

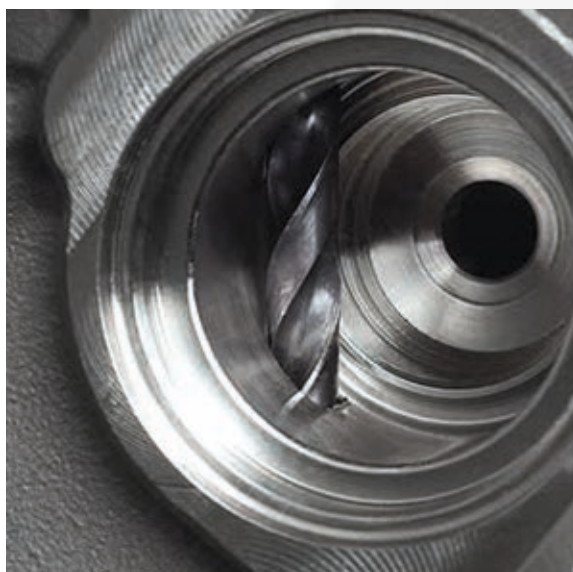


HARTNER

Precision Cutting Tools

TS-DRILLS

SOLID CARBIDE HIGH-PERFORMANCE DRILLS



ISO code

P	Steel, high-alloyed steel
M	Stainless steel
K	Grey cast iron, spher. graphite iron and malleable cast iron
N	Aluminium and other non-ferrous metals
S	Special, super and titanium alloys
H	Hardened steel and chilled cast iron

Pictograms

Tool material	VHM Solid carbide											
Surface	 AITiN	 AITiN nano	 bright	 FIRE	 TiAlN	 TiAlSiN	 TiAlSiN-XP					
Type	N	TS 100 ALU	TS 100 H	TS 100 INOX	TS 100 R	TS 100 T	TS 100 U	TS 150 GG	TS 100 HPC			
Machining depth	3xD	4xD	5xD	7xD	8xD	10xD	12xD	15xD	20xD	25xD	30xD	40xD
Standard	DIN 6537K to DIN	DIN 6537L	 to Hartner Standard									
Point angle	 120°	 130°	 135°	 140°	 180°							
Tolerance on Ø	h7	m7										
Cutting direction	 right											
Shank form	 HA to DIN 6535	 HE	 HB	 Cyl cylindrical								
Web thinning												
Internal coolant	 with IC	 without IC										





TS 100 U

steel and high-alloyed steel,
universal application

TS 3 HPC

high performance steel machining,
universal application

TS 100 HPC

high performance steel machining with
increased cutting values and maximum tool life

TS 180 U

universal application

P	M	K	N	S	H
●	●	●	○	○	○

TS 100 U | TS 100 HPC



TS 100 INOX

stainless, acid and heat-resistant steels,
Titanium and titanium alloys, special alloys

P	M	K	N	S	H
○	●	○	○	○	○

TS 100 INOX



TS 100 R | TS 150 GG

grey, malleable and spheroidal cast iron, CGI/ADI/CDI

P	M	K	N	S	H
○	○	●	○	○	○

TS 100 R | TS 150 GG



TS 100 ALU | TS 150 GG

aluminium, copper, brass and bronze alloys, plastics

P	M	K	N	S	H
○	○	○	●	○	○

TS 100 ALU | TS 150 GG



TS 100 H

alloyed and un alloyed high-tensile steels,
hardened steels, special and titanium alloys

P	M	K	N	S	H
●	○	○	○	●	○

TS 100 H



SOLID CARBIDE MICRO-PRECISION DRILLS

general steel machining up to $\sim 1200 \text{ N/mm}^2$,
universal application

P	M	K	N	S	H
●	●	●	○	○	○

Solid carbide
micro-precision drills



TS 100 T

general steel machining up to $\sim 1200 \text{ N/mm}^2$,
universal application



TS 100 T ALU

aluminium, copper, brass, plastics

P	M	K	N	S	H
●	●	●	○	○	○

TS 100 T

APPLICATION RECOMMENDATIONS

Application
recommendations

P	M	K	N	S	H	Standard	Internal cooling	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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TS 100 U

	•	○	•	○	○	DIN 6537K	without IC	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89413	12
	•	○	•	○	○	DIN 6537K	without IC	Solid carbide		right-hand	HE	3xD	3.000 - 20.000	89402	12
	•	○	•	○	○	DIN 6537K	without IC	Solid carbide		right-hand	HB	3xD	3.000 - 20.000	89430	14
	•	○	•	○	○	DIN 6537L	without IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89414	16
	•	○	•	○	○	DIN 6537L	without IC	Solid carbide		right-hand	HE	5xD	3.000 - 20.000	89417	16
	•	○	•	○	○	DIN 6537L	without IC	Solid carbide		right-hand	HB	5xD	3.000 - 20.000	89431	18
	•	○	•	○	○	DIN 6537K	with IC	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89410	20
	•	○	•	○	○	DIN 6537K	with IC	Solid carbide		right-hand	HE	3xD	3.000 - 20.000	89415	20
	•	○	•	○	○	DIN 6537K	with IC	Solid carbide		right-hand	HB	3xD	3.000 - 20.000	89428	22
	•	○	•	○	○	DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89411	24
	•	○	•	○	○	DIN 6537L	with IC	Solid carbide		right-hand	HE	5xD	3.000 - 20.000	89408	24
	•	○	•	○	○	DIN 6537L	with IC	Solid carbide		right-hand	HB	5xD	3.000 - 20.000	89429	26
	•	○	•	○	○	Company std.	with IC	Solid carbide		right-hand	HA	7xD	3.000 - 20.000	89412	28
	•	○	•	○	○	Company std.	with IC	Solid carbide		right-hand	HE	7xD	3.000 - 20.000	89416	28

P	M	K	N	S	H	Standard	Internal cooling	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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•	○	•	○	○	○	Company std.	with IC	Solid carbide		right-hand	HA	12xD	3.000 - 20.000	89418	30
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TS 180 U



•	•	•	○	○	○	Company std.	with IC	Solid carbide		right-hand	~HA	~3xD	3.000 - 20.000	89519	32
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•	•	•	○	○	○	Company std.	with IC	Solid carbide		right-hand	HA	3xD	4.000 - 20.000	89533	34
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•	•	•	○	○	○	Company std.	with IC	Solid carbide		right-hand	HA	5xD	4.000 - 20.000	89534	36
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TS 100 HPC



•	○	○	○	○	○	DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89460	40
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•	○	○	○	○	○	Company std.	with IC	Solid carbide		right-hand	HA	7xD	3.000 - 20.000	89461	42
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TS 3 HPC



•	○	•	○	○	○	DIN 6537K	with IC	Solid carbide		right-hand	HA	3xD	4.000 - 20.000	89527	44
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•	○	•	○	○	○	DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	4.000 - 20.000	89526	46
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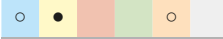
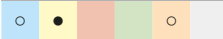
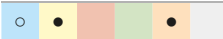
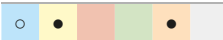
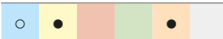
NC spotting drills



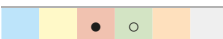
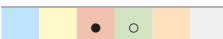
•	•	•	○	•	○	Company std.	without IC	Solid carbide		right-hand	HA/HB		1.000 - 20.000	89203	48
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P	M	K	N	S	H	Standard	Internal cooling	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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TS 100 INOX | TS 100 INOX HPC

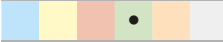
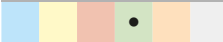
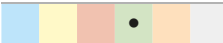
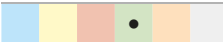
		DIN 6537K	with IC	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89450	52
		DIN 6537K	with IC	Solid carbide		right-hand	HE	3xD	3.000 - 20.000	89550	52
		DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89451	54
		DIN 6537L	with IC	Solid carbide		right-hand	HE	5xD	3.000 - 20.000	89551	54
		DIN 6537K	with IC	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89552	56
		DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89553	58
		Company std.	with IC	Solid carbide		right-hand	HA	7xD	3.000 - 20.000	89554	60

TS 100 R | TS 150 GG

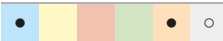
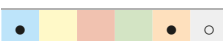
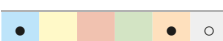
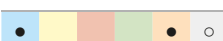
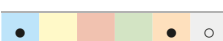
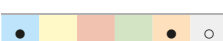
		DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89420	66
		Company std.	with IC	Solid carbide		right-hand	HA	7xD	4.000 - 20.000	89421	68
		Company std.	with IC	Solid carbide		right-hand	HA	4xD	3.000 - 19.000	89292	70
		Company std.	with IC	Solid carbide		right-hand	HA	7xD	3.000 - 20.000	89294	71
		Company std.	with IC	Solid carbide		right-hand	HA	10xD	3.000 - 20.000	89293	72

P	M	K	N	S	H	Standard	Internal cooling	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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TS 100 ALU | TS 150 GG

		DIN 6537K	with IC	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89561	78
		DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89560	80
		Company std.	with IC	Solid carbide		right-hand	HA	7xD	3.000 - 20.000	89562	82
		Company std.	with IC	Solid carbide		right-hand	HA	12xD	3.000 - 16.000	89563	84
		Company std.	with IC	Solid carbide		right-hand	HA	10xD	3.000 - 20.000	89295	86

TS 100 H

		DIN 6537K	ohne IK	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89422	90
		DIN 6537K	with IC	Solid carbide		right-hand	HA	3xD	3.000 - 20.000	89423	92
		DIN 6537K	with IC	Solid carbide		right-hand	HE	3xD	3.000 - 20.000	89424	92
		DIN 6537L	with IC	Solid carbide		right-hand	HA	5xD	3.000 - 20.000	89425	94
		DIN 6537L	with IC	Solid carbide		right-hand	HE	5xD	3.000 - 20.000	89426	94
		Company std.	with IC	Solid carbide		right-hand	HA	7xD	3.000 - 16.000	89427	96

P	M	K	N	S	H	Standard	Internal cooling	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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Micro-precision drills

	•	○	•	○	○	○	Company std.	ohne IK	Solid carbide	○	right-hand	zyl.	~5xD	0.200 - 1.300	89281	100
	•	○	•	○	○	○	Company std.	ohne IK	Solid carbide	ⓐ	right-hand	zyl.	GL38	0.100 - 3.000	86402	101
	•	•	•	○	○	○	Company std.	ohne IK	Solid carbide	ⓐ	right-hand	zyl.	4xD	0.500 - 3.000	86400	102
	•	•	•	○	○	○	Company std.	ohne IK	Solid carbide	ⓐ	right-hand	zyl.	7xD	0.500 - 3.000	86401	103
	•	•	•	○	○	○	Company std.	with IC	Solid carbide	ⓐ	right-hand	zyl.	5xD	1.000 - 3.000	86405	104
	•	•	•	○	○	○	Company std.	with IC	Solid carbide	ⓐ	right-hand	zyl.	8xD	1.000 - 3.000	86408	105
	•	•	•	○	○	○	Company std.	with IC	Solid carbide	ⓐ	right-hand	zyl.	15xD	1.000 - 3.000	86412	106
	•	•	•	○	○	○	Company std.	with IC	Solid carbide	ⓐ	right-hand	~HA	20xD	1.000 - 3.000	86410	107
	○	•	○	•	○	○	Company std.	ohne IK	Solid carbide	ⓧ	right-hand	zyl.	3xD	0.500 - 3.000	86403	108
	○	•	○	•	○	○	Company std.	with IC	Solid carbide	ⓧ	right-hand	zyl.	3xD	1.000 - 3.000	86404	109
	○	•	○	•	○	○	Company std.	with IC	Solid carbide	ⓧ	right-hand	zyl.	6xD	1.000 - 3.000	86406	110
	○	•	○	•	○	○	Company std.	with IC	Solid carbide	ⓧ	right-hand	zyl.	10xD	1.000 - 3.000	86407	111
	○	•	○	•	○	○	Company std.	with IC	Solid carbide	ⓧ	right-hand	zyl.	15xD	1.000 - 3.000	86409	112

P	M	K	N	S	H	Standard	Internal cooling	Tool material	Surface	Cutting direction	Shank form	Drilling depth	d1/mm	Article no.	Progr. page
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TS 100 T

	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	15xD	3.000 - 16.000	86509	116
	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	20xD	3.000 - 16.000	86511	117
	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	25xD	3.000 - 16.000	86512	118
	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	30xD	3.000 - 14.000	86513	119
	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	40xD	3.000 - 10.000	86514	120

TS 100 T ALU

	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	15xD	3.000 - 14.000	89564	121
	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	20xD	3.000 - 14.000	89565	123
	• • • • •	Company std.	with IC	Solid carbide		right-hand	HA	25xD	3.000 - 14.000	89566	125

TS 100 U

STEEL AND HIGH-ALLOYED STEEL

- ▼ universal application

ADVANTAGES AND CHARACTERISTICS

- ▼ maximum cutting values and **exceptional machining results** in long- and short-chipping steels with tensile strengths of up to approx. 1200 N/mm², carbon steels, bronze, cast iron and high-alloyed AlSi alloys
- ▼ **precisely aligned boreholes** with small diameter tolerances and excellent surface finishes
- ▼ **precise centring and short chips** thanks to optimised cutting geometry with two facets and special web thinning





TS-Drills without internal coolant

Article no. 89413



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys

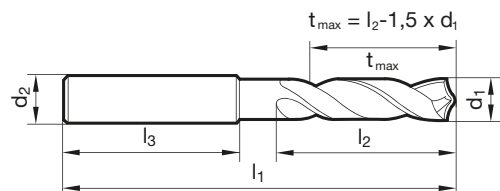
Article no. 89402



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	4.760	3/16	6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	4.800		6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	4.900		6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	5.000		6.00	66.00	28.000	36.000
3.250		6.00	62.00	20.000	36.000	5.100		6.00	66.00	28.000	36.000
3.300		6.00	62.00	20.000	36.000	5.160	13/64	6.00	66.00	28.000	36.000
3.400		6.00	62.00	20.000	36.000	5.200		6.00	66.00	28.000	36.000
3.500		6.00	62.00	20.000	36.000	5.300		6.00	66.00	28.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	5.400		6.00	66.00	28.000	36.000
3.600		6.00	62.00	20.000	36.000	5.500		6.00	66.00	28.000	36.000
3.700		6.00	62.00	20.000	36.000	5.550		6.00	66.00	28.000	36.000
3.800		6.00	66.00	24.000	36.000	5.560	7/32	6.00	66.00	28.000	36.000
3.900		6.00	66.00	24.000	36.000	5.600		6.00	66.00	28.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	5.700		6.00	66.00	28.000	36.000
4.000		6.00	66.00	24.000	36.000	5.800		6.00	66.00	28.000	36.000
4.100		6.00	66.00	24.000	36.000	5.900		6.00	66.00	28.000	36.000
4.200		6.00	66.00	24.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
4.300		6.00	66.00	24.000	36.000	6.000		6.00	66.00	28.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	6.100		8.00	79.00	34.000	36.000
4.400		6.00	66.00	24.000	36.000	6.200		8.00	79.00	34.000	36.000
4.500		6.00	66.00	24.000	36.000	6.300		8.00	79.00	34.000	36.000
4.600		6.00	66.00	24.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
4.650		6.00	66.00	24.000	36.000	6.400		8.00	79.00	34.000	36.000
4.700		6.00	66.00	24.000	36.000	6.500		8.00	79.00	34.000	36.000

TS-Drills without internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	79.00	34.000	36.000	11.400		12.00	102.00	55.000	45.000
6.700		8.00	79.00	34.000	36.000	11.500		12.00	102.00	55.000	45.000
6.750	17/64	8.00	79.00	34.000	36.000	11.600		12.00	102.00	55.000	45.000
6.800		8.00	79.00	34.000	36.000	11.700		12.00	102.00	55.000	45.000
6.900		8.00	79.00	34.000	36.000	11.800		12.00	102.00	55.000	45.000
7.000		8.00	79.00	34.000	36.000	11.900		12.00	102.00	55.000	45.000
7.100		8.00	79.00	41.000	36.000	11.910	15/32	12.00	102.00	55.000	45.000
7.140	9/32	8.00	79.00	41.000	36.000	12.000		12.00	102.00	55.000	45.000
7.200		8.00	79.00	41.000	36.000	12.100		14.00	107.00	60.000	45.000
7.300		8.00	79.00	41.000	36.000	12.200		14.00	107.00	60.000	45.000
7.400		8.00	79.00	41.000	36.000	12.300	31/64	14.00	107.00	60.000	45.000
7.500		8.00	79.00	41.000	36.000	12.400		14.00	107.00	60.000	45.000
7.540	19/64	8.00	79.00	41.000	36.000	12.500		14.00	107.00	60.000	45.000
7.600		8.00	79.00	41.000	36.000	12.600		14.00	107.00	60.000	45.000
7.700		8.00	79.00	41.000	36.000	12.700	1/2	14.00	107.00	60.000	45.000
7.800		8.00	79.00	41.000	36.000	12.800		14.00	107.00	60.000	45.000
7.900		8.00	79.00	41.000	36.000	12.900		14.00	107.00	60.000	45.000
7.940	5/16	8.00	79.00	41.000	36.000	13.000		14.00	107.00	60.000	45.000
8.000		8.00	79.00	41.000	36.000	13.100	33/64	14.00	107.00	60.000	45.000
8.100		10.00	89.00	47.000	40.000	13.200		14.00	107.00	60.000	45.000
8.200		10.00	89.00	47.000	40.000	13.300		14.00	107.00	60.000	45.000
8.300		10.00	89.00	47.000	40.000	13.500		14.00	107.00	60.000	45.000
8.330	21/64	10.00	89.00	47.000	40.000	13.600		14.00	107.00	60.000	45.000
8.400		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
8.500		10.00	89.00	47.000	40.000	13.800		14.00	107.00	60.000	45.000
8.600		10.00	89.00	47.000	40.000	13.900		14.00	107.00	60.000	45.000
8.700		10.00	89.00	47.000	40.000	14.000		14.00	107.00	60.000	45.000
8.730	11/32	10.00	89.00	47.000	40.000	14.100		16.00	115.00	65.000	48.000
8.800		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
8.900		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
9.000		10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
9.100		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
9.130	23/64	10.00	89.00	47.000	40.000	14.700		16.00	115.00	65.000	48.000
9.200		10.00	89.00	47.000	40.000	14.900		16.00	115.00	65.000	48.000
9.250		10.00	89.00	47.000	40.000	15.000		16.00	115.00	65.000	48.000
9.300		10.00	89.00	47.000	40.000	15.100		16.00	115.00	65.000	48.000
9.400		10.00	89.00	47.000	40.000	15.200		16.00	115.00	65.000	48.000
9.500		10.00	89.00	47.000	40.000	15.300		16.00	115.00	65.000	48.000
9.520	3/8	10.00	89.00	47.000	40.000	15.500		16.00	115.00	65.000	48.000
9.600		10.00	89.00	47.000	40.000	15.700		16.00	115.00	65.000	48.000
9.700		10.00	89.00	47.000	40.000	15.800		16.00	115.00	65.000	48.000
9.800		10.00	89.00	47.000	40.000	16.000		16.00	115.00	65.000	48.000
9.900		10.00	89.00	47.000	40.000	16.200		18.00	123.00	73.000	48.000
9.920	25/64	10.00	89.00	47.000	40.000	16.500		18.00	123.00	73.000	48.000
10.000		10.00	89.00	47.000	40.000	17.000		18.00	123.00	73.000	48.000
10.100		12.00	102.00	55.000	45.000	17.500		18.00	123.00	73.000	48.000
10.200		12.00	102.00	55.000	45.000	18.000		18.00	123.00	73.000	48.000
10.300		12.00	102.00	55.000	45.000	18.500		20.00	131.00	79.000	50.000
10.320	13/32	12.00	102.00	55.000	45.000	19.000		20.00	131.00	79.000	50.000
10.400		12.00	102.00	55.000	45.000	19.500		20.00	131.00	79.000	50.000
10.500		12.00	102.00	55.000	45.000	20.000		20.00	131.00	79.000	50.000
10.600		12.00	102.00	55.000	45.000						
10.700		12.00	102.00	55.000	45.000						
10.800		12.00	102.00	55.000	45.000						
10.900		12.00	102.00	55.000	45.000						
11.000		12.00	102.00	55.000	45.000						
11.100		12.00	102.00	55.000	45.000						
11.110	7/16	12.00	102.00	55.000	45.000						
11.200		12.00	102.00	55.000	45.000						
11.300		12.00	102.00	55.000	45.000						

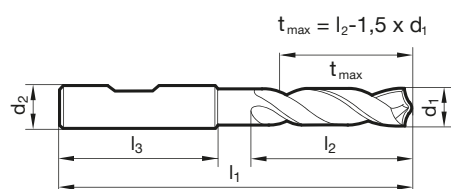


TS-Drills without internal coolant

Article no. 89430



P	M	K	N	S	H
●	○	●	○	○	○

web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometrystructural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AISi alloys

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	5.800		6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	5.900		6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	6.000		6.00	66.00	28.000	36.000
3.250		6.00	62.00	20.000	36.000	6.100		8.00	79.00	34.000	36.000
3.300		6.00	62.00	20.000	36.000	6.200		8.00	79.00	34.000	36.000
3.400		6.00	62.00	20.000	36.000	6.300		8.00	79.00	34.000	36.000
3.500		6.00	62.00	20.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	6.400		8.00	79.00	34.000	36.000
3.600		6.00	62.00	20.000	36.000	6.500		8.00	79.00	34.000	36.000
3.700		6.00	62.00	20.000	36.000	6.530		8.00	79.00	34.000	36.000
3.800		6.00	66.00	24.000	36.000	6.600		8.00	79.00	34.000	36.000
3.900		6.00	66.00	24.000	36.000	6.700		8.00	79.00	34.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	6.750	17/64	8.00	79.00	34.000	36.000
4.000		6.00	66.00	24.000	36.000	6.800		8.00	79.00	34.000	36.000
4.040		6.00	66.00	24.000	36.000	6.900		8.00	79.00	34.000	36.000
4.100		6.00	66.00	24.000	36.000	7.000		8.00	79.00	34.000	36.000
4.200		6.00	66.00	24.000	36.000	7.100		8.00	79.00	41.000	36.000
4.300		6.00	66.00	24.000	36.000	7.140	9/32	8.00	79.00	41.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	7.200		8.00	79.00	41.000	36.000
4.400		6.00	66.00	24.000	36.000	7.300		8.00	79.00	41.000	36.000
4.500		6.00	66.00	24.000	36.000	7.400		8.00	79.00	41.000	36.000
4.600		6.00	66.00	24.000	36.000	7.500		8.00	79.00	41.000	36.000
4.650		6.00	66.00	24.000	36.000	7.540	19/64	8.00	79.00	41.000	36.000
4.700		6.00	66.00	24.000	36.000	7.600		8.00	79.00	41.000	36.000
4.760	3/16	6.00	66.00	28.000	36.000	7.700		8.00	79.00	41.000	36.000
4.800		6.00	66.00	28.000	36.000	7.800		8.00	79.00	41.000	36.000
4.900		6.00	66.00	28.000	36.000	7.900		8.00	79.00	41.000	36.000
5.000		6.00	66.00	28.000	36.000	7.940	5/16	8.00	79.00	41.000	36.000
5.100		6.00	66.00	28.000	36.000	8.000		8.00	79.00	41.000	36.000
5.110		6.00	66.00	28.000	36.000	8.100		10.00	89.00	47.000	40.000
5.160	13/64	6.00	66.00	28.000	36.000	8.200		10.00	89.00	47.000	40.000
5.200		6.00	66.00	28.000	36.000	8.300		10.00	89.00	47.000	40.000
5.250		6.00	66.00	28.000	36.000	8.330	21/64	10.00	89.00	47.000	40.000
5.300		6.00	66.00	28.000	36.000	8.400		10.00	89.00	47.000	40.000
5.400		6.00	66.00	28.000	36.000	8.500		10.00	89.00	47.000	40.000
5.410		6.00	66.00	28.000	36.000	8.600		10.00	89.00	47.000	40.000
5.500		6.00	66.00	28.000	36.000	8.700		10.00	89.00	47.000	40.000
5.550		6.00	66.00	28.000	36.000	8.730	11/32	10.00	89.00	47.000	40.000
5.560	7/32	6.00	66.00	28.000	36.000	8.800		10.00	89.00	47.000	40.000
5.600		6.00	66.00	28.000	36.000	8.900		10.00	89.00	47.000	40.000
5.700		6.00	66.00	28.000	36.000	9.000		10.00	89.00	47.000	40.000

TS-Drills without internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.100	23/64	10.00	89.00	47.000	40.000	13.490	17/32	14.00	107.00	60.000	45.000
9.130		10.00	89.00	47.000	40.000	13.500	35/64	14.00	107.00	60.000	45.000
9.200		10.00	89.00	47.000	40.000	13.600		14.00	107.00	60.000	45.000
9.250		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
9.300	3/8	10.00	89.00	47.000	40.000	13.800	9/16	14.00	107.00	60.000	45.000
9.340		10.00	89.00	47.000	40.000	13.890		14.00	107.00	60.000	45.000
9.400		10.00	89.00	47.000	40.000	13.900		14.00	107.00	60.000	45.000
9.500		10.00	89.00	47.000	40.000	14.000		14.00	107.00	60.000	45.000
9.520	25/64	10.00	89.00	47.000	40.000	14.100	37/64	16.00	115.00	65.000	48.000
9.600		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
9.700		10.00	89.00	47.000	40.000	14.290		16.00	115.00	65.000	48.000
9.800		10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
9.900	13/32	10.00	89.00	47.000	40.000	14.400	19/32	16.00	115.00	65.000	48.000
9.920		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
10.000		10.00	89.00	47.000	40.000	14.600		16.00	115.00	65.000	48.000
10.100		12.00	102.00	55.000	45.000	14.680		16.00	115.00	65.000	48.000
10.200	27/64	12.00	102.00	55.000	45.000	14.700	39/64	16.00	115.00	65.000	48.000
10.300		12.00	102.00	55.000	45.000	14.800		16.00	115.00	65.000	48.000
10.320		12.00	102.00	55.000	45.000	14.900		16.00	115.00	65.000	48.000
10.400		12.00	102.00	55.000	45.000	15.000		16.00	115.00	65.000	48.000
10.500	7/16	12.00	102.00	55.000	45.000	15.080	5/8	16.00	115.00	65.000	48.000
10.600		12.00	102.00	55.000	45.000	15.100		16.00	115.00	65.000	48.000
10.700		12.00	102.00	55.000	45.000	15.200		16.00	115.00	65.000	48.000
10.720		12.00	102.00	55.000	45.000	15.300		16.00	115.00	65.000	48.000
10.800	29/64	12.00	102.00	55.000	45.000	15.400	21/32	16.00	115.00	65.000	48.000
10.900		12.00	102.00	55.000	45.000	15.480		16.00	115.00	65.000	48.000
11.000		12.00	102.00	55.000	45.000	15.500		16.00	115.00	65.000	48.000
11.100		12.00	102.00	55.000	45.000	15.600	43/64	16.00	115.00	65.000	48.000
11.110	15/32	12.00	102.00	55.000	45.000	15.700		16.00	115.00	65.000	48.000
11.200		12.00	102.00	55.000	45.000	15.800		16.00	115.00	65.000	48.000
11.300		12.00	102.00	55.000	45.000	15.870		16.00	115.00	65.000	48.000
11.400	31/64	12.00	102.00	55.000	45.000	15.900	45/64	16.00	115.00	65.000	48.000
11.500		12.00	102.00	55.000	45.000	16.000		16.00	115.00	65.000	48.000
11.510		12.00	102.00	55.000	45.000	16.270		18.00	123.00	73.000	48.000
11.600		12.00	102.00	55.000	45.000	16.500		18.00	123.00	73.000	48.000
11.700	1/2	12.00	102.00	55.000	45.000	16.670	25/32	18.00	123.00	73.000	48.000
11.800		12.00	102.00	55.000	45.000	17.000		18.00	123.00	73.000	48.000
11.900		12.00	102.00	55.000	45.000	17.070		18.00	123.00	73.000	48.000
11.910		12.00	102.00	55.000	45.000	17.460		18.00	123.00	73.000	48.000
12.000	33/64	12.00	102.00	55.000	45.000	17.500		18.00	123.00	73.000	48.000
12.100		14.00	107.00	60.000	45.000	17.860		18.00	123.00	73.000	48.000
12.200		14.00	107.00	60.000	45.000	18.000		18.00	123.00	73.000	48.000
12.300		14.00	107.00	60.000	45.000	18.260		20.00	131.00	79.000	50.000
12.400		14.00	107.00	60.000	45.000	18.500	3/4	20.00	131.00	79.000	50.000
12.500		14.00	107.00	60.000	45.000	19.000		20.00	131.00	79.000	50.000
12.600		14.00	107.00	60.000	45.000	19.050		20.00	131.00	79.000	50.000
12.700		14.00	107.00	60.000	45.000	19.250		20.00	131.00	79.000	50.000
12.800		14.00	107.00	60.000	45.000	19.446		20.00	131.00	79.000	50.000
12.900		14.00	107.00	60.000	45.000	19.500		20.00	131.00	79.000	50.000
13.000		14.00	107.00	60.000	45.000	19.840		20.00	131.00	79.000	50.000
13.100		14.00	107.00	60.000	45.000	20.000		20.00	131.00	79.000	50.000
13.200		14.00	107.00	60.000	45.000						
13.300		14.00	107.00	60.000	45.000						
13.400		14.00	107.00	60.000	45.000						



TS-Drills without internal coolant

Article no. 89414



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys

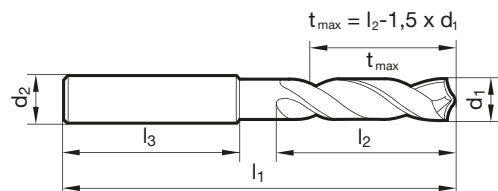
Article no. 89417



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	4.760	3/16	6.00	82.00	44.000	36.000
3.100		6.00	66.00	28.000	36.000	4.800		6.00	82.00	44.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	4.900		6.00	82.00	44.000	36.000
3.200		6.00	66.00	28.000	36.000	5.000		6.00	82.00	44.000	36.000
3.250		6.00	66.00	28.000	36.000	5.100		6.00	82.00	44.000	36.000
3.300		6.00	66.00	28.000	36.000	5.160	13/64	6.00	82.00	44.000	36.000
3.400		6.00	66.00	28.000	36.000	5.200		6.00	82.00	44.000	36.000
3.500		6.00	66.00	28.000	36.000	5.300		6.00	82.00	44.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	5.400		6.00	82.00	44.000	36.000
3.600		6.00	66.00	28.000	36.000	5.500		6.00	82.00	44.000	36.000
3.700		6.00	66.00	28.000	36.000	5.550		6.00	82.00	44.000	36.000
3.800		6.00	74.00	36.000	36.000	5.560	7/32	6.00	82.00	44.000	36.000
3.900		6.00	74.00	36.000	36.000	5.600		6.00	82.00	44.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	5.700		6.00	82.00	44.000	36.000
4.000		6.00	74.00	36.000	36.000	5.800		6.00	82.00	44.000	36.000
4.100		6.00	74.00	36.000	36.000	5.900		6.00	82.00	44.000	36.000
4.200		6.00	74.00	36.000	36.000	5.950	15/64	6.00	82.00	44.000	36.000
4.300		6.00	74.00	36.000	36.000	6.000		6.00	82.00	44.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	6.100		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	6.200		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	6.300		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	6.400		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	6.500		8.00	91.00	53.000	36.000

TS-Drills without internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	91.00	53.000	36.000	10.900		12.00	118.00	71.000	45.000
6.700		8.00	91.00	53.000	36.000	11.000		12.00	118.00	71.000	45.000
6.750	17/64	8.00	91.00	53.000	36.000	11.100		12.00	118.00	71.000	45.000
6.800		8.00	91.00	53.000	36.000	11.110	7/16	12.00	118.00	71.000	45.000
6.900		8.00	91.00	53.000	36.000	11.200		12.00	118.00	71.000	45.000
7.000		8.00	91.00	53.000	36.000	11.300		12.00	118.00	71.000	45.000
7.100		8.00	91.00	53.000	36.000	11.400		12.00	118.00	71.000	45.000
7.140	9/32	8.00	91.00	53.000	36.000	11.500		12.00	118.00	71.000	45.000
7.200		8.00	91.00	53.000	36.000	11.600		12.00	118.00	71.000	45.000
7.300		8.00	91.00	53.000	36.000	11.700		12.00	118.00	71.000	45.000
7.400		8.00	91.00	53.000	36.000	11.800		12.00	118.00	71.000	45.000
7.500		8.00	91.00	53.000	36.000	11.900		12.00	118.00	71.000	45.000
7.540	19/64	8.00	91.00	53.000	36.000	11.910	15/32	12.00	118.00	71.000	45.000
7.600		8.00	91.00	53.000	36.000	12.000		12.00	118.00	71.000	45.000
7.700		8.00	91.00	53.000	36.000	12.100		14.00	124.00	77.000	45.000
7.800		8.00	91.00	53.000	36.000	12.200		14.00	124.00	77.000	45.000
7.900		8.00	91.00	53.000	36.000	12.500		14.00	124.00	77.000	45.000
7.940	5/16	8.00	91.00	53.000	36.000	12.700	1/2	14.00	124.00	77.000	45.000
8.000		8.00	91.00	53.000	36.000	13.000		14.00	124.00	77.000	45.000
8.100		10.00	103.00	61.000	40.000	13.100	33/64	14.00	124.00	77.000	45.000
8.200		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
8.300		10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
8.330	21/64	10.00	103.00	61.000	40.000	13.800		14.00	124.00	77.000	45.000
8.400		10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
8.500		10.00	103.00	61.000	40.000	14.100		16.00	133.00	83.000	48.000
8.600		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
8.700		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
8.730	11/32	10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
8.800		10.00	103.00	61.000	40.000	14.700		16.00	133.00	83.000	48.000
8.900		10.00	103.00	61.000	40.000	15.000		16.00	133.00	83.000	48.000
9.000		10.00	103.00	61.000	40.000	15.100		16.00	133.00	83.000	48.000
9.100		10.00	103.00	61.000	40.000	15.200		16.00	133.00	83.000	48.000
9.130	23/64	10.00	103.00	61.000	40.000	15.500		16.00	133.00	83.000	48.000
9.200		10.00	103.00	61.000	40.000	15.700		16.00	133.00	83.000	48.000
9.250		10.00	103.00	61.000	40.000	16.000		16.00	133.00	83.000	48.000
9.300		10.00	103.00	61.000	40.000	16.500		18.00	143.00	93.000	48.000
9.400		10.00	103.00	61.000	40.000	17.000		18.00	143.00	93.000	48.000
9.500		10.00	103.00	61.000	40.000	17.500		18.00	143.00	93.000	48.000
9.520	3/8	10.00	103.00	61.000	40.000	18.000		18.00	143.00	93.000	48.000
9.600		10.00	103.00	61.000	40.000	18.500		20.00	153.00	101.000	50.000
9.700		10.00	103.00	61.000	40.000	19.000		20.00	153.00	101.000	50.000
9.800		10.00	103.00	61.000	40.000	19.500		20.00	153.00	101.000	50.000
9.900		10.00	103.00	61.000	40.000	20.000		20.00	153.00	101.000	50.000
9.920	25/64	10.00	103.00	61.000	40.000						
10.000		10.00	103.00	61.000	40.000						
10.100		12.00	118.00	71.000	45.000						
10.200		12.00	118.00	71.000	45.000						
10.300		12.00	118.00	71.000	45.000						
10.320	13/32	12.00	118.00	71.000	45.000						
10.400		12.00	118.00	71.000	45.000						
10.500		12.00	118.00	71.000	45.000						
10.600		12.00	118.00	71.000	45.000						
10.700		12.00	118.00	71.000	45.000						
10.800		12.00	118.00	71.000	45.000						

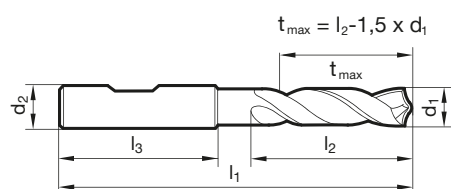


TS-Drills without internal coolant

Article no. 89431



P	M	K	N	S	H
●	○	●	○	○	○

web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometrystructural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AISi alloys

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	6.100		8.00	91.00	53.000	36.000
3.100		6.00	66.00	28.000	36.000	6.200		8.00	91.00	53.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	6.300		8.00	91.00	53.000	36.000
3.200		6.00	66.00	28.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
3.250		6.00	66.00	28.000	36.000	6.400		8.00	91.00	53.000	36.000
3.300		6.00	66.00	28.000	36.000	6.500		8.00	91.00	53.000	36.000
3.400		6.00	66.00	28.000	36.000	6.600		8.00	91.00	53.000	36.000
3.500		6.00	66.00	28.000	36.000	6.700		8.00	91.00	53.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	6.750	17/64	8.00	91.00	53.000	36.000
3.600		6.00	66.00	28.000	36.000	6.800		8.00	91.00	53.000	36.000
3.700		6.00	66.00	28.000	36.000	6.900		8.00	91.00	53.000	36.000
3.800		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
3.900		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.000		6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.600		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.700		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.800		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.900		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
4.900		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.000		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.100		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.160	13/64	6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.200		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.900		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	9.000		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	9.100		10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	9.130	23/64	10.00	103.00	61.000	40.000
5.900		6.00	82.00	44.000	36.000	9.200		10.00	103.00	61.000	40.000
5.950	15/64	6.00	82.00	44.000	36.000	9.250		10.00	103.00	61.000	40.000
6.000		6.00	82.00	44.000	36.000	9.300		10.00	103.00	61.000	40.000

TS-Drills without internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.400		10.00	103.00	61.000	40.000	11.910	15/32	12.00	118.00	71.000	45.000
9.500		10.00	103.00	61.000	40.000	12.000		12.00	118.00	71.000	45.000
9.520	3/8	10.00	103.00	61.000	40.000	12.200		14.00	124.00	77.000	45.000
9.600		10.00	103.00	61.000	40.000	12.500	1/2	14.00	124.00	77.000	45.000
9.700		10.00	103.00	61.000	40.000	12.700		14.00	124.00	77.000	45.000
9.800		10.00	103.00	61.000	40.000	13.000		14.00	124.00	77.000	45.000
9.900		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
9.920	25/64	10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
10.000		10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
10.100		12.00	118.00	71.000	45.000	14.200	9/16	16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	14.290		16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	14.500		16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	14.700		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	15.000		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	15.200		16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
10.800		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
10.900		12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.000		12.00	118.00	71.000	45.000	17.000		18.00	143.00	93.000	48.000
11.100		12.00	118.00	71.000	45.000	17.500		18.00	143.00	93.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	18.000		18.00	143.00	93.000	48.000
11.200		12.00	118.00	71.000	45.000	18.500		20.00	153.00	101.000	50.000
11.300		12.00	118.00	71.000	45.000	19.000		20.00	153.00	101.000	50.000
11.400		12.00	118.00	71.000	45.000	19.500		20.00	153.00	101.000	50.000
11.500		12.00	118.00	71.000	45.000	20.000		20.00	153.00	101.000	50.000
11.600		12.00	118.00	71.000	45.000						
11.700		12.00	118.00	71.000	45.000						
11.800		12.00	118.00	71.000	45.000						
11.900		12.00	118.00	71.000	45.000						



TS-Drills with internal coolant

Article no. 89410



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys

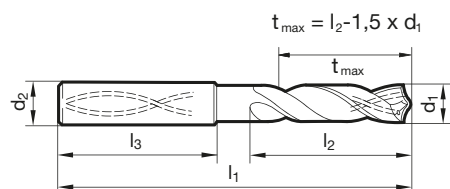
Article no. 89415



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	4.760	3/16	6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	4.800		6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	4.900		6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	5.000		6.00	66.00	28.000	36.000
3.250		6.00	62.00	20.000	36.000	5.100		6.00	66.00	28.000	36.000
3.300		6.00	62.00	20.000	36.000	5.160	13/64	6.00	66.00	28.000	36.000
3.400		6.00	62.00	20.000	36.000	5.200		6.00	66.00	28.000	36.000
3.500		6.00	62.00	20.000	36.000	5.300		6.00	66.00	28.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	5.400		6.00	66.00	28.000	36.000
3.600		6.00	62.00	20.000	36.000	5.500		6.00	66.00	28.000	36.000
3.700		6.00	62.00	20.000	36.000	5.550		6.00	66.00	28.000	36.000
3.800		6.00	66.00	24.000	36.000	5.560	7/32	6.00	66.00	28.000	36.000
3.900		6.00	66.00	24.000	36.000	5.600		6.00	66.00	28.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	5.700		6.00	66.00	28.000	36.000
4.000		6.00	66.00	24.000	36.000	5.800		6.00	66.00	28.000	36.000
4.100		6.00	66.00	24.000	36.000	5.900		6.00	66.00	28.000	36.000
4.200		6.00	66.00	24.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
4.300		6.00	66.00	24.000	36.000	6.000		6.00	66.00	28.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	6.100		8.00	79.00	34.000	36.000
4.400		6.00	66.00	24.000	36.000	6.200		8.00	79.00	34.000	36.000
4.500		6.00	66.00	24.000	36.000	6.300		8.00	79.00	34.000	36.000
4.600		6.00	66.00	24.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
4.650		6.00	66.00	24.000	36.000	6.400		8.00	79.00	34.000	36.000
4.700		6.00	66.00	24.000	36.000	6.500		8.00	79.00	34.000	36.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	79.00	34.000	36.000	10.900		12.00	102.00	55.000	45.000
6.700		8.00	79.00	34.000	36.000	11.000		12.00	102.00	55.000	45.000
6.750	17/64	8.00	79.00	34.000	36.000	11.100		12.00	102.00	55.000	45.000
6.800		8.00	79.00	34.000	36.000	11.110	7/16	12.00	102.00	55.000	45.000
6.900		8.00	79.00	34.000	36.000	11.200		12.00	102.00	55.000	45.000
7.000		8.00	79.00	34.000	36.000	11.300		12.00	102.00	55.000	45.000
7.100		8.00	79.00	41.000	36.000	11.400		12.00	102.00	55.000	45.000
7.140	9/32	8.00	79.00	41.000	36.000	11.500		12.00	102.00	55.000	45.000
7.200		8.00	79.00	41.000	36.000	11.600		12.00	102.00	55.000	45.000
7.300		8.00	79.00	41.000	36.000	11.700		12.00	102.00	55.000	45.000
7.400		8.00	79.00	41.000	36.000	11.800		12.00	102.00	55.000	45.000
7.500		8.00	79.00	41.000	36.000	11.900		12.00	102.00	55.000	45.000
7.540	19/64	8.00	79.00	41.000	36.000	11.910	15/32	12.00	102.00	55.000	45.000
7.600		8.00	79.00	41.000	36.000	12.000		12.00	102.00	55.000	45.000
7.700		8.00	79.00	41.000	36.000	12.100		14.00	107.00	60.000	45.000
7.800		8.00	79.00	41.000	36.000	12.200		14.00	107.00	60.000	45.000
7.900		8.00	79.00	41.000	36.000	12.300	31/64	14.00	107.00	60.000	45.000
7.940	5/16	8.00	79.00	41.000	36.000	12.500		14.00	107.00	60.000	45.000
8.000		8.00	79.00	41.000	36.000	12.700	1/2	14.00	107.00	60.000	45.000
8.100		10.00	89.00	47.000	40.000	13.000		14.00	107.00	60.000	45.000
8.200		10.00	89.00	47.000	40.000	13.100	33/64	14.00	107.00	60.000	45.000
8.300		10.00	89.00	47.000	40.000	13.200		14.00	107.00	60.000	45.000
8.330	21/64	10.00	89.00	47.000	40.000	13.300		14.00	107.00	60.000	45.000
8.400		10.00	89.00	47.000	40.000	13.500		14.00	107.00	60.000	45.000
8.500		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
8.600		10.00	89.00	47.000	40.000	14.000		14.00	107.00	60.000	45.000
8.700		10.00	89.00	47.000	40.000	14.100		16.00	115.00	65.000	48.000
8.730	11/32	10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
8.800		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
8.900		10.00	89.00	47.000	40.000	14.400		16.00	115.00	65.000	48.000
9.000		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
9.100		10.00	89.00	47.000	40.000	14.600		16.00	115.00	65.000	48.000
9.130	23/64	10.00	89.00	47.000	40.000	14.700		16.00	115.00	65.000	48.000
9.200		10.00	89.00	47.000	40.000	15.000		16.00	115.00	65.000	48.000
9.250		10.00	89.00	47.000	40.000	15.200		16.00	115.00	65.000	48.000
9.300		10.00	89.00	47.000	40.000	15.500		16.00	115.00	65.000	48.000
9.400		10.00	89.00	47.000	40.000	15.700		16.00	115.00	65.000	48.000
9.500		10.00	89.00	47.000	40.000	16.000		16.00	115.00	65.000	48.000
9.520	3/8	10.00	89.00	47.000	40.000	16.100		18.00	123.00	73.000	48.000
9.600		10.00	89.00	47.000	40.000	16.500		18.00	123.00	73.000	48.000
9.700		10.00	89.00	47.000	40.000	16.900		18.00	123.00	73.000	48.000
9.800		10.00	89.00	47.000	40.000	17.000		18.00	123.00	73.000	48.000
9.900		10.00	89.00	47.000	40.000	17.300		18.00	123.00	73.000	48.000
9.920	25/64	10.00	89.00	47.000	40.000	17.500		18.00	123.00	73.000	48.000
10.000		10.00	89.00	47.000	40.000	17.700		18.00	123.00	73.000	48.000
10.100		12.00	102.00	55.000	45.000	18.000		18.00	123.00	73.000	48.000
10.200		12.00	102.00	55.000	45.000	18.500		20.00	131.00	79.000	50.000
10.300		12.00	102.00	55.000	45.000	18.900		20.00	131.00	79.000	50.000
10.320	13/32	12.00	102.00	55.000	45.000	19.000		20.00	131.00	79.000	50.000
10.400		12.00	102.00	55.000	45.000	19.500		20.00	131.00	79.000	50.000
10.500		12.00	102.00	55.000	45.000	20.000		20.00	131.00	79.000	50.000
10.600		12.00	102.00	55.000	45.000						
10.700		12.00	102.00	55.000	45.000						
10.800		12.00	102.00	55.000	45.000						

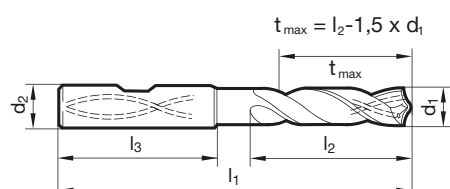


TS-Drills with internal coolant

Article no. 89428



P	M	K	N	S	H
●	○	●	○	○	○

web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometrystructural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AISi alloys

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	5.700		6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	5.750		6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	5.800		6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	5.900		6.00	66.00	28.000	36.000
3.250		6.00	62.00	20.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
3.300		6.00	62.00	20.000	36.000	6.000		6.00	66.00	28.000	36.000
3.400		6.00	62.00	20.000	36.000	6.100		8.00	79.00	34.000	36.000
3.500		6.00	62.00	20.000	36.000	6.200		8.00	79.00	34.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	6.300		8.00	79.00	34.000	36.000
3.600		6.00	62.00	20.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
3.700		6.00	62.00	20.000	36.000	6.400		8.00	79.00	34.000	36.000
3.800		6.00	66.00	24.000	36.000	6.500		8.00	79.00	34.000	36.000
3.900		6.00	66.00	24.000	36.000	6.530		8.00	79.00	34.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	6.600		8.00	79.00	34.000	36.000
4.000		6.00	66.00	24.000	36.000	6.700		8.00	79.00	34.000	36.000
4.040		6.00	66.00	24.000	36.000	6.750	17/64	8.00	79.00	34.000	36.000
4.100		6.00	66.00	24.000	36.000	6.800		8.00	79.00	34.000	36.000
4.200		6.00	66.00	24.000	36.000	6.900		8.00	79.00	34.000	36.000
4.300		6.00	66.00	24.000	36.000	7.000		8.00	79.00	34.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	7.100		8.00	79.00	41.000	36.000
4.400		6.00	66.00	24.000	36.000	7.140	9/32	8.00	79.00	41.000	36.000
4.500		6.00	66.00	24.000	36.000	7.200		8.00	79.00	41.000	36.000
4.600		6.00	66.00	24.000	36.000	7.300		8.00	79.00	41.000	36.000
4.650		6.00	66.00	24.000	36.000	7.400		8.00	79.00	41.000	36.000
4.700		6.00	66.00	24.000	36.000	7.450		8.00	79.00	41.000	36.000
4.760	3/16	6.00	66.00	28.000	36.000	7.500		8.00	79.00	41.000	36.000
4.800		6.00	66.00	28.000	36.000	7.540	19/64	8.00	79.00	41.000	36.000
4.900		6.00	66.00	28.000	36.000	7.600		8.00	79.00	41.000	36.000
5.000		6.00	66.00	28.000	36.000	7.700		8.00	79.00	41.000	36.000
5.100		6.00	66.00	28.000	36.000	7.800		8.00	79.00	41.000	36.000
5.110		6.00	66.00	28.000	36.000	7.900		8.00	79.00	41.000	36.000
5.160	13/64	6.00	66.00	28.000	36.000	7.940	5/16	8.00	79.00	41.000	36.000
5.200		6.00	66.00	28.000	36.000	8.000		8.00	79.00	41.000	36.000
5.250		6.00	66.00	28.000	36.000	8.100		10.00	89.00	47.000	40.000
5.300		6.00	66.00	28.000	36.000	8.200		10.00	89.00	47.000	40.000
5.400		6.00	66.00	28.000	36.000	8.300		10.00	89.00	47.000	40.000
5.410		6.00	66.00	28.000	36.000	8.330	21/64	10.00	89.00	47.000	40.000
5.500		6.00	66.00	28.000	36.000	8.400		10.00	89.00	47.000	40.000
5.550		6.00	66.00	28.000	36.000	8.500		10.00	89.00	47.000	40.000
5.560	7/32	6.00	66.00	28.000	36.000	8.550		10.00	89.00	47.000	40.000
5.600		6.00	66.00	28.000	36.000	8.600		10.00	89.00	47.000	40.000
5.650		6.00	66.00	28.000	36.000	8.700		10.00	89.00	47.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8.730	11/32	10.00	89.00	47.000	40.000	14.100		16.00	115.00	65.000	48.000
8.800		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
8.900		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
9.000		10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
9.100		10.00	89.00	47.000	40.000	14.400		16.00	115.00	65.000	48.000
9.130	23/64	10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
9.200		10.00	89.00	47.000	40.000	14.600		16.00	115.00	65.000	48.000
9.250		10.00	89.00	47.000	40.000	14.680	37/64	16.00	115.00	65.000	48.000
9.300		10.00	89.00	47.000	40.000	14.700		16.00	115.00	65.000	48.000
9.340		10.00	89.00	47.000	40.000	14.800		16.00	115.00	65.000	48.000
9.400		10.00	89.00	47.000	40.000	14.900		16.00	115.00	65.000	48.000
9.500		10.00	89.00	47.000	40.000	15.000		16.00	115.00	65.000	48.000
9.520	3/8	10.00	89.00	47.000	40.000	15.080	19/32	16.00	115.00	65.000	48.000
9.600		10.00	89.00	47.000	40.000	15.100		16.00	115.00	65.000	48.000
9.700		10.00	89.00	47.000	40.000	15.200		16.00	115.00	65.000	48.000
9.800		10.00	89.00	47.000	40.000	15.300		16.00	115.00	65.000	48.000
9.900		10.00	89.00	47.000	40.000	15.400		16.00	115.00	65.000	48.000
9.920	25/64	10.00	89.00	47.000	40.000	15.480	39/64	16.00	115.00	65.000	48.000
10.000		10.00	89.00	47.000	40.000	15.500		16.00	115.00	65.000	48.000
10.100		12.00	102.00	55.000	45.000	15.600		16.00	115.00	65.000	48.000
10.200		12.00	102.00	55.000	45.000	15.700		16.00	115.00	65.000	48.000
10.300		12.00	102.00	55.000	45.000	15.800		16.00	115.00	65.000	48.000
10.320	13/32	12.00	102.00	55.000	45.000	15.870	5/8	16.00	115.00	65.000	48.000
10.400		12.00	102.00	55.000	45.000	15.900		16.00	115.00	65.000	48.000
10.500		12.00	102.00	55.000	45.000	16.000		16.00	115.00	65.000	48.000
10.600		12.00	102.00	55.000	45.000	16.100		18.00	123.00	73.000	48.000
10.700		12.00	102.00	55.000	45.000	16.200		18.00	123.00	73.000	48.000
10.720	27/64	12.00	102.00	55.000	45.000	16.270	41/64	18.00	123.00	73.000	48.000
10.800		12.00	102.00	55.000	45.000	16.500		18.00	123.00	73.000	48.000
10.900		12.00	102.00	55.000	45.000	16.670	21/32	18.00	123.00	73.000	48.000
11.000		12.00	102.00	55.000	45.000	16.900		18.00	123.00	73.000	48.000
11.100		12.00	102.00	55.000	45.000	17.000		18.00	123.00	73.000	48.000
11.110	7/16	12.00	102.00	55.000	45.000	17.070	43/64	18.00	123.00	73.000	48.000
11.200		12.00	102.00	55.000	45.000	17.200		18.00	123.00	73.000	48.000
11.300		12.00	102.00	55.000	45.000	17.300		18.00	123.00	73.000	48.000
11.400		12.00	102.00	55.000	45.000	17.400		18.00	123.00	73.000	48.000
11.500		12.00	102.00	55.000	45.000	17.460	11/16	18.00	123.00	73.000	48.000
11.510	29/64	12.00	102.00	55.000	45.000	17.500		18.00	123.00	73.000	48.000
11.600		12.00	102.00	55.000	45.000	17.600		18.00	123.00	73.000	48.000
11.700		12.00	102.00	55.000	45.000	17.700		18.00	123.00	73.000	48.000
11.800		12.00	102.00	55.000	45.000	17.860	45/64	18.00	123.00	73.000	48.000
11.900		12.00	102.00	55.000	45.000	17.900		18.00	123.00	73.000	48.000
11.910	15/32	12.00	102.00	55.000	45.000	18.000		18.00	123.00	73.000	48.000
12.000		12.00	102.00	55.000	45.000	18.260	23/32	20.00	131.00	79.000	50.000
12.100		14.00	107.00	60.000	45.000	18.300		20.00	131.00	79.000	50.000
12.200		14.00	107.00	60.000	45.000	18.500		20.00	131.00	79.000	50.000
12.300	31/64	14.00	107.00	60.000	45.000	18.900		20.00	131.00	79.000	50.000
12.400		14.00	107.00	60.000	45.000	19.000		20.00	131.00	79.000	50.000
12.500		14.00	107.00	60.000	45.000	19.050	3/4	20.00	131.00	79.000	50.000
12.600		14.00	107.00	60.000	45.000	19.250		20.00	131.00	79.000	50.000
12.700	1/2	14.00	107.00	60.000	45.000	19.300		20.00	131.00	79.000	50.000
12.800		14.00	107.00	60.000	45.000	19.446		20.00	131.00	79.000	50.000
12.900		14.00	107.00	60.000	45.000	19.500		20.00	131.00	79.000	50.000
13.000		14.00	107.00	60.000	45.000	19.840	25/32	20.00	131.00	79.000	50.000
13.100	33/64	14.00	107.00	60.000	45.000	19.900		20.00	131.00	79.000	50.000
13.200		14.00	107.00	60.000	45.000	20.000		20.00	131.00	79.000	50.000
13.300		14.00	107.00	60.000	45.000						
13.400		14.00	107.00	60.000	45.000						
13.490	17/32	14.00	107.00	60.000	45.000						
13.500		14.00	107.00	60.000	45.000						
13.600		14.00	107.00	60.000	45.000						
13.700		14.00	107.00	60.000	45.000						
13.800		14.00	107.00	60.000	45.000						
13.890	35/64	14.00	107.00	60.000	45.000						
13.900		14.00	107.00	60.000	45.000						
14.000		14.00	107.00	60.000	45.000						



TS-Drills with internal coolant

Article no. 89411



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys

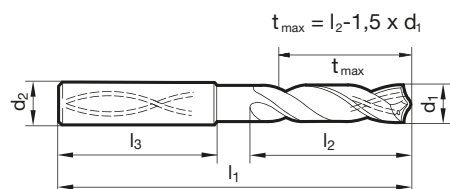
Article no. 89408



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	4.760	3/16	6.00	82.00	44.000	36.000
3.100		6.00	66.00	28.000	36.000	4.800		6.00	82.00	44.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	4.900		6.00	82.00	44.000	36.000
3.200		6.00	66.00	28.000	36.000	5.000		6.00	82.00	44.000	36.000
3.250		6.00	66.00	28.000	36.000	5.100		6.00	82.00	44.000	36.000
3.300		6.00	66.00	28.000	36.000	5.160	13/64	6.00	82.00	44.000	36.000
3.400		6.00	66.00	28.000	36.000	5.200		6.00	82.00	44.000	36.000
3.500		6.00	66.00	28.000	36.000	5.300		6.00	82.00	44.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	5.400		6.00	82.00	44.000	36.000
3.600		6.00	66.00	28.000	36.000	5.500		6.00	82.00	44.000	36.000
3.700		6.00	66.00	28.000	36.000	5.550		6.00	82.00	44.000	36.000
3.800		6.00	74.00	36.000	36.000	5.560	7/32	6.00	82.00	44.000	36.000
3.900		6.00	74.00	36.000	36.000	5.600		6.00	82.00	44.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	5.700		6.00	82.00	44.000	36.000
4.000		6.00	74.00	36.000	36.000	5.800		6.00	82.00	44.000	36.000
4.100		6.00	74.00	36.000	36.000	5.900		6.00	82.00	44.000	36.000
4.200		6.00	74.00	36.000	36.000	5.950	15/64	6.00	82.00	44.000	36.000
4.300		6.00	74.00	36.000	36.000	6.000		6.00	82.00	44.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	6.100		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	6.200		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	6.300		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	6.400		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	6.500		8.00	91.00	53.000	36.000



TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	91.00	53.000	36.000	11.400		12.00	118.00	71.000	45.000
6.700		8.00	91.00	53.000	36.000	11.500		12.00	118.00	71.000	45.000
6.750	17/64	8.00	91.00	53.000	36.000	11.600		12.00	118.00	71.000	45.000
6.800		8.00	91.00	53.000	36.000	11.700		12.00	118.00	71.000	45.000
6.900		8.00	91.00	53.000	36.000	11.800		12.00	118.00	71.000	45.000
7.000		8.00	91.00	53.000	36.000	11.900		12.00	118.00	71.000	45.000
7.100		8.00	91.00	53.000	36.000	11.910	15/32	12.00	118.00	71.000	45.000
7.140	9/32	8.00	91.00	53.000	36.000	12.000		12.00	118.00	71.000	45.000
7.200		8.00	91.00	53.000	36.000	12.100		14.00	124.00	77.000	45.000
7.300		8.00	91.00	53.000	36.000	12.200		14.00	124.00	77.000	45.000
7.400		8.00	91.00	53.000	36.000	12.300	31/64	14.00	124.00	77.000	45.000
7.500		8.00	91.00	53.000	36.000	12.400		14.00	124.00	77.000	45.000
7.540	19/64	8.00	91.00	53.000	36.000	12.500		14.00	124.00	77.000	45.000
7.600		8.00	91.00	53.000	36.000	12.600		14.00	124.00	77.000	45.000
7.700		8.00	91.00	53.000	36.000	12.700	1/2	14.00	124.00	77.000	45.000
7.800		8.00	91.00	53.000	36.000	12.800		14.00	124.00	77.000	45.000
7.900		8.00	91.00	53.000	36.000	13.000		14.00	124.00	77.000	45.000
7.940	5/16	8.00	91.00	53.000	36.000	13.100	33/64	14.00	124.00	77.000	45.000
8.000		8.00	91.00	53.000	36.000	13.300		14.00	124.00	77.000	45.000
8.100		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
8.200		10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
8.300		10.00	103.00	61.000	40.000	13.800		14.00	124.00	77.000	45.000
8.330	21/64	10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
8.400		10.00	103.00	61.000	40.000	14.100		16.00	133.00	83.000	48.000
8.500		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
8.600		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
8.700		10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
8.730	11/32	10.00	103.00	61.000	40.000	14.600		16.00	133.00	83.000	48.000
8.800		10.00	103.00	61.000	40.000	14.700		16.00	133.00	83.000	48.000
8.900		10.00	103.00	61.000	40.000	14.800		16.00	133.00	83.000	48.000
9.000		10.00	103.00	61.000	40.000	15.000		16.00	133.00	83.000	48.000
9.100		10.00	103.00	61.000	40.000	15.100		16.00	133.00	83.000	48.000
9.130	23/64	10.00	103.00	61.000	40.000	15.200		16.00	133.00	83.000	48.000
9.200		10.00	103.00	61.000	40.000	15.300		16.00	133.00	83.000	48.000
9.250		10.00	103.00	61.000	40.000	15.500		16.00	133.00	83.000	48.000
9.300		10.00	103.00	61.000	40.000	15.700		16.00	133.00	83.000	48.000
9.400		10.00	103.00	61.000	40.000	15.800		16.00	133.00	83.000	48.000
9.500		10.00	103.00	61.000	40.000	16.000		16.00	133.00	83.000	48.000
9.520	3/8	10.00	103.00	61.000	40.000	16.500		18.00	143.00	93.000	48.000
9.600		10.00	103.00	61.000	40.000	16.900		18.00	143.00	93.000	48.000
9.700		10.00	103.00	61.000	40.000	17.000		18.00	143.00	93.000	48.000
9.800		10.00	103.00	61.000	40.000	17.500		18.00	143.00	93.000	48.000
9.900		10.00	103.00	61.000	40.000	18.000		18.00	143.00	93.000	48.000
9.920	25/64	10.00	103.00	61.000	40.000	18.500		20.00	153.00	101.000	50.000
10.000		10.00	103.00	61.000	40.000	18.900		20.00	153.00	101.000	50.000
10.100		12.00	118.00	71.000	45.000	19.000	3/4	20.00	153.00	101.000	50.000
10.200		12.00	118.00	71.000	45.000	19.050		20.00	153.00	101.000	50.000
10.300		12.00	118.00	71.000	45.000	19.500		20.00	153.00	101.000	50.000
10.320	13/32	12.00	118.00	71.000	45.000	20.000		20.00	153.00	101.000	50.000
10.400		12.00	118.00	71.000	45.000						
10.500		12.00	118.00	71.000	45.000						
10.600		12.00	118.00	71.000	45.000						
10.700		12.00	118.00	71.000	45.000						
10.800		12.00	118.00	71.000	45.000						
10.900		12.00	118.00	71.000	45.000						
11.000		12.00	118.00	71.000	45.000						
11.100		12.00	118.00	71.000	45.000						
11.110	7/16	12.00	118.00	71.000	45.000						
11.200		12.00	118.00	71.000	45.000						
11.300		12.00	118.00	71.000	45.000						

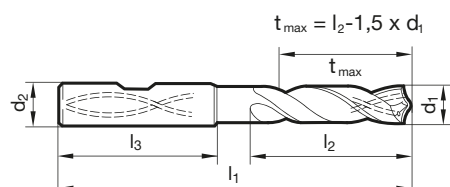


TS-Drills with internal coolant

Article no. 89429



P	M	K	N	S	H
●	○	●	○	○	○

web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometrystructural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AISi alloys

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	6.100		8.00	91.00	53.000	36.000
3.100		6.00	66.00	28.000	36.000	6.200		8.00	91.00	53.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	6.300		8.00	91.00	53.000	36.000
3.200		6.00	66.00	28.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
3.250		6.00	66.00	28.000	36.000	6.400		8.00	91.00	53.000	36.000
3.300		6.00	66.00	28.000	36.000	6.500		8.00	91.00	53.000	36.000
3.400		6.00	66.00	28.000	36.000	6.600		8.00	91.00	53.000	36.000
3.500		6.00	66.00	28.000	36.000	6.700		8.00	91.00	53.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	6.750	17/64	8.00	91.00	53.000	36.000
3.600		6.00	66.00	28.000	36.000	6.800		8.00	91.00	53.000	36.000
3.700		6.00	66.00	28.000	36.000	6.900		8.00	91.00	53.000	36.000
3.800		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
3.900		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.000		6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.600		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.700		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.800		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.900		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
4.900		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.000		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.100		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.160	13/64	6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.200		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.900		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	9.000		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	9.100		10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	9.130	23/64	10.00	103.00	61.000	40.000
5.900		6.00	82.00	44.000	36.000	9.200		10.00	103.00	61.000	40.000
5.950	15/64	6.00	82.00	44.000	36.000	9.250		10.00	103.00	61.000	40.000
6.000		6.00	82.00	44.000	36.000	9.300		10.00	103.00	61.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.400		10.00	103.00	61.000	40.000	11.910	15/32	12.00	118.00	71.000	45.000
9.500		10.00	103.00	61.000	40.000	12.000		12.00	118.00	71.000	45.000
9.520	3/8	10.00	103.00	61.000	40.000	12.200		14.00	124.00	77.000	45.000
9.600		10.00	103.00	61.000	40.000	12.500	1/2	14.00	124.00	77.000	45.000
9.700		10.00	103.00	61.000	40.000	12.700		14.00	124.00	77.000	45.000
9.800		10.00	103.00	61.000	40.000	13.000		14.00	124.00	77.000	45.000
9.900		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
9.920	25/64	10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
10.000		10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
10.100		12.00	118.00	71.000	45.000	14.200	9/16	16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	14.290		16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	14.500		16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	14.700		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	15.000		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	15.200		16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
10.800		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
10.900		12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.000		12.00	118.00	71.000	45.000	17.000		18.00	143.00	93.000	48.000
11.100		12.00	118.00	71.000	45.000	17.500		18.00	143.00	93.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	18.000		18.00	143.00	93.000	48.000
11.200		12.00	118.00	71.000	45.000	18.500		20.00	153.00	101.000	50.000
11.300		12.00	118.00	71.000	45.000	19.000		20.00	153.00	101.000	50.000
11.400		12.00	118.00	71.000	45.000	19.050	3/4	20.00	153.00	101.000	50.000
11.500		12.00	118.00	71.000	45.000	19.500		20.00	153.00	101.000	50.000
11.600		12.00	118.00	71.000	45.000	20.000		20.00	153.00	101.000	50.000
11.700		12.00	118.00	71.000	45.000						
11.800		12.00	118.00	71.000	45.000						
11.900		12.00	118.00	71.000	45.000						



TS-Drills with internal coolant

Article no. 89412



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys

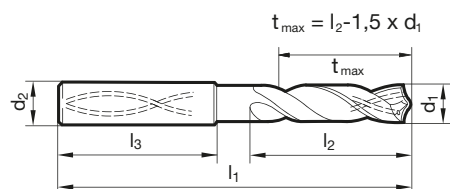
Article no. 89416



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AlSi alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	70.00	30.000	36.000	4.760	3/16	6.00	90.00	50.000	36.000
3.100		6.00	70.00	30.000	36.000	4.800		6.00	90.00	50.000	36.000
3.170	1/8	6.00	70.00	30.000	36.000	4.900		6.00	90.00	50.000	36.000
3.200		6.00	70.00	30.000	36.000	5.000		6.00	90.00	50.000	36.000
3.250		6.00	70.00	30.000	36.000	5.100		6.00	90.00	50.000	36.000
3.300		6.00	70.00	30.000	36.000	5.160	13/64	6.00	90.00	50.000	36.000
3.400		6.00	75.00	35.500	36.000	5.200		6.00	90.00	50.000	36.000
3.500		6.00	75.00	35.500	36.000	5.300		6.00	90.00	50.000	36.000
3.570	9/64	6.00	75.00	35.500	36.000	5.400		6.00	97.00	57.000	36.000
3.600		6.00	75.00	35.500	36.000	5.500		6.00	97.00	57.000	36.000
3.700		6.00	75.00	35.500	36.000	5.560	7/32	6.00	97.00	57.000	36.000
3.800		6.00	75.00	37.500	36.000	5.600		6.00	97.00	57.000	36.000
3.900		6.00	75.00	37.500	36.000	5.700		6.00	97.00	57.000	36.000
3.970	5/32	6.00	75.00	37.500	36.000	5.800		6.00	97.00	57.000	36.000
4.000		6.00	75.00	37.500	36.000	5.900		6.00	97.00	57.000	36.000
4.100		6.00	75.00	37.500	36.000	5.950	15/64	6.00	97.00	57.000	36.000
4.200		6.00	75.00	37.500	36.000	6.000		6.00	97.00	57.000	36.000
4.300		6.00	85.00	45.000	36.000	6.100		8.00	106.00	66.000	36.000
4.370	11/64	6.00	85.00	45.000	36.000	6.200		8.00	106.00	66.000	36.000
4.400		6.00	85.00	45.000	36.000	6.300		8.00	106.00	66.000	36.000
4.500		6.00	85.00	45.000	36.000	6.350	1/4	8.00	106.00	66.000	36.000
4.600		6.00	85.00	45.000	36.000	6.400		8.00	106.00	66.000	36.000
4.650		6.00	85.00	45.000	36.000	6.500		8.00	106.00	66.000	36.000
4.700		6.00	85.00	45.000	36.000	6.600		8.00	106.00	66.000	36.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.700		8.00	106.00	66.000	36.000	10.600		12.00	155.00	106.000	45.000
6.800		8.00	106.00	66.000	36.000	10.700		12.00	155.00	106.000	45.000
6.900		8.00	116.00	76.000	36.000	10.800		12.00	155.00	106.000	45.000
7.000		8.00	116.00	76.000	36.000	10.900		12.00	155.00	106.000	45.000
7.100		8.00	116.00	76.000	36.000	11.000		12.00	155.00	106.000	45.000
7.140	9/32	8.00	116.00	76.000	36.000	11.110	7/16	12.00	163.00	114.000	45.000
7.200		8.00	116.00	76.000	36.000	11.200		12.00	163.00	114.000	45.000
7.300		8.00	116.00	76.000	36.000	11.300		12.00	163.00	114.000	45.000
7.400		8.00	116.00	76.000	36.000	11.400		12.00	163.00	114.000	45.000
7.500		8.00	116.00	76.000	36.000	11.500		12.00	163.00	114.000	45.000
7.540	19/64	8.00	116.00	76.000	36.000	11.600		12.00	163.00	114.000	45.000
7.600		8.00	116.00	76.000	36.000	11.700		12.00	163.00	114.000	45.000
7.700		8.00	116.00	76.000	36.000	11.800		12.00	163.00	114.000	45.000
7.800		8.00	116.00	76.000	36.000	11.900		12.00	163.00	114.000	45.000
7.900		8.00	116.00	76.000	36.000	12.000		12.00	163.00	114.000	45.000
7.940	5/16	8.00	116.00	76.000	36.000	12.100		14.00	182.00	133.000	45.000
8.000		8.00	116.00	76.000	36.000	12.200		14.00	182.00	133.000	45.000
8.100		10.00	131.00	87.000	40.000	12.300	31/64	14.00	182.00	133.000	45.000
8.200		10.00	131.00	87.000	40.000	12.500		14.00	182.00	133.000	45.000
8.300		10.00	131.00	87.000	40.000	12.700	1/2	14.00	182.00	133.000	45.000
8.330	21/64	10.00	131.00	87.000	40.000	13.000		14.00	182.00	133.000	45.000
8.400		10.00	131.00	87.000	40.000	13.100	33/64	14.00	182.00	133.000	45.000
8.500		10.00	131.00	87.000	40.000	13.500		14.00	182.00	133.000	45.000
8.600		10.00	131.00	87.000	40.000	14.000		14.00	182.00	133.000	45.000
8.700		10.00	131.00	87.000	40.000	14.100		16.00	204.00	152.000	48.000
8.730	11/32	10.00	131.00	87.000	40.000	14.200		16.00	204.00	152.000	48.000
8.800		10.00	131.00	87.000	40.000	14.290	9/16	16.00	204.00	152.000	48.000
8.900		10.00	131.00	87.000	40.000	14.500		16.00	204.00	152.000	48.000
9.000		10.00	131.00	87.000	40.000	15.000		16.00	204.00	152.000	48.000
9.100		10.00	139.00	95.000	40.000	15.100		16.00	204.00	152.000	48.000
9.130	23/64	10.00	139.00	95.000	40.000	15.500		16.00	204.00	152.000	48.000
9.200		10.00	139.00	95.000	40.000	16.000		16.00	204.00	152.000	48.000
9.250		10.00	139.00	95.000	40.000	16.500		18.00	223.00	171.000	48.000
9.300		10.00	139.00	95.000	40.000	16.900		18.00	223.00	171.000	48.000
9.400		10.00	139.00	95.000	40.000	17.000		18.00	223.00	171.000	48.000
9.500		10.00	139.00	95.000	40.000	17.500		18.00	223.00	171.000	48.000
9.520	3/8	10.00	139.00	95.000	40.000	18.000		18.00	223.00	171.000	48.000
9.600		10.00	139.00	95.000	40.000	18.500		20.00	244.00	190.000	50.000
9.700		10.00	139.00	95.000	40.000	18.900		20.00	244.00	190.000	50.000
9.800		10.00	139.00	95.000	40.000	19.000		20.00	244.00	190.000	50.000
9.900		10.00	139.00	95.000	40.000	19.050	3/4	20.00	244.00	190.000	50.000
9.920	25/64	10.00	139.00	95.000	40.000	19.500		20.00	244.00	190.000	50.000
10.000		10.00	139.00	95.000	40.000	20.000		20.00	244.00	190.000	50.000
10.100		12.00	155.00	106.000	45.000						
10.200		12.00	155.00	106.000	45.000						
10.300		12.00	155.00	106.000	45.000						
10.400		12.00	155.00	106.000	45.000						
10.500		12.00	155.00	106.000	45.000						



TS-Drills with internal coolant

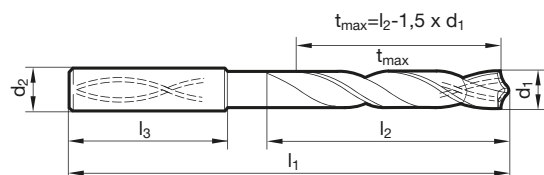
Article no. 89418



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 3.000$ • facet point grind • tip coating • main cutting edge form straight • optimised cutting geometry
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1200 N/mm² • cast materials • bronze, brass • high-alloyed AISi alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	90.00	50.000	36.000	6.350	1/4	8.00	146.00	108.000	36.000
3.100		6.00	90.00	50.000	36.000	6.400		8.00	146.00	108.000	36.000
3.170	1/8	6.00	90.00	50.000	36.000	6.500		8.00	146.00	108.000	36.000
3.200		6.00	90.00	50.000	36.000	6.600		8.00	146.00	108.000	36.000
3.300		6.00	90.00	50.000	36.000	6.700		8.00	146.00	108.000	36.000
3.400		6.00	90.00	50.000	36.000	6.750	17/64	8.00	146.00	108.000	36.000
3.500		6.00	90.00	50.000	36.000	6.800		8.00	146.00	108.000	36.000
3.570	9/64	6.00	90.00	50.000	36.000	6.900		8.00	146.00	108.000	36.000
3.600		6.00	90.00	50.000	36.000	7.000		8.00	146.00	108.000	36.000
3.700		6.00	90.00	50.000	36.000	7.100		8.00	146.00	108.000	36.000
3.800		6.00	102.00	64.000	36.000	7.140	9/32	8.00	146.00	108.000	36.000
3.900		6.00	102.00	64.000	36.000	7.200		8.00	146.00	108.000	36.000
3.970	5/32	6.00	102.00	64.000	36.000	7.300		8.00	146.00	108.000	36.000
4.000		6.00	102.00	64.000	36.000	7.400		8.00	146.00	108.000	36.000
4.100		6.00	102.00	64.000	36.000	7.500		8.00	146.00	108.000	36.000
4.200		6.00	102.00	64.000	36.000	7.540	19/64	8.00	146.00	108.000	36.000
4.300		6.00	102.00	64.000	36.000	7.600		8.00	146.00	108.000	36.000
4.370	11/64	6.00	102.00	64.000	36.000	7.700		8.00	146.00	108.000	36.000
4.400		6.00	102.00	64.000	36.000	7.800		8.00	146.00	108.000	36.000
4.500		6.00	102.00	64.000	36.000	7.900		8.00	146.00	108.000	36.000
4.600		6.00	102.00	64.000	36.000	7.940	5/16	8.00	146.00	108.000	36.000
4.700		6.00	102.00	64.000	36.000	8.000		8.00	146.00	108.000	36.000
4.760	3/16	6.00	116.00	78.000	36.000	8.100		10.00	162.00	120.000	40.000
4.800		6.00	116.00	78.000	36.000	8.200		10.00	162.00	120.000	40.000
4.900		6.00	116.00	78.000	36.000	8.300		10.00	162.00	120.000	40.000
5.000		6.00	116.00	78.000	36.000	8.330	21/64	10.00	162.00	120.000	40.000
5.100		6.00	116.00	78.000	36.000	8.400		10.00	162.00	120.000	40.000
5.160	13/64	6.00	116.00	78.000	36.000	8.500		10.00	162.00	120.000	40.000
5.200		6.00	116.00	78.000	36.000	8.600		10.00	162.00	120.000	40.000
5.300		6.00	116.00	78.000	36.000	8.700		10.00	162.00	120.000	40.000
5.400		6.00	116.00	78.000	36.000	8.730	11/32	10.00	162.00	120.000	40.000
5.500		6.00	116.00	78.000	36.000	8.800		10.00	162.00	120.000	40.000
5.560	7/32	6.00	116.00	78.000	36.000	8.900		10.00	162.00	120.000	40.000
5.600		6.00	116.00	78.000	36.000	9.000		10.00	162.00	120.000	40.000
5.700		6.00	116.00	78.000	36.000	9.100		10.00	162.00	120.000	40.000
5.800		6.00	116.00	78.000	36.000	9.130	23/64	10.00	162.00	120.000	40.000
5.900		6.00	116.00	78.000	36.000	9.200		10.00	162.00	120.000	40.000
5.950	15/64	6.00	116.00	78.000	36.000	9.300		10.00	162.00	120.000	40.000
6.000		6.00	116.00	78.000	36.000	9.400		10.00	162.00	120.000	40.000
6.100		8.00	146.00	108.000	36.000	9.500		10.00	162.00	120.000	40.000
6.200		8.00	146.00	108.000	36.000	9.520	3/8	10.00	162.00	120.000	40.000
6.300		8.00	146.00	108.000	36.000	9.600		10.00	162.00	120.000	40.000



TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.700		10.00	162.00	120.000	40.000	13.000		14.00	230.00	182.000	45.000
9.800		10.00	162.00	120.000	40.000	13.500		14.00	230.00	182.000	45.000
9.900		10.00	162.00	120.000	40.000	13.890	35/64	14.00	230.00	182.000	45.000
9.920	25/64	10.00	162.00	120.000	40.000	14.000		14.00	230.00	182.000	45.000
10.000		10.00	162.00	120.000	40.000	14.500		16.00	260.00	208.000	48.000
10.100		12.00	204.00	156.000	45.000	15.000		16.00	260.00	208.000	48.000
10.200		12.00	204.00	156.000	45.000	15.500		16.00	260.00	208.000	48.000
10.300		12.00	204.00	156.000	45.000	16.000		16.00	260.00	208.000	48.000
10.320	13/32	12.00	204.00	156.000	45.000	16.500		18.00	285.00	234.000	48.000
10.500		12.00	204.00	156.000	45.000	17.000		18.00	285.00	234.000	48.000
10.600		12.00	204.00	156.000	45.000	17.500		18.00	285.00	234.000	48.000
10.700		12.00	204.00	156.000	45.000	18.000		18.00	285.00	234.000	48.000
10.720	27/64	12.00	204.00	156.000	45.000	18.500		20.00	310.00	258.000	50.000
10.800		12.00	204.00	156.000	45.000	19.000		20.00	310.00	258.000	50.000
10.900		12.00	204.00	156.000	45.000	19.050	3/4	20.00	310.00	258.000	50.000
11.000		12.00	204.00	156.000	45.000	19.500		20.00	310.00	258.000	50.000
11.110	7/16	12.00	204.00	156.000	45.000	20.000		20.00	310.00	258.000	50.000
11.500		12.00	204.00	156.000	45.000						
11.510	29/64	12.00	204.00	156.000	45.000						
11.910	15/32	12.00	204.00	156.000	45.000						
12.000		12.00	204.00	156.000	45.000						
12.300	31/64	14.00	230.00	182.000	45.000						
12.500		14.00	230.00	182.000	45.000						
12.700	1/2	14.00	230.00	182.000	45.000						



Flat bottom drills with coolant ducts

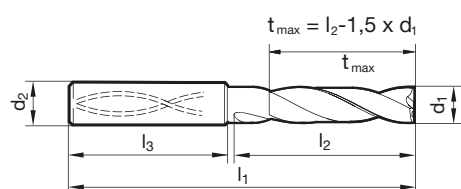
Article no. 89519



P	M	K	N	S	H
•	•	•	○	○	○



web thinning $\geq \varnothing 3.000$ • 180° point geometry for flat bottom of the hole • for piloting, drilling, finishing • low burr development • piloting in all positions and materials



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	61.00	16.000	40.000	5.900		6.00	65.00	26.000	36.000
3.100		6.00	61.00	16.000	40.000	5.950	15/64	6.00	65.00	26.000	36.000
3.170	1/8	6.00	61.00	16.000	40.000	6.000		6.00	65.00	26.000	36.000
3.200		6.00	61.00	16.000	40.000	6.100		8.00	78.00	31.000	36.000
3.250		6.00	61.00	16.000	40.000	6.200		8.00	78.00	31.000	36.000
3.300		6.00	61.00	16.000	40.000	6.300		8.00	78.00	31.000	36.000
3.400		6.00	61.00	16.000	40.000	6.350	1/4	8.00	78.00	31.000	36.000
3.500		6.00	61.00	16.000	40.000	6.400		8.00	78.00	31.000	36.000
3.570	9/64	6.00	61.00	16.000	40.000	6.500		8.00	78.00	31.000	36.000
3.600		6.00	61.00	16.000	40.000	6.530		8.00	78.00	31.000	36.000
3.700		6.00	61.00	16.000	40.000	6.550		8.00	78.00	31.000	36.000
3.800		6.00	65.00	18.000	40.000	6.600		8.00	78.00	31.000	36.000
3.900		6.00	65.00	18.000	40.000	6.700		8.00	78.00	31.000	36.000
3.970	5/32	6.00	65.00	18.000	40.000	6.750	17/64	8.00	78.00	31.000	36.000
4.000		6.00	65.00	18.000	40.000	6.800		8.00	78.00	31.000	36.000
4.040		6.00	65.00	18.000	40.000	6.900		8.00	78.00	31.000	36.000
4.100		6.00	65.00	18.000	40.000	7.000		8.00	78.00	31.000	36.000
4.200		6.00	65.00	18.000	40.000	7.100		8.00	78.00	35.000	36.000
4.300		6.00	65.00	21.000	40.000	7.140	9/32	8.00	78.00	35.000	36.000
4.370	11/64	6.00	65.00	21.000	40.000	7.200		8.00	78.00	35.000	36.000
4.400		6.00	65.00	21.000	40.000	7.300		8.00	78.00	35.000	36.000
4.500		6.00	65.00	21.000	40.000	7.400		8.00	78.00	35.000	36.000
4.600		6.00	65.00	21.000	40.000	7.500		8.00	78.00	35.000	36.000
4.650		6.00	65.00	21.000	40.000	7.540	19/64	8.00	78.00	35.000	36.000
4.700		6.00	65.00	21.000	40.000	7.550		8.00	78.00	35.000	36.000
4.760	3/16	6.00	65.00	26.000	36.000	7.600		8.00	78.00	35.000	36.000
4.800		6.00	65.00	26.000	36.000	7.650		8.00	78.00	35.000	36.000
4.900		6.00	65.00	26.000	36.000	7.700		8.00	78.00	35.000	36.000
5.000		6.00	65.00	26.000	36.000	7.800		8.00	78.00	35.000	36.000
5.100		6.00	65.00	26.000	36.000	7.900		8.00	78.00	35.000	36.000
5.110		6.00	65.00	26.000	36.000	7.940	5/16	8.00	78.00	35.000	36.000
5.160	13/64	6.00	65.00	26.000	36.000	8.000		8.00	78.00	35.000	36.000
5.200		6.00	65.00	26.000	36.000	8.100		10.00	87.00	43.000	40.000
5.300		6.00	65.00	26.000	36.000	8.200		10.00	87.00	43.000	40.000
5.400		6.00	65.00	26.000	36.000	8.300		10.00	87.00	43.000	40.000
5.410		6.00	65.00	26.000	36.000	8.330	21/64	10.00	87.00	43.000	40.000
5.500		6.00	65.00	26.000	36.000	8.400		10.00	87.00	43.000	40.000
5.550		6.00	65.00	26.000	36.000	8.500		10.00	87.00	43.000	40.000
5.560	7/32	6.00	65.00	26.000	36.000	8.600		10.00	87.00	43.000	40.000
5.600		6.00	65.00	26.000	36.000	8.700		10.00	87.00	43.000	40.000
5.700		6.00	65.00	26.000	36.000	8.730	11/32	10.00	87.00	43.000	40.000
5.800		6.00	65.00	26.000	36.000	8.800		10.00	87.00	43.000	40.000

Flat bottom drills with coolant ducts

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8.900		10.00	87.00	43.000	40.000	14.100		16.00	112.00	62.000	48.000
9.000		10.00	87.00	43.000	40.000	14.200		16.00	112.00	62.000	48.000
9.100		10.00	87.00	43.000	40.000	14.290	9/16	16.00	112.00	62.000	48.000
9.130	23/64	10.00	87.00	43.000	40.000	14.300		16.00	112.00	62.000	48.000
9.200		10.00	87.00	43.000	40.000	14.400		16.00	112.00	62.000	48.000
9.250		10.00	87.00	43.000	40.000	14.500		16.00	112.00	62.000	48.000
9.300		10.00	87.00	43.000	40.000	14.600		16.00	112.00	62.000	48.000
9.340		10.00	87.00	43.000	40.000	14.680	37/64	16.00	112.00	62.000	48.000
9.400		10.00	87.00	43.000	40.000	14.700		16.00	112.00	62.000	48.000
9.500		10.00	87.00	43.000	40.000	14.800		16.00	112.00	62.000	48.000
9.520	3/8	10.00	87.00	43.000	40.000	14.900		16.00	112.00	62.000	48.000
9.550		10.00	87.00	43.000	40.000	15.000		16.00	112.00	62.000	48.000
9.600		10.00	87.00	43.000	40.000	15.080	19/32	16.00	112.00	62.000	48.000
9.700		10.00	87.00	43.000	40.000	15.100		16.00	112.00	62.000	48.000
9.800		10.00	87.00	43.000	40.000	15.200		16.00	112.00	62.000	48.000
9.900		10.00	87.00	43.000	40.000	15.300		16.00	112.00	62.000	48.000
9.920	25/64	10.00	87.00	43.000	40.000	15.400		16.00	112.00	62.000	48.000
10.000		10.00	87.00	43.000	40.000	15.480	39/64	16.00	112.00	62.000	48.000
10.100		12.00	100.00	52.000	45.000	15.500		16.00	112.00	62.000	48.000
10.200		12.00	100.00	52.000	45.000	15.550		16.00	112.00	62.000	48.000
10.300		12.00	100.00	52.000	45.000	15.600		16.00	112.00	62.000	48.000
10.320	13/32	12.00	100.00	52.000	45.000	15.700		16.00	112.00	62.000	48.000
10.400		12.00	100.00	52.000	45.000	15.800		16.00	112.00	62.000	48.000
10.500		12.00	100.00	52.000	45.000	15.870	5/8	16.00	112.00	62.000	48.000
10.600		12.00	100.00	52.000	45.000	15.900		16.00	112.00	62.000	48.000
10.700		12.00	100.00	52.000	45.000	16.000		16.00	112.00	62.000	48.000
10.720	27/64	12.00	100.00	52.000	45.000	16.270	41/64	18.00	120.00	70.000	48.000
10.800		12.00	100.00	52.000	45.000	16.300		18.00	120.00	70.000	48.000
10.900		12.00	100.00	52.000	45.000	16.500		18.00	120.00	70.000	48.000
11.000		12.00	100.00	52.000	45.000	16.670	21/32	18.00	120.00	70.000	48.000
11.100		12.00	100.00	52.000	45.000	16.700		18.00	120.00	70.000	48.000
11.110	7/16	12.00	100.00	52.000	45.000	16.900		18.00	120.00	70.000	48.000
11.200		12.00	100.00	52.000	45.000	17.000		18.00	120.00	70.000	48.000
11.300		12.00	100.00	52.000	45.000	17.070	43/64	18.00	120.00	70.000	48.000
11.400		12.00	100.00	52.000	45.000	17.460	11/16	18.00	120.00	70.000	48.000
11.500		12.00	100.00	52.000	45.000	17.500		18.00	120.00	70.000	48.000
11.510	29/64	12.00	100.00	52.000	45.000	17.550		18.00	120.00	70.000	48.000
11.550		12.00	100.00	52.000	45.000	17.700		18.00	120.00	70.000	48.000
11.600		12.00	100.00	52.000	45.000	17.860	45/64	18.00	120.00	70.000	48.000
11.700		12.00	100.00	52.000	45.000	18.000		18.00	120.00	70.000	48.000
11.800		12.00	100.00	52.000	45.000	18.260	23/32	20.00	128.00	76.000	50.000
11.900		12.00	100.00	52.000	45.000	18.500		20.00	128.00	76.000	50.000
11.910	15/32	12.00	100.00	52.000	45.000	18.700		20.00	128.00	76.000	50.000
12.000		12.00	100.00	52.000	45.000	18.900		20.00	128.00	76.000	50.000
12.100		14.00	104.00	57.000	45.000	19.000		20.00	128.00	76.000	50.000
12.200		14.00	104.00	57.000	45.000	19.050	3/4	20.00	128.00	76.000	50.000
12.300	31/64	14.00	104.00	57.000	45.000	19.250		20.00	128.00	76.000	50.000
12.400		14.00	104.00	57.000	45.000	19.300		20.00	128.00	76.000	50.000
12.500		14.00	104.00	57.000	45.000	19.450	49/64	20.00	128.00	76.000	50.000
12.600		14.00	104.00	57.000	45.000	19.500		20.00	128.00	76.000	50.000
12.700	1/2	14.00	104.00	57.000	45.000	19.550		20.00	128.00	76.000	50.000
12.800		14.00	104.00	57.000	45.000	19.700		20.00	128.00	76.000	50.000
12.900		14.00	104.00	57.000	45.000	19.800		20.00	128.00	76.000	50.000
13.000		14.00	104.00	57.000	45.000	19.840	25/32	20.00	128.00	76.000	50.000
13.100	33/64	14.00	104.00	57.000	45.000	20.000		20.00	128.00	76.000	50.000
13.200		14.00	104.00	57.000	45.000						
13.300		14.00	104.00	57.000	45.000						
13.400		14.00	104.00	57.000	45.000						
13.490	17/32	14.00	104.00	57.000	45.000						
13.500		14.00	104.00	57.000	45.000						
13.600		14.00	104.00	57.000	45.000						
13.700		14.00	104.00	57.000	45.000						
13.800		14.00	104.00	57.000	45.000						
13.890	35/64	14.00	104.00	57.000	45.000						
13.900		14.00	104.00	57.000	45.000						
14.000		14.00	104.00	57.000	45.000						



Flat bottom drills with coolant ducts

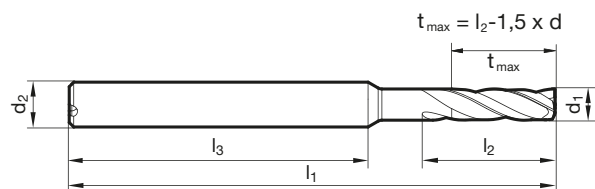
Article no. 89533



P	M	K	N	S	H
•	•	•	○	○	○



flat bottom drills 3-fluted • 180° point geometry for flat bottomed holes • for piloting, drilling, finishing • low burr development • piloting in all positions and materials



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4.000		6.00	65.00	18.000	36.000	7.400		8.00	78.00	35.000	36.000
4.100		6.00	65.00	18.000	36.000	7.500		8.00	78.00	35.000	36.000
4.200		6.00	65.00	18.000	36.000	7.540	19/64	8.00	78.00	35.000	36.000
4.300		6.00	65.00	21.000	36.000	7.600		8.00	78.00	35.000	36.000
4.370	11/64	6.00	65.00	21.000	36.000	7.700		8.00	78.00	35.000	36.000
4.400		6.00	65.00	21.000	36.000	7.800		8.00	78.00	35.000	36.000
4.500		6.00	65.00	21.000	36.000	7.900		8.00	78.00	35.000	36.000
4.600		6.00	65.00	21.000	36.000	7.940	5/16	8.00	78.00	35.000	36.000
4.700		6.00	65.00	21.000	36.000	8.000		8.00	78.00	35.000	36.000
4.760	3/16	6.00	65.00	26.000	36.000	8.100		10.00	87.00	43.000	40.000
4.800		6.00	65.00	26.000	36.000	8.200		10.00	87.00	43.000	40.000
4.900		6.00	65.00	26.000	36.000	8.300		10.00	87.00	43.000	40.000
5.000		6.00	65.00	26.000	36.000	8.330	21/64	10.00	87.00	43.000	40.000
5.100		6.00	65.00	26.000	36.000	8.400		10.00	87.00	43.000	40.000
5.160	13/64	6.00	65.00	26.000	36.000	8.500		10.00	87.00	43.000	40.000
5.200		6.00	65.00	26.000	36.000	8.600		10.00	87.00	43.000	40.000
5.300		6.00	65.00	26.000	36.000	8.700		10.00	87.00	43.000	40.000
5.400		6.00	65.00	26.000	36.000	8.730	11/32	10.00	87.00	43.000	40.000
5.500		6.00	65.00	26.000	36.000	8.800		10.00	87.00	43.000	40.000
5.560	7/32	6.00	65.00	26.000	36.000	8.900		10.00	87.00	43.000	40.000
5.600		6.00	65.00	26.000	36.000	9.000		10.00	87.00	43.000	40.000
5.700		6.00	65.00	26.000	36.000	9.100		10.00	87.00	43.000	40.000
5.800		6.00	65.00	26.000	36.000	9.130	23/64	10.00	87.00	43.000	40.000
5.900		6.00	65.00	26.000	36.000	9.200		10.00	87.00	43.000	40.000
5.950	15/64	6.00	65.00	26.000	36.000	9.300		10.00	87.00	43.000	40.000
6.000		6.00	65.00	26.000	36.000	9.400		10.00	87.00	43.000	40.000
6.100		8.00	78.00	31.000	36.000	9.500		10.00	87.00	43.000	40.000
6.200		8.00	78.00	31.000	36.000	9.520	3/8	10.00	87.00	43.000	40.000
6.300		8.00	78.00	31.000	36.000	9.600		10.00	87.00	43.000	40.000
6.350	1/4	8.00	78.00	31.000	36.000	9.700		10.00	87.00	43.000	40.000
6.400		8.00	78.00	31.000	36.000	9.800		10.00	87.00	43.000	40.000
6.500		8.00	78.00	31.000	36.000	9.900		10.00	87.00	43.000	40.000
6.600		8.00	78.00	31.000	36.000	9.920	25/64	10.00	87.00	43.000	40.000
6.700		8.00	78.00	31.000	36.000	10.000		10.00	87.00	43.000	40.000
6.750	17/64	8.00	78.00	31.000	36.000	10.100		12.00	100.00	52.000	45.000
6.800		8.00	78.00	31.000	36.000	10.200		12.00	100.00	52.000	45.000
6.900		8.00	78.00	31.000	36.000	10.300		12.00	100.00	52.000	45.000
7.000		8.00	78.00	31.000	36.000	10.320	13/32	12.00	100.00	52.000	45.000
7.100		8.00	78.00	35.000	36.000	10.400		12.00	100.00	52.000	45.000
7.140	9/32	8.00	78.00	35.000	36.000	10.500		12.00	100.00	52.000	45.000
7.200		8.00	78.00	35.000	36.000	10.600		12.00	100.00	52.000	45.000
7.300		8.00	78.00	35.000	36.000	10.700		12.00	100.00	52.000	45.000

Flat bottom drills with coolant ducts

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10.800		12.00	100.00	52.000	45.000	13.500		14.00	104.00	57.000	45.000
10.900		12.00	100.00	52.000	45.000	13.800		14.00	104.00	57.000	45.000
11.000		12.00	100.00	52.000	45.000	14.000		14.00	104.00	57.000	45.000
11.100	7/16	12.00	100.00	52.000	45.000	14.500		16.00	112.00	62.000	48.000
11.110		12.00	100.00	52.000	45.000	14.800		16.00	112.00	62.000	48.000
11.200		12.00	100.00	52.000	45.000	15.000		16.00	112.00	62.000	48.000
11.300		12.00	100.00	52.000	45.000	15.500		16.00	112.00	62.000	48.000
11.400		12.00	100.00	52.000	45.000	15.800		16.00	112.00	62.000	48.000
11.500		12.00	100.00	52.000	45.000	16.000		16.00	112.00	62.000	48.000
11.600		12.00	100.00	52.000	45.000	16.500		18.00	120.00	70.000	48.000
11.700		12.00	100.00	52.000	45.000	17.000		18.00	120.00	70.000	48.000
11.800		12.00	100.00	52.000	45.000	17.500		18.00	120.00	70.000	48.000
11.900	15/32	12.00	100.00	52.000	45.000	18.000		18.00	120.00	70.000	48.000
11.910		12.00	100.00	52.000	45.000	18.500		20.00	128.00	76.000	50.000
12.000		12.00	100.00	52.000	45.000	19.000		20.00	128.00	76.000	50.000
12.100		14.00	104.00	57.000	45.000	19.500		20.00	128.00	76.000	50.000
12.200		14.00	104.00	57.000	45.000	20.000		20.00	128.00	76.000	50.000
12.500		14.00	104.00	57.000	45.000						
12.600	1/2	14.00	104.00	57.000	45.000						
12.700		14.00	104.00	57.000	45.000						
12.800		14.00	104.00	57.000	45.000						
12.900		14.00	104.00	57.000	45.000						
13.000		14.00	104.00	57.000	45.000						
13.490	17/32	14.00	104.00	57.000	45.000						



Flat bottom drills with coolant ducts

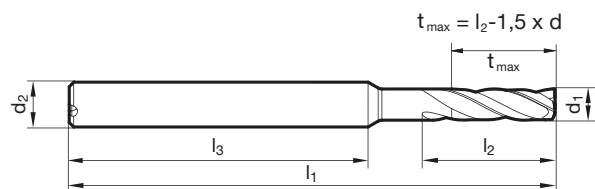
Article no. 89534



P	M	K	N	S	H
•	•	•	○	○	○



flat bottom drills 3-fluted • 180° point geometry for flat bottomed holes • for piloting, drilling, finishing • low burr development • piloting in all positions and materials



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4.000		6.00	73.00	30.000	36.000	7.400		8.00	90.00	50.000	36.000
4.100		6.00	73.00	30.000	36.000	7.500		8.00	90.00	50.000	36.000
4.200		6.00	73.00	30.000	36.000	7.540	19/64	8.00	90.00	50.000	36.000
4.300		6.00	73.00	33.000	36.000	7.600		8.00	90.00	50.000	36.000
4.370	11/64	6.00	73.00	33.000	36.000	7.700		8.00	90.00	50.000	36.000
4.400		6.00	73.00	33.000	36.000	7.800		8.00	90.00	50.000	36.000
4.500		6.00	73.00	33.000	36.000	7.900		8.00	90.00	50.000	36.000
4.600		6.00	73.00	33.000	36.000	7.940	5/16	8.00	90.00	50.000	36.000
4.700		6.00	73.00	33.000	36.000	8.000		8.00	90.00	50.000	36.000
4.760	3/16	6.00	81.00	36.000	36.000	8.100		10.00	101.00	57.000	40.000
4.800		6.00	81.00	36.000	36.000	8.200		10.00	101.00	57.000	40.000
4.900		6.00	81.00	36.000	36.000	8.300		10.00	101.00	57.000	40.000
5.000		6.00	81.00	36.000	36.000	8.330	21/64	10.00	101.00	57.000	40.000
5.100		6.00	81.00	39.000	36.000	8.400		10.00	101.00	57.000	40.000
5.160	13/64	6.00	81.00	39.000	36.000	8.500		10.00	101.00	57.000	40.000
5.200		6.00	81.00	39.000	36.000	8.600		10.00	101.00	57.000	40.000
5.300		6.00	81.00	39.000	36.000	8.700		10.00	101.00	57.000	40.000
5.400		6.00	81.00	39.000	36.000	8.730	11/32	10.00	101.00	57.000	40.000
5.500		6.00	81.00	39.000	36.000	8.800		10.00	101.00	57.000	40.000
5.560	7/32	6.00	81.00	42.000	36.000	8.900		10.00	101.00	57.000	40.000
5.600		6.00	81.00	42.000	36.000	9.000		10.00	101.00	57.000	40.000
5.700		6.00	81.00	42.000	36.000	9.100		10.00	101.00	57.000	40.000
5.800		6.00	81.00	42.000	36.000	9.130	23/64	10.00	101.00	57.000	40.000
5.900		6.00	81.00	42.000	36.000	9.200		10.00	101.00	57.000	40.000
5.950	15/64	6.00	81.00	42.000	36.000	9.300		10.00	101.00	57.000	40.000
6.000		6.00	81.00	42.000	36.000	9.400		10.00	101.00	57.000	40.000
6.100		8.00	90.00	50.000	36.000	9.500		10.00	101.00	57.000	40.000
6.200		8.00	90.00	50.000	36.000	9.520	3/8	10.00	101.00	57.000	40.000
6.300		8.00	90.00	50.000	36.000	9.600		10.00	101.00	57.000	40.000
6.350	1/4	8.00	90.00	50.000	36.000	9.700		10.00	101.00	57.000	40.000
6.400		8.00	90.00	50.000	36.000	9.800		10.00	101.00	57.000	40.000
6.500		8.00	90.00	50.000	36.000	9.900		10.00	101.00	57.000	40.000
6.600		8.00	90.00	50.000	36.000	9.920	25/64	10.00	101.00	57.000	40.000
6.700		8.00	90.00	50.000	36.000	10.000		10.00	101.00	57.000	40.000
6.750	17/64	8.00	90.00	50.000	36.000	10.100		12.00	116.00	68.000	45.000
6.800		8.00	90.00	50.000	36.000	10.200		12.00	116.00	68.000	45.000
6.900		8.00	90.00	50.000	36.000	10.300		12.00	116.00	68.000	45.000
7.000		8.00	90.00	50.000	36.000	10.320	13/32	12.00	116.00	68.000	45.000
7.100		8.00	90.00	50.000	36.000	10.400		12.00	116.00	68.000	45.000
7.140	9/32	8.00	90.00	50.000	36.000	10.500		12.00	116.00	68.000	45.000
7.200		8.00	90.00	50.000	36.000	10.600		12.00	116.00	68.000	45.000
7.300		8.00	90.00	50.000	36.000	10.700		12.00	116.00	68.000	45.000

Flat bottom drills with coolant ducts

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10.800		12.00	116.00	68.000	45.000	13.500		14.00	121.00	74.000	45.000
10.900		12.00	116.00	68.000	45.000	13.800		14.00	121.00	74.000	45.000
11.000		12.00	116.00	68.000	45.000	14.000		14.00	121.00	74.000	45.000
11.100	7/16	12.00	116.00	68.000	45.000	14.500		16.00	130.00	80.000	48.000
11.110		12.00	116.00	68.000	45.000	14.800		16.00	130.00	80.000	48.000
11.200		12.00	116.00	68.000	45.000	15.000		16.00	130.00	80.000	48.000
11.300		12.00	116.00	68.000	45.000	15.500		16.00	130.00	80.000	48.000
11.400		12.00	116.00	68.000	45.000	15.800		16.00	130.00	80.000	48.000
11.500		12.00	116.00	68.000	45.000	16.000		16.00	130.00	80.000	48.000
11.600		12.00	116.00	68.000	45.000	16.500		18.00	140.00	90.000	48.000
11.700		12.00	116.00	68.000	45.000	17.000		18.00	140.00	90.000	48.000
11.800		12.00	116.00	68.000	45.000	17.500		18.00	140.00	90.000	48.000
11.900	15/32	12.00	116.00	68.000	45.000	18.000		18.00	140.00	90.000	48.000
11.910		12.00	116.00	68.000	45.000	18.500		20.00	150.00	98.000	50.000
12.000		12.00	116.00	68.000	45.000	19.000		20.00	150.00	98.000	50.000
12.100		14.00	121.00	74.000	45.000	19.500		20.00	150.00	98.000	50.000
12.200		14.00	121.00	74.000	45.000	20.000		20.00	150.00	98.000	50.000
12.500		14.00	121.00	74.000	45.000						
12.600	1/2	14.00	121.00	74.000	45.000						
12.700		14.00	121.00	74.000	45.000						
12.800		14.00	121.00	74.000	45.000						
12.900		14.00	121.00	74.000	45.000						
13.000		14.00	121.00	74.000	45.000						
13.490	17/32	14.00	121.00	74.000	45.000						

TS 100 HPC

STEEL AND HIGH-ALLOYED STEEL

- ▼ universal application

ADVANTAGES AND CHARACTERISTICS

- ▼ extremely high cutting values for the **best results** in steel machining
- ▼ **precisely aligned boreholes** with small diameter tolerances and excellent surface finishes
- ▼ **precise centring and short chips** thanks to optimised cutting edge geometry with relieved cone, special web thinning and perfect chip evacuation due to polished flutes



Micro-geometry

- ▼ revention of micro chipping and the formation of built-up edges
- ▼ reduction of cutting forces and process temperatures

Point geometry

- ▼ relieved cone with concave cutting edge – short chip break
- ▼ robust cutting edge with cutting edge protection (negative chamfer)

Polished flutes with highest surface finish

- ▼ optimal chip evacuation
- ▼ reduction of the process forces by reducing the friction between chip and tool

Double margin

ensures perfect drilling results and excellent running smoothness



TS-Drills with internal coolant

Article no. 89460

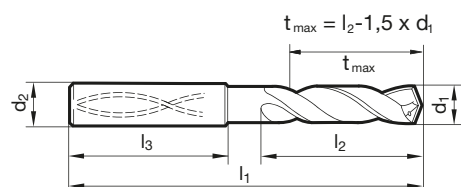


P	M	K	N	S	H
●	○	○	○	○	○



web thinning $\geq \varnothing 3.000$ • relieved cone • major cutting edge concave • optimised cutting geometry • maximum performance • double margin

for high performance machining of structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1400 N/mm² • stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • special alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	5.900		6.00	82.00	44.000	36.000
3.100		6.00	66.00	28.000	36.000	5.950	15/64	6.00	82.00	44.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	6.000		6.00	82.00	44.000	36.000
3.200		6.00	66.00	28.000	36.000	6.100		8.00	91.00	53.000	36.000
3.250		6.00	66.00	28.000	36.000	6.200		8.00	91.00	53.000	36.000
3.300		6.00	66.00	28.000	36.000	6.300		8.00	91.00	53.000	36.000
3.400		6.00	66.00	28.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
3.500		6.00	66.00	28.000	36.000	6.400		8.00	91.00	53.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	6.500		8.00	91.00	53.000	36.000
3.600		6.00	66.00	28.000	36.000	6.530		8.00	91.00	53.000	36.000
3.700		6.00	66.00	28.000	36.000	6.550		8.00	91.00	53.000	36.000
3.800		6.00	74.00	36.000	36.000	6.600		8.00	91.00	53.000	36.000
3.900		6.00	74.00	36.000	36.000	6.700		8.00	91.00	53.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	6.750	17/64	8.00	91.00	53.000	36.000
4.000		6.00	74.00	36.000	36.000	6.800		8.00	91.00	53.000	36.000
4.040		6.00	74.00	36.000	36.000	6.900		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.550		8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	7.600		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	7.650		8.00	91.00	53.000	36.000
4.900		6.00	82.00	44.000	36.000	7.700		8.00	91.00	53.000	36.000
5.000		6.00	82.00	44.000	36.000	7.800		8.00	91.00	53.000	36.000
5.100		6.00	82.00	44.000	36.000	7.900		8.00	91.00	53.000	36.000
5.110		6.00	82.00	44.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
5.160	13/64	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
5.200		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.410		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8.900		10.00	103.00	61.000	40.000	14.100		16.00	133.00	83.000	48.000
9.000		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
9.100		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
9.130	23/64	10.00	103.00	61.000	40.000	14.300		16.00	133.00	83.000	48.000
9.200		10.00	103.00	61.000	40.000	14.400		16.00	133.00	83.000	48.000
9.250		10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
9.300		10.00	103.00	61.000	40.000	14.600		16.00	133.00	83.000	48.000
9.340		10.00	103.00	61.000	40.000	14.680	37/64	16.00	133.00	83.000	48.000
9.400		10.00	103.00	61.000	40.000	14.700		16.00	133.00	83.000	48.000
9.500		10.00	103.00	61.000	40.000	14.800		16.00	133.00	83.000	48.000
9.520	3/8	10.00	103.00	61.000	40.000	14.900		16.00	133.00	83.000	48.000
9.550		10.00	103.00	61.000	40.000	15.000		16.00	133.00	83.000	48.000
9.600		10.00	103.00	61.000	40.000	15.080	19/32	16.00	133.00	83.000	48.000
9.700		10.00	103.00	61.000	40.000	15.100		16.00	133.00	83.000	48.000
9.800		10.00	103.00	61.000	40.000	15.200		16.00	133.00	83.000	48.000
9.900		10.00	103.00	61.000	40.000	15.300		16.00	133.00	83.000	48.000
9.920	25/64	10.00	103.00	61.000	40.000	15.400		16.00	133.00	83.000	48.000
10.000		10.00	103.00	61.000	40.000	15.480	39/64	16.00	133.00	83.000	48.000
10.100		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	15.550		16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	15.600		16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	15.800		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	15.870	5/8	16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	15.900		16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
10.720	27/64	12.00	118.00	71.000	45.000	16.270	41/64	18.00	143.00	93.000	48.000
10.800		12.00	118.00	71.000	45.000	16.300		18.00	143.00	93.000	48.000
10.900		12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.000		12.00	118.00	71.000	45.000	16.670	21/32	18.00	143.00	93.000	48.000
11.100		12.00	118.00	71.000	45.000	16.700		18.00	143.00	93.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	16.900		18.00	143.00	93.000	48.000
11.200		12.00	118.00	71.000	45.000	17.000		18.00	143.00	93.000	48.000
11.300		12.00	118.00	71.000	45.000	17.070	43/64	18.00	143.00	93.000	48.000
11.400		12.00	118.00	71.000	45.000	17.460	11/16	18.00	143.00	93.000	48.000
11.500		12.00	118.00	71.000	45.000	17.500		18.00	143.00	93.000	48.000
11.510	29/64	12.00	118.00	71.000	45.000	17.550		18.00	143.00	93.000	48.000
11.550		12.00	118.00	71.000	45.000	17.700		18.00	143.00	93.000	48.000
11.600		12.00	118.00	71.000	45.000	17.860	45/64	18.00	143.00	93.000	48.000
11.700		12.00	118.00	71.000	45.000	18.000		18.00	143.00	93.000	48.000
11.800		12.00	118.00	71.000	45.000	18.260	23/32	20.00	153.00	101.000	50.000
11.900		12.00	118.00	71.000	45.000	18.500		20.00	153.00	101.000	50.000
11.910	15/32	12.00	118.00	71.000	45.000	18.700		20.00	153.00	101.000	50.000
12.000		12.00	118.00	71.000	45.000	18.900		20.00	153.00	101.000	50.000
12.100		14.00	124.00	77.000	45.000	19.000		20.00	153.00	101.000	50.000
12.200		14.00	124.00	77.000	45.000	19.050	3/4	20.00	153.00	101.000	50.000
12.300	31/64	14.00	124.00	77.000	45.000	19.250		20.00	153.00	101.000	50.000
12.400		14.00	124.00	77.000	45.000	19.300		20.00	153.00	101.000	50.000
12.500		14.00	124.00	77.000	45.000	19.450	49/64	20.00	153.00	101.000	50.000
12.600		14.00	124.00	77.000	45.000	19.500		20.00	153.00	101.000	50.000
12.700	1/2	14.00	124.00	77.000	45.000	19.550		20.00	153.00	101.000	50.000
12.800		14.00	124.00	77.000	45.000	19.700		20.00	153.00	101.000	50.000
12.900		14.00	124.00	77.000	45.000	19.800		20.00	153.00	101.000	50.000
13.000		14.00	124.00	77.000	45.000	19.840	25/32	20.00	153.00	101.000	50.000
13.100	33/64	14.00	124.00	77.000	45.000	20.000		20.00	153.00	101.000	50.000
13.200		14.00	124.00	77.000	45.000						
13.300		14.00	124.00	77.000	45.000						
13.400		14.00	124.00	77.000	45.000						
13.490	17/32	14.00	124.00	77.000	45.000						
13.500		14.00	124.00	77.000	45.000						
13.600		14.00	124.00	77.000	45.000						
13.700		14.00	124.00	77.000	45.000						
13.800		14.00	124.00	77.000	45.000						
13.890	35/64	14.00	124.00	77.000	45.000						
13.900		14.00	124.00	77.000	45.000						
14.000		14.00	124.00	77.000	45.000						



TS-Drills with internal coolant

Article no. 89461

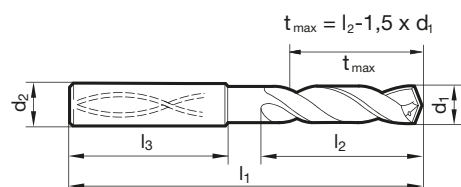


P	M	K	N	S	H
●	○	○	○	○	○



web thinning $\geq \varnothing 3.000$ • major cutting edge concave • relieved cone • optimised cutting geometry • maximum performance • double margin

free-cutting steels, heat-treatable steels • stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • steels (alloyed/unalloyed) up to 1400 N/mm² • for high performance machining of structural and case hardened steels • special alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	70.00	30.000	36.000	5.900		6.00	97.00	57.000	36.000
3.100		6.00	70.00	30.000	36.000	5.950	15/64	6.00	97.00	57.000	36.000
3.170	1/8	6.00	70.00	30.000	36.000	6.000		6.00	97.00	57.000	36.000
3.200		6.00	70.00	30.000	36.000	6.100		8.00	106.00	66.000	36.000
3.250		6.00	70.00	30.000	36.000	6.200		8.00	106.00	66.000	36.000
3.300		6.00	70.00	30.000	36.000	6.300		8.00	106.00	66.000	36.000
3.400		6.00	75.00	35.500	36.000	6.350	1/4	8.00	106.00	66.000	36.000
3.500		6.00	75.00	35.500	36.000	6.400		8.00	106.00	66.000	36.000
3.570	9/64	6.00	75.00	35.500	36.000	6.500		8.00	106.00	66.000	36.000
3.600		6.00	75.00	35.500	36.000	6.530		8.00	106.00	66.000	36.000
3.700		6.00	75.00	35.500	36.000	6.550		8.00	106.00	66.000	36.000
3.800		6.00	75.00	37.500	36.000	6.600		8.00	106.00	66.000	36.000
3.900		6.00	75.00	37.500	36.000	6.700		8.00	106.00	66.000	36.000
3.970	5/32	6.00	75.00	37.500	36.000	6.750	17/64	8.00	106.00	66.000	36.000
4.000		6.00	75.00	37.500	36.000	6.800		8.00	106.00	66.000	36.000
4.040		6.00	75.00	37.500	36.000	6.900		8.00	116.00	76.000	36.000
4.100		6.00	75.00	37.500	36.000	7.000		8.00	116.00	76.000	36.000
4.200		6.00	75.00	37.500	36.000	7.100		8.00	116.00	76.000	36.000
4.300		6.00	85.00	45.000	36.000	7.140	9/32	8.00	116.00	76.000	36.000
4.370	11/64	6.00	85.00	45.000	36.000	7.200		8.00	116.00	76.000	36.000
4.400		6.00	85.00	45.000	36.000	7.300		8.00	116.00	76.000	36.000
4.500		6.00	85.00	45.000	36.000	7.400		8.00	116.00	76.000	36.000
4.600		6.00	85.00	45.000	36.000	7.500		8.00	116.00	76.000	36.000
4.650		6.00	85.00	45.000	36.000	7.540	19/64	8.00	116.00	76.000	36.000
4.700		6.00	85.00	45.000	36.000	7.600		8.00	116.00	76.000	36.000
4.760	3/16	6.00	90.00	50.000	36.000	7.700		8.00	116.00	76.000	36.000
4.800		6.00	90.00	50.000	36.000	7.800		8.00	116.00	76.000	36.000
4.900		6.00	90.00	50.000	36.000	7.900		8.00	116.00	76.000	36.000
5.000		6.00	90.00	50.000	36.000	7.940	5/16	8.00	116.00	76.000	36.000
5.100		6.00	90.00	50.000	36.000	8.000		8.00	116.00	76.000	36.000
5.110		6.00	90.00	50.000	36.000	8.100		10.00	131.00	87.000	40.000
5.160	13/64	6.00	90.00	50.000	36.000	8.200		10.00	131.00	87.000	40.000
5.200		6.00	90.00	50.000	36.000	8.300		10.00	131.00	87.000	40.000
5.300		6.00	90.00	50.000	36.000	8.330	21/64	10.00	131.00	87.000	40.000
5.400		6.00	97.00	57.000	36.000	8.400		10.00	131.00	87.000	40.000
5.410		6.00	97.00	57.000	36.000	8.500		10.00	131.00	87.000	40.000
5.500		6.00	97.00	57.000	36.000	8.600		10.00	131.00	87.000	40.000
5.550		6.00	97.00	57.000	36.000	8.700		10.00	131.00	87.000	40.000
5.560	7/32	6.00	97.00	57.000	36.000	8.730	11/32	10.00	131.00	87.000	40.000
5.600		6.00	97.00	57.000	36.000	8.800		10.00	131.00	87.000	40.000
5.700		6.00	97.00	57.000	36.000	8.900		10.00	131.00	87.000	40.000
5.800		6.00	97.00	57.000	36.000	9.000		10.00	131.00	87.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.100	23/64	10.00	139.00	95.000	40.000	12.900	33/64	14.00	182.00	133.000	45.000
9.130		10.00	139.00	95.000	40.000	13.000		14.00	182.00	133.000	45.000
9.200		10.00	139.00	95.000	40.000	13.100		14.00	182.00	133.000	45.000
9.250		10.00	139.00	95.000	40.000	13.490		14.00	182.00	133.000	45.000
9.300	3/8	10.00	139.00	95.000	40.000	13.500	17/32	14.00	182.00	133.000	45.000
9.340		10.00	139.00	95.000	40.000	13.700		14.00	182.00	133.000	45.000
9.400		10.00	139.00	95.000	40.000	13.890		14.00	182.00	133.000	45.000
9.500		10.00	139.00	95.000	40.000	14.000		14.00	182.00	133.000	45.000
9.520	25/64	10.00	139.00	95.000	40.000	14.100	35/64	16.00	204.00	152.000	48.000
9.600		10.00	139.00	95.000	40.000	14.200		16.00	204.00	152.000	48.000
9.700		10.00	139.00	95.000	40.000	14.290		16.00	204.00	152.000	48.000
9.800		10.00	139.00	95.000	40.000	14.300		16.00	204.00	152.000	48.000
9.900	13/32	10.00	139.00	95.000	40.000	14.500	9/16	16.00	204.00	152.000	48.000
9.920		10.00	139.00	95.000	40.000	14.700		16.00	204.00	152.000	48.000
10.000		10.00	139.00	95.000	40.000	14.800		16.00	204.00	152.000	48.000
10.100		12.00	155.00	106.000	45.000	15.000		16.00	204.00	152.000	48.000
10.200	27/64	12.00	155.00	106.000	45.000	15.100	39/64	16.00	204.00	152.000	48.000
10.300		12.00	155.00	106.000	45.000	15.300		16.00	204.00	152.000	48.000
10.320		12.00	155.00	106.000	45.000	15.480		16.00	204.00	152.000	48.000
10.400		12.00	155.00	106.000	45.000	15.500		16.00	204.00	152.000	48.000
10.500	7/16	12.00	155.00	106.000	45.000	15.700	5/8	16.00	204.00	152.000	48.000
10.600		12.00	155.00	106.000	45.000	15.800		16.00	204.00	152.000	48.000
10.700		12.00	155.00	106.000	45.000	15.870		16.00	204.00	152.000	48.000
10.720		12.00	155.00	106.000	45.000	16.000		16.00	204.00	152.000	48.000
10.800	29/64	12.00	155.00	106.000	45.000	16.300	3/4	18.00	223.00	171.000	48.000
10.900		12.00	155.00	106.000	45.000	16.500		18.00	223.00	171.000	48.000
11.000		12.00	155.00	106.000	45.000	16.700		18.00	223.00	171.000	48.000
11.100		12.00	163.00	114.000	45.000	16.900		18.00	223.00	171.000	48.000
11.110	15/32	12.00	163.00	114.000	45.000	17.000	31/64	18.00	223.00	171.000	48.000
11.200		12.00	163.00	114.000	45.000	17.500		18.00	223.00	171.000	48.000
11.300		12.00	163.00	114.000	45.000	17.700		18.00	223.00	171.000	48.000
11.400		12.00	163.00	114.000	45.000	18.000		18.00	223.00	171.000	48.000
11.500	1/2	12.00	163.00	114.000	45.000	18.500		20.00	244.00	190.000	50.000
11.510		12.00	163.00	114.000	45.000	18.900		20.00	244.00	190.000	50.000
11.600		12.00	163.00	114.000	45.000	19.000		20.00	244.00	190.000	50.000
11.700		12.00	163.00	114.000	45.000	19.050		20.00	244.00	190.000	50.000
11.800		12.00	163.00	114.000	45.000	19.500		20.00	244.00	190.000	50.000
11.900		12.00	163.00	114.000	45.000	19.800		20.00	244.00	190.000	50.000
11.910		12.00	163.00	114.000	45.000	20.000		20.00	244.00	190.000	50.000
12.000		12.00	163.00	114.000	45.000						
12.100		14.00	182.00	133.000	45.000						
12.200		14.00	182.00	133.000	45.000						
12.300		14.00	182.00	133.000	45.000						
12.400		14.00	182.00	133.000	45.000						
12.500		14.00	182.00	133.000	45.000						
12.600		14.00	182.00	133.000	45.000						
12.700		14.00	182.00	133.000	45.000						
12.800		14.00	182.00	133.000	45.000						



HARTNER

TS-Drills, 3-fluted

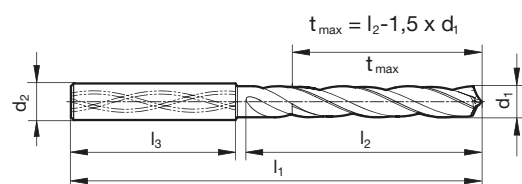
Article no. 89527



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 4.000$ • spiro-point • optimal centering • suitable for interrupted cutting • maximum performance
structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1400 N/mm² • cast materials



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4.000		6.00	66.00	24.000	36.000	6.800		8.00	79.00	34.000	36.000
4.040		6.00	66.00	24.000	36.000	6.900		8.00	79.00	34.000	36.000
4.100		6.00	66.00	24.000	36.000	7.000		8.00	79.00	34.000	36.000
4.200		6.00	66.00	24.000	36.000	7.100		8.00	79.00	41.000	36.000
4.300		6.00	66.00	24.000	36.000	7.140	9/32	8.00	79.00	41.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	7.200		8.00	79.00	41.000	36.000
4.400		6.00	66.00	24.000	36.000	7.300		8.00	79.00	41.000	36.000
4.500		6.00	66.00	24.000	36.000	7.400		8.00	79.00	41.000	36.000
4.600		6.00	66.00	24.000	36.000	7.500		8.00	79.00	41.000	36.000
4.650		6.00	66.00	24.000	36.000	7.540	19/64	8.00	79.00	41.000	36.000
4.700		6.00	66.00	24.000	36.000	7.550		8.00	79.00	41.000	36.000
4.760	3/16	6.00	66.00	28.000	36.000	7.600		8.00	79.00	41.000	36.000
4.800		6.00	66.00	28.000	36.000	7.650		8.00	79.00	41.000	36.000
4.900		6.00	66.00	28.000	36.000	7.700		8.00	79.00	41.000	36.000
5.000		6.00	66.00	28.000	36.000	7.800		8.00	79.00	41.000	36.000
5.100		6.00	66.00	28.000	36.000	7.900		8.00	79.00	41.000	36.000
5.110		6.00	66.00	28.000	36.000	7.940	5/16	8.00	79.00	41.000	36.000
5.160	13/64	6.00	66.00	28.000	36.000	8.000		8.00	79.00	41.000	36.000
5.200		6.00	66.00	28.000	36.000	8.100		10.00	89.00	47.000	40.000
5.300		6.00	66.00	28.000	36.000	8.200		10.00	89.00	47.000	40.000
5.400		6.00	66.00	28.000	36.000	8.300		10.00	89.00	47.000	40.000
5.410		6.00	66.00	28.000	36.000	8.330	21/64	10.00	89.00	47.000	40.000
5.500		6.00	66.00	28.000	36.000	8.400		10.00	89.00	47.000	40.000
5.550		6.00	66.00	28.000	36.000	8.500		10.00	89.00	47.000	40.000
5.560	7/32	6.00	66.00	28.000	36.000	8.600		10.00	89.00	47.000	40.000
5.600		6.00	66.00	28.000	36.000	8.700		10.00	89.00	47.000	40.000
5.700		6.00	66.00	28.000	36.000	8.730	11/32	10.00	89.00	47.000	40.000
5.800		6.00	66.00	28.000	36.000	8.800		10.00	89.00	47.000	40.000
5.900		6.00	66.00	28.000	36.000	8.900		10.00	89.00	47.000	40.000
5.950	15/64	6.00	66.00	28.000	36.000	9.000		10.00	89.00	47.000	40.000
6.000		6.00	66.00	28.000	36.000	9.100		10.00	89.00	47.000	40.000
6.100		8.00	79.00	34.000	36.000	9.130	23/64	10.00	89.00	47.000	40.000
6.200		8.00	79.00	34.000	36.000	9.200		10.00	89.00	47.000	40.000
6.300		8.00	79.00	34.000	36.000	9.250		10.00	89.00	47.000	40.000
6.350	1/4	8.00	79.00	34.000	36.000	9.300		10.00	89.00	47.000	40.000
6.400		8.00	79.00	34.000	36.000	9.340		10.00	89.00	47.000	40.000
6.500		8.00	79.00	34.000	36.000	9.400		10.00	89.00	47.000	40.000
6.530		8.00	79.00	34.000	36.000	9.500		10.00	89.00	47.000	40.000
6.550		8.00	79.00	34.000	36.000	9.520	3/8	10.00	89.00	47.000	40.000
6.600		8.00	79.00	34.000	36.000	9.550		10.00	89.00	47.000	40.000
6.700		8.00	79.00	34.000	36.000	9.600		10.00	89.00	47.000	40.000
6.750	17/64	8.00	79.00	34.000	36.000	9.700		10.00	89.00	47.000	40.000



HARTNER

TS-Drills, 3-fluted

TS 100 U | TS 100 HPC

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.800		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
9.900		10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
9.920	25/64	10.00	89.00	47.000	40.000	14.400		16.00	115.00	65.000	48.000
10.000		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
10.100		12.00	102.00	55.000	45.000	14.600		16.00	115.00	65.000	48.000
10.200		12.00	102.00	55.000	45.000	14.680	37/64	16.00	115.00	65.000	48.000
10.300		12.00	102.00	55.000	45.000	14.700		16.00	115.00	65.000	48.000
10.320	13/32	12.00	102.00	55.000	45.000	14.800		16.00	115.00	65.000	48.000
10.400		12.00	102.00	55.000	45.000	14.900		16.00	115.00	65.000	48.000
10.500		12.00	102.00	55.000	45.000	15.000		16.00	115.00	65.000	48.000
10.600		12.00	102.00	55.000	45.000	15.080	19/32	16.00	115.00	65.000	48.000
10.700		12.00	102.00	55.000	45.000	15.100		16.00	115.00	65.000	48.000
10.720	27/64	12.00	102.00	55.000	45.000	15.200		16.00	115.00	65.000	48.000
10.800		12.00	102.00	55.000	45.000	15.300		16.00	115.00	65.000	48.000
10.900		12.00	102.00	55.000	45.000	15.400		16.00	115.00	65.000	48.000
11.000		12.00	102.00	55.000	45.000	15.480	39/64	16.00	115.00	65.000	48.000
11.100		12.00	102.00	55.000	45.000	15.500		16.00	115.00	65.000	48.000
11.110	7/16	12.00	102.00	55.000	45.000	15.550		16.00	115.00	65.000	48.000
11.200		12.00	102.00	55.000	45.000	15.600		16.00	115.00	65.000	48.000
11.300		12.00	102.00	55.000	45.000	15.700		16.00	115.00	65.000	48.000
11.400		12.00	102.00	55.000	45.000	15.800		16.00	115.00	65.000	48.000
11.500		12.00	102.00	55.000	45.000	15.870	5/8	16.00	115.00	65.000	48.000
11.510	29/64	12.00	102.00	55.000	45.000	15.900		16.00	115.00	65.000	48.000
11.550		12.00	102.00	55.000	45.000	16.000		16.00	115.00	65.000	48.000
11.600		12.00	102.00	55.000	45.000	16.270	41/64	18.00	123.00	73.000	48.000
11.700		12.00	102.00	55.000	45.000	16.300		18.00	123.00	73.000	48.000
11.800		12.00	102.00	55.000	45.000	16.500		18.00	123.00	73.000	48.000
11.900		12.00	102.00	55.000	45.000	16.670	21/32	18.00	123.00	73.000	48.000
11.910	15/32	12.00	102.00	55.000	45.000	16.700		18.00	123.00	73.000	48.000
12.000		12.00	102.00	55.000	45.000	16.900		18.00	123.00	73.000	48.000
12.100		14.00	107.00	60.000	45.000	17.000		18.00	123.00	73.000	48.000
12.200		14.00	107.00	60.000	45.000	17.070	43/64	18.00	123.00	73.000	48.000
12.300	31/64	14.00	107.00	60.000	45.000	17.460	11/16	18.00	123.00	73.000	48.000
12.400		14.00	107.00	60.000	45.000	17.500		18.00	123.00	73.000	48.000
12.500		14.00	107.00	60.000	45.000	17.550		18.00	123.00	73.000	48.000
12.600		14.00	107.00	60.000	45.000	17.700		18.00	123.00	73.000	48.000
12.700	1/2	14.00	107.00	60.000	45.000	17.860	45/64	18.00	123.00	73.000	48.000
12.800		14.00	107.00	60.000	45.000	18.000		18.00	123.00	73.000	48.000
12.900		14.00	107.00	60.000	45.000	18.260	23/32	20.00	131.00	79.000	50.000
13.000		14.00	107.00	60.000	45.000	18.500		20.00	131.00	79.000	50.000
13.100	33/64	14.00	107.00	60.000	45.000	18.700		20.00	131.00	79.000	50.000
13.200		14.00	107.00	60.000	45.000	18.900		20.00	131.00	79.000	50.000
13.300		14.00	107.00	60.000	45.000	19.000		20.00	131.00	79.000	50.000
13.400		14.00	107.00	60.000	45.000	19.050	3/4	20.00	131.00	79.000	50.000
13.490	17/32	14.00	107.00	60.000	45.000	19.250		20.00	131.00	79.000	50.000
13.500		14.00	107.00	60.000	45.000	19.300		20.00	131.00	79.000	50.000
13.600		14.00	107.00	60.000	45.000	19.450	49/64	20.00	131.00	79.000	50.000
13.700		14.00	107.00	60.000	45.000	19.500		20.00	131.00	79.000	50.000
13.800		14.00	107.00	60.000	45.000	19.550		20.00	131.00	79.000	50.000
13.890	35/64	14.00	107.00	60.000	45.000	19.700		20.00	131.00	79.000	50.000
13.900		14.00	107.00	60.000	45.000	19.800		20.00	131.00	79.000	50.000
14.000		14.00	107.00	60.000	45.000	19.840	25/32	20.00	131.00	79.000	50.000
14.100		16.00	115.00	65.000	48.000	20.000		20.00	131.00	79.000	50.000
14.200		16.00	115.00	65.000	48.000						



HARTNER

TS-Drills, 3-fluted

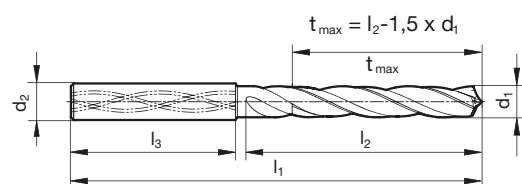
Article no. 89526



P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 4.000$ • spiro-point • optimal centering • suitable for interrupted cutting • maximum performance
 structural and case hardened steels • free-cutting steels, heat-treatable steels • steels (alloyed/unalloyed) up to 1400 N/mm² • cast materials



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4.000		6.00	74.00	36.000	36.000	6.800		8.00	91.00	53.000	36.000
4.040		6.00	74.00	36.000	36.000	6.900		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.550		8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	7.600		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	7.650		8.00	91.00	53.000	36.000
4.900		6.00	82.00	44.000	36.000	7.700		8.00	91.00	53.000	36.000
5.000		6.00	82.00	44.000	36.000	7.800		8.00	91.00	53.000	36.000
5.100		6.00	82.00	44.000	36.000	7.900		8.00	91.00	53.000	36.000
5.110		6.00	82.00	44.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
5.160	13/64	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
5.200		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.410		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000
5.900		6.00	82.00	44.000	36.000	8.900		10.00	103.00	61.000	40.000
5.950	15/64	6.00	82.00	44.000	36.000	9.000		10.00	103.00	61.000	40.000
6.000		6.00	82.00	44.000	36.000	9.100		10.00	103.00	61.000	40.000
6.100		8.00	91.00	53.000	36.000	9.130	23/64	10.00	103.00	61.000	40.000
6.200		8.00	91.00	53.000	36.000	9.200		10.00	103.00	61.000	40.000
6.300		8.00	91.00	53.000	36.000	9.250		10.00	103.00	61.000	40.000
6.350	1/4	8.00	91.00	53.000	36.000	9.300		10.00	103.00	61.000	40.000
6.400		8.00	91.00	53.000	36.000	9.340		10.00	103.00	61.000	40.000
6.500		8.00	91.00	53.000	36.000	9.400		10.00	103.00	61.000	40.000
6.530		8.00	91.00	53.000	36.000	9.500		10.00	103.00	61.000	40.000
6.550		8.00	91.00	53.000	36.000	9.520	3/8	10.00	103.00	61.000	40.000
6.600		8.00	91.00	53.000	36.000	9.550		10.00	103.00	61.000	40.000
6.700		8.00	91.00	53.000	36.000	9.600		10.00	103.00	61.000	40.000
6.750	17/64	8.00	91.00	53.000	36.000	9.700		10.00	103.00	61.000	40.000



HARTNER

TS-Drills, 3-fluted

TS 100 U | TS 100 HPC

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.800		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
9.900		10.00	103.00	61.000	40.000	14.300		16.00	133.00	83.000	48.000
9.920	25/64	10.00	103.00	61.000	40.000	14.400		16.00	133.00	83.000	48.000
10.000		10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
10.100		12.00	118.00	71.000	45.000	14.600		16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	14.680	37/64	16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	14.700		16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	14.800		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	14.900		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	15.000		16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	15.080	19/32	16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	15.100		16.00	133.00	83.000	48.000
10.720	27/64	12.00	118.00	71.000	45.000	15.200		16.00	133.00	83.000	48.000
10.800		12.00	118.00	71.000	45.000	15.300		16.00	133.00	83.000	48.000
10.900		12.00	118.00	71.000	45.000	15.400		16.00	133.00	83.000	48.000
11.000		12.00	118.00	71.000	45.000	15.480	39/64	16.00	133.00	83.000	48.000
11.100		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	15.550		16.00	133.00	83.000	48.000
11.200		12.00	118.00	71.000	45.000	15.600		16.00	133.00	83.000	48.000
11.300		12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
11.400		12.00	118.00	71.000	45.000	15.800		16.00	133.00	83.000	48.000
11.500		12.00	118.00	71.000	45.000	15.870	5/8	16.00	133.00	83.000	48.000
11.510	29/64	12.00	118.00	71.000	45.000	15.900		16.00	133.00	83.000	48.000
11.550		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
11.600		12.00	118.00	71.000	45.000	16.270	41/64	18.00	143.00	93.000	48.000
11.700		12.00	118.00	71.000	45.000	16.300		18.00	143.00	93.000	48.000
11.800		12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.900		12.00	118.00	71.000	45.000	16.670	21/32	18.00	143.00	93.000	48.000
11.910	15/32	12.00	118.00	71.000	45.000	16.700		18.00	143.00	93.000	48.000
12.000		12.00	118.00	71.000	45.000	16.900		18.00	143.00	93.000	48.000
12.100		14.00	124.00	77.000	45.000	17.000		18.00	143.00	93.000	48.000
12.200		14.00	124.00	77.000	45.000	17.070	43/64	18.00	143.00	93.000	48.000
12.300	31/64	14.00	124.00	77.000	45.000	17.460	11/16	18.00	143.00	93.000	48.000
12.400		14.00	124.00	77.000	45.000	17.500		18.00	143.00	93.000	48.000
12.500		14.00	124.00	77.000	45.000	17.550		18.00	143.00	93.000	48.000
12.600		14.00	124.00	77.000	45.000	17.700		18.00	143.00	93.000	48.000
12.700	1/2	14.00	124.00	77.000	45.000	17.860	45/64	18.00	143.00	93.000	48.000
12.800		14.00	124.00	77.000	45.000	18.000		18.00	143.00	93.000	48.000
12.900		14.00	124.00	77.000	45.000	18.260	23/32	20.00	153.00	101.000	50.000
13.000		14.00	124.00	77.000	45.000	18.500		20.00	153.00	101.000	50.000
13.100	33/64	14.00	124.00	77.000	45.000	18.700		20.00	153.00	101.000	50.000
13.200		14.00	124.00	77.000	45.000	18.900		20.00	153.00	101.000	50.000
13.300		14.00	124.00	77.000	45.000	19.000		20.00	153.00	101.000	50.000
13.400		14.00	124.00	77.000	45.000	19.050	3/4	20.00	153.00	101.000	50.000
13.490	17/32	14.00	124.00	77.000	45.000	19.250		20.00	153.00	101.000	50.000
13.500		14.00	124.00	77.000	45.000	19.300		20.00	153.00	101.000	50.000
13.600		14.00	124.00	77.000	45.000	19.450	49/64	20.00	153.00	101.000	50.000
13.700		14.00	124.00	77.000	45.000	19.500		20.00	153.00	101.000	50.000
13.800		14.00	124.00	77.000	45.000	19.550		20.00	153.00	101.000	50.000
13.890	35/64	14.00	124.00	77.000	45.000	19.700		20.00	153.00	101.000	50.000
13.900		14.00	124.00	77.000	45.000	19.800		20.00	153.00	101.000	50.000
14.000		14.00	124.00	77.000	45.000	19.840	25/32	20.00	153.00	101.000	50.000
14.100		16.00	133.00	83.000	48.000	20.000		20.00	153.00	101.000	50.000
14.200		16.00	133.00	83.000	48.000						



HARTNER

NC spotting drills

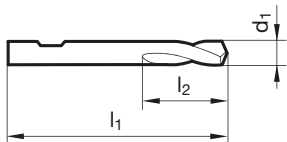
Article no. 89203



P	M	K	N	S	H
•	•	•	○	•	○



only suitable for spotting • $\geq \varnothing 6.0$ mm with clamping surface shank form HB • $\leq \varnothing 3.0$ mm shank- $\varnothing 4.0$ mm with HA shank
universal material suitability



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
1.000		4.00	50.00	3.000	39.400	8.000		8.00	79.00	21.000	36.000
2.000		4.00	50.00	6.000	36.300	10.000		10.00	89.00	25.000	40.000
3.000		4.00	50.00	9.000	33.100	12.000		12.00	102.00	30.000	45.000
4.000		4.00	55.00	12.000	43.000	16.000		16.00	115.00	37.500	48.000
5.000		5.00	62.00	14.000	48.000	20.000		20.00	131.00	45.000	50.000
6.000		6.00	66.00	16.000	36.000						

THE HARTNER ONLINE SHOP

▼ MANY PRACTICAL FEATURES FOR YOUR COMPANY

- ▼ maximum individualisation for your company
- ▼ optimise your internal procurement process
- ▼ overview of your orders
- ▼ all tool data and availabilities
- ▼ interfaces to your ERP system

**REGISTER
NOW &
BENEFIT**



▼ MAXIMISE THE INDIVIDUALISATION FOR YOUR COMPANY

AUTHORIZATION MANAGEMENT

You can individually set, adjust and edit the rights and roles of your employees at any time.

PERSONAL PURCHASING CONDITIONS

Your personal purchasing conditions and prices at a glance at any time.

ACCOUNT ADMINISTRATION

You can view and update your personal details at any time. Manage different delivery addresses in your account or add new users and/or delete old ones.



▼ OPTIMISE YOUR INTERNAL PROCUREMENT PROCESS

INDIVIDUAL MATERIAL NUMBERS

By assigning individual material numbers, you can place orders even faster and optimise your processes.

SUBSCRIPTIONFUNCTION

Automate recurring tool orders with the subscription function.

SHOPPING CARTADMINISTRATION

Shopping carts can be saved, forwarded and ordered directly. Editing shopping carts by several people is also not a problem, thanks to forwarding.



TS 100 INOX

STAINLESS, ACID AND HEAT-RESISTANT STEELS,
TITANIUM AND TITANIUM ALLOYS, SPECIAL ALLOYS

ADVANTAGES AND CHARACTERISTICS

- ▼ **specialist** for precise boreholes and long tool lives in stainless steels, acid-proof and heat-resistant steels, Inconel, Hastelloy, Nimonic, titanium and titanium alloys
- ▼ the **TS 100 INOX** enables **high feed rates** – chips are evacuated quickly and built-up edges are prevented
- ▼ a **maximum coolant duct cross-section** helps to dissipate heat and evacuate chips and counteract built-up edges to guarantee **reliable drilling**



TS-Drills with internal coolant

Article no. 89450



P	M	K	N	S	H
○	●			○	



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel

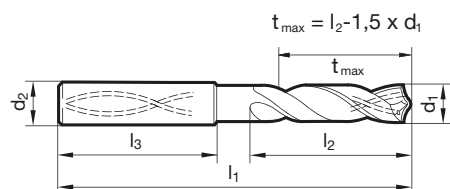
Article no. 89550



P	M	K	N	S	H
○	●			○	



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	4.760	3/16	6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	4.800		6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	4.900		6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	5.000		6.00	66.00	28.000	36.000
3.250		6.00	62.00	20.000	36.000	5.100		6.00	66.00	28.000	36.000
3.300		6.00	62.00	20.000	36.000	5.160	13/64	6.00	66.00	28.000	36.000
3.400		6.00	62.00	20.000	36.000	5.200		6.00	66.00	28.000	36.000
3.500		6.00	62.00	20.000	36.000	5.300		6.00	66.00	28.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	5.400		6.00	66.00	28.000	36.000
3.600		6.00	62.00	20.000	36.000	5.500		6.00	66.00	28.000	36.000
3.700		6.00	62.00	20.000	36.000	5.550		6.00	66.00	28.000	36.000
3.800		6.00	66.00	24.000	36.000	5.560	7/32	6.00	66.00	28.000	36.000
3.900		6.00	66.00	24.000	36.000	5.600		6.00	66.00	28.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	5.700		6.00	66.00	28.000	36.000
4.000		6.00	66.00	24.000	36.000	5.800		6.00	66.00	28.000	36.000
4.100		6.00	66.00	24.000	36.000	5.900		6.00	66.00	28.000	36.000
4.200		6.00	66.00	24.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
4.300		6.00	66.00	24.000	36.000	6.000		6.00	66.00	28.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	6.100		8.00	79.00	34.000	36.000
4.400		6.00	66.00	24.000	36.000	6.200		8.00	79.00	34.000	36.000
4.500		6.00	66.00	24.000	36.000	6.300		8.00	79.00	34.000	36.000
4.600		6.00	66.00	24.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
4.650		6.00	66.00	24.000	36.000	6.400		8.00	79.00	34.000	36.000
4.700		6.00	66.00	24.000	36.000	6.500		8.00	79.00	34.000	36.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	79.00	34.000	36.000	10.900		12.00	102.00	55.000	45.000
6.700		8.00	79.00	34.000	36.000	11.000		12.00	102.00	55.000	45.000
6.750	17/64	8.00	79.00	34.000	36.000	11.100		12.00	102.00	55.000	45.000
6.800		8.00	79.00	34.000	36.000	11.110	7/16	12.00	102.00	55.000	45.000
6.900		8.00	79.00	34.000	36.000	11.200		12.00	102.00	55.000	45.000
7.000		8.00	79.00	34.000	36.000	11.300		12.00	102.00	55.000	45.000
7.100		8.00	79.00	41.000	36.000	11.400		12.00	102.00	55.000	45.000
7.140	9/32	8.00	79.00	41.000	36.000	11.500		12.00	102.00	55.000	45.000
7.200		8.00	79.00	41.000	36.000	11.600		12.00	102.00	55.000	45.000
7.300		8.00	79.00	41.000	36.000	11.700		12.00	102.00	55.000	45.000
7.400		8.00	79.00	41.000	36.000	11.800		12.00	102.00	55.000	45.000
7.500		8.00	79.00	41.000	36.000	11.900		12.00	102.00	55.000	45.000
7.540	19/64	8.00	79.00	41.000	36.000	11.910	15/32	12.00	102.00	55.000	45.000
7.600		8.00	79.00	41.000	36.000	12.000		12.00	102.00	55.000	45.000
7.700		8.00	79.00	41.000	36.000	12.200		14.00	107.00	60.000	45.000
7.800		8.00	79.00	41.000	36.000	12.500		14.00	107.00	60.000	45.000
7.900		8.00	79.00	41.000	36.000	12.700	1/2	14.00	107.00	60.000	45.000
7.940	5/16	8.00	79.00	41.000	36.000	12.800		14.00	107.00	60.000	45.000
8.000		8.00	79.00	41.000	36.000	13.000		14.00	107.00	60.000	45.000
8.100		10.00	89.00	47.000	40.000	13.300		14.00	107.00	60.000	45.000
8.200		10.00	89.00	47.000	40.000	13.500		14.00	107.00	60.000	45.000
8.300		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
8.330	21/64	10.00	89.00	47.000	40.000	14.000		14.00	107.00	60.000	45.000
8.400		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
8.500		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
8.600		10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
8.700		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
8.730	11/32	10.00	89.00	47.000	40.000	14.700		16.00	115.00	65.000	48.000
8.800		10.00	89.00	47.000	40.000	15.000		16.00	115.00	65.000	48.000
8.900		10.00	89.00	47.000	40.000	15.200		16.00	115.00	65.000	48.000
9.000		10.00	89.00	47.000	40.000	15.300		16.00	115.00	65.000	48.000
9.100		10.00	89.00	47.000	40.000	15.500		16.00	115.00	65.000	48.000
9.130	23/64	10.00	89.00	47.000	40.000	15.700		16.00	115.00	65.000	48.000
9.200		10.00	89.00	47.000	40.000	16.000		16.00	115.00	65.000	48.000
9.250		10.00	89.00	47.000	40.000	16.300		18.00	123.00	73.000	48.000
9.300		10.00	89.00	47.000	40.000	16.500		18.00	123.00	73.000	48.000
9.400		10.00	89.00	47.000	40.000	16.900		18.00	123.00	73.000	48.000
9.500		10.00	89.00	47.000	40.000	17.000		18.00	123.00	73.000	48.000
9.520	3/8	10.00	89.00	47.000	40.000	17.300		18.00	123.00	73.000	48.000
9.600		10.00	89.00	47.000	40.000	17.500		18.00	123.00	73.000	48.000
9.700		10.00	89.00	47.000	40.000	18.000		18.00	123.00	73.000	48.000
9.800		10.00	89.00	47.000	40.000	18.500		20.00	131.00	79.000	50.000
9.900		10.00	89.00	47.000	40.000	18.900		20.00	131.00	79.000	50.000
9.920	25/64	10.00	89.00	47.000	40.000	19.000		20.00	131.00	79.000	50.000
10.000		10.00	89.00	47.000	40.000	19.300		20.00	131.00	79.000	50.000
10.100		12.00	102.00	55.000	45.000	19.500		20.00	131.00	79.000	50.000
10.200		12.00	102.00	55.000	45.000	20.000		20.00	131.00	79.000	50.000
10.300		12.00	102.00	55.000	45.000						
10.320	13/32	12.00	102.00	55.000	45.000						
10.400		12.00	102.00	55.000	45.000						
10.500		12.00	102.00	55.000	45.000						
10.600		12.00	102.00	55.000	45.000						
10.700		12.00	102.00	55.000	45.000						
10.800		12.00	102.00	55.000	45.000						

TS-Drills with internal coolant

Article no. 89451



P	M	K	N	S	H
○	●			○	



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel

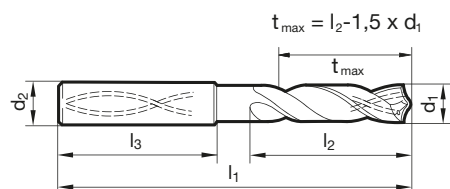
Article no. 89551



P	M	K	N	S	H
○	●			○	



web thinning $\geq \varnothing 3.000$ • facet point grind • main cutting edge form straight • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	4.760	3/16	6.00	82.00	44.000	36.000
3.100		6.00	66.00	28.000	36.000	4.800		6.00	82.00	44.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	4.900		6.00	82.00	44.000	36.000
3.200		6.00	66.00	28.000	36.000	5.000		6.00	82.00	44.000	36.000
3.250		6.00	66.00	28.000	36.000	5.100		6.00	82.00	44.000	36.000
3.300		6.00	66.00	28.000	36.000	5.160	13/64	6.00	82.00	44.000	36.000
3.400		6.00	66.00	28.000	36.000	5.200		6.00	82.00	44.000	36.000
3.500		6.00	66.00	28.000	36.000	5.300		6.00	82.00	44.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	5.400		6.00	82.00	44.000	36.000
3.600		6.00	66.00	28.000	36.000	5.500		6.00	82.00	44.000	36.000
3.700		6.00	66.00	28.000	36.000	5.550		6.00	82.00	44.000	36.000
3.800		6.00	74.00	36.000	36.000	5.560	7/32	6.00	82.00	44.000	36.000
3.900		6.00	74.00	36.000	36.000	5.600		6.00	82.00	44.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	5.700		6.00	82.00	44.000	36.000
4.000		6.00	74.00	36.000	36.000	5.800		6.00	82.00	44.000	36.000
4.100		6.00	74.00	36.000	36.000	5.900		6.00	82.00	44.000	36.000
4.200		6.00	74.00	36.000	36.000	5.950	15/64	6.00	82.00	44.000	36.000
4.300		6.00	74.00	36.000	36.000	6.000		6.00	82.00	44.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	6.100		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	6.200		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	6.300		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	6.400		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	6.500		8.00	91.00	53.000	36.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	91.00	53.000	36.000	10.900		12.00	118.00	71.000	45.000
6.700		8.00	91.00	53.000	36.000	11.000		12.00	118.00	71.000	45.000
6.750	17/64	8.00	91.00	53.000	36.000	11.100		12.00	118.00	71.000	45.000
6.800		8.00	91.00	53.000	36.000	11.110	7/16	12.00	118.00	71.000	45.000
6.900		8.00	91.00	53.000	36.000	11.200		12.00	118.00	71.000	45.000
7.000		8.00	91.00	53.000	36.000	11.300		12.00	118.00	71.000	45.000
7.100		8.00	91.00	53.000	36.000	11.400		12.00	118.00	71.000	45.000
7.140	9/32	8.00	91.00	53.000	36.000	11.500		12.00	118.00	71.000	45.000
7.200		8.00	91.00	53.000	36.000	11.600		12.00	118.00	71.000	45.000
7.300		8.00	91.00	53.000	36.000	11.700		12.00	118.00	71.000	45.000
7.400		8.00	91.00	53.000	36.000	11.800		12.00	118.00	71.000	45.000
7.500		8.00	91.00	53.000	36.000	11.900		12.00	118.00	71.000	45.000
7.540	19/64	8.00	91.00	53.000	36.000	11.910	15/32	12.00	118.00	71.000	45.000
7.600		8.00	91.00	53.000	36.000	12.000		12.00	118.00	71.000	45.000
7.700		8.00	91.00	53.000	36.000	12.200		14.00	124.00	77.000	45.000
7.800		8.00	91.00	53.000	36.000	12.500		14.00	124.00	77.000	45.000
7.900		8.00	91.00	53.000	36.000	12.700	1/2	14.00	124.00	77.000	45.000
7.940	5/16	8.00	91.00	53.000	36.000	12.800		14.00	124.00	77.000	45.000
8.000		8.00	91.00	53.000	36.000	13.000		14.00	124.00	77.000	45.000
8.100		10.00	103.00	61.000	40.000	13.300		14.00	124.00	77.000	45.000
8.200		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
8.300		10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
8.330	21/64	10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
8.400		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
8.500		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
8.600		10.00	103.00	61.000	40.000	14.300		16.00	133.00	83.000	48.000
8.700		10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
8.730	11/32	10.00	103.00	61.000	40.000	14.700		16.00	133.00	83.000	48.000
8.800		10.00	103.00	61.000	40.000	15.000		16.00	133.00	83.000	48.000
8.900		10.00	103.00	61.000	40.000	15.200		16.00	133.00	83.000	48.000
9.000		10.00	103.00	61.000	40.000	15.300		16.00	133.00	83.000	48.000
9.100		10.00	103.00	61.000	40.000	15.500		16.00	133.00	83.000	48.000
9.130	23/64	10.00	103.00	61.000	40.000	15.700		16.00	133.00	83.000	48.000
9.200		10.00	103.00	61.000	40.000	16.000		16.00	133.00	83.000	48.000
9.250		10.00	103.00	61.000	40.000	16.300		18.00	143.00	93.000	48.000
9.300		10.00	103.00	61.000	40.000	16.500		18.00	143.00	93.000	48.000
9.400		10.00	103.00	61.000	40.000	16.900		18.00	143.00	93.000	48.000
9.500		10.00	103.00	61.000	40.000	17.000		18.00	143.00	93.000	48.000
9.520	3/8	10.00	103.00	61.000	40.000	17.300		18.00	143.00	93.000	48.000
9.600		10.00	103.00	61.000	40.000	17.500		18.00	143.00	93.000	48.000
9.700		10.00	103.00	61.000	40.000	18.000		18.00	143.00	93.000	48.000
9.800		10.00	103.00	61.000	40.000	18.500		20.00	153.00	101.000	50.000
9.900		10.00	103.00	61.000	40.000	18.900		20.00	153.00	101.000	50.000
9.920	25/64	10.00	103.00	61.000	40.000	19.000		20.00	153.00	101.000	50.000
10.000		10.00	103.00	61.000	40.000	19.050	3/4	20.00	153.00	101.000	50.000
10.100		12.00	118.00	71.000	45.000	19.300		20.00	153.00	101.000	50.000
10.200		12.00	118.00	71.000	45.000	19.500		20.00	153.00	101.000	50.000
10.300		12.00	118.00	71.000	45.000	20.000		20.00	153.00	101.000	50.000
10.320	13/32	12.00	118.00	71.000	45.000						
10.400		12.00	118.00	71.000	45.000						
10.500		12.00	118.00	71.000	45.000						
10.600		12.00	118.00	71.000	45.000						
10.700		12.00	118.00	71.000	45.000						
10.800		12.00	118.00	71.000	45.000						



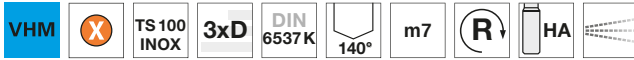
HARTNER

TS-Drills with internal coolant

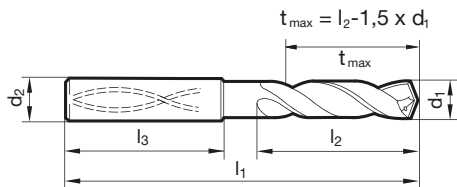
Article no. 89552



P	M	K	N	S	H
○	●			●	



maximum performance • optimised cutting edge geometry • main cutting edge is slightly concave • exceptional hole quality
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	5.900		6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	6.000		6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	6.100		8.00	79.00	34.000	36.000
3.250		6.00	62.00	20.000	36.000	6.200		8.00	79.00	34.000	36.000
3.300		6.00	62.00	20.000	36.000	6.300		8.00	79.00	34.000	36.000
3.400		6.00	62.00	20.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
3.500		6.00	62.00	20.000	36.000	6.400		8.00	79.00	34.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	6.500		8.00	79.00	34.000	36.000
3.600		6.00	62.00	20.000	36.000	6.530		8.00	79.00	34.000	36.000
3.700		6.00	62.00	20.000	36.000	6.550		8.00	79.00	34.000	36.000
3.800		6.00	66.00	24.000	36.000	6.600		8.00	79.00	34.000	36.000
3.900		6.00	66.00	24.000	36.000	6.700		8.00	79.00	34.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	6.750	17/64	8.00	79.00	34.000	36.000
4.000		6.00	66.00	24.000	36.000	6.800		8.00	79.00	34.000	36.000
4.040		6.00	66.00	24.000	36.000	6.900		8.00	79.00	34.000	36.000
4.100		6.00	66.00	24.000	36.000	7.000		8.00	79.00	34.000	36.000
4.200		6.00	66.00	24.000	36.000	7.100		8.00	79.00	41.000	36.000
4.300		6.00	66.00	24.000	36.000	7.140	9/32	8.00	79.00	41.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	7.200		8.00	79.00	41.000	36.000
4.400		6.00	66.00	24.000	36.000	7.300		8.00	79.00	41.000	36.000
4.500		6.00	66.00	24.000	36.000	7.400		8.00	79.00	41.000	36.000
4.600		6.00	66.00	24.000	36.000	7.500		8.00	79.00	41.000	36.000
4.650		6.00	66.00	24.000	36.000	7.540	19/64	8.00	79.00	41.000	36.000
4.700		6.00	66.00	24.000	36.000	7.550		8.00	79.00	41.000	36.000
4.760	3/16	6.00	66.00	28.000	36.000	7.600		8.00	79.00	41.000	36.000
4.800		6.00	66.00	28.000	36.000	7.650		8.00	79.00	41.000	36.000
4.900		6.00	66.00	28.000	36.000	7.700		8.00	79.00	41.000	36.000
5.000		6.00	66.00	28.000	36.000	7.800		8.00	79.00	41.000	36.000
5.100		6.00	66.00	28.000	36.000	7.900		8.00	79.00	41.000	36.000
5.110		6.00	66.00	28.000	36.000	7.940	5/16	8.00	79.00	41.000	36.000
5.160	13/64	6.00	66.00	28.000	36.000	8.000		8.00	79.00	41.000	36.000
5.200		6.00	66.00	28.000	36.000	8.100		10.00	89.00	47.000	40.000
5.300		6.00	66.00	28.000	36.000	8.200		10.00	89.00	47.000	40.000
5.400		6.00	66.00	28.000	36.000	8.300		10.00	89.00	47.000	40.000
5.410		6.00	66.00	28.000	36.000	8.330	21/64	10.00	89.00	47.000	40.000
5.500		6.00	66.00	28.000	36.000	8.400		10.00	89.00	47.000	40.000
5.550		6.00	66.00	28.000	36.000	8.500		10.00	89.00	47.000	40.000
5.560	7/32	6.00	66.00	28.000	36.000	8.600		10.00	89.00	47.000	40.000
5.600		6.00	66.00	28.000	36.000	8.700		10.00	89.00	47.000	40.000
5.700		6.00	66.00	28.000	36.000	8.730	11/32	10.00	89.00	47.000	40.000
5.800		6.00	66.00	28.000	36.000	8.800		10.00	89.00	47.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8.900		10.00	89.00	47.000	40.000	14.100		16.00	115.00	65.000	48.000
9.000		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
9.100		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
9.130	23/64	10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
9.200		10.00	89.00	47.000	40.000	14.400		16.00	115.00	65.000	48.000
9.250		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
9.300		10.00	89.00	47.000	40.000	14.600		16.00	115.00	65.000	48.000
9.340		10.00	89.00	47.000	40.000	14.680	37/64	16.00	115.00	65.000	48.000
9.400		10.00	89.00	47.000	40.000	14.700		16.00	115.00	65.000	48.000
9.500		10.00	89.00	47.000	40.000	14.800		16.00	115.00	65.000	48.000
9.520	3/8	10.00	89.00	47.000	40.000	14.900		16.00	115.00	65.000	48.000
9.550		10.00	89.00	47.000	40.000	15.000		16.00	115.00	65.000	48.000
9.600		10.00	89.00	47.000	40.000	15.080	19/32	16.00	115.00	65.000	48.000
9.700		10.00	89.00	47.000	40.000	15.100		16.00	115.00	65.000	48.000
9.800		10.00	89.00	47.000	40.000	15.200		16.00	115.00	65.000	48.000
9.900		10.00	89.00	47.000	40.000	15.300		16.00	115.00	65.000	48.000
9.920	25/64	10.00	89.00	47.000	40.000	15.400		16.00	115.00	65.000	48.000
10.000		10.00	89.00	47.000	40.000	15.480	39/64	16.00	115.00	65.000	48.000
10.100		12.00	102.00	55.000	45.000	15.500		16.00	115.00	65.000	48.000
10.200		12.00	102.00	55.000	45.000	15.550		16.00	115.00	65.000	48.000
10.300		12.00	102.00	55.000	45.000	15.600		16.00	115.00	65.000	48.000
10.320	13/32	12.00	102.00	55.000	45.000	15.700		16.00	115.00	65.000	48.000
10.400		12.00	102.00	55.000	45.000	15.800		16.00	115.00	65.000	48.000
10.500		12.00	102.00	55.000	45.000	15.870	5/8	16.00	115.00	65.000	48.000
10.600		12.00	102.00	55.000	45.000	15.900		16.00	115.00	65.000	48.000
10.700		12.00	102.00	55.000	45.000	16.000		16.00	115.00	65.000	48.000
10.720	27/64	12.00	102.00	55.000	45.000	16.270	41/64	18.00	123.00	73.000	48.000
10.800		12.00	102.00	55.000	45.000	16.300		18.00	123.00	73.000	48.000
10.900		12.00	102.00	55.000	45.000	16.500		18.00	123.00	73.000	48.000
11.000		12.00	102.00	55.000	45.000	16.670	21/32	18.00	123.00	73.000	48.000
11.100		12.00	102.00	55.000	45.000	16.700		18.00	123.00	73.000	48.000
11.110	7/16	12.00	102.00	55.000	45.000	16.900		18.00	123.00	73.000	48.000
11.200		12.00	102.00	55.000	45.000	17.000		18.00	123.00	73.000	48.000
11.300		12.00	102.00	55.000	45.000	17.070	43/64	18.00	123.00	73.000	48.000
11.400		12.00	102.00	55.000	45.000	17.460	11/16	18.00	123.00	73.000	48.000
11.500		12.00	102.00	55.000	45.000	17.500		18.00	123.00	73.000	48.000
11.510	29/64	12.00	102.00	55.000	45.000	17.550		18.00	123.00	73.000	48.000
11.550		12.00	102.00	55.000	45.000	17.700		18.00	123.00	73.000	48.000
11.600		12.00	102.00	55.000	45.000	17.860	45/64	18.00	123.00	73.000	48.000
11.700		12.00	102.00	55.000	45.000	18.000		18.00	123.00	73.000	48.000
11.800		12.00	102.00	55.000	45.000	18.260	23/32	20.00	131.00	79.000	50.000
11.900		12.00	102.00	55.000	45.000	18.500		20.00	131.00	79.000	50.000
11.910	15/32	12.00	102.00	55.000	45.000	18.700		20.00	131.00	79.000	50.000
12.000		12.00	102.00	55.000	45.000	18.900		20.00	131.00	79.000	50.000
12.100		14.00	107.00	60.000	45.000	19.000		20.00	131.00	79.000	50.000
12.200		14.00	107.00	60.000	45.000	19.050	3/4	20.00	131.00	79.000	50.000
12.300	31/64	14.00	107.00	60.000	45.000	19.250		20.00	131.00	79.000	50.000
12.400		14.00	107.00	60.000	45.000	19.300		20.00	131.00	79.000	50.000
12.500		14.00	107.00	60.000	45.000	19.450	49/64	20.00	131.00	79.000	50.000
12.600		14.00	107.00	60.000	45.000	19.500		20.00	131.00	79.000	50.000
12.700	1/2	14.00	107.00	60.000	45.000	19.550		20.00	131.00	79.000	50.000
12.800		14.00	107.00	60.000	45.000	19.700		20.00	131.00	79.000	50.000
12.900		14.00	107.00	60.000	45.000	19.800		20.00	131.00	79.000	50.000
13.000		14.00	107.00	60.000	45.000	19.840	25/32	20.00	131.00	79.000	50.000
13.100	33/64	14.00	107.00	60.000	45.000	20.000		20.00	131.00	79.000	50.000
13.200		14.00	107.00	60.000	45.000						
13.300		14.00	107.00	60.000	45.000						
13.400		14.00	107.00	60.000	45.000						
13.490	17/32	14.00	107.00	60.000	45.000						
13.500		14.00	107.00	60.000	45.000						
13.600		14.00	107.00	60.000	45.000						
13.700		14.00	107.00	60.000	45.000						
13.800		14.00	107.00	60.000	45.000						
13.890	35/64	14.00	107.00	60.000	45.000						
13.900		14.00	107.00	60.000	45.000						
14.000		14.00	107.00	60.000	45.000						



HARTNER

TS-Drills with internal coolant

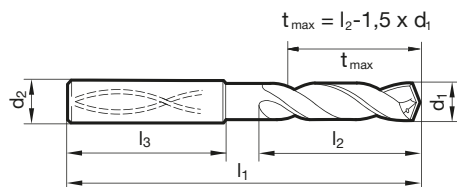
Article no. 89553



P	M	K	N	S	H
○	●			●	



maximum performance • optimised cutting edge geometry • main cutting edge is slightly concave • exceptional hole quality
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	5.900		6.00	82.00	44.000	36.000
3.100		6.00	66.00	28.000	36.000	5.950	15/64	6.00	82.00	44.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	6.000		6.00	82.00	44.000	36.000
3.200		6.00	66.00	28.000	36.000	6.100		8.00	91.00	53.000	36.000
3.250		6.00	66.00	28.000	36.000	6.200		8.00	91.00	53.000	36.000
3.300		6.00	66.00	28.000	36.000	6.300		8.00	91.00	53.000	36.000
3.400		6.00	66.00	28.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
3.500		6.00	66.00	28.000	36.000	6.400		8.00	91.00	53.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	6.500		8.00	91.00	53.000	36.000
3.600		6.00	66.00	28.000	36.000	6.530		8.00	91.00	53.000	36.000
3.700		6.00	66.00	28.000	36.000	6.550		8.00	91.00	53.000	36.000
3.800		6.00	74.00	36.000	36.000	6.600		8.00	91.00	53.000	36.000
3.900		6.00	74.00	36.000	36.000	6.700		8.00	91.00	53.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	6.750	17/64	8.00	91.00	53.000	36.000
4.000		6.00	74.00	36.000	36.000	6.800		8.00	91.00	53.000	36.000
4.040		6.00	74.00	36.000	36.000	6.900		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.550		8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	7.600		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	7.650		8.00	91.00	53.000	36.000
4.900		6.00	82.00	44.000	36.000	7.700		8.00	91.00	53.000	36.000
5.000		6.00	82.00	44.000	36.000	7.800		8.00	91.00	53.000	36.000
5.100		6.00	82.00	44.000	36.000	7.900		8.00	91.00	53.000	36.000
5.110		6.00	82.00	44.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
5.160	13/64	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
5.200		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.410		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8.900		10.00	103.00	61.000	40.000	14.100		16.00	133.00	83.000	48.000
9.000		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
9.100		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
9.130	23/64	10.00	103.00	61.000	40.000	14.300		16.00	133.00	83.000	48.000
9.200		10.00	103.00	61.000	40.000	14.400		16.00	133.00	83.000	48.000
9.250		10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
9.300		10.00	103.00	61.000	40.000	14.600		16.00	133.00	83.000	48.000
9.340		10.00	103.00	61.000	40.000	14.680	37/64	16.00	133.00	83.000	48.000
9.400		10.00	103.00	61.000	40.000	14.700		16.00	133.00	83.000	48.000
9.500		10.00	103.00	61.000	40.000	14.800		16.00	133.00	83.000	48.000
9.520	3/8	10.00	103.00	61.000	40.000	14.900		16.00	133.00	83.000	48.000
9.550		10.00	103.00	61.000	40.000	15.000		16.00	133.00	83.000	48.000
9.600		10.00	103.00	61.000	40.000	15.080	19/32	16.00	133.00	83.000	48.000
9.700		10.00	103.00	61.000	40.000	15.100		16.00	133.00	83.000	48.000
9.800		10.00	103.00	61.000	40.000	15.200		16.00	133.00	83.000	48.000
9.900		10.00	103.00	61.000	40.000	15.300		16.00	133.00	83.000	48.000
9.920	25/64	10.00	103.00	61.000	40.000	15.400		16.00	133.00	83.000	48.000
10.000		10.00	103.00	61.000	40.000	15.480	39/64	16.00	133.00	83.000	48.000
10.100		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	15.550		16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	15.600		16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	15.800		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	15.870	5/8	16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	15.900		16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
10.720	27/64	12.00	118.00	71.000	45.000	16.270	41/64	18.00	143.00	93.000	48.000
10.800		12.00	118.00	71.000	45.000	16.300		18.00	143.00	93.000	48.000
10.900		12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.000		12.00	118.00	71.000	45.000	16.670	21/32	18.00	143.00	93.000	48.000
11.100		12.00	118.00	71.000	45.000	16.700		18.00	143.00	93.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	16.900		18.00	143.00	93.000	48.000
11.200		12.00	118.00	71.000	45.000	17.000		18.00	143.00	93.000	48.000
11.300		12.00	118.00	71.000	45.000	17.070	43/64	18.00	143.00	93.000	48.000
11.400		12.00	118.00	71.000	45.000	17.460	11/16	18.00	143.00	93.000	48.000
11.500		12.00	118.00	71.000	45.000	17.500		18.00	143.00	93.000	48.000
11.510	29/64	12.00	118.00	71.000	45.000	17.550		18.00	143.00	93.000	48.000
11.550		12.00	118.00	71.000	45.000	17.700		18.00	143.00	93.000	48.000
11.600		12.00	118.00	71.000	45.000	17.860	45/64	18.00	143.00	93.000	48.000
11.700		12.00	118.00	71.000	45.000	18.000		18.00	143.00	93.000	48.000
11.800		12.00	118.00	71.000	45.000	18.260	23/32	20.00	153.00	101.000	50.000
11.900		12.00	118.00	71.000	45.000	18.500		20.00	153.00	101.000	50.000
11.910	15/32	12.00	118.00	71.000	45.000	18.700		20.00	153.00	101.000	50.000
12.000		12.00	118.00	71.000	45.000	18.900		20.00	153.00	101.000	50.000
12.100		14.00	124.00	77.000	45.000	19.000		20.00	153.00	101.000	50.000
12.200		14.00	124.00	77.000	45.000	19.050	3/4	20.00	153.00	101.000	50.000
12.300	31/64	14.00	124.00	77.000	45.000	19.250		20.00	153.00	101.000	50.000
12.400		14.00	124.00	77.000	45.000	19.300		20.00	153.00	101.000	50.000
12.500		14.00	124.00	77.000	45.000	19.450	49/64	20.00	153.00	101.000	50.000
12.600		14.00	124.00	77.000	45.000	19.500		20.00	153.00	101.000	50.000
12.700	1/2	14.00	124.00	77.000	45.000	19.550		20.00	153.00	101.000	50.000
12.800		14.00	124.00	77.000	45.000	19.700		20.00	153.00	101.000	50.000
12.900		14.00	124.00	77.000	45.000	19.800		20.00	153.00	101.000	50.000
13.000		14.00	124.00	77.000	45.000	19.840	25/32	20.00	153.00	101.000	50.000
13.100	33/64	14.00	124.00	77.000	45.000	20.000		20.00	153.00	101.000	50.000
13.200		14.00	124.00	77.000	45.000						
13.300		14.00	124.00	77.000	45.000						
13.400		14.00	124.00	77.000	45.000						
13.490	17/32	14.00	124.00	77.000	45.000						
13.500		14.00	124.00	77.000	45.000						
13.600		14.00	124.00	77.000	45.000						
13.700		14.00	124.00	77.000	45.000						
13.800		14.00	124.00	77.000	45.000						
13.890	35/64	14.00	124.00	77.000	45.000						
13.900		14.00	124.00	77.000	45.000						
14.000		14.00	124.00	77.000	45.000						



HARTNER

TS-Drills with internal coolant

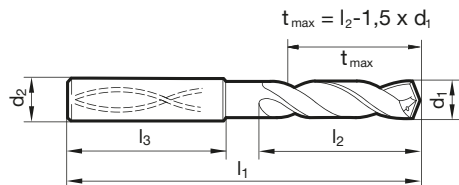
Article no. 89554



P	M	K	N	S	H
○	●			●	



maximum performance • optimised cutting edge geometry • main cutting edge is slightly concave • exceptional hole quality
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	70.00	30.000	36.000	5.900		6.00	97.00	57.000	36.000
3.100		6.00	70.00	30.000	36.000	5.950	15/64	6.00	97.00	57.000	36.000
3.170	1/8	6.00	70.00	30.000	36.000	6.000		6.00	97.00	57.000	36.000
3.200		6.00	70.00	30.000	36.000	6.100		8.00	106.00	66.000	36.000
3.250		6.00	70.00	30.000	36.000	6.200		8.00	106.00	66.000	36.000
3.300		6.00	70.00	30.000	36.000	6.300		8.00	106.00	66.000	36.000
3.400		6.00	75.00	35.500	36.000	6.350	1/4	8.00	106.00	66.000	36.000
3.500		6.00	75.00	35.500	36.000	6.400		8.00	106.00	66.000	36.000
3.570	9/64	6.00	75.00	35.500	36.000	6.500		8.00	106.00	66.000	36.000
3.600		6.00	75.00	35.500	36.000	6.530		8.00	106.00	66.000	36.000
3.700		6.00	75.00	35.500	36.000	6.550		8.00	106.00	66.000	36.000
3.800		6.00	75.00	37.500	36.000	6.600		8.00	106.00	66.000	36.000
3.900		6.00	75.00	37.500	36.000	6.700		8.00	106.00	66.000	36.000
3.970	5/32	6.00	75.00	37.500	36.000	6.750	17/64	8.00	106.00	66.000	36.000
4.000		6.00	75.00	37.500	36.000	6.800		8.00	106.00	66.000	36.000
4.040		6.00	75.00	37.500	36.000	6.900		8.00	116.00	76.000	36.000
4.100		6.00	75.00	37.500	36.000	7.000		8.00	116.00	76.000	36.000
4.200		6.00	75.00	37.500	36.000	7.100		8.00	116.00	76.000	36.000
4.300		6.00	85.00	45.000	36.000	7.140	9/32	8.00	116.00	76.000	36.000
4.370	11/64	6.00	85.00	45.000	36.000	7.200		8.00	116.00	76.000	36.000
4.400		6.00	85.00	45.000	36.000	7.300		8.00	116.00	76.000	36.000
4.500		6.00	85.00	45.000	36.000	7.400		8.00	116.00	76.000	36.000
4.600		6.00	85.00	45.000	36.000	7.500		8.00	116.00	76.000	36.000
4.650		6.00	85.00	45.000	36.000	7.540	19/64	8.00	116.00	76.000	36.000
4.700		6.00	85.00	45.000	36.000	7.550		8.00	116.00	76.000	36.000
4.760	3/16	6.00	90.00	50.000	36.000	7.600		8.00	116.00	76.000	36.000
4.800		6.00	90.00	50.000	36.000	7.650		8.00	116.00	76.000	36.000
4.900		6.00	90.00	50.000	36.000	7.700		8.00	116.00	76.000	36.000
5.000		6.00	90.00	50.000	36.000	7.800		8.00	116.00	76.000	36.000
5.100		6.00	90.00	50.000	36.000	7.900		8.00	116.00	76.000	36.000
5.110		6.00	90.00	50.000	36.000	7.940	5/16	8.00	116.00	76.000	36.000
5.160	13/64	6.00	90.00	50.000	36.000	8.000		8.00	116.00	76.000	36.000
5.200		6.00	90.00	50.000	36.000	8.100		10.00	131.00	87.000	40.000
5.300		6.00	90.00	50.000	36.000	8.200		10.00	131.00	87.000	40.000
5.400		6.00	97.00	57.000	36.000	8.300		10.00	131.00	87.000	40.000
5.410		6.00	97.00	57.000	36.000	8.330	21/64	10.00	131.00	87.000	40.000
5.500		6.00	97.00	57.000	36.000	8.400		10.00	131.00	87.000	40.000
5.550		6.00	97.00	57.000	36.000	8.500		10.00	131.00	87.000	40.000
5.560	7/32	6.00	97.00	57.000	36.000	8.600		10.00	131.00	87.000	40.000
5.600		6.00	97.00	57.000	36.000	8.700		10.00	131.00	87.000	40.000
5.700		6.00	97.00	57.000	36.000	8.730	11/32	10.00	131.00	87.000	40.000
5.800		6.00	97.00	57.000	36.000	8.800		10.00	131.00	87.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
8.900		10.00	131.00	87.000	40.000	14.100		16.00	204.00	152.000	48.000
9.000		10.00	131.00	87.000	40.000	14.200		16.00	204.00	152.000	48.000
9.100		10.00	139.00	95.000	40.000	14.290	9/16	16.00	204.00	152.000	48.000
9.130	23/64	10.00	139.00	95.000	40.000	14.300		16.00	204.00	152.000	48.000
9.200		10.00	139.00	95.000	40.000	14.400		16.00	204.00	152.000	48.000
9.250		10.00	139.00	95.000	40.000	14.500		16.00	204.00	152.000	48.000
9.300		10.00	139.00	95.000	40.000	14.600		16.00	204.00	152.000	48.000
9.340		10.00	139.00	95.000	40.000	14.680	37/64	16.00	204.00	152.000	48.000
9.400		10.00	139.00	95.000	40.000	14.700		16.00	204.00	152.000	48.000
9.500		10.00	139.00	95.000	40.000	14.800		16.00	204.00	152.000	48.000
9.520	3/8	10.00	139.00	95.000	40.000	14.900		16.00	204.00	152.000	48.000
9.550		10.00	139.00	95.000	40.000	15.000		16.00	204.00	152.000	48.000
9.600		10.00	139.00	95.000	40.000	15.080	19/32	16.00	204.00	152.000	48.000
9.700		10.00	139.00	95.000	40.000	15.100		16.00	204.00	152.000	48.000
9.800		10.00	139.00	95.000	40.000	15.200		16.00	204.00	152.000	48.000
9.900		10.00	139.00	95.000	40.000	15.300		16.00	204.00	152.000	48.000
9.920	25/64	10.00	139.00	95.000	40.000	15.400		16.00	204.00	152.000	48.000
10.000		10.00	139.00	95.000	40.000	15.480	39/64	16.00	204.00	152.000	48.000
10.100		12.00	155.00	106.000	45.000	15.500		16.00	204.00	152.000	48.000
10.200		12.00	155.00	106.000	45.000	15.550		16.00	204.00	152.000	48.000
10.300		12.00	155.00	106.000	45.000	15.600		16.00	204.00	152.000	48.000
10.320	13/32	12.00	155.00	106.000	45.000	15.700		16.00	204.00	152.000	48.000
10.400		12.00	155.00	106.000	45.000	15.800		16.00	204.00	152.000	48.000
10.500		12.00	155.00	106.000	45.000	15.870	5/8	16.00	204.00	152.000	48.000
10.600		12.00	155.00	106.000	45.000	15.900		16.00	204.00	152.000	48.000
10.700		12.00	155.00	106.000	45.000	16.000		16.00	204.00	152.000	48.000
10.720	27/64	12.00	155.00	106.000	45.000	16.270	41/64	18.00	223.00	171.000	48.000
10.800		12.00	155.00	106.000	45.000	16.300		18.00	223.00	171.000	48.000
10.900		12.00	155.00	106.000	45.000	16.500		18.00	223.00	171.000	48.000
11.000		12.00	155.00	106.000	45.000	16.670	21/32	18.00	223.00	171.000	48.000
11.100		12.00	163.00	114.000	45.000	16.700		18.00	223.00	171.000	48.000
11.110	7/16	12.00	163.00	114.000	45.000	16.900		18.00	223.00	171.000	48.000
11.200		12.00	163.00	114.000	45.000	17.000		18.00	223.00	171.000	48.000
11.300		12.00	163.00	114.000	45.000	17.070	43/64	18.00	223.00	171.000	48.000
11.400		12.00	163.00	114.000	45.000	17.460	11/16	18.00	223.00	171.000	48.000
11.500		12.00	163.00	114.000	45.000	17.500		18.00	223.00	171.000	48.000
11.510	29/64	12.00	163.00	114.000	45.000	17.550		18.00	223.00	171.000	48.000
11.550		12.00	163.00	114.000	45.000	17.700		18.00	223.00	171.000	48.000
11.600		12.00	163.00	114.000	45.000	17.860	45/64	18.00	223.00	171.000	48.000
11.700		12.00	163.00	114.000	45.000	18.000		18.00	223.00	171.000	48.000
11.800		12.00	163.00	114.000	45.000	18.260	23/32	20.00	244.00	190.000	50.000
11.900		12.00	163.00	114.000	45.000	18.500		20.00	244.00	190.000	50.000
11.910	15/32	12.00	163.00	114.000	45.000	18.700		20.00	244.00	190.000	50.000
12.000		12.00	163.00	114.000	45.000	18.900		20.00	244.00	190.000	50.000
12.100		14.00	182.00	133.000	45.000	19.000		20.00	244.00	190.000	50.000
12.200		14.00	182.00	133.000	45.000	19.050	3/4	20.00	244.00	190.000	50.000
12.300	31/64	14.00	182.00	133.000	45.000	19.250		20.00	244.00	190.000	50.000
12.400		14.00	182.00	133.000	45.000	19.300		20.00	244.00	190.000	50.000
12.500		14.00	182.00	133.000	45.000	19.450	49/64	20.00	244.00	190.000	50.000
12.600		14.00	182.00	133.000	45.000	19.500		20.00	244.00	190.000	50.000
12.700	1/2	14.00	182.00	133.000	45.000	19.550		20.00	244.00	190.000	50.000
12.800		14.00	182.00	133.000	45.000	19.700		20.00	244.00	190.000	50.000
12.900		14.00	182.00	133.000	45.000	19.800		20.00	244.00	190.000	50.000
13.000		14.00	182.00	133.000	45.000	19.840	25/32	20.00	244.00	190.000	50.000
13.100	33/64	14.00	182.00	133.000	45.000	20.000		20.00	244.00	190.000	50.000
13.200		14.00	182.00	133.000	45.000						
13.300		14.00	182.00	133.000	45.000						
13.400		14.00	182.00	133.000	45.000						
13.490	17/32	14.00	182.00	133.000	45.000						
13.500		14.00	182.00	133.000	45.000						
13.600		14.00	182.00	133.000	45.000						
13.700		14.00	182.00	133.000	45.000						
13.800		14.00	182.00	133.000	45.000						
13.890	35/64	14.00	182.00	133.000	45.000						
13.900		14.00	182.00	133.000	45.000						
14.000		14.00	182.00	133.000	45.000						

TS 100 R

GREY, MALLEABLE AND SPHEROIDAL CAST IRON,
CGI/ADI/CDI

ADVANTAGES AND CHARACTERISTICS

- ▼ **special geometry** with patented radius point grind ensures **maximum performance** and economic efficiency when machining CGI (Compacted Graphite Iron) and ADI (austempered ductile iron) as well as all conventional cast materials
- ▼ with its unique balance of face contour and flute profile, the TS 100 R ensures **stability**, dimensional accuracy and **process reliability**
- ▼ suitable for **drilling depths $\leq 7 \times D$**



significantly reduced wear thanks
to **patented radius point grind**

stable point grinding
with special web thinning
guarantees precise spotting
and consistently accurate
hole quality

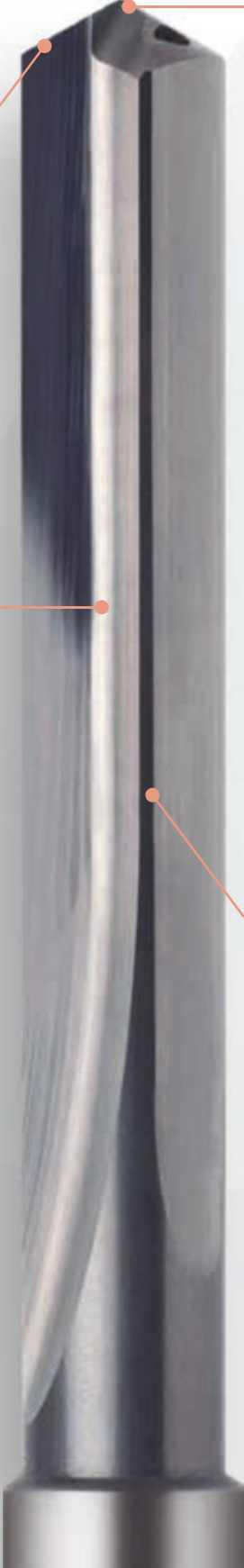
nanoFIRE coating for
maximum wear resistance in
abrasive cast materials

TS 150 GG

GREY, MALLEABLE AND SPHEROIDAL CAST IRON

ADVANTAGES AND CHARACTERISTICS

- ▼ **high-performance solid carbide drill** with coolant ducts for machining **short-chipping materials** such as cast iron, grey cast iron, malleable cast iron and ductile graphite iron
- ▼ for **accurately aligned boreholes**
- ▼ **coatings available** on request



specially adapted cutting geometry for cost-efficient machining of virtually any cast material

bright finish for optimum chip evacuation

special web thinning
for precise drilling
and low straightness
deviation

four guide chamfers
ensure the straightness and
roundness of the borehole

TS-Drills with internal coolant

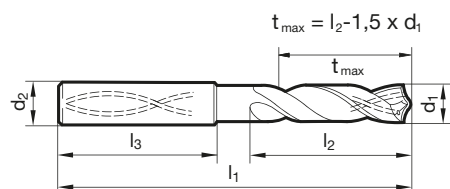
Article no. 89420



P	M	K	N	S	H
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web thinning ≥ Ø 3.000 • patented radius point grind • cutting edge straight (by lip correction)
vermicular cast iron GGK and ADI, CDI • grey cast iron, malleable and spheroidal iron



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	6.100		8.00	91.00	53.000	36.000
3.100		6.00	66.00	28.000	36.000	6.200		8.00	91.00	53.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	6.300		8.00	91.00	53.000	36.000
3.200		6.00	66.00	28.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
3.250		6.00	66.00	28.000	36.000	6.400		8.00	91.00	53.000	36.000
3.300		6.00	66.00	28.000	36.000	6.500		8.00	91.00	53.000	36.000
3.400		6.00	66.00	28.000	36.000	6.600		8.00	91.00	53.000	36.000
3.500		6.00	66.00	28.000	36.000	6.700		8.00	91.00	53.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	6.750	17/64	8.00	91.00	53.000	36.000
3.600		6.00	66.00	28.000	36.000	6.800		8.00	91.00	53.000	36.000
3.700		6.00	66.00	28.000	36.000	6.900		8.00	91.00	53.000	36.000
3.800		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
3.900		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.000		6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.600		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.700		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.800		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.900		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
4.900		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.000		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.100		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.160	13/64	6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.200		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.900		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	9.000		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	9.100		10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	9.130	23/64	10.00	103.00	61.000	40.000
5.900		6.00	82.00	44.000	36.000	9.200		10.00	103.00	61.000	40.000
5.950	15/64	6.00	82.00	44.000	36.000	9.250		10.00	103.00	61.000	40.000
6.000		6.00	82.00	44.000	36.000	9.300		10.00	103.00	61.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.400		10.00	103.00	61.000	40.000	13.000		14.00	124.00	77.000	45.000
9.500		10.00	103.00	61.000	40.000	13.100	33/64	14.00	124.00	77.000	45.000
9.520	3/8	10.00	103.00	61.000	40.000	13.300		14.00	124.00	77.000	45.000
9.600		10.00	103.00	61.000	40.000	13.400		14.00	124.00	77.000	45.000
9.700		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
9.800		10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
9.900		10.00	103.00	61.000	40.000	13.800		14.00	124.00	77.000	45.000
9.920	25/64	10.00	103.00	61.000	40.000	13.900		14.00	124.00	77.000	45.000
10.000		10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
10.100		12.00	118.00	71.000	45.000	14.100		16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	14.200		16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	14.290	9/16	16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	14.300		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	14.400		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	14.500		16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	14.600		16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	14.700		16.00	133.00	83.000	48.000
10.720	27/64	12.00	118.00	71.000	45.000	14.900		16.00	133.00	83.000	48.000
10.800		12.00	118.00	71.000	45.000	15.000		16.00	133.00	83.000	48.000
10.900		12.00	118.00	71.000	45.000	15.100		16.00	133.00	83.000	48.000
11.000		12.00	118.00	71.000	45.000	15.200		16.00	133.00	83.000	48.000
11.100		12.00	118.00	71.000	45.000	15.300		16.00	133.00	83.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	15.400		16.00	133.00	83.000	48.000
11.200		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
11.300		12.00	118.00	71.000	45.000	15.600		16.00	133.00	83.000	48.000
11.400		12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
11.500		12.00	118.00	71.000	45.000	15.800		16.00	133.00	83.000	48.000
11.600		12.00	118.00	71.000	45.000	15.870	5/8	16.00	133.00	83.000	48.000
11.700		12.00	118.00	71.000	45.000	15.900		16.00	133.00	83.000	48.000
11.800		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
11.900		12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.910	15/32	12.00	118.00	71.000	45.000	16.670	21/32	18.00	143.00	93.000	48.000
12.000		12.00	118.00	71.000	45.000	17.000		18.00	143.00	93.000	48.000
12.100		14.00	124.00	77.000	45.000	17.500		18.00	143.00	93.000	48.000
12.200		14.00	124.00	77.000	45.000	18.000		18.00	143.00	93.000	48.000
12.300	31/64	14.00	124.00	77.000	45.000	18.500		20.00	153.00	101.000	50.000
12.400		14.00	124.00	77.000	45.000	19.000		20.00	153.00	101.000	50.000
12.500		14.00	124.00	77.000	45.000	19.500		20.00	153.00	101.000	50.000
12.600		14.00	124.00	77.000	45.000	20.000		20.00	153.00	101.000	50.000
12.700	1/2	14.00	124.00	77.000	45.000						
12.800		14.00	124.00	77.000	45.000						
12.900		14.00	124.00	77.000	45.000						

TS-Drills with internal coolant

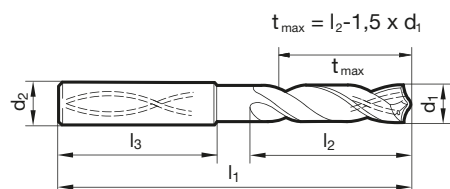
Article no. 89421



P	M	K	N	S	H
		•			



web thinning $\geq \varnothing 4.000$ • patented radius point grind • cutting edge straight (by lip correction)
vermicular cast iron GGK and ADI, CDI • grey cast iron, malleable and spheroidal iron



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
4.000		6.00	75.00	37.500	36.000	7.200		8.00	116.00	76.000	36.000
4.100		6.00	75.00	37.500	36.000	7.300		8.00	116.00	76.000	36.000
4.200		6.00	75.00	37.500	36.000	7.400		8.00	116.00	76.000	36.000
4.300		6.00	85.00	45.000	36.000	7.500		8.00	116.00	76.000	36.000
4.370	11/64	6.00	85.00	45.000	36.000	7.540	19/64	8.00	116.00	76.000	36.000
4.400		6.00	85.00	45.000	36.000	7.600		8.00	116.00	76.000	36.000
4.500		6.00	85.00	45.000	36.000	7.700		8.00	116.00	76.000	36.000
4.600		6.00	85.00	45.000	36.000	7.800		8.00	116.00	76.000	36.000
4.650		6.00	85.00	45.000	36.000	7.900		8.00	116.00	76.000	36.000
4.700		6.00	85.00	45.000	36.000	7.940	5/16	8.00	116.00	76.000	36.000
4.760	3/16	6.00	90.00	50.000	36.000	8.000		8.00	116.00	76.000	36.000
4.800		6.00	90.00	50.000	36.000	8.100		10.00	131.00	87.000	40.000
4.900		6.00	90.00	50.000	36.000	8.200		10.00	131.00	87.000	40.000
5.000		6.00	90.00	50.000	36.000	8.300		10.00	131.00	87.000	40.000
5.100		6.00	90.00	50.000	36.000	8.330	21/64	10.00	131.00	87.000	40.000
5.160	13/64	6.00	90.00	50.000	36.000	8.400		10.00	131.00	87.000	40.000
5.200		6.00	90.00	50.000	36.000	8.500		10.00	131.00	87.000	40.000
5.300		6.00	90.00	50.000	36.000	8.600		10.00	131.00	87.000	40.000
5.400		6.00	97.00	57.000	36.000	8.700		10.00	131.00	87.000	40.000
5.500		6.00	97.00	57.000	36.000	8.730	11/32	10.00	131.00	87.000	40.000
5.550		6.00	97.00	57.000	36.000	8.800		10.00	131.00	87.000	40.000
5.560	7/32	6.00	97.00	57.000	36.000	8.900		10.00	131.00	87.000	40.000
5.600		6.00	97.00	57.000	36.000	9.000		10.00	131.00	87.000	40.000
5.700		6.00	97.00	57.000	36.000	9.100		10.00	139.00	95.000	40.000
5.800		6.00	97.00	57.000	36.000	9.130	23/64	10.00	139.00	95.000	40.000
5.900		6.00	97.00	57.000	36.000	9.200		10.00	139.00	95.000	40.000
5.950	15/64	6.00	97.00	57.000	36.000	9.250		10.00	139.00	95.000	40.000
6.000		6.00	97.00	57.000	36.000	9.300		10.00	139.00	95.000	40.000
6.100		8.00	106.00	66.000	36.000	9.400		10.00	139.00	95.000	40.000
6.200		8.00	106.00	66.000	36.000	9.500		10.00	139.00	95.000	40.000
6.300		8.00	106.00	66.000	36.000	9.520	3/8	10.00	139.00	95.000	40.000
6.350	1/4	8.00	106.00	66.000	36.000	9.600		10.00	139.00	95.000	40.000
6.400		8.00	106.00	66.000	36.000	9.700		10.00	139.00	95.000	40.000
6.500		8.00	106.00	66.000	36.000	9.800		10.00	139.00	95.000	40.000
6.600		8.00	106.00	66.000	36.000	9.900		10.00	139.00	95.000	40.000
6.700		8.00	106.00	66.000	36.000	9.920	25/64	10.00	139.00	95.000	40.000
6.750	17/64	8.00	106.00	66.000	36.000	10.000		10.00	139.00	95.000	40.000
6.800		8.00	106.00	66.000	36.000	10.100		12.00	155.00	106.000	45.000
6.900		8.00	116.00	76.000	36.000	10.200		12.00	155.00	106.000	45.000
7.000		8.00	116.00	76.000	36.000	10.300		12.00	155.00	106.000	45.000
7.100		8.00	116.00	76.000	36.000	10.320	13/32	12.00	155.00	106.000	45.000
7.140	9/32	8.00	116.00	76.000	36.000	10.400		12.00	155.00	106.000	45.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
10.500		12.00	155.00	106.000	45.000	14.000		14.00	182.00	133.000	45.000
10.600		12.00	155.00	106.000	45.000	14.100		16.00	204.00	152.000	48.000
10.700		12.00	155.00	106.000	45.000	14.200		16.00	204.00	152.000	48.000
10.720	27/64	12.00	155.00	106.000	45.000	14.290	9/16	16.00	204.00	152.000	48.000
10.800		12.00	155.00	106.000	45.000	14.300		16.00	204.00	152.000	48.000
10.900		12.00	155.00	106.000	45.000	14.400		16.00	204.00	152.000	48.000
11.000		12.00	155.00	106.000	45.000	14.500		16.00	204.00	152.000	48.000
11.100		12.00	163.00	114.000	45.000	14.600		16.00	204.00	152.000	48.000
11.110	7/16	12.00	163.00	114.000	45.000	14.700		16.00	204.00	152.000	48.000
11.200		12.00	163.00	114.000	45.000	14.900		16.00	204.00	152.000	48.000
11.300		12.00	163.00	114.000	45.000	15.000		16.00	204.00	152.000	48.000
11.400		12.00	163.00	114.000	45.000	15.100		16.00	204.00	152.000	48.000
11.500		12.00	163.00	114.000	45.000	15.200		16.00	204.00	152.000	48.000
11.600		12.00	163.00	114.000	45.000	15.300		16.00	204.00	152.000	48.000
11.700		12.00	163.00	114.000	45.000	15.400		16.00	204.00	152.000	48.000
11.800		12.00	163.00	114.000	45.000	15.500		16.00	204.00	152.000	48.000
11.900		12.00	163.00	114.000	45.000	15.600		16.00	204.00	152.000	48.000
11.910	15/32	12.00	163.00	114.000	45.000	15.700		16.00	204.00	152.000	48.000
12.000		12.00	163.00	114.000	45.000	15.800		16.00	204.00	152.000	48.000
12.100		14.00	182.00	133.000	45.000	15.870	5/8	16.00	204.00	152.000	48.000
12.200		14.00	182.00	133.000	45.000	15.900		16.00	204.00	152.000	48.000
12.300	31/64	14.00	182.00	133.000	45.000	16.000		16.00	204.00	152.000	48.000
12.400		14.00	182.00	133.000	45.000	16.500		18.00	223.00	171.000	48.000
12.500		14.00	182.00	133.000	45.000	16.670	21/32	18.00	223.00	171.000	48.000
12.600		14.00	182.00	133.000	45.000	17.000		18.00	223.00	171.000	48.000
12.700	1/2	14.00	182.00	133.000	45.000	17.500		18.00	223.00	171.000	48.000
12.800		14.00	182.00	133.000	45.000	18.000		18.00	223.00	171.000	48.000
12.900		14.00	182.00	133.000	45.000	18.500		20.00	244.00	190.000	50.000
13.000		14.00	182.00	133.000	45.000	19.000		20.00	244.00	190.000	50.000
13.100	33/64	14.00	182.00	133.000	45.000	19.500		20.00	244.00	190.000	50.000
13.300		14.00	182.00	133.000	45.000	20.000		20.00	244.00	190.000	50.000
13.400		14.00	182.00	133.000	45.000						
13.500		14.00	182.00	133.000	45.000						
13.700		14.00	182.00	133.000	45.000						
13.800		14.00	182.00	133.000	45.000						
13.900		14.00	182.00	133.000	45.000						

TS-Drills with internal coolant

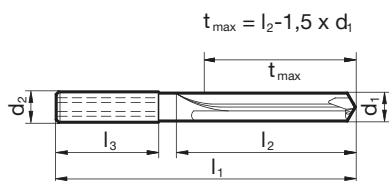
Article no. 89292



P	M	K	N	S	H
		•	○		



web thinning $\geq \varnothing 3.000$ • facet point grind • close diameter tolerances • very good surface quality of hole • observe coolant pressure
grey cast iron, malleable and spheroidal iron



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	24.000	36.000	8.700		10.00	103.00	61.000	40.000
4.000		6.00	74.00	30.000	36.000	9.000		10.00	103.00	61.000	40.000
4.200		6.00	74.00	30.000	36.000	9.400		10.00	103.00	61.000	40.000
5.000		6.00	74.00	36.000	36.000	10.000		10.00	103.00	61.000	40.000
5.100		6.00	74.00	36.000	36.000	10.200		12.00	118.00	71.000	45.000
5.300		6.00	74.00	36.000	36.000	10.500		12.00	118.00	71.000	45.000
5.400		6.00	74.00	36.000	36.000	11.000		12.00	118.00	71.000	45.000
5.900		6.00	74.00	36.000	36.000	11.500		12.00	118.00	71.000	45.000
6.000		6.00	74.00	36.000	36.000	12.000		12.00	118.00	71.000	45.000
6.200		8.00	91.00	53.000	36.000	12.300	31/64	14.00	124.00	74.000	45.000
6.300		8.00	91.00	53.000	36.000	12.500		14.00	124.00	74.000	45.000
6.400		8.00	91.00	53.000	36.000	12.700	1/2	14.00	124.00	74.000	45.000
6.600		8.00	91.00	53.000	36.000	13.000		14.00	124.00	74.000	45.000
6.700		8.00	91.00	53.000	36.000	14.000		14.00	124.00	74.000	45.000
6.800		8.00	91.00	53.000	36.000	16.000		16.00	133.00	83.000	48.000
7.000		8.00	91.00	53.000	36.000	16.500		18.00	143.00	93.000	48.000
7.400		8.00	91.00	53.000	36.000	17.000		18.00	143.00	93.000	48.000
7.500		8.00	91.00	53.000	36.000	17.500		18.00	143.00	93.000	48.000
8.000		8.00	91.00	53.000	36.000	18.000		18.00	143.00	93.000	48.000
8.100		10.00	103.00	61.000	40.000	19.000		20.00	153.00	101.000	50.000
8.200		10.00	103.00	61.000	40.000						
8.300		10.00	103.00	61.000	40.000						
8.400		10.00	103.00	61.000	40.000						
8.500		10.00	103.00	61.000	40.000						

TS-Drills with internal coolant

Article no. 89294

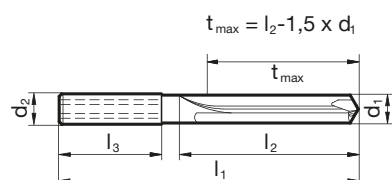


P	M	K	N	S	H
		•	○		



web thinning $\geq \varnothing 3.000$ • relieved cone • close diameter tolerances • very good surface quality of hole • observe optimal coolant pressure

grey cast iron, malleable and spheroidal iron



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	74.00	32.000	36.000	12.300	31/64	14.00	182.00	133.000	45.000
3.500		6.00	74.00	34.000	36.000	12.500		14.00	182.00	133.000	45.000
3.700		6.00	74.00	34.000	36.000	13.500		14.00	182.00	133.000	45.000
4.000		6.00	97.00	45.000	36.000	14.000		14.00	182.00	133.000	45.000
4.200		6.00	97.00	45.000	36.000	15.000		16.00	204.00	152.000	48.000
4.500		6.00	97.00	45.000	36.000	15.500		16.00	204.00	152.000	48.000
5.000		6.00	97.00	57.000	36.000	16.000		16.00	204.00	152.000	48.000
6.000		6.00	97.00	57.000	36.000	16.500		18.00	223.00	171.000	48.000
6.500		8.00	116.00	76.000	36.000	19.000		20.00	244.00	190.000	50.000
7.000		8.00	116.00	76.000	36.000	20.000		20.00	244.00	190.000	50.000
7.800		8.00	116.00	76.000	36.000						
8.000		8.00	116.00	76.000	36.000						
9.000		10.00	139.00	95.000	40.000						
9.500		10.00	139.00	95.000	40.000						
10.200		12.00	163.00	114.000	45.000						
10.500		12.00	163.00	114.000	45.000						
11.500		12.00	163.00	114.000	45.000						
12.000		12.00	163.00	114.000	45.000						

TS-Drills with internal coolant

Article no. 89293



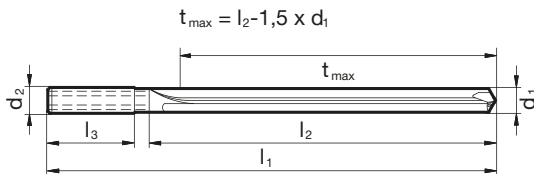
P	M	K	N	S	H
		•	○		



web thinning $\geq \varnothing 3.000$ • relieved cone • close diameter tolerances • very good surface quality of hole • observe optimal coolant pressure

grey cast iron, malleable and spheroidal iron

TS 100 R | TS 150 GG



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	91.00	42.000	36.000	9.520	3/8	10.00	175.00	130.000	40.000
3.100		6.00	91.00	42.000	36.000	10.000		10.00	175.00	130.000	40.000
3.170	1/8	6.00	91.00	42.000	36.000	10.200		12.00	209.00	159.000	45.000
3.200		6.00	91.00	42.000	36.000	10.500		12.00	209.00	159.000	45.000
3.250		6.00	91.00	42.000	36.000	10.720	27/64	12.00	209.00	159.000	45.000
3.300		6.00	91.00	42.000	36.000	11.000		12.00	209.00	159.000	45.000
3.500		6.00	91.00	48.000	36.000	11.500		12.00	209.00	159.000	45.000
3.570	9/64	6.00	91.00	48.000	36.000	12.000		12.00	209.00	159.000	45.000
3.800		6.00	121.00	77.000	36.000	12.500		14.00	233.00	183.000	45.000
3.900		6.00	121.00	77.000	36.000	12.700	1/2	14.00	233.00	183.000	45.000
3.970	5/32	6.00	121.00	77.000	36.000	13.000		14.00	233.00	183.000	45.000
4.000		6.00	121.00	77.000	36.000	13.500		14.00	233.00	183.000	45.000
4.200		6.00	121.00	77.000	36.000	14.000		14.00	233.00	183.000	45.000
4.400		6.00	121.00	77.000	36.000	14.500		16.00	260.00	207.000	48.000
4.500		6.00	121.00	77.000	36.000	15.000		16.00	260.00	207.000	48.000
5.000		6.00	121.00	82.000	36.000	15.500		16.00	260.00	207.000	48.000
5.500		6.00	121.00	82.000	36.000	16.000		16.00	260.00	207.000	48.000
6.000		6.00	121.00	82.000	36.000	17.500		18.00	284.00	231.000	48.000
6.350	1/4	8.00	146.00	106.000	36.000	18.000		18.00	284.00	231.000	48.000
6.500		8.00	146.00	106.000	36.000	20.000		20.00	308.00	255.000	50.000
6.800		8.00	146.00	106.000	36.000						
7.000		8.00	146.00	106.000	36.000						
7.140	9/32	8.00	146.00	106.000	36.000						
7.500		8.00	146.00	106.000	36.000						
7.800		8.00	146.00	106.000	36.000						
8.000		8.00	146.00	106.000	36.000						
8.500		10.00	175.00	130.000	40.000						
8.730	11/32	10.00	175.00	130.000	40.000						
9.000		10.00	175.00	130.000	40.000						
9.500		10.00	175.00	130.000	40.000						

APPLICATION EXAMPLE HOUSING

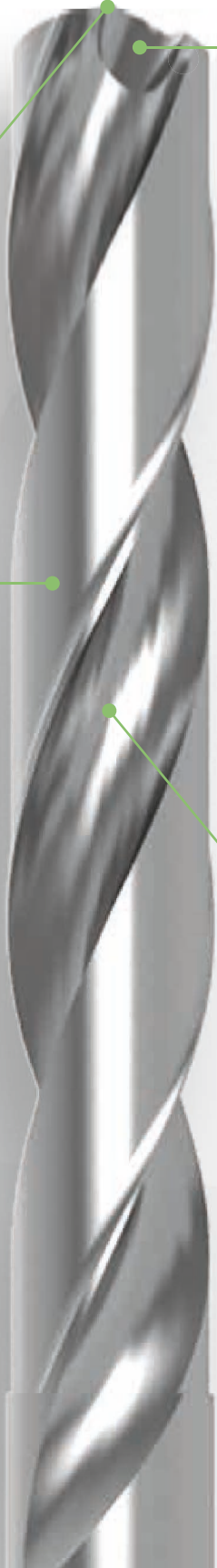
Tool type	TS 100 R
Article no.	89420
Diameter	17 mm
Drilling depth	50 mm
Material	EN-GJS-400-15
Cooling	IC 20 bar
Lubricant	Soluble oil
Machine	BAZ
v_c	160 m/min
f	0.6 mm/rev.
Tool life	305 m

TS 100 ALU

ALUMINIUM, COPPER, BRASS AND
BRONZE ALLOYS, PLASTICS

ADVANTAGES AND CHARACTERISTICS

- ▼ **reliable chip evacuation** and **perfect cutting performance** – particularly in aluminium, copper, brass and bronze alloys as well as plastics
- ▼ **optimal chip formation** across the entire spectrum of materials – from soft, elastic non-ferrous alloys to brittle cast aluminium or brass alloys
- ▼ **low processing temperatures** prevent the formation of built-up edges when machining non-ferrous metals



sharp, micro-treated cutting edges for perfect cutting performance – including in heat-treated AISi alloys

bright finish for optimum chip evacuation

- ▼ **open point geometry and concave cutting edge shape** for optimum chip formation
- ▼ **high surface finish qualities** in the **web thinning, cutting face** and **clearance rake** areas significantly reduce the processing temperature

special grade of carbide for machining non-ferrous metals

TS 150 GG

ALUMINIUM, COPPER, BRASS AND
BRONZE ALLOYS

ADVANTAGES AND CHARACTERISTICS

- ▼ **high-performance solid carbide drill** with coolant ducts for machining **short-chipping materials** such as aluminium alloys with a high silicon content
- ▼ for **accurately aligned boreholes**
- ▼ drilling with **high metal removal rates**
- ▼ **coatings available** on request



specially adapted cutting geometry for cost-efficient machining of virtually any aluminium and cast aluminium alloys

bright finish for optimum chip evacuation

special web thinning
for precise drilling
and low straightness
deviation

four guide chamfers
ensure the straightness and
roundness of the borehole

TS-Drills with internal coolant

Article no. 89561

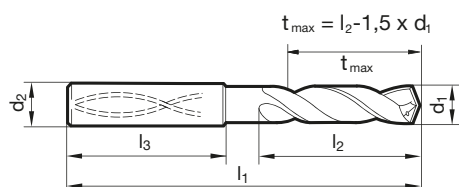


P	M	K	N	S	H
			•		



relieved cone • main cutting edge is slightly concave • optimised cutting edge geometry • sharp cutting characteristics • polished functional surfaces for the prevention of built-up edges

aluminium and Al alloys • Al materials with high Si-content



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	6.100		8.00	79.00	34.000	36.000
3.100		6.00	62.00	20.000	36.000	6.200		8.00	79.00	34.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	6.300		8.00	79.00	34.000	36.000
3.200		6.00	62.00	20.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
3.250		6.00	62.00	20.000	36.000	6.400		8.00	79.00	34.000	36.000
3.300		6.00	62.00	20.000	36.000	6.500		8.00	79.00	34.000	36.000
3.400		6.00	62.00	20.000	36.000	6.600		8.00	79.00	34.000	36.000
3.500		6.00	62.00	20.000	36.000	6.700		8.00	79.00	34.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	6.750	17/64	8.00	79.00	34.000	36.000
3.600		6.00	62.00	20.000	36.000	6.800		8.00	79.00	34.000	36.000
3.700		6.00	62.00	20.000	36.000	6.900		8.00	79.00	34.000	36.000
3.800		6.00	66.00	24.000	36.000	7.000		8.00	79.00	34.000	36.000
3.900		6.00	66.00	24.000	36.000	7.100		8.00	79.00	41.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	7.140	9/32	8.00	79.00	41.000	36.000
4.000		6.00	66.00	24.000	36.000	7.200		8.00	79.00	41.000	36.000
4.100		6.00	66.00	24.000	36.000	7.300		8.00	79.00	41.000	36.000
4.200		6.00	66.00	24.000	36.000	7.400		8.00	79.00	41.000	36.000
4.300		6.00	66.00	24.000	36.000	7.500		8.00	79.00	41.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	7.540	19/64	8.00	79.00	41.000	36.000
4.400		6.00	66.00	24.000	36.000	7.600		8.00	79.00	41.000	36.000
4.500		6.00	66.00	24.000	36.000	7.700		8.00	79.00	41.000	36.000
4.600		6.00	66.00	24.000	36.000	7.800		8.00	79.00	41.000	36.000
4.650		6.00	66.00	24.000	36.000	7.900		8.00	79.00	41.000	36.000
4.700		6.00	66.00	24.000	36.000	7.940	5/16	8.00	79.00	41.000	36.000
4.760	3/16	6.00	66.00	28.000	36.000	8.000		8.00	79.00	41.000	36.000
4.800		6.00	66.00	28.000	36.000	8.100		10.00	89.00	47.000	40.000
4.900		6.00	66.00	28.000	36.000	8.200		10.00	89.00	47.000	40.000
5.000		6.00	66.00	28.000	36.000	8.300		10.00	89.00	47.000	40.000
5.100		6.00	66.00	28.000	36.000	8.330	21/64	10.00	89.00	47.000	40.000
5.160	13/64	6.00	66.00	28.000	36.000	8.400		10.00	89.00	47.000	40.000
5.200		6.00	66.00	28.000	36.000	8.500		10.00	89.00	47.000	40.000
5.300		6.00	66.00	28.000	36.000	8.600		10.00	89.00	47.000	40.000
5.400		6.00	66.00	28.000	36.000	8.700		10.00	89.00	47.000	40.000
5.500		6.00	66.00	28.000	36.000	8.730	11/32	10.00	89.00	47.000	40.000
5.550		6.00	66.00	28.000	36.000	8.800		10.00	89.00	47.000	40.000
5.560	7/32	6.00	66.00	28.000	36.000	8.900		10.00	89.00	47.000	40.000
5.600		6.00	66.00	28.000	36.000	9.000		10.00	89.00	47.000	40.000
5.700		6.00	66.00	28.000	36.000	9.100		10.00	89.00	47.000	40.000
5.800		6.00	66.00	28.000	36.000	9.130	23/64	10.00	89.00	47.000	40.000
5.900		6.00	66.00	28.000	36.000	9.200		10.00	89.00	47.000	40.000
5.950	15/64	6.00	66.00	28.000	36.000	9.250		10.00	89.00	47.000	40.000
6.000		6.00	66.00	28.000	36.000	9.300		10.00	89.00	47.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	89.00	47.000	40.000	12.600		14.00	107.00	60.000	45.000
9.400		10.00	89.00	47.000	40.000	12.700	1/2	14.00	107.00	60.000	45.000
9.500		10.00	89.00	47.000	40.000	12.800		14.00	107.00	60.000	45.000
9.520	3/8	10.00	89.00	47.000	40.000	12.900		14.00	107.00	60.000	45.000
9.600		10.00	89.00	47.000	40.000	13.000		14.00	107.00	60.000	45.000
9.700		10.00	89.00	47.000	40.000	13.100	33/64	14.00	107.00	60.000	45.000
9.800		10.00	89.00	47.000	40.000	13.300		14.00	107.00	60.000	45.000
9.900		10.00	89.00	47.000	40.000	13.400		14.00	107.00	60.000	45.000
9.920	25/64	10.00	89.00	47.000	40.000	13.500		14.00	107.00	60.000	45.000
10.000		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
10.100		12.00	102.00	55.000	45.000	13.800		14.00	107.00	60.000	45.000
10.200		12.00	102.00	55.000	45.000	14.000		14.00	107.00	60.000	45.000
10.300		12.00	102.00	55.000	45.000	14.500		16.00	115.00	65.000	48.000
10.320	13/32	12.00	102.00	55.000	45.000	14.800		16.00	115.00	65.000	48.000
10.400		12.00	102.00	55.000	45.000	15.000		16.00	115.00	65.000	48.000
10.500		12.00	102.00	55.000	45.000	15.500		16.00	115.00	65.000	48.000
10.600		12.00	102.00	55.000	45.000	15.800		16.00	115.00	65.000	48.000
10.700		12.00	102.00	55.000	45.000	16.000		16.00	115.00	65.000	48.000
10.800		12.00	102.00	55.000	45.000	16.500		18.00	123.00	73.000	48.000
10.900		12.00	102.00	55.000	45.000	17.000		18.00	123.00	73.000	48.000
11.000		12.00	102.00	55.000	45.000	17.500		18.00	123.00	73.000	48.000
11.100		12.00	102.00	55.000	45.000	18.000		18.00	123.00	73.000	48.000
11.110	7/16	12.00	102.00	55.000	45.000	18.500		20.00	131.00	79.000	50.000
11.200		12.00	102.00	55.000	45.000	19.000		20.00	131.00	79.000	50.000
11.300		12.00	102.00	55.000	45.000	19.500		20.00	131.00	79.000	50.000
11.400		12.00	102.00	55.000	45.000	20.000		20.00	131.00	79.000	50.000
11.500		12.00	102.00	55.000	45.000						
11.600		12.00	102.00	55.000	45.000						
11.700		12.00	102.00	55.000	45.000						
11.800		12.00	102.00	55.000	45.000						
11.900		12.00	102.00	55.000	45.000						
11.910	15/32	12.00	102.00	55.000	45.000						
12.000		12.00	102.00	55.000	45.000						
12.100		14.00	107.00	60.000	45.000						
12.200		14.00	107.00	60.000	45.000						
12.500		14.00	107.00	60.000	45.000						

TS-Drills with internal coolant

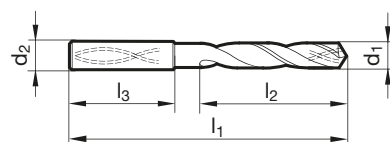
Article no. 89560



P	M	K	N	S	H
			•		



web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge form concave • optimised cutting geometry
aluminium and Al alloys • copper, brass and bronze alloys • plastics



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	6.100		8.00	91.00	53.000	36.000
3.100		6.00	66.00	28.000	36.000	6.200		8.00	91.00	53.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	6.300		8.00	91.00	53.000	36.000
3.200		6.00	66.00	28.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
3.250		6.00	66.00	28.000	36.000	6.400		8.00	91.00	53.000	36.000
3.300		6.00	66.00	28.000	36.000	6.500		8.00	91.00	53.000	36.000
3.400		6.00	66.00	28.000	36.000	6.600		8.00	91.00	53.000	36.000
3.500		6.00	66.00	28.000	36.000	6.700		8.00	91.00	53.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	6.750	17/64	8.00	91.00	53.000	36.000
3.600		6.00	66.00	28.000	36.000	6.800		8.00	91.00	53.000	36.000
3.700		6.00	66.00	28.000	36.000	6.900		8.00	91.00	53.000	36.000
3.800		6.00	74.00	36.000	36.000	7.000		8.00	91.00	53.000	36.000
3.900		6.00	74.00	36.000	36.000	7.100		8.00	91.00	53.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	7.140	9/32	8.00	91.00	53.000	36.000
4.000		6.00	74.00	36.000	36.000	7.200		8.00	91.00	53.000	36.000
4.100		6.00	74.00	36.000	36.000	7.300		8.00	91.00	53.000	36.000
4.200		6.00	74.00	36.000	36.000	7.400		8.00	91.00	53.000	36.000
4.300		6.00	74.00	36.000	36.000	7.500		8.00	91.00	53.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	7.540	19/64	8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	7.600		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	7.700		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	7.800		8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	7.900		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	7.940	5/16	8.00	91.00	53.000	36.000
4.760	3/16	6.00	82.00	44.000	36.000	8.000		8.00	91.00	53.000	36.000
4.800		6.00	82.00	44.000	36.000	8.100		10.00	103.00	61.000	40.000
4.900		6.00	82.00	44.000	36.000	8.200		10.00	103.00	61.000	40.000
5.000		6.00	82.00	44.000	36.000	8.300		10.00	103.00	61.000	40.000
5.100		6.00	82.00	44.000	36.000	8.330	21/64	10.00	103.00	61.000	40.000
5.160	13/64	6.00	82.00	44.000	36.000	8.400		10.00	103.00	61.000	40.000
5.200		6.00	82.00	44.000	36.000	8.500		10.00	103.00	61.000	40.000
5.300		6.00	82.00	44.000	36.000	8.600		10.00	103.00	61.000	40.000
5.400		6.00	82.00	44.000	36.000	8.700		10.00	103.00	61.000	40.000
5.500		6.00	82.00	44.000	36.000	8.730	11/32	10.00	103.00	61.000	40.000
5.550		6.00	82.00	44.000	36.000	8.800		10.00	103.00	61.000	40.000
5.560	7/32	6.00	82.00	44.000	36.000	8.900		10.00	103.00	61.000	40.000
5.600		6.00	82.00	44.000	36.000	9.000		10.00	103.00	61.000	40.000
5.700		6.00	82.00	44.000	36.000	9.100		10.00	103.00	61.000	40.000
5.800		6.00	82.00	44.000	36.000	9.130	23/64	10.00	103.00	61.000	40.000
5.900		6.00	82.00	44.000	36.000	9.200		10.00	103.00	61.000	40.000
5.950	15/64	6.00	82.00	44.000	36.000	9.250		10.00	103.00	61.000	40.000
6.000		6.00	82.00	44.000	36.000	9.300		10.00	103.00	61.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	103.00	61.000	40.000	13.300		14.00	124.00	77.000	45.000
9.400		10.00	103.00	61.000	40.000	13.400		14.00	124.00	77.000	45.000
9.500		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
9.520	3/8	10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
9.600		10.00	103.00	61.000	40.000	13.800		14.00	124.00	77.000	45.000
9.700		10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
9.800		10.00	103.00	61.000	40.000	14.100		16.00	133.00	83.000	48.000
9.900		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
9.920	25/64	10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
10.000		10.00	103.00	61.000	40.000	14.300		16.00	133.00	83.000	48.000
10.100		12.00	118.00	71.000	45.000	14.400		16.00	133.00	83.000	48.000
10.200		12.00	118.00	71.000	45.000	14.500		16.00	133.00	83.000	48.000
10.300		12.00	118.00	71.000	45.000	14.700		16.00	133.00	83.000	48.000
10.320	13/32	12.00	118.00	71.000	45.000	14.800		16.00	133.00	83.000	48.000
10.400		12.00	118.00	71.000	45.000	15.000		16.00	133.00	83.000	48.000
10.500		12.00	118.00	71.000	45.000	15.100		16.00	133.00	83.000	48.000
10.600		12.00	118.00	71.000	45.000	15.200		16.00	133.00	83.000	48.000
10.700		12.00	118.00	71.000	45.000	15.300		16.00	133.00	83.000	48.000
10.800		12.00	118.00	71.000	45.000	15.500		16.00	133.00	83.000	48.000
10.900		12.00	118.00	71.000	45.000	15.700		16.00	133.00	83.000	48.000
11.000		12.00	118.00	71.000	45.000	15.800		16.00	133.00	83.000	48.000
11.100		12.00	118.00	71.000	45.000	16.000		16.00	133.00	83.000	48.000
11.110	7/16	12.00	118.00	71.000	45.000	16.500		18.00	143.00	93.000	48.000
11.200		12.00	118.00	71.000	45.000	16.700		18.00	143.00	93.000	48.000
11.300		12.00	118.00	71.000	45.000	16.900		18.00	143.00	93.000	48.000
11.400		12.00	118.00	71.000	45.000	17.000		18.00	143.00	93.000	48.000
11.500		12.00	118.00	71.000	45.000	17.500		18.00	143.00	93.000	48.000
11.600		12.00	118.00	71.000	45.000	17.700		18.00	143.00	93.000	48.000
11.700		12.00	118.00	71.000	45.000	18.000		18.00	143.00	93.000	48.000
11.800		12.00	118.00	71.000	45.000	18.500		20.00	153.00	101.000	50.000
11.900		12.00	118.00	71.000	45.000	18.900		20.00	153.00	101.000	50.000
11.910	15/32	12.00	118.00	71.000	45.000	19.000		20.00	153.00	101.000	50.000
12.000		12.00	118.00	71.000	45.000	19.050	3/4	20.00	153.00	101.000	50.000
12.100		14.00	124.00	77.000	45.000	19.300		20.00	153.00	101.000	50.000
12.200		14.00	124.00	77.000	45.000	19.500		20.00	153.00	101.000	50.000
12.500		14.00	124.00	77.000	45.000	20.000		20.00	153.00	101.000	50.000
12.600		14.00	124.00	77.000	45.000						
12.700	1/2	14.00	124.00	77.000	45.000						
12.800		14.00	124.00	77.000	45.000						
12.900		14.00	124.00	77.000	45.000						
13.000		14.00	124.00	77.000	45.000						
13.100	33/64	14.00	124.00	77.000	45.000						

TS-Drills with internal coolant

Article no. 89562

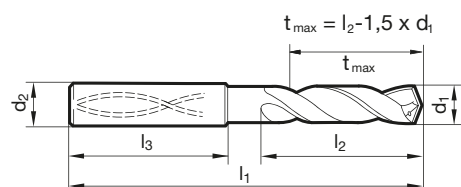


P	M	K	N	S	H
			•		



relieved cone • main cutting edge is slightly concave • optimised cutting edge geometry • sharp cutting characteristics • polished functional surfaces for the prevention of built-up edges

aluminium and Al alloys • Al materials with high Si-content



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	70.00	30.000	36.000	6.100		8.00	106.00	66.000	36.000
3.100		6.00	70.00	30.000	36.000	6.200		8.00	106.00	66.000	36.000
3.170	1/8	6.00	70.00	30.000	36.000	6.300		8.00	106.00	66.000	36.000
3.200		6.00	70.00	30.000	36.000	6.350	1/4	8.00	106.00	66.000	36.000
3.250		6.00	70.00	30.000	36.000	6.400		8.00	106.00	66.000	36.000
3.300		6.00	70.00	30.000	36.000	6.500		8.00	106.00	66.000	36.000
3.400		6.00	75.00	35.500	36.000	6.600		8.00	106.00	66.000	36.000
3.500		6.00	75.00	35.500	36.000	6.700		8.00	106.00	66.000	36.000
3.570	9/64	6.00	75.00	35.500	36.000	6.750	17/64	8.00	106.00	66.000	36.000
3.600		6.00	75.00	35.500	36.000	6.800		8.00	106.00	66.000	36.000
3.700		6.00	75.00	35.500	36.000	6.900		8.00	116.00	76.000	36.000
3.800		6.00	75.00	37.500	36.000	7.000		8.00	116.00	76.000	36.000
3.900		6.00	75.00	37.500	36.000	7.100		8.00	116.00	76.000	36.000
3.970	5/32	6.00	75.00	37.500	36.000	7.140	9/32	8.00	116.00	76.000	36.000
4.000		6.00	75.00	37.500	36.000	7.200		8.00	116.00	76.000	36.000
4.100		6.00	75.00	37.500	36.000	7.300		8.00	116.00	76.000	36.000
4.200		6.00	75.00	37.500	36.000	7.400		8.00	116.00	76.000	36.000
4.300		6.00	85.00	45.000	36.000	7.500		8.00	116.00	76.000	36.000
4.370	11/64	6.00	85.00	45.000	36.000	7.540	19/64	8.00	116.00	76.000	36.000
4.400		6.00	85.00	45.000	36.000	7.600		8.00	116.00	76.000	36.000
4.500		6.00	85.00	45.000	36.000	7.700		8.00	116.00	76.000	36.000
4.600		6.00	85.00	45.000	36.000	7.800		8.00	116.00	76.000	36.000
4.650		6.00	85.00	45.000	36.000	7.900		8.00	116.00	76.000	36.000
4.700		6.00	85.00	45.000	36.000	7.940	5/16	8.00	116.00	76.000	36.000
4.760	3/16	6.00	90.00	50.000	36.000	8.000		8.00	116.00	76.000	36.000
4.800		6.00	90.00	50.000	36.000	8.100		10.00	131.00	87.000	40.000
4.900		6.00	90.00	50.000	36.000	8.200		10.00	131.00	87.000	40.000
5.000		6.00	90.00	50.000	36.000	8.300		10.00	131.00	87.000	40.000
5.100		6.00	90.00	50.000	36.000	8.330	21/64	10.00	131.00	87.000	40.000
5.160	13/64	6.00	90.00	50.000	36.000	8.400		10.00	131.00	87.000	40.000
5.200		6.00	90.00	50.000	36.000	8.500		10.00	131.00	87.000	40.000
5.300		6.00	90.00	50.000	36.000	8.600		10.00	131.00	87.000	40.000
5.400		6.00	97.00	57.000	36.000	8.700		10.00	131.00	87.000	40.000
5.500		6.00	97.00	57.000	36.000	8.730	11/32	10.00	131.00	87.000	40.000
5.550		6.00	97.00	57.000	36.000	8.800		10.00	131.00	87.000	40.000
5.560	7/32	6.00	97.00	57.000	36.000	8.900		10.00	131.00	87.000	40.000
5.600		6.00	97.00	57.000	36.000	9.000		10.00	131.00	87.000	40.000
5.700		6.00	97.00	57.000	36.000	9.100		10.00	139.00	95.000	40.000
5.800		6.00	97.00	57.000	36.000	9.130	23/64	10.00	139.00	95.000	40.000
5.900		6.00	97.00	57.000	36.000	9.200		10.00	139.00	95.000	40.000
5.950	15/64	6.00	97.00	57.000	36.000	9.250		10.00	139.00	95.000	40.000
6.000		6.00	97.00	57.000	36.000	9.300		10.00	139.00	95.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	139.00	95.000	40.000	12.600		14.00	182.00	133.000	45.000
9.400		10.00	139.00	95.000	40.000	12.700	1/2	14.00	182.00	133.000	45.000
9.500		10.00	139.00	95.000	40.000	12.800		14.00	182.00	133.000	45.000
9.520	3/8	10.00	139.00	95.000	40.000	12.900		14.00	182.00	133.000	45.000
9.600		10.00	139.00	95.000	40.000	13.000		14.00	182.00	133.000	45.000
9.700		10.00	139.00	95.000	40.000	13.100	33/64	14.00	182.00	133.000	45.000
9.800		10.00	139.00	95.000	40.000	13.300		14.00	182.00	133.000	45.000
9.900		10.00	139.00	95.000	40.000	13.400		14.00	182.00	133.000	45.000
9.920	25/64	10.00	139.00	95.000	40.000	13.500		14.00	182.00	133.000	45.000
10.000		10.00	139.00	95.000	40.000	13.700		14.00	182.00	133.000	45.000
10.100		12.00	155.00	106.000	45.000	13.800		14.00	182.00	133.000	45.000
10.200		12.00	155.00	106.000	45.000	14.000		14.00	182.00	133.000	45.000
10.300		12.00	155.00	106.000	45.000	14.500		16.00	204.00	152.000	48.000
10.320	13/32	12.00	155.00	106.000	45.000	14.800		16.00	204.00	152.000	48.000
10.400		12.00	155.00	106.000	45.000	15.000		16.00	204.00	152.000	48.000
10.500		12.00	155.00	106.000	45.000	15.500		16.00	204.00	152.000	48.000
10.600		12.00	155.00	106.000	45.000	15.800		16.00	204.00	152.000	48.000
10.700		12.00	155.00	106.000	45.000	16.000		16.00	204.00	152.000	48.000
10.800		12.00	155.00	106.000	45.000	16.500		18.00	223.00	171.000	48.000
10.900		12.00	155.00	106.000	45.000	17.000		18.00	223.00	171.000	48.000
11.000		12.00	155.00	106.000	45.000	17.500		18.00	223.00	171.000	48.000
11.100		12.00	163.00	114.000	45.000	18.000		18.00	223.00	171.000	48.000
11.110	7/16	12.00	163.00	114.000	45.000	18.500		20.00	244.00	190.000	50.000
11.200		12.00	163.00	114.000	45.000	19.000		20.00	244.00	190.000	50.000
11.300		12.00	163.00	114.000	45.000	19.500		20.00	244.00	190.000	50.000
11.400		12.00	163.00	114.000	45.000	20.000		20.00	244.00	190.000	50.000
11.500		12.00	163.00	114.000	45.000						
11.600		12.00	163.00	114.000	45.000						
11.700		12.00	163.00	114.000	45.000						
11.800		12.00	163.00	114.000	45.000						
11.900		12.00	163.00	114.000	45.000						
11.910	15/32	12.00	163.00	114.000	45.000						
12.000		12.00	163.00	114.000	45.000						
12.100		14.00	182.00	133.000	45.000						
12.200		14.00	182.00	133.000	45.000						
12.500		14.00	182.00	133.000	45.000						

TS-Drills with internal coolant

Article no. 89563

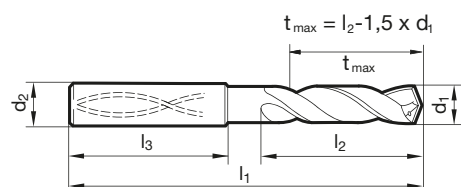


P	M	K	N	S	H
			•		



relieved cone • main cutting edge is slightly concave • optimised cutting edge geometry • sharp cutting characteristics • polished functional surfaces for the prevention of built-up edges

aluminium and Al alloys • Al materials with high Si-content



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	95.00	55.000	36.000	6.100		8.00	158.00	118.000	36.000
3.100		6.00	95.00	55.000	36.000	6.200		8.00	158.00	118.000	36.000
3.170	1/8	6.00	95.00	55.000	36.000	6.300		8.00	158.00	118.000	36.000
3.200		6.00	95.00	55.000	36.000	6.350	1/4	8.00	158.00	118.000	36.000
3.250		6.00	95.00	55.000	36.000	6.400		8.00	158.00	118.000	36.000
3.300		6.00	95.00	55.000	36.000	6.500		8.00	158.00	118.000	36.000
3.400		6.00	95.00	55.000	36.000	6.600		8.00	158.00	118.000	36.000
3.500		6.00	102.00	62.000	36.000	6.700		8.00	158.00	118.000	36.000
3.570	9/64	6.00	102.00	62.000	36.000	6.750	17/64	8.00	158.00	118.000	36.000
3.600		6.00	102.00	62.000	36.000	6.800		8.00	158.00	118.000	36.000
3.700		6.00	102.00	62.000	36.000	6.900		8.00	158.00	118.000	36.000
3.800		6.00	102.00	62.000	36.000	7.000		8.00	158.00	118.000	36.000
3.900		6.00	102.00	62.000	36.000	7.100		8.00	158.00	118.000	36.000
3.970	5/32	6.00	102.00	62.000	36.000	7.140	9/32	8.00	158.00	118.000	36.000
4.000		6.00	102.00	62.000	36.000	7.200		8.00	158.00	118.000	36.000
4.100		6.00	109.00	69.000	36.000	7.300		8.00	158.00	118.000	36.000
4.200		6.00	109.00	69.000	36.000	7.400		8.00	158.00	118.000	36.000
4.300		6.00	109.00	69.000	36.000	7.500		8.00	158.00	118.000	36.000
4.370	11/64	6.00	109.00	69.000	36.000	7.540	19/64	8.00	158.00	118.000	36.000
4.400		6.00	109.00	69.000	36.000	7.600		8.00	158.00	118.000	36.000
4.500		6.00	116.00	76.000	36.000	7.700		8.00	158.00	118.000	36.000
4.600		6.00	116.00	76.000	36.000	7.800		8.00	158.00	118.000	36.000
4.650		6.00	116.00	76.000	36.000	7.900		8.00	158.00	118.000	36.000
4.700		6.00	116.00	76.000	36.000	7.940	5/16	8.00	158.00	118.000	36.000
4.760	3/16	6.00	116.00	76.000	36.000	8.000		8.00	158.00	118.000	36.000
4.800		6.00	116.00	76.000	36.000	8.100		10.00	190.00	146.000	40.000
4.900		6.00	116.00	76.000	36.000	8.200		10.00	190.00	146.000	40.000
5.000		6.00	116.00	76.000	36.000	8.300		10.00	190.00	146.000	40.000
5.100		6.00	123.00	83.000	36.000	8.330	21/64	10.00	190.00	146.000	40.000
5.160	13/64	6.00	123.00	83.000	36.000	8.400		10.00	190.00	146.000	40.000
5.200		6.00	123.00	83.000	36.000	8.500		10.00	190.00	146.000	40.000
5.300		6.00	123.00	83.000	36.000	8.600		10.00	190.00	146.000	40.000
5.400		6.00	123.00	83.000	36.000	8.700		10.00	190.00	146.000	40.000
5.500		6.00	130.00	90.000	36.000	8.730	11/32	10.00	190.00	146.000	40.000
5.550		6.00	130.00	90.000	36.000	8.800		10.00	190.00	146.000	40.000
5.560	7/32	6.00	130.00	90.000	36.000	8.900		10.00	190.00	146.000	40.000
5.600		6.00	130.00	90.000	36.000	9.000		10.00	190.00	146.000	40.000
5.700		6.00	130.00	90.000	36.000	9.100		10.00	190.00	146.000	40.000
5.800		6.00	130.00	90.000	36.000	9.130	23/64	10.00	190.00	146.000	40.000
5.900		6.00	130.00	90.000	36.000	9.200		10.00	190.00	146.000	40.000
5.950	15/64	6.00	130.00	90.000	36.000	9.250		10.00	190.00	146.000	40.000
6.000		6.00	130.00	90.000	36.000	9.300		10.00	190.00	146.000	40.000

TS-Drills with internal coolant

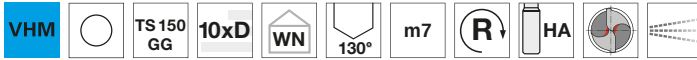
d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	190.00	146.000	40.000	11.900		12.00	223.00	174.000	45.000
9.400		10.00	190.00	146.000	40.000	11.910	15/32	12.00	223.00	174.000	45.000
9.500		10.00	190.00	146.000	40.000	12.000		12.00	223.00	174.000	45.000
9.520	3/8	10.00	190.00	146.000	40.000	12.100		14.00	251.00	202.000	45.000
9.600		10.00	190.00	146.000	40.000	12.200		14.00	251.00	202.000	45.000
9.700		10.00	190.00	146.000	40.000	12.500		14.00	251.00	202.000	45.000
9.800		10.00	190.00	146.000	40.000	12.600		14.00	251.00	202.000	45.000
9.900		10.00	190.00	146.000	40.000	12.700	1/2	14.00	251.00	202.000	45.000
9.920	25/64	10.00	190.00	146.000	40.000	12.800		14.00	251.00	202.000	45.000
10.000		10.00	190.00	146.000	40.000	12.900		14.00	251.00	202.000	45.000
10.100		12.00	223.00	174.000	45.000	13.000		14.00	251.00	202.000	45.000
10.200		12.00	223.00	174.000	45.000	13.100	33/64	14.00	251.00	202.000	45.000
10.300		12.00	223.00	174.000	45.000	13.300		14.00	251.00	202.000	45.000
10.320	13/32	12.00	223.00	174.000	45.000	13.400		14.00	251.00	202.000	45.000
10.400		12.00	223.00	174.000	45.000	13.500		14.00	251.00	202.000	45.000
10.500		12.00	223.00	174.000	45.000	13.700		14.00	251.00	202.000	45.000
10.600		12.00	223.00	174.000	45.000	13.800		14.00	251.00	202.000	45.000
10.700		12.00	223.00	174.000	45.000	14.000		14.00	251.00	202.000	45.000
10.800		12.00	223.00	174.000	45.000	14.500		16.00	282.00	230.000	48.000
10.900		12.00	223.00	174.000	45.000	14.800		16.00	282.00	230.000	48.000
11.000		12.00	223.00	174.000	45.000	15.000		16.00	282.00	230.000	48.000
11.100		12.00	223.00	174.000	45.000	15.500		16.00	282.00	230.000	48.000
11.110	7/16	12.00	223.00	174.000	45.000	15.800		16.00	282.00	230.000	48.000
11.200		12.00	223.00	174.000	45.000	16.000		16.00	282.00	230.000	48.000
11.300		12.00	223.00	174.000	45.000						
11.400		12.00	223.00	174.000	45.000						
11.500		12.00	223.00	174.000	45.000						
11.600		12.00	223.00	174.000	45.000						
11.700		12.00	223.00	174.000	45.000						
11.800		12.00	223.00	174.000	45.000						

TS-Drills with internal coolant

Article no. 89295

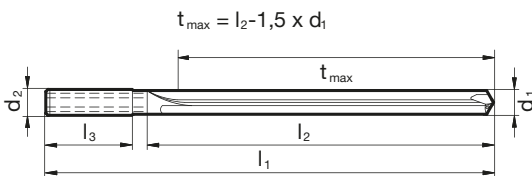


P	M	K	N	S	H
		○	●		



web thinning $\geq \varnothing 3.000$ • facet point grind • close diameter tolerances • very good surface quality of hole • observe optimal coolant pressure

aluminium and Al alloys • copper, brass and bronze alloys • plastics



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	91.00	42.000	36.000	9.000		10.00	175.00	130.000	40.000
3.100		6.00	91.00	42.000	36.000	9.500		10.00	175.00	130.000	40.000
3.200		6.00	91.00	42.000	36.000	20.000		20.00	308.00	255.000	50.000
4.000		6.00	121.00	77.000	36.000						
6.000		6.00	121.00	82.000	36.000						
7.500		8.00	146.00	106.000	36.000						

APPLICATION EXAMPLE HOUSING

Tool type	TS 100 ALU
Article no.	89560
Diameter	10 mm
Drilling depth	50 mm
Material	G-AlSi9Mg
Cooling	IC 60 bar
Lubricant	Soluble oil
Machine	BAZ
v_c	310 m/min
f	0.5 mm/rev.
Tool life	80 m

TS 100 H

ALLOYED AND UNALLOYED HIGH-TENSILE STEELS,
HARDENED STEELS, SPECIAL AND TITANIUM ALLOYS

ADVANTAGES AND CHARACTERISTICS

- ▼ high-tensile materials and special alloys can be machined **precisely** and **efficiently** thanks to a recently developed cutting geometry and an extremely hard **TiAlSiN coating**
- ▼ the **ideal solution** for applications in a range of fields, including the **automotive industry, aviation and aerospace technology, power plant construction** and the **chemicals industry**



the **negative chamfer** protects the cutting edges and ensures an exceptional surface finish on the component

special flute profile for perfect chip evacuation even in long-chipping materials

robust cutting edge geometry and optimum chip formation due to **cone relief point grinding** with **concave cutting edges** and special **web thinning**

four guide chamfers for maximum borehole quality and minimal wear of the cutting edges

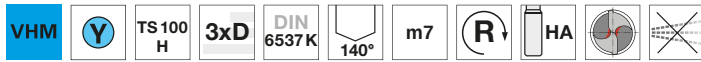
The new **TiAlSiN coating** developed in-house is one of the hardest nitride-based coatings on the market. Thanks to its nano-composite structure with a layer made up of TiAlN and SiN, it achieves the **extreme hardness of 5500 HV**.

TS-Drills without internal coolant

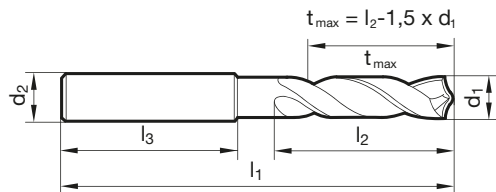
Article no. 89422



P	M	K	N	S	H
•				•	○



Web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting edge geometry • double margin alloyed and high tensile steels up to 1400 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	6.100		8.00	79.00	34.000	36.000
3.100		6.00	62.00	20.000	36.000	6.200		8.00	79.00	34.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	6.300		8.00	79.00	34.000	36.000
3.200		6.00	62.00	20.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
3.250		6.00	62.00	20.000	36.000	6.400		8.00	79.00	34.000	36.000
3.300		6.00	62.00	20.000	36.000	6.500		8.00	79.00	34.000	36.000
3.400		6.00	62.00	20.000	36.000	6.600		8.00	79.00	34.000	36.000
3.500		6.00	62.00	20.000	36.000	6.700		8.00	79.00	34.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	6.750	17/64	8.00	79.00	34.000	36.000
3.600		6.00	62.00	20.000	36.000	6.800		8.00	79.00	34.000	36.000
3.700		6.00	62.00	20.000	36.000	6.900		8.00	79.00	34.000	36.000
3.800		6.00	66.00	24.000	36.000	7.000		8.00	79.00	34.000	36.000
3.900		6.00	66.00	24.000	36.000	7.100		8.00	79.00	41.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	7.140	9/32	8.00	79.00	41.000	36.000
4.000		6.00	66.00	24.000	36.000	7.200		8.00	79.00	41.000	36.000
4.100		6.00	66.00	24.000	36.000	7.300		8.00	79.00	41.000	36.000
4.200		6.00	66.00	24.000	36.000	7.400		8.00	79.00	41.000	36.000
4.300		6.00	66.00	24.000	36.000	7.500		8.00	79.00	41.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	7.540	19/64	8.00	79.00	41.000	36.000
4.400		6.00	66.00	24.000	36.000	7.600		8.00	79.00	41.000	36.000
4.500		6.00	66.00	24.000	36.000	7.700		8.00	79.00	41.000	36.000
4.600		6.00	66.00	24.000	36.000	7.800		8.00	79.00	41.000	36.000
4.650		6.00	66.00	24.000	36.000	7.900		8.00	79.00	41.000	36.000
4.700		6.00	66.00	24.000	36.000	7.940	5/16	8.00	79.00	41.000	36.000
4.760	3/16	6.00	66.00	28.000	36.000	8.000		8.00	79.00	41.000	36.000
4.800		6.00	66.00	28.000	36.000	8.100		10.00	89.00	47.000	40.000
4.900		6.00	66.00	28.000	36.000	8.200		10.00	89.00	47.000	40.000
5.000		6.00	66.00	28.000	36.000	8.300		10.00	89.00	47.000	40.000
5.100		6.00	66.00	28.000	36.000	8.330	21/64	10.00	89.00	47.000	40.000
5.160	13/64	6.00	66.00	28.000	36.000	8.400		10.00	89.00	47.000	40.000
5.200		6.00	66.00	28.000	36.000	8.500		10.00	89.00	47.000	40.000
5.300		6.00	66.00	28.000	36.000	8.600		10.00	89.00	47.000	40.000
5.400		6.00	66.00	28.000	36.000	8.700		10.00	89.00	47.000	40.000
5.500		6.00	66.00	28.000	36.000	8.730	11/32	10.00	89.00	47.000	40.000
5.550		6.00	66.00	28.000	36.000	8.800		10.00	89.00	47.000	40.000
5.560	7/32	6.00	66.00	28.000	36.000	8.900		10.00	89.00	47.000	40.000
5.600		6.00	66.00	28.000	36.000	9.000		10.00	89.00	47.000	40.000
5.700		6.00	66.00	28.000	36.000	9.100		10.00	89.00	47.000	40.000
5.800		6.00	66.00	28.000	36.000	9.130	23/64	10.00	89.00	47.000	40.000
5.900		6.00	66.00	28.000	36.000	9.200		10.00	89.00	47.000	40.000
5.950	15/64	6.00	66.00	28.000	36.000	9.250		10.00	89.00	47.000	40.000
6.000		6.00	66.00	28.000	36.000	9.300		10.00	89.00	47.000	40.000

TS-Drills without internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.400		10.00	89.00	47.000	40.000	13.000		14.00	107.00	60.000	45.000
9.500		10.00	89.00	47.000	40.000	13.300		14.00	107.00	60.000	45.000
9.520	3/8	10.00	89.00	47.000	40.000	13.500		14.00	107.00	60.000	45.000
9.600		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
9.700		10.00	89.00	47.000	40.000	14.000		14.00	107.00	60.000	45.000
9.800		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
9.900		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
9.920	25/64	10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
10.000		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
10.100		12.00	102.00	55.000	45.000	14.700		16.00	115.00	65.000	48.000
10.200		12.00	102.00	55.000	45.000	15.000		16.00	115.00	65.000	48.000
10.300		12.00	102.00	55.000	45.000	15.200		16.00	115.00	65.000	48.000
10.320	13/32	12.00	102.00	55.000	45.000	15.300		16.00	115.00	65.000	48.000
10.400		12.00	102.00	55.000	45.000	15.500		16.00	115.00	65.000	48.000
10.500		12.00	102.00	55.000	45.000	15.700		16.00	115.00	65.000	48.000
10.600		12.00	102.00	55.000	45.000	16.000		16.00	115.00	65.000	48.000
10.700		12.00	102.00	55.000	45.000	16.300		18.00	123.00	73.000	48.000
10.800		12.00	102.00	55.000	45.000	16.500		18.00	123.00	73.000	48.000
10.900		12.00	102.00	55.000	45.000	16.900		18.00	123.00	73.000	48.000
11.000		12.00	102.00	55.000	45.000	17.000		18.00	123.00	73.000	48.000
11.100		12.00	102.00	55.000	45.000	17.300		18.00	123.00	73.000	48.000
11.110	7/16	12.00	102.00	55.000	45.000	17.500		18.00	123.00	73.000	48.000
11.200		12.00	102.00	55.000	45.000	18.000		18.00	123.00	73.000	48.000
11.300		12.00	102.00	55.000	45.000	18.500		20.00	131.00	79.000	50.000
11.400		12.00	102.00	55.000	45.000	18.900		20.00	131.00	79.000	50.000
11.500		12.00	102.00	55.000	45.000	19.000		20.00	131.00	79.000	50.000
11.600		12.00	102.00	55.000	45.000	19.050	3/4	20.00	131.00	79.000	50.000
11.700		12.00	102.00	55.000	45.000	19.300		20.00	131.00	79.000	50.000
11.800		12.00	102.00	55.000	45.000	19.500		20.00	131.00	79.000	50.000
11.900		12.00	102.00	55.000	45.000	20.000		20.00	131.00	79.000	50.000
11.910	15/32	12.00	102.00	55.000	45.000						
12.000		12.00	102.00	55.000	45.000						
12.200		14.00	107.00	60.000	45.000						
12.500		14.00	107.00	60.000	45.000						
12.700	1/2	14.00	107.00	60.000	45.000						
12.800		14.00	107.00	60.000	45.000						

TS-Drills with internal coolant

Article no. 89423



P	M	K	N	S	H
•				•	○

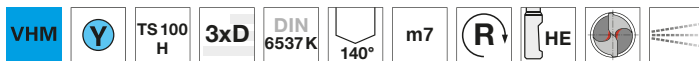


web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin
alloyed and high tensile steels up to 1400 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys

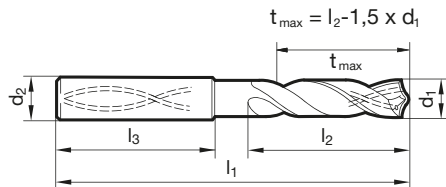
Article no. 89424



P	M	K	N	S	H
•				•	○



web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry
alloyed and high tensile steels up to 1400 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	62.00	20.000	36.000	4.760	3/16	6.00	66.00	28.000	36.000
3.100		6.00	62.00	20.000	36.000	4.800		6.00	66.00	28.000	36.000
3.170	1/8	6.00	62.00	20.000	36.000	4.900		6.00	66.00	28.000	36.000
3.200		6.00	62.00	20.000	36.000	5.000		6.00	66.00	28.000	36.000
3.250		6.00	62.00	20.000	36.000	5.100		6.00	66.00	28.000	36.000
3.300		6.00	62.00	20.000	36.000	5.160	13/64	6.00	66.00	28.000	36.000
3.400		6.00	62.00	20.000	36.000	5.200		6.00	66.00	28.000	36.000
3.500		6.00	62.00	20.000	36.000	5.300		6.00	66.00	28.000	36.000
3.570	9/64	6.00	62.00	20.000	36.000	5.400		6.00	66.00	28.000	36.000
3.600		6.00	62.00	20.000	36.000	5.500		6.00	66.00	28.000	36.000
3.700		6.00	62.00	20.000	36.000	5.550		6.00	66.00	28.000	36.000
3.800		6.00	66.00	24.000	36.000	5.560	7/32	6.00	66.00	28.000	36.000
3.900		6.00	66.00	24.000	36.000	5.600		6.00	66.00	28.000	36.000
3.970	5/32	6.00	66.00	24.000	36.000	5.700		6.00	66.00	28.000	36.000
4.000		6.00	66.00	24.000	36.000	5.800		6.00	66.00	28.000	36.000
4.100		6.00	66.00	24.000	36.000	5.900		6.00	66.00	28.000	36.000
4.200		6.00	66.00	24.000	36.000	5.950	15/64	6.00	66.00	28.000	36.000
4.300		6.00	66.00	24.000	36.000	6.000		6.00	66.00	28.000	36.000
4.370	11/64	6.00	66.00	24.000	36.000	6.100		8.00	79.00	34.000	36.000
4.400		6.00	66.00	24.000	36.000	6.200		8.00	79.00	34.000	36.000
4.500		6.00	66.00	24.000	36.000	6.300		8.00	79.00	34.000	36.000
4.600		6.00	66.00	24.000	36.000	6.350	1/4	8.00	79.00	34.000	36.000
4.650		6.00	66.00	24.000	36.000	6.400		8.00	79.00	34.000	36.000
4.700		6.00	66.00	24.000	36.000	6.500		8.00	79.00	34.000	36.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	79.00	34.000	36.000	10.900		12.00	102.00	55.000	45.000
6.700		8.00	79.00	34.000	36.000	11.000		12.00	102.00	55.000	45.000
6.750	17/64	8.00	79.00	34.000	36.000	11.100		12.00	102.00	55.000	45.000
6.800		8.00	79.00	34.000	36.000	11.110	7/16	12.00	102.00	55.000	45.000
6.900		8.00	79.00	34.000	36.000	11.200		12.00	102.00	55.000	45.000
7.000		8.00	79.00	34.000	36.000	11.300		12.00	102.00	55.000	45.000
7.100		8.00	79.00	41.000	36.000	11.400		12.00	102.00	55.000	45.000
7.140	9/32	8.00	79.00	41.000	36.000	11.500		12.00	102.00	55.000	45.000
7.200		8.00	79.00	41.000	36.000	11.600		12.00	102.00	55.000	45.000
7.300		8.00	79.00	41.000	36.000	11.700		12.00	102.00	55.000	45.000
7.400		8.00	79.00	41.000	36.000	11.800		12.00	102.00	55.000	45.000
7.500		8.00	79.00	41.000	36.000	11.900		12.00	102.00	55.000	45.000
7.540	19/64	8.00	79.00	41.000	36.000	11.910	15/32	12.00	102.00	55.000	45.000
7.600		8.00	79.00	41.000	36.000	12.000		12.00	102.00	55.000	45.000
7.700		8.00	79.00	41.000	36.000	12.200		14.00	107.00	60.000	45.000
7.800		8.00	79.00	41.000	36.000	12.500		14.00	107.00	60.000	45.000
7.900		8.00	79.00	41.000	36.000	12.700	1/2	14.00	107.00	60.000	45.000
7.940	5/16	8.00	79.00	41.000	36.000	12.800		14.00	107.00	60.000	45.000
8.000		8.00	79.00	41.000	36.000	13.000		14.00	107.00	60.000	45.000
8.100		10.00	89.00	47.000	40.000	13.300		14.00	107.00	60.000	45.000
8.200		10.00	89.00	47.000	40.000	13.500		14.00	107.00	60.000	45.000
8.300		10.00	89.00	47.000	40.000	13.700		14.00	107.00	60.000	45.000
8.330	21/64	10.00	89.00	47.000	40.000	14.000		14.00	107.00	60.000	45.000
8.400		10.00	89.00	47.000	40.000	14.200		16.00	115.00	65.000	48.000
8.500		10.00	89.00	47.000	40.000	14.290	9/16	16.00	115.00	65.000	48.000
8.600		10.00	89.00	47.000	40.000	14.300		16.00	115.00	65.000	48.000
8.700		10.00	89.00	47.000	40.000	14.500		16.00	115.00	65.000	48.000
8.730	11/32	10.00	89.00	47.000	40.000	14.700		16.00	115.00	65.000	48.000
8.800		10.00	89.00	47.000	40.000	15.000		16.00	115.00	65.000	48.000
8.900		10.00	89.00	47.000	40.000	15.200		16.00	115.00	65.000	48.000
9.000		10.00	89.00	47.000	40.000	15.300		16.00	115.00	65.000	48.000
9.100		10.00	89.00	47.000	40.000	15.500		16.00	115.00	65.000	48.000
9.130	23/64	10.00	89.00	47.000	40.000	15.700		16.00	115.00	65.000	48.000
9.200		10.00	89.00	47.000	40.000	16.000		16.00	115.00	65.000	48.000
9.250		10.00	89.00	47.000	40.000	16.300		18.00	123.00	73.000	48.000
9.300		10.00	89.00	47.000	40.000	16.500		18.00	123.00	73.000	48.000
9.400		10.00	89.00	47.000	40.000	16.900		18.00	123.00	73.000	48.000
9.500		10.00	89.00	47.000	40.000	17.000		18.00	123.00	73.000	48.000
9.520	3/8	10.00	89.00	47.000	40.000	17.300		18.00	123.00	73.000	48.000
9.600		10.00	89.00	47.000	40.000	17.500		18.00	123.00	73.000	48.000
9.700		10.00	89.00	47.000	40.000	18.000		18.00	123.00	73.000	48.000
9.800		10.00	89.00	47.000	40.000	18.500		20.00	131.00	79.000	50.000
9.900		10.00	89.00	47.000	40.000	18.900		20.00	131.00	79.000	50.000
9.920	25/64	10.00	89.00	47.000	40.000	19.000		20.00	131.00	79.000	50.000
10.000		10.00	89.00	47.000	40.000	19.050	3/4	20.00	131.00	79.000	50.000
10.100		12.00	102.00	55.000	45.000	19.300		20.00	131.00	79.000	50.000
10.200		12.00	102.00	55.000	45.000	19.500		20.00	131.00	79.000	50.000
10.300		12.00	102.00	55.000	45.000	20.000		20.00	131.00	79.000	50.000
10.320	13/32	12.00	102.00	55.000	45.000						
10.400		12.00	102.00	55.000	45.000						
10.500		12.00	102.00	55.000	45.000						
10.600		12.00	102.00	55.000	45.000						
10.700		12.00	102.00	55.000	45.000						
10.800		12.00	102.00	55.000	45.000						

TS-Drills with internal coolant

Article no. 89425



P	M	K	N	S	H
•				•	○



web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin
alloyed and high tensile steels up to 1400 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys

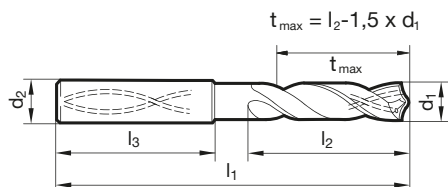
Article no. 89426



P	M	K	N	S	H
•				•	○



Web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting edge geometry • double margin
alloyed and high tensile steels up to 1400 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	66.00	28.000	36.000	4.760	3/16	6.00	82.00	44.000	36.000
3.100		6.00	66.00	28.000	36.000	4.800		6.00	82.00	44.000	36.000
3.170	1/8	6.00	66.00	28.000	36.000	4.900		6.00	82.00	44.000	36.000
3.200		6.00	66.00	28.000	36.000	5.000		6.00	82.00	44.000	36.000
3.250		6.00	66.00	28.000	36.000	5.100		6.00	82.00	44.000	36.000
3.300		6.00	66.00	28.000	36.000	5.160	13/64	6.00	82.00	44.000	36.000
3.400		6.00	66.00	28.000	36.000	5.200		6.00	82.00	44.000	36.000
3.500		6.00	66.00	28.000	36.000	5.300		6.00	82.00	44.000	36.000
3.570	9/64	6.00	66.00	28.000	36.000	5.400		6.00	82.00	44.000	36.000
3.600		6.00	66.00	28.000	36.000	5.500		6.00	82.00	44.000	36.000
3.700		6.00	66.00	28.000	36.000	5.550		6.00	82.00	44.000	36.000
3.800		6.00	74.00	36.000	36.000	5.560	7/32	6.00	82.00	44.000	36.000
3.900		6.00	74.00	36.000	36.000	5.600		6.00	82.00	44.000	36.000
3.970	5/32	6.00	74.00	36.000	36.000	5.700		6.00	82.00	44.000	36.000
4.000		6.00	74.00	36.000	36.000	5.800		6.00	82.00	44.000	36.000
4.100		6.00	74.00	36.000	36.000	5.900		6.00	82.00	44.000	36.000
4.200		6.00	74.00	36.000	36.000	5.950	15/64	6.00	82.00	44.000	36.000
4.300		6.00	74.00	36.000	36.000	6.000		6.00	82.00	44.000	36.000
4.370	11/64	6.00	74.00	36.000	36.000	6.100		8.00	91.00	53.000	36.000
4.400		6.00	74.00	36.000	36.000	6.200		8.00	91.00	53.000	36.000
4.500		6.00	74.00	36.000	36.000	6.300		8.00	91.00	53.000	36.000
4.600		6.00	74.00	36.000	36.000	6.350	1/4	8.00	91.00	53.000	36.000
4.650		6.00	74.00	36.000	36.000	6.400		8.00	91.00	53.000	36.000
4.700		6.00	74.00	36.000	36.000	6.500		8.00	91.00	53.000	36.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
6.600		8.00	91.00	53.000	36.000	10.900		12.00	118.00	71.000	45.000
6.700		8.00	91.00	53.000	36.000	11.000		12.00	118.00	71.000	45.000
6.750	17/64	8.00	91.00	53.000	36.000	11.100		12.00	118.00	71.000	45.000
6.800		8.00	91.00	53.000	36.000	11.110	7/16	12.00	118.00	71.000	45.000
6.900		8.00	91.00	53.000	36.000	11.200		12.00	118.00	71.000	45.000
7.000		8.00	91.00	53.000	36.000	11.300		12.00	118.00	71.000	45.000
7.100		8.00	91.00	53.000	36.000	11.400		12.00	118.00	71.000	45.000
7.140	9/32	8.00	91.00	53.000	36.000	11.500		12.00	118.00	71.000	45.000
7.200		8.00	91.00	53.000	36.000	11.600		12.00	118.00	71.000	45.000
7.300		8.00	91.00	53.000	36.000	11.700		12.00	118.00	71.000	45.000
7.400		8.00	91.00	53.000	36.000	11.800		12.00	118.00	71.000	45.000
7.500		8.00	91.00	53.000	36.000	11.900		12.00	118.00	71.000	45.000
7.540	19/64	8.00	91.00	53.000	36.000	11.910	15/32	12.00	118.00	71.000	45.000
7.600		8.00	91.00	53.000	36.000	12.000		12.00	118.00	71.000	45.000
7.700		8.00	91.00	53.000	36.000	12.200		14.00	124.00	77.000	45.000
7.800		8.00	91.00	53.000	36.000	12.500		14.00	124.00	77.000	45.000
7.900		8.00	91.00	53.000	36.000	12.700	1/2	14.00	124.00	77.000	45.000
7.940	5/16	8.00	91.00	53.000	36.000	12.800		14.00	124.00	77.000	45.000
8.000		8.00	91.00	53.000	36.000	13.000		14.00	124.00	77.000	45.000
8.100		10.00	103.00	61.000	40.000	13.300		14.00	124.00	77.000	45.000
8.200		10.00	103.00	61.000	40.000	13.500		14.00	124.00	77.000	45.000
8.300		10.00	103.00	61.000	40.000	13.700		14.00	124.00	77.000	45.000
8.330	21/64	10.00	103.00	61.000	40.000	14.000		14.00	124.00	77.000	45.000
8.400		10.00	103.00	61.000	40.000	14.200		16.00	133.00	83.000	48.000
8.500		10.00	103.00	61.000	40.000	14.290	9/16	16.00	133.00	83.000	48.000
8.600		10.00	103.00	61.000	40.000	14.300		16.00	133.00	83.000	48.000
8.700		10.00	103.00	61.000	40.000	14.500		16.00	133.00	83.000	48.000
8.730	11/32	10.00	103.00	61.000	40.000	14.700		16.00	133.00	83.000	48.000
8.800		10.00	103.00	61.000	40.000	15.000		16.00	133.00	83.000	48.000
8.900		10.00	103.00	61.000	40.000	15.200		16.00	133.00	83.000	48.000
9.000		10.00	103.00	61.000	40.000	15.300		16.00	133.00	83.000	48.000
9.100		10.00	103.00	61.000	40.000	15.500		16.00	133.00	83.000	48.000
9.130	23/64	10.00	103.00	61.000	40.000	15.700		16.00	133.00	83.000	48.000
9.200		10.00	103.00	61.000	40.000	16.000		16.00	133.00	83.000	48.000
9.250		10.00	103.00	61.000	40.000	16.300		18.00	143.00	93.000	48.000
9.300		10.00	103.00	61.000	40.000	16.500		18.00	143.00	93.000	48.000
9.400		10.00	103.00	61.000	40.000	16.900		18.00	143.00	93.000	48.000
9.500		10.00	103.00	61.000	40.000	17.000		18.00	143.00	93.000	48.000
9.520	3/8	10.00	103.00	61.000	40.000	17.300		18.00	143.00	93.000	48.000
9.600		10.00	103.00	61.000	40.000	17.500		18.00	143.00	93.000	48.000
9.700		10.00	103.00	61.000	40.000	18.000		18.00	143.00	93.000	48.000
9.800		10.00	103.00	61.000	40.000	18.500		20.00	153.00	101.000	50.000
9.900		10.00	103.00	61.000	40.000	18.900		20.00	153.00	101.000	50.000
9.920	25/64	10.00	103.00	61.000	40.000	19.000		20.00	153.00	101.000	50.000
10.000		10.00	103.00	61.000	40.000	19.050	3/4	20.00	153.00	101.000	50.000
10.100		12.00	118.00	71.000	45.000	19.300		20.00	153.00	101.000	50.000
10.200		12.00	118.00	71.000	45.000	19.500		20.00	153.00	101.000	50.000
10.300		12.00	118.00	71.000	45.000	20.000		20.00	153.00	101.000	50.000
10.320	13/32	12.00	118.00	71.000	45.000						
10.400		12.00	118.00	71.000	45.000						
10.500		12.00	118.00	71.000	45.000						
10.600		12.00	118.00	71.000	45.000						
10.700		12.00	118.00	71.000	45.000						
10.800		12.00	118.00	71.000	45.000						

TS-Drills with internal coolant

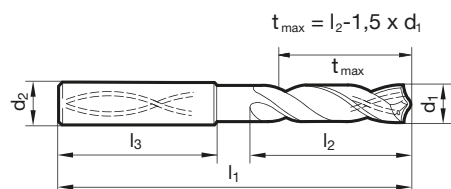
Article no. 89427



P	M	K	N	S	H
•				•	○



web thinning $\geq \varnothing 3.000$ • relieved cone • main cutting edge is slightly concave • optimised cutting geometry • double margin alloyed and high tensile steels up to 1400 N/mm² • Inconel, Hastelloy, Monel • Titanium and Titanium alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	70.00	30.000	36.000	9.250		10.00	139.00	95.000	40.000
3.250		6.00	70.00	30.000	36.000	9.400		10.00	139.00	95.000	40.000
3.300		6.00	70.00	30.000	36.000	9.500		10.00	139.00	95.000	40.000
3.400		6.00	75.00	35.500	36.000	10.000		10.00	139.00	95.000	40.000
3.500		6.00	75.00	35.500	36.000	10.200		12.00	155.00	106.000	45.000
3.700		6.00	75.00	35.500	36.000	10.400		12.00	155.00	106.000	45.000
4.000		6.00	75.00	37.500	36.000	10.500		12.00	155.00	106.000	45.000
4.200		6.00	75.00	37.500	36.000	10.800		12.00	155.00	106.000	45.000
4.300		6.00	85.00	45.000	36.000	11.000		12.00	155.00	106.000	45.000
4.500		6.00	85.00	45.000	36.000	11.300		12.00	163.00	114.000	45.000
4.650		6.00	85.00	45.000	36.000	11.400		12.00	163.00	114.000	45.000
5.000		6.00	90.00	50.000	36.000	11.500		12.00	163.00	114.000	45.000
5.100		6.00	90.00	50.000	36.000	12.000		12.00	163.00	114.000	45.000
5.200		6.00	90.00	50.000	36.000	12.500		14.00	182.00	133.000	45.000
5.500		6.00	97.00	57.000	36.000	13.000		14.00	182.00	133.000	45.000
5.550		6.00	97.00	57.000	36.000	13.100	33/64	14.00	182.00	133.000	45.000
6.000		6.00	97.00	57.000	36.000	13.500		14.00	182.00	133.000	45.000
6.500		8.00	106.00	66.000	36.000	14.000		14.00	182.00	133.000	45.000
6.750	17/64	8.00	106.00	66.000	36.000	14.500		16.00	204.00	152.000	48.000
6.800		8.00	106.00	66.000	36.000	15.000		16.00	204.00	152.000	48.000
6.900		8.00	116.00	76.000	36.000	15.100		16.00	204.00	152.000	48.000
7.000		8.00	116.00	76.000	36.000	15.500		16.00	204.00	152.000	48.000
7.400		8.00	116.00	76.000	36.000	16.000		16.00	204.00	152.000	48.000
7.500		8.00	116.00	76.000	36.000						
7.800		8.00	116.00	76.000	36.000						
8.000		8.00	116.00	76.000	36.000						
8.500		10.00	131.00	87.000	40.000						
8.600		10.00	131.00	87.000	40.000						
8.800		10.00	131.00	87.000	40.000						
9.000		10.00	131.00	87.000	40.000						

INDIVIDUAL SOLUTIONS FOR EFFICIENT TOOL STORAGE AND MANAGEMENT.

▼ TM 326

▼ TM 526



▼ TM 426

▼ TM MINIBOX



▼ TM 626



▼ TM 826



▼ TM SPECIAL
EXPANSION UNITS

THE HARTNER TOOL DISPENSING SYSTEMS

▼ THE TYPES OF CABINETS

The three tool dispensing systems, TM 326, TM 426 and TM 526, offer flexible options for tailored tool storage. You can choose between various degrees of automation depending on the need and the size of the company. Individual dispensing options such as drawers or spiral systems are available.

We tailored the Hartner tool dispensing system individually to your wishes and the needs in your company. This means you can make optimal use of the options. Numerous satisfied customers have also confirmed this.

SOLID CARBIDE MICRO-PRECISION DRILLS

GENERAL STEEL MACHINING UP TO $\sim 1200 \text{ N/MM}^2$

- ▼ universal application

ADVANTAGES AND CHARACTERISTICS

- ▼ for **drilling depths** up to **4xD and 7xD**, solid carbide micro-precision drills without internal coolant are available with **diameters from 0.5 mm to 3.0 mm**
- ▼ solid carbide micro-precision drills **with internal coolant** and a **diameter of 1.4 mm to 3.0 mm** are used for boreholes **up to 8xD and 15xD**
- ▼ thanks to the **optimised tool geometry**, **chip removal is not required** when using solid carbide micro-precision drills from Hartner for drilling depths up to 15xD



the **tool geometry** is designed for universal use in virtually any material

ground cutting edge chamfer for high process reliability – even in critical applications

special web thinning for precise drilling and dimensionally stable boreholes

optimised flute profile for high stability and good chip evacuation

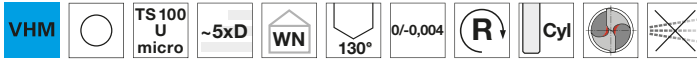
The single-layer composition of the **TiAlN coating** is particularly suited for coating micro-precision tools and ensures high wear resistance and good chip evacuation

Micro-precision drills without coolant ducts

Article no. 89281



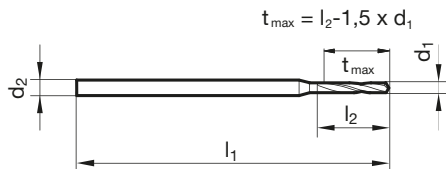
P	M	K	N	S	H
●	○	●	○	○	○



web thinning $\geq \varnothing 0.800$ • facet point grind • main cutting edge form straight

structural and case hardened steels • cast materials • bronze, brass • aluminium and Al alloys • magnesium and magnesium alloys

• plastics and fiber reinforced plastics



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0.200	1.00	25.00	1.500	1.300	1.50	25.00	8.500
0.300	1.00	25.00	1.900				
0.350	1.00	25.00	2.400				
0.400	1.00	25.00	3.000				
0.450	1.00	25.00	3.000				
0.500	1.00	25.00	3.400				
0.600	1.00	25.00	3.900				
0.700	1.00	25.00	4.800				
0.800	1.50	25.00	5.300				
1.000	1.50	25.00	6.800				
1.100	1.50	25.00	7.600				
1.250	1.50	25.00	8.500				

Micro-precision drills without coolant ducts

Article no. 86402



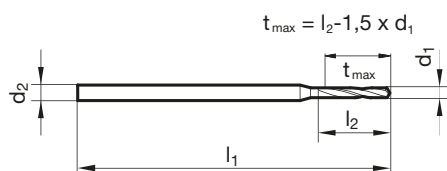
P	M	K	N	S	H
•		•			



web thinning $\geq \varnothing 0.800$ • facet point grind • uniform 3 mm shank • uniform 38 mm total length

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

• machining of circuit boards



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0.100	3.00	38.00	1.200	0.980	3.00	38.00	10.000
0.150	3.00	38.00	2.000	0.990	3.00	38.00	10.000
0.200	3.00	38.00	2.500	1.000	3.00	38.00	10.000
0.250	3.00	38.00	3.000	1.100	3.00	38.00	10.000
0.300	3.00	38.00	5.000	1.110	3.00	38.00	10.000
0.310	3.00	38.00	5.000	1.150	3.00	38.00	10.000
0.350	3.00	38.00	6.000	1.200	3.00	38.00	10.000
0.370	3.00	38.00	6.000	1.210	3.00	38.00	10.000
0.400	3.00	38.00	7.000	1.400	3.00	38.00	10.000
0.450	3.00	38.00	7.000	1.450	3.00	38.00	10.000
0.500	3.00	38.00	7.000	1.500	3.00	38.00	10.000
0.550	3.00	38.00	7.000	1.510	3.00	38.00	10.000
0.600	3.00	38.00	7.000	1.520	3.00	38.00	10.000
0.640	3.00	38.00	7.000	1.550	3.00	38.00	10.000
0.650	3.00	38.00	7.000	1.600	3.00	38.00	12.000
0.700	3.00	38.00	8.000	1.650	3.00	38.00	12.000
0.710	3.00	38.00	8.000	1.700	3.00	38.00	12.000
0.720	3.00	38.00	8.000	1.800	3.00	38.00	12.000
0.740	3.00	38.00	8.000	1.810	3.00	38.00	12.000
0.750	3.00	38.00	8.000	1.830	3.00	38.00	12.000
0.760	3.00	38.00	8.000	1.850	3.00	38.00	12.000
0.770	3.00	38.00	8.000	1.900	3.00	38.00	12.000
0.780	3.00	38.00	8.000	1.920	3.00	38.00	12.000
0.790	3.00	38.00	8.000	1.950	3.00	38.00	12.000
0.800	3.00	38.00	10.000	1.980	3.00	38.00	12.000
0.810	3.00	38.00	10.000	2.000	3.00	38.00	12.000
0.820	3.00	38.00	10.000	2.050	3.00	38.00	12.000
0.830	3.00	38.00	10.000	2.100	3.00	38.00	12.000
0.840	3.00	38.00	10.000	2.400	3.00	38.00	12.000
0.850	3.00	38.00	10.000	2.500	3.00	38.00	12.000
0.860	3.00	38.00	10.000	2.600	3.00	38.00	12.000
0.870	3.00	38.00	10.000	2.750	3.00	38.00	12.000
0.880	3.00	38.00	10.000	2.950	3.00	38.00	12.000
0.890	3.00	38.00	10.000	3.000	3.00	38.00	12.000
0.900	3.00	38.00	10.000				
0.910	3.00	38.00	10.000				
0.920	3.00	38.00	10.000				
0.930	3.00	38.00	10.000				
0.940	3.00	38.00	10.000				
0.950	3.00	38.00	10.000				
0.960	3.00	38.00	10.000				
0.970	3.00	38.00	10.000				

Micro-precision drills without coolant ducts

Article no. 86400

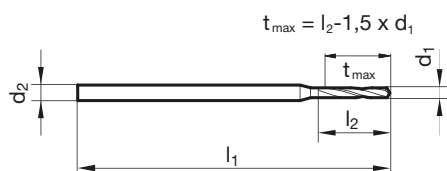


P	M	K	N	S	H
•	•	•	○	○	



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

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



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0.500	3.00	47.00	3.000	1.950	3.00	52.00	11.700
0.550	3.00	47.00	3.300	1.980	4.00	59.00	12.000
0.600	3.00	47.00	3.600	2.000	4.00	59.00	12.000
0.650	3.00	47.00	3.900	2.050	4.00	59.00	12.300
0.700	3.00	47.00	4.200	2.100	4.00	59.00	12.600
0.750	3.00	47.00	4.500	2.150	4.00	59.00	12.900
0.800	3.00	47.00	4.800	2.200	4.00	59.00	13.200
0.850	3.00	47.00	5.100	2.250	4.00	59.00	13.500
0.900	3.00	47.00	5.400	2.300	4.00	59.00	13.800
0.950	3.00	47.00	5.700	2.350	4.00	59.00	14.100
1.000	3.00	47.00	6.000	2.380	4.00	59.00	14.400
1.050	3.00	47.00	6.300	2.400	4.00	59.00	14.400
1.100	3.00	47.00	6.600	2.450	4.00	59.00	14.700
1.150	3.00	47.00	6.900	2.500	4.00	59.00	15.000
1.200	3.00	47.00	7.200	2.550	4.00	59.00	15.300
1.250	3.00	47.00	7.500	2.600	4.00	59.00	15.600
1.300	3.00	47.00	7.800	2.650	4.00	59.00	15.900
1.350	3.00	47.00	8.100	2.700	4.00	59.00	16.200
1.400	3.00	47.00	8.400	2.750	4.00	59.00	16.500
1.450	3.00	47.00	8.700	2.780	4.00	59.00	16.800
1.500	3.00	47.00	9.000	2.800	4.00	59.00	16.800
1.550	3.00	47.00	9.300	2.850	4.00	59.00	17.100
1.590	3.00	47.00	9.600	2.900	4.00	59.00	17.400
1.600	3.00	47.00	9.600	2.950	4.00	59.00	17.700
1.650	3.00	47.00	9.900	3.000	4.00	59.00	18.000
1.700	3.00	47.00	10.200				
1.750	3.00	47.00	10.500				
1.800	3.00	52.00	10.800				
1.850	3.00	52.00	11.100				
1.900	3.00	52.00	11.400				

Micro-precision drills without coolant ducts

Article no. 86401

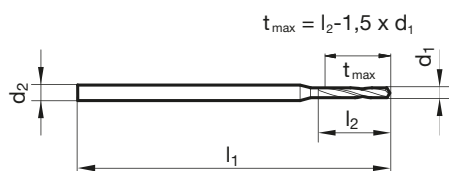


P	M	K	N	S	H
•	•	•	○	○	



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

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



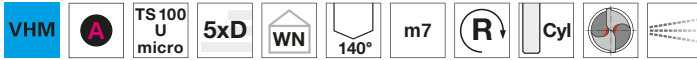
d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0.500	3.00	47.00	4.000	1.950	3.00	52.00	17.600
0.550	3.00	47.00	4.400	1.980	4.00	63.00	18.000
0.600	3.00	47.00	4.800	2.000	4.00	63.00	18.000
0.650	3.00	47.00	5.200	2.050	4.00	63.00	18.500
0.700	3.00	47.00	5.600	2.100	4.00	63.00	18.900
0.750	3.00	47.00	6.000	2.150	4.00	63.00	19.400
0.800	3.00	47.00	6.400	2.200	4.00	63.00	19.800
0.850	3.00	47.00	6.800	2.250	4.00	63.00	20.300
0.900	3.00	47.00	7.200	2.300	4.00	63.00	20.700
0.950	3.00	47.00	7.600	2.350	4.00	63.00	21.200
1.000	3.00	47.00	8.000	2.380	4.00	63.00	21.600
1.050	3.00	47.00	8.400	2.400	4.00	63.00	21.600
1.100	3.00	47.00	8.800	2.450	4.00	63.00	22.100
1.150	3.00	47.00	9.200	2.500	4.00	63.00	22.500
1.200	3.00	52.00	10.800	2.550	4.00	63.00	23.000
1.250	3.00	52.00	11.300	2.600	4.00	67.00	23.400
1.300	3.00	52.00	11.700	2.650	4.00	67.00	23.900
1.350	3.00	52.00	12.200	2.700	4.00	67.00	24.300
1.400	3.00	52.00	12.600	2.750	4.00	67.00	24.800
1.450	3.00	52.00	13.100	2.780	4.00	67.00	25.200
1.500	3.00	52.00	13.500	2.800	4.00	67.00	25.200
1.550	3.00	52.00	14.000	2.850	4.00	67.00	25.700
1.590	3.00	52.00	14.400	2.900	4.00	67.00	26.100
1.600	3.00	52.00	14.400	2.950	4.00	67.00	26.600
1.650	3.00	52.00	14.900	3.000	4.00	67.00	27.000
1.700	3.00	52.00	15.300				
1.750	3.00	52.00	15.800				
1.800	3.00	52.00	16.200				
1.850	3.00	52.00	16.700				
1.900	3.00	52.00	17.100				

Micro-precision drills with coolant ducts

Article no. 86405

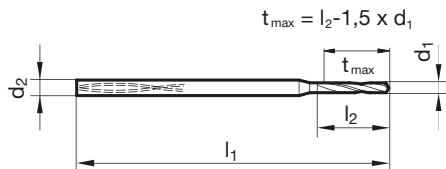


P	M	K	N	S	H
•	•	•	○	○	



web thinning $\geq \varnothing 1.400$ • facet point grind • main cutting edge form straight • edge preparation

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



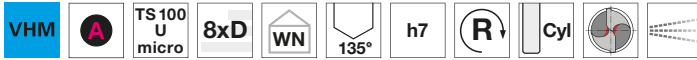
d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	48.00	8.000	2.200	4.00	62.00	18.000
1.020	3.00	48.00	8.500	2.250	4.00	62.00	18.000
1.050	3.00	48.00	8.500	2.300	4.00	62.00	18.000
1.100	3.00	48.00	9.000	2.350	4.00	62.00	19.000
1.150	3.00	48.00	9.500	2.380	4.00	62.00	19.000
1.180	3.00	48.00	9.500	2.400	4.00	62.00	19.000
1.190	3.00	48.00	10.000	2.450	4.00	62.00	20.000
1.200	3.00	48.00	10.000	2.500	4.00	62.00	20.000
1.250	3.00	48.00	10.000	2.550	4.00	62.00	20.000
1.280	3.00	48.00	10.500	2.600	4.00	66.00	21.000
1.300	3.00	48.00	10.500	2.650	4.00	66.00	21.000
1.350	3.00	48.00	11.000	2.700	4.00	66.00	22.000
1.400	4.00	52.00	11.000	2.750	4.00	66.00	22.000
1.450	4.00	52.00	12.000	2.780	4.00	66.00	22.000
1.500	4.00	52.00	12.000	2.800	4.00	66.00	22.000
1.550	4.00	52.00	12.000	2.850	4.00	66.00	23.000
1.590	4.00	52.00	13.000	2.900	4.00	66.00	23.000
1.600	4.00	52.00	13.000	2.950	4.00	66.00	24.000
1.650	4.00	52.00	13.000	3.000	4.00	66.00	24.000
1.700	4.00	56.00	14.000				
1.750	4.00	56.00	14.000				
1.800	4.00	56.00	14.000				
1.850	4.00	56.00	15.000				
1.900	4.00	56.00	15.000				
1.950	4.00	56.00	16.000				
1.980	4.00	56.00	16.000				
2.000	4.00	56.00	16.000				
2.050	4.00	56.00	16.000				
2.100	4.00	62.00	17.000				
2.150	4.00	62.00	17.000				

Micro-precision drills with coolant ducts

Article no. 86408

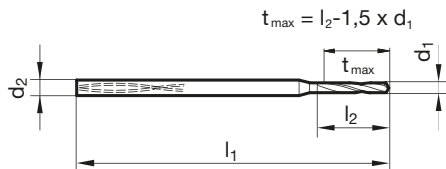


P	M	K	N	S	H
•	•	•	○	○	



web thinning $\geq \varnothing 1.400$ • facet point grind • main cutting edge form straight • edge preparation

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



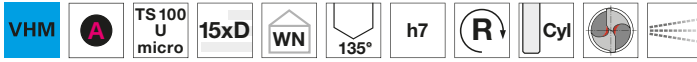
d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	56.00	11.000	2.000	4.00	56.00	22.000
1.020	3.00	56.00	11.500	2.100	4.00	62.00	23.000
1.050	3.00	56.00	12.000	2.200	4.00	62.00	24.000
1.100	3.00	56.00	12.500	2.300	4.00	62.00	25.000
1.150	3.00	56.00	13.000	2.400	4.00	62.00	26.000
1.180	3.00	56.00	13.000	2.500	4.00	62.00	28.000
1.190	3.00	56.00	13.500	2.600	4.00	66.00	29.000
1.200	3.00	56.00	13.500	2.700	4.00	66.00	30.000
1.250	3.00	56.00	14.000	2.800	4.00	66.00	31.000
1.280	3.00	56.00	14.500	2.900	4.00	66.00	32.000
1.300	3.00	56.00	14.500	3.000	4.00	66.00	33.000
1.350	3.00	56.00	15.000				
1.400	4.00	52.00	15.000				
1.500	4.00	52.00	17.000				
1.600	4.00	52.00	18.000				
1.700	4.00	56.00	19.000				
1.800	4.00	56.00	20.000				
1.900	4.00	56.00	21.000				

Micro-precision drills with coolant ducts

Article no. 86412

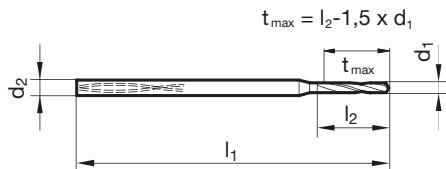


P	M	K	N	S	H
•	•	•	○	○	



web thinning $\geq \varnothing 1.400$ • facet point grind • main cutting edge form straight • edge preparation

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



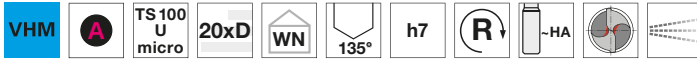
d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	56.00	18.000	2.000	4.00	70.00	36.000
1.020	3.00	56.00	18.500	2.100	4.00	78.00	38.000
1.050	3.00	56.00	19.000	2.200	4.00	78.00	40.000
1.100	3.00	56.00	20.000	2.300	4.00	78.00	42.000
1.150	3.00	56.00	21.000	2.400	4.00	78.00	44.000
1.180	3.00	56.00	21.500	2.500	4.00	78.00	45.000
1.190	3.00	56.00	21.500	2.600	4.00	87.00	47.000
1.200	3.00	56.00	22.000	2.700	4.00	87.00	48.000
1.250	3.00	56.00	22.500	2.800	4.00	87.00	50.000
1.280	3.00	56.00	23.500	2.900	4.00	87.00	52.000
1.300	3.00	56.00	23.500	3.000	4.00	87.00	54.000
1.350	3.00	56.00	24.500				
1.400	4.00	62.00	25.000				
1.500	4.00	62.00	27.000				
1.600	4.00	62.00	29.000				
1.700	4.00	70.00	31.000				
1.800	4.00	70.00	32.000				
1.900	4.00	70.00	34.000				

Micro-precision drills with coolant ducts

Article no. 86410

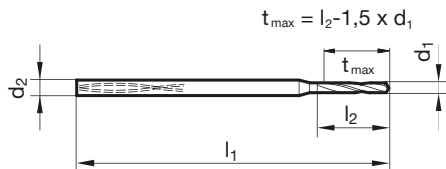


P	M	K	N	S	H
•	•	•	○	○	



facet point grind • main cutting edge form straight • with cutting lip honing

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



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	59.00	23.000	2.050	4.00	79.00	47.200
1.050	3.00	59.00	24.200	2.100	4.00	91.00	48.300
1.100	3.00	59.00	25.300	2.150	4.00	91.00	49.500
1.150	3.00	63.00	26.500	2.200	4.00	91.00	50.600
1.190	3.00	63.00	27.400	2.250	4.00	91.00	51.800
1.200	3.00	63.00	27.600	2.300	4.00	91.00	52.900
1.250	3.00	63.00	28.800	2.320	4.00	91.00	54.100
1.300	3.00	68.00	29.900	2.350	4.00	91.00	54.100
1.350	3.00	68.00	31.100	2.380	4.00	91.00	54.800
1.400	4.00	70.00	32.200	2.400	4.00	91.00	55.200
1.450	4.00	70.00	33.400	2.450	4.00	91.00	56.400
1.500	4.00	70.00	34.500	2.500	4.00	91.00	57.500
1.550	4.00	70.00	35.700	2.550	4.00	91.00	58.700
1.590	4.00	70.00	36.600	2.600	4.00	102.00	59.800
1.600	4.00	70.00	36.800	2.650	4.00	102.00	61.000
1.650	4.00	70.00	38.000	2.700	4.00	102.00	62.100
1.700	4.00	79.00	39.400	2.750	4.00	102.00	63.300
1.750	4.00	79.00	40.300	2.780	4.00	102.00	64.000
1.800	4.00	79.00	41.400	2.800	4.00	102.00	64.400
1.850	4.00	79.00	42.600	2.850	4.00	102.00	65.600
1.900	4.00	79.00	43.700	2.900	4.00	102.00	66.700
1.950	4.00	79.00	44.900	2.950	4.00	102.00	67.900
1.980	4.00	79.00	45.600	3.000	4.00	102.00	69.000
2.000	4.00	79.00	46.000				

Micro-precision drills with coolant ducts

Article no. 86403

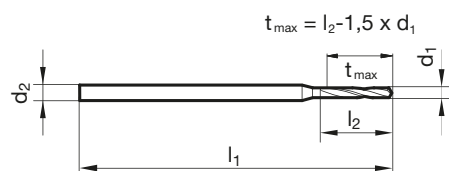


P	M	K	N	S	H
○	●		○	●	



facet point grind • main cutting edge is slightly concave • optimised cutting geometry

stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel • copper, brass and bronze alloys



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
0.500	3.00	38.00	2.800	1.700	4.00	46.00	9.400
0.550	3.00	38.00	3.100	1.750	4.00	46.00	9.700
0.600	3.00	38.00	3.300	1.800	4.00	46.00	9.900
0.650	3.00	38.00	3.600	1.850	4.00	46.00	10.200
0.660	3.00	38.00	3.700	1.900	4.00	46.00	10.500
0.700	3.00	38.00	3.900	1.950	4.00	46.00	10.800
0.740	3.00	38.00	4.100	1.980	4.00	46.00	10.900
0.750	3.00	38.00	4.200	2.000	4.00	46.00	11.000
0.790	3.00	38.00	4.400	2.050	4.00	46.00	11.300
0.800	3.00	38.00	4.400	2.100	4.00	50.00	11.600
0.820	3.00	38.00	4.600	2.150	4.00	50.00	11.900
0.850	3.00	38.00	4.700	2.200	4.00	50.00	12.100
0.900	3.00	38.00	5.000	2.250	4.00	50.00	12.400
0.950	3.00	38.00	5.300	2.300	4.00	50.00	12.700
1.000	3.00	38.00	5.500	2.350	4.00	50.00	13.000
1.020	3.00	38.00	5.700	2.380	4.00	50.00	13.100
1.050	3.00	38.00	5.800	2.400	4.00	50.00	13.200
1.100	3.00	38.00	6.100	2.450	4.00	50.00	13.500
1.150	3.00	38.00	6.400	2.500	4.00	50.00	13.800
1.180	3.00	38.00	6.500	2.550	4.00	50.00	14.100
1.190	3.00	38.00	6.600	2.600	4.00	50.00	14.300
1.200	3.00	38.00	6.600	2.650	4.00	50.00	14.600
1.250	3.00	38.00	6.900	2.700	4.00	50.00	14.900
1.280	3.00	38.00	7.100	2.750	4.00	50.00	15.200
1.300	3.00	38.00	7.200	2.780	4.00	50.00	15.300
1.350	3.00	38.00	7.500	2.800	4.00	50.00	15.400
1.400	4.00	46.00	7.700	2.850	4.00	50.00	15.700
1.450	4.00	46.00	8.000	2.900	4.00	50.00	16.000
1.460	4.00	46.00	8.100	2.950	4.00	50.00	16.300
1.500	4.00	46.00	8.300	3.000	4.00	50.00	16.500
1.550	4.00	46.00	8.600				
1.560	4.00	46.00	8.600				
1.590	4.00	46.00	8.800				
1.600	4.00	46.00	8.800				
1.650	4.00	46.00	9.100				
1.660	4.00	46.00	9.200				

Micro-precision drills with coolant ducts

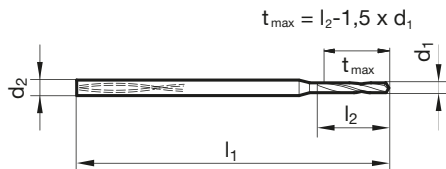
Article no. 86404



P	M	K	N	S	H
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facet point grind • main cutting edge is slightly concave • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel • copper, brass and bronze alloys



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	38.00	5.500	2.050	4.00	46.00	11.300
1.020	3.00	38.00	5.700	2.100	4.00	50.00	11.600
1.050	3.00	38.00	5.800	2.150	4.00	50.00	11.900
1.100	3.00	38.00	6.100	2.200	4.00	50.00	12.100
1.150	3.00	38.00	6.400	2.250	4.00	50.00	12.400
1.180	3.00	38.00	6.500	2.300	4.00	50.00	12.700
1.190	3.00	38.00	6.600	2.350	4.00	50.00	13.000
1.200	3.00	38.00	6.600	2.380	4.00	50.00	13.100
1.250	3.00	38.00	6.900	2.400	4.00	50.00	13.200
1.280	3.00	38.00	7.100	2.450	4.00	50.00	13.500
1.300	3.00	38.00	7.200	2.500	4.00	50.00	13.800
1.350	3.00	38.00	7.500	2.550	4.00	50.00	14.100
1.400	4.00	46.00	7.700	2.600	4.00	50.00	14.300
1.450	4.00	46.00	8.000	2.650	4.00	50.00	14.600
1.460	4.00	46.00	8.100	2.700	4.00	50.00	14.900
1.500	4.00	46.00	8.300	2.750	4.00	50.00	15.200
1.550	4.00	46.00	8.600	2.780	4.00	50.00	15.300
1.560	4.00	46.00	8.600	2.800	4.00	50.00	15.400
1.590	4.00	46.00	8.800	2.850	4.00	50.00	15.700
1.600	4.00	46.00	8.800	2.900	4.00	50.00	16.000
1.650	4.00	46.00	9.100	2.950	4.00	50.00	16.300
1.660	4.00	46.00	9.200	3.000	4.00	50.00	16.500
1.700	4.00	46.00	9.400				
1.750	4.00	46.00	9.700				
1.800	4.00	46.00	9.900				
1.850	4.00	46.00	10.200				
1.900	4.00	46.00	10.500				
1.950	4.00	46.00	10.800				
1.980	4.00	46.00	10.900				
2.000	4.00	46.00	11.000				

Micro-precision drills with coolant ducts

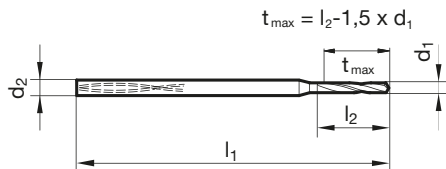
Article no. 86406



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facet point grind • main cutting edge is slightly concave • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel • copper, brass and bronze alloys



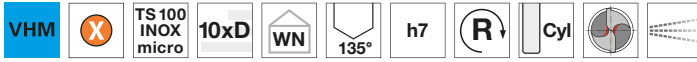
d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	48.00	9.000	2.050	4.00	61.00	18.500
1.050	3.00	48.00	9.500	2.100	4.00	66.00	18.900
1.100	3.00	48.00	9.900	2.150	4.00	66.00	19.400
1.150	3.00	48.00	10.400	2.200	4.00	66.00	19.800
1.190	3.00	48.00	10.800	2.250	4.00	66.00	20.300
1.200	3.00	51.00	10.800	2.300	4.00	66.00	20.700
1.250	3.00	51.00	11.300	2.350	4.00	66.00	21.200
1.300	3.00	51.00	11.700	2.380	4.00	66.00	21.500
1.350	3.00	51.00	12.200	2.400	4.00	66.00	21.600
1.400	4.00	56.00	12.600	2.450	4.00	66.00	22.100
1.450	4.00	56.00	13.100	2.500	4.00	66.00	22.500
1.500	4.00	56.00	13.500	2.550	4.00	66.00	23.000
1.550	4.00	56.00	14.000	2.600	4.00	71.00	23.400
1.590	4.00	56.00	14.400	2.650	4.00	71.00	23.900
1.600	4.00	56.00	14.400	2.700	4.00	71.00	24.300
1.650	4.00	56.00	14.900	2.750	4.00	71.00	24.800
1.700	4.00	61.00	15.300	2.780	4.00	71.00	25.100
1.750	4.00	61.00	15.800	2.800	4.00	71.00	25.200
1.800	4.00	61.00	16.200	2.850	4.00	71.00	25.700
1.850	4.00	61.00	16.700	2.900	4.00	71.00	26.100
1.900	4.00	61.00	17.100	2.950	4.00	71.00	26.600
1.950	4.00	61.00	17.600	3.000	4.00	71.00	27.000
1.980	4.00	61.00	17.900				
2.000	4.00	61.00	18.000				

Micro-precision drills with coolant ducts

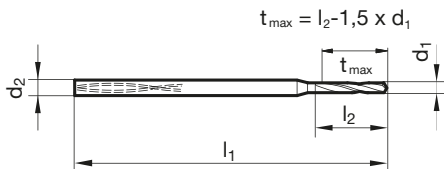
Article no. 86407



P	M	K	N	S	H
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facet point grind • main cutting edge is slightly concave • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel • copper, brass and bronze alloys



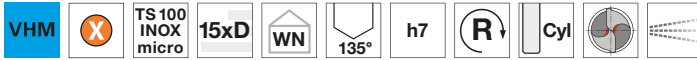
d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	48.00	13.000	2.050	4.00	61.00	26.700
1.050	3.00	48.00	13.700	2.100	4.00	66.00	27.300
1.100	3.00	48.00	14.300	2.150	4.00	66.00	28.000
1.150	3.00	48.00	15.000	2.200	4.00	66.00	28.600
1.190	3.00	48.00	15.500	2.250	4.00	66.00	29.300
1.200	3.00	51.00	15.600	2.300	4.00	66.00	29.900
1.250	3.00	51.00	16.300	2.350	4.00	66.00	30.600
1.300	3.00	51.00	16.900	2.380	4.00	66.00	31.000
1.350	3.00	51.00	17.600	2.400	4.00	66.00	31.200
1.400	4.00	56.00	18.200	2.450	4.00	66.00	31.900
1.450	4.00	56.00	18.900	2.500	4.00	66.00	32.500
1.500	4.00	56.00	19.500	2.550	4.00	66.00	33.200
1.550	4.00	56.00	20.200	2.600	4.00	71.00	33.800
1.590	4.00	56.00	20.700	2.650	4.00	71.00	34.500
1.600	4.00	56.00	20.800	2.700	4.00	71.00	35.100
1.650	4.00	56.00	21.500	2.750	4.00	71.00	35.800
1.700	4.00	61.00	22.100	2.780	4.00	71.00	36.200
1.750	4.00	61.00	22.800	2.800	4.00	71.00	36.400
1.800	4.00	61.00	23.400	2.850	4.00	71.00	37.100
1.850	4.00	61.00	24.100	2.900	4.00	71.00	37.700
1.900	4.00	61.00	24.700	2.950	4.00	71.00	38.400
1.950	4.00	61.00	25.400	3.000	4.00	71.00	39.000
1.980	4.00	61.00	25.800				
2.000	4.00	61.00	26.000				

Micro-precision drills with coolant ducts

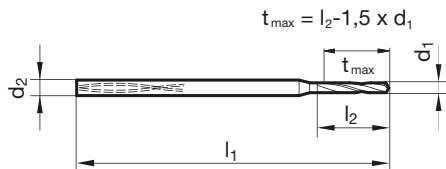
Article no. 86409



P	M	K	N	S	H
○	●		○	●	



facet point grind • main cutting edge is slightly concave • optimised cutting geometry
stainless/acid-/heat-resistant steels • Titanium and Titanium alloys • Inconel, Hastelloy, Monel • copper, brass and bronze alloys



d1 mm	d2 h6 mm	l1 mm	l2 mm	d1 mm	d2 h6 mm	l1 mm	l2 mm
1.000	3.00	54.00	18.000	2.050	4.00	71.00	36.900
1.050	3.00	54.00	18.900	2.100	4.00	79.00	37.800
1.100	3.00	54.00	19.800	2.150	4.00	79.00	38.700
1.150	3.00	54.00	20.700	2.200	4.00	79.00	39.600
1.190	3.00	54.00	21.500	2.250	4.00	79.00	40.500
1.200	3.00	58.00	21.600	2.300	4.00	79.00	41.400
1.250	3.00	58.00	22.500	2.350	4.00	79.00	42.300
1.300	3.00	58.00	23.400	2.380	4.00	79.00	42.900
1.350	3.00	58.00	24.300	2.400	4.00	79.00	43.200
1.400	4.00	64.00	25.200	2.450	4.00	79.00	44.100
1.450	4.00	64.00	26.100	2.500	4.00	79.00	45.000
1.500	4.00	64.00	27.000	2.550	4.00	79.00	45.900
1.550	4.00	64.00	27.900	2.600	4.00	87.00	46.800
1.590	4.00	64.00	28.700	2.650	4.00	87.00	47.700
1.600	4.00	64.00	28.800	2.700	4.00	87.00	48.600
1.650	4.00	64.00	29.700	2.750	4.00	87.00	49.500
1.700	4.00	71.00	30.600	2.780	4.00	87.00	50.100
1.750	4.00	71.00	31.500	2.800	4.00	87.00	50.400
1.800	4.00	71.00	32.400	2.850	4.00	87.00	51.300
1.850	4.00	71.00	33.300	2.900	4.00	87.00	52.200
1.900	4.00	71.00	34.200	2.950	4.00	87.00	53.100
1.950	4.00	71.00	35.100	3.000	4.00	87.00	54.000
1.980	4.00	71.00	35.700				
2.000	4.00	71.00	36.000				



APPLICATION EXAMPLE PUMP

Tool type	Micro-precision drills
Article no.	86412
Diameter	2.8 mm
Drilling depth	38 mm
Material	X6CrNiTi18-10
Cooling	IC 80 bar
Lubricant	Soluble oil
Machine	BAZ
v_c	60 m/min
f	0.03 mm/rev.
Tool life	60 m

TS 100 T

GENERAL STEEL MACHINING UP TO $\sim 1200 \text{N/MM}^2$

- ▼ universal application

ADVANTAGES AND CHARACTERISTICS

- ▼ **spiral-fluted deep hole drill** for drilling depths up to **40xD** in unalloyed and alloyed steels – particularly in crankshaft steel
- ▼ optimised flute cross-section, maximum coolant duct cross-section and bright, very smooth flutes result in **optimum chip evacuation from deep boreholes**
- ▼ **maximum feed rates and cutting speeds** significantly **reduce production times**
- ▼ in addition to the dimensions in stock, **intermediate dimensions** for a maximum borehole depth of up to **40xD** or a maximum **overall length of up to 500 mm** can be supplied
- ▼ **special design** for **machining aluminium** available on request



special web thinning for
precise boreholes and low
straightness deviation

the **maximum coolant
duct cross-section**
effectively supplies cutting
edges with lubricant and
ensures exceptional chip
evacuation

the **tool geometry** is designed
for universal use in virtually any
material

- ▼ **optimum flute cross-section**
ensures ideal chip formation in
the front area of the tool and
good chip evacuation in the
rear area of the tool
- ▼ **polished flutes** for perfect chip
evacuation – even with extreme
drilling depths

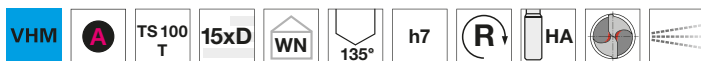
four guide chamfers for
optimum support in the
borehole

TS-Drills with internal coolant

Article no. 86509

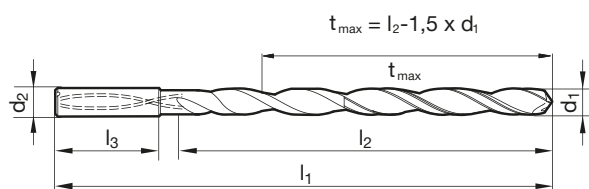


P	M	K	N	S	H
•	•	•	○	○	○



web thinning $\geq \varnothing 3.000$ • relieved cone • tip coating • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure

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



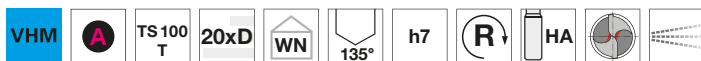
d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	95.00	55.000	36.000	7.540	19/64	8.00	183.00	143.000	36.000
3.100		6.00	106.00	66.000	36.000	7.800		8.00	183.00	143.000	36.000
3.170	1/8	6.00	106.00	66.000	36.000	7.940	5/16	8.00	183.00	143.000	36.000
3.200		6.00	106.00	66.000	36.000	8.000		8.00	183.00	143.000	36.000
3.300		6.00	106.00	66.000	36.000	8.330	21/64	10.00	204.00	160.000	40.000
3.500		6.00	116.00	76.000	36.000	8.500		10.00	204.00	160.000	40.000
3.570	9/64	6.00	116.00	76.000	36.000	8.730	11/32	10.00	204.00	160.000	40.000
3.700		6.00	116.00	76.000	36.000	8.800		10.00	204.00	160.000	40.000
3.800		6.00	116.00	76.000	36.000	9.000		10.00	204.00	160.000	40.000
3.970	5/32	6.00	116.00	76.000	36.000	9.130	23/64	10.00	221.00	177.000	40.000
4.000		6.00	116.00	76.000	36.000	9.500		10.00	221.00	177.000	40.000
4.200		6.00	133.00	93.000	36.000	9.520	3/8	10.00	221.00	177.000	40.000
4.300		6.00	133.00	93.000	36.000	9.800		10.00	221.00	177.000	40.000
4.370	11/64	6.00	133.00	93.000	36.000	9.920	25/64	10.00	221.00	177.000	40.000
4.500		6.00	133.00	93.000	36.000	10.000		10.00	221.00	177.000	40.000
4.600		6.00	133.00	93.000	36.000	10.320	13/32	12.00	247.00	198.000	45.000
4.760	3/16	6.00	133.00	93.000	36.000	10.500		12.00	247.00	198.000	45.000
4.800		6.00	133.00	93.000	36.000	10.720	27/64	12.00	247.00	198.000	45.000
5.000		6.00	133.00	93.000	36.000	11.000		12.00	247.00	198.000	45.000
5.100		6.00	150.00	110.000	36.000	11.110	7/16	12.00	263.00	214.000	45.000
5.160	13/64	6.00	150.00	110.000	36.000	11.510	29/64	12.00	263.00	214.000	45.000
5.410		6.00	150.00	110.000	36.000	11.800		12.00	263.00	214.000	45.000
5.500		6.00	150.00	110.000	36.000	11.910	15/32	12.00	263.00	214.000	45.000
5.560	7/32	6.00	150.00	110.000	36.000	12.000		12.00	263.00	214.000	45.000
5.600		6.00	150.00	110.000	36.000	12.300	31/64	14.00	297.00	248.000	45.000
5.800		6.00	150.00	110.000	36.000	12.500		14.00	297.00	248.000	45.000
5.950	15/64	6.00	150.00	110.000	36.000	12.700	1/2	14.00	297.00	248.000	45.000
6.000		6.00	150.00	110.000	36.000	13.000		14.00	297.00	248.000	45.000
6.300		8.00	167.00	127.000	36.000	13.100	33/64	14.00	297.00	248.000	45.000
6.350	1/4	8.00	167.00	127.000	36.000	13.490	17/32	14.00	297.00	248.000	45.000
6.500		8.00	167.00	127.000	36.000	13.890	35/64	14.00	297.00	248.000	45.000
6.750	17/64	8.00	167.00	127.000	36.000	14.000		14.00	297.00	248.000	45.000
6.800		8.00	167.00	127.000	36.000	14.290	9/16	16.00	333.00	281.000	48.000
7.000		8.00	167.00	127.000	36.000	15.000		16.00	333.00	281.000	48.000
7.140	9/32	8.00	183.00	143.000	36.000	15.870	5/8	16.00	333.00	281.000	48.000
7.500		8.00	183.00	143.000	36.000	16.000		16.00	333.00	281.000	48.000

TS-Drills with internal coolant

Article no. 86511

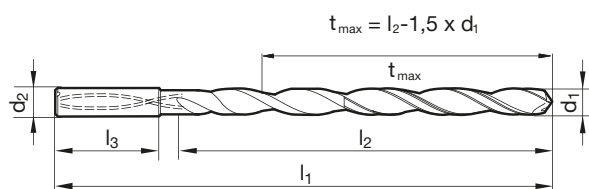


P	M	K	N	S	H
•	•	•	○	○	○



web thinning $\geq \varnothing 3.000$ • relieved cone • tip coating • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure

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



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	110.00	70.000	36.000	7.940	5/16	8.00	223.00	183.000	36.000
3.100		6.00	123.00	83.000	36.000	8.000		8.00	223.00	183.000	36.000
3.170	1/8	6.00	123.00	83.000	36.000	8.330	21/64	10.00	249.00	205.000	40.000
3.200		6.00	123.00	83.000	36.000	8.500		10.00	249.00	205.000	40.000
3.300		6.00	123.00	83.000	36.000	8.730	11/32	10.00	249.00	205.000	40.000
3.500		6.00	136.00	96.000	36.000	8.800		10.00	249.00	205.000	40.000
3.570	9/64	6.00	136.00	96.000	36.000	9.000		10.00	249.00	205.000	40.000
3.700		6.00	136.00	96.000	36.000	9.130	23/64	10.00	271.00	227.000	40.000
3.800		6.00	136.00	96.000	36.000	9.520	3/8	10.00	271.00	227.000	40.000
3.970	5/32	6.00	136.00	96.000	36.000	9.920	25/64	10.00	271.00	227.000	40.000
4.000		6.00	136.00	96.000	36.000	10.000		10.00	271.00	227.000	40.000
4.200		6.00	158.00	118.000	36.000	10.200		12.00	302.00	253.000	45.000
4.300		6.00	158.00	118.000	36.000	10.320	13/32	12.00	302.00	253.000	45.000
4.370	11/64	6.00	158.00	118.000	36.000	10.500		12.00	302.00	253.000	45.000
4.500		6.00	158.00	118.000	36.000	10.720	27/64	12.00	302.00	253.000	45.000
4.600		6.00	158.00	118.000	36.000	11.000		12.00	302.00	253.000	45.000
4.760	3/16	6.00	158.00	118.000	36.000	11.110	7/16	12.00	323.00	274.000	45.000
4.800		6.00	158.00	118.000	36.000	11.510	29/64	12.00	323.00	274.000	45.000
5.000		6.00	158.00	118.000	36.000	11.800		12.00	323.00	274.000	45.000
5.100		6.00	180.00	140.000	36.000	11.910	15/32	12.00	323.00	274.000	45.000
5.160	13/64	6.00	180.00	140.000	36.000	12.000		12.00	323.00	274.000	45.000
5.410		6.00	180.00	140.000	36.000	12.300	31/64	14.00	367.00	318.000	45.000
5.500		6.00	180.00	140.000	36.000	12.500		14.00	367.00	318.000	45.000
5.560	7/32	6.00	180.00	140.000	36.000	12.700	1/2	14.00	367.00	318.000	45.000
5.800		6.00	180.00	140.000	36.000	13.000		14.00	367.00	318.000	45.000
5.950	15/64	6.00	180.00	140.000	36.000	13.100	33/64	14.00	367.00	318.000	45.000
6.000		6.00	180.00	140.000	36.000	13.490	17/32	14.00	367.00	318.000	45.000
6.350	1/4	8.00	202.00	162.000	36.000	13.890	35/64	14.00	367.00	318.000	45.000
6.500		8.00	202.00	162.000	36.000	14.000		14.00	367.00	318.000	45.000
6.750	17/64	8.00	202.00	162.000	36.000	14.290	9/16	16.00	413.00	361.000	48.000
6.800		8.00	202.00	162.000	36.000	15.000		16.00	413.00	361.000	48.000
7.000		8.00	202.00	162.000	36.000	15.870	5/8	16.00	413.00	361.000	48.000
7.140	9/32	8.00	223.00	183.000	36.000	16.000		16.00	413.00	361.000	48.000
7.500		8.00	223.00	183.000	36.000						
7.540	19/64	8.00	223.00	183.000	36.000						
7.800		8.00	223.00	183.000	36.000						

TS-Drills with internal coolant

Article no. 86512

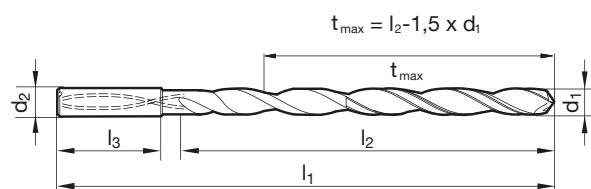


P	M	K	N	S	H
•	•	•	○	○	○



web thinning $\geq \varnothing 3.000$ • relieved cone • tip coating • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure

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



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	125.00	85.000	36.000	7.940	5/16	8.00	263.00	223.000	36.000
3.100		6.00	141.00	101.000	36.000	8.000		8.00	263.00	223.000	36.000
3.170	1/8	6.00	141.00	101.000	36.000	8.330	21/64	10.00	294.00	250.000	40.000
3.200		6.00	141.00	101.000	36.000	8.500		10.00	294.00	250.000	40.000
3.300		6.00	141.00	101.000	36.000	8.730	11/32	10.00	294.00	250.000	40.000
3.500		6.00	156.00	116.000	36.000	8.800		10.00	294.00	250.000	40.000
3.570	9/64	6.00	156.00	116.000	36.000	9.000		10.00	294.00	250.000	40.000
3.700		6.00	156.00	116.000	36.000	9.130	23/64	10.00	321.00	277.000	40.000
3.800		6.00	156.00	116.000	36.000	9.520	3/8	10.00	321.00	277.000	40.000
3.970	5/32	6.00	156.00	116.000	36.000	9.920	25/64	10.00	321.00	277.000	40.000
4.000		6.00	156.00	116.000	36.000	10.000		10.00	321.00	277.000	40.000
4.200		6.00	183.00	143.000	36.000	10.320	13/32	12.00	359.00	310.000	45.000
4.300		6.00	183.00	143.000	36.000	10.720	27/64	12.00	359.00	310.000	45.000
4.370	11/64	6.00	183.00	143.000	36.000	11.000		12.00	359.00	310.000	45.000
4.500		6.00	183.00	143.000	36.000	11.110	7/16	12.00	386.00	337.000	45.000
4.600		6.00	183.00	143.000	36.000	11.510	29/64	12.00	386.00	337.000	45.000
4.760	3/16	6.00	183.00	143.000	36.000	11.910	15/32	12.00	386.00	337.000	45.000
4.800		6.00	183.00	143.000	36.000	12.000		12.00	386.00	337.000	45.000
5.000		6.00	183.00	143.000	36.000	12.300	31/64	14.00	437.00	388.000	45.000
5.100		6.00	210.00	170.000	36.000	12.700	1/2	14.00	437.00	388.000	45.000
5.160	13/64	6.00	210.00	170.000	36.000	13.000		14.00	437.00	388.000	45.000
5.410		6.00	210.00	170.000	36.000	13.100	33/64	14.00	437.00	388.000	45.000
5.500		6.00	210.00	170.000	36.000	13.490	17/32	14.00	437.00	388.000	45.000
5.560	7/32	6.00	210.00	170.000	36.000	13.890	35/64	14.00	437.00	388.000	45.000
5.800		6.00	210.00	170.000	36.000	14.000		14.00	437.00	388.000	45.000
5.950	15/64	6.00	210.00	170.000	36.000	14.290	9/16	16.00	493.00	441.000	48.000
6.000		6.00	210.00	170.000	36.000	15.000		16.00	493.00	441.000	48.000
6.300		8.00	237.00	197.000	36.000	15.870	5/8	16.00	493.00	441.000	48.000
6.350	1/4	8.00	237.00	197.000	36.000	16.000		16.00	493.00	441.000	48.000
6.500		8.00	237.00	197.000	36.000						
6.750	17/64	8.00	237.00	197.000	36.000						
6.800		8.00	237.00	197.000	36.000						
7.000		8.00	237.00	197.000	36.000						
7.140	9/32	8.00	263.00	223.000	36.000						
7.500		8.00	263.00	223.000	36.000						
7.540	19/64	8.00	263.00	223.000	36.000						

TS-Drills with internal coolant

Article no. 86513

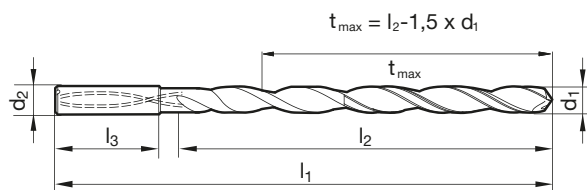


P	M	K	N	S	H
•	•	•	○	○	○



web thinning $\geq \varnothing 3.000$ • relieved cone • tip coating • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure

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



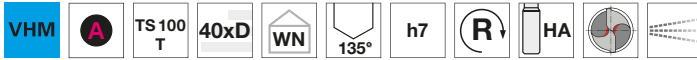
d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	140.00	100.000	36.000	7.500		8.00	303.00	263.000	36.000
3.100		6.00	158.00	118.000	36.000	7.540	19/64	8.00	303.00	263.000	36.000
3.170	1/8	6.00	158.00	118.000	36.000	7.940	5/16	8.00	303.00	263.000	36.000
3.200		6.00	158.00	118.000	36.000	8.000		8.00	303.00	263.000	36.000
3.300		6.00	158.00	118.000	36.000	8.330	21/64	10.00	339.00	295.000	40.000
3.500		6.00	176.00	136.000	36.000	8.500		10.00	339.00	295.000	40.000
3.570	9/64	6.00	176.00	136.000	36.000	8.730	11/32	10.00	339.00	295.000	40.000
3.700		6.00	176.00	136.000	36.000	8.800		10.00	339.00	295.000	40.000
3.800		6.00	176.00	136.000	36.000	9.000		10.00	339.00	295.000	40.000
3.970	5/32	6.00	176.00	136.000	36.000	9.130	23/64	10.00	371.00	327.000	40.000
4.000		6.00	176.00	136.000	36.000	9.520	3/8	10.00	371.00	327.000	40.000
4.200		6.00	208.00	168.000	36.000	9.920	25/64	10.00	371.00	327.000	40.000
4.370	11/64	6.00	208.00	168.000	36.000	10.000		10.00	371.00	327.000	40.000
4.500		6.00	208.00	168.000	36.000	10.320	13/32	12.00	412.00	363.000	45.000
4.760	3/16	6.00	208.00	168.000	36.000	10.720	27/64	12.00	412.00	363.000	45.000
5.000		6.00	208.00	168.000	36.000	11.000		12.00	412.00	363.000	45.000
5.100		6.00	240.00	200.000	36.000	11.110	7/16	12.00	443.00	394.000	45.000
5.160	13/64	6.00	240.00	200.000	36.000	11.510	29/64	12.00	443.00	394.000	45.000
5.410		6.00	240.00	200.000	36.000	11.910	15/32	12.00	443.00	394.000	45.000
5.500		6.00	240.00	200.000	36.000	12.000		12.00	443.00	394.000	45.000
5.560	7/32	6.00	240.00	200.000	36.000	12.300	31/64	14.00	507.00	458.000	45.000
5.950	15/64	6.00	240.00	200.000	36.000	12.700	1/2	14.00	507.00	458.000	45.000
6.000		6.00	240.00	200.000	36.000	13.000		14.00	507.00	458.000	45.000
6.300		8.00	272.00	232.000	36.000	13.100	33/64	14.00	507.00	458.000	45.000
6.350	1/4	8.00	272.00	232.000	36.000	13.490	17/32	14.00	507.00	458.000	45.000
6.500		8.00	272.00	232.000	36.000	13.890	35/64	14.00	507.00	458.000	45.000
6.750	17/64	8.00	272.00	232.000	36.000	14.000		14.00	507.00	458.000	45.000
6.800		8.00	272.00	232.000	36.000						
7.000		8.00	272.00	232.000	36.000						
7.140	9/32	8.00	303.00	263.000	36.000						

TS-Drills with internal coolant

Article no. 86514

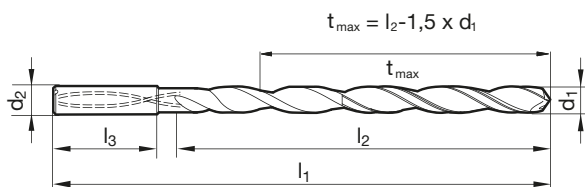


P	M	K	N	S	H
•	•	•	•	•	•



web thinning $\geq \varnothing 3.000$ • relieved cone • tip coating • main cutting edge form concave • optimised flute design • maximum diameter of coolant ducts • observe coolant pressure

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



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	170.00	130.000	36.000	5.500		6.00	280.00	240.000	36.000
3.100		6.00	193.00	153.000	36.000	5.560	7/32	6.00	300.00	260.000	36.000
3.170	1/8	6.00	193.00	153.000	36.000	5.950	15/64	6.00	300.00	260.000	36.000
3.200		6.00	193.00	153.000	36.000	6.000		6.00	300.00	260.000	36.000
3.300		6.00	193.00	153.000	36.000	6.300		8.00	322.00	282.000	36.000
3.500		6.00	193.00	153.000	36.000	6.350	1/4	8.00	322.00	282.000	36.000
3.570	9/64	6.00	216.00	176.000	36.000	6.500		8.00	322.00	282.000	36.000
3.800		6.00	216.00	176.000	36.000	6.750	17/64	8.00	342.00	302.000	36.000
3.970	5/32	6.00	216.00	176.000	36.000	6.800		8.00	342.00	302.000	36.000
4.000		6.00	216.00	176.000	36.000	7.000		8.00	342.00	302.000	36.000
4.200		6.00	238.00	198.000	36.000	7.140	9/32	8.00	363.00	323.000	36.000
4.370	11/64	6.00	238.00	198.000	36.000	7.500		8.00	363.00	323.000	36.000
4.500		6.00	238.00	198.000	36.000	7.540	19/64	8.00	383.00	343.000	36.000
4.760	3/16	6.00	258.00	218.000	36.000	7.940	5/16	8.00	383.00	343.000	36.000
5.000		6.00	258.00	218.000	36.000	8.000		8.00	383.00	343.000	36.000
5.100		6.00	280.00	240.000	36.000	8.500		10.00	409.00	365.000	40.000
5.160	13/64	6.00	280.00	240.000	36.000	9.000		10.00	429.00	386.000	40.000
5.410		6.00	280.00	240.000	36.000	10.000		10.00	471.00	427.000	40.000



HARTNER

TS-Drills with internal coolant

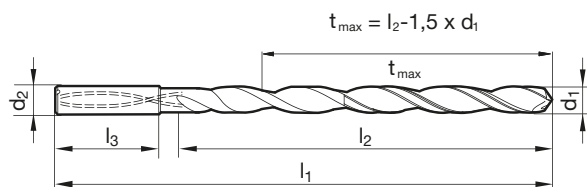
Article no. 89564



P	M	K	N	S	H
			•		



facet point grind • main cutting edge form concave • optimised flute cross-section • maximum diameter of coolant ducts • observe coolant pressure • for piloting, we recommend the TS100 aluminium, art. no. 89561
aluminium and Al alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	95.00	55.000	36.000	6.100		8.00	167.00	127.000	36.000
3.100		6.00	106.00	66.000	36.000	6.200		8.00	167.00	127.000	36.000
3.170	1/8	6.00	106.00	66.000	36.000	6.300		8.00	167.00	127.000	36.000
3.200		6.00	106.00	66.000	36.000	6.350	1/4	8.00	167.00	127.000	36.000
3.250		6.00	106.00	66.000	36.000	6.400		8.00	167.00	127.000	36.000
3.300		6.00	106.00	66.000	36.000	6.500		8.00	167.00	127.000	36.000
3.400		6.00	106.00	66.000	36.000	6.600		8.00	167.00	127.000	36.000
3.500		6.00	116.00	76.000	36.000	6.700		8.00	167.00	127.000	36.000
3.570	9/64	6.00	116.00	76.000	36.000	6.750	17/64	8.00	167.00	127.000	36.000
3.600		6.00	116.00	76.000	36.000	6.800		8.00	167.00	127.000	36.000
3.700		6.00	116.00	76.000	36.000	6.900		8.00	167.00	127.000	36.000
3.800		6.00	116.00	76.000	36.000	7.000		8.00	167.00	127.000	36.000
3.900		6.00	116.00	76.000	36.000	7.100		8.00	183.00	143.000	36.000
3.970	5/32	6.00	116.00	76.000	36.000	7.140	9/32	8.00	183.00	143.000	36.000
4.000		6.00	116.00	76.000	36.000	7.200		8.00	183.00	143.000	36.000
4.100		6.00	133.00	93.000	36.000	7.300		8.00	183.00	143.000	36.000
4.200		6.00	133.00	93.000	36.000	7.400		8.00	183.00	143.000	36.000
4.300		6.00	133.00	93.000	36.000	7.500		8.00	183.00	143.000	36.000
4.370	11/64	6.00	133.00	93.000	36.000	7.540	19/64	8.00	183.00	143.000	36.000
4.400		6.00	133.00	93.000	36.000	7.600		8.00	183.00	143.000	36.000
4.500		6.00	133.00	93.000	36.000	7.700		8.00	183.00	143.000	36.000
4.600		6.00	133.00	93.000	36.000	7.800		8.00	183.00	143.000	36.000
4.650		6.00	133.00	93.000	36.000	7.900		8.00	183.00	143.000	36.000
4.700		6.00	133.00	93.000	36.000	7.940	5/16	8.00	183.00	143.000	36.000
4.760	3/16	6.00	133.00	93.000	36.000	8.000		8.00	183.00	143.000	36.000
4.800		6.00	133.00	93.000	36.000	8.100		10.00	204.00	160.000	40.000
4.900		6.00	133.00	93.000	36.000	8.200		10.00	204.00	160.000	40.000
5.000		6.00	133.00	93.000	36.000	8.300		10.00	204.00	160.000	40.000
5.100		6.00	150.00	110.000	36.000	8.330	21/64	10.00	204.00	160.000	40.000
5.160	13/64	6.00	150.00	110.000	36.000	8.400		10.00	204.00	160.000	40.000
5.200		6.00	150.00	110.000	36.000	8.500		10.00	204.00	160.000	40.000
5.300		6.00	150.00	110.000	36.000	8.600		10.00	204.00	160.000	40.000
5.400		6.00	150.00	110.000	36.000	8.700		10.00	204.00	160.000	40.000
5.500		6.00	150.00	110.000	36.000	8.730	11/32	10.00	204.00	160.000	40.000
5.550		6.00	150.00	110.000	36.000	8.800		10.00	204.00	160.000	40.000
5.560	7/32	6.00	150.00	110.000	36.000	8.900		10.00	204.00	160.000	40.000
5.600		6.00	150.00	110.000	36.000	9.000		10.00	204.00	160.000	40.000
5.700		6.00	150.00	110.000	36.000	9.100		10.00	221.00	177.000	40.000
5.800		6.00	150.00	110.000	36.000	9.130	23/64	10.00	221.00	177.000	40.000
5.900		6.00	150.00	110.000	36.000	9.200		10.00	221.00	177.000	40.000
5.950	15/64	6.00	150.00	110.000	36.000	9.250		10.00	221.00	177.000	40.000
6.000		6.00	150.00	110.000	36.000	9.300		10.00	221.00	177.000	40.000

TS 100 T

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	221.00	177.000	40.000	11.300		12.00	263.00	214.000	45.000
9.400		10.00	221.00	177.000	40.000	11.400		12.00	263.00	214.000	45.000
9.500		10.00	221.00	177.000	40.000	11.500		12.00	263.00	214.000	45.000
9.520	3/8	10.00	221.00	177.000	40.000	11.600		12.00	263.00	214.000	45.000
9.600		10.00	221.00	177.000	40.000	11.700		12.00	263.00	214.000	45.000
9.700		10.00	221.00	177.000	40.000	11.800		12.00	263.00	214.000	45.000
9.800		10.00	221.00	177.000	40.000	11.900		12.00	263.00	214.000	45.000
9.900		10.00	221.00	177.000	40.000	11.910	15/32	12.00	263.00	214.000	45.000
9.920	25/64	10.00	221.00	177.000	40.000	12.000		12.00	263.00	214.000	45.000
10.000		10.00	221.00	177.000	40.000	12.100		14.00	297.00	248.000	45.000
10.100		12.00	247.00	198.000	45.000	12.200		14.00	297.00	248.000	45.000
10.200		12.00	247.00	198.000	45.000	12.500		14.00	297.00	248.000	45.000
10.300		12.00	247.00	198.000	45.000	12.600		14.00	297.00	248.000	45.000
10.320	13/32	12.00	247.00	198.000	45.000	12.700	1/2	14.00	297.00	248.000	45.000
10.400		12.00	247.00	198.000	45.000	12.800		14.00	297.00	248.000	45.000
10.500		12.00	247.00	198.000	45.000	12.900		14.00	297.00	248.000	45.000
10.600		12.00	247.00	198.000	45.000	13.000		14.00	297.00	248.000	45.000
10.700		12.00	247.00	198.000	45.000	13.100	33/64	14.00	297.00	248.000	45.000
10.800		12.00	247.00	198.000	45.000	13.300		14.00	297.00	248.000	45.000
10.900		12.00	247.00	198.000	45.000	13.400		14.00	297.00	248.000	45.000
11.000		12.00	247.00	198.000	45.000	13.500		14.00	297.00	248.000	45.000
11.100		12.00	263.00	214.000	45.000	13.700		14.00	297.00	248.000	45.000
11.110	7/16	12.00	263.00	214.000	45.000	13.800		14.00	297.00	248.000	45.000
11.200		12.00	263.00	214.000	45.000	14.000		14.00	297.00	248.000	45.000

TS-Drills with internal coolant

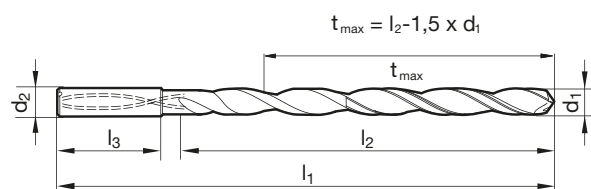
Article no. 89565



P	M	K	N	S	H
			•		



facet point grind • main cutting edge form concave • optimised flute cross-section • maximum diameter of coolant ducts • observe coolant pressure • for piloting, we recommend the TS100 aluminium, art. no. 89561
aluminium and Al alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	110.00	70.000	36.000	6.100		8.00	202.00	162.000	36.000
3.100		6.00	123.00	83.000	36.000	6.200		8.00	202.00	162.000	36.000
3.170	1/8	6.00	123.00	83.000	36.000	6.300		8.00	202.00	162.000	36.000
3.200		6.00	123.00	83.000	36.000	6.350	1/4	8.00	202.00	162.000	36.000
3.250		6.00	123.00	83.000	36.000	6.400		8.00	202.00	162.000	36.000
3.300		6.00	123.00	83.000	36.000	6.500		8.00	202.00	162.000	36.000
3.400		6.00	123.00	83.000	36.000	6.600		8.00	202.00	162.000	36.000
3.500		6.00	136.00	96.000	36.000	6.700		8.00	202.00	162.000	36.000
3.570	9/64	6.00	136.00	96.000	36.000	6.750	17/64	8.00	202.00	162.000	36.000
3.600		6.00	136.00	96.000	36.000	6.800		8.00	202.00	162.000	36.000
3.700		6.00	136.00	96.000	36.000	6.900		8.00	202.00	162.000	36.000
3.800		6.00	136.00	96.000	36.000	7.000		8.00	202.00	162.000	36.000
3.900		6.00	136.00	96.000	36.000	7.100		8.00	223.00	183.000	36.000
3.970	5/32	6.00	136.00	96.000	36.000	7.140	9/32	8.00	223.00	183.000	36.000
4.000		6.00	136.00	96.000	36.000	7.200		8.00	223.00	183.000	36.000
4.100		6.00	158.00	118.000	36.000	7.300		8.00	223.00	183.000	36.000
4.200		6.00	158.00	118.000	36.000	7.400		8.00	223.00	183.000	36.000
4.300		6.00	158.00	118.000	36.000	7.500		8.00	223.00	183.000	36.000
4.370	11/64	6.00	158.00	118.000	36.000	7.540	19/64	8.00	223.00	183.000	36.000
4.400		6.00	158.00	118.000	36.000	7.600		8.00	223.00	183.000	36.000
4.500		6.00	158.00	118.000	36.000	7.700		8.00	223.00	183.000	36.000
4.600		6.00	158.00	118.000	36.000	7.800		8.00	223.00	183.000	36.000
4.650		6.00	158.00	118.000	36.000	7.900		8.00	223.00	183.000	36.000
4.700		6.00	158.00	118.000	36.000	7.940	5/16	8.00	223.00	183.000	36.000
4.760	3/16	6.00	158.00	118.000	36.000	8.000		8.00	223.00	183.000	36.000
4.800		6.00	158.00	118.000	36.000	8.100		10.00	249.00	205.000	40.000
4.900		6.00	158.00	118.000	36.000	8.200		10.00	249.00	205.000	40.000
5.000		6.00	158.00	118.000	36.000	8.300		10.00	249.00	205.000	40.000
5.100		6.00	180.00	140.000	36.000	8.330	21/64	10.00	249.00	205.000	40.000
5.160	13/64	6.00	180.00	140.000	36.000	8.400		10.00	249.00	205.000	40.000
5.200		6.00	180.00	140.000	36.000	8.500		10.00	249.00	205.000	40.000
5.300		6.00	180.00	140.000	36.000	8.600		10.00	249.00	205.000	40.000
5.400		6.00	180.00	140.000	36.000	8.700		10.00	249.00	205.000	40.000
5.500		6.00	180.00	140.000	36.000	8.730	11/32	10.00	249.00	205.000	40.000
5.550		6.00	180.00	140.000	36.000	8.800		10.00	249.00	205.000	40.000
5.560	7/32	6.00	180.00	140.000	36.000	8.900		10.00	249.00	205.000	40.000
5.600		6.00	180.00	140.000	36.000	9.000		10.00	249.00	205.000	40.000
5.700		6.00	180.00	140.000	36.000	9.100		10.00	271.00	227.000	40.000
5.800		6.00	180.00	140.000	36.000	9.130	23/64	10.00	271.00	227.000	40.000
5.900		6.00	180.00	140.000	36.000	9.200		10.00	271.00	227.000	40.000
5.950	15/64	6.00	180.00	140.000	36.000	9.250		10.00	271.00	227.000	40.000
6.000		6.00	180.00	140.000	36.000	9.300		10.00	271.00	227.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	271.00	227.000	40.000	11.300		12.00	323.00	274.000	45.000
9.400		10.00	271.00	227.000	40.000	11.400		12.00	323.00	274.000	45.000
9.500		10.00	271.00	227.000	40.000	11.500		12.00	323.00	274.000	45.000
9.520	3/8	10.00	271.00	227.000	40.000	11.600		12.00	323.00	274.000	45.000
9.600		10.00	271.00	227.000	40.000	11.700		12.00	323.00	274.000	45.000
9.700		10.00	271.00	227.000	40.000	11.800		12.00	323.00	274.000	45.000
9.800		10.00	271.00	227.000	40.000	11.900		12.00	323.00	274.000	45.000
9.900		10.00	271.00	227.000	40.000	11.910	15/32	12.00	323.00	274.000	45.000
9.920	25/64	10.00	271.00	227.000	40.000	12.000		12.00	323.00	274.000	45.000
10.000		10.00	271.00	227.000	40.000	12.100		14.00	367.00	318.000	45.000
10.100		12.00	302.00	253.000	45.000	12.200		14.00	367.00	318.000	45.000
10.200		12.00	302.00	253.000	45.000	12.500		14.00	367.00	318.000	45.000
10.300		12.00	302.00	253.000	45.000	12.600		14.00	367.00	318.000	45.000
10.320	13/32	12.00	302.00	253.000	45.000	12.700	1/2	14.00	367.00	318.000	45.000
10.400		12.00	302.00	253.000	45.000	12.800		14.00	367.00	318.000	45.000
10.500		12.00	302.00	253.000	45.000	12.900		14.00	367.00	318.000	45.000
10.600		12.00	302.00	253.000	45.000	13.000		14.00	367.00	318.000	45.000
10.700		12.00	302.00	253.000	45.000	13.100	33/64	14.00	367.00	318.000	45.000
10.800		12.00	302.00	253.000	45.000	13.300		14.00	367.00	318.000	45.000
10.900		12.00	302.00	253.000	45.000	13.400		14.00	367.00	318.000	45.000
11.000		12.00	302.00	253.000	45.000	13.500		14.00	367.00	318.000	45.000
11.100		12.00	323.00	274.000	45.000	13.700		14.00	367.00	318.000	45.000
11.110	7/16	12.00	323.00	274.000	45.000	13.800		14.00	367.00	318.000	45.000
11.200		12.00	323.00	274.000	45.000	14.000		14.00	367.00	318.000	45.000

TS-Drills with internal coolant

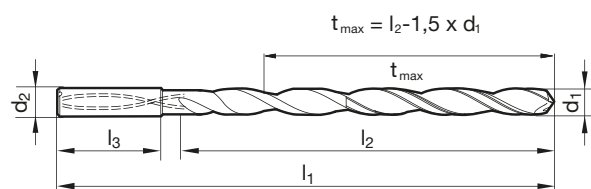
Article no. 89566



P	M	K	N	S	H
			•		



facet point grind • main cutting edge form concave • optimised flute cross-section • maximum diameter of coolant ducts • observe coolant pressure • for piloting, we recommend the TS100 aluminium, art. no. 89561
aluminium and Al alloys



d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
3.000		6.00	125.00	85.000	36.000	6.100		8.00	237.00	197.000	36.000
3.100		6.00	141.00	101.000	36.000	6.200		8.00	237.00	197.000	36.000
3.170	1/8	6.00	141.00	101.000	36.000	6.300		8.00	237.00	197.000	36.000
3.200		6.00	141.00	101.000	36.000	6.350	1/4	8.00	237.00	197.000	36.000
3.250		6.00	141.00	101.000	36.000	6.400		8.00	237.00	197.000	36.000
3.300		6.00	141.00	101.000	36.000	6.500		8.00	237.00	197.000	36.000
3.400		6.00	141.00	101.000	36.000	6.600		8.00	237.00	197.000	36.000
3.500		6.00	156.00	116.000	36.000	6.700		8.00	237.00	197.000	36.000
3.570	9/64	6.00	156.00	116.000	36.000	6.750	17/64	8.00	237.00	197.000	36.000
3.600		6.00	156.00	116.000	36.000	6.800		8.00	237.00	197.000	36.000
3.700		6.00	156.00	116.000	36.000	6.900		8.00	237.00	197.000	36.000
3.800		6.00	156.00	116.000	36.000	7.000		8.00	237.00	197.000	36.000
3.900		6.00	156.00	116.000	36.000	7.100		8.00	263.00	223.000	36.000
3.970	5/32	6.00	156.00	116.000	36.000	7.140	9/32	8.00	263.00	223.000	36.000
4.000		6.00	156.00	116.000	36.000	7.200		8.00	263.00	223.000	36.000
4.100		6.00	183.00	143.000	36.000	7.300		8.00	263.00	223.000	36.000
4.200		6.00	183.00	143.000	36.000	7.400		8.00	263.00	223.000	36.000
4.300		6.00	183.00	143.000	36.000	7.500		8.00	263.00	223.000	36.000
4.370	11/64	6.00	183.00	143.000	36.000	7.540	19/64	8.00	263.00	223.000	36.000
4.400		6.00	183.00	143.000	36.000	7.600		8.00	263.00	223.000	36.000
4.500		6.00	183.00	143.000	36.000	7.700		8.00	263.00	223.000	36.000
4.600		6.00	183.00	143.000	36.000	7.800		8.00	263.00	223.000	36.000
4.650		6.00	183.00	143.000	36.000	7.900		8.00	263.00	223.000	36.000
4.700		6.00	183.00	143.000	36.000	7.940	5/16	8.00	263.00	223.000	36.000
4.760	3/16	6.00	183.00	143.000	36.000	8.000		8.00	263.00	223.000	36.000
4.800		6.00	183.00	143.000	36.000	8.100		10.00	294.00	250.000	40.000
4.900		6.00	183.00	143.000	36.000	8.200		10.00	294.00	250.000	40.000
5.000		6.00	183.00	143.000	36.000	8.300		10.00	294.00	250.000	40.000
5.100		6.00	210.00	170.000	36.000	8.330	21/64	10.00	294.00	250.000	40.000
5.160	13/64	6.00	210.00	170.000	36.000	8.400		10.00	294.00	250.000	40.000
5.200		6.00	210.00	170.000	36.000	8.500		10.00	294.00	250.000	40.000
5.300		6.00	210.00	170.000	36.000	8.600		10.00	294.00	250.000	40.000
5.400		6.00	210.00	170.000	36.000	8.700		10.00	294.00	250.000	40.000
5.500		6.00	210.00	170.000	36.000	8.730	11/32	10.00	294.00	250.000	40.000
5.550		6.00	210.00	170.000	36.000	8.800		10.00	294.00	250.000	40.000
5.560	7/32	6.00	210.00	170.000	36.000	8.900		10.00	294.00	250.000	40.000
5.600		6.00	210.00	170.000	36.000	9.000		10.00	294.00	250.000	40.000
5.700		6.00	210.00	170.000	36.000	9.100		10.00	321.00	277.000	40.000
5.800		6.00	210.00	170.000	36.000	9.130	23/64	10.00	321.00	277.000	40.000
5.900		6.00	210.00	170.000	36.000	9.200		10.00	321.00	277.000	40.000
5.950	15/64	6.00	210.00	170.000	36.000	9.250		10.00	321.00	277.000	40.000
6.000		6.00	210.00	170.000	36.000	9.300		10.00	321.00	277.000	40.000

TS-Drills with internal coolant

d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm	d1 mm	inch	d2 h6 mm	l1 mm	l2 mm	l3 mm
9.340		10.00	321.00	277.000	40.000	11.300		12.00	386.00	337.000	45.000
9.400		10.00	321.00	277.000	40.000	11.400		12.00	386.00	337.000	45.000
9.500		10.00	321.00	277.000	40.000	11.500		12.00	386.00	337.000	45.000
9.520	3/8	10.00	321.00	277.000	40.000	11.600		12.00	386.00	337.000	45.000
9.600		10.00	321.00	277.000	40.000	11.700		12.00	386.00	337.000	45.000
9.700		10.00	321.00	277.000	40.000	11.800		12.00	386.00	337.000	45.000
9.800		10.00	321.00	277.000	40.000	11.900		12.00	386.00	337.000	45.000
9.900		10.00	321.00	277.000	40.000	11.910	15/32	12.00	386.00	337.000	45.000
9.920	25/64	10.00	321.00	277.000	40.000	12.000		12.00	386.00	337.000	45.000
10.000		10.00	321.00	277.000	40.000	12.100		14.00	437.00	388.000	45.000
10.100		12.00	359.00	310.000	45.000	12.200		14.00	437.00	388.000	45.000
10.200		12.00	359.00	310.000	45.000	12.500		14.00	437.00	388.000	45.000
10.300		12.00	359.00	310.000	45.000	12.600		14.00	437.00	388.000	45.000
10.320	13/32	12.00	359.00	310.000	45.000	12.700	1/2	14.00	437.00	388.000	45.000
10.400		12.00	359.00	310.000	45.000	12.800		14.00	437.00	388.000	45.000
10.500		12.00	359.00	310.000	45.000	12.900		14.00	437.00	388.000	45.000
10.600		12.00	359.00	310.000	45.000	13.000		14.00	437.00	388.000	45.000
10.700		12.00	359.00	310.000	45.000	13.100	33/64	14.00	437.00	388.000	45.000
10.800		12.00	359.00	310.000	45.000	13.300		14.00	437.00	388.000	45.000
10.900		12.00	359.00	310.000	45.000	13.400		14.00	437.00	388.000	45.000
11.000		12.00	359.00	310.000	45.000	13.500		14.00	437.00	388.000	45.000
11.100		12.00	386.00	337.000	45.000	13.700		14.00	437.00	388.000	45.000
11.110	7/16	12.00	386.00	337.000	45.000	13.800		14.00	437.00	388.000	45.000
11.200		12.00	386.00	337.000	45.000	14.000		14.00	437.00	388.000	45.000

APPLICATION RECOMMENDATIONS

THE COATINGS



F FIRE/nanoFIRE coating

- ▼ Coating colour: black-violet
- ▼ Multi-layer TiAlN coating with gradient structure. All-round coating offering at least two times the performance of TiN. Combines the benefits of TiN, TiAlN and TiCN. Excellent heat-proof thermal insulation. High toughness. FIRE plus MolyGlide – the ideal combination and a prerequisite for dry and HSC machining.



A AlTiN coating (Aluminium titanium nitride)

a AlTiN nano coating (Aluminium titanium nitride)

- ▼ Coating colour: black-violet
- ▼ The well established coating has been developed at Hartner. By optimizing the structural, chemical and mechanical properties of the new AlTiN coating an extremely high hot hardness, very good oxidation resistance and excellent coating adhesion have been achieved. This coating is used exclusively on carbide cutting tools and is ideally suited for difficult-to-machine aerospace materials such as titanium alloys, Inconel as well as machining hardened steel materials (> 52 HRC) and HSC applications. Particularly suitable for the machining of stainless steels.



A TiAlN coating (Titanium aluminium nitride)

- ▼ Coating colour: black-violet
- ▼ Special coating for machining tasks in abrasive materials (cast iron, AlSi) and/or high temperatures, such as when it is not possible to cool the tool or the tool can only be cooled to a limited extent such as when drilling deep boreholes or boreholes with small diameters. It is important to note in these cases in particular that the coating only results in significant performance improvements for higher cutting parameters.



Y TiAlSiN coating

- ▼ Coating colour: bronze
- ▼ This multilayer, ultra hard and heat-resistant coating is especially designated for the machining of high-tensile steels as well as hardened steels and cast iron. Thanks to its nanocomposite structure with a layer made up of TiAlN and SiN, it achieves the extreme hardness of 5500 HV.



X TiAlSiN-XP coating

- ▼ Coating colour: copper
- ▼ Extremely hard, heat-resistant and wear-resistant multi-layer coating specifically designed for machining operations on stainless and hardened steels and special alloys.

APPLICATION RECOMMENDATIONS

TS-Drills

Generally recommendations:

For safety reasons it is very important, that a drill does not exceed a speed of $n = 6.000 \text{ rev./min}$ when unsupported.
The centrifugal forces can break these long tools before reaching the workpiece surface!

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

Pilot holes are necessary for drilling depths $\geq 7xD$.

1. The pilot hole can be produced with a short, rigid drill.
The diameter should be 0.01-0.02 mm larger than the diameter of the TS-Drills, the drilling depth 1xD.
2. Alternatively TS-Drills can produce their own pilot hole.
Cutting speed and feed rate should be reduced by 30-40 %.

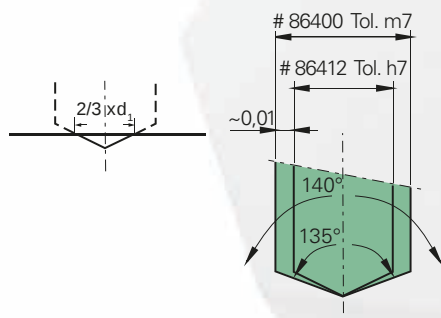
Micro-precision drills

Pilot drilling

For the application of solid carbide micro-precision drills 15xD we recommend a pilot hole 1xD up to 2xD depth. For this pilot hole, the solid carbide micro-precision drill 4xD is optimally suitable. Its point angle and its diameter tolerance are perfectly adapted.

Centering

In order to achieve full performance with solid carbide micro-precision drills from 8xD drilling depth, we recommend centering. The solid carbide micro precision drill up to 4xD, article no. 86400, can be applied for this purpose. The centering diameter should be approximately $2/3xD$.



Filter quality

When applying solid carbide micro-precision drills, we recommend constant monitoring of the lubricant's filter quality due to the extremely small coolant duct diameters.

Flat drill

The following points must be observed when spot drilling with the flat drill (art. 89519):

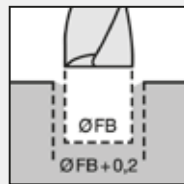
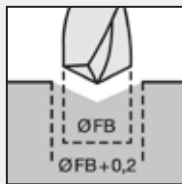
Spot drilling on inclined surfaces/when exiting from inclined surfaces:

- angle up to 15° = reduce feed rate f in mm/rev by 25 %
- angle up to 30° = reduce feed rate f in mm/rev by 50 %
- angle up to max. 45° = reduce feed rate f in mm/rev by 75 %
- when the flat drill is fully wrapped, the feed rate can be raised to 100 %

Spot drilling on flat surfaces:

PLEASE NOTE: When drilling on flat surfaces, pre-drilling is always required.

1. Spot drill with a conventional solid carbide drill on $\varnothing$ FB of the following flat drill (FB) or on $\varnothing$ FB + 0.20 mm of the following flat drill (FB) to directly apply a chamfer.
2. Insert the flat drill at full feed rate.





Material examples cutting data tables

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
P1.1.1	Unalloyed steel, annealed. 0.15 % C. Rm 420 N/mm ² . 125 HB			
P1.1.2	Unalloyed steel, heat-treated. 0.15 % C. Rm 420 N/mm ² . 125 HB			
1.0037	St 37-2	S235JR	-	E24-2
1.0038	St 37-3	S275J2G3	A570.36	E28-3
1.0045	S 355 JR	S 1207	-	E36-2
1.0050	St 50-2	E 295	A570 Gr. 50	A50-2
1.0060	St 60-2	-	A572 Gr. 65	A60-2
1.0114	S 235 J0	S 235 J0	-	E24-3
1.0143	S 275 J0	S 275 J0	-	E28-3
1.0144	St 44-3 N	S 275 J2 G3	A573 Gr. 81	E28-3
1.0149	Ro St 44-2	S 275 J0 H	-	-
1.0301	C10	C10	1010	34C10, XC10
1.0330	St 12	Fe P01	-	DC 01/Fe P01
1.0338	St4	Fe P04	A620(1008)	Fe 14
1.0401	C15	-	1015	C18RR, XC18
1.0402	C22	1 C 22	1020	C20
1.0443	GS-45		A2765-35	E23-45M
1.0539	S355NH			TSE355-4
1.0545	S355N			E355R
1.0546	S355NL			E355FP
1.0547	S355JOH			TSE355-3
1.0549	S355NLH			
1.0553	St52-3U		A14880-40	320-560M
1.0562	St E 355		A633 Gr. C	FeE355KGN
1.0570	St 52-3	S355JR	1	E36-3
1.0715	9SMn28		1213	S250
1.0718	9SMnPb28		12L13	S250Pb
1.0721	10S20		1108	10S20
1.0722	10SPb20		11L08	10PbF2
1.0736	9SMn36		1215	S300
1.0737	9SMnPb36		12L14	S300Pb
1.0972	S315MC			E315D
1.0976	S355MC			E355D
1.0982	S460MC			
1.0984	S500MC			E490D
1.0986	S500MC			E560D
1.1121	Ck10		1010	XC10
1.1141	Ck15	32C	1015	XC15
1.1151	C22E		1020	2C22
1.8900	StE380		A572-60	
P1.1.3	Unalloyed steel, annealed. 0.45 % C. Rm 640 N/mm ² . 190 HB			
P1.1.4	Unalloyed steel, heat-treated. 0.45 % C. Rm 640 N/mm ² . 190 HB			
1.0501	C35		1035	1C35
1.0503	C45		1045	XC42H1TS
1.0511	C40		1040	1C40
1.0540	C50			
1.0551	GS-52		A2770-36	280-480M
1.0553	St52-3U		A14880-40	320-560M
1.0577	S 355 J 2 G 4		A738	A52FP
1.0726	35S20	8M	1140	35MF6
1.0727	45S20		1146	45MF4
1.1157	40Mn4	15	1039	40M5
1.1158	C25E		1025	XC25
1.1166	34Mn5		1536	
1.1167	36Mn5		1335	40M5
1.1170	28Mn6	14A	1330	20M5
1.1178	C30E			XC32
1.1180	C35R		1035	3C35
1.1181	C35E		1035	XC38
1.1191	Ck45		1045	XC45
1.1206	C50E		1050	2C50
1.1213	Cf53		1050	XC48HTS

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
P1.1.5	Unalloyed steel, heat-treated. 0.45 % C. Rm 850 N/mm ² . 250 HB			
1.0501	C35		1035	1C35
1.0503	C45		1045	XC42H1TS
1.0614	C76D		1074	XC75
1.0616	C86D		1086	XC80
1.0618	C92D		1095	XC90
1.0726	35S20	8M	1140	35MF6
1.1157	40Mn4	15	1039	40M5
1.1165	30Mn5		1036	35M5
1.1167	36Mn5		1335	40M5
1.1186	C40E		1040	2C40
1.1191	Ck45		1045	2C45
1.1201	C45R		1049	3C45
1.1213	Cf53		1050	XC48HTS
1.7242	18CrMo4			
1.7337	16CrMo4-4		A387 Gr.12	
1.7362	12CrMo195			Z10CD5-05
P1.1.6	Unalloyed steel, annealed. 0.75 % C. Rm 915 N/mm ² . 270 HB			
1.0603	C67		107	XC65
1.0605	C75		1075	
1.1203	Ck55		1055	2C55
1.1209	C55R		1055	3C55
1.1221	Ck60	43D	1060	2C60
1.1231	C67E		1070	XC68
1.1248	C75E		1074	XC75
1.1269	C85E		1086	XC90
1.1274	Ck 101	C 100S	1095	XC100
1.1545	C 105 W1	C 105U	W1	Y1 105
1.1663	C125W		W112	Y2120
P1.1.7	Unalloyed steel, heat-treated. 0.75 % C. Rm 1020 N/mm ² . 300 HB			
1.0070	St 70-2		1055	A70-2
1.0535	C55		1055	1C55
1.0601	C60	43D	1060	1C60
1.1203	Ck55		1055	2C55
1.1221	Ck60	43D	1060	2C60
1.1274	Ck 101	C 100S	1095	XC100
1.1545	C 105 W1	C 105U	W1	Y1 105
1.1663	C125W		W112	Y2120
1.5120	38MnSi4			
1.5710	36NiCr6	111A	3135	35NC6
1.7701	51CrMoV4			
P2.1.1	Low-alloy steel, annealed. Rm 610 N/mm ² . 180 HB			
1.0904	55Si7	45	9255	55S7
1.0961	60SiCr7		9262	60SC6
1.2067	102CR6	100CR6	L3	Y100C6
1.2108	90CrSi5		L1	
1.2210	115CrV3		L2	100C3
1.2241	51CrV4			
1.2330	35CrMo4		4135	34CD4
1.2419	105WCr6			105WC13
1.2510	100MnCrW4		O1	90 MWCV 5
1.2542	45WCrV7		S1	
1.2550	60WCrV7		S1	55WC20
1.2713	55NiCrMoV6		L6	55NCDV7
1.2721	50NiCr13		L6	55NCV6
1.2842	90MnCrV8		O2	90MV8
1.3501	100Cr2		E50100	
1.3505	100Cr6	31	52100	100C6
1.5024	46Si7			45S7
1.5025	51Si7	50Si7	9259H	51S7
1.5027	60Si7	60Si7	9260	60S7
1.5028	65Si7		9260H	
1.5415	15Mo3		A204Gr.A	15D3

Material examples cutting data tables

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
P2.1.1 Low-alloy steel, annealed. Rm 610 N/mm². 180 HB				
1.5419	20Mo4		4419	
1.5423	16Mo5		4520	
1.5622	14Ni6		A350-LF5	16N6
1.5732	14NiCr10		3415	14NC11
1.5752	14NiCr14	36A	3310	12NC15
1.6511	36CrNiMo4	110	9840	40NCD3
1.6523	21NiCrMo2	362	8620	20NCD2
1.6546	40NiCrMo2-2		8740	
1.6566	17NiCrMo6-4			
1.6587	17CrNiMo6			18NCD6
1.6657	10NiCrMo13-4			
1.7015	10Cr3		5015	12C3
1.7033	34Cr4	18B	5132	32C4
1.7035	41Cr4	18	5140	42C4
1.7131	16MnCr5		5115	16MC5
1.7139	16MnCrS5			
1.7176	55Cr3	48	5155	55C3
1.7225	42CrMo4	42 CrMo 4	4140	42 CD 4
1.7228	55NiCrMoV6G	33		
1.7380	10CrMo9-10		A182F22	12CD9-10
1.7715	14MoV6-3			
1.8159	50CrV4	47	6150	50CrV4
1.8161	58CrV4			
1.8509	41CrAlMo7	41B	A355A	40CAD6-12
1.8523	39CrMoV13-9	40C		
P2.1.2 Low-alloy steel, heat-treated. Rm 930 N/mm². 275 HB				
1.5415	15Mo3		A204Gr.A	15D3
1.5423	16Mo5		4520	
1.5622	14Ni6		A350-LF5	16N6
1.5732	14NiCr10		3415	14NC11
1.5752	14NiCr14	36A	3310	12NC15
1.5755	31NiCr14			18NC13
1.6565	40NiCrMo6	24	4340	35NCD6
1.6587	17CrNiMo6			18NCD6
1.6657	10NiCrMo13-4			
1.6957	26NiCrMoV14-5			
1.7015	10Cr3		5015	12C3
1.7262	15CrMo5			12CD4
1.7335	13CrMo4-4		A182-F11	15CD4-5
1.7380	10CrMo9-10		A182F22	12CD9-10
1.7715	14MoV6-3			
1.7733	24CrMoV55			20CDV6
1.7755	GS-45CrMoV10-4			
1.8070	21CrMoV511			
P2.1.3 Low-alloy steel, heat-treated. Rm 1020 N/mm². 300 HB				
1.1730	C45W3		C45W	XC48
1.2332	47CrMo4	19A	4142	42CD4
1.5736	36NiCr10		3435	30NC11
1.6523	21NiCrMo2	362	8620	20NCD2
1.7033	34Cr4	18B	5132	32C4
1.7218	25CrMo4		4130	25CD4
1.8515	32CrMo12	40B		30CD12
P2.1.4 Low-alloy steel, heat-treated. Rm 1190 N/mm². 350 HB				
1.0904	55Si7	45	9255	55S7
1.0961	60SiCr7		9262	60SC6
1.2067	100Cr6		L3	Y100C6
1.2419	105WCr6			105WC13
1.2542	45WCrV7		S1	
1.2713	55NiCrMoV6		L6	55NCDV7
1.4882	X50CrMnNiNbN219			Z50CMNNb21-09
1.5120	38MnSi4			

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
P2.1.4 Low-alloy steel, heat-treated. Rm 1190 N/mm². 350 HB				
1.5710	36NiCr6	111A	3135	35NC6
1.5755	31NiCr14			18NC13
1.6511	36CrNiMo4	110	9840	40NCD3
1.6546	40NiCrMo2-2		8740	
1.7035	41Cr4	18	5140	42C4
1.7176	55Cr3	48	5155	55C3
1.7220	34CrMo4		4135	35CD4
1.7223	41CrMo4		4142	
1.7225	42CrMo4	42 CrMo 4	4140	42 CD 4
1.7361	32CrMo12	40B		30CD12
1.8159	50CrV4	47	6150	50CrV4
1.8161	58CrV4			
1.8509	41CrAlMo7	41B	A355A	40CAD6-12
1.8523	39CrMoV13-9	40C		
P3.1.1 High-alloy steel and tool steel, annealed. Rm 680 N/mm². 200 HB				
1.2080	X210Cr12	X210Cr12	D3	Z200C12
1.2162	21MnCr5			20MC5
1.2311	40CrMnMo7			40CMD8
1.2312	40CrMnMoS8.6		P20+S	40CMD8S
1.2316	X36CrMo17	X38CrMo16		
1.2343	X38CrMoV5-1		H11	Z38CDV5
1.2344	X40CrMoV5-1		H13	Z40CDV5
1.2363	X100CrMoV5-1		A2	Z100CDV5
1.2379	X155CrVMo121		D2	Z160CDV12
1.2436	X210CrW12		D4(D6)	Z200CD12
1.2510	100MnCrW4		O1	90 MWCV 5
1.2581	X30WCrV9-3		H21	Z30WCV9
1.2601	X165CrMoV12			
1.2606	X37CrMoW51		H12	Z35CWDV5
1.2764	X19NiCrMo4			
1.2767	X45NiCrMo4			45NCD16
1.2842	90MnCrV8		O2	90MV8
1.3243	S6-5-2-5		T15	KCV06-05-05-04-02
1.3249	S18-1-2-5		T4	Z80WKCV18-05-04
1.3343	S6-5-2		M2	Z85WDCV
1.3348	S2-9-2		M7	Z100DCWV09-04-02
1.3355	S18-0-1		T1	Z80WCV18-4-01
1.4718	X45CrSi9-3	52	HNv3	Z45CS9
1.5662	X8Ni9		ASMA353	9Ni
1.5680	12Ni19		2515	Z18N5
P3.1.2 High-alloy steel and tool steel, hardened and tempered. Rm 1100 N/mm². 325 HB				
1.2080	X210Cr12	X210Cr12	D3	Z200C12
1.2344	X40CrMoV5-1		H13	Z40CDV5
1.2363	X100CrMoV5-1		A2	Z100CDV5
1.2436	X210CrW12		D4(D6)	Z200CD12
1.2581	X30WCrV9-3		H21	Z30WCV9
1.2601	X165CrMoV12			
1.2714	55NiCrMoV7		6F3/L6	55NiCrMoV7
1.3202	S12-1-4-5			
1.3207	S10-4-3-10			Z130WKCDV
1.3243	S6-5-2-5		T15	KCV06-05-05-04-02
1.3246	S7-4-2-5		M35	Z110WKCDV07-05-04
1.3247	S2-10-1-8		M42	Z110DKCWV09-08-04
1.3255	S18-1-2-5		T4	Z80WKCV18-05-04
1.3343	S6-5-2		M2	Z85WDCV
1.3348	S2-9-2		M7	Z100DCWV09-04-02
1.3355	S18-0-1		T1	Z80WCV18-4-01
1.4718	X45CrSi9-3	52	HNv3	Z45CS9
1.4935	X20CrMoWV121		422	
1.5680	12Ni19		2515	Z18N5

Material examples cutting data tables

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives				
1.4005	X12CrS13		416	Z11CF13
1.4029	X29CrS13			
1.4035	X46CrS13			
1.4104	X14CrMoS17		430F	Z10CF17
1.4105	X6CrMoS17			
1.4523	X2CrMoTiS18-2			
M1.1.2 Stainless steel, ferritic/martensitic, annealed. Rm 680 N/mm ² . 200 HB				
1.4000	X6Cr13		403	Z6C13
1.4001	X7Cr14		410 S	Z8C13
1.4002	X6CrAl13		405	Z6CA13
1.4006	X12Cr13	56A	410	Z10C13
1.4016	X6Cr17	X8Cr17	430	Z8C17
1.4027	GX20Cr14			Z20C13M
1.4028	X30Cr13		420	Z30C13
1.4034	X46Cr13			Z40C14
1.4057	X19CrNi17-2	57	431	Z15CN16-02
1.4086	GX120Cr29			
1.4112	X90CrMoV18		440B	
1.4113	X6CrMo17		434	Z8CD17-01
1.4313	X3CrNi13-4		CA6-NM	Z4CND13-04M
1.4340	GX40CrNi274			
1.4417	X2CrNiMoSi195		S31500	
1.4418	X4CrNiMo165			Z6CND16-04-01
1.4510	X6CrTi17		XM8	Z4CT17
1.4511	X6CrNb17			Z4CNb17
1.4512	X6CrTi12		409	Z3CT12
1.4720	X20CrMo13			
1.4724	X10CrAl13		405	Z10C13
1.4742	X10CrAl18	60	430	Z10CAS18
1.4747	X80CrNiSi20	59	HNV6	Z80CSN20-02
1.4749	X18CrN28		446	
1.4762	X10CrAl24		446	Z10CAS24
1.4871	X53CrMnNiN21-9		EV8	Z52CMN21-09
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated. Rm 810 N/mm ² . 240 HB				
1.4000	X6Cr13		403	Z6C13
1.4001	X7Cr14		410 S	Z8C13
1.4006	X12Cr13	56A	410	Z10C13
1.4016	X6Cr17	X8Cr17	430	Z8C17
1.4021	X20Cr13		420	Z20C13
1.4027	GX20Cr14			Z20C13M
1.4031	X40Cr13		420	Z40C14
1.4034	X46Cr13			Z40C14
1.4057	X19CrNi17-2	57	431	Z15CN16-02
1.4113	X6CrMo17		434	Z8CD17-01
1.4313	X3CrNi13-4		CA6-NM	Z4CND13-04M
1.4544	A 700		321	Z 10 CNT 18 11
1.4546	X5CrNiNb18-10		348	
M2.1.1 Stainless steel, austenitic, quenched. 180 HB				
1.4020	X13MnNiN18-13-2			
1.4301	X5CrNi18-10		304	Z5CN18-09
1.4303	X4CrNi18-12			
1.4305	X8CrNiS18-9	58M	303	Z8CNF18-09
1.4306	X2CrNi19-11	X3CrNi1810KD	304L	Z2CN18-09
1.4307	X2CrNi18-9			
1.4310	X10CrNi18-8		301	Z12CN17-07
1.4311	X2CrNiN18-10		304LN	Z2CN18-10
1.4315	X5CrNiN19-9			
1.4318	X2CrNiN18-7			

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
M2.1.1 Stainless steel, austenitic, quenched. 180 HB				
1.4325	X9CrNi18-9			
1.4335	X1CrNi25-21			
1.4361	X1CrNiSi18-15-4			
1.4369	X11CrNiMnN19-8-6			
1.4371	X2CrMnNiN17-7-5		202	Z8CMN18-08-05
1.4372	X12CrMnNiN17-7-5			
1.4373	X12CrMnNiN18-9-5			
1.4376	X8CrMnNi19-6-3			
1.4378	X6CrMnNiN18-13-3			
1.4401	X5CrNiMo17-12-2		316	Z3CND17-11-01
1.4404	X2CrNiMo17-12-2		316L	Z2CND17-12
1.4406	X2CrNiMoN17-11-2		316LN	Z2CND17-12AZ
1.4432	X2CrNiMo17-12-3			
1.4434	X2CrNiMoN18-12-4			
1.4435	X2CrNiMo18-14-3		316L	Z3CND17-12-03
1.4438	X2CrNiMo18-15-4		317L	Z2CND19-15-04
1.4439	X2CrNiMoN17-13-5		(s31726)	Z3CND18-14-06AZ
1.4449	X2CrNiMo18-12-3		317	
1.4466	X1CrNiMoN25-22-2			
1.4529	X1NiCrMoCuN25-20-7			
1.4539	X1NiCrMoCu25-20-5			Z2NCU25-20
1.4541	X6CrNiTi18-10		321	Z6CNT18-10
1.4547	X1CrNiMoCuN20-18-7		S31254	
1.4550	X6CrNiNb18-10	58F	347	Z6CNNb18-10
1.4558	X2NiCrAlTi32-20			
1.4560	X3CrNiCu19-9-2			
1.4563	X1NiCrMoCu31-27-4			
1.4565	X2CrNiMnMoN25-18-6-5			
1.4567	X3CrNiCu18-9-4			
1.4570	X6CrNiCuS18-9-2			
1.4571	X6CrNiMoTi17-12-2	58J	316Ti	Z6NDT17-12
1.4578	X3CrNiCuMo17-11-3-2			
1.4580	X6CrNiMoNb17-12-2			
1.4597	X8CrMnCuNB17-8-3			
1.4598	X2CrNiMoCuS17-10-2			
1.4615	X3CrMnNiCu15-8-5-3			
1.4618	X9CrMnNiCu17-8-5-2			
1.4640	X5CrNiCu19-6-2			
1.4646	X6CrMnNiCuN18-12-4-2			
1.4650	X2CrNiCu19-10			
1.4652	X1CrNiMoCuN24-22-8			
1.4659	X1CrNiMoCuNW24-22-6			
M2.1.1 Duplex steel, high-strength stainless steels				
1.4062	X2CrNiN22-2			
1.4669	X1CrNiMoCuN25-25-5			
1.4424	X2CrNiMo20-7-2			
1.4362	X2CrNiN23-4		S32304	Z2CN23-04AZ
1.4162	X2CrMnNiMoN25-18-6-5			
1.4482	X2CrMnNiMoN22-5-3			
1.4462	X2CrNiMoN22-5-3			Z3CND22-05Az
1.4662	X1CrNiMoCuN26-25-5			
1.4507	X2CrNiMoCuN25-6-3			
1.4460	X1CrNiMoCuN20-18-7		329	
1.4410	X2CrNiMoN25-7-4			Z5CND20-12M
1.4501	X2CrNiMoCuWN25-7-4			
1.4477	X2CrNiMoCuN25-6-3			
1.4658	X1NiCrMoCu25-20-5			



Material examples cutting data tables

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
K1.1.1 Grey cast iron, pearlitic/ferritic. 180 HB				
0.6010	GG10	GJL-100	A48 20 B	Ft 10 D
0.6015	GG15	GJL-150	A48 25 B	Ft 15 D
0.6020	GG20	GJL-200	A48 30 B	Ft 20 D
0.6025	GG25	GJL-250	A48 40 B	Ft 25 D
0.6660	GGL-NiCr 20 2	GJLA-XNiCr 20-2	1050/700/7	L-NC 202
K1.1.2 Grey cast iron, pearlitic/martensitic. 260 HB				
0.6025	GG25	GJL-250	A48 40 B	Ft 25 D
0.6030	GG30	GJL-300	A48 45 B	Ft 30 D
0.6035	GG35	GJL-350	A48 50 B	Ft 35 D
0.6040	GG40	GJL-400	A48 60 B	Ft 40 D
K1.2.1 Cast iron with spheroidal graphite, ferritic. 160 HB				
0.7033	GGG35.3	GJS-350-22-LT	-	FGS 370-17
0.7040	GGG40	GJS-400-15	60-40-18	FCS 400-12
0.7043	GGG40.3	GJS-400-18-LT	60-40-18	FGS 370-17
K1.2.2 Cast iron with spheroidal graphite, pearlitic. 250 HB				
0.7050	GGG50	GJS-500-7	80-55-06	FGS 500-7
0.7060	GGG60	GJS-600-3	80-55-06	FGS 600-3
0.7070	GGG70	GJS-700-2	100-70-03	FGS 700-2
0.7652	GGG NiMn 13-7	GJSA-XNiMn 13-7	-	FGS Ni13 Mn7
0.7660	GGG NiCr 20-2	GJSA-XNiCr 20-2	A436 D2	FGS Ni20 Cr2
K1.3.1 Malleable cast iron, ferritic. 130 HB				
0.8135	GTS-35	GJMB350-10	32510	MN 35-10
K1.3.2 Malleable cast iron, pearlitic. 230 HB				
0.8145	GTS-45	GJMB450-6	A220-40010	MN 450
0.8155	GTS-55	GJMB-550-4	50005	MP 50-5
0.8165	GTS-65	GJMB-650-2	70003	MN 650-3
0.8170	GTS-70	GJMB-700-2	90001	MN 700-2
K2.1.1 Vermicular graphite cast iron (GJV)				
5.2100	GJV-300			
5.2201	GJV-400			
5.2301	GJV-500			
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)				
5.3400	GJS-800-10			
5.3402	GJS-900-8			
5.3403	GJS-1050-6			

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
N1.1.1 Wrought aluminium alloys, non-hardened. 60 HB				
3.0205	Al99		Al99	
3.0255	Al99.5		1000	A59050C
3.3206	AlMgSi0.5	AW-6060		
3.3315	AlMg1			
N1.1.2 Wrought aluminium alloys, hardened. 100 HB				
3.1325	AlCuMg1			
3.1655	AlCuSiPb			
3.2315	AlMgSi1			
3.4345	AlZnMgCu0,5		7050	AZ4GU/9051
3.4365	AlZnMgCu1,5		7075	7075
N2.1.1 Aluminium casting alloys, non-hardened. ≤ 12 % Si. 75 HB				
3.2163	AlSi9Cu3			
3.2382	AlSi10Mg			
3.2383	AlSi0Mg(Cu)		A360.2	
3.2581	AlSi12			
3.3561	AlMg5			
N2.1.2 Aluminium casting alloys, hardened. ≤ 12 % Si. 90 HB				
2.1871	AlCu4TiMg			
3.1754	AlCu4Ni2Mg			
3.2371	AlSi7Mg		4218B	
3.2373	AlSi9MgWA		SC64D	A-S7G
3.2381	AlSi10Mg			
3.5106	MgAg3SE2Zr1		QE22	
N3.1.1 Copper and copper alloys: Free-machining alloy. Pb > 1 %				
2.0375	CuZn36Pb3			
2.1090	CuSn75pb		C93200	U-E7Z5pb4
2.1096	CuSn5ZnPB		c83600	
2.1098	CuSn2Znpb		C83600	
2.1182	CuPb15Sn		C23000	U-pb15E8
N3.1.2 Copper and copper alloys: CuZn. CuSnZn. 90 HB				
2.0240	CuZn15			
2.0321	CuZn37		C27200	CuZn36,CuZn37
2.0590	CuZn40Fe			
2.0592	CuZn35Al1		C86500	HTB1
2.0596	CuZn34Al2		C86200	U-Z36N3
2.1293	CuCrZr		C18200	U-Cr0-8Zr
N3.1.3 Copper and copper alloys: CuSn. lead-free copper and copper electrolyte				
2.0060	E-Cu57			
2.0966	CuAl10Ni5Fe4		C63000	U-A10N
2.0975	CuAl10Ni		B-148-52	
2.1050	CuSn10		c90700	
2.1052	G-CuSn12		C90800	UE12P
2.1292	G-CuCrF35		C81500	

Material examples cutting data tables

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
S1.1.1 Heat-resistant alloys. Fe-based. annealed. 200 HB				
1.4558	X2NiCrAlTi3220		N08800	
1.4562	X1NiCrMoCu32287		N08031	
1.4563	X1NiCrMoCuN31274		N08028	Z1NCUDU31-27-03
1.4864	X12NiCrSi36-16		330	Z12NCS37-18
1.4865	GX40NiCrSi38-18			
1.4958	X5NiCrAlTi3120			
S1.1.2 Heat-resistant alloys. Fe-based. hardened. 280 HB				
1.4977	X40CoCrNi2020			Z42CNKDWNb
S1.1.3 Heat-resistant alloys. Ni- or Co-based. annealed. 250 HB				
2.4360	NiCu30Fe			NU30
2.4603	NiCr 30 FeMo		5390A	NC22FeD
2.4610	NiMo16Cr16Ti			
2.4630	NiCr20Ti			NC20T
2.4631	NiCr20TiAl			NC20TA
2.4642	NiCr29Fe			Nnc30Fe
2.4856	NiCr22Mo9Nb			NC22FeDNb
S1.1.4 Heat-resistant alloys. Ni- or Co-based. hardened. 350 HB				
2.4375	NiCu30Al		4676	NU30AT
2.4662	NiFe35Cr14MoTi		5660	ZSNCDT42
2.4668	NiCr19Fe19NbMo		5383	NC19eNB
2.4670	S-NiCr13Al6MoNb		5391	NC12AD
2.4694	NiCr16Fe7TiAl			
2.4955	NiFe25Cr20NbTi			
2.4964	CoCr20W15Ni		5772	KC20WN
S1.1.5 Heat-resistant alloys. Ni- or Co-based. cast. 320 HB				
2.4669	NiCr15Fe7TiAl			NC15TNbA
2.4685	G-NiMo28			
2.4810	G-NiMo30			
2.4973	NiCr19Co11MoTi		AMS 5399	NC19KDT
3.7115	TiAl5Sn2			
S2.1.1 Titanium alloys. pure titanium. Rm 400 N/mm ²				
2.4674	NiCo15Cr10MoAlTi		AMS 5397	
3.7025	Ti1		R50250	
3.7225	Ti1pd		R52250	
S2.1.2 Titanium alloys. Alpha and Beta alloys. hardened. Rm 1050 N/mm ²				
3.7124	TiCu2			
3.7145	TiAl6Sn2Zr4Mo2Si		R54620	
3.7165	TiAl6V4		AMS R56400	T-A6V
3.7185	TiAl4Mo4Sn2			
3.7195	TiAl3V2.5			

Mat. no.	DIN	EN	AISI/ASTM/SAE	AFNOR
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			
1.1231	Ck 67	C 67S	1070	XC 68
1.1248	Ck 75	C 75S	1078, 1080	XC 75
1.1274	Ck 101	C 100S	1095	XC100
1.1545	C 105 W1	C 105U	W1	Y1 105
1.1730	C 45 W3			
1.2067	102CR6	100CR6		
1.2343	X37CrMoV5-1			
1.2361	X91CrMoV18			
1.2379	X155CrMoV12-1			
1.2762	75CrMoNiW67			
1.3401	GX120Mn12		A128(A)	Z120M12
1.6746	32NiCrMo14-5	32nCrMo145		35NCD14
1.7131	16MnCr5			
1.7176	55Cr3	48	5155	55C3
1.7225	42CrMo4	42 CrMo 4	4140	42 CD 4
H2.1.1 Chilled cast iron. 400 HB				
0.9620	GX260NiCr42	GJN-HV520	A532 IB	FB Ni4 Cr2 BC
0.9625	GX330NiCr42	GJN-HV550	A532 IA	FB Ni4 Cr2 HC
0.9630	GX300 CrNiSi 9 5 2	GJN-HV600	A532 ID	FB Cr9 Ni5
0.9640	GX300CrMoNi1521			
0.9650	GX260Cr27			
0.9655	GX300CrNiMo271			
1.4841	X15CrNiSi25-20	X 15 CrNiSi 25 20	310	Z15CNS25-20
H2.1.2 Chilled cast iron. hardened and tempered. < 55 HRC				
0.9635	GX300 CrMo 15 3			
0.9645	GX260 CrMoNi 20 21			

TS 100 U without coolant ducts, 3xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	115	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	115	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	100	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	90	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	80	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	65	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	55	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	40	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	35	0.035	0.060	0.075	0.085	0.100	0.110	0.125	0.145
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	35	0.035	0.055	0.070	0.080	0.095	0.105	0.115	0.140
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	25	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
M2.2.1 Duplex steel, high-strength stainless steels	20	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.110
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	75	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	75	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	70	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	70	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	65	0.085	0.145	0.180	0.215	0.245	0.280	0.305	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	70	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	55	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	165	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	165	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	150	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	150	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	130	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	110	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	95	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	90	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
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	30	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	15	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	10	0.025	0.040	0.050	0.060	0.070	0.080	0.090	0.105
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	25	0.025	0.040	0.050	0.060	0.070	0.080	0.090	0.105
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	20	0.025	0.040	0.050	0.060	0.065	0.075	0.085	0.100
H2.1.1 Chilled cast iron, 400 HB	25	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 100 U without coolant ducts, 5xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	115	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	115	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	100	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	90	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	80	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	65	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	55	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	45	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	40	0.035	0.060	0.075	0.085	0.100	0.110	0.125	0.145
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	40	0.035	0.055	0.070	0.080	0.095	0.105	0.115	0.140
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	25	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
M2.2.1 Duplex steel, high-strength stainless steels	20	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.110
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	75	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	75	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	70	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	70	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	65	0.085	0.145	0.180	0.215	0.245	0.280	0.305	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	70	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	55	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	165	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	165	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	150	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	150	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	130	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
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	30	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	15	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	10	0.025	0.040	0.050	0.060	0.070	0.080	0.090	0.105
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	25	0.025	0.040	0.050	0.060	0.070	0.080	0.090	0.105
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	20	0.025	0.040	0.050	0.060	0.065	0.075	0.085	0.100
H2.1.1 Chilled cast iron, 400 HB	25	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 100 U with coolant ducts, 3xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	145	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	130	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	125	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	115	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	110	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	120	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	120	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	90	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	60	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	55	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	50	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	55	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
M2.2.1 Duplex steel, high-strength stainless steels	45	0.035	0.055	0.070	0.080	0.095	0.105	0.115	0.140
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.180	0.225	0.270	0.310	0.345	0.385	0.455
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	185	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	185	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
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	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	30	0.030	0.050	0.060	0.070	0.085	0.095	0.105	0.120
H2.1.1 Chilled cast iron, 400 HB	40	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	30	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145

TS 100 U with coolant ducts, 5xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	145	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	130	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	125	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	115	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	110	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	120	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	120	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	90	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	70	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	60	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	60	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	55	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	50	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	55	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
M2.2.1 Duplex steel, high-strength stainless steels	45	0.035	0.055	0.070	0.080	0.095	0.105	0.115	0.140
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.180	0.225	0.270	0.310	0.345	0.385	0.455
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	185	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	185	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
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	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	30	0.030	0.050	0.060	0.070	0.085	0.095	0.105	0.120
H2.1.1 Chilled cast iron, 400 HB	40	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	30	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145

TS 100 U with coolant ducts, 7xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	145	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.110	0.185	0.235	0.275	0.315	0.355	0.395	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	130	0.110	0.185	0.235	0.275	0.315	0.355	0.395	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	125	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	115	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	110	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	120	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	120	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	90	0.070	0.120	0.150	0.180	0.205	0.230	0.255	0.305
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	60	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	55	0.055	0.095	0.115	0.140	0.160	0.180	0.195	0.235
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	50	0.050	0.090	0.110	0.130	0.150	0.170	0.185	0.220
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	55	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
M2.2.1 Duplex steel, high-strength stainless steels	45	0.035	0.055	0.070	0.080	0.095	0.105	0.115	0.140
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.180	0.225	0.270	0.310	0.345	0.385	0.455
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	185	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	185	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
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	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	30	0.030	0.050	0.060	0.070	0.085	0.095	0.105	0.120
H2.1.1 Chilled cast iron, 400 HB	40	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	30	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 100 U with coolant ducts, 12xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	110	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	0.110	0.185	0.235	0.275	0.315	0.355	0.395	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	100	0.110	0.185	0.235	0.275	0.315	0.355	0.395	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	95	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	95	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	90	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	85	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	110	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	110	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	95	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	85	0.070	0.120	0.150	0.180	0.205	0.230	0.255	0.305
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	60	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	55	0.055	0.095	0.115	0.140	0.160	0.180	0.195	0.235
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	50	0.050	0.090	0.110	0.130	0.150	0.170	0.185	0.220
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	55	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
M2.2.1 Duplex steel, high-strength stainless steels	45	0.035	0.055	0.070	0.080	0.095	0.105	0.115	0.140
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.085	0.145	0.180	0.215	0.245	0.280	0.305	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	185	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	185	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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									

TS 180 U with coolant ducts, 2-fluted, 3xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.060	0.100	0.120	0.145	0.165	0.185	0.205	0.245
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	80	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	80	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	70	0.050	0.090	0.110	0.130	0.150	0.170	0.185	0.220
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	60	0.045	0.080	0.095	0.115	0.130	0.150	0.165	0.195
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	50	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	45	0.040	0.070	0.085	0.105	0.120	0.135	0.145	0.175
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	45	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	40	0.045	0.075	0.090	0.110	0.125	0.140	0.155	0.185
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	40	0.040	0.070	0.085	0.105	0.120	0.135	0.145	0.175
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	40	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
M2.2.1 Duplex steel, high-strength stainless steels	35	0.040	0.070	0.085	0.105	0.120	0.135	0.145	0.175
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.055	0.090	0.115	0.135	0.155	0.175	0.190	0.230
K2.1.1 Vermicular graphite cast iron (GJV)	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	60	0.060	0.100	0.120	0.145	0.165	0.185	0.205	0.245
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	185	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	185	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	120	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	100	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	95	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
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	30	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	30	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	25	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
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	25	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 180 U with coolant ducts, 3-fluted, 3xD


Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	4	6	8	10	12	14	16	18	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	120	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	110	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	100	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	100	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	95	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	90	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	95	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	95	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	80	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	70	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	60	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	65	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	60	0.085	0.115	0.145	0.175	0.200	0.225	0.245	0.270	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	55	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
M2.2.1 Duplex steel, high-strength stainless steels	50	0.065	0.090	0.110	0.130	0.150	0.170	0.185	0.205	0.220
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.105	0.145	0.180	0.215	0.245	0.280	0.305	0.335	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	140	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	140	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	170	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	170	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	145	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.510	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	140	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.375	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	120	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.320	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	110	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
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	35	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	30	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	40	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.150	0.165
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	30	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145

TS 180 U with coolant ducts, 3-fluted, 5xD



Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	4	6	8	10	12	14	16	18	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	105	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	95	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	95	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	90	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	85	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	80	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	80	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	80	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	70	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	60	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	60	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	50	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	55	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	50	0.085	0.115	0.145	0.175	0.200	0.225	0.245	0.270	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	45	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	50	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
M2.2.1 Duplex steel, high-strength stainless steels	45	0.065	0.090	0.110	0.130	0.150	0.170	0.185	0.205	0.220
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.105	0.145	0.180	0.215	0.245	0.280	0.305	0.335	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	80	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	60	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	130	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	130	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	160	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	160	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	135	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.510	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.375	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.320	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
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	30	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	35	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	25	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	35	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.150	0.165
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	25	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145

TS 100 HPC with coolant ducts, 5xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	180	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	160	0.175	0.295	0.365	0.430	0.495	0.560	0.615	0.730
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	160	0.175	0.295	0.365	0.430	0.495	0.560	0.615	0.730
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	155	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	155	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	145	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	135	0.145	0.245	0.305	0.360	0.415	0.465	0.515	0.610
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	120	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	120	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	90	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	75	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	70	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	70	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.180	0.225	0.270	0.310	0.345	0.385	0.455
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	55	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
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									

TS 100 HPC with coolant ducts, 7xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	160	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	145	0.175	0.295	0.365	0.430	0.495	0.560	0.615	0.730
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	145	0.175	0.295	0.365	0.430	0.495	0.560	0.615	0.730
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	135	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	135	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	130	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	120	0.145	0.245	0.305	0.360	0.415	0.465	0.515	0.610
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	85	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	70	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	65	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	60	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.180	0.225	0.270	0.310	0.345	0.385	0.455
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	55	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
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									

TS 3 HPC with coolant ducts, 3-fluted, 3xD


Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	4	6	8	10	12	14	16	18	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	180	0.300	0.410	0.510	0.605	0.695	0.785	0.865	0.945	1.025
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	160	0.270	0.370	0.460	0.545	0.625	0.705	0.780	0.855	0.925
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	160	0.270	0.370	0.460	0.545	0.625	0.705	0.780	0.855	0.925
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	155	0.255	0.350	0.435	0.515	0.590	0.665	0.735	0.805	0.870
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	155	0.255	0.350	0.435	0.515	0.590	0.665	0.735	0.805	0.870
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	145	0.240	0.330	0.410	0.485	0.555	0.625	0.695	0.760	0.820
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	135	0.225	0.310	0.385	0.455	0.520	0.585	0.650	0.710	0.770
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	130	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	130	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	110	0.205	0.275	0.345	0.410	0.470	0.525	0.585	0.640	0.690
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	100	0.180	0.245	0.305	0.360	0.415	0.465	0.515	0.565	0.610
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	90	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	75	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.510	0.555
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	60	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	55	0.085	0.115	0.145	0.175	0.200	0.225	0.245	0.270	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	50	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB										
M2.2.1 Duplex steel, high-strength stainless steels										
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	130	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	110	0.205	0.275	0.345	0.410	0.470	0.525	0.585	0.640	0.690
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	110	0.205	0.275	0.345	0.410	0.470	0.525	0.585	0.640	0.690
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	105	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
K1.3.1 Malleable cast iron, ferritic, 130 HB	105	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
K1.3.2 Malleable cast iron, pearlitic, 230 HB	90	0.165	0.230	0.285	0.335	0.385	0.435	0.480	0.525	0.570
K2.1.1 Vermicular graphite cast iron (GJV)	100	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	75	0.180	0.245	0.305	0.360	0.415	0.465	0.515	0.565	0.610
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	200	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	200	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	180	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	180	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.750	0.815
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	155	0.205	0.275	0.345	0.410	0.470	0.525	0.585	0.640	0.690
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %										
N3.1.2 Copper and copper alloys: CuZn, CuSnZn										
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte										
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	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.060	0.085	0.105	0.120	0.140	0.160	0.175	0.190	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.055	0.075	0.090	0.105	0.125	0.140	0.155	0.165	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.055	0.075	0.090	0.105	0.125	0.140	0.155	0.165	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.060	0.085	0.105	0.120	0.140	0.160	0.175	0.190	0.205
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	40	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
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										

TS 3 HPC with coolant ducts, 3-fluted, 5xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	180	0.245	0.410	0.510	0.605	0.695	0.785	0.865	1.025
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	160	0.220	0.370	0.460	0.545	0.625	0.705	0.780	0.925
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	160	0.220	0.370	0.460	0.545	0.625	0.705	0.780	0.925
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	155	0.205	0.350	0.435	0.515	0.590	0.665	0.735	0.870
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	155	0.205	0.350	0.435	0.515	0.590	0.665	0.735	0.870
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	145	0.195	0.330	0.410	0.485	0.555	0.625	0.695	0.820
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	135	0.180	0.310	0.385	0.455	0.520	0.585	0.650	0.770
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	130	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	130	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	110	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	100	0.145	0.245	0.305	0.360	0.415	0.465	0.515	0.610
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	90	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	75	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	60	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	55	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	50	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	130	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	110	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	110	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	105	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.3.1 Malleable cast iron, ferritic, 130 HB	105	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.3.2 Malleable cast iron, pearlitic, 230 HB	90	0.135	0.230	0.285	0.335	0.385	0.435	0.480	0.570
K2.1.1 Vermicular graphite cast iron (GJV)	100	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	75	0.145	0.245	0.305	0.360	0.415	0.465	0.515	0.610
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	200	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	200	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	180	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	180	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	155	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	30	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
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									

NC spotting drills without coolant ducts



Machining group	VHM		f (mm/rev) with nom. Ø							
										
	v _c (m/min)		1	3	6	8	10	12	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	75	0.030	0.095	0.165	0.205	0.240	0.275	0.345	0.405
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	70	0.030	0.085	0.145	0.180	0.215	0.250	0.310	0.365
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	70	0.030	0.085	0.145	0.180	0.215	0.250	0.310	0.365
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	65	0.025	0.080	0.140	0.170	0.205	0.235	0.290	0.345
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	65	0.025	0.080	0.140	0.170	0.205	0.235	0.290	0.345
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	60	0.025	0.075	0.130	0.160	0.190	0.220	0.275	0.325
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	55	0.025	0.070	0.120	0.150	0.180	0.205	0.255	0.305
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	55	40	0.020	0.060	0.105	0.130	0.155	0.175	0.220	0.260
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	55	40	0.020	0.060	0.105	0.130	0.155	0.175	0.220	0.260
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	45	30	0.015	0.050	0.090	0.110	0.130	0.150	0.185	0.220
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	40	30	0.015	0.045	0.080	0.095	0.115	0.130	0.165	0.195
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	55	40	0.020	0.060	0.105	0.130	0.155	0.175	0.220	0.260
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	45	35	0.015	0.050	0.090	0.110	0.130	0.150	0.185	0.220
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	35	25	0.015	0.050	0.080	0.100	0.120	0.140	0.175	0.205
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	30	25	0.015	0.045	0.075	0.090	0.110	0.125	0.155	0.185
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	30	20	0.015	0.040	0.070	0.085	0.105	0.120	0.145	0.175
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	25	20	0.015	0.050	0.080	0.100	0.120	0.140	0.175	0.205
M2.2.1 Duplex steel, high-strength stainless steels	20	15	0.015	0.040	0.070	0.085	0.105	0.120	0.145	0.175
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	90	80	0.040	0.125	0.210	0.260	0.305	0.355	0.440	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	75	70	0.035	0.105	0.175	0.220	0.260	0.300	0.375	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	75	70	0.035	0.105	0.175	0.220	0.260	0.300	0.375	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	70	65	0.035	0.100	0.165	0.205	0.245	0.280	0.350	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	70	65	0.035	0.100	0.165	0.205	0.245	0.280	0.350	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	65	55	0.030	0.085	0.145	0.180	0.215	0.245	0.305	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	70		0.040	0.125	0.210	0.260	0.305	0.355	0.440	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	55		0.030	0.090	0.155	0.195	0.230	0.265	0.330	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	165	160	0.040	0.125	0.210	0.260	0.305	0.355	0.440	0.520
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	165	160	0.040	0.125	0.210	0.260	0.305	0.355	0.440	0.520
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	150	140	0.040	0.125	0.210	0.260	0.305	0.355	0.440	0.520
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	150	140	0.040	0.125	0.210	0.260	0.305	0.355	0.440	0.520
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	130	120	0.035	0.105	0.175	0.220	0.260	0.300	0.375	0.440
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	110	80	0.030	0.095	0.165	0.205	0.240	0.275	0.345	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	95	70	0.025	0.080	0.140	0.170	0.205	0.235	0.290	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	90	65	0.025	0.075	0.130	0.160	0.190	0.220	0.275	0.325
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics	55	50	0.015	0.040	0.065	0.080	0.095	0.110	0.135	0.165
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.	55	50	0.015	0.040	0.065	0.080	0.095	0.110	0.135	0.165
N4.1.3 Non-metallic materials: Graphite										
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB	35	25	0.015	0.040	0.065	0.080	0.095	0.110	0.135	0.165
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	20	0.010	0.030	0.050	0.065	0.075	0.090	0.110	0.130
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	30	20	0.015	0.040	0.065	0.080	0.095	0.110	0.135	0.165
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	15	0.010	0.025	0.045	0.055	0.065	0.075	0.095	0.115
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	15	0.010	0.025	0.045	0.055	0.065	0.075	0.095	0.115
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	25	15	0.010	0.030	0.050	0.065	0.075	0.090	0.110	0.130
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	20	10	0.010	0.025	0.040	0.050	0.060	0.070	0.090	0.105
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	25	20	0.015	0.040	0.065	0.080	0.095	0.110	0.135	0.165
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										

TS 100 INOX with coolant ducts 3xD, 5xD



TS 100 INOX

Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	70	0.070	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	70	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
M2.2.1 Duplex steel, high-strength stainless steels	50	0.050	0.090	0.110	0.130	0.150	0.170	0.185	0.220
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	45	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	35	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	45	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	35	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
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									

TS 100 INOX HPC with coolant ducts, 3xD


Machining group		f (mm/rev) with nom. Ø								
	v _c (m/min)	4	6	8	10	12	14	16	18	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	105	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	95	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	95	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.430	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	90	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	85	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	80	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	80	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	80	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	70	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	60	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	60	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	50	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	55	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	50	0.085	0.115	0.145	0.175	0.200	0.225	0.245	0.270	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	45	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.255	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	50	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
M2.2.1 Duplex steel, high-strength stainless steels	45	0.065	0.090	0.110	0.130	0.150	0.170	0.185	0.205	0.220
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.410	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.385	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.105	0.145	0.180	0.215	0.245	0.280	0.305	0.335	0.365
K2.1.1 Vermicular graphite cast iron (GJV)	80	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.480	0.520
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	60	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.360	0.390
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB	130	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	130	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	160	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	160	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.600	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	135	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.510	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	130	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.375	0.405
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	110	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.320	0.345
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	105	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.300	0.325
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	30	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	35	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	25	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	35	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.150	0.165
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	25	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.190	0.205
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	20	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.130	0.145

TS 100 INOX HPC with coolant ducts, 5xD



TS 100 INOX

Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	3	4	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	140	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	125	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	120	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	120	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	110	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	105	0.115	0.145	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	115	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	115	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	85	0.090	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	75	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	65	0.080	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	105	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.405
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	95	0.085	0.110	0.145	0.180	0.215	0.250	0.280	0.310	0.365
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	90	0.080	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	85	0.075	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M2.2.1 Duplex steel, high-strength stainless steels	70	0.065	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.275
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB										
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB										
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB										
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB										
K1.3.1 Malleable cast iron, ferritic, 130 HB										
K1.3.2 Malleable cast iron, pearlitic, 230 HB										
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										
N1.1.2 Wrought aluminium alloys, hardened, 100 HB										
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB										
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB										
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB										
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %										
N3.1.2 Copper and copper alloys: CuZn, CuSnZn										
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte										
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	60	0.060	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	50	0.050	0.060	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	50	0.060	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	35	0.045	0.055	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	35	0.045	0.055	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	60	0.060	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	45	0.050	0.060	0.085	0.105	0.120	0.140	0.160	0.175	0.205
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										

TS 100 INOX HPC with coolant ducts, 7xD



Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	3	4	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	140	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	125	0.110	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.470
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.110	0.140	0.185	0.235	0.275	0.315	0.355	0.395	0.470
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	120	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	120	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	110	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.415
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	105	0.090	0.115	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	115	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	115	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.080	0.100	0.140	0.170	0.205	0.235	0.265	0.290	0.345
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	85	0.070	0.090	0.120	0.150	0.180	0.205	0.230	0.255	0.305
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	75	0.075	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	65	0.065	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	100	0.075	0.095	0.130	0.160	0.190	0.220	0.250	0.275	0.325
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	90	0.070	0.085	0.115	0.145	0.175	0.200	0.225	0.245	0.295
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	85	0.065	0.080	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	80	0.060	0.075	0.105	0.130	0.155	0.175	0.200	0.220	0.260
M2.2.1 Duplex steel, high-strength stainless steels	70	0.050	0.065	0.090	0.110	0.130	0.150	0.170	0.185	0.220
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB										
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB										
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB										
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB										
K1.3.1 Malleable cast iron, ferritic, 130 HB										
K1.3.2 Malleable cast iron, pearlitic, 230 HB										
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										
N1.1.2 Wrought aluminium alloys, hardened, 100 HB										
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB										
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB										
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB										
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %										
N3.1.2 Copper and copper alloys: CuZn, CuSnZn										
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte										
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	45	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	35	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	40	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	25	0.035	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.035	0.040	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	45	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	35	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.140	0.165
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										

TS 100 R with coolant ducts, 5xD



TS 100 R | TS 150 GG

Machining group		f (mm/rev) with nom. Ø							
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	130	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	110	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	110	0.165	0.275	0.345	0.410	0.470	0.525	0.585	0.690
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	105	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.3.1 Malleable cast iron, ferritic, 130 HB	105	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.3.2 Malleable cast iron, pearlitic, 230 HB	90	0.135	0.230	0.285	0.335	0.385	0.435	0.480	0.570
K2.1.1 Vermicular graphite cast iron (GJV)	100	0.190	0.325	0.405	0.480	0.550	0.620	0.685	0.815
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	75	0.145	0.245	0.305	0.360	0.415	0.465	0.515	0.610
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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									

TS 100 R with coolant ducts, 7xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	130	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.1 Malleable cast iron, ferritic, 130 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.3.2 Malleable cast iron, pearlitic, 230 HB	90	0.110	0.180	0.225	0.270	0.310	0.345	0.385	0.455
K2.1.1 Vermicular graphite cast iron (GJV)	100	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	75	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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									

TS 150 GG with coolant ducts, 4xD



TS 100 R | TS 150 GG

Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.085	0.145	0.180	0.215	0.245	0.280	0.305	0.365
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	210	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	210	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	190	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	190	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	160	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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	35	0.04	0.065	0.08	0.095	0.11	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	25	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 150 GG with coolant ducts, 7xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.100	0.165	0.205	0.245	0.280	0.315	0.350	0.415
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.085	0.145	0.180	0.215	0.245	0.280	0.305	0.365
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	210	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	210	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	190	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	190	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	160	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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	35	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	25	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 150 GG with coolant ducts, 10xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.065	0.115	0.140	0.170	0.195	0.215	0.240	0.285
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	210	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	210	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	190	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	190	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	160	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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	35	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	25	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 100 ALU with coolant ducts, 3xD, 5xD



Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	3	4	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB										
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB										
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB										
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB										
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB										
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB										
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB										
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB										
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB										
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB										
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB										
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB										
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB										
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives										
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB										
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB										
M2.1.1 Stainless steel, austenitic, quenched, 180 HB										
M2.2.1 Duplex steel, high-strength stainless steels										
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB										
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB										
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB										
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB										
K1.3.1 Malleable cast iron, ferritic, 130 HB										
K1.3.2 Malleable cast iron, pearlitic, 230 HB										
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	240	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	240	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	220	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	220	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	185	0.165	0.205	0.275	0.345	0.410	0.470	0.525	0.585	0.690
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	160	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	135	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	130	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.415
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics	90	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.165
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.	90	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.165
N4.1.3 Non-metallic materials: Graphite										
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB										
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB										
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB										
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB										
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB										
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²										
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²										
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										

TS 100 ALU with coolant ducts, 7xD



Machining group		f (mm/rev) with nom. Ø								
										
	v _c (m/min)	3	4	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB										
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB										
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB										
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB										
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB										
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB										
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB										
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB										
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB										
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB										
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB										
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB										
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB										
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives										
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB										
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB										
M2.1.1 Stainless steel, austenitic, quenched, 180 HB										
M2.2.1 Duplex steel, high-strength stainless steels										
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB										
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB										
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB										
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB										
K1.3.1 Malleable cast iron, ferritic, 130 HB										
K1.3.2 Malleable cast iron, pearlitic, 230 HB										
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	240	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	240	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550	0.650
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	220	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	220	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685	0.815
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	185	0.165	0.205	0.275	0.345	0.410	0.470	0.525	0.585	0.690
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	160	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	135	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	130	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350	0.415
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics	90	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.165
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.	90	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135	0.165
N4.1.3 Non-metallic materials: Graphite										
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB										
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB										
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB										
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB										
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB										
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²										
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²										
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										

TS 100 ALU with coolant ducts, 12xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	4	6	8	10	12	14	16
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	110	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	110	0.190	0.240	0.325	0.405	0.480	0.550	0.620	0.685
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	95	0.165	0.205	0.275	0.345	0.410	0.470	0.525	0.585
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	140	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	120	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	110	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics	90	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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									

TS 150 GG with coolant ducts, 10xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	105	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	90	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	90	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	85	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
K1.3.1 Malleable cast iron, ferritic, 130 HB	85	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.065	0.115	0.140	0.170	0.195	0.215	0.240	0.285
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	200	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	200	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	180	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	180	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	155	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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	40	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC	30	0.025	0.045	0.055	0.065	0.075	0.085	0.095	0.115

TS 100 H without coolant ducts, 3xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	115	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	115	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	110	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	100	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	105	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	90	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	80	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	65	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	55	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	30	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	20	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	15	0.025	0.040	0.050	0.060	0.070	0.080	0.090	0.105
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	40	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	25	0.025	0.040	0.050	0.060	0.070	0.080	0.090	0.105
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	25	0.025	0.040	0.050	0.060	0.065	0.075	0.085	0.100
H2.1.1 Chilled cast iron, 400 HB									
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC									

TS 100 H with coolant ducts, 3xD, 5xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	145	0.155	0.260	0.325	0.385	0.440	0.495	0.550	0.650
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	130	0.140	0.235	0.290	0.345	0.395	0.445	0.495	0.585
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	125	0.130	0.220	0.275	0.325	0.375	0.420	0.465	0.555
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	115	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	110	0.115	0.195	0.245	0.290	0.330	0.370	0.410	0.490
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	120	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	120	0.125	0.210	0.260	0.305	0.355	0.395	0.440	0.520
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.105	0.175	0.220	0.260	0.300	0.335	0.375	0.440
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	90	0.090	0.155	0.195	0.230	0.265	0.295	0.330	0.390
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	45	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	35	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	40	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.045	0.075	0.090	0.105	0.125	0.140	0.155	0.180
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	45	0.060	0.105	0.130	0.155	0.175	0.200	0.220	0.260
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	35	0.050	0.085	0.105	0.120	0.140	0.160	0.175	0.205
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	55	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	35	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	35	0.035	0.060	0.075	0.090	0.105	0.115	0.130	0.155
H2.1.1 Chilled cast iron, 400 HB									
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC									

TS 100 H with coolant ducts, 7xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	6	8	10	12	14	16	20
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	145	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	130	0.085	0.145	0.180	0.215	0.250	0.280	0.310	0.365
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	130	0.085	0.145	0.180	0.215	0.250	0.280	0.310	0.365
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	125	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	125	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	115	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	110	0.070	0.120	0.150	0.180	0.205	0.230	0.255	0.305
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	120	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	120	0.095	0.165	0.205	0.240	0.275	0.310	0.345	0.405
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	100	0.080	0.140	0.170	0.205	0.235	0.265	0.290	0.345
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	90	0.070	0.120	0.150	0.180	0.205	0.230	0.255	0.305
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.075	0.130	0.160	0.190	0.220	0.250	0.275	0.325
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.065	0.110	0.140	0.165	0.185	0.210	0.235	0.275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	45	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	35	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	40	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	25	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.035	0.055	0.070	0.085	0.095	0.110	0.120	0.145
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	45	0.050	0.080	0.100	0.120	0.140	0.155	0.175	0.205
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	35	0.040	0.065	0.080	0.095	0.110	0.125	0.140	0.165
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	55	0.040	0.065	0.080	0.095	0.110	0.125	0.135	0.165
H1.1.2 Hardened steel, hardened and tempered, < 60 HRC	35	0.030	0.050	0.065	0.075	0.090	0.100	0.110	0.130
H1.1.3 Hardened steel, hardened and tempered, > 60 HRC	35	0.030	0.050	0.060	0.070	0.085	0.095	0.105	0.120
H2.1.1 Chilled cast iron, 400 HB									
H2.1.2 Chilled cast iron, hardened and tempered, < 55 HRC									

TS 100 micro without coolant ducts, GL38


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	0.2	0.5	0.8	1	1.5	2	2.5	3
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	80	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	70	0.0110	0.0270	0.0430	0.0540	0.0810	0.1080	0.1350	0.1620
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	70	0.0110	0.0270	0.0430	0.0540	0.0810	0.1080	0.1350	0.1620
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	70	0.0100	0.0255	0.0410	0.0510	0.0765	0.1020	0.1275	0.1530
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	70	0.0100	0.0255	0.0410	0.0510	0.0765	0.1020	0.1275	0.1530
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	65	0.0095	0.0240	0.0385	0.0480	0.0720	0.0960	0.1200	0.1440
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	60	0.0090	0.0225	0.0360	0.0450	0.0675	0.0900	0.1125	0.1350
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	70	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	70	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	60	0.0100	0.0255	0.0410	0.0510	0.0765	0.1020	0.1275	0.1530
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	55	0.0090	0.0225	0.0360	0.0450	0.0675	0.0900	0.1125	0.1350
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	40	0.0080	0.0200	0.0320	0.0400	0.0600	0.0800	0.1000	0.1200
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	35	0.0070	0.0170	0.0270	0.0340	0.0510	0.0680	0.0850	0.1020
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	25	0.0035	0.0090	0.0145	0.0180	0.0270	0.0360	0.0450	0.0540
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	25	0.0030	0.0080	0.0130	0.0160	0.0245	0.0325	0.0405	0.0485
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	20	0.0030	0.0075	0.0120	0.0155	0.0230	0.0305	0.0380	0.0460
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	15	0.0020	0.0050	0.0080	0.0100	0.0150	0.0200	0.0250	0.0300
M2.2.1 Duplex steel, high-strength stainless steels	15	0.0015	0.0045	0.0070	0.0085	0.0130	0.0170	0.0215	0.0255
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	100	0.0080	0.0200	0.0320	0.0400	0.0600	0.0800	0.1000	0.1200
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	85	0.0070	0.0170	0.0270	0.0340	0.0510	0.0680	0.0850	0.1020
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	85	0.0070	0.0170	0.0270	0.0340	0.0510	0.0680	0.0850	0.1020
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	80	0.0065	0.0160	0.0255	0.0320	0.0480	0.0640	0.0800	0.0960
K1.3.1 Malleable cast iron, ferritic, 130 HB	80	0.0065	0.0160	0.0255	0.0320	0.0480	0.0640	0.0800	0.0960
K1.3.2 Malleable cast iron, pearlitic, 230 HB	70	0.0055	0.0140	0.0225	0.0280	0.0420	0.0560	0.0700	0.0840
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	100	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	100	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	75	0.0100	0.0250	0.0400	0.0500	0.0750	0.1000	0.1250	0.1500
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	75	0.0100	0.0250	0.0400	0.0500	0.0750	0.1000	0.1250	0.1500
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	65	0.0085	0.0215	0.0340	0.0425	0.0640	0.0850	0.1065	0.1275
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	55	0.0080	0.0200	0.0320	0.0400	0.0600	0.0800	0.1000	0.1200
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	45	0.0070	0.0170	0.0270	0.0340	0.0510	0.0680	0.0850	0.1020
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	45	0.0065	0.0160	0.0255	0.0320	0.0480	0.0640	0.0800	0.0960
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	15	0.0020	0.0050	0.0080	0.0100	0.0150	0.0200	0.0250	0.0300
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	10	0.0015	0.0040	0.0065	0.0080	0.0120	0.0160	0.0200	0.0240
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	15	0.0020	0.0050	0.0080	0.0100	0.0150	0.0200	0.0250	0.0300
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	10	0.0015	0.0035	0.0055	0.0070	0.0105	0.0140	0.0175	0.0210
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	10	0.0015	0.0035	0.0055	0.0070	0.0105	0.0140	0.0175	0.0210
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	10	0.0020	0.0050	0.0080	0.0100	0.0150	0.0200	0.0250	0.0300
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	10	0.0015	0.0040	0.0065	0.0080	0.0120	0.0160	0.0200	0.0240
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									

TS 100 micro ohne/with coolant ducts, 4xD, 5xD, 7xD


Machining group			f (mm/rev) with nom. Ø							
										
	v _c (m/min)		0.5	0.8	1	1.2	1.5	2	2.5	3
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	110	0.0400	0.0640	0.0800	0.0960	0.1200	0.1600	0.2000	0.2400
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	100	0.0360	0.0575	0.0720	0.0865	0.1080	0.1440	0.1800	0.2160
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	100	0.0360	0.0575	0.0720	0.0865	0.1080	0.1440	0.1800	0.2160
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	95	0.0340	0.0545	0.0680	0.0815	0.1020	0.1360	0.1700	0.2040
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	95	0.0340	0.0545	0.0680	0.0815	0.1020	0.1360	0.1700	0.2040
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	90	0.0320	0.0510	0.0640	0.0770	0.0960	0.1280	0.1600	0.1920
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	85	0.0300	0.0480	0.0600	0.0720	0.0900	0.1200	0.1500	0.1800
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	80	90	0.0350	0.0560	0.0700	0.0840	0.1050	0.1400	0.1750	0.2100
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	80	90	0.0350	0.0560	0.0700	0.0840	0.1050	0.1400	0.1750	0.2100
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	70	70	0.0300	0.0475	0.0595	0.0715	0.0895	0.1190	0.1490	0.1785
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	60	60	0.0265	0.0420	0.0525	0.0630	0.0790	0.1050	0.1315	0.1575
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	45	45	0.0300	0.0480	0.0600	0.0720	0.0900	0.1200	0.1500	0.1800
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	40	40	0.0255	0.0410	0.0510	0.0610	0.0765	0.1020	0.1275	0.1530
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	30	70	0.0110	0.0175	0.0220	0.0265	0.0330	0.0440	0.0550	0.0660
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	25	65	0.0100	0.0160	0.0200	0.0240	0.0295	0.0395	0.0495	0.0595
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	25	60	0.0095	0.0150	0.0185	0.0225	0.0280	0.0375	0.0465	0.0560
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	15	60	0.0060	0.0095	0.0120	0.0145	0.0180	0.0240	0.0300	0.0360
M2.2.1 Duplex steel, high-strength stainless steels	15	50	0.0050	0.0080	0.0100	0.0120	0.0155	0.0205	0.0255	0.0305
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	130	150	0.0550	0.0880	0.1100	0.1320	0.1650	0.2200	0.2750	0.3300
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	110	130	0.0470	0.0750	0.0935	0.1120	0.1400	0.1870	0.2340	0.2805
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	110	130	0.0470	0.0750	0.0935	0.1120	0.1400	0.1870	0.2340	0.2805
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	105	120	0.0440	0.0705	0.0880	0.1055	0.1320	0.1760	0.2200	0.2640
K1.3.1 Malleable cast iron, ferritic, 130 HB	105	120	0.0440	0.0705	0.0880	0.1055	0.1320	0.1760	0.2200	0.2640
K1.3.2 Malleable cast iron, pearlitic, 230 HB	90	105	0.0385	0.0615	0.0770	0.0925	0.1155	0.1540	0.1925	0.2310
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	100	150	0.0550	0.0880	0.1100	0.1320	0.1650	0.2200	0.2750	0.3300
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	100	150	0.0550	0.0880	0.1100	0.1320	0.1650	0.2200	0.2750	0.3300
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	135	135	0.0210	0.0335	0.0420	0.0505	0.0630	0.0840	0.1050	0.1260
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	135	135	0.0210	0.0335	0.0420	0.0505	0.0630	0.0840	0.1050	0.1260
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	115	115	0.0180	0.0285	0.0355	0.0430	0.0535	0.0715	0.0895	0.1070
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %										
N3.1.2 Copper and copper alloys: CuZn, CuSnZn										
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte										
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	20	35	0.0060	0.0095	0.0120	0.0145	0.0180	0.0240	0.0300	0.0360
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	15	30	0.0050	0.0075	0.0095	0.0115	0.0145	0.0190	0.0240	0.0290
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	15	30	0.0060	0.0095	0.0120	0.0145	0.0180	0.0240	0.0300	0.0360
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	10	20	0.0040	0.0065	0.0085	0.0100	0.0125	0.0170	0.0210	0.0250
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	10	20	0.0040	0.0065	0.0085	0.0100	0.0125	0.0170	0.0210	0.0250
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	15	35	0.0060	0.0095	0.0120	0.0145	0.0180	0.0240	0.0300	0.0360
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	10	25	0.0050	0.0075	0.0095	0.0115	0.0145	0.0190	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										

TS 100 U micro without coolant ducts, 5xD

Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	0.2	0.5	0.8	1	1.5	2	2.5	3
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	50	0.0070	0.0175	0.0280	0.0350	0.0525	0.0700	0.0875	0.1050
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	45	0.0065	0.0160	0.0250	0.0315	0.0475	0.0630	0.0790	0.0945
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	45	0.0065	0.0160	0.0250	0.0315	0.0475	0.0630	0.0790	0.0945
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	45	0.0060	0.0150	0.0240	0.0300	0.0445	0.0595	0.0745	0.0895
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	45	0.0060	0.0150	0.0240	0.0300	0.0445	0.0595	0.0745	0.0895
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	40	0.0055	0.0140	0.0225	0.0280	0.0420	0.0560	0.0700	0.0840
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	40	0.0055	0.0130	0.0210	0.0265	0.0395	0.0525	0.0655	0.0790
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	30	0.0060	0.0145	0.0230	0.0290	0.0435	0.0580	0.0725	0.0870
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	30	0.0060	0.0145	0.0230	0.0290	0.0435	0.0580	0.0725	0.0870
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	20	0.0040	0.0100	0.0160	0.0200	0.0300	0.0400	0.0500	0.0600
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	20	0.0035	0.0090	0.0145	0.0180	0.0270	0.0360	0.0450	0.0540
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	15	0.0035	0.0085	0.0135	0.0170	0.0255	0.0340	0.0425	0.0510
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	15	0.0030	0.0075	0.0120	0.0150	0.0225	0.0300	0.0375	0.0450
M2.2.1 Duplex steel, high-strength stainless steels	15	0.0025	0.0065	0.0100	0.0130	0.0190	0.0255	0.0320	0.0385
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	60	0.0070	0.0175	0.0280	0.0350	0.0525	0.0700	0.0875	0.1050
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	50	0.0060	0.0150	0.0240	0.0300	0.0445	0.0595	0.0745	0.0895
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	50	0.0060	0.0150	0.0240	0.0300	0.0445	0.0595	0.0745	0.0895
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	50	0.0055	0.0140	0.0225	0.0280	0.0420	0.0560	0.0700	0.0840
K1.3.1 Malleable cast iron, ferritic, 130 HB	50	0.0055	0.0140	0.0225	0.0280	0.0420	0.0560	0.0700	0.0840
K1.3.2 Malleable cast iron, pearlitic, 230 HB	40	0.0050	0.0125	0.0195	0.0245	0.0370	0.0490	0.0615	0.0735
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	160	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	160	0.0120	0.0300	0.0480	0.0600	0.0900	0.1200	0.1500	0.1800
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	100	0.0100	0.0250	0.0400	0.0500	0.0750	0.1000	0.1250	0.1500
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	100	0.0100	0.0250	0.0400	0.0500	0.0750	0.1000	0.1250	0.1500
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	85	0.0085	0.0215	0.0340	0.0425	0.0640	0.0850	0.1065	0.1275
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	80	0.0080	0.0205	0.0330	0.0410	0.0615	0.0820	0.1025	0.1230
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	70	0.0070	0.0175	0.0280	0.0350	0.0525	0.0695	0.0870	0.1045
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	65	0.0065	0.0165	0.0260	0.0330	0.0490	0.0655	0.0820	0.0985
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics	100	0.0060	0.0145	0.0230	0.0290	0.0435	0.0580	0.0725	0.0870
N4.1.2 Non-metallic materials: Hard rubber, wood, etc.	100	0.0060	0.0145	0.0230	0.0290	0.0435	0.0580	0.0725	0.0870
N4.1.3 Non-metallic materials: Graphite									
S1.1.1 Heat-resistant alloys, Fe-based, annealed, 200 HB	15	0.0040	0.0100	0.0160	0.0200	0.0300	0.0400	0.0500	0.0600
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	10	0.0030	0.0080	0.0130	0.0160	0.0240	0.0320	0.0400	0.0480
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	15	0.0040	0.0100	0.0160	0.0200	0.0300	0.0400	0.0500	0.0600
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	10	0.0030	0.0070	0.0110	0.0140	0.0210	0.0280	0.0350	0.0420
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	10	0.0030	0.0070	0.0110	0.0140	0.0210	0.0280	0.0350	0.0420
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	10	0.0030	0.0075	0.0120	0.0150	0.0225	0.0300	0.0375	0.0450
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	10	0.0025	0.0060	0.0095	0.0120	0.0180	0.0240	0.0300	0.0360
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									

TS 100 INOX micro without coolant ducts, 3xD


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	0.5	0.8	1	1.2	1.5	2	2.5	3
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.0400	0.0640	0.0800	0.0960	0.1200	0.1600	0.2000	0.2400
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	80	0.0360	0.0575	0.0720	0.0865	0.1080	0.1440	0.1800	0.2160
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	80	0.0360	0.0575	0.0720	0.0865	0.1080	0.1440	0.1800	0.2160
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	75	0.0340	0.0545	0.0680	0.0815	0.1020	0.1360	0.1700	0.2040
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	75	0.0340	0.0545	0.0680	0.0815	0.1020	0.1360	0.1700	0.2040
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	70	0.0320	0.0510	0.0640	0.0770	0.0960	0.1280	0.1600	0.1920
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	70	0.0300	0.0480	0.0600	0.0720	0.0900	0.1200	0.1500	0.1800
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	80	0.0350	0.0560	0.0700	0.0840	0.1050	0.1400	0.1750	0.2100
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	80	0.0350	0.0560	0.0700	0.0840	0.1050	0.1400	0.1750	0.2100
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	70	0.0300	0.0475	0.0595	0.0715	0.0895	0.1190	0.1490	0.1785
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	60	0.0265	0.0420	0.0525	0.0630	0.0790	0.1050	0.1315	0.1575
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	60	0.0350	0.0560	0.0700	0.0840	0.1050	0.1400	0.1750	0.2100
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	50	0.0300	0.0475	0.0595	0.0715	0.0895	0.1190	0.1490	0.1785
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	40	0.0125	0.0200	0.0250	0.0300	0.0375	0.0500	0.0625	0.0750
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	35	0.0115	0.0180	0.0225	0.0270	0.0340	0.0450	0.0565	0.0675
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	35	0.0105	0.0170	0.0215	0.0255	0.0320	0.0425	0.0530	0.0640
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	25	0.0075	0.0120	0.0150	0.0180	0.0225	0.0300	0.0375	0.0450
M2.2.1 Duplex steel, high-strength stainless steels	20	0.0065	0.0100	0.0130	0.0155	0.0190	0.0255	0.0320	0.0385
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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	270	0.0300	0.0480	0.0600	0.0720	0.0900	0.1200	0.1500	0.1800
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	270	0.0300	0.0480	0.0600	0.0720	0.0900	0.1200	0.1500	0.1800
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	180	0.0400	0.0640	0.0800	0.0960	0.1200	0.1600	0.2000	0.2400
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	180	0.0400	0.0640	0.0800	0.0960	0.1200	0.1600	0.2000	0.2400
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	155	0.0340	0.0545	0.0680	0.0815	0.1020	0.1360	0.1700	0.2040
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	125	0.0300	0.0480	0.0600	0.0720	0.0900	0.1200	0.1500	0.1800
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	105	0.0255	0.0410	0.0510	0.0610	0.0765	0.1020	0.1275	0.1530
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	100	0.0240	0.0385	0.0480	0.0575	0.0720	0.0960	0.1200	0.1440
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	30	0.0100	0.0160	0.0200	0.0240	0.0300	0.0400	0.0500	0.0600
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	25	0.0080	0.0130	0.0160	0.0190	0.0240	0.0320	0.0400	0.0480
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	25	0.0100	0.0160	0.0200	0.0240	0.0300	0.0400	0.0500	0.0600
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	15	0.0070	0.0110	0.0140	0.0170	0.0210	0.0280	0.0350	0.0420
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.0070	0.0110	0.0140	0.0170	0.0210	0.0280	0.0350	0.0420
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	25	0.0075	0.0120	0.0150	0.0180	0.0225	0.0300	0.0375	0.0450
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	15	0.0060	0.0095	0.0120	0.0145	0.0180	0.0240	0.0300	0.0360
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									

TS 100 U micro with coolant ducts, 8xD, 15xD


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	105	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	95	0.0360	0.0430	0.0540	0.0650	0.0720	0.0790	0.0900	0.1080
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	95	0.0360	0.0430	0.0540	0.0650	0.0720	0.0790	0.0900	0.1080
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.0340	0.0410	0.0510	0.0610	0.0680	0.0750	0.0850	0.1020
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	90	0.0340	0.0410	0.0510	0.0610	0.0680	0.0750	0.0850	0.1020
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	85	0.0320	0.0385	0.0480	0.0575	0.0640	0.0705	0.0800	0.0960
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	80	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.0340	0.0410	0.0510	0.0610	0.0680	0.0750	0.0850	0.1020
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	50	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	45	0.0340	0.0410	0.0510	0.0610	0.0680	0.0750	0.0850	0.1020
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	70	0.0220	0.0265	0.0330	0.0395	0.0440	0.0485	0.0550	0.0660
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	65	0.0200	0.0240	0.0295	0.0355	0.0395	0.0435	0.0495	0.0595
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	60	0.0185	0.0225	0.0280	0.0335	0.0375	0.0410	0.0465	0.0560
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.0150	0.0180	0.0225	0.0270	0.0300	0.0330	0.0375	0.0450
M2.2.1 Duplex steel, high-strength stainless steels	50	0.0130	0.0155	0.0190	0.0230	0.0255	0.0280	0.0320	0.0385
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	150	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	130	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	130	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	120	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	120	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	105	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	150	0.0900	0.1080	0.1350	0.1620	0.1800	0.1980	0.2250	0.2700
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	150	0.0900	0.1080	0.1350	0.1620	0.1800	0.1980	0.2250	0.2700
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	135	0.0420	0.0505	0.0630	0.0755	0.0840	0.0925	0.1050	0.1260
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	135	0.0420	0.0505	0.0630	0.0755	0.0840	0.0925	0.1050	0.1260
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	115	0.0355	0.0430	0.0535	0.0645	0.0715	0.0785	0.0895	0.1070
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %									
N3.1.2 Copper and copper alloys: CuZn, CuSnZn									
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte									
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	35	0.0120	0.0145	0.0180	0.0215	0.0240	0.0265	0.0300	0.0360
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.0095	0.0115	0.0145	0.0175	0.0190	0.0210	0.0240	0.0290
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	30	0.0120	0.0145	0.0180	0.0215	0.0240	0.0265	0.0300	0.0360
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.0085	0.0100	0.0125	0.0150	0.0170	0.0185	0.0210	0.0250
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	20	0.0085	0.0100	0.0125	0.0150	0.0170	0.0185	0.0210	0.0250
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									

TS 100 U micro 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									

TS 100 INOX micro with coolant ducts 3xD, 6xD


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	0.0500	0.0600	0.0750	0.0900	0.1000	0.1100	0.1250	0.1500
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.0450	0.0540	0.0675	0.0810	0.0900	0.0990	0.1125	0.1350
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.0450	0.0540	0.0675	0.0810	0.0900	0.0990	0.1125	0.1350
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.0425	0.0510	0.0640	0.0765	0.0850	0.0935	0.1065	0.1275
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.0425	0.0510	0.0640	0.0765	0.0850	0.0935	0.1065	0.1275
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.0375	0.0450	0.0565	0.0675	0.0750	0.0825	0.0940	0.1125
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.0500	0.0600	0.0750	0.0900	0.1000	0.1100	0.1250	0.1500
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.0500	0.0600	0.0750	0.0900	0.1000	0.1100	0.1250	0.1500
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.0425	0.0510	0.0640	0.0765	0.0850	0.0935	0.1065	0.1275
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.0375	0.0450	0.0565	0.0675	0.0750	0.0825	0.0940	0.1125
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	70	0.0500	0.0600	0.0750	0.0900	0.1000	0.1100	0.1250	0.1500
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	60	0.0425	0.0510	0.0640	0.0765	0.0850	0.0935	0.1065	0.1275
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	100	0.0370	0.0445	0.0555	0.0665	0.0740	0.0815	0.0925	0.1110
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	90	0.0335	0.0400	0.0500	0.0600	0.0665	0.0735	0.0830	0.1000
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	85	0.0315	0.0375	0.0470	0.0565	0.0630	0.0690	0.0785	0.0945
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	80	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
M2.2.1 Duplex steel, high-strength stainless steels	70	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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	300	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	300	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	200	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	200	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	170	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 %	150	0.0500	0.0600	0.0750	0.0900	0.1000	0.1100	0.1250	0.1500
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	130	0.0425	0.0510	0.0640	0.0765	0.0850	0.0935	0.1065	0.1275
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	120	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
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	50	0.0200	0.0240	0.0300	0.0360	0.0400	0.0440	0.0500	0.0600
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	40	0.0160	0.0190	0.0240	0.0290	0.0320	0.0350	0.0400	0.0480
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	45	0.0200	0.0240	0.0300	0.0360	0.0400	0.0440	0.0500	0.0600
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	30	0.0140	0.0170	0.0210	0.0250	0.0280	0.0310	0.0350	0.0420
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	30	0.0140	0.0170	0.0210	0.0250	0.0280	0.0310	0.0350	0.0420
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	45	0.0150	0.0180	0.0225	0.0270	0.0300	0.0330	0.0375	0.0450
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²	35	0.0120	0.0145	0.0180	0.0215	0.0240	0.0265	0.0300	0.0360
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									

TS 100 INOX micro with coolant ducts 10xD, 15xD



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	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.0270	0.0325	0.0405	0.0485	0.0540	0.0595	0.0675	0.0810
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.0270	0.0325	0.0405	0.0485	0.0540	0.0595	0.0675	0.0810
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.0240	0.0290	0.0360	0.0430	0.0480	0.0530	0.0600	0.0720
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.0225	0.0270	0.0340	0.0405	0.0450	0.0495	0.0560	0.0675
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.0225	0.0270	0.0340	0.0405	0.0450	0.0495	0.0560	0.0675
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	70	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	60	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	100	0.0370	0.0445	0.0555	0.0665	0.0740	0.0815	0.0925	0.1110
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	90	0.0335	0.0400	0.0500	0.0600	0.0665	0.0735	0.0830	0.1000
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	85	0.0315	0.0375	0.0470	0.0565	0.0630	0.0690	0.0785	0.0945
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	80	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
M2.2.1 Duplex steel, high-strength stainless steels	70	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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	300	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	300	0.0400	0.0480	0.0600	0.0720	0.0800	0.0880	0.1000	0.1200
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	200	0.0600	0.0720	0.0900	0.1080	0.1200	0.1320	0.1500	0.1800
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	200	0.0600	0.0720	0.0900	0.1080	0.1200	0.1320	0.1500	0.1800
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	170	0.0510	0.0610	0.0765	0.0920	0.1020	0.1120	0.1275	0.1530
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	150	0.0300	0.0360	0.0450	0.0540	0.0600	0.0660	0.0750	0.0900
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	130	0.0255	0.0305	0.0385	0.0460	0.0510	0.0560	0.0640	0.0765
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	120	0.0240	0.0290	0.0360	0.0430	0.0480	0.0530	0.0600	0.0720
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	50	0.0200	0.0240	0.0300	0.0360	0.0400	0.0440	0.0500	0.0600
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	40	0.0160	0.0190	0.0240	0.0290	0.0320	0.0350	0.0400	0.0480
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	45	0.0200	0.0240	0.0300	0.0360	0.0400	0.0440	0.0500	0.0600
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	30	0.0140	0.0170	0.0210	0.0250	0.0280	0.0310	0.0350	0.0420
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	30	0.0140	0.0170	0.0210	0.0250	0.0280	0.0310	0.0350	0.0420
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²	40	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	30	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									

TS 100 T with coolant ducts, 15xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	4	6	8	10	12	14	16
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	110	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	90	0.115	0.145	0.195	0.245	0.290	0.330	0.370	0.410
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	110	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	110	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	95	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	85	0.090	0.115	0.155	0.195	0.230	0.265	0.295	0.330
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	100	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	85	0.080	0.100	0.140	0.170	0.205	0.235	0.265	0.290
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	100	0.075	0.095	0.130	0.160	0.190	0.220	0.250	0.275
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	90	0.070	0.085	0.115	0.145	0.175	0.200	0.225	0.245
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	85	0.065	0.080	0.110	0.140	0.165	0.185	0.210	0.235
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	70	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175
M2.2.1 Duplex steel, high-strength stainless steels	60	0.040	0.050	0.070	0.085	0.105	0.120	0.135	0.145
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
K1.3.1 Malleable cast iron, ferritic, 130 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
K1.3.2 Malleable cast iron, pearlitic, 230 HB	85	0.110	0.135	0.180	0.225	0.270	0.310	0.345	0.385
K2.1.1 Vermicular graphite cast iron (GJV)	100	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	75	0.070	0.090	0.120	0.150	0.180	0.205	0.230	0.255
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	120	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	100	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	95	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350
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	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.030	0.040	0.050	0.065	0.075	0.090	0.100	0.110
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175
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									

TS 100 T with coolant ducts, 20xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	4	6	8	10	12	14	16
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	110	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	90	0.115	0.145	0.195	0.245	0.290	0.330	0.370	0.410
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	110	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	110	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	95	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	85	0.090	0.115	0.155	0.195	0.230	0.265	0.295	0.330
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	100	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	85	0.080	0.100	0.140	0.170	0.205	0.235	0.265	0.290
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	100	0.075	0.095	0.130	0.160	0.190	0.220	0.250	0.275
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	90	0.070	0.085	0.115	0.145	0.175	0.200	0.225	0.245
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	85	0.065	0.080	0.110	0.140	0.165	0.185	0.210	0.235
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175
M2.2.1 Duplex steel, high-strength stainless steels	50	0.040	0.050	0.070	0.085	0.105	0.120	0.135	0.145
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
K1.3.1 Malleable cast iron, ferritic, 130 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
K1.3.2 Malleable cast iron, pearlitic, 230 HB	85	0.110	0.135	0.180	0.225	0.270	0.310	0.345	0.385
K2.1.1 Vermicular graphite cast iron (GJV)	100	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	75	0.070	0.090	0.120	0.150	0.180	0.205	0.230	0.255
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	120	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	100	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	95	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350
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	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.030	0.040	0.050	0.065	0.075	0.090	0.100	0.110
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175
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									

TS 100 T with coolant ducts, 25xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	4	6	8	10	12	14	16
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	120	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	110	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	110	0.140	0.170	0.235	0.290	0.345	0.395	0.445	0.495
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	100	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	95	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	90	0.115	0.145	0.195	0.245	0.290	0.330	0.370	0.410
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	100	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	100	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	85	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	75	0.090	0.115	0.155	0.195	0.230	0.265	0.295	0.330
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	90	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	75	0.080	0.100	0.140	0.170	0.205	0.235	0.265	0.290
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	100	0.075	0.095	0.130	0.160	0.190	0.220	0.250	0.275
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	90	0.070	0.085	0.115	0.145	0.175	0.200	0.225	0.245
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	85	0.065	0.080	0.110	0.140	0.165	0.185	0.210	0.235
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175
M2.2.1 Duplex steel, high-strength stainless steels	50	0.040	0.050	0.070	0.085	0.105	0.120	0.135	0.145
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	110	0.155	0.190	0.260	0.325	0.385	0.440	0.495	0.550
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	95	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	95	0.130	0.165	0.220	0.275	0.325	0.375	0.420	0.465
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	90	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
K1.3.1 Malleable cast iron, ferritic, 130 HB	90	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.135	0.180	0.225	0.270	0.310	0.345	0.385
K2.1.1 Vermicular graphite cast iron (GJV)	90	0.095	0.120	0.165	0.205	0.240	0.275	0.310	0.345
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	70	0.070	0.090	0.120	0.150	0.180	0.205	0.230	0.255
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	120	0.125	0.155	0.210	0.260	0.305	0.355	0.395	0.440
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	100	0.105	0.130	0.175	0.220	0.260	0.300	0.335	0.375
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	95	0.100	0.120	0.165	0.205	0.245	0.280	0.315	0.350
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	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.030	0.040	0.050	0.065	0.075	0.090	0.100	0.110
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.040	0.050	0.065	0.080	0.095	0.110	0.125	0.135
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.025	0.035	0.045	0.055	0.065	0.075	0.085	0.095
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.050	0.060	0.080	0.100	0.120	0.140	0.155	0.175
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									

TS 100 T with coolant ducts, 30xD



Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	4	5	6	8	10	12	14
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	0.155	0.190	0.225	0.260	0.325	0.385	0.440	0.495
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.140	0.170	0.205	0.235	0.290	0.345	0.395	0.445
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.140	0.170	0.205	0.235	0.290	0.345	0.395	0.445
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.130	0.165	0.195	0.220	0.275	0.325	0.375	0.420
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.130	0.165	0.195	0.220	0.275	0.325	0.375	0.420
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.115	0.145	0.170	0.195	0.245	0.290	0.330	0.370
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.105	0.130	0.155	0.175	0.220	0.260	0.300	0.335
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.090	0.115	0.135	0.155	0.195	0.230	0.265	0.295
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.095	0.120	0.140	0.165	0.205	0.240	0.275	0.310
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.080	0.100	0.120	0.140	0.170	0.205	0.235	0.265
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	80	0.075	0.095	0.115	0.130	0.160	0.190	0.220	0.250
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	70	0.070	0.085	0.100	0.115	0.145	0.175	0.200	0.225
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	70	0.065	0.080	0.095	0.110	0.140	0.165	0.185	0.210
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.050	0.060	0.070	0.080	0.100	0.120	0.140	0.155
M2.2.1 Duplex steel, high-strength stainless steels	50	0.040	0.050	0.060	0.070	0.085	0.105	0.120	0.135
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	105	0.155	0.190	0.225	0.260	0.325	0.385	0.440	0.495
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	90	0.130	0.165	0.195	0.220	0.275	0.325	0.375	0.420
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	90	0.130	0.165	0.195	0.220	0.275	0.325	0.375	0.420
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	85	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
K1.3.1 Malleable cast iron, ferritic, 130 HB	85	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.135	0.160	0.180	0.225	0.270	0.310	0.345
K2.1.1 Vermicular graphite cast iron (GJV)	80	0.095	0.120	0.140	0.165	0.205	0.240	0.275	0.310
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	60	0.070	0.090	0.105	0.120	0.150	0.180	0.205	0.230
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	120	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	100	0.105	0.130	0.155	0.175	0.220	0.260	0.300	0.335
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	95	0.100	0.120	0.145	0.165	0.205	0.245	0.280	0.315
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	0.040	0.050	0.055	0.065	0.080	0.095	0.110	0.125
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.030	0.040	0.045	0.050	0.065	0.075	0.090	0.100
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.040	0.050	0.055	0.065	0.080	0.095	0.110	0.125
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.025	0.035	0.040	0.045	0.055	0.065	0.075	0.085
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.025	0.035	0.040	0.045	0.055	0.065	0.075	0.085
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.050	0.060	0.070	0.080	0.100	0.120	0.140	0.155
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									

TS 100 T with coolant ducts, 40xD


Machining group		f (mm/rev) with nom. Ø							
	 v _c (m/min)	3	4	5	6	7	8	9	10
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB	100	0.155	0.190	0.225	0.260	0.295	0.325	0.355	0.385
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB	90	0.140	0.170	0.205	0.235	0.265	0.290	0.320	0.345
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB	90	0.140	0.170	0.205	0.235	0.265	0.290	0.320	0.345
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB	85	0.130	0.165	0.195	0.220	0.250	0.275	0.300	0.325
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB	85	0.130	0.165	0.195	0.220	0.250	0.275	0.300	0.325
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB	80	0.125	0.155	0.180	0.210	0.235	0.260	0.285	0.305
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB	75	0.115	0.145	0.170	0.195	0.220	0.245	0.265	0.290
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB	90	0.125	0.155	0.180	0.210	0.235	0.260	0.285	0.305
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB	90	0.125	0.155	0.180	0.210	0.235	0.260	0.285	0.305
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB	75	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB	70	0.090	0.115	0.135	0.155	0.175	0.195	0.215	0.230
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB	80	0.095	0.120	0.140	0.165	0.185	0.205	0.220	0.240
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB	70	0.080	0.100	0.120	0.140	0.155	0.170	0.190	0.205
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives	80	0.075	0.095	0.115	0.130	0.145	0.160	0.175	0.190
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB	70	0.070	0.085	0.100	0.115	0.130	0.145	0.160	0.175
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB	70	0.065	0.080	0.095	0.110	0.125	0.140	0.150	0.165
M2.1.1 Stainless steel, austenitic, quenched, 180 HB	60	0.040	0.050	0.055	0.065	0.075	0.080	0.090	0.095
M2.2.1 Duplex steel, high-strength stainless steels	50	0.035	0.040	0.050	0.055	0.060	0.070	0.075	0.080
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB	105	0.155	0.190	0.225	0.260	0.295	0.325	0.355	0.385
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB	90	0.130	0.165	0.195	0.220	0.250	0.275	0.300	0.325
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB	90	0.130	0.165	0.195	0.220	0.250	0.275	0.300	0.325
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB	85	0.125	0.155	0.180	0.210	0.235	0.260	0.285	0.305
K1.3.1 Malleable cast iron, ferritic, 130 HB	85	0.125	0.155	0.180	0.210	0.235	0.260	0.285	0.305
K1.3.2 Malleable cast iron, pearlitic, 230 HB	75	0.110	0.135	0.160	0.180	0.205	0.225	0.250	0.270
K2.1.1 Vermicular graphite cast iron (GJV)	80	0.095	0.120	0.140	0.165	0.185	0.205	0.220	0.240
K2.2.1 Austenitic-ferritic spheroidal graphite cast iron (ADI)	60	0.070	0.090	0.105	0.120	0.135	0.150	0.165	0.180
N1.1.1 Wrought aluminium alloys, non-hardened, 60 HB									
N1.1.2 Wrought aluminium alloys, hardened, 100 HB									
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB									
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB									
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB									
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	120	0.125	0.155	0.180	0.210	0.235	0.260	0.285	0.305
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	100	0.105	0.130	0.155	0.175	0.200	0.220	0.240	0.260
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	95	0.100	0.120	0.145	0.165	0.185	0.205	0.225	0.245
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	0.040	0.050	0.055	0.065	0.075	0.080	0.090	0.095
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB	30	0.030	0.040	0.045	0.050	0.060	0.065	0.070	0.075
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB	35	0.040	0.050	0.055	0.065	0.075	0.080	0.090	0.095
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB	20	0.025	0.035	0.040	0.045	0.050	0.055	0.060	0.065
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB	25	0.025	0.035	0.040	0.045	0.050	0.055	0.060	0.065
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
H1.1.1 Hardened steel, hardened and tempered, < 55 HRC	50	0.050	0.060	0.070	0.080	0.090	0.100	0.110	0.120
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									

TS 100T ALU with coolant ducts, 15xD, 20xD, 25xD

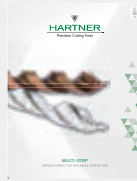


Machining group		f (mm/rev) with nom. Ø							
									
	v _c (m/min)	3	4	5	6	8	10	12	14
P1.1.1 Unalloyed steel, annealed, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.2 Unalloyed steel, heat-treated, 0.15 % C, Rm 420 N/mm ² , 125 HB									
P1.1.3 Unalloyed steel, annealed, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.4 Unalloyed steel, heat-treated, 0.45 % C, Rm 640 N/mm ² , 190 HB									
P1.1.5 Unalloyed steel, heat-treated, 0.45 % C, Rm 850 N/mm ² , 250 HB									
P1.1.6 Unalloyed steel, annealed, 0.75 % C, Rm 915 N/mm ² , 270 HB									
P1.1.7 Unalloyed steel, heat-treated, 0.75 % C, Rm 1020 N/mm ² , 300 HB									
P2.1.1 Low-alloy steel, annealed, Rm 610 N/mm ² , 180 HB									
P2.1.2 Low-alloy steel, heat-treated, Rm 930 N/mm ² , 275 HB									
P2.1.3 Low-alloy steel, heat-treated, Rm 1020 N/mm ² , 300 HB									
P2.1.4 Low-alloy steel, heat-treated, Rm 1190 N/mm ² , 350 HB									
P3.1.1 High-alloy steel and tool steel, annealed, Rm 680 N/mm ² , 200 HB									
P3.1.2 High-alloy steel and tool steel, hardened and tempered, Rm 1100 N/mm ² , 325 HB									
M1.1.1 Stainless steel, ferritic/martensitic, with machining additives									
M1.1.2 Stainless steel, ferritic/martensitic, annealed, Rm 680 N/mm ² , 200 HB									
M1.1.3 Stainless steel, ferritic/martensitic, heat-treated, Rm 810 N/mm ² , 240 HB									
M2.1.1 Stainless steel, austenitic, quenched, 180 HB									
M2.2.1 Duplex steel, high-strength stainless steels									
K1.1.1 Grey cast iron, pearlitic/ferritic, 180 HB									
K1.1.2 Grey cast iron, pearlitic/martensitic, 260 HB									
K1.2.1 Cast iron with spheroidal graphite, ferritic, 160 HB									
K1.2.2 Cast iron with spheroidal graphite, pearlitic, 250 HB									
K1.3.1 Malleable cast iron, ferritic, 130 HB									
K1.3.2 Malleable cast iron, pearlitic, 230 HB									
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	120	0.155	0.190	0.225	0.260	0.325	0.385	0.440	0.495
N1.1.2 Wrought aluminium alloys, hardened, 100 HB	120	0.155	0.190	0.225	0.260	0.325	0.385	0.440	0.495
N2.1.1 Aluminium casting alloys, non-hardened, ≤ 12 % Si, 75 HB	110	0.190	0.240	0.285	0.325	0.405	0.480	0.550	0.620
N2.1.2 Aluminium casting alloys, hardened, ≤ 12 % Si, 90 HB	110	0.190	0.240	0.285	0.325	0.405	0.480	0.550	0.620
N2.1.3 Aluminium casting alloys, non-hardened, > 12 % Si, 130 HB	95	0.165	0.205	0.240	0.275	0.345	0.410	0.470	0.525
N3.1.1 Copper and copper alloys: Free-machining alloy, Pb > 1 %	140	0.125	0.155	0.180	0.210	0.260	0.305	0.355	0.395
N3.1.2 Copper and copper alloys: CuZn, CuSnZn	120	0.105	0.130	0.155	0.175	0.220	0.260	0.300	0.335
N3.1.3 Copper and copper alloys: CuSn, lead-free copper and copper electrolyte	110	0.100	0.120	0.145	0.165	0.205	0.245	0.280	0.315
N4.1.1 Non-metallic materials: Duroplastics, fibre-reinforced plastics	90	0.040	0.050	0.055	0.065	0.080	0.095	0.110	0.125
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									
S1.1.2 Heat-resistant alloys, Fe-based, hardened, 280 HB									
S1.1.3 Heat-resistant alloys, Ni- or Co-based, annealed, 250 HB									
S1.1.4 Heat-resistant alloys, Ni- or Co-based, hardened, 350 HB									
S1.1.5 Heat-resistant alloys, Ni- or Co-based, cast, 320 HB									
S2.1.1 Titanium alloys, pure titanium, Rm 400 N/mm ²									
S2.1.2 Titanium alloys, Alpha and Beta alloys, hardened, Rm 1050 N/mm ²									
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									

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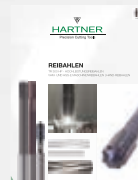
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