Milling tools

HSS milling tools

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Summary of icons used for milling tools

INFO

Cutting material	HSS – High-performance, high-speed steel	HSS-E – High-performance, high-speed steel Cobalt-alloyed	VHM – Solid carbide
Coating	TiN – Titanium-nitride coating	TiCN – Titanium-carbo-nitride coating	TiAlN – Titanium-aluminium-nitride coating
Surface treatment	Nit. – Nitrided surface	Vap. – Vapour-treated surface (steam-treated)	
Type/profile	Typ N – E.g. type N, for normal materials	NF – e.g. NF Roughing-finishing toothing	HR – e.g. HR Fine knuckle-type toothing
Standard	DIN 327 – Complies with DIN 327	DIN 844 – Complies with DIN 844	Werks-norm – Complies with factory standard
Shank design	DIN 6535 HA – E.g. straight shank according to DIN 6535 HA	E.g. straight shank with Weldon clamping surface	E.g. MT shank
Number of cutting edges	Z 3 – e.g. 3 cutting edges and/or 3 insert seats	Z 5 – e.g. 5 cutting edges and/or 5 insert seats	Z 8+ – e.g. 8 or more cutting edges and/or 8 or more insert seats
Spiral angle	30° – e.g. 30° right-hand twist	41° 43° 45° – e.g. unequal helix angle	10° – e.g. 10° left-handed twist
Tooth pitch	unequal tooth pitch		
Tolerance	h5 – Shank tolerance	e8 – Diameter tolerance	±0,005 r – Radius tolerance
Application	Centre cutting	Over-centre cutting	
Coolant design	Axial coolant bore	Radial coolant bore	
Milling technology	HSC – High-Speed-Cutting (High-speed milling)	HPC – High-Performance-Cutting (High-performance milling)	TVC – Trochoidal-Volume-Cutting (Trochoidal milling)
Cutting data	i Vc/fz – More information such as cutting data recommendations in the technical appendix		

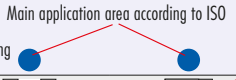
Usage recommendations diagram (example)

- **Materials group**
- **Usage recommendation**: Depicted by ISO colour code. Full dot = very well suited, circle = well suited
- **Recommended cutting speed:** Cutting speed range Vc m/min. for medium-sized tool diameter.

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG / GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	○	●	●	○	●	○	●	○	○	●	●	●	○	●	●	○
		150-200	80-120	70-90	60-90	40-70	40-70	80-120	80-120	60-70	20-35	15-30	280-350	200-250	120-200	120-200	60-90	40-70	40-70
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

Cutting data recommendations for groove and side milling directly on the item

INFO

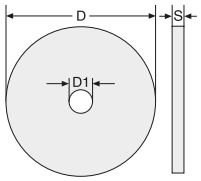


D h9 mm	F mm	L1 mm	L mm	D1 h5 mm	Z	Feed rate fz Steel < 1,000 N/mm² mm/Z	Feed rate fz Steel < 1,000 N/mm² mm/Z	Item no.	€
6.0	0.25	16	64	6.0	3	0.050	0.049	**254015** 0060	54.20
8.0	0.50	20	64	8.0	3	0.070	0.049	254015 0080	70.90

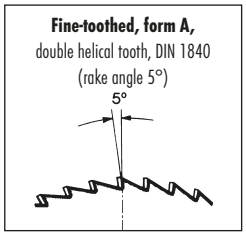
SARA® Metal circular saw blade

HSS | DIN 1837A | Typ N | Vc/fz | 20-237

- **Fine-toothed**
- **Double helical tooth, form A,** lateral bevel grinding (hollow-ground)
- Hole without keyway
- For fine slotting and end-to-end cutting work, for low-depth cutting or for thin-walled materials



Fine-toothed, form A,
double helical tooth, DIN 1840
(rake angle 5°)





material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	○ 25-45	○ 15-25	○ 10-15	○ 7-15	○ 7-15		○ 25-45	○ 25-30				○ 120-400	○ 120-400					

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

D mm	S mm	D1 mm	Number of teeth	art.no.	€
20.0	0.2	5	80	**200101** 0001	18,40
20.0	0.25	5	64	200101 0002	18,40
20.0	0.3	5	64	200101 0003	16,40
20.0	0.4	5	64	200101 0004	16,40
20.0	0.5	5	48	200101 0005	15,30
20.0	0.6	5	48	200101 0006	15,30
20.0	0.8	5	48	200101 0007	15,30
20.0	1.0	5	40	200101 0008	15,30
20.0	1.2	5	40	200101 0009	17,20
20.0	1.6	5	40	200101 0010	19,40
20.0	2.0	5	32	200101 0011	20,20
20.0	2.5	5	32	200101 0012	21,50
20.0	3.0	5	32	200101 0013	23,20
20.0	4.0	5	24	200101 0014	26,60
20.0	5.0	5	24	200101 0015	31,50
20.0	6.0	5	24	200101 0016	35,70
25.0	0.2	8	80	200101 0017	18,70
25.0	0.25	8	80	200101 0018	18,70
25.0	0.3	8	80	200101 0019	17,60
25.0	0.4	8	64	200101 0020	17,60
25.0	0.5	8	64	200101 0021	16,20
25.0	0.6	8	64	200101 0022	16,20
25.0	0.8	8	48	200101 0023	16,20
25.0	1.0	8	48	200101 0024	16,20

2101

D mm	S mm	D1 mm	Number of teeth	art.no.	€
25.0	1.2	8	48	200101 0025	18,50
25.0	1.6	8	40	200101 0026	19,80
25.0	2.0	8	40	200101 0027	21,10
25.0	2.5	8	40	200101 0028	22,80
25.0	3.0	8	32	200101 0029	24,90
25.0	4.0	8	32	200101 0030	29,60
25.0	5.0	8	32	200101 0031	34,40
25.0	6.0	8	24	200101 0032	38,70
32.0	0.2	8	100	200101 0033	20,10
32.0	0.25	8	100	200101 0034	20,10
32.0	0.3	8	80	200101 0035	18,30
32.0	0.4	8	80	200101 0036	18,30
32.0	0.5	8	80	200101 0037	16,90
32.0	0.6	8	64	200101 0038	16,90
32.0	0.8	8	64	200101 0039	16,90
32.0	1.0	8	64	200101 0040	16,90
32.0	1.2	8	48	200101 0041	19,80
32.0	1.6	8	48	200101 0042	20,70
32.0	2.0	8	48	200101 0043	22,40
32.0	2.5	8	40	200101 0044	24,10
32.0	3.0	8	40	200101 0045	25,80
32.0	4.0	8	40	200101 0046	32,70
32.0	5.0	8	32	200101 0047	37,–
32.0	6.0	8	32	200101 0048	40,40

2101

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D mm	S mm	D1 mm	Number of teeth	art.no.	€
40.0	0.2	10	128	200101 0049	21,90
40.0	0.25	10	100	200101 0050	21,90
40.0	0.3	10	100	200101 0051	21,–
40.0	0.4	10	100	200101 0052	21,–
40.0	0.5	10	80	200101 0053	19,–
40.0	0.6	10	80	200101 0054	19,–
40.0	0.8	10	80	200101 0055	19,–
40.0	1.0	10	64	200101 0056	18,90
40.0	1.2	10	64	200101 0057	20,20
40.0	1.6	10	64	200101 0058	21,40
40.0	2.0	10	48	200101 0059	23,20
40.0	2.5	10	48	200101 0060	25,80
40.0	3.0	10	48	200101 0061	29,60
40.0	4.0	10	40	200101 0062	35,30
40.0	5.0	10	40	200101 0063	43,80
40.0	6.0	10	40	200101 0064	48,10
50.0	0.2	13	128	200101 0065	25,90
50.0	0.25	13	128	200101 0066	25,90
50.0	0.3	13	128	200101 0067	23,80
50.0	0.4	13	100	200101 0068	23,80
50.0	0.5	13	100	200101 0069	21,80
50.0	0.6	13	100	200101 0070	21,80
50.0	0.8	13	80	200101 0071	21,80
50.0	1.0	13	80	200101 0072	21,70
50.0	1.2	13	80	200101 0073	22,80
50.0	1.6	13	64	200101 0074	24,90
50.0	2.0	13	64	200101 0075	26,70
50.0	2.5	13	64	200101 0076	28,80
50.0	3.0	13	48	200101 0077	32,70
50.0	4.0	13	48	200101 0078	38,30
50.0	5.0	13	48	200101 0079	49,90
50.0	6.0	13	40	200101 0080	57,–
63.0	0.25	16	160	200101 0081	28,20
63.0	0.3	16	128	200101 0082	27,–
63.0	0.4	16	128	200101 0083	27,–
63.0	0.5	16	128	200101 0084	25,40
63.0	0.6	16	100	200101 0085	25,40
63.0	0.8	16	100	200101 0086	25,40
63.0	1.0	16	100	200101 0087	25,40
63.0	1.2	16	80	200101 0088	26,–
63.0	1.6	16	80	200101 0089	28,80
63.0	2.0	16	80	200101 0090	31,–
63.0	2.5	16	64	200101 0091	33,50
63.0	3.0	16	64	200101 0092	36,30
63.0	4.0	16	64	200101 0093	45,50
63.0	5.0	16	48	200101 0094	58,–
63.0	6.0	16	48	200101 0095	64,50
80.0	0.3	22	160	200101 0096	32,50
80.0	0.4	22	160	200101 0097	32,50
80.0	0.5	22	128	200101 0098	30,70
80.0	0.6	22	128	200101 0099	30,70
80.0	0.8	22	128	200101 0100	30,70
80.0	1.0	22	100	200101 0101	30,70
80.0	1.2	22	100	200101 0102	31,40
80.0	1.6	22	100	200101 0103	33,50
80.0	2.0	22	80	200101 0104	36,90
80.0	2.5	22	80	200101 0105	43,80
80.0	3.0	22	80	200101 0106	48,10
80.0	4.0	22	64	200101 0107	58,–
80.0	5.0	22	64	200101 0108	71,–
80.0	6.0	22	64	200101 0109	80,50

2101

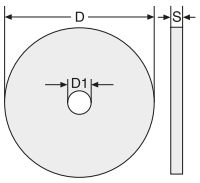
D mm	S mm	D1 mm	Number of teeth	art.no.	€
100.0	0.5	22	160	200101 0110	36,30
100.0	0.6	22	160	200101 0111	36,30
100.0	0.8	22	128	200101 0112	36,30
100.0	1.0	22	128	200101 0113	36,30
100.0	1.2	22	128	200101 0114	37,70
100.0	1.6	22	100	200101 0115	46,–
100.0	2.0	22	100	200101 0116	50,–
100.0	2.5	22	100	200101 0117	55,50
100.0	3.0	22	80	200101 0118	61,–
100.0	4.0	22	80	200101 0119	82,–
100.0	5.0	22	80	200101 0120	93,50
100.0	6.0	22	64	200101 0121	109,–
125.0	0.6	22	160	200101 0122	58,–
125.0	0.8	22	160	200101 0123	58,–
125.0	1.0	22	160	200101 0124	58,–
125.0	1.2	22	128	200101 0125	58,50
125.0	1.6	22	128	200101 0126	61,–
125.0	2.0	22	128	200101 0127	64,–
125.0	2.5	22	100	200101 0128	67,50
125.0	3.0	22	100	200101 0129	75,–
125.0	4.0	22	100	200101 0130	113,–
125.0	5.0	22	80	200101 0131	131,–
125.0	6.0	22	80	200101 0132	148,–
160.0	1.0	32	160	200101 0133	64,50
160.0	1.2	32	160	200101 0134	64,50
160.0	1.6	32	160	200101 0135	66,50
160.0	2.0	32	128	200101 0136	70,–
160.0	2.5	32	128	200101 0137	75,–
160.0	3.0	32	128	200101 0138	84,50
160.0	4.0	32	100	200101 0139	121,–
160.0	5.0	32	100	200101 0140	141,–
160.0	6.0	32	100	200101 0141	164,–
200.0	1.0	32	200	200101 0142	117,–
200.0	1.2	32	200	200101 0143	117,–
200.0	1.6	32	160	200101 0144	126,–
200.0	2.0	32	160	200101 0145	135,–
200.0	2.5	32	160	200101 0146	147,–
200.0	3.0	32	128	200101 0147	163,–
200.0	4.0	32	128	200101 0148	230,–
200.0	5.0	32	128	200101 0149	275,–
200.0	6.0	32	100	200101 0150	320,–

2101

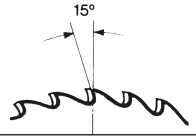
SARA® Metal circular saw blade

HSS | DIN 1838B | Typ N | i Vc/fz | 20-237

- **Coarse-toothed**
- **With curved tooth, form B,** lateral bevel grinding (hollow-grounded)
- Hole without keyway
- For coarse slotting and end-to-end cutting work, and for machining with large cutting depths and cross-sections up to max. 100 mm depending on dimensions, pitch, number of teeth and feed rate/ cutting speed



Coarse-toothed, form B,
curved tooth, DIN 1840
(rake angle 15°)





20

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 25-45	○ 15-25	○ 10-15	○ 7-15	○ 7-15		○ 25-45	○ 25-30				○ 120-400	○ 120-400					
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

D mm	S mm	D1 mm	Number of teeth	art.no.	€
50.0	0.5	13	48	**200105** 0001	21,80
50.0	0.6	13	48	200105 0002	21,80
50.0	0.8	13	40	200105 0003	21,80
50.0	1.0	13	40	200105 0004	21,70
50.0	1.2	13	40	200105 0005	22,80
50.0	1.6	13	32	200105 0006	24,90
50.0	2.0	13	32	200105 0007	26,70
50.0	2.5	13	32	200105 0008	28,80
50.0	3.0	13	24	200105 0009	32,70
50.0	4.0	13	24	200105 0010	38,30
50.0	5.0	13	24	200105 0011	49,90
50.0	6.0	13	20	200105 0012	57,–
63.0	0.5	16	64	200105 0013	25,40
63.0	0.6	16	48	200105 0014	25,40
63.0	0.8	16	48	200105 0015	25,40
63.0	1.0	16	48	200105 0016	25,40
63.0	1.2	16	40	200105 0017	26,–
63.0	1.6	16	40	200105 0018	28,80
63.0	2.0	16	40	200105 0019	31,–
63.0	2.5	16	32	200105 0020	33,50
63.0	3.0	16	32	200105 0021	36,30
63.0	4.0	16	32	200105 0022	45,50
63.0	5.0	16	24	200105 0023	58,–
63.0	6.0	16	24	200105 0024	64,50
80.0	0.5	22	64	200105 0025	30,70
80.0	0.6	22	64	200105 0026	30,70
80.0	0.8	22	64	200105 0027	30,70
80.0	1.0	22	48	200105 0028	30,70
80.0	1.2	22	48	200105 0029	31,40
80.0	1.6	22	48	200105 0030	33,50
80.0	2.0	22	40	200105 0031	36,90
80.0	2.5	22	40	200105 0032	43,80
80.0	3.0	22	40	200105 0033	48,10
80.0	4.0	22	32	200105 0034	58,–
80.0	5.0	22	32	200105 0035	71,–
80.0	6.0	22	32	200105 0036	80,50
100.0	0.6	22	80	200105 0037	36,30
100.0	0.8	22	64	200105 0038	36,30
100.0	1.0	22	64	200105 0039	36,30
100.0	1.2	22	64	200105 0040	37,70
100.0	1.6	22	48	200105 0041	46,–

2101

D mm	S mm	D1 mm	Number of teeth	art.no.	€
100.0	2.0	22	48	200105 0042	50,–
100.0	2.5	22	48	200105 0043	55,50
100.0	3.0	22	40	200105 0044	61,–
100.0	4.0	22	40	200105 0045	82,–
100.0	5.0	22	40	200105 0046	93,50
100.0	6.0	22	32	200105 0047	109,–
125.0	0.8	22	80	200105 0048	58,–
125.0	1.0	22	80	200105 0049	58,–
125.0	1.2	22	64	200105 0050	58,50
125.0	1.6	22	64	200105 0051	61,–
125.0	2.0	22	64	200105 0052	64,–
125.0	2.5	22	48	200105 0053	67,50
125.0	3.0	22	48	200105 0054	75,–
125.0	4.0	22	48	200105 0055	113,–
125.0	5.0	22	40	200105 0056	131,–
125.0	6.0	22	40	200105 0057	148,–
160.0	1.0	32	80	200105 0058	64,50
160.0	1.2	32	80	200105 0059	64,50
160.0	1.6	32	80	200105 0060	66,50
160.0	2.0	32	64	200105 0061	70,–
160.0	2.5	32	64	200105 0062	75,–
160.0	3.0	32	64	200105 0063	84,50
160.0	4.0	32	48	200105 0064	121,–
160.0	5.0	32	48	200105 0065	141,–
160.0	6.0	32	48	200105 0066	164,–
200.0	1.0	32	100	200105 0067	117,–
200.0	1.2	32	100	200105 0068	117,–
200.0	1.6	32	80	200105 0069	126,–
200.0	2.0	32	80	200105 0070	135,–
200.0	2.5	32	80	200105 0071	147,–
200.0	3.0	32	64	200105 0072	163,–
200.0	4.0	32	64	200105 0073	230,–
200.0	5.0	32	64	200105 0074	275,–
200.0	6.0	32	48	200105 0075	320,–
250.0	1.6	32	100	200105 0076	122,–
250.0	2.0	32	100	200105 0077	135,–
250.0	2.5	32	80	200105 0078	154,–
250.0	3.0	32	80	200105 0079	170,–
250.0	4.0	32	80	200105 0080	245,–
250.0	5.0	32	64	200105 0081	290,–
250.0	6.0	32	64	200105 0082	345,–

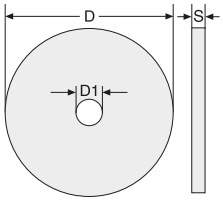
2101

SARA® Metal circular saw blade

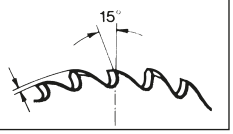
HSS | DIN 1838C | Typ N | Vc/fz | 20-237

- **Coarse-toothed**
- **Curved toothing with lead and raker teeth (HZ toothing)**
- Lateral bevel grinding (hollow grinding), bore hole without keyway
- This tooth form is primarily used for end-to-end cutting as the raised lead tooth makes it impossible to achieve a straight finish at the base of the cut with non-continuous cutting or milling. Otherwise, these blades can be used as specified in DIN 1838 B.





Coarse-toothed/HZ, form C,
curved tooth, DIN 1840
(rake angle 15°)



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 25-45	○ 15-25	○ 10-15	○ 7-15	○ 7-15		○ 25-45	○ 25-30				○ 120-400	○ 120-400					
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

D mm	S mm	D1 mm	Number of teeth	art.no.	€
50.0	1.0	13	40	**200110** 0001	28,80
50.0	1.2	13	40	200110 0002	28,80
50.0	1.6	13	32	200110 0003	31,40
50.0	2.0	13	32	200110 0004	32,70
50.0	2.5	13	32	200110 0005	34,80
50.0	3.0	13	24	200110 0006	36,40
50.0	4.0	13	24	200110 0007	45,50
50.0	5.0	13	24	200110 0008	56,50
50.0	6.0	13	20	200110 0009	62,–
63.0	1.0	16	48	200110 0010	36,30
63.0	1.2	16	40	200110 0011	36,30
63.0	1.6	16	40	200110 0012	36,30
63.0	2.0	16	40	200110 0013	37,–
63.0	2.5	16	32	200110 0014	38,70
63.0	3.0	16	32	200110 0015	42,60
63.0	4.0	16	32	200110 0016	54,–
63.0	5.0	16	24	200110 0017	64,50
63.0	6.0	16	24	200110 0018	72,50
80.0	1.0	22	48	200110 0019	41,70
80.0	1.2	22	48	200110 0020	41,70
80.0	1.6	22	48	200110 0021	41,80
80.0	2.0	22	40	200110 0022	42,–
80.0	2.5	22	40	200110 0023	52,–
80.0	3.0	22	40	200110 0024	56,50
80.0	4.0	22	32	200110 0025	68,–
80.0	5.0	22	32	200110 0026	79,50
80.0	6.0	22	32	200110 0027	92,–
100.0	1.0	22	64	200110 0028	53,50
100.0	1.2	22	64	200110 0029	53,50
100.0	1.6	22	48	200110 0030	53,50
100.0	2.0	22	48	200110 0031	55,50
100.0	2.5	22	48	200110 0032	60,–
100.0	3.0	22	40	200110 0033	67,–
100.0	4.0	22	40	200110 0034	90,50
100.0	5.0	22	40	200110 0035	99,–

2101

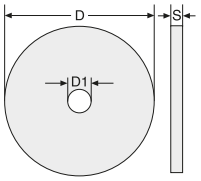
D mm	S mm	D1 mm	Number of teeth	art.no.	€
100.0	6.0	22	32	200110 0036	116,–
125.0	1.0	22	80	200110 0037	71,–
125.0	1.2	22	64	200110 0038	71,–
125.0	1.6	22	64	200110 0039	71,–
125.0	2.0	22	64	200110 0040	72,50
125.0	2.5	22	48	200110 0041	74,–
125.0	3.0	22	48	200110 0042	82,–
125.0	4.0	22	48	200110 0043	124,–
125.0	5.0	22	40	200110 0044	139,–
125.0	6.0	22	40	200110 0045	158,–
160.0	1.0	32	80	200110 0046	76,50
160.0	1.2	32	80	200110 0047	76,50
160.0	1.6	32	80	200110 0048	76,50
160.0	2.0	32	64	200110 0049	77,–
160.0	2.5	32	64	200110 0050	83,50
160.0	3.0	32	64	200110 0051	95,50
160.0	4.0	32	48	200110 0052	134,–
160.0	5.0	32	48	200110 0053	153,–
160.0	6.0	32	48	200110 0054	180,–
200.0	1.2	32	100	200110 0056	139,–
200.0	1.6	32	80	200110 0057	139,–
200.0	2.0	32	80	200110 0058	142,–
200.0	2.5	32	80	200110 0059	157,–
200.0	3.0	32	64	200110 0060	176,–
200.0	4.0	32	64	200110 0061	250,–
200.0	5.0	32	64	200110 0062	295,–
200.0	6.0	32	48	200110 0063	335,–
250.0	1.6	32	100	200110 0064	130,–
250.0	2.0	32	100	200110 0065	143,–
250.0	2.5	32	80	200110 0066	161,–
250.0	3.0	32	80	200110 0067	179,–
250.0	4.0	32	80	200110 0068	255,–
250.0	5.0	32	64	200110 0069	305,–
250.0	6.0	32	64	200110 0070	355,–

2101

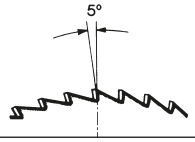
SARA® Solid carbide circular saw blade

VHM | DIN 1837 | Vc/fz | 20-238

- **Fine-toothed**
- **Double helical tooth, form A,** lateral bevel grinding (hollow-grooved)
- Hole without keyway
- For fine slotting and end-to-end cutting work, for low-depth cutting or for thin-walled materials



Fine-toothed, form A,
double helical tooth, DIN 1840
(rake angle 5°)





material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○	○		○	○	○	○	○	○			○	○	○				
	Cutting speed Vc m/min.	100-150	80-120		60-80	60-80	40-60	80-100	60-80	40-60			800-1000	800-1000	200-300				
	Please adjust these guidelines according to clamping operation and machine set-up.																		

D mm	S mm	D1 mm	Number of teeth	art.no.	€
20	0.25	5	64	**202001** 0033	16,10
20	0.3	5	64	202001 0034	16,60
20	0.5	5	48	202001 0037	18,10
20	0.6	5	48	202001 0038	18,60
20	1.0	5	40	202001 0042	24,60
20	1.6	5	40	202001 0048	31,90
25	0.2	8	80	202001 0061	17,70
25	0.3	8	80	202001 0063	16,50
25	0.4	8	64	202001 0065	18,60
25	0.5	8	64	202001 0066	18,60
25	0.6	8	64	202001 0067	19,20
25	0.7	8	48	202001 0068	23,50
25	1.0	8	48	202001 0071	24,40
25	1.2	8	40	202001 0073	26,90
25	1.6	8	40	202001 0077	35,40
25	2.0	8	40	202001 0081	41,10
30	0.25	8	100	202001 0091	20,50
30	0.3	8	80	202001 0092	19,10
30	0.4	8	80	202001 0094	19,10
30	0.5	8	80	202001 0095	19,60
30	0.6	8	64	202001 0096	22,20
30	0.8	8	64	202001 0098	25,30
30	1.0	8	64	202001 0100	27,50
30	1.2	8	48	202001 0102	31,10
30	1.6	8	48	202001 0106	39,20
30	2.0	8	48	202001 0110	44,70
30	2.5	8	40	202001 0111	54,–
40	0.4	10	100	202001 0123	26,20
40	0.5	10	80	202001 0124	27,40
40	0.6	10	80	202001 0125	28,70
40	0.8	10	80	202001 0127	31,80
40	1.0	10	64	202001 0129	34,80
40	1.2	10	64	202001 0131	39,20
40	1.6	10	64	202001 0135	47,30
40	2.0	10	48	202001 0139	49,70
40	2.5	10	48	202001 0140	59,50
40	3.0	10	48	202001 0141	69,50
50	0.5	13	100	202001 0151	34,70
50	0.6	13	100	202001 0152	35,40
50	0.8	13	80	202001 0154	38,40
50	1.0	13	80	202001 0156	42,70

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D mm	S mm	D1 mm	Number of teeth	art.no.	€
50	1.2	13	80	202001 0158	45,80
50	1.6	13	64	202001 0162	59,50
50	2.0	13	64	202001 0166	63,–
50	2.5	13	64	202001 0167	77,50
50	3.0	13	48	202001 0168	86,–
63	0.3	16	128	202001 0175	49,70
63	0.4	16	128	202001 0177	48,60
63	0.5	16	128	202001 0178	47,30
63	0.6	16	100	202001 0179	47,70
63	0.8	16	100	202001 0181	53,–
63	1.0	16	100	202001 0183	56,–
63	1.2	16	80	202001 0185	62,–
63	1.6	16	80	202001 0189	73,50
63	2.0	16	80	202001 0193	80,50
63	2.5	16	64	202001 0194	91,–
63	3.0	16	64	202001 0195	101,–
80	0.5	22	128	202001 0203	68,50
80	0.6	22	128	202001 0204	70,50
80	0.8	22	128	202001 0206	71,50
80	1.0	22	100	202001 0208	75,–
80	1.2	22	100	202001 0210	80,50
80	1.6	22	100	202001 0214	89,50
80	2.0	22	80	202001 0218	111,–
80	2.5	22	80	202001 0219	126,–
80	3.0	22	80	202001 0220	149,–
100	0.6	22	160	202001 0226	102,–
100	0.8	22	128	202001 0228	103,–
100	1.0	22	128	202001 0230	108,–
100	1.2	22	128	202001 0232	114,–
100	1.6	22	100	202001 0236	142,–
100	2.0	22	100	202001 0240	157,–
100	3.0	22	80	202001 0242	215,–
125	0.8	22	160	202001 0249	166,–
125	1.0	22	160	202001 0251	173,–
125	1.2	22	128	202001 0253	189,–
125	1.6	22	128	202001 0257	225,–
125	2.0	22	128	202001 0261	225,–
125	3.0	22	100	202001 0263	330,–
160	1.0	32	160	202001 0268	360,–
160	2.5	32	128	202001 0273	569,–
160	3.0	32	128	202001 0274	619,–

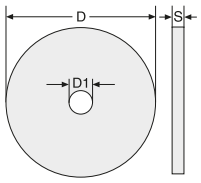
2142

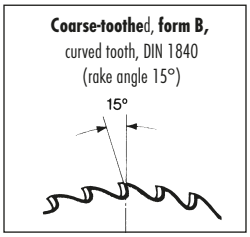
SARA® Solid carbide circular saw blade

VHM | DIN 1838 | Vc/fz 20-238

- **Coarse-toothed**
- **With curved tooth, form B,** lateral bevel grinding (hollow-ground)
- Hole without keyway
- For coarse slotting and end-to-end cutting work, and for machining with large cutting depths and cross-sections up to max. 100 mm depending on dimensions, pitch, number of teeth and feed rate/cutting speed







material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○	○		○	○	○	○	○	○			○	○	○				
		100-150	80-120		60-80	60-80	40-60	80-100	60-80	40-60			800-1000	800-1000	200-300				
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

D mm	S mm	D1 mm	Number of teeth	art.no.	€
20	0.25	5	20	**202002** 0022	16,20
20	0.3	5	20	202002 0023	16,60
20	0.5	5	20	202002 0025	18,10
20	0.6	5	20	202002 0026	18,60
20	1.0	5	20	202002 0030	24,60
20	1.6	5	20	202002 0033	31,90
25	0.2	8	20	202002 0041	17,60
25	0.5	8	20	202002 0045	18,60
25	0.6	8	20	202002 0046	19,20
25	0.8	8	20	202002 0048	22,10
25	1.0	8	20	202002 0050	24,40
25	1.2	8	20	202002 0051	26,90
25	1.6	8	20	202002 0053	35,40
25	2.0	8	20	202002 0055	41,10
30	0.4	8	30	202002 0064	19,10
30	0.5	8	30	202002 0065	19,60
30	0.6	8	30	202002 0066	22,20
30	0.8	8	24	202002 0068	25,30
30	1.0	8	24	202002 0070	27,50
30	1.2	8	24	202002 0071	31,10
30	1.6	8	24	202002 0073	39,20
30	2.0	8	24	202002 0075	44,70
30	2.5	8	24	202002 0076	54,–
40	0.4	10	40	202002 0084	26,20
40	0.5	10	40	202002 0085	27,40
40	0.6	10	40	202002 0086	28,70
40	0.8	10	32	202002 0088	31,80
40	1.0	10	32	202002 0090	34,80
40	1.2	10	32	202002 0091	39,20
40	1.6	10	32	202002 0093	47,30
40	2.0	10	32	202002 0095	49,70
40	2.5	10	32	202002 0096	58,–
40	3.0	10	32	202002 0097	69,50
50	0.5	13	48	202002 0102	34,70
50	0.6	13	48	202002 0103	35,40
50	0.8	13	40	202002 0105	38,60
50	1.0	13	40	202002 0107	42,70

2142

D mm	S mm	D1 mm	Number of teeth	art.no.	€
50	1.2	13	40	202002 0108	45,80
50	1.6	13	32	202002 0110	59,50
50	2.0	13	32	202002 0112	63,–
50	2.5	13	32	202002 0113	77,50
50	3.0	13	24	202002 0114	86,–
63	0.5	16	64	202002 0119	47,30
63	0.6	16	48	202002 0120	47,70
63	0.8	16	48	202002 0122	53,–
63	1.0	16	48	202002 0124	56,–
63	1.2	16	40	202002 0125	62,–
63	1.6	16	40	202002 0127	73,50
63	2.0	16	40	202002 0129	80,50
63	2.5	16	32	202002 0130	91,–
63	3.0	16	32	202002 0131	101,–
80	0.6	22	64	202002 0135	70,50
80	0.8	22	64	202002 0137	71,50
80	1.0	22	48	202002 0139	75,–
80	1.2	22	48	202002 0140	80,50
80	1.6	22	48	202002 0142	89,50
80	2.0	22	40	202002 0144	111,–
80	2.5	22	40	202002 0145	126,–
80	3.0	22	40	202002 0146	149,–
100	0.6	22	80	202002 0150	102,–
100	0.8	22	64	202002 0152	101,–
100	1.0	22	64	202002 0154	108,–
100	1.2	22	64	202002 0155	114,–
100	1.6	22	48	202002 0157	142,–
100	2.0	22	48	202002 0159	157,–
100	3.0	22	40	202002 0161	215,–
125	0.8	22	80	202002 0165	162,–
125	1.0	22	80	202002 0167	173,–
125	1.2	22	64	202002 0168	188,–
125	1.6	22	64	202002 0170	225,–
125	2.0	22	64	202002 0172	225,–
125	2.5	22	48	202002 0173	280,–
125	3.0	22	48	202002 0174	330,–

2142

SARA® Metal circular saw blade, precision version

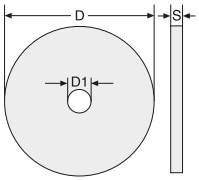
HSS HSS-E Vc/fz 20-239

- Precision version for use on slow-running circular saw machines or cold circular saws from various manufacturers (ADIGE, EISELE, BERG&SCHMID, IBP, THOMAS, MEP, KALTENBACH, TRENNJÄGER, HÄBERLE etc.)
- Steam-treated surface to prevent material welding, enhance coolant absorption and increase wear resistance
- **Quantity and dimensions of driving pin holes: (quantity / bore hole Ø / pitch circle Ø)**



Usage recommendation for

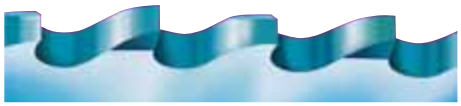
tooth pitch t: 3 + 4
tooth form BW = profiles and pipes, wall thickness 1.0-2.0 mm
approx. 40-60 rpm depending on diameter



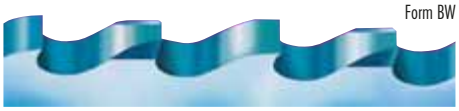
tooth pitch t: 5
tooth form BW = profiles and pipes, wall thickness 2.0-3.0 mm
approx. 40-60 rpm depending on diameter
solid material, cross section 10-20 mm,
approx. 20-40 rpm depending on diameter

tooth pitch t: 6 + 8
tooth form HZ = solid material, cross section 20-40 mm
approx. 20-40 rpm depending on diameter

tooth pitch t: 10
tooth form HZ = solid material, cross section 40-60 mm
approx. 20-40 rpm depending on diameter



Form BW



Form HZ

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 35-45	○ 20-35	○ 10-20	○ 10-18	○ 10-18	○ 10-15	○ 20-35	○ 20-35				○ 200-300	○ 200-300	○ 30-45				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

D mm	S mm	D1 mm	Tooth pitch	Number of teeth	Tooth form	Follower drill holes	HSS art.no.	€	HSS Co5 art.no.	€
225.0	2.0	32	4	180	BW	2/8/45 + 2/11/63 + 4/9/50	**200150** 0104	80,–	**200151** 0104	107,–
225.0	2.0	32	6	120	HZ		200150 0106	80,–	200151 0106	107,–
225.0	2.0	32	8	90	HZ		200150 0108	80,–	200151 0108	107,–
225.0	2.0	40	4	180	BW	2/8/55 + 4/12/64	200150 0204	80,–	200151 0204	107,–
225.0	2.0	40	6	120	HZ		200150 0206	80,–	200151 0206	107,–
225.0	2.0	40	8	90	HZ		200150 0208	80,–	200151 0208	107,–
250.0	2.0	32	4	200	BW	2/8/45 + 2/11/63 + 4/9/50	200150 0304	85,50	200151 0304	111,–
250.0	2.0	32	5	160	HZ		200150 0305	85,50	200151 0305	111,–
250.0	2.0	32	6	128	HZ		200150 0306	85,50	200151 0306	111,–
250.0	2.0	32	8	100	HZ		200150 0308	85,50	200151 0308	111,–
250.0	2.0	40	4	200	BW	2/8/55 + 4/12/64	200150 0404	85,50	200151 0404	111,–
250.0	2.0	40	5	160	HZ		200150 0405	85,50	200151 0405	111,–
250.0	2.0	40	6	128	HZ		200150 0406	85,50	200151 0406	111,–
250.0	2.0	40	8	100	HZ		200150 0408	85,50	200151 0408	111,–
275.0	2.5	32	4	220	BW	2/8/45 + 2/11/63 + 4/9/50	200150 0504	100,–	200151 0504	134,–
275.0	2.5	32	5	180	HZ		200150 0505	100,–	200151 0505	134,–
275.0	2.5	32	6	140	HZ		200150 0506	100,–	200151 0506	134,–
275.0	2.5	32	8	110	HZ		200150 0508	100,–	200151 0508	134,–
275.0	2.5	32	10	90	HZ		200150 0510	100,–	200151 0510	134,–
275.0	2.5	40	4	220	BW	2/8/55 + 4/12/64	200150 0604	100,–	200151 0604	134,–
275.0	2.5	40	5	180	HZ		200150 0605	100,–	200151 0605	134,–
275.0	2.5	40	6	140	HZ		200150 0606	100,–	200151 0606	134,–
275.0	2.5	40	8	110	HZ		200150 0608	100,–	200151 0608	134,–
275.0	2.5	40	10	84	HZ		200150 0610	100,–	200151 0610	134,–
300.0	2.5	32	4	240	BW	2/8/45 + 2/11/63 + 4/9/50	200150 0704	138,–	200151 0704	175,–
300.0	2.5	32	6	160	HZ		200150 0706	138,–	200151 0706	175,–
300.0	2.5	32	8	120	HZ		200150 0708	138,–	200151 0708	175,–
							2102		2102	

Continued on next page >>>

D mm	S mm	D1 mm	Tooth pitch	Number of teeth	Tooth form	Follower drill holes	HSS art.no.	HSS €	HSS Co5 art.no.	HSS Co5 €
300.0	2.5	40	4	240	BW		200150 0804	138,–	200151 0804	175,–
300.0	2.5	40	6	160	HZ	2/8/55 + 4/12/64	200150 0806	138,–	200151 0806	175,–
300.0	2.5	40	8	120	HZ		200150 0808	138,–	200151 0808	175,–
315.0	2.5	32	4	250	BW		200150 0904	158,–	200151 0904	195,–
315.0	2.5	32	5	200	HZ		200150 0905	158,–	200151 0905	195,–
315.0	2.5	32	6	160	HZ	2/8/45 + 2/11/63 + 4/9/50	200150 0906	158,–	200151 0906	195,–
315.0	2.5	32	8	120	HZ		200150 0908	158,–	200151 0908	195,–
315.0	2.5	32	10	100	HZ		200150 0910	158,–	200151 0910	195,–
315.0	2.5	40	4	250	BW		200150 1004	158,–	200151 1004	195,–
315.0	2.5	40	5	200	HZ		200150 1005	158,–	200151 1005	195,–
315.0	2.5	40	6	160	HZ	2/8/55 + 4/12/64	200150 1006	158,–	200151 1006	195,–
315.0	2.5	40	8	120	HZ		200150 1008	158,–	200151 1008	195,–
315.0	2.5	40	10	100	HZ		200150 1010	158,–	200151 1010	195,–
315.0	3.0	32	4	250	BW		200150 1104	184,–	200151 1104	233,–
315.0	3.0	32	5	200	HZ		200150 1105	184,–	200151 1105	233,–
315.0	3.0	32	6	160	HZ	2/8/45 + 2/11/63 + 4/9/50	200150 1106	184,–	200151 1106	233,–
315.0	3.0	32	8	120	HZ		200150 1108	184,–	200151 1108	233,–
315.0	3.0	32	10	100	HZ		200150 1110	184,–	200151 1110	233,–
315.0	3.0	40	4	250	BW		200150 1204	184,–	200151 1204	233,–
315.0	3.0	40	5	200	HZ		200150 1205	184,–	200151 1205	233,–
315.0	3.0	40	6	160	HZ	2/8/55 + 4/12/64	200150 1206	184,–	200151 1206	233,–
315.0	3.0	40	8	120	HZ		200150 1208	184,–	200151 1208	233,–
315.0	3.0	40	10	100	HZ		200150 1210	184,–	200151 1210	233,–
350.0	3.0	32	5	220	HZ		200150 1305	208,–	200151 1305	275,–
350.0	3.0	32	6	180	HZ		200150 1306	208,–	200151 1306	275,–
350.0	3.0	32	7	160	HZ	2/8/45 + 2/11/63	200150 1307	208,–	200151 1307	275,–
350.0	3.0	32	8	140	HZ		200150 1308	208,–	200151 1308	275,–
350.0	3.0	32	10	110	HZ		200150 1310	208,–	200151 1310	275,–
350.0	3.0	40	5	220	HZ		200150 1405	208,–	200151 1405	275,–
350.0	3.0	40	6	180	HZ		200150 1406	208,–	200151 1406	275,–
350.0	3.0	40	7	160	HZ	2/8/55 + 4/12/64	200150 1407	208,–	200151 1407	275,–
350.0	3.0	40	8	140	HZ		200150 1408	208,–	200151 1408	275,–
350.0	3.0	40	10	110	HZ		200150 1410	208,–	200151 1410	275,–
370.0	3.0	50	7	160	HZ		200150 1507	275,–	200151 1507	350,–
370.0	3.0	50	9	120	HZ		200150 1509	275,–	200151 1509	350,–
370.0	3.0	50	11	100	HZ		200150 1512	275,–	200151 1512	350,–
400.0	3.0	50	6	200	HZ	4/15/80 + 4/14/85	200150 1606	325,–	200151 1606	435,–
400.0	3.0	50	8	160	HZ		200150 1608	325,–	200151 1608	435,–
400.0	3.0	50	10	120	HZ		200150 1610	325,–	200151 1610	435,–
400.0	3.0	50	12	100	HZ		200150 1612	325,–	200151 1612	435,–
							2102		2102	

Stahlschlüssel („Key to Steel") pocket book

Useful information on steel

- Materials science, materials testing
- Stahlschlüssel („Key to Steel") extract
- Steel identification systems, dimensions and units
- Mathematics and geometry, tables
- Abbreviations for standards designations / standardisation institutes
- List of material numbers in numerical order

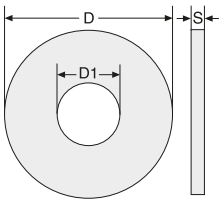


Description	art.no.	€
Stahlschlüssel (Key to Steel) pocket book, plastic cover, 200 pages, DIN A6	**019900** 1015 0111	11,25

SARA® Disc milling cutters

HSS-E | DIN 1834 | Typ N

- **Narrow version**
- **3 cutting edges**
- Type N, cross-cut toothing
- Bore with longitudinal groove in accordance with DIN 138
- Smooth cut thanks to helical toothing
- Optimum chip removal with spacious chip chambers
- Milling cutters are self-freeing to prevent jamming





material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	○	○	○	○	○	○	○	○				○	○	○				
	20-27	15-22	10-15	5-12	5-12	5-10	20-25	20-25				100-200	100-200	30-50				
Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

D js16 mm	S k11 mm	D1 H7 mm	Number of teeth	art.no.	€
63	1.6	22	28	**210105** 0001	77,–
63	2.0	22	28	210105 0002	70,–
63	2.5	22	28	210105 0003	71,50
63	3.0	22	28	210105 0004	70,–
63	4.0	22	28	210105 0005	73,–
63	5.0	22	28	210105 0006	76,50
80	1.6	27	32	210105 0007	84,50
80	2.0	27	32	210105 0008	82,50
80	2.5	27	32	210105 0009	83,50
80	3.0	27	32	210105 0010	82,–
80	4.0	27	32	210105 0011	76,50
80	5.0	27	32	210105 0012	94,–
80	6.0	27	32	210105 0013	101,–
100	1.6	32	36	210105 0014	101,–
100	2.0	32	36	210105 0015	101,–
100	2.5	32	36	210105 0016	101,–
100	3.0	32	36	210105 0017	97,50
100	4.0	32	36	210105 0018	100,–
100	5.0	32	36	210105 0019	106,–
100	6.0	32	36	210105 0020	119,–
125	1.6	32	40	210105 0022	128,–

2103

D js16 mm	S k11 mm	D1 H7 mm	Number of teeth	art.no.	€
125	2.0	32	40	210105 0023	123,–
125	2.5	32	40	210105 0024	126,–
125	3.0	32	40	210105 0025	129,–
125	4.0	32	40	210105 0026	126,–
125	5.0	32	40	210105 0027	135,–
125	6.0	32	40	210105 0028	145,–
125	8.0	32	32	210105 0029	180,–
125	10.0	32	32	210105 0030	197,–
160	2.0	40	48	210105 0031	199,–
160	3.0	40	48	210105 0033	195,–
160	4.0	40	48	210105 0034	187,–
160	5.0	40	48	210105 0035	198,–
160	6.0	40	48	210105 0036	210,–
160	8.0	40	36	210105 0037	240,–
160	10.0	40	36	210105 0038	260,–
200	2.5	40	52	210105 0040	280,–
200	3.0	40	52	210105 0041	265,–
200	4.0	40	52	210105 0042	270,–
200	6.0	40	52	210105 0044	305,–
200	10.0	40	40	210105 0046	395,–

2103

Combination shell-type milling cutter arbour

SARA®

Nickel-plated and pre-balanced to G2.5 at 25,000 rpm

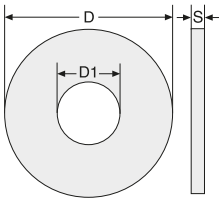


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SARA® Disc milling cutters

HSS-E | DIN 885 | Typ N

- Type N, cross-cut toothing
- Bore with longitudinal groove in accordance with DIN 138
- Helix angle up to Ø 100 mm = 12°, from Ø 125 mm = 15°
- 3 cutting edges
- Milling cutters are self-freeing to prevent jamming





material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	○	○	○	○	○	○	○	○				○	○					
	20-27	15-22	10-15	5-12	5-12	5-10	20-25	20-25				100-200	100-200					
Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									

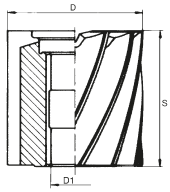
D js16 mm	S k11 mm	D1 H7 mm	Number of teeth	art.no.	€
63	4	22	12	**210115** 0006	74,50
63	5	22	12	210115 0007	79,–
63	6	22	12	210115 0008	78,–
63	8	22	12	210115 0009	86,–
63	10	22	12	210115 0010	97,–
63	14	22	12	210115 0012	123,–
80	5	27	14	210115 0015	100,–
80	6	27	14	210115 0016	102,–
80	8	27	14	210115 0017	109,–
80	10	27	14	210115 0018	112,–
80	12	27	14	210115 0019	126,–
80	14	27	14	210115 0020	144,–
80	16	27	14	210115 0021	156,–
100	6	32	14	210115 0024	142,–
				2103	

D js16 mm	S k11 mm	D1 H7 mm	Number of teeth	art.no.	€
100	8	32	14	210115 0025	145,–
100	10	32	14	210115 0026	155,–
100	12	32	14	210115 0027	168,–
100	14	32	14	210115 0028	187,–
100	16	32	14	210115 0029	197,–
125	8	32	16	210115 0034	192,–
125	10	32	16	210115 0035	205,–
125	12	32	16	210115 0036	225,–
125	14	32	16	210115 0037	250,–
125	16	32	16	210115 0038	265,–
125	20	32	16	210115 0040	310,–
160	8	40	18	210115 0044	285,–
160	10	40	18	210115 0045	305,–
				2103	

SARA® Shell end mills

HSS-E | DIN 841 | Typ N | NF | NR | 30° | Vc/fz 20-240

- **With longitudinal and transverse grooves in accordance with DIN 138**
- Right-hand cutting, right-hand twist = 30°
- Profile relief grinding



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	●	●	○	○	○	○	○	○				○	○	○				
	25-30	20-25	15-20	10-20	10-20	10-15	20-30	20-30				100-180	100-150	40-60				
Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									

D mm	S mm	D1 mm	Z mm	Type N, finishing art.no.	€	Type NF, roughing/ finishing art.no.	€
30.0	30	13	6	**210530** 0001	73,–		
35.0	35	16	6	210530 0002	80,50		
40.0	20	16	8	210530 0003	73,–		
40.0	40	16	8	210530 0004	95,–	**210535** 0004	128,–
50.0	50	22	8	210530 0005	143,–	210535 0005	174,–
60.0	60	27	8	210530 0006	197,–	210535 0006	235,–
75.0	75	27	10	210530 0007	330,–	210535 0007	420,–
				2104		2104	



D mm	S mm	D1 mm	Z mm	Type NR, roughing art.no.	€
40.0	40	16	6	**210540** 0004	117,–
50.0	50	22	6	210540 0005	160,–
60.0	60	27	8	210540 0006	215,–
75.0	75	27	10	210540 0007	380,–
				2104	



SARA® Shell end mills

HSS-E | DIN 1880 | Typ N | NR | HR | NF | 30° | TiAlN | Vc/fz | 20-240

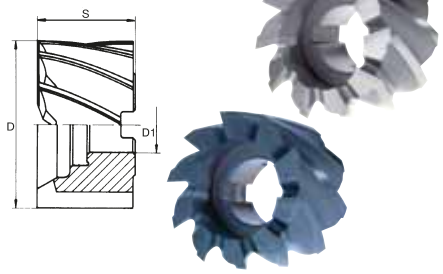
- **With longitudinal and transverse grooves in accordance with DIN 138**
- Right-hand cutting, right-hand twist = 30°
- Profile relief grinding

Type N: Finishing version
Type NR: Knuckle-type tooth profile for roughing work, chip separator with round profile, designed for large machining volumes
Type HR: Knuckle-type tooth profile for roughing work, chip separator with fine round profile, designed for high-strength materials
Type NF: Roughing / finishing toothing, chip separator with flat profile, for medium surface finish quality

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 25-30	● 20-25	○ 15-20	○ 10-20	○ 10-20	○ 10-15	○ 20-30	○ 20-30				○ 100-180	○ 100-150	○ 40-60				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

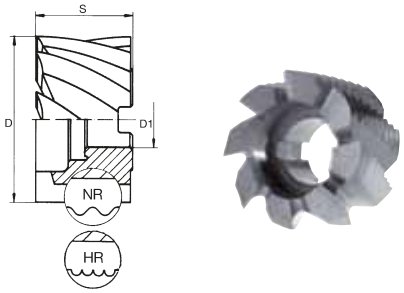
Type N, finishing version

D mm	S mm	D1 mm	Z	art.no.	€	TiAlN art.no.	TiAlN €
40.0	32	16	6	**210501** 0040	78,–	**210506** 0040	131,–
50.0	36	22	8	210501 0050	110,–	210506 0050	139,–
63.0	40	27	8	210501 0063	149,–	210506 0063	235,–
80.0	45	27	10	210501 0080	245,–	210506 0080	355,–
100.0	50	32	10	210501 0100	385,–		
				2104		2104	



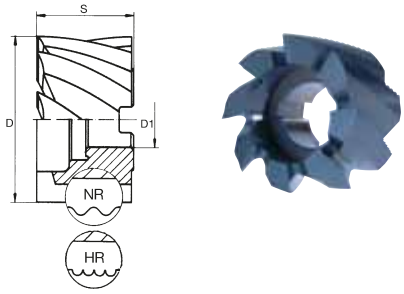
Type NR, roughing version

D mm	S mm	D1 mm	Z	art.no.	€
40.0	32	16	6	**210520** 0040	93,–
50.0	36	22	6	210520 0050	127,–
63.0	40	27	8	210520 0063	186,–
80.0	45	27	8	210520 0080	305,–
100.0	50	32	10	210520 0100	475,–
				2104	



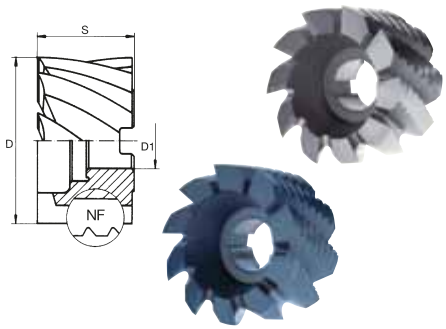
Type HR, roughing version

D mm	S mm	D1 mm	Z	TiAlN art.no.	TiAlN €
40.0	32	16	8	**210523** 0040	142,–
50.0	36	22	8	210523 0050	184,–
63.0	40	27	10	210523 0063	250,–
80.0	45	27	10	210523 0080	385,–
100.0	50	32	12	210523 0100	579,–
				2104	



Type NF, roughing / finishing version

D mm	S mm	D1 mm	Z	art.no.	€	TiAlN art.no.	TiAlN €
40.0	32	16	6	**210525** 0040	104,–	**210528** 0040	153,–
50.0	36	22	6	210525 0050	145,–	210528 0050	200,–
63.0	40	27	8	210525 0063	205,–	210528 0063	275,–
80.0	45	27	8	210525 0080	335,–	210528 0080	410,–
100.0	50	32	10	210525 0100	529,–	210528 0100	609,–
125.0	56	40	12	210525 0125	789,–		
				2104		2104	



Overview of HSS / HSS-E / HSS-E-PM end milling cutters

Sorting by type and number of cutting edges	End milling cutters							
								
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	SARA®	SARA®
							ALU	ALU
Number of cutting edges	1	1	2	2	2	2	2	2
Diameter range / mm	3 - 8	3 - 8	1 - 40	2 - 25	2 - 22	2 - 20	6 - 25	6 - 20
Standard	Factory standard	Factory standard	327D	327D	327D	327D	DIN844	DIN844
Version	Short	Long	Short	Short	Long	Long	Short	Long
Type/profile	W	W	N	N	N	N	W	W
Cutting material	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
Coating				AlCrN		AlCrN		
Order No.	290534....	290535....	220101....	220110....	220115....	220125....	290533....	290539....
Catalogue page	20-18	20-18	20-19	20-19	20-19	20-19	20-20	20-20
Material groups	Usage recommendations							
Steel < 700 N/mm²			●	●	●	●		
Steel < 1000 N/mm²			●	●	●	●		
Steel < 1400 N/mm²			●	●	●	●		
Stainless steel ferritic/martensitic			○	○	○	○		
Stainless steel austenitic			○	○	○	○		
Stainless steel duplex			○	○	○	○		
Cast iron GG/GTS			○	○	○	○		
Cast iron GGG			○	○	○	○		
Titanium alloys								
Superalloys Fe/NiCo base < 30 HRc								
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	●	●	○	○	○	○	●	●
Aluminium ≥ 8 % Si	●	●	○	○	○	○	●	●
Copper Cu-alloy	●	●	○	○	○	○	○	○
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc								
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

Sorting by type and number of cutting edges	End milling cutters					
						
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Number of cutting edges	2	3	3	3	3	3
Diameter range / mm	4 - 28	1 - 10	2 - 10	1.5 - 30.0	2 - 20	3 - 30
Standard	DIN327N	Factory standard	Factory standard	DIN844B	DIN844B	DIN844B
Version	Short	Short	Long	Short	Short	Long
Type/profile	N	N	N	N	N	N
Cutting material	HSS-E-PM	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
Coating	TiAlN				AlCrN	
Order No.	226205....	222001....	222010....	220501....	220510....	220515....
Catalogue page	20-20	20-21	20-21	20-22	20-22	20-22
Material groups	Usage recommendations					
Steel < 700 N/mm²	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●
Steel < 1400 N/mm²	●	○	○	○	○	○
Stainless steel ferritic/martensitic	●	○	○	○	○	○
Stainless steel austenitic	○	○	○	○	○	○
Stainless steel duplex	○	○	○	○	○	○
Cast iron GG/GTS	●	○	○	○	○	○
Cast iron GGG	○	○	○	○	○	○
Titanium alloys	○					
Superalloys Fe/NiCo base < 30 HRc	○					
Superalloys Fe/NiCo base ≥ 30 HRc						
Aluminium < 8 % Si	○	○	○	○	○	○
Aluminium ≥ 8 % Si	○	○	○	○	○	○
Copper Cu-alloy	○	○	○	○	○	○
Graphite GRP/CFP/thermoset						
Hardened steel < 55 HRc	○					
Hardened steel < 60 HRc						
Hardened steel ≥ 60 HRc						

	End milling cutters							
Sorting by type and number of cutting edges								
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Number of cutting edges	3	4 - 6	4	4 - 6	4	4 - 6	4 - 6	3
Diameter range / mm	3 - 20	2 - 30	3 - 20	3 - 32	6 - 20	2 - 32	6 - 32	4 - 28
Standard	DIN844B	DIN844B	DIN844	DIN844	DIN844	DIN844N	DIN844N	DIN844W
Version	Long	Short	Short	Long	Long	Short	Long	Short
Type/profile	N	N	N	N	N	N	N	N
Cutting material	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E-PM	HSS-E-PM	HSS-E-PM
Coating	AlCrN		AlCrN		AlCrN	TiAlN	TiAlN	TiAlN
Order No.	220525....	224001....	224010....	224015....	224055....	226225....	226235....	226215....
Catalogue page	20-22	20-23	20-23	20-23	20-23	20-24	20-24	20-25
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	○	○	●	●	●	●	●	●
Stainless steel ferritic/martensitic	○	○	●	●	●	●	●	●
Stainless steel austenitic	○	○	○	○	○	○	○	○
Stainless steel duplex	○	○	○	○	○	○	○	○
Cast iron GG/GTS	○	○	●	●	●	●	●	●
Cast iron GGG	○	○	○	○	○	○	○	○
Titanium alloys			○	○	○	○	○	○
Superalloys Fe/NiCo base < 30 HRc			○	○	○	○	○	○
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	○	○	○	○	○	○	○	○
Aluminium ≥ 8 % Si	○	○	○	○	○	○	○	○
Copper Cu-alloy	○	○	○	○	○	○	○	○
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc			○	○	○	○	○	○
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								



... maximum material removal rate

ATORN®
High quality for great performance

Overview of HSS / HSS-E / HSS-E-PM end milling cutters (cont'd)

	Roughing cutter							
Sorting by type and number of cutting edges								
Brand	SARA	SARA	ATORN	ATORN	ATORN	ATORN	SARA	SARA
Number of cutting edges	4 - 6	4	4 - 5	4	4 - 6	4 - 6	4 - 5	4 - 5
Diameter range / mm	6 - 40	6 - 20	6 - 20	6 - 20	6 - 32	6 - 32	6 - 25	6 - 25
Standard	DIN844B	DIN844B	DIN844	DIN844	DIN844	DIN844	DIN844B	DIN844B
Version	Short	Short	Short	Long	Short	Long	Short	Short
Type/profile	NF	NF	NF	NF	NR-F	NR-F	HR	HR
Cutting material	HSS-E	HSS-E	HSS-E-PM	HSS-E-PM	HSS-E-PM	HSS-E-PM	HSS-E	HSS-E
Coating		AlCrN	TiAlN	TiAlN	TiAlN	TiAlN		AlCrN
Order No.	226001....	226010....	226255....	226275....	226245....	226265....	225030....	225040....
Catalogue page	20-25	20-25	20-26	20-26	20-26	20-27	20-27	20-27
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	○	○	●	●	●	●	○	○
Stainless steel ferritic/martensitic	○	○	●	●	●	●	○	○
Stainless steel austenitic	○	○	○	○	○	○	○	○
Stainless steel duplex	○	○	○	○	○	○	○	○
Cast iron GG/GTS	○	○	●	●	●	●	○	○
Cast iron GGG	○	○	○	○	○	○	○	○
Titanium alloys			○	○	○	○		
Superalloys Fe/NiCo base < 30 HRc			○	○	○	○		
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	○	○	○	○	○	○	○	○
Aluminium ≥ 8 % Si	○	○	○	○	○	○	○	○
Copper Cu-alloy	○	○	○	○	○	○	○	○
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc			○	○	○	○		
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

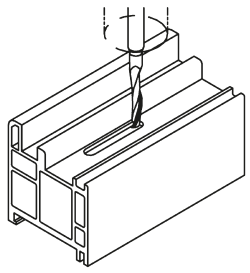
	Roughing cutter							
Sorting by type and number of cutting edges								
Brand	SARA	SARA	SARA	SARA	SARA	SARA	SARA	SARA
								ALU
Number of cutting edges	4 - 6	4 - 6	3 - 6	3 - 6	4 - 6	4 - 5	3 - 6	3
Diameter range / mm	8 - 30	8 - 30	6 - 40	6 - 32	6 - 40	6 - 32	4 - 25	6 - 30
Standard	DIN844B	DIN844B	DIN844B	DIN844B	DIN844HR	DIN844B	DIN844HR	DIN844
Version	Long	Long	Short	Short	Long	Long	Short	Short
Type/profile	HR	HR	NR	NR	NR		HR	WR
Cutting material	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E-PM	HSS-E
Coating		AlCrN		AlCrN		AlCrN	TiAlN	
Order No.	290929....	290931....	225001....	225010....	225015....	225025....	226247....	290963....
Catalogue page	20-27	20-27	20-28	20-28	20-28	20-28	20-29	20-29
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	
Steel < 1000 N/mm²	●	●	●	●	●	●	●	
Steel < 1400 N/mm²	○	○	○	○	○	○	●	
Stainless steel ferritic/martensitic	○	○	○	○	○	○	●	
Stainless steel austenitic	○	○	○	○	○	○	○	
Stainless steel duplex	○	○	○	○	○	○	○	
Cast iron GG/GTS	○	○	○	○	○	○	●	
Cast iron GGG	○	○	○	○	○	○	○	
Titanium alloys							○	
Superalloys Fe/NiCo base < 30 HRc							○	
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	○	○	○	○	○	○	○	●
Aluminium ≥ 8 % Si	○	○	○	○	○	○	○	●
Copper Cu-alloy	○	○	○	○	○	○	○	○
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc							○	
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

	Radius milling cutters		Form milling cutters		
Sorting by type and number of cutting edges					
Brand	ATORN	ATORN	SARA	SARA	SARA
Number of cutting edges	2	2	6 - 10	6 - 10	4 - 8
Diameter range / mm	3 - 20	3 - 20	4.5 - 45.5	11 - 60	12.5 - 40.0
Standard	327	327	DIN850	DIN851	DIN851
Version	Short	Long	Short	Short	Short
Type/profile	N	N	N	N	NR
Cutting material	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
Coating					
Order No.	221001....	221005....	291360....	291365....	291367....
Catalogue page	20-30	20-30	20-31	20-31	20-32
Material groups	Usage recommendations		Usage recommendations		
Steel < 700 N/mm²	●	●	○	○	○
Steel < 1000 N/mm²	●	●	○	○	○
Steel < 1400 N/mm²	○	○			
Stainless steel ferritic/martensitic	○	○	○	○	○
Stainless steel austenitic	○	○	○	○	○
Stainless steel duplex	○	○			
Cast iron GG/GTS	○	○	○	○	○
Cast iron GGG	○	○	○	○	○
Titanium alloys					
Superalloys Fe/NiCo base < 30 HRc					
Superalloys Fe/NiCo base ≥ 30 HRc					
Aluminium < 8 % Si	○	○	○	○	○
Aluminium ≥ 8 % Si	○	○	○	○	○
Copper Cu-alloy	○	○	○	○	○
Graphite GRP/CFP/thermoset					
Hardened steel < 55 HRc					
Hardened steel < 60 HRc					
Hardened steel ≥ 60 HRc					

	Form milling cutters				
Sorting by type and number of cutting edges					
Brand	SARA	SARA	SARA	SARA	SARA
Number of cutting edges	4 - 6	6 - 10	6 - 10	10 - 12	10 - 12
Diameter range / mm	8 - 56	16 - 32	16 - 32	16 - 32	16 - 32
Standard	DIN6518	DIN1833	DIN1833	DIN1833	DIN1833
Version	Short	Short 45°	Short 60°	Short 45°	Short 60°
Type/profile	N	N	N	N	N
Cutting material	HSS-E	HSS-E	HSS-E	HSS-E	HSS-E
Coating					
Order No.	291304....	291392....	291393....	291394....	291395....
Catalogue page	20-32	20-33	20-33	20-33	20-33
Material groups	Usage recommendations				
Steel < 700 N/mm²	○	○	○	○	○
Steel < 1000 N/mm²	○	○	○	○	○
Steel < 1400 N/mm²					
Stainless steel ferritic/martensitic	○	○	○	○	○
Stainless steel austenitic	○	○	○	○	○
Stainless steel duplex					
Cast iron GG/GTS	○	○	○	○	○
Cast iron GGG	○	○	○	○	○
Titanium alloys					
Superalloys Fe/NiCo base < 30 HRc					
Superalloys Fe/NiCo base ≥ 30 HRc					
Aluminium < 8 % Si	○	○	○	○	○
Aluminium ≥ 8 % Si	○	○	○	○	○
Copper Cu-alloy	○	○	○	○	○
Graphite GRP/CFP/thermoset					
Hardened steel < 55 HRc					
Hardened steel < 60 HRc					
Hardened steel ≥ 60 HRc					

ATORN® Single-blade end milling cutters

HSS-E | Werks-norm | Typ W | 30° | DIN 6535 HA | Z 1 | | Vc/fz | 20-240



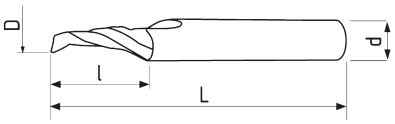
- **Special geometry for aluminium and plastics**
- Centre cutting

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
290535....												● 100	● 120	● 90				
290534....				○								● 100	● 120	● 90				

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

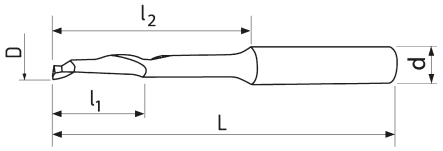




Short

D mm	L1 mm	L mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	12	60	8	0.005	0.007	**290534** 0030	13,90
4.0	12	60	8	0.006	0.008	290534 0040	13,90
5.0	14	60	8	0.009	0.013	290534 0050	13,90
6.0	14	60	8	0.012	0.017	290534 0060	13,90
8.0	14	80	8	0.018	0.025	290534 0080	15,50
						2105	





Long

D mm	L1 mm	L mm	L2 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
4.0	16	80	45	8	0.006	0.008	**290535** 0040	22,20
5.0	16	80	45	8	0.009	0.013	290535 0050	22,20
6.0	16	90	45	8	0.012	0.017	290535 0060	22,20
8.0	30	100	70	8	0.018	0.025	290535 0080	33,90
							2105	

Cutting data calculator

For easy calculation of cutting speeds, rotation speeds, feed rates, feed speeds, machine times, chipping volumes and performance

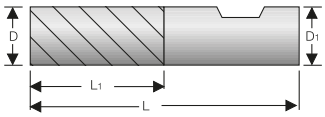


Description	art.no.	€
180 x 78 mm, plastic, with reading slider	**019900** 1006	5,95
	0111	

ATORN® Slot drill

HSS-E | DIN 327 | Typ N | 30° | DIN 1835 B | Z 2 | AlCrN | Vc/fz | 20-240

- **For P9 keyways**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	220101....	● 24	● 24		○ 13	○ 17		○ 27	○ 27				○ 180	○ 55	○ 45				
	220110....	● 41	● 41		○ 19	○ 24		○ 38	○ 38				○ 260	○ 80	○ 55				
	220125....	● 32	● 32		○ 19	○ 24		○ 38	○ 38				○ 260	○ 80	○ 55				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



Short

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
1.0	2.5	47	6	0.002	**220101** 0010	12,80		
1.5	3	47	6	0.002	220101 0015	12,40		
2.0	4	48	6	0.003	220101 0020	9,25	**220110** 0020	13,20
2.5	5	49	6	0.003	220101 0025	9,25	220110 0025	13,20
3.0	5	49	6	0.003	220101 0030	7,20	220110 0030	13,20
3.5	6	50	6	0.003	220101 0035	9,25	220110 0035	13,20
3.8	7	51	6	0.003	220101 0038	9,25	220110 0038	13,20
4.0	7	51	6	0.005	220101 0040	7,20	220110 0040	13,20
4.5	7	51	6	0.005	220101 0045	9,25	220110 0045	13,20
4.8	8	52	6	0.005	220101 0048	9,25	220110 0048	13,20
5.0	8	52	6	0.005	220101 0050	7,45	220110 0050	13,20
5.5	8	52	6	0.005	220101 0055	9,25	220110 0055	13,20
6.0	8	52	6	0.007	220101 0060	7,45	220110 0060	14,20
6.5	10	60	10	0.007	220101 0065	11,–		
7.0	10	60	10	0.007	220101 0070	11,–	220110 0070	16,20
7.5	10	60	10	0.007	220101 0075	11,–		
7.75	11	61	10	0.007	220101 0077	11,–		
8.0	11	61	10	0.01	220101 0080	9,95	220110 0080	16,20
8.5	11	61	10	0.01	220101 0085	13,35		
9.0	11	61	10	0.01	220101 0090	13,35		
9.5	11	61	10	0.01	220101 0095	13,35		
					2106		2106	

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
10.0	13	63	10	0.016	220101 0100	11,–	220110 0100	16,20
11.0	13	70	12	0.016	220101 0110	17,90	220110 0110	23,10
12.0	16	73	12	0.025	220101 0120	15,80	220110 0120	23,10
13.0	16	73	12	0.025	220101 0130	20,80		
14.0	16	73	12	0.025	220101 0140	21,–	220110 0140	27,80
15.0	16	73	16	0.025	220101 0150	25,30	220110 0150	34,–
16.0	19	79	16	0.03	220101 0160	25,50	220110 0160	33,50
18.0	19	79	16	0.03	220101 0180	30,50	220110 0180	41,10
20.0	22	88	20	0.035	220101 0200	35,30	220110 0200	51,–
22.0	22	98	25	0.035	220101 0220	51,50	220110 0220	79,–
25.0	26	102	25	0.035	220101 0250	56,50	220110 0250	96,–
26.0	26	102	25	0.035	220101 0260	65,50		
28.0	26	102	25	0.035	220101 0280	66,–		
30.0	26	102	25	0.035	220101 0300	83,50		
32.0	32	112	32	0.035	220101 0320	90,–		
36.0	32	112	32	0.035	220101 0360	120,50		
40.0	38	120	40	0.035	220101 0400	152,–		
					2106		2106	



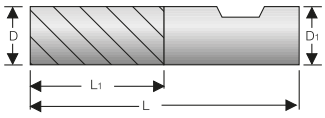
Long

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
2.0	7	51	6	0.003	**220115** 0020	14,40	**220125** 0020	19,60
2.5	8	52	6	0.003	220115 0025	14,40	220125 0025	20,50
3.0	8	52	6	0.003	220115 0030	13,40	220125 0030	19,20
3.5	10	54	6	0.003	220115 0035	14,40	220125 0035	20,50
4.0	11	55	6	0.004	220115 0040	13,40	220125 0040	19,20
4.5	11	55	6	0.004	220115 0045	14,40	220125 0045	20,50
5.0	13	57	6	0.004	220115 0050	13,40	220125 0050	19,20
5.5	13	57	6	0.004	220115 0055	14,40	220125 0055	20,60
6.0	13	57	6	0.006	220115 0060	13,40	220125 0060	19,30
6.5	16	66	10	0.006	220115 0065	20,40	220125 0065	25,–
7.0	16	66	10	0.006	220115 0070	20,40		
					2106		2106	

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
8.0	19	69	10	0.009	220115 0080	18,90	220125 0080	21,70
8.5	19	69	10	0.009	220115 0085	20,40		
9.0	19	69	10	0.009	220115 0090	20,40		
10.0	22	72	10	0.014	220115 0100	18,90	220125 0100	23,60
11.0	22	79	12	0.014	220115 0110	28,50		
12.0	26	83	12	0.021	220115 0120	22,10	220125 0120	26,10
14.0	26	83	12	0.021	220115 0140	37,80	220125 0140	46,60
16.0	32	92	16	0.025	220115 0160	45,–	220125 0160	55,50
18.0	32	92	16	0.025	220115 0180	57,90	220125 0180	72,–
20.0	38	104	20	0.031	220115 0200	59,50	220125 0200	72,–
22.0	38	104	20	0.031	220115 0220	82,50		
					2106		2106	

SARA® Aluminium slot drill

HSS-E | DIN 844 | Typ W | 40° | DIN 1835 B | Z 2 | Vc/fz | 20-240



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													● 70-85	● 35-45	○ 30-35				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
6.0	13	57	6	0.013	**290533** 0060	14,75
8.0	19	69	10	0.019	290533 0080	17,70
10.0	22	72	10	0.025	290533 0100	19,60
12.0	26	83	12	0.03	290533 0120	22,60
16.0	32	92	16	0.038	290533 0160	33,40
20.0	38	104	20	0.045	290533 0201	46,60
25.0	45	121	25	0.055	290533 0250	68,50

2105

Long



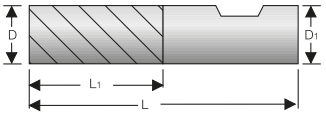
D mm	L1 mm	L mm	D1 mm	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
6.0	24	68	6	0.013	**290539** 0060	18,70
8.0	38	88	10	0.019	290539 0080	22,80
10.0	45	95	10	0.025	290539 0100	23,30
12.0	53	110	12	0.03	290539 0120	27,40
16.0	63	123	16	0.038	290539 0160	39,90
20.0	75	141	20	0.045	290539 0201	68,50

2105

ATORN® Slot drill

HSS-E PM | DIN 327N | 30° | DIN 1835 B | Z 2 | TiAlN | Vc/fz | 20-240

- Eccentric relief grinding
- For P9 keyways



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 55-80	● 55-80	○ 45-75	● 30-45	○ 30-45		● 35-65	● 35-65	● 30-45			○ 290-420	○ 90-170	● 110-210		○ 20-35		
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

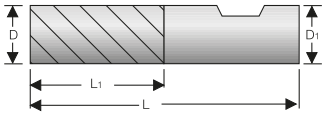


D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4.0	7	51	6	0.012	**226205** 0040	19,30
5.0	8	52	6	0.012	226205 0050	19,30
6.0	8	52	6	0.018	226205 0060	19,30
7.0	10	60	10	0.018	226205 0070	26,70
8.0	11	61	10	0.021	226205 0080	24,10
9.0	11	61	10	0.021	226205 0090	28,70
10.0	13	63	10	0.035	226205 0100	26,70
12.0	16	73	12	0.041	226205 0120	34,50
14.0	16	73	12	0.041	226205 0140	42,60
16.0	19	79	16	0.069	226205 0160	50,50
18.0	19	79	16	0.069	226205 0180	59,50
20.0	22	88	20	0.069	226205 0200	69,–
25.0	26	102	25	0.069	226205 0250	121,–
28.0	26	102	25	0.069	226205 0280	157,–

2106

ATORN® End milling cutters

HSS-E | Werks-norm | Typ N | 30° | DIN 1835 B | Z 3 | Vc/fz | 20-240



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	222001....	● 40	● 30		○ 15	○ 20		○ 30	○ 30				○ 70	○ 60	○ 50				
	222010....	● 24	● 24		○ 13	○ 17		○ 27	○ 27				○ 180	○ 55	○ 45				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
1.0	2	34	6	0.002	**222001** 0010	6,80
1.5	3	34	6	0.002	222001 0015	6,80
1.8	3	34	6	0.002	222001 0018	6,80
2.0	3	35	6	0.002	222001 0020	6,80
2.3	4	35	6	0.004	222001 0023	6,80
2.5	5	36	6	0.004	222001 0025	6,80
2.8	5	36	6	0.004	222001 0028	6,80
3.0	5	36	6	0.007	222001 0030	6,80
3.3	6	37	6	0.007	222001 0033	6,80
3.5	6	37	6	0.007	222001 0035	6,80
3.8	7	38	6	0.007	222001 0038	6,80
4.0	7	38	6	0.007	222001 0040	6,80
4.3	7	38	6	0.01	222001 0043	6,80
4.5	7	38	6	0.01	222001 0045	6,80
4.8	8	39	6	0.01	222001 0048	6,80
5.0	8	39	6	0.01	222001 0050	6,80
5.3	8	39	6	0.013	222001 0053	6,80
5.5	8	39	6	0.013	222001 0055	6,80
6.0	8	39	6	0.013	222001 0060	6,80
6.5	10	42	8	0.013	222001 0065	6,80
7.0	10	42	8	0.016	222001 0070	8,25
8.0	11	43	8	0.016	222001 0080	8,25
8.5	11	48	10	0.02	222001 0085	9,30
9.0	11	48	10	0.02	222001 0090	11,–
10.0	13	50	10	0.02	222001 0100	10,50

2106

Long

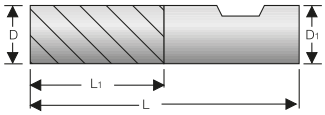


D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
2.0	7	38	6	0.002	**222010** 0020	7,70
2.5	8	39	6	0.002	222010 0025	7,70
3.0	8	39	6	0.007	222010 0030	7,70
3.5	10	41	6	0.007	222010 0035	7,70
4.0	11	42	6	0.007	222010 0040	7,70
4.5	11	42	6	0.01	222010 0045	7,70
5.0	13	44	6	0.01	222010 0050	7,70
5.5	13	44	6	0.013	222010 0055	7,70
6.0	13	44	6	0.013	222010 0060	7,70
6.5	16	48	8	0.015	222010 0065	8,85
7.0	16	48	8	0.016	222010 0070	9,20
8.0	19	51	8	0.016	222010 0080	9,20
9.0	19	56	10	0.02	222010 0090	11,80
10.0	22	59	10	0.02	222010 0100	11,80

2106

ATORN® End milling cutters

HSS-E | DIN 844 | Typ N | 30° | DIN 1835 B | Z 3 | AlCrN | Vc/fz | 20-240



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	220501....	● 24	● 24		○ 13	○ 17		○ 27	○ 27				○ 180	○ 55	○ 45				
	220510....	● 41	● 41		○ 19	○ 24		○ 38	○ 38				○ 260	○ 80	○ 55				
	220515....	● 23	● 23		○ 12	○ 16		○ 25	○ 25				○ 162	○ 50	○ 40				
	220525....	● 37	● 37		○ 17	○ 22		○ 28	○ 28				○ 234	○ 72	○ 50				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
1.5	7	51	6	0.002	**220501** 0015	10,85		
2.0	7	51	6	0.003	220501 0020	10,85	**220510** 0020	13,95
3.0	8	52	6	0.003	220501 0030	10,85	220510 0030	14,20
4.0	11	55	6	0.005	220501 0040	10,85	220510 0040	14,20
4.5	11	55	6	0.005	220501 0045	10,85	220510 0045	14,20
5.0	13	57	6	0.005	220501 0050	10,85	220510 0050	14,20
5.5	13	57	6	0.005	220501 0055	10,85	220510 0055	14,20
6.0	13	57	6	0.007	220501 0060	10,85	220510 0060	14,20
6.5	16	66	10	0.007	220501 0065	14,45		
7.0	16	66	10	0.007	220501 0070	14,15	220510 0070	18,30
7.5	16	66	10	0.007	220501 0075	14,15		
8.0	19	69	10	0.01	220501 0080	14,15	220510 0080	18,30
8.5	19	69	10	0.01	220501 0085	14,15		
9.0	19	69	10	0.01	220501 0090	14,15	220510 0090	18,90
9.5	19	69	10	0.01	220501 0095	14,15		
10.0	22	72	10	0.016	220501 0100	13,55	220510 0100	19,10
11.0	22	79	12	0.016	220501 0110	20,90	220510 0110	26,60
12.0	26	83	12	0.025	220501 0120	18,30	220510 0120	26,60
13.0	26	83	12	0.025	220501 0130	28,40	220510 0130	35,70
14.0	26	83	12	0.025	220501 0140	28,40	220510 0140	35,70
15.0	26	83	16	0.025	220501 0150	29,70	220510 0150	36,90
16.0	32	92	16	0.03	220501 0160	28,–	220510 0160	34,80
17.0	32	92	16	0.03	220501 0170	39,50		
18.0	32	92	16	0.03	220501 0180	38,20	220510 0180	47,60
20.0	38	104	20	0.035	220501 0200	42,90	220510 0200	53,50
22.0	38	104	20	0.035	220501 0220	66,50	220510 0220	82,50
24.0	45	121	25	0.035	220501 0240	62,50		
25.0	45	121	25	0.035	220501 0250	65,–		
28.0	45	121	25	0.035	220501 0280	107,50		
30.0	45	121	25	0.035	220501 0300	123,50		
					2106		2106	

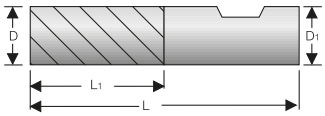
Long



D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
3.0	12	56	6	0.003	**220515** 0030	15,70	**220525** 0030	21,30
4.0	19	63	6	0.004	220515 0040	15,70	220525 0040	21,30
5.0	24	68	6	0.004	220515 0050	15,10	220525 0050	21,50
6.0	24	68	6	0.006	220515 0060	14,50	220525 0060	21,50
8.0	38	88	10	0.009	220515 0080	19,60	220525 0080	25,20
10.0	45	95	10	0.014	220515 0100	20,50	220525 0100	26,30
12.0	53	110	12	0.021	220515 0120	25,50	220525 0120	30,30
14.0	53	110	12	0.021	220515 0140	38,70	220525 0140	47,50
16.0	63	123	16	0.025	220515 0160	41,50	220525 0160	50,50
18.0	63	123	16	0.025	220515 0180	53,–	220525 0180	57,50
20.0	75	141	20	0.031	220515 0200	58,50	220525 0200	67,–
					2106		2106	

ATORN® End milling cutters

HSS-E | DIN 844 | Typ N | 30° | DIN 1835 B | Z 4 | Z 5 | Z 6 | AlCrN | 20-240



- **Face cutter geometry for plunge milling (not extra-long version)**

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
224001....	● 20-25	● 20-25		○ 10-15	○ 10-15		○ 18-20	○ 18-20				○ 80-100	○ 40-50	○ 35-45				
224010....	● 50-60	● 50-60		○ 25-30	○ 25-30		○ 45-55	○ 45-55				○ 120-14	○ 100-130	○ 85-105				
224015....	● 20-25	● 18-22		○ 10-15	○ 10-15		○ 10-15	○ 15-20				○ 70-90	○ 35-45	○ 50-60				
224055....	● 45-55	● 40-50		○ 30-40	○ 30-40		○ 35-45	○ 35-45				○ 100-130	○ 100-120	○ 80-100				

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
2.0	7	51	6	4	0.002	**224001** 0020	9,65		
2.5	8	52	6	4	0.002	224001 0025	9,65		
3.0	8	52	6	4	0.003	224001 0030	9,65	**224010** 0030	14,15
3.5	10	54	6	4	0.003	224001 0035	9,65		
4.0	11	55	6	4	0.007	224001 0040	9,65	224010 0040	14,15
5.0	13	57	6	4	0.009	224001 0050	9,65	224010 0050	14,15
6.0	13	57	6	4	0.011	224001 0060	9,65	224010 0060	14,35
7.0	16	66	10	4	0.011	224001 0070	13,20	224010 0070	17,70
8.0	19	69	10	4	0.016	224001 0080	13,20	224010 0080	17,70
8.5	19	69	10	4	0.016	224001 0085	13,20		
9.0	19	69	10	4	0.016	224001 0090	13,20		
10.0	22	72	10	4	0.021	224001 0100	12,40	224010 0100	18,20
11.0	22	79	12	4	0.021	224001 0110	18,90		
12.0	26	83	12	4	0.026	224001 0120	16,50	224010 0120	22,20
13.0	26	83	12	4	0.026	224001 0130	29,70		
14.0	26	83	12	4	0.026	224001 0140	29,70	224010 0140	30,90
15.0	26	83	16	4	0.026	224001 0150	29,80		
16.0	32	92	16	4	0.032	224001 0160	25,90	224010 0160	35,50
18.0	32	92	16	4	0.032	224001 0180	42,90	224010 0180	41,30
20.0	38	104	20	4	0.038	224001 0200	37,60	224010 0200	50,50
22.0	38	104	20	5	0.038	224001 0220	45,10		
24.0	45	121	25	5	0.04	224001 0240	62,50		
28.0	45	121	25	6	0.045	224001 0280	68,50		
30.0	45	121	25	6	0.05	224001 0300	101,50		
						2106		2106	

Long

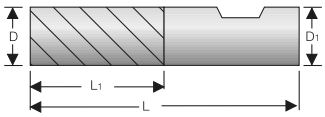


D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
3.0	12	56	6	4	0.002	**224015** 0030	15,30		
4.0	19	63	6	4	0.004	224015 0040	15,30		
5.0	24	68	6	4	0.006	224015 0050	15,30		
6.0	24	68	6	4	0.008	224015 0060	15,30	**224055** 0060	19,70
7.0	30	80	10	4	0.008	224015 0070	22,–		
8.0	38	88	10	4	0.012	224015 0080	22,–	224055 0080	28,80
9.0	38	88	10	4	0.012	224015 0090	22,–		
10.0	45	95	10	4	0.015	224015 0100	22,–	224055 0100	30,70
11.0	45	102	12	4	0.015	224015 0110	30,20		
12.0	53	110	12	4	0.018	224015 0120	30,20	224055 0120	38,50
14.0	53	110	12	4	0.018	224015 0140	43,60	224055 0140	53,50
16.0	63	123	16	4	0.023	224015 0160	53,20	224055 0160	65,–
18.0	63	123	16	4	0.023	224015 0180	65,50	224055 0180	78,50
20.0	75	141	20	4	0.028	224015 0200	61,50	224055 0200	86,–
22.0	75	141	20	5	0.03	224015 0220	71,50		
25.0	90	166	25	5	0.038	224015 0250	88,50		
28.0	90	166	25	6	0.04	224015 0280	108,50		
30.0	90	166	25	6	0.045	224015 0300	124,–		
32.0	106	186	32	6	0.05	224015 0320	136,50		
						2106		2106	

ATORN® End milling cutters

HSS-E PM | DIN 844N | 30° | DIN 1835 B | Z 4 | Z 6 | TiAlN | Vc/fz | 20-243

- Eccentric relief grinding



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
			● 45-75	○ 30-45	● 20-35	● 30-45		● 35-65	● 35-65	● 30-45			● 290-420	● 90-170	● 110-210		○ 20-35		
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 h6 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
2.0	7	51	6	4	0.008	**226225** 0020	17,90
3.0	8	52	6	4	0.008	226225 0030	17,90
4.0	11	55	6	4	0.009	226225 0040	17,90
5.0	13	57	6	4	0.01	226225 0050	17,90
6.0	13	57	6	4	0.018	226225 0060	17,90
7.0	16	66	10	4	0.018	226225 0070	24,–
8.0	19	69	10	4	0.021	226225 0080	22,40
9.0	19	69	10	4	0.021	226225 0090	27,80
10.0	22	72	10	4	0.035	226225 0100	24,80
12.0	26	83	12	4	0.041	226225 0120	31,10
14.0	26	83	12	4	0.041	226225 0140	39,40
16.0	32	92	16	4	0.069	226225 0160	45,80
18.0	32	92	16	4	0.069	226225 0180	55,–
20.0	38	104	20	4	0.069	226225 0200	63,50
25.0	45	121	25	6	0.069	226225 0250	104,–
28.0	45	121	25	6	0.069	226225 0280	149,–
30.0	45	121	25	6	0.069	226225 0300	155,–
32.0	53	133	32	6	0.069	226225 0320	154,–

2106

Long



D mm	L1 mm	L mm	D1 h6 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	24	68	6	4	0.018	**226235** 0060	27,30
8.0	38	88	10	4	0.021	226235 0080	34,70
10.0	45	95	10	4	0.035	226235 0100	37,70
12.0	53	110	12	4	0.011	226235 0120	48,90
14.0	53	110	12	4	0.011	226235 0140	56,–
16.0	63	123	16	4	0.069	226235 0160	70,–
18.0	63	123	16	4	0.069	226235 0180	86,–
20.0	75	141	20	4	0.069	226235 0200	99,50
25.0	90	166	25	6	0.069	226235 0250	165,–
32.0	106	186	32	6	0.069	226235 0320	230,–

2106



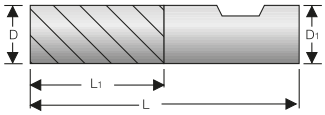
...suggestions are heard.

ATORN®
High quality for great performance

ATORN® End milling cutters

HSS-E PM | DIN 844N | 45° | DIN 1835 B | Z 3 | TiAlN | Vc/fz | 20-242

- Eccentric relief grinding



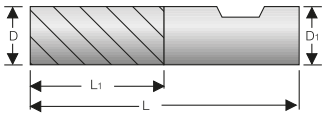
material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 45-75	● 45-65	● 30-45		● 20-35		● 25-45	○ 25-45	● 30-45									
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L mm	D1 h6 mm	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4.0	11	55	6	0.008	**226215** 0040	21,90
5.0	13	57	6	0.008	226215 0050	21,90
6.0	13	57	6	0.018	226215 0060	21,90
7.0	16	66	10	0.018	226215 0070	27,20
8.0	19	69	10	0.021	226215 0080	27,20
9.0	19	69	10	0.021	226215 0090	32,40
10.0	22	72	10	0.036	226215 0100	29,40
12.0	26	83	12	0.036	226215 0120	36,–
14.0	26	83	12	0.036	226215 0140	46,90
16.0	32	92	16	0.053	226215 0160	55,50
18.0	32	92	16	0.053	226215 0180	65,–
20.0	38	104	20	0.053	226215 0200	77,–
25.0	45	121	25	0.053	226215 0250	138,–
28.0	45	121	25	0.053	226215 0280	168,–
					2106	

SARA® Roughing / finishing cutter

HSS-E | DIN 844B | NF | 30° | DIN 1835 B | Z 4 | Z 5 | Z 6 | AlCrN | Vc/fz | 20-240



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	226001....	● 25-30	● 25-30		○ 18-25	○ 18-25		○ 25-30	○ 25-30										
	226010....	● 50-60	● 45-55		○ 35-45	○ 35-45		○ 45-55	○ 45-55										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

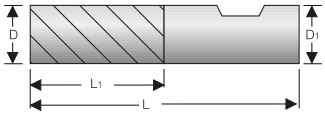


D mm	L1 mm	L mm	D1 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
6.0	13	57	6	4	0.009	**226001** 0060	22,20	**226010** 0060	35,50
7.0	16	60	8	4	0.009	226001 0070	26,50		
8.0	19	69	10	4	0.014	226001 0080	26,20	226010 0080	40,10
10.0	22	72	10	4	0.018	226001 0100	28,90	226010 0100	45,–
11.0	22	79	12	4	0.018	226001 0110	34,10		
12.0	26	83	12	4	0.022	226001 0120	31,10	226010 0120	49,90
14.0	26	83	12	4	0.022	226001 0140	34,90	226010 0140	59,50
16.0	32	92	16	4	0.027	226001 0160	40,80	226010 0160	73,–
18.0	32	92	16	4	0.027	226001 0180	43,30	226010 0180	88,–
20.0	38	104	20	4	0.033	226001 0200	53,50	226010 0200	97,50
22.0	38	104	20	4	0.035	226001 0220	61,50		
25.0	45	121	25	5	0.04	226001 0250	74,–		
28.0	45	121	25	5	0.045	226001 0280	93,50		
30.0	45	121	25	5	0.05	226001 0300	113,–		
32.0	53	133	32	6	0.055	226001 0320	123,–		
						2105		2105	

ATORN® Roughing / finishing cutter

HSS-E PM | DIN 844 NF | 30° | DIN 1835 B | Z 4 | Z 5 | TiAlN | Vc/fz | 20-240

- Eccentric relief grinding



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
226255....	● 55-80	● 45-65	● 30-45	● 30-45	○ 30-45		● 25-45	○ 25-45	● 30-45					○ 90-190		○ 20-35		
226275....	● 55-85	● 45-65	● 30-45	● 30-45	○ 30-45		● 25-45	○ 25-45	● 30-45					○ 90-190		○ 20-35		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 h6 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	13	57	6	4	0.009	0.018	**226255** 0060	28,30
8.0	19	69	10	4	0.011	0.021	226255 0080	35,10
10.0	22	72	10	5	0.017	0.035	226255 0100	29,60
12.0	26	83	12	5	0.021	0.042	226255 0120	38,20
14.0	26	83	12	5	0.021	0.042	226255 0140	43,40
16.0	32	92	16	5	0.035	0.069	226255 0160	51,50
20.0	38	104	20	5	0.035	0.069	226255 0200	73,50

2106

Long



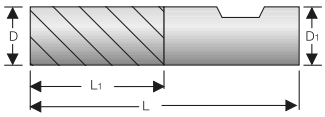
D mm	L1 mm	L mm	D1 h6 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	24	68	6	4	0.009	0.018	**226275** 0060	45,10
8.0	38	88	10	4	0.011	0.021	226275 0080	52,–
10.0	45	95	10	4	0.017	0.035	226275 0100	50,50
12.0	53	110	12	4	0.021	0.042	226275 0120	67,–
16.0	63	123	16	4	0.035	0.069	226275 0160	94,–
20.0	75	141	20	4	0.035	0.069	226275 0200	128,–

2106

ATORN® Roughing cutter

HSS-E PM | DIN 844 NR-F | 30° | DIN 1835 B | Z 4 | Z 5 | Z 6 | TiAlN | Vc/fz | 20-240

- **With fine knuckle-type tooth profile**
- Eccentric relief grinding



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	● 45-75	● 45-75	○ 20-35	● 30-45			● 25-45	○ 25-45	● 30-45							○ 20-35		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	13	57	6	4	0.012	0.021	**226245** 0060	30,–
7.0	16	66	10	4	0.012	0.021	226245 0070	39,90
8.0	19	69	10	4	0.014	0.0245	226245 0080	33,90
9.0	19	69	10	4	0.014	0.0245	226245 0090	38,40
10.0	22	72	10	5	0.0232	0.0406	226245 0100	33,–
12.0	26	83	12	5	0.0276	0.041	226245 0120	42,40
14.0	26	83	12	5	0.0276	0.041	226245 0140	50,50
16.0	32	92	16	5	0.046	0.0805	226245 0160	62,–
18.0	32	92	16	5	0.046	0.0805	226245 0180	67,50
20.0	38	104	20	5	0.046	0.0805	226245 0200	84,–
22.0	38	104	20	5	0.046	0.0805	226245 0220	105,–
25.0	45	121	25	5	0.046	0.0805	226245 0250	123,–
28.0	45	121	25	5	0.046	0.0805	226245 0280	139,–
30.0	45	121	25	5	0.046	0.0805	226245 0300	168,–
32.0	53	133	32	6	0.046	0.0805	226245 0320	173,–

2106

Continued on next page >>>



Long

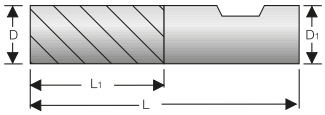
D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	24	68	6	4	0.012	0.021	**226265** 0060	51,–
8.0	38	88	10	4	0.014	0.0245	226265 0080	53,50
10.0	45	95	10	4	0.0232	0.0406	226265 0100	49,10
12.0	53	110	12	4	0.0276	0.0421	226265 0120	61,50
14.0	53	110	12	4	0.0276	0.0421	226265 0140	70,50
16.0	63	123	16	4	0.046	0.0805	226265 0160	87,–
18.0	63	123	16	4	0.046	0.0805	226265 0180	98,–
20.0	75	141	20	4	0.046	0.0805	226265 0200	125,–
25.0	90	166	25	5	0.046	0.0805	226265 0250	191,–
32.0	106	186	32	6	0.046	0.0805	226265 0320	270,–

2106

SARA® Roughing cutter

HSS-E | DIN 844 | HR | 30° | DIN 1835 B | Z 4 | Z 5 | AlCrN | Vc/fz | 20-240

- **Relief-ground knuckle profile**



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
225030....	● 25-30	● 25-30		○ 18-25	○ 18-25		○ 25-30	○ 25-30										
225040....	● 50-60	● 45-55		○ 35-45	○ 35-45		○ 45-55	○ 45-55										
290929....	● 25-30	● 20-25	○ 15-20	○ 15-20	○ 15-20		○ 20-30	○ 20-30										
290931....	● 45-55	● 40-50	○ 30-40	○ 30-40	○ 30-40		○ 40-50	○ 40-50				○ 100-130	○ 100-120	○ 80-100				
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Short

- **Up to Ø 20 mm, cuts to the centre**



D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
6.0	13	57	6	4	0.009	**225030** 0060	19,50	**225040** 0060	24,80
8.0	19	69	10	4	0.014	225030 0080	22,10	225040 0080	27,50
10.0	22	72	10	4	0.018	225030 0100	22,90	225040 0100	28,20
12.0	26	83	12	4	0.022	225030 0120	25,80	225040 0120	31,10
14.0	26	83	12	4	0.022	225030 0140	30,60	225040 0140	43,40
16.0	32	92	16	4	0.027	225030 0160	33,30	225040 0160	46,10
18.0	32	92	16	4	0.027	225030 0180	40,10	225040 0180	53,–
20.0	38	104	20	4	0.033	225030 0200	49,10	225040 0200	62,–
25.0	45	121	25	5	0.04	225030 0250	78,–	225040 0250	95,–

2105 2105



Long

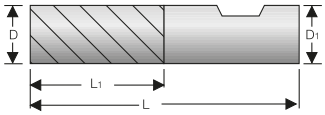
D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
8.0	38	88	10	4	0.012	**290929** 0080	29,70	**290931** 0080	36,60
10.0	45	95	10	4	0.015	290929 0100	35,10	290931 0100	40,50
12.0	53	110	12	4	0.018	290929 0120	40,80	290931 0120	46,10
16.0	63	123	16	4	0.023	290929 0160	53,50	290931 0160	66,50
18.0	63	123	16	4	0.023	290929 0180	65,–	290931 0180	78,–
20.0	75	141	20	4	0.028	290929 0201	71,–	290931 0201	84,–
25.0	90	166	25	4	0.035	290929 0250	93,–	290931 0250	110,–

2105 2105

SARA® Roughing cutter

HSS-E | DIN 844 | NR | 30° | DIN 1835 B | Z 4 | Z 5 | Z 6 | AlCrN | Vc/fz | 20-240

- **Multi-blade milling cutter, relief-ground knuckle profile**
- **Up to Ø 20 mm face cutter geometry for plunge milling (not extra-long version)**



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
225001....	● 25-30	● 25-30		○ 18-25	○ 18-25		○ 25-30	○ 25-30										
225010....	● 50-60	● 45-55		○ 35-45	○ 35-45		○ 45-55	○ 45-55										

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
6.0	13	57	6	4	0.009	**225001** 0060	15,90	**225010** 0060	18,80
8.0	19	69	10	4	0.014	225001 0080	17,90	225010 0080	21,50
10.0	22	72	10	4	0.018	225001 0100	17,90	225010 0100	22,–
12.0	26	83	12	4	0.022	225001 0120	22,90	225010 0120	25,60
14.0	26	83	12	4	0.022	225001 0140	26,20	225010 0140	37,60
16.0	32	92	16	4	0.027	225001 0160	29,80	225010 0160	36,60
18.0	32	92	16	4	0.027	225001 0180	33,50	225010 0180	47,–
20.0	38	104	20	4	0.033	225001 0200	41,20	225010 0200	48,30
22.0	38	104	20	5	0.033	225001 0220	58,70	225010 0220	64,50
25.0	45	121	25	5	0.04	225001 0250	62,50	225010 0250	67,50
28.0	45	121	25	5	0.045	225001 0280	80,50	225010 0280	86,50
30.0	45	121	25	5	0.05	225001 0300	95,50	225010 0300	99,–
32.0	53	133	32	6	0.055	225001 0320	101,–	225010 0320	105,–
36.0	53	133	32	6	0.06	225001 0360	129,–		
40.0	63	155	40	6	0.065	225001 0400	189,–		
						2105		2105	

Long

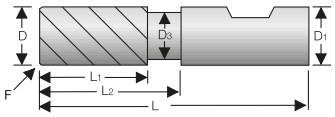


D mm	L1 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	AlCrN art.no.	€
6.0	24	68	6	4	0.009	**225015** 0060	22,10	**225025** 0060	27,60
8.0	38	88	10	4	0.014	225015 0080	34,40	225025 0080	43,–
10.0	45	95	10	4	0.018	225015 0100	36,50	225025 0100	45,40
12.0	53	110	12	4	0.022	225015 0120	48,20	225025 0120	60,50
14.0	53	110	12	4	0.022	225015 0140	46,–	225025 0140	57,50
16.0	63	123	16	4	0.027	225015 0160	58,–	225025 0160	72,50
18.0	63	123	16	4	0.027	225015 0180	70,50	225025 0180	88,–
20.0	75	141	20	4	0.033	225015 0200	90,–	225025 0200	112,–
22.0	75	141	20	4	0.033	225015 0220	109,–	225025 0220	136,–
25.0	90	166	25	5	0.04	225015 0250	128,–	225025 0250	159,–
28.0	90	166	25	5	0.045	225015 0280	159,–	225025 0280	199,–
30.0	90	166	25	5	0.05	225015 0300	171,–	225025 0300	210,–
32.0	106	186	32	6	0.055	225015 0320	182,–	225025 0320	225,–
36.0	106	186	32	6	0.06	225015 0360	220,–		
40.0	125	217	32	6	0.07	225015 0400	245,–		
						2105		2105	

SARA® Roughing cutter

HSS-E PM | DIN 844HR | HR | 45° | DIN 1835 B | Z 3 | Z 4 | Z 5 | Z 6 | TiAlN | Vc/fz 20-244

- Eccentric relief grinding



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 45-75	● 45-65	● 30-45	● 30-45	○ 30-45		● 25-45	○ 25-45								○ 20-35		
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



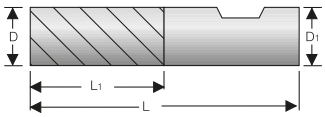
D mm	L1 mm	L mm	D1 h6 mm	L2 mm	D3 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4.0	11	55	6	19	4.0	3	0.008	0.014	**226247** 0040	27,50
5.0	13	57	6	21	4.8	4	0.008	0.014	226247 0050	28,20
6.0	13	57	6	21	5.5	4	0.012	0.021	226247 0060	28,30
8.0	19	69	10	29	7.5	4	0.014	0.0245	226247 0080	32,90
10.0	22	72	10	32	9.5	4	0.0232	0.0406	226247 0100	35,90
12.0	26	83	12	38	11.5	4	0.024	0.042	226247 0120	45,30
16.0	32	92	16	44	15.5	5	0.046	0.0805	226247 0160	67,50
20.0	38	104	20	54	19.5	6	0.046	0.0805	226247 0200	102,–
25.0	45	121	25	65	12.5	6	0.046	0.0805	226247 0250	142,–

2105

SARA® Aluminium roughing cutter

HSS-E | DIN 844 | WR | 30° | DIN 1835 B | Z 3 | Vc/fz 20-240

- **Aluminium teeth**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													● 70-85	● 35-45	○ 30-35				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
6.0	13	57	6	0.013	**290963** 0060	21,80
8.0	19	69	10	0.019	290963 0080	23,40
10.0	22	72	10	0.025	290963 0100	23,40
12.0	26	83	12	0.03	290963 0120	31,50
14.0	26	83	12	0.03	290963 0140	35,10

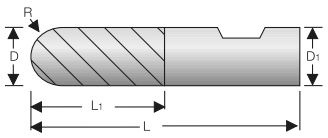
2105

D mm	L1 mm	L mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
16.0	32	92	16	0.038	290963 0160	39,20
18.0	32	92	16	0.045	290963 0180	42,50
20.0	38	104	20	0.05	290963 0201	53,50
25.0	45	121	25	0.055	290963 0250	82,–
30.0	45	121	25	0.06	290963 0300	116,–

2105

ATORN® Radius milling cutter

HSS-E | DIN 327 | Typ N | 30° | DIN 1835 B | Z 2 | Vc/fz | 20-240



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 28	● 23		○ 12	○ 16		○ 25	○ 25				○ 162	○ 50	○ 40				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



Short

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	8	52	6	0.004	**221001** 0030	14,75
4.0	11	55	6	0.01	221001 0040	14,75
5.0	13	57	6	0.01	221001 0050	14,75
6.0	13	57	6	0.014	221001 0060	14,75
8.0	19	69	10	0.022	221001 0080	17,40
10.0	22	72	10	0.036	221001 0100	18,80

2106

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
12.0	26	83	12	0.05	221001 0120	24,10
14.0	26	83	12	0.05	221001 0140	26,60
16.0	32	92	16	0.062	221001 0160	29,80
18.0	32	92	16	0.064	221001 0180	33,90
20.0	38	104	20	0.07	221001 0200	38,70

2106



Long

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	8	56	6	0.003	**221005** 0030	11,65
4.0	19	63	6	0.01	221005 0040	16,60
5.0	24	68	6	0.01	221005 0050	16,60
6.0	24	68	6	0.012	221005 0060	16,60
8.0	38	82	10	0.02	221005 0080	20,10
10.0	45	95	10	0.034	221005 0100	21,50

2106

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
12.0	53	110	12	0.048	221005 0120	27,80
14.0	53	110	12	0.048	221005 0140	30,40
16.0	63	123	16	0.058	221005 0160	34,40
18.0	63	123	16	0.06	221005 0180	38,60
20.0	75	141	20	0.068	221005 0200	44,40

2106

Transverse slot shell-type arbour

SARA®

Nickel-plated and pre-balanced to G2.5 at 25,000 rpm

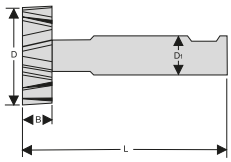


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SARA® Slotting cutter

HSS-E | DIN 850 | Typ N | DIN 1835 B | Z 6 | Z 8+ | Vc/fz | 20-240

- With cross-cut toothing
- For groove milling in accordance with DIN 6888, P9 fit
- * = not DIN-compliant



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 30-40	○ 25-35		○ 20-30	○ 20-30		○ 20-30	○ 20-30				○ 35-55	○ 65-250					
	Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									



D h12 mm	B mm	for DIN 6888-compliant groove mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4.5	1	1 x 1.4	50	6	6	0.045	**291360** 0045	31,90
7.5	1.5	1.5 x 2.6	50	6	6	0.045	291360 0075	25,50
7.5	2	2 x 2.6	50	6	6	0.045	291360 0076	25,50
10.5	2	2 x 3.7	50	6	6	0.045	291360 0105	32,50
10.5	2.5	2.5 x 3.7	50	6	6	0.045	291360 0106	32,50
10.5	3	3 x 3.7	50	6	6	0.045	291360 0107	32,50
13.5	2	2 x 5	56	10	6	0.06	291360 0135	30,90
13.5	3	3 x 5	56	10	6	0.06	291360 0137	30,90
13.5	4	4 x 5	56	10	6	0.06	291360 0138	30,90
16.5	3	3 x 6.5	56	10	6	0.06	291360 0166	33,70
16.5	4	4 x 6.5	56	10	6	0.06	291360 0167	33,70
16.5	5	5 x 6.5	56	10	6	0.06	291360 0168	33,70
19.5	3	3 x 7.5*	63	10	8	0.06	291360 0195	39,40
19.5	4	4 x 7.5	63	10	8	0.06	291360 0196	39,40
19.5	5	5 x 7.5	63	10	8	0.06	291360 0197	39,40
19.5	6	6 x 7.5	63	10	8	0.06	291360 0198	39,40

2107

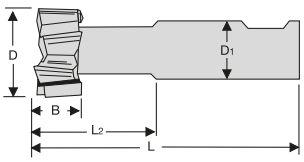
D h12 mm	B mm	for DIN 6888-compliant groove mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
22.5	4	4 x 9	63	10	10	0.08	291360 0225	46,40
22.5	5	5 x 9	63	10	10	0.08	291360 0226	46,40
22.5	6	6 x 9	63	10	10	0.08	291360 0227	46,40
22.5	8	8 x 9	63	10	10	0.08	291360 0228	46,40
25.5	5	5 x 10*	63	10	10	0.08	291360 0255	50,50
25.5	6	6 x 10	63	10	10	0.08	291360 0256	50,50
28.5	6	6 x 11	63	10	10	0.08	291360 0286	59,50
28.5	8	8 x 11	63	10	10	0.08	291360 0288	59,50
28.5	10	10 x 11	71	12	10	0.08	291360 0289	59,50
32.5	6	6 x 13*	71	12	10	0.09	291360 0326	61,50
32.5	7	*	71	12	10	0.09	291360 0327	61,50
32.5	8	8 x 13	71	12	10	0.09	291360 0328	61,50
32.5	10	10 x 13	71	12	10	0.09	291360 0329	61,50
38.5	8	*	71	12	10	0.09	291360 0385	73,–
45.5	8	8 x 16*	71	12	12	0.09	291360 0454	87,50
45.5	10	10 x 16	71	12	12	0.09	291360 0455	87,50

2107

SARA® T-slot milling cutter

HSS-E | DIN 851 | Typ N | DIN 1835 B | Z 6 | Z 8+ | Vc/fz | 20-240

- With cross-cut toothing
- * = not DIN-compliant



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 30-40	○ 25-35		○ 20-30	○ 20-30		○ 20-30	○ 20-30				○ 35-55	○ 65-250					
	Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									



for DIN 650-compliant T-slot	B mm	D mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
M5	4	11.0	10.5	54	10	6	0.06	**291365** 0040	49,50
M6	6	12.5	17.0	57	10	6	0.06	291365 0060	49,70
M8	8	16.0	22.0	62	10	6	0.06	291365 0080	52,–
M10	8	18.0	25.0	70	12	6	0.06	291365 0100	54,–
*	9	190	22.0	71	12	6	0.08	291365 0110	56,–
M12	9	21.0	29.0	74	12	6	0.08	291365 0120	58,–
*	10	22.0	27.0	75	12	6	0.08	291365 0130	61,–
M14	11	25.0	34.0	82	16	8	0.08	291365 0140	64,–

2107

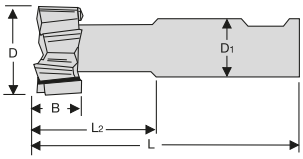
for DIN 650-compliant T-slot	B mm	D mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
M16	12	28.0	37.0	85	16	8	0.08	291365 0160	77,–
M18	14	32.0	42.0	90	16	8	0.09	291365 0180	81,–
M20	16	36.0	47.0	103	25	8	0.09	291365 0200	110,–
M22	18	40.0	52.0	108	25	10	0.09	291365 0220	141,–
M24	20	45.0	57.0	113	25	10	0.11	291365 0240	171,–
M28	22	50.0	56.0	124	32	10	0.13	291365 0250	205,–
M36	28	60.0	71.0	139	32	10	0.2	291365 0260	250,–

2107

SARA® T-slot milling cutter

HSS-E | DIN 851 | NR | DIN 1835 B | Z 6 | Z 8+ | Vc/fz | 20-240

- With cross-cut toothing
- * = not DIN-compliant



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 30-40	○ 25-35		○ 20-30	○ 20-30		○ 20-30	○ 20-30				○ 35-55	○ 65-250					
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



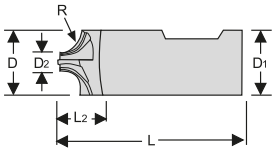
for DIN 650-compliant T-slot	B mm	D mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
M6	6	12.5	13.0	57	10	6	0.06	**291367** 0125	54,50
M8	8	16.0	18.0	62	10	6	0.06	291367 0160	57,50
M10	8	18.0	21.0	70	12	6	0.06	291367 0180	59,50
*	9	19.0	22.0	71	12	6	0.08	291367 0190	61,50
M12	9	21.0	25.0	74	12	6	0.08	291367 0210	64,–
*	10	22.0	27.0	75	12	6	0.08	291367 0220	67,–
M14	11	25.0	28.0	82	16	6	0.08	291367 0250	70,50
M16	12	28.0	29.0	85	16	8	0.08	291367 0280	85,–
M18	14	32.0	32.0	90	16	8	0.09	291367 0320	89,50
M20	16	36.0	38.0	108	25	8	0.09	291367 0360	121,–
M22	18	40.0	45.0	108	25	8	0.09	291367 0400	155,–

2107

SARA® Quadrant milling cutter, concave

HSS-E | DIN 6518 | Typ N | DIN 1835 B | Z 4 | Z 6 | Vc/fz | 20-240

- Radially / axially relieved
- Cutting edge angle (axial) approx. 5°
- Straight shank in accordance with DIN 1835 B, up to shank ∅ 16 mm with additional driving planes



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 25-35	○ 30					○ 20-30	○ 20-30				○ 60-100	○ 45-70					
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



R mm	D mm	D2 mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
1.0	8.0	6	20	60	10.0	4	0.002	**291304** 0010	38,70
1.5	10.0	6	20	60	10.0	4	0.002	291304 0015	38,70
1.6	10.0	6	20	60	10.0	4	0.002	291304 0016	38,70
2.0	10.0	6	20	60	10.0	4	0.003	291304 0020	38,70
2.5	10.0	6	20	60	10.0	4	0.003	291304 0025	38,70
3.0	12.0	6	15	60	12.0	4	0.003	291304 0030	38,70
3.5	12.0	6	15	60	12.0	4	0.003	291304 0035	41,50
4.0	14.0	6	15	60	12.0	4	0.004	291304 0040	41,50
4.5	15.0	6	15	60	12.0	4	0.004	291304 0045	48,90
5.0	16.0	6	15	60	12.0	4	0.004	291304 0050	48,90
6.0	21.0	8	19	67	16.0	4	0.006	291304 0060	57,50
6.5	24.0	8	23	71	16.0	4	0.006	291304 0065	65,50
7.0	24.0	8	23	71	16.0	4	0.006	291304 0070	65,50
7.5	24.0	8	23	71	16.0	4	0.009	291304 0075	65,50

2107

R mm	D mm	D2 mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
8.0	24.0	8	23	71	16.0	4	0.009	291304 0080	65,50
8.5	28.0	8	29	85	25.0	4	0.009	291304 0085	85,50
9.0	28.0	8	29	85	25.0	4	0.009	291304 0090	85,50
10.0	28.0	8	29	85	25.0	4	0.014	291304 0100	85,50
10.5	35.0	10	34	90	25.0	4	0.014	291304 0105	107,50
11.0	35.0	10	34	90	25.0	4	0.018	291304 0110	107,50
12.0	35.0	10	34	90	25.0	4	0.021	291304 0120	107,50
12.5	42.0	14	40	100	25.0	6	0.021	291304 0125	152,–
13.0	42.0	14	40	100	25.0	6	0.021	291304 0130	152,–
14.0	42.0	14	40	100	25.0	6	0.023	291304 0140	152,–
15.0	46.0	16	44	100	25.0	6	0.023	291304 0150	179,–
16.0	48.0	16	44	100	25.0	6	0.025	291304 0160	173,–
18.0	52.0	16	52	112	32.0	6	0.028	291304 0180	179,–
20.0	56.0	16	52	112	32.0	6	0.03	291304 0200	215,–

2107

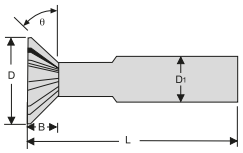
SARA® Angle milling cutter

HSS-E | DIN 1833 | Typ N | Z 6 | Z 8+ | Vc/fz 20-240

- **Type N, 45° and 60°**
- Straight-fluted

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 30-40	○ 25-35		○ 20-30	○ 20-30		○ 20-30	○ 20-30				○ 35-55	○ 65-250					
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



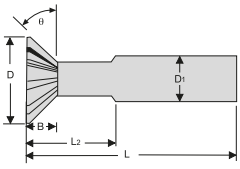


Form C, 45°

D mm	θ	B mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16.0	45°	4	15	60	12	10	0.06	**291392** 0160	38,20
20.0	45°	5	18	63	12	10	0.08	291392 0200	48,30
25.0	45°	6.3	22	67	12	10	0.08	291392 0250	59,50
32.0	45°	8	23	71	16	10	0.09	291392 0320	80,50

2107



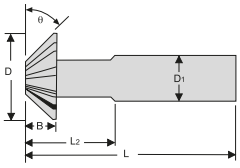


Form C, 60°

D mm	θ	B mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16.0	60°	6.3	15	60	12	10	0.06	**291393** 0160	38,20
20.0	60°	8	18	63	12	10	0.08	291393 0200	48,30
25.0	60°	10	22	67	12	10	0.08	291393 0250	59,50
32.0	60°	12.5	23	71	16	10	0.09	291393 0320	80,50

2107



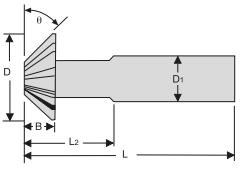


Form D, 45°

D mm	θ	B mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16.0	45°	4	15	60	12	10	0.06	**291394** 0160	38,20
20.0	45°	5	18	63	12	10	0.08	291394 0200	48,30
25.0	45°	6.3	22	67	12	10	0.08	291394 0250	59,50
32.0	45°	8	23	71	16	12	0.09	291394 0320	80,50

2107





Form D, 60°

D mm	θ	B mm	L2 mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16.0	60°	6.3	15	60	12	10	0.06	**291395** 0160	38,20
20.0	60°	8	18	63	12	10	0.08	291395 0200	48,30
25.0	60°	10	22	67	12	10	0.08	291395 0250	59,50
32.0	60°	12.5	23	71	16	12	0.09	291395 0320	80,50

2107

Overview of solid carbide end milling cutters

	End milling cutters							
Sorting by type and number of cutting edges								
Brand	SARA	SARA	SARA	SARA	SARA	SARA	ATORN	ATORN
				HSC				
Number of cutting edges	2	2	2	2	3	3	3	3
Diameter range / mm	0.3 - 20.0	2.0 - 20.0	2.0 - 20.0	1.0 - 20.0	0.5 - 20.0	0.5 - 20.0	3.0 - 20.0	3.0 - 20.0
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short	Short	Short	Short	Extra-short	Extra-short	Normal	Normal
Type/profile	N	N	N	N	N	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN Ultra		TiAlN	TiAlN		TiAlN Ultra	TiAlN	TiAlN
Order No.	254050....	250102....	250106....	254001....	251006....	251009....	251030....	251031....
Catalogue page	20-38	20-39	20-39	20-39	20-40	20-40	20-41	20-41
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	●	○	○	○	●	●		
Stainless steel austenitic	●	○	○	○	●	●		
Stainless steel duplex	○				○	○		
Cast iron GG/GTS	●	●	●	●	●	●	●	●
Cast iron GGG	●	○	○	●	●	●	●	●
Titanium alloys	●			○	●	●	●	●
Superalloys Fe/NiCo base < 30 HRc	●			○	●	●	●	●
Superalloys Fe/NiCo base ≥ 30 HRc	○				○	○	●	●
Aluminium < 8 % Si	●	○	○		●	●		
Aluminium ≥ 8 % Si	●	○	○		●	●		
Copper Cu-alloy	●	○	○		●	●		
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc	○			●	○	○	○	○
Hardened steel < 60 HRc				○				
Hardened steel ≥ 60 HRc								

	End milling cutters							
Sorting by type and number of cutting edges								
Brand	SARA	SARA	SARA	SARA	VAN HOORN CARBIDE	SARA	SARA	SARA
						HPC	HPC	
Number of cutting edges	3	3	3	3	3	4	4	4
Diameter range / mm	3.0 - 20.0	3.0 - 20.0	2.0 - 20.0	2.0 - 20.0	3.0 - 16.0	2.0 - 20.0	3.0 - 16.0	2.0 - 20.0
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Normal	Short	Short	Short	Short	Normal	Extra-long	Short
Type/profile	N	N	N	N	N	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN	TiAlN Ultra		TiAlN	TiAlN	TiAlN Ultra	TiAlN Ultra	
Order No.	251033....	254052....	251050....	251053....	251049....	254054....	254056....	251506....
Catalogue page	20-42	20-42	20-43	20-43	20-43	20-44	20-44	20-45
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	●	●	●	●		●	●	○
Stainless steel austenitic	●	●	○	●		●	●	○
Stainless steel duplex	●	○				○	○	
Cast iron GG/GTS	●	●	●	●	●	●	●	●
Cast iron GGG	●	●	○	○	●	●	●	○
Titanium alloys		●				●	●	
Superalloys Fe/NiCo base < 30 HRc		●				●	●	
Superalloys Fe/NiCo base ≥ 30 HRc		○				○	○	
Aluminium < 8 % Si		●	○	○		●	●	○
Aluminium ≥ 8 % Si		●	○	○	○	●	●	○
Copper Cu-alloy		●	○	○	○	●	●	○
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc		○			○	○	○	
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

	End milling cutters							
Sorting by type and number of cutting edges								
Brand	SARA	SARA	SARA	SARA	VAN HOORN CARBIDE	VAN HOORN CARBIDE	SARA	SARA
		HSC	HSC	HSC			HSC	HSC
Number of cutting edges	4	4	4	4	4	5	6 - 8	6
Diameter range / mm	2.0 - 20.0	2.0 - 25.0	3.0 - 25.0	2.0 - 25.0	2.0 - 25.0	2.0 - 25.0	4 - 20	6 - 25
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short	Short	Short	Long	Normal	Normal	Normal	Extra-long
Type/profile	N	N	N	N	N	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN Ultra	TiAlN
Order No.	251509....	254005....	254006....	254007....	255100....	255101....	254058....	254109....
Catalogue page	20-45	20-45	20-46	20-46	20-46	20-47	20-48	20-48
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	○	○	○	○			●	○
Stainless steel austenitic	○	○	○	○			●	○
Stainless steel duplex							○	
Cast iron GG/GTS	●	●	●	●	●	●	●	●
Cast iron GGG	○	●	●	●	●	●	●	●
Titanium alloys		○	○	○				○
Superalloys Fe/NiCo base < 30 HRc		○	○	○			●	○
Superalloys Fe/NiCo base ≥ 30 HRc							○	
Aluminium < 8 % Si	○							
Aluminium ≥ 8 % Si	○							
Copper Cu-alloy	○							
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc		●	●	●			○	●
Hardened steel < 60 HRc		○	○	○				○
Hardened steel ≥ 60 HRc								

	Roughing cutter						
Sorting by type and number of cutting edges							
Brand	ATORN	SARA	VAN HOORN CARBIDE	VAN HOORN CARBIDE	SARA	SARA	SARA
	With IC				HPC		HSC
Number of cutting edges	4	3 - 5	4	3 - 4	2	2	4
Diameter range / mm	4 - 20	6 - 25	6 - 20	6 - 20	5 - 20	3 - 20	3 - 20
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short	Short	Short	Short	Short	Long	Long
Type/profile	NF	HR	N	NR	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN Ultra	TiAlN	TiAlN	TiAlN	TiAlN Ultra	TiAlN	TiAlN
Order No.	254092....	254016....	255079....	254015....	254090....	254017....	254019....
Catalogue page	20-49	20-49	20-50	20-50	20-51	20-52	20-53
Material groups	Usage recommendations						
Steel < 700 N/mm²	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic			○			○	○
Stainless steel austenitic						○	○
Stainless steel duplex							
Cast iron GG/GTS	●	●	●		●	●	●
Cast iron GGG	●	●	●		●	●	●
Titanium alloys	○		○			○	○
Superalloys Fe/NiCo base < 30 HRc			○			○	○
Superalloys Fe/NiCo base ≥ 30 HRc							
Aluminium < 8 % Si							
Aluminium ≥ 8 % Si				○			
Copper Cu-alloy				○			
Graphite GRP/CFP/thermoset							
Hardened steel < 55 HRc	○	○	●	○	○	●	●
Hardened steel < 60 HRc						○	○
Hardened steel ≥ 60 HRc							

Radius milling cutters

Sorting by type and number of cutting edges						
Brand	SARA	SARA	SARA	SARA	SARA	SARA
Number of cutting edges	2	2	2	2	4	4
Diameter range / mm	3 - 20	3 - 20	1 - 20	2 - 20	3 - 20	1 - 20
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short	Short	Long	Extra-long	Short	Extra-long
Type/profile	N	N	N	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating		TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Order No.	250502....	250505....	254011....	254112....	251532....	254013....
Catalogue page	20-54	20-54	20-55	20-55	20-56	20-56
Material groups	Usage recommendations					
Steel < 700 N/mm²	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●
Stainless steel ferritic/martensitic	○	○	○	○	○	○
Stainless steel austenitic	○	○	○	○	○	○
Stainless steel duplex	○					
Cast iron GG/GTS	●	●	●	●	●	●
Cast iron GGG	○	○	●	●	○	●
Titanium alloys			○	○		○
Superalloys Fe/NiCo base < 30 HRc			○	○		○
Superalloys Fe/NiCo base ≥ 30 HRc						
Aluminium < 8 % Si	○	○			○	
Aluminium ≥ 8 % Si	○	○			○	
Copper Cu-alloy	○	○			○	
Graphite GRP/CFP/thermoset						
Hardened steel < 55 HRc			●	●		●
Hardened steel < 60 HRc			○	○		
Hardened steel ≥ 60 HRc						

Ranges of milling cutters

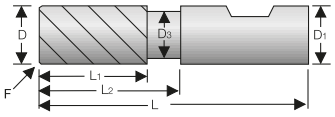
Sorting by type and number of cutting edges	 HPC	 HPC Power	 Ultra-N	 Stainless steel Titanium	 Graphite DIA+	 RockTec 52 RockTec 65	 Trochoidal
Brand	SARA	ATORN	ATORN		SARA	ATORN	SARA
	HPC	HPC	Ultra-N	Stainless steel and titanium range	DIA+	RockTec 52 and 65	Trochoidal
Number of cutting edges	4	3 - 4	1 - 4	2 - 4	2 - 4	2 - 8	3 - 8
Diameter range / mm	3.0 - 25.0	4.0 - 20.0	0.5 - 20.0	0.2 - 20.0	1 - 16	0.1 - 20.0	3 - 20
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short - extra-long	Normal	Short - extra-long	Short - long	Short - long	Short - long	Normal
Type/profile	N / NA	N	W / WR	N / H	N	N / H	N / H
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN / AlTiN	TiAlN	ZrCN	AlCrN	DIA+	TiSi	TiAlSiN
Order No.	From 254130....	From 254503....	From 249001....	From 256011....	From 258005....	From 257002....	From 254155....
Catalogue page	**Overview 20-57**	**Overview 20-65**	**Overview 20-68**	**Overview 20-82**	**Overview 20-92**	**Overview 20-99**	**Overview 20-124**
Material groups	Usage recommendations						
Steel < 700 N/mm²	●	●		●			●
Steel < 1000 N/mm²	●	●		●			●
Steel < 1400 N/mm²	●	●		○		○	●
Stainless steel ferritic/martensitic	●	●		●			●
Stainless steel austenitic	●	●		●			●
Stainless steel duplex	●	●		●			●
Cast iron GG/GTS	●	●		○			
Cast iron GGG	●	●		○			
Titanium alloys	●	●		●		○	●
Superalloys Fe/NiCo base < 30 HRc	●	●		●		○	●
Superalloys Fe/NiCo base ≥ 30 HRc	●	●		●		○	●
Aluminium < 8 % Si	●	○	●				●
Aluminium ≥ 8 % Si	●	○	●				●
Copper Cu-alloy	●	○	●				●
Graphite GRP/CFP/thermoset	●				●		●
Hardened steel < 55 HRc	●					●	●
Hardened steel < 60 HRc	●					●	●
Hardened steel ≥ 60 HRc						●	●

Sorting by type and number of cutting edges	High feed-rate milling cutters	Die-sinking cutter	Quadrant milling cutter	Form milling cutters	Engraving milling cutter
					
Brand	ATORN®	SARA®	SARA®	SARA®	SARA®
	RockTec 65				
Number of cutting edges	4 - 6	3 - 4	4	6 - 10	1
Diameter range / mm	4 - 12	2.5 - 8.0	8 - 16	10 - 45	3 - 6
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Normal	Short / long	Short	Short	Short
Type/profile	N / H	N	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiSi	TiAlN	AlCrN	AlCrN	
Order No.	257040....	253002....	291310....	292004....	251545....
Catalogue page	20-107	20-127	20-128	20-129	20-130
Material groups	Usage recommendations				
Steel < 700 N/mm²		●	●	●	
Steel < 1000 N/mm²		●	●	●	
Steel < 1400 N/mm²	●	●	●		
Stainless steel ferritic/martensitic		○	●		
Stainless steel austenitic		○	●		
Stainless steel duplex			○		
Cast iron GG/GTS		●	●	●	
Cast iron GGG		●	●	●	
Titanium alloys					
Superalloys Fe/NiCo base < 30 HRc			●		
Superalloys Fe/NiCo base ≥ 30 HRc			●		
Aluminium < 8 % Si		○	○		●
Aluminium ≥ 8 % Si		○	○		●
Copper Cu-alloy		○	●		○
Graphite GRP/CFP/thermoset					
Hardened steel < 55 HRc	●	○	●		
Hardened steel < 60 HRc	●		●		
Hardened steel ≥ 60 HRc	●		○		

Sorting by type and number of cutting edges	Form milling cutters		Multifunction tool	Deburring tools	
					
Brand	SARA®	SARA®	SARA®	SARA®	
					Forward and reverse deburring tool
Number of cutting edges	6 - 9	6 - 9	2	3 - 6	3 - 4
Diameter range / mm	16 - 38	16 - 38	0.5 - 20	1 - 16	1.5 - 12
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short	Short	Normal	Short	Normal
Type/profile	N	N	N	N	N / H
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	AlCrN	AlCrN	TiAlN	TiAlN	TiAlN
Order No.	292000/001....	292002/003....	251541/46/49....	251550....	2981320.... 250004.... 250005.... 250006....
Catalogue page	20-130	20-130	20-131	20-132	20-133
Material groups	Usage recommendations				
Steel < 700 N/mm²	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●
Steel < 1400 N/mm²			●	●	●
Stainless steel ferritic/martensitic			○	●	●
Stainless steel austenitic			○	○	○
Stainless steel duplex				○	○
Cast iron GG/GTS	●	●	●	●	●
Cast iron GGG	●	●	●	●	●
Titanium alloys			○	○	○
Superalloys Fe/NiCo base < 30 HRc			○	○	○
Superalloys Fe/NiCo base ≥ 30 HRc				○	○
Aluminium < 8 % Si			●	○	●
Aluminium ≥ 8 % Si			○	○	●
Copper Cu-alloy			○	○	●
Graphite GRP/CFP/thermoset					
Hardened steel < 55 HRc				●	●
Hardened steel < 60 HRc				○	●
Hardened steel ≥ 60 HRc					

SARA® Slot milling cutter

VHM | 30° | e8 | h5 | DIN 6535 HA | DIN 6535 HB | Z 2 | TiAlN | HSC | Vc/fz | 20-245



- **With clearance**
- Straight shank up to Ø 2.5 mm smooth, from Ø 2.8 mm with driving planes in accordance with DIN 6535-HB
- **Optimum chip removal due to extremely smooth surface**
- **For P9 grooves**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-Ultra-coated**

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 100-120	● 80-100	● 60-80	● 50-65	● 50-60	○ 40-50	● 100-130	● 80-120	● 40-60	● 40-50	○ 30-40	● 300-400	● 200-300	● 100-140				
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														



ULTRA

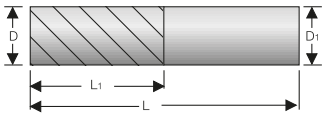
D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	F x 45° mm	● Feed fz steel < 1400 N/mm² mm/tooth	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
1.0	3	-	50	3.0	-	-	0.006	0.007	**254050** 0010	27,10
1.1	3	-	50	3.0	-	-	0.006	0.007	254050 0011	27,10
1.2	4	-	50	3.0	-	-	0.006	0.007	254050 0012	27,10
1.4	4	-	50	3.0	-	-	0.006	0.007	254050 0014	27,10
1.5	4	-	50	3.0	-	-	0.006	0.007	254050 0015	27,10
1.6	4	-	50	3.0	-	-	0.006	0.007	254050 0016	27,10
1.8	5	-	50	3.0	-	-	0.006	0.007	254050 0018	27,10
2.0	5	-	50	3.0	-	0.05	0.006	0.007	254050 0020	27,10
2.5	6	-	50	3.0	-	0.05	0.012	0.015	254050 0025	27,10
2.8	8	15	57	6.0	2.6	0.05	0.012	0.015	254050 0028	23,20
3.0	8	15	57	6.0	2.8	0.05	0.012	0.015	254050 0030	23,20
3.8	11	15	57	6.0	3.6	0.1	0.012	0.015	254050 0038	23,20
4.0	11	15	57	6.0	3.8	0.1	0.012	0.015	254050 0040	23,20
4.8	13	21	57	6.0	4.6	0.1	0.024	0.030	254050 0048	24,60
5.0	13	21	57	6.0	4.8	0.1	0.024	0.030	254050 0050	24,60
5.8	13	21	57	6.0	5.6	0.1	0.024	0.030	254050 0058	24,60
6.0	13	21	57	6.0	5.8	0.1	0.024	0.030	254050 0060	24,60
6.8	16	27	63	8.0	6.6	0.1	0.024	0.030	254050 0068	28,70
7.0	16	27	63	8.0	6.8	0.1	0.024	0.030	254050 0070	28,40
7.8	19	27	63	8.0	7.5	0.1	0.024	0.030	254050 0078	28,20
8.0	19	27	63	8.0	7.7	0.1	0.024	0.030	254050 0080	28,–
8.7	19	32	72	10.0	8.5	0.1	0.032	0.040	254050 0087	40,80
9.0	19	32	72	10.0	8.8	0.1	0.032	0.040	254050 0090	40,80
9.7	22	32	72	10.0	9.5	0.1	0.032	0.040	254050 0097	40,80
10.0	22	32	72	10.0	9.8	0.1	0.032	0.040	254050 0100	40,80
10.7	26	38	83	12.0	10.5	0.1	0.032	0.040	254050 0107	59,–
11.0	26	38	83	12.0	10.8	0.1	0.032	0.040	254050 0110	59,–
11.7	26	38	83	12.0	11.5	0.1	0.032	0.040	254050 0117	59,–
12.0	26	38	83	12.0	11.8	0.1	0.032	0.040	254050 0120	59,–
13.7	26	38	83	14.0	13.5	0.1	0.040	0.050	254050 0137	72,50
14.0	26	38	83	14.0	13.8	0.1	0.040	0.050	254050 0140	72,50
15.7	32	44	92	16.0	15.4	0.1	0.040	0.050	254050 0157	93,50
16.0	32	44	92	16.0	15.7	0.1	0.040	0.050	254050 0160	93,50
17.7	32	44	92	18.0	17.4	0.1	0.048	0.060	254050 0177	128,–
18.0	32	44	92	18.0	17.7	0.1	0.048	0.060	254050 0180	114,–
19.7	38	54	104	20.0	19.4	0.1	0.048	0.060	254050 0197	162,–
20.0	38	54	104	20.0	19.7	0.1	0.048	0.060	254050 0200	144,–

2145

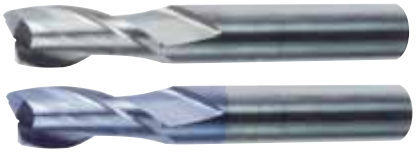
SARA® Slot drill

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 2 | TiAlN | Vc/fz | 20-246

- Eccentric relief grading



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	250102....	● 90-110	● 70-90	● 50-70	○ 50-80	○ 50-80	25-35	● 90-110	○ 35-55				○ 135-225	○ 90-180	○ 70-130				
	250106....	● 100-120	● 80-100	● 60-80	○ 60-90	○ 60-90	30-40	● 100-120	○ 40-60				○ 150-250	○ 100-200	○ 80-150				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



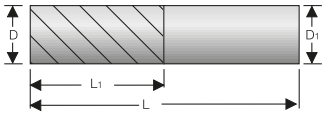
D mm	L1 mm	L mm	D1 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	**TiAlN** art.no.	€
2.0	7.0	39.0	3.0	2	0.010	**250102** 0020	10,95	**250106** 0020	15,70
2.5	7.0	39.0	3.0	2	0.010	250102 0025	10,95	250106 0025	15,70
3.0	9.0	39.0	3.0	2	0.010	250102 0030	11,05	250106 0030	15,70
3.5	12.0	51.0	4.0	2	0.010	250102 0035	12,45	250106 0035	17,30
4.0	14.0	51.0	4.0	2	0.020	250102 0040	12,45	250106 0040	17,30
4.5	14.0	51.0	5.0	2	0.020	250102 0045	13,25	250106 0045	18,10
5.0	16.0	51.0	5.0	2	0.020	250102 0050	13,25	250106 0050	18,10
5.5	16.0	64.0	6.0	2	0.020	250102 0055	14,85	250106 0055	19,70
6.0	19.0	64.0	6.0	2	0.030	250102 0060	14,85	250106 0060	19,70
7.0	19.0	64.0	8.0	2	0.030	250102 0070	20,30	250106 0070	27,40
8.0	21.0	64.0	8.0	2	0.040	250102 0080	23,80	250106 0080	32,20
9.0	22.0	70.0	10.0	2	0.040	250102 0090	33,70	250106 0090	42,80
10.0	22.0	70.0	10.0	2	0.050	250102 0100	36,20	250106 0100	45,40
12.0	25.0	78.0	12.0	2	0.060	250102 0120	50,50	250106 0120	60,50
14.0	30.0	89.0	14.0	2	0.060	250102 0140	69,–	250106 0140	81,–
16.0	32.0	89.0	16.0	2	0.080	250102 0160	88,–	250106 0160	98,50
20.0	38.0	102.0	20.0	2	0.100	250102 0200	146,–	250106 0200	170,–
						2109		2109	

SARA® Slot drill

VHM | 30° | e8 | h5 | DIN 6535 HA | Z 2 | TiAlN | HSC | Vc/fz | 20-248

- Driving planes in accordance with DIN 6535-HB, up to Ø 2.5 mm smooth
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

Up to 55 HRc



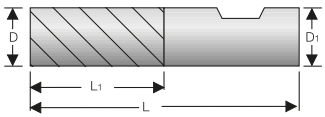
material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 60-85	● 45-70	● 40-70	○ 30-45	○ 30-45		● 60-85	● 45-60								● 25-30	○ 15-20	
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L mm	D1 mm	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
1.0	2.5	40	4.0	0.020	**254001** 0010	25,30
1.5	4	40	4.0	0.030	254001 0015	25,30
2.0	6	40	4.0	0.030	254001 0020	23,20
2.5	8	40	4.0	0.030	254001 0025	23,20
3.0	8	45	6.0	0.040	254001 0030	33,80
4.0	11	45	6.0	0.040	254001 0040	33,80
6.0	13	50	6.0	0.040	254001 0060	33,80
8.0	19	60	8.0	0.050	254001 0080	43,40
10.0	22	70	10.0	0.050	254001 0100	63,–
12.0	26	75	12.0	0.060	254001 0120	85,50
16.0	32	100	16.0	0.080	254001 0160	146,–
20.0	38	105	20.0	0.100	254001 0200	210,–
					2109	

SARA® Mini end milling cutter

VHM | 30° | e8 | h5 | DIN 6535 HA | DIN 6535 HB | Z 3 | TiAlN | Vc/fz | 20-246



- Straight shank with driving plane, up to Ø 1.8 mm smooth
- **Cutting material: ultra-fine grain solid carbide, TiAlN-Ultra-coated**
- **Note:** This milling cutter is not cost-effective to re-sharpen. It is more economical to use the cutters up to their wear limit and replace them with brand new tools.

material — ● very well suited ○ well suited

material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
251006....	● 80-100	● 70-90	● 50-60	● 30-55	● 30-45	○ 25-30	● 100-120	● 70-90	● 20-40	● 15-30	○ 15-30	● 150-250	● 100-200	● 80-150				
251009....	● 90-110	● 80-100	● 45-55	● 40-60	● 35-50	○ 25-35	● 110-130	● 80-100	● 25-45	● 20-35	○ 20-35	● 175-275	● 120-220	● 90-170				
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.





ULTRA

D mm	L1 mm	L mm	D1 mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	TiAlN art.no.	€
0.5	2.0	38.0	3.0	0.012	0.015	**251006** 0005	11,80	**251009** 0005	17,80
0.6	2.0	38.0	3.0	0.012	0.015	251006 0006	11,80	251009 0006	17,80
0.8	2.0	38.0	3.0	0.012	0.015	251006 0008	11,80	251009 0008	17,80
1.0	2.0	38.0	3.0	0.012	0.015	251006 0010	11,80	251009 0010	17,80
1.2	2.0	38.0	3.0	0.012	0.015	251006 0012	11,80	251009 0012	17,80
1.5	2.0	38.0	3.0	0.012	0.015	251006 0015	11,80	251009 0015	17,80
1.8	2.0	38.0	3.0	0.012	0.015	251006 0018	11,80	251009 0018	17,80
2.0	4.0	35.0	6.0	0.012	0.015	251006 0020	11,75	251009 0020	17,80
2.5	4.0	35.0	6.0	0.023	0.03	251006 0025	12,45	251009 0025	17,80
3.0	5.0	36.0	6.0	0.031	0.038	251006 0030	11,75	251009 0030	17,80
3.5	5.0	36.0	6.0	0.040	0.045	251006 0035	12,45	251009 0035	19,30
4.0	7.0	38.0	6.0	0.048	0.052	251006 0040	11,75	251009 0040	17,80
4.5	7.0	38.0	6.0	0.050	0.056	251006 0045	12,45	251009 0045	19,30
5.0	8.0	39.0	6.0	0.051	0.057	251006 0050	11,75	251009 0050	17,80
5.5	8.0	39.0	6.0	0.053	0.06	251006 0055	12,45	251009 0055	19,30
5.75	8.0	39.0	6.0	0.053	0.06	251006 0057	12,45	251009 0057	19,30
6.0	8.0	39.0	6.0	0.054	0.06	251006 0060	11,75	251009 0060	17,80
6.75	11.0	43.0	8.0	0.056	0.062	251006 0067	16,50	251009 0067	23,70
7.0	11.0	43.0	8.0	0.057	0.062	251006 0070	15,70	251009 0070	22,–
7.75	11.0	43.0	8.0	0.059	0.066	251006 0077	16,60	251009 0077	23,80
8.0	11.0	43.0	8.0	0.060	0.066	251006 0080	18,30	251009 0080	23,50
8.7	13.0	50.0	10.0	0.061	0.067	251006 0087	25,70	251009 0087	35,60
9.0	13.0	50.0	10.0	0.062	0.067	251006 0090	23,50	251009 0090	32,40
9.7	13.0	50.0	10.0	0.063	0.068	251006 0097	25,70	251009 0097	35,60
10.0	13.0	50.0	10.0	0.063	0.068	251006 0100	26,40	251009 0100	33,90
12.0	15.0	55.0	12.0	0.063	0.068	251006 0120	33,40	251009 0120	43,80
						2109		2109	

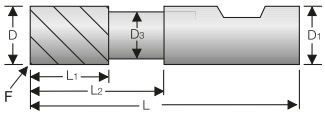


...dreams come true.

ATORN®
High quality for great performance

ATORN® End milling cutters

VHM | 41° -45° | e8 | h5 | DIN 6535 HA | DIN 6535 HB | Z 3 | TiAlN | HPC | Vc/fz | 20-302



- **With clearance**
- **41°/43°/45° right-hand helix**
- Micro edge protection for a longer service life
- For roughing and finishing
- Optimised chip removal during slot milling
- Up to 60 % higher feed rates
- Up to 4 times longer service life
- Runs without vibration
- Enhanced workpiece surface finish quality
- Suitable for all materials up to 1400 N/mm²
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●				●	●	●	●	●							
		180-200	160-180	140-160				140-180	140-160	50-60	40-50	40-50							
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Standard

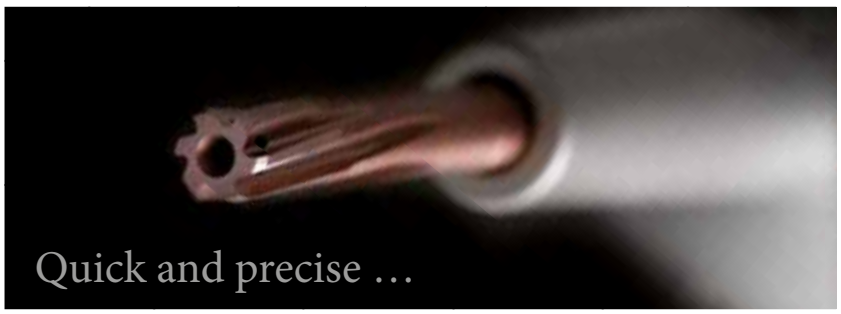


D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HA art.no.	€
3.0	8	15	57	6.0	2.7	0.040	0.060	**251030** 0030	27,20
4.0	11	18	57	6.0	3.7	0.050	0.070	251030 0040	27,20
5.0	13	18	57	6.0	4.7	0.060	0.080	251030 0050	27,60
6.0	13	21	57	6.0	5.5	0.070	0.090	251030 0060	32,10
8.0	19	27	63	8.0	7.5	0.080	0.100	251030 0080	41,20
10.0	22	32	72	10.0	9.2	0.090	0.110	251030 0100	64,–
12.0	26	38	83	12.0	11.0	0.110	0.130	251030 0120	84,50
16.0	32	44	92	16.0	15.0	0.130	0.150	251030 0160	138,–
20.0	38	54	104	20.0	19.0	0.150	0.170	251030 0200	191,–
								2119	

Standard with driving plane



D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HB art.no.	€
3.0	8	15	57	6.0	2.7	0.040	0.060	**251031** 0030	29,20
4.0	11	18	57	6.0	3.7	0.050	0.070	251031 0040	29,20
5.0	13	18	57	6.0	4.7	0.060	0.080	251031 0050	29,60
6.0	13	21	57	6.0	5.5	0.070	0.090	251031 0060	34,20
8.0	19	27	63	8.0	7.5	0.080	0.100	251031 0080	43,20
10.0	22	32	72	10.0	9.2	0.090	0.110	251031 0100	66,–
12.0	26	38	83	12.0	11.0	0.110	0.130	251031 0120	86,50
16.0	32	44	92	16.0	15.0	0.130	0.150	251031 0160	140,–
20.0	38	54	104	20.0	19.0	0.150	0.170	251031 0200	191,–
								2119	

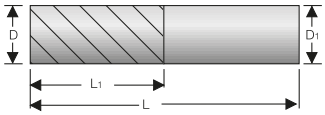


… HPC with internal cooling

ATORN®
High quality for great performance

SARA® End milling cutters

VHM | 38°/40°/42° | h10 | h6 | DIN 6535 HB | Z 3 | TiAlN | HPC | Vc/fz | 20-249



- **38°/40°/42° right-hand helix**
- For universal applications
- **For roughing and finishing**
- For large cutting depths
- **Very high degree of smoothness**
- Protective chamfer for increased service life

Universal

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 240	● 160	● 85	● 75	● 220	● 110	● 180	● 140										
	Cutting speed Vc m/min.										Please adjust these guidelines according to clamping operation and machine set-up.								

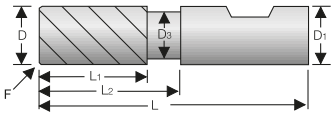


D mm	L1 mm	L mm	D1 mm	F mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3	8	57	6	0.1	0.01	0.012	**251033** 0030	16,30
4	11	57	6	0.1	0.017	0.02	251033 0040	15,70
5	13	57	6	0.15	0.029	0.035	251033 0050	17,80
6	13	57	6	0.2	0.029	0.035	251033 0060	17,90
8	19	63	8	0.2	0.038	0.045	251033 0080	24,10
10	22	72	10	0.2	0.038	0.045	251033 0100	31,80
12	26	83	12	0.3	0.063	0.075	251033 0120	44,50
16	32	92	16	0.3	0.084	0.1	251033 0160	69,50
20	38	104	20	0.4	0.101	0.12	251033 0200	108,–

2145

SARA® End milling cutters

VHM | 45° | e8 | h5 | DIN 6535 HB | Z 3 | TiAlN | HPC | Vc/fz | 20-245



- **With clearance**
- **First-rate chip removal due to extremely smooth surface**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-Ultra-coated**

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 100-120	● 80-100	● 60-80	● 50-65	● 50-60	○ 40-50	● 100-130	● 80-120	● 40-60	● 40-50	○ 30-40	● 300-400	● 200-300	● 100-140				
	Cutting speed Vc m/min.										Please adjust these guidelines according to clamping operation and machine set-up.								





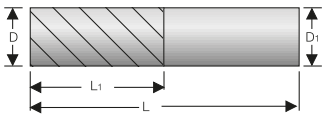
D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	F x 45° mm	● Feed fz steel < 1400 N/mm² mm/tooth	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	8	15	57	6.0	2.8	0.1	0.012	0.015	**254052** 0030	25,90
3.5	11	15	57	6.0	3.3	0.1	0.012	0.015	254052 0035	27,40
4.0	11	15	57	6.0	3.8	0.1	0.012	0.015	254052 0040	25,30
4.5	13	21	57	6.0	4.3	0.1	0.024	0.03	254052 0045	27,40
5.0	13	21	57	6.0	4.8	0.1	0.024	0.03	254052 0050	25,30
5.5	13	21	57	6.0	5.3	0.1	0.024	0.03	254052 0055	27,40
6.0	13	21	57	6.0	5.8	0.1	0.024	0.03	254052 0060	25,30
6.5	16	27	63	8.0	6.3	0.1	0.024	0.03	254052 0065	34,–
7.0	16	27	63	8.0	6.8	0.1	0.024	0.03	254052 0070	33,30
7.5	19	27	63	8.0	7.3	0.1	0.024	0.03	254052 0075	31,80
8.0	21	27	63	8.0	7.7	0.1	0.024	0.03	254052 0080	32,30
8.5	21	32	72	10.0	8.3	0.1	0.032	0.04	254052 0085	50,50
9.0	21	32	72	10.0	8.8	0.1	0.032	0.04	254052 0090	49,70
9.5	22	32	72	10.0	9.3	0.1	0.032	0.04	254052 0095	54,50
10.0	22	32	72	10.0	9.8	0.1	0.032	0.04	254052 0100	47,50
11.0	26	32	83	12.0	10.8	0.1	0.032	0.04	254052 0110	76,50
12.0	26	38	83	12.0	11.8	0.1	0.032	0.04	254052 0120	70,50
14.0	26	38	83	14.0	13.8	0.1	0.04	0.05	254052 0140	88,50
16.0	36	44	92	16.0	15.7	0.1	0.04	0.05	254052 0160	120,–
18.0	36	44	92	18.0	17.7	0.1	0.048	0.06	254052 0180	148,–
20.0	41	54	104	20.0	19.7	0.1	0.048	0.06	254052 0200	189,–

2145

SARA® End milling cutters

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 3 | TiAlN | Vc/fz | 20-246

- Eccentric relief grinding



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	251050	● 90-110	● 70-90	● 50-70	○ 50-80	○ 50-80	○ 25-35	● 90-110	○ 35-55				○ 135-225	○ 90-180	○ 70-130				
	251053	● 100-120	● 80-100	● 60-80	○ 60-90	○ 60-90	○ 30-40	● 100-120	○ 40-60				○ 150-250	○ 100-200	○ 80-150				
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

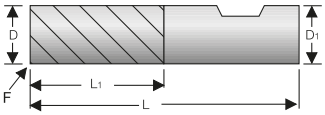
D mm	L1 mm	L mm	D1 mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	TiAlN art.no.	€
2.0	7.0	39.0	3.0	0.009	0.010	**251050** 0020	13,95	**251053** 0020	19,70
3.0	9.0	39.0	3.0	0.010	0.011	251050 0030	13,95	251053 0030	19,70
4.0	14.0	51.0	4.0	0.020	0.023	251050 0040	14,95	251053 0040	19,70
5.0	16.0	51.0	5.0	0.020	0.023	251050 0050	16,20	251053 0050	19,70
6.0	19.0	64.0	6.0	0.030	0.033	251050 0060	16,20	251053 0060	19,70
7.0	19.0	64.0	8.0	0.030	0.033	251050 0070	18,60	251053 0070	27,–
8.0	21.0	64.0	8.0	0.040	0.045	251050 0080	19,70	251053 0080	26,60
9.0	22.0	70.0	10.0	0.040	0.045	251050 0090	33,30	251053 0090	42,10
10.0	22.0	70.0	10.0	0.050	0.060	251050 0100	31,30	251053 0100	38,20
12.0	25.0	78.0	12.0	0.060	0.080	251050 0120	44,10	251053 0120	52,50
16.0	32.0	89.0	16.0	0.080	0.100	251050 0160	76,50	251053 0160	86,–
20.0	38.0	102.0	20.0	0.100	0.120	251050 0200	127,–	251053 0200	142,–
						2109		2109	



VAN HOORN CARBIDE VHVFFW end milling cutter

VHM | 45° | h9 | h5 | DIN 6535 HB | Z 3 | TiAlN | HPC | Vc/fz | 20-251

- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**
- Special **microwave** pre-treatment and finishing treatment
- **New chip flute geometry** for enhanced cooling and chip flow
- For wet and dry machining, **extremely high chip removal rates and long service life**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 160-200	● 90-110	● 70-90				● 90-140	● 80-120										
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

D mm	F mm	L1 mm	L mm	D1 mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	0.10	10	39	3.0	0.01	0.013	**251049** 0030	40,–
4.0	0.10	12	51	4.0	0.01	0.013	251049 0040	41,35
5.0	0.15	14	51	5.0	0.013	0.018	251049 0050	41,75
6.0	0.15	16	64	6.0	0.023	0.032	251049 0060	42,45
8.0	0.20	20	64	8.0	0.033	0.046	251049 0080	61,50
10.0	0.20	22	70	10.0	0.04	0.056	251049 0100	80,20
12.0	0.25	25	78	12.0	0.05	0.07	251049 0120	108,70
16.0	0.25	35	89	16.0	0.058	0.081	251049 0160	147,50
							2113	



SARA End milling cutters

VHM | 30° | e8 | h5 | DIN 6535 HA | DIN 6535 HB | Z 4 | TiAlN | HPC | 20-246

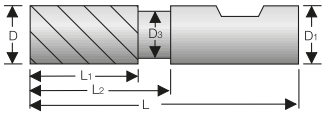
- **With clearance**
- Straight shank in accordance with DIN 6535 HA and with driving plane in accordance with DIN 6535 HB
- **First-rate chip removal due to extremely smooth surface**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-Ultra-coated**

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 100-120	● 80-100	● 60-80	● 50-65	● 50-60	○ 40-50	● 100-130	● 80-120	● 40-60	● 40-50	○ 30-40	● 300-400	● 200-300	● 100-140				
	Cutting speed Vc m/min.										Please adjust these guidelines according to clamping operation and machine set-up.								

Standard version

- Smooth shank
- up to ∅ 6 mm with driving planes in accordance with DIN 6535 HB





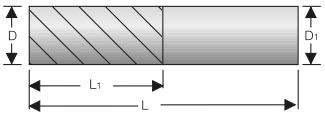
D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	● Feed fz steel < 1400 N/mm² mm/tooth	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
2.0	8	-	32	2.0	-	0.0056	0.007	**254054** 0020	20,70
3.0	12	-	38	3.0	-	0.012	0.015	254054 0030	22,30
4.0	12	-	40	4.0	-	0.012	0.015	254054 0040	23,90
5.0	15	20	50	5.0	4.8	0.024	0.03	254054 0050	25,50
6.0	16	20	58	6.0	5.8	0.024	0.03	254054 0060	35,–
8.0	22	32	70	8.0	7.7	0.024	0.03	254054 0080	38,20
10.0	25	31	73	10.0	9.6	0.032	0.04	254054 0100	57,50
12.0	28	37	84	12.0	11.6	0.032	0.04	254054 0120	83,–
16.0	35	43	93	16.0	15.5	0.04	0.05	254054 0160	134,–
20.0	40	52	104	20.0	19.5	0.048	0.06	254054 0200	200,–

2145

Extra-long without clearance

- Smooth shank





D mm	L1 mm	L mm	D1 mm	● Feed fz steel < 1400 N/mm² mm/tooth	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	30	60	3.0	0.012	0.015	**254056** 0030	25,50
4.0	30	75	4.0	0.012	0.015	254056 0040	27,10
5.0	35	75	5.0	0.024	0.03	254056 0050	30,20
6.0	40	100	6.0	0.024	0.03	254056 0060	47,80
8.0	40	100	8.0	0.024	0.03	254056 0080	60,50
10.0	40	100	10.0	0.032	0.04	254056 0100	92,50
12.0	45	100	12.0	0.032	0.04	254056 0120	156,–
14.0	45	100	14.0	0.04	0.05	254056 0140	185,–
16.0	75	150	16.0	0.04	0.05	254056 0160	250,–

2145



VAN HOORN CARBIDE

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Van Hoorn Carbide is a specialist in solid carbide milling tools which offers the highest quality standards, state-of-the-art technologies, technical knowledge, experience and great service.

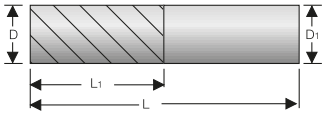


The perfect shank design for every application!

SARA® End milling cutters

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 4 | TiAlN | Vc/fz | 20-246

- Eccentric relief grinding



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	251506	● 90-110	● 70-90	● 50-70	○ 50-80	○ 50-80	○ 25-35	● 90-110	○ 35-55				○ 135-225	○ 90-180	○ 70-130				
	251509	● 100-120	● 80-100	● 60-80	○ 60-90	○ 60-90	○ 30-40	● 100-120	○ 40-60				○ 150-250	○ 100-200	○ 80-150				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€	TiAlN art.no.	€
2.0	7	39	3.0	0.011	**251506** 0020	10,45	**251509** 0020	15,10
3.0	9	39	3.0	0.011	251506 0030	10,45	251509 0030	15,10
3.5	12	51	4.0	0.011	251506 0035	11,90	251509 0035	18,10
4.0	14	51	4.0	0.023	251506 0040	11,90	251509 0040	16,60
4.5	14	51	5.0	0.023	251506 0045	12,65	251509 0045	17,30
5.0	16	51	5.0	0.023	251506 0050	12,65	251509 0050	17,30
6.0	19	64	6.0	0.033	251506 0060	14,25	251509 0060	18,80
7.0	19	64	8.0	0.033	251506 0070	18,10	251509 0070	26,20
8.0	21	64	8.0	0.045	251506 0080	22,70	251509 0080	30,70
9.0	22	70	10.0	0.045	251506 0090	32,40	251509 0090	40,90
10.0	22	70	10.0	0.060	251506 0100	34,60	251509 0100	43,50
12.0	25	78	12.0	0.080	251506 0120	48,50	251509 0120	58,–
14.0	30	89	14.0	0.080	251506 0140	66,50	251509 0140	76,–
16.0	32	89	16.0	0.100	251506 0160	84,50	251509 0160	94,50
20.0	38	102	20.0	0.120	251506 0200	140,–	251509 0200	162,–
					2109		2109	



SARA® End milling cutters

VHM | 30° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 4 | TiAlN | HSC | Vc/fz | 20-253

Up to 55 HRc

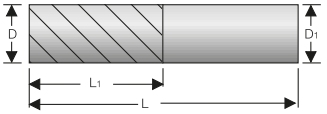
- **Short and long versions**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 60-80	● 50-70	● 40-70	○ 35-45	○ 40-50		● 80-100	● 75-95								● 25-30	○ 15-20	
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

Short

D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HA art.no.	€
2.0	6	40	4.0	0.010	0.055	**254005** 0020	24,–
3.0	8	45	6.0	0.010	0.055	254005 0030	33,80
4.0	11	45	6.0	0.020	0.044	254005 0040	33,80
5.0	13	50	6.0	0.020	0.044	254005 0050	33,80
6.0	13	50	6.0	0.020	0.041	254005 0060	33,80
7.0	16	60	8.0	0.030	0.041	254005 0070	42,70
8.0	19	60	8.0	0.030	0.041	254005 0080	42,70
10.0	22	70	10.0	0.045	0.042	254005 0100	63,–
12.0	26	75	12.0	0.050	0.042	254005 0120	85,50
14.0	26	85	14.0	0.060	0.042	254005 0140	111,–
16.0	32	100	16.0	0.060	0.042	254005 0160	146,–
20.0	38	105	20.0	0.080	0.045	254005 0200	215,–
25.0	45	120	25.0	0.100	0.058	254005 0250	375,–
						2109	

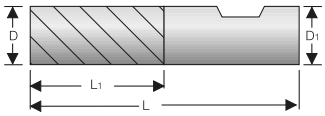




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Short with driving plane



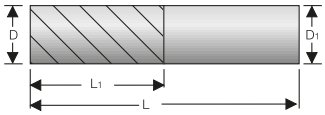


D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HB art.no.	€
3.0	8	45	6.0	0.010	0.055	**254006** 0030	33,80
4.0	11	45	6.0	0.010	0.044	254006 0040	33,80
5.0	13	50	6.0	0.020	0.044	254006 0050	33,80
6.0	13	50	6.0	0.020	0.041	254006 0060	33,80
7.0	16	60	8.0	0.020	0.041	254006 0070	42,70
8.0	19	60	8.0	0.030	0.041	254006 0080	42,70
9.0	19	70	10.0	0.030	0.041	254006 0090	63,–
10.0	22	70	10.0	0.040	0.042	254006 0100	63,–
11.0	22	75	12.0	0.045	0.042	254006 0110	85,50
12.0	26	75	12.0	0.050	0.042	254006 0120	85,50
14.0	26	85	14.0	0.060	0.042	254006 0140	111,–
16.0	32	100	16.0	0.060	0.042	254006 0160	146,–
20.0	38	105	20.0	0.080	0.045	254006 0200	205,–
25.0	45	120	25.0	0.100	0.058	254006 0250	375,–

2109

Long





D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HA art.no.	€
2.0	8	40	4.0	0.010	0.055	**254007** 0020	27,10
3.0	12	50	6.0	0.010	0.055	254007 0030	39,80
4.0	15	50	6.0	0.020	0.044	254007 0040	39,80
5.0	20	60	6.0	0.020	0.044	254007 0050	39,80
6.0	20	60	6.0	0.020	0.041	254007 0060	39,80
8.0	25	70	8.0	0.030	0.041	254007 0080	48,80
10.0	30	90	10.0	0.040	0.042	254007 0100	75,–
12.0	30	90	12.0	0.050	0.042	254007 0120	102,–
14.0	40	110	16.0	0.060	0.042	254007 0140	146,–
16.0	50	110	16.0	0.060	0.042	254007 0160	193,–
20.0	55	110	20.0	0.080	0.045	254007 0200	325,–
25.0	75	140	25.0	0.100	0.058	254007 0250	529,–

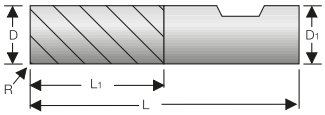
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VAN HOORN CARBIDE VHRS end milling cutter

VHM | 35°-38° | e8 | h5 | DIN 6535 HB | Z 4 | Z 5 | TiAlN | Vc/fz | 20-250

- **Cutting material, solid carbide ultra-fine grain TiAlN-coated**
- Special pre-treatment and finishing treatment due to **micro radiation**
- **Version with 4 or 5 cutting edges**
- For wet and dry machining, **extremely high chip removal rates and service life**

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material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 140-220	● 100-180	● 70-160				● 100-160	● 90-140										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

Standard, 4 cutting edges



The specialist in steel

D mm	R mm	D1 mm	L mm	L1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HB art.no.	€
3	0.2	6	51	7	4	0.01	0.015	**255100** 0302	37,05
4	0.2	6	51	9	4	0.012	0.02	255100 0402	40,65
5	0.2	6	51	11	4	0.02	0.03	255100 0502	43,95
6	0.1	6	64	13	4	0.025	0.035	255100 0601	47,70
6	0.3	6	64	13	4	0.025	0.035	255100 0603	47,70
6	0.5	6	64	13	4	0.025	0.035	255100 0605	47,70

2113

Continued on next page >>>

D mm	R mm	D1 mm	L mm	L1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HB art.no.	€
6	1	6	64	13	4	0.025	0.035	255100 0610	47,70
8	0.1	8	64	18	4	0.035	0.045	255100 0801	62,75
8	0.3	8	64	18	4	0.035	0.045	255100 0803	62,75
8	0.5	8	64	18	4	0.035	0.045	255100 0805	62,75
8	1	8	64	18	4	0.035	0.045	255100 0810	62,75
10	0.1	10	70	22	4	0.04	0.055	255100 1001	81,78
10	0.3	10	70	22	4	0.04	0.055	255100 1003	81,75
10	0.5	10	70	22	4	0.04	0.055	255100 1005	81,75
10	1	10	70	22	4	0.04	0.055	255100 1010	81,75
12	0.1	12	78	25	4	0.05	0.065	255100 1201	115,–
12	0.3	12	78	25	4	0.05	0.065	255100 1203	115,–
12	0.5	12	78	25	4	0.05	0.065	255100 1205	115,–
12	1	12	78	25	4	0.05	0.065	255100 1210	115,–
14	0.5	14	89	30	4	0.055	0.08	255100 1405	169,95
14	1	14	89	30	4	0.055	0.08	255100 1410	169,95
16	0.1	16	89	35	4	0.06	0.08	255100 1601	167,–
16	0.5	16	89	35	4	0.06	0.08	255100 1605	167,–
16	1	16	89	35	4	0.06	0.08	255100 1610	167,–
20	0.5	20	102	42	4	0.08	0.1	255100 2005	268,–
20	1	20	102	42	4	0.08	0.1	255100 2010	268,–
25	0.5	25	120	45	4	0.11	0.12	255100 2505	370,–
25	1	25	120	45	4	0.11	0.12	255100 2510	370,–

2113



for trochoid milling

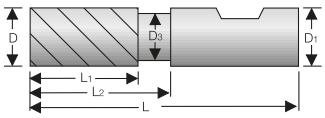
Standard, 5 cutting edges

D mm	R mm	D1 mm	L mm	L1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HB art.no.	€
3	0.2	6	51	7	5	0.015	**255101** 0302	37,05
4	0.2	6	51	9	5	0.02	255101 0402	40,65
5	0.2	6	51	11	5	0.03	255101 0502	43,95
6	0.1	6	64	13	5	0.035	255101 0601	47,70
6	0.3	6	64	13	5	0.035	255101 0603	47,70
6	0.5	6	64	13	5	0.035	255101 0605	47,70
6	1	6	64	13	5	0.035	255101 0610	47,70
8	0.1	8	64	18	5	0.045	255101 0801	62,75
8	0.3	8	64	18	5	0.045	255101 0803	62,75
8	0.5	8	64	18	5	0.045	255101 0805	62,75
8	1	8	64	18	5	0.045	255101 0810	62,75
10	0.1	10	70	22	5	0.055	255101 1001	81,75
10	0.3	10	70	22	5	0.055	255101 1003	81,75
10	0.5	10	70	22	5	0.055	255101 1005	81,75
10	1	10	70	22	5	0.055	255101 1010	81,75
12	0.1	12	78	25	5	0.065	255101 1201	115,–
12	0.3	12	78	25	5	0.065	255101 1203	115,–
12	0.5	12	78	25	5	0.065	255101 1205	115,–
12	1	12	78	25	5	0.065	255101 1210	115,–
14	0.5	14	89	30	5	0.08	255101 1405	169,95
14	1	14	89	30	5	0.08	255101 1410	169,95
16	0.1	16	89	35	5	0.08	255101 1601	167,–
16	0.5	16	89	35	5	0.08	255101 1605	167,–
16	1	16	89	35	5	0.08	255101 1610	167,–
20	0.5	20	102	42	5	0.1	255101 2005	268,–
20	1	20	102	42	5	0.1	255101 2010	268,–
25	0.5	25	120	45	5	0.12	255101 2505	370,–
25	1	25	120	45	5	0.12	255101 2510	370,–

2113

SARA® End milling cutters

VHM | 45° | e8 | h5 | DIN 6535 HB | Z 6 | Z 8+ | TiAlN | HSC | | Vc/fz | 20-245



- **With clearance**
- **First-rate chip removal due to extremely smooth surface**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-Ultra-coated**

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
● 140-160	● 120-140	● 100-140	● 70-90	● 80-100		● 180-200	● 170-190								○ 40-50		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Standard version

- Shank with driving planes in accordance with DIN 6535 HB



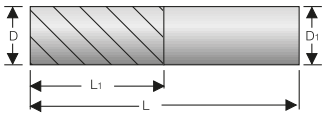
ULTRA

D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	Z	● Feed fz steel < 1400 N/mm² mm/tooth	● Feed fz steel < 1400 N/mm² mm/tooth	DIN 6535-HB art.no.	€
4.0	11	19	57	6.0	3.7	6	0.015	0.020	**254058** 0040	35,60
5.0	13	19	57	6.0	4.7	6	0.150	0.020	254058 0050	33,–
6.0	13	19	57	6.0	5.7	6	0.020	0.030	254058 0060	32,40
8.0	19	25	63	8.0	7.7	6	0.020	0.030	254058 0080	37,90
10.0	22	30	72	10.0	9.7	6	0.030	0.040	254058 0100	60,–
12.0	26	36	83	12.0	11.5	6	0.050	0.060	254058 0120	79,–
14.0	26	36	83	14.0	13.5	6	0.050	0.060	254058 0140	130,–
16.0	32	42	92	16.0	15.5	6	0.070	0.080	254058 0160	141,–
18.0	32	42	92	18.0	17.5	8	0.090	0.100	254058 0180	196,–
20.0	38	52	104	20.0	19.5	8	0.100	0.120	254058 0200	200,–

2145

SARA® End milling cutters

VHM | 45° | h9 | h5 | DIN 6535 HA | Z 6 | TiAlN | HSC | | Vc/fz | 20-263



Up to 55 HRc

- **Extra-long version**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
● 140-160	● 120-140	● 100-140	○ 70-90	○ 80-100		● 180-200	● 170-190								● 40-50	○ 30-40	

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.



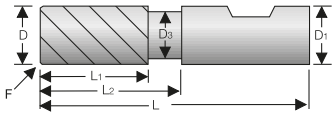
D mm	L1 mm	L mm	D1 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	26	70	6.0	6	0.030	**254109** 0060	49,80
8.0	36	90	8.0	6	0.040	254109 0080	65,50
10.0	46	100	10.0	6	0.060	254109 0100	103,–
12.0	56	110	12.0	6	0.060	254109 0120	145,–
16.0	66	130	16.0	6	0.080	254109 0160	250,–
20.0	76	140	20.0	6	0.100	254109 0200	395,–
25.0	92	180	25.0	6	0.150	254109 0250	739,–

2109

ATORN® Roughing cutter

VHM | NF | 35°-38° | e8 | h6 | DIN 6535 HB | Z 4 | TiAlN | Vc/fz | 20-264

- **With clearance**
- Edge protection chamfer
- **First-rate chip removal due to extremely smooth surface**
- **Double-twisted internal cooling**
- **Cutting material: solid carbide, TiAlN-Ultra-coated**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 90-160	● 80-110	● 60-80				● 130-160	● 130-150								○ 60-80		
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



ULTRA

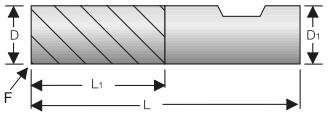
D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	F x 45° mm	● Feed fz steel < 1400 N/mm² mm/tooth	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
4.0	11	21	57	6.0	3.8	0.1	0.024	0.03	**254092** 0040	69,50
5.0	13	21	57	6.0	4.8	0.1	0.024	0.03	254092 0050	69,50
6.0	13	21	57	6.0	5.7	0.2	0.024	0.03	254092 0060	64,–
7.0	16	27	63	8.0	6.7	0.2	0.024	0.03	254092 0070	94,50
8.0	16	27	63	8.0	7.6	0.25	0.024	0.03	254092 0080	97,–
9.0	19	32	72	10.0	8.6	0.25	0.032	0.04	254092 0090	123,–
10.0	22	32	72	10.0	9.6	0.25	0.032	0.04	254092 0100	126,–
12.0	26	38	83	12.0	11.5	0.3	0.032	0.04	254092 0120	170,–
14.0	26	38	83	14.0	13.5	0.3	0.04	0.05	254092 0140	215,–
16.0	32	44	92	16.0	15.5	0.4	0.04	0.05	254092 0160	305,–
20.0	38	54	104	20.0	19.5	0.5	0.048	0.06	254092 0200	519,–

2119

SARA® Roughing cutter

VHM | HR | 20° | e8 | h5 | DIN 6535 HB | Z 3 | Z 4 | Z 5 | TiAlN | HSC | Vc/fz | 20-258

- **Long version**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 130-150	● 110-130	● 90-120				● 100-120	● 60-80								○ 60-80		
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

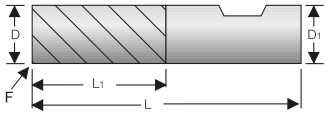


D mm	L1 mm	L mm	D1 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	16	57	6.0	3	0.026	**254016** 0060	42,80
7.0	16	63	8.0	3	0.032	254016 0070	49,30
8.0	16	63	8.0	3	0.040	254016 0080	49,30
9.0	19	72	10.0	4	0.047	254016 0090	77,–
10.0	22	72	10.0	4	0.048	254016 0100	77,–
12.0	26	83	12.0	4	0.152	254016 0120	96,50
16.0	32	92	16.0	4	0.151	254016 0160	158,–
20.0	38	104	20.0	4	0.151	254016 0200	270,–
25.0	45	121	25.0	5	0.149	254016 0250	480,–

2109

VAN HOORN CARBIDE **VHVFFW** roughing cutter

VHM | 50° | h9 | h5 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-262



- **4 cutting edges, face cutter geometry for plunge milling**
- Straight shank with driving planes in accordance with DIN 6535 HB
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**
- Special **microwave** pre-treatment and finishing treatment
- **New chip flute geometry** for enhanced cooling and chip flow
- For wet and dry machining, **high material removal rate**

Material removal rate up to 315 cm³/min. Cutter diameter 12 mm e.g. ap = 18 mm, ae = D

20

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
● 150-200	● 100-180	● 100-150	○ 50-70			● 150-200	● 150-200										

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

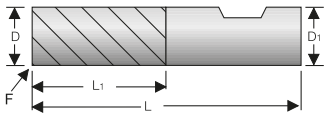


D mm	F mm	D1 mm	L mm	L1 mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	0.15	6.0	64	16	0.035	0.05	**255079** 0060	54,40
8.0	0.20	8.0	64	20	0.045	0.06	255079 0080	74,90
10.0	0.20	10.0	70	22	0.050	0.07	255079 0100	92,20
12.0	0.25	12.0	78	25	0.060	0.08	255079 0120	126,30
16.0	0.25	16.0	89	35	0.080	0.1	255079 0160	175,50
20.0	0.50	20.0	102	40	0.10	0.12	255079 0200	249,50

2113

VAN HOORN CARBIDE **VHRFFW** roughing cutter

VHM | 40° | h9 | h5 | DIN 6535 HB | Z 3 | Z 4 | TiAlN | HPC | Vc/fz | 20-251



- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**
- Special **microwave** pre-treatment and finishing treatment
- **New chip flute geometry** for enhanced cooling and chip flow
- For wet and dry machining, **extremely high chip removal rates and long service life**

Feed rate up to 3 m/min.

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
● 250-300	● 150-200	● 110-150				● 110-170	● 100-150										

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.



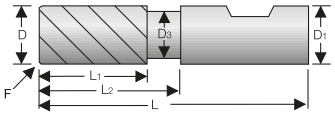
D mm	F mm	L1 mm	L mm	D1 mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	0.25	16	64	6.0	3	0.035	0.050	**254015** 0060	51,40
8.0	0.50	20	64	8.0	3	0.045	0.060	254015 0080	67,30
10.0	0.50	22	70	10.0	3	0.050	0.070	254015 0100	92,30
12.0	0.50	25	78	12.0	3	0.060	0.080	254015 0120	118,80
14.0	1.00	25	89	14.0	3	0.070	0.090	254015 0140	133,30
16.0	1.00	35	89	16.0	3	0.080	0.10	254015 0160	170,20
20.0	1.00	40	102	20.0	4	0.10	0.12	254015 0200	232,20

2113

SARA® Roughing cutter

VHM | NR | 30° | e8 | h5 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-264

- **With clearance**
- **First-rate chip removal due to extremely smooth surface**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-Ultra-coated**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 90-160	● 80-110	● 60-80				● 130-160	● 130-150										
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														



ULTRA

D mm	L1 mm	L2 mm	L mm	D1 mm	D3 mm	F x 45° mm	Feed fz steel < 1400 N/mm² mm/tooth	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
5.0	13	19	57	6.0	4.8	0.5	0.024	0.030	**254090** 0050	82,50
6.0	13	19	57	6.0	5.8	0.5	0.024	0.030	254090 0060	82,50
8.0	19	25	63	8.0	7.7	0.5	0.024	0.030	254090 0080	94,50
10.0	22	30	72	10.0	9.8	0.5	0.032	0.040	254090 0100	103,–
12.0	26	36	83	12.0	11.8	0.5	0.032	0.040	254090 0120	123,–
14.0	26	36	83	14.0	13.8	0.5	0.040	0.050	254090 0140	172,–
16.0	32	42	92	16.0	15.7	0.5	0.040	0.050	254090 0160	195,–
18.0	32	42	92	18.0	17.7	0.5	0.048	0.060	254090 0180	260,–
20.0	38	52	104	20.0	19.7	0.5	0.048	0.060	254090 0200	290,–

2145



VAN HOORN CARBIDE

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Van Hoorn Carbide is a specialist in solid carbide milling tools which offers the highest quality standards, state-of-the-art technologies, technical knowledge, experience and great service.



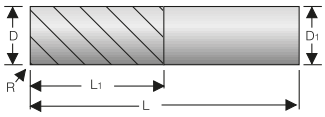
The perfect shank design for every application!

SARA® Torus milling cutter

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 2 | TiAlN | HSC | Vc/fz | 20-265

- **Long version**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

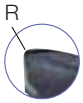
Up to 60 HRc



material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
● very well suited ○ well suited	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	● 70-85	● 60-70	● 50-70	○ 40-50	○ 40-50		● 55-85	● 50-60								● 20-30	● 15-20	
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.





D mm	R mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	0.3	12	50	6.0	0.152	**254017** 0001	36,–
4.0	0.3	15	50	6.0	0.151	254017 0002	36,–
4.0	0.5	15	50	6.0	0.151	254017 0003	36,–
5.0	0.3	20	60	6.0	0.149	254017 0004	36,–
5.0	0.5	20	60	6.0	0.149	254017 0005	36,–
6.0	0.3	20	60	6.0	0.149	254017 0006	36,–
6.0	0.5	20	60	6.0	0.149	254017 0060	36,–
6.0	1.0	20	60	6.0	0.149	254017 1060	36,–
8.0	0.3	25	70	8.0	0.149	254017 0010	43,40
8.0	0.5	25	70	8.0	0.149	254017 0080	43,40
8.0	1.0	25	70	8.0	0.149	254017 1080	43,40
8.0	1.5	25	70	8.0	0.149	254017 1580	43,40
8.0	2.0	25	70	8.0	0.149	254017 2080	43,40
10.0	0.3	30	90	10.0	0.157	254017 0015	62,50
10.0	0.5	30	90	10.0	0.157	254017 0100	62,50
10.0	1.0	30	90	10.0	0.157	254017 1100	62,50
10.0	1.5	30	90	10.0	0.157	254017 1105	62,50
10.0	2.0	30	90	10.0	0.157	254017 2100	62,50
12.0	0.5	30	90	12.0	0.157	254017 0120	91,50
12.0	1.0	30	90	12.0	0.157	254017 1120	91,50
12.0	1.5	30	90	12.0	0.157	254017 1125	91,50
12.0	2.0	30	90	12.0	0.157	254017 2120	91,50
16.0	0.5	50	110	16.0	0.161	254017 0024	162,–
16.0	1.0	50	110	16.0	0.161	254017 0025	162,–
16.0	1.5	50	110	16.0	0.161	254017 0026	162,–
16.0	2.0	50	110	16.0	0.161	254017 0027	162,–
20.0	0.5	50	110	20.0	0.167	254017 0028	280,–
20.0	1.0	50	110	20.0	0.167	254017 0029	280,–
20.0	1.5	50	110	20.0	0.167	254017 0030	280,–
20.0	2.0	50	110	20.0	0.167	254017 0031	280,–

2109

OSG End milling cutters from the market leader

INFO

The OSG Corporation is the world's largest manufacturer of shank tools.

Please request sales documents, free of charge and without obligation!

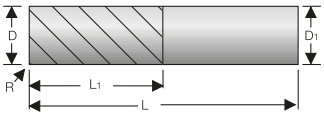


SARA® Torus milling cutter

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 4 | TiAlN | HSC | Vc/fz | 20-265

- **Long version**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

Up to 60 HRc



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 70-85	● 60-70	● 50-70	○ 40-50	○ 40-50		● 55-85	● 50-60								● 20-30	● 15-20	
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.





D mm	R mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	0.3	12	50	6.0	0.041	**254019** 0001	36,–
4.0	0.3	15	50	6.0	0.041	254019 0002	36,–
4.0	0.5	15	50	6.0	0.041	254019 0003	36,–
5.0	0.3	20	60	6.0	0.041	254019 0004	36,–
5.0	0.5	20	60	6.0	0.041	254019 0005	36,–
6.0	0.3	20	60	6.0	0.041	254019 0006	36,–
6.0	0.5	20	60	6.0	0.041	254019 0060	36,–
6.0	1.0	20	60	6.0	0.041	254019 1060	36,–
8.0	0.3	25	70	8.0	0.041	254019 0010	43,40
8.0	0.5	25	70	8.0	0.041	254019 0080	43,40
8.0	1.0	25	70	8.0	0.041	254019 1080	43,40
8.0	1.5	25	70	8.0	0.041	254019 1580	43,40
8.0	2.0	25	70	8.0	0.041	254019 2080	43,40
10.0	0.3	30	90	10.0	0.042	254019 0015	62,50
10.0	0.5	30	90	10.0	0.042	254019 0100	62,50
10.0	1.0	30	90	10.0	0.042	254019 1100	62,50
10.0	1.5	30	90	10.0	0.042	254019 1105	62,50
10.0	2.0	30	90	10.0	0.042	254019 2100	62,50
12.0	0.5	30	90	12.0	0.042	254019 0120	91,50
12.0	1.0	30	90	12.0	0.042	254019 1120	91,50
12.0	1.5	30	90	12.0	0.042	254019 1125	91,50
12.0	2.0	30	90	12.0	0.042	254019 2120	91,50
16.0	0.5	50	110	16.0	0.043	254019 0024	162,–
16.0	1.0	50	110	16.0	0.043	254019 1160	162,–
16.0	1.5	50	110	16.0	0.043	254019 1165	162,–
16.0	2.0	50	110	16.0	0.043	254019 2160	162,–
20.0	0.5	50	110	20.0	0.044	254019 0028	280,–
20.0	1.0	50	110	20.0	0.044	254019 1200	280,–
20.0	1.5	50	110	20.0	0.044	254019 1205	280,–
20.0	2.0	50	110	20.0	0.044	254019 2200	280,–

2109

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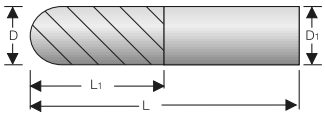
The perfect shank design for every application!



SARA® Radius milling cutter

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 2 | TiAlN | Vc/fz | 20-246

- Eccentric relief grinding



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 100-120	● 80-100	● 40-80	○ 60-90	○ 60-90		● 90-120	○ 60-120				○ 200-400	○ 100-200	○ 100-300				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	Uncoated art.no.	€	TiAlN-coated art.no.	€
3.0	9	39	3.0	0.013	**250502** 0030	15,40	**250505** 0030	20,30
4.0	14	51	4.0	0.025	250502 0040	16,20	250505 0040	21,10
5.0	16	51	5.0	0.025	250502 0050	17,–	250505 0050	21,80
6.0	19	64	6.0	0.037	250502 0060	18,60	250505 0060	23,50
8.0	21	64	8.0	0.051	250502 0080	28,50	250505 0080	36,90
10.0	22	70	10.0	0.068	250502 0100	45,80	250505 0100	55,–
12.0	25	78	12.0	0.090	250502 0120	59,50	250505 0120	70,–
14.0	30	89	14.0	0.090	250502 0140	71,–	250505 0140	81,–
16.0	32	89	16.0	0.113	250502 0160	95,50	250505 0160	108,–
18.0	35	102	18.0	0.113	250502 0180	104,–	250505 0180	118,–
20.0	38	102	20.0	0.135	250502 0200	146,–	250505 0200	167,–
					2109		2109	



...then it's ATORN.

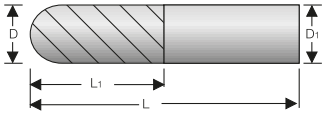
ATORN®
High quality for great performance

SARA® Radius milling cutter

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 2 | TiAlN | HSC | Vc/fz | 20-267

- **Long and extra-long versions**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**

Up to 60 HRc



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	254011	● 150-170	● 120-150	● 100-140	○ 60-100	○ 60-100		● 180-220	● 160-200								● 60-80	● 50-60	
	254112	● 120-150	● 100-130	● 90-130	○ 45-80	○ 45-80											● 50-70	● 40-50	
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Long



D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
1.0	2.5	50	4.0	0.082	**254011** 0010	30,60
1.5	4	50	4.0	0.082	254011 0015	30,60
2.0	5	50	6.0	0.082	254011 0020	28,30
3.0	8	60	6.0	0.081	254011 0030	28,30
4.0	8	70	6.0	0.081	254011 0040	30,60
5.0	10	80	6.0	0.078	254011 0050	31,90
6.0	12	90	6.0	0.078	254011 0060	33,60
7.0	14	90	8.0	0.078	254011 0070	53,–
8.0	14	100	8.0	0.066	254011 0080	53,–
10.0	18	100	10.0	0.066	254011 0100	84,–
12.0	22	110	12.0	0.074	254011 0120	108,–
16.0	30	140	16.0	0.081	254011 0160	182,–
20.0	38	160	20.0	0.089	254011 0200	290,–

2109



Extra-long

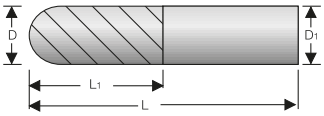
D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
2.0	6	80	3.0	0.082	**254112** 0020	41,10
3.0	8	100	3.0	0.081	254112 0030	41,10
4.0	8	100	4.0	0.081	254112 0040	41,10
5.0	10	120	6.0	0.078	254112 0050	41,10
6.0	10	120	6.0	0.078	254112 0060	41,10
8.0	14	140	8.0	0.066	254112 0080	73,–
10.0	18	180	10.0	0.066	254112 0100	137,–
12.0	22	200	12.0	0.074	254112 0120	178,–
16.0	30	250	16.0	0.081	254112 0160	305,–
20.0	38	250	20.0	0.089	254112 0200	475,–

2109

SARA® Radius milling cutter

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 4 | TiAlN | Vc/fz | 20-246

- **Short version**
- Eccentric relief grinding



material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
● very well suited ○ well suited	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	●	●	●	○	○		●	○				○	○	○				
	100-120	80-100	40-80	60-90	60-90		90-120	60-120				200-400	100-200	100-300				
	Cutting speed Vc m/min.								Please adjust these guidelines according to clamping operation and machine set-up.									



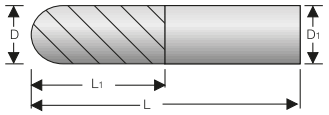
D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	TiAlN-coated art.no.	€
3.0	10	40	3.0	0.009	**251532** 0030	26,40
4.0	15	50	4.0	0.030	251532 0040	27,20
5.0	15	50	5.0	0.030	251532 0050	28,10
6.0	20	65	6.0	0.041	251532 0060	29,60
8.0	20	65	8.0	0.050	251532 0080	41,50
10.0	22	70	10.0	0.058	251532 0100	60,50
12.0	25	78	12.0	0.680	251532 0120	77,50
14.0	30	89	14.0	0.095	251532 0140	90,50
16.0	32	89	16.0	0.095	251532 0160	120,–
20.0	38	102	20.0	0.115	251532 0200	190,–

2109

SARA® Radius milling cutter

VHM | 30° | h9 | h5 | DIN 6535 HA | Z 4 | TiAlN | HSC | Vc/fz | 20-267

- **Long version**
- **Cutting material: ultra-fine grain solid carbide, TiAlN-coated**



material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
● very well suited ○ well suited	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	●	●	●	○	○		●	●								●		
	150-170	120-150	100-140	60-100	60-100		180-220	160-200								60-80		
	Cutting speed Vc m/min.								Please adjust these guidelines according to clamping operation and machine set-up.									



D mm	L1 mm	L mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
1.0	2.5	50	4.0	0.020	**254013** 0010	42,80
1.5	4	50	4.0	0.025	254013 0015	42,80
2.0	5	50	6.0	0.025	254013 0020	39,60
3.0	8	60	6.0	0.025	254013 0030	39,60
5.0	10	80	6.0	0.030	254013 0050	38,90
6.0	12	90	6.0	0.040	254013 0060	41,30
7.0	14	90	8.0	0.050	254013 0070	60,50
8.0	14	100	8.0	0.058	254013 0080	60,50
10.0	18	100	10.0	0.068	254013 0100	90,50
12.0	22	110	12.0	0.095	254013 0120	119,–
16.0	30	140	16.0	0.095	254013 0160	195,–
20.0	38	160	20.0	0.115	254013 0200	325,–

2109

Overview of the 35 - 38° *HPC* series

	End milling cutters				Drilling and plunge milling cutters		End milling cutters	
Sorting by type and number of cutting edges								
Brand	SARA	SARA	SARA	SARA	SARA	SARA	SARA	SARA
Number of cutting edges	4	4	4	4	4	4	4	4
Diameter range / mm	3.0 - 25.0	3.0 - 25.0	5.0 - 20.0	3.0 - 25.0	5.7 - 20.0	5.7 - 20.0	6.0 - 20.0	3.0 - 25.0
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Short	Long	Extra-long	Long	HA shank	HB shank	Long	Short
Type/profile	N / H	N / H	N / H	N / H			N / H	N / H
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN	TiAlN	TiAlN	TiAlN	AlTiN	AlTiN	AlTiN	AlTiN
Order No.	254130....	254131....	254132....	254133....	254144....	254145....	254140....	254134....
Catalogue page	20-58	20-58	20-59	20-59	20-60	20-60	20-61	20-61
Material groups	Usage recommendation							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	
Stainless steel ferritic/martensitic	○	○	○	○	●	●	●	●
Stainless steel austenitic	○	○	○	○	●	●	●	●
Stainless steel duplex					○	○	●	●
Cast iron GG/GTS	●	●	●	●	●	●	●	○
Cast iron GGG	●	●	●	●	○	○	●	○
Titanium alloys					○	○		●
Superalloys Fe/NiCo base < 30 HRc					○	○		●
Superalloys Fe/NiCo base ≥ 30 HRc					○	○		●
Aluminium < 8 % Si								
Aluminium ≥ 8 % Si								
Copper Cu-alloy								
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc								
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

	End milling cutters		Roughing cutter			Torus milling cutters	Radius milling cutters
Sorting by type and number of cutting edges							
Brand	SARA	SARA	SARA	SARA	SARA	SARA	SARA
Number of cutting edges	4	4	4	4	4	4	4
Diameter range / mm	3.0 - 25.0	3.0 - 25.0	4.0 - 20.0	4.0 - 20.0	6.0 - 20.0	4.0 - 20.0	3.0 - 20.0
Standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard	Factory standard
Version	Long	Long	Short	Standard	Long		
Type/profile	N / H	N / H	NF	NF	NF	NH	
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	AlTiN	AlTiN	AlTiN	AlTiN	AlTiN	TiAlN	TiAlN
Order No.	254135....	254136....	254141....	254137....	254142....	254139....	254138....
Catalogue page	20-62	20-62	20-63	20-63	20-63	20-64	20-64
Material groups	Usage recommendations						
Steel < 700 N/mm²	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●
Steel < 1400 N/mm²			●	●	●	●	●
Stainless steel ferritic/martensitic	●	●	○	○	○	○	
Stainless steel austenitic	●	●	○	○	○	○	
Stainless steel duplex	●	●	○	○	○		
Cast iron GG/GTS	○	○	●	●	●	●	●
Cast iron GGG	○	○	●	●	●	●	●
Titanium alloys	●	●					
Superalloys Fe/NiCo base < 30 HRc	●	●					
Superalloys Fe/NiCo base ≥ 30 HRc	●	●					
Aluminium < 8 % Si							
Aluminium ≥ 8 % Si							
Copper Cu-alloy							
Graphite GRP/CFP/thermoset							
Hardened steel < 55 HRc							
Hardened steel < 60 HRc							
Hardened steel ≥ 60 HRc							

SARA® The 35 – 38° *HPC* series

INFO

The universal tool for all roughing and finishing work



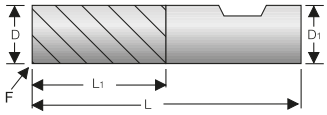
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SARA® End milling cutters

VHM | NH | 35° -38° | h10 | h6 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz

20-254



- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved service life
- Also suitable for dry machining

material

● very well suited ○ well suited

	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
254130....	● 115-135	● 100-120	● 60-80	○ 50-75	○ 50-75		● 100-140	● 100-140										
254131....	● 115-135	● 100-120	● 60-80	○ 50-75	○ 50-75		● 100-140	● 100-140										
254132....	● 90-110	● 60-85	● 40-60	○ 40-60	○ 40-60		● 85-120	● 85-120										

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	Short art.no.	€
3.0	6	54	6	0.10	4	0.008	0.009	**254130** 0030	23,70
4.0	8	54	6	0.13	4	0.013	0.015	254130 0040	23,70
5.0	9	54	6	0.18	4	0.021	0.025	254130 0050	23,70
6.0	10	54	6	0.20	4	0.021	0.025	254130 0060	23,70
7.0	12	58	8	0.20	4	0.027	0.032	254130 0070	30,90
8.0	12	58	8	0.20	4	0.027	0.032	254130 0080	30,90
9.0	14	66	10	0.30	4	0.027	0.032	254130 0090	43,30
10.0	14	66	10	0.30	4	0.044	0.052	254130 0100	43,30
11.0	16	73	12	0.30	4	0.044	0.052	254130 0110	55,50
12.0	16	73	12	0.30	4	0.044	0.052	254130 0120	55,50
13.0	18	75	14	0.30	4	0.044	0.052	254130 0130	69,–
14.0	18	75	14	0.30	4	0.059	0.07	254130 0140	69,–
16.0	22	82	16	0.40	4	0.059	0.07	254130 0160	89,50
18.0	24	84	18	0.40	4	0.071	0.084	254130 0180	132,–
20.0	26	92	20	0.50	4	0.071	0.084	254130 0200	138,–
25.0	32	92	25	0.50	4	0.077	0.091	254130 0250	320,–

2156

Long



D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	Long art.no.	€
3.0	8	57	6	0.10	4	0.008	0.009	**254131** 0030	26,80
4.0	11	57	6	0.13	4	0.013	0.015	254131 0040	26,80
5.0	13	57	6	0.18	4	0.021	0.025	254131 0050	26,80
6.0	13	57	6	0.20	4	0.021	0.025	254131 0060	26,80
7.0	19	63	8	0.20	4	0.027	0.032	254131 0070	36,10
8.0	19	63	8	0.20	4	0.027	0.032	254131 0080	36,10
9.0	22	72	10	0.30	4	0.027	0.032	254131 0090	52,50
10.0	22	72	10	0.30	4	0.044	0.052	254131 0100	52,50
11.0	26	83	12	0.30	4	0.044	0.052	254131 0110	66,–
12.0	26	83	12	0.30	4	0.044	0.052	254131 0120	66,–

2156

Continued on next page >>>

D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	Long art.no.	€
13.0	26	83	14	0.30	4	0.059	0.07	254131 0130	88,50
14.0	26	83	14	0.30	4	0.059	0.07	254131 0140	88,50
16.0	32	92	16	0.40	4	0.059	0.07	254131 0160	115,–
18.0	32	92	18	0.40	4	0.071	0.084	254131 0180	160,–
20.0	38	104	20	0.50	4	0.071	0.084	254131 0200	175,–
25.0	38	104	25	0.50	4	0.077	0.091	254131 0250	360,–

2156

Extra-long

D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	Extra-long art.no.	€
5.0	21	63	6	0.18	4	0.021	0.025	**254132** 0050	41,20
6.0	22	63	6	0.20	4	0.021	0.025	254132 0060	41,20
8.0	28	80	8	0.20	4	0.027	0.032	254132 0080	51,50
10.0	33	100	10	0.30	4	0.044	0.052	254132 0100	66,–
12.0	42	100	12	0.30	4	0.044	0.052	254132 0120	85,50
14.0	48	100	14	0.30	4	0.059	0.07	254132 0140	105,–
16.0	53	150	16	0.40	4	0.059	0.07	254132 0160	157,–
20.0	68	150	20	0.50	4	0.071	0.084	254132 0200	225,–

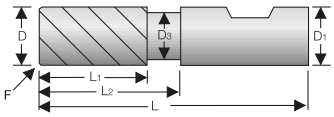
2156



SARA® End milling cutters

VHM | NH | 35°-38° | h10 | h6 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-255

- **With clearance**
- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved service life
- Also suitable for dry machining



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 115-135	● 100-120	● 60-80	○ 50-75	○ 50-75		● 100-140	● 100-140										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	8	18	57	2.8	6	0.13	4	0.008	0.009	**254133** 0030	29,90
4.0	11	21	57	3.6	6	0.18	4	0.013	0.015	254133 0040	29,90
5.0	13	21	57	4.6	6	0.20	4	0.021	0.025	254133 0050	29,90
6.0	13	21	57	5.5	6	0.20	4	0.021	0.025	254133 0060	29,90
7.0	19	27	63	6.5	8	0.20	4	0.027	0.032	254133 0070	40,20
8.0	19	27	63	7.5	8	0.20	4	0.027	0.032	254133 0080	40,20
9.0	22	32	72	8.5	10	0.30	4	0.027	0.032	254133 0090	56,50
10.0	22	32	72	9.5	10	0.30	4	0.044	0.052	254133 0100	56,50
11.0	26	38	83	10.5	12	0.30	4	0.044	0.052	254133 0110	70,–
12.0	26	38	83	11.5	12	0.30	4	0.044	0.052	254133 0120	70,–
13.0	26	42	83	12.5	14	0.30	4	0.059	0.07	254133 0130	91,50
14.0	26	42	83	13.5	14	0.30	4	0.059	0.07	254133 0140	91,50
16.0	32	44	92	15.5	16	0.40	4	0.059	0.07	254133 0160	119,–
18.0	32	50	100	17.5	18	0.40	4	0.071	0.084	254133 0180	164,–
20.0	38	54	104	19.5	20	0.50	4	0.071	0.084	254133 0200	180,–
25.0	42	65	121	24.0	25	0.50	4	0.077	0.091	254133 0250	365,–

2156

End milling cutter set, 5 pcs

Contents	art.no.	€
Solid carbide set 35°/38° Ø6/8/10/12/16 mm, 4 cutting edges, TiAlN	**254133** 1005	315,–

2156

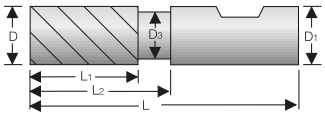


SARA® Drilling and plunge milling cutter

VHM | 36° -38° | h10 | h6 | DIN 6535 HA | DIN 6535 HB | Z 4 | AlTiN | HPC | Vc/fz | 20-261

- **Face geometry for drilling and ramping**
- With clearance
- **Irregular pitch to minimise vibrations**
- High material removal rate
- **High feed rates for plunge milling and groove milling**
- Up to 45° plunge angle
- Undersized for precise fitting grooves

Drilling and milling with one tool



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
254144....	● 210	● 175	● 120	● 110	● 110	○ 50	● 150	○ 110	○ 60-70	○ 20-35	○ 15-30							
254145....	● 210	● 175	● 120	● 110	● 110	○ 90	● 150	○ 110	○ 60-70	○ 20-35	○ 15-30							

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.



Standard

D mm	L1 mm	L2 mm	D1 mm	L mm	D3 mm	F x 45° mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HA art.no.	€
5.7	13	19	6	57	5.4	0.1	0.03	0.04	**254144** 0057	32,60
6	13	19	6	57	5.7	0.1	0.03	0.04	254144 0060	32,60
7.7	19	25	8	63	7.3	0.2	0.045	0.055	254144 0077	44,10
8	19	25	8	63	7.6	0.2	0.045	0.055	254144 0080	44,10
9.7	22	30	10	72	9.2	0.25	0.055	0.065	254144 0097	66,–
10	22	30	10	72	9.5	0.25	0.055	0.065	254144 0100	66,–
11.7	26	36	12	83	11.2	0.3	0.06	0.08	254144 0117	84,50
12	26	36	12	83	11.5	0.3	0.06	0.08	254144 0120	84,50
13.7	26	36	14	83	13.2	0.35	0.07	0.09	254144 0137	111,–
14	26	36	14	83	13.5	0.35	0.07	0.09	254144 0140	111,–
15.6	32	42	16	92	15.1	0.4	0.085	0.1	254144 0156	146,–
16	32	42	16	92	15.5	0.4	0.085	0.1	254144 0160	146,–
19.5	38	52	20	104	19	0.5	0.1	0.12	254144 0195	220,–
20	38	52	20	104	19.5	0.5	0.1	0.12	254144 0200	220,–

2156



Standard with driving plane

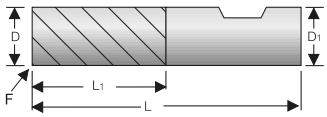
D mm	L1 mm	L2 mm	D1 mm	L mm	D3 mm	F x 45° mm	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	DIN 6535-HB art.no.	€
5.7	13	19	6	57	5.4	0.1	0.03	0.04	**254145** 0057	32,60
6	13	19	6	57	5.7	0.1	0.03	0.04	254145 0060	32,60
7.7	19	25	8	63	7.3	0.2	0.045	0.055	254145 0077	44,10
8	19	25	8	63	7.6	0.2	0.045	0.055	254145 0080	44,10
9.7	22	30	10	72	9.2	0.25	0.055	0.065	254145 0097	66,–
10	22	30	10	72	9.5	0.25	0.055	0.065	254145 0100	66,–
11.7	26	36	12	83	11.2	0.3	0.06	0.08	254145 0117	84,50
12	26	36	12	83	11.5	0.3	0.06	0.08	254145 0120	84,50
13.7	26	36	14	83	13.2	0.35	0.07	0.09	254145 0137	111,–
14	26	36	14	83	13.5	0.35	0.07	0.09	254145 0140	111,–
15.6	32	42	16	92	15.1	0.4	0.085	0.1	254145 0156	146,–
16	32	42	16	92	15.5	0.4	0.085	0.1	254145 0160	146,–
19.5	38	52	20	104	19	0.5	0.1	0.12	254145 0195	220,–
20	38	52	20	104	19.5	0.5	0.1	0.12	254145 0200	220,–

2156

SARA® End milling cutters

VHM | NH | 35°-38° | h10 | h6 | DIN 6535 HB | Z 4 | AlTiN | HPC | Vc/fz | 20-256

- **With internal coolant supply**
- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved service life



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 120-140	● 100-125	● 60-80	● 50-85	● 50-85	● 40-60	● 100-140	● 80-100										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



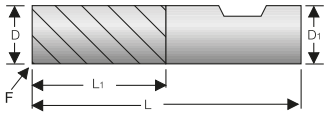
D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	13	57	6	0.20	4	0.021	0.025	**254140** 0060	66,–
8.0	19	63	8	0.20	4	0.027	0.032	254140 0080	71,–
10.0	22	72	10	0.30	4	0.044	0.052	254140 0100	77,50
12.0	26	83	12	0.30	4	0.044	0.052	254140 0120	95,–
16.0	32	92	16	0.40	4	0.059	0.07	254140 0160	144,–
20.0	38	104	20	0.50	4	0.071	0.084	254140 0200	210,–

2156

SARA® *Stainless steel* end milling cutter

VHM | Typ N | 35°-38° | h10 | h6 | DIN 6535 HB | Z 4 | AlTiN | HPC | Vc/fz | 20-257

- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved service life
- Specially designed for stainless steel machining



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 120-150	● 80-110		● 40-65	● 40-65	● 30-50	○ 100-140	○ 80-100	● 30-45	● 30-45	● 25-40							
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



Short

D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	● Feed fz stainless steel austenitic mm/tooth	● Feed fz stainless steel austenitic mm/tooth	art.no.	€
3.0	6	54	6	0.10	4	0.008	0.009	**254134** 0030	23,70
4.0	8	54	6	0.13	4	0.013	0.015	254134 0040	23,70
5.0	9	54	6	0.18	4	0.021	0.025	254134 0050	23,70
6.0	10	54	6	0.20	4	0.021	0.025	254134 0060	23,70
7.0	12	58	8	0.20	4	0.027	0.032	254134 0070	30,90
8.0	12	58	8	0.20	4	0.027	0.032	254134 0080	30,90
9.0	14	66	10	0.30	4	0.027	0.032	254134 0090	43,30
10.0	14	66	10	0.30	4	0.044	0.052	254134 0100	43,30
11.0	16	73	12	0.30	4	0.044	0.052	254134 0110	55,50
12.0	16	73	12	0.30	4	0.044	0.052	254134 0120	55,50
13.0	18	75	14	0.30	4	0.059	0.07	254134 0130	69,–
14.0	18	75	14	0.30	4	0.059	0.07	254134 0140	69,–
16.0	22	82	16	0.40	4	0.059	0.07	254134 0160	89,50
18.0	24	84	18	0.40	4	0.071	0.084	254134 0180	132,–
20.0	26	92	20	0.50	4	0.071	0.084	254134 0200	138,–
25.0	32	92	25	0.50	4	0.077	0.091	254134 0250	320,–

2156

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Long



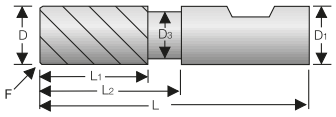
D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	art.no.	€
3.0	8	57	6	0.13	4	0.009	0.009	**254135** 0030	26,80
4.0	11	57	6	0.13	4	0.013	0.015	254135 0040	26,80
5.0	13	57	6	0.18	4	0.021	0.025	254135 0050	26,80
6.0	13	57	6	0.2	4	0.021	0.025	254135 0060	26,80
7.0	19	63	8	0.2	4	0.027	0.032	254135 0070	36,10
8.0	19	63	8	0.2	4	0.027	0.032	254135 0080	36,10
9.0	22	72	10	0.3	4	0.027	0.032	254135 0090	52,50
10.0	22	72	10	0.3	4	0.044	0.052	254135 0100	52,50
11.0	26	83	12	0.3	4	0.044	0.052	254135 0110	66,–
12.0	26	83	12	0.3	4	0.044	0.052	254135 0120	66,–
14.0	26	83	14	0.3	4	0.059	0.07	254135 0140	88,50
16.0	32	92	16	0.4	4	0.059	0.07	254135 0160	116,–
18.0	32	92	18	0.4	4	0.071	0.084	254135 0180	160,–
20.0	38	104	20	0.5	4	0.071	0.084	254135 0200	176,–
25.0	42	104	25	0.5	4	0.077	0.091	254135 0250	360,–

2156

SARA® End milling cutters *Stainless steel*

VHM | Typ N | 35° -38° | h10 | h6 | DIN 6535 HB | Z 4 | AlTiN | HPC | Vc/fz | 20-302

- **With clearance**
- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved service life
- Specially designed for stainless steel machining



material — ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
● 120-150	● 80-110		● 40-65	● 40-65	● 30-50	○ 100-140	○ 80-100	● 30-45	● 30-45	● 25-40							

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.



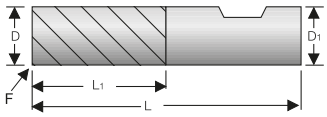
D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	art.no.	€
3.0	8	18	57	2.8	6	0.13	4	0.008	0.009	**254136** 0030	29,90
4.0	11	21	57	3.6	6	0.18	4	0.013	0.015	254136 0040	29,90
5.0	13	21	57	4.6	6	0.20	4	0.021	0.025	254136 0050	29,90
6.0	13	21	57	5.5	6	0.20	4	0.021	0.025	254136 0060	29,90
7.0	19	27	63	6.5	8	0.20	4	0.027	0.032	254136 0070	40,20
8.0	19	27	63	7.5	8	0.20	4	0.027	0.032	254136 0080	40,20
9.0	22	32	72	8.5	10	0.30	4	0.027	0.032	254136 0090	56,50
10.0	22	32	72	9.5	10	0.30	4	0.044	0.052	254136 0100	56,50
11.0	26	38	83	10.5	12	0.30	4	0.044	0.052	254136 0110	70,–
12.0	26	38	83	11.5	12	0.30	4	0.044	0.052	254136 0120	70,–
13.0	26	42	83	12.5	14	0.30	4	0.059	0.07	254136 0130	91,50
14.0	26	42	83	13.5	14	0.30	4	0.059	0.07	254136 0140	91,50
16.0	32	44	92	15.5	16	0.40	4	0.059	0.07	254136 0160	119,–
18.0	32	50	100	17.5	18	0.40	4	0.071	0.084	254136 0180	163,–
20.0	38	54	104	19.5	20	0.50	4	0.071	0.084	254136 0200	180,–
25.0	42	65	121	24.0	25	0.50	4	0.077	0.091	254136 0250	365,–

2156

SARA® Roughing cutter

VHM | NF | 35°-38° | h10 | h6 | DIN 6535 HB | Z 4 | AlTiN | HPC | Vc/fz | 20-264

- **Irregular helix angle for low-vibration milling**
- With protective chamfer F for improved service life
- Also suitable for dry machining
- High material removal rate



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 130-150	● 80-100	● 40-70	○ 50-60	○ 50-60	○ 30-50	● 100-120	● 50-70										
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

Short



D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	AlTiN art.no.	€
4.0	6	54	6	0.13	4	0.013	0.015	**254141** 0040	24,20
5.0	8	54	6	0.15	4	0.021	0.025	254141 0050	24,20
6.0	10	54	6	0.20	4	0.021	0.025	254141 0060	24,20
8.0	12	58	8	0.20	4	0.027	0.032	254141 0080	34,–
10.0	14	66	10	0.30	4	0.044	0.052	254141 0100	48,40
12.0	16	73	12	0.30	4	0.044	0.052	254141 0120	60,50
14.0	18	75	14	0.30	4	0.059	0.07	254141 0140	83,50
16.0	22	82	16	0.40	4	0.059	0.07	254141 0160	106,–
20.0	26	92	20	0.50	4	0.071	0.084	254141 0200	225,–

2156

Standard



D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	AlTiN art.no.	€
4.0	11	57	6	0.13	4	0.044	0.015	**254137** 0040	28,80
5.0	13	57	6	0.18	4	0.044	0.025	254137 0050	28,80
6.0	13	57	6	0.20	4	0.059	0.025	254137 0060	28,80
8.0	19	63	8	0.20	4	0.059	0.032	254137 0080	39,10
10.0	22	72	10	0.30	4	0.071	0.052	254137 0100	57,50
12.0	26	83	12	0.30	4	0.021	0.052	254137 0120	72,–
14.0	26	83	14	0.30	4	0.027	0.070	254137 0140	95,–
16.0	32	92	16	0.40	4	0.044	0.070	254137 0160	126,–
20.0	38	104	20	0.50	4	0.044	0.084	254137 0200	265,–

2156

Extra-long



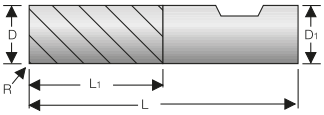
D mm	L1 mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	TiALN art.no.	€
6.0	24	68	6	0.3	4	0.021	0.025	**254142** 0060	45,30
8.0	38	88	8	0.3	4	0.027	0.032	254142 0080	62,–
10.0	45	95	10	0.4	4	0.044	0.052	254142 0100	84,50
12.0	53	110	12	0.5	4	0.044	0.052	254142 0120	112,–
16.0	63	123	16	0.6	4	0.059	0.07	254142 0160	191,–
20.0	75	141	20	0.6	4	0.071	0.084	254142 0200	320,–

2156

SARA® Torus milling cutter

VHM | NH | 35° -38° | h10 | h6 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-266

- **Irregular helix angle for low-vibration milling**
- Also suitable for dry machining



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 120-130	● 100-120	● 50-75	○ 30-60	○ 30-60		● 100-130	● 70-100								● 40-60	● 30-40	
	Cutting speed Vc m/min.																		



D mm	L1 mm	L mm	D1 mm	R mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4.0	11	57	6	0.25	4	0.013	0.015	**254139** 0402	27,80
4.0	11	57	6	0.50	4	0.013	0.015	254139 0405	27,80
4.0	11	57	6	1.00	4	0.013	0.015	254139 0410	27,80
5.0	13	57	6	0.50	4	0.021	0.025	254139 0505	27,80
5.0	13	57	6	1.00	4	0.021	0.025	254139 0510	27,80
5.0	13	57	6	1.50	4	0.021	0.025	254139 0515	27,80
6.0	13	57	6	0.50	4	0.021	0.025	254139 0605	27,80
6.0	13	57	6	1.00	4	0.021	0.025	254139 0610	27,80
6.0	13	57	6	1.50	4	0.021	0.025	254139 0615	27,80
6.0	13	57	6	2.00	4	0.021	0.025	254139 0620	27,80
8.0	19	63	8	0.50	4	0.027	0.032	254139 0805	38,10
8.0	19	63	8	1.00	4	0.027	0.032	254139 0810	38,10
8.0	19	63	8	1.50	4	0.027	0.032	254139 0815	38,10
8.0	19	63	8	2.00	4	0.027	0.032	254139 0820	38,10
10.0	22	72	10	0.50	4	0.044	0.052	254139 1005	55,50
10.0	22	72	10	1.00	4	0.044	0.052	254139 1010	55,50
10.0	22	72	10	1.50	4	0.044	0.052	254139 1015	55,50
10.0	22	72	10	2.00	4	0.044	0.052	254139 1020	55,50
12.0	26	83	12	0.50	4	0.044	0.052	254139 1205	70,–

2156

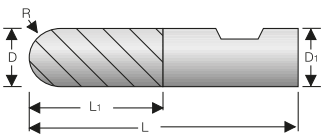
D mm	L1 mm	L mm	D1 mm	R mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
12.0	26	83	12	1.00	4	0.044	0.052	254139 1210	70,–
12.0	26	83	12	1.50	4	0.044	0.052	254139 1215	70,–
12.0	26	83	12	2.00	4	0.044	0.052	254139 1220	70,–
14.0	26	83	14	1.00	4	0.059	0.07	254139 1410	93,50
14.0	26	83	14	2.00	4	0.059	0.07	254139 1420	93,50
16.0	32	92	16	1.00	4	0.059	0.07	254139 1610	122,–
16.0	32	92	16	1.50	4	0.059	0.07	254139 1615	122,–
16.0	32	92	16	2.00	4	0.059	0.07	254139 1620	122,–
16.0	32	92	16	2.50	4	0.059	0.07	254139 1625	122,–
18.0	32	92	18	1.50	4	0.071	0.084	254139 1815	169,–
18.0	32	92	18	2.50	4	0.071	0.084	254139 1825	169,–
20.0	38	104	20	1.00	4	0.071	0.084	254139 2010	186,–
20.0	38	104	20	1.50	4	0.071	0.084	254139 2015	186,–
20.0	38	104	20	2.00	4	0.071	0.084	254139 2020	186,–
20.0	38	104	20	2.50	4	0.071	0.084	254139 2025	186,–
20.0	38	104	20	3.00	4	0.071	0.084	254139 2030	186,–
20.0	38	104	20	4.00	4	0.071	0.084	254139 2040	186,–
20.0	38	104	20	5.00	4	0.071	0.084	254139 2050	186,–

2156

SARA® Radius milling cutter

VHM | 35° -38° | h10 | h6 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-269

- **Irregular helix angle for low-vibration milling**
- Also suitable for dry machining



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 450-550	● 250-350	● 200-250				● 450-550	● 400-500								● 100-140		
	Cutting speed Vc m/min.																		



D mm	L1 mm	L mm	D1 mm	R mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3.0	8	57	6	1.50	4	0.011	**254138** 0030	28,80
4.0	10	57	6	2.00	4	0.035	254138 0040	28,80
5.0	13	57	6	2.50	4	0.035	254138 0050	28,80
6.0	13	57	6	3.0	4	0.045	254138 0060	28,80
8.0	16	63	8	4.0	4	0.055	254138 0080	39,10

2156

D mm	L1 mm	L mm	D1 mm	R mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10.0	22	72	10	5.0	4	0.065	254138 0100	57,50
12.0	26	83	12	6.0	4	0.065	254138 0120	72,–
14.0	26	83	14	7.0	4	0.09	254138 0140	96,–
16.0	32	92	16	8.0	4	0.09	254138 0160	126,–
20.0	38	104	20	10.0	4	0.12	254138 0200	192,–

2156

ATORN® HPC POWER high-performance range

Tough on everything!

The performance of the low-vibration premium tools was significantly increased with the new ATORN HPC POWER high-performance range. It offers a milling range with innovative HPC geometry designed for efficient and universal machining of steel, stainless steel, non-ferrous metal, cast iron and special alloys.
Significantly higher material removal rates in machining are the result of various spiral angles in conjunction with newly developed, robust face and surface cutting edges. Even with extreme cutting data, the tools impress with their ultra-smooth operation, high process safety and low machine loads. Plunge milling and ramping processes are enhanced by the optimised face geometries. The new solid carbide with an innovative PVD high-performance coating also contributes to improved service life and safer chip removal.

Advantages:
- Increased productivity – roughing and finishing with the same tool
- Excellent surface quality even with high feed rates
- Long service life thanks to optimised cutting edge geometries and high-performance coatings
- Machining methods such as plunge milling/drilling or ramping possible
- Low machine load thanks to smooth operation, long service life
- Comprehensive possible uses and efficient machining of tough materials
- Suitable for all modern milling strategies e.g. trochoidal milling

UNIVERSAL

P M K N S





Dual cutting edge protection with edge protection chamfer and robust face-cutter

Optimised face-cutter geometry with large chip spaces

Long design with axial internal cooling available

The HPC POWER groove milling cutter is a 3-edge high-performance tool. With its large chip spaces and excellent chip removal, it is ideal for groove milling. Each cutting edge has another helix angle (33°/35°/37°). In addition to the entire range of stainless and acid-resistant steels, it can also be used in all aspects of steel machining.

Features:
- Ø range 4 - 20 mm
- Long version
- Each cutting edge has another helix angle (33°/35°/37°)

STEEL

P K





Dual cutting edge protection with edge protection chamfer and robust face-cutter

Defined cutting edge honing increases the service life and process safety

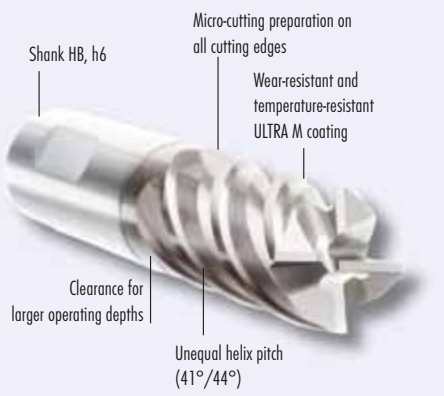
Radius-shaped gashing for improved chip removal

The performance of the low-vibration premium tools was considerably increased with the HPC POWER solid carbide end milling cutter for steel and cast iron: significantly higher material removal rates in machining are the result of various spiral angles in conjunction with newly developed, robust face and surface cutting edges.
A feature of the ATORN HPC POWER milling cutter is its multi-functional application: Roughing and finishing can be achieved with the same tool. Similarly, narrow bridges and grooves up to 2xD with outstanding surface quality can be produced.

Features:
- Ø range 4 - 20 mm
- Long version
- Unequal helix pitch (35°/38°)
- Low power consumption
- Stable cutting edge and edge protection chamfer
- Optimised face-cutter design

Stainless steel

M N S





New edge protection in the form multi-chamfer grinding

Optimised gashing in the centre

Long version with radial internal cooling available

The 4-edge high-speed milling cutter was specially developed for cutting stainless and acid-resistant steels, titanium and nickel-based alloys, as well as short-chipping aluminium.
Special cutting geometries combined with the optimum carbide quality and multi-layer, fine-crystal PVD coating set new standards in machining demanding materials. Chip formation, chip removal and temperature resistance were optimised and guarantee high-performance with demanding cutting data.

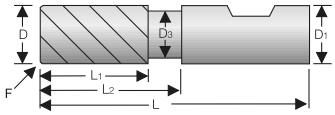
Features:
- Ø range 4 - 20 mm
- Unequal helix pitch (41°/44°)
- Optimised cutting edge design (multi-chamfer grinding)
- Perfect for modern milling strategies

ATORN® HPC Power end milling cutter, universal

VHM | NH | 33° -35° -37° | h10 | h6 | DIN 6535 HB | Z 3 | TiAlN | HPC | Vc/fz | 20-259

- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved tool life and stable face cutter, double protected
- Optimised face-cutter geometry with large chip spaces
- **With clearance**
- ULTRA coated for maximum service life





20

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 180-220	● 140-180	● 100-150	● 100-130	● 100-120	○ 80-100	● 150-170	○ 150-170	● 50-80	○ 30-50	○ 30-50	● 280-320	● 240-280	● 180-220		●		
		Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.								

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4	8	12	54	3.8	6	0.1	3	0.04	0.06	**254503** 0040	36,40
5	10	15	54	4.8	6	0.15	3	0.05	0.08	254503 0050	36,40
6	13	21	57	5.7	6	0.2	3	0.06	0.1	254503 0060	36,40
8	19	27	63	7.7	8	0.2	3	0.08	0.12	254503 0080	42,70
10	22	32	72	9.7	10	0.2	3	0.1	0.14	254503 0100	57,–
12	26	38	83	11.6	12	0.2	3	0.12	0.18	254503 0120	87,50
14	26	38	83	13.6	14	0.3	3	0.16	0.2	254503 0140	117,–
16	32	44	92	15.6	16	0.3	3	0.16	0.2	254503 0160	130,–
18	32	44	92	17.6	18	0.3	3	0.2	0.26	254503 0180	167,–
20	38	54	104	19.6	20	0.3	3	0.2	0.26	254503 0200	198,–

2119

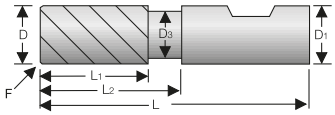


ATORN® HPC Power end milling cutter, steel

VHM | NH | 35° -38° | h10 | h6 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-260

- **Irregular helix angle and pitch for low-vibration milling**
- With protective chamfer F for improved tool life and stable face cutter, double protected
- Optimised face-cutter geometry with large chip spaces
- Radius-shaped face gashing for improved chip removal
- Defined cutting-edge rounding
- **With clearance**
- ULTRA coated for maximum service life





material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 220-270	● 180-220	● 140-180				● 150-180	● 130-170										
		Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.								

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	● Feed fz steel < 1000 N/mm² mm/tooth	● Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
4	8	12	54	3.8	6	0.1	4	0.04	0.06	**254511** 0040	36,40
5	10	15	54	4.8	6	0.15	4	0.06	0.08	254511 0050	36,40
6	13	21	57	5.7	6	0.2	4	0.07	0.1	254511 0060	36,40
8	19	27	63	7.7	8	0.2	4	0.09	0.12	254511 0080	40,–
10	22	32	72	9.7	10	0.2	4	0.11	0.14	254511 0100	55,50
12	26	38	83	11.6	12	0.2	4	0.13	0.18	254511 0120	82,–
14	26	38	83	13.6	14	0.3	4	0.18	0.2	254511 0140	117,–
16	32	44	92	15.6	16	0.3	4	0.18	0.2	254511 0160	127,–
18	32	44	92	17.6	18	0.3	4	0.22	0.26	254511 0180	167,–
20	38	54	104	19.6	20	0.3	4	0.22	0.26	254511 0200	198,–

2119

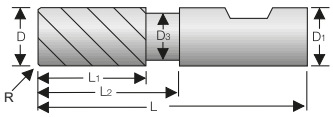


ATORN® HPC Power end milling cutter, stainless steel

VHM | NH | 41°-44° | h10 | h6 | DIN 6535 HB | Z 4 | TiAlN | HPC | Vc/fz | 20-260

- **Irregular helix angle and pitch for low-vibration milling**
- New edge protection in the form of multi-chamfer grinding
- Optimised gashing in the centre
- Micro-cutting preparation on all cutting edges
- **With clearance**
- Wear-resistant and temperature-resistant ULTRA M coating





material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
					● 115-135	● 100-120	● 90-110			● 60-80	● 40-60	● 40-60	● 280-320	● 260-300	● 260-300				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	● Feed fz stainless steel austenitic mm/tooth	● Feed fz stainless steel austenitic mm/tooth	art.no.	€
4	8	12	54	3.8	6	0.15	4	0.03	0.05	**254517** 0040	40,–
5	10	15	54	4.8	6	0.2	4	0.04	0.06	254517 0050	40,–
6	13	21	57	5.7	6	0.3	4	0.04	0.06	254517 0060	40,–
8	19	27	63	7.7	8	0.3	4	0.06	0.08	254517 0080	44,–
10	22	32	72	9.7	10	0.3	4	0.07	0.09	254517 0100	61,–
12	26	38	83	11.6	12	0.3	4	0.09	0.11	254517 0120	90,–
16	32	44	92	15.6	16	0.4	4	0.11	0.13	254517 0160	139,–
20	38	54	104	19.6	20	0.4	4	0.14	0.16	254517 0200	218,–

2119



ATORN® High-performance milling tools *Ultra-N*

INFO

Tool geometry

An optimal cutting-, micro- and chip-space geometry is particularly crucial in aluminium machining. Based on numerous machining tests, the geometries have been revised and adapted perfectly to the requirements of aluminium machining:

- maximum core diameter for high stability
- special cutting geometry to reduce cutting pressure
- optimal chip-space geometry for process-reliable chip removal
- Increased service life thanks to µm-precise cutting-edge rounding

Wear-resistant carbide metal

The basic substrate consists of H10F fine-grade solid carbide for aluminium with a grain size of 0.6 - 0.8 µm. This substrate is especially wear-resistant, hard and resistant to pressure.
It can best withstand the dynamic and mechanical loads to be encountered. This is particularly important in the event of vibrations, which can easily lead to chunking on the cutting edge.



Defined cutting-edge rounding

The basic aim of a cutting-edge rounding is to increase the service life of the tool and of the cutting edge. In the cutting tool grinding process, the cutting edge loses its definition due to micro-fractures (chunking). Through a defined honing, a process environment can be achieved at an early stage; that is, grinding-related points are removed and the risk of comb cracks minimised.

Conventional methods for the cutting edge rounding had the disadvantage that they were unable to create a reproducible and even honing of the cutting edge. The new technology allows optimum process control and reproducibility. With it, a uniform, µm-precise honing of the cutting edge and face can be achieved. This has a positive effect on the quality and service life of the tools and significantly improves your workpiece surfaces.

Improved tolerances

Precision produces quality: one reason why this new generation of tools is manufactured to tighter tolerances. Basically, all shanks are made in h5 quality and all cutting edges in g7 quality.

ATORN®

The *ULTRA-N*
high-speed milling range for the milling of aluminium



With the new ATORN range, Sartorius offers a complete milling range for machining aluminium.
The ATORN milling program ULTRA-N sets technical benchmarks here:

- extremely soft cut, optimum chip removal and excellent running smoothness
- short processing times thanks to high usage parameters
- excellent surface quality
- no or minimal burr formation
- Precision thanks to low manufacturing tolerances
- coating specially designed for machining aluminium

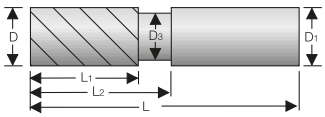
The perfect combination of solid carbide, geometry and coating makes ATORN's ULTRA-N milling range the best in class. It increases the productivity and process reliability in production.

Overview of the range	*Ultra-N*	Ø-area mm	Page
Solid carbide, single cutting edge end milling cutter		Ø 1.5 - 16	20-69
Solid carbide mini end milling cutters		Ø 0.5 - 2.5	20-70
Solid carbide mini-torus cutter		Ø 0.5 - 2.5	20-77
Solid carbide mini-radius milling cutter		Ø 0.5 - 2.5	20-80
Solid carbide slot drills		Ø 3 - 20	20-70
Solid carbide end milling cutters, short version		Ø 3 - 20	20-71
Solid carbide end milling cutters, long version		Ø 3 - 20	20-72
Solid carbide end milling cutters, short version		Ø 3 - 20	20-72
Solid carbide end milling cutters, long version		Ø 4 - 16	20-73
Solid carbide end milling cutter, extra-long version		Ø 6 - 16	20-75
Solid carbide end milling cutters HPC, short version		Ø 3 - 20	20-75
Solid carbide end milling cutters HPC, long version		Ø 4 - 20	20-75
Solid carbide roughing cutters		Ø 6 - 20	20-76
Solid carbide torus cutters, short version		Ø 3 - 16	20-78
Solid carbide torus cutters, long version		Ø 3 - 16	20-78
Solid carbide torus cutters, extra-long version		Ø 6 - 16	20-79
Solid carbide torus cutters		Ø 5 - 20	20-79
Solid carbide radius milling cutters, short version		Ø 3 - 16	20-81
Solid carbide radius milling cutters, long version		Ø 3 - 16	20-81
Solid carbide radius milling cutters, extra-long version		Ø 3 - 12	20-81

material	● very well suited ○ nagyon alkalmas	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●	●			

ATORN® Ultra-N single-blade end milling cutter

VHM | Typ W | 30° | h9 | h5 | DIN 6535 HA | Z 1 | | Vc/fz | 20-271



- **With clearance**
- **1 cutting edge, sharp**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Cutting material: superfine grain solid carbide, uncoated with **mirror finish**
- Large chip space for unhindered chip removal

material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
● very well suited ○ well suited	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
												●	●	●	●			
												350-500	150-250	150-350	200-350			
Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

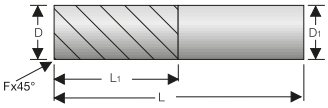


D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
1.5	6	50	22.0	1.45	3	0.0175	0.025	**249100** 0015	23,80
2.0	8	50	22.0	1.8	3	0.02555	0.0365	249100 0020	24,10
3.0	12	50	22.0	2.8	3	0.04025	0.0575	249100 0030	24,30
4.0	15	57	29.0	3.8	4	0.0455	0.065	249100 0040	25,70
5.0	17	60	32.0	4.8	5	0.056	0.08	249100 0050	33,30
6.0	20	64	28.0	5.8	6	0.06825	0.0975	249100 0060	34,10
8.0	24	64	28.0	7.8	8	0.08225	0.1175	249100 0080	46,30
10.0	25	73	33.0	9.7	10	0.091	0.13	249100 0100	72,–
12.0	32	84	39.0	11.7	12	0.105	0.15	249100 0120	98,50
16.0	38	93	45.0	15.7	16	0.1155	0.165	249100 0160	140,–

2149

VAN HOORN CARBIDE Single-blade end milling cutter

VHM | 30° | e8 | h5 | DIN 6535 HA | Z 1 | HSC | | Vc/fz | 20-271



- **Especially for machining non-ferrous materials**

Also very good for synthetic materials

material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
● very well suited ○ well suited	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
												●	●	○				
												100-400	100-250	100-200				
Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

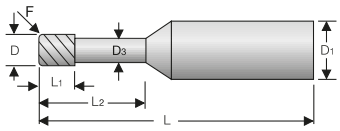


D mm	D1 mm	L1 mm	L mm	F x 45° mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
0.6	3	3	38	-	0.00875	0.0125	**250001** 0006	34,35
0.8	3	4	38	-	0.0112	0.016	250001 0008	34,35
1.0	3	5	38	-	0.01225	0.0175	250001 0010	33,–
1.2	3	5	38	-	0.01435	0.0205	250001 0012	33,–
1.5	3	5	38	-	0.0175	0.025	250001 0015	33,–
1.6	3	6	38	-	0.01995	0.0285	250001 0016	31,50
1.8	3	7	38	-	0.02205	0.0315	250001 0018	31,50
2.0	3	8	38	-	0.02765	0.0395	250001 0020	27,10
2.5	3	9	38	-	0.0329	0.047	250001 0025	27,10
3.0	3	12	38	0.10	0.04025	0.0575	250001 0030	26,50
4.0	4	12	50	0.10	0.0455	0.065	250001 0040	28,60
5.0	5	15	50	0.15	0.056	0.08	250001 0050	34,60
6.0	6	16	50	0.20	0.06825	0.0975	250001 0060	34,20
7.0	7	20	60	0.20	0.07525	0.1075	250001 0070	48,20
8.0	8	20	60	0.25	0.08575	0.1225	250001 0080	46,50
10.0	10	22	70	0.30	0.105	0.15	250001 0100	67,40
12.0	12	25	75	0.35	0.1295	0.185	250001 0120	84,20

2112

ATORN® Ultra-N mini end milling cutter

VHM | Typ W | 30° | e8 | h5 | DIN 6535 HA | Z 2 | ZrCN | Vc/fz | 20-272



- **With clearance**
- **2 cutting edges, with edge chamfer F**
- **With defined cutting edge rounding from Ø 1.5 mm**
- Long-necked version for non-ferrous materials
- Cutting edge tolerance 0/-0.015 mm
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													400-550	180-320	180-420				
	Cutting speed Vc m/min.												Please adjust these guidelines according to clamping operation and machine set-up.						

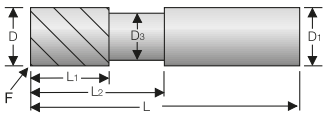


D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
0.5	0.9	55	4.0	0.48	4	0.05	0.012	**249001** 0504	45,40
0.5	0.9	65	6.0	0.48	4	0.05	0.012	249001 0506	54,50
0.5	0.9	65	10.0	0.48	4	0.05	0.012	249001 0510	54,50
1.0	1.5	55	5.0	0.95	4	0.10	0.021	249001 1005	45,40
1.0	1.5	65	10.0	0.95	4	0.10	0.021	249001 1010	52,50
1.0	1.5	65	15.0	0.95	4	0.10	0.021	249001 1015	54,50
1.5	1.8	55	8.0	1.44	4	0.10	0.033	249001 1508	45,40
1.5	1.8	65	15.0	1.44	4	0.10	0.033	249001 1515	53,50
1.5	1.8	65	20.0	1.44	4	0.10	0.033	249001 1520	54,50
2.0	2.0	55	10.0	1.92	4	0.10	0.043	249001 2010	45,40
2.0	2.0	65	20.0	1.92	4	0.10	0.043	249001 2020	53,50
2.5	2.5	55	12.0	2.40	4	0.10	0.050	249001 2512	46,90
2.5	2.5	65	20.0	2.40	4	0.10	0.050	249001 2520	54,50

2149

ATORN® Ultra-N slot drill

VHM | Typ W | 45° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 2 | ZrCN | Vc/fz | 20-273



- **With clearance**
- **2 cutting edges, with edge chamfer F**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Cutting material: superfine grain solid carbide, uncoated with **mirror finish**
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													350-500	150-250	150-350				
	Cutting speed Vc m/min.												Please adjust these guidelines according to clamping operation and machine set-up.						

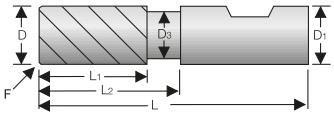
Standard



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	**ZrCN DIN 6535-HA** art.no.	€
3.0	8	57	18	2.9	6	0.1	0.045	**249201** 0030	30,60
4.0	11	57	18	3.9	6	0.1	0.053	249201 0040	30,60
5.0	13	57	20	4.9	6	0.1	0.060	249201 0050	30,60
6.0	13	57	20	5.8	6	0.1	0.068	249201 0060	32,30
8.0	19	63	26	7.8	8	0.1	0.075	249201 0080	39,10
10.0	22	72	29	9.7	10	0.2	0.085	249201 0100	48,70
12.0	26	83	36	11.7	12	0.2	0.095	249201 0120	76,–
16.0	32	92	42	15.7	16	0.2	0.110	249201 0160	111,–

2149

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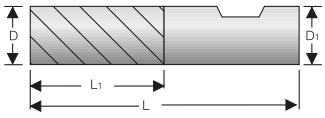


Standard with driving plane

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth	Mirror finish DIN 6535-HB art.no.	€	ZrCN DIN 6535-HB art.no.	€
3.0	8	57	18	2.9	6	0.1	0.045	**249200** 0030	26,90	**249202** 0030	31,30
4.0	11	57	18	3.9	6	0.1	0.053	249200 0040	26,90	249202 0040	31,30
5.0	13	57	20	4.9	6	0.1	0.060	249200 0050	26,90	249202 0050	31,50
6.0	13	57	20	5.8	6	0.1	0.068	249200 0060	28,40	249202 0060	32,90
8.0	19	63	26	7.8	8	0.1	0.075	249200 0080	36,20	249202 0080	39,90
10.0	22	72	29	9.7	10	0.2	0.085	249200 0100	45,–	249202 0100	49,80
12.0	26	83	36	11.7	12	0.2	0.095	249200 0120	65,–	249202 0120	76,–
16.0	32	92	42	15.7	16	0.2	0.110	249200 0160	96,50	249202 0160	113,–
20.0	38	104	52	19.7	20	0.2	0.125	249200 0200	156,–		
								2149		2149	

VAN HOORN CARBIDE **VHLAW** end milling cutter

VHM | 25° | h9 | h5 | DIN 6535 HB | Z 2 | Z 3 | HSC | Vc/fz 20-273



- **Roughing cutter** for a broad range of applications (non-ferrous metals and plastics)
- Highly positive rake and clearance angles as well as sharp cutting edges guarantee
- **very low cutting forces** and **minimal cutting pressure**
  Large chip flutes for reliable chip removal at **up to 50 % higher feed rates**, resulting in shorter machining times

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													400-500	150-280	250-300				
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

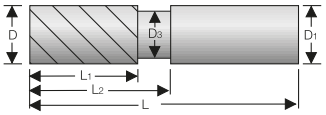
VHLAW finishing version, 25° helix angle



D mm	D1 mm	L1 mm	L mm	Z	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
4.0	6	11	64	2	0.040	**255169** 0040	26,80
5.0	6	13	64	2	0.050	255169 0050	28,60
6.0	6	13	64	3	0.050	255169 0060	38,50
8.0	8	19	64	3	0.060	255169 0080	51,60
10.0	10	22	70	3	0.120	255169 0100	65,60
12.0	12	26	78	3	0.120	255169 0120	80,15
16.0	16	32	89	3	0.180	255169 0160	144,80
20.0	20	38	102	3	0.200	255169 0200	256,90
25.0	25	45	120	3	0.220	255169 0250	399,–
						2112	

ATORN® Ultra-N end milling cutter

VHM | Typ W | 45° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 3 | ZrCN | Vc/fz | 20-274



- **With clearance**
- **3 cutting edges, sharp**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Cutting material: superfine grain solid carbide, uncoated with **mirror finish**
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
												●	●	●				
												350-500	150-250	150-350				

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	ZrCN DIN 6535-HA art.no.	€	Mirror finish DIN 6535-HB art.no.	€
3.0	12	57	16	2.8	6	0.018	0.025	**249304** 0030	31,30	**249305** 0030	27,60
4.0	12	57	18	3.8	6	0.021	0.030	249304 0040	31,30	249305 0040	27,60
5.0	15	57	18	4.7	6	0.026	0.038	249304 0050	31,30	249305 0050	27,60
6.0	16	57	21	5.6	6	0.032	0.045	249304 0060	36,60	249305 0060	30,20
8.0	22	64	28	7.6	8	0.042	0.060	249304 0080	44,20	249305 0080	37,80
10.0	25	73	33	9.6	10	0.053	0.075	249304 0100	53,50	249305 0100	46,90
12.0	28	84	39	11.4	12	0.060	0.085	249304 0120	76,–	249305 0120	66,–
16.0	35	93	45	15.4	16	0.068	0.098	249304 0160	111,–	249305 0160	96,50
20.0	40	104	54	19.4	20	0.079	0.113	249304 0200	175,–	249305 0200	162,–
								2149		2149	



4 pcs sets

Contents	ZrCN DIN 6535-HA art.no.	€	Mirror finish DIN 6535-HB art.no.	€
Ø 6, 8, 10, 12 mm	**249304** 0001	210,–	**249305** 0001	180,–
	2149		2149	



Long

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	ZrCN DIN 6535-HA art.no.	€
3.0	15	64	21	2.8	6	0.020	0.025	**249352** 0030	37,20
4.0	19	64	27	3.8	6	0.024	0.030	249352 0040	37,20
5.0	20	64	28	4.7	6	0.030	0.038	249352 0050	37,20
6.0	20	64	28	5.6	6	0.036	0.045	249352 0060	42,80
8.0	38	80	44	7.6	8	0.048	0.060	249352 0080	55,50
10.0	45	95	55	9.6	10	0.060	0.075	249352 0100	73,–
12.0	53	100	55	11.4	12	0.068	0.085	249352 0120	95,50
16.0	63	123	75	15.4	16	0.078	0.098	249352 0160	158,–
20.0	65	125	75	19.4	20	0.090	0.113	249352 0200	220,–
								2149	



ATORN® Ultra-N end milling cutter

VHM | Typ W | 45° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 3 | ZrCN | Vc/fz | 20-274

- **With clearance**
- **3 cutting edges, with edge protection F**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Cutting material: superfine grain solid carbide, uncoated with **mirror finish**
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material: ● very well suited ○ well suited

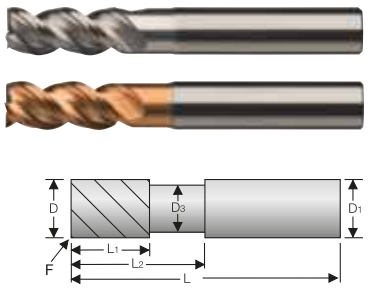
steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
											●	●	●				
											350-500	150-250	150-350				

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

20

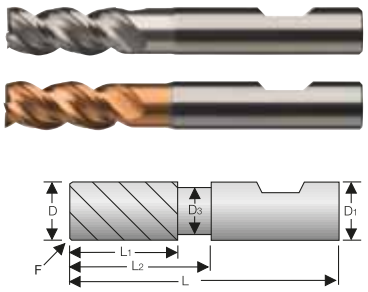
Short

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth ●	Feed fz aluminium < 8 % Si mm/tooth ●	Mirror finish, DIN 6535-HA art.no.	€	ZrCN DIN 6535-HA art.no.	€
3.0	12	57	16	2.8	6	0.1	0.018	0.025	**249300** 0030	27,60	**249302** 0030	31,30
4.0	12	57	18	3.8	6	0.1	0.021	0.030	249300 0040	27,60	249302 0040	31,30
5.0	15	57	18	4.7	6	0.1	0.026	0.038	249300 0050	27,60	249302 0050	31,30
6.0	16	57	21	5.6	6	0.1	0.032	0.045	249300 0060	30,20	249302 0060	36,60
8.0	22	64	28	7.6	8	0.1	0.042	0.060	249300 0080	37,80	249302 0080	44,20
10.0	25	73	33	9.6	10	0.2	0.053	0.075	249300 0100	46,90	249302 0100	53,50
12.0	28	84	39	11.4	12	0.2	0.060	0.085	249300 0120	66,–	249302 0120	76,–
16.0	35	93	45	15.4	16	0.2	0.068	0.098	249300 0160	96,50	249302 0160	111,–
20.0	40	104	54	19.4	20	0.2	0.079	0.113	249300 0200	162,–	249302 0200	175,–
									2149		2149	



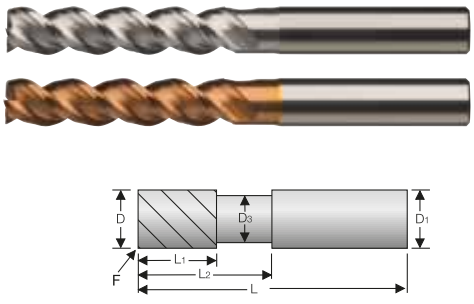
Short with driving plane

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth ●	Feed fz aluminium < 8 % Si mm/tooth ●	Mirror finish DIN 6535-HB art.no.	€	ZrCN DIN 6535-HB art.no.	€
3.0	12	57	16	2.8	6	0.1	0.018	0.025	**249301** 0030	27,60	**249303** 0030	31,30
4.0	12	57	18	3.8	6	0.1	0.021	0.030	249301 0040	27,60	249303 0040	31,30
5.0	15	57	18	4.7	6	0.1	0.026	0.038	249301 0050	27,60	249303 0050	31,30
6.0	16	57	21	5.6	6	0.1	0.032	0.045	249301 0060	30,20	249303 0060	36,60
8.0	22	64	28	7.6	8	0.1	0.042	0.060	249301 0080	37,80	249303 0080	44,20
10.0	25	73	33	9.6	10	0.2	0.053	0.075	249301 0100	46,90	249303 0100	53,50
12.0	28	84	39	11.4	12	0.2	0.060	0.085	249301 0120	66,–	249303 0120	76,–
16.0	35	93	45	15.4	16	0.2	0.068	0.098	249301 0160	96,50	249303 0160	111,–
20.0	40	104	54	19.4	20	0.2	0.079	0.113	249301 0200	162,–	249303 0200	175,–
									2149		2149	



Long

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth ●	Feed fz aluminium < 8 % Si mm/tooth ●	Mirror finish, DIN 6535-HA art.no.	€	ZrCN DIN 6535-HA art.no.	€
3.0	15	64	21	2.8	6	0.1	0.020	0.025	**249351** 0030	31,70	**249350** 0030	37,20
4.0	19	64	27	3.8	6	0.1	0.024	0.030	249351 0040	31,70	249350 0040	37,20
5.0	20	64	28	4.7	6	0.1	0.030	0.038	249351 0050	31,70	249350 0050	37,80
6.0	20	64	28	5.6	6	0.1	0.036	0.045	249351 0060	37,80	249350 0060	42,80
8.0	38	80	44	7.6	8	0.1	0.048	0.060	249351 0080	45,20	249350 0080	54,50
10.0	45	95	55	9.6	10	0.2	0.060	0.075	249351 0100	63,50	249350 0100	73,–
12.0	53	100	55	11.4	12	0.2	0.068	0.085	249351 0120	88,50	249350 0120	95,50
16.0	63	123	75	15.4	16	0.2	0.078	0.098	249351 0160	144,–	249350 0160	158,–
20.0	65	125	75	19.4	20	0.2	0.090	0.113	249351 0200	210,–	249350 0200	220,–
									2149		2149	



ATORN® Ultra-N end milling cutter

VHM | Typ W | 45° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 4 | ZrCN | Vc/fz | 20-274

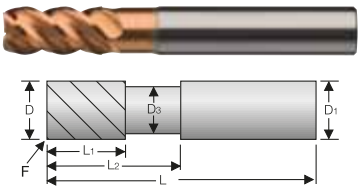
- **With clearance**
- **4 cutting edges, with edge protection F**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
											● 350-500	● 150-250	● 150-350				

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

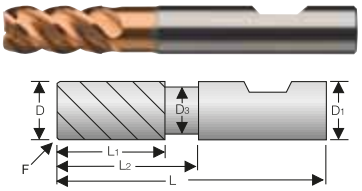
Short



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HA art.no.	€
3.0	6	57	10	2.8	6	0.1	0.021	0.030	**249400** 0030	37,80
4.0	8	57	14	3.8	6	0.1	0.025	0.035	249400 0040	38,20
5.0	10	57	16	4.7	6	0.1	0.030	0.043	249400 0050	38,20
6.0	12	57	19	5.6	6	0.2	0.033	0.048	249400 0060	40,70
8.0	16	63	25	7.6	8	0.2	0.042	0.060	249400 0080	49,80
10.0	20	72	30	9.6	10	0.2	0.053	0.075	249400 0100	67,–
12.0	24	83	36	11.4	12	0.2	0.060	0.085	249400 0120	83,50
16.0	32	92	42	15.4	16	0.2	0.077	0.110	249400 0160	150,–
20.0	40	104	52	19.4	20	0.2	0.126	0.180	249400 0200	199,–

2149

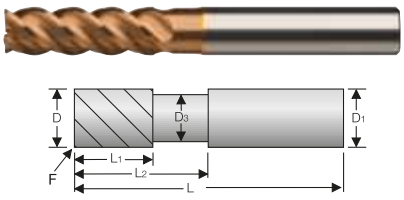
Short with driving plane



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HB art.no.	€
3.0	6	57	10	2.8	6	0.1	0.021	0.030	**249401** 0030	37,80
4.0	8	57	14	3.8	6	0.1	0.025	0.035	249401 0040	37,80
5.0	10	57	16	4.7	6	0.1	0.030	0.043	249401 0050	37,80
6.0	12	57	19	5.6	6	0.2	0.033	0.048	249401 0060	40,70
8.0	16	63	25	7.6	8	0.2	0.042	0.060	249401 0080	48,70
10.0	20	72	30	9.6	10	0.2	0.053	0.075	249401 0100	67,–
12.0	24	83	36	11.4	12	0.2	0.060	0.085	249401 0120	82,–
16.0	32	92	42	15.4	16	0.2	0.077	0.110	249401 0160	152,–
20.0	40	104	52	19.4	20	0.2	0.126	0.180	249401 0200	205,–

2149

Long



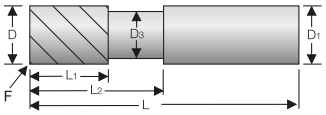
D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HA art.no.	€
4.0	16	62	22	3.8	6	0.1	0.032	0.035	**249450** 0040	42,80
5.0	17	62	24	4.7	6	0.1	0.038	0.043	249450 0050	43,60
6.0	18	62	24	5.6	6	0.2	0.043	0.048	249450 0060	48,90
8.0	24	72	30	7.6	8	0.2	0.054	0.060	249450 0080	63,50
10.0	30	80	38	9.6	10	0.2	0.068	0.075	249450 0100	82,–
12.0	36	93	46	11.4	12	0.2	0.077	0.085	249450 0120	107,–
16.0	48	108	58	15.4	16	0.2	0.099	0.110	249450 0160	199,–

2149

Continued on next page >>>



Extra-long

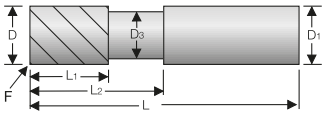


D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HA art.no.	€
6.0	12	80	42	5.6	6	0.2	0.038	0.048	**249460** 0060	57,50
8.0	16	100	58	7.6	8	0.2	0.048	0.060	249460 0080	81,–
10.0	20	100	62	9.6	10	0.2	0.060	0.075	249460 0100	102,–
12.0	24	120	75	11.4	12	0.2	0.068	0.085	249460 0120	144,–
16.0	32	150	100	15.4	16	0.2	0.088	0.110	249460 0160	230,–

2149

ATORN® Ultra-N end milling cutter

VHM | Typ W | 35° -38° | h9 | h5 | DIN 6535 HA | Z 4 | ZrCN | HPC | Vc/fz | 20-275



- **With clearance**
- **4 cutting edges, with edge protection F**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Irregular helix angle for vibration-free milling
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
												● 350-500	● 150-250	● 150-350				
Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

Short



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	6	57	10	2.8	6	0.1	0.019	0.028	**249480** 0030	40,30
4.0	8	57	14	3.8	6	0.1	0.023	0.033	249480 0040	40,30
5.0	10	57	16	4.7	6	0.1	0.028	0.040	249480 0050	40,30
6.0	12	57	19	5.6	6	0.2	0.033	0.048	249480 0060	45,–
8.0	16	63	25	7.6	8	0.2	0.042	0.060	249480 0080	56,50
10.0	20	72	30	9.6	10	0.2	0.242	0.345	249480 0100	72,–
12.0	24	83	36	11.4	12	0.2	0.060	0.085	249480 0120	91,50
16.0	32	92	42	15.4	16	0.2	0.077	0.110	249480 0160	153,–
20.0	40	104	52	19.4	20	0.2	0.126	0.180	249480 0200	220,–

2149

Long



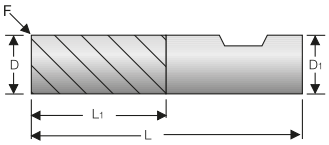
D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
4.0	16	62	22	3.8	6	0.1	0.029	0.033	**249490** 0040	48,70
5.0	17	62	24	4.7	6	0.1	0.036	0.040	249490 0050	48,70
6.0	18	62	24	5.6	6	0.2	0.043	0.048	249490 0060	54,50
8.0	24	68	30	7.6	8	0.2	0.054	0.060	249490 0080	67,–
10.0	30	80	38	9.6	10	0.2	0.311	0.345	249490 0100	89,50
12.0	36	93	46	11.4	12	0.2	0.077	0.085	249490 0120	117,–
16.0	48	108	58	15.4	16	0.2	0.099	0.110	249490 0160	200,–
20.0	60	126	74	19.4	20	0.2	0.162	0.180	249490 0200	280,–

2149

VAN HOORN CARBIDE Roughing cutter

VHM | 40° | h9 | h6 | DIN 6535 HB | Z 3 | HSC | Vc/fz | 20-273

- **Very low cutting forces** and **minimal cutting pressure**
- Large chip flutes for reliable chip removal at **up to 50 % higher feed rates**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													400-500	150-280	250-300				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	D1 mm	F mm	L1 mm	L mm	Z	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
6.0	6	0.25	16	64	3	0.031	0.050	**255168** 0060	56,60
8.0	8	0.50	20	64	3	0.036	0.060	255168 0080	71,70
10.0	10	0.50	22	70	3	0.040	0.100	255168 0100	81,80
12.0	12	0.50	25	78	3	0.048	0.120	255168 0120	96,90
16.0	16	1.00	35	89	3	0.072	0.180	255168 0160	151,–
20.0	20	1.00	40	102	3	0.081	0.200	255168 0200	270,–
25.0	25	1.00	50	120	3	0.090	0.220	255168 0250	406,70

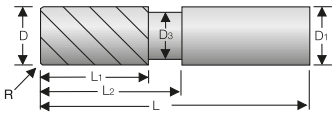
2112

ATORN® 3D aluminium roughing cutter

VHM | 5° -6° | e8 | h5 | DIN 6535 HA | Z 3 | ZrCrN | Vc/fz | 20-275

- Reinforced core
- Defined edge rounding
- All tools with clearance
- Suitable for shrinking
- **High-performance CALIDA Z coating (ZrCrN, titanium-free)**

Up to 50 % longer service life



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													300-1000	175-275	175-375				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	D1 mm	R±0.02 mm	D3 mm	L mm	L1 mm	L2 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
6.0	6.0	0.6	5.9	57	8	21	0.025	0.035	**250260** 0060	75,50
8.0	8.0	0.8	7.9	63	10	27	0.025	0.035	250260 0080	95,–
10.0	10.0	1.0	9.9	72	12	32	0.025	0.035	250260 0100	120,–
12.0	12.0	1.2	11.9	83	16	38	0.025	0.035	250260 0120	146,–
14.0	14.0	1.4	139.9	83	18	38	0.025	0.035	250260 0140	210,–
16.0	16.0	1.6	15.9	92	20	44	0.032	0.045	250260 0160	215,–
20.0	20.0	2.0	19.9	104	25	54	0.032	0.045	250260 0200	270,–
25.0	25.0	2.5	24.9*	121	30	65	0.032	0.045	250260 0250	539,–

2119

VAN HOORN CARBIDE



Request your catalogue now, with no obligation!

The perfect shank design for every application!



ATORN® Ultra-N roughing cutter

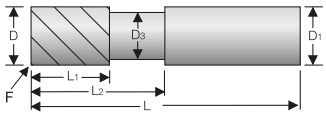
VHM | WR | 40° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 3 | ZrCN | Vc/fz | 20-276

- **With clearance**
- **3 cutting edges, with edge protection F**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated
- **249372.... with internal cooling**

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													350-500	150-250	150-350				
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

Standard

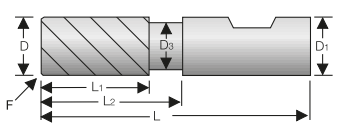




D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HA art.no.	€	DIN 6535-HA with internal cooling art.no.	€
6.0	13	57	18	5.6	6	0.4	0.039	0.055	**249370** 0060	40,50	**249372** 0060	61,50
8.0	21	63	25	7.6	8	0.4	0.049	0.070	249370 0080	52,50	249372 0080	84,50
10.0	22	72	30	9.6	10	0.4	0.060	0.085	249370 0100	59,50	249372 0100	99,50
12.0	26	83	36	11.4	12	0.4	0.067	0.095	249370 0120	76,–	249372 0120	140,–
16.0	36	92	42	15.4	16	0.4	0.084	0.120	249370 0160	127,–	249372 0160	235,–
20.0	41	104	52	19.4	20	0.4	0.140	0.200	249370 0200	193,–	249372 0200	370,–
									2149		2149	

Standard with driving plane



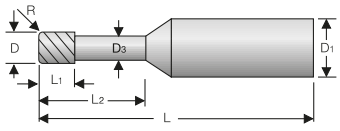


D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	F mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HB art.no.	€
6.0	13	57	18	5.6	6	0.4	0.039	0.055	**249371** 0060	40,50
8.0	21	63	25	7.6	8	0.4	0.049	0.070	249371 0080	52,50
10.0	22	72	30	9.6	10	0.4	0.060	0.085	249371 0100	59,50
12.0	26	83	36	11.4	12	0.4	0.067	0.095	249371 0120	76,–
16.0	36	92	42	15.4	16	0.4	0.084	0.120	249371 0160	127,–
20.0	41	104	52	19.4	20	0.4	0.140	0.200	249371 0200	189,–
									2149	

ATORN® Ultra-N mini torus cutter

VHM | Typ W | 30° | e8 | h5 | DIN 6535 HA | Z 2 | ZrCN | Vc/fz | 20-272

- **With clearance**
- **With defined cutting edge rounding from Ø 1.5 mm**
- Long-necked version for non-ferrous materials
- Radius tolerance +/- 0.01 mm
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													400-550	180-320	180-420				
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



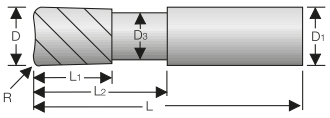
D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
0.5	0.9	55	4.0	0.48	4	0.05	0.008	0.012	**249002** 0504	46,90
0.5	0.9	65	6.0	0.48	4	0.05	0.008	0.012	249002 0506	54,50
0.5	0.9	65	10.0	0.48	4	0.05	0.008	0.012	249002 0510	54,50
1.0	1.5	55	5.0	0.95	4	0.10	0.014	0.021	249002 1005	46,30
1.0	1.5	65	10.0	0.95	4	0.10	0.014	0.021	249002 1010	53,50
1.0	1.5	65	15.0	0.95	4	0.10	0.014	0.021	249002 1015	54,50
1.5	1.8	55	8.0	1.44	4	0.15	0.023	0.033	249002 1508	46,30
									2149	

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
1.5	1.8	65	15.0	1.44	4	0.15	0.023	0.033	249002 1515	54,50
1.5	1.8	65	20.0	1.44	4	0.15	0.023	0.033	249002 1520	54,50
2.0	2.0	55	10.0	1.92	4	0.20	0.030	0.043	249002 2010	45,40
2.0	2.0	65	20.0	1.92	4	0.20	0.030	0.043	249002 2020	54,50
2.5	2.5	55	12.0	2.40	4	0.25	0.035	0.050	249002 2512	46,30
2.5	2.5	65	20.0	2.40	4	0.25	0.035	0.050	249002 2520	54,50
									2149	

ATORN® Ultra-N torus cutter

VHM | Typ W | 30° | e8 | h5 | DIN 6535 HA | Z 2 | ZrCN | Vc/fz | 20-276

- **With clearance**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Radius tolerance +/- 0.015 mm
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													● 375-550	● 175-275	● 175-375				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	4	50	14	2.9	3	0.3	0.019	0.028	**249211** 0303	38,–
4.0	5	50	16	3.8	4	0.3	0.023	0.033	249211 0203	43,80
5.0	6	54	18	4.8	5	0.3	0.028	0.040	249211 0503	48,30
6.0	7	57	21	5.7	6	0.3	0.033	0.048	249211 0603	53,50
6.0	7	57	21	5.7	6	1.0	0.033	0.048	249211 0610	52,50
6.0	7	57	21	5.7	6	2.0	0.033	0.048	249211 0620	53,50
8.0	9	63	27	7.7	8	0.3	0.042	0.060	249211 0803	73,–
8.0	9	63	27	7.7	8	1.0	0.042	0.060	249211 0810	70,–
8.0	9	63	27	7.7	8	2.0	0.042	0.060	249211 0820	73,–
10.0	11	72	32	9.6	10	0.3	0.053	0.075	249211 1003	93,50
10.0	11	72	32	9.6	10	1.5	0.053	0.075	249211 1015	93,50
10.0	11	72	32	9.6	10	3.0	0.053	0.075	249211 1030	95,50
12.0	12	83	38	11.6	12	1.5	0.060	0.085	249211 1215	127,–
12.0	12	83	38	11.6	12	4.0	0.060	0.085	249211 1240	130,–
16.0	16	92	44	15.5	16	2.0	0.077	0.110	249211 1620	210,–
16.0	16	92	44	15.5	16	4.0	0.077	0.110	249211 1640	210,–

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Long



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	4	75	32	2.8	3	0.3	0.025	0.028	**249212** 0303	53,50
4.0	5	75	36	3.75	4	0.3	0.029	0.033	249212 0203	59,50
5.0	6	75	40	4.7	5	0.3	0.036	0.040	249212 0503	66,–
6.0	7	80	44	5.6	6	0.3	0.043	0.048	249212 0603	69,–
6.0	7	80	44	5.6	6	1.0	0.043	0.048	249212 0610	71,–
6.0	7	80	44	5.6	6	2.0	0.043	0.048	249212 0620	71,–
8.0	9	100	54	7.6	8	0.3	0.054	0.060	249212 0803	99,50
8.0	9	100	54	7.6	8	1.0	0.054	0.060	249212 0810	98,50
8.0	9	100	54	7.6	8	2.0	0.054	0.060	249212 0820	98,50
10.0	11	100	60	9.5	10	0.3	0.068	0.075	249212 1003	134,–
10.0	11	100	60	9.5	10	1.5	0.068	0.075	249212 1015	134,–
10.0	11	100	60	9.5	10	3.0	0.068	0.075	249212 1030	134,–
12.0	12	120	75	11.5	12	1.5	0.077	0.085	249212 1215	167,–
12.0	12	120	75	11.5	12	4.0	0.077	0.085	249212 1240	171,–
16.0	16	150	92	15.5	16	2.0	0.099	0.110	249212 1620	295,–
16.0	16	150	92	15.5	16	4.0	0.099	0.110	249212 1640	295,–

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Continued on next page >>>



Extra-long

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
6.0	7	120	80	5.6	6	0.3	0.038	0.048	**249213** 0603	109,–
6.0	7	120	80	5.6	6	1.0	0.038	0.048	249213 0610	109,–
8.0	9	130	90	7.6	8	0.3	0.048	0.060	249213 0803	140,–
8.0	9	130	90	7.6	8	1.0	0.048	0.060	249213 0810	140,–
8.0	9	130	90	7.6	8	2.0	0.048	0.060	249213 0820	140,–
10.0	11	150	110	9.5	10	0.3	0.060	0.075	249213 1003	167,–
10.0	11	150	110	9.5	10	3.0	0.060	0.075	249213 1030	169,–
12.0	12	160	115	11.5	12	1.5	0.060	0.075	249213 1215	245,–
12.0	12	160	115	11.5	12	4.0	0.060	0.075	249213 1240	250,–
16.0	16	200	140	15.5	16	2.0	0.088	0.110	249213 1620	385,–

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ATORN® Ultra-N torus cutter

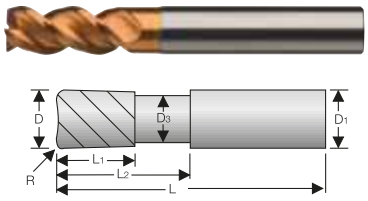
VHM | Typ W | 45° | h9 | h5 | DIN 6535 HA | DIN 6535 HB | Z 3 | ZrCN | Vc/fz 20-274

- **With clearance**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Radius tolerance +/- 0.015 mm
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													● 375-550	● 175-275	● 175-375				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Standard

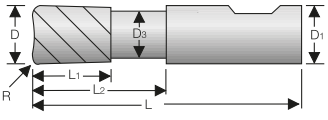


D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HA art.no.	€
5.0	13	57	18	4.7	6	0.5	0.026	0.038	**249311** 0505	41,70
5.0	13	57	18	4.7	6	1.0	0.026	0.038	249311 0510	42,10
6.0	13	57	18	5.6	6	0.5	0.032	0.045	249311 0605	47,30
6.0	13	57	18	5.6	6	1.0	0.032	0.045	249311 0610	46,30
8.0	21	63	25	7.6	8	0.5	0.042	0.060	249311 0805	54,50
8.0	21	63	25	7.6	8	1.0	0.042	0.060	249311 0810	53,50
10.0	22	72	30	9.6	10	0.5	0.053	0.075	249311 1005	86,50
10.0	22	72	30	9.6	10	1.0	0.053	0.075	249311 1010	84,50
12.0	26	83	36	11.4	12	0.5	0.060	0.085	249311 1205	119,–
12.0	26	83	36	11.4	12	1.0	0.060	0.085	249311 1210	115,–
16.0	36	92	42	15.4	16	2.0	0.068	0.098	249311 1620	220,–
16.0	36	92	42	15.4	16	4.0	0.068	0.098	249311 1640	220,–
20.0	41	104	52	19.4	20	4.0	0.079	0.113	249311 2040	315,–

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Standard with driving plane



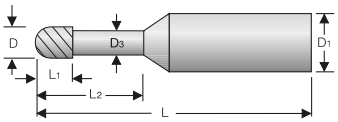


D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	R mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	DIN 6535-HB art.no.	€
5.0	13	57	18	4.7	6	0.5	0.026	0.038	**249312** 0505	42,10
5.0	13	57	18	4.7	6	1.0	0.026	0.038	249312 0510	42,10
6.0	13	57	18	5.6	6	0.5	0.032	0.045	249312 0605	47,70
6.0	13	57	18	5.6	6	1.0	0.032	0.045	249312 0610	47,70
8.0	21	63	25	7.6	8	0.5	0.042	0.060	249312 0805	54,50
8.0	21	63	25	7.6	8	1.0	0.042	0.060	249312 0810	54,50
10.0	22	72	30	9.6	10	0.5	0.053	0.075	249312 1005	85,50
10.0	22	72	30	9.6	10	1.0	0.053	0.075	249312 1010	86,50
12.0	26	83	36	11.4	12	0.5	0.060	0.085	249312 1205	119,–
12.0	26	83	36	11.4	12	1.0	0.060	0.085	249312 1210	119,–
16.0	36	92	42	15.4	16	2.0	0.068	0.098	249312 1620	220,–
16.0	36	92	42	15.4	16	4.0	0.068	0.098	249312 1640	220,–
20.0	41	104	52	19.4	20	4.0	0.079	0.113	249312 2040	315,–

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ATORN® Ultra-N mini radius milling cutter

VHM | Typ W | 30° | e8 | h5 | DIN 6535 HA | Z 2 | ZrCN | Vc/fz | 20-278



- **With clearance**
- **With defined cutting edge rounding from Ø 1.5 mm**
- Long-necked version for non-ferrous materials
- Radius tolerance +/- 0.01 mm
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													400-550	180-320	180-420				
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	Feed fz aluminium < 8 % Si mm/tooth	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
0.5	0.9	55	4.0	0.48	4	0.009	0.014	**249003** 0504	45,40
0.5	0.9	65	6.0	0.48	4	0.009	0.014	249003 0506	53,50
0.5	0.9	65	10.0	0.48	4	0.009	0.014	249003 0510	54,50
1.0	1.5	55	5.0	0.95	4	0.018	0.025	249003 1005	45,40
1.0	1.5	65	10.0	0.95	4	0.018	0.025	249003 1010	52,50
1.0	1.5	65	15.0	0.95	4	0.018	0.025	249003 1015	53,50
1.5	1.8	55	8.0	1.44	4	0.026	0.038	249003 1508	45,40
1.5	1.8	65	15.0	1.44	4	0.026	0.038	249003 1515	53,50
1.5	1.8	65	20.0	1.44	4	0.026	0.038	249003 1520	54,50
2.0	2.0	55	10.0	1.92	4	0.033	0.048	249003 2010	45,40
2.0	2.0	65	20.0	1.92	4	0.033	0.048	249003 2020	52,50
2.5	2.5	55	12.0	2.40	4	0.040	0.058	249003 2512	46,90
2.5	2.5	65	20.0	2.40	4	0.040	0.058	249003 2520	54,50

2149

ATORN® High-performance milling tools *Ultra-N*

INFO

Tool geometry

An optimal cutting-, micro- and chip-space geometry is particularly crucial in aluminium machining. Based on numerous machining tests, the geometries have been revised and adapted perfectly to the requirements of aluminium machining:

- maximum core diameter for high stability
- special cutting geometry to reduce cutting pressure
- optimal chip-space geometry for process-reliable chip removal
- Increased service life thanks to µm-precise cutting-edge rounding

Wear-resistant carbide metal

The basic substrate consists of H10F fine-grade solid carbide for aluminium with a grain size of 0.6 - 0.8 µm. This substrate is especially wear-resistant, hard and resistant to pressure.
It can best withstand the dynamic and mechanical loads to be encountered. This is particularly important in the event of vibrations, which can easily lead to chunking on the cutting edge.



Defined cutting-edge rounding

The basic aim of a cutting-edge rounding is to increase the service life of the tool and of the cutting edge. In the cutting tool grinding process, the cutting edge loses its definition due to micro-fractures (chunking). Through a defined honing, a process environment can be achieved at an early stage; that is, grinding-related points are removed and the risk of comb cracks minimised.

Conventional methods for the cutting edge rounding had the disadvantage that they were unable to create a reproducible and even honing of the cutting edge. The new technology allows optimum process control and reproducibility. With it, a uniform, µm-precise honing of the cutting edge and face can be achieved. This has a positive effect on the quality and service life of the tools and significantly improves your workpiece surfaces.

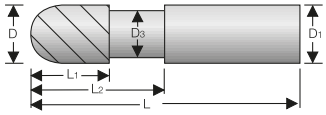
Improved tolerances

Precision produces quality: one reason why this new generation of tools is manufactured to tighter tolerances. Basically, all shanks are made in h5 quality and all cutting edges in g7 quality.

ATORN® Ultra-N radius milling cutter

VHM | Typ W | 45° | e8 | h5 | DIN 6535 HA | Z 2 | ZrCN | Vc/fz | 20-279

- **With clearance**
- **With defined cutting edge rounding**
- For non-ferrous materials
- Radius tolerance +/- 0.01 mm
- Cutting material: superfine grain solid carbide, **ZrCN Ultra-N**-coated



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													●	●	●				
													400-550	180-320	180-420				
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

Short



D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	6	50	16	2.9	3	0.021	0.030	**249240** 0030	35,40
4.0	7	54	17	3.8	4	0.023	0.033	249240 0040	41,90
5.0	8	54	18	4.8	5	0.026	0.038	249240 0050	46,70
6.0	10	54	21	5.7	6	0.030	0.043	249240 0060	45,60
8.0	12	60	27	7.7	8	0.042	0.060	249240 0080	59,50
10.0	13	67	32	9.6	10	0.053	0.075	249240 0100	78,–
12.0	16	73	38	11.6	12	0.060	0.085	249240 0120	105,–
16.0	20	83	44	15.5	16	0.077	0.110	249240 0160	167,–

2149



Long

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	10	75	32	2.9	3	0.027	0.030	**249250** 0030	51,–
4.0	13	75	36	3.8	4	0.029	0.033	249250 0040	59,50
5.0	15	75	40	4.8	5	0.034	0.038	249250 0050	69,–
6.0	16	100	44	5.7	6	0.038	0.043	249250 0060	62,50
8.0	22	100	54	7.7	8	0.054	0.060	249250 0080	87,50
10.0	25	100	60	9.6	10	0.068	0.075	249250 0100	117,–
12.0	26	100	60	11.6	12	0.077	0.085	249250 0120	152,–
16.0	30	150	92	15.5	16	0.099	0.110	249250 0160	240,–

2149



Extra-long

D mm	L1 mm	L mm	L2 mm	D3 mm	D1 mm	● Feed fz aluminium < 8 % Si mm/tooth	● Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	10	125	82	2.8	3	0.024	0.030	**249260** 0030	90,50
4.0	13	125	86	3.75	4	0.026	0.033	249260 0040	101,–
5.0	15	150	90	4.8	5	0.030	0.038	249260 0050	118,–
6.0	16	150	94	5.6	6	0.034	0.043	249260 0060	132,–
8.0	22	150	104	7.6	8	0.048	0.060	249260 0080	164,–
10.0	25	150	110	9.6	10	0.060	0.075	249260 0100	191,–
12.0	26	150	110	11.4	12	0.068	0.085	249260 0120	220,–

2149

ATORN® High-speed milling cutters for stainless steel and special alloys

INFO

The new generation of ATORN milling cutters are characterised by excellent performance in the machining of stainless steel and special alloys containing metals such as nickel, cobalt and titanium. An ultra-fine-grain carbide metal substrate in combination with high-performance geometry and specially developed ULTRA-MS coating make these tools absolutely process-safe and wear-resistant and allow a high metal removal rate.
The new geometries – i.e., adapted core diameters, optimal and positive rake and helix angles and corresponding microgeometries – allow for high feed rates and deliveries. One example of this are the 4-edge HPC milling cutters. These are designed with unequal flute spacing and unequal helix pitch. This design not only makes the tools suitable for use in **HPC milling**, but allows trouble-free **trochoidal milling** as well.
The range includes HSC- and HPC-enabled tools for roughing, semi-roughing and finishing from Ø 0.2-20 mm. The excellent stability during machining leads to process safety and high-quality surfaces, which cuts costs and boosts efficiency.
The mini-end milling cutters, also available as torus and radius milling cutters, round out the range.

ATORN®

High quality for great performance



Extreme temperature resistance thanks to ULTRA-MS
The special ULTRA-MS coating can handle application temperatures of up to 1100 ° C. That's important, because these special alloys are poor heat dissipaters.

Maximum service life
The ULTRA-MS coating significantly increases the service life of the tools.

Perfect cutting edge geometry makes for quiet running
Perfectly matched to the machining conditions in stainless steel and special alloys:
positive cutting geometries ensure soft cuts and smooth running

Low vibrations, even in border areas
The unequal helix pitch and unequal flute spacing reduce vibrations during machining

High precision
For precise components, high-precision edge radii, among other things, with a tolerance of less than 0.01 mm, ensure

The highest surface quality
The multitude of special features guarantees the highest quality surface finishes with no chatter marks, and much more.

Overview of the range

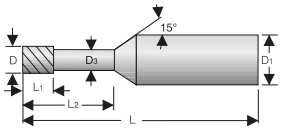
		Ø-area mm	Page
Solid carbide mini end milling cutters		Ø 0.5 - 4	20-83
Solid carbide mini torus cutters		Ø 0.5 - 4	20-88
Solid carbide mini radius milling cutters		Ø 0.5 - 4	20-90
Solid carbide end milling cutters for stainless steel		Ø 4 - 20	20-84
Solid carbide end milling cutters for titanium materials		Ø 3 - 25	20-86
Solid carbide torus cutters		Ø 4 - 20	20-89
Solid carbide radius milling cutters, standard		Ø 3 - 20	20-91

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	○	●	●	●	○	○	●	●	●							

ATORN® Ultra-MS mini end milling cutter

VHM | NH | 40° | e8 | h6 | DIN 6535 HA | Z 2 | AlCrN | Vc/fz | 20-279

- With clearance



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 96-112	● 96-112	○ 96-112	● 60-80	● 60-80	● 60-80	○ 96-112	○ 96-112	● 60-80	● 60-80	● 60-80							
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Z	Feed fz stainless steel austenitic mm/tooth	art.no.	€
0.5	0.7	2.0	50	0.45	4	2	0.001	**256011** 0011	38,20
0.5	0.7	4.0	50	0.45	4	2	0.001	256011 0012	38,20
0.5	0.7	6.0	50	0.45	4	2	0.001	256011 0013	38,20
0.5	0.7	8.0	50	0.45	4	2	0.001	256011 0014	38,20
0.8	1.2	4.0	50	0.75	4	2	0.003	256011 0020	36,20
0.8	1.2	6.0	50	0.75	4	2	0.003	256011 0021	36,20
0.8	1.2	8.0	50	0.75	4	2	0.003	256011 0022	36,20
0.8	1.2	10.0	50	0.75	4	2	0.003	256011 0023	36,20
0.8	1.2	12.0	50	0.75	4	2	0.003	256011 0024	36,20
1.0	1.5	6.0	50	0.95	4	2	0.004	256011 0025	26,40
1.0	1.5	8.0	50	0.95	4	2	0.004	256011 0026	26,40
1.0	1.5	10.0	50	0.95	4	2	0.004	256011 0027	26,40
1.0	1.5	12.0	50	0.95	4	2	0.004	256011 0028	27,40
1.0	1.5	16.0	50	0.95	4	2	0.004	256011 0029	27,40
1.2	1.8	6.0	50	1.15	4	2	0.005	256011 0030	27,40
1.2	1.8	8.0	50	1.15	4	2	0.005	256011 0031	27,40
1.2	1.8	10.0	50	1.15	4	2	0.005	256011 0032	28,50
1.2	1.8	12.0	50	1.15	4	2	0.005	256011 0033	28,50
1.5	2.3	6.0	50	1.45	4	2	0.006	256011 0034	27,40
1.5	2.3	8.0	50	1.45	4	2	0.006	256011 0035	27,40
1.5	2.3	10.0	50	1.45	4	2	0.006	256011 0036	27,40
1.5	2.3	12.0	50	1.45	4	2	0.006	256011 0037	28,50
1.5	2.3	16.0	50	1.45	4	2	0.006	256011 0038	28,50
1.5	2.3	20.0	60	1.45	4	2	0.006	256011 0039	28,50
2.0	3	6.0	50	1.95	4	2	0.008	256011 0040	27,40
2.0	3	8.0	50	1.95	4	2	0.008	256011 0041	27,40
2.0	3	10.0	50	1.95	4	2	0.008	256011 0042	27,40
2.0	3	12.0	50	1.95	4	2	0.008	256011 0043	27,40
2.0	3	16.0	50	1.95	4	2	0.008	256011 0044	28,50
2.0	3	20.0	60	1.95	4	2	0.008	256011 0045	29,50
2.0	3	25.0	75	1.95	4	2	0.008	256011 0046	30,30
2.5	3.7	8.0	50	2.40	4	2	0.010	256011 0048	27,40
2.5	3.7	10.0	50	2.40	4	2	0.010	256011 0049	27,40
2.5	3.7	12.0	50	2.40	4	2	0.010	256011 0050	27,40
2.5	3.7	16.0	50	2.40	4	2	0.010	256011 0051	28,50
2.5	3.7	20.0	60	2.40	4	2	0.010	256011 0052	30,80
2.5	3.7	25.0	60	2.40	4	2	0.010	256011 0053	31,40
3.0	4.5	8.0	50	2.85	6	2	0.012	256011 0055	38,20
3.0	4.5	10.0	50	2.85	6	2	0.012	256011 0056	38,20
3.0	4.5	12.0	50	2.85	6	2	0.012	256011 0057	38,20
3.0	4.5	16.0	60	2.85	6	2	0.012	256011 0058	38,20
3.0	4.5	20.0	60	2.85	6	2	0.012	256011 0059	39,50
3.0	4.5	25.0	75	2.85	6	2	0.012	256011 0060	40,50
4.0	4.5	20.0	60	3.85	6	2	0.016	256011 0063	39,50
4.0	4.5	25.0	75	3.85	6	2	0.016	256011 0064	40,50
4.0	4.5	30.0	75	3.85	6	2	0.016	256011 0065	40,50
4.0	4.5	40.0	75	3.85	6	2	0.016	256011 0066	40,50

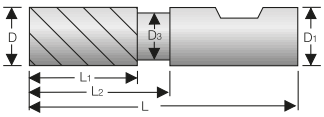
2153

HPMT End milling cutters

VHM | 40° | h10 | h6 | DIN 6535 HB | Z 4 | AlCrN | HPC | Vc/fz | 20-256

The all-rounder! Extremely low vibration levels due to irregular pitch

- **With clearance**
- **Irregular pitch to minimise vibrations**
- CNC repetition precision to within 10 µm
- For milling stainless steel, machining exotic materials, and general applications
- **Especially suitable for groove milling and lateral machining**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	○	●	●	●			●	●	●	●	●	●				
		150-200	80-120	70-90	60-90	40-70	50-60			60-70	20-35	15-30	280-350	200-250	150-200				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	L1 mm	L2 mm	D1 mm	L mm	D3 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
3	9	15	6	57	2.80	0.016	0.020	**254121** 0030	24,60
4	12	20	6	57	3.70	0.021	0.026	254121 0040	24,60
5	13	20	6	57	4.60	0.026	0.032	254121 0050	24,60
6	13	20	6	57	5.50	0.031	0.038	254121 0060	24,60
8	20	30	8	64	7.40	0.037	0.046	254121 0080	34,80
10	22	32	10	72	9.20	0.044	0.054	254121 0100	51,50
12	26	37	12	83	11.00	0.050	0.062	254121 0120	66,50
16	32	46	16	92	15.00	0.063	0.078	254121 0160	116,–
20	38	58	20	104	19.00	0.075	0.094	254121 0200	188,–

2146

Safety in the workplace

Please protect your eyes, ears and respiratory system!



ATORN® Ultra-MS end milling cutter

VHM | NH | 35°-38° | e8 | h6 | DIN 6535 HA | DIN 6535 HB | Z 4 | AlCrN | HPC | Vc/fz | 20-279

- With clearance

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 120-140	● 120-140	○ 120-140	● 60-80	● 60-80	● 60-80	○ 120-140	○ 120-140	● 60-80	● 60-80	● 60-80							
	Cutting speed Vc m/min.																		

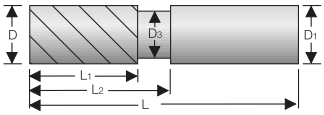
Please adjust these guidelines according to clamping operation and machine set-up.

Standard

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	DIN 6535-HA art.no.	€
4	11	20	57	3.70	6	0.1	4	0.016	0.021	**256008** 0040	34,80
5	13	20	57	4.60	6	0.1	4	0.020	0.026	256008 0050	34,80
6	13	20	57	5.50	6	0.1	4	0.024	0.031	256008 0060	34,80
8	20	30	64	7.40	8	0.2	4	0.030	0.038	256008 0080	51,–
10	22	32	72	9.20	10	0.2	4	0.036	0.046	256008 0100	62,50
12	26	37	83	11.00	12	0.2	4	0.043	0.054	256008 0120	90,50
16	32	46	92	15.00	16	0.3	4	0.054	0.068	256008 0160	150,–
20	38	58	104	19.00	20	0.4	4	0.066	0.083	256008 0200	235,–

2153







Standard end milling cutter set

Contents	art.no.	€
End milling cutter set, solid carbide 35°/38°, UT, Ø6, 8, 10, 12 mm, clear. (stainless steel) 4 S., HA, Ultra-MS	**256008** 1004	240,–

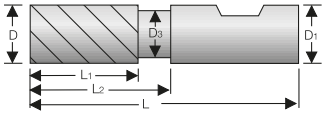
2153

Standard with driving plane

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	DIN 6535-HB art.no.	€
4	11	20	57	3.70	6	0.1	4	0.016	0.021	**256007** 0040	35,80
5	13	20	57	4.60	6	0.1	4	0.020	0.026	256007 0050	35,80
6	13	20	57	5.50	6	0.1	4	0.024	0.031	256007 0060	35,80
8	20	30	64	7.40	8	0.2	4	0.030	0.038	256007 0080	52,–
10	22	32	72	9.20	10	0.2	4	0.036	0.046	256007 0100	64,50
12	26	37	83	11.00	12	0.2	4	0.043	0.054	256007 0120	92,50
16	32	46	92	15.00	16	0.3	4	0.054	0.068	256007 0160	152,–
20	38	58	104	19.00	20	0.4	4	0.066	0.083	256007 0200	240,–

2153







Standard end milling cutter set with driving plane

Contents	art.no.	€
End milling cutter set, solid carbide 35°/38°, UT, Ø6, 8, 10, 12 mm, clear. (stainless steel) 4 S., HB, Ultra-MS	**256007** 1004	245,–

2153

VAN HOORN CARBIDE



Request your catalogue now, with no obligation!

The perfect shank design for every application!



VAN HOORN CARBIDE VHVTR/W 4/5 end milling cutter

VHM | 35° -38° | e8 | h9 | DIN 6535 HA | DIN 6535 HB | Z 4 | Z 5 | TiAlSiN | Vc/fz | 20-262

- **Cutting material: ultra-fine grain solid carbide, TiAlSiN-coated**
- Special pre-treatment and finishing treatment due to **micro radiation**
- **New chip flute geometry** for enhanced cooling and chip flow
- For wet machining, **high material removal rate**

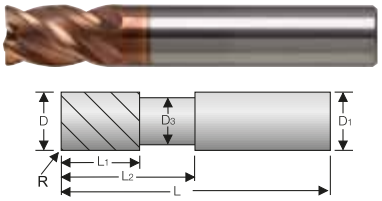
For machining titanium and stainless steel

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	255088....				● 80-150	● 60-120	● 40-100			● 70-100	● 30-50	● 20-30							
	255087....				● 80-150	● 60-120	● 40-100			● 70-100	● 30-50	● 20-30							
	255102....				● 80-150	● 60-120	● 40-100			● 70-100	● 30-50	● 20-30							
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

Short Z4

D mm	R mm	D3 mm	D1 mm	L mm	L1 mm	Z	L2 mm	● Feed fz stainless steel ferrit./martens. mm/tooth	● Feed fz stainless steel ferrit./martens. mm/tooth	DIN 6535-HB art.no.	€
3.0	0.2	2.8	6.0	39	5	4	7	0.015	0.020	**255088** 0030	35,45
4.0	0.2	3.8	6.0	51	6	4	9	0.025	0.030	255088 0040	38,85
5.0	0.2	4.6	6.0	51	7	4	11	0.025	0.030	255088 0050	41,95
6.0	0.3	5.6	6.0	64	8	4	13	0.030	0.040	255088 0060	45,80
8.0	0.5	7.4	8.0	64	11	4	18	0.040	0.050	255088 0080	60,10
10.0	0.5	9.4	10.0	70	13	4	22	0.055	0.070	255088 0100	79,–
12.0	1.0	11.4	12.0	78	15	4	25	0.065	0.080	255088 0120	112,–
16.0	1.0	15.4	16.0	89	19	4	35	0.080	0.100	255088 0160	161,–
20.0	1.0	19.2	20.0	102	23	4	42	0.010	0.200	255088 0200	264,–
25.0	1.0	24.2	25.0	120	28	4	45	0.125	0.250	255088 0250	360,–

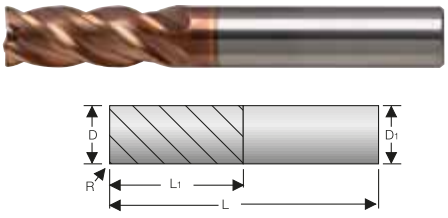
2113



Standard Z4

D mm	R mm	D1 mm	L mm	L1 mm	Z	● Feed fz stainless steel ferrit./martens. mm/tooth	● Feed fz stainless steel ferrit./martens. mm/tooth	DIN 6535-HA art.no.	€
3.0	0.2	6.0	39	7	4	0.015	0.020	**255087** 0030	37,05
4.0	0.2	6.0	51	9	4	0.025	0.030	255087 0040	40,65
5.0	0.2	6.0	51	11	4	0.025	0.030	255087 0050	43,95
6.0	0.3	6.0	64	13	4	0.030	0.040	255087 0060	47,70
8.0	0.5	8.0	64	18	4	0.040	0.050	255087 0080	62,75
10.0	0.5	10.0	70	22	4	0.055	0.070	255087 0100	81,75
12.0	1.0	12.0	78	25	4	0.065	0.080	255087 0120	115,–
16.0	1.0	16.0	89	35	4	0.080	0.100	255087 0160	167,–
20.0	1.0	20.0	102	42	4	0.010	0.200	255087 0200	268,–
25.0	1.0	25.0	120	45	4	0.125	0.250	255087 0250	370,–

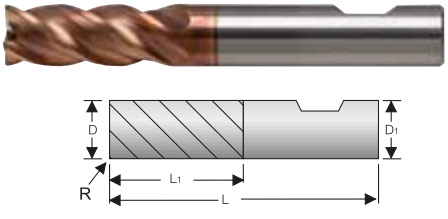
2113



Standard with driving plane Z4

D mm	R mm	D1 mm	L mm	L1 mm	Z	● Feed fz stainless steel ferrit./martens. mm/tooth	● Feed fz stainless steel ferrit./martens. mm/tooth	DIN 6535-HB art.no.	€
6.0	0.3	6.0	64	13	4	0.030	0.040	**255084** 0060	47,70
8.0	0.5	8.0	64	18	4	0.040	0.050	255084 0080	62,75
10.0	0.5	10.0	70	22	4	0.055	0.070	255084 0100	81,75
12.0	1.0	12.0	78	25	4	0.065	0.080	255084 0120	115,–
16.0	1.0	16.0	89	35	4	0.080	0.100	255084 0160	167,–
20.0	1.0	20.0	102	42	4	0.010	0.200	255084 0200	268,–
25.0	1.0	25.0	120	45	4	0.125	0.250	255084 0250	370,–

2113

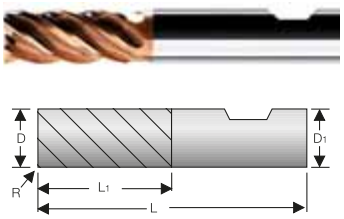


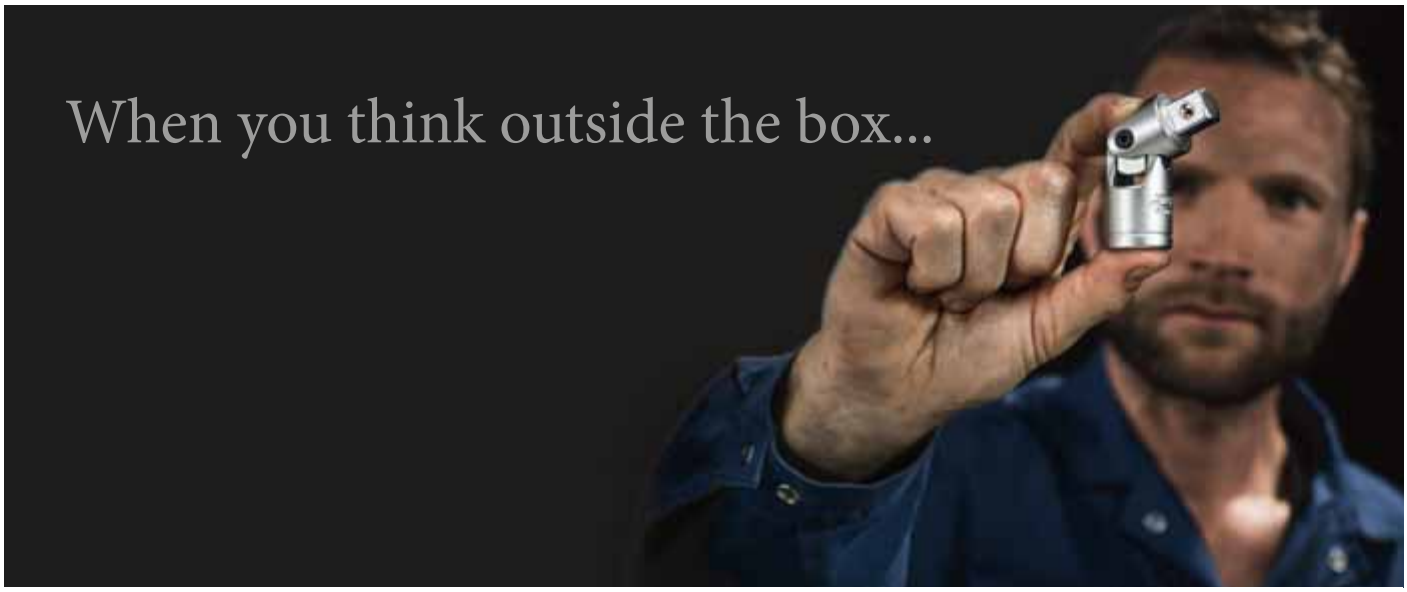
Continued on next page >>>

Standard with driving plane Z5

D mm	R mm	D1 mm	L mm	L1 mm	Z	Feed fz stainless steel ferrit./martens. mm/tooth	DIN 6535-HB art.no.	€
3	0.2	6	51	7	5	0.01	**255102** 0302	37,05
4	0.2	6	51	9	5	0.012	255102 0402	40,65
5	0.2	6	51	11	5	0.02	255102 0502	43,95
6	0.1	6	64	13	5	0.025	255102 0601	47,70
6	0.3	6	64	13	5	0.025	255102 0603	47,70
6	0.5	6	64	13	5	0.025	255102 0605	47,70
6	1	6	64	13	5	0.025	255102 0610	47,70
8	0.1	8	64	18	5	0.035	255102 0801	62,75
8	0.3	8	64	18	5	0.035	255102 0803	62,75
8	0.5	8	64	18	5	0.035	255102 0805	62,75
8	1	8	64	18	5	0.035	255102 0810	62,75
10	0.1	10	70	22	5	0.04	255102 1001	81,75
10	0.3	10	70	22	5	0.04	255102 1003	81,75
10	0.5	10	70	22	5	0.04	255102 1005	81,75
10	1	10	70	22	5	0.04	255102 1010	81,75
12	0.1	12	78	25	5	0.05	255102 1201	115,–
12	0.3	12	78	25	5	0.05	255102 1203	115,–
12	0.5	12	78	25	5	0.05	255102 1205	115,–
12	1	12	78	25	5	0.05	255102 1210	115,–
14	0.5	14	89	30	5	0.055	255102 1405	169,95
14	1	14	89	30	5	0.055	255102 1410	169,95
16	0.1	16	89	35	5	0.06	255102 1601	167,–
16	0.5	16	89	35	5	0.06	255102 1605	167,–
16	1	16	89	35	5	0.06	255102 1610	167,–
20	0.5	20	102	42	5	0.08	255102 2005	268,–
20	1	20	102	42	5	0.08	255102 2010	268,–
25	0.5	25	120	45	5	0.11	255102 2505	370,–
25	1	25	120	45	5	0.11	255102 2510	370,–

2113





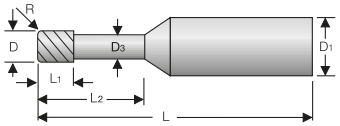
...new things are created.

ATORN®
High quality for great performance

ATORN® Ultra-MS mini torus cutter

VHM | NH | 40° | e8 | h6 | DIN 6535 HA | Z 2 | AlCrN | Vc/fz | 20-279

- With clearance



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 96-112	● 96-112	○ 96-112	● 60-80	● 60-80	● 60-80	○ 96-112	○ 96-112	● 60-80	● 60-80	● 60-80							
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



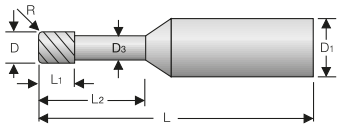
D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	art.no.	€
0.5	0.7	2.0	50	0.45	4	0.05	2	0.001	0.002	**256012** 0011	41,60
0.5	0.7	4.0	50	0.45	4	0.05	2	0.001	0.002	256012 0012	41,60
0.5	0.7	6.0	50	0.45	4	0.05	2	0.001	0.002	256012 0013	39,50
0.5	0.7	8.0	50	0.45	4	0.05	2	0.001	0.002	256012 0014	39,50
0.8	1.2	4.0	50	0.75	4	0.10	2	0.003	0.004	256012 0018	38,20
0.8	1.2	6.0	50	0.75	4	0.10	2	0.003	0.004	256012 0019	38,20
0.8	1.2	8.0	50	0.75	4	0.10	2	0.003	0.004	256012 0020	38,20
0.8	1.2	10.0	50	0.75	4	0.10	2	0.003	0.004	256012 0021	39,50
0.8	1.2	12.0	50	0.75	4	0.10	2	0.003	0.004	256012 0022	39,50
1.0	1.5	6.0	50	0.95	4	0.10	2	0.004	0.005	256012 0023	28,50
1.0	1.5	8.0	50	0.95	4	0.10	2	0.004	0.005	256012 0024	28,50
1.0	1.5	10.0	50	0.95	4	0.10	2	0.004	0.005	256012 0025	28,50
1.0	1.5	12.0	50	0.95	4	0.10	2	0.004	0.005	256012 0026	29,50
1.0	1.5	16.0	50	0.95	4	0.10	2	0.004	0.005	256012 0027	29,50
1.2	1.8	6.0	50	1.15	4	0.10	2	0.005	0.006	256012 0028	28,50
1.2	1.8	8.0	50	1.15	4	0.10	2	0.005	0.006	256012 0029	28,50
1.2	1.8	10.0	50	1.15	4	0.10	2	0.005	0.006	256012 0030	28,50
1.2	1.8	12.0	50	1.15	4	0.10	2	0.005	0.006	256012 0031	28,50
1.5	2.3	6.0	50	1.45	4	0.20	2	0.006	0.007	256012 0032	28,50
1.5	2.3	8.0	50	1.45	4	0.20	2	0.006	0.007	256012 0033	28,50
1.5	2.3	10.0	50	1.45	4	0.20	2	0.006	0.007	256012 0034	28,50
1.5	2.3	12.0	50	1.45	4	0.20	2	0.006	0.007	256012 0035	28,50
1.5	2.3	16.0	50	1.45	4	0.20	2	0.006	0.007	256012 0036	29,50
1.5	2.3	20.0	60	1.45	4	0.20	2	0.006	0.007	256012 0037	29,50
2.0	3	6.0	50	1.95	4	0.20	2	0.008	0.010	256012 0038	28,50
2.0	3	8.0	50	1.95	4	0.20	2	0.008	0.010	256012 0039	28,50
2.0	3	10.0	50	1.95	4	0.20	2	0.008	0.010	256012 0040	28,50
2.0	3	12.0	50	1.95	4	0.20	2	0.008	0.010	256012 0041	28,50
2.0	3	16.0	50	1.95	4	0.20	2	0.008	0.010	256012 0042	29,50
2.0	3	20.0	60	1.95	4	0.20	2	0.008	0.010	256012 0043	30,80
2.0	3	25.0	75	1.95	4	0.20	2	0.008	0.010	256012 0044	31,80
2.5	3.7	8.0	50	2.40	4	0.30	2	0.010	0.013	256012 0046	28,50
2.5	3.7	10.0	50	2.40	4	0.30	2	0.010	0.013	256012 0047	28,50
2.5	3.7	12.0	50	2.40	4	0.30	2	0.010	0.013	256012 0048	28,50
2.5	3.7	16.0	50	2.40	4	0.30	2	0.010	0.013	256012 0049	29,50
2.5	3.7	20.0	60	2.40	4	0.30	2	0.010	0.013	256012 0050	32,80
2.5	3.7	25.0	60	2.40	4	0.30	2	0.010	0.013	256012 0051	33,90
3.0	4.5	8.0	50	2.85	6	0.30	2	0.012	0.015	256012 0053	40,50
3.0	4.5	10.0	50	2.85	6	0.30	2	0.012	0.015	256012 0054	40,50
3.0	4.5	12.0	50	2.85	6	0.30	2	0.012	0.015	256012 0055	40,50
3.0	4.5	16.0	60	2.85	6	0.30	2	0.012	0.015	256012 0056	40,50
3.0	4.5	20.0	60	2.85	6	0.30	2	0.012	0.015	256012 0057	40,50
3.0	4.5	25.0	75	2.85	6	0.30	2	0.012	0.015	256012 0058	42,60
4.0	4.5	20.0	60	3.85	6	0.40	2	0.016	0.021	256012 0061	40,50
4.0	4.5	25.0	75	3.85	6	0.40	2	0.016	0.021	256012 0062	42,60
4.0	4.5	30.0	75	3.85	6	0.40	2	0.016	0.021	256012 0063	42,60
4.0	4.5	40.0	75	3.85	6	0.40	2	0.016	0.021	256012 0064	43,80

2153

ATORN® Ultra-MS torus cutter

VHM | NH | 35°-38° | e8 | h6 | DIN 6535 HA | Z 4 | AlCrN | HSC | Vc/fz | 20-279

- With clearance



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 120-140	● 120-140	○ 120-140	● 60-80	● 60-80	● 60-80	○ 120-140	○ 120-140	● 60-80	● 60-80	● 60-80							
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

Standard



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	DIN 6535-HA art.no.	€
4.0	11	20	57	3.70	6	0.30	4	0.016	0.021	**256010** 0001	37,20
4.0	11	20	57	3.70	6	0.50	4	0.016	0.021	256010 0002	37,20
5.0	13	20	57	4.60	6	0.30	4	0.020	0.026	256010 0003	37,20
5.0	13	20	57	4.60	6	0.50	4	0.020	0.026	256010 0004	37,20
6.0	13	20	57	5.50	6	0.30	4	0.024	0.031	256010 0005	37,20
6.0	13	20	57	5.50	6	0.50	4	0.024	0.031	256010 0006	37,20
6.0	13	20	57	5.50	6	1.00	4	0.024	0.031	256010 0007	37,20
8.0	20	30	64	7.40	8	0.50	4	0.030	0.038	256010 0009	53,–
8.0	20	30	64	7.40	8	1.00	4	0.030	0.038	256010 0010	53,–
10.0	22	32	72	9.20	10	0.50	4	0.036	0.046	256010 0012	70,50
10.0	22	32	72	9.20	10	1.00	4	0.036	0.046	256010 0013	70,50
12.0	26	37	83	11.00	12	0.50	4	0.043	0.054	256010 0014	94,50
12.0	26	37	83	11.00	12	1.00	4	0.043	0.054	256010 0015	94,50
12.0	26	37	83	11.00	12	2.00	4	0.043	0.054	256010 0016	94,50
12.0	26	37	83	11.00	12	3.00	4	0.043	0.054	256010 0018	94,50
16.0	32	46	92	15.00	16	1.00	4	0.054	0.068	256010 0020	155,–
16.0	32	46	92	15.00	16	2.00	4	0.054	0.068	256010 0021	155,–
16.0	32	46	92	15.00	16	3.00	4	0.054	0.068	256010 0022	155,–
20.0	38	58	104	19.00	20	1.00	4	0.066	0.083	256010 0025	240,–
20.0	38	58	104	19.00	20	2.00	4	0.066	0.083	256010 0026	240,–
20.0	38	58	104	19.00	20	3.00	4	0.066	0.083	256010 0027	240,–
20.0	38	58	104	19.00	20	4.00	4	0.066	0.083	256010 0028	240,–

2153



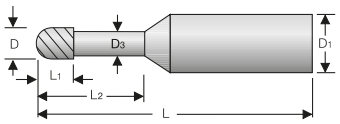
...then it's ATORN.

ATORN®
High quality for great performance

ATORN® Ultra-MS mini radius milling cutter

VHM | NH | 30° | e8 | h6 | DIN 6535 HA | Z 2 | AlCrN | Vc/fz | 20-280

- With clearance



material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
● very well suited ○ well suited	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	●	●	○	●	●	●	○	○	●	●	●							
	96-112	96-112	96-112	60-80	60-80	60-80	96-112	96-112	60-80	60-80	60-80							
Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



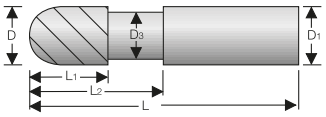
D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	● Feed fz stainless steel austenitic mm/tooth	● Feed fz stainless steel austenitic mm/tooth	art.no.	€
0.5	0.4	2.0	50	0.45	4	0.25	2	0.002	0.003	**256013** 0012	43,80
0.5	0.4	4.0	50	0.45	4	0.25	2	0.002	0.003	256013 0014	43,80
0.5	0.4	6.0	50	0.45	4	0.25	2	0.002	0.003	256013 0016	43,80
0.5	0.4	8.0	50	0.45	4	0.25	2	0.002	0.003	256013 0017	43,80
0.8	0.6	2.0	50	0.75	4	0.40	2	0.002	0.003	256013 0024	41,60
0.8	0.6	4.0	50	0.75	4	0.40	2	0.003	0.004	256013 0025	41,60
0.8	0.6	6.0	50	0.75	4	0.40	2	0.003	0.004	256013 0027	41,60
0.8	0.6	8.0	50	0.75	4	0.40	2	0.003	0.004	256013 0028	41,60
0.8	0.6	10.0	50	0.75	4	0.40	2	0.003	0.004	256013 0029	41,60
1.0	0.8	3.0	50	0.95	4	0.50	2	0.004	0.005	256013 0030	30,80
1.0	0.8	4.0	50	0.95	4	0.50	2	0.004	0.005	256013 0031	30,80
1.0	0.8	6.0	50	0.95	4	0.50	2	0.004	0.005	256013 0033	30,80
1.0	0.8	8.0	50	0.95	4	0.50	2	0.004	0.005	256013 0034	30,80
1.0	0.8	10.0	50	0.95	4	0.50	2	0.004	0.005	256013 0035	31,80
1.0	0.8	12.0	50	0.95	4	0.50	2	0.004	0.005	256013 0036	31,80
1.0	0.8	20.0	50	0.95	4	0.50	2	0.004	0.005	256013 0037	32,80
1.5	1.2	8.0	50	1.45	4	0.75	2	0.006	0.007	256013 0042	30,80
1.5	1.2	12.0	50	1.45	4	0.75	2	0.006	0.007	256013 0043	30,80
1.5	1.2	16.0	50	1.45	4	0.75	2	0.006	0.007	256013 0044	31,80
2.0	1.6	6.0	50	1.95	4	1.00	2	0.008	0.010	256013 0045	30,80
2.0	1.6	8.0	50	1.95	4	1.00	2	0.008	0.010	256013 0046	30,80
2.0	1.6	10.0	50	1.95	4	1.00	2	0.008	0.010	256013 0047	30,80
2.0	1.6	12.0	50	1.95	4	1.00	2	0.008	0.010	256013 0048	30,80
2.0	1.6	16.0	50	1.95	4	1.00	2	0.008	0.010	256013 0049	31,80
2.0	1.6	20.0	60	1.95	4	1.00	2	0.008	0.010	256013 0050	35,10
2.0	1.6	25.0	75	1.95	4	1.00	2	0.008	0.010	256013 0051	38,20
3.0	2.4	8.0	50	2.85	6	1.50	2	0.012	0.015	256013 0053	45,90
3.0	2.4	10.0	50	2.85	6	1.50	2	0.012	0.015	256013 0054	45,90
3.0	2.4	16.0	60	2.85	6	1.50	2	0.012	0.015	256013 0055	45,90
3.0	2.4	20.0	60	2.85	6	1.50	2	0.012	0.015	256013 0056	45,90
3.0	2.4	25.0	75	2.85	6	1.50	2	0.012	0.015	256013 0057	48,20
3.0	2.4	30.0	75	2.85	6	1.50	2	0.012	0.015	256013 0058	48,20
4.0	3.2	10.0	50	3.85	6	2.00	2	0.016	0.021	256013 0059	45,90
4.0	3.2	16.0	60	3.85	6	2.00	2	0.016	0.021	256013 0060	45,90
4.0	3.2	20.0	60	3.85	6	2.00	2	0.016	0.021	256013 0061	45,90
4.0	3.2	25.0	75	3.85	6	2.00	2	0.016	0.021	256013 0062	50,50
4.0	3.2	30.0	75	3.85	6	2.00	2	0.016	0.021	256013 0063	50,50
4.0	3.2	35.0	75	3.85	6	2.00	2	0.016	0.021	256013 0064	51,50
4.0	3.2	40.0	100	3.85	6	2.00	2	0.016	0.021	256013 0065	53,–
4.0	3.2	50.0	100	3.85	6	2.00	2	0.016	0.021	256013 0066	55,–

2153

ATORN® Ultra-MS radius milling cutter

VHM | NH | 30° | e8 | h6 | DIN 6535 HA | Z 2 | AlCrN | Vc/fz | 20-280

- With clearance



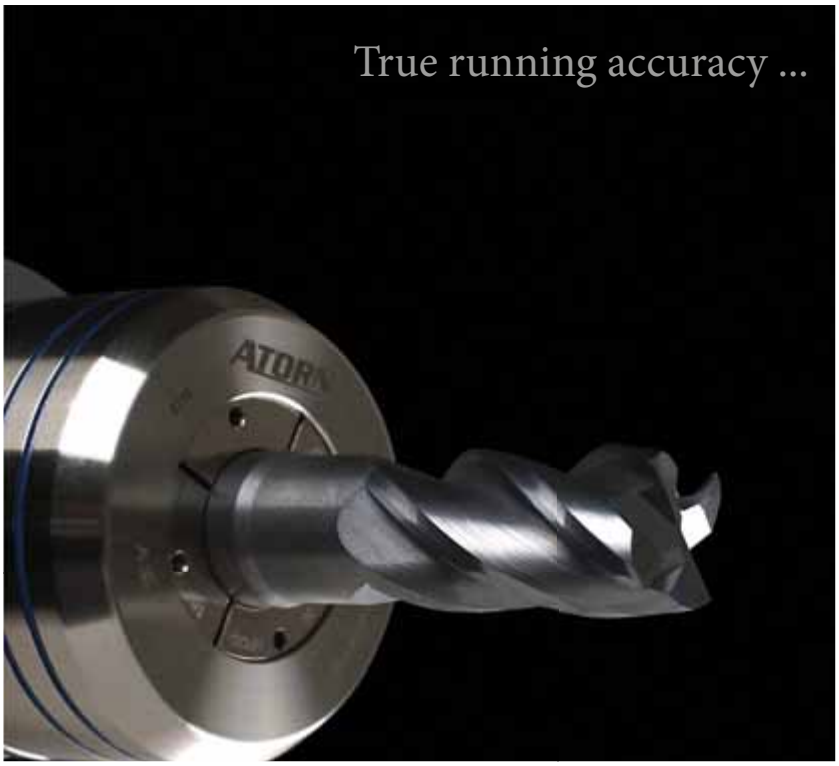
material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 150-200	● 150-200	○ 150-200	● 60-80	● 70-90	● 70-90	○ 150-200	○ 150-200	● 60-80	● 60-80	● 60-80							
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

Standard



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz stainless steel austenitic mm/tooth	Feed fz stainless steel austenitic mm/tooth	DIN 6535-HA art.no.	€
3.0	5	20	57	2.80	6	1.50	2	0.012	0.015	**256016** 0030	34,10
4.0	6	20	57	3.70	6	2.00	2	0.016	0.021	256016 0040	34,10
5.0	7	20	57	4.60	6	2.50	2	0.020	0.026	256016 0050	34,10
6.0	8	20	57	5.50	6	3.00	2	0.024	0.031	256016 0060	34,10
8.0	10	25	64	7.40	8	4.00	2	0.030	0.038	256016 0080	45,70
10.0	12	35	75	9.20	10	5.00	2	0.036	0.046	256016 0100	64,50
12.0	14	35	75	11.00	12	6.00	2	0.043	0.054	256016 0120	87,50
16.0	18	45	90	15.00	16	8.00	2	0.054	0.068	256016 0160	152,–
20.0	22	50	100	19.00	20	10.00	2	0.066	0.083	256016 0200	240,–

2153



ATORN®
High quality for great performance

SARA® Diamond-coated end milling cutters DIA+

INFO

Specially designed for the machining of graphite

- High-tech CVD diamond coating
- Improved geometry
- Increased wear resistance thanks to crystalline diamond coating
- Layer thickness 10+2 µm
- Hardness 10,000 HV
- 0.2 - 16 mm diameter range
- Shank, torus and radius milling cutters

The graphite milling tool

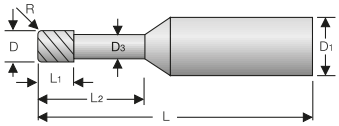
		Ø-area mm	Page
Mini-torus cutter		Ø 0.2 - 12	from 20-92
Mini-radius milling cutter		Ø 0.2 - 12	from 20-95
Torus cutter, short		Ø 3 - 16	20-97
Torus cutter, long		Ø 3 - 16	20-97

SARA® DIA+ mini torus cutter

VHM | Typ N | 30° | h9 | h5 | DIN 6535 HA | Z 2 | DIA | HSC | Vc/fz | 20-280

- Crystalline diamond coating
- Reliable graphite, GFRP and CFRP machining
- With clearance
- Radius tolerance +/- 0.0003

Layer thickness 10+2 µm



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
															● 95-300			
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz graphite mm/tooth	Feed fz GRP/CFP/thermoset mm/tooth	art.no.	€
0.20	0.20	1	55	0.20	3.00	0.05	2	0.002	0.003	**258005** 0001	82,50
0.30	0.30	3	55	0.27	3.00	0.05	2	0.003	0.004	258005 0004	77,50
0.30	0.30	3	55	0.27	4.00	0.05	2	0.003	0.004	258005 0005	77,50
0.40	0.40	2	55	0.35	3.00	0.05	2	0.003	0.004	258005 0007	70,–
0.40	0.40	4	55	0.35	3.00	0.05	2	0.003	0.004	258005 0008	70,–
0.40	0.40	8	55	0.35	3.00	0.05	2	0.003	0.004	258005 0009	70,–
0.40	0.40	8	55	0.35	4.00	0.05	2	0.003	0.004	258005 0010	70,–
0.40	0.40	4	55	0.35	4.00	0.05	2	0.003	0.004	258005 0012	70,–
0.50	0.50	2	55	0.45	3.00	0.05	2	0.003	0.004	258005 0013	56,50
0.50	0.50	5	55	0.45	3.00	0.05	2	0.003	0.004	258005 0014	56,50
0.50	0.50	10	55	0.45	3.00	0.05	2	0.003	0.004	258005 0015	56,50
0.50	0.50	10	55	0.45	4.00	0.05	2	0.003	0.004	258005 0016	56,50
0.50	0.50	2	55	0.45	4.00	0.05	2	0.003	0.004	258005 0017	56,50
0.50	0.50	5	55	0.45	4.00	0.05	2	0.003	0.004	258005 0018	56,50
0.60	0.80	3	55	0.56	3.00	0.06	2	0.005	0.008	258005 0019	55,50
0.60	0.80	6	55	0.56	3.00	0.06	2	0.005	0.008	258005 0020	55,50
0.60	0.80	9	55	0.56	3.00	0.06	2	0.005	0.008	258005 0021	55,50
0.60	0.80	3	55	0.56	4.00	0.06	2	0.005	0.008	258005 0023	61,–
0.60	0.80	9	55	0.56	4.00	0.06	2	0.005	0.008	258005 0025	61,–
0.80	1.00	4	55	0.75	3.00	0.08	2	0.005	0.008	258005 0027	55,50
0.80	1.00	8	55	0.75	3.00	0.08	2	0.005	0.008	258005 0028	55,50
0.80	1.00	12	55	0.75	3.00	0.08	2	0.005	0.008	258005 0029	55,50
0.80	1.00	16	55	0.75	3.00	0.08	2	0.005	0.008	258005 0030	55,50
0.80	1.00	4	55	0.75	4.00	0.08	2	0.005	0.008	258005 0031	66,–
0.80	1.00	8	55	0.75	4.00	0.08	2	0.005	0.008	258005 0032	66,–
0.80	1.00	12	55	0.75	4.00	0.08	2	0.005	0.008	258005 0033	66,–
0.80	1.00	16	55	0.75	4.00	0.08	2	0.005	0.008	258005 0034	66,–
1.00	1.00	5	55	0.90	3.00	0.10	2	0.01	0.015	258005 0035	55,50

Continued on next page >>>

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz graphite GRP/CFP/thermoset mm/tooth	Feed fz graphite GRP/CFP/thermoset mm/tooth	art.no.	€
1.00	1.00	10	55	0.90	3.00	0.10	2	0.01	0.015	258005 0036	55,50
1.00	1.00	15	55	0.90	3.00	0.10	2	0.01	0.015	258005 0037	55,50
1.00	1.00	20	55	0.90	3.00	0.10	2	0.01	0.015	258005 0038	55,50
1.00	1.00	25	55	0.90	3.00	0.10	2	0.01	0.015	258005 0039	55,50
1.00	1.00	5	55	0.90	4.00	0.10	2	0.01	0.015	258005 0040	55,50
1.00	1.00	10	55	0.90	4.00	0.10	2	0.01	0.015	258005 0041	55,50
1.00	1.00	15	55	0.90	4.00	0.10	2	0.01	0.015	258005 0042	55,50
1.00	1.00	20	55	0.90	4.00	0.10	2	0.01	0.015	258005 0043	55,50
1.00	1.00	25	55	0.90	4.00	0.10	2	0.01	0.015	258005 0044	55,50
1.20	1.50	10	55	1.10	3.00	0.12	2	0.01	0.015	258005 0047	55,50
1.20	1.50	15	55	1.10	4.00	0.12	2	0.01	0.015	258005 0049	55,50
1.20	1.50	10	55	1.10	4.00	0.12	2	0.01	0.015	258005 0050	55,50
1.20	1.50	5	55	1.10	4.00	0.12	2	0.01	0.015	258005 0051	55,50
1.50	2.00	5	55	1.40	3.00	0.15	2	0.012	0.02	258005 0052	55,50
1.50	2.00	8	55	1.40	3.00	0.15	2	0.012	0.02	258005 0053	55,50
1.50	2.00	10	55	1.40	3.00	0.15	2	0.012	0.02	258005 0054	55,50
1.50	2.00	15	55	1.40	3.00	0.15	2	0.012	0.02	258005 0055	55,50
1.50	2.00	20	55	1.40	3.00	0.15	2	0.012	0.02	258005 0056	55,50
1.50	2.00	25	55	1.40	3.00	0.15	2	0.012	0.02	258005 0057	55,50
1.50	2.00	25	55	1.40	4.00	0.15	2	0.012	0.02	258005 0058	55,50
1.50	2.00	20	55	1.40	4.00	0.15	2	0.012	0.02	258005 0059	55,50
1.50	2.00	15	55	1.40	4.00	0.15	2	0.012	0.02	258005 0060	55,50
1.50	2.00	10	55	1.40	4.00	0.15	2	0.012	0.02	258005 0061	55,50
1.80	2.00	20	55	1.70	3.00	0.18	2	0.012	0.025	258005 0066	55,50
2.00	2.00	10	65	1.90	3.00	0.20	2	0.015	0.025	258005 0069	55,50
2.00	2.00	15	65	1.90	3.00	0.20	2	0.015	0.025	258005 0070	55,50
2.00	2.00	20	65	1.90	3.00	0.20	2	0.015	0.025	258005 0071	55,50
2.00	2.00	25	65	1.90	3.00	0.20	2	0.015	0.025	258005 0072	55,50
2.00	2.00	10	65	1.90	3.00	0.50	2	0.015	0.025	258005 0073	55,50
2.00	2.00	15	65	1.90	3.00	0.50	2	0.015	0.025	258005 0074	55,50
2.00	2.00	20	65	1.90	3.00	0.50	2	0.015	0.025	258005 0075	55,50
2.00	2.00	25	65	1.90	3.00	0.50	2	0.015	0.025	258005 0076	55,50
2.00	2.00	25	65	1.90	4.00	0.50	2	0.015	0.025	258005 0077	55,50
2.00	2.00	10	65	1.90	4.00	0.20	2	0.015	0.025	258005 0079	55,50
2.00	2.00	15	65	1.90	4.00	0.20	2	0.015	0.025	258005 0080	55,50
2.00	2.00	20	65	1.90	4.00	0.20	2	0.015	0.025	258005 0081	55,50
2.00	2.00	25	65	1.90	4.00	0.20	2	0.015	0.025	258005 0082	55,50
2.00	2.00	10	65	1.90	4.00	0.50	2	0.015	0.025	258005 0083	55,50
2.00	2.00	15	65	1.90	4.00	0.50	2	0.015	0.025	258005 0085	55,50
2.00	2.00	20	65	1.90	4.00	0.50	2	0.015	0.025	258005 0086	55,50
3.00	3.00	15	65	2.90	4.00	0.30	2	0.02	0.03	258005 0087	69,–
3.00	3.00	25	75	2.90	4.00	0.30	2	0.02	0.03	258005 0088	69,–
3.00	3.00	10	65	2.90	4.00	0.50	2	0.02	0.03	258005 0089	69,–
3.00	3.00	15	65	2.90	4.00	0.50	2	0.02	0.03	258005 0090	69,–
3.00	3.00	20	65	2.90	4.00	0.50	2	0.02	0.03	258005 0091	69,–
3.00	3.00	25	75	2.90	4.00	0.50	2	0.02	0.03	258005 0092	69,–
3.00	3.00	30	75	2.90	4.00	0.50	2	0.02	0.03	258005 0093	69,–
3.00	3.00	20	65	2.90	6.00	0.50	2	0.02	0.03	258005 0095	89,50
4.00	4.00	15	65	3.90	6.00	0.30	2	0.03	0.04	258005 0094	89,50
4.00	4.00	15	65	3.90	6.00	0.40	2	0.03	0.04	258005 0097	89,50
4.00	4.00	25	75	3.90	6.00	0.40	2	0.03	0.04	258005 0098	89,50
4.00	4.00	20	65	3.90	6.00	0.50	2	0.03	0.04	258005 0099	82,50
4.00	4.00	30	75	3.90	6.00	0.50	2	0.03	0.04	258005 0100	82,50
4.00	4.00	40	90	3.90	6.00	0.50	2	0.03	0.04	258005 0101	85,50
5.00	5.00	20	75	4.90	6.00	0.50	2	0.045	0.06	258005 0102	98,–
5.00	5.00	30	75	4.90	6.00	0.50	2	0.045	0.06	258005 0103	98,–
5.00	5.00	40	90	4.90	6.00	0.50	2	0.045	0.06	258005 0104	98,–
5.00	5.00	50	90	4.90	6.00	0.50	2	0.045	0.06	258005 0105	98,–
6.00	6.00	30	75	5.90	6.00	0.30	2	0.045	0.06	258005 0106	98,–

Continued on next page >>>

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz graphite GRP/CFP/thermoset mm/tooth	Feed fz graphite GRP/CFP/thermoset mm/tooth	art.no.	€
6.00	6.00	30	75	5.90	6.00	0.50	2	0.045	0.06	258005 0107	98,–
6.00	6.00	40	90	5.90	6.00	0.50	2	0.045	0.06	258005 0108	104,–
6.00	6.00	50	90	5.90	6.00	0.50	2	0.045	0.06	258005 0109	104,–
6.00	6.00	60	100	5.90	6.00	0.50	2	0.045	0.06	258005 0110	104,–
6.00	6.00	30	75	5.90	6.00	1.00	2	0.045	0.06	258005 0111	104,–
6.00	6.00	40	90	5.90	6.00	1.00	2	0.045	0.06	258005 0112	104,–
8.00	8.00	30	80	7.80	8.00	0.50	2	0.06	0.08	258005 0113	144,–
8.00	8.00	60	100	7.80	8.00	0.50	2	0.06	0.08	258005 0114	144,–
8.00	8.00	30	80	7.80	8.00	1.00	2	0.06	0.08	258005 0115	144,–
8.00	8.00	60	100	7.80	8.00	1.00	2	0.06	0.08	258005 0116	144,–
10.00	10.00	30	80	9.80	10.00	0.50	2	0.08	0.1	258005 0117	175,–
10.00	10.00	60	100	9.80	10.00	0.50	2	0.08	0.1	258005 0118	175,–
10.00	10.00	30	80	9.80	10.00	1.00	2	0.08	0.1	258005 0119	175,–
10.00	10.00	60	100	9.80	10.00	1.00	2	0.08	0.1	258005 0120	175,–
12.00	12.00	60	100	11.80	12.00	1.00	2	0.1	0.12	258005 0124	240,–

2154

Stahlschlüssel („Key to Steel") pocket book

Useful information on steel

- Materials science, materials testing
- Stahlschlüssel („Key to Steel") extract
- Steel identification systems, dimensions and units
- Mathematics and geometry, tables
- Abbreviations for standards designations / standardisation institutes
- List of material numbers in numerical order



Description	art.no.	€
Stahlschlüssel (Key to Steel) pocket book, plastic cover, 200 pages, DIN A6	**019900** 1015	11,25

0111



...then it's ATORN.

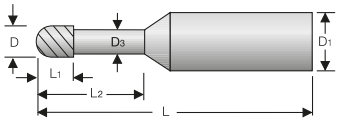
ATORN®
High quality for great performance

SARA DIA+ mini radius milling cutter

VHM | Typ N | 30° | h9 | h5 | DIN 6535 HA | Z 2 | DIA | HSC | Vc/fz | 20-280

- Crystalline diamond coating
- Reliable graphite, GFRP and CFRP machining
- With clearance
- Radius tolerance +/- 0.0003

Layer thickness 10+2 µm



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
																● 95-300			
	Cutting speed Vc m/min.																		



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	● Feed fz graphite GRP/CFP/thermoset mm/tooth	● Feed fz graphite GRP/CFP/thermoset mm/tooth	art.no.	€
0.20	0.20	1	55	0.18	3.00	0.1	2	0.002	0.003	**258006** 0001	82,50
0.20	0.20	1	55	0.18	4.00	0.1	2	0.002	0.003	258006 0002	82,50
0.30	0.30	1	55	0.27	3.00	0.15	2	0.003	0.004	258006 0003	77,50
0.30	0.30	3	55	0.27	3.00	0.15	2	0.003	0.004	258006 0004	77,50
0.30	0.30	5	55	0.27	3.00	0.15	2	0.003	0.004	258006 0005	77,50
0.30	0.30	1	55	0.27	4.00	0.15	2	0.003	0.004	258006 0006	77,50
0.30	0.30	3	55	0.27	4.00	0.15	2	0.003	0.004	258006 0007	77,50
0.30	0.30	5	55	0.27	4.00	0.15	2	0.003	0.004	258006 0008	77,50
0.30	0.30	8	55	0.27	4.00	0.15	2	0.003	0.004	258006 0009	77,50
0.40	0.40	4	55	0.35	3.00	0.2	2	0.003	0.004	258006 0011	70,–
0.40	0.40	6	55	0.35	3.00	0.2	2	0.003	0.004	258006 0012	70,–
0.40	0.40	8	55	0.35	3.00	0.2	2	0.003	0.004	258006 0013	70,–
0.40	0.40	4	55	0.35	4.00	0.2	2	0.003	0.004	258006 0014	70,–
0.40	0.40	6	55	0.35	4.00	0.2	2	0.003	0.004	258006 0015	70,–
0.40	0.40	8	55	0.35	4.00	0.2	2	0.003	0.004	258006 0016	70,–
0.50	0.50	5	55	0.45	3.00	0.25	2	0.003	0.004	258006 0017	56,50
0.50	0.50	10	55	0.45	3.00	0.25	2	0.003	0.004	258006 0018	56,50
0.50	0.50	5	55	0.45	4.00	0.25	2	0.003	0.004	258006 0019	59,50
0.50	0.50	10	55	0.45	4.00	0.25	2	0.003	0.004	258006 0020	59,50
0.60	0.80	6	55	0.56	3.00	0.3	2	0.005	0.008	258006 0021	56,50
0.60	0.80	9	55	0.56	3.00	0.3	2	0.005	0.008	258006 0022	56,50
0.60	0.80	12	55	0.56	3.00	0.3	2	0.005	0.008	258006 0023	56,50
0.60	0.80	6	55	0.56	4.00	0.3	2	0.005	0.008	258006 0024	59,50
0.60	0.80	9	55	0.56	4.00	0.3	2	0.005	0.008	258006 0025	59,50
0.60	0.80	12	55	0.56	4.00	0.3	2	0.005	0.008	258006 0026	59,50
0.70	0.90	7	55	0.65	3.00	0.35	2	0.005	0.008	258006 0027	56,50
0.70	0.90	14	55	0.65	3.00	0.35	2	0.005	0.008	258006 0028	56,50
0.70	0.90	7	55	0.65	4.00	0.35	2	0.005	0.008	258006 0029	59,50
0.80	1.00	8	55	0.75	3.00	0.4	2	0.005	0.008	258006 0031	56,50
0.80	1.00	12	55	0.75	3.00	0.4	2	0.005	0.008	258006 0032	56,50
0.80	1.00	16	55	0.75	3.00	0.4	2	0.005	0.008	258006 0033	56,50
0.80	1.00	8	55	0.75	4.00	0.4	2	0.005	0.008	258006 0034	59,50
0.80	1.00	12	55	0.75	4.00	0.4	2	0.005	0.008	258006 0035	59,50
0.80	1.00	16	55	0.75	4.00	0.4	2	0.005	0.008	258006 0036	59,50
1.00	1.00	5	55	0.90	3.00	0.5	2	0.01	0.015	258006 0037	56,50
1.00	1.00	10	55	0.90	3.00	0.5	2	0.01	0.015	258006 0038	56,50
1.00	1.00	15	55	0.90	3.00	0.5	2	0.01	0.015	258006 0039	56,50
1.00	1.00	20	55	0.90	3.00	0.5	2	0.01	0.015	258006 0040	56,50
1.00	1.00	25	55	0.90	3.00	0.5	2	0.01	0.015	258006 0041	56,50
1.00	1.00	30	55	0.90	3.00	0.5	2	0.01	0.015	258006 0042	56,50
1.00	1.00	5	55	0.90	4.00	0.5	2	0.01	0.015	258006 0077	59,50
1.00	1.00	10	55	0.90	4.00	0.5	2	0.01	0.015	258006 0078	59,50
1.00	1.00	15	55	0.90	4.00	0.5	2	0.01	0.015	258006 0079	59,50

Continued on next page >>>

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz graphite GRP/CFP/thermoset mm/tooth	Feed fz graphite GRP/CFP/thermoset mm/tooth	art.no.	€
1.00	1.00	20	55	0.90	4.00	0.5	2	0.01	0.015	258006 0080	59,50
1.00	1.00	25	55	0.90	4.00	0.5	2	0.01	0.015	258006 0081	59,50
1.00	1.00	30	55	0.90	4.00	0.5	2	0.01	0.015	258006 0082	59,50
1.20	1.50	5	55	1.10	3.00	0.6	2	0.01	0.015	258006 0044	56,50
1.20	1.50	10	55	1.10	3.00	0.6	2	0.01	0.015	258006 0045	56,50
1.20	1.50	15	55	1.10	3.00	0.6	2	0.01	0.015	258006 0046	56,50
1.20	1.50	10	55	1.10	4.00	0.6	2	0.01	0.015	258006 0084	59,50
1.20	1.50	15	55	1.10	4.00	0.6	2	0.01	0.015	258006 0085	59,50
1.50	2.00	5	55	1.40	3.00	0.75	2	0.012	0.02	258006 0047	56,50
1.50	2.00	10	55	1.40	3.00	0.75	2	0.012	0.02	258006 0048	56,50
1.50	2.00	15	55	1.40	3.00	0.75	2	0.012	0.02	258006 0049	56,50
1.50	2.00	20	55	1.40	3.00	0.75	2	0.012	0.02	258006 0050	56,50
1.50	2.00	25	55	1.40	3.00	0.75	2	0.012	0.02	258006 0051	56,50
1.50	2.00	15	55	1.40	6.00	0.75	2	0.012	0.02	258006 0052	89,50
1.50	2.00	5	55	1.40	4.00	0.75	2	0.012	0.02	258006 0086	59,50
1.50	2.00	10	55	1.40	4.00	0.75	2	0.012	0.02	258006 0087	59,50
1.50	2.00	15	55	1.40	4.00	0.75	2	0.012	0.02	258006 0088	59,50
1.50	2.00	20	55	1.40	4.00	0.75	2	0.012	0.02	258006 0089	59,50
1.50	2.00	25	55	1.40	4.00	0.75	2	0.012	0.02	258006 0090	59,50
2.00	2.00	10	55	1.90	3.00	1	2	0.015	0.025	258006 0055	56,50
2.00	2.00	15	55	1.90	3.00	1	2	0.015	0.025	258006 0056	56,50
2.00	2.00	20	55	1.90	3.00	1	2	0.015	0.025	258006 0057	56,50
2.00	2.00	25	65	1.90	3.00	1	2	0.015	0.025	258006 0058	56,50
2.00	2.00	30	65	1.90	3.00	1	2	0.015	0.025	258006 0059	56,50
2.00	2.00	20	65	2.40	6.00	1.25	2	0.015	0.025	258006 0061	89,50
2.00	2.00	10	55	1.90	4.00	1	2	0.015	0.025	258006 0093	59,50
2.00	2.00	15	55	1.90	4.00	1	2	0.015	0.025	258006 0094	59,50
2.00	2.00	20	55	1.90	4.00	1	2	0.015	0.025	258006 0095	59,50
2.00	2.00	25	65	1.90	4.00	1	2	0.015	0.025	258006 0096	59,50
2.00	2.00	30	65	1.90	4.00	1	2	0.015	0.025	258006 0097	59,50
3.00	3.00	10	65	2.90	4.00	1.5	2	0.02	0.03	258006 0063	68,–
3.00	3.00	15	65	2.90	4.00	1.5	2	0.02	0.03	258006 0064	68,–
3.00	3.00	20	65	2.90	4.00	1.5	2	0.02	0.03	258006 0065	68,–
3.00	3.00	25	75	2.90	4.00	1.5	2	0.02	0.03	258006 0066	68,–
3.00	3.00	30	75	2.90	4.00	1.5	2	0.02	0.03	258006 0067	68,–
3.00	3.00	20	65	2.90	6.00	1.5	2	0.02	0.03	258006 0068	89,50
4.00	4.00	20	65	3.90	6.00	2	2	0.03	0.04	258006 0070	98,–
4.00	4.00	30	75	3.90	6.00	2	2	0.03	0.04	258006 0071	99,–
4.00	4.00	40	90	3.90	6.00	2	2	0.03	0.04	258006 0072	102,–
5.00	5.00	20	65	4.90	6.00	2.5	2	0.045	0.06	258006 0073	99,–
5.00	5.00	30	75	4.90	6.00	2.5	2	0.045	0.06	258006 0074	102,–
5.00	5.00	40	90	4.90	6.00	2.5	2	0.045	0.06	258006 0075	102,–
5.00	5.00	50	90	4.90	6.00	2.5	2	0.045	0.06	258006 0076	102,–
6.00	6.00	30	75	5.90	6.00	3	2	0.045	0.06	258006 0098	103,–
6.00	6.00	40	90	5.90	6.00	3	2	0.045	0.06	258006 0099	108,–
6.00	6.00	50	90	5.90	6.00	3	2	0.045	0.06	258006 0100	108,–
6.00	6.00	60	100	5.90	6.00	3	2	0.045	0.06	258006 0101	108,–
8.00	8.00	30	80	7.80	8.00	4	2	0.06	0.08	258006 0102	146,–
8.00	8.00	60	100	7.80	8.00	4	2	0.06	0.08	258006 0103	149,–
10.00	10.00	30	80	9.80	10.00	5	2	0.08	0.1	258006 0104	175,–
10.00	10.00	60	100	9.80	10.00	5	2	0.08	0.1	258006 0105	175,–
12.00	12.00	30	83	11.80	12.00	6	2	0.1	0.12	258006 0106	215,–
12.00	12.00	60	100	11.80	12.00	6	2	0.1	0.12	258006 0107	240,–

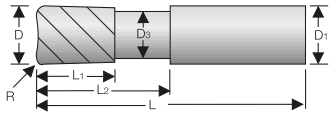
2154

SARA® DIA+ torus cutter

VHM | Typ N | 30° | h9 | h5 | DIN 6535 HA | Z 4 | DIA | HSC | Vc/fz | 20-281

- Crystalline diamond coating
- Reliable graphite, GFRP and CFRP machining
- With clearance

Layer thickness 6+2 µm



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
																● 95-300			
	Cutting speed Vc m/min.																		

Short



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	● Feed fz graphite GRP/CFP/thermoset mm/tooth	● Feed fz graphite GRP/CFP/thermoset mm/tooth	art.no.	€
3.00	6.00	14	50	2.70	3.00	0.3	4	0.02	0.03	**258013** 0001	52,–
3.00	6.00	14	50	2.70	3.00	0.5	4	0.02	0.03	258013 0002	52,–
4.00	8.00	16	50	3.70	4.00	0.4	4	0.03	0.04	258013 0004	55,50
4.00	8.00	16	50	3.70	4.00	0.5	4	0.03	0.04	258013 0005	55,50
4.00	8.00	16	50	3.70	4.00	1	4	0.03	0.04	258013 0006	55,50
5.00	10.00	18	54	4.60	5.00	0.5	4	0.045	0.06	258013 0007	64,50
6.00	13.00	21	57	5.50	6.00	0.5	4	0.045	0.06	258013 0009	77,50
8.00	15.00	27	63	7.40	8.00	0.5	4	0.06	0.08	258013 0012	107,–
8.00	15.00	27	63	7.40	8.00	1	4	0.06	0.08	258013 0013	107,–
10.00	18.00	32	72	9.20	10.00	0.5	4	0.08	0.1	258013 0016	135,–
10.00	18.00	32	72	9.20	10.00	1	4	0.08	0.1	258013 0017	135,–
12.00	26.00	38	83	11.00	12.00	0.5	4	0.1	0.12	258013 0020	157,–

2154



Long

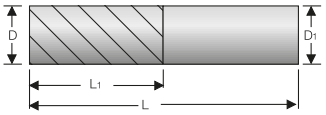
D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	● Feed fz graphite GRP/CFP/thermoset mm/tooth	● Feed fz graphite GRP/CFP/thermoset mm/tooth	art.no.	€
3.00	6.00	32	80	2.70	3.00	0.3	4	0.020	0.030	**258014** 0001	59,–
3.00	6.00	32	80	2.70	3.00	0.5	4	0.020	0.030	258014 0002	59,–
4.00	8.00	36	80	3.70	4.00	0.5	4	0.030	0.040	258014 0005	67,–
6.00	13.00	44	90	5.50	6.00	0.5	4	0.045	0.055	258014 0009	89,50
6.00	13.00	44	90	5.50	6.00	1	4	0.045	0.055	258014 0010	89,50
8.00	15.00	54	100	7.40	8.00	0.5	4	0.060	0.070	258014 0012	124,–
10.00	18.00	60	100	9.20	10.00	0.5	4	0.080	0.100	258014 0016	157,–
10.00	18.00	60	100	9.20	10.00	1	4	0.080	0.100	258014 0017	157,–
10.00	18.00	60	100	9.20	10.00	1.5	4	0.080	0.100	258014 0018	157,–
10.00	18.00	60	100	9.20	10.00	2	4	0.080	0.100	258014 0019	157,–
12.00	26.00	75	120	11.00	12.00	0.5	4	0.100	0.120	258014 0020	191,–
12.00	26.00	75	120	11.00	12.00	1	4	0.100	0.120	258014 0021	191,–
12.00	26.00	75	120	11.00	12.00	1.5	4	0.100	0.120	258014 0022	191,–
12.00	26.00	75	120	11.00	12.00	2	4	0.100	0.120	258014 0023	191,–
16.00	32.00	85	120	15.00	16.00	0.5	4	0.200	0.250	258014 0024	340,–
16.00	32.00	85	120	15.00	16.00	1	4	0.200	0.250	258014 0025	340,–
16.00	32.00	85	120	15.00	16.00	1.5	4	0.200	0.250	258014 0026	340,–
16.00	32.00	85	120	15.00	16.00	2	4	0.200	0.250	258014 0027	340,–

2154

SARA® Contour cutter for GFRP and CFRP

VHM | Typ N | h5 | Vc/fz | 20-281

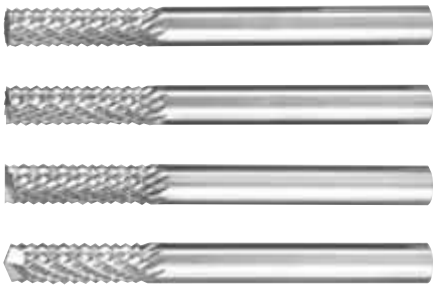
- Various versions
- Type A - smooth front face
- Type B - rotary cutter front face
- Type C - end mill front face
- Type D - drill point



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
															● 200-230			
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



● Feed fz graphite GRP/CFP/thermoset mm/tooth

D mm	L1 mm	D1 mm	L mm	Type A art.no.	€	Type B art.no.	€	Type C art.no.	€	Type D art.no.	€
1.6	5	3	38	1000-1500	**250050** 0001	7,90	**250051** 0001	9,40	**250052** 0001	9,40	**250053** 0001	9,95
2.4	9.5	3	38	1100-1800	250050 0002	8,40	250051 0002	9,40	250052 0002	10,15	250053 0002	10,70
3.0	12	3	38	1100-1800	250050 0003	8,–	250051 0003	8,95	250052 0003	9,65	250053 0003	10,25
4.0	16	4	50	900-1700	250050 0004	13,10	250051 0004	14,60	250052 0004	15,20	250053 0004	15,30
4.0	16	6	50	900-1700	250050 0005	14,30	250051 0005	16,–	250052 0005	17,–	250053 0005	17,70
6.0	19	6	50	900-1700	250050 0007	14,30	250051 0007	16,–	250052 0007	17,–	250053 0007	17,70
6.0	19	6	63	900-1700	250050 0008	14,30	250051 0008	16,–	250052 0008	17,–	250053 0008	17,70
6.0	25	6	75	900-1700	250050 0009	17,70	250051 0009	19,30	250052 0009	20,20	250053 0009	20,80
8.0	25	8	63	900-1700	250050 0006	29,70	250051 0006	31,60	250052 0006	32,90	250053 0006	33,80
10.0	25	10	75	500-1300	250050 0010	37,–	250051 0010	40,20	250052 0010	41,70	250053 0010	43,30
12.0	25	12	75	500-1300	250050 0011	51,–	250051 0011	56,–	250052 0011	58,50	250053 0011	61,50
					2109		2109		2109		2109	

Safety in the workplace

Please protect your eyes, ears and respiratory system!

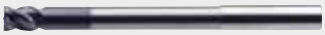
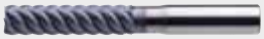


ATORN® RockTec complete range for materials up to 52/65 HRc

INFO

- For all instances of machining and usage, you now get a complete ATORN range of solid carbide end milling cutters, solid carbide torus milling cutters and solid carbide radius milling cutters.
- **Diameter range from Ø 0.1 – Ø 20 mm**
- The different geometries are matched to different milling operations.
- **Cutting material: solid carbide ultra-micrograin of high hardness and extreme toughness**

Over 660 innovative solid carbide milling tools

	Ø-range mm	RockTec 52	Page	RockTec 65	Page
Solid carbide miniature end milling cutters	Ø 0.1 - 0.9		20-101		20-101
Solid carbide miniature end milling cutters, long neck	Ø 0.2 - 3.0		20-102		20-103
Solid carbide miniature torus milling cutters, long neck	Ø 0.2 - 3.0		20-110		20-111
Solid carbide miniature radius milling cutters	Ø 0.2 - 0.9		20-117		20-117
Solid carbide miniature radius milling cutters, long neck	Ø 0.2 - 3.0		20-118		20-119
Solid carbide end milling cutters	Ø 3.0 - 20.0		20-104		20-124
Solid carbide end milling cutter with short cutting edge, long design	Ø 3.0 - 20.0		20-105		20-106
Solid carbide end milling cutter with short cutting edge, extra-long design	Ø 3.0 - 20.0		20-105		20-106
Solid carbide multi-flute milling cutters, standard design	Ø 3.0 - 20.0		20-108		20-109
Solid carbide multi-flute milling cutters, long design	Ø 3.0 - 20.0		20-108		20-109
Solid carbide torus milling cutters	Ø 3.0 - 20.0		20-112		20-113
Solid carbide torus milling cutter with short cutting edge, standard design	Ø 3.0 - 16.0		20-114		20-115
Solid carbide torus milling cutter with short cutting edge, long design	Ø 3.0 - 16.0		20-114		20-116
Solid carbide torus milling cutter with short cutting edge, extra-long design	Ø 3.0 - 16.0		20-115		20-116
Solid carbide radius milling cutters, short, Z 2	Ø 2.0 - 20.0		20-120		20-121
Solid carbide radius milling cutters, long, Z 2	Ø 2.0 - 20.0		20-120		20-121
Solid carbide radius milling cutters, extra-long, Z 2	Ø 2.0 - 20.0		20-120		20-121
Solid carbide radius milling cutters, short, Z 4	Ø 3.0 - 20.0		20-122		20-123
Solid carbide radius milling cutters, long, Z 4	Ø 3.0 - 20.0		20-122		20-123

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	RockTec 52	●	●	●	●	●	○	●	●	●	●	●					●		
	RockTec 65			○						○	○	○					●	●	●

ATORN® RockTec Highest efficiency through new coatings

INFO

ATORN milling tools offer the best conditions for the efficient machining of materials up to 65 HRc.
Through a special cutting-edge treatment, as well as the new coatings, you achieve the highest machining performance, precision and durability.

RockTec 52

Cutting material:	Ultra-superfine grain
Grain size:	0.005 mm
ISO quality:	K 10/K 40
Coating:	AlTiN (monolayer PVD)
Layer thickness:	2.5 ~ 3.5 µm
Micro-hardness:	(HV 0.05) 3,300
Application temperature:	≥ 900 °C
Friction coefficient:	0.25

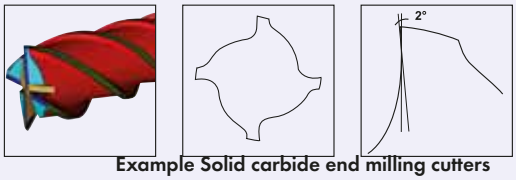


RockTec 65

Cutting material:	Ultra-superfine grain
Grain size:	0.005 mm
ISO quality:	K 10/K 40
Coating:	TiSi-based (multilayer PVD)
Layer thickness:	2.5 ~ 3.5 µm
Micro-hardness:	(HV 0.05) 3,600
Application temperature:	≥ 1,200 °C
Friction coefficient:	0.3



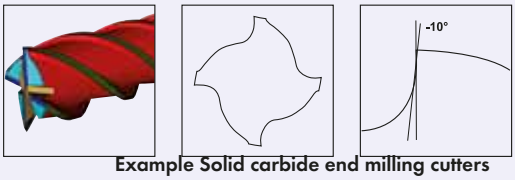
Tools up to 52 HRc



Example Solid carbide end milling cutters

Helix angle:	40°
Rake angle on the external Ø:	2°
Core diameter:	65%

Tools up to 65 HRc



Example Solid carbide end milling cutters

Helix angle:	40°
Rake angle on the external Ø:	-10°
Core diameter:	65%

ATORN®

Advantages of hard machining

Save on costs – boost efficiency with hard machining

HSC HPC

High flexibility

- Hard machining can replace grinding and EDM in many cases

Boost quality

- No heat warping due to subsequent tempering
- High-quality surface finish

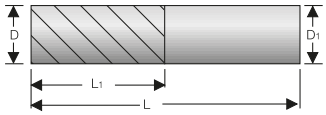
Time savings

- Workpiece can be machined in one clamping procedure
- Fewer work-steps thanks to high machining volume

Discover maximum quality in all areas of tool and mould manufacture.

ATORN® RockTec 52 mini end milling cutter

VHM | 40° | h6 | DIN 6535 HA | Z 2 | AlTiN | Vc/fz | 20-244



- Short, stable design for machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 0.9 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●	●	●	○	●	●	●	●	●					●		
		100-120	80-100	60-80	50-90	50-90	50-70	50-90	50-90	50-90	50-90	50-80					30-60		
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

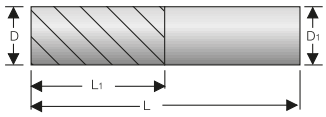
D mm	L1 mm	L mm	D1 mm	art.no.	€
0.1	0.2	40	4.0	**257001** 0001	19,60
0.2	0.4	40	4.0	257001 0002	19,60
0.3	0.6	40	4.0	257001 0003	19,60
0.4	0.8	40	4.0	257001 0004	19,60
0.5	1.0	40	4.0	257001 0005	19,60
0.6	1.2	40	4.0	257001 0006	19,60
0.7	1.4	40	4.0	257001 0007	19,60
0.8	1.6	40	4.0	257001 0008	19,60
0.9	1.8	40	4.0	257001 0009	19,60

2146



ATORN® RockTec 65 mini end milling cutter

VHM | 40° | h6 | DIN 6535 HA | Z 2 | TiSiN | Vc/fz | 20-282



- Short, stable design for machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 0.9 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -5°~-7°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
				○						○	○	○					●	●	●
				60-100						15-80	15-80	13-65					50-90	50-90	40-80
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

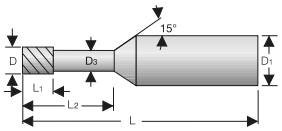
D mm	L1 mm	L mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
0.1	0.2	40	4.0	0.002	**257002** 0001	24,40
0.2	0.4	40	4.0	0.002	257002 0002	24,40
0.3	0.6	40	4.0	0.002	257002 0003	24,40
0.4	0.8	40	4.0	0.002	257002 0004	24,40
0.5	1.0	40	4.0	0.002	257002 0005	24,40
0.6	1.2	40	4.0	0.002	257002 0006	24,40
0.7	1.4	40	4.0	0.002	257002 0007	24,40
0.8	1.6	40	4.0	0.002	257002 0008	24,40
0.9	1.8	40	4.0	0.006	257002 0009	24,40

2146



ATORN® RockTec 52 mini end milling cutter

VHM | 40° | h6 | DIN 6535 HA | Z 2 | AlTiN | Vc/fz | 20-244



- Long-necked version for machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 100-120	● 80-100	● 60-80	● 50-90	● 50-90	○ 50-70	● 50-90	● 50-90	● 50-90	● 50-90	● 50-80					● 30-60		
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
0.2	0.3	0.5	50	0.16	4.0	0.005	**257009** 0001	33,30
0.2	0.3	1.0	50	0.16	4.0	0.005	257009 0002	33,30
0.2	0.3	1.5	50	0.16	4.0	0.009	257009 0003	33,30
0.3	0.4	1.0	50	0.26	4.0	0.009	257009 0004	33,30
0.3	0.4	2.0	50	0.26	4.0	0.009	257009 0005	33,30
0.3	0.4	3.0	50	0.26	4.0	0.009	257009 0006	33,30
0.4	0.6	2.0	50	0.37	4.0	0.009	257009 0007	33,30
0.4	0.6	3.0	50	0.37	4.0	0.009	257009 0008	33,30
0.4	0.6	4.0	50	0.37	4.0	0.009	257009 0009	33,30
0.4	0.6	5.0	50	0.37	4.0	0.009	257009 0010	33,30
0.5	0.7	2.0	50	0.45	4.0	0.009	257009 0011	32,90
0.5	0.7	4.0	50	0.45	4.0	0.009	257009 0012	32,90
0.5	0.7	6.0	50	0.45	4.0	0.009	257009 0013	32,90
0.5	0.7	8.0	50	0.45	4.0	0.009	257009 0014	32,90
0.6	0.9	2.0	50	0.55	4.0	0.009	257009 0015	31,30
0.6	0.9	4.0	50	0.55	4.0	0.009	257009 0016	31,30
0.6	0.9	6.0	50	0.55	4.0	0.009	257009 0017	31,30
0.6	0.9	8.0	50	0.55	4.0	0.009	257009 0018	31,40
0.6	0.9	10.0	50	0.55	4.0	0.009	257009 0019	31,60
0.8	1.2	4.0	50	0.75	4.0	0.009	257009 0020	31,30
0.8	1.2	6.0	50	0.75	4.0	0.013	257009 0021	31,30
0.8	1.2	8.0	50	0.75	4.0	0.013	257009 0022	31,40
0.8	1.2	10.0	50	0.75	4.0	0.013	257009 0023	31,60
0.8	1.2	12.0	50	0.75	4.0	0.013	257009 0024	31,70
1.0	1.5	6.0	50	0.95	4.0	0.013	257009 0025	23,40
1.0	1.5	8.0	50	0.95	4.0	0.013	257009 0026	23,40
1.0	1.5	10.0	50	0.95	4.0	0.013	257009 0027	24,–

2146

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
1.0	1.5	12.0	50	0.95	4.0	0.013	257009 0028	24,30
1.0	1.5	14.0	50	0.95	4.0	0.013	257009 0029	24,90
1.0	1.5	16.0	50	0.95	4.0	0.013	257009 0030	24,90
1.2	1.8	6.0	50	1.15	4.0	0.013	257009 0031	22,90
1.2	1.8	10.0	50	1.15	4.0	0.013	257009 0032	23,20
1.5	2.3	8.0	50	1.45	4.0	0.020	257009 0033	22,90
1.5	2.3	12.0	50	1.45	4.0	0.020	257009 0034	23,20
1.5	2.3	16.0	50	1.45	4.0	0.020	257009 0035	23,70
1.5	2.3	20.0	60	1.45	4.0	0.020	257009 0036	25,20
2.0	3.0	6.0	50	1.95	4.0	0.020	257009 0037	22,60
2.0	3.0	8.0	50	1.95	4.0	0.020	257009 0038	22,60
2.0	3.0	12.0	50	1.95	4.0	0.027	257009 0039	23,20
2.0	3.0	16.0	50	1.95	4.0	0.027	257009 0040	23,70
2.0	3.0	20.0	60	1.95	4.0	0.027	257009 0041	26,50
2.0	3.0	25.0	75	1.95	4.0	0.027	257009 0042	27,80
2.5	3.7	8.0	50	2.40	4.0	0.027	257009 0043	22,60
2.5	3.7	10.0	50	2.40	4.0	0.027	257009 0044	22,60
2.5	3.7	12.0	50	2.40	4.0	0.027	257009 0045	22,60
2.5	3.7	16.0	50	2.40	4.0	0.027	257009 0046	23,70
2.5	3.7	20.0	60	2.40	4.0	0.027	257009 0047	26,50
2.5	3.7	25.0	75	2.40	4.0	0.027	257009 0048	28,50
3.0	4.5	8.0	50	2.85	6.0	0.027	257009 0049	33,50
3.0	4.5	10.0	50	2.85	6.0	0.027	257009 0050	33,50
3.0	4.5	12.0	50	2.85	6.0	0.027	257009 0051	33,50
3.0	4.5	16.0	60	2.85	6.0	0.027	257009 0052	33,50
3.0	4.5	20.0	60	2.85	6.0	0.027	257009 0053	33,50
3.0	4.5	25.0	75	2.85	6.0	0.027	257009 0054	35,60

2146

VAN HOORN CARBIDE



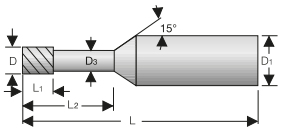
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The perfect shank design
for every application!



ATORN® RockTec 65 mini end milling cutter

VHM | 40° | h6 | DIN 6535 HA | Z 2 | TiSiN | 20-282



- Long-necked version for machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -5°~-7°
- With clearance

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
				○ 60-100						○ 15-80	○ 15-80	○ 13-65					● 50-90	● 50-90	● 40-80
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
0.2	0.3	0.5	50	0.16	4.0	0.002	**257010** 0001	39,10
0.2	0.3	1.0	50	0.16	4.0	0.002	257010 0002	39,10
0.2	0.3	1.5	50	0.16	4.0	0.002	257010 0003	39,10
0.3	0.4	1.0	50	0.26	4.0	0.002	257010 0004	39,10
0.3	0.4	2.0	50	0.26	4.0	0.002	257010 0005	39,10
0.3	0.4	3.0	50	0.26	4.0	0.002	257010 0006	39,10
0.4	0.6	2.0	50	0.37	4.0	0.002	257010 0007	39,10
0.4	0.6	3.0	50	0.37	4.0	0.002	257010 0008	39,10
0.4	0.6	4.0	50	0.37	4.0	0.002	257010 0009	39,10
0.4	0.6	5.0	50	0.37	4.0	0.002	257010 0010	39,10
0.5	0.7	2.0	50	0.45	4.0	0.002	257010 0011	37,70
0.5	0.7	4.0	50	0.45	4.0	0.002	257010 0012	37,70
0.5	0.7	6.0	50	0.45	4.0	0.002	257010 0013	37,70
0.5	0.7	8.0	50	0.45	4.0	0.002	257010 0014	37,70
0.6	0.9	2.0	50	0.55	4.0	0.002	257010 0015	36,–
0.6	0.9	4.0	50	0.55	4.0	0.002	257010 0016	36,–
0.6	0.9	6.0	50	0.55	4.0	0.002	257010 0017	36,–
0.6	0.9	8.0	50	0.55	4.0	0.002	257010 0018	36,20
0.6	0.9	10.0	50	0.55	4.0	0.002	257010 0019	36,30
0.8	1.2	4.0	50	0.75	4.0	0.002	257010 0020	36,–
0.8	1.2	6.0	50	0.75	4.0	0.002	257010 0021	36,–
0.8	1.2	8.0	50	0.75	4.0	0.002	257010 0022	36,20
0.8	1.2	10.0	50	0.75	4.0	0.002	257010 0023	36,30
0.8	1.2	12.0	50	0.75	4.0	0.002	257010 0024	36,40
1.0	1.5	6.0	50	0.95	4.0	0.006	257010 0025	27,–
1.0	1.5	8.0	50	0.95	4.0	0.006	257010 0026	27,–
1.0	1.5	10.0	50	0.95	4.0	0.006	257010 0027	27,60

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D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
1.0	1.5	12.0	50	0.95	4.0	0.006	257010 0028	27,90
1.0	1.5	14.0	50	0.95	4.0	0.006	257010 0029	28,60
1.0	1.5	16.0	50	0.95	4.0	0.006	257010 0030	28,60
1.2	1.8	6.0	50	1.15	4.0	0.006	257010 0031	26,40
1.2	1.8	10.0	50	1.15	4.0	0.006	257010 0032	26,70
1.5	2.3	8.0	50	1.45	4.0	0.006	257010 0033	26,40
1.5	2.3	12.0	50	1.45	4.0	0.006	257010 0034	26,70
1.5	2.3	16.0	50	1.45	4.0	0.006	257010 0035	27,30
1.5	2.3	20.0	60	1.45	4.0	0.006	257010 0036	29,–
2.0	3.0	6.0	50	1.95	4.0	0.012	257010 0037	25,90
2.0	3.0	8.0	50	1.95	4.0	0.012	257010 0038	25,90
2.0	3.0	12.0	50	1.95	4.0	0.012	257010 0039	26,70
2.0	3.0	16.0	50	1.95	4.0	0.012	257010 0040	27,30
2.0	3.0	20.0	60	1.95	4.0	0.012	257010 0041	30,50
2.0	3.0	25.0	75	1.95	4.0	0.012	257010 0042	32,–
2.5	3.7	8.0	50	2.40	4.0	0.019	257010 0043	25,90
2.5	3.7	10.0	50	2.40	4.0	0.019	257010 0044	25,90
2.5	3.7	12.0	50	2.40	4.0	0.019	257010 0045	25,90
2.5	3.7	16.0	50	2.40	4.0	0.019	257010 0046	27,30
2.5	3.7	20.0	60	2.40	4.0	0.019	257010 0047	30,50
2.5	3.7	25.0	75	2.40	4.0	0.019	257010 0048	32,80
3.0	4.5	8.0	50	2.85	6.0	0.019	257010 0049	38,50
3.0	4.5	10.0	50	2.85	6.0	0.019	257010 0050	38,50
3.0	4.5	12.0	50	2.85	6.0	0.019	257010 0051	38,50
3.0	4.5	16.0	60	2.85	6.0	0.019	257010 0052	38,50
3.0	4.5	20.0	60	2.85	6.0	0.019	257010 0053	38,50
3.0	4.5	25.0	75	2.85	6.0	0.019	257010 0054	41,–

2146

Cutting data calculator

For easy calculation of cutting speeds, rotation speeds, feed rates, feed speeds, machine times, chipping volumes and performance

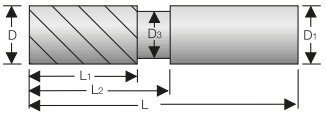


Description	art.no.	€
180 x 78 mm, plastic, with reading slider	**019900** 1006	5,95

0111

ATORN® RockTec 52 end milling cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | AlTiN | Vc/fz | 20-252



- **With clearance**
- For machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 3.0 – 20.0 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 140-160	● 130-150	● 120-140	● 100-120	● 100-120	○ 80-100	● 100-120	● 100-120	● 80-100	● 80-100	● 70-90					● 60-80		
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	9	15	50	2.8	6.0	0.02	**257003** 0030	26,50
4.0	12	20	50	3.7	6.0	0.02	257003 0040	26,50
5.0	15	20	50	4.6	6.0	0.03	257003 0050	26,50
6.0	16	20	50	5.5	6.0	0.03	257003 0060	26,50
8.0	20	30	64	7.4	8.0	0.04	257003 0080	41,90
10.0	22	32	70	9.2	10.0	0.05	257003 0100	56,50
12.0	25	37	75	11.0	12.0	0.06	257003 0120	64,50
16.0	32	46	90	15.0	16.0	0.08	257003 0160	113,–
20.0	38	58	100	19.0	20.0	0.1	257003 0200	155,–

2146



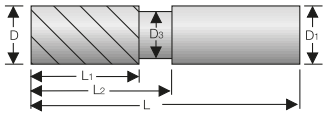
Set, version HA

Contents	art.no.	€
Set, solid carbide 40°, Ø 6/8/10/12 mm, 4 cutting edges, RockTec 52	**257003** 0001	189,–

2146

ATORN® RockTec 65 end milling cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | TiSiN | Vc/fz | 20-282



- **With clearance**
- For machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 3.0 – 20.0 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -6°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
				○ 160-200						○ 250-300	○ 250-300	○ 250-300					● 120-140	● 140-140	● 80-120
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	● Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	9	15	50	2.8	6.0	0.015	**257004** 0030	28,90
4.0	12	20	50	3.7	6.0	0.02	257004 0040	28,90
5.0	15	20	50	4.6	6.0	0.025	257004 0050	28,90
6.0	16	20	50	5.5	6.0	0.038	257004 0060	28,90
8.0	20	30	64	7.4	8.0	0.05	257004 0080	46,10
10.0	22	32	70	9.2	10.0	0.052	257004 0100	63,–
12.0	25	37	75	11.0	12.0	0.06	257004 0120	77,–
16.0	32	46	90	15.0	16.0	0.07	257004 0160	135,–
20.0	38	58	100	19.0	20.0	0.08	257004 0200	163,–

2146



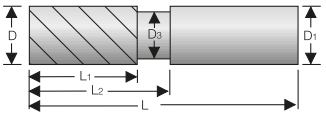
Set, version HA

Contents	art.no.	€
Set, solid carbide 40°, Ø 6/8/10/12 mm, 4 cutting edges, RockTec 65	**257004** 0001	210,–

2146

ATORN® RockTec 52 end milling cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | AlTiN | Vc/fz | 20-252



- **With clearance**
- For machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 3.0 – 20.0 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
257005....	120-140	110-130	80-110	90-110	90-110	70-90	90-110	90-110	70-90	70-90	60-80					50-70		
257007....	100-120	90-110	80-100	80-100	80-100	60-80	80-100	80-100	70-90	60-80	50-70					40-60		
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	5	30	75	2.8	6.0	0.02	**257005** 0030	37,60
4.0	8	32	75	3.7	6.0	0.02	257005 0040	37,60
5.0	9	32	75	4.6	6.0	0.03	257005 0050	37,60
6.0	10	40	75	5.5	6.0	0.03	257005 0060	37,60
8.0	12	40	75	7.4	8.0	0.04	257005 0080	48,30
10.0	14	60	100	9.2	10.0	0.05	257005 0100	74,–
12.0	16	60	100	11.0	12.0	0.06	257005 0120	86,–
16.0	22	85	125	15.0	16.0	0.08	257005 0160	129,–
20.0	26	85	125	19.0	20.0	0.1	257005 0200	245,–

2146



Extra-long

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	5	60	100	2.8	6.0	0.02	**257007** 0030	44,10
4.0	8	60	100	3.7	6.0	0.03	257007 0040	44,10
5.0	9	60	100	4.6	6.0	0.04	257007 0050	44,10
6.0	10	60	100	5.5	6.0	0.055	257007 0060	44,10
8.0	12	60	100	7.4	8.0	0.08	257007 0080	65,–
10.0	14	85	125	9.2	10.0	0.09	257007 0100	95,50
12.0	16	110	150	11.0	12.0	0.1	257007 0120	111,–
16.0	22	110	150	15.0	16.0	0.11	257007 0160	167,–
20.0	26	110	150	19.0	20.0	0.12	257007 0200	320,–

2146



VAN HOORN CARBIDE

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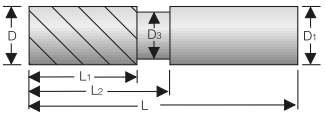
Van Hoorn Carbide is a specialist in solid carbide milling tools which offers the highest quality standards, state-of-the-art technologies, technical knowledge, experience and great service.



The perfect shank design for every application!

ATORN® RockTec 65 end milling cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | TiSiN | Vc/fz | 20-282



- **With clearance**
- For machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 3.0 – 20.0 mm = 0/– 0.020 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -6°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	257006....			○ 140-160						○ 200-260	○ 200-260	○ 200-260					● 100-130	● 100-130	● 70-100
	257008....			○ 120-140						○ 130-170	○ 130-170	○ 130-170					● 80-110	● 80-110	● 50-80
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	5	30	75	2.8	6.0	0.015	**257006** 0030	42,60
4.0	8	32	75	3.7	6.0	0.02	257006 0040	42,60
5.0	9	32	75	4.6	6.0	0.025	257006 0050	42,60
6.0	10	40	75	5.5	6.0	0.035	257006 0060	42,60
8.0	12	40	75	7.4	8.0	0.05	257006 0080	54,50
10.0	14	60	100	9.2	10.0	0.055	257006 0100	84,–
12.0	16	60	100	11.0	12.0	0.06	257006 0120	97,50
16.0	22	85	125	15.0	16.0	0.07	257006 0160	146,–
20.0	26	85	125	19.0	20.0	0.08	257006 0200	275,–

2146

Extra-long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	5	60	100	2.8	6.0	0.015	**257008** 0030	46,50
4.0	8	60	100	3.7	6.0	0.02	257008 0040	46,50
5.0	9	60	100	4.6	6.0	0.025	257008 0050	46,50
6.0	10	60	100	5.5	6.0	0.04	257008 0060	45,70
8.0	12	60	100	7.4	8.0	0.05	257008 0080	66,50
10.0	14	85	125	9.2	10.0	0.055	257008 0100	101,–
12.0	16	110	150	11.0	12.0	0.06	257008 0120	134,–
16.0	22	110	150	15.0	16.0	0.07	257008 0160	200,–
20.0	26	110	150	19.0	20.0	0.08	257008 0200	340,–

2146



...then it's ATORN.

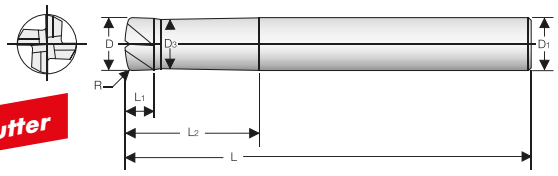
ATORN®
High quality for great performance

ATORN® Solid carbide high feed-rate end milling cutter *RockTec 65*

VHM | e8 | h6 | DIN 6535 HA | Z 4 | Z 6 | TiSiN | Vc/fz | 20-283

- 4-6 cutting edges
- **For machining materials up to 65 HRc**
- **For copy and line milling**
- **Very high machining volumes are achieved with a special milling strategy**
- Solid carbide ultra-fine grain cutting material

High feed-rate milling cutter



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
				● 140-160													● 140-160	● 100-120	● 80-120
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.





D mm	L1 mm	L2 mm	L mm	D1 mm	R mm	D3 mm	Z	● Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
4.0	1.5	8	57	6	0.4	3.7	4	0.028	**257040** 0001	69,50
4.0	1.5	15	57	6	0.4	3.7	4	0.028	257040 0002	69,50
5.0	2.0	10	57	6	0.5	4.6	4	0.035	257040 0003	69,50
5.0	2.0	21	57	6	0.5	4.6	4	0.035	257040 0004	69,50
6.0	2.5	12	57	6	0.6	5.5	4	0.045	257040 0005	69,50
6.0	2.5	26	57	6	0.6	5.5	4	0.045	257040 0006	69,50
8.0	3.0	16	63	8	0.8	7.4	6	0.060	257040 0007	100,–
8.0	3.0	31	63	8	0.8	7.4	6	0.060	257040 0008	100,–
10.0	3.5	20	72	10	1.0	9.2	6	0.070	257040 0009	149,–
10.0	3.5	36	72	10	1.0	9.2	6	0.070	257040 0010	149,–
12.0	4.0	24	83	12	1.2	11.0	6	0.080	257040 0011	185,–
12.0	4.0	41	83	12	1.2	11.0	6	0.080	257040 0012	185,–

2146

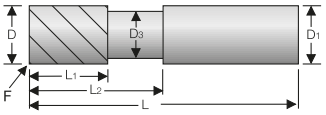


... maximum material removal rate

ATORN®
High quality for great performance

ATORN® RockTec 52 multi-flute milling cutter

VHM | 50° | e8 | h6 | DIN 6535 HA | Z 6 | Z 8+ | AlTiN | Vc/fz | 20-252



- For machining materials **up to 52 HRc**
- Edge protection chamfer
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●	●	●	○	●	●	●	●	●					●		
		140-160	130-150	120-140	100-120	100-120	80-100	100-120	100-120	80-100	80-100	70-90					60-80		
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

Standard



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	8	20	50	2.8	6.0	0.03	6	0.02	**257011** 0030	23,80
4.0	11	20	50	3.7	6.0	0.04	6	0.02	257011 0040	23,80
5.0	13	20	50	4.6	6.0	0.05	6	0.03	257011 0050	22,50
6.0	15	20	50	5.5	6.0	0.06	6	0.03	257011 0060	31,–
8.0	20	30	64	7.4	8.0	0.08	6	0.04	257011 0080	36,80
10.0	22	32	70	9.2	10.0	0.10	6	0.05	257011 0100	57,–
12.0	25	37	75	11.0	12.0	0.12	6	0.06	257011 0120	75,–
16.0	30	46	90	15.0	16.0	0.16	8	0.08	257011 0160	134,–
20.0	38	58	100	19.0	20.0	0.20	8	0.1	257011 0200	179,–

2146

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	19	30	75	2.8	6.0	0.03	6	0.02	**257013** 0030	30,80
4.0	19	32	75	3.7	6.0	0.04	6	0.02	257013 0040	27,90
5.0	19	32	75	4.6	6.0	0.05	6	0.03	257013 0050	29,40
6.0	31	40	75	5.5	6.0	0.06	6	0.03	257013 0060	31,20
8.0	31	40	75	7.4	8.0	0.08	6	0.04	257013 0080	40,40
10.0	45	60	100	9.2	10.0	0.10	6	0.06	257013 0100	61,50
12.0	50	60	100	11.0	12.0	0.12	6	0.06	257013 0120	80,–
16.0	57	85	125	15.0	16.0	0.16	8	0.08	257013 0160	149,–
20.0	57	85	125	19.0	20.0	0.20	8	0.1	257013 0200	220,–

2146

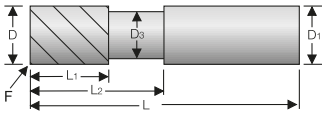
Safety in the workplace

Please protect your eyes, ears and respiratory system!



ATORN® RockTec 65 multi-flute milling cutter

VHM | 50° | e8 | h6 | DIN 6535 HA | Z 6 | Z 8+ | TiSiN | Vc/fz | 20-282



- For machining materials **up to 65 HRc**
- Edge protection chamfer
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -26°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	257012....			○ 160-200						○ 250-300	○ 250-300	○ 250-300					● 120-140	● 140-140	● 80-120
	257014....			○ 140-160						○ 200-260	○ 200-260	○ 200-260					● 100-130	● 100-130	● 70-100
	Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									

Standard



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	8	20	50	2.8	6.0	0.03	6	0.015	**257012** 0030	29,60
4.0	11	20	50	3.7	6.0	0.04	6	0.03	257012 0040	29,60
5.0	13	20	50	4.6	6.0	0.05	6	0.05	257012 0050	27,50
6.0	15	20	50	5.5	6.0	0.06	6	0.05	257012 0060	38,40
8.0	20	30	64	7.4	8.0	0.08	6	0.05	257012 0080	45,50
10.0	22	32	70	9.2	10.0	0.10	6	0.06	257012 0100	70,50
12.0	25	37	75	11.0	12.0	0.12	6	0.06	257012 0120	93,–
16.0	30	46	90	15.0	16.0	0.16	8	0.07	257012 0160	167,–
20.0	38	58	100	19.0	20.0	0.20	8	0.08	257012 0200	205,–

2146

Long

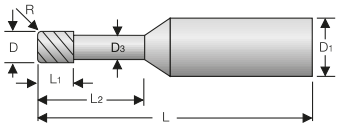


D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F x 45° mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	19	30	75	2.8	6.0	0.03	6	0.015	**257014** 0030	37,–
4.0	19	32	75	3.7	6.0	0.04	6	0.03	257014 0040	33,30
5.0	19	32	75	4.6	6.0	0.05	6	0.05	257014 0050	31,90
6.0	31	40	75	5.5	6.0	0.06	6	0.05	257014 0060	35,30
8.0	31	40	75	7.4	8.0	0.08	6	0.05	257014 0080	42,90
10.0	45	60	100	9.2	10.0	0.10	6	0.06	257014 0100	68,50
12.0	50	60	100	11.0	12.0	0.12	6	0.06	257014 0120	93,50
16.0	57	85	125	15.0	16.0	0.16	8	0.07	257014 0160	174,–
20.0	57	85	125	19.0	20.0	0.20	8	0.08	257014 0200	260,–

2146

ATORN® RockTec 52 mini torus cutter

VHM | 40° | h6 | DIN 6535 HA | Z 2 | AlTiN | Vc/fz | 20-244



- Long-necked version for machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material — ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
● 100-120	● 80-100	● 60-80	● 50-90	● 50-90	○ 50-70	● 50-90	● 50-90	● 50-90	● 50-90	● 50-80					● 30-60		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
0.2	0.3	0.5	50	0.16	4.0	0.02	0.005	**257023** 0001	46,–
0.2	0.3	1.0	50	0.16	4.0	0.02	0.005	257023 0002	46,–
0.2	0.3	1.5	50	0.16	4.0	0.02	0.005	257023 0003	46,–
0.3	0.4	1.0	50	0.26	4.0	0.03	0.005	257023 0004	43,10
0.3	0.4	2.0	50	0.26	4.0	0.03	0.005	257023 0005	43,10
0.3	0.4	3.0	50	0.26	4.0	0.03	0.005	257023 0006	43,10
0.4	0.6	2.0	50	0.37	4.0	0.03	0.0085	257023 0007	40,20
0.4	0.6	3.0	50	0.37	4.0	0.03	0.0085	257023 0008	40,20
0.4	0.6	4.0	50	0.37	4.0	0.03	0.0085	257023 0009	40,20
0.4	0.6	5.0	50	0.37	4.0	0.03	0.0085	257023 0010	40,20
0.5	0.7	2.0	50	0.45	4.0	0.05	0.0085	257023 0011	38,10
0.5	0.7	4.0	50	0.45	4.0	0.05	0.0085	257023 0012	38,10
0.5	0.7	6.0	50	0.45	4.0	0.05	0.0085	257023 0013	38,10
0.5	0.7	8.0	50	0.45	4.0	0.05	0.0085	257023 0014	38,10
0.6	0.9	2.0	50	0.55	4.0	0.05	0.0085	257023 0015	36,40
0.6	0.9	4.0	50	0.55	4.0	0.05	0.0085	257023 0016	36,40
0.6	0.9	6.0	50	0.55	4.0	0.05	0.0085	257023 0017	36,40
0.6	0.9	8.0	50	0.55	4.0	0.05	0.0085	257023 0018	36,60
0.6	0.9	10.0	50	0.55	4.0	0.05	0.0085	257023 0019	36,80
0.8	1.2	4.0	50	0.75	4.0	0.08	0.0085	257023 0020	36,40
0.8	1.2	6.0	50	0.75	4.0	0.08	0.0085	257023 0021	36,40
0.8	1.2	8.0	50	0.75	4.0	0.08	0.0085	257023 0022	36,60
0.8	1.2	10.0	50	0.75	4.0	0.08	0.0085	257023 0023	36,80
0.8	1.2	12.0	50	0.75	4.0	0.08	0.0085	257023 0024	36,90
1.0	1.5	6.0	50	0.95	4.0	0.10	0.013	257023 0025	35,60
1.0	1.5	8.0	50	0.95	4.0	0.10	0.013	257023 0026	35,60
1.0	1.5	10.0	50	0.95	4.0	0.10	0.013	257023 0027	35,60

2146

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
1.0	1.5	12.0	50	0.95	4.0	0.10	0.013	257023 0028	35,60
1.0	1.5	14.0	50	0.95	4.0	0.10	0.013	257023 0029	35,60
1.0	1.5	16.0	50	0.95	4.0	0.10	0.013	257023 0030	35,60
1.2	1.8	6.0	50	1.15	4.0	0.10	0.013	257023 0031	35,60
1.2	1.8	10.0	50	1.15	4.0	0.10	0.013	257023 0032	35,60
1.5	2.3	8.0	50	1.45	4.0	0.15	0.013	257023 0033	35,60
1.5	2.3	12.0	50	1.45	4.0	0.15	0.013	257023 0034	35,60
1.5	2.3	16.0	50	1.45	4.0	0.15	0.013	257023 0035	35,60
1.5	2.3	20.0	60	1.45	4.0	0.15	0.013	257023 0036	37,70
2.0	3.0	6.0	50	1.95	4.0	0.20	0.0195	257023 0037	35,60
2.0	3.0	8.0	50	1.95	4.0	0.20	0.0195	257023 0038	35,60
2.0	3.0	12.0	50	1.95	4.0	0.20	0.0195	257023 0039	35,60
2.0	3.0	16.0	50	1.95	4.0	0.20	0.0195	257023 0040	35,60
2.0	3.0	20.0	60	1.95	4.0	0.20	0.0195	257023 0041	37,70
2.0	3.0	25.0	75	1.95	4.0	0.20	0.0195	257023 0042	41,10
2.5	3.7	8.0	50	2.40	4.0	0.30	0.0265	257023 0043	35,60
2.5	3.7	10.0	50	2.40	4.0	0.30	0.0265	257023 0044	35,60
2.5	3.7	12.0	50	2.40	4.0	0.30	0.0265	257023 0045	35,60
2.5	3.7	16.0	50	2.40	4.0	0.30	0.0265	257023 0046	35,60
2.5	3.7	20.0	60	2.40	4.0	0.30	0.0265	257023 0047	37,70
2.5	3.7	25.0	75	2.40	4.0	0.30	0.0265	257023 0048	35,60
3.0	4.5	8.0	50	2.85	6.0	0.30	0.0265	257023 0049	39,10
3.0	4.5	10.0	50	2.85	6.0	0.30	0.0265	257023 0050	39,10
3.0	4.5	12.0	50	2.85	6.0	0.30	0.0265	257023 0051	39,10
3.0	4.5	16.0	60	2.85	6.0	0.30	0.0265	257023 0052	39,10
3.0	4.5	20.0	60	2.85	6.0	0.30	0.0265	257023 0053	39,10
3.0	4.5	25.0	75	2.85	6.0	0.30	0.0265	257023 0054	41,60

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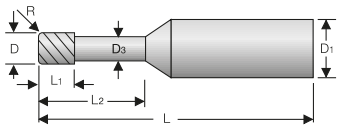


...suggestions are heard.

ATORN®
High quality for great performance

ATORN® RockTec 65 mini torus cutter

VHM | 40° | h6 | DIN 6535 HA | Z 2 | TiSiN | Vc/fz | 20-282



- Long-necked version for machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -5°~-7°

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 60-100						○ 15-80	○ 15-80	○ 13-65					● 50-90	● 50-90	● 40-80

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
0.2	0.3	0.5	50	0.16	4.0	0.02	0.002	**257024** 0001	55,50
0.2	0.3	1.0	50	0.16	4.0	0.02	0.002	257024 0002	55,50
0.2	0.3	1.5	50	0.16	4.0	0.02	0.002	257024 0003	55,50
0.3	0.4	1.0	50	0.26	4.0	0.03	0.002	257024 0004	52,–
0.3	0.4	2.0	50	0.26	4.0	0.03	0.002	257024 0005	52,–
0.3	0.4	3.0	50	0.26	4.0	0.03	0.002	257024 0006	52,–
0.4	0.6	2.0	50	0.37	4.0	0.03	0.002	257024 0007	49,–
0.4	0.6	3.0	50	0.37	4.0	0.03	0.002	257024 0008	49,–
0.4	0.6	4.0	50	0.37	4.0	0.03	0.002	257024 0009	49,–
0.4	0.6	5.0	50	0.37	4.0	0.03	0.002	257024 0010	49,–
0.5	0.7	2.0	50	0.45	4.0	0.05	0.002	257024 0011	40,70
0.5	0.7	4.0	50	0.45	4.0	0.05	0.002	257024 0012	40,70
0.5	0.7	6.0	50	0.45	4.0	0.05	0.002	257024 0013	40,70
0.5	0.7	8.0	50	0.45	4.0	0.05	0.002	257024 0014	40,70
0.6	0.9	2.0	50	0.55	4.0	0.05	0.002	257024 0015	40,70
0.6	0.9	4.0	50	0.55	4.0	0.05	0.002	257024 0016	40,70
0.6	0.9	6.0	50	0.55	4.0	0.05	0.002	257024 0017	40,70
0.6	0.9	8.0	50	0.55	4.0	0.05	0.002	257024 0018	40,70
0.6	0.9	10.0	50	0.55	4.0	0.05	0.002	257024 0019	41,30
0.8	1.2	4.0	50	0.75	4.0	0.08	0.002	257024 0020	39,10
0.8	1.2	6.0	50	0.75	4.0	0.08	0.002	257024 0021	42,–
0.8	1.2	8.0	50	0.75	4.0	0.08	0.002	257024 0022	42,–
0.8	1.2	10.0	50	0.75	4.0	0.08	0.002	257024 0023	42,–
0.8	1.2	12.0	50	0.75	4.0	0.08	0.002	257024 0024	42,–
1.0	1.5	6.0	50	0.95	4.0	0.10	0.006	257024 0025	42,–
1.0	1.5	8.0	50	0.95	4.0	0.10	0.006	257024 0026	42,–
1.0	1.5	10.0	50	0.95	4.0	0.10	0.006	257024 0027	42,–

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D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
1.0	1.5	12.0	50	0.95	4.0	0.10	0.006	257024 0028	42,–
1.0	1.5	14.0	50	0.95	4.0	0.10	0.006	257024 0029	42,–
1.0	1.5	16.0	50	0.95	4.0	0.10	0.006	257024 0030	42,–
1.2	1.8	6.0	50	1.15	4.0	0.10	0.006	257024 0031	43,10
1.2	1.8	10.0	50	1.15	4.0	0.10	0.006	257024 0032	43,10
1.5	2.3	8.0	50	1.45	4.0	0.15	0.006	257024 0033	43,10
1.5	2.3	12.0	50	1.45	4.0	0.15	0.006	257024 0034	43,10
1.5	2.3	16.0	50	1.45	4.0	0.15	0.006	257024 0035	43,10
1.5	2.3	20.0	60	1.45	4.0	0.15	0.006	257024 0036	43,30
2.0	3.0	6.0	50	1.95	4.0	0.20	0.012	257024 0037	43,10
2.0	3.0	8.0	50	1.95	4.0	0.20	0.012	257024 0038	43,30
2.0	3.0	12.0	50	1.95	4.0	0.20	0.012	257024 0039	43,30
2.0	3.0	16.0	50	1.95	4.0	0.20	0.012	257024 0040	43,30
2.0	3.0	20.0	60	1.95	4.0	0.20	0.012	257024 0041	43,30
2.0	3.0	25.0	75	1.95	4.0	0.20	0.012	257024 0042	43,30
2.5	3.7	8.0	50	2.40	4.0	0.30	0.0185	257024 0043	43,30
2.5	3.7	10.0	50	2.40	4.0	0.30	0.0185	257024 0044	43,30
2.5	3.7	12.0	50	2.40	4.0	0.30	0.0185	257024 0045	43,30
2.5	3.7	16.0	50	2.40	4.0	0.30	0.0185	257024 0046	43,30
2.5	3.7	20.0	60	2.40	4.0	0.30	0.0185	257024 0047	43,30
2.5	3.7	25.0	75	2.40	4.0	0.30	0.0185	257024 0048	43,30
3.0	4.5	8.0	50	2.85	6.0	0.30	0.0185	257024 0049	44,90
3.0	4.5	10.0	50	2.85	6.0	0.30	0.0185	257024 0050	44,90
3.0	4.5	12.0	50	2.85	6.0	0.30	0.0185	257024 0051	44,90
3.0	4.5	16.0	60	2.85	6.0	0.30	0.0185	257024 0052	44,90
3.0	4.5	20.0	60	2.85	6.0	0.30	0.0185	257024 0053	44,90
3.0	4.5	25.0	75	2.85	6.0	0.30	0.0185	257024 0054	43,80

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Stahlschlüssel („Key to Steel") pocket book

Useful information on steel

- Materials science, materials testing
- Stahlschlüssel („Key to Steel") extract
- Steel identification systems, dimensions and units
- Mathematics and geometry, tables
- Abbreviations for standards designations / standardisation institutes
- List of material numbers in numerical order

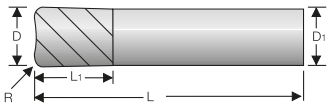


Description	art.no.	€
Stahlschlüssel (Key to Steel) pocket book, plastic cover, 200 pages, DIN A6	**019900** 1015	11,25

0111

ATORN® RockTec 52 torus cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | AlTiN | Vc/fz | 20-252



- For machining materials **up to 52 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 140-160	● 130-150	● 120-140	● 100-120	● 100-120	○ 80-100	● 100-120	● 100-120	● 80-100	● 80-100	● 70-90					● 60-80		
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

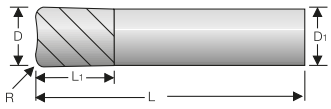


D mm	L1 mm	L mm	D1 mm	R mm	● Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	9	50	6.0	0.3	0.02	**257015** 0001	39,50
3.0	9	50	6.0	0.5	0.02	257015 0002	39,50
4.0	12	50	6.0	0.3	0.02	257015 0003	39,50
4.0	12	50	6.0	0.5	0.02	257015 0004	39,50
4.0	12	50	6.0	1.0	0.02	257015 0005	39,50
5.0	15	50	6.0	0.3	0.03	257015 0027	39,70
5.0	15	50	6.0	0.5	0.03	257015 0006	39,70
5.0	15	50	6.0	1.0	0.03	257015 0007	39,70
6.0	20	60	6.0	0.3	0.03	257015 0008	33,50
6.0	20	60	6.0	0.5	0.03	257015 0009	33,50
6.0	20	60	6.0	1.0	0.03	257015 0010	33,50
8.0	20	64	8.0	0.5	0.04	257015 0011	45,40
8.0	20	64	8.0	1.0	0.04	257015 0012	45,40
8.0	20	64	8.0	1.5	0.04	257015 0013	45,40
8.0	20	64	8.0	2.0	0.04	257015 0014	45,40
10.0	22	75	10.0	0.5	0.05	257015 0015	54,–
10.0	22	75	10.0	1.0	0.05	257015 0028	54,–
10.0	22	75	10.0	1.5	0.05	257015 0016	54,–
10.0	22	75	10.0	2.0	0.05	257015 0017	54,–
12.0	25	75	12.0	1.0	0.06	257015 0018	85,–
12.0	25	75	12.0	2.0	0.06	257015 0019	85,–
12.0	25	75	12.0	3.0	0.06	257015 0020	85,–
16.0	32	90	16.0	1.0	0.08	257015 0021	127,–
16.0	32	90	16.0	2.0	0.08	257015 0022	130,–
16.0	32	90	16.0	3.0	0.08	257015 0023	131,–
20.0	38	100	20.0	1.0	0.1	257015 0024	200,–
20.0	38	100	20.0	2.0	0.1	257015 0025	200,–
20.0	38	100	20.0	3.0	0.1	257015 0026	205,–

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ATORN® Torus milling cutter RockTec 65

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | TiSiN | Vc/fz | 20-282



- Long-necked version for machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -5°~-7°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
				○ 160-200						○ 250-300	○ 250-300	○ 250-300					● 120-140	● 140-140	● 80-120
	Cutting speed Vc m/min.	Please adjust these guidelines according to clamping operation and machine set-up.																	



D mm	L1 mm	L mm	D1 mm	R mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	9	50	6.0	0.3	0.015	**257016** 0001	39,40
3.0	9	50	6.0	0.5	0.015	257016 0002	39,40
4.0	12	50	6.0	0.3	0.015	257016 0003	39,40
4.0	12	50	6.0	0.5	0.015	257016 0004	39,40
4.0	12	50	6.0	1.0	0.015	257016 0005	39,40
5.0	15	50	6.0	0.3	0.025	257016 0027	40,–
5.0	15	50	6.0	0.5	0.025	257016 0006	40,–
5.0	15	50	6.0	1.0	0.025	257016 0007	40,–
6.0	20	60	6.0	0.3	0.025	257016 0008	45,30
6.0	20	60	6.0	0.5	0.025	257016 0009	45,30
6.0	20	60	6.0	1.0	0.025	257016 0010	45,30
8.0	20	64	8.0	0.5	0.05	257016 0011	50,50
8.0	20	64	8.0	1.0	0.05	257016 0012	50,50
8.0	20	64	8.0	1.5	0.05	257016 0013	50,50
8.0	20	64	8.0	2.0	0.05	257016 0014	50,50
10.0	22	75	10.0	0.5	0.05	257016 0015	64,50
10.0	22	75	10.0	1.0	0.05	257016 0028	64,50
10.0	22	75	10.0	1.5	0.05	257016 0016	64,50
10.0	22	75	10.0	2.0	0.05	257016 0017	64,50
12.0	25	75	12.0	1.0	0.06	257016 0018	100,–
12.0	25	75	12.0	2.0	0.06	257016 0019	100,–
12.0	25	75	12.0	3.0	0.06	257016 0020	100,–
16.0	32	90	16.0	1.0	0.07	257016 0021	151,–
16.0	32	90	16.0	2.0	0.07	257016 0022	151,–
16.0	32	90	16.0	3.0	0.07	257016 0023	151,–
20.0	38	100	20.0	1.0	0.08	257016 0024	225,–
20.0	38	100	20.0	2.0	0.08	257016 0025	225,–
20.0	38	100	20.0	3.0	0.08	257016 0026	225,–

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Cutting data calculator

For easy calculation of cutting speeds, rotation speeds, feed rates, feed speeds, machine times, chipping volumes and performance

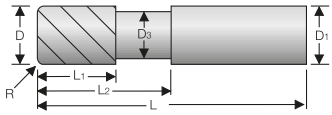


Description	art.no.	€
180 x 78 mm, plastic, with reading slider	**019900** 1006	5,95

0111

ATORN® RockTec 52 torus cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | AlTiN | Vc/fz | 20-252



- **With clearance**
- For machining materials **up to 52 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
257017....	● 140-160	● 130-150	● 120-140	● 100-120	● 100-120	○ 80-100	● 100-120	● 100-120	● 80-100	● 80-100	● 70-90					● 60-80		
257019....	● 120-140	● 110-130	● 80-110	● 90-110	● 90-110	○ 70-90	● 90-110	● 90-110	● 70-90	● 70-90	● 60-80					● 50-70		
257021....	● 100-120	● 90-110	● 80-100	● 80-100	● 80-100	○ 60-80	● 80-100	● 80-100	● 70-90	● 60-80	● 50-70					● 40-60		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Standard



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	4	14	60	2.8	6.0	0.3	0.02	**257017** 0001	29,70
3.0	4	14	60	2.8	6.0	0.5	0.02	257017 0002	29,70
4.0	5	16	60	3.7	6.0	0.3	0.02	257017 0003	31,70
4.0	5	16	60	3.7	6.0	0.5	0.02	257017 0004	31,70
5.0	6	18	60	4.6	6.0	0.3	0.03	257017 0005	34,70
5.0	6	18	60	4.6	6.0	0.5	0.03	257017 0006	34,70
6.0	7	20	60	5.5	6.0	0.5	0.03	257017 0007	39,20
6.0	7	20	60	5.5	6.0	1.0	0.03	257017 0008	39,20
8.0	9	26	64	7.4	8.0	0.5	0.04	257017 0009	48,50
8.0	9	26	64	7.4	8.0	1.0	0.04	257017 0010	48,50
10.0	11	31	70	9.2	10.0	1.0	0.05	257017 0011	67,50
10.0	11	31	70	9.2	10.0	2.0	0.05	257017 0012	67,50
12.0	13	37	75	11.0	12.0	1.0	0.06	257017 0013	88,–
12.0	13	37	75	11.0	12.0	2.0	0.06	257017 0014	88,–
16.0	17	43	90	15.0	16.0	1.0	0.08	257017 0015	143,–
16.0	17	43	90	15.0	16.0	2.0	0.08	257017 0016	143,–

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Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	5	30	75	2.8	6.0	0.3	0.02	**257019** 0001	36,80
3.0	5	30	75	2.8	6.0	0.5	0.02	257019 0002	36,80
4.0	8	32	75	3.7	6.0	0.3	0.02	257019 0003	36,80
4.0	8	32	75	3.7	6.0	0.5	0.02	257019 0004	36,80
5.0	9	32	75	4.6	6.0	0.3	0.03	257019 0005	36,80
5.0	9	32	75	4.6	6.0	0.5	0.03	257019 0006	36,80
6.0	10	40	75	5.5	6.0	0.5	0.03	257019 0007	41,80
6.0	10	40	75	5.5	6.0	1.0	0.03	257019 0008	42,–
8.0	12	40	75	7.4	8.0	0.5	0.04	257019 0009	56,50
8.0	12	40	75	7.4	8.0	1.0	0.04	257019 0010	57,50
10.0	14	60	100	9.2	10.0	1.0	0.05	257019 0011	79,–
10.0	14	60	100	9.2	10.0	2.0	0.05	257019 0012	80,–
12.0	16	60	100	11.0	12.0	1.0	0.06	257019 0013	96,–
12.0	16	60	100	11.0	12.0	2.0	0.06	257019 0014	97,–
16.0	22	85	125	15.0	16.0	1.0	0.08	257019 0015	179,–
16.0	22	85	125	15.0	16.0	2.0	0.08	257019 0016	180,–

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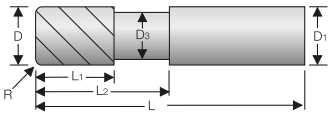
Extra-long

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	5	60	100	2.8	6.0	0.3	0.02	**257021** 0001	52,50
3.0	5	60	100	2.8	6.0	0.5	0.02	257021 0002	52,50
4.0	8	60	100	3.7	6.0	0.3	0.03	257021 0003	52,50
4.0	8	60	100	3.7	6.0	0.5	0.03	257021 0004	52,50
5.0	9	60	100	4.6	6.0	0.3	0.04	257021 0005	52,50
5.0	9	60	100	4.6	6.0	0.5	0.04	257021 0006	52,50
6.0	10	60	100	5.5	6.0	0.5	0.06	257021 0007	52,50
6.0	10	60	100	5.5	6.0	1.0	0.06	257021 0008	53,50
8.0	12	60	100	7.4	8.0	0.5	0.08	257021 0009	71,–
8.0	12	60	100	7.4	8.0	1.0	0.08	257021 0010	72,50
10.0	14	85	125	9.2	10.0	1.0	0.09	257021 0011	99,50
10.0	14	85	125	9.2	10.0	2.0	0.09	257021 0012	99,50
12.0	16	110	150	11.0	12.0	1.0	0.1	257021 0013	128,–
12.0	16	110	150	11.0	12.0	2.0	0.1	257021 0014	128,–
16.0	22	110	150	15.0	16.0	1.0	0.11	257021 0015	235,–
16.0	22	110	150	15.0	16.0	2.0	0.11	257021 0016	235,–

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ATORN® RockTec 65 torus cutter

VHM | 40° | e8 | h6 | DIN 6535 HA | Z 4 | TiSiN | Vc/fz 20-282



- **With clearance**
- For machining materials **up to 65 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- -6°~-10° rake angle

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
257018....			○ 160-200						○ 250-300	○ 250-300	○ 250-300					● 120-140	● 140-140	● 80-120
257020....			○ 140-160						○ 200-260	○ 200-260	○ 200-260					● 100-130	● 100-130	● 70-100
257022....			○ 120-140						○ 130-170	○ 130-170	○ 130-170					● 80-110	● 80-110	● 50-80

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Standard



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	4	14	60	2.8	6.0	0.3	0.015	**257018** 0001	32,70
3.0	4	14	60	2.8	6.0	0.5	0.015	257018 0002	32,70
4.0	5	16	60	3.7	6.0	0.3	0.015	257018 0003	35,60
4.0	5	16	60	3.7	6.0	0.5	0.015	257018 0004	35,60
5.0	6	18	60	4.6	6.0	0.3	0.025	257018 0005	35,60
5.0	6	18	60	4.6	6.0	0.5	0.025	257018 0006	35,60
6.0	7	20	60	5.5	6.0	0.5	0.025	257018 0007	41,50
6.0	7	20	60	5.5	6.0	1.0	0.025	257018 0008	41,50
8.0	9	26	64	7.4	8.0	0.5	0.05	257018 0009	57,50
8.0	9	26	64	7.4	8.0	1.0	0.05	257018 0010	57,50
10.0	11	31	70	9.2	10.0	1.0	0.05	257018 0011	74,–
10.0	11	31	70	9.2	10.0	2.0	0.05	257018 0012	74,–
12.0	13	37	75	11.0	12.0	1.0	0.06	257018 0013	101,–
12.0	13	37	75	11.0	12.0	2.0	0.06	257018 0014	101,–
16.0	17	43	90	15.0	16.0	1.0	0.07	257018 0015	169,–
16.0	17	43	90	15.0	16.0	2.0	0.07	257018 0016	169,–

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Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	5	30	75	2.8	6.0	0.3	0.015	**257020** 0001	42,60
3.0	5	30	75	2.8	6.0	0.5	0.015	257020 0002	42,60
4.0	8	32	75	3.7	6.0	0.3	0.015	257020 0003	42,60
4.0	8	32	75	3.7	6.0	0.5	0.015	257020 0004	42,60
5.0	9	32	75	4.6	6.0	0.3	0.025	257020 0005	42,60
5.0	9	32	75	4.6	6.0	0.5	0.025	257020 0006	42,60
6.0	10	40	75	5.5	6.0	0.5	0.025	257020 0007	46,50
6.0	10	40	75	5.5	6.0	1.0	0.025	257020 0008	46,50
8.0	12	40	75	7.4	8.0	0.5	0.05	257020 0009	61,50
8.0	12	40	75	7.4	8.0	1.0	0.05	257020 0010	61,50
10.0	14	60	100	9.2	10.0	1.0	0.05	257020 0011	85,–
10.0	14	60	100	9.2	10.0	2.0	0.05	257020 0012	85,–
12.0	16	60	100	11.0	12.0	1.0	0.06	257020 0013	104,–
12.0	16	60	100	11.0	12.0	2.0	0.06	257020 0014	104,–
16.0	22	85	125	15.0	16.0	1.0	0.07	257020 0015	205,–
16.0	22	85	125	15.0	16.0	2.0	0.07	257020 0016	210,–

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Extra-long

D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	5	60	100	2.8	6.0	0.3	0.015	**257022** 0001	58,50
3.0	5	60	100	2.8	6.0	0.5	0.015	257022 0002	58,50
4.0	8	60	100	3.7	6.0	0.3	0.02	257022 0003	58,50
4.0	8	60	100	3.7	6.0	0.5	0.02	257022 0004	58,50
5.0	9	60	100	4.6	6.0	0.3	0.025	257022 0005	58,50
5.0	9	60	100	4.6	6.0	0.5	0.025	257022 0006	58,50
6.0	10	60	100	5.5	6.0	0.5	0.035	257022 0007	58,50
6.0	10	60	100	5.5	6.0	1.0	0.035	257022 0008	59,50
8.0	12	60	100	7.4	8.0	0.5	0.05	257022 0009	78,50
8.0	12	60	100	7.4	8.0	1.0	0.05	257022 0010	80,50
10.0	14	85	125	9.2	10.0	1.0	0.05	257022 0011	115,–
10.0	14	85	125	9.2	10.0	2.0	0.05	257022 0012	115,–
12.0	16	110	150	11.0	12.0	1.0	0.06	257022 0013	149,–
12.0	16	110	150	11.0	12.0	2.0	0.06	257022 0014	149,–
16.0	22	110	150	15.0	16.0	1.0	0.07	257022 0015	260,–
16.0	22	110	150	15.0	16.0	2.0	0.07	257022 0016	260,–

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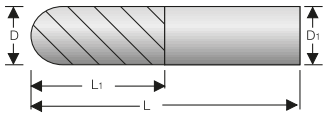


...dreams come true.

ATORN®
High quality for great performance

ATORN® RockTec 52 mini radius milling cutter

VHM | 30° | h6 | DIN 6535 HA | Z 2 | AlTiN | Vc/fz | 20-266



- Short, stable design for machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 0.9 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	● 100-120	● 80-100	● 60-80	● 50-90	● 50-90	○ 50-70	● 50-90	● 50-90	● 50-90	● 50-90	● 50-80					● 30-60		
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

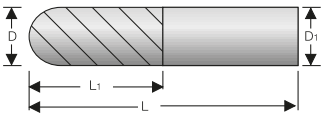


D mm	R mm	L1 mm	L mm	D1 mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
0.2	0.10	0.4	40	4.0	0.004	**257025** 0002	45,20
0.3	0.15	0.6	40	4.0	0.004	257025 0003	41,80
0.4	0.20	0.8	40	4.0	0.0065	257025 0004	35,50
0.5	0.25	1.2	40	4.0	0.0065	257025 0005	29,60
0.6	0.30	1.4	40	4.0	0.0065	257025 0006	31,10
0.7	0.35	1.6	40	4.0	0.0065	257025 0007	29,60
0.8	0.40	1.8	40	4.0	0.0065	257025 0008	29,60
0.9	0.45	2.0	40	4.0	0.0085	257025 0009	29,60

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ATORN® RockTec 65 mini radius milling cutter

VHM | 30° | DIN 6535 HA | Z 2 | TiSiN | Vc/fz | 20-283



- Short, stable design for machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 0.9 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -5°

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
			○ 60-100						○ 30-100	○ 25-80	○ 25-80					● 50-90	● 50-90	● 40-80
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

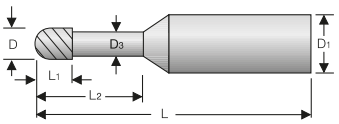


D mm	R mm	L1 mm	L mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
0.2	0.10	0.4	40	4.0	0.0025	**257026** 0002	50,50
0.3	0.15	0.6	40	4.0	0.0025	257026 0003	46,20
0.4	0.20	0.8	40	4.0	0.003	257026 0004	42,–
0.5	0.25	1.2	40	4.0	0.003	257026 0005	42,–
0.6	0.30	1.4	40	4.0	0.003	257026 0006	39,90
0.7	0.35	1.6	40	4.0	0.003	257026 0007	42,–
0.8	0.40	1.8	40	4.0	0.003	257026 0008	42,–
0.9	0.45	2.0	40	4.0	0.0065	257026 0009	42,–

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ATORN® RockTec 52 mini radius milling cutter

VHM | 30° | h6 | DIN 6535 HA | Z 2 | AlTiN | Vc/fz | 20-266



- **With clearance**
- Long-necked version for machining materials **up to 52 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material: ● very well suited ○ well suited

steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
100-120	80-100	60-80	50-90	50-90	50-70	50-90	50-90	50-90	50-90	50-80					30-60		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.



D mm	R mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
0.2	0.10	0.2	0.5	50	0.15	4.0	0.003	**257033** 0001	43,50
0.2	0.10	0.2	1.0	50	0.15	4.0	0.003	257033 0002	43,50
0.2	0.10	0.2	1.5	50	0.15	4.0	0.003	257033 0003	43,50
0.3	0.15	0.3	1.0	50	0.25	4.0	0.003	257033 0004	43,50
0.3	0.15	0.3	2.0	50	0.25	4.0	0.003	257033 0005	43,50
0.3	0.15	0.3	3.0	50	0.25	4.0	0.003	257033 0006	43,50
0.4	0.20	0.4	1.0	50	0.35	4.0	0.0065	257033 0007	40,30
0.4	0.20	0.4	2.0	50	0.35	4.0	0.0065	257033 0008	40,30
0.4	0.20	0.4	3.0	50	0.35	4.0	0.0065	257033 0009	40,30
0.4	0.20	0.4	4.0	50	0.35	4.0	0.0065	257033 0010	40,30
0.4	0.20	0.4	5.0	50	0.35	4.0	0.0065	257033 0011	40,30
0.5	0.25	0.4	2.0	50	0.45	4.0	0.0065	257033 0012	38,10
0.5	0.25	0.4	3.0	50	0.45	4.0	0.0065	257033 0013	38,10
0.5	0.25	0.4	4.0	50	0.45	4.0	0.0065	257033 0014	38,10
0.5	0.25	0.4	5.0	50	0.45	4.0	0.0065	257033 0015	38,10
0.5	0.25	0.4	6.0	50	0.45	4.0	0.0065	257033 0016	38,10
0.5	0.25	0.4	8.0	50	0.45	4.0	0.0065	257033 0017	38,10
0.6	0.30	0.5	2.0	50	0.55	4.0	0.0065	257033 0018	36,30
0.6	0.30	0.5	3.0	50	0.55	4.0	0.0065	257033 0019	36,30
0.6	0.30	0.5	4.0	50	0.55	4.0	0.0065	257033 0020	36,30
0.6	0.30	0.5	5.0	50	0.55	4.0	0.0065	257033 0021	30,90
0.6	0.30	0.5	6.0	50	0.55	4.0	0.0065	257033 0022	36,30
0.6	0.30	0.5	8.0	50	0.55	4.0	0.0065	257033 0023	36,40
0.8	0.40	0.6	2.0	50	0.75	4.0	0.0065	257033 0024	36,30
0.8	0.40	0.6	4.0	50	0.75	4.0	0.0065	257033 0025	36,30
0.8	0.40	0.6	5.0	50	0.75	4.0	0.0065	257033 0026	36,30
0.8	0.40	0.6	6.0	50	0.75	4.0	0.0065	257033 0027	36,30

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D mm	R mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
0.8	0.40	0.6	7.0	50	0.75	4.0	0.0065	257033 0028	36,30
0.8	0.40	0.6	8.0	50	0.75	4.0	0.0065	257033 0029	36,40
0.8	0.40	0.6	10.0	50	0.75	4.0	0.0065	257033 0030	36,60
1.0	0.50	0.8	3.0	50	0.95	4.0	0.0085	257033 0031	26,90
1.0	0.50	0.8	6.0	50	0.95	4.0	0.0085	257033 0032	26,90
1.0	0.50	0.8	8.0	50	0.95	4.0	0.0085	257033 0033	26,90
1.0	0.50	0.8	10.0	50	0.95	4.0	0.0085	257033 0034	27,60
1.0	0.50	0.8	12.0	50	0.95	4.0	0.0085	257033 0035	27,90
1.0	0.50	0.8	16.0	50	0.95	4.0	0.0085	257033 0036	28,60
1.0	0.50	0.8	20.0	60	0.95	4.0	0.0085	257033 0037	28,60
1.2	0.60	1.0	6.0	50	1.15	4.0	0.0085	257033 0038	28,50
1.2	0.60	1.0	10.0	50	1.15	4.0	0.0085	257033 0039	28,80
1.5	0.75	1.2	8.0	50	1.45	4.0	0.0085	257033 0040	26,60
1.5	0.75	1.2	12.0	50	1.45	4.0	0.0085	257033 0041	26,80
1.5	0.75	1.2	16.0	50	1.45	4.0	0.0085	257033 0042	27,10
1.5	0.75	1.2	18.0	60	1.45	4.0	0.0085	257033 0043	28,50
2.0	1.0	1.6	4.0	50	1.95	4.0	0.019	257033 0044	26,10
2.0	1.0	1.6	8.0	50	1.95	4.0	0.019	257033 0045	26,40
2.0	1.0	1.6	12.0	50	1.95	4.0	0.019	257033 0046	26,60
2.0	1.0	1.6	16.0	50	1.95	4.0	0.019	257033 0047	27,30
2.0	1.0	1.6	20.0	60	1.95	4.0	0.019	257033 0048	30,60
2.0	1.0	1.6	25.0	75	1.95	4.0	0.019	257033 0049	33,40
3.0	1.50	2.4	8.0	50	2.85	6.0	0.0235	257033 0050	39,30
3.0	1.50	2.4	10.0	50	2.85	6.0	0.0235	257033 0051	39,30
3.0	1.50	2.4	16.0	60	2.85	6.0	0.0235	257033 0052	39,30
3.0	1.50	2.4	20.0	60	2.85	6.0	0.0235	257033 0053	39,30
3.0	1.50	2.4	25.0	75	2.85	6.0	0.0235	257033 0054	43,10

2146

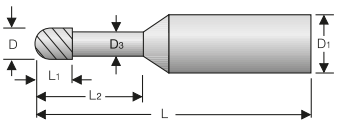


...then it's ATORN.

ATORN®
High quality for great performance

ATORN® RockTec 65 mini radius milling cutter

VHM | 30° | h6 | DIN 6535 HA | Z 2 | TiSiN | Vc/fz | 20-283



- **With clearance**
- Long-necked version for machining materials **up to 65 HRc**
- Cutting edge tolerance: at Ø 0.1 – 0.7 mm = 0/– 0.012 mm, at Ø 0.8 – 3.0 mm = 0/– 0.020 mm
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -5°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
				○ 60-100						○ 30-100	○ 25-80	○ 25-80					● 50-90	● 50-90	● 40-80
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



D mm	R mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
0.2	0.10	0.2	0.5	50	0.15	4.0	0.0025	**257034** 0001	52,–
0.2	0.10	0.2	1.0	50	0.15	4.0	0.0025	257034 0002	52,–
0.2	0.10	0.2	1.5	50	0.15	4.0	0.0025	257034 0003	52,–
0.3	0.15	0.3	1.0	50	0.25	4.0	0.0025	257034 0004	50,–
0.3	0.15	0.3	2.0	50	0.25	4.0	0.0025	257034 0005	50,–
0.3	0.15	0.3	3.0	50	0.25	4.0	0.0025	257034 0006	50,–
0.4	0.20	0.4	1.0	50	0.35	4.0	0.003	257034 0007	46,40
0.4	0.20	0.4	2.0	50	0.35	4.0	0.003	257034 0008	46,40
0.4	0.20	0.4	3.0	50	0.35	4.0	0.003	257034 0009	46,40
0.4	0.20	0.4	4.0	50	0.35	4.0	0.003	257034 0010	46,40
0.4	0.20	0.4	5.0	50	0.35	4.0	0.003	257034 0011	46,40
0.5	0.25	0.4	2.0	50	0.45	4.0	0.003	257034 0012	43,90
0.5	0.25	0.4	3.0	50	0.45	4.0	0.003	257034 0013	43,90
0.5	0.25	0.4	4.0	50	0.45	4.0	0.003	257034 0014	43,90
0.5	0.25	0.4	5.0	50	0.45	4.0	0.003	257034 0015	43,90
0.5	0.25	0.4	6.0	50	0.45	4.0	0.003	257034 0016	43,90
0.5	0.25	0.4	8.0	50	0.45	4.0	0.003	257034 0017	43,90
0.6	0.30	0.5	2.0	50	0.55	4.0	0.003	257034 0018	41,80
0.6	0.30	0.5	3.0	50	0.55	4.0	0.003	257034 0019	41,80
0.6	0.30	0.5	4.0	50	0.55	4.0	0.003	257034 0020	41,80
0.6	0.30	0.5	5.0	50	0.55	4.0	0.003	257034 0021	35,60
0.6	0.30	0.5	6.0	50	0.55	4.0	0.003	257034 0022	41,80
0.6	0.30	0.5	8.0	50	0.55	4.0	0.003	257034 0023	42,–
0.8	0.40	0.6	2.0	50	0.75	4.0	0.003	257034 0024	41,80
0.8	0.40	0.6	4.0	50	0.75	4.0	0.003	257034 0025	41,80
0.8	0.40	0.6	5.0	50	0.75	4.0	0.003	257034 0026	41,80
0.8	0.40	0.6	6.0	50	0.75	4.0	0.003	257034 0027	41,80

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D mm	R mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
0.8	0.40	0.6	7.0	50	0.75	4.0	0.003	257034 0028	41,80
0.8	0.40	0.6	8.0	50	0.75	4.0	0.003	257034 0029	42,–
0.8	0.40	0.6	10.0	50	0.75	4.0	0.003	257034 0030	42,10
1.0	0.50	0.8	3.0	50	0.95	4.0	0.0065	257034 0031	30,90
1.0	0.50	0.8	6.0	50	0.95	4.0	0.0065	257034 0032	30,90
1.0	0.50	0.8	8.0	50	0.95	4.0	0.0065	257034 0033	30,90
1.0	0.50	0.8	10.0	50	0.95	4.0	0.0065	257034 0034	31,70
1.0	0.50	0.8	12.0	50	0.95	4.0	0.0065	257034 0035	32,10
1.0	0.50	0.8	16.0	50	0.95	4.0	0.0065	257034 0036	32,90
1.0	0.50	0.8	20.0	60	0.95	4.0	0.0065	257034 0037	32,90
1.2	0.60	1.0	6.0	50	1.15	4.0	0.0065	257034 0038	32,80
1.2	0.60	1.0	10.0	50	1.15	4.0	0.0065	257034 0039	33,10
1.5	0.75	1.2	8.0	50	1.45	4.0	0.0065	257034 0040	30,50
1.5	0.75	1.2	12.0	50	1.45	4.0	0.0065	257034 0041	30,90
1.5	0.75	1.2	16.0	50	1.45	4.0	0.0065	257034 0042	31,20
1.5	0.75	1.2	18.0	60	1.45	4.0	0.0065	257034 0043	32,80
2.0	1.0	1.6	4.0	50	1.95	4.0	0.0075	257034 0044	30,10
2.0	1.0	1.6	8.0	50	1.95	4.0	0.0075	257034 0045	30,20
2.0	1.0	1.6	12.0	50	1.95	4.0	0.0075	257034 0046	30,60
2.0	1.0	1.6	16.0	50	1.95	4.0	0.0075	257034 0047	31,30
2.0	1.0	1.6	20.0	60	1.95	4.0	0.0075	257034 0048	35,10
2.0	1.0	1.6	25.0	75	1.95	4.0	0.0075	257034 0049	38,40
3.0	1.50	2.4	8.0	50	2.85	6.0	0.0155	257034 0050	45,20
3.0	1.50	2.4	10.0	50	2.85	6.0	0.0155	257034 0051	45,20
3.0	1.50	2.4	16.0	60	2.85	6.0	0.0155	257034 0052	45,20
3.0	1.50	2.4	20.0	60	2.85	6.0	0.0155	257034 0053	45,20
3.0	1.50	2.4	25.0	75	2.85	6.0	0.0155	257034 0054	49,50

2146

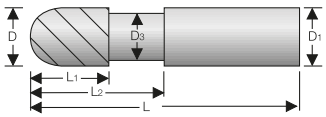
Safety in the workplace

Please protect your eyes, ears and respiratory system!



ATORN® RockTec 52 radius milling cutter

VHM | 30° | e8 | h6 | DIN 6535 HA | Z 2 | AlTiN | Vc/fz | 20-268



- **With clearance**
- For machining materials **up to 52 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material — ● very well suited ○ well suited

	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
257027....	180-370	180-350	180-350	180-370	180-370	150-300	180-350	180-350	180-350	180-350	150-270					120-240		
257029....	160-320	160-300	160-300	160-320	160-320	100-250	160-300	160-300	160-300	160-300	150-260					110-200		
257031....	90-190	90-190	90-190	90-190	90-190	60-150	90-190	90-190	90-190	90-190	70-160					60-130		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
2.0	4	8	40	1.85	4.0	1.00	2	0.035	**257027** 0020	22,70
2.5	4	10	40	2.35	4.0	1.25	2	0.035	257027 0025	27,30
3.0	5	14	50	2.80	4.0	1.50	2	0.035	257027 0030	34,80
4.0	8	20	50	3.70	4.0	2.00	2	0.0475	257027 0040	35,60
5.0	9	20	50	4.60	6.0	2.50	2	0.0475	257027 0050	31,80
6.0	10	20	50	5.50	6.0	3.00	2	0.065	257027 0060	31,80
8.0	12	30	64	7.40	8.0	4.00	2	0.065	257027 0080	42,70
10.0	14	32	70	9.20	10.0	5.00	2	0.1	257027 0100	53,50
12.0	16	38	75	11.0	12.0	6.00	2	0.1	257027 0120	78,–
16.0	32	46	90	15.0	16.0	8.00	2	0.105	257027 0160	131,–
20.0	38	58	100	19.0	20.0	10.00	2	0.105	257027 0200	198,–

2146

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
2.0	4	14	75	1.85	6.0	1.00	2	0.035	**257029** 0020	46,50
2.5	4	18	75	2.35	6.0	1.25	2	0.035	257029 0025	46,50
3.0	5	21	75	2.80	6.0	1.50	2	0.035	257029 0030	47,50
4.0	8	28	75	3.70	6.0	2.00	2	0.0475	257029 0040	47,50
5.0	9	32	75	4.60	6.0	2.50	2	0.0475	257029 0050	47,50
6.0	10	40	75	5.50	6.0	3.00	2	0.065	257029 0060	47,50
8.0	12	40	75	7.40	8.0	4.00	2	0.065	257029 0080	55,50
10.0	14	60	100	9.20	10.0	5.00	2	0.1	257029 0100	73,–
12.0	16	60	100	11.0	12.0	6.00	2	0.1	257029 0120	95,–
16.0	32	80	125	15.0	16.0	8.00	2	0.105	257029 0160	187,–
20.0	38	80	125	19.0	20.0	10.00	2	0.105	257029 0200	265,–

2146

Extra-long

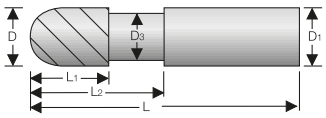


D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
2.0	4	20	100	1.85	6.0	1.00	2	0.035	**257031** 0020	49,10
2.5	4	25	100	2.35	6.0	1.25	2	0.035	257031 0025	49,10
3.0	5	30	100	2.80	6.0	1.50	2	0.035	257031 0030	49,10
4.0	8	40	100	3.70	6.0	2.00	2	0.0475	257031 0040	49,10
5.0	9	50	100	4.60	6.0	2.50	2	0.0475	257031 0050	49,10
6.0	10	60	150	5.50	6.0	3.00	2	0.065	257031 0060	50,–
8.0	12	80	150	7.40	8.0	4.00	2	0.065	257031 0080	73,50
10.0	14	100	150	9.20	10.0	5.00	2	0.1	257031 0100	102,–
12.0	16	110	150	11.00	12.0	6.00	2	0.1	257031 0120	145,–
16.0	32	150	200	15.00	16.0	8.00	2	0.105	257031 0160	235,–
20.0	38	150	200	19.00	20.0	10.00	2	0.105	257031 0200	310,–

2146

ATORN® RockTec 65 radius milling cutter

VHM | 30° | e8 | h6 | DIN 6535 HA | Z 2 | TiSiN | Vc/fz | 20-284



- **With clearance**
- For machining materials **up to 65 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -10°

material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
257028....			○ 180-370						○ 180-250	○ 180-250	○ 150-210					● 100-220	● 100-220	● 50-80
257030....			○ 130-320						○ 130-300	○ 130-300	○ 120-260					● 100-200	● 100-200	● 40-65
257032....			○ 80-190						○ 80-190	○ 80-190	○ 70-180					● 60-130	● 60-130	● 25-45

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
2.0	4	8	40	1.85	4.0	1.00	2	0.03	**257028** 0020	27,90
2.5	4	10	40	2.35	4.0	1.25	2	0.03	257028 0025	32,80
3.0	5	14	50	2.80	4.0	1.50	2	0.03	257028 0030	35,90
4.0	8	20	50	3.70	4.0	2.00	2	0.0425	257028 0040	37,40
5.0	9	20	50	4.60	6.0	2.50	2	0.0425	257028 0050	38,60
6.0	10	20	50	5.50	6.0	3.00	2	0.0625	257028 0060	37,20
8.0	12	30	64	7.40	8.0	4.00	2	0.0625	257028 0080	46,90
10.0	14	32	70	9.20	10.0	5.00	2	0.09	257028 0100	61,50
12.0	16	38	75	11.0	12.0	6.00	2	0.09	257028 0120	89,–
16.0	32	46	90	15.0	16.0	8.00	2	0.095	257028 0160	140,–
20.0	38	58	100	19.0	20.0	10.00	2	0.095	257028 0200	220,–

2146

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
2.0	4	14	75	1.85	6.0	1.00	2	0.03	**257030** 0020	48,30
2.5	4	18	75	2.35	6.0	1.25	2	0.03	257030 0025	48,30
3.0	5	21	75	2.80	6.0	1.50	2	0.03	257030 0030	48,30
4.0	8	28	75	3.70	6.0	2.00	2	0.0425	257030 0040	48,30
5.0	9	32	75	4.60	6.0	2.50	2	0.0425	257030 0050	48,30
6.0	10	40	75	5.50	6.0	3.00	2	0.0625	257030 0060	48,30
8.0	12	40	75	7.40	8.0	4.00	2	0.0625	257030 0080	60,–
10.0	14	60	100	9.20	10.0	5.00	2	0.09	257030 0100	98,50
12.0	16	60	100	11.0	12.0	6.00	2	0.09	257030 0120	128,–
16.0	32	80	125	15.0	16.0	8.00	2	0.095	257030 0160	215,–
20.0	38	80	125	19.0	20.0	10.00	2	0.095	257030 0200	300,–

2146

Extra-long

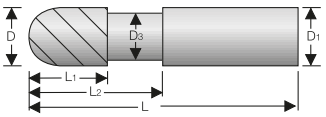


D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
2.0	4	20	100	1.85	6.0	1.00	2	0.03	**257032** 0020	56,50
2.5	4	25	100	2.35	6.0	1.25	2	0.03	257032 0025	56,50
3.0	5	30	100	2.80	6.0	1.50	2	0.03	257032 0030	56,50
4.0	8	40	100	3.70	6.0	2.00	2	0.0425	257032 0040	56,50
5.0	9	50	100	4.60	6.0	2.50	2	0.0425	257032 0050	56,50
6.0	10	60	150	5.50	6.0	3.00	2	0.0625	257032 0060	56,50
8.0	12	80	150	7.40	8.0	4.00	2	0.0625	257032 0080	83,–
10.0	14	100	150	9.20	10.0	5.00	2	0.09	257032 0100	116,–
12.0	16	110	150	11.00	12.0	6.00	2	0.09	257032 0120	166,–
16.0	32	150	200	15.00	16.0	8.00	2	0.095	257032 0160	265,–
20.0	38	150	200	19.00	20.0	10.00	2	0.095	257032 0200	355,–

2146

ATORN® RockTec 52 radius milling cutter

VHM | 30° | e8 | h6 | DIN 6535 HA | Z 4 | AlTiN | Vc/fz | 20-268



- **With clearance**
- For machining materials **up to 52 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle 3°

material — ● very well suited ○ well suited

material	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
257035....	● 180-370	● 180-350	● 180-350	● 180-370	● 180-370	○ 150-300	● 180-350	● 180-350	● 180-350	● 180-350	● 150-270					● 120-240		
257037....	● 160-320	● 160-300	● 160-300	● 160-320	● 160-320	○ 100-250	● 160-300	● 160-300	● 160-300	● 160-300	● 150-260					● 110-200		

Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.

Short



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	5	14	50	2.80	6	1.50	4	0.035	**257035** 0030	37,80
4.0	8	20	50	3.70	6	2.00	4	0.0475	257035 0040	37,80
5.0	9	20	50	4.60	6	2.50	4	0.0475	257035 0050	37,80
6.0	10	20	50	5.50	6	3.00	4	0.065	257035 0060	37,80
8.0	12	30	64	7.40	8	4.00	4	0.065	257035 0080	50,50
10.0	14	32	70	9.20	10	5.00	4	0.1	257035 0100	65,–
12.0	16	38	75	11.00	12	6.00	4	0.1	257035 0120	90,50
16.0	32	46	90	15.00	16	8.00	4	0.105	257035 0160	137,–
20.0	38	58	100	19.00	20	10.00	4	0.105	257035 0200	235,–

2146

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz steel < 1400 N/mm² mm/tooth	art.no.	€
3.0	5	21	75	2.80	6	1.50	4	0.035	**257037** 0030	48,30
4.0	8	28	75	3.70	6	2.00	4	0.0475	257037 0040	48,30
5.0	9	32	75	4.60	6	2.50	4	0.0475	257037 0050	48,30
6.0	10	40	75	5.50	6	3.00	4	0.065	257037 0060	48,30
8.0	12	40	75	7.40	8	4.00	4	0.065	257037 0080	64,–
10.0	14	60	100	9.20	10	5.00	4	0.1	257037 0100	107,–
12.0	16	60	100	11.00	12	6.00	4	0.1	257037 0120	137,–
16.0	32	80	125	15.00	16	8.00	4	0.105	257037 0160	215,–
20.0	38	80	125	19.00	20	10.00	4	0.105	257037 0200	300,–

2146

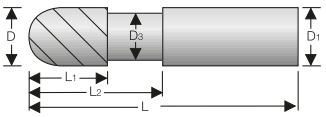


… 3 µm

ATORN®
High quality for great performance

ATORN® RockTec 65 radius milling cutter

VHM | 30° | e8 | h6 | DIN 6535 HA | Z 4 | TiSiN | Vc/fz | 20-284



- **With clearance**
- For machining materials **up to 65 HRc**
- Radius tolerance: 0/-0.01 mm
- **Cutting material: ultra-fine grain solid carbide**
- Rake angle -10°

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	257036....			○ 180-370						○ 180-250	○ 180-250	○ 150-210					● 100-220	● 100-220	● 50-80
	257038....			○ 130-320						○ 130-300	○ 130-300	○ 120-260					● 100-200	● 100-200	● 40-65
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		

Short



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	5	14	50	2.80	6	1.50	4	0.03	**257036** 0030	43,70
4.0	8	20	50	3.70	6	2.00	4	0.0425	257036 0040	43,70
5.0	9	20	50	4.60	6	2.50	4	0.0425	257036 0050	43,70
6.0	10	20	50	5.50	6	3.00	4	0.0625	257036 0060	43,70
8.0	12	30	64	7.40	8	4.00	4	0.0625	257036 0080	60,–
10.0	14	32	70	9.20	10	5.00	4	0.09	257036 0100	75,50
12.0	16	38	75	11.00	12	6.00	4	0.09	257036 0120	118,–
16.0	32	46	90	15.00	16	8.00	4	0.095	257036 0160	162,–
20.0	38	58	100	19.00	20	10.00	4	0.095	257036 0200	265,–

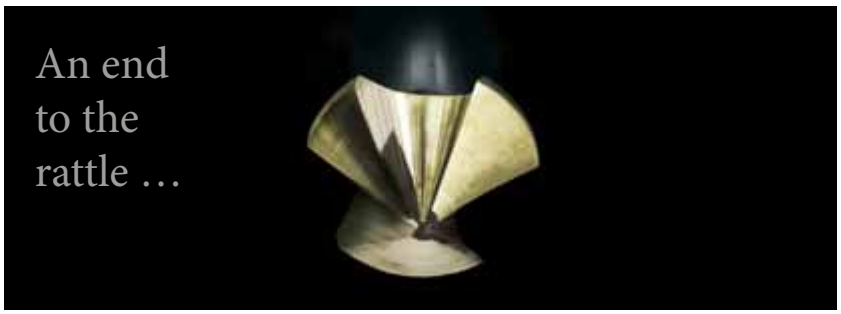
2146

Long



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	R mm	Z	Feed fz hardened steel ≥ 60 HRc mm/tooth	art.no.	€
3.0	5	21	75	2.80	6	1.50	4	0.03	**257038** 0030	54,50
4.0	8	28	75	3.70	6	2.00	4	0.0425	257038 0040	54,50
5.0	9	32	75	4.60	6	2.50	4	0.0425	257038 0050	54,50
6.0	10	40	75	5.50	6	3.00	4	0.0625	257038 0060	54,50
8.0	12	40	75	7.40	8	4.00	4	0.0625	257038 0080	67,–
10.0	14	60	100	9.20	10	5.00	4	0.09	257038 0100	113,–
12.0	16	60	100	11.00	12	6.00	4	0.09	257038 0120	145,–
16.0	32	80	125	15.00	16	8.00	4	0.095	257038 0160	245,–
20.0	38	80	125	19.00	20	10.00	4	0.095	257038 0200	365,–

2146

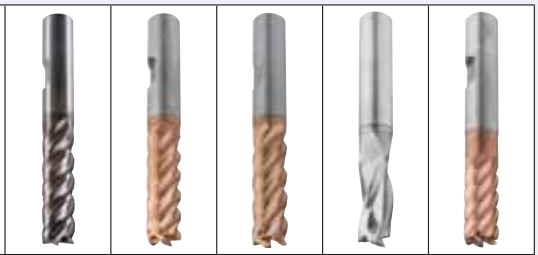


… caused by uneven divisions

ATORN®
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ATORN® Trochoidal milling

INFO



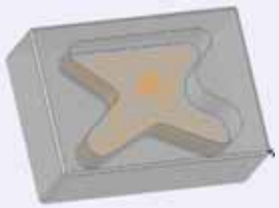
Brand	ATORN®	ATORN®	SARA®	ATORN®	SARA®
Number of cutting edges	5	5	4-6	4	6-8
Diameter range / mm	6-20	6-20	3-20	4-20	2.5-20
Standard	WN	WN	WN	WN	WN
Version	N	N	N	WN	H
Type/profile	TVC	TVC	TVC	TVC	TVC
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	AlTiN	TiAlSiN	TiAlSiN		TiAlSiN
Item number	254155	254157	254153	254159	254154
Page	20-124	20-125	20-125	20-126	20-127
Material groups	Usage recommendations				
Steel < 700 N/mm²	●				
Steel < 1000 N/mm²	●				
Steel < 1400 N/mm²	●				
Stainless steel ferritic/martensitic		●			
Stainless steel austenitic		●			
Stainless steel duplex		●			
Cast iron GG/GTS					
Cast iron GGG					
Titanium alloys			●		
Superalloys Fe/NiCo base < 30 HRc			●		
Superalloys Fe/NiCo base ≥ 30 HRc			●		
Aluminium < 8 % Si				●	
Aluminium ≥ 8 % Si				●	
Copper Cu-alloy				●	
Graphite GRP/CFP/thermoset				●	
Hardened steel < 55 HRc					●
Hardened steel < 60 HRc					●
Hardened steel ≥ 60 HRc					●

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- Reduced tool costs
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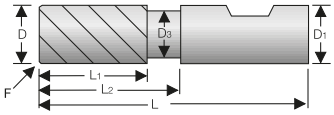
www.AdeQuateSolutions.com

ATORN® Trochoidal end milling cutter (steel)

VHM | Typ N | 44° -45° | e8 | h5 | DIN 6535 HB | Z 5 | AlTiN | TVC | Vc/fz | 20-288

Trochoidal

- With clearance
- **Milling cutter designed for TVC use**
- Reinforced core
- With chip breaker
- **Cutting material: superfine grain solid carbide**
- Rounded chip space for improved chip removal
- **ae max. 20 %**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 250	● 180	● 140															
		Cutting speed Vc m/min.			Please adjust these guidelines according to clamping operation and machine set-up.														



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
6.0	19.0	21.0	62	5.8	6	0.12	5	0.050	**254155** 0060	54,–
8.0	26.0	28.0	68	7.8	8	0.16	5	0.065	254155 0080	71,50
10.0	32.0	32.0	80	9.8	10	0.20	5	0.080	254155 0100	91,–
12.0	38.0	42.0	93	11.8	12	0.24	5	0.095	254155 0120	119,–
16.0	50.0	56.0	108	15.8	16	0.32	5	0.13	254155 0160	205,–
20.0	62.0	70.0	126	19.8	20	0.40	5	0.16	254155 0200	325,–

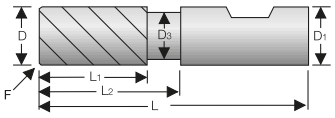
2119

ATORN® Trochoidal end milling cutter (stainless steel)

VHM | Typ N | 37°-40° | e8 | h5 | DIN 6535 HB | Z 5 | TiAlSiN | TVC | Vc/fz | 20-286

Trochoidal

- With clearance
- **Milling cutter designed for TVC use**
- Reinforced core
- With chip breaker
- **Cutting material: superfine grain solid carbide**
- Irregular tooth pitch for a strong head centre
- **ae max. 15 %**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
					● 140	● 100	● 75												
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F mm	Z	● Feed fz stainless steel ferrit./martens. mm/tooth	art.no.	€
6.0	19.0	21.0	62	5.8	6	0.12	5	0.050	**254157** 0060	67,50
8.0	26.0	28.0	68	7.8	8	0.16	5	0.065	254157 0080	88,–
10.0	32.0	35.0	80	9.8	10	0.20	5	0.080	254157 0100	114,–
12.0	38.0	42.0	93	11.8	12	0.24	5	0.095	254157 0120	139,–
16.0	50.0	56.0	108	15.8	16	0.32	5	0.13	254157 0160	240,–
20.0	62.0	70.0	126	19.8	20	0.40	5	0.16	254157 0200	370,–

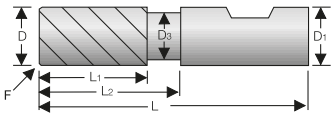
2119

SARA® Trochoidal end milling cutter (titanium)

VHM | Typ N | 37°-40° | e8 | h5 | DIN 6535 HB | Z 4 | Z 5 | Z 6 | TiAlSiN | TVC | Vc/fz | 20-286

Trochoidal

- With clearance
- **Milling cutter designed for TVC use**
- Reinforced core
- With chip breaker
- **Cutting material: superfine grain solid carbide**
- Irregular pitch angle to minimise vibration
- **ae max. 12 %**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
										● 70	● 50	● 35							
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F mm	Z	● Feed fz titanium alloys mm/tooth	art.no.	€
3	10	15	57	5.8	6	0.1	4	0.025	**254153** 0030	51,–
4	13	15	57	5.8	6	0.1	4	0.035	254153 0040	51,–
5	16	20	57	5.8	6	0.1	4	0.040	254153 0050	51,–
6	19	25	57	5.8	6	0.1	5	0.050	254153 0060	51,–
8	25	30	63	7.8	8	0.15	5	0.065	254153 0080	81,50
10	32	35	72	9.8	10	0.2	5	0.080	254153 0100	111,–
12	38	45	83	11.8	12	0.2	6	0.095	254153 0120	146,–
16	42	55	108	15.8	16	0.3	6	0.130	254153 0160	245,–
20	50	70	126	19.8	20	0.4	7	0.160	254153 0200	415,–

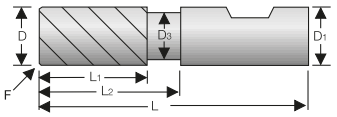
2119

ATORN® Trochoidal end milling cutter (aluminium)

VHM | Typ W | 20° | e8 | h5 | DIN 6535 HB | Z 4 | TVC | Vc/fz | 20-288

Trochoidal

- With clearance
- **Milling cutter designed for TVC use**
- Reinforced core
- **Cutting material: superfine grain solid carbide**
- Polished cutting edges for perfect chip removal
- **ae max. 30 %**



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
												● 600	● 400					
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F mm	Z	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
4.0	13.0	14.0	62	3.8	6	0.08	4	0.06	**254159** 0040	44,–
5.0	16.0	17.5	62	4.8	6	0.10	4	0.08	254159 0050	44,–
6.0	19.0	21.0	62	5.8	6	0.12	4	0.1	254159 0060	44,–
8.0	26.0	28.0	68	7.8	8	0.16	4	0.12	254159 0080	53,–
10.0	32.0	35.0	80	9.8	10	0.20	4	0.15	254159 0100	91,–
12.0	38.0	42.0	93	11.8	12	0.24	4	0.17	254159 0120	123,–
16.0	50.0	56.0	108	15.8	16	0.32	4	0.20	254159 0160	230,–
20.0	62.0	70.0	126	19.8	20	0.40	4	0.25	254159 0200	335,–

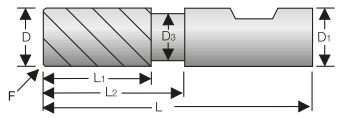
2119

SARA® Trochoidal end milling cutter (hard)

VHM | Typ H | 37°-40° | e8 | h5 | DIN 6535 HB | Z 6 | Z 8+ | TiAlSiN | TVC | Vc/fz | 20-287

Trochoidal

- **For use up to 70 HRc**
- With clearance
- **Milling cutter designed for TVC use**
- Reinforced core
- **Cutting material: superfine grain solid carbide**
- **ae max. 5 %**



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
																● 140	● 100	● 80
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



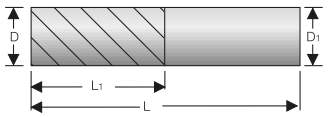
D mm	L1 mm	L2 mm	L mm	D3 mm	D1 mm	F mm	Z	Feed fz hardened steel < 60 HRc mm/tooth	art.no.	€
2.5	4	8	57	5.9	6	0.1	6	0.025	**254154** 0025	44,30
3	5	10	57	5.9	6	0.1	6	0.035	254154 0030	44,30
4	11	13	57	5.8	6	0.1	6	0.045	254154 0040	44,30
5	13	16	57	5.8	6	0.1	6	0.055	254154 0050	44,30
6	13	19	57	5.8	6	0.1	6	0.065	254154 0060	44,30
8	20	25	63	7.8	8	0.15	6	0.080	254154 0080	62,50
10	22	32	72	9.8	10	0.15	6	0.095	254154 0100	87,–
12	26	38	83	11.8	12	0.2	6	0.110	254154 0120	119,–
14	26	42	83	13.8	14	0.2	6	0.120	254154 0140	151,–
16	34	44	92	15.8	16	0.2	8	0.125	254154 0160	198,–
18	34	44	92	17.8	18	0.3	8	0.130	254154 0180	245,–
20	41	54	104	19.8	20	0.3	8	0.140	254154 0200	290,–

2119

SARA® Die-sinking cutter

VHM | 30° | h6 | DIN 6535 HA | Z 3 | Z 4 | TiAlN

- Tapered form
- Constructional dimensions in compliance with factory standard
- For use in extruder, die, mould, model and tool making



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 40-60	● 40-55	● 40-50	● 30-45	● 30-45	○ 20-30	● 40-60	● 40-60								● 30-40		
	Cutting speed Vc m/min. Please adjust these guidelines according to clamping operation and machine set-up.																		



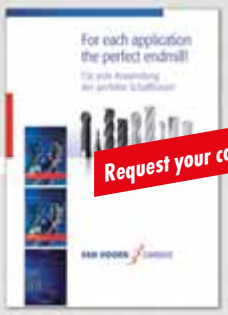
Taper angle one-side °	D mm	L1 mm	L mm	D1 mm	Z	art.no.	€
1	2.5	20	60	4	3	**253002** 1001	36,50
1	3.0	20	60	4	3	253002 1002	40,70
1	4.0	20	65	5	3	253002 1003	41,–
1	5.0	30	75	6	3	253002 1004	50,50
1	6.0	30	75	8	3	253002 1005	69,50
1	8.0	30	75	10	4	253002 1006	89,–
1	10.0	30	75	12	4	253002 1007	103,–
1	12.0	55	100	14	4	253002 1008	182,–
1	16.0	55	100	18	4	253002 1009	280,–
1.5	2.5	20	60	4	3	253002 1501	36,50
1.5	3.0	19	60	4	3	253002 1502	36,50
1.5	4.0	19	60	5	3	253002 1503	40,40
1.5	5.0	35	75	8	3	253002 1504	66,50
1.5	6.0	35	75	8	3	253002 1505	68,–
1.5	8.0	35	75	10	4	253002 1506	87,–
1.5	10.0	38	75	12	4	253002 1507	105,–
1.5	12.0	60	100	16	4	253002 1508	210,–
1.5	16.0	65	100	20	4	253002 1509	355,–
2	2.5	20	60	4	3	253002 2001	36,50
2	3.0	25	60	5	3	253002 2002	40,40
2	3.5	20	60	5	3	253002 2003	40,40
2	4.0	20	60	6	3	253002 2004	44,–
2	5.0	35	75	8	3	253002 2006	74,–
2	6.0	28	75	8	3	253002 2008	64,–
2	6.0	57	100	10	3	253002 2009	118,–
2	8.0	28	75	10	4	253002 2010	85,–
2	8.0	57	100	12	4	253002 2011	136,–
2	10.0	28	75	12	4	253002 2012	109,–
2	12.0	28	75	14	4	253002 2013	159,–

2109

Taper angle one-side °	D mm	L1 mm	L mm	D1 mm	Z	art.no.	€
2	12.0	57	100	16	4	253002 2014	225,–
2	16.0	55	100	20	4	253002 2015	375,–
3	2.5	20	60	5	3	253002 3001	37,–
3	3.0	25	60	6	3	253002 3002	46,30
3	3.0	40	75	8	3	253002 3003	70,–
3	4.0	38	75	8	3	253002 3004	75,50
3	5.0	28	75	8	3	253002 3005	76,50
3	6.0	38	75	10	3	253002 3006	97,50
3	6.0	57	100	12	3	253002 3007	132,–
3	8.0	38	75	12	4	253002 3008	114,–
3	8.0	57	100	14	4	253002 3009	174,–
3	10.0	38	75	14	4	253002 3010	148,–
3	12.0	55	100	18	4	253002 3012	310,–
5	2.5	20	60	6	3	253002 5001	40,60
5	3.0	28	75	8	3	253002 5002	73,–
5	3.0	40	75	10	3	253002 5003	100,–
5	3.5	25	75	8	3	253002 5004	73,–
5	4.0	22	75	8	3	253002 5005	73,–
5	5.0	28	75	10	3	253002 5008	98,50
5	6.0	34	75	12	3	253002 5009	110,–
5	6.0	57	100	16	3	253002 5010	205,–
5	8.0	57	100	18	4	253002 5011	300,–
5	10.0	34	75	16	4	253002 5012	191,–
5	10.0	45	100	18	4	253002 5013	310,–
5	12.0	45	100	20	4	253002 5015	350,–
7	2.5	22	75	8	3	253002 7001	70,–
7	5.0	28	75	12	3	253002 7002	112,–
10	2.5	21	75	10	3	253002 1101	95,–
10	3.0	25	75	12	3	253002 1102	117,–

2109

VAN HOORN CARBIDE



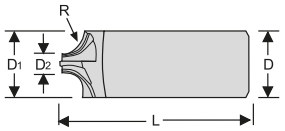
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The perfect shank design
for every application!



SARA® Quadrant milling cutter

VHM | Werks-norm | Typ N | DIN 6535 HA | Z 4 | AlCrN | Vc/fz | 20-285



- Factory standard
- **Design**: straight-fluted, no profile distortion
- **Application**: for rounding off and deburring edges

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●	●	●	○	●	●		●	●	○	○	●		●	●	○
		70-100	60-90	35-60	35-70	25-60	25-60	70-95	60-80		10-30	10-30	140-500	140-500	85-190		65-90	65-90	40-60
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

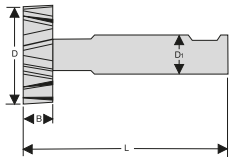


D mm	L mm	R mm	D1 mm	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
8.0	70	0.5	7	0.004	**291310** 0050	80,40
8.0	70	1.0	6	0.009	291310 0100	80,80
10.0	75	1.5	7	0.009	291310 0150	85,60
10.0	75	2.0	6	0.015	291310 0200	85,60
12.0	75	2.5	7	0.015	291310 0250	93,–
12.0	75	3.0	6	0.015	291310 0300	93,–
16.0	80	3.5	9	0.015	291310 0350	118,–
16.0	80	4.0	8	0.033	291310 0400	118,–
16.0	80	4.5	7	0.033	291310 0450	118,–
20.0	80	5.0	10	0.033	291310 0500	165,50
20.0	80	6.0	8	0.055	291310 0600	165,50
25.0	100	8.0	9	0.064	291310 0800	272,–
25.0	100	10.0	5	0.073	291310 1000	277,–

2107

SARA® Slotting cutter

VHM | DIN 850 | Typ N | DIN 1835 B | Z 6 | Z 8+ | AlCrN | Vc/fz | 20-269



- For keyway milling in accordance with DIN 6888
- For slot milling
- Circumferential cutting
- With cross-cut toothing
- in accordance with DIN 850

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●					●	●										
		90-120	60-80					100-120	80-100										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		



D h11 mm	B mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10.5	2	50	4.0	6	0.036	**292004** 1052	210,–
10.5	3	50	4.2	6	0.036	292004 1053	230,–
13.5	2	56	4.6	8	0.036	292004 1352	285,–
13.5	3	56	4.6	8	0.036	292004 1353	305,–
13.5	4	56	4.6	8	0.036	292004 1354	320,–
16.5	3	56	4.6	10	0.036	292004 1653	330,–
16.5	4	56	4.6	10	0.036	292004 1654	350,–
19.5	3	63	5.6	10	0.039	292004 1953	335,–
19.5	4	63	5.6	10	0.039	292004 1954	355,–
22.5	4	63	6.6	10	0.039	292004 2254	420,–
25.5	5	63	7.5	10	0.039	292004 2555	475,–
28.5	5	63	8.5	10	0.041	292004 2855	549,–
32.5	5	71	8.5	10	0.041	292004 3255	639,–
38.5	10	71	11.8	10	0.041	292004 3851	709,–
45.5	10	71	11.8	10	0.041	292004 4551	759,–

2152

SARA® Angle milling cutter

VHM | DIN 1833C | DIN 1833D | Typ N | DIN 1835 B | Z 6 | Z 8+ | AlCrN |  | i Vc/fz | 20-270

- For milling guides in tool and machine manufacturing.

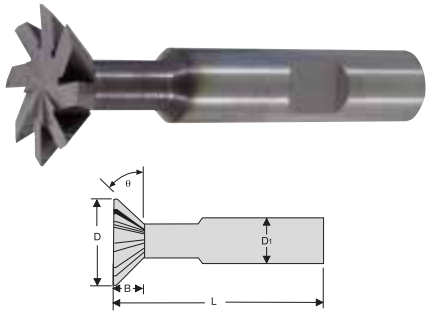
material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 90-120	● 60-80					● 100-120	● 80-100										
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

Form C, 45°

D js16 mm	B mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16	4	60	6.7	0.2	6	0.034	**292000** 0160	355,–
20	5	63	7	0.2	8	0.035	292000 0200	410,–
22	6	67	8	0.2	8	0.035	292000 0220	460,–
25	6.3	67	8	0.2	8	0.035	292000 0250	509,–
28	7.5	80	8.5	0.2	9	0.035	292000 0280	599,–
32	8	71	13	0.2	9	0.036	292000 0320	689,–
38	10	80	15	0.2	9	0.036	292000 0380	779,–

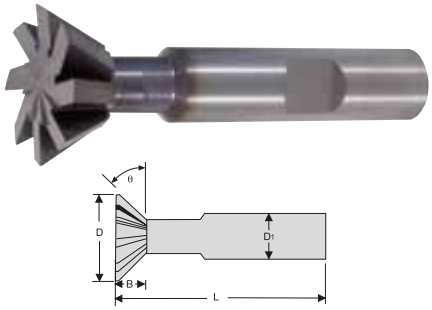
2152



Form C, 60°

D js16 mm	B mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16	6.3	60	6.7	0.2	6	0.034	**292001** 0160	340,–
20	8	63	7	0.2	8	0.035	292001 0200	390,–
22	9	67	8	0.2	8	0.035	292001 0220	440,–
25	10	67	8	0.2	8	0.035	292001 0250	480,–
28	11	80	8.5	0.2	9	0.035	292001 0280	569,–
32	12.5	71	13	0.2	9	0.036	292001 0320	649,–
38	16	80	15	0.2	9	0.036	292001 0380	749,–

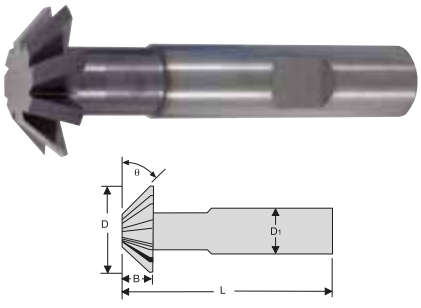
2152



Form D, 45°

D js16 mm	B mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16	4	60	6.7	0.2	6	0.034	**292002** 0160	325,–
20	5	63	7	0.2	8	0.035	292002 0200	370,–
22	6	67	8	0.2	8	0.035	292002 0220	420,–
25	6.3	67	8	0.2	8	0.035	292002 0250	455,–
28	7.5	80	8.5	0.2	9	0.035	292002 0280	549,–
32	8	71	13	0.2	9	0.036	292002 0320	619,–
38	10	80	15	0.2	9	0.036	292002 0380	709,–

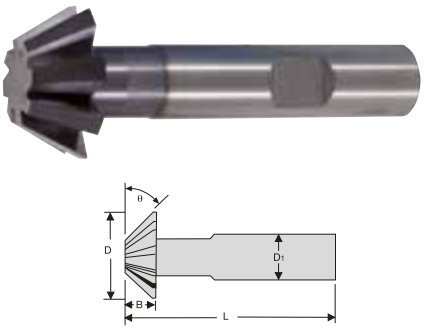
2152



Form D, 60°

D js16 mm	B mm	L mm	D1 mm	F x 45° mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
16	6.3	60	6.7	0.2	6	0.034	**292003** 0160	325,–
20	8	63	7	0.2	8	0.035	292003 0200	370,–
22	9	67	8	0.2	8	0.035	292003 0220	420,–
25	10	67	8	0.2	8	0.035	292003 0250	455,–
28	11	80	8.5	0.2	9	0.035	292003 0280	549,–
32	12.5	71	13	0.2	9	0.036	292003 0320	619,–
38	16	80	15	0.2	9	0.036	292003 0380	709,–

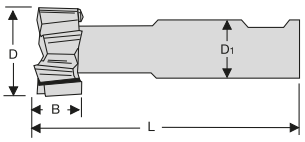
2152



SARA® T-slot milling cutter

VHM | DIN 851 | Typ N | NF | DIN 6535 HB | Z 6 | AlCrN | Vc/fz | 20-269

- For milling T-slots in accordance with DIN 650
- Circumferential cutting
- With cross-cut toothing



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 90-120	● 60-80					● 100-120	● 80-100										
	Cutting speed Vc m/min.	Please adjust these guidelines according to clamping operation and machine set-up.																	

Standard



D h11 mm	B mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Type N art.no.	€
12.5	6	57	5	6	0.033	**292005** 1256	345,–
16	8	62	7	6	0.034	292005 1680	435,–
18	8	70	8	6	0.034	292005 1880	445,–
21	9	74	10	6	0.034	292005 2190	519,–
25	11	82	12	6	0.034	292005 2511	599,–
28	12	85	13	6	0.35	292005 2812	659,–
32	14	90	15	6	0.045	292005 3214	769,–

2152

Standard, type NF



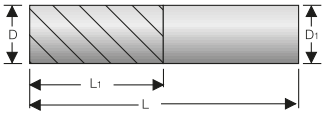
D h11 mm	B mm	L mm	D1 mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	Type NF art.no.	€
12.5	6	57	5	6	0.033	**292006** 1256	380,–
16	8	62	7	6	0.034	292006 1608	480,–
18	8	70	8	6	0.034	292006 1808	490,–
21	9	74	10	6	0.034	292006 2109	569,–
25	11	82	12	6	0.034	292006 2511	659,–
28	12	85	13	6	0.035	292006 2812	729,–
32	14	90	15	6	0.045	292006 3214	849,–

2152

SARA® Engraving cutter

VHM | Werks-norm | Typ N | 60° | DIN 6535 HA | Z 1

- 1 cutting edge, centre cutting
- For engraving plastics and non-ferrous metals
- Lettering width 0.1 mm



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		○ 40-60	○ 25-45	○ 15-35	○	○ 20-40	20-40	○ 35-55					● 120-140	● 85-105	○ 160-180				
	Cutting speed Vc m/min.	Please adjust these guidelines according to clamping operation and machine set-up.																	



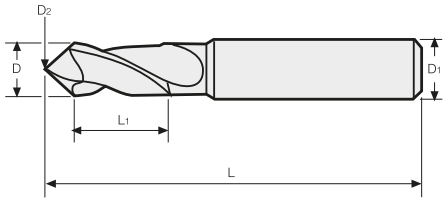
D mm	D1 mm	L mm	L1 mm	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
3.0	3.0	40	15	0.01	**251545** 0030	33,30
4.0	4.0	40	15	0.02	251545 0040	35,60
6.0	6.0	40	15	0.03	251545 0060	38,60

2162

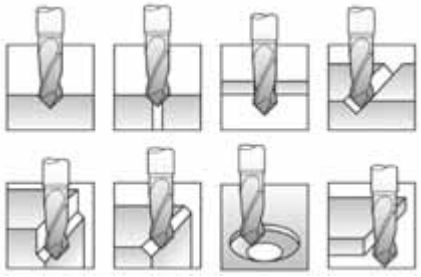
SARA® MULTI-V multifunction tool

VHM | Typ N | 60° | 90° | 120° | 30° | Z 2 | TiAlN | Vc/fz | 20-251

- Reinforced straight shank
- **Cutting material: K15F solid carbide, TiAlN-coated**
- Milling, drilling and countersinking with a single tool
- Especially suitable for use on CNC machining centres
- Up to eight machining operations without tool change



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●	○	○		●	●	○	○		●	○	○				
		40-75	35-40	30-35	30-35	30-35		35-40	30-35	25-30	10-20		100-150	50-120	60-80				
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		





D mm	L mm	L1 mm	D1 mm	D2 mm	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	60° art.no.	€	90° art.no.	€	120° art.no.	€
0.5	39	1.0	3	0.05	0.002	0.004			**251549** 0050	41,10		
0.6	39	1.2	3	0.06	0.002	0.004			251549 0060	41,10		
0.7	39	1.4	3	0.07	0.002	0.004			251549 0070	41,10		
0.8	39	1.6	3	0.08	0.002	0.004			251549 0080	41,10		
0.9	39	1.8	3	0.09	0.002	0.004			251549 0090	41,10		
1.0	39	2.0	3	0.10	0.003	0.006	**251546** 0100	49,90	251549 0100	41,10	**251541** 0100	41,10
1.2	39	2.4	3	0.12	0.003	0.006			251549 0120	41,10		
1.4	39	2.8	3	0.14	0.003	0.006			251549 0140	41,10		
1.5	39	3.0	3	0.15	0.003	0.006	251546 0150	49,90	251549 0150	41,10	251541 0150	41,10
1.8	39	3.6	3	0.18	0.003	0.006			251549 0180	41,10		
2.0	39	4.0	3	0.20	0.004	0.008	251546 0200	49,90	251549 0200	41,10	251541 0200	41,10
2.5	39	5.0	3	0.25	0.004	0.008	251546 0250	49,90	251549 0250	41,10	251541 0250	41,10
3.0	50	6.0	4	0.30	0.004	0.008	251546 0300	63,–	251549 0300	50,50	251541 0300	51,50
4.0	50	8.0	5	0.40	0.004	0.008	251546 0400	66,–	251549 0400	52,50	251541 0400	53,50
5.0	50	10.0	6	0.50	0.006	0.013	251546 0500	69,50	251549 0500	55,50	251541 0500	56,–
6.0	60	12.0	8	0.60	0.006	0.013	251546 0600	85,–	251549 0600	68,–	251541 0600	69,–
8.0	70	16.0	10	0.80	0.012	0.025	251546 0800	118,–	251549 0800	94,–	251541 0800	95,50
10.0	70	18.0	12	1.00	0.012	0.025	251546 1000	151,–	251549 1000	121,–	251541 1000	123,–
12.0	70	20.0	12	1.20	0.017	0.04	251546 1200	149,–	251549 1200	119,–	251541 1200	121,–
16.0	80	26.0	16	1.60	0.02	0.05	251546 1600	215,–	251549 1600	172,–	251541 1600	175,–
20.0	100	32.0	20	2.00	0.027	0.062	251546 2000	370,–	251549 2000	295,–	251541 2000	300,–
							2108		2108		2108	

Safety in the workplace

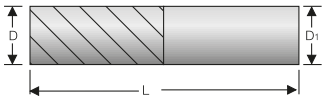
Please protect your eyes, ears and respiratory system!



ATORN® Deburring tool

VHM | Typ N | 60° | 90° | 120° | DIN 6535 HA | Z 3 | Z 4 | Z 5 | Z 6 | TiAlN

- **Ideal for chamfering and deburring workpiece edges, and for contour milling**



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	●	●	●	●	○	○	●	●	○	○	○							
	160-180	120-140	100-120	80-100	60-80	60-80	140-160	140-160	80-100	80-100	60-80							
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.



D mm	L mm	D1 mm	Z	60° art.no.	60° €	90° art.no.	90° €	120° art.no.	120° €
1.0	38	3	3	**251550** 0010	24,30	**251551** 0010	24,30	**251552** 0010	24,30
2.0	38	3	3	251550 0020	24,30	251551 0020	24,30	251552 0020	24,30
3.0	38	3	3	251550 0030	24,30	251551 0030	24,30	251552 0030	24,30
4.0	51	4	4	251550 0040	25,90	251551 0040	25,90	251552 0040	25,90
6.0	64	6	4	251550 0060	31,90	251551 0060	31,90	251552 0060	31,90
8.0	64	8	5	251550 0080	39,80	251551 0080	39,80	251552 0080	39,80
10.0	70	10	6	251550 0100	47,–	251551 0100	47,–	251552 0100	47,–
12.0	78	12	6	251550 0120	69,–	251551 0120	69,–	251552 0120	69,–
16.0	89	16	6	251550 0160	117,–	251551 0160	117,–	251552 0160	117,–
				2119		2119		2119	

90° deburring tool set

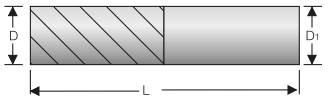


Contents	art.no.	€
Ø 6, 8, 10, 12 mm (1 of each)	**251551** 0001	180,–
	2119	

SARA® Deburring tool

VHM | Typ N | 60° | 90° | 120° | DIN 6535 HA | Z 4 | TiAlN

- **4 cutting edges**
- Ideal for chamfering and deburring workpiece edges, and for contour milling
- **Cutting material: superfine grain solid carbide, TiAlN-coated**



material

● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
	< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	●	●	●	●	○	○	●	●	○	○	○							
	160-180	120-140	100-120	80-100	60-80	60-80	140-160	140-160	80-100	80-100	60-80							
Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

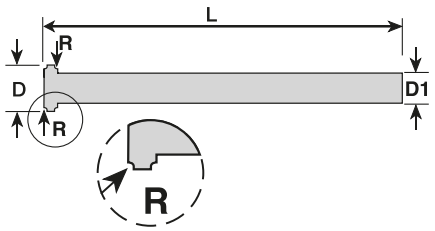


D mm	L mm	D1 mm	Z	60° art.no.	60° €	90° art.no.	90° €	120° art.no.	120° €
4	51	4	4	**251538** 0040	21,50	**251540** 0040	21,50	**255165** 0040	21,50
6	64	6	4	251538 0060	26,50	251540 0060	26,50	255165 0060	26,50
8	64	8	4	251538 0080	33,–	251540 0080	33,–	255165 0080	33,–
10	70	10	4	251538 0100	38,90	251540 0100	38,90	255165 0100	38,90
12	78	12	4	251538 0120	57,50	251540 0120	57,50	255165 0120	57,50
				2112		2112		2112	

SARA® Front and rear-side quadrant milling cutter

VHM | DIN 6535 HA | Z 4 | TiAlN

- **For linear and circular front and rear-side radius milling**



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 40-65	● 40-50	● 25-35	● 30-40	● 15-20	● 15-20	● 25-35	● 25-35				● 150-230	● 80-115	● 40-60		● 20-25	● 15-20	
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														



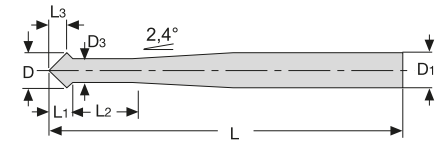
D mm	D1 mm	L mm	R mm	Z	art.no.	€
8.0	6	100	0.2	4	**291320** 0002	119,–
8.0	6	100	0.3	4	291320 0003	119,–
8.0	6	100	0.4	4	291320 0004	119,–
8.0	6	100	0.5	4	291320 0005	119,–
10.0	6	100	0.8	4	291320 0008	125,–
10.0	6	100	1.0	4	291320 0010	125,–
10.0	6	100	1.2	4	291320 0012	125,–
10.0	6	100	1.5	4	291320 0015	125,–

2162

ATORN® Front and rear-side deburring tool

VHM | 90° | DIN 6535 HA | Z 4 | TiAlN

- **For linear and circular front and rear-side deburring or chamfering**



250004 0040



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 60-120	● 60-90	● 50-80	● 70-100	○ 60-90	○ 60-90	● 40-80	● 40-80	○ 20-40	○ 20-40	○ 20-30	○ 100-200	○ 60-140	○ 60-100		● 50-60		
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														



250004 0040



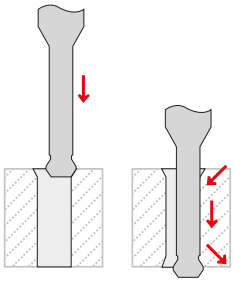
D mm	D1 h6 mm	D2 mm	L mm	L1 mm	L3 mm	L2 mm	D3 mm	art.no.	€
3.9	4	-	75	2.95	1.95	10	1.9	**250004** 0040	68,50
5.8	6	0.8	100	3.8	1.9	-	-	250004 0060	76,–
7.8	6	6.0	100	1.8	0.9	-	-	250004 0080	98,–
9.8	6	6.0	100	3.8	1.9	-	-	250004 0100	121,–
11.8	6	6.0	100	5.8	2.9	-	-	250004 0120	146,–

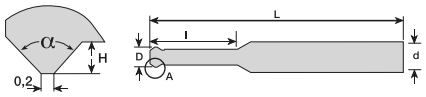
2108

ATORN® Front and rear-side deburring tool

VHM | 90° | DIN 6535 HA | Z 3 | TiAlN

- **For linear and circular front and rear-side deburring or chamfering**
- Two cutting edges
- Spiral-fluted for an easy cut





material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 60-120	● 60-90	● 50-80	● 70-100	○ 60-90	○ 60-90	● 40-80	● 40-80	○ 20-40	○ 20-40	○ 20-30	○ 100-200	○ 60-140	○ 60-100		● 50-60		
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

90°



D mm	d mm	L mm	l mm	H mm	a °	art.no.	€
1.5	3	39	3.8	0.3	90	**250005** 0015	46,60
2.0	3	39	5.0	0.4	90	250005 0020	46,60
2.5	3	39	6.3	0.5	90	250005 0025	46,60
3.0	3	39	7.5	0.6	90	250005 0030	46,60
3.5	4	51	8.8	0.7	90	250005 0035	49,40
4.0	4	51	10.0	0.8	90	250005 0040	49,40
4.5	5	51	11.3	1.0	90	250005 0045	51,–
5.0	5	51	12.5	1.1	90	250005 0050	51,–
5.5	6	51	13.8	1.2	90	250005 0055	54,–
6.0	6	51	15.0	1.5	90	250005 0060	54,–

2108

90° for large projecting lengths

D mm	d mm	L mm	l mm	H mm	a °	art.no.	€
3.0	3	39	12.0	0.6	90	**250006** 0030	46,60
3.5	4	51	14.0	0.7	90	250006 0035	49,40
4.0	4	51	16.0	0.8	90	250006 0040	49,40
4.5	5	51	18.0	1.0	90	250006 0045	51,–
5.0	5	51	20.0	1.1	90	250006 0050	51,–
5.5	6	58	22.0	1.2	90	250006 0055	54,–
6.0	6	58	24.0	1.5	90	250006 0060	54,–
8.0	8	64	28.0	1.6	90	250006 0080	70,–
10.0	10	73	35.0	1.8	90	250006 0100	91,–
12.0	12	84	42.0	2.1	90	250006 0120	111,–

2108



... without shrinkage

ATORN®
High quality for great performance

Orbitool *deburring tool*®For machining on the inside



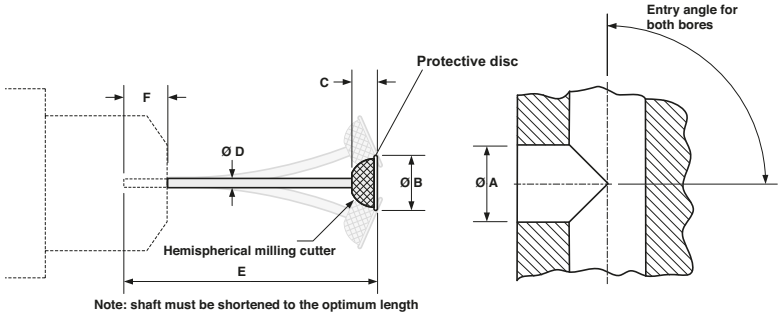


Vc/fz 20-301

- **Deburring tool system for intersecting bores**
- Can be used reliably in automated applications with CNC machines
- Fully integrated into the production process **from 2.0 mm bore diameter**
- Free of burrs with no manual finishing
- With the ORBITOOL®deburring tool, the deburring process is easy to control. Material abrasion only occurs on the edges of the workpiece. The (bore) surfaces are not touched thanks to the protective disc. Intact surfaces are not scratched and workpieces are not damaged. This makes work considerably easier, especially with precision parts. Once the protective disc has passed the edges, the cutting surfaces of the deburring tool can cut away material from the edges. Deburring is carried out as the milling cutter moves in a spiral through the axial bore to the centre of the radial bore. In the case of manual deburring with an electric grinding machine, the burrs are removed by forward and backward movements.

Advantages:

- Consistent results – consistent quality
- Increased throughput capacity/shorter cycle times
- Reduced deburring costs
- No additional deburring work required
- No backlogs in the machining process
- Ideal for CNC machining

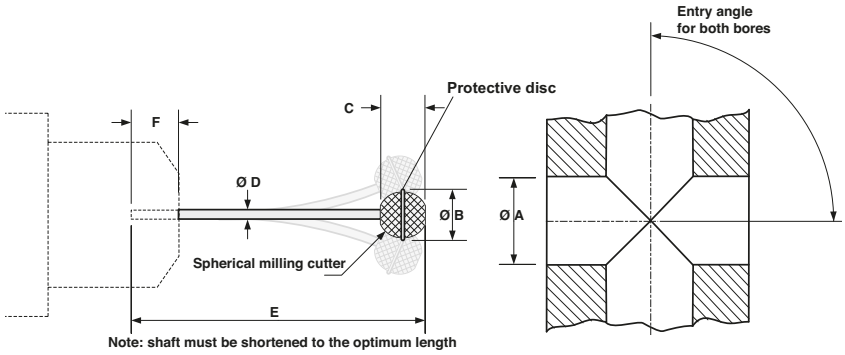




Hemisphere

Dimensions	Approach angle 90°/ A min. mm	Approach angle 60°/ A min. mm	Approach angle 45°/ A min. mm	B mm	C mm	D mm	E mm	F min. mm	F max. mm	art.no.	€
1.90	2.0	On request	On request	-	2.1	0.78	60	3.8	9.2	**250010** 0001	215,–
2.38	3.2	4.5	6.2	2.7	2.1	0.78	60	3.8	9.2	250010 0002	181,–
3.18	4.4	6.0	8.2	3.6	2.4	1.14	100	3.8	9.2	250010 0003	181,–
3.97	5.5	7.5	10.2	4.4	2.8	1.55	100	3.8	14.2	250010 0004	205,–
4.77	6.6	9.0	12.3	5.2	3.2	1.55	100	3.8	14.2	250010 0005	205,–
6.35	8.8	12.0	16.4	6.9	3.9	2.39	150	3.8	14.2	250010 0006	205,–
9.58	13.2	18.0	22.5	10.3	5.5	2.39	150	3.8	18.3	250010 0007	230,–

2147





Ball

Dimensions	Approach angle 90°/ A min. mm	Approach angle 60°/ A min. mm	Approach angle 45°/ A min. mm	B mm	C mm	D mm	E mm	F min. mm	F max. mm	art.no.	€
1.9	2.0	On request	On request	-	3.2	0.78	60	3.8	9.2	**250011** 0001	300,–
2.38	3.2	4.5	6.2	2.7	3.2	0.78	60	3.8	9.2	250011 0002	265,–
3.18	4.4	6.0	8.2	3.6	3.9	1.14	100	3.8	9.2	250011 0003	265,–
3.97	5.5	7.5	10.2	4.4	4.6	1.55	100	3.8	14.2	250011 0004	315,–
4.77	6.6	9.0	12.3	5.2	5.4	1.55	100	3.8	14.2	250011 0005	315,–
6.35	8.8	12.0	16.4	6.9	6.8	2.39	150	3.8	14.2	250011 0006	315,–
9.58	13.2	18.0	22.5	10.3	10.1	2.39	150	3.8	18.3	250011 0007	380,–

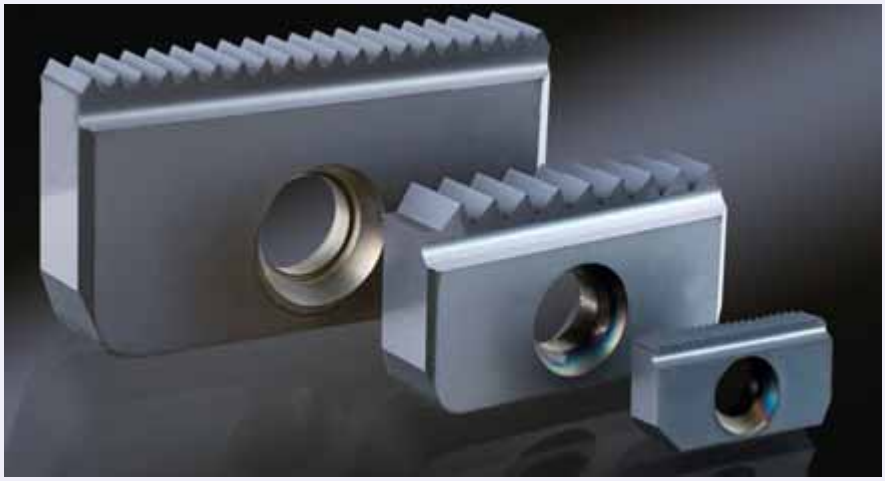
2147

SARA® Thread milling / circular cutting

INFO

ATORN thread milling cutters are specially designed for use on CNC milling machines and machining centres which have 3-axis control with helical interpolation.





Advantages and application

- Male and female threads
- For through-hole and blind bore threads
- Synchronous and up-cut milling and change of the axial feed direction
- Enables production of straight and conical threads and of all standard thread variants
- Thread production with varying tolerances
- Optimal clamping
- Short chips
- Low cutting pressure

HM quality AMT7

TiAlN-coated ultra-fine grain quality for universal applications with all materials at medium to high cutting speeds

Overview of solid carbide thread milling cutters

					
Brand	ATORN® SARA®	ATORN® SARA®	ATORN® SARA®	ATORN® SARA®	ATORN®
Thread	M MF	G55 BSF BSP	M	M	M
Thread depth	2.2 x D	1.5 x D	2 x D	2 x D	2 x D
Size range	4 - 27	⅛" - 1"	1 - 20	2 - 16	6 - 23
Coating	TiAlN	TiAlN	TiAlN	TiAlN	TiAlN
Application				Hard machining	DMT
Item number	258002.... 258020....	258003.... 258021....	258010.... 258022....	258011.... 258023....	258100....
Page	20-137	20-138	20-138	20-139	20-139
Material groups	Usage recommendations				
Steel < 700 N/mm²	●	●	●		●
Steel < 1000 N/mm²	●	●	●		●
Steel < 1400 N/mm²	●	●	●		●
Stainless steel ferritic/martensitic	●	●	●		●
Stainless steel austenitic	●	●	●		●
Stainless steel duplex	○	○	○		●
Cast iron GG/GTS	●	●	●		●
Cast iron GGG	○	○	○		●
Titanium alloys	●	●	●	●	
Superalloys Fe/NiCo base < 30 HRc	○	○	○	●	
Superalloys Fe/NiCo base ≥ 30 HRc	○	○	○	●	
Aluminium < 8 % Si	●	●	●		●
Aluminium ≥ 8 % Si	●	●	●		●
Copper Cu-alloy	○	○	○		●
Graphite GRP/CFP/thermoset	○	○	○		●
Hardened steel < 55 HRc				●	
Hardened steel < 60 HRc				●	
Hardened steel ≥ 60 HRc				●	

Modular thread/circular milling cutters

			
Brand	ATORN®	ATORN®	ATORN®
Number of cutting edges	1 - 2	3 - 6	1 - 6
Coolant bore	IC	IC	IC
ISO milling insert type	ISO UN BSW NPT	ISO BSE	ISO UN BSW, BSF NPT TR
Item number	25900.	26300.	26600. ....
Page	20-140 - 20-143	20-144 - 20-146	20-147 - 20-152
Material groups	Usage recommendations		
Steel < 700 N/mm²	●	●	●
Steel < 1000 N/mm²	●	●	●
Steel < 1400 N/mm²	●	●	●
Stainless steel ferritic/martensitic	●	●	●
Stainless steel austenitic	●	○	●
Stainless steel duplex			
Cast iron GG/GTS	●	●	●
Cast iron GGG	●	●	●
Titanium alloys		○	
Superalloys Fe/NiCo base < 30 HRc		○	
Superalloys Fe/NiCo base ≥ 30 HRc			
Aluminium < 8 % Si	●	○	●
Aluminium ≥ 8 % Si	●	○	●
Copper Cu-alloy	●	○	●
Graphite GRP/CFP/thermoset	○		○
Hardened steel < 55 HRc		○	
Hardened steel < 60 HRc			
Hardened steel ≥ 60 HRc			

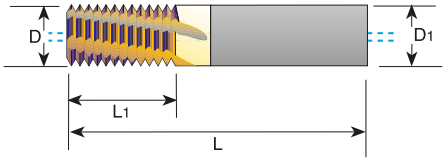
ATORN® Thread end milling cutter

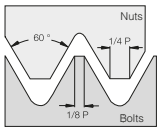
VHM    20-289

- The thread is machined in just one operation
- Chip flutes permit an easy cut
- Short machine times thanks to multiple (3-6) cutting edges
- Operating range from dimension D = 2.2 mm
- Allows thread cutting in blind bores up to the shoulder
- One tool for right-hand and left-hand threads
- One tool for material groups P, M, K, S and H
- Excellent surface finish quality
- Long service life due to special multi-layer coating
- Low cutting pressure makes it possible to machine thin-walled workpieces
- **Cutting material: AMT7 solid carbide, multi-layer TiAlN coating for universal applications**
- **Through-hole version (internal cooling outlet in flute) available on request!**



Solid carbide thread end milling cutter for the following thread types available on request:
-UN
-BSPT
-NPT
-NPS
-NPTF
-NPSF
-external threads, metr. full profile
-external threads, UN



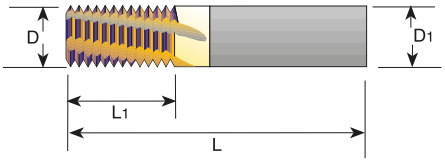


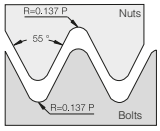


Metric, full profile, ISO 60°, internal, with internal coolant supply

Designation	Pitch mm	Standard thread	Fine thread	D mm	D1 mm	L1 mm	L mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	ATORN® art.no.	ATORN® €	SARA® art.no.	SARA® €
MTB06038C10 0.5 ISO	0.5	-	Ø ≥ 5	3.8	6	10.3	58	3	0.03	**258002** 0002	176,–	**258020** 0002	136,–
MTB06031C7 0.7 ISO	0.7	M4	Ø ≥ 5	3.1	6	7.4	58	3	0.03	258002 0003	176,–	258020 0003	136,–
MTB06045C10 0.75 ISO	0.75	-	Ø ≥ 6	4.5	6	10.1	58	3	0.03	258002 0004	176,–	258020 0004	136,–
MTB06038C9 0.8 ISO	0.8	M5	Ø ≥ 6	3.8	6	9.2	58	3	0.03	258002 0005	176,–	258020 0005	136,–
MTB06046C10 1.0 ISO	1.0	M6	Ø ≥ 7	4.6	6	10.5	58	3	0.03	258002 0010	176,–	258020 0010	136,–
MTB06046C14 1.0 ISO	1.0	M6	Ø ≥ 7	4.6	6	14.5	58	3	0.03	258002 0015	210,–	258020 0015	136,–
MTB0606C12 1.0 ISO	1.0	-	Ø ≥ 9	6.0	6	12.5	58	3	0.03	258002 0020	176,–		
MTB0808D16 1.0 ISO	1.0	-	Ø ≥ 10	8.0	8	16.5	64	4	0.04	258002 0030	225,–	258020 0030	173,–
MTB0606C14 1.25 ISO	1.25	M8	Ø ≥ 10	6.0	6	14.4	58	3	0.03	258002 0040	176,–	258020 0040	136,–
MTB0606C19 1.25 ISO	1.25	M8	Ø ≥ 10	6.0	6	19.4	58	3	0.03	258002 0045	210,–		
MTB08078C17 1.5 ISO	1.5	M10	Ø ≥ 12	7.8	8	17.0	64	3	0.04	258002 0050	225,–	258020 0050	173,–
MTB08078C24 1.5 ISO	1.5	M10	Ø ≥ 12	7.8	8	24.8	76	3	0.04	258002 0055	270,–		
MTB1010D21 1.5 ISO	1.5	-	Ø ≥ 14	10.0	10	21.8	73	4	0.05	258002 0060	270,–		
MTB1212D26 1.5 ISO	1.5	-	Ø ≥ 16	12.0	12	26.3	84	4	0.05	258002 0065	325,–		
MTB1616F33 1.5 ISO	1.5	-	Ø ≥ 20	16.0	16	33.8	105	6	0.07	258002 0070	465,–		
MTB1009C20 1.75 ISO	1.75	M12	Ø ≥ 12	9.0	10	20.1	73	3	0.05	258002 0080	270,–	258020 0080	205,–
MTB1009C28 1.75 ISO	1.75	M12	Ø ≥ 12	9.0	10	28.9	73	3	0.05	258002 0085	320,–		
MTB1010C27 2.0 ISO	2.0	M14	Ø ≥ 15	10.0	10	27.0	73	3	0.05	258002 0090	270,–		
MTB12118D27 2.0 ISO	2.0	M16	Ø ≥ 17	11.8	12	27.0	84	4	0.05	258002 0100	325,–	258020 0100	250,–
MTB12118D39 2.0 ISO	2.0	M16	Ø ≥ 17	11.8	12	39.0	105	4	0.05	258002 0105	390,–		
MTB2020F41 2.0 ISO	2.0	-	Ø ≥ 26	20.0	20	41.0	105	6	0.08	258002 0110	579,–		
MTB1615E33 2.5 ISO	2.5	M20	Ø ≥ 22	15.0	16	33.8	105	5	0.07	258002 0120	465,–		
MTB1615E48 2.5 ISO	2.5	M20	Ø ≥ 22	15.0	16	48.8	105	5	0.07	258002 0125	559,–		
MTB2018D40 3.0 ISO	3.0	M24	Ø ≥ 25	18.0	20	40.5	105	4	0.08	258002 0130	579,–		
MTB2018D58 3.0 ISO	3.0	M24	Ø ≥ 25	18.0	20	58.5	120	4	0.08	258002 0135	689,–		
MTB2020D43 3.0 ISO	3.0	M27	Ø ≥ 27	20.0	20	43.5	105	4	0.08	258002 0140	579,–		
										2115		2166	

Continued on next page >>>





Ww 55° internal = external

Designation	Pitch TPI	D mm	D1 mm	L1 mm	L mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	ATORN art.no.	ATORN €	SARA art.no.	SARA €
MT0606C9 28W	28	6.0	6	9.5	58	3	0.03	**258003** 0010	176,–	**258021** 0010	136,–
MT0808C14 19W	19	8.0	8	14.0	64	3	0.04	258003 0020	225,–	258021 0020	173,–
MT1212D19 14W	14	12.0	12	19.0	84	4	0.05	258003 0030	325,–	258021 0030	250,–
MT1212D26 14W	14	12.0	12	26.3	84	4	0.05	258003 0035	390,–		
MT1212C24 11W	11	12.0	12	24.2	84	3	0.05	258003 0040	325,–		
MT1616D38 11W	11	16.0	16	38.1	105	4	0.07	258003 0050	465,–	258021 0050	360,–
MT2020E47 11W	11	20.0	20	47.3	105	5	0.08	258003 0060	579,–		
								2115		2166	

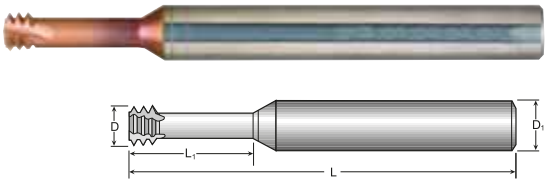
ATORN® Thread end milling cutter for small bores

VHM HSC Vc/fz 20-289

- **Especially for small bores, with straight shank**
- Thread cutting from M1 x 0.25 mm, **thread depth up to 2 x D1**
- **Version for thread depths up to 3 x D1 available on request**
- Suitable for HSC, extremely low cutting pressure, excellent surface finish quality
- Allows thread cutting in blind bores up to the shoulder
- Long service life due to special multi-layer coating
- One tool for right-hand and left-hand threads
- **Cutting material: AMT7 solid carbide, multi-layer TiAlN coating for universal applications**
- **MTSH version for hard machining up to 62 HRc available on request!**







Metric, full profile, ISO 60°, internal

Designation	Pitch mm	Standard thread	D mm	D1 mm	L1 mm	L mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	ATORN art.no.	ATORN €	SARA art.no.	SARA €
MTS03007C2 0.25 ISO	0.25	M1	0.72	3	2.5	39	3	0.04	**258010** 0010	118,–		
MTS06016C4 0.4 ISO	0.4	M2	1.53	6	4.5	58	3	0.04	258010 0020	118,–	**258022** 0020	91,50
MTS06017C5 0.45 ISO	0.45	M2.2	1.65	6	5.0	58	3	0.04	258010 0022	118,–		
MTS0602C5 0.45 ISO	0.45	M2.5	1.95	6	5.5	58	3	0.04	258010 0025	118,–	258022 0025	91,50
MTS06024C6 0.5 ISO	0.5	M3	2.37	6	6.5	58	3	0.04	258010 0030	118,–	258022 0030	91,50
MTS06028C7 0.6 ISO	0.6	M3.5	2.75	6	7.5	58	3	0.05	258010 0035	118,–	258022 0035	91,50
MTS06031C9 0.7 ISO	0.7	M4	3.10	6	9.0	58	3	0.05	258010 0040	118,–	258022 0040	91,50
MTS06038C12 0.8 ISO	0.8	M5	3.80	6	12.5	58	3	0.05	258010 0050	118,–	258022 0050	91,50
MTS06047C14 1.0 ISO	1.0	M6	4.65	6	14.0	58	3	0.06	258010 0060	118,–	258022 0060	91,50
MTS0606C18 1.25 ISO	1.25	M8	6.00	6	18.0	58	3	0.07	258010 0080	118,–	258022 0080	91,50
MTS08078C23 1.5 ISO	1.5	M10	7.80	8	23.0	64	3	0.07	258010 0100	158,–	258022 0100	122,–
MTS01009C26 1.75 ISO	1.75	M12	9.00	10	26.0	73	3	0.07	258010 0120	182,–	258022 0120	140,–
MTS12118D35 2.0 ISO	2.0	M16	11.80	12	35.0	84	4	0.07	258010 0160	260,–		
MTS1615E43 2.5 ISO	2.5	M20	15.00	16	43.0	105	5	0.07	258010 0200	330,–		
									2115		2166	

Continued on next page >>>

Code M04, anti-clockwise

Metric, full profile, ISO 60°, internal, for hard machining up to 62 HRc, anticlockwise rotation (code M04)

Designation	Pitch mm	Standard thread	D mm	D1 mm	L1 mm	L mm	Z mm	Feed fz hardened steel ≥ 60 HRc mm/tooth	ATORN art.no.	ATORN €	SARA art.no.	SARA €
MTSH06016C4 0,4 ISO	0.4	M2	1.53	6	4.5	58	3	0.02	**258011** 0020	129,–	**258023** 0020	105,–
MTSH06017C5 0,45 ISO	0.45	M2.2	1.65	6	5.0	58	3	0.02	258011 0022	129,–		
MTSH0602C5 0,45 ISO	0.45	M2.5	1.95	6	5.5	58	3	0.02	258011 0025	129,–	258023 0025	105,–
MTSH06024C6 0,5 ISO	0.5	M3	2.37	6	6.5	58	3	0.02	258011 0030	129,–	258023 0030	105,–
MTSH06028C7 0,6 ISO	0.6	M3.5	2.75	6	7.5	58	3	0.03	258011 0035	129,–		
MTSH06031C9 0,7 ISO	0.7	M4	3.10	6	9.0	58	3	0.03	258011 0040	129,–	258023 0040	105,–
MTSH06038C12 0,8 ISO	0.8	M5	3.80	6	12.5	58	3	0.03	258011 0050	129,–	258023 0050	105,–
MTSH06047C14 1,0 ISO	1.0	M6	4.65	6	14.0	58	3	0.04	258011 0060	129,–	258023 0060	105,–
MTSH0606C18 1,25 ISO	1.25	M8	6.00	6	18.0	58	3	0.04	258011 0080	129,–	258023 0080	105,–
MTSH08078C23 1,5 ISO	1.5	M10	7.80	8	23.0	64	3	0.05	258011 0100	169,–	258023 0100	140,–
MTSH1009C26 1,75 ISO	1.75	M12	9.00	10	26.0	73	3	0.06	258011 0120	230,–		
MTSH12118D35 2,0 ISO	2.0	M16	11.80	12	35.0	84	4	0.07	258011 0160	275,–	258023 0160	230,–
									2115		2166	

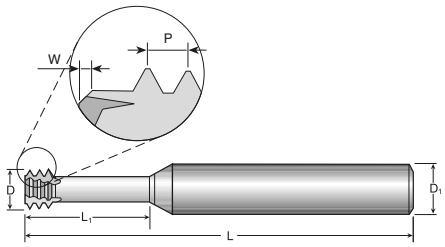
ATORN® DMT drilling and thread milling cutter

VHM    20-289

Drilling Thread milling Chamfering

- **High-performance tool with IC for manufacturing female threads**
- Using a circular motion, you cut the tapping hole, mill the thread and countersink in a single operation
- Eliminates the need to pre-drill the tapping hole
- Fast turnaround reduces your machine times
- Suitable for through-holes and blind bores
- **No time wasted on tool changes as only one tool is used for drilling, thread milling and chamfering**
- Full profile tool
- **Anticlockwise spindle rotation, code M04:**
  Left-hand thread = reverse rotation
  Right-hand thread = synchronous rotation
- Can be used with a large variety of materials
- **Thread depth 2 x D**
- **Cutting material: AMT7 solid carbide, multi-layer TiAlN coating for universal applications**





Metric, full profile, ISO 60°, internal

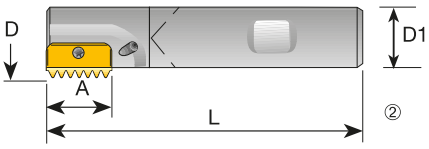
Designation	Pitch mm	Standard thread	D mm	D1 mm	L1 mm	L mm	W mm	Z	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
DMT08047C14 1.0 ISO	1.0	M6 - M9	4.7	8	14	64	0.4	3	0.02	**258100** 0060	197,–
DMT08061D18 1.25 ISO	1.25	M8 - M12	6.1	8	18	64	0.5	4	0.02	258100 0080	197,–
DMT08078D23 1.5 ISO	1.5	M10 - M15	7.8	8	23	64	0.6	4	0.02	258100 0100	197,–
DMT1009D26 1.75 ISO	1.75	M12	9.0	10	26	73	0.6	4	0.03	258100 0120	270,–
DMT12118D35 2.0 ISO	2.0	M16 - M23	11.8	12	35	84	0.6	4	0.04	258100 0160	325,–
										2115	

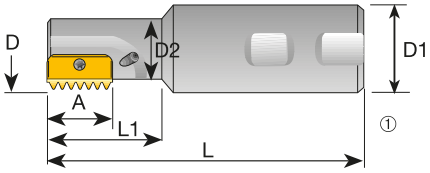
ATORN® Holder for thread mill inserts

- **With internal cooling**
- Supplied with clamping screw and chuck key
- **Force-fit insert seat due to 15° bevel on the milling insert**

Standard holder

- Straight shank in accordance with DIN 1835B
- Holder SR009H12 not for use with the following inserts: 12-18 NPT/NPTF, 12-19 BSPT
- Holder SR0018H21 not for use with the following inserts: 21 I34 ISO, 21 I8 UN, 21 I7 UN, 21-11 BSPT, 21-11.5 NPT, 21-11.5 NPTF







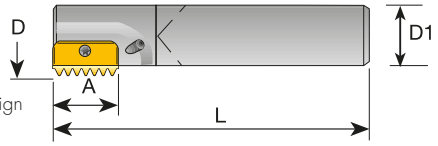
Designation	A mm	D mm	D1 mm	D2 mm	L mm	L1 mm	Illustration			art.no.	€
SR0009 H12	12	9.5	20	7.5	85	14	1	A1	B1	**259001** 0912	147,–
SR0010 H12	12	9.9	20	7.6	85	16	1	A1	B1	259001 1012	180,–
SR0012 F14	14	12	20	8.9	75	20	1	A2	B1	259001 1214	128,–
SR0014 H14	14	14.5	20	11.2	85	25	1	A2	B1	259001 1414	141,–
SR0017 H14	14	17.0	20	13.4	85	30	1	A2	B1	259001 1714	157,–
SR0018 H21	21	18.0	20	14.4	85	30	1	A3	B2	259001 1821	200,–
SR0021 H21	21	21.0	20	16.5	94	40	1	A3	B2	259001 2121	205,–
SR0025 K21	21	25.0	20	-	125	-	2	A3	B2	259001 2521	225,–
SR0029 J30	30	29.0	25	22.4	110	50	1	A4	B3	259001 2930	250,–
SR0031 M30	30	31.0	25	-	150	-	2	A4	B3	259001 3130	255,–
SR0038 M30	30	38.0	32	-	150	-	2	A4	B3	259001 3830	265,–
SR0048 M40	40	48.0	40	35.0	153	78	1	A5	B3	259001 4840	340,–

2116



Solid carbide holder

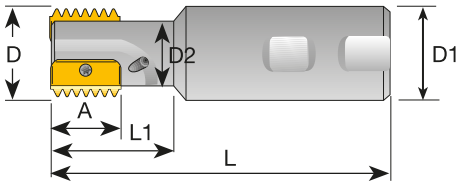
- **Long version**
- Particularly low vibration levels thanks to solid carbide design
- Straight shank
- SR0010 K12C without IC



Designation	A mm	D mm	D1 mm	L mm			art.no.	€
SR0010 K12C	12	9.9	8	125	A1	B1	**259002** 1012	355,–
SR0013 H14C	14	13.2	10	110	A2	B1	259002 1214	300,–
SR0013 J14C	14	13.2	10	155	A2	B1	259002 1314	310,–
SR0015 K14C	14	15.2	12	175	A2	B1	259002 1514	385,–
SR0021 K21C	21	21.0	16	130	A3	B2	259002 2125	549,–
SR0021 M21C	21	21.0	16	200	A3	B2	259002 2121	569,–
SR0027 S30C	30	27.0	20	270	A4	B3	259002 2730	909,–

2116





Double-seat holder

- **For use with two thread mill inserts**
- For increased feed rates and specially for hard materials
- Straight shank in accordance with DIN 1835B

Designation	A mm	D mm	D1 mm	D2 mm	L mm	L1 mm			art.no.	€
SR0020 H14-2	14	20.0	20	16.0	93	41	A2	B1	**259003** 2014	305,–
SR0030 J21-2	21	30.0	25	24.0	108	52	A3	B2	259003 3021	375,–
SR0040 L30-2	30	40.0	32	30.0	130	70	A4	B3	259003 4030	445,–
SR0050 M40-2	40	50.0	40	38.0	153	78	A5	B3	259003 5040	519,–

2116

Spare parts

	Screw art.no.	€
A1	259501 9000	1,87
A2	259501 9001	1,87
A3	259501 9002	1,77
A4	259501 9003	3,46
A5	259501 9004	3,46

3116

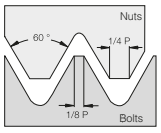
	TORX wrench art.no.	€
B1	703040 0080	4,41
B2	703040 0150	4,78
B3	703040 0250	5,45

7111

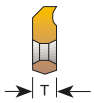
ATORN® ISO thread mill inserts

20-290

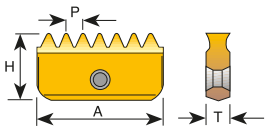
- **Metric, full profile, ISO**
- **Carbide quality AMT7**
  TiAlN-coated ultra-fine grain quality for universal applications in all materials at medium to high cutting speeds







Inserts with A = 12 mm have one cutting edge!



Full profile, 60°, internal

A mm	Pitch P mm	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
12	0.5	6.3	2.9	12 I 0.5 ISO	0.05-0.15	5	**259501** 4135	38,70
12	0.75	6.3	2.9	12 I 0.75 ISO	0.05-0.15	5	259501 4235	38,70
12	1.0	6.3	2.9	12 I 1.0 ISO	0.05-0.15	5	259501 4335	38,70
12	1.25	6.3	2.9	12 I 1.25 ISO	0.05-0.15	5	259501 4435	38,70
12	1.5	6.3	2.9	12 I 1.5 ISO	0.05-0.15	5	259501 4535	38,70
14	0.5	7.5	3.1	14 I 0.5 ISO	0.05-0.15	5	259501 0135	38,70
14	0.75	7.5	3.1	14 I 0.75 ISO	0.05-0.15	5	259501 0235	38,70
14	1.0	7.5	3.1	14 I 1.0 ISO	0.05-0.15	5	259501 0335	38,70
14	1.25	7.5	3.1	14 I 1.25 ISO	0.05-0.15	5	259501 0435	38,70
14	1.5	7.5	3.1	14 I 1.5 ISO	0.05-0.15	5	259501 0535	38,70
14	1.75	7.5	3.1	14 I 1.75 ISO	0.05-0.15	5	259501 0835	38,70
14	2.0	7.5	3.1	14 I 2.0 ISO	0.05-0.15	5	259501 0635	38,70
14	2.5	7.5	3.1	14 I 2.5 ISO	0.05-0.15	5	259501 0735	38,70
21	1.0	12	4.7	21 I 1.0 ISO	0.05-0.15	5	259501 1035	50,50
21	1.5	12	4.7	21 I 1.5 ISO	0.05-0.15	5	259501 1135	50,50
21	1.75	12	4.7	21 I 1.75 ISO	0.05-0.15	5	259501 1635	50,50
21	2.0	12	4.7	21 I 2.0 ISO	0.05-0.15	5	259501 1235	50,50
21	2.5	12	4.7	21 I 2.5 ISO	0.05-0.15	5	259501 1335	50,50

2117

A mm	Pitch P mm	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
21	3.0	12	4.7	21 I 3.0 ISO	0.05-0.15	5	259501 1435	50,50
21	3.5	12	4.7	21 I 3.5 ISO	0.05-0.15	5	259501 1535	50,50
30	1.5	16	5.5	30 I 1.5 ISO	0.05-0.15	5	259501 2035	69,50
30	2.0	16	5.5	30 I 2.0 ISO	0.05-0.15	5	259501 2135	69,50
30	3.0	16	5.5	30 I 3.0 ISO	0.05-0.15	5	259501 2235	69,50
30	3.5	16	5.5	30 I 3.5 ISO	0.05-0.15	5	259501 2435	69,50
30	4.0	16	5.5	30 I 4.0 ISO	0.05-0.15	5	259501 2335	69,50
30	4.5	16	5.5	30 I 4.5 ISO	0.05-0.15	5	259501 3635	69,50
30	5.0	16	5.5	30 I 5.0 ISO	0.05-0.15	5	259501 2535	69,50
40	1.5	20	6.3	40 I 1.5 ISO	0.05-0.15	2	259501 3035	122,–
40	2.0	20	6.3	40 I 2.0 ISO	0.05-0.15	2	259501 3135	122,–
40	3.0	20	6.3	40 I 3.0 ISO	0.05-0.15	2	259501 3235	122,–
40	3.5	20	6.3	40 I 3.5 ISO	0.05-0.15	2	259501 3735	122,–
40	4.0	20	6.3	40 I 4.0 ISO	0.05-0.15	2	259501 3335	122,–
40	4.5	20	6.3	40 I 4.5 ISO	0.05-0.15	2	259501 3835	122,–
40	5.0	20	6.3	40 I 5.0 ISO	0.05-0.15	2	259501 3435	122,–
40	5.5	20	6.3	40 I 5.5 ISO	0.05-0.15	2	259501 3935	122,–
40	6.0	20	6.3	40 I 6.0 ISO	0.05-0.15	2	259501 3535	122,–

2117

Full profile, 60°, external

A mm	Pitch P mm	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
14	0.75	7.5	3.1	14 E 0.75 ISO	0.05-0.15	5	**259502** 0135	38,70
14	1.0	7.5	3.1	14 E 1.0 ISO	0.05-0.15	5	259502 0235	38,70
14	1.25	7.5	3.1	14 E 1.25 ISO	0.05-0.15	5	259502 0335	38,70
14	1.5	7.5	3.1	14 E 1.5 ISO	0.05-0.15	5	259502 0435	38,70
14	1.75	7.5	3.1	14 E 1.75 ISO	0.05-0.15	5	259502 0735	38,70
14	2.0	7.5	3.1	14 E 2.0 ISO	0.05-0.15	5	259502 0535	38,70
14	2.5	7.5	3.1	14 E 2.5 ISO	0.05-0.15	5	259502 0635	38,70
21	1.0	12	4.7	21 E 1.0 ISO	0.05-0.15	5	259502 1035	50,50
21	1.5	12	4.7	21 E 1.5 ISO	0.05-0.15	5	259502 1135	50,50
21	2.0	12	4.7	21 E 2.0 ISO	0.05-0.15	5	259502 1235	50,50
21	2.5	12	4.7	21 E 2.5 ISO	0.05-0.15	5	259502 1335	50,50
21	3.0	12	4.7	21 E 3.0 ISO	0.05-0.15	5	259502 1435	50,50

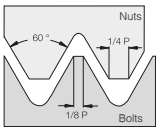
2117

A mm	Pitch P mm	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
30	1.5	16	5.5	30 E 1.5 ISO	0.05-0.15	5	259502 2035	69,50
30	2.0	16	5.5	30 E 2.0 ISO	0.05-0.15	5	259502 2135	69,50
30	3.0	16	5.5	30 E 3.0 ISO	0.05-0.15	5	259502 2235	69,50
30	3.5	16	5.5	30 E 3.5 ISO	0.05-0.15	5	259502 2435	69,50
30	4.0	16	5.5	30 E 4.0 ISO	0.05-0.15	5	259502 2335	69,50
40	1.5	20	6.3	40 E 1.5 ISO	0.05-0.15	2	259502 3035	122,–
40	2.0	20	6.3	40 E 2.0 ISO	0.05-0.15	2	259502 3135	122,–
40	3.0	20	6.3	40 E 3.0 ISO	0.05-0.15	2	259502 3235	122,–
40	4.0	20	6.3	40 E 4.0 ISO	0.05-0.15	2	259502 3335	122,–
40	5.0	20	6.3	40 E 5.0 ISO	0.05-0.15	2	259502 3435	122,–
40	6.0	20	6.3	40 E 6.0 ISO	0.05-0.15	2	259502 3535	122,–

2117

ATORN® UN thread mill inserts

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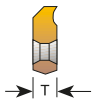


- **Metric, full profile, UN**
- **Carbide quality AMT7**
  TiAlN-coated ultra-fine grain quality for universal applications in all materials at medium to high cutting speeds
- **Other thread pitches available on request!**

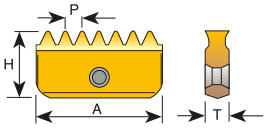
Full profile, UN, internal

A mm	Pitch TPI	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
12	32	6.3	2.9	12 I 32 UN	0.05-0.15	5	**259503** 4135	38,70
12	28	6.3	2.9	12 I 28 UN	0.05-0.15	5	259503 4235	38,70
12	24	6.3	2.9	12 I 24 UN	0.05-0.15	5	259503 4335	38,70
12	20	6.3	2.9	12 I 20 UN	0.05-0.15	5	259503 4435	38,70
12	18	6.3	2.9	12 I 18 UN	0.05-0.15	5	259503 4535	38,70
12	16	6.3	2.9	12 I 16 UN	0.05-0.15	5	259503 4635	38,70
14	32	7.5	3.1	14 I 32 UN	0.05-0.15	5	259503 0135	38,70
14	28	7.5	3.1	14 I 28 UN	0.05-0.15	5	259503 0235	38,70
14	24	7.5	3.1	14 I 24 UN	0.05-0.15	5	259503 0335	38,70
14	20	7.5	3.1	14 I 20 UN	0.05-0.15	5	259503 0435	38,70
14	18	7.5	3.1	14 I 18 UN	0.05-0.15	5	259503 0535	38,70
14	16	7.5	3.1	14 I 16 UN	0.05-0.15	5	259503 0635	38,70
14	14	7.5	3.1	14 I 14 UN	0.05-0.15	5	259503 0735	38,70
14	12	7.5	3.1	14 I 12 UN	0.05-0.15	5	259503 0835	38,70
21	24	12	4.7	21 I 24 UN	0.05-0.15	5	259503 1035	50,50
21	20	12	4.7	21 I 20 UN	0.05-0.15	5	259503 1135	50,50
21	18	12	4.7	21 I 18 UN	0.05-0.15	5	259503 1235	50,50
21	16	12	4.7	21 I 16 UN	0.05-0.15	5	259503 1335	50,50
21	14	12	4.7	21 I 14 UN	0.05-0.15	5	259503 1435	50,50
21	12	12	4.7	21 I 12 UN	0.05-0.15	5	259503 1535	50,50
21	10	12	4.7	21 I 10 UN	0.05-0.15	5	259503 1635	50,50
30	20	16	5.5	30 I 20 UN	0.05-0.15	5	259503 2035	69,50
30	18	16	5.5	30 I 18 UN	0.05-0.15	5	259503 2135	69,50
30	16	16	5.5	30 I 16 UN	0.05-0.15	5	259503 2235	69,50
30	14	16	5.5	30 I 14 UN	0.05-0.15	5	259503 2335	69,50
30	12	16	5.5	30 I 12 UN	0.05-0.15	5	259503 2435	69,50
30	10	16	5.5	30 I 10 UN	0.05-0.15	5	259503 2535	69,50
30	8	16	5.5	30 I 8 UN	0.05-0.15	5	259503 2635	69,50
30	6	16	5.5	30 I 6 UN	0.05-0.15	5	259503 2735	69,50
40	14	20	6.3	40 I 14 UN	0.05-0.15	5	259503 3035	122,–
40	12	20	6.3	40 I 12 UN	0.05-0.15	2	259503 3135	122,–
40	10	20	6.3	40 I 10 UN	0.05-0.15	2	259503 3235	122,–
40	8	20	6.3	40 I 8 UN	0.05-0.15	2	259503 3335	122,–
40	6	20	6.3	40 I 6 UN	0.05-0.15	2	259503 3435	122,–

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Inserts with A = 12 mm have one cutting edge



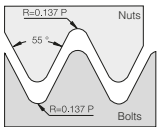


… for special measurement tasks

ATORN®
High quality for great performance

ATORN® BSW/NPT thread mill inserts

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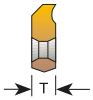


- **BSW, NPT**
- **Carbide quality AMT7**
  TiAlN-coated ultra-fine grain quality for universal applications in all materials at medium to high cutting speeds
- **Other versions available on request (NPTF, BSPT, NPS and NPSF)**

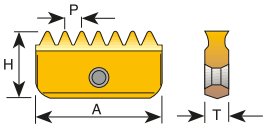
BSW, internal = external

A mm	Pitch TPI	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
12	19	6.3	2.9	12-19 W	0.05-0.15	5	**259505** 0035	38,70
14	24	7.5	3.1	14-24 W	0.05-0.15	5	259505 0135	38,70
14	20	7.5	3.1	14-20 W	0.05-0.15	5	259505 0235	38,70
14	19	7.5	3.1	14-19 W	0.05-0.15	5	259505 0335	38,70
14	16	7.5	3.1	14-16 W	0.05-0.15	5	259505 0435	38,70
14	14	7.5	4.7	14-14 W	0.05-0.15	5	259505 0535	38,70
21	20	12	4.7	21-20 W	0.05-0.15	5	259505 1035	50,50
21	19	12	4.7	21-19 W	0.05-0.15	5	259505 1135	50,50
21	16	12	4.7	21-16 W	0.05-0.15	5	259505 1235	50,50
21	14	12	4.7	21-14 W	0.05-0.15	5	259505 1335	50,50
21	11	12	4.7	21-11 W	0.05-0.15	5	259505 1435	50,50
30	16	16	5.5	30-16 W	0.05-0.15	5	259505 2035	69,50
30	14	16	5.5	30-14 W	0.05-0.15	5	259505 2135	69,50
30	11	16	5.5	30-11 W	0.05-0.15	5	259505 2235	69,50
40	11	20	6.3	40-11 W	0.05-0.15	2	259505 3035	122,–
40	8	20	6.3	40- 8 W	0.05-0.15	2	259505 3135	122,–

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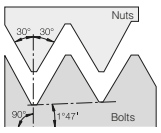
Inserts with A = 12 mm have one cutting edge!



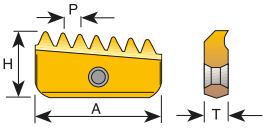
NPT, internal = external

A mm	Pitch TPI	H mm	T mm	Designation	Feed fz steel < 1000 N/mm² mm/tooth		art.no.	€
12	18.0	6.3	2.9	12-18 NPT	0.05-0.15	5	**259506** 0035	42,50
14	18.0	7.5	3.1	14-18 NPT	0.05-0.15	5	259506 0135	42,50
14	14.0	7.5	3.1	14-14 NPT	0.05-0.15	5	259506 0235	42,50
21	14.0	12	4.7	21-14 NPT	0.05-0.15	5	259506 1035	56,–
21	11.5	12	4.7	21-11.5 NPT	0.05-0.15	5	259506 1135	56,–
30	11.5	16	5.5	30-11.5 NPT	0.05-0.15	5	259506 2035	77,50
30	8.0	16	5.5	30-8 NPT	0.05-0.15	5	259506 2135	77,50
40	11.5	20	6.3	40-11.5 NPT	0.05-0.15	2	259506 3035	133,–
40	8.0	20	6.3	40-8 NPT	0.05-0.15	2	259506 3135	133,–

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Inserts for tapered threads have one cutting edge!



... and optimum service life

ATORN®
High quality for great performance

ATORN® Tool system for machining drill holes *MINI-MILL*

DIN 6535 HA | DIN 6535 HB | Vc/fz | 20-297



- Type ZH 22 **from bore Ø 22 mm**
- Solid carbide inserts, quality grade **HC 8620**
- **Solid carbide milling cutter shank** with internal coolant supply
- **Steel milling cutter shank** with internal coolant supply
- 3-rib toothing
- For machining grooves, circlip grooves, ISO metric threads, Whitworth pipe threads and full radius grooves, as well as for chamfering and deburring

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●	●	○		●	●	○	○		○	○	○		○		





DIN 6535 HA solid carbide shank

Designation	D3 mm	L mm	L2 mm	Cutting circle average mm	t max. mm			art.no.	€
ZH22.1212..42.A.HM	-	100	42	21.7	4.5	A1	B1	**263001** 1242	176,–
ZH22.1212..60.A.HM	-	130	60	21.7	4.5	A1	B1	263001 1260	210,–
ZH22.1611..30.A.HM	11.5	90	30	21.7	3.9	A1	B1	263001 1630	225,–
ZH22.1612..42.A.HM	12.0	100	42	21.7	4.5	A1	B1	263001 1642	230,–
ZH22.1612..60.A.HM	12.0	130	60	21.7	4.5	A1	B1	263001 1660	280,–
ZH22.1612..85.A.HM	12.0	160	85	21.7	4.5	A1	B1	263001 1685	315,–
ZH22.2016..45.A.HM	16.0	110	45	21.7	2.5	A1	B1	263001 2045	340,–
ZH22.2016..65.A.HM	16.0	130	65	21.7	2.5	A1	B1	263001 2065	340,–

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DIN 1835 A steel shank

Designation	D3 mm	L mm	L2 mm	Cutting circle average mm	t max. mm			art.no.	€
ZH22.1011.10.A.ST	11.3	60	10.7	21.7	4.5	A1	B1	**263005** 0010	112,–
ZH22.1311.25.A.ST	11.3	70	25.7	21.7	4.0	A1	B1	263005 0025	115,–
ZH22.1612.24.A.ST	12.0	80	24.0	21.7	4.5	A1	B1	263005 0024	125,–

2141





DIN 6535 HB solid carbide shank

Designation	D3 mm	L mm	L2 mm	Cutting circle average mm	t max. mm			art.no.	€
ZH22.1212..42.B.HM	-	100	42	21.7	4.5	A1	B1	**263002** 1242	176,–
ZH22.1212..60.B.HM	-	130	60	21.7	4.5	A1	B1	263002 1260	210,–
ZH22.1611..30.B.HM	11.5	90	30	21.7	3.9	A1	B1	263002 1630	225,–
ZH22.1612..42.B.HM	12.0	100	42	21.7	4.5	A1	B1	263002 1642	230,–
ZH22.1612..60.B.HM	12.0	130	60	21.7	4.5	A1	B1	263002 1660	280,–
ZH22.1612..85.B.HM	12.0	160	85	21.7	4.5	A1	B1	263002 1685	315,–
ZH22.2016..45.B.HM	16.0	110	45	21.7	2.5	A1	B1	263002 2045	340,–
ZH22.2016..65.B.HM	16.0	130	65	21.7	2.5	A1	B1	263002 2065	340,–

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DIN 1835 B steel shank

Designation	D3 mm	L mm	L2 mm	Cutting circle average mm	t max. mm			art.no.	€
ZH22.1612.24.B.ST	12.0	80	24	21.7	4.5	A1	B1	**263004** 0024	125,–

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Spare parts

	Screw	
	art.no.	€
A1	263999 0001	3,35

7114

	TORX	
	art.no.	€
B1	703053 0200	3,40

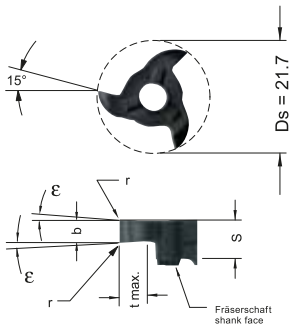
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Cutting inserts for DIN 471/472 circlip grooves

Designation	S mm	r mm	ε °	Groove width mm	t max. mm	b -0.02 mm	HC8620 art.no.	€
Z 22.0070.00	5.7	-	1.0	0.7	1.5	0.74	**263100** 0007	35,30
Z 22.0080.00	5.7	-	1.0	0.8	1.7	0.84	263100 0008	35,30
Z 22.0090.00	5.7	-	1.0	0.9	1.9	0.94	263100 0009	31,60
Z 22.0100.00	5.7	-	1.0	1.0	2.1	1.04	263100 0010	33,50
Z 22.0110.00	5.7	-	1.0	1.1	2.5	1.21	263100 0011	33,50
Z 22.0130.00	5.7	0.1	3.0	1.3	4.5	1.41	263100 0013	31,90
Z 22.0160.00	5.7	0.1	3.0	1.6	4.5	1.71	263100 0016	31,90
Z 22.0185.02	5.7	0.15	3.0	1.85	4.5	1.96	263100 0185	31,90
Z 22.0215.02	5.7	0.15	3.0	2.15	4.5	2.26	263100 0215	31,90
Z 22.0265.02	5.7	0.15	3.0	2.65	4.5	2.76	263100 0265	31,90
Z 22.0315.02	5.7	0.15	3.0	3.15	4.5	3.26	263100 0315	31,90
Z 22.0415.02	5.7	0.15	3.0	4.14	4.5	4.26	263100 0414	31,90
Z 22.0515.02	5.7	0.15	3.0	5.15	4.5	5.26	263100 0515	31,90

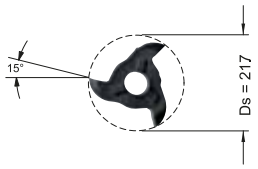
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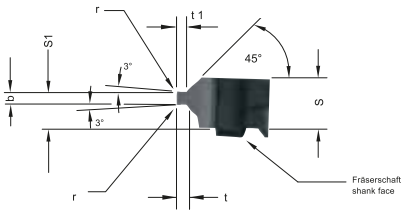


Cutting inserts with groove outer edge chamfering for DIN 471/472 circlip grooves

Designation	S mm	s1 mm	r mm	Groove width mm	b -0.02 mm	t mm	t1 max. mm	HC8620 art.no.	€
Z 22.1105.30	5.85	5.07	-	1.1	1.21	0.5	0.49	**263101** 1105	34,60
Z 22.1307.30	5.85	5.17	-	1.3	1.41	0.7	0.67	263101 1307	34,60
Z 22.1308.30	5.85	5.17	-	1.3	1.41	0.85	0.83	263101 1308	34,60
Z 22.1609.35	5.85	5.07	-	1.6	1.71	0.85	0.83	263101 1609	34,60
Z 22.1610.35	5.85	5.07	-	1.6	1.71	1.0	0.97	263101 1610	34,60
Z 22.1812.35	5.85	5.19	0.15	1.85	1.96	1.25	1.23	263101 1812	34,60
Z 22.2215.35	5.85	5.34	0.15	2.15	2.26	1.5	1.47	263101 2215	34,60
Z 22.2616.45	5.85	5.09	0.15	2.65	2.76	1.5	1.47	263101 2616	34,60
Z 22.2617.45	5.85	5.09	0.15	2.65	2.76	1.75	1.72	263101 2617	34,60
Z 22.3118.45	5.85	5.34	0.20	3.15	3.26	1.75	1.72	263101 3118	34,60
Z 22.4120.55	5.85	5.34	0.20	4.15	4.26	2.0	1.97	263101 4120	34,60
Z 22.4125.55	5.85	5.34	0.20	4.15	4.26	2.5	2.47	263101 4125	34,60

2141

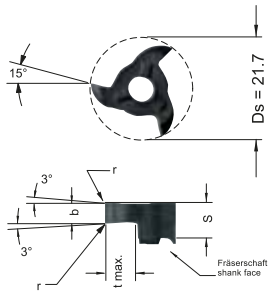




Cutting inserts for general groove milling

Designation	S mm	r mm	b +0.02 mm	t max. mm	HC8620 art.no.	€
Z 22.0150.02	5.7	0.2	1.5	4.5	**263102** 0015	32,60
Z 22.0200.02	5.7	0.2	2.0	4.5	263102 0020	32,60
Z 22.0250.02	5.7	0.2	2.5	4.5	263102 0025	32,60
Z 22.0300.02	5.7	0.2	3.0	4.5	263102 0030	32,60
Z 22.0400.02	5.7	0.2	4.0	4.5	263102 0040	32,60

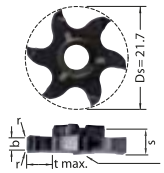
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6-tooth cutting inserts for general groove milling

Designation	S mm	r mm	b mm	t max. mm	HC8620 art.no.	€
Z622.0150.01	6.2	0.1	1.5	4.5	**263108** 0015	55,–
Z622.0200.02	6.2	0.2	2.0	4.5	263108 0020	55,–
Z622.0250.02	6.2	0.2	2.5	4.5	263108 0025	55,–
Z622.0300.02	6.2	0.2	3.0	4.5	263108 0030	55,–
Z622.0400.02	6.2	0.2	4.0	4.5	263108 0040	55,–

2141



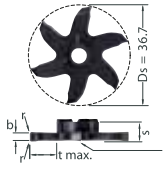
Bevel grinding on the front face

6-tooth cutting inserts for general groove milling

- t-max. 12 mm only with holder ZH22

Designation	S mm	r mm	b mm	t max. mm	D min. mm	HC8620 art.no.	€
Z637.0050.00	5.85	-	0.5	12.0	37.0	**263111** 0005	91,50
Z637.0100.01	5.85	0.1	1.0	12.0	37.0	263111 0010	83,50
Z637.0150.01	5.85	0.1	1.5	12.0	37.0	263111 0015	74,50

2141

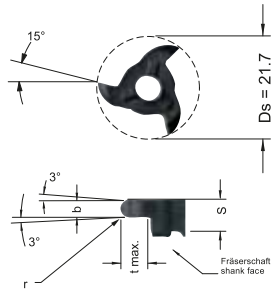


Bevel grinding on the front face for b ≥ 1 mm

Cutting inserts for full radius grooves

Designation	S mm	r mm	b +0.03 mm	t max. mm	HC8620 art.no.	€
Z 22.0005.10	5.75	0.5	1.0	4.5	**263103** 0010	37,40
Z 22.0010.20	5.75	1.0	2.0	4.5	263103 0020	37,40
Z 22.0014.28	5.75	1.4	2.8	4.5	263103 0028	38,70
Z 22.0015.30	5.75	1.5	3.0	4.5	263103 0030	37,40
Z 22.0020.40	5.75	2.0	4.0	4.5	263103 0040	37,40

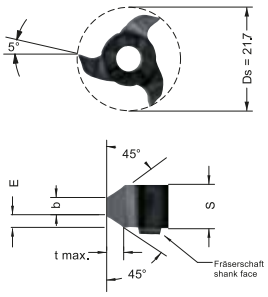
2141



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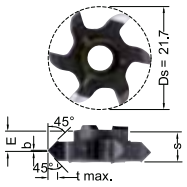
Bore milling cutter inserts, front and rear-side chamfering

Designation	S mm	E mm	b mm	t max. mm	HC8620 art.no.	€
Z 22.4545.58	5.85	2.00	2.0	1.7	**263106** 0015	27,80
Z 22.4545.94	9.4	3.25	3.0	3.0	263106 0020	29,20
					2141	



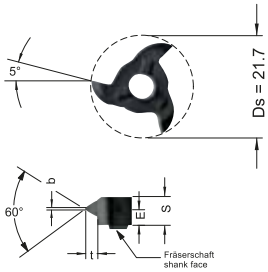
Bore milling cutter inserts, front and rear-side chamfering with 6 teeth

Designation	S mm	E mm	b +0.03 mm	t max. mm	HC8620 art.no.	€
Z622.4545.63	6.4	3.9	0.2	1.9	**263109** 0015	55,–
					2141	



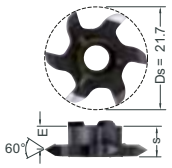
Cutting inserts for ISO metric threads, partial profile

Designation	S mm	Pitch P mm	E mm	b mm	t mm	HC8620 art.no.	€
Z 22.0720.01	5.85	1.0 - 2.0	4.6	0.12	1.19	**263104** 1020	40,70
Z 22.2545.01	5.85	2.0 - 4.5	3.7	0.31	2.71	263104 2545	42,10
Z 22.0815.01	5.85	1.5 - 2.75	4.8	0.18	1.62	263104 0015	40,70
Z 22.1020.01	5.85	2.0 - 3.75	4.6	0.25	2.22	263104 0020	40,70
Z 22.1630.01	5.85	2.5 - 5.0	4.3	0.37	2.98	263104 0030	40,80
						2141	



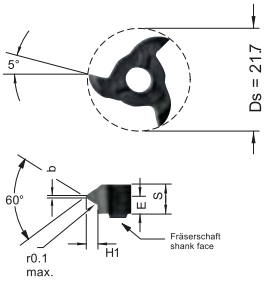
Cutting inserts for ISO metric threads, internal, partial profile, 6 teeth

Designation	S mm	Pitch P mm	E mm	Thread nominal Ø mm	HC8620 art.no.	€
Z622.0720.01	6.20	1.0 - 2.0	5.1	> 27.0	**263110** 1020	65,–
Z622.2545.01	6.05	2.0 - 4.5	4.3	> 33.0	263110 2545	66,50
					2141	



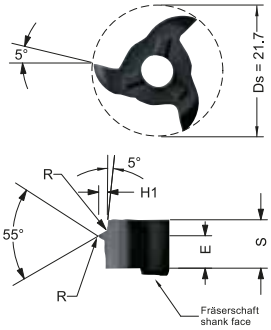
Cutting inserts for ISO metric threads, full profile

Designation	S mm	Pitch P mm	E mm	b mm	H1 mm	HC8620 art.no.	€
Z 22.0815.02	5.85	1.5	4.8	0.18	0.81	**263105** 0150	42,80
Z 22.0917.02	5.85	1.75	4.7	0.20	0.95	263105 0175	42,80
Z 22.1020.02	5.85	2.0	4.6	0.25	1.08	263105 0200	44,80
Z 22.1630.02	5.85	3.0	4.3	0.37	1.62	263105 0300	44,80
Z 22.1835.02	5.85	3.5	4.1	0.43	1.89	263105 0350	48,20
Z 22.2140.02	5.85	4.0	3.9	0.5	2.16	263105 0400	48,20
Z 22.2445.02	5.85	4.5	3.7	0.56	2.43	263105 0450	48,20
						2141	



Cutting inserts for Whitworth pipe threads, DIN ISO 228 (259) + 2999 full profile

Designation	S mm	Pitch TPI	E mm	R mm	H1 mm	HC8620 art.no.	€
Z 22.5506.02	5.85	6 (4.23)	3.1	0.58	2.71	**263107** 0060	53,50
Z 22.5508.02	5.85	8 (3.17)	3.5	0.43	2.03	263107 0080	53,50
Z 22.5511.02	5.85	11 (2.30)	4.0	0.31	1.48	263107 0011	50,–
						2141	



ATORN® The CMT system

INFO

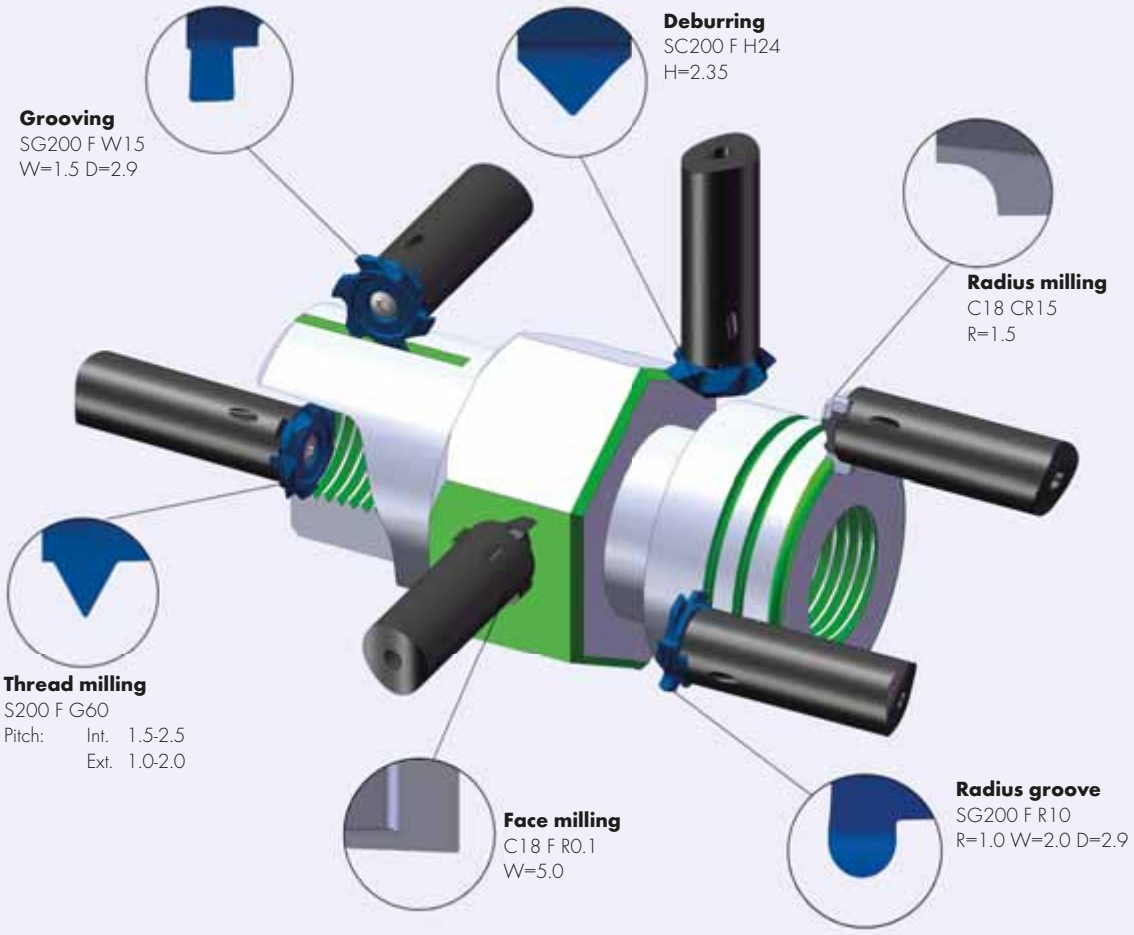
Removable, vertical thread-mill inserts and holders for a variety of thread profiles

- Front-mounted plate for high precision and excellent performance
- Milling with high cutting rates and perfect surface finish
- Stable and precise clamping for consistent reproducibility
- Same plate for right-hand and left-hand threads
- Tool holders with Weldon shank and internal cooling
- Plates for countersinking, grooving and face milling



One holder for all machining situations

SRC 2018 J with internal coolant supply



Safety in the workplace

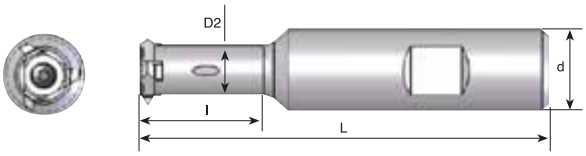
Please protect your eyes, ears and respiratory system!

ATORN® CMT tool system for vertical thread milling

DIN 6535 HB | DIN 6535 HA | Vc/fz 20-297

- **Type C10, from Ø 11 mm bore**
- **Solid carbide cutting inserts in quality grade AMT7 for all materials up to 55 HRc**
- **Solid carbide cutting inserts in quality grade AMT8, extremely heat-resistant, for all materials up to 62 HRc**
- Solid carbide milling cutter shank with internal coolant supply
- Steel milling cutter shank with internal coolant supply
- **For partial profile (55 and 60°), full profile (ISO, UN and G55°) and trapezoidal threading, countersinking, grooving, plunge milling, face milling and finishing**

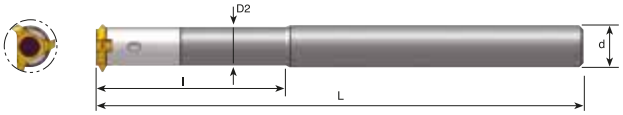




DIN 6535 HB steel shank with internal coolant supply

model	Holder	Insert size mm	d mm	D2 mm	l mm	L mm				art.no.	€
SRC 1210 E	H1	C10	12	7.3	19	70	A1		C1	**266001** 0001	128,–
SRC 1610 G	H2	C10	16	7.3	19	90	A1		C1	266001 0002	128,–
SRC 1212 E	H3	C12	12	9.0	25	70	A2		C2	266001 0003	128,–
SRC 1612 G	H4	C12	16	9.0	25	90	A2		C2	266001 0004	128,–
SRC 1612 H	H5	C12	16	9.0	35	100	A2		C2	266001 0005	141,–
SRC 1618 H	H6	C18	16	13.8	48	100		B1	C2	266001 0006	144,–
SRC 2018 H	H7	C18	20	13.8	32	100		B1	C2	266001 0007	144,–
SRC 2018 J	H8	C18	20	13.8	48	110		B1	C2	266001 0008	148,–
SRC 2018 L	H9	C18	20	13.8	74	140		B1	C2	266001 0009	168,–
SRC 2525 J	H10	C25	25	17.5	45	115		B2	C3	266001 0010	200,–
SRC 2525 M	H11	C25	25	17.5	80	150		B2	C3	266001 0011	220,–

2150





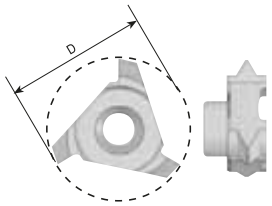
DIN 1835 A solid carbide shank with internal coolant supply

model	Holder	Insert size mm	d mm	D2 mm	l mm	L mm				art.no.	€
CRC 0810 L35 K	H12	C10	8	7.3	35	125	A1		C1	**266002** 0001	220,–
CRC 0810 K	H13	C10	8	8.0	-	125	A1		C1	266002 0002	230,–
CRC 1012 M	H14	C12	10	10.0	-	150	A2		C2	266002 0003	235,–
CRC 1218 P	H15	C18	12	12.0	-	170		B1	C2	266002 0004	345,–
CRC 1625 R	H16	C25	16	16.0	-	205		B2	C3	266002 0005	405,–
CRC 2025 L85 S	H17	C25	20	17.5	85	250		B2	C3	266002 0006	569,–

2150

Spare parts

Screw			Screw			TORX wrench		
	art.no.	€		art.no.	€		art.no.	€
A1	259501 9009	4,–	B1	341401 0011	1,52	C1	705105 0006	5,20
A2	259501 9010	4,–	B2	341401 0041	3,46	C2	705105 0010	5,30
						C3	705105 0025	5,60
3116			3116			7112		





Partial profile, 60°

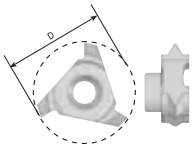
- the same tool for internal and external threads

ISO P M K N S H

model	Insert size mm	D mm	D min. mm	Pitch int. mm	Pitch int. TPI	Pitch ex. mm	Pitch ex. TPI	Holder	AMT7 art.no.	€
C10 A60	C10	10	11	0.5 - 0.8	56 - 28	0.4 - 0.8	64 - 32	H1, 2, 12, 13	**266100** 1001	39,70
C10 G60	C10	10	12	1.0 - 2.0	28 - 13	0.8 - 1.75	32 - 15	H1, 2, 12	266100 1002	35,90
C12 A60	C12	12	13	0.5 - 0.8	56 - 28	0.4 - 0.8	64 - 32	H3, 4, 5, 14	266100 1201	40,10
C12 G60	C12	12.4	14	1.0 - 2.0	28 - 13	0.8 - 1.75	32 - 15	H3, 4, 5, 14	266100 1202	36,30
C18 A60	C18	17.8	19	0.5 - 0.8	56 - 28	0.4 - 0.8	64 - 32	H6, 7, 8, 9, 15	266100 1801	46,60
C18 G60	C18	17.8	20	1.0 - 1.75	28 - 14	0.8 - 1.5	32 - 16	H6, 7, 8, 9, 15	266100 1802	42,50
C18 D60	C18	17.8	21	2.0 - 3.0	13 - 8	1.75 - 2.5	15 - 10	H6, 7, 8, 9, 15	266100 1803	42,50
C25 G60	C25	25	28	1.5 - 2.5	16 - 10	1.0 - 2.0	28 - 13	H10, 11, 16, 17	266100 2501	49,30
C25 N60	C25	25	30	3.0 - 5.0	8 - 5	2.5 - 4.5	10 - 6	H10, 11, 16, 17	266100 2502	49,30
C25 Q60	C25	25	34	5.0 - 6.0	5 - 4	4.5 - 5.0	6 - 5	H10, 11, 16, 17	266100 2503	49,30

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Continued on next page >>>




Partial profile, 60°, multi-flute

- the same tool for internal and external threads

ISO P M K N S H

model	Insert size mm	Pitch int. mm	Pitch int. TPI	Pitch ex. mm	Pitch ex. TPI	D mm	D min. mm	Number of teeth	Holder	AMT8 art.no.	€
S200 D N60	S20	3.0-5.0	8-5	2.5-4.5	10-6	20	25	4	H15	**266110** 2002	55,50
S200 F G60	S20	1.5-2.5	16-10	1.0-2.0	28-13	20	23	6	H6, 7, 8, 9, 15	266110 2001	55,50

2151

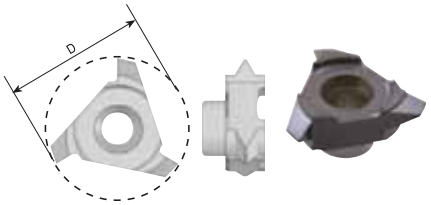
Partial profile, 55°

- the same tool for internal and external threads

ISO P M K N S H

model	Insert size mm	Pitch TPI	D mm	D min. mm	Holder	AMT7 art.no.	€
C10 G55	C10	19-14	10.0	13	H1, 2, 12	**266101** 1001	35,90
C12 G55	C12	28-19	12.0	14	H3, 4, 5, 14	266101 1201	36,30
C12 N55	C12	14-11	12.2	16	H3, 4, 5,	266101 1202	36,30
C18 G55	C18	14-8	18.0	23	H6, 7, 8, 9, 15	266101 1801	42,50
C25 N55	C25	7-5	25.0	31	H10, 11, 16, 17	266101 2501	49,30

2151



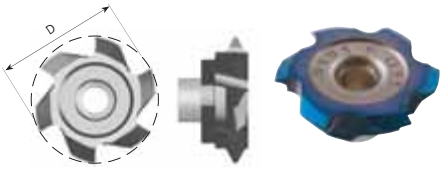
Partial profile, 55°, BSP (G), BSF, BSW, multi-flute

- the same tool for internal and external threads

ISO P M K N S H

model	Insert size mm	Pitch TPI	D mm	D min. mm	Number of teeth	Holder	AMT8 art.no.	€
S195 F G55	S20	14	19.5	23	6	H6, 7, 8, 9, 15	**266112** 2001	55,50
S200 D N55	S20	8-6	20.0	25	4	H15	266112 2002	55,50

2151



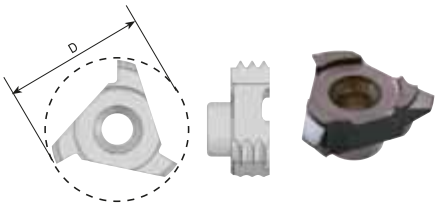
Full profile, ISO

- for female threads

ISO P M K N S H

model	Insert size mm	Pitch mm	D mm	D min. mm	T per cutting edge	Holder	AMT7 art.no.	€
C10 I 0.5 ISO	C10	0.5	9.0	10	6	H1, 2, 12, 13	**266102** 1001	54,–
C10 I 1.0 ISO	C10	1.0	10.0	12	3	H1, 2, 12, 13	266102 1002	44,70
C10 I 1.5 ISO	C10	1.5	10.0	13	2	H1, 2, 12, 13	266102 1003	44,70
C10 I 2.0 ISO	C10	2.0	10.0	14	1	H1, 2, 12	266102 1004	44,70
C12 I 0.5 ISO	C12	0.5	12.0	13	6	H3, 4, 5, 14	266102 1201	54,–
C12 I 0.75 ISO	C12	0.75	12.0	13	4	H3, 4, 5, 14	266102 1202	49,70
C12 I 1.0 ISO	C12	1.0	12.0	14	3	H3, 4, 5, 14	266102 1203	45,–
C12 I 1,5 ISO	C12	1.5	12.0	15	2	H3, 4, 5, 14	266102 1204	45,–
C12 I 2.0 ISO	C12	2.0	12.4	16	1	H3, 4, 5, 14	266102 1205	45,–
C12 I 2.5 ISO	C12	2.5	12.0	17	1	H3, 4, 5	266102 1206	45,–
C12 I 3.0 ISO	C12	3.0	12.4	17	1	H3, 4, 5	266102 1207	45,–
C18 I 0.5 ISO	C18	0.5	17.8	19	9	H6, 7, 8, 9, 15	266102 1801	62,–
C18 I 0.75 ISO	C18	0.75	17.8	19	6	H6, 7, 8, 9, 15	266102 1802	61,–
C18 I 1.0 ISO	C18	1.0	17.8	20	5	H6, 7, 8, 9, 15	266102 1803	56,–
C18 I 1.5 ISO	C18	1.5	17.8	20	3	H6, 7, 8, 9, 15	266102 1804	56,–
C18 I 2.0 ISO	C18	2.0	17.8	21	2	H6, 7, 8, 9, 15	266102 1805	56,–
C18 I 2.5 ISO	C18	2.5	17.8	22	2	H6, 7, 8, 9, 15	266102 1806	56,–
C18 I 3.0 ISO	C18	3.0	17.8	23	1	H6, 7, 8, 9, 15	266102 1807	56,–
C18 I 3.5 ISO	C18	3.5	17.8	24	1	H6, 7, 8, 9, 15	266102 1808	56,–
C25 I 3.0 ISO	C25	3.0	25.0	30	2	H10, 11, 16, 17	266102 2501	63,–
C25 I 4.0 ISO	C25	4.0	25.0	32	1	H10, 11, 16, 17	266102 2502	63,–
C25 I 4.5 ISO	C25	4.5	25.0	33	1	H10, 11, 16, 17	266102 2503	63,–
C25 I 5.0 ISO	C25	5.0	25.0	34	1	H10, 11, 16, 17	266102 2504	63,–
C25 I 5.5 ISO	C25	5.5	25.0	35	1	H10, 11, 16, 17	266102 2505	63,–
C25 I 6.0 ISO	C25	6.0	25.0	36	1	H10, 11, 16, 17	266102 2506	63,–

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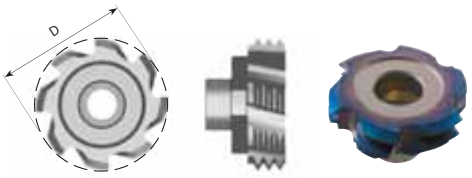
Full profile, ISO, multi-flute

• for female threads

ISO P M K N S H

model	Insert size mm	Pitch mm	D mm	D min. mm	T per cutting edge	Number of teeth	Holder	AMT8 art.no.	€
S163 H 1.0 ISO	S20	1.0	16.3	18	5	8	H6, 7, 8, 9, 15	**266113** 2001	72,50
S175 H 1.5 ISO	S20	1.5	17.5	20	3	8	H6, 7, 8, 9, 15	266113 2002	72,50
S178 F 2.5 ISO	S20	2.5	17.8	22	2	6	H6, 7, 8, 9, 15	266113 2004	72,50
S186 F 2.0 ISO	S20	2.0	18.6	22	2	6	H6, 7, 8, 9, 15	266113 2003	72,50
S189 F 3.0 ISO	S20	3.0	18.9	24	1	6	H6, 7, 8, 9, 15	266113 2005	72,50
S200 F 3.5 ISO	S20	3.5	20.0	26	1	6	H6, 7, 8, 9, 15	266113 2006	72,50
S200 F 4.0 ISO	S20	4.0	20.0	27	1	6	H6, 7, 8, 9, 15	266113 2007	72,50
S200 F 4.5 ISO	S20	4.5	20.0	28	1	5	H6, 7, 8, 9, 15	266113 2008	72,50
S200 F 5.0 ISO	S20	5.0	20.0	29	1	4	H15	266113 2009	72,50

2151



Full profile, UN

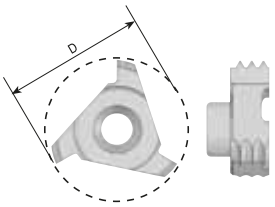
• for female threads

ISO P M K N S H

model	Insert size mm	Pitch TPI	D mm	T per cutting edge	Holder	AMT7 art.no.	€
C10 I 20 UN	C10	20	10.0	2	H1, 2, 12, 13	**266103** 1001	44,70
C10 I 18 UN	C10	18	10.0	2	H1, 2, 12, 13	266103 1002	44,70
C10 I 12 UN	C10	12	10.0	1	H1, 2, 12	266103 1003	44,70
C12 I 32 UN	C12	32	12.0	3	H3, 4, 5, 14	266103 1201	49,70
C12 I 28 UN	C12	28	12.0	3	H3, 4, 5, 14	266103 1202	45,–
C12 I 24 UN	C12	24	12.0	2	H3, 4, 5, 14	266103 1203	45,–
C12 I 20 UN	C12	20	12.0	2	H3, 4, 5, 14	266103 1204	45,–
C12 I 18 UN	C12	18	12.0	2	H3, 4, 5, 14	266103 1205	45,–
C12 I 16 UN	C12	16	12.0	1	H3, 4, 5, 14	266103 1206	45,–
C12 I 11 UN	C12	11	12.0	1	H3, 4, 5	266103 1207	45,–
C12 I 10 UN	C12	10	12.0	1	H3, 4, 5	266103 1208	45,–
C18 I 32 UN	C18	32	17.8	6	H6, 7, 8, 9, 15	266103 1801	61,–
C18 I 28 UN	C18	28	17.8	5	H6, 7, 8, 9, 15	266103 1802	56,–
C18 I 24 UN	C18	24	17.8	4	H6, 7, 8, 9, 15	266103 1803	56,–
C18 I 20 UN	C18	20	17.8	3	H6, 7, 8, 9, 15	266103 1804	56,–
C18 I 18 UN	C18	18	17.8	3	H6, 7, 8, 9, 15	266103 1805	56,–
C18 I 16 UN	C18	16	17.8	3	H6, 7, 8, 9, 15	266103 1806	56,–
C18 I 14 UN	C18	14	17.8	2	H6, 7, 8, 9, 15	266103 1807	56,–
C18 I 12 UN	C18	12	17.8	2	H6, 7, 8, 9, 15	266103 1808	56,–
C18 I 11 UN	C18	11	17.8	2	H6, 7, 8, 9, 15	266103 1809	56,–
C18 I 9 UN	C18	9	17.8	1	H6, 7, 8, 9, 15	266103 1810	56,–
C18 I 8 UN	C18	8	17.8	1	H6, 7, 8, 9, 15	266103 1811	56,–
C25 I 8 UN	C25	8	25.0	2	H10, 11, 16, 17	266103 2501	63,–
C25 I 7 UN	C25	7	25.0	1	H10, 11, 16, 17	266103 2502	63,–
C25 I 6 UN	C25	6	25.0	1	H10, 11, 16, 17	266103 2503	63,–
C25 I 5 UN	C25	5	25.0	1	H10, 11, 16, 17	266103 2504	63,–
C25 I 4 UN	C25	4	25.0	1	H10, 11, 16, 17	266103 2505	63,–

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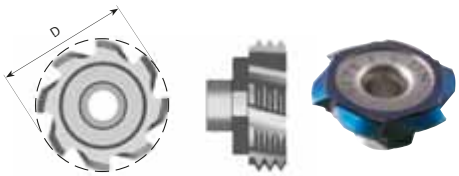
Full profile, UN, multi-flute

• for female threads

ISO P M K N S H

model	Insert size mm	Pitch TPI	D mm	Number of teeth	T per cutting edge	Holder	AMT8 art.no.	€
S160 H 24 UN	S20	24	16.0	8	4	H6, 7, 8, 9, 15	**266114** 2001	72,50
S164 F 16 UN	S20	16	16.4	6	3	H6, 7, 8, 9, 15	266114 2003	72,50
S169 H20 UN	S20	20	16.9	8	4	H6, 7, 8, 9, 15	266114 2002	72,50
S178 F 9 UN	S20	9	17.8	6	1	H6, 7, 8, 9, 15	266114 2006	72,50
S186 F 12 UN	S20	12	18.6	6	2	H6, 7, 8, 9, 15	266114 2005	72,50
S191 F14 UN	S20	14	19.1	6	2	H6, 7, 8, 9, 15	266114 2004	72,50
S200 D 5 UN	S20	5	20.0	4	1	H15	266114 2010	72,50
S200 E 6 UN	S20	6	20.0	5	1	H6, 7, 8, 9, 15	266114 2009	72,50
S200 F 7 UN	S20	7	20.0	6	1	H6, 7, 8, 9, 15	266114 2008	72,50
S200 F 8 UN	S20	8	20.0	6	1	H6, 7, 8, 9, 15	266114 2007	72,50

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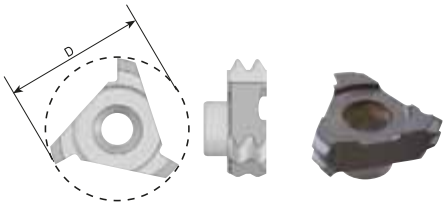
G55° BSW, BSF, BSP

- the same tool for internal and external threads

ISO P M K N S H

model	Insert size mm	Pitch TPI	D mm	T per cutting edge	Holder	AMT7 art.no.	€
C10 19 W	C10	19	10.0	2	H1, 2, 12, 13	**266104** 1001	44,70
C12 19 W	C12	19	12.0	2	H3, 4, 5, 14	266104 1201	45,–
C18 14 W	C18	14	17.8	2	H6, 7, 8, 9, 15	266104 1801	56,–
C18 11 W	C18	11	17.8	2	H6, 7, 8, 9, 15	266104 1802	56,–

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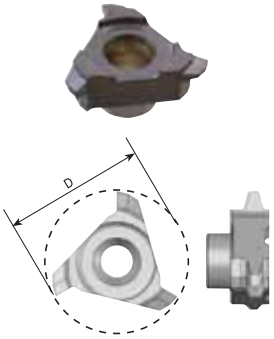
Trapezoid

- DIN 103
- For female threads

ISO P M K N S H

model	Insert size mm	Pitch mm	D mm	Holder	AMT7 art.no.	€
C10 I 2 TR	C10	2	10.0	H1, 2, 12	**266105** 1001	44,70
C18 I 3 TR	C18	3	17.8	H6, 7, 8, 9, 15	266105 1801	56,–
C18 I 4 TR	C18	4	17.8	H15	266105 1802	56,–
C18 I 5 TR	C18	5	17.8	H15	266105 1803	56,–
C25 I 6 TR	C25	6	25.0	H10, 11, 16, 17	266105 2501	63,–

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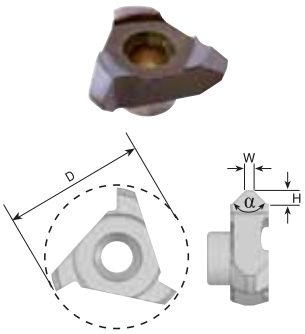
Countersinking and grooving

- suitable for deburring, reverse countersinking, and grooving
- Two cutting edges
- suitable for all materials

ISO P M K N S H

model	Insert size mm	D mm	H mm	W mm	a °	Holder	AMT7 art.no.	€
C10 C90	C10	10.0	1.30	0.4	90	H1, 2, 12	**266107** 1001	33,50
C12 C90	C12	12.0	1.35	0.3	90	H3,4,5	266107 1201	33,90
C18 C90	C18	17.8	1.95	1.1	90	H6, 7, 8, 9, 15	266107 1801	38,50
C25 C90	C25	25.0	2.50	1.0	90	H10, 11, 16, 17	266107 2501	56,–

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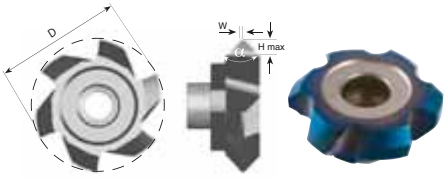
Countersinking and grooving, multi-flute

- suitable for deburring, reverse countersinking, and grooving
- Two cutting edges
- suitable for all materials

ISO P M K N S H

model	Insert size mm	D mm	H mm	W mm	a °	Number of teeth	Holder	AMT8 art.no.	€
SC170 E H14	S20	17.0	1.35	0.2	90°	5	H6, 7, 8, 9, 15	**266116** 2001	50,50
SC200 F H12	S20	20.0	1.20	2.5	90°	6	H6, 7, 8, 9, 15	266116 2007	50,50
SC200 F H14	S20	20.0	1.35	0.2	90°	6	H6, 7, 8, 9, 15	266116 2002	50,50
SC200 F H15	S20	20.0	1.50	2.0	90°	6	H6, 7, 8, 9, 15	266116 2006	50,50
SC200 F H17	S20	20.0	1.70	1.5	90°	6	H6, 7, 8, 9, 15	266116 2005	50,50
SC200 F H20	S20	20.0	1.95	1.0	90°	6	H6, 7, 8, 9, 15	266116 2004	50,50
SC200 F H24	S20	20.0	2.35	0.2	90°	6	H6, 7, 8, 9, 15	266116 2003	50,50

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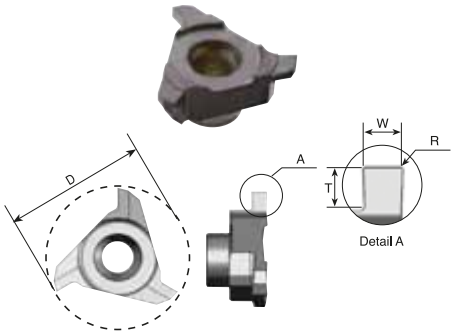
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Plunge milling

ISO P M K N S H

model	Insert size mm	D mm	W±0.02 mm	T max. mm	R mm	D min. mm	Holder	AMT7 art.no.	€
C10 W08	C10	10.0	0.80	0.80	0.1	10.0	H1, 2, 12, 13	**266108** 1001	32,–
C10 W09	C10	10.0	0.90	0.90	0.1	10.0	H1, 2, 12, 13	266108 1002	32,–
C10 W10	C10	10.0	1.00	0.90	0.1	10.0	H1, 2, 12, 13	266108 1003	32,–
C12 W08	C12	12.0	0.80	0.80	0.1	12.0	H3, 4, 5, 14	266108 1201	32,50
C12 W10	C12	12.0	1.00	0.90	0.1	12.0	H3, 4, 5, 14	266108 1202	32,50
C18 W10	C18	17.8	1.00	1.50	0.1	17.8	H6, 7, 8, 9, 15	266108 1801	38,70
C18 W12	C18	17.8	1.20	1.50	0.1	17.8	H6, 7, 8, 9, 15	266108 1802	38,70
C18 W15	C18	17.8	1.50	1.95	0.1	17.8	H6, 7, 8, 9, 15	266108 1803	38,70
C18 W20	C18	17.8	2.00	2.80	0.1	17.8	H15	266108 1804	38,70
C25 W20	C25	25.0	2.00	3.00	0.2	25.0	H10, 11, 16, 17	266108 2501	45,50
C25 W25	C25	25.0	2.50	3.00	0.2	25.0	H10, 11, 16, 17	266108 2502	45,50
C25 W30	C25	25.0	3.00	3.00	0.2	25.0	H10, 11, 16, 17	266108 2503	45,50
C25 W35	C25	25.0	3.50	3.50	0.2	25.0	H10, 11, 16, 17	266108 2504	45,50
C25 W40	C25	25.0	4.00	3.50	0.2	25.0	H10, 11, 16, 17	266108 2505	45,50
C25 W50	C25	25.0	5.00	3.50	0.2	25.0	H10, 11, 16, 17	266108 2506	45,50

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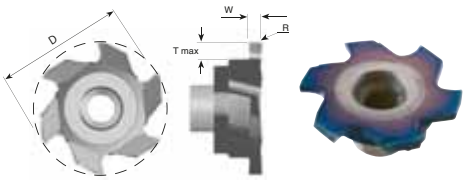


Plunge milling, multi-flute

ISO P M K N S H

model	Insert size mm	D mm	W±0.02 mm	T max. mm	R mm	D min. mm	Number of teeth	Holder	AMT8 art.no.	€
SG200 E W20T	S20	20.0	2.0	3.7	0.2	20	5	H15	**266117** 2007	52,50
SG200 E W25T	S20	20.0	2.5	3.7	0.2	20	5	H15	266117 2008	52,50
SG200 E W30T	S20	20.0	3.0	3.7	0.2	20	5	H15	266117 2009	52,50
SG200 F W15	S20	20.0	1.5	2.9	0.2	20	6	H6, 7, 8, 9, 15	266117 2001	50,50
SG200 F W20	S20	20.0	2.0	2.9	0.2	20	6	H6, 7, 8, 9, 15	266117 2002	50,50
SG200 F W25	S20	20.0	2.5	2.9	0.2	20	6	H6, 7, 8, 9, 15	266117 2003	50,50
SG200 F W30	S20	20.0	3.0	2.9	0.2	20	6	H6, 7, 8, 9, 15	266117 2004	50,50
SG200 F W40	S20	20.0	4.0	2.9	0.2	20	6	H6, 7, 8, 9, 15	266117 2005	50,50
SG200 F W49	S20	20.0	4.9	2.9	0.2	20	6	H6, 7, 8, 9, 15	266117 2006	50,50

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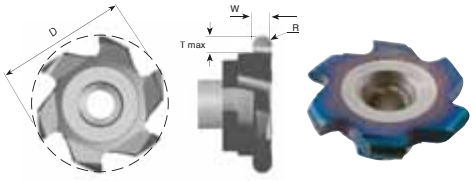


Full radius plunge milling, multi-flute

ISO P M K N S H

model	Insert size mm	D mm	W±0.02 mm	T max. mm	R mm	D min. mm	Number of teeth	Holder	AMT8 art.no.	€
SG200 F R10	S20	20.0	2.0	2.9	1.0	20	6	H6, 7, 8, 9, 15	**266118** 2001	52,50
SG200 F R12	S20	20.0	2.4	2.9	1.2	20	6	H6, 7, 8, 9, 15	266118 2002	52,50
SG200 F R15	S20	20.0	3.0	2.9	1.5	20	6	H6, 7, 8, 9, 15	266118 2003	52,50
SG200 F R20	S20	20.0	4.0	2.9	2.0	20	6	H6, 7, 8, 9, 15	266118 2004	52,50

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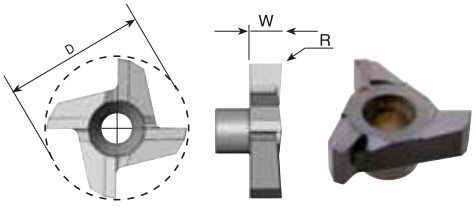


Face milling and finishing

ISO P M K N S H

model	Insert size mm	D mm	W mm	R mm	Holder	AMT7 art.no.	€
C18 F R 0.1	C18	17.8	5.0	0.1	H6, 7, 8, 9, 15	**266109** 1801	49,40
C25 F R 0.2	C25	25.0	6.0	0.2	H10, 11, 16, 17	266109 2501	56,–

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Overview of tool holders

	Exchangeable head milling cutters	Face milling cutters							
Sorting by type									
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Order No.	255500-504.... 255600-615....	260801.... 260202....	262555....	260200....	262550....	262548....	260150....	260111....	265232....
Tool cutting edge angle	Various	45°	45°	45°	45°	43°	45°		75°
Number of cutting edges	2 - 8	2-16	4-20	4-13	4-16	3-8	4-8	4-8	4
Coolant bore		IC	IC	IC	IC	IC	IC		
ISO milling inserts		SE.T 1204	SN.X 1206 SNMU 1206	SE.N 1203	SE.T 13T3 XEHW 13T3	OFMT 05T3	SAHT 1306	OCKX 1606 XCKX 1606 RCKX 1606 SAHT 1306	APKT 1003 APHX 1003
Page	20-156	20-165	20-166	20-168	20-171	20-169	20-169	20-170	20-179
Material groups	**Usage recommendations**								
Steel < 700 N/mm²	●	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	●	●	●	●	●	●	●	●	●
Stainless steel austenitic	●	●	●	●	●	●	●	●	●
Stainless steel duplex									
Cast iron GG/GTS	●	●	●	●	●	●	●	●	●
Cast iron GGG	●	●	●	●	●	●	●	●	●
Titanium alloys					●				
Superalloys Fe/NiCo base < 30 HRc					●				
Superalloys Fe/NiCo base ≥ 30 HRc									
Aluminium < 8 % Si	●	●	●	●	●				●
Aluminium ≥ 8 % Si	●	●	●	●	●				●
Copper Cu-alloy	●								●
Graphite GRP/CFP/thermoset									●
Hardened steel < 55 HRc	●				●				
Hardened steel < 60 HRc	●				●				
Hardened steel ≥ 60 HRc	●								

	Face milling cutters	Drilling/die sinking cutters			Shoulder milling cutters				
Sorting by type									
Brand	ATORN®	SARA®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Order No.	262530....	262515.... 262516....	262515.... 262516....	262515.... 262516....	Various	262547....	262540.... 262542.... 262546....	262559.... 262560.... 262562....	262525.... 262505.... 262510.... 262511....
Tool cutting edge angle	75°	90°	90°	90°	89.5	90°	90°	90°	90°
Number of cutting edges	3-7	2	3	3	1-9	4-9	1-12	3-10	4-16
Coolant bore		IC	IC	IC	IC	IC	IC		IC
ISO milling inserts	APKT 1604 APHX 1604	AP.. 0803	APKT 1003 APHX 1003	APKT 1604 APHX 1604	SPMT 06.. SPMT 12.. SPGT 06.. SPGT 12..	SDMT 1205	AP.. 1003	LN.X 100605	APKT 1604 APHX 1604
Page	20-182	20-173	20-177	20-181	20-187	20-189	20-174	20-185	20-182
Material groups	**Usage recommendations**								
Steel < 700 N/mm²	●	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	●	●	●	●	●	●	●	●	●
Stainless steel austenitic	●	●	●	●	●	●	●	●	●
Stainless steel duplex					○				
Cast iron GG/GTS	●	●	●	●	●	●	●	●	●
Cast iron GGG	●	●	●	●	●	●	●	●	●
Titanium alloys						●			
Superalloys Fe/NiCo base < 30 HRc						●			
Superalloys Fe/NiCo base ≥ 30 HRc									
Aluminium < 8 % Si	●		●	●	●		●	●	●
Aluminium ≥ 8 % Si	●		●	●	●		●	●	●
Copper Cu-alloy	●		●	●	●		●	●	●
Graphite GRP/CFP/thermoset	●		●	●			●	●	●
Hardened steel < 55 HRc									
Hardened steel < 60 HRc									
Hardened steel ≥ 60 HRc									

	Roughing spiral flute milling cutters		Spiral flute chamfer milling cutters		Countersinking mill, adjustable		Chamfer cutters	
Sorting by type								
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Order No.	262529.... 262544....	262523....	262531....	262527....	260122....	260123....	260121.... 260125....	260126....
Tool cutting edge angle	90°	90°	15-75°	15-75°	10-80°	10-80°	30-45-60°	45°
Number of cutting edges	1-4	3-6	9	6	1	1	1-3	1
Coolant bore	IC		IC					IC
ISO milling inserts	APKT 1003 APHX 1003	APKT 1604 APHX 1604	APKT 1003 APHX 1003	APKT 1604 APHX 1604	TC.. 1102	TC.. 16T3 SCMT 1204	TCMT 1102 TCMT 16T3 SCMT 0602 SCMT 09T3	TCMT 16T3
Page	20-178	20-182	20-178	20-183	20-191	20-191	20-194	20-197
Material groups	**Usage recommendations**							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	●	●	●	●	●	●	●	●
Stainless steel austenitic	●	●	●	●	●	●	●	●
Stainless steel duplex								
Cast iron GG/GTS	●	●	●	●	●	●	●	●
Cast iron GGG	●	●	●	●	●	●	●	●
Titanium alloys					●	●	●	●
Superalloys Fe/NiCo base < 30 HRc					●	●	●	●
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	●	●	●	●				
Aluminium ≥ 8 % Si	●	●	●	●				
Copper Cu-alloy	●	●	●	●				
Graphite GRP/CFP/thermoset	●	●	●	●				
Hardened steel < 55 HRc								
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

	High-speed corner milling cutters				High-speed spiral flute milling cutters			T-slot milling cutters
Sorting by type								
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	SARA®
Order No.	264001.... 264002....	264003.... 264004....	264006.... 264007.... 264009....	264011.... 264012.... 264014....	264005....	264008.... 264010....	264013....	263007....
Tool cutting edge angle	90°	90°	90°	90°	90°	90°	90°	
Number of cutting edges	1-6	2-6	2-9	2-9	6-15	8-20	12-20	2-4
Coolant bore	IC	IC	IC	IC	IC	IC	IC	IC
ISO milling inserts	AD..X 06..	AD..X 09..	AD..X 12..	AD..X 17..	AD..X 09..	AD..X 12..	AD..X 17..	SPMT 0603 SPMT 09T3 SPMT 1204
Page	20-199	20-201	20-202	20-204	20-202	20-203	20-205	20-198
Material groups	**Usage recommendations**							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic	●	●	●	●	●	●	●	●
Stainless steel austenitic	●	●	●	●	●	●	●	●
Stainless steel duplex	●	●	●	●	●	●	●	
Cast iron GG/GTS	●	●	●	●	●	●	●	●
Cast iron GGG	●	●	●	●	●	●	●	●
Titanium alloys								
Superalloys Fe/NiCo base < 30 HRc								
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	●	●	●	●	●	●	●	
Aluminium ≥ 8 % Si	●	●	●	●	●	●	●	
Copper Cu-alloy	●	●	●	●	●	●	●	
Graphite GRP/CFP/thermoset	●	●	●	●	●	●	●	
Hardened steel < 55 HRc								
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

	Plunge milling cutters	High feed-rate milling cutters	Face, corner and high feed-rate milling cutters			Mirror face milling cutters
Sorting by type						
Brand	ATORN®	ATORN®	SARA®	SARA®	SARA®	SARA®
Order No.	260400.... 260402....	Various	"260301... 260302..."	260303... to 260308	206309... 260310...	260328...
Tool cutting edge angle	90°		90°	90°	90°	
Number of cutting edges	2-5	2-10	2-7	2-6	2-9	2
Coolant bore	IC	IC	IC	IC	IC	IC
ISO milling inserts	VCGT 220530 VPGT 160412	XCNT/W 07 XCNT/W 09 XCNT/W 12 XDM 09	XCH..	XD..T	SDM..	THEX
Page	20-210	20-206	20-211	20-213	20-215	20-217
Material groups	**Usage recommendations**					
Steel < 700 N/mm²		●	●	●	●	●
Steel < 1000 N/mm²		●	●	●	●	●
Steel < 1400 N/mm²		●	●	●	●	●
Stainless steel ferritic/martensitic		●	●	●	●	●
Stainless steel austenitic		●	●	●	●	●
Stainless steel duplex		●	●	●	●	●
Cast iron GG/GTS		●	●	●	●	●
Cast iron GGG		●	●	●	●	●
Titanium alloys			●	●	●	●
Superalloys Fe/NiCo base < 30 HRc			●	●	●	●
Superalloys Fe/NiCo base ≥ 30 HRc			●	●	●	●
Aluminium < 8 % Si	●	●	●	●		●
Aluminium ≥ 8 % Si	●	●	●	●		●
Copper Cu-alloy	●	●		●		
Graphite GRP/CFP/thermoset	●					●
Hardened steel < 55 HRc			●	●		●
Hardened steel < 60 HRc			●	●		●
Hardened steel ≥ 60 HRc				●		●

	Copy milling cutters	Disc milling cutters	
Sorting by type			
Brand	ATORN®	ATORN®	ATORN®
Order No.	260611.... 260612....	262600.... 262610....	354050.... 354051....
Tool cutting edge angle			
Number of cutting edges	2-7	8-24	6-12
Coolant bore	IC		
ISO milling inserts	RD 0501M0 RD 0702M0 RD 1003M0 RD 12T3M0 RD 1604M0	SNHX 110.T SNHX 120.T	AIMC AIMJ AIPV
Page	20-219	20-231	20-233
Material groups	**Usage recommendations**		
Steel < 700 N/mm²	●	●	●
Steel < 1000 N/mm²	●	●	●
Steel < 1400 N/mm²	●	●	●
Stainless steel ferritic/martensitic	●	●	●
Stainless steel austenitic	●	●	●
Stainless steel duplex			
Cast iron GG/GTS	●	●	●
Cast iron GGG	●	●	●
Titanium alloys	●		
Superalloys Fe/NiCo base < 30 HRc	●		
Superalloys Fe/NiCo base ≥ 30 HRc			
Aluminium < 8 % Si		●	●
Aluminium ≥ 8 % Si		●	●
Copper Cu-alloy		●	
Graphite GRP/CFP/thermoset			
Hardened steel < 55 HRc	●		
Hardened steel < 60 HRc	●		
Hardened steel ≥ 60 HRc			

ATORN® Modular milling system

INFO

								
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Number of cutting edges	2	3	3	4	4	6-8	4-6	4-5
Diameter range / mm	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10-20
Standard	WN	WN	WN	WN	WN	WN	WN	WN
Version			HPC		HPC		MTC	MTC
Type/profile	N	N	W	N	NH	N	NRf	NR
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	TiAlN	TiAlN	ZrN	TiAlN	AlTiN	TiAlN	AlTiN	AlTiN
Item number	255604...	255605...	255603...	255606...	255600	255607	255601	255602
Page	20-159	20-159	20-160	20-161	20-161	20-162	20-162	20-162
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic								
Stainless steel austenitic	●	●		●	●	●	●	●
Stainless steel duplex								
Cast iron GG/GTS	●	●		●	●	●	●	●
Cast iron GGG	●	●		●	●	●	●	●
Titanium alloys								
Superalloys Fe/NiCo base < 30 HRc								
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si	●	●						
Aluminium ≥ 8 % Si	●	●	●					
Copper Cu-alloy	●	●	●					
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc								
Hardened steel < 60 HRc								
Hardened steel ≥ 60 HRc								

								
Brand	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®	ATORN®
Number of cutting edges	4	2	2	2	4	2	6	4
Diameter range / mm	10-20	10-20	10-20	10-20	10-20	10-20	10-20	10-20
Standard	WN	WN	WN	WN	WN	WN	WN	WN
Version	HPC/HSC	HPC	HPC/HSC	HSC				
Type/profile	N	NH	H	H	N	N	N	N
Cutting material	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide	Solid carbide
Coating	AlTiN+	AlTiN	AlTiN+	AlTiN	TiAlN	TiAlN	TiAlN	TiAlN
Item number	255608	255609	255610	255612	255611	255613	255614	255615
Page	20-162	20-162	20-162	20-163	20-163	20-163	20-164	20-164
Material groups	Usage recommendations							
Steel < 700 N/mm²	●	●	●	●	●	●	●	●
Steel < 1000 N/mm²	●	●	●	●	●	●	●	●
Steel < 1400 N/mm²	●	●	●	●	●	●	●	●
Stainless steel ferritic/martensitic						●	●	●
Stainless steel austenitic						●	●	●
Stainless steel duplex								
Cast iron GG/GTS	●	●	○	●	●	●	●	●
Cast iron GGG	●	●	○	●	●	●	●	●
Titanium alloys								
Superalloys Fe/NiCo base < 30 HRc								
Superalloys Fe/NiCo base ≥ 30 HRc								
Aluminium < 8 % Si						●	●	●
Aluminium ≥ 8 % Si						●	●	●
Copper Cu-alloy						●	●	●
Graphite GRP/CFP/thermoset								
Hardened steel < 55 HRc	●	●	●	●	●			
Hardened steel < 60 HRc	●	●	●	●				
Hardened steel ≥ 60 HRc	●	●	●	●				

ATORN® Modular milling system

INFO

Properties

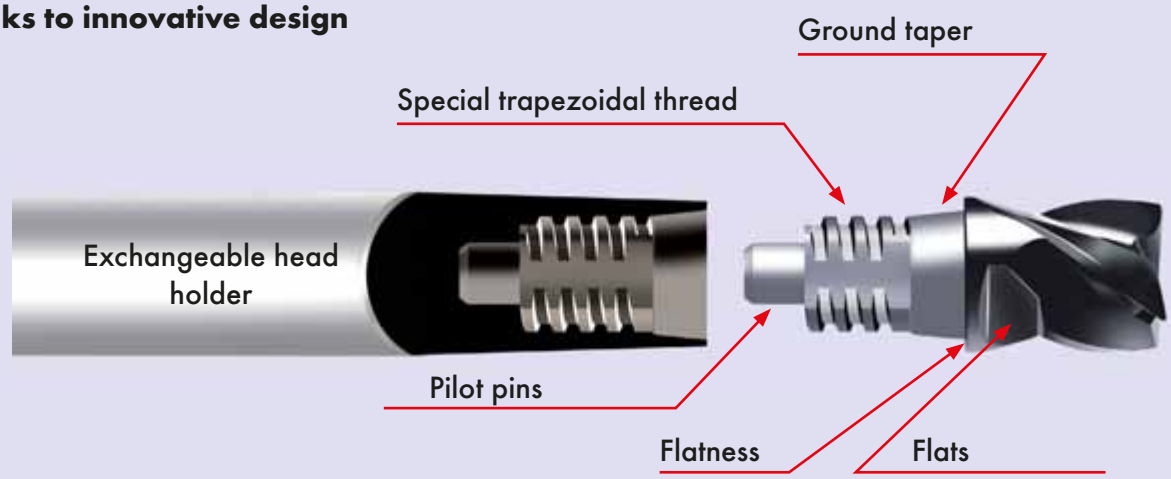
- Low tooling times
- A wide range of geometries
- Various shank shapes
- Diameters from 8 to 20 mm

Advantages

Reduced costs

- High true-running accuracy < 20µm
- High stability and stiffness thanks to pilot pins
- Low-vibration
- Guaranteed repetition precision

Perfect friction and form fit thanks to innovative design



A modular system for a wide range of tasks

- For ISO material groups P, M, N, K, H
- For roughing and finishing all contours
- Optimal for series production
- Particularly suitable for multiple-spindle automated lathes without tool changer and lathes with driven tools



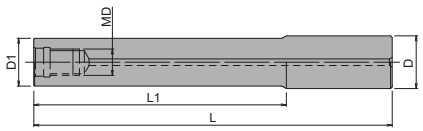
Cost advantages

- Replacement of the head, shank remains clamped
- Up to 50 change cycles per shank possible
- Replaceable heads can be resharpened
- Quick change
- Reduced auxiliary processing times

ATORN® Straight exchangeable head holder

h6 | DIN 6535 HB | DIN 6535 HA

- incl. chuck key





Steel holder, short

D mm	L mm	L1 mm	D1 mm	MD	art.no.	€
10	65	5	9.6	20	**255500** 0020	86,50
12	75	5	11.6	30	255500 0030	86,50
16	80	6	15.4	40	255500 0040	96,–
20	90	6	19.2	50	255500 0050	97,50

2159

Steel holder, long

D mm	L mm	L1 mm	D1 mm	MD	art.no.	€
10	75	18	9.6	20	**255501** 0020	97,–
12	85	21	11.6	30	255501 0030	97,–
16	95	23	15.4	40	255501 0040	106,–
20	110	28	19.2	50	255501 0050	108,–

2159

Solid carbide holder, extra-long

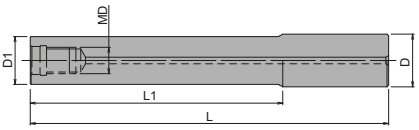
D mm	L mm	L1 mm	D1 mm	MD	art.no.	€
10	111	56	9.6	20	**255502** 0020	215,–
12	128	63	11.6	30	255502 0030	235,–
16	149	79	15.4	40	255502 0040	305,–
20	174	94	19.2	50	255502 0050	415,–

2159

ATORN® Tapered exchangeable head holder

h6 | DIN 6535 HA

- incl. chuck key





Steel holder 5 °

D mm	L mm	L1 mm	D1 mm	MD	art.no.	€
16	105	36	9.6	20	**255503** 0020	117,–
20	120	48	11.6	30	255503 0030	117,–
20	135	26	15.4	40	255503 0040	118,–
25	150	33	19.2	50	255503 0050	123,–

2159

Steel holder 1 °

D mm	L mm	L1 mm	D1 mm	MD	art.no.	€
16	110	36	9.6	20	**255504** 0020	117,–
20	130	53	11.6	30	255504 0030	117,–
20	145	59	15.4	40	255504 0040	118,–
25	180	74	19.2	50	255504 0050	123,–

2159

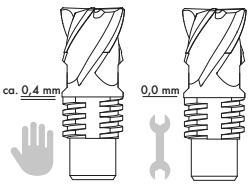
ATORN® Assembly key for exchangeable head holder



MD	Wr. width mm	L mm	h mm	art.no.	€
20	8	92	2.8	**255698** 0020	5,45
30	10	100	3.8	255698 0030	5,80
40	13	135	3.8	255698 0040	7,50
50	16	145	4.8	255698 0050	8,15

2161

initial tightening by hand, then using specified torque



ATORN® Open-end snap-in spanner for exchangeable head holder

MD	Wr. width mm	h mm	Quadratic mm	art.no.	€
20	8	2.8	9x12	**255699** 0020	63,–
30	10	3.8	9x12	255699 0030	63,–
40	13	3.8	9x12	255699 0040	63,–
50	16	4.8	9x12	255699 0050	63,–

2161



For snap-in tools
- Accuracy ± 3 % of scale value
- Including serial number and certificate
- DIN EN ISO 6789:2003 (D)





Snap-in tools from page 70-43

Torque N-m	Quadratic mm	Scale division N-m	Length mm	art.no.	€	Calibration art.no.	Calibration €
10-60	9x12	0.5	312	**702603** 0002	134,–	079310 0001	31,50

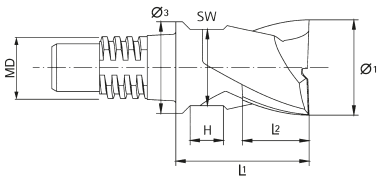
7109



702603 0002

ATORN® Exchangeable head milling cutter, Z2

VHM | Typ N | 30° | h10 | h6 | Z 2 | TiAlN | Vc/fz 20-292



material	● very well suited ○ well suited	steel < 700 N/mm²	steel < 1000 N/mm²	steel < 1400 N/mm²	stainless steel ferrit./martens.	stainless steel austenitic	stainless steel duplex	cast iron GG/GTS	cast iron GGG	titanium alloys	superalloys Fe/NiCo-based < 30 HRc	superalloys Fe/NiCo-based ≥ 30 HRc	aluminium < 8 % Si	aluminium ≥ 8 % Si	copper Cu-alloy	graphite GRP/CFP/thermo.	hardened steel < 55 HRc	hardened steel < 60 HRc	hardened steel ≥ 60 HRc
		●	●	●		●		●	●				●	●	●				
	Cutting speed Vc m/min.	220	190	155		120		180	140				300	220	200				

Please adjust these guidelines according to clamping operation and machine set-up.

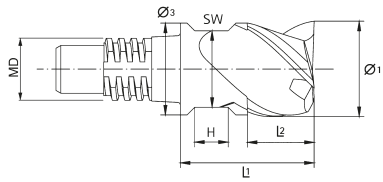
D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N-m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	14	9.6	2	8x3	20	12	0.084	**255604** 0100	46,40
12	9	9	11.6	2	10x4	30	15	0.084	255604 0120	58,50
16	12	21	15.4	2	13x4	40	30	0.11	255604 0160	84,50
20	15	15	19.2	2	16x5	50	45	0.14	255604 0200	103,–

2160



ATORN® Exchangeable head milling cutter, Z3 Type N

VHM | Typ N | 45° | h10 | h6 | Z 3 | TiAlN | Vc/fz 20-292



material	● very well suited ○ well suited	steel < 700 N/mm²	steel < 1000 N/mm²	steel < 1400 N/mm²	stainless steel ferrit./martens.	stainless steel austenitic	stainless steel duplex	cast iron GG/GTS	cast iron GGG	titanium alloys	superalloys Fe/NiCo-based < 30 HRc	superalloys Fe/NiCo-based ≥ 30 HRc	aluminium < 8 % Si	aluminium ≥ 8 % Si	copper Cu-alloy	graphite GRP/CFP/thermo.	hardened steel < 55 HRc	hardened steel < 60 HRc	hardened steel ≥ 60 HRc
		●	●	●		●		●	●				●	●	●				
	Cutting speed Vc m/min.	220	190	155		120		180	140				250	300	200				

Please adjust these guidelines according to clamping operation and machine set-up.

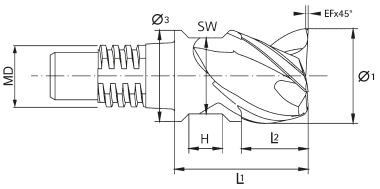
D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N-m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	7	9.6	3	8x3	20	12	0.084	**255605** 0100	46,40
12	9	17	11.6	3	10x4	30	15	0.084	255605 0120	58,50
16	12	12	15.4	3	13x4	40	30	0.11	255605 0160	84,50
20	15	15	19.2	3	16x5	50	45	0.14	255605 0200	103,–

2160



ATORN® Exchangeable head milling cutter, Z3 Type W

VHM | Typ W | 45° | h10 | h6 | Z 3 | ZrN | HPC | Vc/fz | 20-291



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
													● 400	● 350	● 160				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

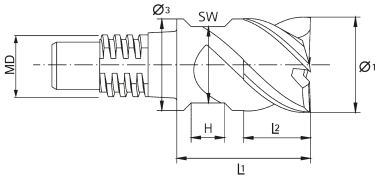
D mm	L2 mm	L1 mm	D1 mm	Z	F x 45° mm	Wr. width mm	MD	Tightening torque max. N·m	Feed fz aluminium < 8 % Si mm/tooth	art.no.	€
10	7	14	9.6	3	0.20	8x3	20	12	0.065	**255603** 0100	46,40
12	9	9	11.6	3	0.20	10x4	30	15	0.065	255603 0120	57,50
16	12	21	15.4	3	0.20	13x4	40	30	0.085	255603 0160	85,50
20	15	15	19.2	3	0.20	16x5	50	45	0.11	255603 0200	108,–

2160



ATORN® Exchangeable head milling cutter, Z4

VHM | Typ N | 45° | h10 | h6 | Z 4 | TiAlN | Vc/fz | 20-292



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 220	● 190	● 155		● 120		● 180	● 140					● 300	● 200				
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

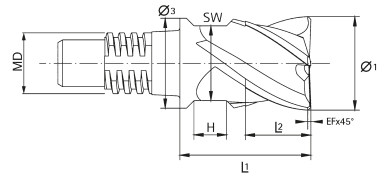
D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	7	9.6	4	8x3	20	12	0.084	**255606** 0100	46,40
12	9	9	11.6	4	10x4	30	15	0.084	255606 0120	58,50
16	12	12	15.4	4	13x4	40	30	0.11	255606 0160	84,50
20	15	26	19.2	4	16x5	50	45	0.14	255606 0200	103,–

2160



ATORN® Exchangeable head milling cutter, Z4 irregular

VHM | NH | 35°-38° | h10 | h6 | Z 4 | AlTiN | HPC | Vc/fz | 20-291



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 190	● 160	● 110		● 75		● 190	● 140										
	Cutting speed Vc m/min.																		

Please adjust these guidelines according to clamping operation and machine set-up.

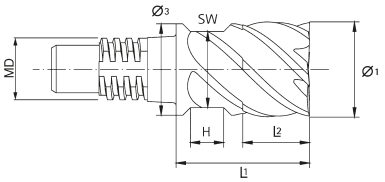
D mm	L2 mm	L1 mm	D1 mm	F x 45° mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	14	9.6	0.3	4	8x3	20	12	0.075	**255600** 0100	54,50
12	9	17	11.6	0.3	4	10x4	30	15	0.075	255600 0120	68,–
16	12	12	15.4	0.4	4	13x4	40	30	0.1	255600 0160	107,–
20	15	15	19.2	0.5	4	16x5	50	45	0.12	255600 0200	123,–

2160



ATORN® Exchangeable head milling cutter, multi-flute

VHM | Typ N | 45° | h10 | h6 | Z 6 | Z 8+ | TiAlN | Vc/fz | 20-293



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 220	● 160	● 90		● 120		● 200	● 170										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

● Feed fz steel < 1000 N/mm² mm/tooth

D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N·m	art.no.	€
10	7	14	9.6	6	8x3	20	12	0.065	**255607** 0100	53,50
12	9	9	11.6	6	10x4	30	15	0.065	255607 0120	69,–
16	12	12	15.4	6	13x4	40	30	0.075	255607 0160	104,–
20	15	15	19.2	8	16x5	50	45	0.1	255607 0200	141,–

2160



ATORN® Exchangeable head milling cutter, roughing cutter NR

VHM | NRf | NR | 45° | h10 | h6 | Z 4 | Z 5 | Z 6 | AlTiN | MTC | Vc/fz | 20-291

material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 190	● 150	● 110		● 90		● 170	● 120										
	Cutting speed Vc m/min.																		
	Please adjust these guidelines according to clamping operation and machine set-up.																		

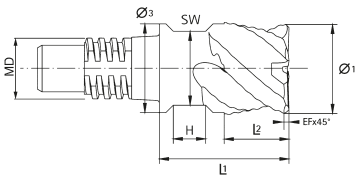


NRf - toothing

● Feed fz steel < 1000 N/mm² mm/tooth

D mm	L2 mm	L1 mm	D1 mm	F x 45° mm	Z	Wr. width mm	MD	Tightening torque max. N·m	art.no.	€
10	7	7	9.6	0.20	4	8x3	20	12	0.052	**255601** 0100	50,50
12	9	9	11.6	0.20	4	10x4	30	15	0.052	255601 0120	64,–
16	12	21	15.4	0.25	5	13x4	50	30	0.07	255601 0160	97,–
20	15	15	19.2	0.25	6	16x5	50	45	0.084	255601 0200	123,–

2160

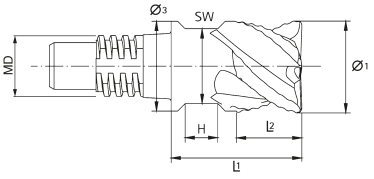


NR - toothing

● Feed fz steel < 1000 N/mm² mm/tooth

D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N·m	art.no.	€
10	7	7	9.6	4	8x3	20	12	0.052	**255602** 0100	50,50
12	9	17	11.6	4	10x4	30	15	0.052	255602 0120	64,–
16	12	12	15.4	5	13x4	40	30	0.07	255602 0160	97,–
20	15	15	19.2	5	16x5	50	45	0.084	255602 0200	123,–

2160



ATORN® Exchangeable head milling cutter, torus

VHM | Typ H | NH | 45° | 15° | h10 | h6 | Z 4 | Z 2 | AlTiN+ | AlTiN | HPC | HSC | | Vc/fz | 20-293

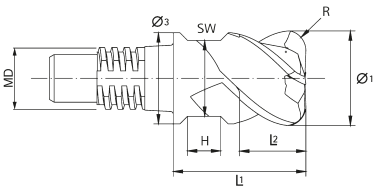
material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
	255608....	●	●	●				●	●								○	○	○
		194-355	181-330	137-320				178-325	162-295								107-195	60-110	52-95
	255609....	●	●	●				●	●								○	○	○
		200	140	120				180	150								95	70	60
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

Type H (HPC/HSC) 45°

• For dry machining

D mm	L2 mm	L1 mm	D1 mm	R mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	Feed fz steel < 1000 N/mm² mm/tooth	AlTiN+ art.no.	€
10	7	7	9.6	0.5	4	8x3	20	12	0.074	0.1	**255608** 1005	55,50
10	7	14	9.6	1.0	4	8x3	20	12	0.074	0.1	255608 1010	55,50
10	7	7	9.6	1.5	4	8x3	20	12	0.074	0.1	255608 1015	55,50
10	7	14	9.6	2.0	4	8x3	20	12	0.074	0.1	255608 1020	55,50
12	9	17	11.6	0.5	4	10x4	30	15	0.074	0.1	255608 1205	70,–
12	9	17	11.6	1.0	4	10x4	30	15	0.074	0.1	255608 1210	70,–
12	9	17	11.6	1.5	4	10x4	30	15	0.074	0.1	255608 1215	70,–
12	9	9	11.6	2.0	4	10x4	30	15	0.074	0.1	255608 1220	70,–
16	12	21	15.4	1.0	4	13x4	40	30	0.089	0.12	255608 1605	109,–
16	12	12	15.4	1.5	4	13x4	40	30	0.089	0.12	255608 1610	109,–
16	12	21	15.4	2.0	4	13x4	40	30	0.089	0.12	255608 1615	109,–
16	12	21	15.4	3.0	4	13x4	40	30	0.089	0.12	255608 1620	109,–
20	15	26	19.2	1.0	4	16x5	50	45	0.111	0.15	255608 2010	126,–

2160

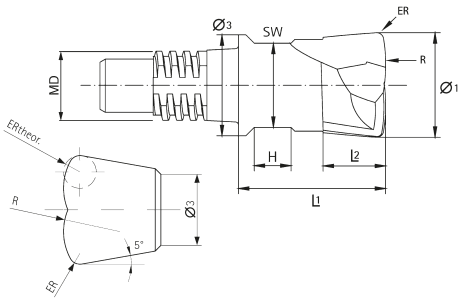




Type H-N (HSC) 15°

D mm	L2 mm	L1 mm	D1 mm	R mm	Z	Wr. width mm	MD	Tightening torque max. N·m	ERtheor. mm	Feed fz steel < 1000 N/mm² mm/tooth	AlTiN art.no.	€
10	7	14	9.6	0.64	2	8x3	20	12	0.90	0.2	**255609** 0100	46,40
12	9	9	11.6	0.75	2	10x4	30	15	1.10	0.2	255609 0120	58,50
16	12	21	15.4	1.06	2	13x4	40	30	1.45	0.25	255609 0160	86,50
20	15	15	19.2	1.25	2	16x5	50	45	1.65	0.3	255609 0200	102,–

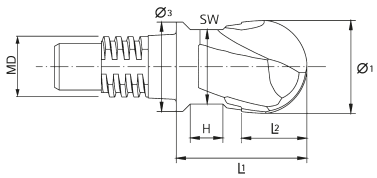
2160





ATORN® Exchangeable head milling cutter, radius Type H Z2

VHM | Typ H | 30° | h10 | h6 | Z 2 | AlTiN+ | HPC | HSC | | Vc/fz | 20-294



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		●	●	●				○	○								●	●	●
		570	350	240				400	380								180	160	150
	Cutting speed Vc m/min.				Please adjust these guidelines according to clamping operation and machine set-up.														

30°

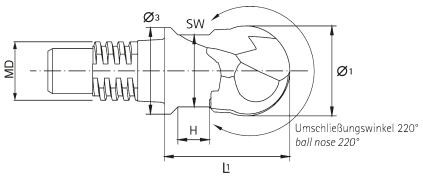
D mm	L2 mm	L1 mm	D1 mm	R mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	AlTiN+ art.no.	€
10	7	14	9.6	5	2	8x3	20	12	0.065	**255610** 0100	46,40
12	9	17	11.6	6	2	10x4	30	15	0.065	255610 0120	57,50
16	12	12	15.4	8	2	13x4	40	30	0.09	255610 0160	87,50
20	15	15	19.2	10	2	16x5	50	45	0.12	255610 0200	108,–

2160



ATORN® Exchangeable head milling cutter, radius Type H Z2 220°

VHM | NH | 15° | h10 | h6 | Z 2 | AlTiN | HSC | Vc/fz | 20-295



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 450	● 310	● 170				● 450	● 410								● 120	● 90	● 70
	Cutting speed Vc m/min.							Please adjust these guidelines according to clamping operation and machine set-up.											

15°

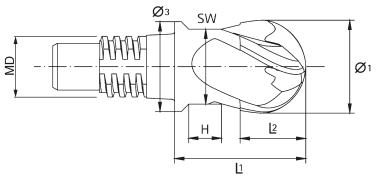
D mm	L2 mm	L1 mm	D1 mm	R mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	AlTiN art.no.	€
10	7	14	9.6	5	2	8x3	20	12	0.065	**255612** 0100	53,50
12	9	9	11.6	6	2	10x4	30	15	0.065	255612 0120	66,–
16	12	21	15.4	8	2	13x4	40	30	0.09	255612 0160	100,–
20	15	15	19.2	10	2	16x5	50	45	0.1	255612 0200	123,–

2160



ATORN® Exchangeable head milling cutter, radius Type N

VHM | Typ N | 30° | h10 | h6 | Z 4 | TiAlN | Vc/fz | 20-294



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 570	● 350	● 200				● 550	● 500								● 130		
	Cutting speed Vc m/min.							Please adjust these guidelines according to clamping operation and machine set-up.											

30°

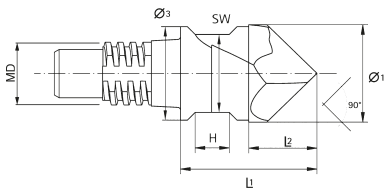
D mm	L2 mm	L1 mm	D1 mm	R mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	14	9.6	5	4	8x3	20	12	0.065	**255611** 0100	51,50
12	9	17	11.6	6	4	10x4	30	15	0.065	255611 0120	64,–
16	12	21	15.4	8	4	13x4	40	30	0.09	255611 0160	98,–
20	15	26	19.2	10	4	16x5	50	45	0.12	255611 0200	122,–

2160



ATORN® Exchangeable head milling cutter, multimill

VHM | Typ N | 90° | 30° | h10 | h6 | Z 2 | TiAlN | Vc/fz | 20-295



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 120	● 90	● 65	● 80	● 80		● 120	● 90				● 300	● 280	● 200				
	Cutting speed Vc m/min.							Please adjust these guidelines according to clamping operation and machine set-up.											

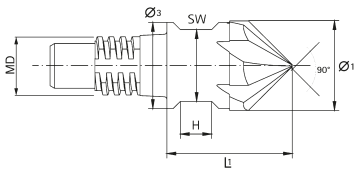
D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	7	9.6	2	8x3	20	12	0.045	**255613** 0100	40,20
12	9	17	11.6	2	10x4	30	15	0.065	255613 0120	50,50
16	12	21	15.4	2	13x4	40	30	0.08	255613 0160	76,–
20	15	15	19.2	2	16x5	50	45	0.09	255613 0200	92,50

2160



ATORN® Exchangeable head milling cutter, deburring milling cutter

VHM | Typ N | 90° | h10 | h6 | Z 6 | TiAlN | Vc/fz | 20-295



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 190	● 120	● 160	● 75	● 110		● 150	● 100				● 700	● 500	● 300				
	Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									

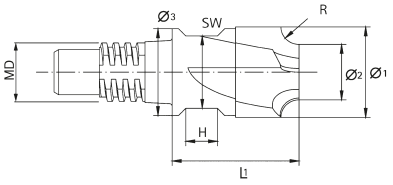
D mm	L2 mm	L1 mm	D1 mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	7	9.6	6	8x3	20	12	0.044	**255614** 0100	40,20
12	9	17	11.6	6	10x4	30	15	0.05	255614 0120	50,50
16	12	12	15.4	6	13x4	40	30	0.075	255614 0160	76,–
20	15	26	19.2	6	16x5	50	45	0.1	255614 0200	92,50

2160



ATORN® Exchangeable head milling cutter, quadrant milling cutter

VHM | Typ N | h10 | h6 | Z 4 | TiAlN | Vc/fz | 20-296



material	● very well suited ○ well suited	steel			stainless steel			cast iron		titanium alloys	superalloys Fe/NiCo-based		aluminium		copper	graphite	hardened steel		
		< 700 N/mm²	< 1000 N/mm²	< 1400 N/mm²	ferrit./martens.	austenitic	duplex	GG/GTS	GGG		< 30 HRc	≥ 30 HRc	< 8 % Si	≥ 8 % Si	Cu-alloy	GRP/CFP/thermo.	< 55 HRc	< 60 HRc	≥ 60 HRc
		● 190	● 140	● 80	● 75	● 110		● 150	● 100				● 600	● 500	● 300				
	Cutting speed Vc m/min.									Please adjust these guidelines according to clamping operation and machine set-up.									

D mm	L2 mm	L1 mm	D1 mm	R mm	Z	Wr. width mm	MD	Tightening torque max. N·m	Feed fz steel < 1000 N/mm² mm/tooth	art.no.	€
10	7	14	7	1.5	4	8x3	20	12	0.012	**255615** 1015	50,50
10	7	7	6	2.0	4	8x3	20	12	0.012	255615 1020	50,50
12	9	17	7	2.5	4	10x4	30	15	0.015	255615 1225	58,50
12	9	9	6	3.0	4	10x4	30	15	0.015	255615 1230	58,50
16	12	12	9	3.5	4	13x4	40	30	0.025	255615 1635	87,50
16	12	21	8	4.0	4	13x4	40	30	0.025	255615 1640	87,50
16	12	21	7	4.5	4	13x4	40	30	0.025	255615 1645	87,50
20	15	26	10	5.0	4	16x5	50	45	0.032	255615 2050	111,–
20	15	15	8	6.0	4	16x5	50	45	0.032	255615 2060	111,–

2160



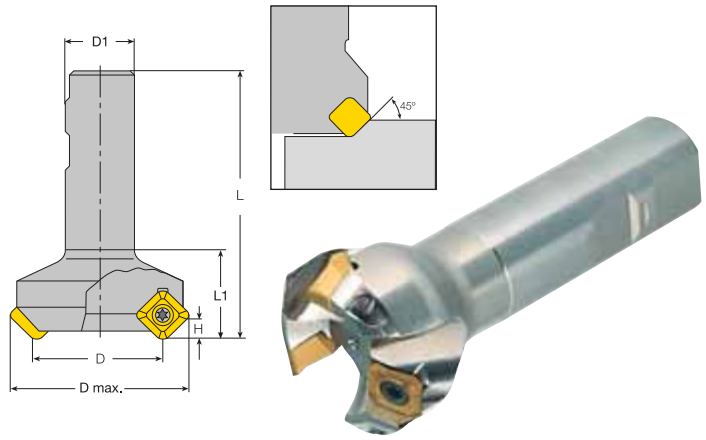


...then it's ATORN.

ATORN®
High quality for great performance

ATORN® 45° end milling cutter, SE.T 1204

- **For ISO milling inserts, type SE.T 1204**
- Highly positive rake angle
- Weldon shank
- Easy-action, low-noise milling
- Large insert thickness
- For plunge milling and face milling
- Supplied with clamping screws and wrench
- Can be used on machines with low drive power and in unstable conditions
- **Cutting angle:** Tool cutting edge angle 45°, axial rake angle 16°, radial rake angle -6°



D mm	D1 mm	D max. mm	L mm	H mm	L1 mm	Z	Weight kg	Tightening torque max. N·m			art.no.	€
25.0	25	38.0	100	6	44	2	0.40	7.93	A1	B1	**260801** 0025	205,–
32.0	25	45.0	110	6	54	3	0.45	7.93	A1	B1	260801 0032	210,–
40.0	32	53.0	115	6	55	4	0.50	7.93	A1	B1	260801 0040	315,–

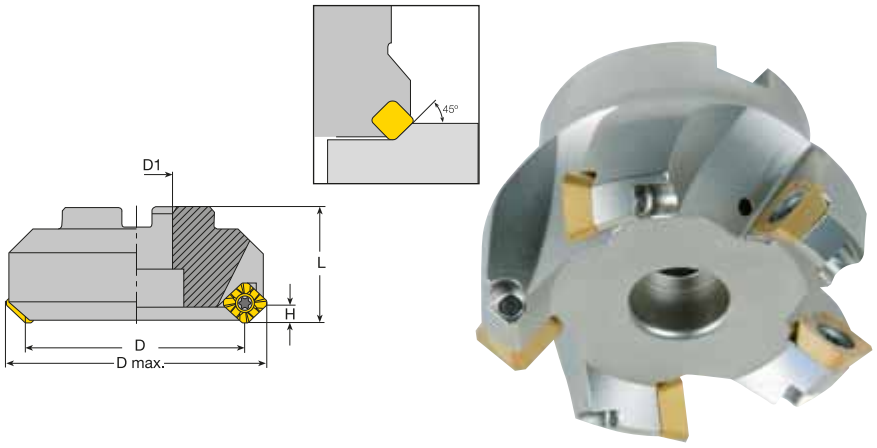
2124

Spare parts

	Screw			Wrench	
	art.no.	€		art.no.	€
A1	321701 0108	8,75	B1	705141 0020	5,95
	3106			7114	

ATORN® 45° face milling cutter

- **For ISO milling inserts, type SE.T 1204**
- Highly positive rake angle
- Easy-action, low-noise milling
- Large insert thickness
- For plunge milling and face milling
- **Up to Ø 160 mm with internal coolant supply**
- Supplied with clamping screws and wrench
- Can be used on machines with low drive power and in unstable conditions
- **Cutting angle:** Tool cutting edge angle 45°, axial rake angle 20°, radial rake angle -10°



D mm	D1 mm	D max. mm	L mm	H mm	Z	Weight kg	Tightening torque max. N·m			art.no.	€
40.0	16	53.0	40	6	3	0.30	7.93	A1	B1	**260202** 0040	161,–
50.0	22	63.0	48	6	4	0.50	7.93	A1	B1	260202 0050	186,–
50.0	22	63.0	48	6	5	0.49	7.93	A1	B1	260202 0150	210,–
63.0	22	76.0	48	6	5	0.59	7.93	A1	B1	260202 0063	225,–
63.0	22	76.0	48	6	6	0.56	7.93	A1	B1	260202 0163	240,–
80.0	27	93.0	50	6	6	1.08	7.93	A1	B1	260202 0080	255,–
80.0	27	93.0	50	6	7	1.04	7.93	A1	B1	260202 0180	295,–
100.0	32	113.0	50	6	6	1.77	7.93	A1	B1	260202 0100	305,–
100.0	32	113.0	50	6	8	1.70	7.93	A1	B1	260202 1100	320,–
125.0	40	138.0	63	6	7	3.42	7.93	A1	B1	260202 0125	375,–
125.0	40	138.0	63	6	9	3.10	7.93	A1	B1	260202 1125	425,–
160.0	40	173.0	63	6	8	5.16	7.93	A1	B1	260202 0160	559,–
160.0	40	173.0	63	6	10	5.10	7.93	A1	B1	260202 1160	709,–
200.0	60	213.0	63	6	12	6.20	7.93	A1	B1	260202 0200	1.329,–
250.0	60	263.0	63	6	16	13.00	7.93	A1	B1	260202 0250	1.579,–

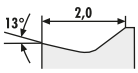
2124

Spare parts

	Screw			Wrench	
	art.no.	€		art.no.	€
A1	321701 0108	8,75	B1	705141 0020	5,95
	3106			7114	

Continued on next page >>>

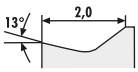
SEET

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
													
Universal application			SEET 1204 AFFN			●	●			HW 4410	10	**284225** 3001	8,50
				●	●	●				HC 4620	10	284225 3005	10,20
				●	●	●				HC 4540	10	284225 3007	10,20

ISO	HC 4540	HC 4620	HW 4410
ISO P steel	Vc = 200 - 255	Vc = 205 - 280	
ISO M stainless steel	Vc = 120 - 150	Vc = 120 - 165	
ISO K cast iron	Vc = 190 - 240	Vc = 190 - 265	Vc = 125 - 145
ISO N Al/non-ferrous			Vc = 125 - 680
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0		

2129

SEKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
													
Universal application			SEKT 1204 AF-R			●	●			DC 235	10	**284810** 3708	13,75
				●	●	●				DC 9235	10	284810 3749	17,60

ISO	DC 235	DC 9235
ISO P steel		Vc = 80 - 180
ISO M stainless steel		Vc = 80 - 220
ISO K cast iron	Vc = 90 - 150	Vc = 80 - 290
ISO N Al/non-ferrous	Vc = 160 - 320	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0	

2167

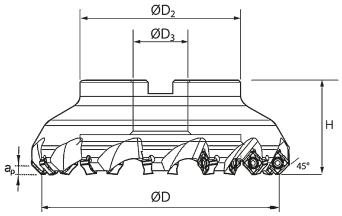
ATORN® 45° face milling cutter

20-298



- **For ISO milling inserts, SN.X 1206, SNMU 1260, ONMU1205**
- Innovative double-sided indexable cutting inserts with large rake angle, use of eight cutting edges (SN_X, SNMU)
- Innovative double-sided indexable cutting inserts, use of sixteen cutting edges (ONMU)
- Easy cutting action with low machining force
- Excellent surface finish
- Very broad range of applications
- Use on many metals including steel, stainless steel, cast iron and aluminium
- Supplied with clamping screw and wrench
- ap max. 5.5 mm (SN_X, SNMU)
- ap max. 3.0 mm (ONMU)





Standard

D mm	D2 mm	D3 mm	H mm	Z	Tightening torque max. N-m			art.no.	€
50.0	49	22	40	4	4.01	A1	B1	**262555** 0050	230,–
63.0	48	22	40	6	4.01	A1	B1	262555 0063	260,–
80.0	57	27	50	7	4.01	A1	B1	262555 0080	320,–
100.0	67	32	50	8	4.01	A1	B1	262555 0100	340,–
125.0	87	40	63	10	4.01	A1	B1	262555 0125	395,–
160.0	107	40	63	12	4.01	A1	B1	262555 0160	589,–
200.0	160	60	63	14	4.01	A1	B1	262555 0200	1.259,–
250.0	160	60	63	16	4.01	A1	B1	262555 0250	1.369,–

2124

Set includes SNMU 1260 and ONMU 1205 HC4630 indexable cutting inserts (20 of each)

D mm	D2 mm	D3 mm	H mm	Z	Tightening torque max. N-m	Contents	art.no.	€
63	48	22	40	6	4.01	incl. 10 WP SNMU 1260 and ONMU 1205 HC4630	**262555** 2063	579,–

2124



Narrow pitch

- Ø 160 mm supplied with sealing washers

D mm	D2 mm	D3 mm	H mm	Z	Tightening torque max. N-m			art.no.	€
50.0	42	22	40	6	4.01	A1	B1	**262555** 1050	305,–
63.0	49	22	40	8	4.01	A1	B1	262555 1063	350,–
80.0	57	27	50	10	4.01	A1	B1	262555 1080	425,–
100.0	67	32	50	12	4.01	A1	B1	262555 1100	440,–
125.0	87	40	63	16	4.01	A1	B1	262555 1125	549,–
160.0	107	40	63	20	4.01	A1	B1	262555 1160	1.029,–

2124

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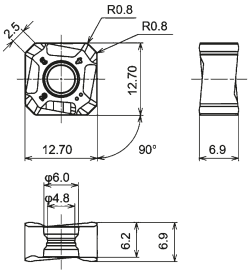


Milling inserts

ISO designation	ISO P Coated HC4630 art.no.	€	ISO M Coated HC 4535 art.no.	€	ISO PK Coated HC4410 art.no.	€	ISO N HW 4310 art.no.	€	ISO PMK Coated HC4635 art.no.	€
SNEX 1206 ANN-MA							10 **295730** 0101	14,65		
SNKX 1206 ANN MM1									10 **295734** 0101	14,–
SNMX 1206 ANN-MM1	10 **295732** 0101	16,10	10 **295731** 0101	16,10	10 **295733** 0101	16,10				
	2129		2129		2129		2129		2129	

Double-sided, 8 cutting edges, with chip breaker





Milling insert with chip breaker

- For particularly good surface quality

ISO designation	ISO PM Coated HC4630 art.no.	€	ISO PMK Coated HC4535 art.no.	€	ISO PK Coated HC4410 art.no.	€
SNMU 1260 A NER	10 **295736** 0101	15,90	10 **295735** 0101	15,90	10 **295737** 0101	15,90
	2129		2129		2129	

NEW, double-sided, 16 cutting edges



Milling insert with 16 cutting edges

ISO designation	ISO PM Coated HC4630 art.no.	€	ISO PMK Coated HC4535 art.no.	€	ISO PK Coated HC4410 art.no.	€
ONMU 1205 ANN	10 **295738** 0101	15,90	10 **295739** 0101	15,90	10 **295740** 0101	15,90
	2129		2129		2129	

Spare parts

	Screw art.no.	€
A1	260124 0002	8,55
	3106	

	TORX art.no.	€
B1	703053 0200	3,40
	7114	

Transverse slot shell-type arbour

SARA®

Nickel-plated and pre-balanced to G2.5 at 25,000 rpm



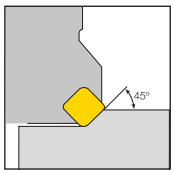
Page 40-76

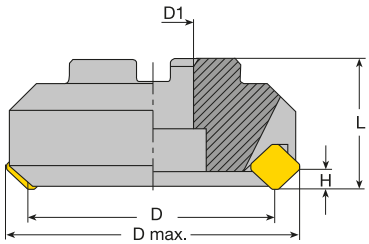
ATORN® 45° face milling cutter

- **For ISO milling inserts, type SE.N 1203**
- Highly positive cutting edge geometry
- Easy cutting action
- Also for machines with low drive power or unstable conditions
- Wedge for fast and reliable clamping of the indexable insert
- Supplied with clamping screws and wrench
- from Ø 160 mm with sealing washers
- **Cutting angle:** Tool cutting edge angle 45°, axial rake angle 20°, radial rake angle -4.5°



Ø 160 to 250 mm with sealing washers







D mm	D1 mm	D max. mm	L mm	H mm	Z	Weight kg	Tightening torque max. N·m	A1	B1	C1	D1	art.no.	€
50.0	22	63	48	6	4	0.53	4.01	A1	B1	C1	D1	**260200** 0050	280,–
63.0	22	76	40	6	5	0.60	4.01	A1	B1	C1	D1	260200 0063	340,–
80.0	27	93	50	6	6	1.10	4.01	A1	B1	C1	D1	260200 0080	370,–
100.0	32	113	50	6	6	1.80	4.01	A1	B1	C1	D1	260200 0100	415,–
125.0	40	138	63	6	7	3.40	4.01	A1	B1	C1	D1	260200 0125	539,–
160.0	40	173	63	6	7	5.20	4.01	A1	B1	C1	D1	260200 0160	649,–
200.0	60	213	63	6	10	8.60	4.01	A1	B1	C1	D1	260200 0200	959,–
250.0	60	263	63	6	13	14.20	4.01	A1	B1	C1	D1	260200 0250	1.149,–

2124

Spare parts

Spacer			Screw			Clamping screw			TORX plus		
	art.no.	€		art.no.	€		art.no.	€		art.no.	€
A1	321701 0002	10,85	B1	321701 0109	6,15	C1	321701 0111	13,35	D1	705145 0025	7,32
3106			3106			3106			7113		

SEEN

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
													
Universal application			SEEN 1203 AFFN			●				**HW 4410**	10	**284215** 2901	7,50
				●	●					**HC 4620**	10	284215 2905	10,20
				●	●	●				**HC 4540**	10	284215 2907	10,20
			SEEN 1203 AFSN	●						**HW 4640**	10	284215 3003	6,95
				●	●					**HC 4620**	10	284215 3005	10,40
				●	●	●				**HC 4540**	10	284215 3007	10,40

2129

ISO	HC 4540	HC 4620	HW 4410	HW 4640
ISO P steel	Vc = 180 - 230	Vc = 120 - 210		Vc = 90 - 190
ISO M stainless steel	Vc = 105 - 135	Vc = 110 - 155		
ISO K cast iron	Vc = 170 - 215		Vc = 125 - 145	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0			

SEKN

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
													
Universal application			SEKN 1203 AFTN-M	●	●	●				**DC 9235**	10	**284210** 3949	10,30

2167

ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0

SEKN

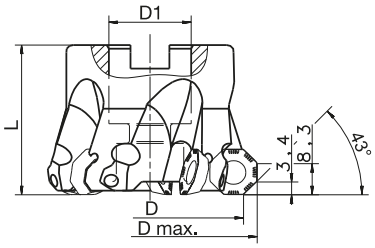
F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
													
Universal application			SEKN 1203 AFTN	●	●	●				**JC 5040**	10	**284210** 3948	7,45

2167

ISO	JC 5040
ISO P steel	Vc = 120 - 250
ISO M stainless steel	Vc = 100 - 200
ISO K cast iron	Vc = 120 - 220
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0

ATORN® 43° face milling cutter

- **For ISO milling inserts, type OFMT 05T3**
- Easy cutting action due to the positive installation position of the indexable insert
- Maximum insert seat stability
- Tools deliver smooth milling performance
- Chip chambers designed for optimum chip flow
- Nickel-plated high-strength base body
- Supplied with clamping screws





Type	D mm	D max. mm	D1 mm	H mm	Z	Tightening torque max. N-m			art.no.	€
F032-001	32.0	39.0	16	40	3	3.5	A1	B1	**262548** 0032	210,–
F040-001	40.0	47.0	16	40	3	3.5	A1	B1	262548 0040	210,–
F050-001	50.0	57.0	22	40	4	3.5	A1	B1	262548 0050	265,–
F063-001	63.0	70.0	22	40	5	3.5	A1	B1	262548 0063	300,–
F080-001	80.0	87.0	27	50	6	3.5	A1	B1	262548 0080	355,–
F100-001	100.0	107.0	32	50	7	3.5	A1	B1	262548 0100	430,–
F125-001	125.0	132.0	40	63	8	3.5	A1	B1	262548 0125	490,–

2124

Spare parts

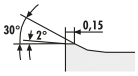
	Screw			Wrench	
	art.no.	€		art.no.	€
A1	262549 0040	8,20	B1	705141 0015	5,75
	3106			7114	

OFMT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	OFMT 05T305-TN-7	●	●	●				DC 9235	10	**286915** 0149	12,95



Universal application



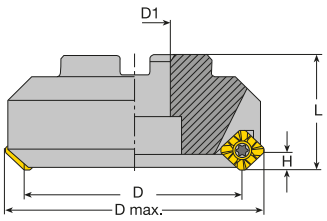
2167

ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 8.3

ATORN® 45° face milling cutter

20-298

- **For ISO milling inserts, type SAHT 1306..**
- For stainless steel and long-chipping materials
- Nickel-plated design for high corrosion resistance





- Ø 125 mm without internal coolant supply

D mm	D max. mm	D1 mm	L mm	H mm	Z	Tightening torque max. N-m			art.no.	€
50	61	22	40	6	4	10.0	A1	B1	**260150** 0050	410,–
63	74	22	40	6	5	10.0	A1	B1	260150 0063	490,–
80	91	27	50	6	6	10.0	A1	B1	260150 0080	549,–
100	111	32	50	6	7	10.0	A1	B1	260150 0100	699,–
125	136	40	63	6	8	10.0	A1	B1	260150 0125	799,–

2125

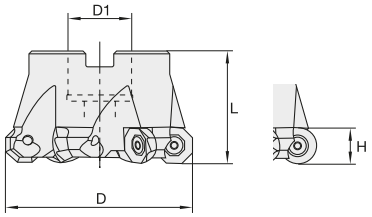
Spare parts

	Screw			Wrench	
	art.no.	€		art.no.	€
A1	260400 0050	5,10	B1	705141 0015	5,75
	2125			7114	

ATORN® Face and copy milling cutter (OCKX, XCKX, RCKX and SAHT)

20-299

- **Can be fitted with square, octagonal, double-hexagon or round indexable inserts**
- High feed rates and smooth operation
- Low power requirements due to small number of teeth
- Allows axial and diagonal plunging, well suited to excavation and pocket milling
- Directly pressed indexable insert with 8 or 12 effective cutting edges
- Stable insert seat, anti-twist protection and defined indexing possible
- Indexable insert with rotational direction index, reliable production and high usability





- Ø 125 mm without internal coolant supply

D mm	H mm	L mm	D1 mm	Z	Tightening torque max. N·m			art.no.	€
52.0	16	40	22	4	10	A1	B1	**260111** 0052	225,–
66.0	16	50	27	5	10	A1	B1	260111 0066	255,–
80.0	16	50	27	6	10	A1	B1	260111 0080	310,–
100.0	16	50	32	7	10	A1	B1	260111 0100	355,–
125.0	16	63	40	8	10	A1	B1	260111 0125	519,–
								2125	

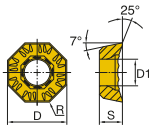
Spare parts

	Screw art.no.	€		Wrench art.no.	€
A1	260400 0050	5,10	B1	705141 0015	5,75
	2125			7114	

OCKX octagonal milling inserts

With cutting depths up to ap = 3 mm, all 8 cutting edges can be used

ISO designation	S mm	D mm	D1 mm	R mm	ISO PM HC 4640			ISO K HC 4410		
						art.no.	€		art.no.	€
OCKX 0606 AD-TR	6.35	16.0	5.8	0.5	10	**270100** 0624	9,70	10	**270100** 0661	9,70
						2126			2126	

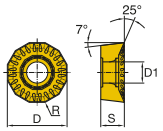




XCKX double-hexagon milling inserts

- With cutting depths up to ap = 1 mm, all 12 cutting edges can be used

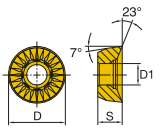
ISO designation	S mm	D mm	D1 mm	ISO PM HC 4640		
					art.no.	€
XCKX 1606 AD-TR	6.35	16.0	5.8	10	**270101** 1624	10,30
					2126	





RCKX round milling inserts

ISO designation	S mm	D mm	D1 mm	ISO PM HC 4640			ISO K HC 4410		
					art.no.	€		art.no.	€
RCKX 1606 MO-TR	6.35	16.0	5.8	10	**270102** 1624	8,65	10	**270102** 1661	8,65
					2126			2126	













SAHT square milling inserts

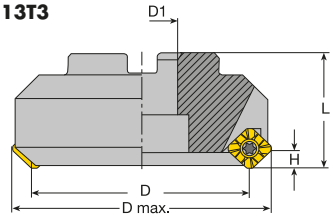
ISO designation	ISO N HW 4310			ISO M Coated HC 4540			ISO MS Coated HC 4640			ISO PKN Coated HC 4410		
		art.no.	€		art.no.	€		art.no.	€		art.no.	€
SAHT 1306AA	10	**270105** 1620	16,10	10	**270105** 1624	16,10	10	**270105** 1626	16,30	10	**270105** 1661	17,10
		2126			2126			2126			2126	

SARA® Smooth-running 45° face milling cutter



20-298

- **For ISO milling inserts, type SEMT 13T3 / SEGT 13T3 / XEHW 13T3**
- **Internal cooling up to Ø 125 mm**
- High productivity from finishing to roughing
- Excellent surface finish
- Very broad range of applications
- For universal use with steel, stainless steel and cast iron
- Supplied with clamping screw and wrench
- **Now also with indexable cutting inserts for non-ferrous materials**
- **ap. max. 6 mm**





Compatible with: SANDVIK Coro Mill® 245, MITSUBISHI ASX445, SUMITOMO WGC

Narrow pitch

D mm	D max. mm	D1 mm	L mm	H mm	Z	Tightening torque max. N-m			art.no.	€
50.0	63.0	22	40	6	4	2.68	A1	B1	**262550** 0050	205,–
63.0	76.0	22	40	6	5	2.68	A1	B1	262550 0063	245,–
80.0	93.0	27	50	6	6	2.68	A1	B1	262550 0080	300,–
100.0	113.0	32	50	6	7	2.68	A1	B1	262550 0100	345,–
125.0	138.0	40	63	6	8	2.68	A1	B1	262550 0125	405,–
160.0	173.0	40	63	6	10	2.68	A1	B1	262550 0160	759,–
200.0	213.0	60	63	6	12	2.68	A1	B1	262550 0200	1.119,–
250.0	263.0	60	63	6	16	2.68	A1	B1	262550 0250	1.439,–

2118

Extra-narrow pitch

D mm	D max. mm	D1 mm	L mm	H mm	Z	Tightening torque max. N-m			art.no.	€
50.0	63.0	22	40	6	5	2.68	A1	B1	**262550** 1050	255,–
63.0	76.0	22	40	6	6	2.68	A1	B1	262550 1063	305,–
80.0	93.0	27	50	6	8	2.68	A1	B1	262550 1080	360,–
100.0	113.0	32	50	6	10	2.68	A1	B1	262550 1100	430,–
125.0	138.0	40	63	6	12	2.68	A1	B1	262550 1125	509,–
160.0	173.0	40	63	6	16	2.68	A1	B1	262550 1160	939,–

2118

Spare parts

	Screw			Wrench	
	art.no.	€		art.no.	€
A1	262551 3511	8,05	B1	705141 0015	5,75
	3106			7114	

SEMT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEMT 13T3 AGSN-PM	●	●	●		●	●	**JC 5040**	10	**288001** 0040	9,50
				●	●	●		●	●	**JC 8015**	10	288001 0015	9,50
				●	●			●		**JC 8050**	10	288001 0050	9,50
			SEMT 13T3 AGSN-KM			●				**JC 605 W**	10	288001 0605	9,50



Universal application

2167

ISO	JC 5040	JC 605 W	JC 8015	JC 8050
ISO P steel	Vc = 100 - 200		Vc = 100 - 200	Vc = 100 - 200
ISO M stainless steel			Vc = 100 - 200	Vc = 100 - 200
ISO K cast iron		Vc = 150 - 250	Vc = 150 - 250	
ISO S superalloys			Vc = 30 - 40	Vc = 20 - 50
ISO H hard			Vc = 50 - 100	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 ap = ap. max. 6 mm			

Wiper (wide finishing) insert for smooth-running 45° face milling cutter

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	-	-	XEHW 13T3 AGSN-W	●		●		●	●	**DH 103**	10	**288002** 0003	15,40



Micro finishing machining

2167

ISO	DH 103
ISO P steel	Vc = 200 - 300
ISO K cast iron	Vc = 200 - 300
ISO S superalloys	Vc = 30 - 40
ISO H hard	Vc = 70 - 120
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 ap = ap. max. 1.0 mm

SEGT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEGT 13T3AGFN-AL				●			**Uncoated**	10	**288004** 0005	9,85



Universal application

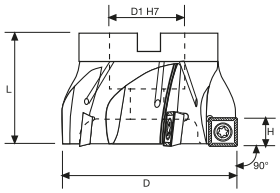
2167

ISO	Uncoated
ISO N Al/non-ferrous	Vc = 250 - 300
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 ap = ap. max. 6 mm

ATORN® 90° shoulder milling cutter

20-299

- **For ISO milling inserts, type SDMT 1205 PDR.69**
- **Exactly 90°**
- **Internal coolant supply**
- General corner milling and face milling
- Drilling by means of circular interpolation
- Insert design with four cutting edges per plate
- Cutting depths up to max. 10.5 mm





D mm	D1 H7 mm	L mm	H mm	Z	Tightening torque max. N-m			art.no.	€
40.0	16.0	40	10.5	4	4.01	A1	B1	**262547** 0040	340,–
50.0	22.0	40	10.5	5	4.01	A1	B1	262547 0050	265,–
63.0	22.0	40	10.5	6	4.01	A1	B1	262547 0063	340,–
80.0	27.0	50	10.5	6	4.01	A1	B1	262547 0080	395,–
100.0	32.0	50	10.5	8	4.01	A1	B1	262547 0100	519,–
125.0	40.0	63	10.5	9	4.01	A1	B1	262547 0125	609,–

2124

Spare parts

	Screw art.no.	€		Wrench art.no.	€
A1	320901 2504	5,75	B1	705141 0015	5,75
	3106			7114	

Indexable cutting inserts

ISO P M K S

ISO designation		HC 4625 art.no.	€
SDMT 1205 PDR69	10	**283310** 2765	17,20

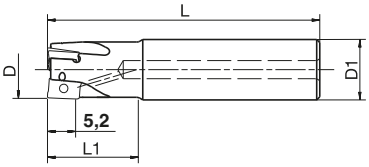
2129



ATORN® 90° end milling cutter

- **For ISO milling inserts, type AP.. 0602**
- **Internal coolant supply**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm
- For groove milling and side milling
- Precise 90° corner milling
- Supplied with clamping screws and wrench





D mm	D1 h6 mm	L mm	L1 mm	Z	Tightening torque max. N-m			art.no.	€
10	10	100	28	2	0.6	A1	B1	**262534** 0010	110,–
12	12	100	30	3	0.6	A1	B1	262534 0012	139,–
14	12	120	32	3	0.6	A1	B1	262534 0014	145,–
16	16	120	32	4	0.6	A1	B1	262534 0016	178,–
18	16	120	32	4	0.6	A1	B1	262534 0018	185,–
20	20	150	35	5	0.6	A1	B1	262534 0020	205,–
25	20	150	35	7	0.6	A1	B1	262534 0025	230,–
32	25	150	35	8	0.6	A1	B1	262534 0032	245,–

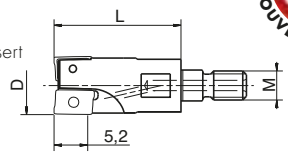
2124

Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	262551 1801	7,20	B1	703053 0060	3,09
	3106			7114	

ATORN® 90° screw-in milling cutter

- **For ISO milling inserts, type AP.. 0602**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- **Internal coolant supply**
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm





D mm	L mm	Thread	Z	Tightening torque max. N-m			art.no.	€
10	16	M6	2	0.6	A1	B1	**262536** 0010	109,–
12	16	M6	3	0.6	A1	B1	262536 0012	141,–
16	21	M8	4	0.6	A1	B1	262536 0016	169,–
20	20	M10	5	0.6	A1	B1	262536 0020	183,–
25	22	M12	7	0.6	A1	B1	262536 0025	198,–

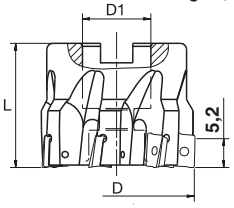
2124

Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	262551 1801	7,20	B1	703053 0060	3,09
	3106			7114	

ATORN® 90° corner milling cutter

- **For ISO milling inserts, type AP.. 0602**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- **Internal coolant supply**
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm





D mm	D1 H7 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
32	16	40	8	0.6	A1	B1	**262535** 0032	255,–
40	16	40	10	0.6	A1	B1	262535 0040	285,–
50	22	40	11	0.6	A1	B1	262535 0050	310,–

2124

Spare parts

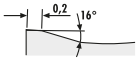
	Screw art.no.	€		TORX art.no.	€
A1	262551 1801	7,20	B1	703053 0060	3,09
	3106			7114	

APKT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 060204 PDTR-K	●	●	●				**HC 4635**	10	**281518** 0609	8,20



Universal application



2129

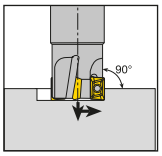
ISO	HC 4635
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 60 - 100
ISO K cast iron	Vc = 120 - 200
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.03 to 0.25 per cutting edge ap = 0.1 - 3.0

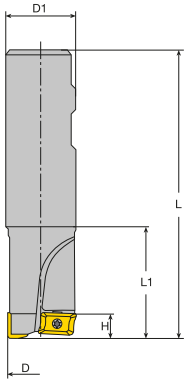
SARA® 90° drilling/die sinking cutter

- **For ISO milling inserts, type AP.. 0803**
- **Internal coolant supply**
- With Weldon shank
- High cutting capacity
- Reliable chip flow even when drilling due to positive indexable insert geometry
- Supplied with clamping screws and wrench

Drilling flutes from Ø 16 mm







Short

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
16.0	16	7	30	85	2	4.01	A1	B1	**262515** 0005	240,–

2118

Long

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
16.0	16	7	30	150	2	4.01	A1	B1	**262516** 0006	270,–

2118

Spare parts

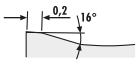
	Screw art.no.	€		TORX art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

APKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 0803 PD-R	●	●					**DC 150**	10	**281510** 7130	16,20
				●	●	●				**DC 9235**	10	281510 7149	16,20



Universal application

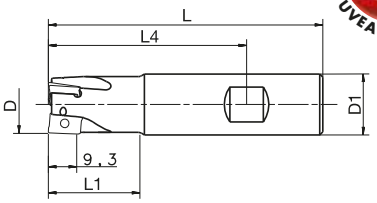


2167

ISO	DC 150	DC 9235
ISO P steel	Vc = 105 - 290	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 250	Vc = 80 - 220
ISO K cast iron		Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length	

SARA® 90° end milling cutter

- **For ISO milling inserts, type AP.. 1003**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm
- For groove milling and side milling
- Precise 90° corner milling
- Shank according to DIN 1835B
- Supplied with clamping screws and wrench





D mm	D1 h6 mm	L mm	L1 mm	L4 mm	Z	Tightening torque max. N-m			art.no.	€
16	16	85	34	60	2	1.2	A1	B1	**262556** 0016	70,–
20	20	90	37	65	3	1.2	A1	B1	262556 0020	92,50
25	25	105	46	70	4	1.2	A1	B1	262556 0025	109,–

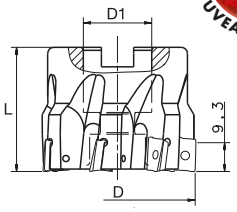
2118

Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

SARA® 90° corner milling cutter

- **For ISO milling inserts, type AP.. 1003**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm





D mm	D1 H7 mm	L mm	Z	Tightening torque max. N-m			art.no.	€
40	16	40	6	1.2	A1	B1	**262557** 0040	139,–
50	22	40	7	1.2	A1	B1	262557 0050	149,–

2118

Spare parts

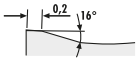
	Screw art.no.	€		TORX art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

APMT

F finishing	M medium	R roughing	SARA® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APMT 1003 PDER-M	●	●	●				SC 4635	10	**281516** 3009	5,90



Universal application



2167

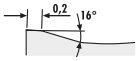
ISO	SC 4635
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 90 - 160
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length

APKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDSR	●	●	●				DC 9235	10	**281513** 1049	11,20



Universal application



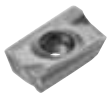
2167

ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

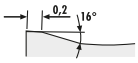
Continued on next page >>>

APKT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDER 05	●	●	●		●		JC 5118	10	**281514** 1025	9,60
				●	●			●		JC 8050	10	281514 1050	9,60



Universal application



ISO	JC 5118	JC 8050
ISO P steel	Vc = 120 - 200	Vc = 80 - 150
ISO M stainless steel	Vc = 100 - 160	Vc = 80 - 120
ISO K cast iron	Vc = 100 - 150	Vc = 100 - 150
ISO S superalloys	Vc = 40 - 70	Vc = 30 - 60
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length	

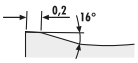
2167

APKT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDER-S	●		●				HC 4615	10	**281514** 3005	8,95
				●	●					HC 4535	10	281514 3007	8,95
				●	●	●				HC 4635	10	281514 3009	8,95



Universal application



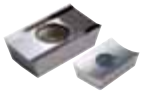
ISO	HC 4535	HC 4615	HC 4635
ISO P steel	Vc = 100 - 170	Vc = 180 - 280	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130		Vc = 90 - 160
ISO K cast iron		Vc = 160 - 270	Vc = 120 - 250
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

2129

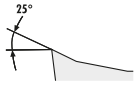
Polished design!

APHX specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APHX 100304 FR-ALU				●			HW 4415	10	**281517** 2003	16,90



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

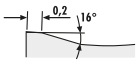
2129

APKT Radius

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 100308PDER	●	●	●				HC 4540	10	**281514** 4011	11,60
			APKT 100312PDER	●	●	●				HC 4540	10	281514 4012	11,60
			APKT 100320PDER	●	●	●				HC 4540	10	281514 4013	11,60



Universal application



ISO	HC 4540
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 90 - 160
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

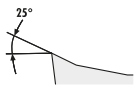
2129

APKR specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDFR R04				●			HW 4415	10	**281715** 0025	16,60



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

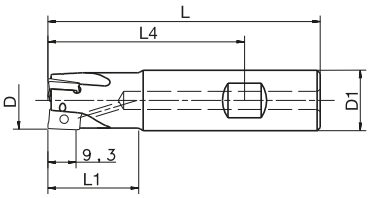
2129

ATORN® 90° end milling cutter



- **For ISO milling inserts, type AP.. 1003**
- **Internal coolant supply**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm
- For groove milling and side milling
- Precise 90° shoulder milling
- Shank according to DIN 1835B
- Supplied with clamping screws and wrench
- Diameter 20 x 90 mm





Short

D mm	D1 h6 mm	L mm	L1 mm	L4 mm	Z	Tightening torque max. N-m	A1	B1	art.no.	€
10.0	16	80	24	56	1	1.0	A1	B1	**262540** 0100	89,50
11.0	16	80	24	56	1	1.0	A1	B1	262540 0110	143,–
12.0	16	80	24	56	1	1.0	A1	B1	262540 0120	89,50
13.0	16	80	24	56	1	1.0	A1	B1	262540 0130	148,–
14.0	16	80	24	56	1	1.0	A1	B1	262540 0140	89,50
15.0	16	85	25	60	2	1.0	A1	B1	262540 0150	122,–
15.7	16	85	25	60	2	1.0	A1	B1	262540 0157	142,–
16.0	16	85	25	60	2	1.0	A1	B1	262540 0160	111,–
17.0	16	85	25	60	2	1.0	A1	B1	262540 0170	159,–
18.0	20	85	25	60	2	1.0	A1	B1	262540 0180	122,–
19.5	20	90	25	65	3	1.0	A1	B1	262540 0195	220,–
19.7	20	90	25	65	3	1.0	A1	B1	262540 0197	235,–
20.0	20	90	25	65	3	1.0	A1	B1	262540 0200	146,–
22.0	25	95	25	70	3	1.0	A1	B1	262540 0220	161,–
24.7	25	95	25	70	4	1.0	A1	B1	262540 0247	245,–
25.0	25	95	25	70	4	1.0	A1	B1	262540 0250	171,–
28.0	25	95	25	70	4	1.0	A1	B1	262540 0280	190,–
30.0	25	95	25	70	4	1.0	A1	B1	262540 0300	192,–
32.0	25	95	26	70	5	1.0	A1	B1	262540 0320	200,–

2124

Long

D mm	D1 h6 mm	L mm	L1 mm	L4 mm	Z	Tightening torque max. N-m	A1	B1	art.no.	€
10.0	16	150	24	126	1	1.0	A1	B1	**262540** 0101	138,–
12.0	16	150	24	126	1	1.0	A1	B1	262540 0121	138,–
16.0	16	150	100	126	2	1.0	A1	B1	262540 0161	157,–
18.0	16	150	25	126	2	1.0	A1	B1	262540 0181	225,–
20.0	20	150	100	125	3	1.0	A1	B1	262540 0201	198,–
25.0	20	150	25	125	4	1.0	A1	B1	262540 0251	230,–
32.0	25	150	25	124	5	1.0	A1	B1	262540 0321	265,–

2124

Spare parts

	Screw	
	art.no.	€
A1	262551 0025	4,90

3106

	TORX	
	art.no.	€
B1	703053 0080	3,15

7114

Solid carbide extension

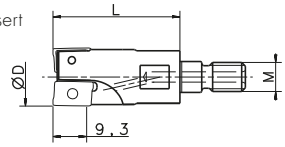
SARA®



Page 40-87

ATORN® 90° screw-in milling cutter

- **For ISO milling inserts, type AP.. 1003**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- **Internal coolant supply**
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm





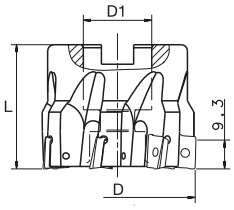
D mm	L mm	Thread	Z	Tightening torque max. N·m			art.no.	€
10.0	20	M6	1	1.0	A1	B1	**262542** 0010	144,–
12.0	20	M6	1	1.0	A1	B1	262542 0012	144,–
16.0	25	M8	2	1.0	A1	B1	262542 0016	169,–
20.0	30	M10	3	1.0	A1	B1	262542 0020	181,–
25.0	35	M12	4	1.0	A1	B1	262542 0025	225,–
32.0	43	M16	5	1.0	A1	B1	262542 0032	275,–
							2124	

Spare parts

Screw			TORX		
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

ATORN® 90° shoulder milling cutter

- **For ISO milling inserts, type AP.. 1003**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- **Internal coolant supply**
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm





D mm	D1 H7 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
40.0	16.0	40	6	1.0	A1	B1	**262546** 0040	210,–
50.0	22.0	40	7	1.0	A1	B1	262546 0050	225,–
63.0	22.0	40	8	1.0	A1	B1	262546 0063	255,–
80.0	27.0	50	11	1.0	A1	B1	262546 0080	360,–
100.0	32.0	50	12	1.0	A1	B1	262546 0100	410,–
							2124	

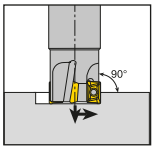
Spare parts

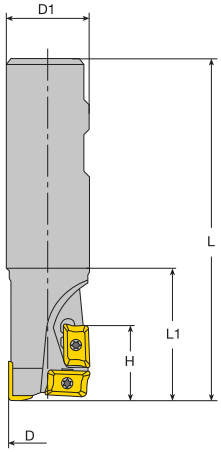
Screw			TORX		
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

ATORN® 90° drilling/die sinking cutter

- **For ISO milling inserts, type AP.. 1003**
- **Internal coolant supply**
- With Weldon shank
- High cutting capacity
- Reliable chip flow even when drilling due to positive indexable insert geometry
- Supplied with clamping screws and wrench







Short

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
20.0	20	17	35	90	3	1.0	A1	B1	**262515** 0002	215,–
25.0	25	19	50	110	3	1.0	A1	B1	262515 0003	259,–
									2124	

Long

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
20.0	20	17	35	150	3	1.0	A1	B1	**262516** 0002	265,–
25.0	25	19	50	150	3	1.0	A1	B1	262516 0003	300,–
									2124	

Extra-long

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
20	20	17	35	180	3	1.0	A1	B1	**262517** 0020	320,–
25	25	19	50	200	3	1.0	A1	B1	272517 0025	325,–
									2124	

Spare parts

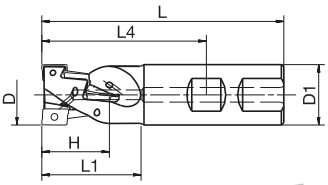
Screw			TORX		
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

ATORN® 90° roughing spiral flute end mill




20-299

- **For ISO milling inserts, type AP.. 1003**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- **Internal coolant supply**
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm
- Shank according to DIN 1835B





D mm	L mm	L1 mm	L4 mm	H mm	Z	Z eff.	Tightening torque max. N·m			art.no.	€
20.0	87	37	58	28	4	1	1.0	A1	B1	**262544** 0020	270,–
25.0	105	49	64	37	8	2	1.0	A1	B1	262544 0025	320,–
32.0	115	55	75	46	15	3	1.0	A1	B1	262544 0033	719,–
32.0	115	55	75	46	10	2	1.0	A1	B1	262544 0032	495,–
40.0	130	70	76	55	18	3	1.0	A1	B1	262544 0040	629,–

2124

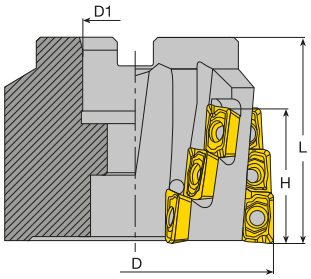
Spare parts

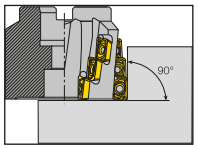
	Screw			TORX	
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
3106			7114		

ATORN® 90° roughing spiral flute milling cutter



- **For ISO milling inserts, type AP.. 1003**
- **Internal coolant supply**
- Just one insert type for both face and side cutting edges
- High right-hand helix configuration for good chip shaping
- Full coverage within one row of teeth
- Supplied with clamping screws and wrench







D mm	D1 mm	H mm	L mm	Z eff.	Z	Tightening torque max. N·m			art.no.	€
40.0	16	37	50	3	12	1.0	A1	B1	**262529** 0040	579,–
50.0	22	46	60	3	15	1.0	A1	B1	262529 0050	729,–
63.0	27	46	60	4	20	1.0	A1	B1	262529 0063	849,–

2124

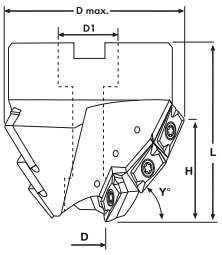
Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
3106			7114		

ATORN® Spiral flute chamfer milling cutter



- **For roughing**
- **15 °, 30 °, 40 °, 45 °, 60 °, 75 °**
- **For ISO milling inserts, type AP.. 1003**
- **Internal coolant supply**
- Ideal for pre-machining welded seams
- Manufacturing and indexable insert tolerances allow crank formation
- Supplied with clamping screws and wrench
- **Additional versions with user-defined chamfer angles are manufactured on request (minimum purchase 2 units)**





D mm	D max. mm	D1 mm	L mm	γ °	H mm	Z eff.	Z	Tightening torque max. N·m				art.no.	€
17.0	70.0	22	50	15	7	3	9	1.0	A1	B1	C1	**262531** 1715	569,–
17.0	65.0	22	50	30	13	3	9	1.0	A1	B1	C1	262531 1730	569,–
17.0	60.0	22	50	40	17	3	9	1.0	A1	B1	C1	262531 1740	569,–
17.0	56.0	22	50	45	19	3	9	1.0	A1	B1	C1	262531 1745	569,–
17.0	45.0	16	50	60	24	3	9	1.0	A1	B2	C1	262531 1760	569,–
19.0	33.0	16	60	75	27	3	9	1.0	A1	B2	C1	262531 1975	569,–

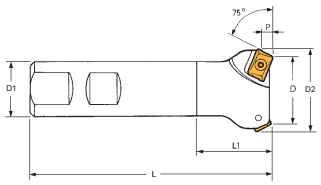
2124

Spare parts

	Screw			Retaining screw			TORX	
	art.no.	€		art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	320901 2509	41,10	C1	703053 0080	3,15
			B2	320901 2510	41,10			
3106			3106			7114		

ATORN® 75° end / face milling cutter

- With Weldon shank
- **For ISO milling inserts, type AP..1003**
- Also ideal for indexable inserts that are already worn from use in 90° shoulder milling cutters or 90° end milling cutters. Worn inserts can be reused by utilising the unworn cutting edges.
- Supplied with clamping screws and wrench





D mm	D1 mm	L1 mm	L mm	P mm	Z	Tightening torque max. N·m			art.no.	€
25	20	25	95	4	2	1.0	A1	B1	**262532** 0025	190,–
32	25	25	95	4	3	1.0	A1	B1	262532 0032	230,–
40	25	25	100	4	4	1.0	A1	B1	262532 0040	285,–

2124

Spare parts

	Screw art.no.	€
A1	262551 0025	4,90

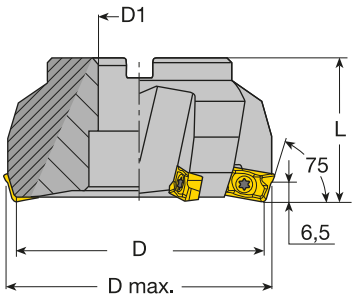
3106

	TORX art.no.	€
B1	703053 0080	3,15

7114

ATORN® 75° face milling cutter

- **For ISO milling inserts, type AP..1003**
- Also ideal for indexable inserts that are already worn from use in 90° shoulder milling cutters or 90° end milling cutters. Worn inserts can be reused by utilising the unworn cutting edges.
- Supplied with clamping screws and wrench





D mm	D1 mm	D max. mm	L mm	Z	Tightening torque max. N·m			art.no.	€
50.0	22	54	40	5	1.0	A1	B1	**262533** 0050	300,–
63.0	22	67	40	6	1.0	A1	B1	262533 0063	340,–

2124

Spare parts

	Screw art.no.	€
A1	262551 0025	4,90

3106

	TORX art.no.	€
B1	703053 0080	3,15

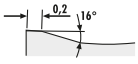
7114

APKT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDER-S	●		●				**HC 4615**	10	**281514** 3005	8,95
				●	●					**HC 4535**	10	281514 3007	8,95
				●	●	●				**HC 4635**	10	281514 3009	8,95



Universal application

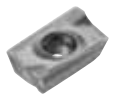


2129

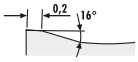
ISO	HC 4535	HC 4615	HC 4635
ISO P steel	Vc = 100 - 170	Vc = 180 - 280	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130		Vc = 90 - 160
ISO K cast iron		Vc = 160 - 270	Vc = 120 - 250
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

APKT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDER 05	●	●	●		●		**JC 5118**	10	**281514** 1025	9,60
				●	●			●		**JC 8050**	10	281514 1050	9,60



Universal application



2167

ISO	JC 5118	JC 8050
ISO P steel	Vc = 120 - 200	Vc = 80 - 150
ISO M stainless steel	Vc = 100 - 160	Vc = 80 - 120
ISO K cast iron	Vc = 100 - 150	Vc = 100 - 150
ISO S superalloys	Vc = 40 - 70	Vc = 30 - 60
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length	

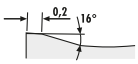
Continued on next page >>>

APKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDSR	●	●	●				**DC 9235**	10	**281513** 1049	11,20



Universal application



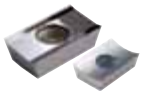
ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

2167

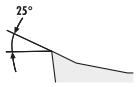
Polished design!

APHX specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APHX 100304 FR-ALU				●			**HW 4415**	10	**281517** 2003	16,90



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

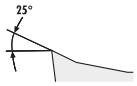
2129

APKR specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDFR R04				●			**HW 4415**	10	**281715** 0025	16,60



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

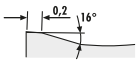
2129

APKT Radius

F finishing	M medium	R roughing	ATORN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 100308PDER	●	●	●				**HC 4540**	10	**281514** 4011	11,60
			APKT 100312PDER	●	●	●				**HC 4540**	10	281514 4012	11,60
			APKT 100320PDER	●	●	●				**HC 4540**	10	281514 4013	11,60



Universal application



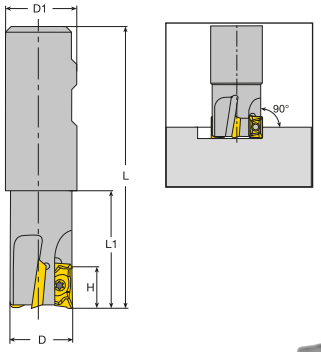
ISO	HC 4540
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 90 - 160
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

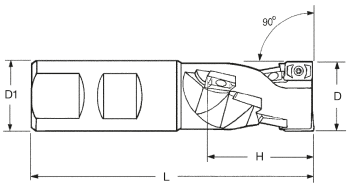
2129

ATORN® 90° end milling cutter



- **For ISO milling inserts, type AP.. 1604**
- **Internal coolant supply**
- Easy cutting action due to the positive installation position of the indexable insert
- Tools deliver smooth milling performance
- Axial run-out max. 0.03 mm
- Radial run-out max. 0.03 mm
- For groove milling and side milling
- Precise 90° shoulder milling
- Shank according to DIN 1835B
- Supplied with clamping screws and wrench
- Ø 25 x 100 mm







262505 0025



262505 0032



Short

D mm	D1 mm	L1 mm	H mm	L mm	Z	Tightening torque max. N-m			art.no.	€
25.0	25	44	14.9	100	2	4.01	A1	B1	**262505** 0025	146,–
32.0	32	50	14.9	110	3	4.01	A1	B1	262505 0032	159,–
40.0	32	45	14.9	115	4	4.01	A1	B1	262505 0040	192,–

2124

Long

D mm	D1 mm	L1 mm	H mm	L mm	Z	Tightening torque max. N-m			art.no.	€
25.0	25	60	14.9	200	2	4.01	A1	B1	**262510** 0025	255,–
32.0	32	60	14.9	200	3	4.01	A1	B1	262510 0032	310,–
40.0	32	60	14.9	200	4	4.01	A1	B1	262510 0040	370,–

2124



Roughing spiral flute end mill

D mm	D1 mm	L mm	H mm	Z eff.	Z	Tightening torque max. N-m			art.no.	€
25.0	25	105	29	1	2	4.01	A1	B1	**262511** 0025	355,–
32.0	32	115	44	2	6	4.01	A1	B1	262511 0032	475,–
40.0	32	130	58	2	8	4.01	A1	B1	262511 0040	559,–

2124

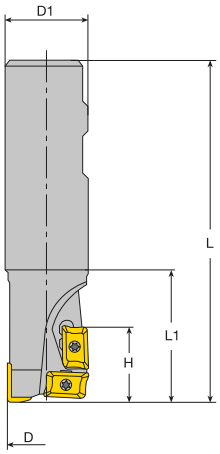
Spare parts

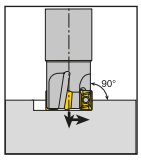
	Screw			Wrench	
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	705141 0015	5,75
	3106			7114	

ATORN® 90° drilling/die sinking cutter



- **For ISO milling inserts, type AP.. 1604**
- **Internal coolant supply**
- With Weldon shank
- High cutting capacity
- Reliable chip flow even when drilling due to positive indexable insert geometry
- Supplied with clamping screws and wrench







Short

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N-m			art.no.	€
32.0	32	30	50	130	3	4.01	A1	B1	**262515** 0004	280,–

2124

Extra-long

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N-m			art.no.	€
32.0	32	30	155	220	3	4.01	A1	B1	**262516** 0004	330,–

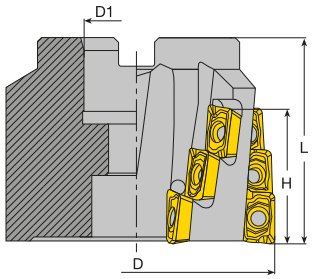
2124

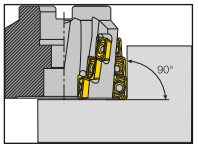
Spare parts

	Screw			Wrench	
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	705141 0015	5,75
	3106			7114	

ATORN® 90° roughing spiral flute milling cutter

- **For ISO milling inserts, type AP.. 1604**
- Just one insert type for both face and side cutting edges
- High right-hand helix configuration for good chip shaping
- Full coverage within one row of teeth
- Supplied with clamping screws and wrench







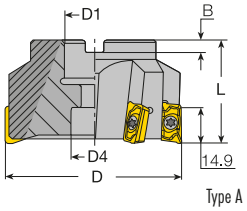
D mm	D1 mm	H mm	L mm	Z eff.	Z	Tightening torque max. N·m			art.no.	€
50.0	27	30	50	3	6	4.01	A1	B1	**262523** 0050	415,–
63.0	27	44	60	4	12	4.01	A1	B1	262523 0063	559,–
80.0	32	44	60	5	15	4.01	A1	B1	262523 0080	799,–
100.0	40	44	60	6	18	4.01	A1	B1	262523 0100	1.019,–
									2124	

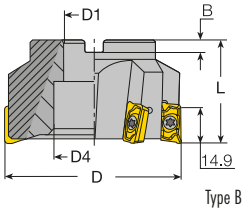
Spare parts

Screw			Wrench		
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	705141 0015	5,75
	3106			7114	

ATORN® 90° shoulder milling cutter

- **For ISO milling inserts, type AP.. 1604**
- Precise 90° shoulder milling
- Rhombic shape for large cutting depths
- **Internal coolant supply**
- Supplied with clamping screws and wrench
- **Cutting angle:** Tool cutting edge angle 90°, axial rake angle 7° + 13°, radial rake angle 20°
- * Without internal coolant supply







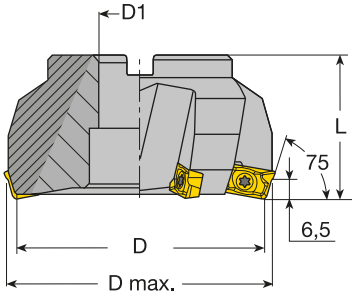
Type	D mm	D1 mm	L mm	D4 mm	B mm	Z	Tightening torque max. N·m			art.no.	€
A	40.0	16	40	12.0	5.6	4	4.01	A1	B1	**262525** 0040	188,–
A	50.0	22	40	18.0	6.3	5	4.01	A1	B1	262525 0050	205,–
A	63.0	22	40	18.0	6.3	6	4.01	A1	B1	262525 0063	230,–
A	80.0	27	50	20.0	7	7	4.01	A1	B1	262525 0080	305,–
B	100.0	32	50	45.0	8	8	4.01	A1	B1	262525 0100	375,–
B	125.0	40	63	56.0	9	9	4.01	A1	B1	262525 0125	440,–
B*	160.0	40	63	87.0	9	10	4.01	A1	B1	262525 0160	609,–
B*	200.0	60	63	87.0	9	13	4.01	A1	B1	262525 0200	819,–
B*	250.0	60	63	87.0	9	16	4.01	A1	B1	262525 0250	1.359,–
									2124		

Spare parts

Screw			Wrench		
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	705141 0015	5,75
	3106			7114	

ATORN® 75° face milling cutter

- **For ISO milling inserts, type AP..1604**
- Also ideal for indexable inserts that are already worn from use in 90° shoulder milling cutters or 90° end milling cutters. Worn inserts can be reused by utilising the unworn cutting edges.
- Supplied with clamping screws and wrench





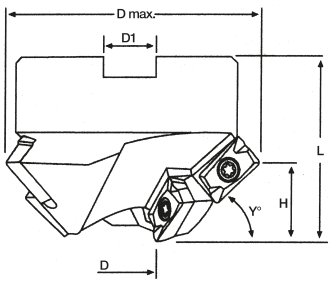
D mm	D1 mm	D max. mm	L mm	Z	Tightening torque max. N·m			art.no.	€
50.0	16	54	40	3	4.01	A1	B1	**262530** 0050	173,–
63.0	22	67	40	4	4.01	A1	B1	262530 0063	215,–
80.0	27	84	50	5	4.01	A1	B1	262530 0080	245,–
100.0	32	104	50	6	4.01	A1	B1	262530 0100	295,–
125.0	40	129	63	7	4.01	A1	B1	262530 0125	345,–
								2124	

Spare parts

Screw			Wrench		
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	705141 0015	5,75
	3106			7114	

ATORN® Spiral flute chamfer milling cutter

- **For roughing**
- **15 °, 30 °, 40 °, 45 °, 60 °, 75 °**
- **For ISO milling inserts, type AP.. 1604**
- Ideal for pre-machining welded seams
- Indexable insert tolerances allow crank formation
- Supplied with clamping screws and wrench
- **Additional versions with user-defined chamfer angles are manufactured on request (minimum purchase 2 units)**





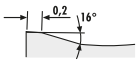
D mm	D max. mm	D1 mm	L mm	γ °	H mm	Z eff.	Z	Tightening torque max. N·m			art.no.	€
35.0	94.0	27	50	15	8	3	6	4.01	A1	B1	**262527** 3515	499,–
35.0	88.0	27	50	30	15	3	6	4.01	A1	B1	262527 3530	499,–
35.0	77.8	27	50	45	21.5	3	6	4.01	A1	B1	262527 3545	499,–
35.0	65.0	27	50	60	26.5	3	6	4.01	A1	B1	262527 3560	499,–
35.0	50.7	22	60	75	29.5	3	6	4.01	A1	B1	262527 3575	499,–

2124

Spare parts

	Screw			Wrench	
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	705141 0015	5,75
	3106			7114	

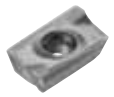
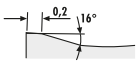
APKT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 			APKT 1604 PDER-S	●		●				**HC 4615**	10	**281514** 3205	10,10
				●	●					**HC 4535**	10	281514 3207	10,10
				●	●	●				**HC 4635**	10	281514 3209	10,10

2129

ISO	HC 4535	HC 4615	HC 4635
ISO P steel	Vc = 100 - 170	Vc = 180 - 280	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130		Vc = 90 - 160
ISO K cast iron		Vc = 160 - 270	Vc = 120 - 250
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

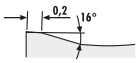
APKT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 			APKT 1604 PDER	●	●					**JC 5040**	10	**281521** 6840	12,25
				●	●			●		**JC 8050**	10	281521 6825	12,25

2167

ISO	JC 5040	JC 8050
ISO P steel	Vc = 90 - 160	Vc = 80 - 150
ISO M stainless steel	Vc = 80 - 140	Vc = 80 - 120
ISO S superalloys		Vc = 30 - 60
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length	

APKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 			APKT 1604 PD-R	●	●	●				**DC 9235**	10	**281520** 6849	22,40
				●	●					**DC 735**	10	281520 6862	21,50
			APKT 1604 PD-R-7	●	●	●				**DC 9235**	10	281520 6949	14,95

2167

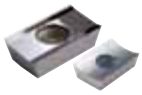
ISO	DC 735	DC 9235
ISO P steel	Vc = 90 - 225	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 235	Vc = 80 - 220
ISO K cast iron		Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length	

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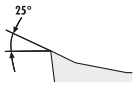
APHX specially for non-ferrous metals

Polished design!

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●	APHX 160404 FR-ALU				●			**HW 4415**	10 **281517** 2203	17,90



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

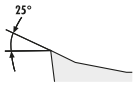
2129

APKR specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●	APKT 1604 PDFR R04				●			**HW 4415**	10 **281715** 0030	17,10



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

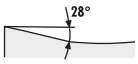
2129

APKR specially for non-ferrous metals

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●	APKR 1604 PD-R				●			**DC 235**	10 **281215** 6808	17,60
							●			**DC 9235**	10 281215 6849	22,40



Universal application



ISO	DC 235	DC 9235
ISO N Al/non-ferrous	Vc = 160 - 650	Vc = 200 - 850
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.4 ap = max. 0.7 x cutting edge length	

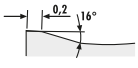
2167

APKT Radius

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●	APKT 1604 16R	●		●				**DC 725**	10 **281520** 1258	21,50
			APKT 1604 24R	●		●				**DC 725**	10 281520 1458	21,50
			APKT 1604 32R	●		●				**DC 725**	10 281520 1658	21,50
				●	●					**DC 735**	10 281520 1662	21,50
			APKT 1604 48R	●	●	●				**DC 9235**	10 281520 1864	22,40



Universal application



ISO	DC 725	DC 735	DC 9235
ISO P steel	Vc = 100 - 300	Vc = 90 - 225	Vc = 80 - 180
ISO M stainless steel		Vc = 80 - 235	Vc = 80 - 220
ISO K cast iron	Vc = 90 - 150		Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

2167

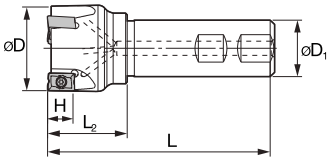
ATORN® End milling cutters 4-10 Power




20-300

- **For ISO milling inserts, type LN.X 100605 PNR**
- **Internal coolant supply**
- **For face milling, shoulder milling, straight-line edge milling and groove milling**
- Multi-functional milling tool system with **4 cutting edges** on a **double-sided indexable cutting insert**
- High tool life quantities due to low machining forces
- Special chip shape geometry allows low power consumption due to a large rake angle despite the thick cutting edge
- With the new carbide types, the chip geometry ensures consistently high tool life quantities
- Nickel-plated design for high wear-resistance and increased base body service life





Short

D mm	D1 mm	L mm	L2 mm	H mm	Z	Tightening torque max. N·m			art.no.	€
20.0	20	100	30	9	3	1.75	A1	B1	**262559** 0020	186,–
25.0	25	115	35	9	3	1.75	A1	B1	262559 0025	230,–
32.0	25	125	40	9	4	1.75	A1	B1	262559 0032	255,–

2124



Long

D mm	D1 mm	L mm	L2 mm	H mm	Z	Tightening torque max. N·m			art.no.	€
20	20	150	50	9	3	1.75	A1	B1	**262561** 0020	215,–
25	25	150	50	9	3	1.75	A1	B1	262561 0025	265,–
32	32	150	60	9	4	1.75	A1	B1	262561 0032	295,–

2124

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	285799 0102	7,15	B1	703053 0090	3,15
	3106			7114	

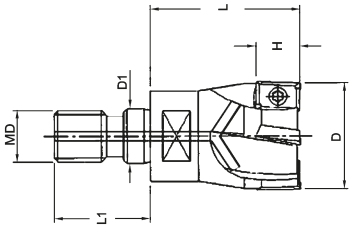
ATORN® Screw-in milling cutter 4-10 Power




20-300

- **For ISO milling inserts, type LN.X 100605 PNR**
- **Internal coolant supply**
- **For face milling, shoulder milling, straight-line edge milling and groove milling**
- Multi-functional milling tool system with **4 cutting edges** on a **double-sided indexable cutting insert**
- High tool life quantities due to low machining forces
- Special chip shape geometry allows low power consumption due to a large rake angle despite the thick cutting edge
- With the new carbide types, the chip geometry ensures consistently high tool life quantities
- Nickel-plated design for high wear-resistance and increased base body service life





D mm	L mm	Z	D1 mm	H mm	L1 mm	MD	Tightening torque max. N·m			art.no.	€
20	30	3	10.5	9	20	M10	1.75	A1	B1	**262563** 0020	215,–
25	35	3	10.5	9	22	M12	1.75	A1	B1	262563 0025	265,–
32	43	3	17	9	24	M16	1.75	A1	B1	262563 0032	295,–

2124

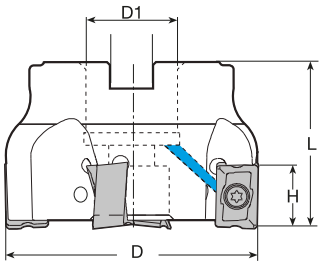
Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	285799 0102	7,15	B1	703053 0090	3,15
	3106			7114	

ATORN® Shoulder milling cutter 4-10 power/4-15 power

20-300

- **Internal coolant supply**
- **For face milling, shoulder milling, straight-line edge milling and groove milling**
- Multi-functional milling tool system with **4 cutting edges** on a **double-sided milling insert**
- High tool life quantities due to low machining forces.
- Special chip shape geometry allows low power consumption due to a large rake angle despite the thick cutting edge
- With the new carbide types, the chip geometry ensures consistently high tool life quantities
- Nickel-plated design for high wear-resistance and increased base body service life





4-10 Power

- **For ISO milling inserts, type LN.X 100605 PNR**

D mm	D1 mm	L mm	H mm	Z	Tightening torque max. N-m			art.no.	€
40.0	16	40	9	5	1.75	A1	B1	**262560** 0040	295,–
50.0	22	40	9	7	1.75	A1	B1	262560 0050	325,–
63.0	22	40	9	9	1.75	A1	B1	262560 0063	410,–

2124



4-15 Power

- **For ISO milling inserts, type LN.X 151008 PNR**

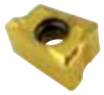
D mm	D1 mm	L mm	H mm	Z	Tightening torque max. N-m			art.no.	€
50.0	22	40	14	5	4.01	A2	B2	**262562** 0050	270,–
63.0	22	40	14	6	4.01	A2	B2	262562 0063	295,–
80.0	27	50	14	7	4.01	A2	B2	262562 0080	320,–
100.0	32	50	14	8	4.01	A2	B2	262562 0100	385,–
125.0	40	63	14	10	4.01	A2	B2	262562 0125	699,–

2124

Spare parts

Screw			TORX		
	art.no.	€		art.no.	€
A1	285799 0102	7,15	B1	703053 0090	3,15
A2	285799 0103	7,15	B2	703053 0150	3,35
	3106			7114	

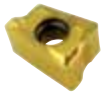
LNM(E)X 10

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application			LNMX 100605PNR-MM	●	●	●				HC 4630	10	**295811** 0001	14,30
				●		●				HC 4410	10	295812 0001	14,30
					●					HC 4535	10	295813 0001	14,30
			LNEX 100605PNR-MA				●			HW 4310	10	295815 0002	13,30

2129

ISO	HC 4410	HC 4535	HC 4630	HW 4310
ISO P steel	Vc = 180 - 280		Vc = 110 - 220	
ISO M stainless steel		Vc = 120 - 180	Vc = 90 - 160	
ISO K cast iron	Vc = 120 - 300		Vc = 120 - 230	
ISO N Al/non-ferrous				Vc = 200 - 300
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 to 0.20 per cutting edge ap = max. 0.7 x cutting edge length			

LNM(E)X 15

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application			LNMX 151008PNR-MM	●	●	●				HC 4630	10	**295821** 0001	17,60
				●		●				HC 4410	10	295824 0001	17,60
					●					HC 4535	10	295825 0001	17,60
			LNEX 151008PNR-MA				●			HW 4310	10	295826 0002	16,70

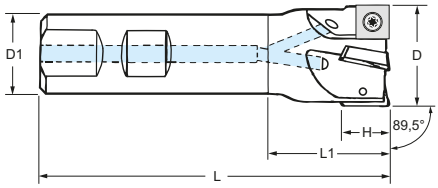
2129

ISO	HC 4410	HC 4535	HC 4630	HW 4310
ISO P steel	Vc = 180 - 280		Vc = 110 - 220	
ISO M stainless steel		Vc = 120 - 180	Vc = 90 - 160	
ISO K cast iron	Vc = 120 - 300		Vc = 120 - 230	
ISO N Al/non-ferrous				Vc = 200 - 300
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 to 0.20 per cutting edge ap = max. 0.7 x cutting edge length			

ATORN® 89.5° end milling cutter

DIN 1835 B

- **for milling inserts SP.T 0603**
- Positive indexable insert basic form
- Four cutting edges per indexable insert
- Also suitable for machines with low drive power
- For excellent surface quality
- Burr-free milling cutter
- **Internal coolant supply**
- Shank according to DIN 1835B
- Supplied with clamping screw and wrench



Particularly cost-effective thanks to 4 cutting edges



Short

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
10	16	6	24	80	1	1.0	A1	B1	**265000** 0010	88,50
12	16	6	24	80	1	1.0	A1	B1	265000 0012	88,50
16	16	6	25	85	2	1.0	A1	B1	265000 0016	117,–
20	20	6	25	90	3	1.0	A1	B1	265000 0020	153,–
25	25	6	25	95	4	1.0	A1	B1	265000 0025	188,–
32	25	6	26	95	5	1.0	A1	B1	265000 0032	210,–

2124

Long

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
16	16	6	100	150	2	1.0	A1	B1	**265001** 0016	136,–
20	20	6	100	150	3	1.0	A1	B1	265001 0020	184,–
25	20	6	25	150	4	1.0	A1	B1	265001 0025	210,–
32	25	6	30	150	5	1.0	A1	B1	265001 0032	245,–

2124

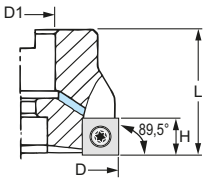
Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

ATORN® 89.5° shell-type milling cutter

- **for milling inserts SP.T 0603**
- Positive indexable insert basic form
- Four cutting edges per indexable insert
- Also suitable for machines with low drive power
- For excellent surface quality
- Burr-free milling cutter
- **Internal coolant supply**
- Supplied with clamping screw and wrench

Particularly cost-effective thanks to 4 cutting edges





D mm	L mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
40	40	16	6	6	1.0	A1	B1	**265002** 0040	240,–
50	40	22	7	6	1.0	A1	B1	265002 0050	280,–
63	40	22	8	6	1.0	A1	B1	265002 0063	385,–

2124

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	262551 0025	4,90	B1	703053 0080	3,15
	3106			7114	

SPMT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	○	○	SPMT 060304	●	○	○				**HC 4635**	10	**263008** 0006	10,10



Finishing / medium machining

2129

ISO	HC 4635
ISO P steel	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 - 0.15 ap = 0.5 - 5.0

SPGT ALU

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○	SPGT 060304-ALU				●			**HW 4415**	10	**263009** 0006	14,40



Universal application

2129

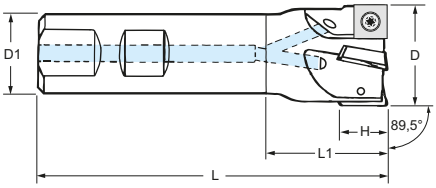
ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.10 - 0.20 ap = 0.5 - 5.0

ATORN® 89.5° end milling cutter

DIN 1835 B

Particularly cost-effective thanks to 4 cutting edges

- **for milling inserts SP.T 09T3**
- Positive indexable insert basic form
- Four cutting edges per indexable insert
- Also suitable for machines with low drive power
- For excellent surface quality
- Burr-free milling cutter
- **Internal coolant supply**
- Shank according to DIN 1835B
- Supplied with clamping screw and wrench





D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
25	25	9	44	100	2	2.68	A1	B1	**265003** 0025	154,–
32	32	9	50	110	3	2.68	A1	B1	265003 0032	177,–
40	32	9	45	115	4	2.68	A1	B1	265003 0040	225,–

2124

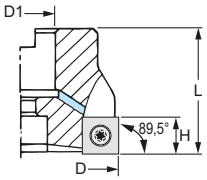
Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	262551 0035	7,15	B1	703053 0150	3,35
	3106			7114	

ATORN® 89.5° shell-type milling cutter

- **for milling inserts SP.T 09T3**
- Positive indexable insert basic form
- Four cutting edges per indexable insert
- Also suitable for machines with low drive power
- For excellent surface quality
- Burr-free milling cutter
- **Internal coolant supply**
- Supplied with clamping screw and wrench

Particularly cost-effective thanks to 4 cutting edges





D mm	L mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
40	40	16	4	9	2.68	A1	B1	**265004** 0040	205,–
50	40	22	5	9	2.68	A1	B1	265004 0050	225,–
63	40	22	6	9	2.68	A1	B1	265004 0063	260,–
80	50	27	7	9	2.68	A1	B1	265004 0080	285,–
100	50	32	8	9	2.68	A1	B1	265004 0100	355,–

2124

Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	262551 0035	7,15	B1	703053 0150	3,35
	3106			7114	

SPMT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	○	○	SPMT 09T308	●	○	○				**HC 4635**	10	**263008** 0009	10,80



Finishing / medium machining

2129

ISO	HC 4635
ISO P steel	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 - 0.18 ap = 0.5 - 5.0

SPGT ALU

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○	SPGT 09T308-ALU				●			**HW 4415**	10	**263009** 0009	15,60



Universal application

2129

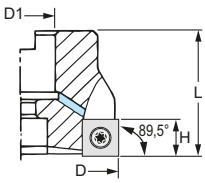
ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.10 - 0.20 ap = 0.5 - 5.0

ATORN® 89.5° shell-type milling cutter



Particularly cost-effective thanks to 4 cutting edges

- **for milling inserts SP.T 1204**
- Positive indexable insert basic form
- Four cutting edges per indexable insert
- Also suitable for machines with low drive power
- For excellent surface quality
- Burr-free milling cutter
- **Internal coolant supply**
- Supplied with clamping screw and wrench





D mm	L mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
50	40	22	5	12	7.93	A1	B1	**265005** 0050	295,–
63	40	22	6	12	7.93	A1	B1	265005 0063	320,–
80	50	27	6	12	7.93	A1	B1	265005 0080	365,–
100	50	32	8	12	7.93	A1	B1	265005 0100	450,–
125	63	40	9	12	7.93	A1	B1	265005 0125	549,–

2124

Spare parts

	Screw	
	art.no.	€
A1	321701 0108	8,75

3106

	TORX	
	art.no.	€
B1	703053 0200	3,40

7114

SPMT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	○	○	SPMT 120408	●	○	○				**HC 4635**	10	**263008** 0012	12,10



Finishing / medium machining

2129

ISO	HC 4635
ISO P steel	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 - 0.2 ap = 0.5 - 5.0

SPGT ALU

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○	SPGT 120408-ALU				●			**HW 4415**	10	**263009** 0012	16,80



Universal application

2129

ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.10 - 0.20 ap = 0.5 - 5.0



… with safety

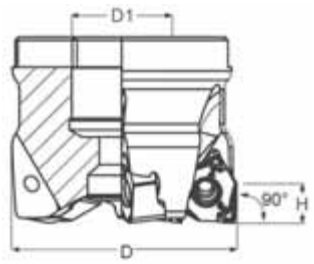
ATORN®
High quality for great performance

ATORN® 90° corner milling cutter

- **For WNEU 0806 milling inserts**
- Wear-resistant, nickel-plated design
- Positive indexable insert basic form
- Very low power consumption thanks to special chip shape geometry
- Six cutting edges per indexable insert
- Double-sided indexable insert
- Large insert thickness
- **Internal coolant supply**
- Supplied with clamping screw and wrench

NEW • NUOVO • NY • NOUVEAU • NUEVO

6 cutting edges





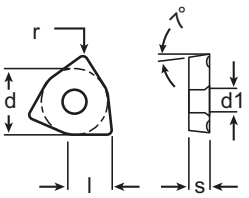
D mm	L mm	D1 mm	Z	H mm	Tightening torque max. N-m			art.no.	€
50	40	22	5	7	3.0	A1	B1	**262565** 0050	320,–
63	40	22	6	7	3.0	A1	B1	262565 0063	355,–
80	50	27	7	7	3.0	A1	B1	262565 0080	400,–
100	50	32	8	7	3.0	A1	B1	262565 0100	490,–
125	63	40	10	7	3.0	A1	B1	262565 0125	629,–
160	63	40	11	7	3.0	A1	B1	262565 0160	729,–
								2124	

Spare parts

	Screw		
	art.no.	€	
A1	262551 4035	5,15	
	3106		

	TORX	
	art.no.	€
B1	703053 0150	3,35
	7114	

ATORN® Milling inserts WNEU



NEW • NUOVO • NY • NOUVEAU • NUEVO



ISO designation		ISO P K Coated HC4620 art.no.	€		ISO P M Coated HC4630 art.no.	€		ISO P M K Coated HC4430 art.no.	€
WNEU 080608-M	10	**295827** 0001	18,50	10	**295828** 0001	17,60	10	**295829** 0001	17,60
		2131			2131			2131	

Transverse slot shell-type arbour

SARA®

Nickel-plated and pre-balanced to G2.5 at 25,000 rpm



Page 40-76

ATORN® Countersinking mill, adjustable

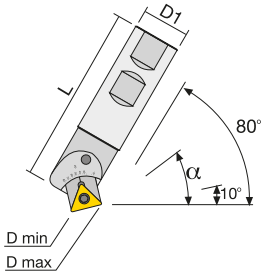
- **Adjustable from 10° to 80°**
- Universal indexable insert countersinking mill for chamfering, deburring and countersinking in fixed operating conditions. Cannot be used on drilling machines
- Stable, smooth operation
- Straight shank with driving planes in accordance with DIN 1835B in tolerance zone h6
- Scale tolerance ± 2.5°, please use a pre-setting device for precise adjustment
- Supplied with clamping screws and wrench



For ISO indexable inserts, type TC.. 1102

D1 mm	L mm	a °	D min. mm	D max. mm	Tightening torque max. N·m	suitable indexable inserts					art.no.	€
		10°	5.0	26.0								
		20°	8.0	27.0								
		30°	10.0	27.0								
		40°	13.0	27.0								
20	100	45°	14.0	27.0	1	TC..1102	A1	B1	C1	D1	**260122** 0020	230,–
		50°	15.0	27.0								
		60°	17.0	26.0								
		70°	19.0	25.0								
		80°	20.0	24.0								

2124



Spare parts

Cartridge			Screw			Screw for cartridge			TORX		
	art.no.	€		art.no.	€		art.no.	€		art.no.	€
A1	320901 2001	84,–	B1	320901 2002	8,75	C1	320901 2003	8,75	D1	703053 0080	3,15
3106			3106			3106			7114		

ATORN® Countersinking mill with 2 cartridges, adjustable

- **Adjustable from 10° to 80°**
- Universal indexable insert countersinking mill for chamfering, deburring and countersinking in fixed operating conditions. Cannot be used on drilling machines. Stable, smooth operation
- Straight shank with driving planes in accordance with DIN 1835B in tolerance zone h6
- Scale tolerance ± 2.5°, please use a pre-setting device for precise adjustment
- Supplied with clamping screws and wrench



Cartridge for TC.. 16T3..

Including two cartridges, one cartridge each for **TCMT 16T3..** and **SCMT 1204..**

D1 mm	L mm	a °	D min. mm	D max. mm	Tightening torque max. N·m	suitable indexable inserts	art.no.	€
		10°	5.0	32.0				
		20°	6.0	33.0				
		30°	7.0	34.0				
		40°	10.0	33.0				
25	100	45°	11.0	33.0	4.01	TC..16T3 SC..1204	**260123** 0025	270,–
		50°	13.0	32.0				
		60°	16.0	31.0				
		70°	19.0	29.0				
		80°	23.0	27.0				

2124



Cartridge for SC.. 1204..

Spare cartridges

Description				art.no.	€
Cartridge for SCMT1204..	A1	B1	C2	**260124** 0012	82,–
Cartridge for TCMT16T3..	A2	B1	C1	260124 0016	82,–

3106



260124 0012



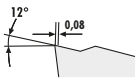
260124 0016

Spare parts

Screw			Screw for cartridge			TORX		
	art.no.	€		art.no.	€		art.no.	€
A1	260124 0002	8,55	B1	260124 0010	10,25	C1	703053 0150	3,35
A2	320901 2502	10,50				C2	703053 0200	3,40
3106			3106			7114		

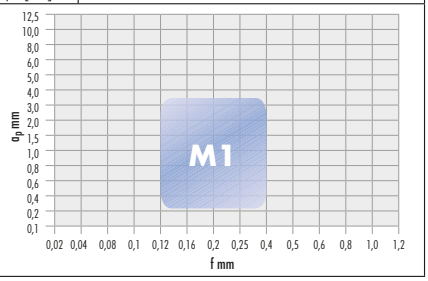
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Chip breaker *M1*

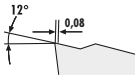
F finishing -	M medium ●	R roughing ○	SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 120404-M1			●	○	○				**SC 25 PT**	10	**366649** 0525	9,45
	SCMT 120408-M1			●	○	○				**SC 25 PT**	10	366649 0625	9,45

3135

ISO	SC 25 PT
ISO P steel	Vc = 100 - 240
ISO M stainless steel	Vc = 70 - 210
ISO K cast iron	Vc = 120 - 250
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.4 ap = 0.25 - 4.5

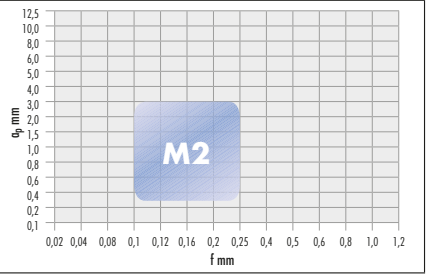


Chip breaker *M2*, especially for stainless steel

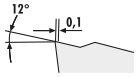
F finishing -	M medium ●	R roughing ○	SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 120404-M2			○	●					**SP 25 MT**	10	**366650** 0321	9,45
	SCMT 120408-M2			○	●					**SP 25 MT**	10	366650 0421	9,45

3135

ISO	SP 25 MT
ISO P steel	Vc = 60 - 250
ISO M stainless steel	Vc = 40 - 250
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.4 ap = 0.25 - 3.5

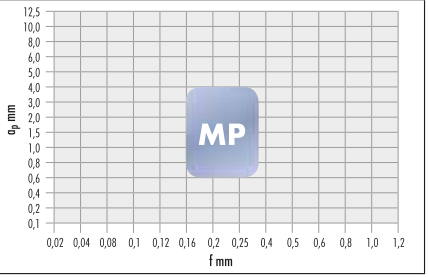


Chip breaker type MP

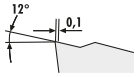
F finishing -	M medium ●	R roughing -	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 120404-MP			●		○				**HC 7620**	10	**311401** 2612	11,25
	SCMT 120408-MP			●		○				**HC 7620**	10	311401 2712	11,25

3108

ISO	HC 7620
ISO P steel	Vc = 110 - 250
ISO K cast iron	Vc = 140 - 240
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.35 ap = 0.1 - 3.0

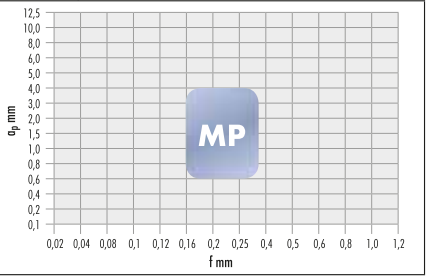


Chip breaker type MP, stainless steel

F finishing -	M medium ●	R roughing -	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 120408-MP				●			○		**HC 7520**	10	**311401** 2722	11,70

3108

ISO	HC 7520
ISO M stainless steel	Vc = 80 - 220
ISO S superalloys	Vc = 30 - 60
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.32 ap = 0.5 - 2.5



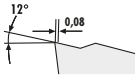
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Chip breaker *M1*

F finishing	M medium	R roughing
-	●	○



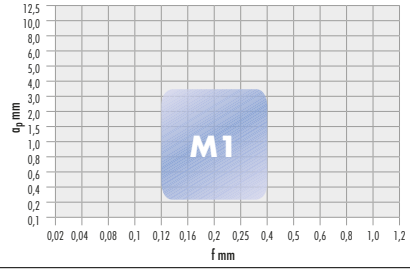
Medium machining



SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
TCMT 16T304-M1	●	○	○				**SC 25 PT**	10	**366665** 0625	7,35
	●	○					**SC 35 PT**	10	366665 0735	7,35
TCMT 16T308-M1	●	○	○				**SC 25 PT**	10	366665 0825	7,35
	●	○					**SC 35 PT**	10	366665 0935	7,35

3135

ISO	SC 25 PT	SC 35 PT
ISO P steel	Vc = 100 - 240	Vc = 90 - 200
ISO M stainless steel	Vc = 70 - 210	Vc = 55 - 200
ISO K cast iron	Vc = 120 - 250	
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.4 ap = 0.25 - 4.5	

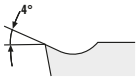


Chip breaker *FF7*, CERMET design

F finishing	M medium	R roughing
●	-	-



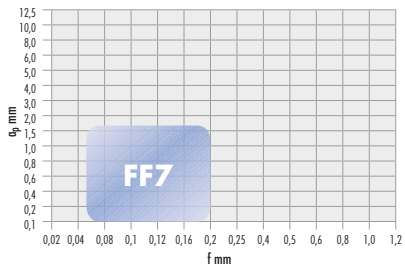
Micro finishing machining



SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
TCMT 110202-FF7	●	○	○				**ST 10 UT**	10	**366666** 0140	9,45
TCMT 110204-FF7	●	○	○				**ST 10 UT**	10	366666 0240	5,80

3135

ISO	ST 10 UT
ISO P steel	Vc = 160 - 300
ISO M stainless steel	Vc = 130 - 240
ISO K cast iron	Vc = 220 - 350
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.05 - 0.2 ap = 0.1 - 1.65

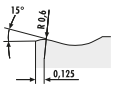


Chip breaker type MP

F finishing	M medium	R roughing
-	●	-



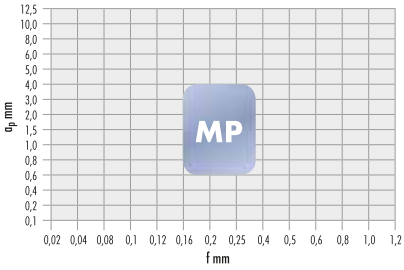
Medium machining



ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
TCMT 16T304-MP	●		○				**HC 7610**	10	**311501** 3411	9,25
	●		○				**HC 7620**	10	311501 3412	9,25
	●						**HC 7630**	10	311501 3413	9,25
TCMT 16T308-MP	●		○				**HC 7610**	10	311501 3511	9,25
	●		○				**HC 7620**	10	311501 3512	9,25
	●						**HC 7630**	10	311501 3513	9,25

3108

ISO	HC 7610	HC 7620	HC 7630
ISO P steel	Vc = 110 - 250	Vc = 110 - 250	Vc = 110 - 250
ISO K cast iron	Vc = 140 - 240	Vc = 140 - 240	
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.25 ap = 0.4 - 3.0		

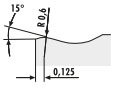


Chip breaker type MP, stainless steel

F finishing	M medium	R roughing
-	●	-



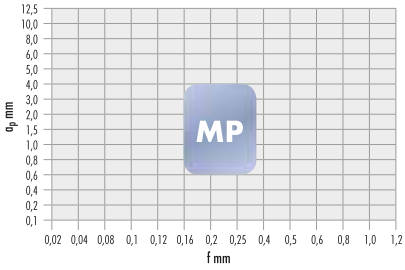
Medium machining



ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
TCMT 16T304-MP		●			○		**HC 7520**	10	**310501** 3425	9,25
TCMT 16T308-MP		●			○		**HC 7520**	10	310501 3525	9,25
		●			○		**HC 7530**	10	310501 3526	9,25

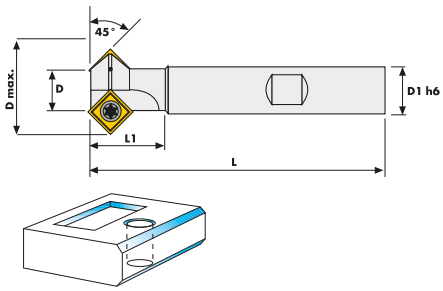
3108

ISO	HC 7520	HC 7530
ISO M stainless steel	Vc = 80 - 210	Vc = 90 - 160
ISO S superalloys	Vc = 30 - 60	Vc = 20 - 50
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.25 ap = 0.4 - 3.0	



ATORN® 30°/45°/60° chamfer cutter, SCMT and TCMT

- With Weldon shank
- Suitable for bore diameters from Ø 1.2 mm
- Uses ISO indexable cutting inserts, type SCMT.. and TCMT..
- **Both versions with internal cooling**

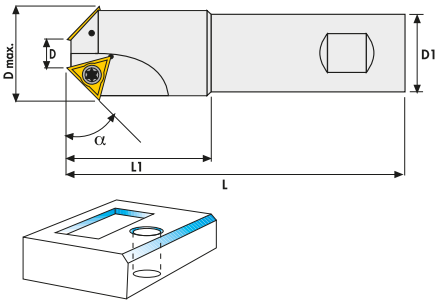




45° SCMT.. with IC

D mm	D max. mm	L mm	L1 mm	D1 h6 mm	Z	Tightening torque max. N-m	suitable indexable inserts	suitable clamping screw	suitable TORX wrench				art.no.	€
4.0	10.0	80	28	12.0	1	1	SCMT 0602..	M2.5 x 5.5	TX 8		B1	C1	**260121** 0001	107,–
11.0	20.0	80	32	12.0	2	1	SCMT 0602..	M2.5 x 5.5	TX 8		B1	C1	260121 0002	158,–
12.0	23.7	100	37	20.0	1	4	SCMT 09T3..	M4.0 x 8	TX 15	A2		C2	260121 0003	90,–
12.0	23.7	200	37	20.0	1	4	SCMT 09T3..	M4.0 x 8	TX 15	A2		C2	260121 1001	107,–
16.0	28.8	100	32	16.0	2	4	SCMT 09T3..	M4.0 x 8	TX 15	A2		C2	260121 0004	141,–
16.0	28.8	200	32	16.0	2	4	SCMT 09T3..	M4.0 x 8	TX 15	A2		C2	260121 1002	161,–
30.0	42.3	100	32	20.0	3	4	SCMT 09T3..	M4.0 x 8	TX 15	A2		C2	260121 0005	164,–
30.0	42.3	200	32	20	3	4	SCMT 09T3..	M4.0 x 8	TX 15	A2		C2	260121 1003	184,–

2124





30°/45°/60° TCMT.. with IC

D mm	D max. mm	L mm	L1 mm	D1 h6 mm	a °	Z	suitable indexable inserts	Tightening torque max. N-m	suitable clamping screw	suitable TORX wrench				art.no.	€
1.2	16.0	70	20	12.0	45°	1	TCMT 1102..	1	M2.5 x 5.5	TX 8		B1	C1	**260125** 4516	71,–
5.4	16.0	70	20	12.0	60°	1	TCMT 1102..	1	M2.5 x 5.5	TX 8		B1	C1	260125 6016	73,–
6.0	32.0	100	38	25.0	30°	2	TCMT 16T3..	4	M4.0 x 8	TX 15	A2		C2	260125 3032	163,–
6.2	21.0	90	35	20.0	45°	2	TCMT 1102..	1	M2.5 x 5.5	TX 8	A1		C1	260125 4521	93,–
10.4	32.5	100	42	25.0	45°	2	TCMT 16T3..	4	M4.0 x 8	TX 15	A2		C2	260125 4532	159,–
15.8	26.0	90	35	20.0	60°	2	TCMT 1102..	1	M2.5 x 5.5	TX 8	A1		C1	260125 6026	100,–
20.0	35.0	100	39	25.0	60°	2	TCMT 16T3..	4	M4.0 x 8	TX 15	A2		C2	260125 6035	163,–

2124

Spare parts

	Screw		
	art.no.	€	
A1	262551 0025	4,90	
A2	320901 2502	10,50	

3106

	Screw	
	art.no.	€
B1	320901 2513	10,50

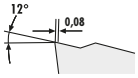
3106

	TORX	
	art.no.	€
C1	703053 0080	3,15
C2	703053 0150	3,35

7114

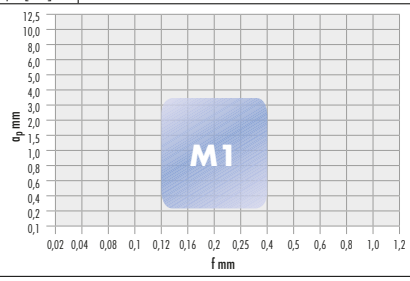
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Chip breaker *M1*

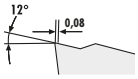
F finishing -	M medium ●	R roughing ○	SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 09T304-M1			●	○	○				SC 25 PT	10	**366649** 0125	8,15
	SCMT 09T308-M1			●	○	○				SC 25 PT	10	366649 0225	8,15
				●	○					SC 35 PT	10	366649 0335	8,15
	SCMT 120404-M1			●	○	○				SC 25 PT	10	366649 0525	9,45
	SCMT 120408-M1			●	○	○				SC 25 PT	10	366649 0625	9,45

3135

ISO	SC 25 PT	SC 35 PT
ISO P steel	Vc = 100 - 240	Vc = 90 - 190
ISO M stainless steel	Vc = 70 - 210	Vc = 55 - 200
ISO K cast iron	Vc = 120 - 250	
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.4 ap = 0.25 - 4.5	

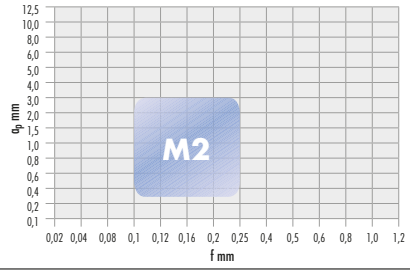


Chip breaker *M2*, especially for stainless steel

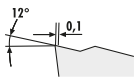
F finishing -	M medium ●	R roughing ○	SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 09T304-M2			○	●					SP 25 MT	10	**366650** 0121	8,15
	SCMT 09T308-M2			○	●					SP 25 MT	10	366650 0221	8,15
	SCMT 120404-M2			○	●					SP 25 MT	10	366650 0321	9,45
	SCMT 120408-M2			○	●					SP 25 MT	10	366650 0421	9,45

3135

ISO	SP 25 MT
ISO P steel	Vc = 60 - 250
ISO M stainless steel	Vc = 40 - 250
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.4 ap = 0.25 - 3.5

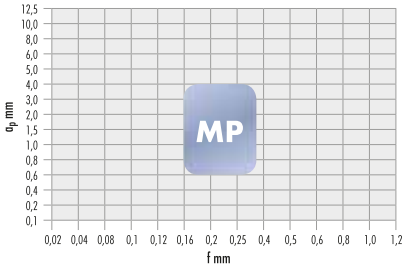


Chip breaker type MP

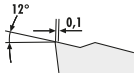
F finishing -	M medium ●	R roughing -	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 09T304-MP			●		○				HC 7620	10	**311401** 1212	7,95
				●		○				HC 7630	10	311401 1213	7,95
	SCMT 09T308-MP			●		○				HC 7620	10	311401 1312	7,95
				●		○				HC 7630	10	311401 1313	7,95
	SCMT 120404-MP			●		○				HC 7620	10	311401 2612	11,25
	SCMT 120408-MP			●		○				HC 7620	10	311401 2712	11,25

3108

ISO	HC 7620	HC 7630
ISO P steel	Vc = 110 - 250	Vc = 80 - 220
ISO K cast iron	Vc = 140 - 240	
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.35 ap = 0.1 - 3.0	

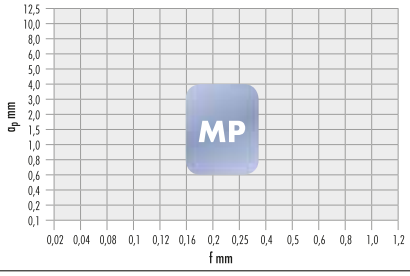


Chip breaker type MP, stainless steel

F finishing -	M medium ●	R roughing -	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 	SCMT 09T308-MP				●			○		HC 7520	10	**311401** 1322	8,25
	SCMT 120408-MP				●			○		HC 7520	10	311401 2722	11,70

3108

ISO	HC 7520
ISO M stainless steel	Vc = 80 - 220
ISO S superalloys	Vc = 30 - 60
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.32 ap = 0.5 - 2.5



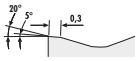
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SCMT

F finishing	M medium	R roughing
●	●	-



Finishing / medium machining



ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
SCMT 060204	●						HC 4635	10 **327410** 1510	18,95

ISO	HC 4635
ISO P steel	Vc = 60 - 160
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.4 ap = max. 0.7 x cutting edge length

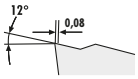
3108

Chip breaker *M1*

F finishing	M medium	R roughing
-	●	○

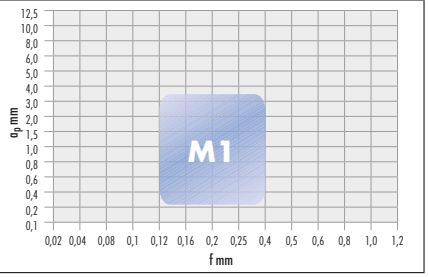


Medium machining



SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
TCMT 110204-M1	●	○	○				SC 25 PT	10 **366665** 0225	5,80
	●	○					SC 35 PT	10 366665 0325	5,80
TCMT 16T304-M1	●	○	○				SC 25 PT	10 366665 0625	7,35
	●	○					SC 35 PT	10 366665 0735	7,35
TCMT 16T308-M1	●	○	○				SC 25 PT	10 366665 0825	7,35
	●	○					SC 35 PT	10 366665 0935	7,35

ISO	SC 25 PT	SC 35 PT
ISO P steel	Vc = 100 - 240	Vc = 90 - 200
ISO M stainless steel	Vc = 70 - 210	Vc = 55 - 200
ISO K cast iron	Vc = 120 - 250	
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.4 ap = 0.25 - 4.5	



3135

Chip breaker *FF7*, CERMET design

F finishing	M medium	R roughing
●	-	-

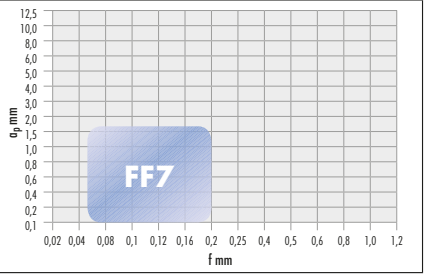


Micro finishing machining



SARATURN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
TCMT 110202-FF7	●	○	○				ST 10 UT	10 **366666** 0140	9,45
TCMT 110204-FF7	●	○	○				ST 10 UT	10 366666 0240	5,80

ISO	ST 10 UT
ISO P steel	Vc = 160 - 300
ISO M stainless steel	Vc = 130 - 240
ISO K cast iron	Vc = 220 - 350
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.05 - 0.2 ap = 0.1 - 1.65



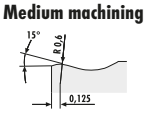
3135

Chip breaker type MP

F finishing	M medium	R roughing
-	●	-

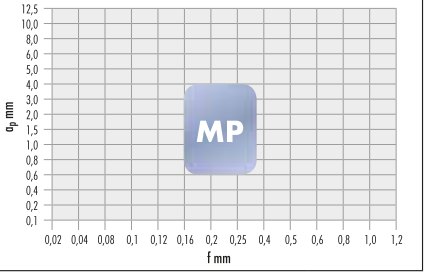


Medium machining



ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
TCMT 110204-MP	●		○				HC 7610	10 **311501** 1511	6,35
	●		○				HC 7620	10 311501 1512	6,35
	●						HC 7630	10 311501 1513	6,35
TCMT 16T304-MP	●		○				HC 7610	10 311501 3411	9,25
	●		○				HC 7620	10 311501 3412	9,25
	●						HC 7630	10 311501 3413	9,25
TCMT 16T308-MP	●		○				HC 7610	10 311501 3511	9,25
	●		○				HC 7620	10 311501 3512	9,25
	●						HC 7630	10 311501 3513	9,25

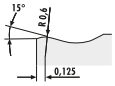
ISO	HC 7610	HC 7620	HC 7630
ISO P steel	Vc = 110 - 250	Vc = 110 - 250	Vc = 110 - 250
ISO K cast iron	Vc = 140 - 240	Vc = 140 - 240	
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.25 ap = 0.4 - 3.0		



3108

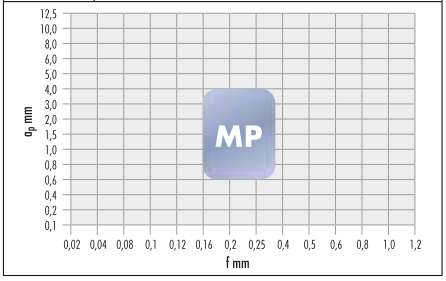
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Chip breaker type MP, stainless steel

F finishing -	M medium ●	R roughing -	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
 Medium machining 			TCMT 110204-MP		●			○		HC 7520	10	**310501** 1525	6,45
			TCMT 16T304-MP		●			○		HC 7520	10	310501 3425	9,25
			TCMT 16T308-MP		●			○		HC 7520	10	310501 3525	9,25
					●			○		HC 7530	10	310501 3526	9,25

3108

ISO	HC 7520	HC 7530
ISO M stainless steel	Vc = 80 - 210	Vc = 90 - 160
ISO S superalloys	Vc = 30 - 60	Vc = 20 - 50
Vc = [m/min] f = [mm/U] ap = [mm]	f = 0.12 - 0.25 ap = 0.4 - 3.0	



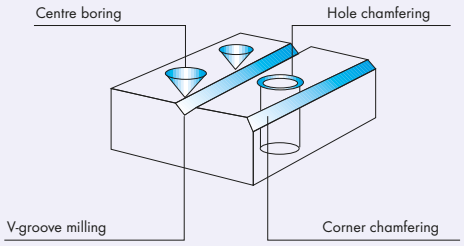
ATORN® 45° chamfer and centring cutter

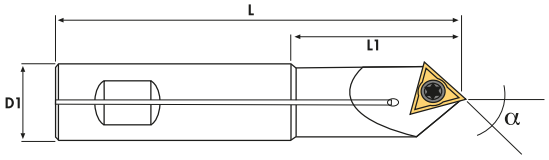
20-301

- **Internal coolant supply**
- NC spot drilling, engraving, chamfering, centring, V-groove milling
- **When used for chamfering only, an ISO turning insert of type TCMT 16T3.. can be utilised instead**



Suitable for use as standing tool on turning machines for facing





D1 h6 mm	L mm	L1 mm	a °	Z	D min. mm	D max. mm	suitable indexable inserts	Tightening torque max. N-m			art.no.	€
20	115	40	45°	1	0.2	20.0	TCMX 16T3ZR..	4	A1	B1	**260126** 4540	159,–
20	150	60	45°	1	0.2	20.0	TCMX 16T3ZR..	4	A1	B1	260126 4560	186,–
20	200	80	45°	1	0.2	20.0	TCMX 16T3ZR..	4	A1	B1	260126 4580	210,–

2124

Spare parts

Screw			TORX		
	art.no.	€		art.no.	€
A1	320901 2502	10,50	B1	703053 0150	3,35
3106			7114		

Turning insert

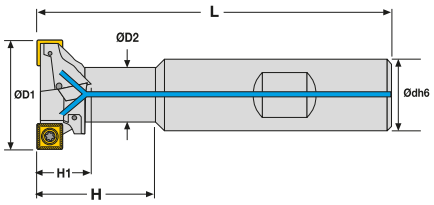
ISO designation	ISO P HC4625			ISO P HC4630 (V-groove)		
		art.no.	€		art.no.	€
TCMX 16T3ZR	10	**260127** 1603	15,40	10	**260127** 1613	15,40
		2129			2129	

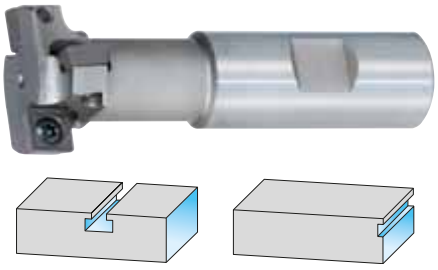


ATORN® T-slot milling cutter

DIN 6535 HB | Vc/fz | 20-300

- **For T-slots in accordance with DIN 650-UNI 4788-ISO 299**
- Straight shank with driving plane
- For ISO milling inserts, type SPMT....
- Supplied with clamping screws and wrench





D1 mm	D2 mm	L mm	H mm	H1 mm	D h6 mm	Z mm	Tightening torque max. N-m	suitable indexable inserts				art.no.	€
21	11	76	26	9	16	2	1.0	SPMT 060304	A1		C1	**263007** 0021	275,–
25	13	82	31	11	16	4	1.0	SPMT 060304	A1		C1	263007 0025	325,–
32	17	88	38	14	20	4	2.68	SPMT 09T308	A2		C2	263007 0032	355,–
40	21	108	50	17	25	4	2.68	SPMT 09T308	A2		C2	263007 0040	375,–
50	27	120	56	22	32	4	7.93	SPMT 120408		B1	C3	263007 0050	430,–

2124

Spare parts

Screw	art.no.	€
A1	262551 0025	4,90
A2	262551 0035	7,15

3106

Screw	art.no.	€
B1	321701 0108	8,75

3106

TORX	art.no.	€
C1	703053 0080	3,15
C2	703053 0150	3,35
C3	703053 0200	3,40

7114

SPMT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	○	○	SPMT 060304	●	○	○				**HC 4635**	10	**263008** 0006	10,10
			SPMT 09T308	●	○	○				**HC 4635**	10	263008 0009	10,80
			SPMT 120408	●	○	○				**HC 4635**	10	263008 0012	12,10



Finishing / medium machining

2129

ISO	HC 4635
ISO P steel	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 - 0.15 ap = 0.5 - 5.0

SPGT ALU

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○	SPGT 060304-ALU				●			**HW 4415**	10	**263009** 0006	14,40
			SPGT 09T308-ALU				●			**HW 4415**	10	263009 0009	15,60
			SPGT 120408-ALU				●			**HW 4415**	10	263009 0012	16,80



Universal application

2129

ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.10 - 0.20 ap = 0.5 - 5.0



... without shrinkage

ATORN®
High quality for great performance

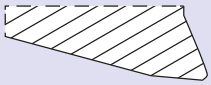
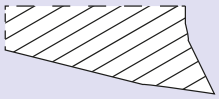
ATORN® High-speed milling cutters range

INFO

Exactly 90°

- Shoulder milling at exactly 90° in steel, cast iron, stainless steel and non-ferrous materials
- Extremely smooth running with low power consumption
- Large selection of base bodies and indexable cutting inserts
- Indexable cutting inserts in four sizes with different corner radii
- Extra-long end milling cutters for deep cavities
- Cutting depths of up to 16.5 mm
- High feed rate due to the large number of thread ridges
- Soft cut due to extremely positive geometry and irregular pitch
- All milling cutters have an internal coolant supply and have been surface-treated



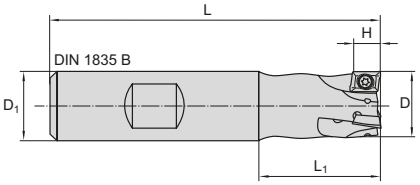
Indexable insert designation	Features	Chip shape levels
ADKX	Universal indexable cutting insert geometry with circumferential protective chamfer for machining steel and cast iron materials as well as stainless steels	 -SR -SR-TR
ADHX	Special ground indexable cutting insert geometry with polished face and sharp cutting edges for machining non-ferrous materials (aluminium, soft copper alloys and plastics)	 -FR-ALC

ATORN® 90° end milling cutter

20-302

- **For milling inserts, type AD..X 06..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank according to DIN 1835B
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N-m			art.no.	€
10	10	5.5	20	60	1	0.7	A1	B1	**264002** 0010	198,–
12	12	5.5	25	70	2	0.7	A1	B1	264002 0012	205,–
16	16	5.5	28	76	3	0.7	A1	B1	264002 0016	220,–
20	20	5.5	36	86	4	0.7	A1	B1	264002 0020	255,–
25	20	5.5	36	86	6	0.7	A1	B1	264002 0025	295,–

2127

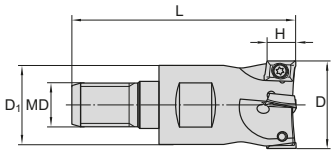
Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9901	4,33	B1	703053 0060	3,09
	3106			7114	

ATORN® 90° screw-in milling cutter

20-302





- **For milling inserts, type AD..X 06..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy

D mm	D1 mm	L mm	MD	Z	H mm	Tightening torque max. N·m			art.no.	€
12	13	45	M8	2	5.5	0.7	A1	B1	**264001** 0012	184,–
16	13	45	M8	3	5.5	0.7	A1	B1	264001 0016	210,–
20	18	49	M10	4	5.5	0.7	A1	B1	264001 0020	225,–
									2127	

Spare parts

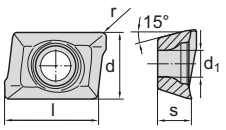
	Screw art.no.	€
A1	264000 9901	4,33
	3106	

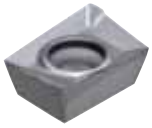
	TORX art.no.	€
B1	703053 0060	3,09
	7114	

ATORN® AD..X 06.. milling inserts

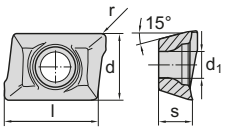
Milling inserts

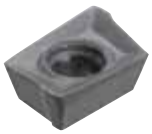
ISO designation	R mm		ISO K N HC4410 art.no.	€		ISO N HW4410 art.no.	€
ADHX 060202 FR-ALC	0.2	10	**282001** 1006	11,15	10	**282001** 1007	10,50
			2131			2131	





ISO designation	R mm		ISO P M S HC4640 art.no.	€		ISO P K N HC4410 art.no.	€
ADKX 060202SR	0.2	10	**282002** 1001	9,30	10	**282002** 1006	9,30
ADKX 060204SR	0.4	10	282002 2001	9,30	10	282002 2006	9,30
			2131			2131	

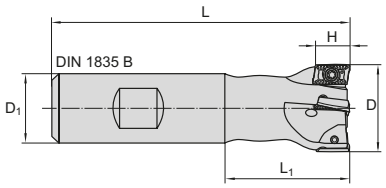




ATORN® 90° end milling cutter

20-302





- **For milling inserts, type AD..X 09..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank according to DIN 1835B
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy

D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
16	16	8.5	28	76	2	1.2	A1	B1	**264004** 0016	171,–
20	20	8.5	36	86	3	1.2	A1	B1	264004 0020	205,–
20	20	8.5	36	86	4	1.2	A1	B1	264004 0021	220,–
25	20	8.5	36	86	4	1.2	A1	B1	264004 0025	230,–
25	20	8.5	36	86	5	1.2	A1	B1	264004 0026	255,–
32	25	8.5	40	86	6	1.2	A1	B1	264004 0032	290,–
									2127	

Spare parts

	Screw art.no.	€
A1	264000 9902	5,15
	3106	

	TORX art.no.	€
B1	703053 0080	3,15
	7114	

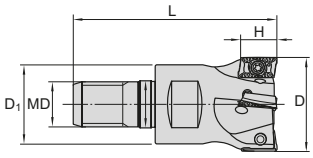
ATORN® 90° screw-in milling cutter




20-302

- **For milling inserts, type AD..X 09..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





D mm	D1 mm	L mm	MD	Z	H mm	Tightening torque max. N-m			art.no.	€
20	18	49	M10	3	8.5	1.2	A1	B1	**264003** 0020	188,–
25	21	55	M12	4	8.5	1.2	A1	B1	264003 0025	230,–
32	29	67	M16	6	8.5	1.2	A1	B1	264003 0032	265,–
									2127	

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9902	5,15	B1	703053 0080	3,15
	3106			7114	

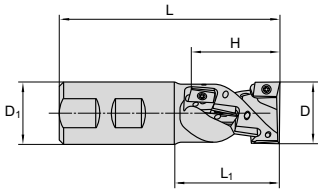
ATORN® 90° porcupine milling cutter




20-302

- **For milling inserts, type AD..X 09..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank according to DIN 1835B
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





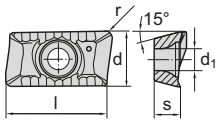
D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N-m			art.no.	€
20	20	25	36	86	6	1.2	A1	B1	**264005** 0020	380,–
25	25	33	44	100	8	1.2	A1	B1	264005 0025	425,–
32	32	41	55	115	15	1.2	A1	B1	264005 0032	519,–
									2127	

Spare parts

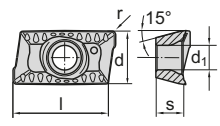
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9902	5,15	B1	703053 0080	3,15
	3106			7114	

ATORN® AD..X 09.. milling inserts

ISO designation	R mm	ISO K N HC4410			ISO N HW4410		
			art.no.	€		art.no.	€
ADHX090308FR-ALC	0.8	10	**282003** 1006	12,05	10	**282003** 1007	11,35
ADHX090312FR-ALC	1.2	10	282003 2006	12,05	10	282003 2007	11,35
			2131			2131	









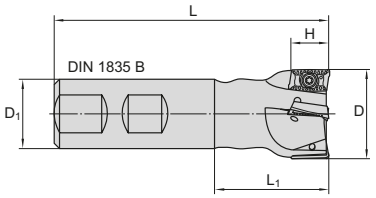
ISO designation	R mm	ISO P M S HC4640			ISO M HC4540 dry milling			ISO M HC4544 wet milling			ISO P K N HC4410		
			art.no.	€		art.no.	€		art.no.	€		art.no.	€
ADKX090304SR-TR	0.4	10	**282004** 1001	9,90							10	**282004** 1006	9,90
ADKX090308SR-TR	0.8	10	282004 2001	9,90	10	**282004** 2003	9,90	10	**282004** 2004	9,90	10	282004 2006	9,90
ADKX090312SR-TR	1.2	10	282004 3001	9,90	10	282004 3003	9,90	10	282004 3004	9,90	10	282004 3006	9,90
ADKX090316SR-TR	1.6	10	282004 4001	9,90	10	282004 4003	9,90	10	282004 4004	9,90	10	282004 4006	9,90
			2131			2131			2131			2131	

ATORN® 90° end milling cutter

20-302



- **For milling inserts, type AD..X 12..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank according to DIN 1835B
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy



D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
20	20	12	36	86	2	2.25	A1	B1	**264007** 0020	187,–
25	20	12	36	86	3	2.25	A1	B1	264007 0025	210,–
32	25	12	40	96	4	2.25	A1	B1	264007 0032	270,–
32	25	12	40	96	5	2.25	A1	B1	264007 0033	325,–
40	32	12	50	110	6	2.25	A1	B1	264007 0040	350,–

2127

Spare parts

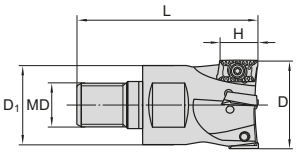
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9903	6,20	B1	703053 0080	3,15
	3106			7114	

ATORN® 90° screw-in milling cutter

20-302



- **For milling inserts, type AD..X 12..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy



D mm	D1 mm	L mm	MD	Z	H mm	Tightening torque max. N·m			art.no.	€
32	29	67	M16	4	12	2.25	A1	B1	**264006** 0032	265,–
40	29	67	M16	6	12	2.25	A1	B1	264006 0040	300,–

2127

Spare parts

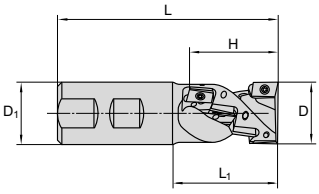
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9903	6,20	B1	703053 0080	3,15
	3106			7114	

ATORN® 90° roughing spiral flute end milling cutter

20-302



- **For milling inserts, type AD..X 12..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank according to DIN 1835B
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy



D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
32	32	45	55	115	8	2.25	A1	B1	**264008** 0032	460,–
40	40	55	70	140	15	2.25	A1	B1	264008 0040	779,–

2127

Spare parts

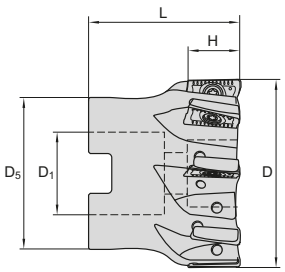
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9903	6,20	B1	703053 0080	3,15
	3106			7114	

ATORN® 90° shoulder milling cutter




20-302

- **For milling inserts, type AD..X 12..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





D mm	L mm	D5 mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
40	40	32	16	4	12	2.25	A1	B1	**264009** 0040	220,–
40	40	32	16	6	12	2.25	A1	B1	264009 0041	240,–
50	40	40	22	5	12	2.25	A1	B1	264009 0050	280,–
50	40	40	22	7	12	2.25	A1	B1	264009 0051	335,–
63	40	50	22	6	12	2.25	A1	B1	264009 0063	360,–
63	40	50	22	9	12	2.25	A1	B1	264009 0064	410,–
									2127	

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9903	6,20	B1	703053 0080	3,15
	3106			7114	

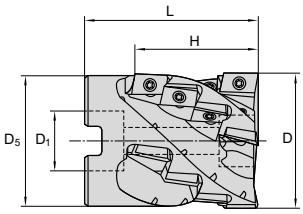
ATORN® 90° roughing spiral flute milling cutter




20-302

- **For milling inserts, type AD..X 12..**
- Just one insert type for both face and side cutting edges
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





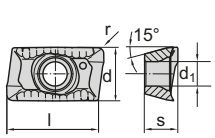
D mm	L mm	D5 mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
40	55	38	16	9	34	2.25	A1	B1	**264010** 0040	609,–
50	65	48	22	16	45	2.25	A1	B1	264010 0050	819,–
63	70	58	27	20	45	2.25	A1	B1	264010 0063	959,–
									2127	

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9903	6,20	B1	703053 0080	3,15
	3106			7114	

ATORN® AD..X 12.. milling inserts

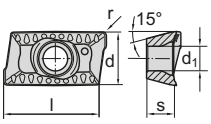
ISO designation	R mm	ISO K N HC4410			ISO N HW4410		
			art.no.	€		art.no.	€
ADHX 120408FR-ALC	0.8	10	**282005** 1006	12,70	10	**282005** 1007	11,65
ADHX 120412FR-ALC	1.2	10	282005 2006	12,70	10	282005 2007	11,65
ADHX 120416FR-ALC	1.6	10	282005 3006	12,70	10	282005 3007	11,65
			2131			2131	





ISO designation	R mm	ISO P M S HC4640			ISO M HC4540 dry milling			ISO M HC4544 wet milling			ISO P K N HC4410		
			art.no.	€		art.no.	€		art.no.	€		art.no.	€
ADKX 120408SR-TR	0.8	10	**282006** 1001	10,40	10	**282006** 1003	10,40	10	**282006** 1004	10,40	10	**282006** 1006	10,40
ADKX 120412SR-TR	1.2	10	282006 2001	10,40	10	282006 2003	10,40	10	282006 2004	10,40	10	282006 2006	10,40
ADKX 120416SR-TR	1.6	10	282006 3001	10,40	10	282006 3003	10,40	10	282006 3004	10,40	10	282006 3006	10,40
ADKX 120420SR-TR	2.0	10	282006 4001	10,40							10	282006 4006	10,40
			2131			2131			2131			2131	



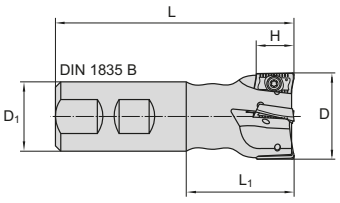


ATORN® 90° end milling cutter



20-302

- **For milling inserts, type AD..X 17..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank according to DIN 1835B
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
25	25	16.5	40	96	2	3.5	A1	B1	**264011** 0025	161,–
32	32	16.5	40	110	3	3.5	A2	B1	264011 0032	200,–
40	32	16.5	50	110	4	3.5	A2	B1	264011 0040	265,–
									2127	

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9904	7,–	B1	703053 0150	3,35
A2	264000 9905	7,–			
	3106			7114	

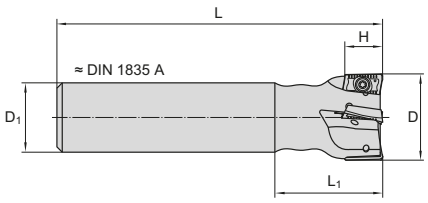
ATORN® 90° end milling cutter, long



20-302

- **For milling inserts, type AD..X 17..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Shank in accordance with DIN 1835 A
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m			art.no.	€
25	25	16.5	40	200	2	3.5	A1	B1	**264012** 0025	193,–
32	32	16.5	50	250	3	3.5	A2	B1	264012 0032	255,–
40	32	16.5	50	250	4	3.5	A2	B1	264012 0040	345,–
									2127	

Spare parts

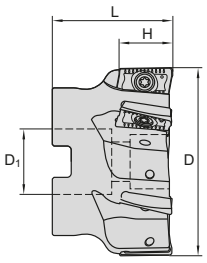
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9904	7,–	B1	703053 0150	3,35
A2	264000 9905	7,–			
	3106			7114	

ATORN® 90° shoulder milling cutter



20-302

- **For milling inserts, type AD..X 17..**
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





D mm	L mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
40	36	16	4	16.5	3.5	A1	B1	**264014** 0040	230,–
50	40	22	5	16.5	3.5	A1	B1	264014 0050	280,–
63	40	22	6	16.5	3.5	A1	B1	264014 0063	330,–
80	50	27	8	16.5	3.5	A1	B1	264014 0080	425,–
100	50	32	9	16.5	3.5	A1	B1	264014 0100	569,–
								2127	

Spare parts

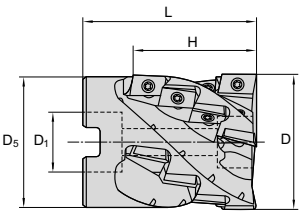
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9905	7,–	B1	703053 0150	3,35
	3106			7114	

ATORN® 90° roughing spiral flute milling cutter




20-302

- **For milling inserts, type AD..X 17..**
- Just one insert type for both face and side cutting edges
- Easy cutting action due to the positive cutting edge geometry
- Tools deliver smooth milling performance due to irregular pitch
- Precise 90° shoulder milling
- **Internal coolant supply**
- Precision-sintered milling inserts (ADKX)
- Precision-ground milling inserts (ADHX) for maximum accuracy





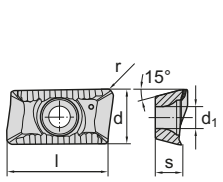
D mm	D5 mm	L mm	D1 mm	Z	H mm	Tightening torque max. N·m			art.no.	€
63	58	70	27	12	48	3.5	A1	B1	**264013** 0063	749,–
80	63	85	32	20	63	3.5	A1	B1	264013 0080	1.029,–
									2127	

Spare parts

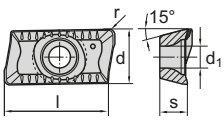
	Screw			TORX	
	art.no.	€		art.no.	€
A1	264000 9905	7,–	B1	703053 0150	3,35
	3106			7114	

ATORN® AD..X 17.. milling inserts

ISO designation	R mm	ISO K N HC4410			ISO N HW4410		
			art.no.	€		art.no.	€
ADHX 170508FR-ALC	0.8	10	**282007** 1006	13,90	10	**282007** 1007	12,80
ADHX 170512FR-ALC	1.2	10	282007 2006	13,90	10	282007 2007	12,80
ADHX 170516FR-ALC	1.6	10	282007 3006	13,90	10	282007 3007	12,80
			2131			2131	









ISO designation	R mm	ISO P M S HC4640			ISO P K HC4430			ISO M HC4540 dry milling			ISO M HC4544 wet milling			ISO P K N HC4410		
			art.no.	€		art.no.	€		art.no.	€		art.no.	€		art.no.	€
ADKX 170508SR-TR	0.8	10	**282008** 1001	10,85	10	**282008** 1002	10,85							10	**282008** 1006	10,85
ADKX 170512SR-TR	1.2	10	282008 2001	10,85	10	282008 2002	10,85	10	**282008** 2003	10,85	10	**282008** 2004	10,85	10	282008 2006	10,85
ADKX 170516SR-TR	1.6	10	282008 3001	10,85	10	282008 3002	10,85	10	282008 3003	10,85	10	282008 3004	10,85	10	282008 3006	10,85
ADKX 170520SR-TR	2.0	10	282008 4001	10,85	10	282008 4002	10,85	10	282008 4003	10,85	10	282008 4004	10,85	10	282008 4006	10,85
			2131			2131			2131			2131			2131	

ATORN® High feed-rate screw-in milling cutter

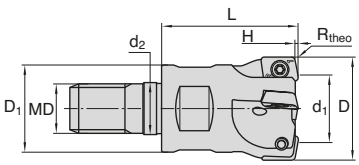



20-300



- **For milling inserts XDM.. 09**
- 2-edged, small, extremely robust indexable insert
- Positive geometry for easy cutting
- **High material removal rate, even with less powerful machining centres**
- Long service life thanks to nickel-plated design
- **High feed rates achievable**
- Uniform size of indexable cutting inserts





D mm	D1 mm	d1 mm	d2 mm	L mm	MD	Z	Tightening torque max. N·m	H mm	ERtheor. mm			art.no.	€
16	13	7	8.5	28	M8	2	1.2	1	1.3	A1	B1	**286001** 2016	191,–
16	13	7	8.5	28	M8	3	1.2	1	1.3	A1	B1	286001 3016	200,–
20	18	11	10.5	30	M10	3	1.2	1	1.3	A2	B1	286001 3020	200,–
20	18	11	10.5	30	M10	4	1.2	1	1.3	A2	B1	286001 4020	210,–
25	21	16	12.5	33	M12	4	1.2	1	1.3	A2	B1	286001 4025	210,–
32	29	23	17	43	M16	5	1.2	1	1.3	A2	B1	286001 5032	265,–
35	29	26	17	43	M16	5	1.2	1	1.3	A2	B1	286001 5035	265,–
42	29	33	17	43	M16	6	1.2	1	1.3	A2	B1	286001 6042	320,–
												2125	

Spare parts

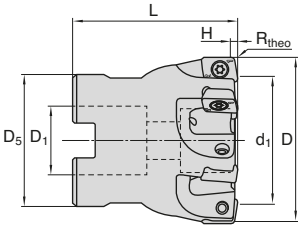
	Screw			TORX	
	art.no.	€		art.no.	€
A1	286900 9901	3,10	B1	703053 0080	3,15
A2	286900 9902	4,10			
	3106			7114	

ATORN® High feed-rate shell-type milling cutter

20-306

- **For milling inserts XDM.. 09**
- 2-edged, small, extremely robust indexable insert
- Positive geometry for easy cutting
- **High material removal rate, even with less powerful machining centres**
- Long service life thanks to nickel-plated design
- **High feed rates achievable**
- Uniform size of indexable cutting inserts





D mm	L mm	D5 mm	D1 mm	H mm	d1 mm	Z	Tightening torque max. N-m	ERtheor. mm			art.no.	€
35	40	32	16	1	26	5	1.2	1.3	A1	B1	**286002** 5035	285,–
35	40	32	16	1	26	6	1.2	1.3	A1	B1	286002 6035	310,–
40	40	32	16	1	31	6	1.2	1.3	A1	B1	286002 6040	320,–
42	40	32	16	1	33	6	1.2	1.3	A1	B1	286002 6042	345,–
50	40	40	22	1	41	7	1.2	1.3	A1	B1	286002 7050	365,–
52	40	40	22	1	43	7	1.2	1.3	A1	B1	286002 7052	385,–
63	50	50	27	1	54	8	1.2	1.3	A1	B1	286002 8063	400,–
66	50	50	27	1	57	8	1.2	1.3	A1	B1	286002 8066	400,–
80	50	50	27	1	71	9	1.2	1.3	A1	B1	286002 9080	445,–

2125

Spare parts

Screw	art.no.	€
A1	286900 9902	4,10

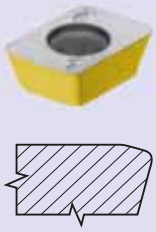
3106

TORX	art.no.	€
B1	703053 0080	3,15

7114

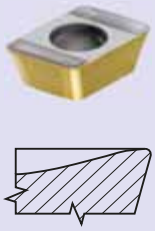
XDM.. chip shape levels 0903

INFO



XDMW
- Stable indexable cutting insert geometry for cutting high-strength tempered and tool steels
- Negative protective chamfer with cutting edge rounding

SR chip shape levels



XDMT
- Soft-cutting indexable cutting insert geometry for reduced cutting forces
- Use in unstable setups
- Particularly suitable for tool machines with low drive output

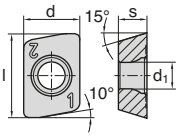
ER chip shape levels

ATORN® Milling inserts XDM.. 0903

- **XDMW** stable indexable cutting insert geometry for cutting high-strength tempered and tool steels, negative protection chamfer with rounded cutting edges
- **XDMT** easy-cutting indexable cutting insert geometry for reduced cutting forces. Particularly suitable for machine tools with low drive output. Use in unstable setups.
- **HC4640** ideal for high feed rates, tough carbide substrate with double PVD coating and outstanding suitability for roughing, with additional TiN layer around circumference for improved wear detection
- **HC4410** wear-resistant superfine grain substrate for high machining capacity, universally suitable for high cutting speeds in steel at reduced feed rates.
- **HC4544** special superfine grain substrate for high machining capacity incl. stainless steel materials

ISO designation	R mm		ISO P K H HC4410 art.no.	€		ISO P M HC4640 art.no.	€
XDMW 0903SR	1.3	10	**286100** 0110	10,35	10	**286100** 0140	10,35

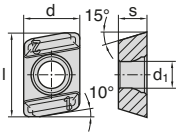
2126 2126





ISO designation	R mm		ISO P K H HC4410 art.no.	€		ISO P M HC4640 art.no.	€
XDMT 0903ER	1.3	10	**286101** 0110	10,35	10	**286101** 0140	10,35

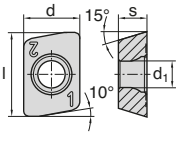
2126 2126





ISO designation	R mm		ISO M HC4544 art.no.	€
XDMW 090316SR	1.6	10	**286102** 0144	11,95

2126





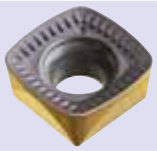
ATORN® High feed-rate milling cutter

INFO

- Roughing of smooth surfaces and cavities with high feed rates
- Machining of cavities by linear and circular interpolation
- Plunge milling even in unstable conditions
- Use of the same CAD/CAM programs as for milling with circular indexable inserts
- Can be used on traditional and modern high-performance machines
- High material removal rates and cost-effective machining of moulds, dies and other components
- Efficient machining even on low-performance machines
- Heat dissipation through the chips, so that heat-sensitive workpieces can be machined

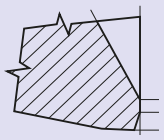


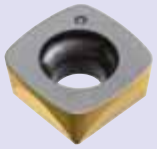
Chip breaker



XCNT
- Universal geometry for a wide range of applications
- Wide negative protective chamfer for increased cutting edge stability
- Ideal for use on high-performance machines

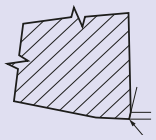
-SN-TR

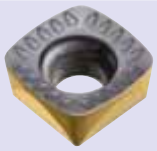




XCNW
- Stable geometry for cutting high-strength tempered and tool steels
- Negative protective chamfer with cutting edge rounding

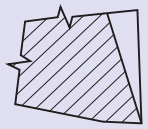
-SN





XCNT
- Soft-cutting geometry for reduced cutting forces
- Used with stainless steel and long-chipping materials
- Particularly suitable for machine tools with low drive output

-EN-TR



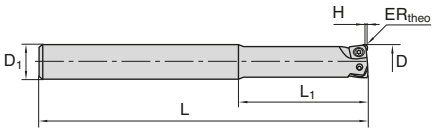
ATORN® High feed-rate end milling cutter




20-301



- **for milling inserts, type XCN.. 07**
- 4-cutting-edge, extremely robust indexable inserts
- Deep cutting troughs with cutting surface topography
- **Irregular pitch for low-vibration milling even for high exposed lengths**
- Long service life thanks to nickel-plated design
- **Wide range of applications**



D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N·m	ERtheor. mm			art.no.	€
20	20	1	60	175	2	2.25	1.5	A1	B1	**285001** 0020	285,–
25	25	1	75	190	3	2.25	1.5	A1	B1	285001 0025	335,–
32	32	1	80	210	4	2.25	1.5	A1	B1	285001 0033	380,–

2125

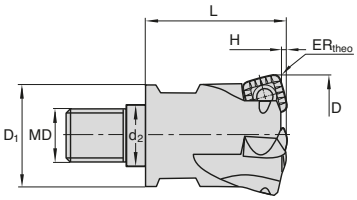
Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	285000 9901	4,07	B1	703053 0080	3,15
	3106			7114	

ATORN® High feed-rate screw-in milling cutter




20-301





- **for milling inserts, type XCN.. 07**
- 4-cutting-edge, extremely robust indexable inserts
- Deep cutting troughs with cutting surface topography
- **Irregular pitch for low-vibration milling even for high exposed lengths**
- Long service life thanks to nickel-plated design
- **Wide range of applications**

D mm	D1 mm	L mm	MD	H mm	Z	Tightening torque max. N·m	ERtheor. mm			art.no.	€
20	18	30	M10	1.0	2	2.25	1.5	A1	B1	**285003** 0020	270,–
25	21	33	M12	1.0	3	2.25	1.5	A1	B1	285003 0025	315,–
32	29	43	M16	1.0	4	2.25	1.5	A1	B1	285003 0033	385,–
35	29	43	M16	1.0	5	2.25	1.5	A1	B1	285003 0035	410,–

2125

Spare parts

	Screw art.no.	€		TORX art.no.	€
A1	285000 9901	4,07	B1	703053 0080	3,15
	3106			7114	

ATORN® XCN..07 milling inserts

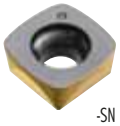
- **HC4640** ideal for high feed rates, tough carbide substrate with double PVD coating and outstanding suitability for roughing; with additional TiN layer around circumference for improved wear detection
- **HC4410** wear-resistant superfine grain substrate for high machining capacity, universally suitable for high cutting speeds in steel at reduced feed rates.

ISO designation	R mm	ISO P K N S HC4410			ISO P M K HC4640			ISO P M K HC4640		
			art.no.	€		art.no.	€		art.no.	€
XCNT 070308 EN-TR	0.8							10	**285101** 0140	15,90
XCNT 070308 SN-TR	0.8	10	**285100** 0110	15,90	10	**285100** 0140	16,70			
			2126			2126			2126	


-EN-TR


-SN-TR

ISO designation	R mm	ISO P K N S HC4410			ISO P M K HC4640		
			art.no.	€		art.no.	€
XCNW 070308 SN	0.8	10	**285102** 0110	15,30	10	**285102** 0140	17,10
			2126			2126	

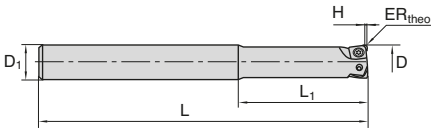

-SN

ATORN® High feed-rate end milling cutter

20-301

- **for milling inserts, type XCN.. 09**
- 4-cutting-edge, extremely robust indexable inserts
- Deep cutting troughs with cutting surface topography
- **Irregular pitch for low-vibration milling even for high exposed lengths**
- Long service life thanks to nickel-plated design
- **Wide range of applications**







D mm	D1 mm	H mm	L1 mm	L mm	Z	Tightening torque max. N-m	ERtheor. mm	A1	B1	art.no.	€
32	32	1.2	80	210	3	3.5	2.5	A1	B1	**285002** 0032	355,–
32	32	1.2	80	210	4	3.5	2.5	A1	B1	285002 0033	380,–
										2125	

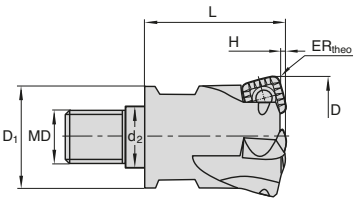
Spare parts

	Screw art.no.	€		Wrench art.no.	€
A1	285000 9902	4,07	B1	705141 0015	5,75
	3106			7114	

ATORN® High feed-rate screw-in milling cutter

20-301

- **for milling inserts, type XCN.. 09**
- 4-cutting-edge, extremely robust indexable inserts
- Deep cutting troughs with cutting surface topography
- **Irregular pitch for low-vibration milling even for high exposed lengths**
- Long service life thanks to nickel-plated design
- **Wide range of applications**





D mm	D1 mm	L mm	MD	Z	Tightening torque max. N-m	ERtheor. mm	H mm	A1	B1	art.no.	€
32	29	43	M16	3	3.5	2.5	1,2	A1	B1	**285004** 0032	365,–
32	29	43	M16	4	3.5	2.5	1,2	A1	B1	285004 0033	320,–
35	29	43	M16	4	3.5	2.5	1,2	A1	B1	285004 0035	410,–
42	29	43	M16	5	3.5	2.5	1,2	A1	B1	285004 0043	445,–
										2125	

Spare parts

	Screw art.no.	€		Wrench art.no.	€
A1	285000 9902	4,07	B1	705141 0015	5,75
	3106			7114	

ATORN® High feed-rate shell-type milling cutter

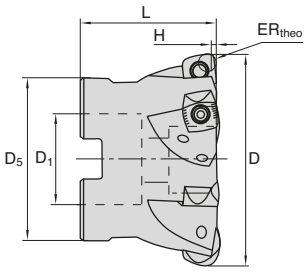


20-301

- **for milling inserts, type XCN.. 09**
- 4-cutting-edge, extremely robust indexable inserts
- Deep cutting troughs with cutting surface topography
- **Irregular pitch for low-vibration milling even for high exposed lengths**
- Long service life thanks to nickel-plated design
- **Wide range of applications**







D mm	L mm	D5 mm	D1 mm	H mm	Z	Tightening torque max. N·m	ERtheor. mm			art.no.	€
42	40	32	16	1.2	4	3.5	2.5	A1	B1	**285005** 0043	450,–
42	40	32	16	1.2	5	3.5	2.5	A1	B1	285005 0044	480,–
52	40	40	22	1.2	5	3.5	2.5	A1	B1	285005 0053	485,–
52	40	40	22	1.2	6	3.5	2.5	A1	B1	285005 0054	519,–
										2125	

Spare parts

	Screw art.no.	€		Wrench art.no.	€
A1	285000 9903	3,61	B1	705141 0015	5,75
	3106			7114	

ATORN® XCN..09 milling inserts

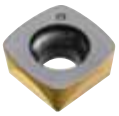
- **HC4640** ideal for high feed rates, tough carbide substrate with double PVD coating and outstanding suitability for roughing; with additional TiN layer around circumference for improved wear detection
- **HC4410** wear-resistant superfine grain substrate for high machining capacity, universally suitable for high cutting speeds in steel at reduced feed rates.

ISO designation	R mm	ISO PKNS HC4410			ISO PMK HC4640			ISO PMK HC4640		
			art.no.	€		art.no.	€		art.no.	€
XCNT 09T312 EN-TR	1.2							10	**285101** 0240	16,90
XCNT 09T312 SN-TR	1.2	10	**285100** 0210	17,10	10	**285100** 0240	17,70			
			2126			2126			2126	

ISO designation	R mm	ISO PKNS HC4410			ISO PMK HC4640		
			art.no.	€		art.no.	€
XCNW 09T312 SN	1.2	10	**285102** 0210	17,50	10	**285102** 0240	18,10
			2126			2126	


-EN-TR


-SN-TR

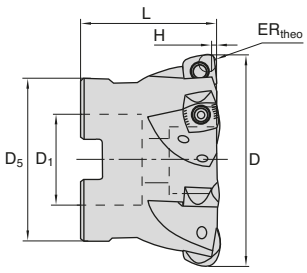

-SN

ATORN® High feed-rate shell-type milling cutter



20-301

- **for milling inserts, type XCN.. 12**
- 4-cutting-edge, extremely robust indexable inserts
- Deep cutting troughs with cutting surface topography
- **Irregular pitch for low-vibration milling even for high exposed lengths**
- Long service life thanks to nickel-plated design
- **Wide range of applications**





D mm	L mm	D5 mm	D1 mm	H mm	Z	Tightening torque max. N·m	ERtheor. mm			art.no.	€
42	40	32	16	1.5	3	7.6	3.5	A1	B1	**285006** 0042	420,–
42	40	32	16	1.5	4	7.6	3.5	A1	B1	285006 0043	440,–
52	40	40	22	1.5	4	7.6	3.5	A1	B1	285006 0052	450,–
52	40	40	22	1.5	5	7.6	3.5	A1	B1	285006 0053	475,–
66	50	50	27	1.5	5	7.6	3.5	A1	B1	285006 0066	470,–
66	50	50	27	1.5	6	7.6	3.5	A1	B1	285006 0067	509,–
66	50	50	27	1.5	7	7.6	3.5	A1	B1	285006 0068	539,–
80	50	60	27	1.5	6	7.6	3.5	A1	B1	285006 0080	529,–
80	50	60	27	1.5	8	7.6	3.5	A1	B1	285006 0081	589,–
100	50	65	32	1.5	7	7.6	3.5	A1	B1	285006 0100	549,–
100	50	65	32	1.5	10	7.6	3.5	A1	B1	285006 0101	689,–
										2125	

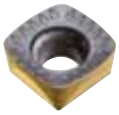
Spare parts

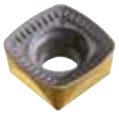
	Screw art.no.	€		Wrench art.no.	€
A1	285000 9904	4,64	B1	705141 0020	5,95
	3106			7114	

ATORN® XCN..12 milling inserts

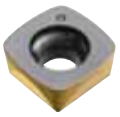
- **HC4640** ideal for high feed rates, tough carbide substrate with double PVD coating and outstanding suitability for roughing; with additional TiN layer around circumference for improved wear detection
- **HC4410** wear-resistant superfine grain substrate for high machining capacity, universally suitable for high cutting speeds in steel at reduced feed rates.

ISO designation	R mm	ISO P K N S HC4410			ISO P M K HC4640			ISO P M K HC4640		
			art.no.	€		art.no.	€		art.no.	€
XCNT 120520 EN-TR	2.0							10	**285101** 0340	17,70
XCNT 120520 SN-TR	2.0	10	**285100** 0310	17,70	10	**285100** 0340	18,80			
			2126			2126			2126	


-EN-TR


-SN-TR

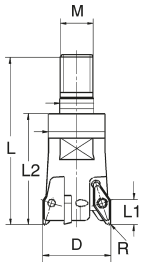
ISO designation	R mm	ISO P K N S HC4410			ISO P M K HC4640		
			art.no.	€		art.no.	€
XCNW 120520 SN	2.0	10	**285102** 0310	17,10	10	**285102** 0340	18,80
			2126			2126	


-SN

ATORN® 90° indexable insert milling cutter for non-ferrous metals and plastics

Z 2 | Z 3 | Z 4 | Z 5 | HPC | Vc/fz 20-302

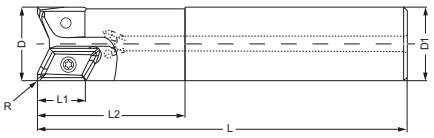
- **For excavation and plunge milling without pilot holes**





Screw-in milling cutter

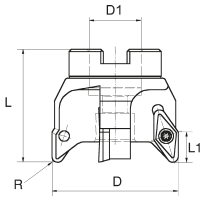
D mm	R mm	L1 mm	L2 mm	Z	d1 mm	Tightening torque max. N·m	Thread	suitable indexable inserts			art.no.	€
25	1.2	13.5	40	2	21	5.2	M12	VPGT 160412-ALM	A1	B1	**260400** 2540	245,–
32	3.0	15	50	2	29	10	M16	VCGT 220530-ALM	A2	B2	260400 3250	280,–
42	3.0	15	50	3	29	10	M16	VCGT 220530-ALM	A2	B2	260400 4250	330,–
											2125	





End milling cutters

D mm	R mm	L1 mm	L2 mm	D1 mm	L mm	Z	Tightening torque max. N·m	suitable indexable inserts			art.no.	€
25	1.2	13.5	40	20	200	2	5.2	VPGT 160412-ALM	A1	B1	**260402** 5200	245,–
32	3.0	15	50	25	220	2	10	VCGT 220530-ALM	A2	B2	260403 2220	280,–
											2125	





Shell-type milling cutter

D mm	R mm	L1 mm	L mm	D1 mm	Z	Tightening torque max. N·m	suitable indexable inserts			art.no.	€
42	3.0	15	55	16	3	10	VCGT 220530-ALM	A2	B2	**260400** 4255	330,–
52	3.0	15	55	22	3	10	VCGT 220530-ALM	A2	B2	260400 5255	365,–
66	3.0	15	60	27	4	10	VCGT 220530-ALM	A2	B2	260400 6660	405,–
80	3.0	15	60	27	4	10	VCGT 220530-ALM	A2	B2	260400 8060	440,–
100	3.0	15	65	32	5	10	VCGT 220530-ALM	A2	B2	260401 0065	509,–
										2125	

Spare parts

	Screw			TORX wrench	
	art.no.	€		art.no.	€
A1	260400 0040	4,50	B1	703040 0080	4,41
A2	260400 0050	5,10	B2	703040 0150	4,78
	2125			7111	

VCGT/VPGT ISO milling inserts

ISO designation	R mm	ISO N Uncoated HW4410			ISO N Coated HC4410		
			art.no.	€		art.no.	€
VPGT 160412-ALM	1.2	10	**270104** 0161	14,85			
VCGT 160412-ALM	3.0				10	**270104** 1661	15,70
VCGT 220530-ALM	3.0	10	270104 1221	19,80	10	270104 0221	20,20
			2126			2126	


HC44210


HW4410

SARA®MILL Groove and corner milling cutter, high-rate milling cutter

INFO

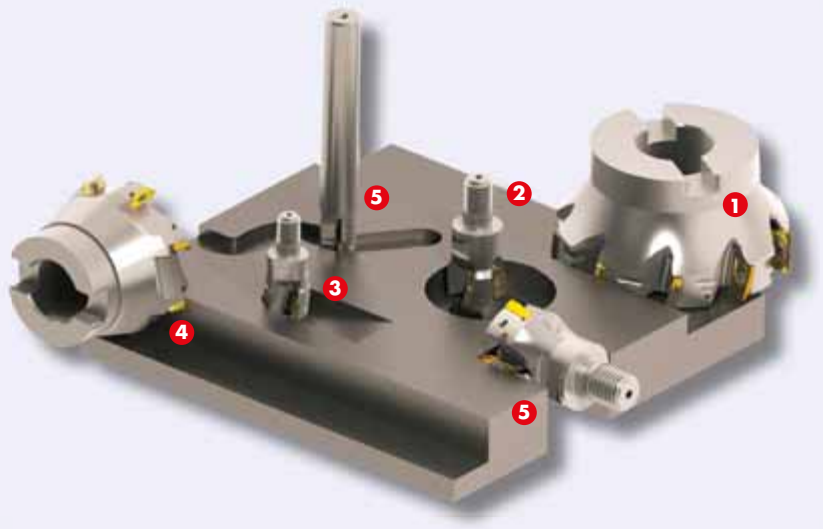
High-performance metal cutting of all materials

SARA®MILL High-Performance S and M is the complete range in corner and groove milling cutters for universal applications: Roughing and finishing of steel, aluminium, graphite, plastic and hardened materials, as well as stainless steel machining. Highly suitable for face, groove, side and pocket milling, as well as for diagonal and circular plunge milling.
Version with screw-in milling cutter, end milling cutter with Weldon surface and shell-type milling cutter. The screw-in tools are suitable for finishing at depth in conjunction with a carbide extension. Highly precision-made supports guarantee an exceptional milling result.
Thanks to the optimum coolant supply to the cutting edge, no chips stick to the cutting surface. This allows reliable milling of even the toughest materials.

Small in size, big in performance, the tools are characterised by exceptionally easy cutting.
The tools are multifunctional, with a full range of indexable cutting inserts for all applications.
With specially-developed cutting inserts, the tools are even suitable as high-feed milling cutters for the high-feed hard machining of all materials up to 60+2 HRc.
The adapted cutting surface geometry of this cutting material also guarantees an extremely long service life and equally smooth operation.
The **SARA®MILL High-Performance S and M** range offers the right tool and indexable insert combination for every machining method.



Suitable for corner and groove milling, and for high-feed milling with various cutting inserts

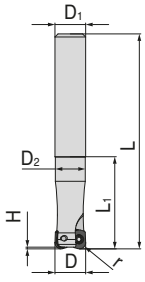


1. **Face milling**
2. **Circular plunge milling**
3. **Diagonal plunge milling**
4. **Side milling**
5. **Groove milling**

SARA®MILL S 90° end milling cutter

20-306

- **Corner and groove milling cutter**
- Universal applications: Roughing and finishing of steel, aluminium, graphite, plastics, hardened materials, cast iron and stainless steel/high temperature-resistant materials
- Optimised supply of coolant to the cutting edges
- **High feed-rate machining**
- Real corner radius for close-contour working
- High-feed hard machining of materials up to 62+2 HRc
- Maximum substrate stability thanks to negative axial angle
- Special cutting insert surface finish for aluminium processing
- Innovative coatings and carbide metals for maximum service life
- Integrated simple chamfer produces outstanding surface qualities





D mm	D1 mm	H mm	L1 mm	L mm	D2 mm	r mm	Z	Tightening torque max. N-m			art.no.	€
10	10	0.7	30	70	9.75	0.8	2	0.5	A1	B1	**260302** 1002	136,–
12	12	0.7	36	61	11.5	0.8	3	0.5	A1	B1	260302 1203	174,–
16	16	0.7	48	96	15.5	0.8	4	0.5	A1	B1	260302 1604	200,–

2163

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	260300 9003	3,20	B1	703054 0060	4,30
	2165			7114	

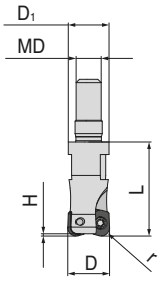
SARA® MILL Type S 90° screw-in milling cutter




20-306



- **Corner and groove milling cutter**
- Universal applications: Roughing and finishing of steel, aluminium, graphite, plastics, hardened materials, cast iron and stainless steel/high temperature-resistant materials
- Optimised supply of coolant to the cutting edges
- **High feed-rate machining**
- Real corner radius for close-contour working
- High-feed hard machining of materials up to 62+2 HRc
- Maximum substrate stability thanks to negative axial angle
- Special cutting insert surface finish for aluminium processing
- Innovative coatings and carbide metals for maximum service life
- Integrated simple chamfer produces outstanding surface qualities





D mm	D1 mm	L mm	MD	H mm	r mm	Z	Tightening torque max. N·m			art.no.	€
10	9.75	22.5	M6	0.7	0.8	2	0.5	A1	B1	**260301** 1002	136,–
12	11.5	22.5	M6	0.7	0.8	3	0.5	A1	B1	260301 1203	174,–
16	13.8	27.5	M8	0.7	0.8	4	0.5	A1	B1	260301 1604	200,–
20	18	27.5	M10	0.7	0.8	5	0.5	A1	B1	260301 2005	246,–
25	21	32	M12	0.7	0.8	5	0.5	A1	B1	260301 2505	271,–
32	29	32	M16	0.7	0.8	7	0.5	A1	B1	260301 3207	362,–
										2163	

Spare parts

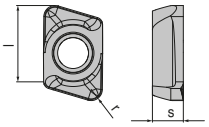
Screw			TORX		
	art.no.	€		art.no.	€
A1	260300 9003	3,20	B1	703054 0060	4,30
	2165			7114	

SARA® MILL Milling inserts XCH.. 0622



Corner milling inserts

ISO designation	s mm	l mm	R mm	ISO P M K S H SP05YM			ISO N SD05NM		
					art.no.	€		art.no.	€
XCHT 062208 SR	2.2	6.2	0.8	10	**261001** 0840	20,–	10	**261001** 0844	40,–
					2164			2164	

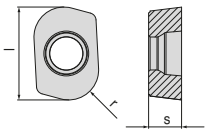




Diamant

High feed-rate insert XCHW

ISO designation	s mm	l mm	R mm	ISO P K H SP05YM			ISO N SD05NM			ISO P K H SP05PKM		
					art.no.	€		art.no.	€		art.no.	€
XCHW 062220 EN	2.2	6.2	2	10	**261012** 2040	15,20	10	**261012** 2044	35,10	10	**261012** 2041	15,20
					2164			2164			2164	

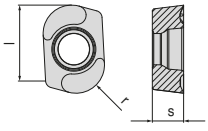




Diamant

High feed-rate insert XCHT

ISO designation	s mm	l mm	R mm	ISO N SW10NM			ISO M N SP10MNM			ISO M S SP40MSM		
					art.no.	€		art.no.	€		art.no.	€
XCHT 062220 EN	2.2	6.2	2							10	**261013** 2051	15,20
XCHT 062220 FN	2.2	6.2	2	10	**261013** 2060	15,80	10	**261013** 2061	16,80			
					2164			2164			2164	





Solid carbide extension



SARA®



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SARA® MILL Type M 90° end milling cutter

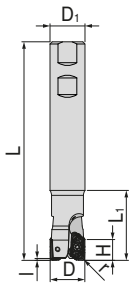



20-308



- **Corner and groove milling cutter**
- Universal applications: Roughing and finishing of steel, aluminium, graphite, plastics, hardened materials, cast iron and stainless steel/ high temperature-resistant materials
- Optimised supply of coolant to the cutting edges
- Integrated simple chamfer produces outstanding surface qualities





Version up to r 2.0

D mm	D1 mm	L mm	L1 mm	H mm	l mm	Z	r mm	Tightening torque max. N-m			art.no.	€
16	16	165	32	10	2.5	2	0.4-2	1.0	A1	B1	**260305** 1602	168,–
20	20	165	40	10	2.5	3	0.4-2	1.0	A1	B1	260305 2002	214,–
25	25	225	50	10	2.5	3	0.4-2	1.0	A1	B1	260305 2503	227,–
25	25	225	50	10	2.5	4	0.4-2	1.0	A1	B1	260305 2504	227,–

2163

Version > r 2.0

D mm	D1 mm	L mm	L1 mm	H mm	l mm	r mm	Tightening torque max. N-m	Z			art.no.	€
16	16	165	32	10	2.5	3-4	1.0	2	A1	B1	**260306** 1602	168,–
20	20	165	40	10	2.5	3-4	1.0	3	A1	B1	260306 2002	214,–
25	25	225	50	10	2.5	3-4	1.0	3	A1	B1	260306 2503	227,–
25	25	225	50	10	2.5	3-4	1.0	4	A1	B1	260306 2504	227,–

2163

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	260300 9006	5,70	B1	703054 0080	4,30
	2165			7114	

SARA® MILL Type M 90° screw-in milling cutter

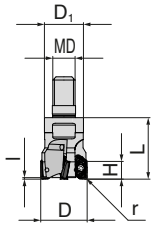



20-308



- **Corner and groove milling cutter**
- Universal applications: Roughing and finishing of steel, aluminium, graphite, plastics, hardened materials, cast iron and stainless steel/high temperature-resistant materials
- Optimised supply of coolant to the cutting edges
- Integrated simple chamfer produces outstanding surface qualities





Version up to r 2.0

D mm	D1 mm	H mm	MD	L mm	l mm	r mm	Z	Tightening torque max. N-m			art.no.	€
16	13.8	10	M8	29	2.5	0.4-2	2	1.0	A1	B1	**260303** 1602	161,–
20	18	10	M10	29	2.5	0.4-2	2	1.0	A1	B1	260303 2002	198,–
20	18	10	M10	29	2.5	0.4-2	3	1.0	A1	B1	260303 2003	198,–
25	21	10	M12	33	2.5	0.4-2	3	1.0	A1	B1	260303 2503	218,–
25	21	10	M12	33	2.5	0.4-2	4	1.0	A1	B1	260303 2504	218,–
32	29	10	M16	43	2.5	0.4-2	4	1.0	A2	B1	260303 3204	244,–
32	29	10	M16	43	2.5	0.4-2	5	1.0	A2	B1	260303 3205	244,–
42	29	10	M16	43	2.5	0.4-2	5	1.0	A2	B1	260303 4205	285,–

2163

Version > r 2.0

D mm	D1 mm	H mm	MD	L mm	l mm	r mm	Z	Tightening torque max. N-m			art.no.	€
16	13.8	10	M8	29	2.5	3-4	2	1.0	A1	B1	**260304** 1602	161,–
20	18	10	M10	29	2.5	3-4	2	1.0	A1	B1	260304 2002	198,–
20	18	10	M10	29	2.5	3-4	3	1.0	A1	B1	260304 2003	198,–
25	21	10	M12	33	2.5	3-4	3	1.0	A1	B1	260304 2503	218,–
25	21	10	M12	33	2.5	3-4	4	1.0	A1	B1	260304 2504	218,–
32	29	10	M16	43	2.5	3-4	4	1.0	A2	B1	260304 3204	244,–
32	29	10	M16	43	2.5	3-4	5	1.0	A2	B1	260304 3205	244,–
42	29	10	M16	43	2.5	3-4	5	1.0	A2	B1	260304 4205	285,–

2163

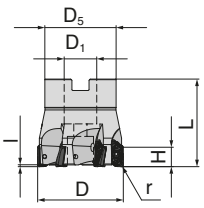
Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	260300 9006	5,70	B1	703054 0080	4,30
A2	260300 9007	6,30			
	2165			7114	

SARA MILL Type M 90° shell-type milling cutter

20-308

- **Corner and groove milling cutter**
- Universal applications: Roughing and finishing of steel, aluminium, graphite, plastics, hardened materials, cast iron and stainless steel/high temperature-resistant materials
- Optimised supply of coolant to the cutting edges
- Integrated simple chamfer produces outstanding surface qualities





20

Version up to r 2.0

D mm	L mm	D5 mm	D1 mm	H mm	l mm	r mm	Z	Tightening torque max. N·m			art.no.	€
42	43	35	16	10	2.5	0.4-2	5	1.0	A1	B1	**260307** 4205	285,–
52	53	40	22	10	2.5	0.4-2	6	1.0	A1	B1	260307 5206	319,–

2163

Version > r 2.0

D mm	L mm	D5 mm	D1 mm	H mm	l mm	r mm	Z	Tightening torque max. N·m			art.no.	€
35	43	35	16	10	2.5	3-4	5	1.0	A1	B1	**260308** 4205	285,–
40	53	40	22	10	2.5	3-4	6	1.0	A1	B1	260308 5206	319,–

2163

Spare parts

	Screw art.no.	€
A1	260300 9007	6,30

2165

	TORX art.no.	€
B1	703054 0080	4,30

7114

SARA MILL Milling inserts XD..T

XDHT corner milling insert

ISO designation	s mm	l mm	R mm	ISO P M K S SP40PKM			ISO N S H SP10MNM		
					art.no.	€		art.no.	€
XDHT 10T310 ER	3.58	10	1.0	10	**261002** 1022	16,70	10	**261002** 1031	19,70

2164 2164

XDHT aluminium corner milling insert

ISO designation	s mm	l mm	R mm	ISO N SW10NM			ISO N SD10NM			ISO N SKD10NM		
					art.no.	€		art.no.	€		art.no.	€
XDHT 10T304 FR	3.58	10	0.4	10	**261002** 0460	30,10						
XDHT 10T308 FR	3.58	10	0.8	10	261002 0860	30,10						
XDHT 10T310 ER	3.58	10	1.0	10	261002 1060	17,70	10	**261002** 1062	51,–	10	**261002** 1080	112,–
XDHT 10T320 FR	3.58	10	2.0	10	261002 2060	17,70						
XDHT 10T330 FR	3.58	10	3.0	10	261002 3060	17,70						
XDHT 10T340 FR	3.58	10	4.0	10	261002 4060	17,70						

2164 2164 2164

Diamant PKD

XDMT corner milling insert

ISO designation	s mm	l mm	R mm	ISO P M K S SP40PKM			ISO P K H SP05UM			ISO P M S SP40MSM			ISO M S SP35MSM		
					art.no.	€		art.no.	€		art.no.	€		art.no.	€
XDMT 10T308 ER	3.58	10	0.8	10	**261003** 0822	12,40	10	**261003** 0842	13,–	10	**261003** 0851	13,60	10	**261003** 0850	14,90
XDMT 10T310 ER	3.58	10	1.0	10	261003 1022	12,40	10	261003 1042	13,–	10	261003 1051	13,60			
XDMT 10T320 ER	3.58	10	2.0							10	261003 2051	13,60			
XDMT 10T330 ER	3.58	10	3.0							10	261003 3051	13,60			
XDMT 10T340 ER	3.58	10	4.0							10	261003 4051	13,60			

2164 2164 2164 2164

XDEW high feed-rate insert

ISO designation	s mm	l mm	R mm	ISO P K H SP05YM			ISO P K H SP05PKM		
					art.no.	€		art.no.	€
XDEW 10T3 SR	3.58	10	1.4	10	**261014** 1440	14,70	10	**261014** 1441	14,70

2164 2164

XDMT ER high feed-rate insert

ISO designation	s mm	l mm	R mm	ISO M S SP35MSM			ISO P M S SP40MSM		
					art.no.	€		art.no.	€
XDMT 10T3 ER	3.58	10	1.4	10	**261015** 1450	14,90	10	**261015** 1451	13,60

2164 2164

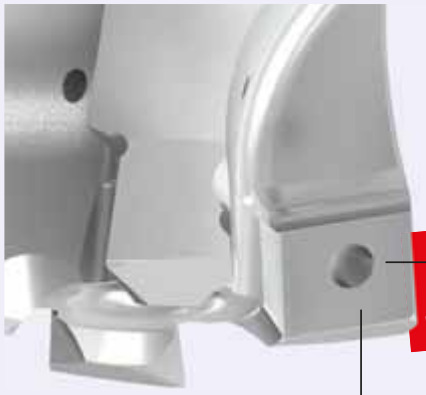
XDMT TR high feed-rate insert

ISO designation	s mm	l mm	R mm	ISO P M K SP40PKM			ISO K H SP10KM		
					art.no.	€		art.no.	€
XDMT 10T3 TR	3.58	10	1.4	10	**261015** 1423	11,40	10	**261015** 1463	11,40

2164 2164

Highest removal rates in high-feed milling and corner/groove milling

The modern and proven high-speed talent has become even more versatile with new cutting materials for corner and groove milling.
With large diameters up to 100 mm, extremely high feed rates with simultaneously enormous cutting depths are now possible for corner and groove milling.
The corner inserts, typically with four cutting edges, can be used on the same tool holders as high-feed inserts. Whether corner and groove milling or high-feed milling: all sheet geometries are in their element when it comes to rough and medium cutting of steel, stainless steel and cast iron, as well as high temperature-resistant compounds.
With high-feed cutting materials, a particular macrogeometry comprising a combination of large radius and face edge cutters ensures universal usage options in 2D, 2½D and 3D machining. The microgeometry with polished cutting surface helps to minimise the temperature in the cutting material, and ensure even chip removal.
In practice users benefit from ultra-efficient machining and maximum utilisation of the machine capacity.



One tool holder for 2 machining methods

Corner and groove milling cutter, 90° setting angle



Inserts with chip breaker
P40, P25 and M40 cutting materials with PVGO and PVST coatings are available for machining steel, stainless steel, cast iron and highly heat-resistant alloys.

High-feed milling cutter



Inserts with chip breaker
P40, P25, K10 and M40 cutting materials with PVGO and PVST coatings are available for machining steel, stainless steel, cast iron and highly heat-resistant alloys.



Inserts without chip breaker
P25 and K10 inserts with PVTi coating are available for machining steel and cast iron.



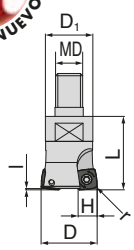
SARA MILL 90° screw-in milling cutter SDM..





20-311

- One milling cutter suitable for use as a corner and groove milling cutter or high feed-rate milling cutter thanks to optional use of cutting inserts of varying geometries
- Four cutting edges per indexable cutting insert for ultra-efficient use
- Maximum removal rates thanks to extreme feed rates and enormous cutting depths
- Excellent surface qualities are achieved even in rough machining during high feed-rate milling with face edge cutter and large radius
- Maximum process reliability in uninterrupted cutting thanks to absolutely secure positioning of the indexable cutting inserts





D mm	D1 mm	H mm	MD	L mm	l mm	r mm	Z	Tightening torque max. N-m				art.no.	€
32	29	13	M16	42	1.5	1	2	3.6	A1	B1	C1	**260309** 3202	275,–
35	29	13	M16	42	1.5	1	3	3.6	A1	B1	C1	260309 3503	295,–
												2163	

Spare parts

	Screw		
	art.no.		€
A1	260300 9012		6,50
	2165		

	Grub screws		
	art.no.		€
B1	260300 9601		30,80
	2165		

	TORX		
	art.no.		€
C1	703054 0150		5,–
	7114		

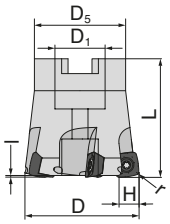
SARA MILL SDM 90° shell-type milling cutter...





20-311

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- Four cutting edges per indexable cutting insert for ultra-efficient use
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- Maximum process reliability in uninterrupted cutting thanks to absolutely secure positioning of the indexable cutting inserts





D mm	L mm	D5 mm	D1 mm	H mm	l mm	r mm	Z	Tightening torque max. N-m					art.no.	€
40	42.5	35	16	13	2.5	1	4	3.6	A1		C1	D1	**260310** 4004	322,–
42	42.5	35	16	13	2.5	1	4	3.6	A1		C1	D1	260310 4204	322,–
50	50	40	22	13	2.5	1	4	3.6	A1			D1	260310 5004	332,–
50	50	40	22	13	2.5	1	5	3.6	A1			D1	260310 5005	345,–
52	50	48	22	13	2.5	1	4	3.6	A1			D1	260310 5204	332,–
63	53	48	27	13	2.5	1	6	3.6	A1			D1	260310 6306	390,–
66	53	48	27	13	2.5	1	6	3.6	A1			D1	260310 6606	390,–
80	53	60	27	13	2.5	1	6	3.6	A1			D1	260310 8006	420,–
100	53	70	32	13	2.5	1	7	3.6	A1	B1		D1	260310 1007	450,–
													2163	

Spare parts

	Screw		
	art.no.		€
A1	260300 9012		6,50
	2165		

	Retaining screw		
	art.no.		€
B1	260300 9401		5,80
	2165		

	Grub screws		
	art.no.		€
C1	260300 9601		30,80
	2165		

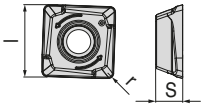
	TORX		
	art.no.		€
D1	703054 0150		5,–
	7114		

SARA MILL Milling inserts SDM..1350



SDMT R 1.0 corner milling insert

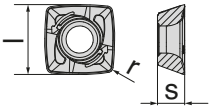
ISO designation	s mm	l mm	R mm	ISO PK SP40PKM art.no.	€	ISO PK SP25PKM art.no.	€	ISO MS SP40MSM art.no.	€
SDMT 135010 EN	5	13	1					10 **261004** 1051	14,50
SDMT 135010 SN	5	13	1	10 **261004** 1022	14,50	10 **261004** 1012	14,50		
				2164		2164		2164	





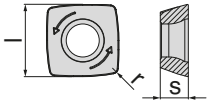
SDMT R 2.0 high feed-rate milling insert

ISO designation	s mm	l mm	R mm	ISO PK SP40PKM art.no.	€	ISO PK SP25PKM art.no.	€	ISO PK SP10MNM art.no.	€	ISO MS SP40MSM art.no.	€
SDMT 135020 SN	5	13	2	10 **261011** 2033	14,50	10 **261011** 2012	14,50	10 **261011** 2064	14,50		
SDMT135020 EN	5	13	2							10 **261011** 2051	14,50
				2164		2164		2164		2164	



SDMW R 2.0 high feed-rate milling insert

ISO designation	s mm	l mm	R mm	ISO PK SC25PKM art.no.	€	ISO PK SP10MNM art.no.	€
SDMW 135020 SN	5	13	2	10 **261010** 2010	14,50	10 **261010** 2061	14,50
				2164		2164	





SARA®MILL Surface milling cutter

INFO

Milling instead of grinding – smooth surfaces and maximum efficiency

The SARA®MILL surface milling cutter is a face-milling cutter that has been specially developed for producing absolutely smooth and level surfaces, with maximum efficiency, and is therefore advanced in the field of grinding.
It can be used to combine several processing steps. An additional grinding process is superfluous.

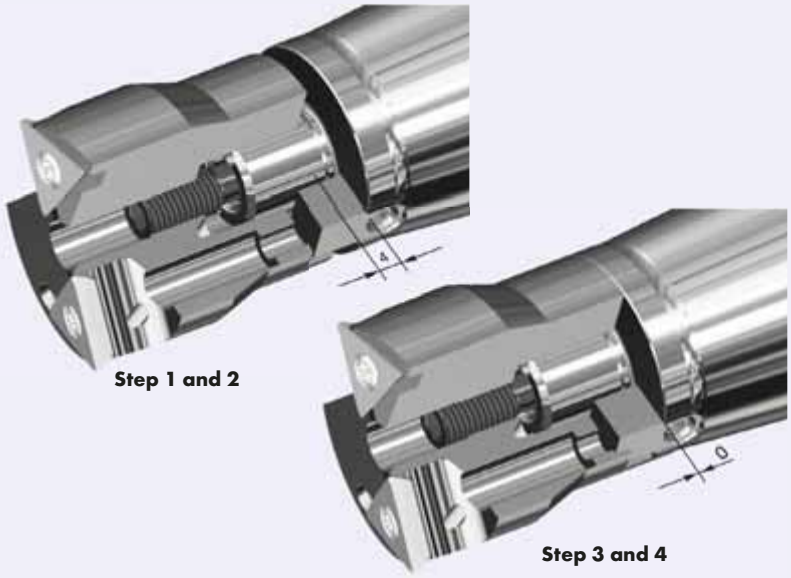
This milling system is designed with only two indexable cutting inserts and features a simple yet effective setting option in the µ range using two axial run-out setting screws. The tool also impresses with its exceptionally smooth operation.

The SARA®MILL surface milling cutter is particularly suitable for unstable components. The concept of working with only two indexable inserts has proven particularly effective for difficult-to-clamp workpieces that are quickly inclined to vibration.
Through successive enhancement of the cutting material, feed rates of up to 10,000 mm/min are achieved.

Grub screw assembly instructions

1. Screw grub screws into the milling body up to the stop.
2. Place milling body on the milling mount, leaving a gap of approx. 4 mm between the workpiece and mount.
3. Evenly screw grub screw into the mount (wr. width 4). Continue to screw in the grub screw until there is no gap between the mount and the milling body.
4. If there is still a gap, the grub screw must be readjusted in the milling body. To do this, loosen the milling body completely from the milling mount, and unscrew the grub screw from the milling tool with approx. ½ rotation. Continue with Step 2.

Maximum tightening torque = 10 Nm



Step 1 and 2

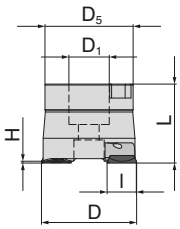
Step 3 and 4

SARA®MILL TEHX 16T3 mirror face milling cutter

20-312

- **For TEHX 16T3 milling inserts**
- Particularly smooth operation
- **Surface qualities of Rz < 2.5 µm**
- Grinding process can be completely omitted
- **Fine adjustment regulates the absolute axial run-out in the µm range**
- Also suitable for unstable components
- Reliable utilisation of all three cutting edges
- **Safety instructions:**
  The axial run-out setting screws in every milling cutter must be tightened to the pre-load during operation. If the screws are not required for fine adjustment, we recommend that you remove the screws from the tool.





D mm	L mm	D5 mm	D1 mm	Z	H mm	l mm	Tightening torque max. N-m	A1	B1	C2	art.no.	€
42	43	35	16	2	1	14.32	2.4	A1	B1	C2	**260328** 4202	304,–
52	43	48	22	2	1	14.32	2.4	A1		C2	260328 5202	366,–
66	53	60	27	2	1	14.32	2.4	A1		C2	260328 6602	427,–
80	53	60	27	2	1	14.32	2.4	A1		C2	260328 8002	490,–
100	53	70	32	2	1	14.32	2.4	A1		C2	260328 1002	551,–

2163

Spare parts

Screw	art.no.	€
A1	260300 9010	4,30
A2	260300 9015	4,80

2165

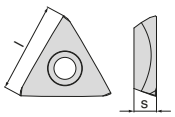
Grub screws	art.no.	€
B1	260300 9601	30,80

2165

Wrench	art.no.	€
C1	705141 0015	5,75
C2	705141 0020	5,95

7114

SARA MILL Milling inserts TEHX 16T3





ISO designation	s mm	l mm	R mm		ISO P M K N S H SP05YM art.no.	€
TEHX 16T3 ZF	4	14.32	-	10	**261012** 0040 2164	18,80

PHOENIX PFB ball-nose cutter and PFR torus cutter

INFO

- **PFB: Radius accuracy ± 6 µm**
- **PFR: Surface tolerance + 0 / - 20 µm, corner radius ± 8 µm**
- **Spiralled, stable and extremely sharp cutting edges**
- **Steel and solid carbide shanks**

Advantages
- Optimum surface finishes with short and long projection lengths
- Vibration reduction

Plain ball cutter PHOENIX PFB

Torus milling cutter PHOENIX PFR



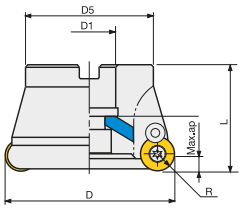
Please contact us for more information, free of charge and without obligation.

ATORN® Copy miller, with internal coolant supply



20-303

- For copy milling, radius cutting and contour milling in die and mould production
- Suitable for diagonal or axial plunge milling thanks to the clearance of the round indexable insert
- **Internal coolant supply**

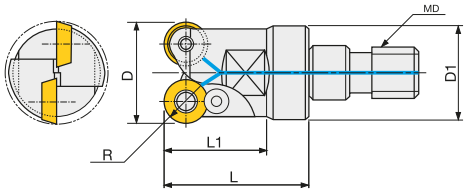




Shell-type milling cutter

D mm	R mm	D5 mm	L mm	D1 mm	ap max. mm	Z	suitable indexable inserts	Tightening torque max. N-m				art.no.	€
42.0	5	32	44	16	2.5	6	RD..1003M0.	2.7	A2	B2	D1	**260611** 4200	210,–
52.0	6	40	50	22	3	5	RD..12T3M0.	2.7	A2	B2	D1	260611 5200	245,–
66.0	6	48	50	27	3	6	RD..12T3M0.	2.7	A2	B2	D1	260611 6600	245,–
52.0	8	40	60	22	4	4	RD..1604M0.	4	A4	B1	D2	260611 5201	215,–
66.0	8	48	50	27	4	5	RD..1604M0.	4	A4	B1	D2	260611 6601	225,–
80.0	8	60	50	27	4	6	RD..1604M0.	4	A4	B1	D2	260611 8000	280,–
100.0	8	65	55	32	4	7	RD..1604M0.	4	A4	B1	D2	260611 1000	335,–

2124





Modular screw-in milling cutter

- ∅ 10.0 mm without internal coolant supply

D mm	R mm	L1 mm	L mm	D1 mm	MD	Z	suitable indexable inserts	Tightening torque max. N-m					art.no.	€
10.0	2.5	10	18	9	M6	2	RD..0501M0.	0.3	A1		C1		**260612** 1000	113,–
20.0	2.5	7.75	30	9	M6	5	RD..0501M0.	0.3	A1		C1		260612 2005	230,–
15.0	3.5	14	23	13	M8	2	RD..0702M0.	1	A3		C2		260612 1500	120,–
15.0	3.5	23	23	13	M8	3	RD..0702M0.	1	A3		C2		260612 1501	132,–
20.0	3.5	30	30	18	M10	4	RD..0702M0.	1	A3		C2		260612 2000	165,–
25.0	3.5	35	35	21	M12	5	RD..0702M0.	1	A3		C2		260612 2500	215,–
30.0	3.5	-	43	-	M16	5	RD..0702M0.	1	A3		C2		260612 3005	235,–
20.0	5	30	30	18	M10	2	RD..1003M0.	2.7	A2		C3		260612 2001	120,–
25.0	5	35	35	21	M12	2	RD..1003M0.	2.7	A2		C3		260612 2501	121,–
25.0	5	14	35	21	M12	3	RD..1003M0.	2.7	A2		C3		260612 2502	153,–
30.0	5	21	43	29	M16	4	RD..1003M0.	2.7	A2		C3		260612 3000	171,–
35.0	5	22	43	29	M16	4	RD..1003M0.	2.7	A2		C3		260612 3501	179,–
42.0	5	24	43	29	M16	5	RD..1003M0.	2.7	A2		C3		260612 4201	265,–
24.0	6	30	35	21	M12	2	RD..12T3M0.	2.7	A2	B2	C3		260612 2400	133,–
35.0	6	30	43	29	M16	3	RD..12T3M0.	2.7	A2	B2	C3		260612 3502	161,–
42.0	6	30	43	29	M16	4	RD..12T3M0.	2.7	A2	B2	C3		260612 4202	220,–
32.0	8	30	43	29	M16	2	RD..1604M0.	4	A4	B1	C4	D2	260612 3201	168,–

2124

Spare parts

	Screw		€
	art.no.		
A1	262551 0018		7,95
A2	262551 0035		7,15
A3	262551 2530		7,95
A4	320901 2505		5,70

3106

	Clamping screw		€
	art.no.		
B1	320901 2506		7,75
B2	320901 2507		7,75

3106

	TORX		€
	art.no.		
C1	703053 0060		3,09
C2	703053 0070		3,09
C3	703053 0150		3,35
C4	703053 0200		3,40

7114

	Wrench		€
	art.no.		
D1	705141 0015		5,75
D2	705141 0020		5,95

7114

Continued on next page >>>

RDHX

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application			RDHX 0501 MOT	●		●		●	●	**DH 103**	10	**339102** 0003	12,30
			RDHX 0702 MOT	●		●		●	●	**DH 103**	10	339102 0203	11,40
				●	●	●		●	●	**JC 5118**	10	339101 0230	11,40
				●						**JC 5040**	10	339101 0246	11,40
				●	●			●	●	**JC 8015**	10	339101 0280	11,40
			RDHX 1003 MOT	●		●		●	●	**DH 103**	10	339102 0303	11,55
				●	●	●		●	●	**JC 5118**	10	339101 0330	11,55
				●						**JC 5040**	10	339101 0346	11,55
				●	●			●	●	**JC 8015**	10	339101 0380	11,55
			RDHX 12T3 MOT	●		●		●	●	**DH 103**	10	339102 0403	12,55
				●	●	●		●	●	**JC 5118**	10	339101 0430	12,55
				●						**JC 5040**	10	339101 0446	12,55
				●	●			●	●	**JC 8015**	10	339101 0480	12,55
			RDHX 1604 MOT	●		●		●	●	**DH 103**	10	339102 0503	16,20
				●	●	●		●	●	**JC 5118**	10	339101 0530	16,20
				●						**JC 5040**	10	339101 0546	16,20
				●	●			●	●	**JC 8015**	10	339101 0580	16,20

2130

ISO	DH 103	JC 5040	JC 5118	JC 8015
ISO P steel	Vc = 200 - 300	Vc = 100 - 200	Vc = 100 - 300	Vc = 100 - 200
ISO M stainless steel			Vc = 100 - 200	Vc = 100 - 200
ISO K cast iron	Vc = 200 - 300		Vc = 100 - 200	
ISO S superalloys	Vc = 30 - 40		Vc = 20 - 30	Vc = 30 - 40
ISO H hard	Vc = 70 - 120		Vc = 50 - 100	Vc = 50 - 100
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.08 to 0.35 per cutting edge ap = 0.05 - 0.5			

RDHT

F finishing	M medium	R roughing	SARA® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○											
 Medium machining			RDHT 0501 MOT	●	○	○		○	○	**SHC 4635**	10	**239100** 0503	6,70
			RDHT 0702 MOT	●	○	○		○	○	**SHC 4635**	10	239100 0703	7,15
			RDHT 1003 MOT	●	○	○		○	○	**SHC 4635**	10	239100 1003	8,20
			RDHT 12T3 MOT	●	○	○		○	○	**SHC 4635**	10	239100 1203	9,05
			RDHT 1604 MOT	●	○	○		○	○	**SHC 4635**	10	239100 1603	12,50

2167

ISO	SHC 4635
ISO P steel	Vc = 90 - 250
ISO M stainless steel	Vc = 80 - 230
ISO K cast iron	Vc = 100 - 280
ISO H hard	Vc = 80 - 120
ISO S superalloys	Vc = 60 - 150
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.15 - 1.2 ap = 1.0 - 5.0

RDHT - aluminium

F finishing	M medium	R roughing	SARA® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○											
 Medium machining			RDHT 0501 MOF				●			**SHW 4415**	10	**239101** 0503	6,15
			RDHT 0702 MOF				●			**SHW 4415**	10	239101 0703	6,40
			RDHT 1003 MOF				●			**SHW 4415**	10	239101 1003	6,70
			RDHT 12T3 MOF				●			**SHW 4415**	10	239101 1203	7,75
			RDHT 1604 MOF				●			**SHW 4415**	10	239101 1603	10,25

2167

ISO	SHW 4415
ISO N Al/non-ferrous	Vc = 100 - 350
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.2 - 1.0 ap = 0.5 - 5.0

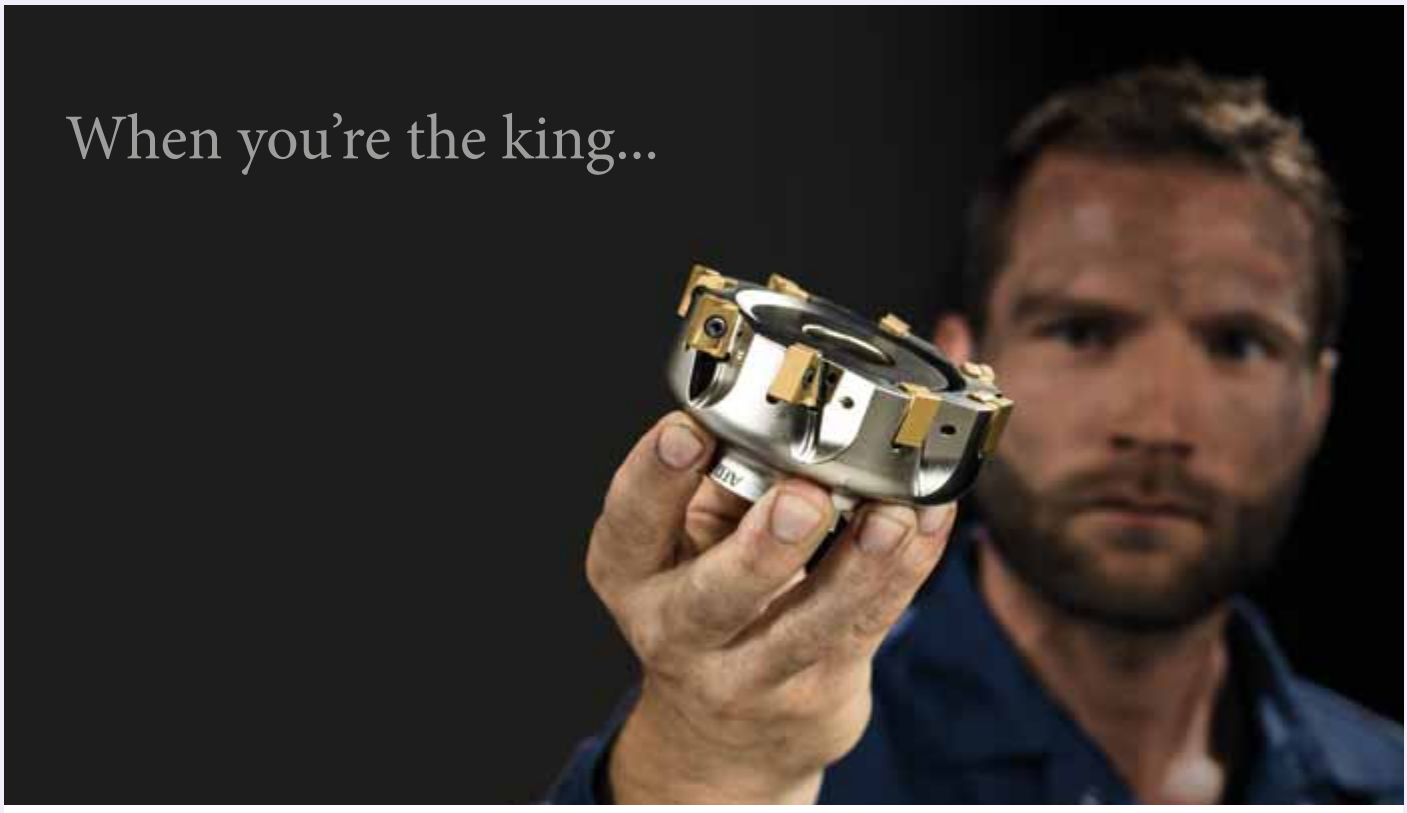
Milling insert geometries

INFO

ISO designation codes in the INFO section

	**AP...**	**from page 20-217**
	**OF...**	**from page 20-219**
	**RD...**	**from page 20-219**
	**SD...**	**from page 20-220**
	**SE...**	**from page 20-220**
	**SP...**	**from page 20-223**
	**TP...**	**from page 20-224**
	**LN...**	**from page 20-225**
	**XE...**	**from page 20-221**

20



...dreams come true.

ATORN®
High quality for great performance

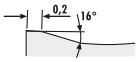
ISO milling inserts *APKT / APMT / ADKT / APKR / APHX*

APKT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 060204 PDTR-K	●	●	●				HC 4635	10	**281518** 0609	8,20



Universal application



2129

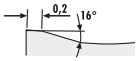
ISO	HC 4635
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 60 - 100
ISO K cast iron	Vc = 120 - 200
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.03 to 0.25 per cutting edge ap = 0.1 - 3.0

APMT

F finishing	M medium	R roughing	SARA® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APMT 1003 PDER-M	●	●	●				SC 4635	10	**281516** 3009	5,90



Universal application



2167

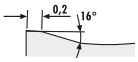
ISO	SC 4635
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 90 - 160
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length

APKT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●		●		●				HC 4615	10	**281514** 3005	8,75
			APKT 1003 PDER-S	●	●					HC 4535	10	281514 3007	8,75
				●	●	●				HC 4635	10	281514 3009	8,75
				●		●				HC 4615	10	281514 3205	9,80
			APKT 1604 PDER-S	●	●					HC 4535	10	281514 3207	9,80
				●	●	●				HC 4635	10	281514 3209	9,80



Universal application



2129

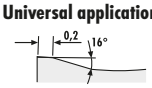
ISO	HC 4535	HC 4615	HC 4635
ISO P steel	Vc = 100 - 170	Vc = 180 - 280	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130		Vc = 90 - 160
ISO K cast iron		Vc = 160 - 270	Vc = 120 - 250
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

APKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●		●	●					DC 150	10	**281510** 7130	15,70
			APKT 0803 PD-R	●	●	●				DC 9235	10	281510 7149	15,70
			APKT 1003 PDSR	●	●	●				DC 9235	10	281513 1049	10,95
			APKT 1203 PD-R	●	●	●				DC 9235	10	281515 6849	18,80
			APKT 1604 PD-R	●	●	●				DC 9235	10	281520 6849	21,70
				●	●					DC 735	10	281520 6862	20,80
			APKT 1604 PD-R-7	●	●	●				DC 9235	10	281520 6949	14,45



Universal application



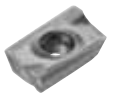
2167

ISO	DC 150	DC 735	DC 9235
ISO P steel	Vc = 105 - 290	Vc = 90 - 225	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 250	Vc = 80 - 235	Vc = 80 - 220
ISO K cast iron			Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

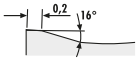
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APKT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDER 05	●	●			●		JC 5118	10	**281514** 1025	9,30
				●	●			●		JC 8050	10	281514 1050	9,30
			APKT 1604 PDER	●	●					JC 5040	10	281521 6840	11,90
				●	●			●		JC 8050	10	281521 6825	11,90



Universal application



ISO	JC 5040	JC 5118	JC 8050
ISO P steel	Vc = 90 - 160	Vc = 120 - 200	Vc = 80 - 150
ISO M stainless steel	Vc = 80 - 140	Vc = 100 - 160	Vc = 80 - 120
ISO K cast iron		Vc = 100 - 150	Vc = 100 - 150
ISO S superalloys		Vc = 40 - 70	Vc = 30 - 60
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length		

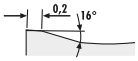
2167

APKT Radius

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 100308PDER	●	●	●				HC 4540	10	**281514** 4011	11,20
			APKT 100312PDER	●	●	●				HC 4540	10	281514 4012	11,20
			APKT 100320PDER	●	●	●				HC 4540	10	281514 4013	11,20



Universal application



ISO	HC 4540
ISO P steel	Vc = 70 - 130
ISO M stainless steel	Vc = 90 - 160
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

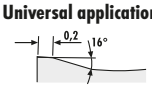
2129

APKT Radius

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1604 16R	●		●				DC 725	10	**281520** 1258	21,50
			APKT 1604 24R	●		●				DC 725	10	281520 1458	21,50
			APKT 1604 32R	●		●				DC 725	10	281520 1658	21,50
				●	●					DC 735	10	281520 1662	21,50
			APKT 1604 48R	●	●	●				DC 9235	10	281520 1864	22,40



Universal application



ISO	DC 725	DC 735	DC 9235
ISO P steel	Vc = 100 - 300	Vc = 90 - 225	Vc = 80 - 180
ISO M stainless steel		Vc = 80 - 235	Vc = 80 - 220
ISO K cast iron	Vc = 90 - 150		Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length		

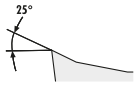
2167

APKR specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APKT 1003 PDFR R04				●			HW 4415	10	**281715** 0025	16,10
			APKT 1604 PDFR R04				●			HW 4415	10	281715 0030	16,60
			APKT 1604 PDFR R08				●			HW 4415	10	281715 0035	16,60



Universal application



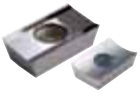
ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

2129

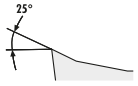
Polished design!

APHX specially for non-ferrous metals

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	APHX 100304 FR-ALU				●			HW 4415	10	**281517** 2003	16,40
			APHX 160404 FR-ALU				●			HW 4415	10	281517 2203	17,40



Universal application



ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.7 x cutting edge length

2129

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APKR specially for non-ferrous metals

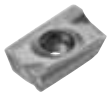
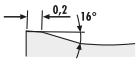
F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 	APKR 1604 PD-R						●			DC 235	10	**281215** 6808	17,–
							●			DC 9235	10	281215 6849	21,70

2167

ISO	DC 235	DC 9235
ISO N Al/non-ferrous	Vc = 160 - 650	Vc = 200 - 850
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.4 ap = max. 0.7 x cutting edge length	

ADKT

- JC 5030 quality grade is replaced by JC 5040

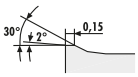
F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 	ADKT 150508 PDER			●	●					JC 5040	10	**281514** 1525	10,40

2167

ISO	JC 5040
ISO P steel	Vc = 90 - 160
ISO M stainless steel	Vc = 80 - 140
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 0.7 x cutting edge length

OFMT ISO milling inserts

OFMT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 	OFMT 05T305-TN-7			●	●	●				DC 9235	10	**286915** 0149	12,95

2167

ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 8.3

Safety in the workplace

Please protect your eyes, ears and respiratory system!



ISO milling inserts *RDHX*

RDHX

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application			RDHX 0501 MOT	●		●		●	●	**DH 103**	10	**339102** 0003	11,95
			RDHX 0701 MOT	●		●		●	●	**DH 103**	10	339102 0103	11,50
				●						**JC 5040**	10	339101 0146	11,50
				●	●			●	●	**JC 8015**	10	339101 0180	11,50
			RDHX 0702 MOT	●		●		●	●	**DH 103**	10	339102 0203	11,05
				●	●	●		●	●	**JC 5118**	10	339101 0230	11,05
				●						**JC 5040**	10	339101 0246	11,05
				●	●			●	●	**JC 8015**	10	339101 0280	11,05
			RDHX 1003 MOT	●		●		●	●	**DH 103**	10	339102 0303	11,20
				●	●	●		●	●	**JC 5118**	10	339101 0330	11,20
				●						**JC 5040**	10	339101 0346	11,20
				●	●			●	●	**JC 8015**	10	339101 0380	11,20
			RDHX 12T3 MOT	●		●		●	●	**DH 103**	10	339102 0403	12,15
				●	●	●		●	●	**JC 5118**	10	339101 0430	12,15
				●						**JC 5040**	10	339101 0446	12,15
				●	●			●	●	**JC 8015**	10	339101 0480	12,15
			RDHX 1604 MOT	●		●		●	●	**DH 103**	10	339102 0503	15,70
				●	●	●		●	●	**JC 5118**	10	339101 0530	15,70
				●						**JC 5040**	10	339101 0546	15,70
				●	●			●	●	**JC 8015**	10	339101 0580	15,70

2130

ISO	DH 103	JC 5040	JC 5118	JC 8015
ISO P steel	Vc = 200 - 300	Vc = 100 - 200	Vc = 100 - 300	Vc = 100 - 200
ISO M stainless steel			Vc = 100 - 200	Vc = 100 - 200
ISO K cast iron	Vc = 200 - 300		Vc = 100 - 200	
ISO S superalloys	Vc = 30 - 40		Vc = 20 - 30	Vc = 30 - 40
ISO H hard	Vc = 70 - 120		Vc = 50 - 100	Vc = 50 - 100
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.08 to 0.35 per cutting edge ap = 0.05 - 0.5			

RDHT ISO indexable cutting inserts

RDHT

F finishing	M medium	R roughing	SARA ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○											
 Medium machining			RDHT 0501 MOT	●	○	○		○	○	**SHC 4635**	10	**239100** 0503	6,50
			RDHT 0702 MOT	●	○	○		○	○	**SHC 4635**	10	239100 0703	6,95
			RDHT 1003 MOT	●	○	○		○	○	**SHC 4635**	10	239100 1003	7,95
			RDHT 12T3 MOT	●	○	○		○	○	**SHC 4635**	10	239100 1203	8,80
			RDHT 1604 MOT	●	○	○		○	○	**SHC 4635**	10	239100 1603	12,10

2167

ISO	SHC 4635
ISO P steel	Vc = 90 - 250
ISO M stainless steel	Vc = 80 - 230
ISO K cast iron	Vc = 100 - 280
ISO H hard	Vc = 80 - 120
ISO S superalloys	Vc = 60 - 150
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.15 - 1.2 ap = 1.0 - 5.0

RDHT - aluminium

F finishing	M medium	R roughing	SARA ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○											
 Medium machining			RDHT 0501 MOF				●			**SHW 4415**	10	**239101** 0503	5,95
			RDHT 0702 MOF				●			**SHW 4415**	10	239101 0703	6,20
			RDHT 1003 MOF				●			**SHW 4415**	10	239101 1003	6,50
			RDHT 12T3 MOF				●			**SHW 4415**	10	239101 1203	7,50
			RDHT 1604 MOF				●			**SHW 4415**	10	239101 1603	9,95

2167

ISO	SHW 4415
ISO N Al/non-ferrous	Vc = 100 - 350
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.2 - 1.0 ap = 0.5 - 5.0

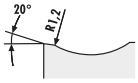
RPMT ISO milling inserts

RPMT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●	RPMT 120400	●	●					DC 725	10 **281810** 0158	11,80



Universal application



ISO	DC 725
ISO P steel	Vc = 90 - 225
ISO M stainless steel	Vc = 80 - 235
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.5 x cutting edge length

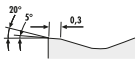
SCMT ISO milling inserts

SCMT

F finishing	M medium	R roughing	ATORN ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	-	SCMT 060204	●						HC 4635	10 **327410** 1510	22,70



Finishing / medium machining



ISO	HC 4635
ISO P steel	Vc = 60 - 160
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.4 ap = max. 0.7 x cutting edge length

SEMT ISO milling inserts

SEMT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●		●						JC 5040	10 **288001** 0040	9,20
			SEMT 13T3 AGSN-PM	●	●	●		●	●	JC 8015	10 288001 0015	9,20
				●	●			●		JC 8050	10 288001 0050	9,20
			SEMT 13T3 AGSN-KM			●				JC 605 W	10 288001 0605	9,20



Universal application

ISO	JC 5040	JC 605 W	JC 8015	JC 8050
ISO P steel	Vc = 100 - 200		Vc = 100 - 200	Vc = 100 - 200
ISO M stainless steel			Vc = 100 - 200	Vc = 100 - 200
ISO K cast iron		Vc = 150 - 250	Vc = 150 - 250	
ISO S superalloys			Vc = 30 - 40	Vc = 20 - 50
ISO H hard			Vc = 50 - 100	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 ap = ap. max. 6 mm			

SEGT ISO milling inserts

SEGT

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality	art.no.	€
●	●	●	SEGT 13T3AGFN-AL				●			Uncoated	10 **288004** 0005	9,55



Universal application

ISO	Uncoated
ISO N Al/non-ferrous	Vc = 250 - 300
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 ap = ap. max. 6 mm

XEHW ISO milling inserts

Wiper (wide finishing) insert for smooth-running 45° face milling cutter

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	-	-	XEHW 13T3 AGSN-W	●		●		●	●	**DH 103**	10	**288002** 0003	14,95



Micro finishing machining

ISO	DH 103
ISO P steel	Vc = 200 - 300
ISO K cast iron	Vc = 200 - 300
ISO S superalloys	Vc = 30 - 40
ISO H hard	Vc = 70 - 120
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 ap = ap. max. 1.0 mm

2167

SEEN ISO milling inserts

SEEN

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEEN 1203 AFFN			●				**HW 4410**	10	**284215** 2901	7,20
				●	●					**HC 4620**	10	284215 2905	9,80
				●	●	●				**HC 4540**	10	284215 2907	9,80
			SEEN 1203 AFSN	●						**HW 4640**	10	284215 3003	6,70
				●	●					**HC 4620**	10	284215 3005	10,–
				●	●	●				**HC 4540**	10	284215 3007	10,–



Universal application

ISO	HC 4540	HC 4620	HW 4410	HW 4640
ISO P steel	Vc = 180 - 230	Vc = 120 - 210		Vc = 90 - 190
ISO M stainless steel	Vc = 105 - 135	Vc = 110 - 155		
ISO K cast iron	Vc = 170 - 215		Vc = 125 - 145	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0			

2129

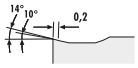
SEER ISO milling inserts

SEER

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEER 1203 AFSN	●		●				**HC 4620**	10	**284220** 3005	9,60
				●	●	●				**HC 4540**	10	284220 3007	9,80



Universal application



ISO	HC 4540	HC 4620
ISO P steel	Vc = 200 - 270	Vc = 205 - 280
ISO M stainless steel	Vc = 120 - 160	
ISO K cast iron	Vc = 190 - 255	Vc = 190 - 265
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0	

2129

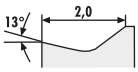
SEET ISO milling inserts

SEET

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEET 1204 AFFN			●	●			**HW 4410**	10	**284225** 3001	8,20
				●	●	●				**HC 4620**	10	284225 3005	9,80
				●	●	●				**HC 4540**	10	284225 3007	9,80



Universal application



ISO	HC 4540	HC 4620	HW 4410
ISO P steel	Vc = 200 - 255	Vc = 205 - 280	
ISO M stainless steel	Vc = 120 - 150	Vc = 120 - 165	
ISO K cast iron	Vc = 190 - 240	Vc = 190 - 265	Vc = 125 - 145
ISO N Al/non-ferrous			Vc = 125 - 680
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0		

2129

SEKN ISO milling inserts

SEKN

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEKN 1203 AFTN-M	●	●	●				DC 9235	10	**284210** 3949	10,–



Universal application

2167

ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0

SEKN

F finishing	M medium	R roughing	ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEKN 1203 AFTN	●	●	●				JC 5040	10	**284210** 3948	7,25



Universal application

2167

ISO	JC 5040
ISO P steel	Vc = 120 - 250
ISO M stainless steel	Vc = 100 - 200
ISO K cast iron	Vc = 120 - 220
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0

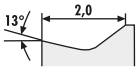
SEKT ISO milling inserts

SEKT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEKT 1204 AF-R			●	●			DC 235	10	**284810** 3708	13,35
				●	●	●				DC 9235	10	284810 3749	17,10



Universal application



2167

ISO	DC 235	DC 9235
ISO P steel		Vc = 80 - 180
ISO M stainless steel		Vc = 80 - 220
ISO K cast iron	Vc = 90 - 150	Vc = 80 - 290
ISO N Al/non-ferrous	Vc = 160 - 320	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0	

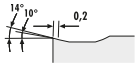
SEKR ISO milling inserts

SEKR

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SEKR 1203 AFN-7	●	●	●				DC 9235	10	**284510** 3149	9,85



Universal application



2167

ISO	DC 9235
ISO P steel	Vc = 80 - 180
ISO M stainless steel	Vc = 80 - 220
ISO K cast iron	Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0

SPKN ISO milling inserts

SPKN

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SPKN 1203 EDSR	●	●	●				**HC 4620**	10	**285720** 5605	7,70
				●	●	●				**HC 4540**	10	285720 5607	7,70



Universal application

ISO	HC 4540	HC 4620
ISO P steel	Vc = 200 - 270	Vc = 205 - 280
ISO M stainless steel	Vc = 120 - 160	Vc = 120 - 165
ISO K cast iron	Vc = 190 - 255	Vc = 190 - 265
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 6.0	

2129

ISO milling inserts SPMT / SPGT

SPMT

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	○	○	SPMT 060304	●	○	○				**HC 4635**	10	**263008** 0006	9,30
			SPMT 09T308	●	○	○				**HC 4635**	10	263008 0009	11,50
			SPMT 120408	●	○	○				**HC 4635**	10	263008 0012	12,60



Finishing / medium machining

ISO	HC 4635
ISO P steel	Vc = 110 - 220
ISO M stainless steel	Vc = 70 - 130
ISO K cast iron	Vc = 120 - 230
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 - 0.15 ap = 0.5 - 5.0

2129

SPGT ALU

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
○	●	○	SPGT 060304-ALU				●			**HW 4415**	10	**263009** 0006	16,40
			SPGT 09T308-ALU				●			**HW 4415**	10	263009 0009	17,80
			SPGT 120408-ALU				●			**HW 4415**	10	263009 0012	19,20



Universal application

ISO	HW 4415
ISO N Al/non-ferrous	Vc = 200 - 700
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.10 - 0.20 ap = 0.5 - 5.0

2129

SPUN ISO milling inserts

SPUN

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●	SPUN 120308	●						**HW 4640**	10	**286020** 0203	5,10



Universal application

ISO	HW 4640
ISO P steel	Vc = 75 - 120
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 - 0.3 per cutting edge ap = max. 6.0

2129

TPKN ISO milling inserts

TPKN

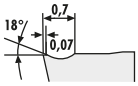
F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application	TPKN 1603 PPTR-M		●						DC 325 M uncoated	10	**286310** 8915	6,35
			●	●	●				DC 9235	10	286310 8949	8,15
	TPKN 2204 PDTR-M		●	●	●				DC 9235	10	286315 7749	12,75

ISO	DC 325 M uncoated	DC 9235
ISO P steel	Vc = 60 - 200	Vc = 80 - 180
ISO M stainless steel		Vc = 80 - 220
ISO K cast iron		Vc = 80 - 290
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.5 x cutting edge length	

2167

TPMT ISO milling inserts

TPMT

F finishing	M medium	R roughing	Duracarb ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application 	TPMT 1603 04		●	●					DC 735	10	**286910** 0262	8,80
	TPMT 1603 08		●		●				DC 725	10	286910 0458	8,70
			●	●					DC 735	10	286910 0462	8,70

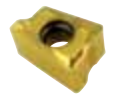
ISO	DC 725	DC 735
ISO P steel	Vc = 100 - 300	Vc = 90 - 225
ISO M stainless steel		Vc = 80 - 235
ISO K cast iron	Vc = 90 - 150	
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.1 to 0.4 per cutting edge ap = max. 0.5 x cutting edge length	

2167

4-10 Power/4-15 Power ISO milling inserts

- Cutting edges are marked with dots; please always use cutting edges with the same dots
- Quality grade HC 4535, ideal for stainless steel
- MM universal milling
- HW 4310 for aluminium, uncoated K10
- **PVD TiAlN/TiN**: coated carbide metal types

LNM(E)X 10

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application	LNMX 100605PNR-MM		●	●	●				HC 4630	10	**295811** 0001	14,30
			●		●				HC 4410	10	295812 0001	14,30
				●					HC 4535	10	295813 0001	14,30
	LNEX 100605PNR-MA					●			HW 4310	10	295815 0002	13,30

ISO	HC 4410	HC 4535	HC 4630	HW 4310
ISO P steel	Vc = 180 - 280		Vc = 110 - 220	
ISO M stainless steel		Vc = 120 - 180	Vc = 90 - 160	
ISO K cast iron	Vc = 120 - 300		Vc = 120 - 230	
ISO N Al/non-ferrous				Vc = 200 - 300
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 to 0.20 per cutting edge ap = max. 0.7 x cutting edge length			

2129

LNM(E)X 15

F finishing	M medium	R roughing	ATORN® ISO designation	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	Quality		art.no.	€
●	●	●											
 Universal application	LNMX 151008PNR-MM		●	●	●				HC 4630	10	**295821** 0001	17,60
			●		●				HC 4410	10	295824 0001	17,60
				●					HC 4535	10	295825 0001	17,60
	LNEX 151008PNR-MA					●			HW 4310	10	295826 0002	16,70

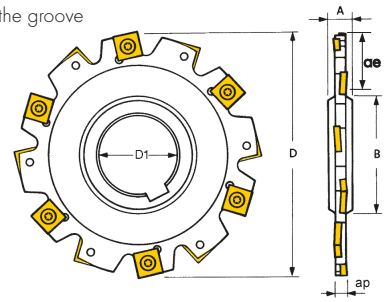
ISO	HC 4410	HC 4535	HC 4630	HW 4310
ISO P steel	Vc = 180 - 280		Vc = 110 - 220	
ISO M stainless steel		Vc = 120 - 180	Vc = 90 - 160	
ISO K cast iron	Vc = 120 - 300		Vc = 120 - 230	
ISO N Al/non-ferrous				Vc = 200 - 300
Vc = [m/min] fz = [mm/Z] ap = [mm]	fz = 0.05 to 0.20 per cutting edge ap = max. 0.7 x cutting edge length			

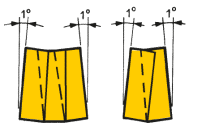
2129

ATORN® Disc milling cutters

20-313

- Three cutting edges
- Fixed width
- Generates a slight roof shape at the base of the groove
- Screw-in indexable inserts
- For slotting, cutting and groove milling
- Supplied with clamping screws





Axial angle -3°, hook angle -12°



D mm	D1 mm	ap mm	A mm	B mm	Z	Z eff.	Cutting depth ae max. mm	suitable indexable inserts	suitable clamping screw	suitable TORX wrench			art.no.	€
63.0	22.0	4	8	34	8	4	14	SNHX 1102T	VTX 3503	TX 9	A1	B1	**262600** 6304	460,–
63.0	22.0	5	8	34	8	4	14	SNHX 1103T	VTX 3504	TX 9	A2	B1	262600 6305	460,–
63.0	22.0	6	8	34	6	3	14	SNHX 1203T	VTX 405	TX 15	A3	B2	262600 6306	460,–
80.0	22.0	4	8	34	10	5	22	SNHX 1102T	VTX 3503	TX 9	A1	B1	262600 8004	529,–
80.0	22.0	5	8	34	10	5	22	SNHX 1103T	VTX 3504	TX 9	A2	B1	262600 8005	529,–
80.0	22.0	6	8	34	8	4	22	SNHX 1203T	VTX 405	TX 15	A3	B2	262600 8006	529,–
100.0	27.0	4	12	45	12	6	25	SNHX 1102T	VTX 3503	TX 9	A1	B1	262600 1004	639,–
100.0	27.0	5	12	45	12	6	25	SNHX 1103T	VTX 3504	TX 9	A2	B1	262600 1005	639,–
100.0	27.0	6	12	45	10	5	25	SNHX 1203T	VTX 405	TX 15	A3	B2	262600 1006	639,–
100.0	27.0	10	12	45	10	5	25	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 1010	689,–
125.0	40.0	4	12	58	12	6	31	SNHX 1102T	VTX 3503	TX 9	A1	B1	262600 1204	769,–
125.0	40.0	5	12	58	12	6	31	SNHX 1103T	VTX 3504	TX 9	A2	B1	262600 1205	769,–
125.0	40.0	6	12	58	12	6	31	SNHX 1203T	VTX 405	TX 15	A3	B2	262600 1206	769,–
125.0	40.0	10	12	58	12	6	31	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 1210	799,–
160.0	40.0	4	12	68	18	9	44	SNHX 1102T	VTX 3503	TX 9	A1	B1	262600 1604	899,–
160.0	40.0	5	12	68	18	9	44	SNHX 1103T	VTX 3504	TX 9	A2	B1	262600 1605	899,–
160.0	40.0	6	12	68	16	8	44	SNHX 1203T	VTX 405	TX 15	A3	B2	262600 1606	899,–
160.0	40.0	10	12	68	16	8	44	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 1610	939,–
160.0	40.0	14	14	68	15	5	44	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 1614	959,–
200.0	50.0	4	12	72	18	9	62	SNHX 1102T	VTX 3503	TX 9	A1	B1	262600 2004	1.219,–
200.0	50.0	5	12	72	18	9	62	SNHX 1103T	VTX 3504	TX 9	A2	B1	262600 2005	1.219,–
200.0	50.0	6	12	72	18	9	62	SNHX 1203T	VTX 405	TX 15	A3	B2	262600 2006	1.219,–
200.0	50.0	10	12	72	18	9	62	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 2010	1.239,–
200.0	50.0	14	14	72	18	6	62	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 2014	1.239,–
250.0	50.0	10	12	72	24	12	87	SNHX 1205T	VTX 408	TX 15	A4	B2	262600 2510	1.489,–

2124

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	285799 3530	7,15	B1	703053 0090	3,15
A2	285799 3540	7,15	B2	703053 0150	3,35
A3	285799 4050	7,15			
A4	285799 4080	7,15			

3106 7114



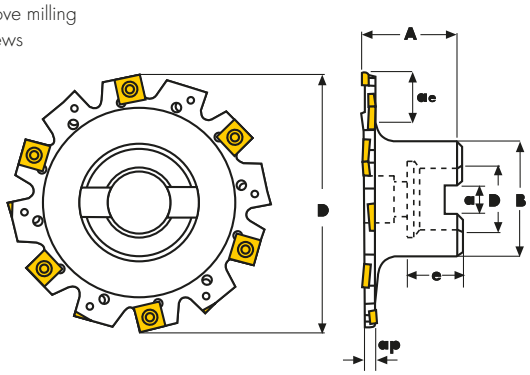
...suggestions are heard.

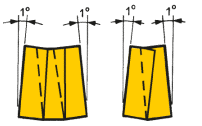
ATORN®
High quality for great performance

ATORN® Disc milling cutter with collar

20-313

- Three cutting edges
- Fixed width
- Generates a slight roof shape at the base of the groove
- Screw-in indexable inserts
- For slotting, cutting and groove milling
- Supplied with clamping screws





Axial angle -3°, hook angle -12°



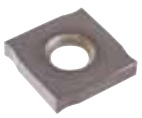
D mm	D1 mm	ap mm	A mm	B mm	Z	Z eff.	Cutting depth ae max. mm	a mm	e mm	suitable indexable inserts	suitable clamping screw	suitable TORX wrench			art.no.	€
63.0	22	4	50	40	8	4	10.5	10.4	21	SNHX 1102T	VTX 3503	TX 9	A1	B1	**262610** 6304	509,–
63.0	22	5	50	40	8	4	10.5	10.4	21	SNHX 1103T	VTX 3504	TX 9	A2	B1	262610 6305	509,–
63.0	22	6	50	40	6	3	10.5	10.4	21	SNHX 1203T	VTX 405	TX 15	A3	B2	262610 6306	495,–
80.0	22	4	50	40	10	5	20.0	10.4	21	SNHX 1102T	VTX 3503	TX 9	A1	B1	262610 8004	579,–
80.0	22	5	50	40	10	5	20.0	10.4	21	SNHX 1103T	VTX 3504	TX 9	A2	B1	262610 8005	579,–
80.0	22	6	50	40	8	4	20.0	10.4	21	SNHX 1203T	VTX 405	TX 15	A3	B2	262610 8006	579,–
100.0	27	4	50	48	12	6	24.2	12.4	23	SNHX 1102T	VTX 3503	TX 9	A1	B1	262610 1004	759,–
100.0	27	5	50	48	12	6	24.2	12.4	23	SNHX 1103T	VTX 3504	TX 9	A2	B1	262610 1005	769,–
100.0	27	6	50	48	10	5	24.2	12.4	23	SNHX 1203T	VTX 405	TX 15	A3	B2	262610 1006	769,–
100.0	27	10	50	48	10	5	24.2	12.4	23	SNHX 1205T	VTX 408	TX 15	A4	B2	262610 1010	769,–
125.0	40	6	50	70	12	6	23.7	16.4	30	SNHX 1203T	VTX 405	TX 15	A3	B2	262610 1206	819,–
125.0	40	10	50	70	12	6	23.7	16.4	30	SNHX 1205T	VTX 408	TX 15	A4	B2	262610 1210	819,–
160.0	40	6	50	70	16	8	41.2	16.4	30	SNHX 1203T	VTX 405	TX 15	A3	B2	262610 1606	959,–
160.0	40	10	50	70	16	8	41.2	16.4	30	SNHX 1205T	VTX 408	TX 15	A4	B2	262610 1610	959,–

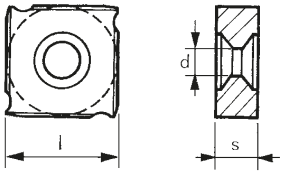
2124

Spare parts

	Screw			TORX	
	art.no.	€		art.no.	€
A1	285799 3530	7,15	B1	703053 0090	3,15
A2	285799 3540	7,15	B2	703053 0150	3,35
A3	285799 4050	7,15			
A4	285799 4080	7,15			
	3106			7114	

ATORN® SNHX milling inserts





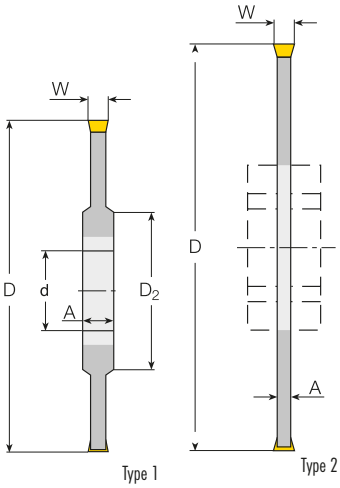
Type	l mm	s mm	d mm	ISO P M K	HC4630 TiAlN art.no.	€	ISO N K	HW4415 uncoated art.no.	€
SNHX 1102T	11.0	2.3	4.4	10	**285705** 0107	20,40	10	**285707** 0107	21,–
SNHX 1103T	11.0	2.7	4.4	10	285705 0207	20,60	10	285707 0207	21,–
SNHX 1203T	12.7	3.2	5.0	10	285705 0307	21,–	10	285707 0307	21,90
SNHX 1205T	12.7	5.4	5.0	10	285705 0507	21,20	10	285707 0507	22,10
					2129			2129	

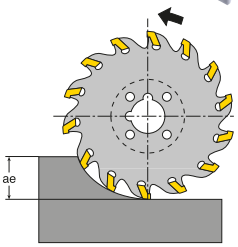
ATORN® A-CUT disc milling cutter

Vc/fz **20-313**

- Disc milling cutter for holding type AIMC, AIMJ or AIPV cutting inserts
- Supplied with ejector, without cutting inserts
- **Note:** Type 2 requires a follower set; the maximum rotational speed must not be exceeded; use AIPV cutting inserts for precision grooves







Type 1

Designation	D mm	W mm	Number of teeth	d mm	A mm	Cutting depth ae max. mm	max. speed r/min	D2 mm	art.no.	€
ASC 100 1.6-22A	100.0	1.6	10	22	2.4	30.5	800	39	**354050** 1001	829,–
ASC 125 1.6-27A	125.0	1.6	12	27	2.4	30.5	640	64	354050 1251	1.019,–
ASC 100 2-22A	100.0	2-2.2	10	22	2.4	30.5	800	39	354050 1002	829,–

3117

Type 2

- Requires driving pin set

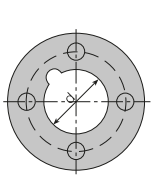
Designation	D mm	W mm	Number of teeth	d mm	A mm	Cutting depth ae max. mm	max. speed r/min	Follower set	art.no.	€
ASC 100 3-22K	100.0	3.1	6	22	2.4	27	800	AR22-46	**354051** 1004	659,–
ASC 125 3-32K	125.0	3.1	8	32	2.4	35	640	AR32-55	354051 1254	699,–
ASC 160 3-40K	160.0	3.1	10	40	2.4	40	500	AR40-80	354051 1604	809,–
ASC 100 4-22K	100.0	4.1	6	22	3.2	27	800	AR22-46	354051 1005	689,–
ASC 125 4-32K	125.0	4.1	8	32	3.2	35	640	AR32-55	354051 1255	739,–
ASC 160 4-40K	160.0	4.1	10	40	3.2	40	500	AR40-80	354051 1605	849,–

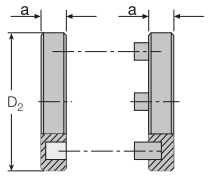
3117

Driving pin sets

Designation	D2 mm	d mm	A mm	a mm	art.no.	€
AR22-46	46.0	22	10	10	**354052** 2246	95,50
AR32-55	55.0	32	10	10	354052 3255	75,–
AR40-80	80.0	40	12	12	354052 4080	113,–

3117





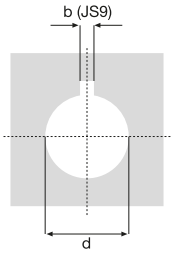


Suitable cutting inserts can be found among the A-Cut recess turning tools in product group 30, "Turning"

Push broaches (keyway broaches)

- For manufacturing true-to-size and precisely centred keyways in accordance with DIN 6885
- Can be used on normal workshop presses (hand press or hydraulic press); no special machinery required
- Low tooling time
- Good surface finish on machined workpieces
- Manufacturing time for one keyway only approx. 1 minute
- Broaches supplied with inserts for achieving the cutting depth
- Special alloy HSS steel for machining any materials with a hardness of up to 34 HRc
- Broaches with other rake angles are available on request for machining solid or very soft materials.
- Square and multi-purpose four square broaches are available on request.
- **From size 32 x 102, guide bush without collar**





- **Use:**
  1. Slide guide bush into workpiece bore and insert broach until the first tooth on the workpiece is standing upright
  2. Lubricate broach
  3. Push broach in approx. 1/3
  4. Briefly release plunger and push broach in fully
  5. Clean broach and fit insert for the second pass
  6. Repeat broaching operation

Broaches

Groove in workpiece b (JS9) x depth mm	Broach length mm	Broaching length min./max. mm	Number of faces	art.no.	€
2 x 1.0	133	6 - 30	1	**234001** 0020	125,–
3 x 1.4	133	6 - 30	2	234001 0030	125,–
4 x 1.8	178	8 - 43	2	234001 0040	147,–
5 x 2.3	178	8 - 43	2	234001 0050	147,–
6 x 2.8	302	10 - 64	2	234001 0060	179,–
8 x 3.3	302	10 - 64	2	234001 0080	179,–
10 x 3.3	352	20 - 150	3	234001 0100	255,–
12 x 3.3	352	20 - 150	3	234001 0120	255,–
14 x 3.8	352	20 - 150	3	234001 0140	255,–
16 x 4.3	387	20 - 150	4	234001 0160	445,–
18 x 4.4	387	20 - 150	4	234001 0180	445,–

2114



Guide bushes

d h9 mm	Length mm	Guide bushes for broaches mm	art.no.	€
6	32	2-3	**234005** 0632	26,70
7	32	2-3	234005 0732	26,70
8	32	2-3	234005 0832	26,70
9	32	2-3	234005 0932	26,70
10	32	2-3	234005 1032	26,70
11	46	4-5	234005 1146	28,90
12	46	4-5	234005 1246	28,90
14	46	4-5	234005 1446	28,90
15	46	4-5	234005 1546	28,90
16	46	4-5	234005 1646	28,90
17	46	4-5	234005 1746	28,90
17	65	6-8	234005 1765	31,90
18	65	6-8	234005 1865	31,90
19	65	6-8	234005 1965	31,90
20	65	6-8	234005 2065	31,90
22	65	6-8	234005 2265	31,90
24	65	6-8	234005 2465	31,90
25	65	6-8	234005 2565	31,90

2114

d h9 mm	Length mm	Guide bushes for broaches mm	art.no.	€
26	65	6-8	234005 2665	31,90
28	65	6-8	234005 2865	38,10
30	65	6-8	234005 3065	38,10
32	102	10-14	234005 3210	49,80
34	102	10-14	234005 3410	49,80
35	102	10-14	234005 3510	49,80
36	102	10-14	234005 3610	49,80
38	102	10-14	234005 3810	49,80
40	102	10-14	234005 4010	59,–
42	102	10-14	234005 4210	59,–
44	102	10-14	234005 4410	59,–
45	127	10-14	234005 4512	59,–
46	127	10-14	234005 4612	59,–
48	127	10-14	234005 4812	59,–
50	127	10-14	234005 5012	59,–
52	127	16-18	234005 5212	131,–
54	127	16-18	234005 5412	131,–
55	127	16-18	234005 5512	131,–

2114

d h9 mm	Length mm	Guide bushes for broaches mm	art.no.	€
56	127	16-18	234005 5612	131,–
58	127	16-18	234005 5812	134,–
60	154	16-18	234005 6015	134,–
62	154	16-18	234005 6215	134,–
64	154	16-18	234005 6415	134,–
65	154	16-18	234005 6515	142,–
66	154	16-18	234005 6615	142,–
68	154	16-18	234005 6815	142,–
70	154	16-18	234005 7015	149,–

2114

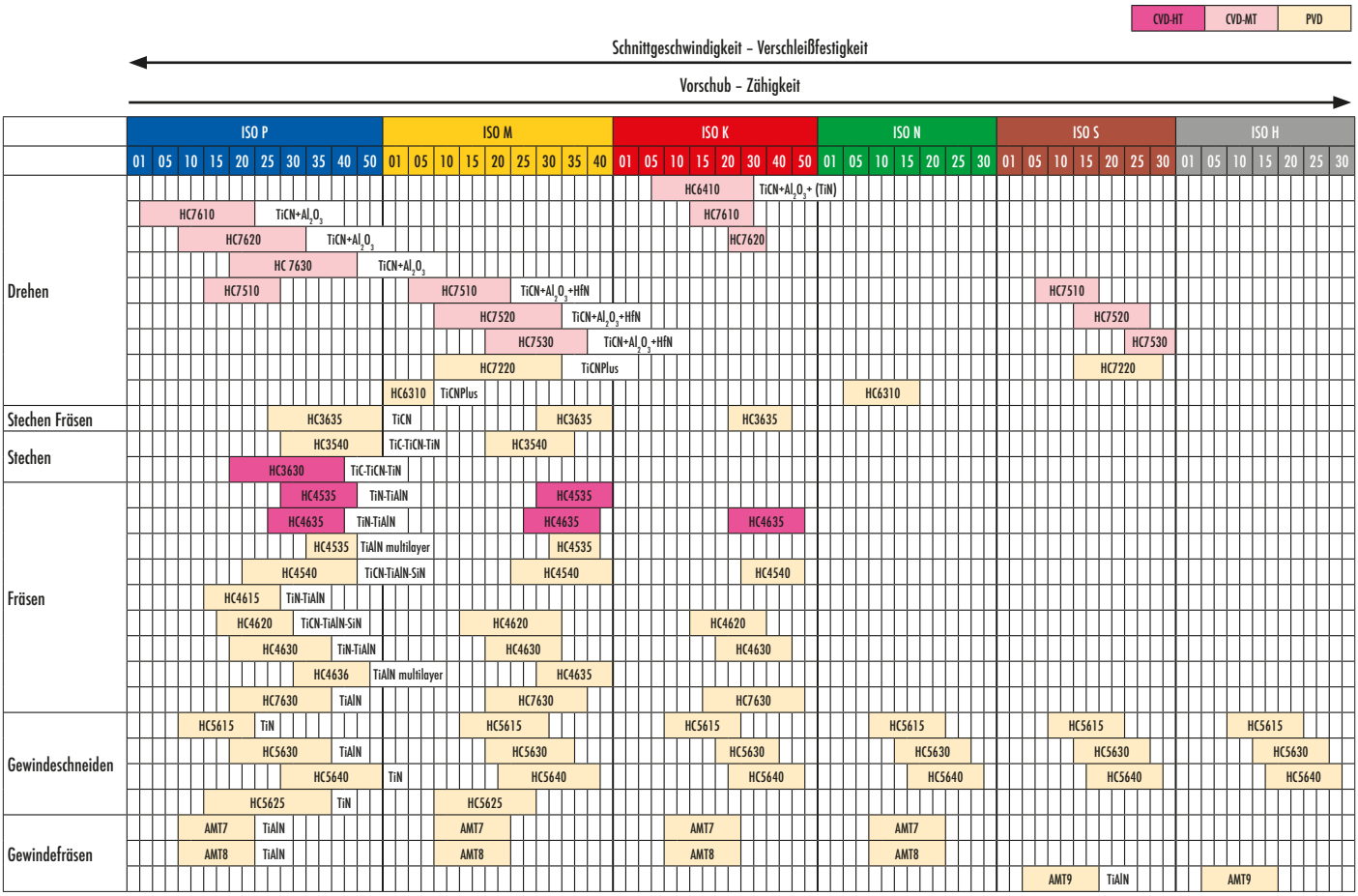
Sets

Contents	art.no.	€
1 broach for each keyway width, 2/3/4/5/6/8 mm, including inserts. 1 guide bush in each size, 8/10/12/14/15/16/18/20/22/24/25/28/30	**234010** 0208	1.389,–
1 broach for each keyway width, 4/5/6/8 mm, including inserts. 1 guide bush in each size, 12/14/15/16/18/20/22/24/25	234010 0408	899,–

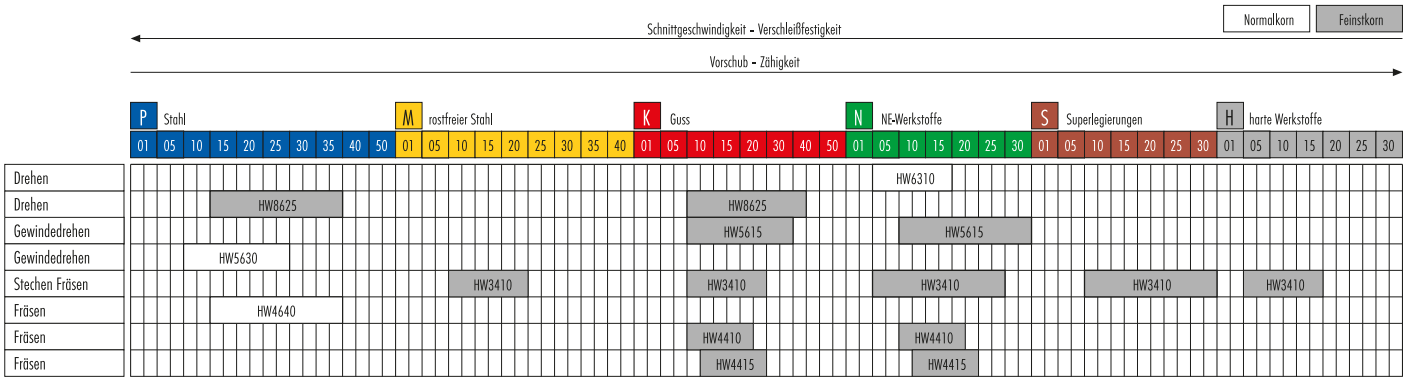
2114



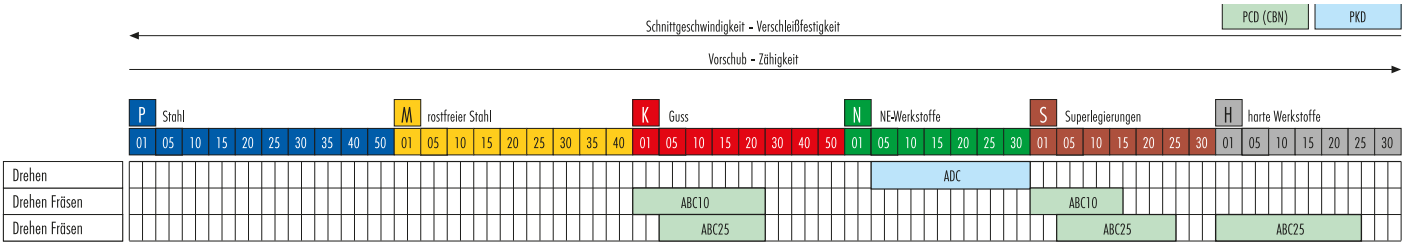
ATORN® Schneidstofftabelle HM-Qualitäten, beschichtet



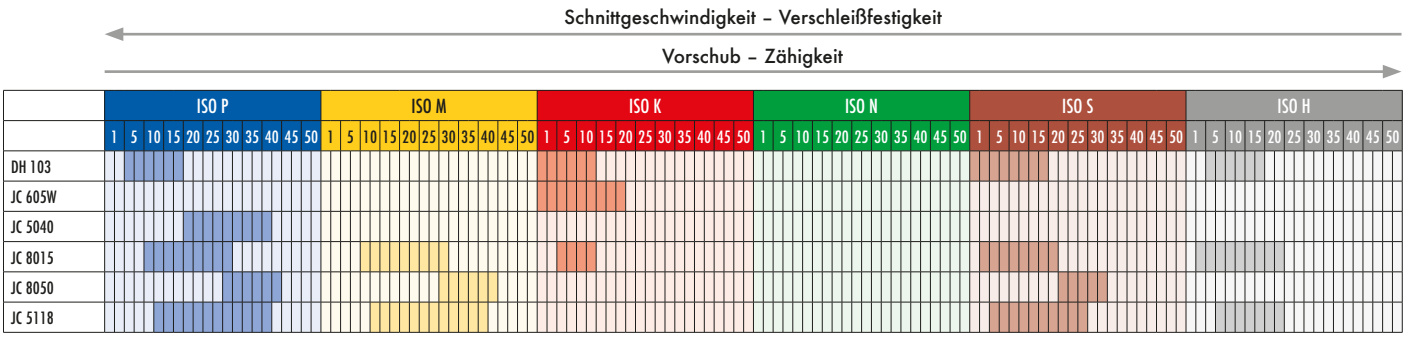
ATORN® Schneidstofftabelle HM-Qualitäten, unbeschichtet



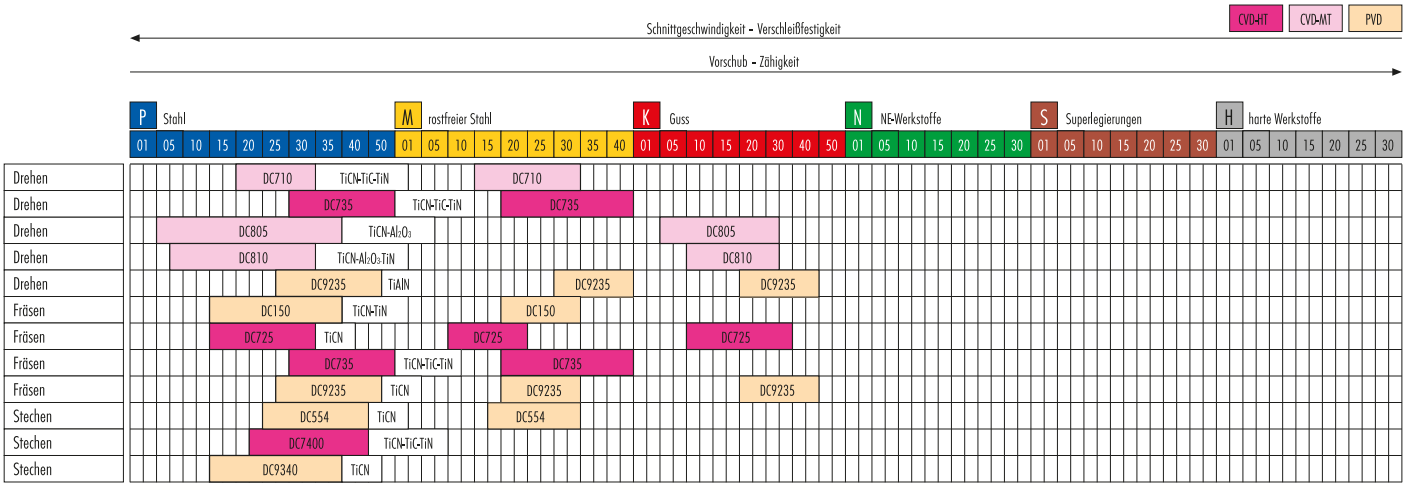
ATORN® Schneidstofftabelle CBN / PKD



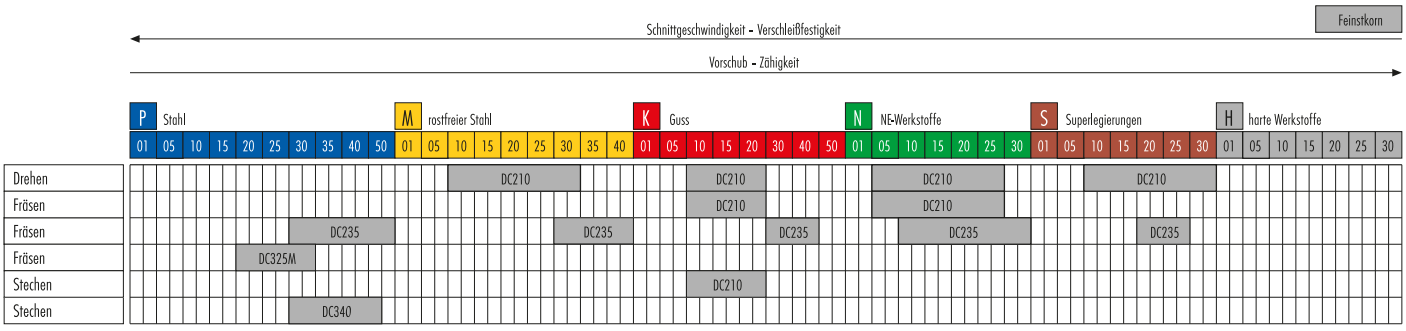
Schneistofftabelle HM-Qualitäten



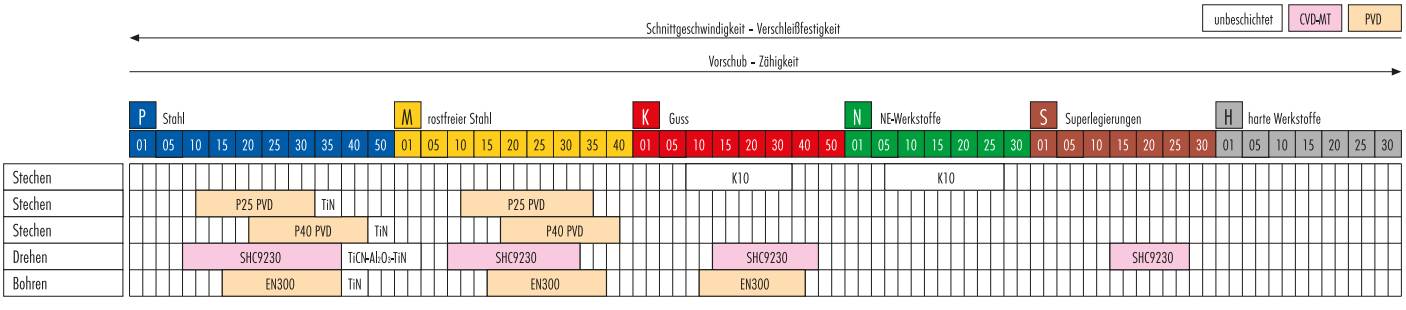
Duracarb Schneidstofftabelle HM-Qualitäten, beschichtet



Duracarb Schneidstofftabelle HM-Qualitäten, unbeschichtet



SARA® Schneidstofftabelle HM-Qualitäten



SARA® Metall-Kreissägeblatt



200101....
200105....
200110....

V_c = Schnittgeschwindigkeit (m/min)

n = Drehzahl (min^{-1}) - mittlerer Wert

f = Der Vorschub pro Umdrehung ist zu ermittlen – abhängig von Material-Querschnitt und -Stabilität, Zahnung des Sägeblattes sowie der maschinellen Gegebenheit.

ISO	Werkstoff	Vc min max.	1. Zeile: Drehzahl min 2. Zeile: Drehzahl max. Metallkreissägeblatt-Ø mm 32	40	50	63	80	100	125	160	200	250	Kühl- bzw. Schmiermittel
P	**Stahl bis 500 N/mm²**	25 50	250 500	200 400	160 320	125 250	100 200	80 160	63 130	50 100	40 80	31 62	Hochleistungs-Kühl-schmier-Konzentrat
P	**Stahl bis 800 N/mm²**	15 30	120 300	120 240	95 190	75 150	60 120	47 95	38 76	30 60	24 47	19 38	Wasser 1:20
P	**Stahl bis 1100 N/mm²**	10 20	100 200	79 160	63 125	50 100	40 80	31 63	25 50	20 40	16 32	12,7 25	dto. mit Wasser 1:15
M	**INOX Stahl (V2A, V4A)**	7 15	75 150	55 120	45 95	35 75	28 60	22 47	18 38	14 30	11 24	9 19	dto. mit Wasser 1:12
K	**Grauguss bis GG 18**	25 45	250 450	200 350	160 290	125 225	100 180	80 145	63 115	50 90	40 70	31 57	Trocken- oder Pressluft
K	**Grauguss über GG 18**	25 30	250 300	200 240	160 190	125 150	100 120	80 95	63 76	50 60	40 47	31 38	Trocken- oder Pressluft
N	**Bronze, Rotguss, Cu-Legierungen**	120 200	1.200 2.000	955 1.600	760 1.300	610 1.000	480 800	380 630	300 500	240 400	190 320	152 250	mit Wasser 1:30
N	**Kupfer, Messing, Leichtmetall**	400 1.000	4.000 10.000	3.200 8.000	2.500 6.300	2.000 5.050	1.600 4.000	1.300 3.200	1.000 2.500	800 2.000	650 1.600	510 1.270	mit Wasser 1:50
N	**Leichtmetall-Profile** *	1.000 2.400	10.000 24.000	8.000 19.100	6.300 15.300	5.050 12.120	4.000 9.560	3.200 7.650	2.500 6.120	2.000 4.780	1.600 3.820	1.270 3.050	Schmierstift
N	**Kunststoffe, Pressstoffe** *	1.500 2.400	15.000 24.000	12.000 19.100	9.500 15.300	7.500 12.120	6.000 9.560	5.000 7.650	3.800 6.120	3.000 4.780	2.400 3.820	1.900 3.050	Trocken

*) Für hohe Schnittgeschwindigkeiten (ab 1000 m/min) unbedingt Sägeblätter mit erhöhter Zähigkeit verwenden!
Bei Bestellung angeben: Maschinendrehzahl oder Schnittgeschwindigkeit und zu schneidender Werkstoff.

Alle Blätter sind durch Hohlschliff seitlich freigeschliffen.
Alle Größen ab 200 mm Ø und sehr schmale Blätter haben zur Stabilisierung einen Bohrungsbund.
Genauigkeit, Zahnform und seitlicher Freischliff entsprechen DIN 1840.



DIN 1837 A feingezahnt mit Winkelzahn Form A.
Gerade Zähne mit verhältnismäßig kleinen Zahntaschen.

– für dünnwandige Werkstücke und für geringe Schnitttiefen. Besonders geeignet zum Bearbeiten von spröden, kurzspanenden Werkstoffen.

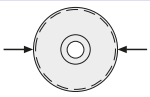
DIN 1838 B grobgezahnt mit Bogenzahn Form B.
Bogenförmige Zähne mit verhältnismäßig großen Zahntaschen.

– diese Blätter können durch bessere Spanbildung und mehr Spanraum universeller eingesetzt werden als DIN 1837 A. Sie werden für stärkeres Material und größere Schnitttiefen verwendet.

DIN 1838 C grobgezahnt mit Bogenzahn Form C.
Hochleistungs-Zahnung (HZ) mit Vor- und Nachschneider.
Der Vorschneider steht um 0,15-0,30 mm höher als der Nachschneider und ist an beiden Zahnecken abgeschrägt.
Dadurch teilen sich beide Zähne die Arbeit des Zerspanens.

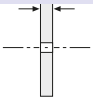
– besonders geeignet zum Trennen von Werkstücken mit niedriger bis mittlerer Festigkeit. Durch die spanteilende Zahnform wird eine hohe Spanleitung erreicht.

Herstellungsgenauigkeiten nach DIN und ISO für Metallkreissägeblätter HSS



Durchmesser-Toleranz nach ISO

	Nennmaßbereich in mm					
über bis	30 50	50 80	80 120	120 180	180 250	250 315
Toleranzfeld nach js 15 (µm)	+500 –500	+600 –600	+700 –700	+800 –800	+925 –925	+1050 –1050



Stärken-Toleranz nach ISO

	Nennmaßbereich in mm		
über bis	 1,0	1,0 3,0	3,0 6,0
Toleranzfeld nach js 11 (µm)	+20 –20	+30 –30	+38 –38



Bohrungs-Toleranz nach ISO

	Nennmaßbereich in mm					
über bis	3 6	6 10	10 18	18 30	30 50	50 80
Toleranzfeld nach js 15 (µm)	+12 0	+15 0	+18 0	+21 0	+25 0	+30 0



Rundlauf nach DIN 1840

Außen-Ø	Zul. Abweichg.
bis 100 mm	0,10 mm
über 100	0,16 mm



Stirnlauf (Seitenschlag) nach DIN 1840

Außen-Ø	Zul. Abweichg.
bis 40 mm	0,10 mm
über40 bis 100 mm	0,16 mm
über 100 bis 200 mm	0,25 mm
über 200 bis 315 mm	0,40 mm

SARA® VHM-Kreissägeblatt



202001....

- **Zahnform A**
- für kleine Schnitttiefen und kurzspaniges Material

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Z	
						fz	Kühl/Schmierstoffe
P	Stahl Stahl	bis 700 bis 1000	St-52 16 MnCr 5	1.0052 1.7131	150 120	0,010 - 0,030 0,005 - 0,020	Emulsion 1:20 Emulsion 1:10
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80	0,005 - 0,015	Emulsion 1:10
K	Grauguss		GG 25	0.6025	100	0,005 - 0,010	Trocken
S	Titan	bis 950	TiAl6V4	3.7165	60	0,003 - 0,005	Schneidöl
N	Kupferlegierungen Messinglegierungen Aluminium				300 500 1.000 - 2.000	0,020 - 0,040 0,010 - 0,040 0,010 - 0,040	Emulsion Emulsion Emulsion

SARA® VHM-Kreissägeblatt



202002....

- **Zahnform B**
- für Vollmaterial, große Schnitttiefen und langspaniges Material

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Z	
						fz	Kühl/Schmierstoffe
P	Stahl Stahl	bis 700 bis 1000	St-52 16 MnCr 5	1.0052 1.7131	150 120	0,010 - 0,030 0,005 - 0,020	Emulsion 1:20 Emulsion 1:10
M	INOX Stahl	500 - 950	X 5 CrNi 18 10	1.4301	80	0,005 - 0,015	Emulsion 1:10
K	Grauguss		GG 25	0.6025	100	0,005 - 0,010	Trocken
S	Titan	bis 950	TiAl6V4	3.7165	60	0,003 - 0,005	Schneidöl
N	Kupferlegierungen Messinglegierungen Aluminium				300 500 1.000 - 2.000	0,020 - 0,040 0,010 - 0,040 0,010 - 0,040	Emulsion Emulsion Emulsion



...suggestions are heard.

ATORN®
High quality for great performance

SARA® Metall-Kreissägeblatt, Präzisionsausführung

200150....
200151....

Die Tabellen ermöglichen die Wahl der korrekten Zahnteilung und der Werte für Vorschub und Umdrehung, bezogen auf die zu schneidenden Werkstoffe.
Sie beinhalten die beschriebenen Eigenschaften für ein optimales Kreissägeblatt sowie die Erfahrung unserer Ingenieure und vieler zufriedener Kunden.
Für die zu sägenden Werkstoffe können Zahnteilung für Rohre/Profile und Vollmaterial, Vorschub passend zur Zahnteilung sowie Umdrehungszahl des Sägeblattes, bezogen auf den Sägeblattdurchmesser, ermittelt werden.
Die Daten beziehen sich auf Kreissägeblätter mit blanker oder Special-OV-Oberfläche.
Mit Oberflächenbeschichtungen können die Werte für Vorschub und Umdrehungen erhöht werden.

Die Daten sind unverbindliche Erfahrungswerte. Beim Schneiden ist auf korrekte Aufspannung des Sägeblattes, ausreichende Kühlung, korrekte Maschinenbedienung sowie optimalen Zustand des Sägeblattes zu achten.

	P						M	
	Stähle bis 500 N/mm²		Stähle bis 600 N/mm²		Stähle bis 1200 N/mm²		INOX Stähle	
Rohre/Profile: Wandstärke	**Zahnteilung**		**Zahnteilung**		**Zahnteilung**		**Zahnteilung**	
< 1 mm	3		3		3		3	
1 - 1,5 mm	4		4		3		4	
1,5 - 2 mm	4		4		4		4	
2 - 3 mm	5		5		4		5	
> 3 mm	> 6		> 6		> 5		> 6	
Vollmaterial: Querschnitt								
10 - 20 mm	5		5		4		4	
20 - 40 mm	8		6		6		6	
40 - 60 mm	10		10		8		8	
60 - 90 mm	12		12		10		11	
90 - 110 mm	14		14		12		14	
110 - 130 mm	16		16		14		16	
130 - 150 mm	18		16		14		16	
Vorschub mm /min für Zahnteilung	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**
3	350	450	250	350	90	160	70	150
4	300	400	200	300	80	140	60	130
5	250	350	150	250	70	130	55	110
6	200	300	100	180	60	120	50	90
8	150	250	80	130	45	90	40	75
10	100	200	70	100	40	80	35	60
12	80	150	65	90	35	65	30	55
14	70	130	60	80	25	50	20	50
16	50	120	55	70	15	40	15	35
Umdrehungen pro min bei Sägeblattdurchmesser	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**
200	45	80	30	65	25	40	15	35
225	45	70	30	60	20	35	15	30
250	40	65	25	50	20	30	15	25
275	35	60	25	45	15	30	10	25
300	30	55	20	45	15	25	10	20
315	30	50	20	40	15	25	10	20
350	25	45	20	35	15	25	10	20
370	25	45	15	35	15	20	10	15
400	5	5	20	40	15	30	10	20

	K		N					
	Guss		Bronze und Kupfer		Aluminium-legierungen		Messing	
Rohre/Profile: Wandstärke	**Zahnteilung**		**Zahnteilung**		**Zahnteilung**		**Zahnteilung**	
< 1 mm	-		4		4		4	
1 - 1,5 mm	-		5		5		4	
1,5 - 2 mm	-		6		6		5	
2 - 3 mm	-		7		7		5	
> 3 mm	-		> 8		> 8		> 8	
Vollmaterial: Querschnitt								
10 - 20 mm	5		6		6		6	
20 - 40 mm	6		8		8		8	
40 - 60 mm	8		10		12		10	
60 - 90 mm	11		12 - 14		16		12	
90 - 110 mm	14		14 - 16		18		16	
110 - 130 mm	16		16 - 18		20		18	
130 - 150 mm	16		18 - 20		20		18	
Vorschub mm /min für Zahnteilung	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**
3	350	550	-	-	-	-	-	-
4	280	440	-	-	-	-	-	-
5	210	350	-	-	-	-	-	-
6	180	300	1.400	2.000	-	-	2.000	4.000
8	140	220	1.000	1.600	4.500	8.500	1.500	3.200
10	120	180	700	1.200	3.800	6.000	1.000	2.500
12	90	150	550	850	3.000	5.000	800	1.800
14	75	125	500	700	2.800	4.600	700	1.400
16	65	110	400	600	2.500	3.700	600	1.000
Umdrehungen pro min bei Sägeblattdurchmesser	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**	**Voll-material**	**Rohre/ Profile**
200	45	80	320	480	950	1500	650	950
225	45	70	300	430	850	1250	550	850
250	40	65	250	380	750	1100	500	770
275	35	60	230	350	700	1050	450	700
300	30	55	210	350	650	950	430	640
315	30	50	200	300	600	900	400	600
350	25	45	180	270	550	820	350	550
370	25	45	170	260	520	770	350	520
400	20	40	160	240	470	720	300	480

HSS-E-Fräser

Tabelle 1
Aus Tabelle 1 entnehmen Sie die Code-Zahl für die Schnittgeschwindigkeit des vorliegenden Werkstoffes.

Tabelle 2
Anhand der Code-Zahl (aus Tabelle 1) erhalten Sie die Schnittgeschwindigkeit und die Drehzahl, abhängig vom Durchmesser des verwendeten Werkzeugs.

1

ISO	Werkstoffgruppe	Werkstoff	Härte HB	Zug-Festigkeit N/mm²	Schnittgeschwindigkeit Code Nummer
P	Stahl	magnetisch, weicher Stahl	<120	<400	9
		Baustahl, Stahl für Einsatzhärtung	<200	<700	8
		Kohlenstoffstahl, unlegiert	<250	<850	7
		legierter Stahl	<250	<850	7
		legierter Stahl gehärtet und angelassen	250-350	850-1200	6
		legierter Stahl gehärtet und angelassen	>350	>1200	4
M	INOX Stahl	gut bearbeitbar	<250	<850	6
		austenitisch	<250	<850	5
		ferritisch, austenitisch	<300	<1000	4
K	Gusseisen	mit Lamellengraphit	<150	<500	8
		mit Lamellengraphit	150-300	500-1000	7
		mit Kugelgraphit, Temperguss	<200	<700	8
		mit Kugelgraphit, Temperguss	200-300	700-1000	6
S	Titan	Titan, unlegiert	<200	<700	5
		Titan, legiert	<270	<900	4
		Titan, legiert	270-350	900-1250	3
	Nickel	Nickel, unlegiert	<150	<500	2
		Nickel, legiert	>270	>900	2
		Nickel, legiert	270-350	900-1200	1
N	Kupfer	Kupfer	<100	<350	12
		Messing, Bronze	<200	<700	9
		Messing	<200	<700	10
		hochfeste Bronze	<470	<1500	5
	Aluminium, Magnesium	Al, Mg, unlegiert	<100	<350	13
		Al legiert, Si < 5%	<150	<500	12
		Al legiert, Si 5-10%	<120	<400	11
		Al legiert, Si >10% Whisker verstärkte Al- und Mg-Legierungen	<120	<400	10
	Synthetische Werkstoffe	Thermoplastische Kunststoffe	-	-	12
		Warmaushärtende Kunststoffe	-	-	11
		Faserverstärkte Kunststoffe	-	-	11

2

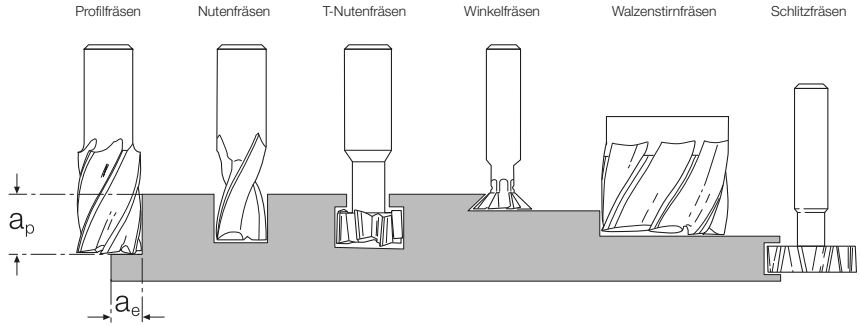
Code Nummer	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vc m/min	6	8	10	12	16	20	25	32	40	50	60	80	100	125	160	200
Ø mm	U/min															
2,0	955	1273	1592	1910	2546	3183	3979	5093	6366	7958	9549	12732	15915	19894	25465	31831
2,5	764	1019	1273	1528	2037	2546	3183	4074	5093	6366	7639	10186	12732	15915	20372	25465
3,0	637	849	1061	1273	1698	2122	2653	3395	4244	5305	6366	8488	10610	13263	16977	21221
4,0	477	637	796	955	1273	1592	1989	2546	3183	3979	4775	6366	7958	9947	12732	15915
5,0	382	509	637	764	1019	1273	1592	2037	2546	3183	3820	5093	6366	7958	10186	12732
6,0	318	424	531	637	849	1061	1326	1698	2122	2653	3183	4244	5305	6631	8488	10610
8,0	239	318	398	477	637	796	995	1273	1592	1989	2387	3183	3979	4974	6366	7958
10,0	191	255	318	382	509	637	796	1019	1273	1592	1910	2546	3183	3979	5093	6366
12,0	159	212	265	318	424	531	663	849	1061	1326	1592	2122	2653	3316	4244	5305
16,0	119	159	199	239	318	398	497	637	796	995	1194	1592	1989	2487	3183	3979
20,0	95	127	159	191	255	318	398	509	637	796	955	1273	1592	1989	2546	3183
25,0	76	102	127	153	204	255	318	407	509	637	764	1019	1273	1592	2037	2546
32,0	60	80	99	119	159	199	249	318	398	497	597	796	995	1243	1592	1989
40,0	48	64	80	95	127	159	199	255	318	398	477	637	796	995	1273	1592
50,0	38	51	64	76	102	127	159	204	255	318	382	509	637	796	1019	1273
63,0	30	40	51	61	81	101	126	162	202	253	303	404	505	632	808	1011
80,0	24	32	40	48	64	80	99	127	159	199	239	318	398	497	637	796
100,0	19	25	32	38	51	64	80	102	127	159	191	255	318	398	509	637
125,0	15	20	25	31	41	51	64	81	102	127	153	204	255	318	407	509
160,0	12	16	20	24	32	40	50	64	80	99	119	159	199	249	318	398

Tabelle 3
Hier kann der Querschnitt des Schnitts gewählt werden, mit dem gearbeitet wird; dies ergibt wiederum den empfohlenen Werkzeugtyp und den Buchstaben des Vorschubcodes.

Tabelle 4
Vorschubcode-Buchstaben und Schnittgeschwindigkeitscodezahl in Tabelle 4 ergeben den Vorschub (Vf).

3

Werkzeug-Einsatz	Profilfräsen												Nutenfräsen				Spezial		Spezial					
Radiale Schnittbreite ae	0.125 X D			0.25 X D			0.5 X D			0.75 X D			1 X D				0.5 X D	0.25 X D	0.75 X D					
Axiale Schnitttiefe ap	1.25 X D	1.5 X D	2.0 X D	1.25 X D	1.5 X D	2.0 X D	1.25 X D	1.5 X D	2.0 X D	1.25 X D	1.5 X D	2.0 X D	0.5 X D	1 X D	1.5 X D	2 X D	0.5 X D	0.5 X D	3.0 mm	6.0 mm	10.0 mm	6.0 mm	12.0 mm	20.0 mm
Werkzeugtyp	Vorschub Code																							
Einwegfräser	-	-	-	-	-	-	J	I	H	G	E	C	L	F	-	-	-	-	-	-	-	-	-	-
2-Schneider	-	-	-	-	-	-	-	-	-	-	-	-	J	E	-	-	-	-	-	-	-	-	-	-
3-Schneider	-	-	-	-	-	-	I	H	G	F	D	B	J	E	-	-	-	-	-	-	-	-	-	-
3-Schneider Alu	-	-	-	-	-	-	M	L	J	I	G	F	N	H	E	-	-	-	-	-	-	-	-	-
Mehrschneider	P	P	M	N	L	I	K	I	G	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Schruppfräser	-	-	-	-	-	-	L	L	L	J	H	F	L	J	F	C	-	-	-	-	-	-	-	-
Schruppfräser (fein)	-	-	-	-	-	-	M	M	M	M	K	I	M	M	I	E	-	-	-	-	-	-	-	-
T-Nuten-Fräser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	J	-	-	-	-	-	-	-
Schlitzfräser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	E	-	-	-	-	-	-
Winkelfräser	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	G	-	-	-	-	-	-
Walzenstirnfräser																								
Schlicht	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	J	J	H	-	-	-
Schrupp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	J	J	H



Hinweis:
Alle Angaben für das Fräsen gelten für eine starre Einrichtung, inklusive Aufspannung, ausreichender Maschinenleistung sowie Anwendung von Kühlmittel.
Die Vorschläge für Schnittgeschwindigkeiten und Vorschübe können modifiziert (erhöht oder reduziert) werden, um den Anforderungen des Bearbeitungsvorganges unter Berücksichtigung aller Umstände zu entsprechen.

4

Schnittgeschw.-CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vorschub-CODE	**Vorschub (Vf) mm / min**															
A	6	8	10	12	16	20	25	32	40	50	60	80	100	120	160	200
B	7	9	11	14	18	22	28	35	45	55	70	90	110	140	180	220
C	8	10	12	16	20	25	32	40	50	60	80	100	120	160	200	250
D	9	11	14	18	22	28	35	45	55	70	90	110	140	180	220	280
E	10	12	16	20	25	32	40	50	60	80	100	120	160	200	250	320
F	11	14	18	22	28	35	45	55	70	90	110	140	180	220	280	350
G	12	16	20	25	32	40	50	60	80	100	120	160	200	250	320	400
H	14	18	22	28	35	45	55	70	90	110	140	180	220	280	350	450
I	16	20	25	32	40	50	60	80	100	120	160	200	250	320	400	500
J	18	22	28	35	45	55	70	90	110	140	180	220	280	350	450	560
K	20	25	32	40	50	60	80	100	120	160	200	250	320	400	500	600
L	22	28	35	45	55	70	90	110	140	180	220	280	350	450	560	700
M	25	32	40	50	60	80	100	120	160	200	250	320	400	500	600	800
N	28	35	45	55	70	90	110	140	180	220	280	350	450	560	700	900
O	32	40	50	60	80	100	120	160	200	250	320	400	500	600	800	1000
P	35	45	55	70	90	110	140	180	220	280	350	450	560	700	900	1100

Hinweis: Für HSS/Co-Werkzeuge sind die angegebenen Werte für Schnittgeschwindigkeit und Vorschub als Ausgangswert zu verwenden.
Bei Fräsern in langer Ausführung sollte der Vorschub (Vf) halbiert werden. Alle Beschichtungen aus TiAlN, TiN und TiCN erlauben höhere Schnittgeschwindigkeiten und Vorschübe und ergeben eine längere Standzeit.
Bei allen Beschichtungen empfehlen wir als Ausgangswerte um bis zu 50% höhere Schnittgeschwindigkeiten und Vorschübe.

ATORN® HSS-E-PM-Fräser

Nutenfräsen

Die angegebenen Richtwerte gelten für die Ausführung TiAlN-Beschichtung, für unbeschichtete Werkzeuge sind die Schnittgeschwindigkeiten um 20-30% zu reduzieren.
Außerdem sind die Richtwerte der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!


226205....


226215....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesserbereich in mm 4,0 - 5,0	6,0 - 7,0	8,0 - 9,0	10,0	12,0 - 14,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	45 - 75	0,020	0,030	0,035	0,058	0,069
	Automatenstahl	bis 700	9 SMn 28	1.0715	45 - 75	0,020	0,030	0,035	0,058	0,069
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	45 - 75	0,020	0,030	0,035	0,058	0,069
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	45 - 65	0,020	0,030	0,035	0,058	0,060
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	30 - 45	0,014	0,030	0,035	0,058	0,060
	Stahlguss	bis 950	GS 40	1.0416	30 - 45	0,020	0,030	0,035	0,058	0,069
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	30 - 45	0,012	0,025	0,030	0,052	0,052
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	30 - 45	0,012	0,025	0,030	0,052	0,052
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	30 - 45	0,012	0,025	0,030	0,052	0,052
K	Grauguss	bis 240 HB	GG 25	0.6025	35 - 65	0,020	0,030	0,035	0,058	0,069
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	25 - 45	0,014	0,030	0,035	0,058	0,069
	Sphäroguss	bis 300 HB	GGG 60	0.7060	25 - 45	0,014	0,030	0,035	0,058	0,069
	Temperguss	bis 300 HB	GTS 55	0.8155	25 - 45	0,020	0,030	0,035	0,058	0,069
H	Hartguss	300 - 600		Ampco	20 - 35	0,012	0,025	0,030	0,052	0,052
	gehärteter Stahl	45 - 50 HRc			20 - 35	0,012	0,025	0,030	0,052	0,052
	gehärteter Stahl	50 - 60 HRc			10 - 20	0,012	0,025	0,030	0,052	0,052

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub Fz mm/U bezogen auf Fräserdurchmesserbereich in mm 16,0 - 18,0	20,0	25,0 - 28,0		
P	unlegierter Baustahl	bis 700	St-52	1.0052	45 - 75	0,115	0,115	0,115		
	Automatenstahl	bis 700	9 SMn 28	1.0715	45 - 75	0,115	0,115	0,115		
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	45 - 75	0,115	0,115	0,115		
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	45 - 65	0,115	0,115	0,115		
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	30 - 45	0,115	0,115	0,115		
	Stahlguss	bis 950	GS 40	1.0416	30 - 45	0,115	0,115	0,115		
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	30 - 45	0,075	0,075	0,075		
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	30 - 45	0,075	0,075	0,075		
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	30 - 45	0,075	0,075	0,075		
K	Grauguss	bis 240 HB	GG 25	0.6025	35 - 65	0,115	0,115	0,115		
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	25 - 45	0,115	0,115	0,115		
	Sphäroguss	bis 300 HB	GGG 60	0.7060	25 - 45	0,115	0,115	0,115		
	Temperguss	bis 300 HB	GTS 55	0.8155	25 - 45	0,115	0,115	0,115		
H	Hartguss	300 - 600 HB		Ampco	20 - 35	0,075	0,075	0,075		
	gehärteter Stahl	45 - 50 HRc			20 - 35	0,075	0,075	0,075		
	gehärteter Stahl	50 - 60 HRc			10 - 20	0,075	0,075	0,075		

	ap	Korrekturfaktor Vorschub
2-Schneider: ae = D	0,5 x D	0,6
3-Schneider: ae = D	0,5 x D	0,7



...dreams come true.

ATORN®
High quality for great performance

ATORN® HSS-E-PM-Fräser



Die angegebenen Richtwerte gelten für die Ausführung TiAlN-Beschichtung, für unbeschichtete Werkzeuge sind die Schnittgeschwindigkeiten um 20-30% zu reduzieren.
Außerdem sind die Richtwerte der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

226225....
226235....

ISO	Werkstoffgruppe	Festigkeit/Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesserbereich in mm 4,0 - 5,0	6,0 - 7,0	8,0 - 9,0	10,0	12,0 - 14,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	45 - 75	0,020	0,030	0,035	0,058	0,069
	Automatenstahl	bis 700	9 SMn 28	1.0715	45 - 75	0,020	0,030	0,035	0,058	0,069
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	45 - 75	0,020	0,030	0,035	0,058	0,069
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	45 - 65	0,020	0,030	0,035	0,058	0,060
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	30 - 45	0,014	0,030	0,035	0,058	0,060
	Stahlguss	bis 950	GS 40	1.0416	30 - 45	0,020	0,030	0,035	0,058	0,069
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	30 - 45	0,012	0,025	0,030	0,052	0,052
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	30 - 45	0,012	0,025	0,030	0,052	0,052
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	30 - 45	0,012	0,025	0,030	0,052	0,052
K	Grauguss	bis 240 HB	GG 25	0.6025	35 - 65	0,020	0,030	0,035	0,058	0,069
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	25 - 45	0,014	0,030	0,035	0,058	0,069
	Sphäroguss	bis 300 HB	GGG 60	0.7060	25 - 45	0,014	0,030	0,035	0,058	0,069
	Temperguss	bis 300 HB	GTS 55	0.8155	25 - 45	0,020	0,030	0,035	0,058	0,069
H	Hartguss	300 - 600 HB		Ampco	20 - 35	0,012	0,025	0,030	0,052	0,052
	gehärteter Stahl	45 - 50 HRc			20 - 35	0,012	0,025	0,030	0,052	0,052
	gehärteter Stahl	50 - 60 HRc			10 - 20	0,012	0,025	0,030	0,052	0,052

ISO	Werkstoffgruppe	Festigkeit/Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesserbereich in mm 16,0 - 18,0	20,0	25,0 - 28,0		
P	unlegierter Baustahl	bis 700	St-52	1.0052	45 - 75	0,115	0,115	0,115		
	Automatenstahl	bis 700	9 SMn 28	1.0715	45 - 75	0,115	0,115	0,115		
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	45 - 75	0,115	0,115	0,115		
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	45 - 65	0,115	0,115	0,115		
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	30 - 45	0,115	0,115	0,115		
	Stahlguss	bis 950	GS 40	1.0416	30 - 45	0,115	0,115	0,115		
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	30 - 45	0,075	0,075	0,075		
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	30 - 45	0,075	0,075	0,075		
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	30 - 45	0,075	0,075	0,075		
K	Grauguss	bis 240 HB	GG 25	0.6025	35 - 65	0,115	0,115	0,115		
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	25 - 45	0,115	0,115	0,115		
	Sphäroguss	bis 300 HB	GGG 60	0.7060	25 - 45	0,115	0,115	0,115		
	Temperguss	bis 300 HB	GTS 55	0.8155	25 - 45	0,115	0,115	0,115		
H	Hartguss	300 - 600 HB		Ampco	20 - 35	0,075	0,075	0,075		
	gehärteter Stahl	45 - 50 HRc			20 - 35	0,075	0,075	0,075		
	gehärteter Stahl	50 - 60 HRc			10 - 20	0,075	0,075	0,075		

	ap	Korrekturfaktor Vorschub
ae = 0,1 x D	1,5 x D	1
ae = 0,25 x D	1,5 x D	0,7
ae = 0,5 x D	1,5 x D	0,4



… for special measurement tasks

ATORN®
High quality for great performance

ATORN® HSS-E-PM-Fräser

Die angegebenen Richtwerte gelten für die Ausführung TiAlN-Beschichtung, für unbeschichtete Werkzeuge sind die Schnittgeschwindigkeiten um 20-30% zu reduzieren.
Außerdem sind die Richtwerte der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

226245....
226265....
226255....
226275....
226247....



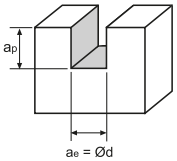
ISO	Werkstoffgruppe	Festigkeit/Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesserbereich in mm 4,0 - 5,0	6,0 - 7,0	8,0 - 9,0	10,0	12,0 - 14,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	45 - 75	0,020	0,030	0,035	0,058	0,069
	Automatenstahl	bis 700	9 SMn 28	1.0715	45 - 75	0,020	0,030	0,035	0,058	0,069
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	45 - 75	0,020	0,030	0,035	0,058	0,069
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	45 - 65	0,020	0,030	0,035	0,058	0,060
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	30 - 45	0,014	0,030	0,035	0,058	0,060
	Stahlguss	bis 950	GS 40	1.0416	30 - 45	0,020	0,030	0,035	0,058	0,069
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	30 - 45	0,012	0,025	0,030	0,052	0,052
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	30 - 45	0,012	0,025	0,030	0,052	0,052
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	30 - 45	0,012	0,025	0,030	0,052	0,052
K	Grauguss	bis 240 HB	GG 25	0.6025	35 - 65	0,020	0,030	0,035	0,058	0,069
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	25 - 45	0,014	0,030	0,035	0,058	0,069
	Sphäroguss	bis 300 HB	GGG 60	0.7060	25 - 45	0,014	0,030	0,035	0,058	0,069
	Temperguss	bis 300 HB	GTS 55	0.8155	25 - 45	0,020	0,030	0,035	0,058	0,069
H	Hartguss	300 - 600		Ampco	20 - 35	0,012	0,025	0,030	0,052	0,052
	gehärteter Stahl	45 - 50 HRc			20 - 35	0,012	0,025	0,030	0,052	0,052
	gehärteter Stahl	50 - 60 HRc			10 - 20	0,012	0,025	0,030	0,052	0,052

ISO	Werkstoffgruppe	Festigkeit/Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesserbereich in mm 16,0 - 18,0	20,0	25,0 - 28,0		
P	unlegierter Baustahl	bis 700	St-52	1.0052	45 - 75	0,115	0,115	0,115		
	Automatenstahl	bis 700	9 SMn 28	1.0715	45 - 75	0,115	0,115	0,115		
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	45 - 75	0,115	0,115	0,115		
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	45 - 65	0,115	0,115	0,115		
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	30 - 45	0,115	0,115	0,115		
	Stahlguss	bis 950	GS 40	1.0416	30 - 45	0,115	0,115	0,115		
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	30 - 45	0,075	0,075	0,075		
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	30 - 45	0,075	0,075	0,075		
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	30 - 45	0,075	0,075	0,075		
K	Grauguss	bis 240 HB	GG 25	0.6025	35 - 65	0,115	0,115	0,115		
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	25 - 45	0,115	0,115	0,115		
	Sphäroguss	bis 300 HB	GGG 60	0.7060	25 - 45	0,115	0,115	0,115		
	Temperguss	bis 300 HB	GTS 55	0.8155	25 - 45	0,115	0,115	0,115		
H	Hartguss	300 - 600		Ampco	20 - 35	0,075	0,075	0,075		
	gehärteter Stahl	45 - 50 HRc			20 - 35	0,075	0,075	0,075		
	gehärteter Stahl	50 - 60 HRc			10 - 20	0,075	0,075	0,075		

	ap	Korrekturfaktor Vorschub
ae = 0,25 x D	1,5 x D	1
ae = 0,5 x D	1,5 x D	0,7
ae = D	1 x D	0,4

ATORN® Mini-Schaftfräser, Mini-Torusfräser *RockTec 52*

Die niedrigeren Vc-Werte gelten jeweils für lange Freistellungen und den kleineren Durchmesserbereich, die höheren Vc-Werte für kurze Freilängen und den größeren Durchmesserbereich.
Das gilt auch für die angegebenen ap max. Werte.
Die angebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen.





257001....
257009....
257023....

ISO	Werkstoffgruppe	Festigkeit/Härte N/mm²	Durchmesserbereich ≤ 0,5 mm Vc m/min	ap max.	Durchmesserbereich 0,6 - 1 mm Vc m/min	ap max.	Durchmesserbereich > 1 mm Vc m/min	ap max.	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 0,1 - 0,3	0,4 - 0,8	0,9 - 1,5	1,6 - 2,0	2,5 - 3,0
P	Stahl- , Stahlguss	< 700	60 - 80	0,003 - 0,025	70 - 90	0,004 - 0,050	80 - 100	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Stahl- , Stahlguss	< 1100	60 - 80	0,003 - 0,025	70 - 90	0,004 - 0,050	80 - 100	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Stahl	< 1300	60 - 80	0,002 - 0,020	70 - 90	0,003 - 0,045	80 - 100	0,015 - 0,35	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Stahl	< 1600	60 - 80	0,002 - 0,020	70 - 90	0,003 - 0,045	80 - 100	0,015 - 0,35	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
M	INOX Stahl		50 - 70	0,003 - 0,025	60 - 80	0,004 - 0,050	70 - 90	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
K	GG		50 - 70	0,003 - 0,025	60 - 80	0,004 - 0,050	70 - 90	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	GGG		50 - 70	0,003 - 0,025	60 - 80	0,004 - 0,050	70 - 90	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Temperguss		50 - 70	0,003 - 0,025	60 - 80	0,004 - 0,050	70 - 90	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
S	Titan, Titanlegierung	> 700	50 - 70	0,003 - 0,025	60 - 80	0,004 - 0,050	70 - 90	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Ni- /Co- Legierung	< 35 HRc	50 - 70	0,002 - 0,020	60 - 80	0,003 - 0,045	70 - 90	0,015 - 0,35	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Ni- /Co- Legierung	< 45 HRc	40 - 60	0,002 - 0,020	50 - 70	0,003 - 0,040	60 - 80	0,015 - 0,30	0,002 - 0,005	0,003 - 0,007	0,008 - 0,014	0,012 - 0,023	0,018 - 0,035
H	gehärtete Stähle	< 52 HRc	30 - 50	0,002 - 0,020	40 - 60	0,003 - 0,040	50 - 70	0,015 - 0,15	0,002 - 0,004	0,002 - 0,007	0,006 - 0,012	0,011 - 0,018	0,016 - 0,022

SARA® VHM-Schaftfräser

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



254050....



254054....
254056....



254052....

ISO	Werkstoff-gruppe	Materialbezeichnung	Festigkeit/ Härte	Vc m/min	Vorschub fz mm ≤Ø 2	≤Ø 4	≤Ø 8	≤Ø 12	≤Ø 16	≤Ø 20
P	1.1.1	Automatenstahl	bis 500 N/mm²	160	0,010	0,020	0,040	0,050	0,060	0,070
	1.1.2		über 500 N/mm²	110	0,010	0,020	0,040	0,050	0,060	0,070
	1.2.1	Baustahl	unlegiert bis 500 N/mm²	160	0,015	0,030	0,050	0,050	0,070	0,080
	1.2.2		unlegiert über 500 N/mm²	112	0,015	0,030	0,050	0,050	0,070	0,080
	1.2.3		legiert	90	0,010	0,020	0,040	0,050	0,060	0,070
	2.1.1	Einsatzstahl	bis 150 HB	140	0,010	0,020	0,040	0,050	0,060	0,070
	2.1.2		150-200 HB	110	0,007	0,015	0,030	0,040	0,050	0,060
	2.1.3		über 200 HB	90	0,007	0,015	0,030	0,040	0,050	0,060
	2.2.1	Nitrierstahl	bis 1000 N/mm²	110	0,007	0,015	0,030	0,040	0,050	0,060
	2.2.2		über 1000 N/mm²	80	0,007	0,015	0,030	0,040	0,050	0,060
	2.3.1	Vergütungsstahl	unlegiert bis 800 N/mm²	120	0,007	0,015	0,030	0,040	0,050	0,060
	2.3.2	Werkzeugstahl	unlegiert 800-1000 N/mm²	110	0,007	0,015	0,030	0,040	0,050	0,060
	2.3.3		legiert bis 800 N/mm²	110	0,007	0,015	0,030	0,040	0,050	0,060
	2.3.4		legiert 800-1000 N/mm²	90	0,007	0,015	0,030	0,040	0,050	0,060
	2.3.5		legiert 1000-1300 N/mm²	80	0,007	0,015	0,030	0,040	0,050	0,060
	5.1.1	konventioneller	unlegiert	150	0,015	0,030	0,050	0,050	0,070	0,080
	5.1.2	Stahlguss	niedrig legiert	120	0,015	0,030	0,050	0,050	0,070	0,080
	5.1.3		hoch legiert	90	0,015	0,030	0,050	0,050	0,070	0,080
M	4.1.1	INOX Stahl	ferritisch	70	0,005	0,010	0,020	0,030	0,040	0,050
	4.1.2		martensitisch	56	0,005	0,010	0,020	0,030	0,040	0,050
	4.1.3		austenitisch A5 <40%	70	0,005	0,010	0,020	0,030	0,040	0,050
	4.1.4		austenitisch A5 >40%	70	0,005	0,010	0,020	0,030	0,040	0,050
	4.1.5		geschwefelt	84	0,005	0,010	0,020	0,030	0,040	0,050
	5.2.1	INOX Stahlguss	ferritisch / martensitisch	70	0,005	0,010	0,020	0,030	0,040	0,050
	5.2.2		austenitisch	70	0,005	0,010	0,020	0,030	0,040	0,050
K	6.1.1	GG	unlegiert bis 180 HB	156	0,018	0,035	0,060	0,070	0,090	0,120
	6.1.2	(mit lamellarem	unlegiert über 180 HB	130	0,018	0,035	0,060	0,070	0,090	0,120
	6.1.3	Graphit)	legiert	104	0,007	0,015	0,030	0,040	0,050	0,060
	6.1.4		hoch legiert	90	0,007	0,015	0,030	0,040	0,050	0,060
	6.2.1	GGG	unlegiert bis 180 HB	156	0,015	0,030	0,050	0,050	0,070	0,080
	6.2.2	(mit Kugelgraphit)	unlegiert über 180 HB	130	0,015	0,030	0,050	0,050	0,070	0,080
	6.2.3		legiert	104	0,005	0,010	0,020	0,030	0,040	0,050
	6.3.1	GTW	bis 180 HB	156	0,018	0,035	0,060	0,070	0,090	0,120
	6.3.2	(weisser Temperguss)	über 180 HB	130	0,018	0,035	0,060	0,070	0,090	0,120
	6.4.1	GTS	bis 180 HB	156	0,018	0,035	0,060	0,070	0,090	0,120
	6.4.2	(schwarzer Temperguss)	über 180 HB	130	0,018	0,035	0,060	0,070	0,090	0,120
N	7.1.1	Aluminium	unlegiert	500	0,021	0,040	0,060	0,080	0,150	0,20
	7.1.2		Knetleg. nicht ausgehärtet	500	0,021	0,040	0,060	0,080	0,150	0,20
	7.1.3		Knetlegierung ausgehärtet	500	0,021	0,040	0,060	0,080	0,150	0,20
	7.1.4		Gusslegierung bis 6% Si	400	0,021	0,040	0,060	0,080	0,150	0,20
	7.1.5		Gusslegierung 6-12% Si	300	0,015	0,030	0,050	0,070	0,120	0,170
	7.1.6		Gusslegierung über 12% Si	200	0,015	0,030	0,050	0,070	0,120	0,170
	7.2.1	Magnesium	Knetlegierung	180	0,015	0,030	0,050	0,070	0,120	0,170
	7.2.2		Gusslegierung	160	0,015	0,030	0,050	0,070	0,120	0,170
	7.3.1	Kupfer	unlegiert	140	0,010	0,020	0,040	0,060	0,080	0,120
	7.3.2		Knetleg. nicht ausgehärtet	120	0,010	0,020	0,040	0,060	0,080	0,120
	7.3.3		Knetlegierung ausgehärtet	100	0,010	0,020	0,040	0,060	0,080	0,120
	7.3.4		CuNi-Legierung	120	0,010	0,020	0,040	0,060	0,080	0,120
	7.3.5		CuNiZn-Leg. langspanend	100	0,010	0,020	0,040	0,060	0,080	0,120
	7.3.6		CuNiZn-Leg. kurzspanend	120	0,010	0,020	0,040	0,060	0,080	0,120
	7.4.1	CuZn (Messing)	CuZn langspanend	150	0,010	0,020	0,040	0,060	0,080	0,120
	7.4.2		CuZn kurzspanend	200	0,010	0,020	0,040	0,060	0,080	0,120
	7.5.1	CuSn (Bronze)	CuSn langspanend	120	0,010	0,020	0,040	0,060	0,080	0,120
	7.5.2		CuSn kurzspanend	140	0,010	0,020	0,040	0,060	0,080	0,120
	7.6.1	CuAlFe (Ampco)	CuAlFe langspanend	120	0,010	0,020	0,040	0,060	0,080	0,120
	7.6.2		CuAlFe kurzspanend	140	0,010	0,020	0,040	0,060	0,080	0,120
S	4.2.1	hochwarmfeste	Fe-Legierung	30	0,010	0,010	0,020	0,030	0,040	0,050
	4.2.2	Legierung	Ni-Leg. nicht ausgehärtet	30	0,010	0,010	0,020	0,030	0,040	0,050
	4.2.3		Ni-Legierung ausgehärtet	30	0,010	0,010	0,020	0,030	0,040	0,050
	4.2.4		Co-Legierung	30	0,010	0,010	0,020	0,030	0,040	0,050
	7.8.1	Titan	unlegiert	50	0,010	0,010	0,020	0,030	0,040	0,050
	7.8.2		legiert, weichgeglüht	35	0,010	0,010	0,020	0,030	0,040	0,050
	7.8.3		legiert, ausgehärtet	20	0,010	0,010	0,020	0,030	0,040	0,050

Schnittgeschwindigkeits- und Vorschubkorrekturfaktoren

ae	10 %	20 %	50 %	100%
Faktor für Vc	1,30	1,10	1,00	0,85
Faktor für fz	1,50	1,30	1,00	0,80

VHM-Schaftfräser

Anwendungshinweise:
Um den zu bearbeitenden Werkstoff zuzuordnen, nutzen Sie bitte die Tabelle der Seite 20-63

Tabelle 1
Aus Tabelle 1 entnehmen Sie die Code-Zahl für die Schnittgeschwindigkeit des vorliegenden Werkstoffes.

1

ISO	Werkstoffgruppe	Werkstoff	Härte HB	Zug-Festigkeit N/mm²	Schnittgeschwindigkeit Code Nummer
P	Stahl	magnetisch, weicher Stahl	<120	<400	11
		Baustahl, Stahl für Einsatzhärtung	<200	<700	10
		Kohlenstoffstahl,unlegiert	<250	<850	9
		legierter Stahl	<250	<850	9
		legierter Stahl gehärtet und angelassen	250-350	850-1200	8
		legierter Stahl gehärtet und angelassen	>350	>1200	6
M	INOX Stahl	gut bearbeitbar	<250	<850	9
		austenitisch	<250	<850	8
		ferritisch, austenitisch	<300	<1000	7
K	Gusseisen	mit Lamellengraphit	<150	<500	10
		mit Lamellengraphit	150-300	500-1000	9
		mit Kugelgraphit, Temperguss	<200	<700	10
		mit Kugelgraphit, Temperguss	200-300	700-1000	7
S	Titan	Titan, unlegiert	<200	<700	8
		Titan, legiert	<270	<900	7
		Titan, legiert	270-350	900-1250	5
	Nickel	Nickel, unlegiert	<150	<500	8
		Nickel, legiert	>270	>900	5
		Nickel, legiert	270-350	900-1200	3
N	Kupfer	Kupfer	<100	<350	14
		Messing, Bronze	<200	<700	11
		Messing	<200	<700	12
		hochfeste Bronze	<470	<1500	7
	Aluminium, Magnesium	Al, Mg, unlegiert	<100	<350	15
		Al legiert, Si< 5%	<150	<500	14
		Al legiert, Si 5-10%	<120	<400	12
		Al legiert, Si>10% Whisker verstärkte Al- und Mg-Legierungen	<120	<400	10
	Synthetische Werkstoffe	Thermoplastische Kunststoffe	-	-	14
		Warmaushärtende Kunststoffe	-	-	13
		Faserverstärkte Kunststoffe	-	-	13

2

Code Nummer	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vc m/min	14	19	24	30	38	48	60	72	96	120	150	192	240	300	384	480
Ø mm	U/min															
2.0	2292	3055	3820	4775	6112	7639	9550	11459	15278	19098	23873	30558	38197	47747	61116	76394
2.5	1834	2444	3055	3820	4889	6112	7639	9167	12223	15278	19098	24446	30558	38197	48893	61116
3.0	1528	2038	2546	3184	4074	5093	6366	7639	10186	12732	15916	20372	25465	31831	40744	50929
4.0	1146	1528	1910	2387	3055	3820	4775	5730	7639	9550	11936	15278	19098	23873	30558	38197
5.0	917	1223	1528	1910	2444	3055	3820	4584	6112	7639	9550	12223	15278	19098	24446	30558
6.0	764	1019	1273	1591	2038	2546	3184	3820	5093	6366	7957	10186	12732	15916	20372	25465
8.0	572	764	955	1194	1528	1910	2387	2864	3820	4775	5969	7639	9550	11936	15278	19098
10.0	458	611	764	955	1223	1528	1910	2292	3055	3820	4775	6112	7639	9550	12223	15278
12.0	382	509	637	796	1019	1273	1591	1910	2546	3184	3979	5093	6366	7957	10186	12732
16.0	287	382	478	596	764	955	1194	1433	1910	2387	2984	3820	4775	5969	7639	9550
20.0	229	306	382	478	611	764	955	1146	1528	1910	2387	3055	3820	4775	6112	7639
25.0	184	245	306	382	488	611	764	917	1223	1528	1910	2444	3055	3820	4889	6112

VHM-Schaftfräser Fortsetzung

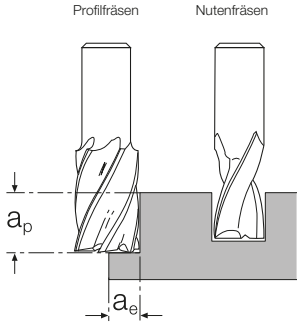
Tabelle 2
Anhand der Code-Zahl (aus Tabelle 1) erhalten Sie die Schnittgeschwindigkeit und die Drehzahl, abhängig vom Durchmesser des verwendeten Werkzeugs.

Tabelle 3
Hier kann der Querschnitt des Schnitts gewählt werden, mit dem gearbeitet wird; dies ergibt wiederum den empfohlenen Werkzeugtyp und den Buchstaben des Vorschubcodes.

Tabelle 4
Vorschubcode-Buchstaben und Schnittgeschwindigkeitscodezahl in Tabelle 4 ergeben den Vorschub (Vf).

3

Werkzeug-Einsatz	PROFIL-FRÄSEN												NUTEN-FRÄSEN											
Radiale Schnittbreite	0.125 x D			0.25 x D			0,5 x D			0.75 x D			1 x D											
Axiale Schnittiefe	1.25 x D	1.5 x D	2.0 x D	1.25 x D	1.5 x D	2.0 x D	1.25 x D	1.5 x D	2.0 x D	1.25 x D	1.5 x D	2.0 x D	0.5 x D	1 x D	1.5 x D	2 x D								
Werkzeug-Typ	Vorschub-Code																							
2-Schneider	-	-	-	-	-	-	-	-	-	-	-	-	J	E	-	-								
3-Schneider	-	-	-	-	-	-	I	H	G	F	D	B	J	E	-	-								
4-Schneider	P	P	M	N	L	I	K	I	G	-	-	-	-	-	-	-								
60° Fräser	N	N	K	O	J	G	I	G	E	-	-	-	-	-	-	-								
2-Schneider Alu	-	-	-	-	-	-	L	K	I	H	F	E	M	G	D	-								
Schruppfräser	-	-	-	-	-	-	L	L	L	J	H	F	L	J	F	C								
Schruppfräser (Fein)	-	-	-	-	-	-	M	M	M	M	K	I	M	M	I	C								



Hinweis:
Alle Angaben für das Fräsen gelten für eine starre Einrichtung, inklusive Aufspannung, ausreichender Maschinenleistung sowie Anwendung von Kühlmittel.
Die Vorschläge für Schnittgeschwindigkeiten und Vorschübe können modifiziert (erhöht oder reduziert) werden, um den Anforderungen des Bearbeitungsvorganges unter Berücksichtigung aller Umstände zu entsprechen.

4

Schnittgeschw.-CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Vorschub-CODE	**Vorschub (Vf) mm / min**															
A	12	14	19	24	30	38	48	60	72	96	120	144	192	240	300	384
B	13	17	22	26	34	42	54	66	84	108	132	168	216	264	336	420
C	14	19	24	30	38	48	60	72	96	120	144	192	240	300	384	480
D	17	22	26	34	42	54	66	84	108	132	168	216	264	336	420	540
E	19	24	30	38	48	60	72	96	120	144	192	240	300	384	480	600
F	22	26	34	42	54	66	84	108	132	168	216	264	336	420	540	672
G	24	30	38	48	60	72	96	120	144	192	240	300	384	480	600	720
H	26	34	42	54	66	84	108	132	168	216	264	336	420	540	672	840
I	30	38	48	60	72	96	120	144	192	240	300	384	480	600	720	960
J	34	42	54	66	84	108	132	168	216	264	336	420	540	672	840	1080
K	38	48	60	72	96	120	144	192	240	300	384	480	600	720	960	1200
L	42	54	66	84	108	132	168	216	264	336	420	540	672	840	1080	1320
M	48	60	72	96	120	144	192	240	300	384	480	600	720	960	1200	1440
N	54	66	84	108	132	168	216	264	336	420	540	672	840	1080	1320	1680
O	60	72	96	120	144	192	240	300	384	480	600	720	960	1200	1440	1920
P	66	84	108	132	168	216	264	336	420	540	672	840	1080	1320	1680	2160

Hinweis: Bei Fräsern in langer Ausführung sollte der Vorschub (Vf) halbiert werden.
Bei allen Beschichtungen empfehlen wir als Ausgangswerte um bis zu 50% höhere Schnittgeschwindigkeiten und Vorschübe.

VHM-Schaftfräser

HSC-Fräsen



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254001....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vf mm/min für Fräser-Ø 1,0 - 1,5 mm	Schnittge-schwindigkeit Vc m/min	Vf mm/min für Fräser-Ø 2,0 - 4,0 mm		
P	unlegierter Baustahl	bis 700	1.0052	60 - 65	130	70 - 75	135 - 235		
	Automatenstahl	bis 700	1.0715	60 - 65	130	70 - 75	135 - 235		
	unlegierter Vergütungsstahl	500 - 950	1.1191	60 - 65	130	70 - 75	135 - 235		
	legierter Einsatzstahl	bis 950	1.7131	45 - 50	125	50 - 60	125 - 185		
	Werkzeugstahl	950 - 1400	1.2343	45 - 50	125	50 - 60	125 - 185		
	Stahlguss	bis 950	1.0416	45 - 50	125	50 - 60	125 - 185		
M	INOX Stahl,austenitisch	500 - 950	1.4301	35 - 40	65	40 - 45	70 - 90		
	INOX Stahl, geschwefelt	500 - 950	1.4104	40 - 45	70	45 - 50	75 - 95		
	INOX Stahl,martensitisch	500 - 950	1.4122	30 - 35	60	35 - 40	65 - 85		
K	Grauguss	bis 240 HB	0.6025	60 - 65	130	70 - 75	135 - 235		
	legierter Grauguss	bis 350 HB	0.6678	40	90	45 - 55	90 - 125		
	Sphäroguss	bis 300 HB	0.7060	45	95	50 - 60	95 - 130		
	Temperguss	bis 300 HB	0.8155	45	95	50 - 60	95 - 130		
H	Hartguss	300 - 600	Ampco	60 - 65	130	70 - 75	135 - 235		
	gehärteter Stahl	45 - 50 HRc	20	30 - 40	25	40 - 50			
	gehärteter Stahl	50 - 60 HRc	15	25	17 - 20	25 - 30			

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vf mm/min für Fräser-Ø in mm 5,0 - 8,0	10,0 - 14,0	16,0 - 18,0	20,0		
P	unlegierter Baustahl	bis 700	1.0052	85	315 - 295	280	260 - 230	205 - 190		
	Automatenstahl	bis 700	1.0715	85	315 - 295	280	260 - 230	205 - 190		
	unlegierter Vergütungsstahl	500 - 950	1.1191	85	315 - 295	280	260 - 230	205 - 190		
	legierter Einsatzstahl	bis 950	1.7131	70	235	230 - 215	200 - 180	155 - 145		
	Werkzeugstahl	950 - 1400	1.2343	70	235	230 - 215	200 - 180	155 - 145		
	Stahlguss	bis 950	1.0416	70	235	230 - 215	200 - 180	155 - 145		
M	INOX Stahl,austenitisch	500 - 950	1.4301	50	100	95	85 - 75	65 - 60		
	INOX Stahl, geschwefelt	500 - 950	1.4104	55	105	100	90 - 80	70 - 65		
	INOX Stahl,martensitisch	500 - 950	1.4122	45	95	90	80 - 70	60 - 55		
K	Grauguss	bis 240 HB	0.6025	85	315 - 295	280	260 - 230	205 - 190		
	legierter Grauguss	bis 350 HB	0.6678	55	130 - 125	125 - 110	100 - 90	80 - 70		
	Sphäroguss	bis 300 HB	0.7060	60	135 - 130	130 - 115	105 - 95	85 - 75		
	Temperguss	bis 300 HB	0.8155	60	135 - 130	130 - 115	105 - 95	85 - 75		
H	Hartguss	300 - 600 HB	Ampco	85	315 - 295	280	260 - 230	205 - 190		
	gehärteter Stahl	45 - 50 HRc	20	30	55 - 50	50 - 40	35 - 30	30 - 25		
	gehärteter Stahl	50 - 60 HRc	15	20	30 - 25	25 - 18	16 - 14	13 - 11		

Axiale Schnitttiefe ap bei ISO Bereichen ISO P M K	
	ap
Duchmesser kleiner 3,00 mm:	0,3 x D
Durchmesser ab 3,00 mm:	0,5 x D
Axiale Schnitttiefe ap bei ISO Bereich ISO H	
Härte 45 - 50 HRc	ap
Durchmesser ab 1,00 mm	0,05 x D
Härte 50 - 60 HRc	ap
Durchmesser kleiner 3,00 mm	0,02 x D
Durchmesser ab 3,00 mm	0,05 x D

Safety in the workplace

Please protect your eyes, ears and respiratory system!



VHM-Hochleistungs-Schaftfräser



251030....
251031....

Anmerkung:
Die aufgeführten Schnittwertempfehlungen stellen Richtwerte für die konventionelle Schruppbearbeitung dar und setzten stabile Maschinenbedingungen, eine schwingungsarme Werkstückspannung und den Einsatz von geeignetem Kühlschmiermittel voraus.
Zum Schlichten kann die Schnittgeschwindigkeit Vc um 20% erhöht werden.
Zum Vollnuten empfehlen wir das Reduzieren der Schnittgeschwindigkeit Vc um ca. 15% und des Vorschubs Vf mm/min. um 30%.

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittg.- Vc m/min	Vorschubgeschwindigkeit Vf in mm/min bezogen auf Fräserdurchmesserbereich in mm								
						3,0	4,0	5,0	6,0	8,0	10,0	12,0	16,0	20,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	200	1.274	1.242	1.299	1.274	1.314	1.338	1.354	1.194	1.146
	Automatenstahl	bis 700	9 SMn 28	1.0715	200	1.274	1.242	1.299	1.274	1.314	1.338	1.354	1.194	1.146
	Baustahl	500 - 950	Ck45	1.1191	200	1.274	1.242	1.299	1.274	1.314	1.338	1.354	1.194	1.146
	Einsatzstahl	bis 950	16 MnCr 5	1.7131	180	1.146	1.118	1.169	1.146	1.182	1.204	1.218	1.075	1.032
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	160	1.019	994	1.039	1.019	955	994	1.019	908	841
	Stahlguss	bis 950	GS 40	1.0416	200	1.274	1.242	1.299	1.274	1.314	1.338	1.354	1.194	1.146
M	INOX Stahl,austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	90	459	430	430	430	430	473	466	430	408
	INOX Stahl,ferritisch	500 - 950	X 12 CrMoS 17	1.4104	110	631	604	610	613	591	631	613	591	525
	INOX Stahl,martensitisch	500 - 950	X 10 Cr 13	1.4006	70	334	301	281	279	293	301	279	272	268
K	Grauguss	100 - 400	GG 25	0.6025	180	1.146	1.118	1.169	1.146	1.182	1.204	1.218	1.075	1.032
	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	160	1.019	994	1.039	1.019	955	994	1.019	908	841
	Sphäroguss	400 - 800	GGG 60	0.7060	160	1.019	994	1.039	1.019	955	994	1.019	908	841
	Temperguss	350 - 700	GTS 55	0.8155	160	1.019	994	1.039	1.019	955	994	1.019	908	841
N	Reinmetalle, weich	bis 500	Reineisen		220	1.401	1.366	1.429	1.401	1.445	1.471	1.489	1.314	1.261
	Al.-Leg. kurzspanend	bis 400	G-AlSi 12	3.2581	300	1.911	1.863	1.949	1.911	1.791	1.863	1.911	1.702	1.576
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	300	1.529	1.433	1.433	1.433	1.433	1.576	1.553	1.433	1.361
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	300	1.529	1.433	1.433	1.433	1.433	1.576	1.553	1.433	1.361
	Magnesium-Legierungen	160 - 300	G-MgAl9Zn 1	3.5912	220	1.401	1.366	1.429	1.401	1.314	1.366	1.401	1.248	1.156
S	Titan-Legierungen	bis 950	TiAl6V4	3.7165	55	280	263	263	263	263	289	285	263	250
	Titan-Legierungen	900 - 1400	TiAl6Sn 2	3.7174	45	229	215	215	215	215	236	233	215	204
	Nickelbasis-Legierungen	bis 950	NiCr12Al6MoNb	2.4670	35	111	109	107	111	125	117	111	115	109
	Nickelbasis-Legierungen	900 - 1400	NiCr19Fe19NbMo	Inconel 718	30	96	93	92	96	107	100	96	99	93



251033....

ISO	Nuten ap: 1,00 x D | ae: 1,00 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm				
						3,0 - 4,0	5,0 - 6,0	8,0 - 10,0	12 - 16	18 - 25
P	unlegierter Baustahl	bis 700	St-52	1.0052	156	0,01	0,029	0,038	0,063	0,101
	Automatenstahl	bis 700	9 SMn 28	1.0715	170	0,01	0,029	0,038	0,063	0,101
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	127	0,01	0,029	0,038	0,063	0,101
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	99	0,008	0,021	0,027	0,044	0,071
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	85	0,008	0,021	0,027	0,044	0,071
	Stahlguss	bis 950	GS 40	1.0416	105	0,01	0,029	0,038	0,063	0,101
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	156	0,01	0,029	0,038	0,063	0,101
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	53	0,008	0,021	0,027	0,044	0,071
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	53	0,008	0,021	0,027	0,044	0,071
K	Grauguss	100 - 400	GG 25	0.6025	127	0,01	0,029	0,038	0,063	0,101
	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	99	0,01	0,029	0,038	0,063	0,101
	Sphäroguss	400 - 800	GGG 60	0.7060	99	0,01	0,029	0,038	0,063	0,101
	Temperguss	350 - 700	GTS 55	0.8155	99	0,01	0,029	0,038	0,063	0,101
S	Titan-Legierung	bis 950	TiAl6V4	3.7165						
	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	25	0,006	0,013	0,021	0,027	0,059
	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670						
	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	25	0,006	0,013	0,021	0,027	0,059
ISO	Schlichten und Besäumen ap: 1,00 x D | ae: 0,50 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm				
						3,0 - 4,0	5,0 - 6,0	8,0 -10,0	12,0 - 16,0	18,0 - 25,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	156	0,012	0,035	0,045	0,075	0,12
	Automatenstahl	bis 700	9 SMn 28	1.0715	170	0,012	0,035	0,045	0,075	0,12
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	127	0,012	0,035	0,045	0,075	0,12
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	99	0,009	0,025	0,032	0,052	0,084
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	85	0,009	0,025	0,032	0,052	0,084
	Stahlguss	bis 950	GS 40	1.0416	105	0,012	0,035	0,045	0,075	0,12
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	156	0,012	0,035	0,045	0,075	0,12
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	53	0,009	0,025	0,032	0,052	0,084
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	53	0,009	0,025	0,032	0,052	0,084
K	Grauguss	100 - 400	GG 25	0.6025	127	0,012	0,035	0,045	0,075	0,12
	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	99	0,012	0,035	0,045	0,075	0,12
	Sphäroguss	400 - 800	GGG 60	0.7060	99	0,012	0,035	0,045	0,075	0,12
	Temperguss	350 - 700	GTS 55	0.8155	99	0,012	0,035	0,045	0,075	0,12
S	Titan-Legierung	bis 950	TiAl6V4	3.7165						
	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	25	0,007	0,015	0,025	0,032	0,07
	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670						
	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	25	0,007	0,015	0,025	0,032	0,07

VAN HOORN CARBIDE Schaftfräser *VHRSW* Z4



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255100 ....

ISO	**Schruppen / Nuten** fz für ae = 1,0 x D und ap = 1,0 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm										
	Werkstoffgruppe					3	4	5	6	8	10	12	14	16	20	25
P	Automatenstahl	bis 700	9 SMn 28	1.0715	200	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
P	unlegierter Baustahl	bis 700	St-52	1.0052	200	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
P	Baustahl	700 - 950	Ck45	1.1191	200	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
P	Stahlguss	bis 950	GS 40	1.0416	130	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
P	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	180	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	130	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	80	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
M	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	90	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
M	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	100	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
K	Grauguss	bis 260 HB	GG 25	0.6025	180	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
K	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	160	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
K	Sphäroguss	bis 280 HB	GGG 60	0.7060	100	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
K	Temperguss	bis 280 HB	GTS 55	0.8155	100	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	50	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
S	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	30	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	100	0,010	0,015	0,020	0,025	0,035	0,040	0,050	0,055	0,065	0,080	0,110

ISO	**Schlichetn / Besäumen** fz für ae = 0,5 x D und ap = 1,0 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm										
	Werkstoffgruppe					3	4	5	6	8	10	12	14	16	20	25
P	Automatenstahl	bis 700	9 SMn 28	1.0715	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	unlegierter Baustahl	bis 700	St-52	1.0052	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Baustahl	700 - 950	Ck45	1.1191	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Stahlguss	bis 950	GS 40	1.0416	150	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	200	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	150	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	110	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	130	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Grauguss	bis 260 HB	GG 25	0.6025	200	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	180	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Sphäroguss	bis 280 HB	GGG 60	0.7060	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Temperguss	bis 280 HB	GTS 55	0.8155	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	60	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
S	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	40	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125

ATORN® Schaftfräser *VHRSW* Z5



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255101 ....

ISO	**Schlichten / Besäumen** fz für ae = 0,5 x D und ap = 1,0 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm										
	Werkstoffgruppe					3	4	5	6	8	10	12	14	16	20	25
P	Automatenstahl	bis 700	9 SMn 28	1.0715	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	unlegierter Baustahl	bis 700	St-52	1.0052	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Baustahl	700 - 950	Ck45	1.1191	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Stahlguss	bis 950	GS 40	1.0416	150	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	200	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	150	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	110	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	130	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Grauguss	bis 260 HB	GG 25	0.6025	200	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	180	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Sphäroguss	bis 280 HB	GGG 60	0.7060	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Temperguss	bis 280 HB	GTS 55	0.8155	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	60	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
S	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	40	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125

VHM-Fräser *VHVFFW3* und *VHRFFW3/4*

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

251049....
254015....



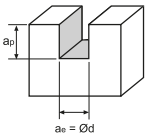
Schlichtausführung

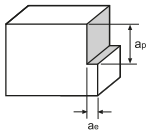
ISO	Material	Werkstoff-Nr.	Schnittgeschw. m/min
P	Kohlenstoffstahl	1.0037 - St37-2 1.0050 - St50-2 1.0503 - C45 1.0601 - C60 1.0715 - 9SMn28K	160 - 200
P	Werkzeugstahl	1.2312 - 40CrMnMoS8-6 1.2343 - 38CrMoV5-1 1.2379 - X155CrVMo12-1	70 - 90
P		1.2080 - X210Cr12 1.2083 - X42Cr13 1.2510 - 100MnCrW4	90 - 110
P	legierter Stahl	1.7131 - 16MnCr5 1.7227 - 42CrMo4 1.8507 - 34CrAlMo5	90 - 120
M	INOX Stahl	1.4301 1.4571	50 - 70
M		1.4104 1.4305	100 - 130



Schruppausführung

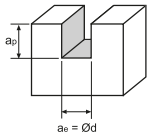
ISO	Material	Werkstoff-Nr.	Schnittgeschw. m/min
P	Kohlenstoffstahl	1.0037 - St37-2 1.0050 - St52-3 1.0503 - C45 1.0601 - C60 1.0715 - 9SMn28K	250 - 300
P	Werkzeugstahl	1.2312 - 40CrMnMoS8-6 1.2343 - 38CrMoV5-1 1.2379 - X155CrVMo12-1 1.2767 - X45NiCrMo4	110 - 150
P		1.2080 - X210Cr12 1.2083 - X42Cr13 1.2510 - 100MnCrW4	150 - 180
P	legierter Stahl	1.7131 - 16MnCr5 1.7227 - 42CrMo4 1.8507 - 34CrAlMo5	150 - 200
M	INOX Stahl	1.4301 1.4571	
M		1.4104 1.4305	

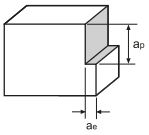




Ø	Nutenfräsen ap max.	Nutenfräsen fz (mm/Zahn)	Eckfräsen ap* max.	Eckfräsen ae* 0,1 x Ø	Eckfräsen ae* 0,25 x Ø	Eckfräsen ae* 0,5 x Ø	Eckfräsen ae* max.
3	<4,5	0,007-0,012	< 5				< 1,5
4	<6,0	0,010-0,015	< 8				< 2,0
5	<7,5	0,015-0,030	<10				< 2,5
6	<9,0	0,025-0,040	<12	f_z*=3,0 x f_z	f_z*=2,0 x f_z	f_z*=1,4 x f_z	< 3
8	<12	0,030-0,050	<16				< 4
10	<15	0,035-0,065	<20				< 5
12	<18	0,045-0,070	<24				< 6
16	<24	0,060-0,100	<32				< 8

Beim Eckfräsen ist Vorschub fz* abhängig von Schnittbreite a_e*
Beispiel Fräser Ø12mm: wenn Schnittbreite a_e*=3mm, dann wird der Vorschub/Zahn f_z*=2 x f_z = 0,09-0,14 mm/Zahn





Ø	Nutenfräsen ap max.	Nutenfräsen fz (mm/Zahn)	Eckfräsen ap* max.	Eckfräsen ae* 0,1 x Ø	Eckfräsen ae* 0,25 x Ø	Eckfräsen ae* 0,5 x Ø	Eckfräsen ae* max.
6	<10	0,03-0,04	<12				< 3
8	<16	0,04-0,06	<16				< 4
10	<20	0,06-0,08	<20				< 5
12	<24	0,08-0,10	<24	f_z*=3,0 x f_z	f_z*=2,0 x f_z	f_z*=1,4 x f_z	< 6
14	<28	0,10-0,12	<28				< 7
16	<32	0,12-0,15	<32				< 8
20	<40	0,12-0,20	<40				<10

Beim Eckfräsen ist Vorschub fz* abhängig von Schnittbreite a_e*
Beispiel Fräser Ø12mm: wenn Schnittbreite a_e*=3mm, dann wird der Vorschub/Zahn f_z*=2 x f_z = 0,16-0,20 mm/Zahn

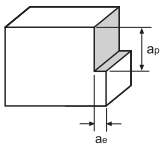


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Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!





257003....



257015....



257011....
257013....

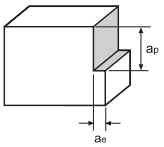


257017....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 3,0	5,0	8,0	12,0	16,0	20,0
P	Stahl-, Stahlguss	< 700	0,20 x D	1,5 x D	140 - 160	0,02	0,04	0,06	0,09	0,12	0,15
P	Stahl-, Stahlguss	< 1100	0,20 x D	1,5 x D	130 - 150	0,02	0,03	0,05	0,07	0,10	0,12
P	Stahl	< 1300	0,20 x D	1,5 x D	120 - 140	0,02	0,03	0,04	0,06	0,08	0,10
P	Stahl	< 1600	0,20 x D	1,5 x D	120 - 140	0,02	0,03	0,04	0,06	0,08	0,10
M	INOX Stahl		0,20 x D	1,5 x D	100 - 120	0,02	0,03	0,05	0,06	0,08	0,10
K	GG		0,20 x D	1,5 x D	100 - 120	0,02	0,03	0,04	0,06	0,08	0,10
K	GGG		0,20 x D	1,5 x D	100 - 120	0,02	0,03	0,04	0,06	0,08	0,10
K	Temperguss		0,20 x D	1,5 x D	100 - 120	0,02	0,03	0,04	0,06	0,08	0,10
S	Titan, Titanlegierung	> 700	0,20 x D	1,5 x D	80 - 100	0,02	0,03	0,04	0,06	0,08	0,10
S	Ni-/Co-Legierung	< 35 HRc	0,20 x D	1,5 x D	80 - 100	0,02	0,03	0,04	0,06	0,08	0,10
S	Ni-/Co-Legierung	< 45 HRc	0,20 x D	1,5 x D	70 - 90	0,02	0,03	0,04	0,06	0,08	0,10
H	gehärtete Stähle	< 52 HRc	0,05 x D	1,0 x D	60 - 80	0,01	0,02	0,03	0,04	0,06	0,07

ATORN® Schaftfräser, Torusfräser RockTec 52

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!





257005....

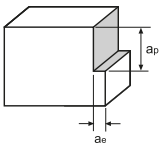


257019....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 3,0	5,0	8,0	12,0	16,0	20,0
P	Stahl-, Stahlguss	< 700	0,20 x D	1,5 x D	120 - 140	0,02	0,04	0,06	0,09	0,12	0,15
P	Stahl-, Stahlguss	< 1100	0,20 x D	1,5 x D	110 - 130	0,02	0,03	0,05	0,07	0,10	0,12
P	Stahl	< 1300	0,20 x D	1,5 x D	100 - 120	0,02	0,03	0,04	0,06	0,08	0,10
P	Stahl	< 1600	0,20 x D	1,5 x D	100 - 120	0,02	0,03	0,04	0,06	0,08	0,10
M	INOX Stahl		0,20 x D	1,5 x D	90 - 110	0,02	0,03	0,05	0,06	0,08	0,10
K	GG		0,20 x D	1,5 x D	90 - 110	0,02	0,03	0,04	0,06	0,08	0,10
K	GGG		0,20 x D	1,5 x D	90 - 110	0,02	0,03	0,04	0,06	0,08	0,10
K	Temperguss		0,20 x D	1,5 x D	90 - 110	0,02	0,03	0,04	0,06	0,08	0,10
S	Titan, Titanlegierung	> 700	0,20 x D	1,5 x D	70 - 90	0,02	0,03	0,04	0,06	0,08	0,10
S	Ni-/Co-Legierung	< 35 HRc	0,20 x D	1,5 x D	70 - 90	0,02	0,03	0,04	0,06	0,08	0,10
S	Ni-/Co-Legierung	< 45 HRc	0,20 x D	1,5 x D	60 - 80	0,02	0,03	0,04	0,06	0,08	0,10
H	gehärtete Stähle	< 52 HRc	0,05 x D	1,0 x D	50 - 70	0,01	0,02	0,03	0,04	0,06	0,07

ATORN® Schaftfräser, Torusfräser RockTec 52

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!





257007....



257021....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 3,0	5,0	8,0	12,0	16,0	20,0
P	Stahl	< 1300	0,20 x D	1,5 x D	120 - 140	0,02	0,04	0,08	0,10	0,11	0,12
P	Stahl	< 1600	0,20 x D	1,5 x D	120 - 140	0,02	0,04	0,08	0,10	0,11	0,12
S	Titan, Titanlegierung	> 700	0,20 x D	1,5 x D	130 - 170	0,02	0,04	0,08	0,10	0,10	0,10
S	Ni-/Co-Legierung	< 35 HRc	0,20 x D	1,5 x D	130 - 170	0,02	0,04	0,08	0,10	0,10	0,10
S	Ni-/Co-Legierung	< 45 HRc	0,20 x D	1,5 x D	130 - 170	0,02	0,04	0,08	0,10	0,10	0,10
H	Hartguss		0,05 x D	1,0 x D	80 - 110	0,02	0,03	0,06	0,08	0,09	0,10
H	gehärtete Stähle	< 52 HRc	0,05 x D	1,0 x D	80 - 110	0,02	0,03	0,06	0,08	0,09	0,10
H	gehärtete Stähle	52-65 HRc	0,03 - 0,05 x D (max. 0,2-0,5 mm)	1,0 x D	50 - 80	0,015	0,025	0,05	0,06	0,07	0,08

SARA® Schaftfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254005....
254006....
254007....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 2,0 - 3,0	4,0 - 5,0	6,0 - 8,0	10,0 - 12,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	80	310 - 505	530 - 620	615 - 590	590
	Automatenstahl	bis 700	9 SMn 28	1.0715	80	310 - 505	530 - 620	615 - 590	590
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	70	280 - 355	370 - 425	425 - 420	420
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	70	280 - 355	370 - 425	425 - 420	420
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	70	280 - 355	370 - 425	425 - 420	420
	Stahlguss	bis 950	GS 40	1.0416	70	280 - 355	370 - 425	425 - 420	420
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	40 - 50	100 - 110	115 - 125	130	130
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	45 - 55	105 - 115	120 - 130	135	135
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	35 - 45	95 - 105	110 - 120	125	125
K	Grauguss	bis 240 HB	GG 25	0.6025	100	370 - 595	635 - 740	735 - 710	710
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	90	360 - 585	625 - 730	725 - 700	700
	Sphäroguss	bis 300 HB	GGG 60	0.7060	95	365 - 590	630 - 735	730 - 705	705
	Temperguss	bis 300 HB	GTS 55	0.8155	95	365 - 590	630 - 735	730 - 705	705
H	Hartguss	300 - 600		Ampco	80	310 - 505	530 - 620	615 - 590	590
	gehärteter Stahl	45 - 50 HRc			25 - 30	60	70 - 75	70 - 65	65 - 60
	gehärteter Stahl	50 - 60 HRc			15 - 20	40 - 45	45 - 40	40 - 35	35 - 30

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 14,0 - 16,0	18,0 - 20,0	22,0 - 24,0	25,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	80	575 - 550	540 - 520	480 - 440	420
	Automatenstahl	bis 700	9 SMn 28	1.0715	80	575 - 550	540 - 520	480 - 440	420
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	70	415	405 - 370	340 - 315	300
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	70	415	405 - 370	340 - 315	300
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	70	415	405 - 370	340 - 315	300
	Stahlguss	bis 950	GS 40	1.0416	70	415	405 - 370	340 - 315	300
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	40 - 50	125 - 115	105 - 95	85 - 75	75
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	45 - 55	130 - 120	110 - 100	90 - 80	80
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	35 - 45	120 - 110	100 - 90	80 - 70	70
K	Grauguss	bis 240 HB	GG 25	0.6025	100	680 - 655	655 - 620	560 - 520	500
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	90	670 - 645	645 - 610	550 - 510	490
	Sphäroguss	bis 300 HB	GGG 60	0.7060	95	675 - 650	650 - 615	555 - 515	495
	Temperguss	bis 300 HB	GTS 55	0.8155	95	675 - 650	650 - 615	555 - 515	495
H	Hartguss	300 - 600 HB		Ampco	80	575 - 550	540 - 520	480 - 440	420
	gehärteter Stahl	45 - 50 HRc			25 - 30	50 - 45	40 - 35	30	30
	gehärteter Stahl	50 - 60 HRc			15 - 20	25 - 20	20 - 19	17 - 16	15

	ap	ae
Werkstoff bis 45 HRc		
D bis 3 mm	1,5 x D	0,05 x D
D größer 3 mm	1,5 x D	0,1 x D
Werkstoff von 45-60 HRc	1,0 x D	0,02 x D



...then it's ATORN.

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High quality for great performance

SARA® Schaftfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254130....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	141	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -700 N/mm²	134	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	allg. Stähle - 850N/mm²	127	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -1000 N/mm²	113	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	allg. Stähle -1400 N/mm²	85	0,005	0,013	0,015	0,015	0,027	0,027	0,027	0,044	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	120	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	106	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	78	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	57	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
K	Gusseisen bis 180 HB	141	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	Temperguss	106	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	Gusseisen mit Kugelgraphit	106	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
M	Rost und säurebeständige Stähle bis 700N/mm²	57	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	200	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -700 N/mm²	190	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	allg. Stähle - 850N/mm²	180	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -1000 N/mm²	160	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	allg. Stähle -1400 N/mm²	120	0,006	0,015	0,018	0,018	0,032	0,032	0,032	0,052	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	170	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	150	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	110	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	80	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
K	Gusseisen bis 180 HB	200	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	Temperguss	150	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	Gusseisen mit Kugelgraphit	150	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
M	Rost und säurebeständige Stähle bis 700N/mm²	80	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091



254131....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	138	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -700 N/mm²	131	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle - 850N/mm²	124	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -1000 N/mm²	110	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	allg. Stähle -1400 N/mm²	81	0,005	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	117	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	103	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	74	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	53	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
K	Gusseisen bis 180 HB	138	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Temperguss	103	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Gusseisen mit Kugelgraphit	103	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
M	Rost und säurebeständige Stähle bis 700N/mm²	55	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Rost und säurebeständige Stähle ab 700N/mm²	27	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	195	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -700 N/mm²	185	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle - 850N/mm²	175	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -1000 N/mm²	155	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	allg. Stähle -1400 N/mm²	115	0,006	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	165	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	145	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	105	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	75	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
K	Gusseisen bis 180 HB	195	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Temperguss	145	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Gusseisen mit Kugelgraphit	145	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
M	Rost und säurebeständige Stähle bis 700N/mm²	78	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Rost und säurebeständige Stähle ab 700N/mm²	38	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091

SARA® Schaftfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254132....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	113	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
P	allg. Stähle -700 N/mm²	106	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
P	allg. Stähle - 850N/mm²	99	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
P	allg. Stähle -1000 N/mm²	85	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
P	allg. Stähle -1400 N/mm²	57	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	92	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	78	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	49	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	42	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
K	Gusseisen bis 180 HB	120	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
K	Temperguss	85	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
K	Gusseisen mit Kugelgraphit	85	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
M	Rost und säurebeständige Stähle bis 700N/mm²	64	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	160	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
P	allg. Stähle -700 N/mm²	150	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
P	allg. Stähle - 850N/mm²	140	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
P	allg. Stähle -1000 N/mm²	120	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
P	allg. Stähle -1400 N/mm²	80	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	130	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	110	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	70	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	60	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
K	Gusseisen bis 180 HB	170	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
K	Temperguss	120	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
K	Gusseisen mit Kugelgraphit	120	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
M	Rost und säurebeständige Stähle bis 700N/mm²	90	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084



254133....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	134	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
P	allg. Stähle -700 N/mm²	127	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
P	allg. Stähle - 850N/mm²	120	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
P	allg. Stähle -1000 N/mm²	106	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
P	allg. Stähle -1400 N/mm²	78	0,005	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	113	0,010	0,017	0,021	0,021	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	106	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	78	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	57	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
K	Gusseisen bis 180 HB	134	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
K	Temperguss	99	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
K	Gusseisen mit Kugelgraphit	99	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
M	Rost und säurebeständige Stähle bis 700N/mm²	53	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
M	Rost und säurebeständige Stähle ab 700N/mm²	25	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	190	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
P	allg. Stähle -700 N/mm²	180	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
P	allg. Stähle - 850N/mm²	170	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
P	allg. Stähle -1000 N/mm²	150	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
P	allg. Stähle -1400 N/mm²	110	0,006	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	160	0,012	0,020	0,025	0,025	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	150	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	110	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
P	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	80	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
K	Gusseisen bis 180 HB	190	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
K	Temperguss	140	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
K	Gusseisen mit Kugelgraphit	140	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
M	Rost und säurebeständige Stähle bis 700N/mm²	75	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
M	Rost und säurebeständige Stähle ab 700N/mm²	35	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091

SARA® Schaftfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254140....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	139	0,029	0,038	0,063	0,063	0,084	0,101
	allg. Stähle -700 N/mm²	132	0,029	0,038	0,063	0,063	0,084	0,101
	allg. Stähle - 850N/mm²	125	0,029	0,038	0,063	0,063	0,084	0,101
	allg. Stähle -1000 N/mm²	103	0,021	0,027	0,044	0,044	0,059	0,071
	allg. Stähle -1400 N/mm²	74	0,021	0,027	0,044	0,044	0,059	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	118	0,029	0,038	0,063	0,063	0,084	0,101
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	103	0,021	0,027	0,044	0,044	0,059	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	76	0,021	0,027	0,044	0,044	0,059	0,071
K	Gusseisen bis 180 HB	134	0,029	0,038	0,063	0,063	0,084	0,101
	Temperguss	99	0,029	0,038	0,063	0,063	0,084	0,101
	Gusseisen mit Kugelgraphit	99	0,029	0,038	0,063	0,063	0,084	0,101
M	Rost und säurebeständige Stähle bis 700N/mm²	85	0,021	0,027	0,044	0,044	0,059	0,071
	Rost und säurebeständige Stähle ab 700N/mm²	49	0,021	0,027	0,044	0,044	0,059	0,071
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	197	0,035	0,045	0,075	0,075	0,100	0,120
	allg. Stähle -700 N/mm²	187	0,035	0,045	0,075	0,075	0,100	0,120
	allg. Stähle - 850N/mm²	177	0,035	0,045	0,075	0,075	0,100	0,120
	allg. Stähle -1000 N/mm²	145	0,025	0,032	0,052	0,052	0,070	0,084
	allg. Stähle -1400 N/mm²	105	0,025	0,032	0,052	0,052	0,070	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	167	0,035	0,045	0,075	0,075	0,100	0,120
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	145	0,025	0,032	0,052	0,052	0,070	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	107	0,025	0,032	0,052	0,052	0,070	0,084
K	Gusseisen bis 180 HB	190	0,035	0,045	0,075	0,075	0,100	0,120
	Temperguss	140	0,035	0,045	0,075	0,075	0,100	0,120
	Gusseisen mit Kugelgraphit	140	0,035	0,045	0,075	0,075	0,100	0,120
M	Rost und säurebeständige Stähle bis 700N/mm²	120	0,025	0,032	0,052	0,052	0,070	0,084
	Rost und säurebeständige Stähle ab 700N/mm²	70	0,025	0,032	0,052	0,052	0,070	0,084

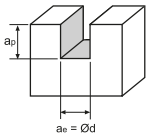
HPMT Schaftfräser

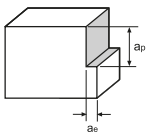


Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254121....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min
P	unlegierter Baustahl	bis 700	St-52	1.0052	150 - 200
	Automatenstahl	bis 700	9 SMn 28	1.0715	150 - 200
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	100 - 120
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	80 - 120
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	70 - 90
	Stahlguss	bis 950	GS 40	1.0416	100 - 120
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	40 - 70
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	60 - 90
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	40 - 70
K	Grauguss	bis 240 HB	GG 25	0.6025	150 - 200
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	150 - 200
	Sphäroguss	bis 300 HB	GGG 60	0.7060	150 - 200
	Temperguss	bis 300 HB	GTS 55	0.8155	150 - 200
N	Aluminium				280 - 350
	Aluminium-Legierung				200 - 250
S	Titan-Legierungen				60 - 70
	Nickelbasis-Legierungen				15 - 25
H	Hartguss	300 - 600 HB		Ampco	50 - 70
	gehärteter Stahl	45 - 52 HRc			40 - 60





Ø	Nutenfräsen ap max.	Nutenfräsen fz (mm/Zahn)	Eckfräsen ap* max.	Eckfräsen ae* 0,1 x Ø	Eckfräsen ae* 0,25 x Ø	Eckfräsen ae* 0,5 x Ø	Eckfräsen ae* max.
6	< 6	0,015 - 0,040	<12				< 3
8	< 8	0,020 - 0,060	<16				< 4
10	<10	0,025 - 0,065	<20				< 5
12	<12	0,030 - 0,070	<24	f_z*=3,0 x f_z	f_z*=2,0 x f_z	f_z*=1,4 x f_z	< 6
16	<16	0,030 - 0,070	<32				< 8
20	<20	0,035 - 0,070	<40				<10

Beim Eckfräsen ist Vorschub fz* abhängig von Schnittbreite a_e*
Beispiel Fräser Ø12mm: wenn Schnittbreite a_e*=3mm, dann wird der Vorschub/Zahn f_z*=2xf_z = 0,16-0,20 mm/Zahn

SARA® Schaftfräser INOX



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254134....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	163	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -700 N/mm²	148	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle - 850N/mm²	124	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -1000 N/mm²	106	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	allg. Stähle -1400 N/mm²	71	0,005	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	113	0,010	0,017	0,021	0,021	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	99	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	64	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,084
K	Gusseisen bis 180 HB	134	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Temperguss	99	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Gusseisen mit Kugelgraphit	99	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
M	Rost und säurebeständige Stähle bis 700N/mm²	62	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Rost und säurebeständige Stähle ab 700N/mm²	34	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
S	Titan, Ti-, Ni-, Co- Legierungen (Inconel,Stellite...)	41	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	230	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -700 N/mm²	210	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle - 850N/mm²	175	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -1000 N/mm²	150	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	allg. Stähle -1400 N/mm²	100	0,006	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,100
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	160	0,012	0,020	0,025	0,025	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	140	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,100
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	90	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,100
K	Gusseisen bis 180 HB	190	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Temperguss	140	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Gusseisen mit Kugelgraphit	140	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
M	Rost und säurebeständige Stähle bis 700N/mm²	88	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Rost und säurebeständige Stähle ab 700N/mm²	48	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
S	Titan, Ti-, Ni-, Co- Legierungen (Inconel,Stellite...)	58	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091



254135....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	159	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -700 N/mm²	145	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	allg. Stähle - 850N/mm²	120	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -1000 N/mm²	103	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	allg. Stähle -1400 N/mm²	67	0,006	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	110	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	95	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	60	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	42	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
K	Gusseisen bis 180 HB	131	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	Temperguss	95	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
	Gusseisen mit Kugelgraphit	95	0,012	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,101	0,101	0,109
M	Rost und säurebeständige Stähle bis 700N/mm²	64	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
	Rost und säurebeständige Stähle ab 700N/mm²	35	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
S	Titan, Ti-, Ni-, Co- Legierungen (Inconel,Stellite...)	42	0,009	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,071	0,071	0,077
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	225	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -700 N/mm²	205	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	allg. Stähle - 850N/mm²	170	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -1000 N/mm²	145	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	allg. Stähle -1400 N/mm²	95	0,006	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	155	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	135	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	85	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
K	Gusseisen bis 180 HB	185	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	Temperguss	135	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
	Gusseisen mit Kugelgraphit	135	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,120	0,120	0,130
M	Rost und säurebeständige Stähle bis 700N/mm²	90	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
	Rost und säurebeständige Stähle ab 700N/mm²	50	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091
S	Titan, Ti-, Ni-, Co- Legierungen (Inconel,Stellite...)	60	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,084	0,084	0,091

SARA® Schaftfräse INOX



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254136....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	156	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -700 N/mm²	141	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle - 850N/mm²	117	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	allg. Stähle -1000 N/mm²	99	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	allg. Stähle -1400 N/mm²	64	0,005	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	106	0,010	0,017	0,021	0,021	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	92	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	57	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
K	Gusseisen bis 180 HB	127	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Temperguss	92	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
	Gusseisen mit Kugelgraphit	92	0,010	0,017	0,029	0,029	0,038	0,038	0,038	0,063	0,063	0,063	0,084	0,084	0,084	0,101	0,101	0,109
M	Rost und säurebeständige Stähle bis 700N/mm²	60	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
	Rost und säurebeständige Stähle ab 700N/mm²	32	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
S	Titan, Ti-, Ni-, Co- Legierungen (Inconel,Stellite...)	39	0,008	0,013	0,021	0,021	0,027	0,027	0,027	0,044	0,044	0,044	0,059	0,059	0,059	0,071	0,071	0,077
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 7,00 fz	D1 8,00 fz	D1 9,00 fz	D1 10,00 fz	D1 11,00 fz	D1 12,00 fz	D1 13,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz	D1 25,00 fz
P	allg. Stähle -500 N/mm²	220	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -700 N/mm²	200	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle - 850N/mm²	165	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	allg. Stähle -1000 N/mm²	140	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	allg. Stähle -1400 N/mm²	90	0,006	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	150	0,012	0,020	0,025	0,025	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	130	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	80	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
K	Gusseisen bis 180 HB	180	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Temperguss	130	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
	Gusseisen mit Kugelgraphit	130	0,012	0,020	0,035	0,035	0,045	0,045	0,045	0,075	0,075	0,075	0,100	0,100	0,100	0,120	0,120	0,130
M	Rost und säurebeständige Stähle bis 700N/mm²	85	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
	Rost und säurebeständige Stähle ab 700N/mm²	45	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091
S	Titan, Ti-, Ni-, Co- Legierungen (Inconel,Stellite...)	55	0,009	0,015	0,025	0,025	0,032	0,032	0,032	0,052	0,052	0,052	0,070	0,070	0,070	0,084	0,084	0,091

SARA® Schruppfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254016....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesserbereich in mm 6,0	8,0	10,0	12,0	16,0	20,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	150	0,017	0,022	0,026	0,032	0,040	0,047
	Automatenstahl	bis 700	9 SMn 28	1.0715	150	0,017	0,022	0,056	0,032	0,040	0,047
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	130	0,017	0,022	0,026	0,032	0,040	0,047
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	130	0,017	0,022	0,026	0,032	0,040	0,047
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	120	0,017	0,022	0,026	0,032	0,040	0,047
	Stahlguss	bis 950	GS 40	1.0416	120	0,017	0,022	0,026	0,032	0,040	0,047
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	60	0,012	0,015	0,020	0,021	0,027	0,030
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	70	0,012	0,015	0,020	0,021	0,027	0,030
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	60	0,012	0,015	0,020	0,021	0,027	0,030
K	Grauguss	bis 240 HB	GG 25	0.6025	120	0,014	0,017	0,021	0,023	0,027	0,030
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	60	0,012	0,015	0,018	0,020	0,025	0,028
	Sphäroguss	bis 300 HB	GGG 60	0.7060	80	0,014	0,017	0,021	0,023	0,027	0,030
	Temperguss	bis 300 HB	GTS 55	0.8155	80	0,014	0,017	0,021	0,023	0,027	0,030
S	Nickelbasis-Legierungen	bis 950	NiCr12Al6MoNb	2.4670	40	0,011	0,013	0,016	0,018	0,020	0,022
H	gehärteter Stahl	45 - 50 HRc			80	0,012	0,015	0,020	0,021	0,023	0,025

	Nutenfräsen ap	Profilfräsen ap	ae
Stahl bis 1300 N/mm²	0,4 x D	1,5 x D	0,4 x D
Stahl von 1300 N/mm² - 2000 N/mm²	0,3 x D	1 x D	0,3 x D
INOX Stahl	0,3 x D	1 x D	0,3 x D

ATORN® HPC Power Schaftfräser 3Z



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254503 ....

ISO	**Schruppen / Nuten** fz für ae = 1,0 x D und ap = 1,0 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
						4	5	6	8	10	12	14	16	18	20
P	Automatenstahl	bis 700	9 SMn 28	1.0715	180	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
	unlegierter Baustahl	bis 700	St-52	1.0052	180	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
	Baustahl	700 - 950	Ck45	1.1191	160	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
	Stahlguss	bis 950	GS 40	1.0416	105	0,030	0,040	0,050	0,070	0,090	0,100	0,140	0,140	0,170	0,170
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	130	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	80	0,030	0,040	0,050	0,060	0,070	0,080	0,110	0,110	0,140	0,140
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	80	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	80	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
K	Grauguss	bis 260 HB	GG 25	0.6025	145	0,060	0,070	0,080	0,110	0,140	0,170	0,220	0,220	0,280	0,280
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	130	0,050	0,060	0,070	0,100	0,120	0,140	0,190	0,190	0,240	0,240
	Sphäroguss	bis 280 HB	GGG 60	0.7060	120	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
	Temperguss	bis 280 HB	GTS 55	0.8155	100	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
N	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581	240	0,050	0,060	0,080	0,100	0,130	0,150	0,200	0,200	0,250	0,250
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730	200	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	50	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	25	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100

ISO	**Schlichten / Besäumen** fz für ae = 0,5 x D und ap = 1,0 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
						4	5	6	8	10	12	14	16	18	20
P	Automatenstahl	bis 700	9 SMn 28	1.0715	230	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
	unlegierter Baustahl	bis 700	St-52	1.0052	230	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
	Baustahl	700 - 950	Ck45	1.1191	200	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
	Stahlguss	bis 950	GS 40	1.0416	130	0,030	0,040	0,050	0,070	0,090	0,100	0,140	0,140	0,170	0,170
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	160	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	100	0,030	0,040	0,050	0,060	0,070	0,080	0,110	0,110	0,140	0,140
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	100	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	100	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	100	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
K	Grauguss	bis 260 HB	GG 25	0.6025	180	0,060	0,070	0,080	0,110	0,140	0,170	0,220	0,220	0,280	0,280
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	160	0,050	0,060	0,070	0,100	0,120	0,140	0,190	0,190	0,240	0,240
	Sphäroguss	bis 280 HB	GGG 60	0.7060	150	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
	Temperguss	bis 280 HB	GTS 55	0.8155	120	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
N	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581	300	0,050	0,060	0,080	0,100	0,130	0,150	0,200	0,200	0,250	0,250
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730	250	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	60	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	30	0,020	0,030	0,030	0,040	0,050	0,060	0,080	0,080	0,100	0,100



… 3 µm

ATORN®
High quality for great performance

ATORN® HPC Power Schaftfräser 4Z Stahl



• Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254511 ....

ISO	**Schruppen / Nuten** fz für ae = 1,0 x D und ap = 1,0 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
						4	5	6	8	10	12	14	16	18	20
P	Automatenstahl	bis 700	9 SMn 28	1.0715	200	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
P	unlegierter Baustahl	bis 700	St-52	1.0052	200	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
P	Baustahl	700 - 950	Ck45	1.1191	170	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
P	Stahlguss	bis 950	GS 40	1.0416	110	0,030	0,040	0,050	0,070	0,090	0,100	0,140	0,140	0,170	0,170
P	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	135	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	90	0,030	0,040	0,040	0,060	0,070	0,080	0,110	0,110	0,140	0,140
K	Grauguss	bis 260 HB	GG 25	0.6025	150	0,060	0,070	0,080	0,110	0,140	0,170	0,220	0,220	0,280	0,280
K	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	140	0,050	0,060	0,070	0,100	0,120	0,140	0,190	0,190	0,240	0,240
K	Sphäroguss	bis 280 HB	GGG 60	0.7060	130	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
K	Temperguss	bis 280 HB	GTS 55	0.8155	100	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220

ISO	**Schlichten / Besäumen** fz für ae = 0,5 x D und ap = 1,0 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
						4	5	6	8	10	12	14	16	18	20
P	Automatenstahl	bis 700	9 SMn 28	1.0715	230	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
P	unlegierter Baustahl	bis 700	St-52	1.0052	230	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
P	Baustahl	700 - 950	Ck45	1.1191	200	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
P	Stahlguss	bis 950	GS 40	1.0416	130	0,030	0,040	0,050	0,070	0,090	0,100	0,140	0,140	0,170	0,170
P	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	160	0,040	0,050	0,060	0,080	0,100	0,120	0,160	0,160	0,200	0,200
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	100	0,030	0,040	0,040	0,060	0,070	0,080	0,110	0,110	0,140	0,140
K	Grauguss	bis 260 HB	GG 25	0.6025	180	0,060	0,070	0,080	0,110	0,140	0,170	0,220	0,220	0,280	0,280
K	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	160	0,050	0,060	0,070	0,100	0,120	0,140	0,190	0,190	0,240	0,240
K	Sphäroguss	bis 280 HB	GGG 60	0.7060	150	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220
K	Temperguss	bis 280 HB	GTS 55	0.8155	120	0,040	0,060	0,070	0,090	0,110	0,130	0,180	0,180	0,220	0,220

ATORN® HPC Power Schaftfräser 4Z INOX



• Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254517 ....

ISO	**Schruppen / Nuten** fz für ae = 1,0 x D und ap = 1,0 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
						4	5	6	8	10	12	14	16	18	20
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	90	0,030	0,030	0,030	0,050	0,050	0,050	0,080	0,080	0,080	0,080
M	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80	0,040	0,040	0,040	0,070	0,070	0,070	0,110	0,110	0,110	0,110
M	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	80	0,040	0,040	0,040	0,070	0,070	0,070	0,110	0,110	0,110	0,110
N	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581	250	0,060	0,060	0,060	0,120	0,120	0,120	0,190	0,190	0,190	0,190
N	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730	210	0,050	0,050	0,050	0,100	0,100	0,100	0,160	0,160	0,160	0,160
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	50	0,020	0,020	0,020	0,040	0,040	0,040	0,060	0,060	0,060	0,060
S	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718	25	0,020	0,020	0,020	0,040	0,040	0,040	0,060	0,060	0,060	0,060

ISO	**Schlichten / Besäumen** fz für ae = 0,5 x D und ap = 1,0 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
						4	5	6	8	10	12	14	16	18	20
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	90	0,030	0,030	0,030	0,050	0,050	0,050	0,080	0,080	0,080	0,080
M	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80	0,040	0,040	0,040	0,070	0,070	0,070	0,110	0,110	0,110	0,110
M	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	80	0,040	0,040	0,040	0,070	0,070	0,070	0,110	0,110	0,110	0,110
N	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581	250	0,060	0,060	0,060	0,120	0,120	0,120	0,190	0,190	0,190	0,190
N	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730	210	0,050	0,050	0,050	0,100	0,100	0,100	0,160	0,160	0,160	0,160
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	50	0,020	0,020	0,020	0,040	0,040	0,040	0,060	0,060	0,060	0,060
S	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718	25	0,020	0,020	0,020	0,040	0,040	0,040	0,060	0,060	0,060	0,060

SARA® Bohr- und Tauchfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254144....
254145....

ISO	Ramping Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm					
						5,7 - 6,0	7,7 - 8,0	9,7 - 10,0	11,7 - 14,0	15,7 - 16	19,7 - 20
P	unlegierter Baustahl	bis 700	St-52	1.0052	210	0,025	0,038	0,045	0,05	0,07	0,09
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	175	0,025	0,035	0,04	0,045	0,065	0,075
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	120	0,02	0,03	0,035	0,04	0,055	0,07
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	110	0,015	0,023	0,034	0,045	0,05	0,055
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	110	0,015	0,023	0,034	0,045	0,05	0,055
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	90	0,015	0,02	0,03	0,035	0,045	0,05
K	Grauguss	100 - 400	GG 25	0.6025	150	0,018	0,025	0,038	0,045	0,06	0,075
	Sphäroguss	400 - 800	GGG 60	0.7060	110	0,018	0,025	0,038	0,045	0,06	0,075
	Temperguss	350 - 700	GTS 55	0.8155	110	0,018	0,025	0,038	0,045	0,06	0,075
S	Titan-Legierung	bis 950	TiAl6V4	3.7165	70	0,015	0,02	0,03	0,035	0,045	0,05
	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	70	0,015	0,02	0,03	0,035	0,045	0,05
	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670	50	0,015	0,02	0,035	0,045	0,05	0,055
	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	50	0,015	0,02	0,035	0,045	0,05	0,055

Maximale Eintauchwinkel berücksichtigen!

P	Stahl	45°
M	INOX Stahl, austenitisch	10°
	INOX Stahl, geschwefelt	10°
	INOX Stahl, martensitisch	5°
K	Temperguss	45°
S	Nickelbasis-Legierung	5°

ISO	Bohren Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm					
						5,7 - 6,0	7,7 - 8,0	9,7 - 10,0	11,7 - 14,0	15,7 - 16	19,7 - 20
P	unlegierter Baustahl	bis 700	St-52	1.0052	210	0,018	0,025	0,03	0,035	0,048	0,06
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	175	0,015	0,023	0,028	0,03	0,043	0,05
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	120	0,013	0,02	0,025	0,025	0,038	0,045
K	Grauguss	100 - 400	GG 25	0.6025	150	0,013	0,018	0,025	0,03	0,04	0,05
	Sphäroguss	400 - 800	GGG 60	0.7060	110	0,013	0,018	0,025	0,03	0,04	0,05
	Temperguss	350 - 700	GTS 55	0.8155	110	0,013	0,018	0,025	0,03	0,04	0,05

ISO	Umfangfräsen Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm					
						5,7 - 6,0	7,7 - 8,0	9,7 - 10,0	11,7 - 14,0	15,7 - 16	19,7 - 20
P	unlegierter Baustahl	bis 700	St-52	1.0052	210	0,045	0,06	0,07	0,085	0,115	0,14
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	175	0,04	0,055	0,065	0,08	0,1	0,12
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	120	0,035	0,05	0,06	0,075	0,085	0,1
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	110	0,03	0,04	0,055	0,07	0,075	0,085
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	110	0,03	0,04	0,055	0,07	0,075	0,085
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	90	0,03	0,04	0,05	0,055	0,07	0,08
K	Grauguss	100 - 400	GG 25	0.6025	150	0,03	0,045	0,06	0,075	0,09	0,11
	Sphäroguss	400 - 800	GGG 60	0.7060	110	0,03	0,045	0,06	0,075	0,09	0,11
	Temperguss	350 - 700	GTS 55	0.8155	110	0,03	0,045	0,06	0,075	0,09	0,11
S	Titan-Legierung	bis 950	TiAl6V4	3.7165	70	0,03	0,04	0,05	0,055	0,07	0,08
	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	70	0,03	0,04	0,05	0,055	0,07	0,08
	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670	50	0,03	0,04	0,055	0,07	0,075	0,085
	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	50	0,03	0,04	0,055	0,07	0,075	0,085

ISO	Nutfräsen Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm					
						5,7 - 6,0	7,7 - 8,0	9,7 - 10,0	11,7 - 14,0	15,7 - 16	19,7 - 20
P	unlegierter Baustahl	bis 700	St-52	1.0052	210	0,035	0,05	0,06	0,07	0,095	0,12
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	175	0,03	0,045	0,055	0,06	0,085	0,1
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	120	0,025	0,04	0,05	0,05	0,075	0,09
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	110	0,02	0,03	0,045	0,06	0,065	0,075
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	110	0,02	0,03	0,045	0,06	0,065	0,075
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	90	0,02	0,03	0,04	0,045	0,06	0,07
K	Grauguss	100 - 400	GG 25	0.6025	150	0,025	0,035	0,05	0,06	0,08	0,1
	Sphäroguss	400 - 800	GGG 60	0.7060	110	0,025	0,035	0,05	0,06	0,08	0,1
	Temperguss	350 - 700	GTS 55	0.8155	110	0,025	0,035	0,05	0,06	0,08	0,1
S	Titan-Legierung	bis 950	TiAl6V4	3.7165	70	0,02	0,03	0,04	0,045	0,06	0,07
	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	70	0,02	0,03	0,04	0,045	0,06	0,07
	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670	50	0,02	0,03	0,045	0,06	0,065	0,075
	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	50	0,02	0,03	0,045	0,06	0,065	0,075

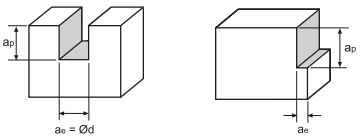
VAN HOORN CARBIDE VHM-Schruppfräser *VHVFFW*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255079....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min
P	unlegierter Baustahl	bis 700	St-52	1.0052	150 - 200
	Automatenstahl	bis 700	9 SMn 28	1.0715	150 - 200
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	150 - 200
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	90 - 130
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	90 - 130
	Stahlguss	bis 950	GS 40	1.0416	100 - 150
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	70 - 100
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	90 - 120
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	70 - 100
K	Grauguss	bis 240 HB	GG 25	0.6025	150 - 200
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	150 - 200
	Sphäroguss	bis 300 HB	GGG 60	0.7060	150 - 200
	Temperguss	bis 300 HB	GTS 55	0.8155	150 - 200
H	Hartguss	300 - 600 HB		Ampco	110 - 150
	gehärteter Stahl	45 - 52 HRc			100 - 150



Ø	Nutenfräsen ap max.	Nutenfräsen fz (mm/Zahn)	Eckfräsen ap* max.	Eckfräsen ae* 0,10 x Ø	Eckfräsen ae* 0,25 x Ø	Eckfräsen ae* 0,50 x Ø	Eckfräsen ae* max.
4	< 4	0,015-0,030	< 5				< 2
6	< 6	0,020-0,040	< 9				< 3
8	< 10	0,025-0,050	< 16				< 4
10	< 12	0,030-0,060	< 20	fz*=3,0 x fz	fz*=2,0 x fz	fz*=1,0 x fz	< 5
12	< 18	0,035-0,070	< 24				< 6
16	< 24	0,045-0,080	< 32				< 8
20	< 30	0,050-0,090	<38				<10

Beim Eckfräsen ist der Vorschub fz* abhängig von der Schnittbreite ae*
Beispiel Fräser Ø12mm: wenn Schnittbreite ae*=3 mm, dann wird der Vorschub/Zahn fz*=2 x fz = 0,07 - 0,14 mm / Zahn

VAN HOORN CARBIDE Schaftfräser *VHVTR* Z4



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255084....
255087....
255088....

ISO	**Schruppen / Nuten** ae = 1,0 x D ap = 0,6 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
	Werkstoffgruppe					3	4	5	6	8	10	12	16	20	25
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	80 - 150	0,01	0,02	0,02	0,02	0,03	0,04	0,05	0,06	0,08	0,10
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80 - 150	0,01	0,02	0,02	0,02	0,03	0,04	0,05	0,06	0,08	0,10
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	60 - 120	0,01	0,02	0,02	0,02	0,03	0,04	0,05	0,06	0,08	0,10
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	70 - 100	0,01	0,02	0,02	0,02	0,03	0,04	0,05	0,06	0,08	0,10
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	30 - 50	0,01	0,02	0,02	0,02	0,03	0,04	0,05	0,06	0,08	0,10

ISO	**Schlichten / Besäumen** ae = 0,5 x D ap = 1 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm									
	Werkstoffgruppe					3	4	5	6	8	10	12	16	20	25
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	80 - 150	0,02	0,03	0,03	0,04	0,05	0,07	0,08	0,10	0,12	0,15
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80 - 150	0,02	0,03	0,03	0,04	0,05	0,07	0,08	0,10	0,12	0,15
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	60 - 120	0,02	0,03	0,03	0,04	0,05	0,07	0,08	0,10	0,12	0,15
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	70 - 100	0,02	0,03	0,03	0,04	0,05	0,07	0,08	0,10	0,12	0,15
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	30 - 50	0,02	0,03	0,03	0,04	0,05	0,07	0,08	0,10	0,12	0,15

VAN HOORN CARBIDE Schaftfräser *VHVTRW* Z5



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255102 ....

ISO	**Schlichetn / Besäumen** fz für ae = 0,5 x D und ap = 1,0 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesser in mm										
	Werkstoffgruppe					3	4	5	6	8	10	12	14	16	20	25
P	Automatenstahl	bis 700	9 SMn 28	1.0715	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	unlegierter Baustahl	bis 700	St-52	1.0052	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Baustahl	700 - 950	Ck45	1.1191	225	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Stahlguss	bis 950	GS 40	1.0416	150	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	200	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	150	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	110	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462	130	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
K	Grauguss	bis 260 HB	GG 25	0.6025	200	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678	180	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Sphäroguss	bis 280 HB	GGG 60	0.7060	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Temperguss	bis 280 HB	GTS 55	0.8155	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	60	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718	40	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	120	0,020	0,025	0,030	0,035	0,045	0,055	0,065	0,070	0,080	0,100	0,125

SARA® ATORN® Schaftfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254058....
254109....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 6,0 - 8,0	10,0 - 12,0	14,0 - 16,0	18,0 - 20,0	25,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	160	1.230 - 1.180	1.180	1.150 - 1.100	1.080 - 1.040	840
	Automatenstahl	bis 700	9 SMn 28	1.0715	160	1.230 - 1.180	1.180	1.150 - 1.100	1.080 - 1.040	840
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	140	850 - 840	840	830	810 - 740	600
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	140	850 - 840	840	830	810 - 740	600
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	140	850 - 840	840	830	810 - 740	600
	Stahlguss	bis 950	GS 40	1.0416	140	850 - 840	840	830	810 - 740	600
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80 - 100	260	260	250 - 230	210 - 190	150
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	90 - 110	270	270	260 - 240	220 - 200	160
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	70 - 90	250	250	240 - 220	200 - 180	140
K	Grauguss	bis 240 HB	GG 25	0.6025	200	1.470 - 1.420	1.420	1.360 - 1.310	1.310 - 1.240	1.000
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	180	1.450 - 1.400	1.400	1.340 - 1.290	1.290 - 1.220	980
	Sphäroguss	bis 300 HB	GGG 60	0.7060	190	1.460 - 1.410	1.410	1.350 - 1.300	1.300 - 1.230	990
	Temperguss	bis 300 HB	GTS 55	0.8155	190	1.460 - 1.410	1.410	1.350 - 1.300	1.300 - 1.230	990
H	Hartguss	300 - 600 HB		Ampco	160	1.230 - 1.180	1.180	1.150 - 1.100	1.080 - 1.040	840
	gehärteter Stahl	45 - 50 HRc			50 - 60	140 - 130	130 - 120	100 - 90	80 - 70	60
	gehärteter Stahl	50 - 60 HRc			30 - 40	80 - 70	70 - 60	50 - 40	40 - 38	30

	ap	ae
Werkstoff bis 45 HRc		
D bis 3 mm	1,5 x D	0,05 x D
D größer 3 mm	1,5 x D	0,1 x D
Werkstoff von 45-60 HRc	1,0 x D	0,02 x D

Schnittwertempfehlungen für extra lange Ausführung:

Reduzieren Sie bitte die oben angegeben Werte um 25%.



… HPC with internal cooling

ATORN®
High quality for great performance

SARA® Schruppfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254090....
254092....

ISO	Werkstoff-gruppe	Materialbezeichnung	Festigkeit/Härte	Vc m/min	Vorschub fz mm ≤Ø 8	≤Ø 12	≤Ø 16	≤Ø 20
P	1.1.1	Automatenstahl	bis 500 N/mm²	160	0,04	0,05	0,06	0,07
	1.1.2		über 500 N/mm²	112	0,04	0,05	0,06	0,07
	1.2.1	Baustahl	unlegiert bis 500 N/mm²	160	0,05	0,05	0,07	0,08
	1.2.2		unlegiert über 500 N/mm²	112	0,05	0,05	0,07	0,08
	1.2.3		legiert	96	0,04	0,05	0,06	0,07
	1.3.1	Federstahl	geglüht (bis 250 HB)	96	0,03	0,04	0,05	0,06
	2.1.1	Einsatzstahl	bis 150 HB	143	0,04	0,05	0,06	0,07
	2.1.2		150-200 HB	113	0,03	0,04	0,05	0,06
	2.1.3		über 200 HB	90	0,03	0,04	0,05	0,06
	2.2.1	Nitrierstahl	bis 1000 N/mm²	105	0,03	0,04	0,05	0,06
	2.2.2		über 1000 N/mm²	83	0,03	0,04	0,05	0,06
	2.3.1	Vergütungsstahl	unlegiert bis 800 N/mm²	120	0,03	0,04	0,05	0,06
	2.3.2	Werkzeugstahl	unlegiert 800-1000 N/mm²	105	0,03	0,04	0,05	0,06
	2.3.3		legiert bis 800 N/mm²	105	0,03	0,04	0,05	0,06
	2.3.4		legiert 800-1000 N/mm²	90	0,03	0,04	0,05	0,06
	2.3.5		legiert 1000-1300 N/mm²	83	0,03	0,04	0,05	0,06
K	6.1.1	GG	unlegiert bis 180 HB	156	0,06	0,07	0,09	0,12
	6.1.2	(mit lamellarem	unlegiert über 180 HB	130	0,06	0,07	0,09	0,12
	6.1.3	Graphit)	legiert	104	0,03	0,04	0,05	0,06
	6.1.4		hoch legiert	91	0,03	0,04	0,05	0,06
	6.2.1	GGG	unlegiert bis 180 HB	156	0,05	0,05	0,07	0,08
	6.2.2	(mit Kugelgraphit)	unlegiert über 180 HB	130	0,05	0,05	0,07	0,08
	6.2.3		legiert	104	0,02	0,03	0,04	0,05
	6.3.1	GTW	bis 180 HB	156	0,06	0,07	0,09	0,12
	6.3.2	(weisser Temperguss)	über 180 HB	130	0,06	0,07	0,09	0,12
	6.4.1	GTS	bis 180 HB	156	0,06	0,07	0,09	0,12
	6.4.2	(schwarzer Temperguss)	über 180 HB	130	0,06	0,07	0,09	0,12

Schnittgeschwindigkeits- und Vorschubkorrekturfaktoren

ae	50 %	100%			
Faktor für Vc	1,0	0,85			
Faktor für fz	1,0	0,80			

SARA® Schruppfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254137.... 254141.... 254142....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	159	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
	allg. Stähle -700 N/mm²	145	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
	allg. Stähle - 850N/mm²	120	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
	allg. Stähle -1000 N/mm²	103	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
	allg. Stähle -1400 N/mm²	71	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	113	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	95	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	64	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	46	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
K	Gusseisen bis 180 HB	120	0,017	0,029	0,029	0,038	0,067	0,067	0,084	0,084	0,101
	Temperguss	71	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101
	Gusseisen mit Kugelgraphit	71	0,017	0,029	0,029	0,038	0,067	0,067	0,084	0,084	0,101
M	Rost und säurebeständige Stähle bis 700N/mm²	67	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
	Rost und säurebeständige Stähle ab 700N/mm²	47	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	225	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
	allg. Stähle -700 N/mm²	205	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
	allg. Stähle - 850N/mm²	170	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
	allg. Stähle -1000 N/mm²	145	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
	allg. Stähle -1400 N/mm²	100	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	160	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	135	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	90	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	65	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
K	Gusseisen bis 180 HB	170	0,020	0,035	0,035	0,045	0,080	0,080	0,100	0,100	0,120
	Temperguss	100	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120
	Gusseisen mit Kugelgraphit	100	0,020	0,035	0,035	0,045	0,080	0,080	0,100	0,100	0,120
M	Rost und säurebeständige Stähle bis 700N/mm²	95	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084
	Rost und säurebeständige Stähle ab 700N/mm²	67	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084

SARA® Torusfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254017....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 6,0 - 8,0	10,0 - 12,0				
P	unlegierter Baustahl	bis 700	1.0052	85	315 - 295	280				
	Automatenstahl	bis 700	1.0715	85	315 - 295	280				
	unlegierter Vergütungsstahl	500 - 950	1.1191	85	315 - 295	280				
	legierter Einsatzstahl	bis 950	1.7131	70	235	230 - 215				
	Werkzeugstahl	950 - 1400	1.2343	70	235	230 - 215				
	Stahlguss	bis 950	1.0416	70	235	230 - 215				
M	INOX Stahl,austenitisch	500 - 950	1.4301	50	100	95				
	INOX Stahl, geschwefelt	500 - 950	1.4104	55	105	100				
	INOX Stahl,martensitisch	500 - 950	1.4122	45	95	90				
K	Grauguss	bis 240 HB	0.6025	85	315 - 295	280				
	legierter Grauguss	bis 350 HB	0.6678	55	130 - 125	125 - 110				
	Sphäroguss	bis 300 HB	0.7060	60	135 - 130	130 - 115				
	Temperguss	bis 300 HB	0.8155	60	135 - 130	130 - 115				
H	Hartguss	300 - 600 HB	Ampco	85	315 - 295	280				
	gehärteter Stahl	45 - 50 HRc	20	30	55 - 50	50 - 40				
	gehärteter Stahl	50 - 60 HRc	15	20	30 - 25	25 - 18				

Axiale Schnitttiefe ap bei ISO Bereichen ISO P M K	ap
	0,5 x D
Axiale Schnitttiefe ap bei ISO Bereich ISO H	
Härte 45 - 50 HRc	ap 0,05 x D
Härte 50 - 60 HRc	ap 0,05 x D

SARA® Torusfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254019....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 6,0 - 8,0	10,0 - 12,0		
P	unlegierter Baustahl	bis 700	St-52	1.0052	80	615 - 590	590		
	Automatenstahl	bis 700	9 SMn 28	1.0715	80	615 - 590	590		
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	70	425 - 420	420		
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	70	425 - 420	420		
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	70	425 - 420	420		
	Stahlguss	bis 950	GS 40	1.0416	70	425 - 420	420		
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	40 - 50	130	130		
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	45 - 55	135	135		
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	35 - 45	125	125		
K	Grauguss	bis 240 HB	GG 25	0.6025	100	735 - 710	710		
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	90	725 - 700	700		
	Sphäroguss	bis 300 HB	GGG 60	0.7060	95	730 - 705	705		
	Temperguss	bis 300 HB	GTS 55	0.8155	95	730 - 705	705		
H	Hartguss	300 - 600 HB		Ampco	80	615 - 590	590		
	gehärteter Stahl	45 - 50 HRc			25 - 30	70 - 65	65 - 60		
	gehärteter Stahl	50 - 60 HRc			15 - 20	40 - 35	35 - 30		

	ap	ae
Werkstoff bis 45 HRc		
D bis 3 mm	1,5 x D	0,05 x D
D größer 3 mm	1,5 x D	0,1 x D
Werkstoff von 45 - 60 HRc	1,0 x D	0,02 x D

Safety in the workplace

Please protect your eyes, ears and respiratory system!



SARA® Torusfräser



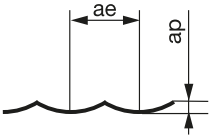
Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254139....

ISO	Schruppen ap: 1,00 x D1 | ae: 1,00 x D1 Werkstoff	Vc m/min	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	131	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
	allg. Stähle -700 N/mm²	124	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
	allg. Stähle - 850N/mm²	117	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
	allg. Stähle -1000 N/mm²	103	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
	allg. Stähle -1400 N/mm²	74	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	110	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	95	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	67	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	53	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
K	Gusseisen bis 180 HB	131	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
	Temperguss	95	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
	Gusseisen mit Kugelgraphit	95	0,017	0,029	0,029	0,038	0,063	0,063	0,084	0,084	0,101	0,101
M	Rost und säurebeständige Stähle bis 700N/mm²	57	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
	Rost und säurebeständige Stähle ab 700N/mm²	28	0,013	0,021	0,021	0,027	0,044	0,044	0,059	0,059	0,071	0,071
ISO	Schlichten/Besäumen ap: 1,00 x D1 | ae: 0,50 x D1 Werkstoff	Vc m/min	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 18,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	185	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
	allg. Stähle -700 N/mm²	175	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
	allg. Stähle - 850N/mm²	165	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
	allg. Stähle -1000 N/mm²	145	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084
	allg. Stähle -1400 N/mm²	105	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	155	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	135	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	95	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	75	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084
K	Gusseisen bis 180 HB	185	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
	Temperguss	135	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
	Gusseisen mit Kugelgraphit	135	0,020	0,035	0,035	0,045	0,075	0,075	0,100	0,100	0,120	0,120
M	Rost und säurebeständige Stähle bis 700N/mm²	80	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084
	Rost und säurebeständige Stähle ab 700N/mm²	40	0,015	0,025	0,025	0,032	0,052	0,052	0,070	0,070	0,084	0,084

ATORN® Mini-Radiusfräser *RockTec 52*

Die niedrigeren Vc-Werte gelten jeweils für lange Freistellungen und den kleineren Durchmesserbereich, die höheren Vc-Werte für kurze Freilängen und den größeren Durchmesserbereich. Das gilt auch für die angegebenen ap max. Werte.
Die angebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen.





257025....



257033....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Durchmesserbereich ≤ 0,5 mm Vc m/min	ap max.	Durchmesserbereich 0,6 - 1 mm Vc m/min	ap max.	Durchmesserbereich > 1 mm Vc m/min	ap max.	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 0,2 - 0,3	0,4 - 0,8	0,9 - 1,5	1,6 - 2,0	2,5 - 3,0
P	Stahl-, Stahlguss	< 700	60 - 80	0,007 - 0,030	70 - 90	0,010 - 0,05	80 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Stahl-, Stahlguss	< 1100	60 - 80	0,007 - 0,030	70 - 90	0,010 - 0,05	80 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Stahl	< 1300	60 - 80	0,006 - 0,025	70 - 90	0,010 - 0,05	80 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Stahl	< 1600	60 - 80	0,006 - 0,025	70 - 90	0,010 - 0,05	80 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
M	INOX Stahl		50 - 70	0,007 - 0,030	60 - 80	0,010 - 0,05	70 - 90	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
K	GG		50 - 70	0,007 - 0,030	60 - 80	0,010 - 0,05	70 - 90	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	GGG		50 - 70	0,007 - 0,030	60 - 80	0,010 - 0,05	70 - 90	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Temperguss		50 - 70	0,007 - 0,030	60 - 80	0,010 - 0,05	70 - 90	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
S	Titan, Titanlegierung	> 700	50 - 70	0,007 - 0,030	60 - 80	0,010 - 0,05	70 - 90	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Ni-/Co-Legierung	< 35 HRc	50 - 70	0,006 - 0,025	60 - 80	0,010 - 0,05	70 - 90	0,04 - 0,15	0,003 - 0,004	0,003 - 0,008	0,004 - 0,010	0,006 - 0,022	0,013 - 0,029
	Ni-/Co-Legierung	< 45 HRc	40 - 60	0,005 - 0,020	50 - 70	0,010 - 0,05	60 - 80	0,04 - 0,15	0,003 - 0,004	0,003 - 0,007	0,004 - 0,009	0,006 - 0,016	0,013 - 0,022
H	gehärtete Stähle	< 52 HRc	30 - 50	0,003 - 0,015	40 - 60	0,008 - 0,05	50 - 70	0,02 - 0,15	0,002 - 0,004	0,002 - 0,005	0,003 - 0,008	0,004 - 0,011	0,011 - 0,021

SARA® Radiusfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254011.... 254012.... 254013....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 1,0 - 2,0	3,0 - 4,0	5 ,0 - 6,0	8,0 - 10,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	168	1.071	1.071	1.197	1.407
	Automatenstahl	bis 700	9 SMn 28	1.0715	168	1.071	1.071	1.197	1.407
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	154	1.071	1.071	1.197	1.407
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	140	854	868	903	1.064
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	140	868	882	917	1.078
	Stahlguss	bis 950	GS 40	1.0416	140	854	868	903	1.064
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	98	399	462	532	623
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	98	406	469	539	630
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4122	98	392	455	525	616
K	Grauguss	bis 240 HB	GG 25	0.6025	217	1.071-1.316	1.316	1.470	1.750
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	189	1.029-1.274	1.274	1.428	1.708
	Sphäroguss	bis 300 HB	GGG 60	0.7060	203	1.050-1.295	1.295	1.449	1.729
	Temperguss	bis 300 HB	GTS 55	0.8155	203	1.050-1.295	1.295	1.449	1.729
H	Hartguss	300 - 600		Ampco	91	1.120	1.120	1.260	1.470
	gehärteter Stahl	45 - 50 HRc			84	294	336	406	462
	gehärteter Stahl	50 - 60 HRc			63	196	224	252	294
	gehärteter Stahl	60 - 70 HRc			56	133	154	168	196

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschubgeschwindigkeit Vf mm/min bezogen auf Fräserdurchmesserbereich in mm 12,0 - 14,0	16,0 - 18,0	20,0
P	unlegierter Baustahl	bis 700	St-52	1.0052	168	1.225	1.141	1.001
	Automatenstahl	bis 700	9 SMn 28	1.0715	168	1.225	1.141	1.001
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	154	1.225	1.141	1.001
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	140	952	868	784
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	140	966	882	798
	Stahlguss	bis 950	GS 40	1.0416	140	952	868	784
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	98	574	532	469
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	98	581	539	476
	INOX Stahl, martensitisch	500 - 950	X 39 CrMo 17 1	1.4006	98	567	525	462
K	Grauguss	bis 240 HB	GG 25	0.6025	217	1.505	1.435	1.316
	legierter Grauguss	bis 350 HB	GGL-NiCr 35 2	0.6678	189	1.463	1.393	1.274
	Sphäroguss	bis 300 HB	GGG 60	0.7060	203	1.484	1.414	1.295
	Temperguss	bis 300 HB	GTS 55	0.8155	203	1.484	1.414	1.295
H	Hartguss	300 - 600 HB		Ampco	91	1.260	1.190	1.050
	gehärteter Stahl	45 - 50 HRc			84	427	371	322
	gehärteter Stahl	50 - 60 HRc			63	273	252	224
	gehärteter Stahl	60 - 70 HRc			56	182	168	154

	ap	ae
Werkstoff bis 45 HRc	0,1 x D	0,2 x D
Werkstoff von 45-60 HRc	0,05 x D	0,1 x D

Schnittwertempfehlungen für extra lange Ausführung:

Reduzieren Sie bitte die oben angegeben Werte um 25%.

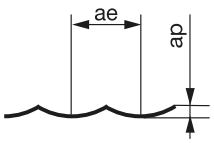


... from Ø 0.2 mm

ATORN®
High quality for great performance

ATORN® Radiusfräser RockTec 52

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



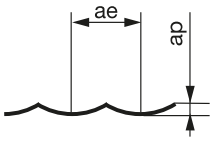


257027....



257035....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Vc m/min Durchmesserbereich 2 - 3 mm	Vc m/min Durchmesserbereich 4 - 20 mm	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 2 - 3	4 - 5	6 - 8	10 - 12	16	20
P	Stahl-, Stahlguss	< 700	max. 0,4 x R	max 0,1 x R	180 - 270	270 - 370	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl-, Stahlguss	< 1100	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1300	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1600	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
M	INOX Stahl		max. 0,4 x R	max 0,1 x R	180 - 270	270 - 370	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
K	GG		max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	GGG		max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Temperguss		max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
S	Titan, Titanlegierung	> 700	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 35 HRc	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 45 HRc	max. 0,4 x R	max 0,1 x R	150 - 210	210 - 270	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
H	gehärtete Stähle	< 52 HRc	max. 0,4 x R	max 0,1 x R	120 - 180	180 - 240	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,11	0,08 - 0,11	0,08 - 0,11



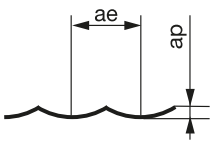


257029....



257037....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Vc m/min Durchmesserbereich 2 - 3 mm	Vc m/min Durchmesserbereich 4 - 20 mm	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 2 - 3	4 - 5	6 - 8	10 - 12	16	20
P	Stahl-, Stahlguss	< 700	max. 0,4 x R	max 0,1 x R	160 - 240	240 - 320	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl-, Stahlguss	< 1100	max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1300	max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1600	max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
M	INOX Stahl		max. 0,4 x R	max 0,1 x R	160 - 240	240 - 320	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
K	GG		max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	GGG		max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Temperguss		max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
S	Titan, Titanlegierung	> 700	max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 35 HRc	max. 0,4 x R	max 0,1 x R	160 - 220	220 - 300	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 45 HRc	max. 0,4 x R	max 0,1 x R	150 - 190	180 - 260	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
H	gehärtete Stähle	< 52 HRc	max. 0,4 x R	max 0,1 x R	110 - 150	140 - 200	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,11	0,08 - 0,11	0,08 - 0,11





257031....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Vc m/min Durchmesserbereich 2 - 3 mm	Vc m/min Durchmesserbereich 4 - 20 mm	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 2 - 3	4 - 5	6 - 8	10 - 12	16	20
P	Stahl-, Stahlguss	< 700	max. 0,4 x R	max 0,1 x R	90 - 170	150 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl-, Stahlguss	< 1100	max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1300	max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1600	max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
M	INOX Stahl		max. 0,4 x R	max 0,1 x R	90 - 170	150 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
K	GG		max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	GGG		max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Temperguss		max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
S	Titan, Titanlegierung	> 700	max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 35 HRc	max. 0,4 x R	max 0,1 x R	90 - 150	130 - 190	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 45 HRc	max. 0,4 x R	max 0,1 x R	70 - 130	110 - 160	0,03 - 0,04	0,04 - 0,055	0,05 - 0,08	0,08 - 0,12	0,09 - 0,12	0,09 - 0,12
H	gehärtete Stähle	< 52 HRc	max. 0,4 x R	max 0,1 x R	60 - 100	90 - 130	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,11	0,08 - 0,11	0,08 - 0,11

SARA® Radiusfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **254138....**

ISO	Schlichten/Besäumen ap: 0,03 x D1 | ae: 0,30 x D1 Werkstoff	Vc m/min	D1 3,00 fz	D1 4,00 fz	D1 5,00 fz	D1 6,00 fz	D1 8,00 fz	D1 10,00 fz	D1 12,00 fz	D1 14,00 fz	D1 16,00 fz	D1 20,00 fz
P	allg. Stähle -500 N/mm²	560	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	allg. Stähle -700 N/mm²	440	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	allg. Stähle - 850N/mm²	380	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	allg. Stähle -1000 N/mm²	370	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	allg. Stähle -1400 N/mm²	260	0,007	0,025	0,025	0,032	0,040	0,045	0,045	0,060	0,060	0,080
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 850N/mm²	390	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1000N/mm²	310	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle < 1400N/mm²	210	0,007	0,025	0,025	0,032	0,040	0,045	0,045	0,060	0,060	0,080
	Feder-, Einsatz-, Nitrier-, Wkzg.-Stähle > 1400N/mm²	180	0,007	0,025	0,025	0,032	0,040	0,045	0,045	0,060	0,060	0,080
H	gehärtete Stähle 45-55 HRC	140	0,007	0,025	0,025	0,032	0,040	0,045	0,045	0,060	0,060	0,080
K	Gusseisen bis 180 HB	560	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	Temperguss	510	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120
	Gusseisen mit Kugelgraphit	510	0,011	0,035	0,035	0,045	0,055	0,065	0,065	0,090	0,090	0,120

SARA® Schlitzfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **292004....**

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 10,5 fz	Ø 13,5 fz	Ø 16,5 fz	Ø 19,5 fz	Ø 22,5 fz	Ø 25,5 fz	Ø 28,5 fz	Ø 32,5 fz	Ø 38,5 fz	Ø 45,5 fz	Ø 20 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,03	0,03	0,03	0,03	0,035	0,035	0,035	0,038	0,038	0,038	0,057
		> 500 - 800 N/mm²	90	0,03	0,03	0,03	0,03	0,035	0,035	0,035	0,038	0,038	0,038	0,057
	Automatenstähle	< 850 N/mm²	90	0,028	0,028	0,028	0,028	0,033	0,033	0,033	0,036	0,036	0,036	0,066
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,03	0,03	0,03	0,03	0,035	0,035	0,035	0,038	0,038	0,038	0,057
		700 - 850 N/mm²	85	0,028	0,028	0,028	0,028	0,033	0,033	0,033	0,036	0,036	0,036	0,066
		850 - 1000 N/mm²	80	0,028	0,028	0,028	0,028	0,033	0,033	0,033	0,036	0,036	0,036	0,066
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,028	0,028	0,028	0,028	0,033	0,033	0,033	0,036	0,036	0,036	0,066
K	Gusseisen	< 240 HB	120	0,035	0,035	0,035	0,035	0,04	0,04	0,04	0,045	0,045	0,045	0,073
		< 300 HB	100	0,035	0,035	0,035	0,035	0,04	0,04	0,04	0,045	0,045	0,045	0,073

SARA® T-Nutenfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **292005....**

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 12,5 fz	Ø 16 fz	Ø 18 fz	Ø 21 fz	Ø 25 fz	Ø 28 fz	Ø 32 fz	Ø 32,5 fz	Ø 38,5 fz	Ø 45,5 fz	Ø 20 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,03	0,03	0,03	0,035	0,035	0,035	0,045	0,038	0,038	0,038	0,057
		> 500 - 800 N/mm²	90	0,03	0,03	0,03	0,035	0,035	0,035	0,045	0,038	0,038	0,038	0,057
	Automatenstähle	< 850 N/mm²	90	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,03	0,03	0,03	0,035	0,035	0,035	0,045	0,038	0,038	0,038	0,057
		700 - 850 N/mm²	85	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
		850 - 1000 N/mm²	80	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
K	Gusseisen	< 240 HB	120	0,035	0,035	0,035	0,04	0,04	0,04	0,05	0,045	0,045	0,045	0,073
		< 300 HB	100	0,035	0,035	0,035	0,04	0,04	0,04	0,05	0,045	0,045	0,045	0,073



292006....

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 12,5 fz	Ø 16 fz	Ø 18 fz	Ø 21 fz	Ø 25 fz	Ø 28 fz	Ø 32 fz	Ø 32,5 fz	Ø 38,5 fz	Ø 45,5 fz	Ø 20 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,03	0,03	0,03	0,035	0,035	0,035	0,045	0,038	0,038	0,038	0,057
		> 500 - 800 N/mm²	90	0,03	0,03	0,03	0,035	0,035	0,035	0,045	0,038	0,038	0,038	0,057
	Automatenstähle	< 850 N/mm²	90	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,03	0,03	0,03	0,035	0,035	0,035	0,045	0,038	0,038	0,038	0,057
		700 - 850 N/mm²	85	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
		850 - 1000 N/mm²	80	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,028	0,028	0,028	0,033	0,033	0,033	0,04	0,036	0,036	0,036	0,066
K	Gusseisen	< 240 HB	120	0,035	0,035	0,035	0,04	0,04	0,04	0,05	0,045	0,045	0,045	0,073
		< 300 HB	100	0,035	0,035	0,035	0,04	0,04	0,04	0,05	0,045	0,045	0,045	0,073

SARA® Winkelfräser

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



292000....

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 16 fz	Ø 20 fz	Ø 22 fz	Ø 25 fz	Ø 28 fz	Ø 32 fz	Ø 38 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		> 500 - 800 N/mm²	90	0,04	0,04	0,04	0,04	0,042	0,042	0,042
	Automatenstähle	< 850 N/mm²	90	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		700 - 850 N/mm²	85	0,035	0,035	0,035	0,04	0,04	0,04	0,05
		850 - 1000 N/mm²	80	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,035	0,035	0,035	0,04	0,04	0,04	0,05
K	Gusseisen	< 240 HB	120	0,045	0,045	0,045	0,045	0,048	0,048	0,048
		< 300 HB	100	0,045	0,045	0,045	0,045	0,048	0,048	0,048



292001....

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 16 fz	Ø 20 fz	Ø 22 fz	Ø 25 fz	Ø 28 fz	Ø 32 fz	Ø 38 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		> 500 - 800 N/mm²	90	0,04	0,04	0,04	0,04	0,042	0,042	0,042
	Automatenstähle	< 850 N/mm²	90	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		700 - 850 N/mm²	85	0,035	0,035	0,035	0,04	0,04	0,04	0,05
		850 - 1000 N/mm²	80	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,035	0,035	0,035	0,04	0,04	0,04	0,05
K	Gusseisen	< 240 HB	120	0,045	0,045	0,045	0,045	0,048	0,048	0,048
		< 300 HB	100	0,045	0,045	0,045	0,045	0,048	0,048	0,048



292002....

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 16 fz	Ø 20 fz	Ø 22 fz	Ø 25 fz	Ø 28 fz	Ø 32 fz	Ø 38 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		> 500 - 800 N/mm²	90	0,04	0,04	0,04	0,04	0,042	0,042	0,042
	Automatenstähle	< 850 N/mm²	90	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		700 - 850 N/mm²	85	0,035	0,035	0,035	0,04	0,04	0,04	0,05
		850 - 1000 N/mm²	80	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,035	0,035	0,035	0,04	0,04	0,04	0,05
K	Gusseisen	< 240 HB	120	0,045	0,045	0,045	0,045	0,048	0,048	0,048
		< 300 HB	100	0,045	0,045	0,045	0,045	0,048	0,048	0,048



292003....

ISO	Werkstoff	Zugfestigkeit/ Härte	Vc m/min	Ø 16 fz	Ø 20 fz	Ø 22 fz	Ø 25 fz	Ø 28 fz	Ø 32 fz	Ø 38 fz
P	Allgemeine Baustähle	< 500 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		> 500 - 800 N/mm²	90	0,04	0,04	0,04	0,04	0,042	0,042	0,042
	Automatenstähle	< 850 N/mm²	90	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	unlegierte Vergütungsstähle	< 700 N/mm²	120	0,04	0,04	0,04	0,04	0,042	0,042	0,042
		700 - 850 N/mm²	85	0,035	0,035	0,035	0,04	0,04	0,04	0,05
		850 - 1000 N/mm²	80	0,035	0,035	0,035	0,04	0,04	0,04	0,05
	legierte Vergütungsstähle	850 - 1000 N/mm²	70	0,035	0,035	0,035	0,04	0,04	0,04	0,05
K	Gusseisen	< 240 HB	120	0,045	0,045	0,045	0,045	0,048	0,048	0,048
		< 300 HB	100	0,045	0,045	0,045	0,045	0,048	0,048	0,048

ATORN® Einschneiden-Schaftfräser *Ultra-N*



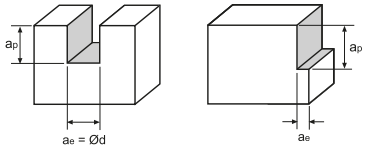
Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion** **249100....**

Korrekturbeispiele:

Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7

Korrekturfaktor fz für ap < 1xD = 1,2

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 1,5	2,0	3,0	4,0	5,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Magnesium-Leg.	<500			350 - 500	400	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,023 - 0,027	0,030 - 0,043	0,045 - 0,070	0,050 - 0,080	0,060 - 0,100

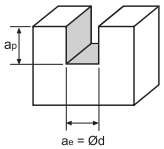
ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 6,0	8,0	10,0	12,0	16,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Magnesium-Leg.	<500			350 - 500	400	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,075 - 0,120	0,095 - 0,140	0,110 - 0,150	0,130 - 0,170	0,15 - 0,180

SARA® Einschneiden-Schaftfräser

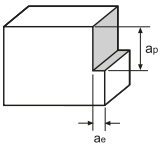


Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

250001....



Vc = 100 - 400 m/min
ap = bis zu 1 x d



Vc = 190 - 400 m/min
ap = 0,5 x d bis 1 x d
ae = 0,05 x d bis 0,5 x d

Bevorzugte Kühlung: 1. Emulsion
Bohren: Benutzen Sie die gleichen Vorschubwerte wie beim Fräsen

Ø d	fz
0,6	0,010 - 0,015
0,8	0,014 - 0,018
1,0	0,015 - 0,020
1,2	0,018 - 0,023
1,5	0,023 - 0,027
1,6	0,025 - 0,032
1,8	0,027 - 0,036
2,0	0,036 - 0,043
2,5	0,034 - 0,060

Ø d	fz
3,0	0,045 - 0,070
4,0	0,050 - 0,080
5,0	0,060 - 0,100
6,0	0,075 - 0,120
7,0	0,080 - 0,135
8,0	0,095 - 0,150
10,0	0,115 - 0,185
12,0	0,140 - 0,230

ATORN® Mini-Schaftfräser *Ultra-N*

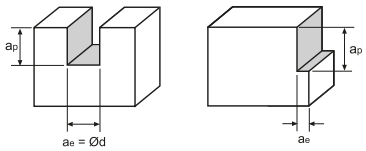


Die angegebenen Werte gelten für ae < 0,5xD.
Korrekturbeispiele:
Korrekturfaktor fz für Auskraglänge (5-10xD) = 0,7
Korrekturfaktor fz für Auskraglänge (>10xD) = 0,5
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für Kopieren = 1,3

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

Kühlung = Emulsion

249001....
249002....



ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 0,5	1,0	ap min/max in mm bezogen auf den Fräserdurchmesser in mm 0,5	1,0
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Magnesium-Leg.	<500			400 - 550	450	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	330	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,009 - 0,015	0,016 - 0,025	0,02 - 0,30	0,05 - 0,70

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 1,5	2,0	ap min/max in mm bezogen auf den Fräserdurchmesser in mm 1,5	2,0
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Magnesium-Leg.	<500			400 - 550	450	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	330	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,030 - 0,035	0,035 - 0,050	0,07 - 1,20	0,10 - 1,50

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 2,5	ap min/max in mm bezogen auf den Fräserdurchmesser in mm 2,5
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,040 - 0,060	0,12 - 2,00
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,040 - 0,060	0,12 - 2,00
	Magnesium-Leg.	<500			400 - 550	450	0,040 - 0,060	0,12 - 2,00
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,040 - 0,060	0,12 - 2,00
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,040 - 0,060	0,12 - 2,00
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,040 - 0,060	0,12 - 2,00
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,040 - 0,060	0,12 - 2,00
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	330	0,040 - 0,060	0,12 - 2,00
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,040 - 0,060	0,12 - 2,00
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,040 - 0,060	0,12 - 2,00
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,040 - 0,060	0,12 - 2,00



... from Ø 0.2 mm

ATORN®
High quality for great performance

ATORN® Langlochfräser *Ultra-N*

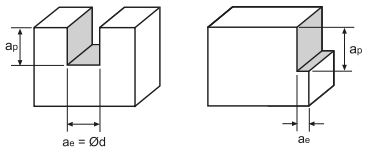


Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

249200....
249201....
249202....

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2
Unbeschichtete Werkzeuge:
Vc Werte bitte um 10% reduzieren! fz Werte bleiben gleich.

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 3,0	4,0	5,0	6,0	8,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Magnesium-Leg.	<500			350 - 500	400	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,030 - 0,060	0,035 - 0,070	0,040 - 0,080	0,045 - 0,090	0,050 - 0,100

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 10,0	12,0	16,0	20,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Magnesium-Leg.	<500			350 - 500	400	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,060 - 0,110	0,070 - 0,120	0,080 - 0,140	0,100 - 0,150

VAN HOORN CARBIDE Schaftfräser *VHLAW / VHRAW*

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



255168....



255169....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub fz in mm/Z bezogen auf Fräserdurchmesserbereich in mm **Schruppen** 8,0	12,0	16,0	**Schlichten** 8,0	12,0	16,0
N	Reinmetalle, weich	bis 500	Reineisen		400	0,10	0,20	0,30	0,05	0,07	0,10
	Al.-Leg. langspanend	bis 550	AlMg 3	3.3535	500	0,10	0,20	0,30	0,06	0,08	0,12
	Al.-Leg. kurzspanend	bis 400	G-AlSi 12	3.2581	280	0,10	0,20	0,30	0,06	0,08	0,12
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	280	0,10	0,20	0,30	0,05	0,07	0,10
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	300	0,10	0,20	0,30	0,05	0,07	0,10
	Magnesium-Legierungen	160 - 300	G-MgAl9Zn 1	3.5912	400	0,10	0,20	0,30	0,06	0,08	0,12
	Thermoplaste	40 - 70	PVC, Acrylglas		300	0,10	0,20	0,30	0,05	0,10	0,14
	Duroplaste	20 - 40	Bakelit		300	0,10	0,20	0,30	0,05	0,10	0,14
S	Titan-Legierungen, weich	bis 950	TiAl6V4	3.7165	180	0,10	0,20	0,30	0,06	0,08	0,12

Vorschubkorrektur f2 = 1,0
Schruppbearbeitung ae = 0,1 x D ap = max. L1
Schlichtbearbeitung ae = 0,1 x D ap = max. L1

Vorschubkorrektur f2 = 0,6
Schruppbearbeitung ae = 1,0 x D ap = max. L1
Schlichtbearbeitung ae = 0,3 x D ap = max. L1

Vorschubkorrektur	**f2 = 0,3**	**f2 = 0,5**
1 x D tief bohren und anschließend Längsfräsen	Bohren	Fräsen

ae = radiale Schnitttiefe
ap = axiale Schnittiefe
D = Fräserdurchmesser
L1 = Schneidenlänge

Die jeweilige Vorschubgeschwindigkeit errechnet sich:
Vf = fz x z x n x f2

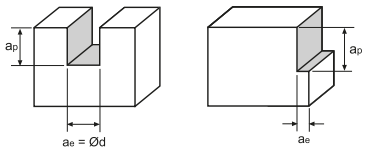
ATORN® Schaftfräser *Ultra-N*



Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2
Lange Ausführung: fz Werte bitte um Faktor 0,8 korrigieren
Unbeschichtete Werkzeuge:
Vc Werte bitte um 10% reduzieren! fz Werte bleiben gleich.

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



249300....
249301....
249302....
249303....
249304....
249305....
249350....
249351....
249352....

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 3,0	4,0	5,0	6,0	8,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Magnesium-Leg.	<500			350 - 500	400	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,015 - 0,035	0,020 - 0,040	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 10,0	12,0	16,0	20,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Magnesium-Leg.	<500			350 - 500	400	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,050 -0,100	0,060 - 0,110	0,065 - 0,130	0,075 - 0,150

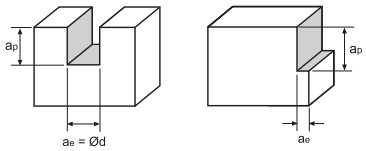
ATORN® Schaftfräser *Ultra-N*



Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2
Lange Ausführung: fz Werte bitte um Faktor 0,9 korrigieren
Extra lange Ausführung: fz Werte bitte um Faktor 0,8 korrigieren

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



249400....
249401....
249450....
249460....

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 3,0	4,0	5,0	6,0	8,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Magnesium-Leg.	<500			350 - 500	400	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,020 - 0,040	0,025 - 0,045	0,035 - 0,050	0,040 - 0,055	0,05 - 0,07

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 10,0	12,0	16,0	20,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Magnesium-Leg.	<500			350 - 500	400	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22

ATORN® Schaftfräser *Ultra-N*

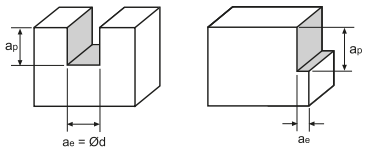


Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

249480....
249490....

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2
Lange Ausführung: fz Werte bitte um Faktor 0,9 korrigieren

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 3,0	4,0	5,0	6,0	8,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Magnesium-Leg.	<500			350 - 500	400	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,02 - 0,035	0,025 - 0,04	0,03 - 0,05	0,040 - 0,055	0,05 - 0,07

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 10,0	12,0	16,0	20,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Magnesium-Leg.	<500			350 - 500	400	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,06 - 0,09	0,07 - 0,10	0,10 - 0,12	0,14 - 0,22

ATORN® 3D Aluminium Schruppfräser

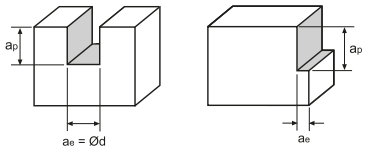


Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

250260....

Korrekturbeispiel:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 6,0	8,0	10,0	12,0	16,0
N	Alu-Leg.,langspanend	<500			300 - 1000	450	0,030 - 0,040	0,030 - 0,040	0,030 - 0,040	0,030 - 0,040	0,040 - 0,050
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	300 - 1000	450	0,030 - 0,040	0,030 - 0,040	0,030 - 0,040	0,030 - 0,040	0,040 - 0,050
	Magnesium-Leg.	<500			300 - 1000	450	0,030 - 0,040	0,030 - 0,040	0,030 - 0,040	0,030 - 0,040	0,040 - 0,050
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	175 - 275	200	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	225 - 375	275	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	175 - 275	200	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	225 - 375	275	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	175 - 275	200	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Thermoplast	<100	PVC, Acrylglas		375 - 550	450	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Duroplast	<150	Bakelit, Melamin		275 - 450	350	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		225 - 375	275	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110	0,065 - 0,130

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 20,0	25,0
N	Alu-Leg.,langspanend	<500			300 - 1000	450	0,040 - 0,050	0,040 - 0,050
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	300 - 1000	450	0,040 - 0,050	0,040 - 0,050
	Magnesium-Leg.	<500			300 - 1000	450	0,040 - 0,050	0,040 - 0,050
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	175 - 275	200	0,070 - 0,140	0,075 - 0,145
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	225 - 375	275	0,070 - 0,140	0,075 - 0,145
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	175 - 275	200	0,070 - 0,140	0,075 - 0,145
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	225 - 375	275	0,070 - 0,140	0,075 - 0,145
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	175 - 275	200	0,070 - 0,140	0,075 - 0,145
	Thermoplast	<100	PVC, Acrylglas		375 - 550	450	0,070 - 0,140	0,075 - 0,145
	Duroplast	<150	Bakelit, Melamin		275 - 450	350	0,070 - 0,140	0,075 - 0,145
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		225 - 375	275	0,070 - 0,140	0,075 - 0,145

ATORN® Schruppfräser *Ultra-N*

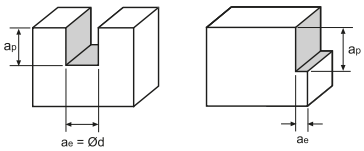


Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

249370....
249371....
249372....

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 6,0	8,0	10,0	12,0	16,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Magnesium-Leg.	<500			350 - 500	400	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,05 - 0,06	0,06 - 0,08	0,07 - 0,10	0,08 - 0,11	0,11 - 0,13

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 20,0
N	Alu-Leg.,langspanend	<500			350 - 500	400	0,15 - 0,25
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	350 - 500	400	0,15 - 0,25
	Magnesium-Leg.	<500			350 - 500	400	0,15 - 0,25
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	150 - 250	175	0,15 - 0,25
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	200 - 350	250	0,15 - 0,25
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	150 - 250	175	0,15 - 0,25
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	200 - 350	250	0,15 - 0,25
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	150 - 250	175	0,15 - 0,25
	Thermoplast	<100	PVC, Acrylglas		350 - 500	420	0,15 - 0,25
	Duroplast	<150	Bakelit, Melamin		250 - 400	320	0,15 - 0,25
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		200 - 350	250	0,15 - 0,25

ATORN® Torusfräser *Ultra-N*

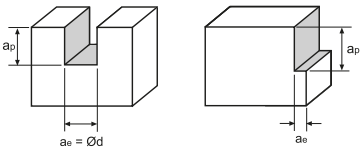


Die angegebenen Werte gelten für ae < 0,5xD und ap 0,2xD. **Kühlung = Emulsion**

249211....
249212....
249213....

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Lange Ausführung: fz Werte bitte um Faktor 0,9 korrigieren
Extra lange Ausführung: fz Werte bitte um Faktor 0,8 korrigieren

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 3,0	4,0	5,0	6,0	8,0
N	Alu-Leg.,langspanend	<500			375 - 550	425	0,020 - 0,035	0,025 - 0,040	0,030 - 0,050	0,040 - 0,055	0,050 - 0,070
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	375 - 550	425	0,020 - 0,035	0,025 - 0,040	0,030 - 0,050	0,040 - 0,055	0,050 - 0,070
	Magnesium-Leg.	<500			375 - 550	425	0,020 - 0,035	0,025 - 0,040	0,030 - 0,050	0,040 - 0,055	0,050 - 0,070
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	175 - 275	200	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	225 - 375	275	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	175 - 275	200	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	225 - 375	275	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	175 - 275	200	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Thermoplast	<100	PVC, Acrylglas		375 - 550	450	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Duroplast	<150	Bakelit, Melamin		275 - 450	350	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		225 - 375	275	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070

ISO	Werkstoffgruppe	Festigkeit N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 10,0	12,0	16,0
N	Alu-Leg.,langspanend	<500			375 - 550	425	0,060 - 0,090	0,070 - 0,100	0,100 - 0,120
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	375 - 550	425	0,060 - 0,090	0,070 - 0,100	0,100 - 0,120
	Magnesium-Leg.	<500			375 - 550	425	0,060 - 0,090	0,070 - 0,100	0,100 - 0,120
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	175 - 275	200	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	225 - 375	275	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	175 - 275	200	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	225 - 375	275	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	175 - 275	200	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Thermoplast	<100	PVC, Acrylglas		375 - 550	450	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Duroplast	<150	Bakelit, Melamin		275 - 450	350	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		225 - 375	275	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140

ATORN® Torusfräser *Ultra-N*

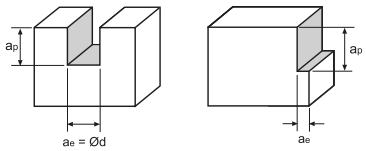


Die angegebenen Werte gelten für ae < 0,5xD und ap 1xD. **Kühlung = Emulsion**

249311....
249312....

Korrekturbeispiele:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 5,0	6,0	8,0	10,0	12,0
N	Alu-Leg.,langspanend	<500			375 - 550	425	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	375 - 550	425	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Magnesium-Leg.	<500			375 - 550	425	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	175 - 275	200	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	225 - 375	275	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	175 - 275	200	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	225 - 375	275	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	175 - 275	200	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Thermoplast	<100	PVC, Acrylglas		375 - 550	450	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Duroplast	<150	Bakelit, Melamin		275 - 450	350	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		225 - 375	275	0,025 - 0,050	0,030 - 0,060	0,040 - 0,080	0,050 -0,100	0,060 - 0,110

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 16,0	20,0			
N	Alu-Leg.,langspanend	<500			375 - 550	425	0,065 - 0,130	0,075 - 0,150			
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	375 - 550	425	0,065 - 0,130	0,075 - 0,150			
	Magnesium-Leg.	<500			375 - 550	425	0,065 - 0,130	0,075 - 0,150			
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	175 - 275	200	0,065 - 0,130	0,075 - 0,150			
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	225 - 375	275	0,065 - 0,130	0,075 - 0,150			
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	175 - 275	200	0,065 - 0,130	0,075 - 0,150			
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	225 - 375	275	0,065 - 0,130	0,075 - 0,150			
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	175 - 275	200	0,065 - 0,130	0,075 - 0,150			
	Thermoplast	<100	PVC, Acrylglas		375 - 550	450	0,065 - 0,130	0,075 - 0,150			
	Duroplast	<150	Bakelit, Melamin		275 - 450	350	0,065 - 0,130	0,075 - 0,150			
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		225 - 375	275	0,065 - 0,130	0,075 - 0,150			



...dreams come true.

ATORN®
High quality for great performance

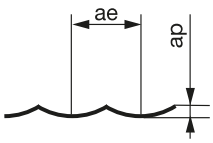
ATORN® Mini-Radiusfräser *Ultra-N*



Die angegebenen Werte gelten für ae < 0,5xD. **Kühlung = Emulsion** **249003....**

Korrekturbeispiel:

Korrekturfaktor fz für Auskraglänge (5-10xD) = 0,7
Korrekturfaktor fz für Auskraglänge (>10xD) = 0,5
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für Kopieren = 1,3



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 0,5	1,0	ap min/max in mm bezogen auf den Fräserdurchmesser in mm 0,5	1,0
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Magnesium-Leg.	<500			400 - 550	450	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	230	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,010 - 0,017	0,020 -0,030	0,025 - 0,25	0,10 - 0,50

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 1,5	2,0	ap min/max in mm bezogen auf den Fräserdurchmesser in mm 1,5	2,0
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Magnesium-Leg.	<500			400 - 550	450	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	230	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,030 - 0,045	0,035 - 0,060	0,15 - 0,75	0,20 - 1,00

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 2,5	ap min/max in mm bezogen auf den Fräserdurchmesser in mm 2,5
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,045 - 0,070	0,25 - 1,25
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,045 - 0,070	0,25 - 1,25
	Magnesium-Leg.	<500			400 - 550	450	0,045 - 0,070	0,25 - 1,25
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,045 - 0,070	0,25 - 1,25
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,045 - 0,070	0,25 - 1,25
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,045 - 0,070	0,25 - 1,25
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,045 - 0,070	0,25 - 1,25
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	230	0,045 - 0,070	0,25 - 1,25
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,045 - 0,070	0,25 - 1,25
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,045 - 0,070	0,25 - 1,25
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,045 - 0,070	0,25 - 1,25

Safety in the workplace

Please protect your eyes, ears and respiratory system!



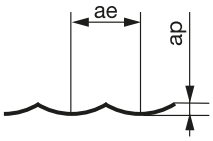
ATORN® Radiusfräser *Ultra-N*



Die angegebenen Werte gelten für ae < 0,5xD und ap 0,2xD. **Kühlung = Emulsion**

249240....
249250....
249260....

Korrekturbeispiel:
Korrekturfaktor fz für Vollnut (ae > 0,5xD) = 0,7
Korrekturfaktor fz für ap < 1xD = 1,2
Lange Ausführung: fz Werte bitte um Faktor 0,9 korrigieren
Extra lange Ausführung: fz Werte bitte um Faktor 0,8 korrigieren



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 3,0	4,0	5,0	6,0	8,0
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Magnesium-Leg.	<500			400 - 550	450	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	330	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,020 - 0,040	0,025 - 0,040	0,030 - 0,045	0,035 - 0,050	0,050 - 0,070

ISO	Werkstoff-gruppe	Festigkeit N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Vc min/max m/min	Vc Start m/min	Vorschub fz min/max in mm/Z bezogen auf den Fräserdurchmesser in mm 10,0	12,0	16,0		
N	Alu-Leg.,langspanend	<500			400 - 550	450	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Knet-Leg. Rein-Metalle	<500	Al99.9	3.0305	400 - 550	450	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Magnesium-Leg.	<500			400 - 550	450	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Alu-Legierungen, kurzspanend	<500	G - AlSi12	3.2581	180 - 320	220	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Kupfer-Leg. (Bronze), langspanend	<1200	CuSn4	2.1016	250 - 420	320	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Kupfer-Leg. (Bronze), kurzspanend	<850	CuNi12Zn24	2.0730	180 - 320	220	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Kupfer-Leg. (Messing), langspaned	<600	Cu Zn 20	2.0250	250 - 420	320	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Kupfer-Leg. (Messing), kurzspaned	<600	Cu Zn 39 Pb 3	2.0381	180 - 320	330	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Thermoplast	<100	PVC, Acrylglas		400 - 550	450	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Duroplast	<150	Bakelit, Melamin		300 - 450	360	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		
	Faserverstärkte Kunststoffe	<1500	CFK, GFK		250 - 420	320	0,060 - 0,090	0,070 - 0,100	0,080 - 0,140		

ATORN® Mini-Schaftfräser, Mini-Torusfräser *Ultra-MS*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

256011....
256012....

ISO	Werkstoff	Vc m/min Ø < = 0,5 mm	Vc m/min Ø < = 1,5 mm	Vc m/min Ø > = 1,5 mm	ap max. Ø < = 0,5 mm	ap max. Ø < = 1,5 mm	ap max. Ø > = 1,5 mm	Ø 0,5 fz	Ø 0,9 fz	Ø 1,0 - 1,5 fz	Ø 1,6 - 2,5 fz	Ø 2,5 - 4,0 fz
P	Automatenstahl bis 900 N/mm²	20 - 50	30 - 60	40 - 60	0,01 - 0,04	0,01 - 0,09	0,05 - 0,5	0,002 - 0,005	0,004 - 0,008	0,005 - 0,014	0,01 - 0,023	0,015 - 0,03
	Baustahl bis 500 N/mm²	25 - 55	40 - 90	70 - 100	0,01 - 0,05	0,02 - 0,1	0,05 - 0,6	0,002 - 0,005	0,003 - 0,01	0,006 - 0,015	0,01 - 0,025	0,02 - 0,035
	Baustahl über 500 N/mm²	25 - 55	40 - 90	70- 100	0,01 - 0,05	0,02 - 0,1	0,05 - 0,6	0,002 - 0,005	0,003 - 0,01	0,006 -0,015	0,01 - 0,025	0,02 - 0,035
	Vergütungsstahl bis 1000 N/mm²	20 - 50	30 - 60	40 - 60	0,01 - 0,04	0,01 - 0,09	0,05 - 0,5	0,002 - 0,005	0,004 - 0,008	0,005 - 0,014	0,01 - 0,023	0,015 - 0,03
	Stahlguss bis 1000 N/mm²	85 - 100	20 - 50	30 - 60	0,01 - 0,04	0,01 - 0,09	0,05 - 0,5	0,002 - 0,005	0,004 - 0,008	0,005 - 0,014	0,01 - 0,023	0,015 - 0,03
M	Rost und säurebeständige Stähle bis 1100N/mm²	20 - 35	20 - 40	30 - 40	0,035	0,08	0,5	0,003 - 0,005	0,004 - 0,008	0,005 - 0,014	0,01 - 0,023	0,015 - 0,035
S	Titan-Legierungen bis 1200 HB	22 - 50	30 - 60	45 - 60	0,04	0,13	0,65	0,002 - 0,007	0,004 - 0,008	0,006 - 0,015	0,01 - 0,023	0,025 - 0,035
	Nickelbasislegierungen bis 1400 HB	22 - 60	40 - 120	90 - 150	0,04	0,13	0,65	0,001 - 0,005	0,003 - 0,009	0,006 - 0,021	0,016 - 0,03	0,035 - 0,06
	Superlegierungen bis 1300 HB	22 - 50	30 - 60	45 - 60	0,04	0,13	0,65	0,002 - 0,007	0,004 - 0,008	0,006 -0,015	0,01 - 0,023	0,025 - 0,035

ATORN® Schaftfräser, Torusfräser *Ultra-MS*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

256007....
256008....
256010....

ISO	Werkstoff	Vc m/min Ø < = 0,5 mm	Ø 3 - 4 fz	Ø 5 - 6 fz	Ø 8 - 10 fz	Ø 12 - 16 fz	Ø 16 - 20 fz
P	Automatenstahl bis 900 N/mm²	120 - 140	0,02 - 0,03	0,03 - 0,04	0,04 - 0,055	0,06 - 0,08	0,07 - 0,1
	Baustahl bis 500 N/mm²	130 - 150	0,02 - 0,03	0,03 - 0,04	0,04 - 0,055	0,06 - 0,08	0,07 - 0,1
	Baustahl über 500 N/mm²	130 - 150	0,02 - 0,03	0,03 - 0,04	0,04 - 0,055	0,06 - 0,08	0,07 - 0,1
	Vergütungsstahl bis 1000 N/mm²	120 - 140	0,02 - 0,03	0,03 - 0,04	0,04 - 0,055	0,06 - 0,08	0,07 - 0,1
	Stahlguss bis 1000 N/mm²	120 - 140	0,02 - 0,03	0,03 - 0,04	0,04 - 0,055	0,06 - 0,08	0,07 - 0,1
M	Rost und säurebeständige Stähle bis 1100N/mm²	60 - 80	0,014 - 0,022	0,024 - 0,032	0,036 -0,048	0,05 - 0,07	0,06 - 0,09
S	Titan-Legierungen bis 1200 HB	60 - 80	0,018 - 0,028	0,032 - 0,043	0,048 - 0,064	0,068 - 0,095	0,087 - 0,12
	Nickelbasislegierungen bis 1400 HB	60 - 80	0,014 - 0,022	0,024 - 0,032	0,036 - 0,048	0,051 - 0,071	0,065 - 0,087
	Superlegierungen bis 1300 HB	60 - 80	0,018 -0,028	0,032 - 0,043	0,048 - 0,064	0,068 - 0,095	0,087 - 0,12

ATORN® Mini-Radiusfräser *Ultra-MS*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **256013....**

ISO	Werkstoff	Vc m/min Ø < = 0,5 mm	Vc m/min Ø < = 1,5 mm	Vc m/min Ø > = 1,5 mm	Ø 0,2 - 0,5 fz	Ø 0,6 - 0,9 fz	Ø 1,0 - 1,5 fz	Ø 1,6 - 2,5 fz	Ø 2,5 - 4,0 fz
P	Automatenstahl bis 900 N/mm²	20 - 45	40 - 60	40 - 60	0,001 - 0,005	0,005 - 0,008	0,006 - 0,01	0,011 - 0,019	0,019 - 0,035
P	Baustahl bis 500 N/mm²	25 - 60	50 - 100	70 - 100	0,002 - 0,004	0,004 - 0,01	0,008 - 0,015	0,01 - 0,02	0,02 - 0,035
P	Baustahl über 500 N/mm²	25 - 60	50 - 100	70 - 100	0,002 - 0,004	0,004 - 0,01	0,008 - 0,015	0,01 - 0,02	0,02 - 0,035
P	Vergütungsstahl bis 1000 N/mm²	25 - 45	40 - 60	40 -60	0,001 - 0,005	0,005 - 0,008	0,006 - 0,01	0,011 - 0,019	0,019 - 0,035
P	Stahlguss bis 1000 N/mm²	20 - 45	40 - 60	40 - 60	0,001 - 0,005	0,005 - 0,008	0,006 - 0,01	0,011 - 0,019	0,019 - 0,35
M	Rost und säurebeständige Stähle bis 1100N/mm²	20 - 40	28 - 40	28 - 40	0,002 - 0,005	0,005 - 0,008	0,007 - 0,014	0,011 - 0,018	0,019 - 0,035
S	Titan-Legierungen bis 1200 HB	20 - 50	40 - 60	45 - 60	0,001 - 0,005	0,005 - 0,006	0,006 - 0,01	0,011 - 0,019	0,019 - 0,035
S	Nickelbasislegierungen bis 1400 HB	20 - 60	50 - 150	100 - 150	0,002 - 0,007	0,007 - 0,01	0,01 - 0,028	0,021 - 0,038	0,04 - 0,075
S	Superlegierungen bis 1300 HB	20 - 50	40 - 60	45 - 60	0,001 - 0,005	0,005 - 0,009	0,006 - 0,01	0,011 - 0,019	0,019 - 0,035

ATORN® Radiusfräser *Ultra-MS*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **256016....**

ISO	Werkstoff	Vc m/min Ø < = 0,5 mm	Ø 3 - 4 fz	Ø 5 - 6 fz	Ø 8 - 10 fz	Ø 12 - 16 fz	Ø 16 - 20 fz
P	Automatenstahl bis 900 N/mm²	130 - 150	0,022 - 0,033	0,034 - 0,042	0,042 - 0,058	0,063 - 0,082	0,072 - 0,11
P	Baustahl bis 500 N/mm²	140 - 160	0,022 - 0,033	0,034 - 0,042	0,043 - 0,057	0,062 - 0,083	0,073 - 0,12
P	Baustahl über 500 N/mm²	140 - 160	0,022 - 0,033	0,034 - 0,042	0,043 - 0,057	0,062 - 0,083	0,073 - 0,12
P	Vergütungsstahl bis 1000 N/mm²	130 - 150	0,022 - 0,033	0,034 - 0,042	0,042 - 0,058	0,063 - 0,082	0,072 - 0,11
P	Stahlguss bis 1000 N/mm²	130 - 150	0,022 - 0,033	0,034 - 0,042	0,042 - 0,058	0,063 - 0,082	0,072 - 0,11
M	Rost und säurebeständige Stähle bis 1100N/mm²	65 - 85	0,016 - 0,025	0,026 - 0,035	0,038 - 0,05	0,052 - 0,073	0,063 - 0,1
S	Titan-Legierungen bis 1200 HB	60 - 80	0,018 - 0,028	0,032 - 0,043	0,048 - 0,064	0,068 - 0,095	0,087 - 0,12
S	Nickelbasislegierungen bis 1400 HB	60 - 80	0,014 - 0,022	0,024 - 0,032	0,036 - 0,048	0,051 - 0,071	0,065 - 0,087
S	Superlegierungen bis 1300 HB	60 - 80	0,018 - 0,028	0,032 - 0,043	0,048 - 0,064	0,068 - 0,095	0,087 - 0,12

SARA® Mini-Torusfräser *DIA+*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **258005....**

ISO	Schruppen Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,002	0,003	0,005	0,010	0,012	0,015

ISO	Schruppen Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,020	0,030	0,045	0,060	0,080	0,100

ISO	Finishing Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,003	0,004	0,008	0,015	0,020	0,025

ISO	Finishing Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,030	0,040	0,060	0,080	0,100	0,120

SARA® Mini-Radiusfräser *DIA+*



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! **258006....**

ISO	Schruppen Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,002	0,003	0,005	0,010	0,012	0,015

ISO	Schruppen Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,020	0,030	0,045	0,060	0,080	0,100

ISO	Finishing Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,003	0,004	0,008	0,015	0,020	0,025

ISO	Finishing Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,030	0,040	0,060	0,080	0,100	0,120

SARA® Torusfräser DIA+



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

258013....

ISO	Schruppen Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,002	0,003	0,005	0,010	0,012	0,015

ISO	Schruppen Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,020	0,030	0,045	0,060	0,080	0,100

ISO	Finishing Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,003	0,004	0,008	0,015	0,020	0,025

ISO	Finishing Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,030	0,040	0,060	0,080	0,100	0,120

SARA® Torusfräser lang DIA+



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

258014....

ISO	Schruppen Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,002	0,003	0,005	0,010	0,012	0,015

ISO	Schruppen Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Graphit, Faserverstärkte Kunststoffe	95	0,020	0,030	0,045	0,060	0,080	0,100

ISO	Finishing Werkstoff	Vc m/min	Ø 0,2 fz	Ø 0,3 0,4 0,5 fz	Ø 0,6 0,7 0,8 fz	Ø 0,9 1,0 1,2 fz	Ø 1,5 fz	Ø 2 fz
N	Faserverstärkte Kunststoffe	95	0,002	0,003	0,005	0,010	0,012	0,015

ISO	Finishing Werkstoff	Vc m/min	Ø 3 fz	Ø 4 fz	Ø 5,0 6,0 fz	Ø 8 fz	Ø 10 fz	Ø 12 fz
N	Faserverstärkte Kunststoffe	95	0,020	0,030	0,045	0,060	0,080	0,100

Konturenfräser für GFK und CFK



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

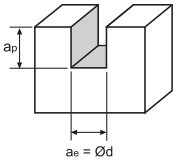
250050....
250051....
250052....
250053....

Typ A - Stirn glatt
Typ B - Stirn wie Frässtift
Typ C - Stirn wie Schaftfräser
Typ D - Bohrerspitze

Durchmesser mm	Drehzahl min^{-1}	Vorschub mm / min.
1,6	40.000 - 45.000	1.000 - 1.500
2,4	25.000 - 30.000	1.100 - 1.800
3,0	20.000 - 25.000	1.100 - 1.800
4,0	20.000 - 24.000	900 - 1.700
6,0	20.000 - 24.000	900 - 1.700
10,0	15.000 - 20.000	700 - 1.500
12,0	10.000 - 15.000	500 - 1.300

ATORN® Mini-Schaftfräser, Mini-Torusfräser RockTec 65

Die niedrigeren Vc-Werte gelten jeweils für lange Freistellungen und den kleineren Durchmesserbereich, die höheren Vc-Werte für kurze Freilängen und den größeren Durchmesserbereich.
Das gilt auch für die angegebenen ap max. Werte.
Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen.




257002....

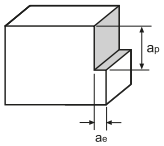

257010....


257024....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Durchmesserbereich ≤ 0,5 mm Vc m/min	ap max.	Durchmesserbereich 0,6 - 1 mm Vc m/min	ap max.	Durchmesserbereich > 1 mm Vc m/min	ap max.	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 0,1 - 0,3	0,4 - 0,8	0,9 - 1,5	1,6 - 2,0	2,5 - 3,0
P	Stahl	< 1300	60 - 80	0,002 - 0,020	70 - 90	0,003 - 0,045	80 - 100	0,015 - 0,35	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Stahl	< 1600	60 - 80	0,002 - 0,020	70 - 90	0,003 - 0,045	80 - 100	0,015 - 0,35	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
S	Titan, Titanlegierung	> 700	15 - 45	0,003 - 0,025	30 - 70	0,004 - 0,050	50 - 80	0,020 - 0,40	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Ni-/Co-Legierung	< 35 HRc	15 - 45	0,002 - 0,020	30 - 70	0,003 - 0,045	50 - 80	0,015 - 0,35	0,003 - 0,007	0,005 - 0,012	0,008 - 0,018	0,014 - 0,025	0,018 - 0,035
	Ni-/Co-Legierung	< 45 HRc	13 - 40	0,002 - 0,020	30 - 55	0,003 - 0,040	35 - 65	0,015 - 0,30	0,002 - 0,005	0,003 - 0,007	0,008 - 0,014	0,012 - 0,023	0,018 - 0,035
H	Hartguss		50 - 70	0,002 - 0,020	60 - 80	0,003 - 0,040	70 - 90	0,015 - 0,15	0,002 - 0,004	0,002 - 0,007	0,006 - 0,012	0,011 - 0,018	0,016 - 0,022
	gehärtete Stähle	< 52 HRc	50 - 70	0,002 - 0,020	60 - 80	0,003 - 0,040	70 - 90	0,015 - 0,15	0,002 - 0,004	0,002 - 0,007	0,006 - 0,012	0,011 - 0,018	0,016 - 0,022
	gehärtete Stähle	52-65 HRc	40 - 60	0,001 - 0,010	50 - 70	0,003 - 0,015	60 - 80	0,015 - 0,08	0,001 - 0,003	0,001 - 0,003	0,003 - 0,009	0,008 - 0,016	0,015 - 0,022

ATORN® Schaftfräser, Mehrzahnfräser, Torusfräser RockTec 65

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!




257004....


257016....

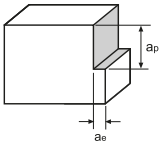

257012....


257018....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 3,0	5,0	8,0	12,0	16,0	20,0
P	Stahl	< 1300	0,20 x D	1,5 x D	160 - 200	0,02	0,04	0,08	0,10	0,11	0,12
	Stahl	< 1600	0,20 x D	1,5 x D	160 - 200	0,02	0,04	0,08	0,10	0,11	0,12
S	Titan, Titanlegierung	> 700	0,20 x D	1,5 x D	250 - 300	0,02	0,04	0,08	0,10	0,10	0,10
	Ni-/Co-Legierung	< 35 HRc	0,20 x D	1,5 x D	250 - 300	0,02	0,04	0,08	0,10	0,10	0,10
	Ni-/Co-Legierung	< 45 HRc	0,20 x D	1,5 x D	250 - 300	0,02	0,04	0,08	0,10	0,10	0,10
H	Hartguss		0,05 x D	1,0 x D	120 - 140	0,02	0,03	0,06	0,08	0,09	0,10
	gehärtete Stähle	< 52 HRc	0,05 x D	1,0 x D	120 - 140	0,02	0,03	0,06	0,08	0,09	0,10
	gehärtete Stähle	52-65 HRc	0,03 - 0,05 x D (max. 0,2-0,5 mm)	1,0 x D	80 - 120	0,015	0,025	0,05	0,06	0,07	0,08

ATORN® Schaftfräser, Mehrzahnfräser, Torusfräser RockTec 65

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!




257006....

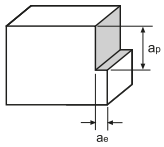

257014....


257020....

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Schnittgeschwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 3,0	5,0	8,0	12,0	16,0	20,0
P	Stahl	< 1300	0,20 x D	1,5 x D	140 - 160	0,02	0,04	0,08	0,10	0,11	0,12
	Stahl	< 1600	0,20 x D	1,5 x D	140 - 160	0,02	0,04	0,08	0,10	0,11	0,12
S	Titan, Titanlegierung	> 700	0,20 x D	1,5 x D	200 - 260	0,02	0,04	0,08	0,10	0,10	0,10
	Ni-/Co-Legierung	< 35 HRc	0,20 x D	1,5 x D	200 - 260	0,02	0,04	0,08	0,10	0,10	0,10
	Ni-/Co-Legierung	< 45 HRc	0,20 x D	1,5 x D	200 - 260	0,02	0,04	0,08	0,10	0,10	0,10
H	Hartguss		0,05 x D	1,0 x D	100 - 130	0,02	0,03	0,06	0,08	0,09	0,10
	gehärtete Stähle	< 52 HRc	0,05 x D	1,0 x D	100 - 130	0,02	0,03	0,06	0,08	0,09	0,10
	gehärtete Stähle	52-65 HRc	0,03 - 0,05 x D (max. 0,2-0,5 mm)	1,0 x D	70 - 100	0,015	0,025	0,05	0,06	0,07	0,08

ATORN® Schaftfräser, Torusfräser RockTec 65

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!





257008....



257022....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 3,0	5,0	8,0	12,0	16,0	20,0
P	Stahl	< 1300	0,20 x D	1,5 x D	120 - 140	0,02	0,04	0,08	0,10	0,11	0,12
	Stahl	< 1600	0,20 x D	1,5 x D	120 - 140	0,02	0,04	0,08	0,10	0,11	0,12
S	Titan, Titanlegierung	> 700	0,20 x D	1,5 x D	130 - 170	0,02	0,04	0,08	0,10	0,10	0,10
	Ni-/Co-Legierung	< 35 HRc	0,20 x D	1,5 x D	130 - 170	0,02	0,04	0,08	0,10	0,10	0,10
	Ni-/Co-Legierung	< 45 HRc	0,20 x D	1,5 x D	130 - 170	0,02	0,04	0,08	0,10	0,10	0,10
H	Hartguss		0,05 x D	1,0 x D	80 - 110	0,02	0,03	0,06	0,08	0,09	0,10
	gehärtete Stähle	< 52 HRc	0,05 x D	1,0 x D	80 - 110	0,02	0,03	0,06	0,08	0,09	0,10
	gehärtete Stähle	52-65 HRc	0,03 - 0,05 x D (max. 0,2-0,5 mm)	1,0 x D	50 - 80	0,015	0,025	0,05	0,06	0,07	0,08

ATORN® VHM-Hochvorschubschaftfräser RockTec 65



257040....

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

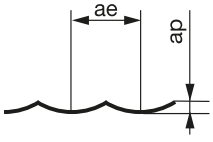
Stahl < 1400 N/mm², gehärteter Stahl 45 - 55 HRc				
Durchmesser	Vc=160 m/min n (min⁻¹)	Vorschub (mm/min)	ae	ap
4	12.500	5.000	2,00	0,100
5	10.000	5.200	2,50	0,125
6	8.500	5.440	3,00	0,150
8	6.300	5.500	4,00	0,200
10	5.100	5.500	5,00	0,250
12	4.200	5.300	6,00	0,300

Hartguss < 52 HRc, gehärtete Stähle 55 - 60 HRc				
Durchmesser	Vc=120 m/min n (min⁻¹)	Vorschub (mm/min)	ae	ap
4	9.500	2.280	2,00	0,070
5	7.600	2.400	2,50	0,088
6	6.300	2.500	3,00	0,105
8	4.700	2.600	4,00	0,140
10	3.800	2.700	5,00	0,175
12	3.150	2.600	6,00	0,210

Konturfräsen oder Fräsen in der Z-Richtung, bitte unter einem Neigungswinkel von 1° oder mehr und unter Verringerung des Vorschubwertes auf 60-70% fräsen.

ATORN® Mini-Radiusfräser RockTec 65

Die niedrigeren Vc-Werte gelten jeweils für lange Freistellungen und den kleineren Durchmesserbereich, die höheren Vc-Werte für kurze Freilängen und den größeren Durchmesserbereich. Das gilt auch für die angegebenen ap max. Werte.
Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen.





257026....

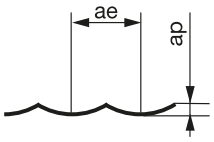


257034....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Durchmesserbereich ≤ 0,5 mm Vc m/min	ap max.	Durchmesserbereich 0,6 - 1 mm Vc m/min	ap max.	Durchmesserbereich > 1 mm Vc m/min	ap max.	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 0,2 - 0,3	0,4 - 0,8	0,9 - 1,5	1,6 - 2,0	2,5 - 3,0
P	Stahl	< 1300	60 - 80	0,006 - 0,025	70 - 90	0,010 - 0,05	80 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Stahl	< 1600	60 - 80	0,006 - 0,025	70 -90	0,010 - 0,05	80 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
S	Titan, Titanlegierung	> 700	30 - 55	0,007 - 0,030	30 - 75	0,010 - 0,05	50 - 100	0,04 - 0,15	0,003 - 0,005	0,004 - 0,009	0,005 - 0,012	0,010 - 0,028	0,015 - 0,032
	Ni-/Co-Legierung	< 35 HRc	25 - 45	0,006 - 0,025	30 - 60	0,010 - 0,05	40 - 80	0,04 - 0,15	0,003 - 0,004	0,003 - 0,008	0,004 - 0,010	0,006 - 0,022	0,013 - 0,029
	Ni-/Co-Legierung	< 45 HRc	25 - 45	0,005 - 0,020	30 - 60	0,010 - 0,05	40 - 80	0,04 - 0,15	0,003 - 0,004	0,003 - 0,007	0,004 - 0,009	0,006 - 0,016	0,013 - 0,022
H	Hartguss		50 - 70	0,004 - 0,015	60 - 80	0,008 - 0,05	70 - 90	0,02 - 0,15	0,002 - 0,004	0,002 - 0,005	0,003 - 0,008	0,004 - 0,011	0,011 - 0,021
	gehärtete Stähle	< 52 HRc	50 - 70	0,003 - 0,015	60 - 80	0,008 - 0,05	70 - 90	0,02 - 0,15	0,002 - 0,004	0,002 - 0,005	0,003 - 0,010	0,004 - 0,011	0,011 - 0,021
	gehärtete Stähle	52-65 HRc	40 - 60	0,003 - 0,015	50 - 70	0,008 - 0,05	60 - 80	0,02 - 0,15	0,001 - 0,004	0,001 - 0,005	0,003 - 0,010	0,004 - 0,011	0,011 - 0,021

ATORN® Radiusfräser RockTec 65

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!



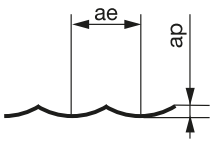


257028....



257036....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Vc m/min Durchmesserbereich 2 - 3 mm	Vc m/min Durchmesserbereich 4 - 20 mm	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 2 - 3	4 - 5	6 - 8	10 - 12	16	20
P	Stahl	< 1300	max. 0,4 x R	max 0,1 x R	180 - 270	250 - 370	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1600	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
S	Titan, Titanlegierung	> 700	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 35 HRc	max. 0,4 x R	max 0,1 x R	180 - 250	250 - 350	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 45 HRc	max. 0,4 x R	max 0,1 x R	150 - 210	210 - 270	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
H	Hartguss		max. 0,4 x R	max 0,1 x R	100 - 160	160 - 220	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,12	0,08 - 0,12	0,08 - 0,12
	gehärtete Stähle	< 52 HRc	max. 0,4 x R	max 0,1 x R	100 - 160	160 - 220	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,12	0,08 - 0,12	0,08 - 0,12
	gehärtete Stähle	52-65 HRc	max. 0,4 x R	max 0,1 x R	50 - 75	60 - 80	0,025 - 0,035	0,035 - 0,050	0,045 - 0,08	0,070 - 0,11	0,08 - 0,11	0,08 - 0,11



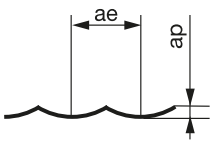


257030....



257038....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Vc m/min Durchmesserbereich 2 - 3 mm	Vc m/min Durchmesserbereich 4 - 20 mm	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 2 - 3	4 - 5	6 - 8	10 - 12	16	20
P	Stahl	< 1300	max. 0,4 x R	max 0,1 x R	130 - 250	200 - 320	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1600	max. 0,4 x R	max 0,1 x R	130 - 230	200 - 300	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
S	Titan, Titanlegierung	> 700	max. 0,4 x R	max 0,1 x R	130 - 230	200 - 300	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 35 HRc	max. 0,4 x R	max 0,1 x R	130 - 230	200 - 300	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 45 HRc	max. 0,4 x R	max 0,1 x R	120 - 200	160 - 260	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
H	Hartguss		max. 0,4 x R	max 0,1 x R	100 - 150	130 - 200	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,12	0,08 - 0,12	0,08 - 0,12
	gehärtete Stähle	< 52 HRc	max. 0,4 x R	max 0,1 x R	100 - 150	130 - 200	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,12	0,08 - 0,12	0,08 - 0,12
	gehärtete Stähle	52-65 HRc	max. 0,4 x R	max 0,1 x R	40 - 60	45 - 65	0,025 - 0,035	0,035 - 0,050	0,045 - 0,08	0,070 - 0,11	0,08 - 0,11	0,08 - 0,11





257032....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	ae max.	ap max.	Vc m/min Durchmesserbereich 2 - 3 mm	Vc m/min Durchmesserbereich 4 - 20 mm	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 2 - 3	4 - 5	6 - 8	10 - 12	16	20
P	Stahl	< 1300	max. 0,4 x R	max 0,1 x R	80 - 140	130 - 190	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Stahl	< 1600	max. 0,4 x R	max 0,1 x R	80 - 140	130 - 190	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
S	Titan, Titanlegierung	> 700	max. 0,4 x R	max 0,1 x R	80 - 140	130 - 190	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 35 HRc	max. 0,4 x R	max 0,1 x R	80 - 140	130 - 190	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
	Ni-/Co-Legierung	< 45 HRc	max. 0,4 x R	max 0,1 x R	70 - 130	120 - 180	0,030 - 0,040	0,040 - 0,055	0,050 - 0,08	0,080 - 0,12	0,09 - 0,12	0,09 - 0,12
H	Hartguss		max. 0,4 x R	max 0,1 x R	60 - 110	90 - 130	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,12	0,08 - 0,12	0,08 - 0,12
	gehärtete Stähle	< 52 HRc	max. 0,4 x R	max 0,1 x R	60 - 110	90 - 130	0,025 - 0,035	0,035 - 0,050	0,045 - 0,07	0,075 - 0,12	0,08 - 0,12	0,08 - 0,12
	gehärtete Stähle	52-65 HRc	max. 0,4 x R	max 0,1 x R	25 - 40	30 - 45	0,025 - 0,035	0,035 - 0,050	0,045 - 0,08	0,070 - 0,11	0,08 - 0,11	0,08 - 0,11

SARA® Viertelkreisfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

291310....

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc in m/min	Vorschub fz bezogen auf Durchmesser D1 in mm bei ae 0,05xD und ap 1,5xD 8,0	10,0	12,0	16,0	20,0 - 25,0
P	Unlegierter Baustahl	bis 700	St-52	1.0052	70 - 100	0,03 - 0,05	0,04 - 0,06	0,05 - 0,07	0,05 - 0,08	0,06 - 0,09
	Automatenstahl	bis 700	9 SMn 28	1.0715	60 - 95	0,03 - 0,05	0,04 - 0,06	0,05 - 0,07	0,05 - 0,08	0,06 - 0,09
	Baustahl	500 - 950	Ck45	1.1191	60 - 100	0,04 - 0,05	0,05 - 0,06	0,06 - 0,07	0,07 - 0,08	0,08 - 0,09
	Einsatzstahl	bis 950	16 MnCr 5	1.7131	60 - 95	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	35 - 60	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	Stahlguß	bis 950	GS 40	1.0416	60 - 95	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	25 - 60	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	INOX Stahl, ferritisch	500 - 950	X 12 CrMoS 17	1.4104	25 - 60	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	35 - 70	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
K	Grauguss	100 - 400	GG 25	0.6025	70 - 95	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	Legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	60 - 85	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	Sphäroguss	400 - 800	GGG 60	0.7060	60 - 80	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
	Temperguss	350 - 700	GTS 55	0.8155	60 - 80	0,02 - 0,03	0,03 - 0,04	0,04 - 0,05	0,04 - 0,05	0,05 - 0,06
N	Reinmetalle, weich	bis 500	Reineisen		140 - 500	0,02 - 0,04	0,03 - 0,05	0,04 - 0,06	0,04 - 0,07	0,05 - 0,08
	Al.-Leg. langspanend	bis 550	AlMg 3	3.3535	140 - 500	0,02 - 0,04	0,03 - 0,05	0,04 - 0,06	0,04 - 0,07	0,05 - 0,08
	Al.-Leg. kurzspanend	bis 400	G-AlSi 12	3.2581	140 - 500	0,02 - 0,04	0,03 - 0,05	0,04 - 0,06	0,04 - 0,07	0,05 - 0,08
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	85 - 180	0,01 - 0,015	0,01 - 0,02	0,02 - 0,03	0,02 - 0,03	0,03 - 0,04
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	95 - 190	0,01 - 0,015	0,01 - 0,02	0,02 - 0,03	0,02 - 0,03	0,03 - 0,04
S	Nickelbasis-Legierungen	bis 950	NiCr12Al6MoNb	2.4670	10 - 30	0,01 - 0,015	0,01 - 0,02	0,02 - 0,03	0,02 - 0,03	0,03 - 0,04
	Nickelbasis-Legierungen	900 - 1400	NiCr19Fe19NbMo	Inconel 718	10 - 30	0,01 - 0,015	0,01 - 0,02	0,02 - 0,03	0,02 - 0,03	0,03 - 0,04
H	Hartguss	300 - 600			45 - 70	0,01 - 0,015	0,01 - 0,02	0,02 - 0,03	0,02 - 0,03	0,03 - 0,04
	gehärteter Stahl	45 - 50 HRc			65 - 90	0,02 - 0,04	0,03 - 0,05	0,04 - 0,06	0,04 - 0,07	0,05 - 0,08
	gehärteter Stahl	50 - 60 HRc			65 - 90	0,02 - 0,04	0,03 - 0,05	0,04 - 0,06	0,04 - 0,07	0,05 - 0,08

SARA® Multifunktionswerkzeug *MULTI-V*



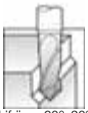
251541....
251546....
251549....

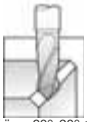

Anbohren 90°, 120°


Senken 60°, 90°, 120°

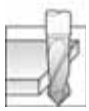

Bohren 90°, 120°


V-Nut-Fräsen 60°, 90°, 120°


Kombifräsen 60°, 90°, 120°


Fasfräsen 60°, 90°, 120°


Zirkularfräsen 60°, 90°, 120°


Umfangfräsen 60°, 90°, 120°

ISO	Schnittdaten	Vc m/min	Anbohren / Bohren / Senken Vorschub pro Zahn Ø 3-4	Ø 5-6	Ø 8-10	Ø 12	Ø 16	Ø20	V-Nut-Fräsen Vorschub pro Zahn Ø 3-4	Ø 5-6	Ø 8-10	Ø 12	Ø 16	Ø20	Fasen / Fräsen / Zirkularfräsen Vorschub pro Zahn Ø 3-4	Ø 5-6	Ø 8-10	Ø 12	Ø 16	Ø20
P	**niedrig legierter Stahl**																			
	bis 500 N/mm²	70 - 75	0,050	0,080	0,140	0,190	0,240	0,280	0,005	0,008	0,014	0,019	0,025	0,030	0,008	0,014	0,025	0,040	0,052	0,065
	500 - 800 N/mm²	40 - 60	0,050	0,080	0,140	0,200	0,250	0,280	0,005	0,008	0,014	0,019	0,025	0,030	0,008	0,013	0,025	0,040	0,052	0,062
	legierter Stahl																			
	800 - 1000 N/mm²	35 - 40	0,045	0,070	0,120	0,180	0,220	0,280	0,004	0,006	0,012	0,017	0,020	0,027	0,008	0,013	0,025	0,040	0,050	0,062
	1000 - 1300 N/mm²	30 - 35	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,012	0,016	0,020	0,027	0,008	0,013	0,025	0,036	0,050	0,060
M	**INOX Stahl**	30 - 35	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,012	0,016	0,020	0,027	0,008	0,013	0,025	0,036	0,045	0,070
S	**Sonderlegierungen Inconel, Nimonic, Waspaloy**	20	0,040	0,060	0,110	0,160	0,200	0,250	0,003	0,005	0,010	0,013	0,018	0,025	0,007	0,011	0,025	0,035	0,050	0,060
	Titan und Titanlegierungen	25 - 30	0,040	0,060	0,110	0,160	0,200	0,250	0,004	0,006	0,010	0,013	0,018	0,027	0,008	0,013	0,025	0,036	0,045	0,070
K	**Gusseisen**																			
	bis 180 HB	35 - 40	0,045	0,070	0,120	0,180	0,220	0,280	0,004	0,006	0,012	0,017	0,020	0,027	0,008	0,013	0,025	0,040	0,050	0,062
	über 180 HB	30 - 35	0,045	0,070	0,120	0,170	0,220	0,260	0,004	0,006	0,012	0,016	0,020	0,027	0,008	0,013	0,025	0,040	0,050	0,060
N	**Aluminium, Al-Legierungen**	150	0,050	0,090	0,150	0,200	0,270	0,350	0,008	0,013	0,023	0,030	0,042	0,050	0,008	0,013	0,030	0,045	0,050	0,065
	Kupferlegierungen	50 - 120	0,100	0,150	0,250	0,300	0,350	0,450	0,008	0,010	0,017	0,020	0,030	0,040	0,010	0,015	0,030	0,045	0,050	0,065
	Kunststoffe	150	0,050	0,090	0,190	0,200	0,270	0,350	0,010	0,015	0,025	0,033	0,045	0,056	0,012	0,015	0,035	0,050	0,053	0,070

ATORN® VHM-Fräser



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254157....

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	3			4			5		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	115-165	0,015-0,030	< 9,00	< 0,450	0,025-0,050	< 12,00	< 0,600	0,030-0,060	< 15,00	< 0,750
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	115-165	0,015-0,030	< 9,00	< 0,450	0,025-0,050	< 12,00	< 0,600	0,030-0,060	< 15,00	< 0,750
M	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	85-125	0,015-0,030	< 9,00	< 0,450	0,025-0,050	< 12,00	< 0,600	0,030-0,060	< 15,00	< 0,750
S	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670	45-65	0,015-0,030	< 9,00	< 0,450	0,025-0,050	< 12,00	< 0,600	0,030-0,060	< 15,00	< 0,750
S	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	45-65	0,015-0,030	< 9,00	< 0,450	0,025-0,050	< 12,00	< 0,600	0,030-0,060	< 15,00	< 0,750

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	6			8			10		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	115-165	0,040-0,070	< 18,00	< 0,900	0,050-0,085	< 24,00	< 1,200	0,060-0,100	< 30,00	<1,500
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	115-165	0,040-0,070	< 18,00	< 0,900	0,050-0,085	< 24,00	< 1,200	0,060-0,100	< 30,00	<1,500
M	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	85-125	0,040-0,070	< 18,00	< 0,900	0,050-0,085	< 24,00	< 1,200	0,060-0,100	< 30,00	<1,500
S	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670	45-65	0,040-0,070	< 18,00	< 0,900	0,050-0,085	< 24,00	< 1,200	0,060-0,100	< 30,00	<1,500
S	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	45-65	0,040-0,070	< 18,00	< 0,900	0,050-0,085	< 24,00	< 1,200	0,060-0,100	< 30,00	<1,500

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	12			16			20		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	115-165	0,085-0,120	< 36,00	<1,800	0,100-0,145	< 40,00	< 2,400	0,125-0,175	< 50,00	< 3,000
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	115-165	0,085-0,120	< 36,00	<1,800	0,100-0,145	< 40,00	< 2,400	0,125-0,175	< 50,00	< 3,000
M	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	85-125	0,085-0,120	< 36,00	<1,800	0,100-0,145	< 40,00	< 2,400	0,125-0,175	< 50,00	< 3,000
S	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670	45-65	0,085-0,120	< 36,00	<1,800	0,100-0,145	< 40,00	< 2,400	0,125-0,175	< 50,00	< 3,000
S	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718	45-65	0,085-0,120	< 36,00	<1,800	0,100-0,145	< 40,00	< 2,400	0,125-0,175	< 50,00	< 3,000

ATORN® VHM-Fräser



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

254153....

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	3			4			5		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
S	Titan-Legierung	bis 950	TiAl6V4	3.7165	80-120	0,015-0,030	< 9,00	< 0,360	0,025-0,050	< 12,00	< 0,480	0,030-0,060	< 15,00	< 0,600
S	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	80-120	0,015-0,030	< 9,00	< 0,360	0,025-0,050	< 12,00	< 0,480	0,030-0,060	< 15,00	< 0,600

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	6			8			10		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
S	Titan-Legierung	bis 950	TiAl6V4	3.7165	80-120	0,040-0,070	< 18,00	< 0,720	0,050-0,085	< 24,00	< 0,960	0,060-0,100	< 30,00	< 1,200
S	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	80-120	0,040-0,070	< 18,00	< 0,720	0,050-0,085	< 24,00	< 0,960	0,060-0,100	< 30,00	< 1,200

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	12			16			20		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
S	Titan-Legierung	bis 950	TiAl6V4	3.7165	80-120	0,085-0,120	< 36,00	< 1,440	0,100-0,145	< 40,00	< 1,920	0,125-0,175	< 50,00	< 2,400
S	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174	80-120	0,085-0,120	< 36,00	< 1,440	0,100-0,145	< 40,00	< 1,920	0,125-0,175	< 50,00	< 2,400

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254154....

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	2,5			3			4		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
H	gehärteter Stahl	45 - 50 HRc			100-150	0,015-0,025	< 4,0	< 0,125	0,020-0,035	< 5,0	< 0,150	0,030-0,045	< 11,0	< 0,200
H	gehärteter Stahl	50 - 60 HRc			110-170	0,015-0,025	< 4,0	< 0,125	0,020-0,035	< 5,0	< 0,150	0,030-0,045	< 11,0	< 0,200

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	5			6			8		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
H	gehärteter Stahl	45 - 50 HRc			100-150	0,035-0,055	< 13,0	< 0,250	0,045-0,065	< 13,0	< 0,300	0,060-0,080	< 20,0	< 0,400
H	gehärteter Stahl	50 - 60 HRc			110-170	0,035-0,055	< 13,0	< 0,250	0,045-0,065	< 13,0	< 0,300	0,060-0,080	< 20,0	< 0,400

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	10			12			14		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
H	gehärteter Stahl	45 - 50 HRc			100-150	0,070-0,095	< 22,0	< 0,500	0,085-0,110	< 26,0	< 0,600	0,090-0,115	< 26,0	< 0,700
H	gehärteter Stahl	50 - 60 HRc			110-170	0,070-0,095	< 22,0	< 0,500	0,085-0,110	< 26,0	< 0,600	0,090-0,115	< 26,0	< 0,700

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit	16			18			20		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
H	gehärteter Stahl	45 - 50 HRc			100-150	0,095-0,125	< 34,0	< 0,800	0,100-0,130	< 34,0	< 0,900	0,105-0,140	< 41,0	< 1,000
H	gehärteter Stahl	50 - 60 HRc			110-170	0,095-0,125	< 34,0	< 0,800	0,100-0,130	< 34,0	< 0,900	0,105-0,140	< 41,0	< 1,000



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High quality for great performance

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254155....

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						3			4			5		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
P	unlegierter Baustahl	bis 700	St-52	1.0052	240-300	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000
P	Automatenstahl	bis 700	9 SMn 28	1.0715	240-300	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	160-240	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	160-240	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	130-200	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000
P	Stahlguss	bis 950	GS 40	1.0416	130-200	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	125-225	0,015-0,035	< 9,00	< 0,600	0,025-0,050	< 12,00	< 0,800	0,030-0,060	< 15,00	< 1,000

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						6			8			10		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
P	unlegierter Baustahl	bis 700	St-52	1.0052	240-300	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000
P	Automatenstahl	bis 700	9 SMn 28	1.0715	240-300	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	160-240	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	160-240	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	130-200	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000
P	Stahlguss	bis 950	GS 40	1.0416	130-200	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	125-225	0,040-0,070	< 18,00	< 1,200	0,050-0,085	< 24,00	< 1,600	0,060-0,100	< 30,00	< 2,000

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						12			16			20		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
P	unlegierter Baustahl	bis 700	St-52	1.0052	240-300	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000
P	Automatenstahl	bis 700	9 SMn 28	1.0715	240-300	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	160-240	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	160-240	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	130-200	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000
P	Stahlguss	bis 950	GS 40	1.0416	130-200	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	125-225	0,085-0,120	< 36,00	< 2,400	0,100-0,145	< 40,00	<3,200	0,125-0,175	< 50,00	< 4,000

ATORN® VHM-Fräser



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254159....

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						3			4			5		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	400-800	0,025-0,055	< 10,0	< 0,900	0,030-0,065	< 13,0	< 1,200	0,040-0,080	< 16,0	< 1,500
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	250-600	0,025-0,055	< 10,0	< 0,900	0,030-0,065	< 13,0	< 1,200	0,040-0,080	< 16,0	< 1,500
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	400-625	0,025-0,055	< 10,0	< 0,900	0,030-0,065	< 13,0	< 1,200	0,040-0,080	< 16,0	< 1,500
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	400-625	0,025-0,055	< 10,0	< 0,900	0,030-0,065	< 13,0	< 1,200	0,040-0,080	< 16,0	< 1,500

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						6			8			10		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	400-800	0,055-0,100	< 18,0	< 1,800	0,080-0,120	< 22,0	< 2,400	0,095-0,140	< 25,0	< 3,000
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	250-600	0,055-0,100	< 18,0	< 1,800	0,080-0,120	< 22,0	< 2,400	0,095-0,140	< 25,0	< 3,000
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	400-625	0,055-0,100	< 18,0	< 1,800	0,080-0,120	< 22,0	< 2,400	0,095-0,140	< 25,0	< 3,000
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	400-625	0,055-0,100	< 18,0	< 1,800	0,080-0,120	< 22,0	< 2,400	0,095-0,140	< 25,0	< 3,000

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						12			14			16		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	400-800	0,105-0,175	< 28,0	< 3,600	0,120-0,185	< 30,0	< 4,200	0,140-0,200	< 36,0	< 4,800
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	250-600	0,105-0,175	< 28,0	< 3,600	0,120-0,185	< 30,0	< 4,200	0,140-0,200	< 36,0	< 4,800
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	400-625	0,105-0,175	< 28,0	< 3,600	0,120-0,185	< 30,0	< 4,200	0,140-0,200	< 36,0	< 4,800
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	400-625	0,105-0,175	< 28,0	< 3,600	0,120-0,185	< 30,0	< 4,200	0,140-0,200	< 36,0	< 4,800

ISO	Umfang	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit									
						18			20			25		
	Werkstoffgruppe	N/mm²			Vc m/min	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm	fz mm/Zahn	ap max mm	ae max mm
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	400-800	0,160-0,255	< 36,0	< 5,400	0,180-0,250	< 42,0	< 6,000	0,220-0,300	< 45,0	< 7,500
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	250-600	0,160-0,255	< 36,0	< 5,400	0,180-0,250	< 42,0	< 6,000	0,220-0,300	< 45,0	< 7,500
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	400-625	0,160-0,255	< 36,0	< 5,400	0,180-0,250	< 42,0	< 6,000	0,220-0,300	< 45,0	< 7,500
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	400-625	0,160-0,255	< 36,0	< 5,400	0,180-0,250	< 42,0	< 6,000	0,220-0,300	< 45,0	< 7,500

ATORN® Gewinde-Schaftfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

258002.... 258020....
258003.... 258021....

ISO	Material	Schnittgeschw. Vc m/min	Vorschub fz mm/Zahn Ø4	Ø6	Ø8	Ø10	Ø12	Ø16	Ø20	Ø25	Ø30
P	niedrig. leg. Kohlenstoffstahl	100-250	0,04	0,06	0,07	0,08	0,09	0,12	0,15	0,18	0,21
	Kohlenstoffstahl	110-180	0,03	0,05	0,06	0,07	0,08	0,10	0,12	0,15	0,18
	legierter Werkzeugstahl	90-160	0,03	0,03	0,04	0,05	0,05	0,07	0,08	0,10	0,11
	Stahlguss	130-170	0,03	0,03	0,04	0,05	0,05	0,07	0,08	0,10	0,11
M	INOX Stahl	110-170	0,03	0,03	0,04	0,05	0,05	0,07	0,08	0,10	0,11
K	Guss	70-150	0,04	0,06	0,07	0,08	0,09	0,12	0,15	0,18	0,21
N	NE-Material	160-300	0,04	0,06	0,07	0,08	0,09	0,12	0,15	0,18	0,21
S	Nickel-Leg. / Titan-Leg.	20- 50	0,03	0,03	0,03	0,04	0,05	0,06	0,07	0,08	0,08

ATORN® Gewinde-Schaftfräser, für kleine Bohrlöcher



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

258010....
258022....

ISO	Material	Schnittgeschw. Vc m/min	Vorschub fz mm/Zahn Ø1,5	Ø2	Ø3	Ø4	Ø5	Ø6			
P	niedrig. leg. Kohlenstoffstahl	60-120	0,05	0,05	0,07	0,09	0,11	0,13			
	Kohlenstoffstahl	60- 90	0,04	0,05	0,06	0,08	0,09	0,10			
	legierter Werkzeugstahl	50- 80	0,04	0,04	0,05	0,05	0,06	0,07			
	Stahlguss	70- 90	0,04	0,04	0,05	0,05	0,06	0,07			
M	INOX Stahl	60- 90	0,03	0,03	0,04	0,05	0,06	0,06			
K	Guss	40- 80	0,05	0,05	0,07	0,09	0,11	0,13			
N	NE-Material	50-200	0,10	0,11	0,12	0,14	0,16	0,18			
S	Nickel-Leg. / Titan-Leg.	20- 40	0,03	0,03	0,04	0,04	0,05	0,06			

ATORN® Gewinde-Schaftfräser, für kleine Bohrlöcher bis 62 HRc



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

258011....
258023....

Linkslaufende Spindeldrehrichtung Code M04

ISO	Werkstoffgruppe	Festigkeit/Härte HRc	Schnittgeschwindigkeit Vc m/min	Vorschubwerte fz mm/Zahn Ø1	Ø1,5	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9	Ø10	Ø12	Ø14	Ø16
S	Nickel-Leg. / Titan-Leg.		20 - 40	50	50	50	50	50	50	50	50	50	50	50	50	50	50
H	gehärteter Stahl	45 - 50	60 - 70	0,03	0,04	0,04	0,05	0,05	0,06	0,06	0,07	0,07	0,08	0,08	0,09	0,10	0,11
		51 - 55	50 - 60	0,02	0,03	0,03	0,04	0,04	0,05	0,05	0,06	0,06	0,07	0,07	0,08	0,09	0,10
		56-62	40 - 50	0,01	0,02	0,02	0,03	0,03	0,04	0,04	0,05	0,05	0,06	0,06	0,07	0,08	0,09

ATORN® Bohr-Gewinde-Fräser DMT



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

258100....

Linkslaufende Spindeldrehrichtung Code M04

ISO	Werkstoffgruppe	Schnittgeschwindigkeit Vc m/min	Vorschubwerte fz in mm/Zahn bezogen auf Bohrerdurchmesserbereich in mm 4	5	6	8	9	10	12
P	Kohlenstoffstahl < 0,55%C	60 - 120	0,03	0,05	0,03	0,04	0,05	0,05	0,05
	Kohlenstoffstahl > 0,55%C	60 - 90	0,02	0,02	0,03	0,04	0,04	0,04	0,05
	hoch legierter Stahl	50 - 80	0,02	0,02	0,02	0,02	0,03	0,03	0,04
M	INOX Stahl	70 - 100	0,02	0,02	0,02	0,02	0,03	0,03	0,03
	INOX Stahl, austenitisch	60 - 90	0,02	0,02	0,02	0,02	0,03	0,03	0,03
	INOX Stahl, gegossen	70 - 90	0,02	0,02	0,02	0,02	0,03	0,03	0,04
K	GG, GGG	40 - 80	0,03	0,03	0,04	0,05	0,05	0,05	0,05
N	Aluminium < 10 % Si Kupfer	100 - 200	0,03	0,03	0,04	0,05	0,05	0,05	0,05
	Aluminium > 10 % Si	60 - 140	0,02	0,02	0,02	0,02	0,03	0,03	0,03
	Kunststoff, Duroplaste	50 - 200	0,04	0,05	0,05	0,06	0,06	0,06	0,06

ATORN® Gewindefräsplatten

Die ATORN-Gewindefräser sind speziell für den Einsatz auf CNC-Fräsmaschinen und Bearbeitungszentren konzipiert, die über eine 3-Achsen-Steuerung mit Schraubeninterpolation verfügen.



Vorteile und Einsatz:

- Innen- und Außengewinde
- Durchgangs- und Sacklochgewinde
- Gleich- oder Gegenlauf-Fräsen und Änderung der axialen Vorschubrichtung ermöglicht die Fertigung zylindrischer und konischer Gewinde sowie die Fertigung fast aller herkömmlicher Gewindevarianten
- Gewindeherstellung mit abweichenden Toleranzen
- optimale Spannung
- kurze Späne
- geringer Schnittdruck

HM-Qualität: **AMT7**
TiAlN-beschichtete Ultra-Feinstkorn-Qualität für universelle Anwendungen in allen Materialien bei mittleren bis hohen Schnittgeschwindigkeiten

Auswahl der Schnittgeschwindigkeiten Vc (m/min)

ISO	Material	HM-Qualität AMT7
P	Kohlenstoffstahl	115-280
P	legierter Stahl	130-200
P	hochlegierter Stahl	105-180
P	Stahlguss	150-190
M	INOX Stahl	130-190
K	Grauguss	80-170
N	NE-Metalle Aluminium	180-340

Vorschub f = 0,05 - 0,15 mm/U

CNC-Programmierung für Innengewinde:

aufsteigende Fräsoperation
(Programm ist für den Einsatz auf Bearbeitungszentren)

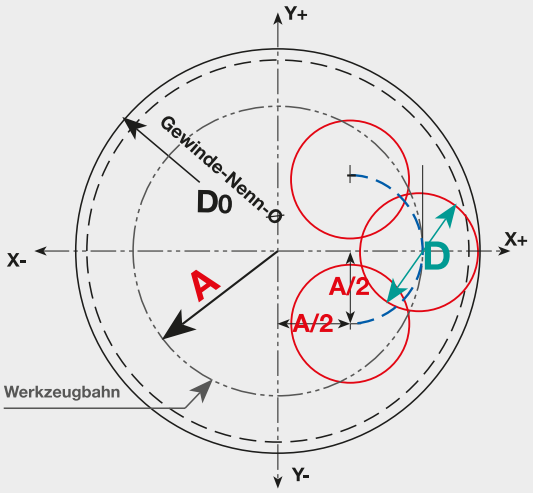
A=(D0 - D)/2

A= Radius der Werkzeugbahn
D0= Gewinde-Nenn-Ø
D= Schneid-Ø

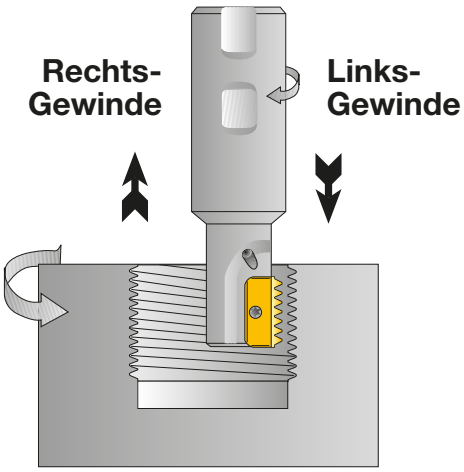
Standard-Programmierung:
G90 G00 G54 G43 H1X0 Y0 Z10 S---
G00 Z-(Gewindetiefe)
G01 G91 G41 D1 X(A/2) Y-(A/2) Z0 F---
G03 X(A/2) Y(A/2) R(A/2) Z(1/8 x Steigung)
G03 X0 Y0 I-(A) J0 Z(Steigung)
G03 X-(A/2) Y(A/2) R(A/2) Z(1/8 x Steigung)
G01 G40 X-(A/2) Y-(A/2) Z0
G90 X0 Y0 Z0

Beispiel:
M32 x 2 (Gewindetiefe 18 mm)
Werkzeughalter: SR0021 H21
(Schneid-Ø 21 mm)
Platte: 21 I 2,0 ISO
A = (32-21) / 2 = 5,5

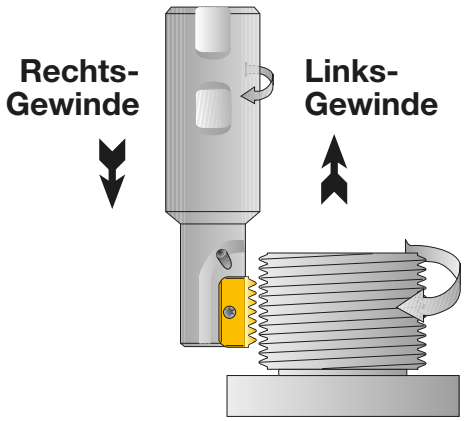
ergibt folgende Programmierung:
G90 G00 G54 G43 H1X0 Y0 Z10 S2800
G00 Z-18
G01 G91 G41 X2,75 Y2,75 Z0 F85 D1
G03 X2,75 Y2,75 R2,75 Z0,25
G03 X0 Y0 I-5,5 J0 Z2
G03 X-2,75 Y2,75 R2,75 Z0,25
G01 G40 X-2,75 Y-2,75 Z0
G90 G0 X0 Y0 Z0



Innengewinde



Außengewinde



ATORN® Wechselkopf-Fräser Z4



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255600....

ISO	**Umfang** ae = 0,5 x D ap = 0,6 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	190	0,075	0,075	0,1	0,12
P	Automatenstahl	bis 700	9 SMn 28	1.0715	180	0,075	0,075	0,1	0,12
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	170	0,075	0,075	0,1	0,12
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	160	0,075	0,075	0,1	0,12
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	110	0,052	0,052	0,07	0,084
P	Stahlguss	bis 950	GS 40	1.0416	150	0,052	0,052	0,07	0,084
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	75	0,052	0,052	0,07	0,084
K	Grauguss	100 - 400	GG 25	0.6025	190	0,075	0,075	0,1	0,12
K	Sphäroguss	400 - 800	GGG 60	0.7060	140	0,075	0,075	0,1	0,12
K	Temperguss	350 - 700	GTS 55	0.8155	140	0,075	0,075	0,1	0,12

ATORN® Wechselkopf-Schruppfräser NRZ



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255601....

ISO	**Umfang** ae = 0,5 x D ap = 0,6 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	190	0,075	0,075	0,1	0,12
P	Automatenstahl	bis 700	9 SMn 28	1.0715	180	0,075	0,075	0,1	0,12
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	170	0,075	0,075	0,1	0,12
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	150	0,052	0,052	0,07	0,084
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	110	0,052	0,052	0,07	0,084
P	Stahlguss	bis 950	GS 40	1.0416	130	0,052	0,052	0,07	0,084
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	90	0,075	0,075	0,1	0,12
K	Grauguss	100 - 400	GG 25	0.6025	170	0,075	0,075	0,1	0,12
K	Sphäroguss	400 - 800	GGG 60	0.7060	120	0,075	0,075	0,1	0,12
K	Temperguss	350 - 700	GTS 55	0.8155	120	0,075	0,075	0,1	0,12

ATORN® Wechselkopf-Schruppfräser NR



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255602....

ISO	**Umfang** ae = 0,5 x D ap = 0,6 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	190	0,075	0,075	0,1	0,12
P	Automatenstahl	bis 700	9 SMn 28	1.0715	180	0,075	0,075	0,1	0,12
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	170	0,075	0,075	0,1	0,12
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	150	0,052	0,052	0,07	0,084
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	110	0,052	0,052	0,07	0,084
P	Stahlguss	bis 950	GS 40	1.0416	130	0,052	0,052	0,07	0,084
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	90	0,075	0,075	0,1	0,12
K	Grauguss	100 - 400	GG 25	0.6025	170	0,075	0,075	0,1	0,12
K	Sphäroguss	400 - 800	GGG 60	0.7060	120	0,075	0,075	0,1	0,12
K	Temperguss	350 - 700	GTS 55	0.8155	120	0,075	0,075	0,1	0,12

ATORN® Wechselkopf-Fräser Z3 Typ W



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

255603....

ISO	**Umfang** ae = 0,5 x D ap = 0,6 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	400	0,065	0,065	0,085	0,11
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	350	0,065	0,065	0,085	0,11
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	160	0,05	0,05	0,075	0,09
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	160	0,05	0,05	0,075	0,09
N	Thermoplast	40 - 70	PVC, Acrylglas		450	0,065	0,065	0,085	0,11

ATORN® Wechselkopf-Fräser Z2



255604....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,1 x D ap = 0,6 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	220	0,12	0,12	0,16	0,2
	Automatenstahl	bis 700	9 SMn 28	1.0715	200	0,084	0,084	0,11	0,14
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	195	0,084	0,084	0,11	0,14
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	190	0,084	0,084	0,11	0,14
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	155	0,06	0,06	0,08	0,1
	Stahlguss	bis 950	GS 40	1.0416	175	0,06	0,06	0,08	0,1
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,084	0,084	0,11	0,14
K	Grauguss	100 - 400	GG 25	0.6025	180	0,084	0,084	0,11	0,14
	Sphäroguss	400 - 800	GGG 60	0.7060	140	0,084	0,084	0,11	0,14
	Temperguss	350 - 700	GTS 55	0.8155	150	0,084	0,084	0,11	0,14
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	250	0,084	0,084	0,11	0,14
	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	300	0,084	0,084	0,11	0,14
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	200	0,084	0,084	0,11	0,14
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	200	0,084	0,084	0,11	0,14
	Thermoplast	40 - 70	PVC, Acrylglas		200	0,084	0,084	0,11	0,14

ATORN® Wechselkopf-Fräser Z3 Typ N



255605....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,1 x D ap = 0,6 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	220	0,12	0,12	0,16	0,2
	Automatenstahl	bis 700	9 SMn 28	1.0715	200	0,084	0,084	0,11	0,14
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	195	0,084	0,084	0,11	0,14
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	190	0,084	0,084	0,11	0,14
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	155	0,06	0,06	0,08	0,1
	Stahlguss	bis 950	GS 40	1.0416	175	0,06	0,06	0,08	0,1
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,084	0,084	0,11	0,14
K	Grauguss	100 - 400	GG 25	0.6025	180	0,084	0,084	0,11	0,14
	Sphäroguss	400 - 800	GGG 60	0.7060	140	0,084	0,084	0,11	0,14
	Temperguss	350 - 700	GTS 55	0.8155	150	0,084	0,084	0,11	0,14
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	250	0,084	0,084	0,11	0,14
	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	300	0,084	0,084	0,11	0,14
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	200	0,084	0,084	0,11	0,14
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	200	0,084	0,084	0,11	0,14
	Thermoplast	40 - 70	PVC, Acrylglas		200	0,084	0,084	0,11	0,14

ATORN® Wechselkopf-Fräser Z4



255606....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,1 x D ap = 0,6 x D Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	220	0,12	0,12	0,16	0,2
	Automatenstahl	bis 700	9 SMn 28	1.0715	200	0,084	0,084	0,11	0,14
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	195	0,084	0,084	0,11	0,14
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	190	0,084	0,084	0,11	0,14
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	155	0,06	0,06	0,08	0,1
	Stahlguss	bis 950	GS 40	1.0416	175	0,06	0,06	0,08	0,1
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,084	0,084	0,11	0,14
K	Grauguss	100 - 400	GG 25	0.6025	180	0,084	0,084	0,11	0,14
	Sphäroguss	400 - 800	GGG 60	0.7060	140	0,084	0,084	0,11	0,14
	Temperguss	350 - 700	GTS 55	0.8155	150	0,084	0,084	0,11	0,14
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	300	0,084	0,084	0,11	0,14
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	200	0,084	0,084	0,11	0,14
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	200	0,084	0,084	0,11	0,14

ATORN® Wechselkopf-Fräser Mehrschneider



255607....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,3 x D ap = 0,6 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	220	0,065	0,065	0,075	0,1
P	Automatenstahl	bis 700	9 SMn 28	1.0715	180	0,065	0,065	0,075	0,1
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	180	0,065	0,065	0,075	0,1
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	160	0,065	0,065	0,075	0,1
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	90	0,045	0,045	0,053	0,07
P	Stahlguss	bis 950	GS 40	1.0416	120	0,045	0,045	0,053	0,07
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	120	0,045	0,045	0,053	0,07
K	Grauguss	100 - 400	GG 25	0.6025	200	0,065	0,065	0,075	0,1
K	Sphäroguss	400 - 800	GGG 60	0.7060	170	0,065	0,065	0,075	0,1
K	Temperguss	350 - 700	GTS 55	0.8155	170	0,065	0,065	0,075	0,1
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	200	0,065	0,065	0,075	0,1
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	200	0,065	0,065	0,075	0,1

ATORN® Wechselkopf-Fräser Torus Typ H



255608....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Nuten** ae = 0,1 x D ap = 0,6 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	194	0,074	0,074	0,089	0,111
P	Automatenstahl	bis 700	9 SMn 28	1.0715	189	0,074	0,074	0,089	0,111
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	183	0,074	0,074	0,089	0,111
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	181	0,074	0,074	0,089	0,111
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	137	0,074	0,074	0,089	0,111
P	Stahlguss	bis 950	GS 40	1.0416	175	0,074	0,074	0,089	0,111
K	Grauguss	100 - 400	GG 25	0.6025	178	0,074	0,074	0,089	0,111
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	162	0,074	0,074	0,089	0,111
K	Sphäroguss	400 - 800	GGG 60	0.7060	162	0,074	0,074	0,089	0,111
H	gehärteter Stahl	45 - 50 HRc			107	0,074	0,074	0,089	0,111
H	gehärteter Stahl	50 - 60 HRc			60	0,074	0,074	0,089	0,111
H	gehärteter Stahl	60 - 70 HRc			52	0,074	0,074	0,089	0,111

ISO	**Umfang** ae = 0,03 x D ap = 0,6 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	355	0,1	0,1	0,12	0,15
P	Automatenstahl	bis 700	9 SMn 28	1.0715	345	0,1	0,1	0,12	0,15
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	335	0,1	0,1	0,12	0,15
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	330	0,1	0,1	0,12	0,15
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	320	0,1	0,1	0,12	0,15
P	Stahlguss	bis 950	GS 40	1.0416	320	0,1	0,1	0,12	0,15
K	Grauguss	100 - 400	GG 25	0.6025	325	0,1	0,1	0,12	0,15
K	Sphäroguss	400 - 800	GGG 60	0.7060	295	0,1	0,1	0,12	0,15
K	Temperguss	350 - 700	GTS 55	0.8155	295	0,1	0,1	0,12	0,15
H	gehärteter Stahl	45 - 50 HRc			195	0,1	0,1	0,12	0,15
H	gehärteter Stahl	50 - 60 HRc			110	0,1	0,1	0,12	0,15
H	gehärteter Stahl	60 - 70 HRc			95	0,1	0,1	0,12	0,15

ATORN® Wechselkopf-Fräser Torus Typ H-N



255609....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 1 x D ap = 0,1 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	200	0,2	0,2	0,25	0,3
	Automatenstahl	bis 700	9 SMn 28	1.0715	180	0,2	0,2	0,25	0,3
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	150	0,2	0,2	0,25	0,3
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	140	0,2	0,2	0,25	0,3
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	120	0,2	0,2	0,25	0,3
	Stahlguss	bis 950	GS 40	1.0416	130	0,2	0,2	0,25	0,3
K	Grauguss	100 - 400	GG 25	0.6025	180	0,2	0,2	0,25	0,3
	Sphäroguss	400 - 800	GGG 60	0.7060	150	0,2	0,2	0,25	0,3
	Temperguss	350 - 700	GTS 55	0.8155	150	0,2	0,2	0,25	0,3
H	gehärteter Stahl	45 - 50 HRc			95	0,15	0,15	0,2	0,25
	gehärteter Stahl	50 - 60 HRc			70	0,09	0,09	0,12	0,15
	gehärteter Stahl	60 - 70 HRc			60	0,08	0,08	0,09	0,12

ATORN® Wechselkopf-Fräser Radius Z2



255610....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Nuten** ae = 0,3 x D ap = 0,03 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	570	0,065	0,065	0,09	0,12
	Automatenstahl	bis 700	9 SMn 28	1.0715	450	0,065	0,065	0,09	0,12
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	390	0,065	0,065	0,09	0,12
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	350	0,065	0,065	0,09	0,12
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	240	0,045	0,045	0,06	0,08
	Stahlguss	bis 950	GS 40	1.0416	300	0,065	0,065	0,09	0,12
K	Grauguss	100 - 400	GG 25	0.6025	400	0,065	0,065	0,09	0,12
	Sphäroguss	400 - 800	GGG 60	0.7060	380	0,065	0,065	0,09	0,12
	Temperguss	350 - 700	GTS 55	0.8155	380	0,065	0,065	0,09	0,12
H	gehärteter Stahl	45 - 50 HRc			180	0,045	0,045	0,06	0,08
	gehärteter Stahl	50 - 60 HRc			160	0,045	0,045	0,06	0,08
	gehärteter Stahl	60 - 70 HRc			150	0,045	0,045	0,06	0,08

ATORN® Wechselkopf-Fräser Radius Z4



255611....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,3 x D ap = 0,03 x D / Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
						10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	570	0,065	0,065	0,09	0,12
	Automatenstahl	bis 700	9 SMn 28	1.0715	450	0,065	0,065	0,09	0,12
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	390	0,065	0,065	0,09	0,12
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	350	0,065	0,065	0,09	0,12
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	200	0,045	0,045	0,06	0,08
	Stahlguss	bis 950	GS 40	1.0416	300	0,065	0,065	0,09	0,12
K	Grauguss	100 - 400	GG 25	0.6025	550	0,065	0,065	0,09	0,12
	Sphäroguss	400 - 800	GGG 60	0.7060	500	0,065	0,065	0,09	0,12
	Temperguss	350 - 700	GTS 55	0.8155	500	0,065	0,065	0,09	0,12
K	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	700	0,065	0,065	0,09	0,12
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	700	0,065	0,065	0,09	0,12
H	gehärteter Stahl	45 - 50 HRc			130	0,045	0,045	0,06	0,08

ATORN® Wechselkopf-Fräser Radius Z2 220°



255612....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,3 x D ap = 0,03 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	450	0,065	0,065	0,09	0,1
	Automatenstahl	bis 700	9 SMn 28	1.0715	350	0,065	0,065	0,09	0,1
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	305	0,065	0,065	0,09	0,1
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	310	0,065	0,065	0,09	0,1
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	170	0,045	0,045	0,055	0,65
	Stahlguss	bis 950	GS 40	1.0416	250	0,065	0,065	0,09	0,1
K	Grauguss	100 - 400	GG 25	0.6025	450	0,065	0,065	0,09	0,1
	Sphäroguss	400 - 800	GGG 60	0.7060	410	0,065	0,065	0,09	0,1
	Temperguss	350 - 700	GTS 55	0.8155	410	0,065	0,065	0,09	0,1
H	gehärteter Stahl	45 - 50 HRc			120	0,045	0,045	0,055	0,65
	gehärteter Stahl	50 - 60 HRc			90	0,045	0,045	0,055	0,65
	gehärteter Stahl	60 - 70 HRc			70	0,045	0,045	0,055	0,65

ATORN® Wechselkopf-Fräser Multimill



255613....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,3 x D ap = 0,5 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	120	0,045	0,065	0,08	0,09
	Automatenstahl	bis 700	9 SMn 28	1.0715	105	0,045	0,065	0,08	0,09
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	95	0,045	0,065	0,08	0,09
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	90	0,045	0,065	0,08	0,09
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	65	0,03	0,045	0,06	0,07
	Stahlguss	bis 950	GS 40	1.0416	80	0,045	0,065	0,08	0,09
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	80	0,03	0,045	0,06	0,07
K	Grauguss	100 - 400	GG 25	0.6025	120	0,045	0,065	0,08	0,09
	Sphäroguss	400 - 800	GGG 60	0.7060	90	0,045	0,065	0,08	0,09
	Temperguss	350 - 700	GTS 55	0.8155	60	0,045	0,065	0,08	0,09
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	300	0,045	0,065	0,08	0,09
	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	280	0,045	0,065	0,08	0,09
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	200	0,045	0,065	0,08	0,09
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	200	0,045	0,065	0,08	0,09

ATORN® Wechselkopf-Entgratfräser



255614....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,3 x D ap = 0,5 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	190	0,085	0,113	0,141	0,169
	Automatenstahl	bis 700	9 SMn 28	1.0715	170	0,085	0,113	0,141	0,169
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	170	0,085	0,113	0,141	0,169
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	120	0,044	0,05	0,075	0,1
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	160	0,063	0,075	0,1	0,125
	Stahlguss	bis 950	GS 40	1.0416	120	0,044	0,05	0,075	0,1
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	110	0,038	0,044	0,063	0,075
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	75	0,031	0,038	0,056	0,075
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	75	0,031	0,038	0,056	0,075
K	Grauguss	100 - 400	GG 25	0.6025	150	0,05	0,056	0,075	0,1
	Sphäroguss	400 - 800	GGG 60	0.7060	100	0,07	0,085	0,113	0,144
	Temperguss	350 - 700	GTS 55	0.8155	70	0,07	0,085	0,113	0,144
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	700	0,05	0,063	0,081	0,106
	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	500	0,085	0,113	0,141	0,169
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	300	0,085	0,113	0,141	0,169
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	300	0,085	0,113	0,141	0,169

ATORN® Wechselkopf-Viertelkreisfräser



255615....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	**Umfang** ae = 0,1 x D ap = 0,1 x D	Festigkeit/ Härte	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm			
	Werkstoffgruppe	N/mm²			m/min	10	12	16	20
P	unlegierter Baustahl	bis 700	St-52	1.0052	190	0,012	0,015	0,025	0,032
	Automatenstahl	bis 700	9 SMn 28	1.0715	170	0,012	0,015	0,025	0,032
	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	160	0,012	0,015	0,025	0,032
	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	140	0,012	0,015	0,025	0,032
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	80	0,012	0,015	0,025	0,032
	Stahlguss	bis 950	GS 40	1.0416	100	0,012	0,015	0,025	0,032
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	110	0,012	0,015	0,025	0,032
	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	75	0,012	0,015	0,025	0,032
	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	75	0,012	0,015	0,025	0,032
K	Grauguss	100 - 400	GG 25	0.6025	150	0,012	0,015	0,025	0,032
	Sphäroguss	400 - 800	GGG 60	0.7060	100	0,012	0,015	0,025	0,032
	Temperguss	350 - 700	GTS 55	0.8155	70	0,012	0,015	0,025	0,032
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	600	0,012	0,015	0,025	0,032
	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	500	0,012	0,015	0,025	0,032
	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	300	0,012	0,015	0,025	0,032
	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	300	0,012	0,015	0,025	0,032



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ATORN®
High quality for great performance

ATORN® Werkzeugsystem zur Bohrungsbearbeitung MINI-MILL



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

263001 - 263111....

ISO	Werkstoff-gruppe	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Zahn Bohrfräsen	Gewindefräsen
P	unlegierter Baustahl	9 S 20 ST 37 ST 50	1.0711 1.0037 1.0050	120 - 200	0,20 - 0,40	0,15 - 0,25
P	niedriglegierter Stahl	ST 70 16 MnCr 5 25 CrMo 4	1.0070 1.7131 1.7218	100 - 180	0,15 - 0,30	0,15 - 0,25
P	hochlegierter Stahl	90 MnCrV 8 42 CrMoV X 40 CrMoS 17	1.2842 1.7225 1.2344	80 - 160	0,15 - 0,30	0,15 - 0,25
M	INOX Stahl (martensitisch)	X 6 CrA 13 X 6 CrTi 17 X 12 CrMoS 17	1.4002 1.4510 1.4104	120 - 200	0,15 - 0,30	0,15 - 0,25
M	INOX Stahl	20 CrNi 17 2 X 5 CrNi 18 10 X 6 CrNiMoTi 17 12 2	1.4057 1.4301 1.4571	80 - 150	0,10 - 0,25	0,15 - 0,25
K	Grauguss	GG 20 GG 40	0.6020 0.6040	100 - 170	0,20 - 0,40	0,20 - 0,30
K	Grauguss mit Kugelgraphit	GGG 40 GGG 70	0.7040 0.7070	120	0,20 - 0,40	0,20 - 0,30
K	Temperguss	GTW 35 GTS 55	0.8035 0.8155	80 - 120	0,20 - 0,40	0,20 - 0,30
N	Aluminium 0,5 10% Si Kupfer	MS 58 G-MgAl9Zn 1	2.0402 3.5912	300 - 500	0,15 - 0,40	0,20 - 0,30
S	hochwarmfeste Legierungen	TiAl6Sn 2	3.7174	80 - 110	0,05 - 0,25	0,05 - 0,25
S	Titanlegierungen	NiCr12Al6MoNb	2.4670	80 - 110	0,01 - 0,08	0,01 - 0,08

$$n = \frac{Vc \times 1000}{d \times \pi}$$

$$U_{eff} = f_z \times z \times n$$

Fräsen - Außenkontur

$$U_{prog} = \frac{U_{eff} \times (D + d)}{D}$$

$$U_{eff} = \frac{D \times U_{prog}}{(D + d)}$$

Fräsen - Innenkontur

$$U_{prog} = \frac{U_{eff} \times (D - d)}{D}$$

$$U_{eff} = \frac{D \times U_{prog}}{(D - d)}$$

$$h_m = \frac{f_z}{\sqrt{\frac{d}{a_e}}} \qquad f_z = h_m \times \sqrt{\frac{d}{a_e}}$$

mittlere Spandicke
$h_m > 0{,}05$ mm/U anstreben!

n	=	Spindeldrehzahl	min.$^{-1}$	h_m	=	mittlere Spandicke	mm/U
V_c	=	Schnittgeschwindigkeit	m/min.	U_{prog}	=	programmierte Vorschubgeschwindigkeit	mm/min.
d	=	Fräserdurchmesser	mm	U_{eint}	=	programmierter Eintauchvorschub	mm/min.
D	=	Gewindedurchmesser	mm	f_z	=	Vorschub pro Zahn	mm
U_{eff}	=	effektive Vorschubgeschwindigkeit (an der Kontur)	mm/min.	z	=	Schneidenanzahl des Fräsers	
				a_e	=	Spantiefe radial	mm

ATORN® Schneidplatten CMT



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

266100 - 266109....

ISO	Werkstoff-gruppe	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Zahn Ø10	Ø12	Ø18	Ø25
P	niedrig- und mittellegierter Kohlenstoff< 0,55%C	60 - 120	0,16	0,17	0,20	0,22
P	hochlegierter Kohlenstoffstahl>0,55%C	60 - 90	0,14	0,16	0,20	0,22
P	legierter Stahl, Vergütungsstahl	50 - 80	0,10	0,12	0,16	0,18
P	Stahlguss	70 - 90	0,10	0,12	0,15	0,18
M	INOX Stahl, ferritisch	70 - 100	0,10	0,11	0,15	0,17
M	INOX Stahl, austenitisch	60 - 90	0,10	0,11	0,15	0,17
K	Grauguss	40 - 80	0,16	0,17	0,20	0,22
K	Gusseisen mit Kugelgraphit	40 - 80	0,16	0,17	0,20	0,22
K	Temperguss	40 - 80	0,16	0,17	0,20	0,22
N	Aluminium<10%Si,Kupfer	100 - 200	0,16	0,17	0,20	0,22
N	Aluminium>10%%Si	60 - 140	0,10	0,11	0,16	0,18
N	Kunstoff	50 - 200	0,19	0,19	0,22	0,24
N	Bronze	50 - 200	0,19	0,19	0,22	0,24
N	Messing	50 - 200	0,19	0,19	0,22	0,24
S	Titan-Legierungen	20 - 40	0,07	0,07	0,10	0,12
S	Nickelbasis-Legierungen	20 - 40	0,07	0,07	0,10	0,12
H	gehärteter Stahl 45 - 50 HRc	60 - 70	0,09	0,09	0,13	0,15
H	gehärteter Stahl 50 - 55 HRc	50 - 60	0,08	0,08	0,12	0,14

ATORN® Planfräser 45°



262555....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Wendeplatte SNEX 1206 ANN... ap max. 5,0 mm: Schnitt-geschwindigkeit Vc m/min	Wendeplatte SNEX 1206 ANN... ap max. 5,0 mm: Vorschub pro Schneide fz mm / z	Wendeplatte SNMU 1260 ANER... ap max. 5,0 mm: Schnitt-geschwindigkeit Vc m/min	Wendeplatte SNMU 1260 ANER... ap max. 5,0 mm: Vorschub pro Schneide fz mm / z	Wendeplatte ONMU 1505 ANN... ap max. 0,5 - 3,0 mm: Schnitt-geschwindigkeit Vc m/min	Wendeplatte ONMU 1505 ANN... ap max. 0,5 - 3,0 mm: Vorschub pro Schneide fz mm / z	HM Sorte
P	unlegierter Baustahl	bis 700	St-52	1.0052	150 - 300	0,10 - 0,30	110 - 200	0,05 - 0,25	100 - 170	0,05 - 0,25	HC 4630
P	Automatenstahl	bis 700	9 SMn 28	1.0715							
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191							
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131							
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343							
P	Stahlguss	bis 950	GS 40	1.0416							
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	90 - 160	0,10 - 0,35	90 - 170	0,05 - 0,25	90 - 160	0,05 - 0,25	HC 4535
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104							
M	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006							
K	Grauguss	100 - 400	GG 25	0.6025	120 - 180	0,10 - 0,40	200 - 300	0,05 - 0,25	200 - 300	0,05 - 0,25	HC 4410
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678							
K	Sphäroguss	400 - 800	GGG 60	0.7060							
K	Temperguss	350 - 700	GTS 55	0.8155							
N	Reinmetalle, weich	bis 500	Reineisen		180 - 350	0,10 - 0,40					HW 4310
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535							
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581							
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320							
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402							

SARA® Leichtlauf-Planfräser 45°



262550....

Wendeschneidplatte, ISO-Bezeichnung: SEMT 13T3 AGSN-PM
Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen! ap max. 6 mm

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittge-schw. Vc m/min	Vorschub pro Schneide fz mm/z	HM Sorte
P	unlegierter Baustahl Automatenstahl Baustahl	bis 700 bis 700 500 - 950	St-52 9 SMn 28 Ck45	1.0052 1.0715 1.1191	200 - 300	0,1 - 0,3	JC 5040 (JC 8050)
P	Einsatzstahl Werkzeugstahl	bis 950 950 - 1400	16 MnCr 5 X 38 CrMoV 5 1	1.7131 1.2343	170 - 250 100 - 150	0,1 - 0,3 0,1 - 0,3	JC 5040 (JC 8050) JC 5040
M	INOX Austenitisch INOX Ferritisch INOX Martensitisch	500 - 950 500 - 950 500 - 950	X 5 CrNi 18 10 X 12 CrMoS 17 X 10 Cr 13	1.4301 1.4104 1.4006	170 - 250	0,1 - 0,3	JC 8050 (JC 8015)
K	Grauguss Sphäroguss	100 - 400 400 - 800	GG 25 GGG 60	0.6025 0.7060	150 - 250 120 - 180	0,1 - 0,3 0,1 - 0,3	JC 605W (JC 8015) JC 8015
H	gehärteter Stahl 40 - 55 HRc			1.2379	60 - 100	0,1 - 0,2	JC 8015

ATORN® Planfräser 45°



260150....

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff	Vc m/min	Max. Zahnvorschübe fz in mm bei ae = 0,75 x d1 (d1 = Fräserdurchmesser) SAHT 1306[2]	Passende Wendeplatte
M	Rost- und säurebeständiger Stahl, ferritisch, martensitisch 500 - 950 N/mm²	140 - 170	0,30	HC4540 HC4640
M	Rost- und säurebeständiger Stahl, austenitisch 500 - 950 N/mm²	200 - 280 60 - 120[1]	0,25	
M	Martensitaushärtbarer Stahl 500 - 950 N/mm²	180 - 240 60 - 120[1]	0,25	
K	Gusseisen mit Lamellengraphit 100 - 400 N/mm²	200 - 260	0,40	HC4410
K	Legiertes Gusseisen 150 -250 N/mm²	160 - 200	0,30	
K	Gusseisen mit Kugelgraphit 400 - 800 N/mm²	140 - 180	0,35	
K	Temperguss 350 - 700 N/mm²	160 - 200	0,35	
N	Rein-Metalle, weich bis 500 N/mm²	160 - 220	0,35	HW4310
N	Aluminium-Legierungen, langspanend bis 550 N/mm²	300 - 1000	0,40	
N	Kupfer-Legierungen, langspanend 300 - 700 N/mm²	250 - 500	0,40	
S	Titan-Legierungen, mittelfest bis 950 N/mm²	40 - 80[1]	0,15	HC4640
S	Titan-Legierungen, hochfest 900 - 1400 N/mm²	30 - 40[1]	0,15	

[1] Schnittwert für Nasszerspanung
[2] Die fz-Werte beziehen sich auf die Schnitttiefen für ap = 3 mm (SAHT 1306)

ATORN® Plan- und Kopierfräser, OCKX, XCKX, RCKX 1606 und SAHT 1306



260111....

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittgeschwindigkeit Vc m/min	Vorschub pro Schneide fz mm/z	HM Sorte
P	unlegierter Baustahl Automatenstahl Baustahl Einsatzstahl Werkzeugstahl Stahlguss	bis 700 bis 700 500 - 950 bis 950 950 - 1400 bis 950	St-52 9 SMn 28 Ck45 16 MnCr 5 X 38 CrMoV 5 1 GS 40	1.0052 1.0715 1.1191 1.7131 1.2343 1.0416	135 - 180 120 - 300	0,10 - 0,35	HC 4540 HC 4620
M	INOX Austenitisch INOX Ferritisch INOX Martensitisch	500 - 950 500 - 950 500 - 950	X 5 CrNi 18 10 X 12 CrMoS 17 X 10 Cr 13	1.4301 1.4104 1.4006	180 - 240	0,10 - 0,35	HC 4540
K	Grauguss Legierter Grauguss Sphäroguss Temperguss	100 - 400 150 - 250 400 - 800 350 - 700	GG 25 GGL-NiCr 35 2 GGG 60 GTS 55	0.6025 0.6678 0.7060 0.8155	50 - 120 160 - 300	0,10 - 0,35	HC 4410 HC 4620

ATORN® Eckfräser 90°



262547.... 283310....

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nr.	Schnittge-schwindigkeit Vc m/min	Zahnvorschub fz mm/z		
						Schlichtbearbeitung	mittlere Bearbeitung	Schruppbearbeitung
P	unlegierter Baustahl Automatenstahl Baustahl Einsatzstahl Werkzeugstahl Stahlguss	bis 700 bis 700 500 - 950 bis 950 950 - 1400 bis 950	St-52 9 SMn 28 Ck45 16 MnCr 5 X 38 CrMoV 5 1 GS 40	1.0052 1.0715 1.1191 1.7131 1.2343 1.0416	220 - 250 220 - 250 220 - 250 160 - 200 160 - 200 220 - 250	0,10 0,10 0,10 0,08 0,08 0,10	0,20 0,20 0,20 0,15 0,15 0,20	0,30 0,30 0,30 0,20 0,25 0,30
M	INOX Stahl, austenitisch INOX Stahl, ferritisch INOX Stahl, martensitisch	500 - 950 500 - 950 500 - 950	X 5 CrNi 18 10 X 12 CrMoS 17 X 10 Cr 13	1.4301 1.4104 1.4006	130 - 140 130 - 140 130 - 140	0,06 0,06 0,06	0,12 0,12 0,12	0,20 0,20 0,20
K	Grauguss Legierter Grauguss Sphäroguss Temperguss	100 - 400 150 - 250 400 - 800 350 - 700	GG 25 GGL-NiCr 35 2 GGG 60 GTS 55	0.6025 0.6678 0.7060 0.8155	140 - 200 140 - 180 140 - 180 140 - 200	0,12 0,10 0,10 0,12	0,25 0,20 0,20 0,25	0,35 0,30 0,30 0,35
S	Nickelbasis-Legierungen Nickelbasis-Legierungen	bis 950 900 - 1400	NiCr12Al6MoNb NiCr19Fe19NbMo	2.4670 Inconel 718	40 - 60 40 - 60	0,05 0,05	0,08 0,08	0,12 0,12

ae/D	50-100 %	30 %	20 %	10 %	5 %	2 %
Faktor	1	1,2	1,5	2,1	3	4,8

ATORN® Schrupp-Wendelschaftfräser 90°



262544....

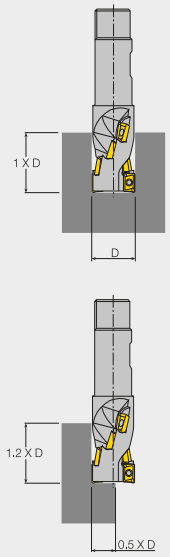
Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

Nachfolgende Schnittbedingungen sind als Richtwerte zu betrachten.
Verschiedene Faktoren können diese Werte beeinflussen:

- Starrheit der Maschine
- Werkstück-Aufspannung
- Material

A = Nutenfräsen: A_p (axial Schnitttiefe) bis 1 x Fräser-Durchmesser
B = Eckfräsen: A_e (radial Schnitttiefe) bis 0,5 x Fräser-Durchmesser und A_p (axial Schnitttiefe) bis 1,2 x Fräser-Durchmesser

ISO	Werkstück Material	Härte Brinell	Hartmetall-Sorte	Schnittge-schwindigkeit Vc (m/min)	Vorschub fz (mm/Zahnreihe)			
					Ø 20 + Ø 25		Ø 32 + Ø 40	
					A	B	A	B
P	Kohlenstoff-Stähle	150 - 200	DC325M	110 - 200	0,08 - 0,15	0,08 - 0,18	0,10 - 0,20	0,10 - 0,25
			DC735	110 - 175				
	niedrig legierte Stähle	125 - 275	DC325M	90 - 135	0,08 - 0,15	0,08 - 0,18	0,10 - 0,20	0,10 - 0,25
			DC735	90 - 125				
	legierte Stähle	275 - 325	DCM325M	80 - 100	0,07 - 0,15	0,07 - 0,18	0,08 - 0,20	0,08 - 0,25
			DC735	80 - 90				
M	INOX Stähle ferr./mart.	175 - 275	DC325M	90 - 150	0,08 - 0,15	0,08 - 0,18	0,10 - 0,20	0,10 - 0,25
			DC735	90 - 160				
	INOX Stähle austenitisch	135 - 175	DC325M	100 - 130	0,08 - 0,15	0,08 - 0,18	0,10 - 0,20	0,10 - 0,25
			DC725	100 - 110				
K	Grauguss	- 200	DC210	85 - 105	0,08 - 0,20	0,10 - 0,25	0,10 - 0,25	0,10 - 0,30
	Temperguss	110 - 250	DC210	55 - 85	0,07 - 0,18	0,08 - 0,20	0,08 - 0,23	0,10 - 0,27
N	Aluminium, legiert		DC210	250- 450	0,12 - 0,23	0,11 - 0,28	0,13 - 0,28	0,15 - 0,35



ATORN® 4-10 Power / 4-15 Power



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

262559.... **262562....**
262560.... **262563....**

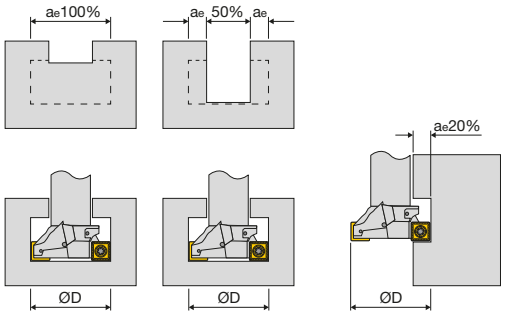
ISO	Werkstoff-gruppe	Festigkeit/ Härte N/mm²	Werkstoffbeispiele	Werkstoff-Nr.	Schnittge-schw. Vc m/min	Vorschub pro Schneide fz mm/z	HM Sorte	Wendeplatten-bezeichnung
P	unlegierter Baustahl Automatenstahl Baustahl Einsatzstahl Werkzeugstahl Stahlguss	bis 700 bis 700 500 - 950 bis 950 950 - 1400 bis 950	St-52 9 SMn 28 Ck45 16 MnCr 5 X 38 CrMoV 5 1 GS 40	1.0052 1.0715 1.1191 1.7131 1.2343 1.0416	100 - 300	0,10 - 0,30	HC 4630	LNMX 10.. / 15.. PNR-MM
M	INOX Austenitisch INOX Ferritisch INOX Martensitisch	500 - 950 500 - 950 500 - 950	X 5 CrNi 18 10 X 12 CrMoS 17 X 10 Cr 13	1.4301 1.4104 1.4006	120 - 180	0,05 - 0,25	HC 4535	LNMX 10.. / 15.. PNR-MM
K	Grauguss Legierter Grauguss Sphäroguss Temperguss	100 - 400 150 - 250 400 - 800 350 - 700	GG 25 GGL-NiCr 35 2 GGG 60 GTS 55	0.6025 0.6678 0.7060 0.8155	120 - 300	0,08 - 0,25	HC 4410	LNMX 10.. / 15.. PNR-MM
N	Reinmetalle, weich Al.-Leg. langspanend Al.-Leg. kurzspanend Kupfer-Leg. langspanend Kupfer-Leg. kurzspanend	bis 500 bis 550 bis 400 300 - 700 bis 500	Reineisen AlMg 3 G-AlSi 12 MS 63 MS 58	3.3535 3.2581 2.0320 2.0402	200 - 300	0,10 - 0,30	HW 4310	LNMX 10.. / 15.. PNR-MA

SARA® T-Nutenfräser



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

263007....
263008....



ae/D	100 %	50 %	20 %	10 %
Vc	100 %	90 %	80 %	70 %
X	1	1	1,3	1,5

Bei abnehmender Eingriffsbreite ae/D ist die Schnittgeschwindigkeit Vc zu reduzieren.
Der Vorschub je Schneide fz ist um den Faktor X zu korrigieren.

ISO	Werkstoff-gruppe	Schnittge-schwindigkeit Vc m/min	Vorschub fz mm/Z bezogen auf Fräserdurchmesser in mm 21 - 25	32 - 40	50
P	unlegierter Stahl niedrig legierter Stahl hochlegierter Stahl Werkzeugstahl	250 200 170 170	0,10 0,08 0,08 0,08	0,12 0,09 0,06 0,06	0,16 0,10 0,08 0,08
M	INOX Stahl, austenitisch	200	0,06	0,06	0,06
K	Grauguss Gusseisen mit Kugelgraphit Temperguss	200 180 200	0,12 0,10 0,08	0,16 0,12 0,08	0,18 0,12 0,10
S	warmfeste Legierungen Titanlegierungen	40 60	0,06 0,06	0,06 0,06	0,06 0,06
	ap max. [mm]		9 - 11	14 - 17	21

ATORN® Hochvorschubfräser XDM..



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

286001..../286002....

ISO	ae = 0,75 x D ap = 0,6 mm Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z HC4640 XDMW 0903SR	Vorschub fz in mm/Z HC4640 XDMT 0903ER	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm/Z HC4410 XDMW 0903SR	Vorschub fz in mm/Z HC4410 XDMT 0903ER
P	Automatenstahl	bis 700	9 SMn 28	1.0715	200 - 260	1,7	1,4	260 - 270	1,5	1,3
	unlegierter Baustahl	bis 700	St-52	1.0052	200 - 260	1,7	1,4	260 - 270	1,5	1,3
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131	150 - 180	1,4	1,2	160 - 190	1,3	1,1
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	160 - 210	1,2	1,0	180 - 220	1,2	1,0
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	200 - 240		0,9			
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	200 - 240		0,9			
K	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678				180 - 200	1,0	
	Sphäroguss	bis 280 HB	GGG 60	0.7060				200 - 240	1,0	
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083				100	1,0	
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379				80	0,7	
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067				70	0,4	

ATORN® Hochvorschubfräser



- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

285001.... **285003....** **285005....**
285002.... **285004....** **285006....**

ISO	ae = 0,7 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm HC4640					
	Werkstoffgruppe					XCNT07 SN-TR XCNW07 SN	XCNT09 SN-TR XCNW12 SN	XCNT12 SN-TR XCNW07 SN	XCNT07 EN-TR	XCNT09 EN-TR	XCNT12 EN-TR
P	unlegierter Baustahl	bis 700	St-52	1.0052	200-260	2,0	2,5	3,0	1,4	1,7	2,0
P	Automatenstahl	bis 700	9 SMn 28	1.0715	210-250	2,0	2,5	3,0	1,4	1,7	2,0
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	180-220	2,0	2,5	3,0	1,4	1,7	2,0
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	140-180	2,0	2,5	3,0	1,4	1,7	2,0
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	220-260	0,8	1,2	1,5	0,8	1,2	1,5
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	220-260	1,0	1,5	1,8	1,0	1,5	1,8
K	Grauguss	100 - 400	GG 25	0.6025	200-260	1,5	2,0	2,5	1,2	1,6	2,0
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	160-200	1,5	2,0	2,5	1,2	1,6	2,0
K	Sphäroguss	400 - 800	GGG 60	0.7060	200-240	1,5	2,0	2,5	1,0	1,4	1,7
K	Temperguss	350 - 700	GTS 55	0.8155	160-200	1,1	1,3	1,5	0,7	0,9	1,0

ISO	ae = 0,7 x D	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz in mm / Z bezogen auf Fräserdurchmesser in mm HC4410		
	Werkstoffgruppe					XCNT07 SN-TR XCNW07 SN	XCNT09 SN-TR XCNw12 SN	XCNT12 SN-TR XCNW07 SN
P	unlegierter Baustahl	bis 700	St-52	1.0052	240-300	1,6	2,0	2,4
P	Automatenstahl	bis 700	9 SMn 28	1.0715	240-300	1,6	2,0	2,4
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	220-280	1,6	2,0	2,4
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	180-240	1,6	2,0	2,4
K	Grauguss	100 - 400	GG 25	0.6025	200-260	1,5	2,0	1,2
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678	160-200	1,5	2,0	1,2
K	Sphäroguss	400 - 800	GGG 60	0.7060	200-240	1,5	2,0	2,5
K	Temperguss	350 - 700	GTS 55	0.8155	160-200	1,1	1,3	1,5

ATORN® Fas- und Zentrierfräser 45 °



Vc = 50 - 60 m/min. f = 0,03 - 0,05 mm/U

260126....
260127....

Entgratwerkzeug Orbitool® für Innenbearbeitung



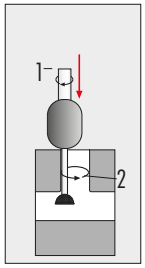
250010....
250011....

❶ Drehzahl min⁻¹
Das Werkzeug wird im Uhrzeigersinn rotiert. Je höher die Drehzahl, desto mehr Material wird abgetragen. Einschränkende Faktoren sind die Drehzahl der Maschinenspindel und die gewünschte Oberflächenqualität. Die empfohlene Drehzahl für ORBITOOL® ENTGRATWERKZEUGE liegt zwischen 2.000 und 8.000 min⁻¹.
Eine tiefere Drehzahl reduziert Vibrationen und ergibt ein besseres Finish.
Härtere Materialien erfordern höhere Drehzahlen.

❷ Vorschubrate
Die Vorschubrate bestimmt die Menge des Materialabtrages und die Form der Schnittkante der sich kreuzenden Bohrungen. Bei weicherem Material wie z.B. Aluminium, führen kleinere Vorschubraten zu Anfasungen anstatt eines Radius. Empfehlenswert sind Vorschubraten von 0,05 bis 0,6 mm pro Kreisbewegung des Werkzeuges.

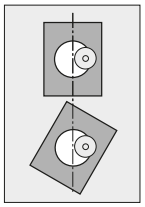
❸ Drehzahl der Kreisbewegung
Es gibt drei Möglichkeiten ORBITOOL® ENTGRATWERKZEUGE in der Bohrung des Werkstücks zu bewegen:
Empholener Drehzahlbereich für die Kreisbewegung: 20 - 100 min⁻¹

Die Berechnung des Durchmessers der Kreisbewegung ist:
D = Dh-Ds
D = Durchmesser der Kreisbewegung
Dh = Durchmesser der Bohrung
Ds = ORBITOOL® ENTGRATWERKZEUG Fräserschaftdurchmesser

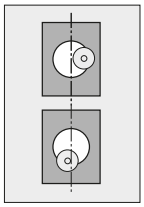


1 Rotationsgeschwindigkeit
2 Kreisbewegung (Interpolation)

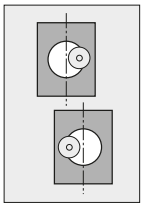
rotierendes Werkzeug, rotierendes Werkstück



rotierendes Werkzeug, schraubenartige Bewegung, stationäres Werkstück



rotierendes Werkzeug, Werkstück bewegt sich auf X- und Y-Achse



❹ Hinweise
Die Abtragsleistung des Werkzeuges erhöht sich mit der Steifigkeit der Werkzeugspannung. Die Flexibilität des Werkzeugschaftes ermöglicht den Einsatz in nahezu allen Einsatzbereichen. Es kann jedoch bei zu kurzen Schaftlängen des ORBITOOL® ENTGRATWERKZEUGS, insbesondere bei kleineren Schaftdurchmessern, zu einer bleibenden Verformung des Werkzeugschaftes kommen. Bei eher sensiblen Zerspanungsprozessen, empfindlichen Oberflächen oder zu kurzen Schaftlängen kann hier durch den Einsatz eines flexiblen Zwischenstückes (optional) Abhilfe geschaffen werden. Gewindebohrungen können ebenfalls problemlos entgratet werden.
Die Anlaufscheibe des Fräswerkzeugs schützt das Gewindeprofil vor Beschädigungen.

ATORN® Tauchfräser für NE-Metalle



260400....
260401....
260402....
260403....
270104....

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoff	Vc m/min	
		HC4410	HW4410
N	Aluminium-Legierungen, langspanend 100-400 N/mm²	1500 - 3000 1000 - 2000	1000 - 2000 800 - 1600
N	Aluminium-Legierungen, kurzspanend bis 400 N/mm²	1000	800
N	Kupfer-Legierungen, langspanend 150-250 N/mm²	300	250
N	Kupfer-Legierungen, kurzspanend bis 500 N/mm²	500	400
N	Magnesium-Legierungen 160-300 N/mm²	500	400
N	Thermoplaste 350-700 N/mm²	400	300
N	Duroplaste 20-40 N/mm²	200	150

ISO	Maximale Vorschübe pro Zahn = fz (mm/z.)	
	VPGT1604... ap max = 8 mm	VCGT2205... ap max = 9 mm
N	0,35	0,5
N	0,3	0,4

ATORN® Hochleistungsfräser Programm



Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz/Zahn HC4640				Schnitt-geschwindigkeit Vc m/min	Vorschub fz/Zahn HC4540 / HC4544			Schnitt-geschwindigkeit Vc m/min	Vorschub fz/Zahn HC4410 / HC4430			
						ADKX 0602	ADKX 0903	ADKX 1204	ADKX 1705		ADKX 0903	ADKX 1204	ADKX 1705		ADKX 0602	ADKX 0903	ADKX 1204	ADKX 1705
P	unlegierter Baustahl	bis 700	St-52	1.0052	180 - 220	0,08	0,12	0,18	0,30					220 - 240	0,06	0,10	0,14	0,24
P	Automatenstahl	bis 700	9 SMn 28	1.0715	180 - 220	0,08	0,12	0,18	0,30					220 - 240	0,06	0,10	0,14	0,24
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191	180 - 220	0,08	0,12	0,18	0,30					220 - 240	0,06	0,10	0,14	0,24
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131	180 - 220	0,06	0,10	0,16	0,24					220 - 240	0,05	0,08	0,14	0,20
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343	180 - 220	0,05	0,08	0,14	0,20					220 - 240	0,04	0,06	0,11	0,16
P	Stahlguss	bis 950	GS 40	1.0416	180 - 220	0,06	0,10	0,16	0,24					220 - 240	0,05	0,08	0,14	0,20
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301	180 - 220	0,05	0,08	0,10	0,16	180 - 240	0,08	0,12	0,18					
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104	180 - 220	0,05	0,08	0,10	0,16	180 - 240	0,08	0,12	0,18					
M	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006	180 - 220	0,05	0,08	0,10	0,16	180 - 240	0,08	0,12	0,18					
K	Grauguss	100 - 400	GG 25	0.6025										220 - 280	0,12	0,18	0,25	0,35
K	legierter Grauguss	150 - 250	GGL-NiCr 35 2	0.6678										220 - 280	0,12	0,18	0,25	0,35
K	Sphäroguss	400 - 800	GGG 60	0.7060										140 - 180	0,08	0,12	0,20	0,30
K	Temperguss	350 - 700	GTS 55	0.8155										140 - 180	0,08	0,12	0,2	0,30
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535										300 - 400	0,10	0,12	0,15	0,20
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581										300 - 400	0,10	0,12	0,15	0,20
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320										200 - 250	0,10	0,12	0,15	0,20
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402										200 - 250	0,10	0,12	0,15	0,20
N	Thermoplast	40 - 70	PVC, Acrylglas											250 - 300	0,12	0,20	0,25	0,35
N	Duroplast	20 - 40	Bakelit											200 - 250	0,12	0,20	0,25	0,35
S	Titan-Legierung	bis 950	TiAl6V4	3.7165						60 - 80	0,08	0,12	0,15	60 - 80	0,05	0,08	0,12	0,15
S	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174						40 - 60	0,08	0,12	0,15	40 - 60	0,05	0,08	0,12	0,15
S	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670						40 - 60	0,08	0,12	0,15	40 - 60	0,05	0,08	0,12	0,15
S	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718						20 -40	0,08	0,12	0,15	20 - 40	0,05	0,08	0,12	0,15

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiele	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	Vorschub fz/Zahn HC4410 / HW4410			
						ADHX 0602	ADHX 0903	ADHX 1204	ADHX 1705
P	unlegierter Baustahl	bis 700	St-52	1.0052					
P	Automatenstahl	bis 700	9 SMn 28	1.0715					
P	unlegierter Vergütungsstahl	500 - 950	Ck45	1.1191					
P	legierter Einsatzstahl	bis 950	16 MnCr 5	1.7131					
P	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343					
P	Stahlguss	bis 950	GS 40	1.0416					
M	INOX Stahl, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301					
M	INOX Stahl, geschwefelt	500 - 950	X 12 CrMoS 17	1.4104					
M	INOX Stahl, martensitisch	500 - 950	X 10 Cr 13	1.4006					
N	Al.-Leg. langspannend	bis 550	AlMg 3	3.3535	800-1000	0,20	0,25	0,30	0,40
N	Al.-Leg. kurzspannend	bis 400	G-AlSi 12	3.2581	350-500	0,10	0,12	0,15	0,20
N	Kupfer-Leg. langspanend	300 - 700	MS 63	2.0320	350-500	0,12	0,15	0,20	0,30
N	Kupfer-Leg. kurzspanend	bis 500	MS 58	2.0402	250-300	0,10	0,12	0,15	0,20
N	Thermoplast	40 - 70	PVC, Acrylglas		250-300	0,12	0,20	0,24	0,35
N	Duroplast	20 - 40	Bakelit		200-350	0,12	0,20	0,24	0,35
S	Titan-Legierung	bis 950	TiAl6V4	3.7165					
S	Titan-Legierung	900 - 1400	TiAl6Sn 2	3.7174					
S	Nickelbasis-Legierung	bis 950	NiCr12Al6MoNb	2.4670					
S	Nickelbasis-Legierung	900 - 1400	NiCr19Fe19NbMo	Inconel 718					

Schnitttiefe ap / mm			
ADHX ..0602	ADHX ..0903	ADHX ..1204	ADHX ..1705
5,5	8,5	12,0	16,5

ATORN® Kopierfräser, mit innerer Kühlmittelzufuhr

Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!


260603....


260612....

Schnittwerte

ISO	Materialgruppe	Durchmesser													
		Ø 12		Ø 15		Ø 16		Ø 20		Ø 25		Ø 32		Ø 40	
		Spantiefe ap max. 0,5 mm		Spantiefe ap max. 0,75 mm		Spantiefe ap max. 1,0 mm		Spantiefe ap max. 2,0 mm		Spantiefe ap max. 2,5 mm		Spantiefe ap max. 3,0 mm		Spantiefe ap max. 3,5 mm	
		U/min	Vf mm/min	U/min	Vf mm/min	U/min	Vf mm/min	U/min	Vf mm/min	U/min	Vf mm/min	U/min	Vf mm/min	U/min	Vf mm/min
P	Kohlenstoffstahl (HB 125-180)	8500	4400	5200	2700	5200	2700	4000	2800	3100	2100	2450	1700	2000	1400
P	Kohlenstoffstahl (HB 170-220)	7500	4000	4500	2300	4500	2300	3500	2400	2700	1900	2200	1550	1750	1200
P	legierter Stahl	5200	2700	3200	1800	3200	1800	2500	1700	2200	1400	1700	1100	1400	900
P	Werkzeugstahl	4500	2300	2700	1400	2700	1400	2200	1500	1900	1200	1500	1000	1200	800
M	INOX Stahl	6200	3300	3600	1900	3600	1900	2800	1800	2200	1400	1700	1100	1350	900
K	Grauguss	6500	3900	3850	2700	3850	2700	3000	2500	2400	2000	1900	1500	1500	1200
K	Kugelgraphitguss	5100	3000	3000	2500	3600	2500	2400	2000	1900	1600	1500	1250	1200	1000


260611....

Schnittwerte für ATORN-Kopierfräser

ISO	Materialgruppe			ap mm	ae mm	n U/min	Vf mm/min	Wendeplatte	Leistung kw netto
	Werkzeugdurchmesser 40 mm								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	3 - 3,5	40	1900	2000	RD..12T3	12
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	3 - 3,5	40	1750	1850	RD..12T3	12
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	3 - 3,5	40	1600	1700	RD..12T3	12
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	3 - 3,5	40	1450	1300	RD..12T3	10
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	3 - 3,5	40	1550	1400	RD..12T3	11
K	Grauguss	HB 200 - 250	GG25, GRADE 220	3 - 3,5	40	1700	1550	RD..12T3	5
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	3 - 3,5	40	1600	1450	RD..12T3	5
	Werkzeugdurchmesser 42 mm								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	3 - 4	52	1400	2100	RD..12T3	16
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	3 - 4	52	1250	1875	RD..12T3	16
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	3 - 4	52	900	1350	RD..12T3	13
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	3 - 4	52	750	1125	RD..12T3	12
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	3 - 4	52	1050	1575	RD..12T3	17
K	Grauguss	HB 200 - 250	GG25, GRADE 220	3 - 4	52	1080	2160	RD..12T3	9
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	3 - 4	52	900	1800	RD..12T3	8
	Werkzeugdurchmesser 52 mm								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	3 - 4	52	1400	1680	RD..11604	13
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	3 - 4	52	1250	1500	RD..11604	13
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	3 - 4	52	900	1080	RD..11604	10
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	3 - 4	52	750	900	RD..11604	9,5
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	3 - 4	52	1050	1260	RD..11604	13
K	Grauguss	HB 200 - 250	GG25, GRADE 220	3 - 4	52	1080	1728	RD..11604	7
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	3 - 4	52	900	1440	RD..11604	6,5

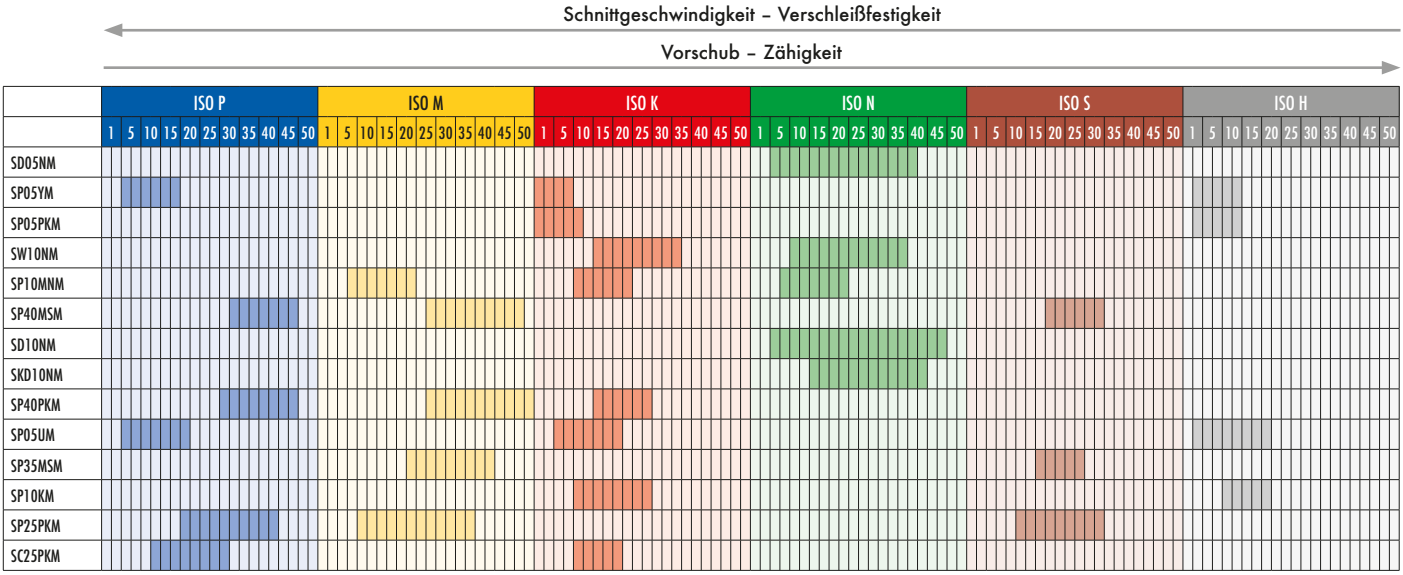


260611....

Fortsetzung (Schnittwerte für Diemaster-Planfräser)

ISO	Materialgruppe			ap mm	ae mm	n U/min	Vf mm/min	Wendeplatte	Leistung kw netto
	Werkzeugdurchmesser 63-66 mm (6 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	3 - 4	63 - 66	1090	1960	RD..12T3	19
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	3 - 4	63 - 66	950	1700	RD..12T3	19
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	3 - 4	63 - 66	670	1200	RD..12T3	14
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	3 - 4	63 - 66	580	1050	RD..12T3	14
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	3 - 4	63 - 66	820	1450	RD..12T3	19
K	Grauguss	HB 200 - 250	GG25, GRADE 220	3 - 4	63 - 66	850	2040	RD..12T3	10,5
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	3 - 4	63 - 66	700	1700	RD..12T3	9,5
	Werkzeugdurchmesser 63-66 mm (5 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	4 - 5	63 - 66	1090	1600	RD..11604	19
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	4 - 5	63 - 66	950	1400	RD..11604	19
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	4 - 5	63 - 66	670	1000	RD..11604	15
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	4 - 5	63 - 66	580	870	RD..11604	14
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	4 - 5	63 - 66	820	1200	RD..11604	20
K	Grauguss	HB 200 - 250	GG25, GRADE 220	4 - 5	63 - 66	850	1250	RD..11604	8
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	4 - 5	63 - 66	700	1070	RD..11604	7,5
	Werkzeugdurchmesser 80 mm (7 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	3 - 4	80	900	1800	RD..12T3	22
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	3 - 4	80	750	1500	RD..12T3	21
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	3 - 4	80	500	1050	RD..12T3	16
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	3 - 4	80	450	950	RD..12T3	16
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	3 - 4	80	650	1350	RD..12T3	23
K	Grauguss	HB 200 - 250	GG25, GRADE 220	3 - 4	80	700	1950	RD..12T3	13
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	3 - 4	80	600	1660	RD..12T3	12
	Werkzeugdurchmesser 80 mm (6 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	4 - 5	80	900	1620	RD..11604	25
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	4 - 5	80	750	1350	RD..11604	23
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	4 - 5	80	500	900	RD..11604	17
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	4 - 5	80	450	810	RD..11604	17
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	4 - 5	80	650	1170	RD..11604	25
K	Grauguss	HB 200 - 250	GG25, GRADE 220	4 - 5	80	700	1680	RD..11604	14
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	4 - 5	80	600	1440	RD..11604	13
	Werkzeugdurchmesser 100 mm (7 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	4 - 5	100	720	1960	RD..11604	38
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	4 - 5	100	610	1700	RD..11604	37
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	4 - 5	100	400	1200	RD..11604	29
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	4 - 5	100	350	1050	RD..11604	28
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	4 - 5	100	520	1450	RD..11604	38
K	Grauguss	HB 200 - 250	GG25, GRADE 220	4 - 5	100	560	2040	RD..11604	21
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	4 - 5	100	460	1700	RD..11604	19
	Werkzeugdurchmesser 125 mm (8 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	4 - 5	125	570	1350	RD..11604	32
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	4 - 5	125	500	1200	RD..11604	33
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	4 - 5	125	350	840	RD..11604	25
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	4 - 5	125	300	700	RD..11604	23
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	4 - 5	125	400	900	RD..11604	30
K	Grauguss	HB 200 - 250	GG25, GRADE 220	4 - 5	125	450	1400	RD..11604	18
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	4 - 5	125	370	1150	RD..11604	16
	Werkzeugdurchmesser 160 mm (9 Schneiden)								
P	Kohlenstoffstahl	HB 125 - 180	C15, ST37, 1.0401	4 - 5	160	450	1600	RD..11604	49
P	niedrig legierter Stahl	HB 170 - 220	CK45, 1.1231, 16MnCr5	4 - 5	160	400	1400	RD..11604	49
P	hoch legierter Stahl	HB 200 - 260	X20Cr13, 1.4923	4 - 5	160	280	1000	RD..11604	38
P	Werkzeugstahl	HB 180 - 370	1.2379, 1.2311	4 - 5	160	200	870	RD..11604	37
M	INOX Stahl	HB 150 - 270	1.4404, 316, 321	4 - 5	160	320	1200	RD..11604	51
K	Grauguss	HB 200 - 250	GG25, GRADE 220	4 - 5	160	360	1250	RD..11604	20
K	Kugelgraphitguss	HB 180 - 250	GGG60, SNG600/3	4 - 5	160	300	1130	RD..11604	20

SARA MILL Schneistofftabelle HM-Qualitäten



SARA MILL Schneidstoffübersicht

	ISO P	ISO M	ISO K	ISO N	ISO S	ISO H	
SD05NM				●			diamantbeschichtete Basissorte speziell für die Feinzerspanung von Alu und Grafit im HSC-Bereich
SP05YM	●	○	●	○	○	●	beschichtete optimierte Spezialsorte für die Bearbeitung, von Stahl, gehärtetem Stahl und Guss im HSC-Bereich sowie Grafit und Kunststoffen
SP05PKM	●		●			●	beschichtete optimierte Spezialsorte für die Bearbeitung, von Stahl, gehärtetem Stahl und Guss im HSC-Bereich sowie Grafit und Kunststoffen
SW10NM			●	●			unbeschichtete Standardsorte für die mittlere Zerspanung von Eisenguss, NE-Metallen, Grafit
SP10MNM		●	●	●	○	○	beschichtete Standardsorte für die Feinzerspanung von Stahl bei mittlerer Schnittgeschwindigkeit
SP40MSM	●	●			●		beschichtete sehr zähe Spezialsorte für die Mittel- und Grobzerspanung von rostfreien hochwarmfesten Stählen und Titan
SD10NM				●			diamantbeschichtete Basissorte speziell für die Feinzerspanung von Alu und Grafit im HSC-Bereich
SKD10NM				●			universelle PKD-Sorte für die Feinbearbeitung von NEMetallen und Kunststoffen im HSC-Bereich
SP40PKM	●	●	●		○		beschichtete sehr zähe Spezialsorte für die Mittel- und Grobzerspanung von Stahl, einzusetzen bei mittleren bis hohen Schnittgeschwindigkeiten, teilweise auch für die Zerspanung von Guss und rostfreien Stählen geeignet.
SP05UM	●		●			●	extrem verschleißfeste, beschichtete Spezialsorte für die Bearbeitung von Stahl, gehärtetem Stahl und Guss bei hohen bis sehr hohen Schnittgeschwindigkeiten
SP35MSM		●			●		hochtemparaturstabiles Hartmetall mit maßgeschneideter CVD-Beschichtung, entwickelt für die Trockenbearbeitung von INOX-Werkstoffen sowie die Nasszerspanung von Superlegierungen
SP10KM	○		●			○	beschichtete optimierte Spezialsorte für die Bearbeitung, von Stahl, gehärtetem Stahl und Guss im HSC-Bereich sowie Grafit und Kunststoffen
SP25PKM	●	○	●				beschichtete Standardsorte für die Feinzerspanung von Stahl bei mittlerer Schnittgeschwindigkeit
SC25PKM	●		●				beschichtete, zähe Standardsorte für die Fein- und Mittelzerspanung von Stahl bei mittlerer und hoher Schnittgeschwindigkeit, für noch höhere Standzeiten

SARA MILL Fräser Typ S 90°




• Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

260301.... 260302....

Eckfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Eckfräsplatte XCHT					
					HM-Sorte: SP05YM			HM-Sorte: SD05NM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	150 - 400 (F)	0,3 - 2,0	0,05 - 0,30			
	unlegierter Baustahl	bis 700	St-52	1.0052						
	Baustahl	700 - 950	Ck45	1.1191						
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225						
	Stahlguss	bis 950	GS 40	1.0416						
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131						
	Vergütungsstahl	950 -1300	43CrMo4	1.3563						
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519						
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343						
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	100 - 200 (F)	0,3 - 2,0	0,05 - 0,25			
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301						
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462						
K	Grauguss	bis 260 HB	GG 25	0.6025	200 - 350 (F)	0,3 - 2,0	0,05 - 0,30			
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678						
	Sphäroguss	bis 280 HB	GGG 60	0.7060						
	Temperguss	bis 280 HB	GTS 55	0.8155						
N	Al.-Leg. langspanend	bis 500	AlMg 3	3.3535				200 - 800 (F)	0,3 - 2,0	0,05 - 0,30
	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581						
	Kupfer-Leg. (Bronze) langspanend	bis 1200	CuSn4	2.1016						
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730						
	Kupfer-Leg. (Messing) langspanend	bis 600	Cu ZN 20	2.0250						
	Kupfer-Leg. (Messing) kurzspanend	bis 600	Cu Zn 39 Pb 3	2.0381						
	Thermoplast		PVC							
	Duroplast		Melamin							
	faserverstärkte Kunststoffe		CFK, GFK							
	Graphit		C8000							
	Verbundwerkstoffe		Honeycomp							
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	40 - 100 (F)	0,3 - 2,0	0,05 - 0,25			
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718						
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718						
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	35 - 250 (F)	0,3 - 2,0	0,05 -0,25			
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379						
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067						

(R) = roughing (M) = medium (F) = finishing

Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Hochvorschubplatte XCHW								
					HM-Sorte: SP05YM			HM-Sorte: SD05NM			HM-Sorte: SD05PKM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	120 - 250 (R) 150 - 400 (M) 150 - 400 (F)	0,05 - 0,40	0,05 - 0,70				120 - 250 (R) 150 - 400 (M) 150 - 400 (F)	0,05 - 0,40	0,05 - 0,70
	unlegierter Baustahl	bis 700	St-52	1.0052									
	Baustahl	700 - 950	Ck45	1.1191									
	Vergütungsstahl	500 - 950	42 CrMo4	1.7225									
	Stahlguss	bis 950	GS 40	1.0416									
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131									
	Vergütungsstahl	950 -1300	43CrMo4	1.3563									
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519									
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343									
K	Grauguss	bis 260 HB	GG 25	0.6025	100 - 200 (R) 150 - 300 (M) 200 - 350 (F)	0,05 - 0,40	0,05 - 0,70				100 - 200 (R) 150 - 300 (M) 200 - 350 (F)	0,05 - 0,40	0,05 - 0,70
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678									
	Sphäroguss	bis 280 HB	GGG 60	0.7060									
	Temperguss	bis 280 HB	GTS 55	0.8155									
N	Al.-Leg. langspanend	bis 500	AlMg 3	3.3535				200 - 800 (R) 200 - 800 (M) 200 - 800 (F)	0,05 - 1,0	0,05 - 0,70			
	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581									
	Kupfer-Leg. (Bronze) langspanend	bis 1200	CuSn4	2.1016									
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730									
	Kupfer-Leg. (Messing) langspanend	bis 600	Cu ZN 20	2.0250									
	Kupfer-Leg. (Messing) kurzspanend	bis 600	Cu Zn 39 Pb 3	2.0381									
	Thermoplast		PVC										
	Duroplast		Melamin										
	faserverstärkte Kunststoffe		CFK, GFK										
	Graphit		C8000										
	Verbundwerkstoffe		Honeycomp										
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	35 - 250 (R) 35 - 250 (M) 35 - 250 (F)	0,05 - 0,40	0,05 - 0,60				35 - 250 (R) 35 - 250 (M) 35 - 250 (F)	0,05 - 0,40	0,05 - 0,60
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379									
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067									

(R) = roughing (M) = medium (F) = finishing

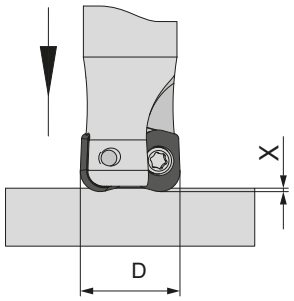
Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Hochvorschubplatte XCHT								
					HM-Sorte: SW10NM			HM-Sorte: SP10MNM			HM-Sorte: SP40MSM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006				90 - 150 (M) 150 - 180 (F)	0,02 - 0,3	0,02 - 0,4	80 - 180 (R) 100 - 210 (M) 120 - 250 (F)	0,05 - 1,0	0,03 - 0,6
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301									
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462									
N	Al.-Leg. langspanend	bis 500	AlMg 3	3.3535	100 - 800 (R) 100 - 800 (M) 100 - 800 (F)	0,05 - 1,0	0,02 - 1,0	100 - 800 (R) 100 - 800 (M) 100 - 800 (F)	0,05 - 1,0	0,02 - 1,0			
	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581									
	Kupfer-Leg. (Bronze) langspanend	bis 1200	CuSn4	2.1016									
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730									
	Kupfer-Leg. (Messing) langspanend	bis 600	Cu ZN 20	2.0250									
	Kupfer-Leg. (Messing) kurzspanend	bis 600	Cu Zn 39 Pb 3	2.0381									
	Thermoplast		PVC										
	Duroplast		Melamin										
	faserverstärkte Kunststoffe		CFK, GFK										
	Graphit		C8000										
	Verbundwerkstoffe		Honeycomp										
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174							30 - 80 (R) 40 - 90 (M) 60 - 120 (F)	0,05 - 1,0	0,03 - 0,6
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718									
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718									

(R) = roughing (M) = medium (F) = finishing

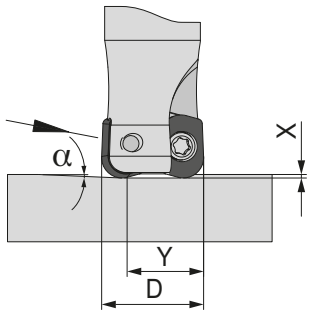
Erweiterte Einsatzdaten Eck- und Hochvorschubfräsen

axiales Eintauchen ins Volle



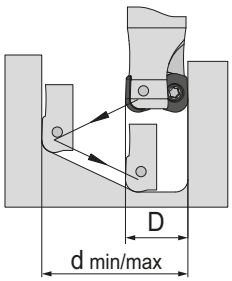
Fräser-Ø D / mm	X max / mm
10 - 32	0,7

schräges Eintauchen ins Volle



Fräser-Ø D / mm	α°	Y / mm
10	< 2,5	4
12	< 2	6
16	< 1,6	10
20	< 1,2	14
25	< 1	19
32	< 1	26

Zirkularfräsen



Fräser-Ø D / mm	d min / mm	d max / mm
10	13	20
12	17	24
16	25	32
20	33	39
25	43	49
32	57	63

Safety in the workplace

Please protect your eyes, ears and respiratory system!



SARA MILL Fräser Typ M 90°



260305/06.... 260303/04.... 260307/08....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

Eckfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	XDHT Eckfräsplatte					
					HM-Sorte: SP40YM			HM-Sorte: SP10YM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	100 - 200 (R) 100 - 200 (M) 160 - 250 (F)	0,1 - 6,0	0,05 - 0,25			
	unlegierter Baustahl	bis 700	St-52	1.0052						
	Baustahl	700 - 950	Ck45	1.1191						
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225						
	Stahlguss	bis 950	GS 40	1.0416						
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131						
	Vergütungsstahl	950 -1300	43CrMo4	1.3563						
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519						
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343						
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	90 - 130 (R) 90 - 130 (M) 110 - 160 (F)	0,1 - 3,0	0,05 - 0,25			
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301						
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462						
K	Grauguss	bis 260 HB	GG 25	0.6025	110 - 150 (R) 110 - 150 (M) 120 - 180 (F)	0,1 - 6,0	0,05 - 0,25			
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678						
	Sphäroguss	bis 280 HB	GGG 60	0.7060						
	Temperguss	bis 280 HB	GTS 55	0.8155						
N	Al.-Leg. langspanend	bis 500	AlMg 3	3.3535				100 - 800 (R) 100 - 800 (M) 100 - 800 (F)	0,1 - 9,0	0,08 - 0,35
	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581						
	Kupfer-Leg. (Bronze) langspanend	bis 1200	CuSn4	2.1016						
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730						
	Kupfer-Leg. (Messing) langspanend	bis 600	Cu ZN 20	2.0250						
	Kupfer-Leg. (Messing) kurzspanend	bis 600	Cu Zn 39 Pb 3	2.0381						
	Thermoplast		PVC							
	Duroplast		Melamin							
	faserverstärkte Kunststoffe		CFK, GFK							
	Graphit		C8000							
	Verbundwerkstoffe		Honeycomp							
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	60 - 100 (R) 60 - 100 (M) 80 - 120 (F)	0,1 - 3,0	0,05 - 0,25	35 - 100 (F)	0,1 - 3,0	0,8 - 0,12
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718						
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718						
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083				35 - 250 (F)	0,1 - 1,0	0,08 - 0,15
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379						
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067						

(R) = roughing (M) = medium (F) = finishing

Eckfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	XDHT Alu Eckfräsplatte								
					HM-Sorte: SW10NM			HM-Sorte: SD10NM			HM-Sorte: SKD10NM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
N	Al.-Leg. langspanend	bis 500	AlMg 3	3.3535	100 - 800 (R) 100 - 800 (M) 100 - 800 (F)	0,1 - 9,0	0,08 - 0,35	100 - 800 (R) 100 - 800 (M) 100 - 800 (F)	0,1 - 9,0	0,08 - 0,35	200 - 600 (R) 400 - 800 (M) 600 - 1000 (F)	0,1 - 4,0	0,08 - 0,2
	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581									
	Kupfer-Leg. (Bronze) langspanend	bis 1200	CuSn4	2.1016									
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730									
	Kupfer-Leg. (Messing) langspanend	bis 600	Cu ZN 20	2.0250									
	Kupfer-Leg. (Messing) kurzspanend	bis 600	Cu Zn 39 Pb 3	2.0381									
	Thermoplast		PVC										
	Duroplast		Melamin										
	faserverstärkte Kunststoffe		CFK, GFK										
	Graphit		C8000										
	Verbundwerkstoffe		Honeycomp										

(R) = roughing (M) = medium (F) = finishing

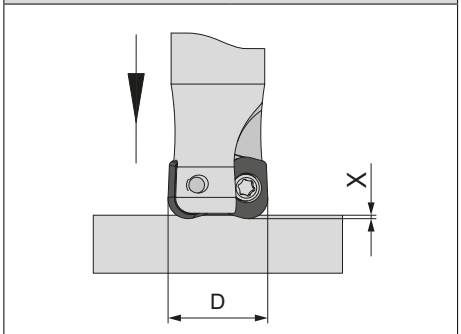
Eckfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	XDMT Eckfräsplatte											
					HM-Sorte: SP40PKM			HM-Sorte: SP05UM			HM-Sorte: SP40PMM			HM-Sorte: SP35MSM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	100 - 200 (R) 100 - 200 (M) 160 - 250 (F)	0,1 - 6,0	0,05 - 0,25	120 - 200 (R) 120 - 200 (M)	0,1 - 5,0	0,05 - 0,25	80 - 200 (R) 100 - 200 (M)	0,1 - 6,0 *	0,05 - 0,25*			
	unlegierter Baustahl	bis 700	St-52	1.0052												
	Baustahl	700 - 950	Ck45	1.1191												
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225												
	Stahlguss	bis 950	GS 40	1.0416												
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131												
	Vergütungsstahl	950 -1300	43CrMo4	1.3563												
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519												
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343												
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	90 - 130 (R) 90 - 130 (M) 110 - 160 (F)	0,1 - 3,0	0,05 - 0,25				80 - 180 (R) 100 - 210 (M) 120 - 250 (F)	0,1 - 9,0	0,08 - 0,35	100 - 200 (R) 120 - 230 (M) 160 - 280 (F)	0,1 - 9,0	0,08 - 0,35
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301												
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462												
K	Grauguss	bis 260 HB	GG 25	0.6025	110 - 150 (R) 110 - 150 (M) 120 - 180 (F)	0,1 - 6,0	0,05 - 0,25	100 - 200 (R) 100 - 200 (M)	0,1 - 4,0	0,05 - 0,25						
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678												
	Sphäroguss	bis 280 HB	GGG 60	0.7060												
	Temperguss	bis 280 HB	GTS 55	0.8155												
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	60 - 100 (R) 60 - 100 (M) 80 - 120 (F)	0,1 - 3,0	0,05 - 0,25				30 - 80 (R) 40 - 90 (M) 60 - 120 (F)	0,1 - 9,0	0,08 - 0,25	30 - 100 (R) 40 - 110 (M) 60 - 140 (F)	0,1 - 9,0	0,08 - 0,25
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718												
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718												
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083				80 - 220 (R) 40 - 220 (M) 40 - 220 (F)	0,1 - 5,0	0,08 - 0,25						
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379												
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067												

(R) = roughing (M) = medium (F) = finishing *= gilt nur für Platten mit Radius 0,8 mm oder 1 mm

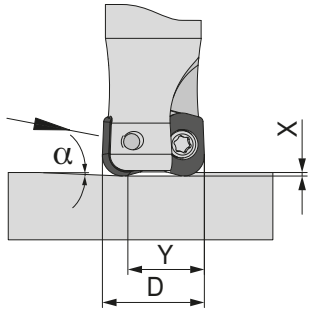
Erweiterte Einsatzdaten Eckfräsen

axiales Eintauchen ins Volle



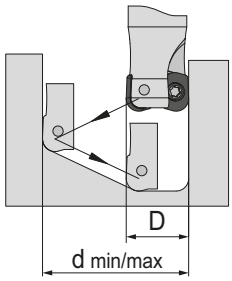
Fräser-Ø D / mm	X max / mm
16 - 52	2,5

schräges Eintauchen ins Volle



Fräser-Ø D / mm	α°	Y / mm
16	< 24,5	5,3
20	< 14,5	9,3
25	< 8	14,3
32	< 5	21,3
42	< 3	31,3
52	< 2,5	41,3

Zirkularfräsen



Fräser-Ø D / mm	d min / mm	d max / mm
16	21,3	32
20	29,3	40
25	39,3	50
32	53,3	64
42	73,7	84
52	93,3	104

Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	XDEW Hochvorschubplatte					
					HM-Sorte: SP05YM			HM-Sorte: SP05PKM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	120 - 250 (R) 150 - 400 (M)	0,15 - 0,7	0,5 - 1,6	120 - 250 (R) 150 - 400 (M)	0,15 - 0,7	0,5 - 1,6
	unlegierter Baustahl	bis 700	St-52	1.0052						
	Baustahl	700 - 950	Ck45	1.1191						
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225						
	Stahlguss	bis 950	GS 40	1.0416						
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131						
	Vergütungsstahl	950 -1300	43CrMo4	1.3563						
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519						
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343						
K	Grauguss	bis 260 HB	GG 25	0.6025	100 - 200 (R) 150 - 300 (M)	0,15 - 0,7	0,4 - 1,8	100 - 200 (R) 150 - 300 (M)	0,15 - 0,7	0,4 - 1,8
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678						
	Sphäroguss	bis 280 HB	GGG 60	0.7060						
	Temperguss	bis 280 HB	GTS 55	0.8155						
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	35 - 250 (R) 35 - 250 (M)	0,1 - 0,5	0,3 - 1,0	35 - 250 (R) 35 - 250 (M)	0,1 - 0,5	0,3 - 1,0
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379						
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067						

(R) = roughing (M) = medium (F) = finishing

Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	XDMT ER Hochvorschubplatte					
					HM-Sorte: SP35MSM			HM-Sorte: SP40MSM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715				80 - 100 (R) 100 - 200 (M)	0,15 - 1,0	0,3 - 1,5
	unlegierter Baustahl	bis 700	St-52	1.0052						
	Baustahl	700 - 950	Ck45	1.1191						
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225						
	Stahlguss	bis 950	GS 40	1.0416						
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131						
	Vergütungsstahl	950 -1300	43CrMo4	1.3563						
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519						
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343						
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	110 - 200 (R) 120 - 230 (M)	0,15 - 0,75	0,15 - 1,0	80 - 180 (R) 100 - 210 (M)	0,15 - 0,75	0,15 - 1,4
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301						
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462						
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	30 - 100 (R) 40 - 110 (M)	0,15 - 0,65	0,1 - 0,9	30 - 80 (R) 40 - 90 (M)	0,15 - 0,65	0,1 - 0,9
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718						
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718						

(R) = roughing (M) = medium (F) = finishing

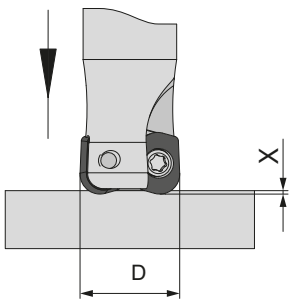
Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	XDMT TR Hochvorschubplatte					
					HM-Sorte: SP40PM			HM-Sorte: SP10KM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	100 - 200 (R) 100 - 200 (M)	0,5 - 1,6	0,3 - 1,5			
	unlegierter Baustahl	bis 700	St-52	1.0052						
	Baustahl	700 - 950	Ck45	1.1191						
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225						
	Stahlguss	bis 950	GS 40	1.0416						
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131						
	Vergütungsstahl	950 -1300	43CrMo4	1.3563						
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519						
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343						
K	Grauguss	bis 260 HB	GG 25	0.6025				150 - 220 (R) 160 - 220 (M)	0,2 - 1,5	0,3 - 1,2
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678						
	Sphäroguss	bis 280 HB	GGG 60	0.7060						
	Temperguss	bis 280 HB	GTS 55	0.8155						
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083				80 - 150 (R) 100 - 200 (M)	0,2 - 1,0	0,15 - 1,0
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379						
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067						

(R) = roughing (M) = medium (F) = finishing

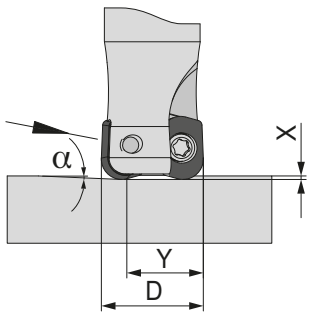
Erweiterte Einsatzdaten Hochvorschubfräsen

axiales Eintauchen ins Volle



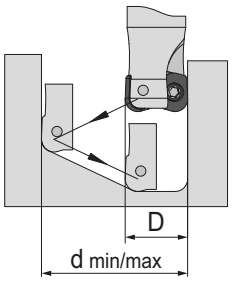
Fräser-Ø D / mm	X_{max} / mm
16 - 52	0,85

schräges Eintauchen ins Volle



Fräser-Ø D / mm	α°	Y / mm
16	4	12
20	3	16
25	2,5	21
32	1,7	28
42	1,2	38
52	1	41,3

Zirkularfräsen



Fräser-Ø D / mm	d_{min} / mm	d_{max} / mm
16	26	32
20	34	40
25	44	50
32	58	64
42	78	84
52	98	104

SARA MILL Fräser Typ 90° SDM..





• Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

260309.... 260310....

Eckfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Eckfräsplatte SDMT								
					HM-Sorte: SP40PKM			HM-Sorte: SP25PKM			HM-Sorte: SP40MSM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	100 - 200 (R) 100 - 200 (M) 160 - 250 (F)	0,2 - 8,0	0,1 - 0,5	110 - 220 (R) 120 - 250 (M) 150 - 300 (F)	0,2 - 8,0	0,1 - 0,5			
	unlegierter Baustahl	bis 700	St-52	1.0052									
	Baustahl	700 - 950	Ck45	1.1191									
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225									
	Stahlguss	bis 950	GS 40	1.0416									
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131									
	Vergütungsstahl	950 -1300	43CrMo4	1.3563									
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519									
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343									
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006							80 - 180 (R) 100 - 210 (M) 120 - 250 (F)	0,1 - 6,0	0,05 - 0,3
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301									
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462									
K	Grauguss	bis 260 HB	GG 25	0.6025	100 - 150 (R) 100 - 150 (M) 120 - 180 (F)	0,2 - 8,0	0,1 - 0,5	120 - 170 (R) 130 - 170 (M) 135 - 250 (F)	0,2 - 8,0	0,1 - 0,5			
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678									
	Sphäroguss	bis 280 HB	GGG 60	0.7060									
	Temperguss	bis 280 HB	GTS 55	0.8155									
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174							30 - 80 (R) 40 - 90 (M) 60 - 120 (F)	0,05 - 6,0	0,05 - 0,25
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718									
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718									

(R) = roughing (M) = medium (F) = finishing

Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Hochvorschubplatte SDMT											
					HM-Sorte: SP40PKM			HM-Sorte: SP25PKM			HM-Sorte: SP10PKM			HM-Sorte: SP40MSM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	100 - 200 (R) 100 - 200 (M)	0,4 - 2,0	0,5 - 2,5	110 - 220 (R) 120 - 250 (M)	0,4 - 2,0	0,5 - 2,5	130 - 210 (R) 150 - 220 (M)	0,4 - 2,0	0,5 - 2,5			
	unlegierter Baustahl	bis 700	St-52	1.0052												
	Baustahl	700 - 950	Ck45	1.1191												
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225												
	Stahlguss	bis 950	GS 40	1.0416												
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131												
	Vergütungsstahl	950 -1300	43CrMo4	1.3563												
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519												
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343												
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006										80 - 180 (R) 100 - 210 (M)	0,5 - 1,5	0,3 - 1,7
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301												
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462												
K	Grauguss	bis 260 HB	GG 25	0.6025	110 - 150 (R) 110 - 150 (M)	0,5 - 2,2	0,6 - 2,5	120 - 170 (R) 130 - 170 (M)	0,5 - 2,2	0,6 - 2,5	110 - 200 (R) 150 - 200 (M)	0,5 - 2,2	0,6 - 2,5			
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678												
	Sphäroguss	bis 280 HB	GGG 60	0.7060												
	Temperguss	bis 280 HB	GTS 55	0.8155												
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174										30 - 80 (R) 40 - 90 (M)	0,4 - 1,5	0,3 - 1,2
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718												
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718												

(R) = roughing (M) = medium (F) = finishing

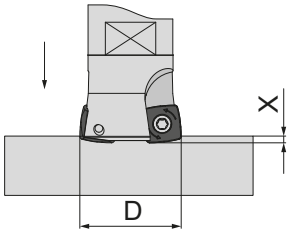
Hochvorschubfräsen

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Hochvorschubplatte SDMW					
					HM-Sorte: SC25PKM			HM-Sorte: SP10PKM		
					Vc m/min	ap/mm	fz/mm	Vc m/min	ap/mm	fz/mm
P	Automatenstahl	bis 700	9 SMn 28	1.0715	100 - 300 (R) 100 - 150 (M)	0,5 - 2,0	0,6 - 2,8	130 - 210 (R) 150 - 220 (M)	0,5 - 2,0	0,6 - 2,8
	unlegierter Baustahl	bis 700	St-52	1.0052						
	Baustahl	700 - 950	Ck45	1.1191						
	Vergütungsswtahl	500 - 950	42 CrMo4	1.7225						
	Stahlguss	bis 950	GS 40	1.0416						
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131						
	Vergütungsstahl	950 -1300	43CrMo4	1.3563						
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519						
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343						
K	Grauguss	bis 260 HB	GG 25	0.6025	130 - 180 (R) 100 - 170 (M)	0,6 - 2,2	0,6 - 2,5	150 - 200 (R) 150 - 200 (M)	0,6 - 2,2	0,6 - 2,5
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678						
	Sphäroguss	bis 280 HB	GGG 60	0.7060						
	Temperguss	bis 280 HB	GTS 55	0.8155						

(R) = roughing (M) = medium (F) = finishing

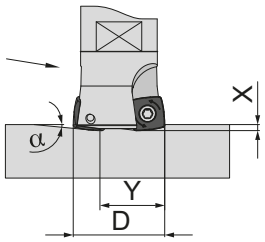
Erweiterte Einsatzdaten Eck- und Hochvorschubfräsen

axiales Eintauchen ins Volle



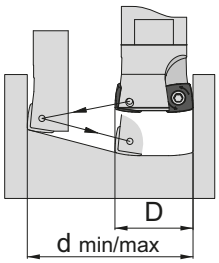
Fräser-Ø D / mm	X max / mm
32 - 35	1,5
40 - 100	2,5

schräges Eintauchen ins Volle

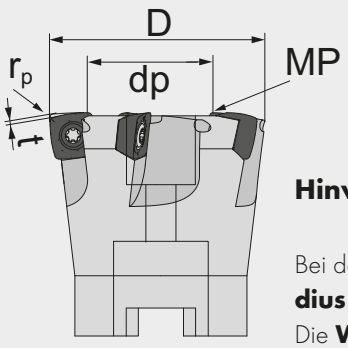


Fräser-Ø D / mm	α°	Y / mm
32	< 9,0	8,8
35	< 7,0	11,8
40	< 6,5	16,8
42	< 5,8	18,8
50	< 4,1	26,8
52	< 3,7	28,8
63	< 2,6	39,8
66	< 2,4	42,8
80	< 1,8	56,8
100	< 1,2	72,8

Zirkularfräsen



Fräser-Ø D / mm	d min / mm	d max / mm
32	40,8	62
35	46,8	68
40	56,8	78
42	60,8	82
50	76,8	98
52	80,8	102
63	102,8	124
66	108,8	130
80	136,8	158
100	176,8	198



Hinweis

Bei der **CAD/CAM-Programmierung** der Werkzeuggeometrie ist ein Fräser mit theoretischem **Eckradius rp = 3,3 mm** einzusetzen. Der unzerspante Bereich an **Restmaterial t** beträgt damit **0,86 mm**. Die **Werkzeuglängenvermessung** erfolgt am Messpunkt MP am Plandurchmesser dp.

SARA MILL Oberflächenfräser



260328 ....

- Die angegebenen Richtwerte sind der Werkstückaufspannung und den Maschinenverhältnissen anzupassen!

ISO	Werkstoffgruppe	Festigkeit/ Härte N/mm²	Werkstoff-beispiel chemisch	Werkstoff-Nummer	Schnitt-geschwindigkeit Vc m/min	HM-Sorte: SP05YM	
						Zustelltiefe ap/mm	Vorschub fz in mm/Z
P	Automatenstahl	bis 700	9 SMn 28	1.0715	150 - 400	0,05 - 0,20	0,5 - 2,0
	unlegierter Baustahl	bis 700	St-52	1.0052			
	Baustahl	700 - 950	Ck45	1.1191			
	Vergütungsstahl	500 - 950	42 CrMo4	1.7225			
	Stahlguss	bis 950	GS 40	1.0416			
	Einsatzstahl	bis 1200	16 MnCr 5	1.7131			
	Vergütungsstahl	950 -1300	43CrMo4	1.3563			
	Nitrierstahl	950 - 1300	31CrMoV9	1.8519			
	Werkzeugstahl	950 - 1400	X 38 CrMoV 5 1	1.2343			
M	INOX, ferr./marten.	500 - 950	X10Cr13	1.4006	100 - 200	0,05 - 0,10	0,5 - 1,0
	INOX, austenitisch	500 - 950	X 5 CrNi 18 10	1.4301			
	Duplex	700 - 950	x 2 CrNiMoN 22-5-3	1.4462			
K	Grauguss	bis 260 HB	GG 25	0.6025	200 - 350	0,05 - 0,20	0,5 - 2,0
	legierter Grauguss	bis 310 HB	GGL-NiCr 35 2	0.6678			
	Sphäroguss	bis 280 HB	GGG 60	0.7060			
	Temperguss	bis 280 HB	GTS 55	0.8155			
N	Al.-Leg. langspanend	bis 500	AlMg 3	3.3535	100 - 800	0,05 - 0,25	0,5 - 2,0
	Al.-Leg. kurzspanend	bis 500	G-AlSi 12	3.2581			
	Kupfer-Leg. (Bronze) langspanend	bis 1200	CuSn4	2.1016			
	Kupfer-Leg. (Bronze) kurzspanend	bis 850	CuNi12Zn24	2.0730			
	Kupfer-Leg. (Messing) langspanend	bis 600	Cu ZN 20	2.0250			
	Kupfer-Leg. (Messing) kurzspanend	bis 600	Cu Zn 39 Pb 3	2.0381			
	Thermoplast		PVC				
	Duroplast		Melamin				
	faserverstärkte Kunststoffe		CFK, GFK				
	Graphit		C8000				
	Verbundwerkstoffe		Honeycomp				
S	Titan-Legierungen	bis 1300	TiAl6Sn 2	3.7174	40 - 100	0,05 - 0,10	0,2 - 1,0
	Nickelbasis-Legierungen	bis 1300	NiCr19Fe19NbMo	Inconel 718			
	Superlegierungen	bis 1300	X45CrSi 9 3	1.4718			
H	gehärtete Werkstoffe bis 55 HRC		X40Cr14	1.2083	35 - 250	0,05 - 0,10	0,2 - 1,0
	gehärtete Werkstoffe bis 60 HRC		X153CrMoV12	1.2379			
	gehärtete Werkstoffe bis 64 HRC		100Cr6	1.2067			

ATORN® Scheibenfräser

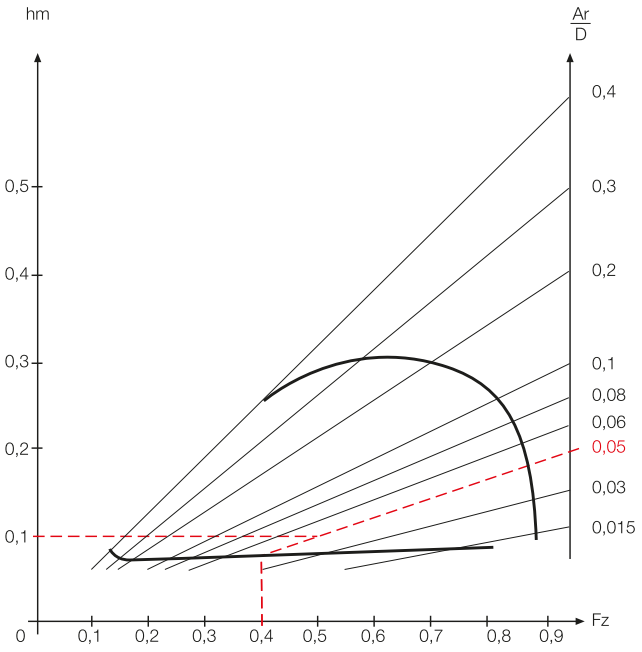

262600....


262610....

Um den schnellen Verschleiß der Wendeplatten zu vermeiden sollte die mittlere Spandicke **hm** mindestens 0,1 mm betragen. Die Stärke des Spans ist beim Nutenfräsen weitaus geringer als der Vorschub pro Zahn. Daher ist das Verhältnis zwischen Nutentiefe **Ar** und Fräserdurchmesser **D** zu beachten.
Die mittlere Spandicke und der entsprechende Mindestvorschub ist nachfolgender Grafik zu entnehmen:

Beispiel: Fräser-Ø 160 mm
Nuttiefe Ar 8 mm
Verhältnis $\frac{Ar}{D}$ 0,05

Ergebnis: Vorschub pro Zahn Fz = 0,4 mm



ISO	Werkstoff	Sorte	Schnittgeschwindigkeit Vc m/min
P	Kohlenstoff	HC4630 TiAlN-besch.	200
P	legierter Stahl, Werkzeugstahl	HC4630 TiAlN-besch.	150
M	INOX Stahl, austenitisch	HC4630 TiAlN-besch.	160
K	Grauguss	HW4415 HC4630 TiAlN-besch.	100 140
N	Aluminium-Legierungen	HW4415	350

ATORN® Scheibenfräser A-CUT


354050....
354051....

Empfohlene Einsatzdaten
Für Bearbeitung von Aluminium Qualität HW 3410 für maximale Schnittgeschwindigkeit verwenden. Die maximale Drehzahl ist auf dem Scheibenfräser angegeben.

ISO	Werkstoff		Härte HB	HC 3635 ISO P20-P30	HC 3540 + HC 3630 ISO P25-P45	HW 3410 ISO K10
				Schnittgeschwindigkeit m/min		
P	Kohlenstoffstahl	0.2% C	150	195-265	170-230	
		0.45% C	190	140-230	120-200	
		0.83% C	250	105-195	90-170	
P	legierter Stahl		bis 200	140-210	120-180	
			200-250	115-185	100-160	
			275-325	90-150	80-130	
			325-375	80-120	70-110	
			375-425	65-110	55- 95	
			425-475	50- 90	45- 80	
M	INOX Stahl	ferritisch	135-175	195-255	170-220	
			175-225	150-230	130-200	
		martensitisch	275-325	115-175	100-150	
			375-425	50- 80	45- 70	
		austenitisch	135-175	115-175	100-150	
K	Temperguss	ferritisch	110-145			80-110
		perlitisch	200-250			70- 95
K	Gusseisen, niedrige Zug festigkeit, mit Lamellengraphit		180			110- 95
K	Gusseisen, höherer Zug festigkeit, mit Lamellengraphit, legiert		250			70-100
K	Kugelgraphitguss	ferritisch	160			70-110
		perlitisch	250			55- 80
H	Hartguss		400			10- 20

Vorschub fz in mm/Z bezogen auf die Schnittbreite b in mm	
b mm	fz mm/Z
1,6	0,04 - 0,12
2,0 - 2,2	0,05 - 0,13
3,1	0,06 - 0,18
4,1	0,08 - 0,20

Vorschub, abhängig von der Schnitttiefe
Der effektive Vorschub verringert sich in dem Maße, indem sich die Schnitttiefe reduziert. Deshalb ist der empfohlene Vorschubwert der folgenden Tabelle erhöht:

ae/D	1/6	1/8	1/10	1/20
f erhöhen um	15%	30%	45%	100%

