	0.0190	0.0255	0.0320	0.0385
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	140	0.0450	0.0675	0.0900	0.1125	0.1350
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	120	0.0385	0.0575	0.0765	0.0955	0.1145
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	120	0.0385	0.0575	0.0765	0.0955	0.1145
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	120	0.0385	0.0575	0.0765	0.0955	0.1145
K1.3.1 Malleable cast iron, ferritic, 130 HB	110	0.0360	0.0540	0.0720	0.0900	0.1080
K1.3.2 Malleable cast iron, pearlitic, 230 HB	110	0.0360	0.0540	0.0720	0.0900	0.1080
K2.1.1 Vermicular graphite cast iron (GJV)						
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)						
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	135	0.0450	0.0675	0.0900	0.1125	0.1350
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	135	0.0450	0.0675	0.0900	0.1125	0.1350
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	135	0.0600	0.0900	0.1200	0.1500	0.1800
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	135	0.0600	0.0900	0.1200	0.1500	0.1800
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	115	0.0510	0.0765	0.1020	0.1275	0.1530
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.0265	0.0395	0.0525	0.0655	0.0790
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.0225	0.0335	0.0445	0.0560	0.0670
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.0210	0.0315	0.0420	0.0525	0.0630
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics						
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.						
N4.1.3 Non-metallic materials: Graphite						
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB	40	0.0115	0.0170	0.0225	0.0280	0.0340
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.0090	0.0135	0.0180	0.0225	0.0270
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.0115	0.0170	0.0225	0.0280	0.0340
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.0080	0.0120	0.0160	0.0195	0.0235
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.0080	0.0120	0.0160	0.0195	0.0235
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	35	0.0090	0.0135	0.0180	0.0225	0.0270
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	25	0.0070	0.0110	0.0145	0.0180	0.0215
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC						
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC						
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC						
H2.1.1 Chilled cast iron, 400 HB						
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC						



ExclusiveLine micro-precision drill XL

201 712/25036-IX-23 | Printed in Germany | 2025

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