ToolFactory
Cutting Tool Solutions

Catalogue 2020 / 2021

High Precision Cutting Tools

Catalogue 2020 2021

ToolFactory
Cutting Tool Solutions

More than just being a supplier of tools, our company name "TOOL FACTORY Cutting Tool Solutions GmbH" implies the development of customized and efficient machining solutions to meet your individual application requirements.

25 years' experience in the tooling sector as well as our partnership with the specialized trades make us a reliable supplier appreciated by our customers.

Our motivation

Striving for an on-going improvement is the main part of our mission statement and includes the continued development of our products, services and our staff. We believe that this is the only way to respond to our customers' needs and to help them meet the ever-growing challenging demands they are facing now and in the future.

Constantly improving our company and our product range, we have now one become of the leading suppliers of drills and milling tools. Our products are used by major national and international organisations in the aerospace industry, the automotive industry and the medical technology sector.

We provide high-quality precision tools made from high-performance and durable cutting materials.

New milling technologies and the development of innovative strategies for machining advanced materials – such as titanium and nickel alloys and carbon composite materials – are core competencies of our day-to-day business.

Rather partner than only supplier

For any special machining demands, we offer the development of customized solutions and technical competency to assist you with any cutting and machining issues.

Our substantial stocks and a modern warehouse management system allow us to ship your products on the same day and thus ensure a next-day delivery on time throughout Germany.

This makes TOOL FACTORY a reliable partner for all your application requirements.

All prices are per unit plus VAT. Our General Terms and Conditions shall apply.

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Material Class	Suitable	Partly suitable	Not suitable
Steel	P	P	P
INOX	M	M	M
Cast iron	K	K	K
Non-ferrous metals	N	N	N
Special and titanium alloys	S	S	S
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	200200	Solid Carbide Deep-Hole Drill 20xD, IC	P M K N	38
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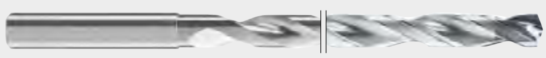	300200	Solid Carbide Deep-Hole Drill 30xD, IC	P M K N	40
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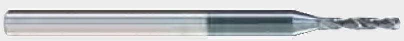	41100	Solid Carbide Miniature Spiral Drill 4xD	P M K N	42
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	35402	Solid Carbide HPC End Mill ≠	P M K S	59
	35384	Solid Carbide HPC Torus Cutter ≠	P M K S	60
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	30382	Solid Carbide MTC End Mill ≠	P M K S	61
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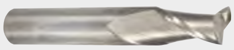	25021	Solid Carbide End Mill	P M K N	129
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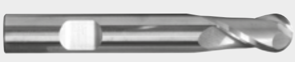	26022	Solid Carbide Ball-Nosed End Mill		P M K S	150
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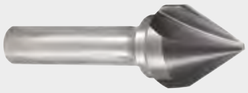	33060	Solid Carbide Countersink 60°	P M K N S H	168
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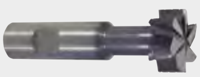	58512	Solid Carbide Roughing / Finishing T-Slot Cutter	P M K N S H	173
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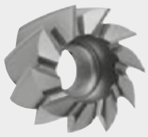
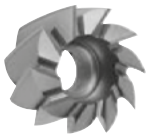
	AX514	HSS Shell End Mill	P M K	223
	AX814	HSS-Co5 Shell End Mill	P M K S	223
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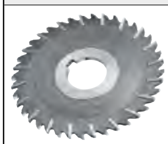	AX1834A	HSS-Co5 Side Milling Cutter	P M K N S	227

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Symbols For Page Reference

Bur shape

Sharp-edged	Protective chamfer	Corner chamfer	Corner radius	Full radius	Drill tip

No. of Flutes

Z 2	Z 3

Shank Type

HA	HB	HE
HA Shank	HB Shank	HE Shank

Grade

VHM	PM	HM	HSS	HSS-E	HSS-Co5	HSS-Co8
Solid carbide	Powder metal	Carbide	HSS	HSS-E	HSS-Co5	HSS-Co8

Coating

Uncoated	Alcrona Pro	Alnova	Aldura	AlTiN	TiAlN	TiN	Diamond	ZrCN	ZrN	Hardlube	MnS1	MnT1

Conformity

DIN 6527	DIN 6527 L	Manu-facturer standard	DIN 844	DIN 844L

Versions

Type N	Type H	Type W	Type WR	Type HR	Type NF	Type NR

Flute design

Z 1	Z 3	Z 41	Z 5	Z ALU
Normal cut	Double cut (standard)	Fine cut	Diamond cut	Aluminium cut

Symbols For Page Reference

Helix angle

25°	26°	30°	39°	40°	45°	50°	55°
Helix angle 25°	Helix angle 26°	Helix angle 30°	Helix angle 39°	Helix angle 40°	Helix angle 45°	Helix angle 50°	Helix angle 55°

Geometry

≠	Improved shearing action	x° y° y° x°	
Unequal helix		Unequal pitch	Increased core diameter

Length of cut

Short	Medium	Long	Extra long

Internal coolant

Internal coolant

Optional application

HSC	HHC	HPC	TPM	MTC
High Speed Cutting	High Hard Cutting	High Performance Cutting	Trochoidal Performance Machining	Multi Task Cutting

Allowed use

Center cutting		

Suitable for

Graph-itee	GRP	CFRP
	Glass fibre reinforced plastics	Carbon fibre reinforced plastics

Max. material hardness

HRC ≤53	HRC ≤63

Rotation accuracy

0.005 mm

Diameter Tolerance

e8

Drilling depth ratio

3xD	5xD	8xD

Point angle

142°	140°	135°	120°	90°	60°

Special shapes

Cross-cut	convex	concave	Longitudinal slot	Angle cutter double-sided	Angle cutter one-sided	Angle cutter one-sided	One-side cutting

Chip breaker

The cutting parameters given here are initial values. Please determine the optimum values as required for the relevant application.

ToolFactory
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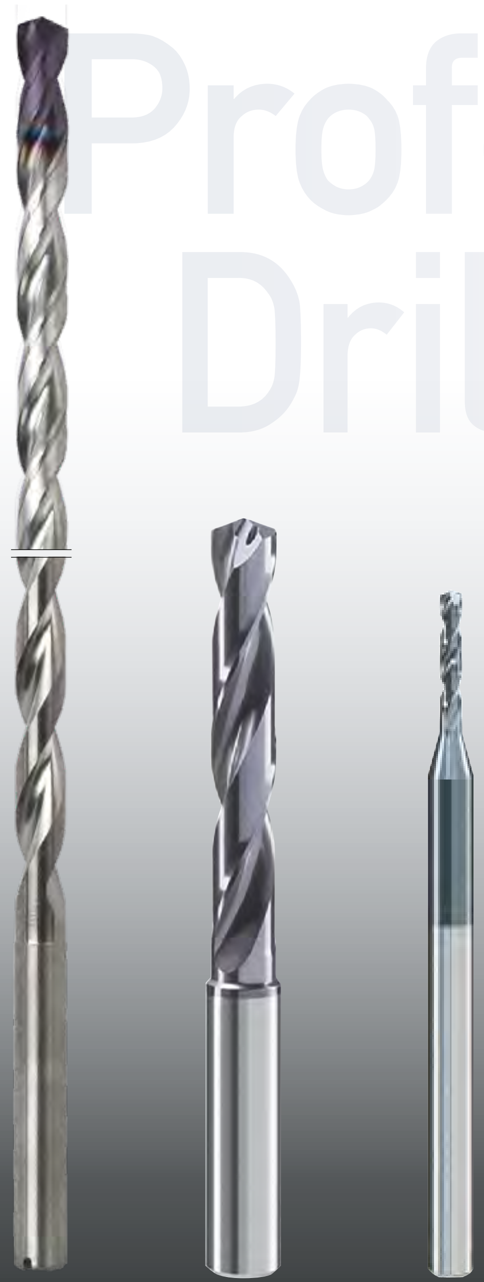
Professional Drilling Line

Solid Carbide Spiral Drills

Professional
Drilling Line

High Performance
Endurance
Economical

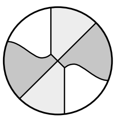


31100

TiAlN | HA | HB | HE* | 3xD | VHM | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill 3xD w/o Internal Coolant

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



d_1
m7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
1.00	4	7	28	45	31100010HA	–	0.05 – 0.09
1.10	4	7	28	45	31100011HA	–	0.05 – 0.09
1.20	4	7	28	45	31100012HA	–	0.05 – 0.09
1.30	4	7	28	45	31100013HA	–	0.05 – 0.09
1.40	4	7	28	45	31100014HA	–	0.05 – 0.09
1.50	4	14	28	55	31100015HA	–	0.05 – 0.09
1.60	4	14	28	55	31100016HA	–	0.05 – 0.09
1.70	4	14	28	55	31100017HA	–	0.05 – 0.09
1.80	4	14	28	55	31100018HA	–	0.05 – 0.09
1.85	4	14	28	55	311000185HA	–	0.05 – 0.09
1.90	4	14	28	55	31100019HA	–	0.05 – 0.09
2.00	4	20	28	55	31100020HA	–	0.05 – 0.09
2.10	4	20	28	55	31100021HA	–	0.05 – 0.09
2.15	4	20	28	55	311000215HA	–	0.05 – 0.09
2.20	4	20	28	55	31100022HA	–	0.05 – 0.09
2.30	4	20	28	55	31100023HA	–	0.05 – 0.09
2.40	4	20	28	55	31100024HA	–	0.05 – 0.09
2.50	4	20	28	55	31100025HA	–	0.05 – 0.09
2.60	4	20	28	55	31100026HA	–	0.05 – 0.09
2.65	4	20	28	55	311000265HA	–	0.05 – 0.09
2.70	4	20	28	55	31100027HA	–	0.05 – 0.09
2.80	4	20	28	55	31100028HA	–	0.05 – 0.09
2.85	4	20	28	55	311000285HA	–	0.05 – 0.09
2.90	4	20	28	55	31100029HA	–	0.05 – 0.09
3.00	6	20	36	62	31100030HA	31100030HB	0.06 – 0.14
3.10	6	20	36	62	31100031HA	31100031HB	0.06 – 0.14
3.20	6	20	36	62	31100032HA	31100032HB	0.06 – 0.14
3.25	6	20	36	62	311000325HA	311000325HB	0.06 – 0.14
3.30	6	20	36	62	31100033HA	31100033HB	0.06 – 0.14
3.40	6	20	36	62	31100034HA	31100034HB	0.06 – 0.14
3.50	6	20	36	62	31100035HA	31100035HB	0.06 – 0.14
3.60	6	20	36	62	31100036HA	31100036HB	0.06 – 0.14
3.70	6	20	36	62	31100037HA	31100037HB	0.06 – 0.14
3.80	6	24	36	66	31100038HA	31100038HB	0.06 – 0.14
3.90	6	24	36	66	31100039HA	31100039HB	0.06 – 0.14
4.00	6	24	36	66	31100040HA	31100040HB	0.08 – 0.16
4.10	6	24	36	66	31100041HA	31100041HB	0.08 – 0.16
4.20	6	24	36	66	31100042HA	31100042HB	0.08 – 0.16
4.30	6	24	36	66	31100043HA	31100043HB	0.08 – 0.16
4.40	6	24	36	66	31100044HA	31100044HB	0.08 – 0.16
4.50	6	24	36	66	31100045HA	31100045HB	0.08 – 0.16
4.60	6	24	36	66	31100046HA	31100046HB	0.08 – 0.16
4.65	6	24	36	66	311000465HA	311000465HB	0.08 – 0.16
4.70	6	24	36	66	31100047HA	31100047HB	0.08 – 0.16
4.80	6	28	36	66	31100048HA	31100048HB	0.08 – 0.16
4.90	6	28	36	66	31100049HA	31100049HB	0.08 – 0.16
5.00	6	28	36	66	31100050HA	31100050HB	0.09 – 0.20
5.10	6	28	36	66	31100051HA	31100051HB	0.09 – 0.20
5.20	6	28	36	66	31100052HA	31100052HB	0.09 – 0.20
5.30	6	28	36	66	31100053HA	31100053HB	0.09 – 0.20
5.40	6	28	36	66	31100054HA	31100054HB	0.09 – 0.20
5.50	6	28	36	66	31100055HA	31100055HB	0.09 – 0.20
5.55	6	28	36	66	311000555HA	311000555HB	0.09 – 0.20
5.60	6	28	36	66	31100056HA	31100056HB	0.09 – 0.20
5.70	6	28	36	66	31100057HA	31100057HB	0.09 – 0.20
5.80	6	28	36	66	31100058HA	31100058HB	0.09 – 0.20
5.90	6	28	36	66	31100059HA	31100059HB	0.09 – 0.20
6.00	6	28	36	66	31100060HA	31100060HB	0.10 – 0.23
6.10	8	34	36	79	31100061HA	31100061HB	0.10 – 0.23
6.20	8	34	36	79	31100062HA	31100062HB	0.10 – 0.23
6.30	8	34	36	79	31100063HA	31100063HB	0.10 – 0.23
6.40	8	34	36	79	31100064HA	31100064HB	0.10 – 0.23
6.50	8	34	36	79	31100065HA	31100065HB	0.10 – 0.23
6.60	8	34	36	79	31100066HA	31100066HB	0.10 – 0.23
6.70	8	34	36	79	31100067HA	31100067HB	0.10 – 0.23
6.80	8	34	36	79	31100068HA	31100068HB	0.10 – 0.23
6.90	8	34	36	79	31100069HA	31100069HB	0.10 – 0.23
7.00	8	34	36	79	31100070HA	31100070HB	0.11 – 0.25
7.10	8	41	36	79	31100071HA	31100071HB	0.11 – 0.25
7.20	8	41	36	79	31100072HA	31100072HB	0.11 – 0.25
7.30	8	41	36	79	31100073HA	31100073HB	0.11 – 0.25
7.40	8	41	36	79	31100074HA	31100074HB	0.11 – 0.25
7.45	8	41	36	79	311000745HA	311000745HB	0.11 – 0.25
7.50	8	41	36	79	31100075HA	31100075HB	0.11 – 0.25
7.55	8	41	36	79	311000755HA	311000755HB	0.11 – 0.25
7.60	8	41	36	79	31100076HA	31100076HB	0.11 – 0.25

*HE drill: same price, availability on request

Product family 111

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
7.70	8	41	36	79	31100077HA	31100077HB	0.11 – 0.25
7.80	8	41	36	79	31100078HA	31100078HB	0.11 – 0.25
7.90	8	41	36	79	31100079HA	31100079HB	0.11 – 0.25
8.00	8	41	36	79	31100080HA	31100080HB	0.11 – 0.27
8.10	10	47	40	89	31100081HA	31100081HB	0.11 – 0.27
8.20	10	47	40	89	31100082HA	31100082HB	0.11 – 0.27
8.30	10	47	40	89	31100083HA	31100083HB	0.11 – 0.27
8.40	10	47	40	89	31100084HA	31100084HB	0.11 – 0.27
8.50	10	47	40	89	31100085HA	31100085HB	0.11 – 0.27
8.60	10	47	40	89	31100086HA	31100086HB	0.11 – 0.27
8.70	10	47	40	89	31100087HA	31100087HB	0.11 – 0.27
8.80	10	47	40	89	31100088HA	31100088HB	0.11 – 0.27
8.90	10	47	40	89	31100089HA	31100089HB	0.11 – 0.27
9.00	10	47	40	89	31100090HA	31100090HB	0.12 – 0.28
9.10	10	47	40	89	31100091HA	31100091HB	0.12 – 0.28
9.20	10	47	40	89	31100092HA	31100092HB	0.12 – 0.28
9.25	10	47	40	89	311000925HA	311000925HB	0.12 – 0.28
9.30	10	47	40	89	31100093HA	31100093HB	0.12 – 0.28
9.35	10	47	40	89	311000935HA	311000935HB	0.12 – 0.28
9.40	10	47	40	89	31100094HA	31100094HB	0.12 – 0.28
9.50	10	47	40	89	31100095HA	31100095HB	0.12 – 0.28
9.55	10	47	40	89	311000955HA	311000955HB	0.12 – 0.28
9.60	10	47	40	89	31100096HA	31100096HB	0.12 – 0.28
9.70	10	47	40	89	31100097HA	31100097HB	0.12 – 0.28
9.80	10	47	40	89	31100098HA	31100098HB	0.12 – 0.28
9.90	10	47	40	89	31100099HA	31100099HB	0.12 – 0.28
10.00	10	47	40	89	31100100HA	31100100HB	0.13 – 0.30
10.10	12	55	45	102	31100101HA	31100101HB	0.13 – 0.30
10.20	12	55	45	102	31100102HA	31100102HB	0.13 – 0.30
10.30	12	55	45	102	31100103HA	31100103HB	0.13 – 0.30
10.40	12	55	45	102	31100104HA	31100104HB	0.13 – 0.30
10.50	12	55	45	102	31100105HA	31100105HB	0.13 – 0.30
10.60	12	55	45	102	31100106HA	31100106HB	0.13 – 0.30
10.70	12	55	45	102	31100107HA	31100107HB	0.13 – 0.30
10.80	12	55	45	102	31100108HA	31100108HB	0.13 – 0.30
10.90	12	55	45	102	31100109HA	31100109HB	0.13 – 0.30
11.00	12	55	45	102	31100110HA	31100110HB	0.14 – 0.32
11.10	12	55	45	102	31100111HA	31100111HB	0.14 – 0.32
11.20	12	55	45	102	31100112HA	31100112HB	0.14 – 0.32
11.30	12	55	45	102	31100113HA	31100113HB	0.14 – 0.32
11.40	12	55	45	102	31100114HA	31100114HB	0.14 – 0.32
11.50	12	55	45	102	31100115HA	31100115HB	0.14 – 0.32
11.60	12	55	45	102	31100116HA	31100116HB	0.14 – 0.32
11.70	12	55	45	102	31100117HA	31100117HB	0.14 – 0.32
11.80	12	55	45	102	31100118HA	31100118HB	0.14 – 0.32
11.90	12	55	45	102	31100119HA	31100119HB	0.14 – 0.32
12.00	12	55	45	102	31100120HA	31100120HB	0.15 – 0.32
12.20	14	60	45	107	31100122HA	31100122HB	0.15 – 0.32
12.50	14	60	45	107	31100125HA	31100125HB	0.15 – 0.32
12.70	14	60	45	107	31100127HA	31100127HB	0.15 – 0.32
12.80	14	60	45	107	31100128HA	31100128HB	0.15 – 0.32
13.00	14	60	45	107	31100130HA	31100130HB	0.15 – 0.32
13.30	14	60	45	107	31100133HA	31100133HB	0.15 – 0.32
13.50	14	60	45	107	31100135HA	31100135HB	0.15 – 0.32
13.70	14	60	45	107	31100137HA	31100137HB	0.15 – 0.32
13.80	14	60	45	107	31100138HA	31100138HB	0.15 – 0.32
14.00	14	60	45	107	31100140HA	31100140HB	0.16 – 0.35
14.20	16	65	48	115	31100142HA	31100142HB	0.16 – 0.35
14.50	16	65	48	115	31100145HA	31100145HB	0.16 – 0.35
14.70	16	65	48	115	31100147HA	31100147HB	0.16 – 0.35
14.80	16	65	48	115	31100148HA	31100148HB	0.16 – 0.35
15.00	16	65	48	115	31100150HA	31100150HB	0.16 – 0.35
15.20	16	65	48	115	31100152HA	31100152HB	0.16 – 0.35
15.30	16	65	48	115	31100153HA	31100153HB	0.16 – 0.35
15.50	16	65	48	115	31100155HA	31100155HB	0.16 – 0.35
15.70	16	65	48	115	31100157HA	31100157HB	0.16 – 0.35
15.80	16	65	48	115	31100158HA	31100158HB	0.16 – 0.35
16.00	16	65	48	115	31100160HA	31100160HB	0.17 – 0.37
16.50	18	73	48	123	31100165HA	31100165HB	0.17 – 0.37
16.80	18	73	48	123	31100168HA	31100168HB	0.17 – 0.37
17.00	18	73	48	123	31100170HA	31100170HB	0.17 – 0.37
17.50	18	73	48	123	31100175HA	31100175HB	0.17 – 0.37
17.70	18	73	48	123	31100177HA	31100177HB	0.17 – 0.37
17.80	18	73	48	123	31100178HA	31100178HB	0.17 – 0.37
18.00	18	73	48	123	31100180HA	31100180HB	0.18 – 0.40
18.50	20	79	50	131	31100185HA	31100185HB	0.18 – 0.40
18.80	20	79	50	131	31100188HA	31100188HB	0.18 – 0.40
19.00	20	79	50	131	31100190HA	31100190HB	0.18 – 0.40
19.50	20	79	50	131	31100195HA	31100195HB	0.18 – 0.40
19.80	20	79	50	131	31100198HA	31100198HB	0.18 – 0.40
20.00	20	79	50	131	31100200HA	31100200HB	0.20 – 0.45

Material	Alu & Al Alloys	Alu & Al alloys <10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²
V_c (m/min)	105	270

Material	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	> 600 N/mm²
V_c (m/min)	180

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	45	120	60

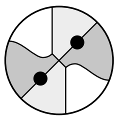
Product family 111

31200

TiAlN | HA | HB | HE* | 3xD | VHM | 25 bar | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill 3xD with Internal Coolant

$t_{max} = l_2 - 1.5 \times d_1$



d_1
m7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
2.00	4	20	28	55	31200020HA	–	0.06 – 0.11
2.10	4	20	28	55	31200021HA	–	0.06 – 0.11
2.15	4	20	28	55	312000215HA	–	0.06 – 0.11
2.20	4	20	28	55	31200022HA	–	0.06 – 0.11
2.30	4	20	28	55	31200023HA	–	0.06 – 0.11
2.40	4	20	28	55	31200024HA	–	0.06 – 0.11
2.50	4	20	28	55	31200025HA	–	0.06 – 0.11
2.60	4	20	28	55	31200026HA	–	0.06 – 0.11
2.65	4	20	28	55	312000265HA	–	0.06 – 0.11
2.70	4	20	28	55	31200027HA	–	0.06 – 0.11
2.80	4	20	28	55	31200028HA	–	0.06 – 0.11
2.85	4	20	28	55	312000285HA	–	0.06 – 0.11
2.90	4	20	28	55	31200029HA	–	0.06 – 0.11
3.00	6	20	36	62	31200030HA	31200030HB	0.06 – 0.14
3.10	6	20	36	62	31200031HA	31200031HB	0.06 – 0.14
3.20	6	20	36	62	31200032HA	31200032HB	0.06 – 0.14
3.25	6	20	36	62	312000325HA	312000325HB	0.06 – 0.14
3.30	6	20	36	62	31200033HA	31200033HB	0.06 – 0.14
3.40	6	20	36	62	31200034HA	31200034HB	0.06 – 0.14
3.50	6	20	36	62	31200035HA	31200035HB	0.06 – 0.14
3.60	6	20	36	62	31200036HA	31200036HB	0.06 – 0.14
3.70	6	20	36	62	31200037HA	31200037HB	0.06 – 0.14
3.80	6	24	36	66	31200038HA	31200038HB	0.06 – 0.14
3.90	6	24	36	66	31200039HA	31200039HB	0.06 – 0.14
4.00	6	24	36	66	31200040HA	31200040HB	0.08 – 0.16
4.10	6	24	36	66	31200041HA	31200041HB	0.08 – 0.16
4.20	6	24	36	66	31200042HA	31200042HB	0.08 – 0.16
4.30	6	24	36	66	31200043HA	31200043HB	0.08 – 0.16
4.40	6	24	36	66	31200044HA	31200044HB	0.08 – 0.16
4.50	6	24	36	66	31200045HA	31200045HB	0.08 – 0.16
4.60	6	24	36	66	31200046HA	31200046HB	0.08 – 0.16
4.65	6	24	36	66	312000465HA	312000465HB	0.08 – 0.16
4.70	6	24	36	66	31200047HA	31200047HB	0.08 – 0.16
4.80	6	28	36	66	31200048HA	31200048HB	0.08 – 0.16
4.90	6	28	36	66	31200049HA	31200049HB	0.08 – 0.16
5.00	6	28	36	66	31200050HA	31200050HB	0.09 – 0.20
5.10	6	28	36	66	31200051HA	31200051HB	0.09 – 0.20
5.20	6	28	36	66	31200052HA	31200052HB	0.09 – 0.20
5.30	6	28	36	66	31200053HA	31200053HB	0.09 – 0.20
5.40	6	28	36	66	31200054HA	31200054HB	0.09 – 0.20
5.50	6	28	36	66	31200055HA	31200055HB	0.09 – 0.20
5.55	6	28	36	66	312000555HA	312000555HB	0.09 – 0.20
5.60	6	28	36	66	31200056HA	31200056HB	0.09 – 0.20
5.70	6	28	36	66	31200057HA	31200057HB	0.09 – 0.20
5.80	6	28	36	66	31200058HA	31200058HB	0.09 – 0.20
5.90	6	28	36	66	31200059HA	31200059HB	0.09 – 0.20
6.00	6	28	36	66	31200060HA	31200060HB	0.10 – 0.23
6.10	8	34	36	79	31200061HA	31200061HB	0.10 – 0.23
6.20	8	34	36	79	31200062HA	31200062HB	0.10 – 0.23
6.30	8	34	36	79	31200063HA	31200063HB	0.10 – 0.23
6.40	8	34	36	79	31200064HA	31200064HB	0.10 – 0.23
6.50	8	34	36	79	31200065HA	31200065HB	0.10 – 0.23
6.60	8	34	36	79	31200066HA	31200066HB	0.10 – 0.23
6.70	8	34	36	79	31200067HA	31200067HB	0.10 – 0.23
6.80	8	34	36	79	31200068HA	31200068HB	0.10 – 0.23
6.90	8	34	36	79	31200069HA	31200069HB	0.10 – 0.23
7.00	8	34	36	79	31200070HA	31200070HB	0.11 – 0.25
7.10	8	41	36	79	31200071HA	31200071HB	0.11 – 0.25
7.20	8	41	36	79	31200072HA	31200072HB	0.11 – 0.25
7.30	8	41	36	79	31200073HA	31200073HB	0.11 – 0.25
7.40	8	41	36	79	31200074HA	31200074HB	0.11 – 0.25
7.45	8	41	36	79	312000745HA	312000745HB	0.11 – 0.25
7.50	8	41	36	79	31200075HA	31200075HB	0.11 – 0.25
7.55	8	41	36	79	312000755HA	312000755HB	0.11 – 0.25
7.60	8	41	36	79	31200076HA	31200076HB	0.11 – 0.25
7.70	8	41	36	79	31200077HA	31200077HB	0.11 – 0.25
7.80	8	41	36	79	31200078HA	31200078HB	0.11 – 0.25
7.90	8	41	36	79	31200079HA	31200079HB	0.11 – 0.25
8.00	8	41	36	79	31200080HA	31200080HB	0.11 – 0.27
8.10	10	47	40	89	31200081HA	31200081HB	0.11 – 0.27
8.20	10	47	40	89	31200082HA	31200082HB	0.11 – 0.27
8.30	10	47	40	89	31200083HA	31200083HB	0.11 – 0.27
8.40	10	47	40	89	31200084HA	31200084HB	0.11 – 0.27
8.50	10	47	40	89	31200085HA	31200085HB	0.11 – 0.27

*HE drill: same price, availability on request

Product family 111

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
8.60	10	47	40	89	31200086HA	31200086HB	0.11 – 0.27
8.70	10	47	40	89	31200087HA	31200087HB	0.11 – 0.27
8.80	10	47	40	89	31200088HA	31200088HB	0.11 – 0.27
8.90	10	47	40	89	31200089HA	31200089HB	0.11 – 0.27
9.00	10	47	40	89	31200090HA	31200090HB	0.12 – 0.28
9.10	10	47	40	89	31200091HA	31200091HB	0.12 – 0.28
9.20	10	47	40	89	31200092HA	31200092HB	0.12 – 0.28
9.25	10	47	40	89	312000925HA	312000925HB	0.12 – 0.28
9.30	10	47	40	89	31200093HA	31200093HB	0.12 – 0.28
9.35	10	47	40	89	312000935HA	312000935HB	0.12 – 0.28
9.40	10	47	40	89	31200094HA	31200094HB	0.12 – 0.28
9.50	10	47	40	89	31200095HA	31200095HB	0.12 – 0.28
9.55	10	47	40	89	312000955HA	312000955HB	0.12 – 0.28
9.60	10	47	40	89	31200096HA	31200096HB	0.12 – 0.28
9.70	10	47	40	89	31200097HA	31200097HB	0.12 – 0.28
9.80	10	47	40	89	31200098HA	31200098HB	0.12 – 0.28
9.90	10	47	40	89	31200099HA	31200099HB	0.12 – 0.28
10.00	10	47	40	89	31200100HA	31200100HB	0.13 – 0.30
10.10	12	55	45	102	31200101HA	31200101HB	0.13 – 0.30
10.20	12	55	45	102	31200102HA	31200102HB	0.13 – 0.30
10.30	12	55	45	102	31200103HA	31200103HB	0.13 – 0.30
10.40	12	55	45	102	31200104HA	31200104HB	0.13 – 0.30
10.50	12	55	45	102	31200105HA	31200105HB	0.13 – 0.30
10.60	12	55	45	102	31200106HA	31200106HB	0.13 – 0.30
10.70	12	55	45	102	31200107HA	31200107HB	0.13 – 0.30
10.80	12	55	45	102	31200108HA	31200108HB	0.13 – 0.30
10.90	12	55	45	102	31200109HA	31200109HB	0.13 – 0.30
11.00	12	55	45	102	31200110HA	31200110HB	0.14 – 0.32
11.10	12	55	45	102	31200111HA	31200111HB	0.14 – 0.32
11.20	12	55	45	102	31200112HA	31200112HB	0.14 – 0.32
11.30	12	55	45	102	31200113HA	31200113HB	0.14 – 0.32
11.40	12	55	45	102	31200114HA	31200114HB	0.14 – 0.32
11.50	12	55	45	102	31200115HA	31200115HB	0.14 – 0.32
11.60	12	55	45	102	31200116HA	31200116HB	0.14 – 0.32
11.70	12	55	45	102	31200117HA	31200117HB	0.14 – 0.32
11.80	12	55	45	102	31200118HA	31200118HB	0.14 – 0.32
11.90	12	55	45	102	31200119HA	31200119HB	0.14 – 0.32
12.00	12	55	45	102	31200120HA	31200120HB	0.15 – 0.32
12.20	14	60	45	107	31200122HA	31200122HB	0.15 – 0.32
12.50	14	60	45	107	31200125HA	31200125HB	0.15 – 0.32
12.70	14	60	45	107	31200127HA	31200127HB	0.15 – 0.32
12.80	14	60	45	107	31200128HA	31200128HB	0.15 – 0.32
13.00	14	60	45	107	31200130HA	31200130HB	0.15 – 0.32
13.50	14	60	45	107	31200135HA	31200135HB	0.15 – 0.32
13.70	14	60	45	107	31200137HA	31200137HB	0.15 – 0.32
13.80	14	60	45	107	31200138HA	31200138HB	0.15 – 0.32
14.00	14	60	45	107	31200140HA	31200140HB	0.16 – 0.35
14.20	16	65	48	115	31200142HA	31200142HB	0.16 – 0.35
14.50	16	65	48	115	31200145HA	31200145HB	0.16 – 0.35
14.70	16	65	48	115	31200147HA	31200147HB	0.16 – 0.35
14.80	16	65	48	115	31200148HA	31200148HB	0.16 – 0.35
15.00	16	65	48	115	31200150HA	31200150HB	0.16 – 0.35
15.20	16	65	48	115	31200152HA	31200152HB	0.16 – 0.35
15.30	16	65	48	115	31200153HA	31200153HB	0.16 – 0.35
15.50	16	65	48	115	31200155HA	31200155HB	0.16 – 0.35
15.70	16	65	48	115	31200157HA	31200157HB	0.16 – 0.35
15.80	16	65	48	115	31200158HA	31200158HB	0.16 – 0.35
16.00	16	65	48	115	31200160HA	31200160HB	0.17 – 0.37
16.50	18	73	48	123	31200165HA	31200165HB	0.17 – 0.37
16.80	18	73	48	123	31200168HA	31200168HB	0.17 – 0.37
17.00	18	73	48	123	31200170HA	31200170HB	0.17 – 0.37
17.50	18	73	48	123	31200175HA	31200175HB	0.17 – 0.37
17.70	18	73	48	123	31200177HA	31200177HB	0.18 – 0.40
17.80	18	73	48	123	31200178HA	31200178HB	0.18 – 0.40
18.00	18	73	48	123	31200180HA	31200180HB	0.18 – 0.40
18.50	20	79	50	131	31200185HA	31200185HB	0.18 – 0.40
18.80	20	79	50	131	31200188HA	31200188HB	0.18 – 0.40
19.00	20	79	50	131	31200190HA	31200190HB	0.18 – 0.40
19.50	20	79	50	131	31200195HA	31200195HB	0.18 – 0.40
19.80	20	79	50	131	31200198HA	31200198HB	0.20 – 0.45
20.00	20	79	50	131	31200200HA	31200200HB	0.20 – 0.45

Material	Alu & Al Alloys	Alu & Al alloys >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²
V_c (m/min)	125	325

Material	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	> 600 N/mm²
V_c (m/min)	220

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	140	130	130	120	60	100	50	150	80

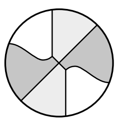
51100

TiAlN | HA | HB | HE* | 5xD | VHM | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill 5xD

w/o Internal Coolant

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



d_1
m7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
3.00	6	28	36	66	51100030HA	51100030HB	0.06 – 0.14
3.10	6	28	36	66	51100031HA	51100031HB	0.06 – 0.14
3.20	6	28	36	66	51100032HA	51100032HB	0.06 – 0.14
3.30	6	28	36	66	51100033HA	51100033HB	0.06 – 0.14
3.40	6	28	36	66	51100034HA	51100034HB	0.06 – 0.14
3.50	6	28	36	66	51100035HA	51100035HB	0.06 – 0.14
3.60	6	28	36	66	51100036HA	51100036HB	0.06 – 0.14
3.70	6	28	36	66	51100037HA	51100037HB	0.06 – 0.14
3.80	6	36	36	74	51100038HA	51100038HB	0.06 – 0.14
3.90	6	36	36	74	51100039HA	51100039HB	0.06 – 0.14
4.00	6	36	36	74	51100040HA	51100040HB	0.08 – 0.16
4.10	6	36	36	74	51100041HA	51100041HB	0.08 – 0.16
4.20	6	36	36	74	51100042HA	51100042HB	0.08 – 0.16
4.30	6	36	36	74	51100043HA	51100043HB	0.08 – 0.16
4.40	6	36	36	74	51100044HA	51100044HB	0.08 – 0.16
4.50	6	36	36	74	51100045HA	51100045HB	0.08 – 0.16
4.60	6	36	36	74	51100046HA	51100046HB	0.08 – 0.16
4.65	6	36	36	74	511000465HA	511000465HB	0.08 – 0.16
4.70	6	36	36	74	51100047HA	51100047HB	0.08 – 0.16
4.80	6	44	36	82	51100048HA	51100048HB	0.08 – 0.16
4.90	6	44	36	82	51100049HA	51100049HB	0.08 – 0.16
5.00	6	44	36	82	51100050HA	51100050HB	0.09 – 0.20
5.10	6	44	36	82	51100051HA	51100051HB	0.09 – 0.20
5.20	6	44	36	82	51100052HA	51100052HB	0.09 – 0.20
5.30	6	44	36	82	51100053HA	51100053HB	0.09 – 0.20
5.40	6	44	36	82	51100054HA	51100054HB	0.09 – 0.20
5.50	6	44	36	82	51100055HA	51100055HB	0.09 – 0.20
5.55	6	44	36	82	511000555HA	511000555HB	0.09 – 0.20
5.60	6	44	36	82	51100056HA	51100056HB	0.09 – 0.20
5.70	6	44	36	82	51100057HA	51100057HB	0.09 – 0.20
5.80	6	44	36	82	51100058HA	51100058HB	0.09 – 0.20
5.90	6	44	36	82	51100059HA	51100059HB	0.09 – 0.20
6.00	6	44	36	82	51100060HA	51100060HB	0.10 – 0.23
6.10	8	53	36	91	51100061HA	51100061HB	0.10 – 0.23
6.20	8	53	36	91	51100062HA	51100062HB	0.10 – 0.23
6.30	8	53	36	91	51100063HA	51100063HB	0.10 – 0.23
6.40	8	53	36	91	51100064HA	51100064HB	0.10 – 0.23
6.50	8	53	36	91	51100065HA	51100065HB	0.10 – 0.23
6.60	8	53	36	91	51100066HA	51100066HB	0.10 – 0.23
6.70	8	53	36	91	51100067HA	51100067HB	0.10 – 0.23
6.80	8	53	36	91	51100068HA	51100068HB	0.10 – 0.23
6.90	8	53	36	91	51100069HA	51100069HB	0.10 – 0.23
7.00	8	53	36	91	51100070HA	51100070HB	0.11 – 0.25
7.10	8	53	36	91	51100071HA	51100071HB	0.11 – 0.25
7.20	8	53	36	91	51100072HA	51100072HB	0.11 – 0.25
7.30	8	53	36	91	51100073HA	51100073HB	0.11 – 0.25
7.40	8	53	36	91	51100074HA	51100074HB	0.11 – 0.25
7.50	8	53	36	91	51100075HA	51100075HB	0.11 – 0.25
7.60	8	53	36	91	51100076HA	51100076HB	0.11 – 0.25
7.70	8	53	36	91	51100077HA	51100077HB	0.11 – 0.25
7.80	8	53	36	91	51100078HA	51100078HB	0.11 – 0.25
7.90	8	53	36	91	51100079HA	51100079HB	0.11 – 0.25
8.00	8	53	36	91	51100080HA	51100080HB	0.11 – 0.27
8.10	10	61	40	103	51100081HA	51100081HB	0.11 – 0.27
8.20	10	61	40	103	51100082HA	51100082HB	0.11 – 0.27
8.30	10	61	40	103	51100083HA	51100083HB	0.11 – 0.27
8.40	10	61	40	103	51100084HA	51100084HB	0.11 – 0.27
8.50	10	61	40	103	51100085HA	51100085HB	0.11 – 0.27
8.60	10	61	40	103	51100086HA	51100086HB	0.11 – 0.27
8.70	10	61	40	103	51100087HA	51100087HB	0.11 – 0.27
8.80	10	61	40	103	51100088HA	51100088HB	0.11 – 0.27
8.90	10	61	40	103	51100089HA	51100089HB	0.11 – 0.27
9.00	10	61	40	103	51100090HA	51100090HB	0.12 – 0.28
9.10	10	61	40	103	51100091HA	51100091HB	0.12 – 0.28
9.20	10	61	40	103	51100092HA	51100092HB	0.12 – 0.28
9.25	10	61	40	103	511000925HA	511000925HB	0.12 – 0.28
9.30	10	61	40	103	51100093HA	51100093HB	0.12 – 0.28
9.40	10	61	40	103	51100094HA	51100094HB	0.12 – 0.28

Product family 111

*HE drill: same price, availability on request

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
9.50	10	61	40	103	51100095HA	51100095HB	0.12 – 0.28
9.60	10	61	40	103	51100096HA	51100096HB	0.12 – 0.28
9.70	10	61	40	103	51100097HA	51100097HB	0.12 – 0.28
9.80	10	61	40	103	51100098HA	51100098HB	0.12 – 0.28
9.90	10	61	40	103	51100099HA	51100099HB	0.12 – 0.28
9.92	10	61	40	103	511000992HA	511000992HB	0.12 – 0.28
10.00	10	61	40	103	51100100HA	51100100HB	0.13 – 0.30
10.10	12	71	45	118	51100101HA	51100101HB	0.13 – 0.30
10.20	12	71	45	118	51100102HA	51100102HB	0.13 – 0.30
10.30	12	71	45	118	51100103HA	51100103HB	0.13 – 0.30
10.40	12	71	45	118	51100104HA	51100104HB	0.13 – 0.30
10.50	12	71	45	118	51100105HA	51100105HB	0.13 – 0.30
10.60	12	71	45	118	51100106HA	51100106HB	0.13 – 0.30
10.70	12	71	45	118	51100107HA	51100107HB	0.13 – 0.30
10.80	12	71	45	118	51100108HA	51100108HB	0.13 – 0.30
10.90	12	71	45	118	51100109HA	51100109HB	0.13 – 0.30
11.00	12	71	45	118	51100110HA	51100110HB	0.14 – 0.32
11.10	12	71	45	118	51100111HA	51100111HB	0.14 – 0.32
11.20	12	71	45	118	51100112HA	51100112HB	0.14 – 0.32
11.30	12	71	45	118	51100113HA	51100113HB	0.14 – 0.32
11.40	12	71	45	118	51100114HA	51100114HB	0.14 – 0.32
11.50	12	71	45	118	51100115HA	51100115HB	0.14 – 0.32
11.60	12	71	45	118	51100116HA	51100116HB	0.14 – 0.32
11.70	12	71	45	118	51100117HA	51100117HB	0.14 – 0.32
11.80	12	71	45	118	51100118HA	51100118HB	0.14 – 0.32
11.90	12	71	45	118	51100119HA	51100119HB	0.14 – 0.32
12.00	12	71	45	118	51100120HA	51100120HB	0.15 – 0.32
12.10	14	77	45	124	51100121HA	51100121HB	0.15 – 0.32
12.20	14	77	45	124	51100122HA	51100122HB	0.15 – 0.32
12.30	14	77	45	124	51100123HA	51100123HB	0.15 – 0.32
12.40	14	77	45	124	51100124HA	51100124HB	0.15 – 0.32
12.50	14	77	45	124	51100125HA	51100125HB	0.15 – 0.32
12.70	14	77	45	124	51100127HA	51100127HB	0.15 – 0.32
13.00	14	77	45	124	51100130HA	51100130HB	0.15 – 0.32
13.50	14	77	45	124	51100135HA	51100135HB	0.15 – 0.32
13.70	14	77	45	124	51100137HA	51100137HB	0.15 – 0.32
13.80	14	77	45	124	51100138HA	51100138HB	0.15 – 0.32
14.16	14	77	45	124	51100139HA	51100139HB	0.15 – 0.32
14.00	14	77	45	124	51100140HA	51100140HB	0.16 – 0.35
14.10	16	83	48	133	51100141HA	51100141HB	0.16 – 0.35
14.20	16	83	48	133	51100142HA	51100142HB	0.16 – 0.35
14.50	16	83	48	133	51100145HA	51100145HB	0.16 – 0.35
14.70	16	83	48	133	51100147HA	51100147HB	0.16 – 0.35
15.00	16	83	48	133	51100150HA	51100150HB	0.16 – 0.35
15.20	16	83	48	133	51100152HA	51100152HB	0.16 – 0.35
15.50	16	83	48	133	51100155HA	51100155HB	0.16 – 0.35
15.70	16	83	48	133	51100157HA	51100157HB	0.16 – 0.35
15.80	16	83	48	133	51100158HA	51100158HB	0.16 – 0.35
16.00	16	83	48	133	51100160HA	51100160HB	0.17 – 0.37
16.50	18	93	48	143	51100165HA	51100165HB	0.17 – 0.37
17.00	18	93	48	143	51100170HA	51100170HB	0.17 – 0.37
17.50	18	93	48	143	51100175HA	51100175HB	0.17 – 0.37
18.00	18	93	48	143	51100180HA	51100180HB	0.18 – 0.40
18.50	20	101	50	153	51100185HA	51100185HB	0.18 – 0.40
19.00	20	101	50	153	51100190HA	51100190HB	0.18 – 0.40
19.50	20	101	50	153	51100195HA	51100195HB	0.18 – 0.40
20.00	20	101	50	153	51100200HA	51100200HB	0.20 – 0.45

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	105	270	180

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	45	120	60

Product family 111

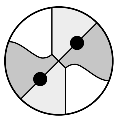
51200

TiAlN | HA | HB | HE* | 5xD | VHM | 25 bar | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill 5xD

with Internal Coolant

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



d_1
m7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
2.00	4	26	28	62	51200020HA	–	0.05 – 0.12
2.10	4	26	28	62	51200021HA	–	0.05 – 0.12
2.15	4	26	28	62	512000215HA	–	0.05 – 0.12
2.20	4	26	28	62	51200022HA	–	0.05 – 0.12
2.30	4	26	28	62	51200023HA	–	0.05 – 0.12
2.40	4	26	28	62	51200024HA	–	0.05 – 0.12
2.50	4	26	28	62	51200025HA	–	0.05 – 0.12
2.60	4	26	28	62	51200026HA	–	0.05 – 0.12
2.65	4	26	28	62	512000265HA	–	0.05 – 0.12
2.70	4	26	28	62	51200027HA	–	0.05 – 0.12
2.80	4	26	28	62	51200028HA	–	0.05 – 0.12
2.85	4	26	28	62	512000285HA	–	0.05 – 0.12
2.90	4	26	28	62	51200029HA	–	0.05 – 0.12
3.00	6	28	36	66	51200030HA	51200030HB	0.06 – 0.14
3.05	6	28	36	66	512000305HA	512000305HB	0.06 – 0.14
3.10	6	28	36	66	51200031HA	51200031HB	0.06 – 0.14
3.20	6	28	36	66	51200032HA	51200032HB	0.06 – 0.14
3.25	6	28	36	66	512000325HA	512000325HB	0.06 – 0.14
3.30	6	28	36	66	51200033HA	51200033HB	0.06 – 0.14
3.40	6	28	36	66	51200034HA	51200034HB	0.06 – 0.14
3.50	6	28	36	66	51200035HA	51200035HB	0.06 – 0.14
3.60	6	28	36	66	51200036HA	51200036HB	0.06 – 0.14
3.70	6	28	36	66	51200037HA	51200037HB	0.06 – 0.14
3.80	6	36	36	74	51200038HA	51200038HB	0.06 – 0.14
3.90	6	36	36	74	51200039HA	51200039HB	0.06 – 0.14
4.00	6	36	36	74	51200040HA	51200040HB	0.08 – 0.16
4.05	6	36	36	74	512000405HA	512000405HB	0.08 – 0.16
4.10	6	36	36	74	51200041HA	51200041HB	0.08 – 0.16
4.20	6	36	36	74	51200042HA	51200042HB	0.08 – 0.16
4.30	6	36	36	74	51200043HA	51200043HB	0.08 – 0.16
4.40	6	36	36	74	51200044HA	51200044HB	0.08 – 0.16
4.50	6	36	36	74	51200045HA	51200045HB	0.08 – 0.16
4.60	6	36	36	74	51200046HA	51200046HB	0.08 – 0.16
4.65	6	36	36	74	512000465HA	512000465HB	0.08 – 0.16
4.70	6	36	36	74	51200047HA	51200047HB	0.08 – 0.16
4.80	6	44	36	82	51200048HA	51200048HB	0.08 – 0.16
4.90	6	44	36	82	51200049HA	51200049HB	0.08 – 0.16
5.00	6	44	36	82	51200050HA	51200050HB	0.09 – 0.20
5.05	6	44	36	82	512000505HA	512000505HB	0.09 – 0.20
5.10	6	44	36	82	51200051HA	51200051HB	0.09 – 0.20
5.20	6	44	36	82	51200052HA	51200052HB	0.09 – 0.20
5.30	6	44	36	82	51200053HA	51200053HB	0.09 – 0.20
5.40	6	44	36	82	51200054HA	51200054HB	0.09 – 0.20
5.50	6	44	36	82	51200055HA	51200055HB	0.09 – 0.20
5.55	6	44	36	82	512000555HA	512000555HB	0.09 – 0.20
5.60	6	44	36	82	51200056HA	51200056HB	0.09 – 0.20
5.70	6	44	36	82	51200057HA	51200057HB	0.09 – 0.20
5.80	6	44	36	82	51200058HA	51200058HB	0.09 – 0.20
5.90	6	44	36	82	51200059HA	51200059HB	0.09 – 0.20
6.00	6	44	36	82	51200060HA	51200060HB	0.10 – 0.23
6.05	6	44	36	82	512000605HA	512000605HB	0.10 – 0.23
6.10	8	53	36	91	51200061HA	51200061HB	0.10 – 0.23
6.20	8	53	36	91	51200062HA	51200062HB	0.10 – 0.23
6.30	8	53	36	91	51200063HA	51200063HB	0.10 – 0.23
6.40	8	53	36	91	51200064HA	51200064HB	0.10 – 0.23
6.50	8	53	36	91	51200065HA	51200065HB	0.10 – 0.23
6.60	8	53	36	91	51200066HA	51200066HB	0.10 – 0.23
6.70	8	53	36	91	51200067HA	51200067HB	0.10 – 0.23
6.80	8	53	36	91	51200068HA	51200068HB	0.10 – 0.23
6.90	8	53	36	91	51200069HA	51200069HB	0.10 – 0.23
7.00	8	53	36	91	51200070HA	51200070HB	0.11 – 0.25
7.10	8	53	36	91	51200071HA	51200071HB	0.11 – 0.25
7.20	8	53	36	91	51200072HA	51200072HB	0.11 – 0.25
7.30	8	53	36	91	51200073HA	51200073HB	0.11 – 0.25
7.40	8	53	36	91	51200074HA	51200074HB	0.11 – 0.25
7.45	8	53	36	91	512000745HA	512000745HB	0.11 – 0.25
7.50	8	53	36	91	51200075HA	51200075HB	0.11 – 0.25
7.55	8	53	36	91	512000755HA	512000755HB	0.11 – 0.25
7.60	8	53	36	91	51200076HA	51200076HB	0.11 – 0.25
7.70	8	53	36	91	51200077HA	51200077HB	0.11 – 0.25

Product family 111

*HE drill: same price, availability on request

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
7.80	8	53	36	91	51200078HA	51200078HB	0.11 – 0.25
7.90	8	53	36	91	51200079HA	51200079HB	0.11 – 0.25
8.00	8	53	36	91	51200080HA	51200080HB	0.11 – 0.27
8.05	8	53	36	91	512000805HA	512000805HB	0.11 – 0.27
8.10	10	61	40	103	51200081HA	51200081HB	0.11 – 0.27
8.20	10	61	40	103	51200082HA	51200082HB	0.11 – 0.27
8.30	10	61	40	103	51200083HA	51200083HB	0.11 – 0.27
8.40	10	61	40	103	51200084HA	51200084HB	0.11 – 0.27
8.50	10	61	40	103	51200085HA	51200085HB	0.11 – 0.27
8.60	10	61	40	103	51200086HA	51200086HB	0.11 – 0.27
8.70	10	61	40	103	51200087HA	51200087HB	0.11 – 0.27
8.80	10	61	40	103	51200088HA	51200088HB	0.11 – 0.27
8.90	10	61	40	103	51200089HA	51200089HB	0.11 – 0.27
9.00	10	61	40	103	51200090HA	51200090HB	0.12 – 0.28
9.10	10	61	40	103	51200091HA	51200091HB	0.12 – 0.28
9.20	10	61	40	103	51200092HA	51200092HB	0.12 – 0.28
9.25	10	61	40	103	512000925HA	512000925HB	0.12 – 0.28
9.30	10	61	40	103	51200093HA	51200093HB	0.12 – 0.28
9.35	10	61	40	103	512000935HA	512000935HB	0.12 – 0.28
9.40	10	61	40	103	51200094HA	51200094HB	0.12 – 0.28
9.50	10	61	40	103	51200095HA	51200095HB	0.12 – 0.28
9.55	10	61	40	103	512000955HA	512000955HB	0.12 – 0.28
9.60	10	61	40	103	51200096HA	51200096HB	0.12 – 0.28
9.70	10	61	40	103	51200097HA	51200097HB	0.12 – 0.28
9.80	10	61	40	103	51200098HA	51200098HB	0.12 – 0.28
9.90	10	61	40	103	51200099HA	51200099HB	0.12 – 0.28
9.92	10	61	40	103	512000992HA	512000992HB	0.12 – 0.28
10.00	10	61	40	103	51200100HA	51200100HB	0.13 – 0.30
10.05	10	61	40	103	512001005HA	512001005HB	0.13 – 0.30
10.10	12	71	45	118	51200101HA	51200101HB	0.13 – 0.30
10.20	12	71	45	118	51200102HA	51200102HB	0.13 – 0.30
10.30	12	71	45	118	51200103HA	51200103HB	0.13 – 0.30
10.40	12	71	45	118	51200104HA	51200104HB	0.13 – 0.30
10.50	12	71	45	118	51200105HA	51200105HB	0.13 – 0.30
10.60	12	71	45	118	51200106HA	51200106HB	0.13 – 0.30
10.70	12	71	45	118	51200107HA	51200107HB	0.13 – 0.30
10.80	12	71	45	118	51200108HA	51200108HB	0.13 – 0.30
10.90	12	71	45	118	51200109HA	51200109HB	0.13 – 0.30
11.00	12	71	45	118	51200110HA	51200110HB	0.14 – 0.32
11.10	12	71	45	118	51200111HA	51200111HB	0.14 – 0.32
11.20	12	71	45	118	51200112HA	51200112HB	0.14 – 0.32
11.30	12	71	45	118	51200113HA	51200113HB	0.14 – 0.32
11.40	12	71	45	118	51200114HA	51200114HB	0.14 – 0.32
11.50	12	71	45	118	51200115HA	51200115HB	0.14 – 0.32
11.60	12	71	45	118	51200116HA	51200116HB	0.14 – 0.32
11.70	12	71	45	118	51200117HA	51200117HB	0.14 – 0.32
11.80	12	71	45	118	51200118HA	51200118HB	0.14 – 0.32
11.90	12	71	45	118	51200119HA	51200119HB	0.14 – 0.32
12.00	12	71	45	118	51200120HA	51200120HB	0.15 – 0.32
12.05	12	71	45	118	512001205HA	512001205HB	0.15 – 0.32
12.10	14	77	45	124	51200121HA	51200121HB	0.15 – 0.32
12.20	14	77	45	124	51200122HA	51200122HB	0.15 – 0.32
12.30	14	77	45	124	51200123HA	51200123HB	0.15 – 0.32
12.40	14	77	45	124	51200124HA	51200124HB	0.15 – 0.32
12.50	14	77	45	124	51200125HA	51200125HB	0.15 – 0.32
12.70	14	77	45	124	51200127HA	51200127HB	0.15 – 0.32
12.80	14	77	45	124	51200128HA	51200128HB	0.15 – 0.32
13.00	14	77	45	124	51200130HA	51200130HB	0.15 – 0.32
13.50	14	77	45	124	51200135HA	51200135HB	0.15 – 0.32
13.70	14	77	45	124	51200137HA	51200137HB	0.15 – 0.32
13.80	14	77	45	124	51200138HA	51200138HB	0.15 – 0.32
13.90	14	77	45	124	51200139HA	51200139HB	0.15 – 0.32
14.00	14	77	45	124	51200140HA	51200140HB	0.16 – 0.35

Further sizes on p. 32

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	125	325	220

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	140	130	130	120	60	100	50	150	80

Product family 111

51200

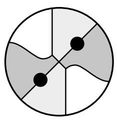
TiAlN | HA | HB | HE* | 5xD | VHM | 25 bar | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill 5xD

with Internal Coolant

Continued from p. 31

$t_{max} = l_2 - 1.5 \times d_1$



d_1
m7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
14.10	16	83	48	133	51200141HA	51200141HB	0.16 – 0.35
14.20	16	83	48	133	51200142HA	51200142HB	0.16 – 0.35
14.50	16	83	48	133	51200145HA	51200145HB	0.16 – 0.35
14.70	16	83	48	133	51200147HA	51200147HB	0.16 – 0.35
14.80	16	83	48	133	51200148HA	51200148HB	0.16 – 0.35
15.00	16	83	48	133	51200150HA	51200150HB	0.16 – 0.35
15.10	16	83	48	133	51200151HA	51200151HB	0.16 – 0.35
15.20	16	83	48	133	51200152HA	51200152HB	0.16 – 0.35
15.30	16	83	48	133	51200153HA	51200153HB	0.16 – 0.35
15.50	16	83	48	133	51200155HA	51200155HB	0.16 – 0.35
15.70	16	83	48	133	51200157HA	51200157HB	0.16 – 0.35
15.80	16	83	48	133	51200158HA	51200158HB	0.16 – 0.35
16.00	16	83	48	133	51200160HA	51200160HB	0.17 – 0.37
16.50	18	93	48	143	51200165HA	51200165HB	0.17 – 0.37
16.80	18	93	48	143	51200168HA	51200168HB	0.17 – 0.37
17.00	18	93	48	143	51200170HA	51200170HB	0.17 – 0.37
17.50	18	93	48	143	51200175HA	51200175HB	0.17 – 0.37
17.70	18	93	48	143	51200177HA	51200177HB	0.17 – 0.37
17.80	18	93	48	143	51200178HA	51200178HB	0.17 – 0.37
18.00	18	93	48	143	51200180HA	51200180HB	0.18 – 0.40
18.50	20	101	50	153	51200185HA	51200185HB	0.18 – 0.40
18.80	20	101	50	153	51200188HA	51200188HB	0.18 – 0.40
19.00	20	101	50	153	51200190HA	51200190HB	0.18 – 0.40
19.50	20	101	50	153	51200195HA	51200195HB	0.18 – 0.40
19.80	20	101	50	153	51200198HA	51200198HB	0.18 – 0.40
20.00	20	101	50	153	51200200HA	51200200HB	0.20 – 0.45

*HE-Bohrer: Preis identisch; Verfügbarkeit auf Anfrage.

Our solid carbide drills are ready for any grade of steel

Visit YouTube to watch our high-performance drill 51200 machining various materials.

https://www.youtube.com/watch?v=ozj03k5RT5o

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	125	325	220

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	140	130	130	120	60	100	50	150	80

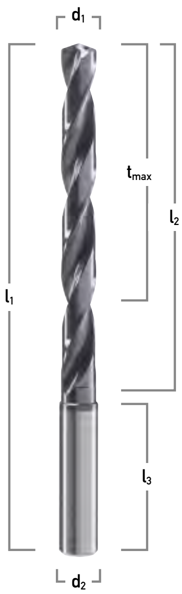
Product family 111

71200

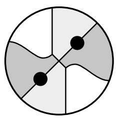
TiAlN | HA | HB | HE* | 7xD | VHM | 25 bar | 140° | Werks-norm

Solid Carbide High-Performance Drill 7xD

with Internal Coolant



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



d_1
m7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
2.80	4	30	28	66	71200028HA	–	0.04 – 0.12
3.00	6	34	36	72	71200030HA	71200030HB	0.06 – 0.14
3.10	6	34	36	72	71200031HA	71200031HB	0.06 – 0.14
3.20	6	34	36	72	71200032HA	71200032HB	0.06 – 0.14
3.25	6	34	36	72	712000325HA	712000325HB	0.06 – 0.14
3.30	6	34	36	72	71200033HA	71200033HB	0.06 – 0.14
3.40	6	34	36	72	71200034HA	71200034HB	0.06 – 0.14
3.50	6	34	36	72	71200035HA	71200035HB	0.06 – 0.14
3.60	6	34	36	72	71200036HA	71200036HB	0.06 – 0.14
3.70	6	34	36	72	71200037HA	71200037HB	0.06 – 0.14
3.80	6	43	36	81	71200038HA	71200038HB	0.06 – 0.14
3.90	6	43	36	81	71200039HA	71200039HB	0.06 – 0.14
4.00	6	43	36	81	71200040HA	71200040HB	0.08 – 0.16
4.10	6	43	36	81	71200041HA	71200041HB	0.08 – 0.16
4.20	6	43	36	81	71200042HA	71200042HB	0.08 – 0.16
4.30	6	43	36	81	71200043HA	71200043HB	0.08 – 0.16
4.40	6	43	36	81	71200044HA	71200044HB	0.08 – 0.16
4.50	6	43	36	81	71200045HA	71200045HB	0.08 – 0.16
4.60	6	43	36	81	71200046HA	71200046HB	0.08 – 0.16
4.70	6	43	36	81	71200047HA	71200047HB	0.08 – 0.16
4.80	6	57	36	95	71200048HA	71200048HB	0.08 – 0.16
4.90	6	57	36	95	71200049HA	71200049HB	0.08 – 0.16
5.00	6	57	36	95	71200050HA	71200050HB	0.09 – 0.20
5.10	6	57	36	95	71200051HA	71200051HB	0.09 – 0.20
5.20	6	57	36	95	71200052HA	71200052HB	0.09 – 0.20
5.30	6	57	36	95	71200053HA	71200053HB	0.09 – 0.20
5.40	6	57	36	95	71200054HA	71200054HB	0.09 – 0.20
5.50	6	57	36	95	71200055HA	71200055HB	0.09 – 0.20
5.60	6	57	36	95	71200056HA	71200056HB	0.09 – 0.20
5.70	6	57	36	95	71200057HA	71200057HB	0.09 – 0.20
5.80	6	57	36	95	71200058HA	71200058HB	0.09 – 0.20
5.90	6	57	36	95	71200059HA	71200059HB	0.09 – 0.20
6.00	6	57	36	95	71200060HA	71200060HB	0.10 – 0.23
6.10	8	76	36	114	71200061HA	71200061HB	0.10 – 0.23
6.20	8	76	36	114	71200062HA	71200062HB	0.10 – 0.23
6.30	8	76	36	114	71200063HA	71200063HB	0.10 – 0.23
6.40	8	76	36	114	71200064HA	71200064HB	0.10 – 0.23
6.50	8	76	36	114	71200065HA	71200065HB	0.10 – 0.23
6.60	8	76	36	114	71200066HA	71200066HB	0.10 – 0.23
6.70	8	76	36	114	71200067HA	71200067HB	0.10 – 0.23
6.80	8	76	36	114	71200068HA	71200068HB	0.10 – 0.23
6.90	8	76	36	114	71200069HA	71200069HB	0.10 – 0.23
7.00	8	76	36	114	71200070HA	71200070HB	0.11 – 0.25
7.10	8	76	36	114	71200071HA	71200071HB	0.11 – 0.25
7.20	8	76	36	114	71200072HA	71200072HB	0.11 – 0.25
7.30	8	76	36	114	71200073HA	71200073HB	0.11 – 0.25
7.40	8	76	36	114	71200074HA	71200074HB	0.11 – 0.25
7.50	8	76	36	114	71200075HA	71200075HB	0.11 – 0.25
7.60	8	76	36	114	71200076HA	71200076HB	0.11 – 0.25
7.70	8	76	36	114	71200077HA	71200077HB	0.11 – 0.25
7.80	8	76	36	114	71200078HA	71200078HB	0.11 – 0.25
7.90	8	76	36	114	71200079HA	71200079HB	0.11 – 0.25
8.00	8	76	36	114	71200080HA	71200080HB	0.11 – 0.27
8.10	10	95	40	142	71200081HA	71200081HB	0.11 – 0.27
8.20	10	95	40	142	71200082HA	71200082HB	0.11 – 0.27
8.30	10	95	40	142	71200083HA	71200083HB	0.11 – 0.27
8.40	10	95	40	142	71200084HA	71200084HB	0.11 – 0.27
8.50	10	95	40	142	71200085HA	71200085HB	0.11 – 0.27
8.60	10	95	40	142	71200086HA	71200086HB	0.11 – 0.27
8.70	10	95	40	142	71200087HA	71200087HB	0.11 – 0.27
8.80	10	95	40	142	71200088HA	71200088HB	0.11 – 0.27
8.90	10	95	40	142	71200089HA	71200089HB	0.11 – 0.27

*HE drill: same price, availability on request

Product family 111

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev
9.00	10	95	40	142	71200090HA	71200090HB	0.12 – 0.28
9.10	10	95	40	142	71200091HA	71200091HB	0.12 – 0.28
9.20	10	95	40	142	71200092HA	71200092HB	0.12 – 0.28
9.30	10	95	40	142	71200093HA	71200093HB	0.12 – 0.28
9.40	10	95	40	142	71200094HA	71200094HB	0.12 – 0.28
9.50	10	95	40	142	71200095HA	71200095HB	0.12 – 0.28
9.60	10	95	40	142	71200096HA	71200096HB	0.12 – 0.28
9.70	10	95	40	142	71200097HA	71200097HB	0.12 – 0.28
9.80	10	95	40	142	71200098HA	71200098HB	0.12 – 0.28
9.90	10	95	40	142	71200099HA	71200099HB	0.12 – 0.28
10.00	10	95	40	142	71200100HA	71200100HB	0.13 – 0.30
10.20	12	114	45	162	71200102HA	71200102HB	0.13 – 0.30
10.30	12	114	45	162	71200103HA	71200103HB	0.13 – 0.30
10.50	12	114	45	162	71200105HA	71200105HB	0.13 – 0.30
10.80	12	114	45	162	71200108HA	71200108HB	0.13 – 0.30
11.00	12	114	45	162	71200110HA	71200110HB	0.14 – 0.32
11.20	12	114	45	162	71200112HA	71200112HB	0.14 – 0.32
11.50	12	114	45	162	71200115HA	71200115HB	0.14 – 0.32
11.60	12	114	45	162	71200116HA	71200116HB	0.14 – 0.32
11.80	12	114	45	162	71200118HA	71200118HB	0.14 – 0.32
12.00	12	114	45	162	71200120HA	71200120HB	0.15 – 0.32
12.10	14	133	45	178	71200121HA	71200121HB	0.15 – 0.32
12.20	14	133	45	178	71200122HA	71200122HB	0.15 – 0.32
12.50	14	133	45	178	71200125HA	71200125HB	0.15 – 0.32
12.70	14	133	45	178	71200127HA	71200127HB	0.15 – 0.32
12.80	14	133	45	178	71200128HA	71200128HB	0.15 – 0.32
13.00	14	133	45	178	71200130HA	71200130HB	0.15 – 0.32
13.50	14	133	45	178	71200135HA	71200135HB	0.15 – 0.32
13.80	14	133	45	178	71200138HA	71200138HB	0.15 – 0.35
14.00	14	133	45	178	71200140HA	71200140HB	0.16 – 0.35
14.20	16	152	48	203	71200142HA	71200142HB	0.16 – 0.35
14.50	16	152	48	203	71200145HA	71200145HB	0.16 – 0.35
14.80	16	152	48	203	71200148HA	71200148HB	0.16 – 0.35
15.00	16	152	48	203	71200150HA	71200150HB	0.16 – 0.35
15.50	16	152	48	203	71200155HA	71200155HB	0.16 – 0.35
15.80	16	152	48	203	71200158HA	71200158HB	0.18 – 0.40
16.00	16	152	48	203	71200160HA	71200160HB	0.17 – 0.37
16.50	18	171	48	222	71200165HA	71200165HB	0.17 – 0.37
17.00	18	171	48	222	71200170HA	71200170HB	0.17 – 0.37
17.50	18	171	48	222	71200175HA	71200175HB	0.17 – 0.37
18.00	18	171	48	222	71200180HA	71200180HB	0.18 – 0.40
18.50	20	190	50	243	71200185HA	71200185HB	0.18 – 0.40
19.00	20	190	50	243	71200190HA	71200190HB	0.18 – 0.40
19.50	20	190	50	243	71200195HA	71200195HB	0.18 – 0.40
20.00	20	190	50	243	71200200HA	71200200HB	0.20 – 0.45

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm^2	< 600 N/mm^2	> 600 N/mm^2
V_c (m/min)	125	325	220

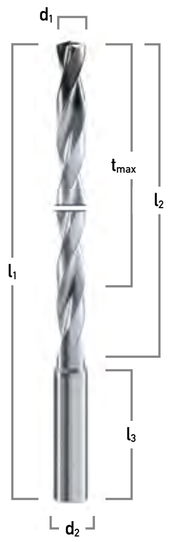
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm^2	< 1000 N/mm^2	< 1000 N/mm^2	< 1200 N/mm^2	< 1400 N/mm^2	< 1200 N/mm^2	< 750 N/mm^2	< 650 N/mm^2	> 260 HB
V_c (m/min)	140	130	130	120	60	100	55	150	80

Product family 111

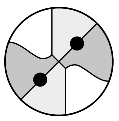
120200

TiAlN | HA | 12xD | VHM | 25 bar | 135° | Manu-facturer standard

Solid Carbide High-Performance Drill 12xD
with Internal Coolant



$t_{max} = l_2 - 1.5 \times d_1$



d_1
h7

- High performance drill for the universal application
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1	d_2	l_2	l_3	l_1	HA	Feed		
mm	mm	mm	mm	mm	Part No.	mm/rev		
3.00	6	50	36	90	120200030HA	0.06	–	0.14
3.10	6	50	36	90	120200031HA	0.06	–	0.14
3.20	6	50	36	90	120200032HA	0.06	–	0.14
3.30	6	50	36	90	120200033HA	0.06	–	0.14
3.40	6	50	36	90	120200034HA	0.06	–	0.14
3.50	6	50	36	90	120200035HA	0.06	–	0.14
3.60	6	50	36	90	120200036HA	0.06	–	0.14
3.70	6	50	36	90	120200037HA	0.06	–	0.14
3.80	6	64	36	102	120200038HA	0.06	–	0.14
3.90	6	64	36	102	120200039HA	0.06	–	0.14
4.00	6	64	36	102	120200040HA	0.08	–	0.16
4.10	6	64	36	102	120200041HA	0.08	–	0.16
4.20	6	64	36	102	120200042HA	0.08	–	0.16
4.30	6	64	36	102	120200043HA	0.08	–	0.16
4.40	6	64	36	102	120200044HA	0.08	–	0.16
4.50	6	64	36	102	120200045HA	0.08	–	0.16
4.60	6	64	36	102	120200046HA	0.08	–	0.16
4.70	6	64	36	102	120200047HA	0.08	–	0.16
4.80	6	78	36	116	120200048HA	0.08	–	0.16
4.90	6	78	36	116	120200049HA	0.08	–	0.16
5.00	6	78	36	116	120200050HA	0.09	–	0.20
5.10	6	78	36	116	120200051HA	0.09	–	0.20
5.20	6	78	36	116	120200052HA	0.09	–	0.20
5.30	6	78	36	116	120200053HA	0.09	–	0.20
5.40	6	78	36	116	120200054HA	0.09	–	0.20
5.50	6	78	36	116	120200055HA	0.09	–	0.20
5.60	6	78	36	116	120200056HA	0.09	–	0.20
5.70	6	78	36	116	120200057HA	0.09	–	0.20
5.80	6	78	36	116	120200058HA	0.09	–	0.20
5.90	6	78	36	116	120200059HA	0.09	–	0.20
6.00	6	78	36	116	120200060HA	0.10	–	0.23
6.10	8	108	36	146	120200061HA	0.10	–	0.23
6.20	8	108	36	146	120200062HA	0.10	–	0.23
6.30	8	108	36	146	120200063HA	0.10	–	0.23
6.40	8	108	36	146	120200064HA	0.10	–	0.23
6.50	8	108	36	146	120200065HA	0.10	–	0.23
6.60	8	108	36	146	120200066HA	0.10	–	0.23
6.70	8	108	36	146	120200067HA	0.10	–	0.23
6.80	8	108	36	146	120200068HA	0.10	–	0.23
6.90	8	108	36	146	120200069HA	0.10	–	0.23
7.00	8	108	36	146	120200070HA	0.11	–	0.25
7.10	8	108	36	146	120200071HA	0.11	–	0.25
7.20	8	108	36	146	120200072HA	0.11	–	0.25
7.30	8	108	36	146	120200073HA	0.11	–	0.25
7.40	8	108	36	146	120200074HA	0.11	–	0.25
7.50	8	108	36	146	120200075HA	0.11	–	0.25
7.60	8	108	36	146	120200076HA	0.11	–	0.25
7.70	8	108	36	146	120200077HA	0.11	–	0.25
7.80	8	108	36	146	120200078HA	0.11	–	0.25
7.90	8	108	36	146	120200079HA	0.11	–	0.25
8.00	8	108	36	146	120200080HA	0.11	–	0.27
8.10	10	120	40	162	120200081HA	0.11	–	0.27
8.20	10	120	40	162	120200082HA	0.11	–	0.27
8.30	10	120	40	162	120200083HA	0.11	–	0.27
8.40	10	120	40	162	120200084HA	0.11	–	0.27
8.50	10	120	40	162	120200085HA	0.11	–	0.27
8.60	10	120	40	162	120200086HA	0.11	–	0.27
8.70	10	120	40	162	120200087HA	0.11	–	0.27
8.80	10	120	40	162	120200088HA	0.11	–	0.27
8.90	10	120	40	162	120200089HA	0.11	–	0.27
9.00	10	120	40	162	120200090HA	0.12	–	0.28
9.10	10	120	40	162	120200091HA	0.12	–	0.28
9.20	10	120	40	162	120200092HA	0.12	–	0.28
9.30	10	120	40	162	120200093HA	0.12	–	0.28
9.40	10	120	40	162	120200094HA	0.12	–	0.28

Product family (111)

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	Feed mm/rev
9.50	10	120	40	162	120200095HA	0.12 – 0.28
9.60	10	120	40	162	120200096HA	0.12 – 0.28
9.70	10	120	40	162	120200097HA	0.12 – 0.28
9.80	10	120	40	162	120200098HA	0.12 – 0.28
9.90	10	120	40	162	120200099HA	0.12 – 0.28
10.00	10	120	40	162	120200100HA	0.13 – 0.30
10.20	12	156	45	204	120200102HA	0.13 – 0.30
10.50	12	156	45	204	120200105HA	0.13 – 0.30
11.00	12	156	45	204	120200110HA	0.14 – 0.32
11.50	12	156	45	204	120200115HA	0.14 – 0.32
12.00	12	156	45	204	120200120HA	0.15 – 0.32
12.50	14	182	45	230	120200125HA	0.15 – 0.32
12.70	14	182	45	230	120200127HA	0.15 – 0.32
13.00	14	182	45	230	120200130HA	0.15 – 0.32
13.50	14	182	45	230	120200135HA	0.15 – 0.32
14.00	14	182	45	230	120200140HA	0.16 – 0.35
14.50	16	208	48	260	120200145HA	0.16 – 0.35
15.00	16	208	48	260	120200150HA	0.16 – 0.35
15.50	16	208	48	260	120200155HA	0.16 – 0.35
16.00	16	208	48	260	120200160HA	0.17 – 0.37
16.50	18	234	48	285	120200165HA	0.17 – 0.37
17.00	18	234	48	285	120200170HA	0.17 – 0.37
17.50	18	234	48	285	120200175HA	0.17 – 0.37
18.00	18	234	48	285	120200180HA	0.18 – 0.40
18.50	20	258	50	310	120200185HA	0.18 – 0.40
19.00	20	258	50	310	120200190HA	0.18 – 0.40
19.50	20	258	50	310	120200195HA	0.18 – 0.40
20.00	20	258	50	310	120200200HA	0.20 – 0.45

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	140	150	120

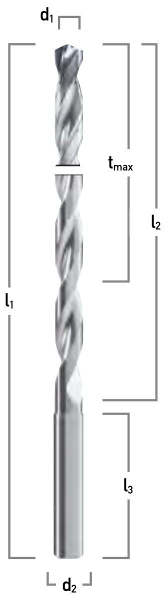
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	55	120	60

Product family 111

200200

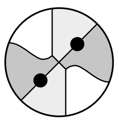
TiAlN | HA | 20xD | VHM | 40 bar | 135° | Manu-facturer standard

Solid Carbide Deep-Hole Drill 20xD
with Internal Coolant



d_1	d_2	l_2	l_3	l_1	HA	Feed		
mm	mm	mm	mm	mm	Part No.	mm/rev		
3.00	6	70	36	110	200200030HA	0.06	–	0.14
3.50	6	96	36	136	200200035HA	0.06	–	0.14
3.97	6	96	36	136	2002000397HA	0.06	–	0.14
4.00	6	96	36	136	200200040HA	0.08	–	0.16
4.50	6	118	36	158	200200045HA	0.08	–	0.16
4.76	6	118	36	158	2002000476HA	0.08	–	0.16
5.00	6	118	36	158	200200050HA	0.09	–	0.20
5.50	6	140	36	180	200200055HA	0.09	–	0.20
5.56	6	140	36	180	2002000556HA	0.09	–	0.20
6.00	6	140	36	180	200200060HA	0.10	–	0.23
6.35	8	162	36	202	2002000635HA	0.10	–	0.23
6.50	8	162	36	202	200200065HA	0.10	–	0.23
7.00	8	162	36	202	200200070HA	0.11	–	0.25
7.14	8	183	36	223	2002000714HA	0.11	–	0.25
7.50	8	183	36	223	200200075HA	0.11	–	0.25
8.00	8	183	36	223	200200080HA	0.11	–	0.27
8.50	10	205	40	249	200200085HA	0.11	–	0.27
9.00	10	205	40	249	200200090HA	0.12	–	0.28
10.00	10	227	40	271	200200100HA	0.13	–	0.30
12.00	12	274	45	323	200200120HA	0.15	–	0.32
14.00	14	318	45	367	200200140HA	0.16	–	0.35

$t_{max} = l_2 - 1.5 \times d_1$



d_1
h7

- Deep-hole drill for universal applications
- Ultra-micro grain solid carbide with TiAlN coating
- 4 margins for concentricity and alignment accuracy
- Optimized geometry for an optimum chip breaking and a high level of process reliability.

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	140	150	120

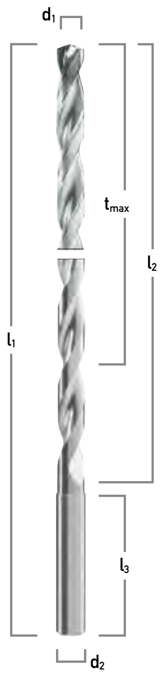
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	75	120	60

Product family 111

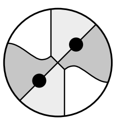
250200

TiAlN | HA | 25xD | VHM | 40 bar | 135° | Manu-facturer standard

Solid Carbide Deep-Hole Drill 25xD
with Internal Coolant



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



d_1
h7

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	Feed mm/rev
3.00	6	85	36	125	250200030HA	0.06 – 0.14
3.50	6	116	36	156	250200035HA	0.06 – 0.14
3.97	6	116	36	156	2502000397HA	0.06 – 0.14
4.00	6	116	36	156	250200040HA	0.08 – 0.16
4.50	6	143	36	183	250200045HA	0.08 – 0.16
4.76	6	143	36	183	2502000476HA	0.08 – 0.16
5.00	6	143	36	183	250200050HA	0.09 – 0.20
5.50	6	170	36	210	250200055HA	0.09 – 0.20
5.56	6	170	36	210	2502000556HA	0.09 – 0.20
6.00	6	170	36	210	250200060HA	0.10 – 0.23
6.35	8	197	36	237	2502000635HA	0.10 – 0.23
6.50	8	197	36	237	250200065HA	0.10 – 0.23
7.00	8	197	36	237	250200070HA	0.11 – 0.25
7.14	8	223	36	263	2502000714HA	0.11 – 0.25
7.50	8	223	36	263	250200075HA	0.11 – 0.25
8.00	8	223	36	263	250200080HA	0.11 – 0.27
8.50	10	250	40	294	250200085HA	0.11 – 0.27
9.00	10	250	40	294	250200090HA	0.12 – 0.28
10.00	10	277	40	321	250200100HA	0.13 – 0.30
12.00	12	337	45	386	250200120HA	0.15 – 0.32

· Deep-hole drill for universal applications
· Ultra-micro grain solid carbide with TiAlN coating
· 4 margins for concentricity and alignment accuracy
· Optimized geometry for an optimum chip breaking and a high level of process reliability.

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	140	150	120

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	75	120	60

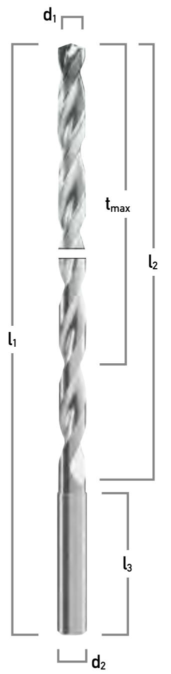
Product family 111

300200

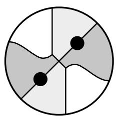
TiAlN | HA | 30xD | VHM | 40 bar | 135° | Manu-facturer standard

Solid Carbide Deep-Hole Drill 30xD

with Internal Coolant



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



d_1
h7

d_1	d_2	l_2	l_3	l_1	HA	Feed
mm	mm	mm	mm	mm	Part No.	mm/rev
3.00	6	100	36	140	300200030HA	0.06 – 0.14
3.50	6	136	36	176	300200035HA	0.06 – 0.14
3.97	6	136	36	176	3002000397HA	0.06 – 0.14
4.00	6	136	36	176	300200040HA	0.08 – 0.16
4.50	6	168	36	208	300200045HA	0.08 – 0.16
4.76	6	168	36	208	3002000476HA	0.08 – 0.16
5.00	6	168	36	208	300200050HA	0.09 – 0.20
5.50	6	200	36	240	300200055HA	0.09 – 0.20
5.56	6	200	36	240	3002000556HA	0.09 – 0.20
6.00	6	200	36	240	300200060HA	0.10 – 0.23
6.35	8	232	36	272	3002000635HA	0.10 – 0.23
6.50	8	232	36	272	300200065HA	0.10 – 0.23
7.00	8	232	36	272	300200070HA	0.11 – 0.25
7.14	8	263	36	303	3002000714HA	0.11 – 0.25
7.50	8	263	36	303	300200075HA	0.11 – 0.25
8.00	8	263	36	303	300200080HA	0.11 – 0.27
8.50	10	295	40	339	300200085HA	0.11 – 0.27
9.00	10	295	40	339	300200090HA	0.12 – 0.28
10.00	10	327	40	371	300200100HA	0.13 – 0.30

· Deep-hole drill for universal applications
· Ultra-micro grain solid carbide with TiAlN coating
· 4 margins for concentricity and alignment accuracy
· Optimized geometry for an optimum chip breaking and a high level of process reliability.

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	140	150	120

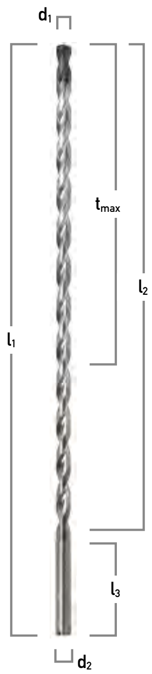
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	75	120	60

Product family 111

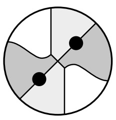
400200

TiAlN | HA | 40xD | VHM | 40 bar | 135° | Manu-facturer standard

Solid Carbide Deep-Hole Drill 40xD
with Internal Coolant



$t_{max} = l_2 - 1.5 \times d_1$



d_1
h7

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	Feed mm/rev
3.00	6	130	36	170	400200030HA	0.06 – 0.14
3.17	6	153	36	193	4002000317HA	0.06 – 0.14
3.50	6	153	36	193	400200035HA	0.06 – 0.14
3.97	6	176	36	216	4002000397HA	0.06 – 0.14
4.00	6	176	36	216	400200040HA	0.08 – 0.16
4.50	6	198	36	238	400200045HA	0.08 – 0.16
4.76	6	218	36	258	4002000476HA	0.08 – 0.16
5.00	6	218	36	258	400200050HA	0.09 – 0.20
5.50	6	240	36	280	400200055HA	0.09 – 0.20
5.56	6	260	36	300	4002000556HA	0.09 – 0.20
6.00	6	260	36	300	400200060HA	0.10 – 0.23
6.35	8	282	36	322	4002000635HA	0.10 – 0.23
6.50	8	282	36	322	400200065HA	0.10 – 0.23
7.00	8	302	36	342	400200070HA	0.11 – 0.25
7.14	8	323	36	363	4002000714HA	0.11 – 0.25
7.50	8	323	36	363	400200075HA	0.11 – 0.25
8.00	8	343	36	383	400200080HA	0.11 – 0.27

· Deep-hole drill for universal applications
· Ultra-micro grain solid carbide with TiAlN coating
· 4 margins for concentricity and alignment accuracy
· Optimized geometry for an optimum chip breaking and a high level of process reliability.

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	140	150	120

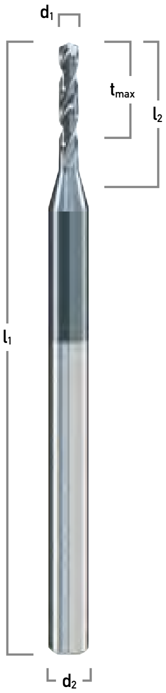
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	> 260 HB
V_c (m/min)	120	110	105	105	45	85	75	120	60

Product family 111

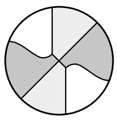
41100

TiAlN | HA | 4xD | VHM | 140° | Manu-facturer standard

Solid Carbide Miniature Spiral Drill 4xD
w/o Internal Coolant



$t_{max} = l_2 - 1.5 \times d_1$



d_1
m7

d_1	d_2	l_2	l_1	HA	Feed
mm	mm	mm	mm	Part No.	mm/rev
0.80	3	4.80	47	41100008HA	0.008 – 0.09
0.85	3	5.10	47	411000085HA	0.008 – 0.09
0.90	3	5.40	47	41100009HA	0.008 – 0.09
0.95	3	5.70	47	411000095HA	0.008 – 0.09
1.00	3	6.00	47	41100010HA	0.012 – 0.12
1.05	3	6.30	47	411000105HA	0.012 – 0.12
1.10	3	6.60	47	41100011HA	0.012 – 0.12
1.15	3	6.90	47	411000115HA	0.012 – 0.12
1.20	3	7.20	47	41100012HA	0.012 – 0.12
1.25	3	7.50	47	411000125HA	0.012 – 0.12
1.30	3	7.80	47	41100013HA	0.012 – 0.12
1.35	3	8.10	47	411000135HA	0.012 – 0.12
1.40	3	8.40	47	41100014HA	0.012 – 0.12
1.45	3	8.70	47	411000145HA	0.012 – 0.12
1.50	3	9.00	47	41100015HA	0.021 – 0.18
1.55	3	9.30	47	411000155HA	0.021 – 0.18
1.60	3	9.60	47	41100016HA	0.021 – 0.18
1.65	3	9.90	47	411000165HA	0.021 – 0.18
1.70	3	10.20	47	41100017HA	0.021 – 0.18
1.75	3	10.50	47	411000175HA	0.021 – 0.18
1.80	3	10.80	52	41100018HA	0.021 – 0.18
1.85	3	11.10	52	411000185HA	0.021 – 0.18
1.90	3	11.40	52	41100019HA	0.021 – 0.18
1.95	3	11.70	52	411000195HA	0.021 – 0.18
2.00	4	12.00	59	41100020HA	0.032 – 0.24
2.05	4	12.30	59	411000205HA	0.032 – 0.24
2.10	4	12.60	59	41100021HA	0.032 – 0.24
2.15	4	12.90	59	411000215HA	0.032 – 0.24
2.20	4	13.20	59	41100022HA	0.032 – 0.24
2.25	4	13.50	59	411000225HA	0.032 – 0.24
2.30	4	13.80	59	41100023HA	0.032 – 0.24
2.35	4	14.10	59	411000235HA	0.032 – 0.24
2.40	4	14.40	59	41100024HA	0.032 – 0.24
2.45	4	14.70	59	411000245HA	0.032 – 0.24
2.50	4	15.00	59	41100025HA	0.045 – 0.30
2.55	4	15.30	59	411000255HA	0.045 – 0.30
2.60	4	15.60	59	41100026HA	0.045 – 0.30
2.65	4	15.90	59	411000265HA	0.045 – 0.30
2.70	4	16.20	59	41100027HA	0.045 – 0.30
2.75	4	16.50	59	411000275HA	0.045 – 0.30
2.80	4	16.80	59	41100028HA	0.045 – 0.30
2.85	4	17.10	59	411000285HA	0.045 – 0.30
2.90	4	17.40	59	41100029HA	0.045 – 0.30
2.95	4	17.70	59	411000295HA	0.045 – 0.30
3.00	4	18.00	59	41100030HA	0.060 – 0.36

- Miniature drill for universal applications
- Made from ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the optimized geometry provide an optimum chip breaking and the highest level of process reliability
- No chip clearing even with deeper drilling holes
- MQL-suitable

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	70	135	120

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 100 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	< 240HB
V_c (m/min)	105	90	90	50	50	70	50	130	140

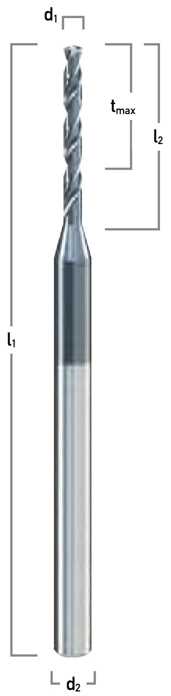
Product family 111

70100

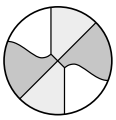
TiAlN | HA | 7xD | VHM | 140° | Manu-facturer standard

Solid Carbide Miniature Spiral Drill 7xD

w/o Internal Coolant



$t_{max} = l_2 - 1.5 \times d_1$



d_1
m7

d_1	d_2	l_2	l_1	HA	Feed
mm	mm	mm	mm	Part No.	mm/rev
0.80	3	6.40	47	70100008HA	0.008 – 0.09
0.85	3	6.80	47	701000085HA	0.008 – 0.09
0.90	3	7.20	47	70100009HA	0.008 – 0.09
0.95	3	7.60	47	701000095HA	0.008 – 0.09
1.00	3	8.00	47	70100010HA	0.012 – 0.12
1.05	3	8.40	47	701000105HA	0.012 – 0.12
1.10	3	8.80	47	70100011HA	0.012 – 0.12
1.15	3	9.20	47	701000115HA	0.012 – 0.12
1.20	3	10.80	52	70100012HA	0.012 – 0.12
1.25	3	11.30	52	701000125HA	0.012 – 0.12
1.30	3	11.70	52	70100013HA	0.012 – 0.12
1.35	3	12.20	52	701000135HA	0.012 – 0.12
1.40	3	12.60	52	70100014HA	0.012 – 0.12
1.45	3	13.10	52	701000145HA	0.012 – 0.12
1.50	3	13.50	52	70100015HA	0.021 – 0.18
1.55	3	14.00	52	701000155HA	0.021 – 0.18
1.60	3	14.40	52	70100016HA	0.021 – 0.18
1.65	3	15.18	52	701000165HA	0.021 – 0.18
1.70	3	15.30	52	70100017HA	0.021 – 0.18
1.75	3	15.80	52	701000175HA	0.021 – 0.18
1.80	3	16.20	52	70100018HA	0.021 – 0.18
1.85	3	16.70	52	701000185HA	0.021 – 0.18
1.90	3	17.10	52	70100019HA	0.021 – 0.18
1.95	3	17.60	52	701000195HA	0.021 – 0.18
2.00	4	18.00	63	70100020HA	0.032 – 0.24
2.05	4	18.50	63	701000205HA	0.032 – 0.24
2.10	4	18.90	63	70100021HA	0.032 – 0.24
2.15	4	19.40	63	701000215HA	0.032 – 0.24
2.20	4	19.80	63	70100022HA	0.032 – 0.24
2.25	4	20.30	63	701000225HA	0.032 – 0.24
2.30	4	20.70	63	70100023HA	0.032 – 0.24
2.35	4	21.20	63	701000235HA	0.032 – 0.24
2.40	4	21.60	63	70100024HA	0.032 – 0.24
2.45	4	22.10	63	701000245HA	0.032 – 0.24
2.50	4	22.50	63	70100025HA	0.045 – 0.30
2.55	4	23.00	63	701000255HA	0.045 – 0.30
2.60	4	23.40	67	70100026HA	0.045 – 0.30
2.65	4	23.90	67	701000265HA	0.045 – 0.30
2.70	4	24.30	67	70100027HA	0.045 – 0.30
2.75	4	24.80	67	701000275HA	0.045 – 0.30
2.80	4	25.20	67	70100028HA	0.045 – 0.30
2.85	4	25.70	67	701000285HA	0.045 – 0.30
2.90	4	26.10	67	70100029HA	0.045 – 0.30
2.95	4	27.11	67	701000295HA	0.045 – 0.30
3.00	4	27.00	67	70100030HA	0.060 – 0.36

- Universal miniature drill made from ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the optimized geometry provide an optimum chip breaking and the highest level of process reliability
- No chip clearing even with deeper drilling holes
- MQL-suitable

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	70	135	120

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	< 240HB
V_c (m/min)	105	90	90	50	50	70	50	130	140

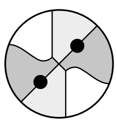
Product family 111

81200

TiAlN | HA | 8xD | VHM | 40 bar | 140° | Manu-facturer standard

Solid Carbide Miniature Spiral Drill 8xD
with Internal Coolant

$t_{max} = l_2 - 1.5 \times d_1$



d_1
h7

d_1 mm	d_2 mm	l_2 mm	l_1 mm	HA Part No.	Feed mm/rev
1.40	4	15	52	81200014HA	0.012 – 0.12
1.45	4	16	52	812000145HA	0.012 – 0.12
1.50	4	17	52	81200015HA	0.021 – 0.18
1.55	4	17	52	812000155HA	0.021 – 0.18
1.59	4	18	52	812000159HA	0.021 – 0.18
1.60	4	18	52	81200016HA	0.021 – 0.18
1.65	4	18	52	812000165HA	0.021 – 0.18
1.70	4	19	56	81200017HA	0.021 – 0.18
1.75	4	19	56	812000175HA	0.021 – 0.18
1.80	4	20	56	81200018HA	0.021 – 0.18
1.85	4	20	56	812000185HA	0.021 – 0.18
1.90	4	21	56	81200019HA	0.021 – 0.18
1.95	4	21	56	812000195HA	0.021 – 0.18
1.98	4	22	56	812000198HA	0.021 – 0.18
2.00	4	22	56	81200020HA	0.032 – 0.24
2.05	4	23	56	812000205HA	0.032 – 0.24
2.10	4	23	62	81200021HA	0.032 – 0.24
2.15	4	24	62	812000215HA	0.032 – 0.24
2.20	4	24	62	81200022HA	0.032 – 0.24
2.25	4	25	62	812000225HA	0.032 – 0.24
2.30	4	25	62	81200023HA	0.032 – 0.24
2.35	4	26	62	812000235HA	0.032 – 0.24
2.38	4	26	62	812000238HA	0.032 – 0.24
2.40	4	26	62	81200024HA	0.032 – 0.24
2.45	4	27	62	812000245HA	0.032 – 0.24
2.50	4	28	62	81200025HA	0.045 – 0.30
2.55	4	28	62	812000255HA	0.045 – 0.30
2.60	4	29	66	81200026HA	0.045 – 0.30
2.65	4	29	66	812000265HA	0.045 – 0.30
2.70	4	30	66	81200027HA	0.045 – 0.30
2.75	4	30	66	812000275HA	0.045 – 0.30
2.78	4	31	66	812000278HA	0.045 – 0.30
2.80	4	31	66	81200028HA	0.045 – 0.30
2.85	4	31	66	812000285HA	0.045 – 0.30
2.90	4	32	66	81200029HA	0.045 – 0.30
2.95	4	32	66	812000295HA	0.045 – 0.30
3.00	4	33	66	81200030HA	0.060 – 0.36

- Miniature drill for universal applications
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the optimized geometry provide an optimum chip breaking and the highest level of process reliability.
- No chip clearing even with deeper drilling holes
- MQL-suitable
- **Application instruction:** To ensure a high level of process reliability we recommend a 142° centering and a pilot hole drilling.

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	90	160	140

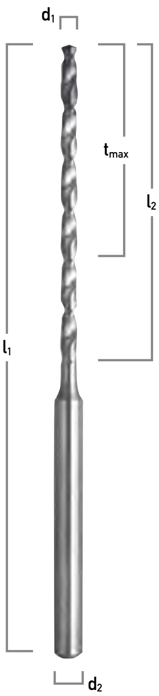
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	< 240HB
V_c (m/min)	105	90	90	50	50	70	60	130	140

Product family 111

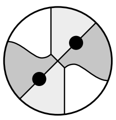
150200

TiAlN | HA | 15xD | VHM | 40 bar | 140° | Manu-facturer standard

Solid Carbide Miniature Spiral Drill 15xD
with Internal Coolant



$t_{max} = l_2 - 1.5 \times d_1$



d_1
h7

d_1	d_2	l_2	l_1	HA	Feed
mm	mm	mm	mm	Part No.	mm/rev
1.40	4	25	62	150200014HA	0.012 – 0.12
1.50	4	27	62	150200015HA	0.021 – 0.18
1.59	4	29	62	1502000159HA	0.021 – 0.18
1.60	4	29	62	150200016HA	0.021 – 0.18
1.70	4	31	70	150200017HA	0.021 – 0.18
1.80	4	32	70	150200018HA	0.021 – 0.18
1.90	4	34	70	150200019HA	0.021 – 0.18
1.98	4	36	70	1502000198HA	0.021 – 0.18
2.00	4	36	70	150200020HA	0.032 – 0.24
2.10	4	38	78	150200021HA	0.032 – 0.24
2.20	4	40	78	150200022HA	0.032 – 0.24
2.30	4	42	78	150200023HA	0.032 – 0.24
2.40	4	44	78	150200024HA	0.032 – 0.24
2.50	4	45	78	150200025HA	0.045 – 0.30
2.60	4	47	87	150200026HA	0.045 – 0.30
2.70	4	48	87	150200027HA	0.045 – 0.30
2.78	4	50	87	1502000278HA	0.045 – 0.30
2.80	4	50	87	150200028HA	0.045 – 0.30
2.90	4	52	87	150200029HA	0.045 – 0.30
3.00	4	54	87	150200030HA	0.060 – 0.36

- Miniature drill for universal applications
- Ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the optimized geometry provide an optimum chip breaking and the highest level of process reliability.
- No chip clearing even with deeper drilling holes
- MQL-suitable
- **Application instruction:** To ensure a high level of process reliability we recommend a 142° centering and a pilot hole drilling.

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si
Tensile strength/ Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²
V_c (m/min)	90	160	140

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Steel	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 650 N/mm²	< 240HB
V_c (m/min)	105	90	90	50	50	70	60	130	140

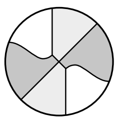
Product family 111

31000

TiAlN	HA	HB	3xD	VHM	140°	Manu-facturer standard

Solid Carbide High-Performance Drill INOX 3xD
w/o Internal Coolant

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



d_1
m7

- High performance drill for the treatment of INOX, Duplex, Titanium and heat-resisting alloys
- Made from ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
1.00	4	7	28	45	31000010HA	–	0.02 – 0.03
1.10	4	7	28	45	31000011HA	–	0.02 – 0.03
1.20	4	7	28	45	31000012HA	–	0.02 – 0.03
1.30	4	7	28	45	31000013HA	–	0.02 – 0.03
1.40	4	7	28	45	31000014HA	–	0.02 – 0.03
1.50	4	14	28	55	31000015HA	–	0.02 – 0.03
1.60	4	14	28	55	31000016HA	–	0.02 – 0.03
1.70	4	14	28	55	31000017HA	–	0.02 – 0.03
1.80	4	14	28	55	31000018HA	–	0.02 – 0.03
1.90	4	14	28	55	31000019HA	–	0.02 – 0.03
2.00	4	20	28	55	31000020HA	–	0.03 – 0.04
2.10	4	20	28	55	31000021HA	–	0.03 – 0.04
2.15	4	20	28	55	310000215HA	–	0.03 – 0.04
2.20	4	20	28	55	31000022HA	–	0.03 – 0.04
2.30	4	20	28	55	31000023HA	–	0.03 – 0.04
2.40	4	20	28	55	31000024HA	–	0.03 – 0.04
2.50	4	20	28	55	31000025HA	–	0.03 – 0.04
2.60	4	20	28	55	31000026HA	–	0.03 – 0.04
2.65	4	20	28	55	310000265HA	–	0.03 – 0.04
2.70	4	20	28	55	31000027HA	–	0.03 – 0.04
2.80	4	20	28	55	31000028HA	–	0.03 – 0.04
2.85	4	20	28	55	310000285HA	–	0.03 – 0.04
2.90	4	20	28	55	31000029HA	–	0.03 – 0.04
3.00	6	20	36	62	31000030HA	31000030HB	0.06 – 0.08
3.10	6	20	36	62	31000031HA	31000031HB	0.06 – 0.08
3.20	6	20	36	62	31000032HA	31000032HB	0.06 – 0.08
3.25	6	20	36	62	310000325HA	310000325HB	0.06 – 0.08
3.30	6	20	36	62	31000033HA	31000033HB	0.06 – 0.08
3.40	6	20	36	62	31000034HA	31000034HB	0.06 – 0.08
3.50	6	20	36	62	31000035HA	31000035HB	0.06 – 0.08
3.60	6	20	36	62	31000036HA	31000036HB	0.06 – 0.08
3.70	6	20	36	62	31000037HA	31000037HB	0.06 – 0.08
3.80	6	24	36	66	31000038HA	31000038HB	0.06 – 0.08
3.90	6	24	36	66	31000039HA	31000039HB	0.06 – 0.08
4.00	6	24	36	66	31000040HA	31000040HB	0.06 – 0.08
4.10	6	24	36	66	31000041HA	31000041HB	0.06 – 0.08
4.20	6	24	36	66	31000042HA	31000042HB	0.06 – 0.08
4.30	6	24	36	66	31000043HA	31000043HB	0.06 – 0.08
4.40	6	24	36	66	31000044HA	31000044HB	0.06 – 0.08
4.50	6	24	36	66	31000045HA	31000045HB	0.06 – 0.08
4.60	6	24	36	66	31000046HA	31000046HB	0.06 – 0.08
4.65	6	24	36	66	310000465HA	310000465HB	0.06 – 0.08
4.70	6	24	36	66	31000047HA	31000047HB	0.06 – 0.08
4.80	6	28	36	66	31000048HA	31000048HB	0.06 – 0.08
4.90	6	28	36	66	31000049HA	31000049HB	0.06 – 0.08
5.00	6	28	36	66	31000050HA	31000050HB	0.07 – 0.09
5.10	6	28	36	66	31000051HA	31000051HB	0.07 – 0.09
5.20	6	28	36	66	31000052HA	31000052HB	0.07 – 0.09
5.30	6	28	36	66	31000053HA	31000053HB	0.07 – 0.09
5.40	6	28	36	66	31000054HA	31000054HB	0.07 – 0.09
5.50	6	28	36	66	31000055HA	31000055HB	0.07 – 0.09
5.55	6	28	36	66	310000555HA	310000555HB	0.07 – 0.09
5.60	6	28	36	66	31000056HA	31000056HB	0.07 – 0.09
5.70	6	28	36	66	31000057HA	31000057HB	0.07 – 0.09
5.80	6	28	36	66	31000058HA	31000058HB	0.07 – 0.09
5.90	6	28	36	66	31000059HA	31000059HB	0.07 – 0.09
6.00	6	28	36	66	31000060HA	31000060HB	0.07 – 0.09
6.10	8	34	36	79	31000061HA	31000061HB	0.07 – 0.09
6.20	8	34	36	79	31000062HA	31000062HB	0.07 – 0.09
6.30	8	34	36	79	31000063HA	31000063HB	0.07 – 0.09
6.40	8	34	36	79	31000064HA	31000064HB	0.07 – 0.09
6.50	8	34	36	79	31000065HA	31000065HB	0.07 – 0.09
6.60	8	34	36	79	31000066HA	31000066HB	0.07 – 0.09
6.70	8	34	36	79	31000067HA	31000067HB	0.07 – 0.09
6.80	8	34	36	79	31000068HA	31000068HB	0.07 – 0.09
6.90	8	34	36	79	31000069HA	31000069HB	0.07 – 0.09
7.00	8	34	36	79	31000070HA	31000070HB	0.09 – 0.10
7.10	8	41	36	79	31000071HA	31000071HB	0.09 – 0.10
7.20	8	41	36	79	31000072HA	31000072HB	0.09 – 0.10
7.30	8	41	36	79	31000073HA	31000073HB	0.09 – 0.10
7.40	8	41	36	79	31000074HA	31000074HB	0.09 – 0.10

Product family 111

d_1	d_2	l_2	l_3	l_1	HA	HB	Feed		
mm	mm	mm	mm	mm	Part No.	Part No.	mm/rev		
7.45	8	41	36	79	310000745HA	310000745HB	0.09	–	0.10
7.50	8	41	36	79	31000075HA	31000075HB	0.09	–	0.10
7.55	8	41	36	79	310000755HA	310000755HB	0.09	–	0.10
7.60	8	41	36	79	31000076HA	31000076HB	0.09	–	0.10
7.70	8	41	36	79	31000077HA	31000077HB	0.09	–	0.10
7.80	8	41	36	79	31000078HA	31000078HB	0.09	–	0.10
7.90	8	41	36	79	31000079HA	31000079HB	0.09	–	0.10
8.00	8	41	36	79	31000080HA	31000080HB	0.10	–	0.12
8.10	10	47	40	89	31000081HA	31000081HB	0.10	–	0.12
8.20	10	47	40	89	31000082HA	31000082HB	0.10	–	0.12
8.30	10	47	40	89	31000083HA	31000083HB	0.10	–	0.12
8.40	10	47	40	89	31000084HA	31000084HB	0.10	–	0.12
8.50	10	47	40	89	31000085HA	31000085HB	0.10	–	0.12
8.60	10	47	40	89	31000086HA	31000086HB	0.10	–	0.12
8.70	10	47	40	89	31000087HA	31000087HB	0.10	–	0.12
8.80	10	47	40	89	31000088HA	31000088HB	0.10	–	0.12
8.90	10	47	40	89	31000089HA	31000089HB	0.10	–	0.12
9.00	10	47	40	89	31000090HA	31000090HB	0.10	–	0.12
9.10	10	47	40	89	31000091HA	31000091HB	0.10	–	0.12
9.20	10	47	40	89	31000092HA	31000092HB	0.10	–	0.12
9.30	10	47	40	89	31000093HA	31000093HB	0.10	–	0.12
9.35	10	47	40	89	310000935HA	310000935HB	0.10	–	0.12
9.40	10	47	40	89	31000094HA	31000094HB	0.10	–	0.12
9.50	10	47	40	89	31000095HA	31000095HB	0.10	–	0.12
9.55	10	47	40	89	310000955HA	310000955HB	0.10	–	0.12
9.60	10	47	40	89	31000096HA	31000096HB	0.10	–	0.12
9.70	10	47	40	89	31000097HA	31000097HB	0.10	–	0.12
9.80	10	47	40	89	31000098HA	31000098HB	0.10	–	0.12
9.90	10	47	40	89	31000099HA	31000099HB	0.10	–	0.12
10.00	10	47	40	89	31000100HA	31000100HB	0.10	–	0.12
10.10	12	55	45	102	31000101HA	31000101HB	0.10	–	0.12
10.20	12	55	45	102	31000102HA	31000102HB	0.10	–	0.12
10.30	12	55	45	102	31000103HA	31000103HB	0.10	–	0.12
10.40	12	55	45	102	31000104HA	31000104HB	0.10	–	0.12
10.50	12	55	45	102	31000105HA	31000105HB	0.10	–	0.12
10.60	12	55	45	102	31000106HA	31000106HB	0.10	–	0.12
10.70	12	55	45	102	31000107HA	31000107HB	0.10	–	0.12
10.80	12	55	45	102	31000108HA	31000108HB	0.10	–	0.12
10.90	12	55	45	102	31000109HA	31000109HB	0.10	–	0.12
11.00	12	55	45	102	31000110HA	31000110HB	0.10	–	0.12
11.10	12	55	45	102	31000111HA	31000111HB	0.10	–	0.12
11.20	12	55	45	102	31000112HA	31000112HB	0.10	–	0.12
11.30	12	55	45	102	31000113HA	31000113HB	0.10	–	0.12
11.40	12	55	45	102	31000114HA	31000114HB	0.10	–	0.12
11.50	12	55	45	102	31000115HA	31000115HB	0.10	–	0.12
11.60	12	55	45	102	31000116HA	31000116HB	0.10	–	0.12
11.70	12	55	45	102	31000117HA	31000117HB	0.10	–	0.12
11.80	12	55	45	102	31000118HA	31000118HB	0.10	–	0.12
11.90	12	55	45	102	31000119HA	31000119HB	0.10	–	0.12
12.00	12	55	45	102	31000120HA	31000120HB	0.14	–	0.16
12.20	14	60	45	107	31000122HA	31000122HB	0.14	–	0.16
12.50	14	60	45	107	31000125HA	31000125HB	0.14	–	0.16
12.70	14	60	45	107	31000127HA	31000127HB	0.14	–	0.16
12.80	14	60	45	107	31000128HA	31000128HB	0.14	–	0.16
13.00	14	60	45	107	31000130HA	31000130HB	0.14	–	0.16
13.50	14	60	45	107	31000135HA	31000135HB	0.14	–	0.16
13.80	14	60	45	107	31000138HA	31000138HB	0.14	–	0.16
14.00	14	60	45	107	31000140HA	31000140HB	0.14	–	0.16
14.20	16	65	48	115	31000142HA	31000142HB	0.14	–	0.16
14.50	16	65	48	115	31000145HA	31000145HB	0.14	–	0.16
14.80	16	65	48	115	31000148HA	31000148HB	0.14	–	0.16
15.00	16	65	48	115	31000150HA	31000150HB	0.14	–	0.16
15.30	16	65	48	115	31000153HA	31000153HB	0.14	–	0.16
15.50	16	65	48	115	31000155HA	31000155HB	0.14	–	0.16
15.80	16	65	48	115	31000158HA	31000158HB	0.14	–	0.16
16.00	16	65	48	115	31000160HA	31000160HB	0.15	–	0.17
16.50	18	73	48	123	31000165HA	31000165HB	0.15	–	0.17
16.80	18	73	48	123	31000168HA	31000168HB	0.15	–	0.17
17.00	18	73	48	123	31000170HA	31000170HB	0.15	–	0.17
17.50	18	73	48	123	31000175HA	31000175HB	0.15	–	0.17
17.70	18	73	48	123	31000177HA	31000177HB	0.15	–	0.17
17.80	18	73	48	123	31000178HA	31000178HB	0.15	–	0.17
18.00	18	73	48	123	31000180HA	31000180HB	0.15	–	0.17
18.50	20	79	50	131	31000185HA	31000185HB	0.15	–	0.17
18.80	20	79	50	131	31000188HA	31000188HB	0.15	–	0.17
19.00	20	79	50	131	31000190HA	31000190HB	0.15	–	0.17
19.50	20	79	50	131	31000195HA	31000195HB	0.15	–	0.17
19.80	20	79	50	131	31000198HA	31000198HB	0.15	–	0.17
20.00	20	79	50	131	31000200HA	31000200HB	0.15	–	0.17

Material	Stainless steels	Stainless steels	Super alloys	Titanium materials
Tensile strength/Hardness	< 750 N/mm²	< 850 N/mm²	> 260 HB	< 1400 N/mm²
V_c (m/min)	70	60	30	45

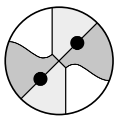
Product family 111

31300

TiAlN | HA | HB | HE* | 3xD | VHM | 25 bar | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill INOX 3xD with Internal Coolant

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



d_1
m7

- High performance drill for the treatment of INOX, Duplex, Titanium and heat-resisting alloys
- Made from ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
2.00	4	20	28	55	31300020HA	–	0.03 – 0.06
2.10	4	20	28	55	31300021HA	–	0.03 – 0.06
2.15	4	20	28	55	313000215HA	–	0.03 – 0.06
2.20	4	20	28	55	31300022HA	–	0.03 – 0.06
2.30	4	20	28	55	31300023HA	–	0.03 – 0.06
2.40	4	20	28	55	31300024HA	–	0.03 – 0.06
2.50	4	20	28	55	31300025HA	–	0.03 – 0.06
2.60	4	20	28	55	31300026HA	–	0.03 – 0.06
2.65	4	20	28	55	313000265HA	–	0.03 – 0.06
2.70	4	20	28	55	31300027HA	–	0.03 – 0.06
2.80	4	20	28	55	31300028HA	–	0.03 – 0.06
2.85	4	20	28	55	313000285HA	–	0.03 – 0.06
2.90	4	20	28	55	31300029HA	–	0.03 – 0.06
3.00	6	20	36	62	31300030HA	31300030HB	0.04 – 0.08
3.10	6	20	36	62	31300031HA	31300031HB	0.04 – 0.08
3.20	6	20	36	62	31300032HA	31300032HB	0.04 – 0.08
3.25	6	20	36	62	313000325HA	313000325HB	0.04 – 0.08
3.30	6	20	36	62	31300033HA	31300033HB	0.04 – 0.08
3.40	6	20	36	62	31300034HA	31300034HB	0.04 – 0.08
3.50	6	20	36	62	31300035HA	31300035HB	0.04 – 0.08
3.60	6	20	36	62	31300036HA	31300036HB	0.04 – 0.08
3.70	6	20	36	62	31300037HA	31300037HB	0.04 – 0.08
3.80	6	24	36	66	31300038HA	31300038HB	0.04 – 0.08
3.90	6	24	36	66	31300039HA	31300039HB	0.04 – 0.08
4.00	6	24	36	66	31300040HA	31300040HB	0.06 – 0.10
4.10	6	24	36	66	31300041HA	31300041HB	0.06 – 0.10
4.20	6	24	36	66	31300042HA	31300042HB	0.06 – 0.10
4.30	6	24	36	66	31300043HA	31300043HB	0.06 – 0.10
4.40	6	24	36	66	31300044HA	31300044HB	0.06 – 0.10
4.50	6	24	36	66	31300045HA	31300045HB	0.06 – 0.10
4.60	6	24	36	66	31300046HA	31300046HB	0.06 – 0.10
4.65	6	24	36	66	313000465HA	313000465HB	0.06 – 0.10
4.70	6	24	36	66	31300047HA	31300047HB	0.06 – 0.10
4.80	6	28	36	66	31300048HA	31300048HB	0.06 – 0.10
4.90	6	28	36	66	31300049HA	31300049HB	0.06 – 0.10
5.00	6	28	36	66	31300050HA	31300050HB	0.07 – 0.12
5.10	6	28	36	66	31300051HA	31300051HB	0.07 – 0.12
5.20	6	28	36	66	31300052HA	31300052HB	0.07 – 0.12
5.30	6	28	36	66	31300053HA	31300053HB	0.07 – 0.12
5.40	6	28	36	66	31300054HA	31300054HB	0.07 – 0.12
5.50	6	28	36	66	31300055HA	31300055HB	0.07 – 0.12
5.55	6	28	36	66	313000555HA	313000555HB	0.07 – 0.12
5.60	6	28	36	66	31300056HA	31300056HB	0.07 – 0.12
5.70	6	28	36	66	31300057HA	31300057HB	0.07 – 0.12
5.80	6	28	36	66	31300058HA	31300058HB	0.07 – 0.12
5.90	6	28	36	66	31300059HA	31300059HB	0.07 – 0.12
6.00	6	28	36	66	31300060HA	31300060HB	0.08 – 0.14
6.10	8	34	36	79	31300061HA	31300061HB	0.08 – 0.14
6.20	8	34	36	79	31300062HA	31300062HB	0.08 – 0.14
6.30	8	34	36	79	31300063HA	31300063HB	0.08 – 0.14
6.40	8	34	36	79	31300064HA	31300064HB	0.08 – 0.14
6.50	8	34	36	79	31300065HA	31300065HB	0.08 – 0.14
6.60	8	34	36	79	31300066HA	31300066HB	0.08 – 0.14
6.70	8	34	36	79	31300067HA	31300067HB	0.08 – 0.14
6.80	8	34	36	79	31300068HA	31300068HB	0.08 – 0.14
6.90	8	34	36	79	31300069HA	31300069HB	0.08 – 0.14
7.00	8	34	36	79	31300070HA	31300070HB	0.09 – 0.15
7.10	8	41	36	79	31300071HA	31300071HB	0.09 – 0.15
7.20	8	41	36	79	31300072HA	31300072HB	0.09 – 0.15
7.30	8	41	36	79	31300073HA	31300073HB	0.09 – 0.15
7.40	8	41	36	79	31300074HA	31300074HB	0.09 – 0.15
7.45	8	41	36	79	313000745HA	313000745HB	0.09 – 0.15
7.50	8	41	36	79	31300075HA	31300075HB	0.09 – 0.15
7.55	8	41	36	79	313000755HA	313000755HB	0.09 – 0.15
7.60	8	41	36	79	31300076HA	31300076HB	0.09 – 0.15
7.70	8	41	36	79	31300077HA	31300077HB	0.09 – 0.15
7.80	8	41	36	79	31300078HA	31300078HB	0.09 – 0.15
7.90	8	41	36	79	31300079HA	31300079HB	0.09 – 0.15
8.00	8	41	36	79	31300080HA	31300080HB	0.09 – 0.16
8.10	10	47	40	89	31300081HA	31300081HB	0.09 – 0.16
8.20	10	47	40	89	31300082HA	31300082HB	0.09 – 0.16
8.30	10	47	40	89	31300083HA	31300083HB	0.09 – 0.16

Product family 111

*HE drill: same price, availability on request

ToolFactory Cutting Tool Solutions

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
8.40	10	47	40	89	31300084HA	31300084HB	0.09 – 0.16
8.50	10	47	40	89	31300085HA	31300085HB	0.09 – 0.16
8.60	10	47	40	89	31300086HA	31300086HB	0.09 – 0.16
8.70	10	47	40	89	31300087HA	31300087HB	0.09 – 0.16
8.80	10	47	40	89	31300088HA	31300088HB	0.09 – 0.16
8.90	10	47	40	89	31300089HA	31300089HB	0.09 – 0.16
9.00	10	47	40	89	31300090HA	31300090HB	0.10 – 0.17
9.10	10	47	40	89	31300091HA	31300091HB	0.10 – 0.17
9.20	10	47	40	89	31300092HA	31300092HB	0.10 – 0.17
9.30	10	47	40	89	31300093HA	31300093HB	0.10 – 0.17
9.35	10	47	40	89	313000935HA	313000935HB	0.10 – 0.17
9.40	10	47	40	89	31300094HA	31300094HB	0.10 – 0.17
9.50	10	47	40	89	31300095HA	31300095HB	0.10 – 0.17
9.55	10	47	40	89	313000955HA	313000955HB	0.10 – 0.17
9.60	10	47	40	89	31300096HA	31300096HB	0.10 – 0.17
9.70	10	47	40	89	31300097HA	31300097HB	0.10 – 0.17
9.80	10	47	40	89	31300098HA	31300098HB	0.10 – 0.17
9.90	10	47	40	89	31300099HA	31300099HB	0.10 – 0.17
10.00	10	47	40	89	31300100HA	31300100HB	0.10 – 0.18
10.10	12	55	45	102	31300101HA	31300101HB	0.10 – 0.18
10.20	12	55	45	102	31300102HA	31300102HB	0.10 – 0.18
10.30	12	55	45	102	31300103HA	31300103HB	0.10 – 0.18
10.40	12	55	45	102	31300104HA	31300104HB	0.10 – 0.18
10.50	12	55	45	102	31300105HA	31300105HB	0.10 – 0.18
10.60	12	55	45	102	31300106HA	31300106HB	0.10 – 0.18
10.70	12	55	45	102	31300107HA	31300107HB	0.10 – 0.18
10.80	12	55	45	102	31300108HA	31300108HB	0.10 – 0.18
10.90	12	55	45	102	31300109HA	31300109HB	0.10 – 0.18
11.00	12	55	45	102	31300110HA	31300110HB	0.10 – 0.18
11.10	12	55	45	102	31300111HA	31300111HB	0.10 – 0.18
11.20	12	55	45	102	31300112HA	31300112HB	0.10 – 0.18
11.30	12	55	45	102	31300113HA	31300113HB	0.10 – 0.18
11.40	12	55	45	102	31300114HA	31300114HB	0.10 – 0.18
11.50	12	55	45	102	31300115HA	31300115HB	0.10 – 0.18
11.60	12	55	45	102	31300116HA	31300116HB	0.10 – 0.18
11.70	12	55	45	102	31300117HA	31300117HB	0.10 – 0.18
11.80	12	55	45	102	31300118HA	31300118HB	0.10 – 0.18
11.90	12	55	45	102	31300119HA	31300119HB	0.10 – 0.18
12.00	12	55	45	102	31300120HA	31300120HB	0.12 – 0.20
12.20	14	60	45	107	31300122HA	31300122HB	0.12 – 0.20
12.50	14	60	45	107	31300125HA	31300125HB	0.12 – 0.20
12.70	14	60	45	107	31300127HA	31300127HB	0.12 – 0.20
12.80	14	60	45	107	31300128HA	31300128HB	0.12 – 0.20
13.00	14	60	45	107	31300130HA	31300130HB	0.12 – 0.20
13.30	14	60	45	107	31300133HA	31300133HB	0.12 – 0.20
13.50	14	60	45	107	31300135HA	31300135HB	0.12 – 0.20
13.70	14	60	45	107	31300137HA	31300137HB	0.12 – 0.20
13.80	14	60	45	107	31300138HA	31300138HB	0.12 – 0.20
14.00	14	60	45	107	31300140HA	31300140HB	0.13 – 0.22
14.20	16	65	48	115	31300142HA	31300142HB	0.13 – 0.22
14.30	16	65	48	115	31300143HA	31300143HB	0.13 – 0.22
14.50	16	65	48	115	31300145HA	31300145HB	0.13 – 0.22
14.70	16	65	48	115	31300147HA	31300147HB	0.13 – 0.22
14.80	16	65	48	115	31300148HA	31300148HB	0.13 – 0.22
15.00	16	65	48	115	31300150HA	31300150HB	0.13 – 0.22
15.20	16	65	48	115	31300152HA	31300152HB	0.13 – 0.22
15.30	16	65	48	115	31300153HA	31300153HB	0.13 – 0.22
15.50	16	65	48	115	31300155HA	31300155HB	0.13 – 0.22
15.70	16	65	48	115	31300157HA	31300157HB	0.13 – 0.22
15.80	16	65	48	115	31300158HA	31300158HB	0.13 – 0.22
16.00	16	65	48	115	31300160HA	31300160HB	0.14 – 0.23
16.50	18	73	48	123	31300165HA	31300165HB	0.14 – 0.23
16.80	18	73	48	123	31300168HA	31300168HB	0.14 – 0.23
17.00	18	73	48	123	31300170HA	31300170HB	0.14 – 0.23
17.50	18	73	48	123	31300175HA	31300175HB	0.14 – 0.23
17.70	18	73	48	123	31300177HA	31300177HB	0.14 – 0.23
17.80	18	73	48	123	31300178HA	31300178HB	0.14 – 0.23
18.00	18	73	48	123	31300180HA	31300180HB	0.15 – 0.25
18.50	20	79	50	131	31300185HA	31300185HB	0.15 – 0.25
18.80	20	79	50	131	31300188HA	31300188HB	0.14 – 0.23
19.00	20	79	50	131	31300190HA	31300190HB	0.15 – 0.25
19.50	20	79	50	131	31300195HA	31300195HB	0.15 – 0.25
19.80	20	79	50	131	31300198HA	31300198HB	0.15 – 0.25
20.00	20	79	50	131	31300200HA	31300200HB	0.16 – 0.26

Material	Stainless steels	Stainless steels	Super alloys	Titanium materials
Tensile strength/Hardness	< 750 N/mm²	< 850 N/mm²	> 260 HB	< 1400 N/mm²
V_c (m/min)	90	70	40	55

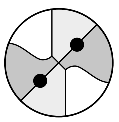
Product family 111

51300

TiAlN | HA | HB | HE* | 5xD | VHM | 25 bar | 140° | Manu-facturer standard

Solid Carbide High-Performance Drill INOX 5xD with Internal Coolant

$t_{max} = l_2 - 1.5 \times d_1$



d_1
m7

- High performance drill for the treatment of INOX, Duplex, Titanium and heat-resisting alloys
- Made from ultra-micro grain solid carbide with state-of-the-art TiAlN coating
- Excellent self-centering and high drilling performance
- Straight main cutting edges and the reinforced geometry provide an optimum chip breaking and the highest level of process reliability.

d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
2.00	4	26	28	62	51300020HA	–	0.03 – 0.06
2.10	4	26	28	62	51300021HA	–	0.03 – 0.06
2.15	4	26	28	62	513000215HA	–	0.03 – 0.06
2.20	4	26	28	62	51300022HA	–	0.03 – 0.06
2.30	4	26	28	62	51300023HA	–	0.03 – 0.06
2.40	4	26	28	62	51300024HA	–	0.03 – 0.06
2.50	4	26	28	62	51300025HA	–	0.03 – 0.06
2.60	4	26	28	62	51300026HA	–	0.03 – 0.06
2.65	4	26	28	62	513000265HA	–	0.03 – 0.06
2.70	4	26	28	62	51300027HA	–	0.03 – 0.06
2.80	4	26	28	62	51300028HA	–	0.03 – 0.06
2.85	4	26	28	62	513000285HA	–	0.03 – 0.06
2.90	4	26	28	62	51300029HA	–	0.03 – 0.06
3.00	6	28	36	66	51300030HA	51300030HB	0.04 – 0.08
3.10	6	28	36	66	51300031HA	51300031HB	0.04 – 0.08
3.20	6	28	36	66	51300032HA	51300032HB	0.04 – 0.08
3.25	6	28	36	66	513000325HA	513000325HB	0.04 – 0.08
3.30	6	28	36	66	51300033HA	51300033HB	0.04 – 0.08
3.40	6	28	36	66	51300034HA	51300034HB	0.04 – 0.08
3.50	6	28	36	66	51300035HA	51300035HB	0.04 – 0.08
3.60	6	28	36	66	51300036HA	51300036HB	0.04 – 0.08
3.70	6	28	36	66	51300037HA	51300037HB	0.04 – 0.08
3.80	6	36	36	74	51300038HA	51300038HB	0.04 – 0.08
3.90	6	36	36	74	51300039HA	51300039HB	0.04 – 0.08
4.00	6	36	36	74	51300040HA	51300040HB	0.06 – 0.10
4.10	6	36	36	74	51300041HA	51300041HB	0.06 – 0.10
4.20	6	36	36	74	51300042HA	51300042HB	0.06 – 0.10
4.30	6	36	36	74	51300043HA	51300043HB	0.06 – 0.10
4.40	6	36	36	74	51300044HA	51300044HB	0.06 – 0.10
4.50	6	36	36	74	51300045HA	51300045HB	0.06 – 0.10
4.60	6	36	36	74	51300046HA	51300046HB	0.06 – 0.10
4.65	6	36	36	74	513000465HA	513000465HB	0.06 – 0.10
4.70	6	36	36	74	51300047HA	51300047HB	0.06 – 0.10
4.80	6	44	36	82	51300048HA	51300048HB	0.06 – 0.10
4.90	6	44	36	82	51300049HA	51300049HB	0.06 – 0.10
5.00	6	44	36	82	51300050HA	51300050HB	0.07 – 0.12
5.10	6	44	36	82	51300051HA	51300051HB	0.07 – 0.12
5.20	6	44	36	82	51300052HA	51300052HB	0.07 – 0.12
5.30	6	44	36	82	51300053HA	51300053HB	0.07 – 0.12
5.40	6	44	36	82	51300054HA	51300054HB	0.07 – 0.12
5.50	6	44	36	82	51300055HA	51300055HB	0.07 – 0.12
5.55	6	44	36	82	513000555HA	513000555HB	0.07 – 0.12
5.60	6	44	36	82	51300056HA	51300056HB	0.07 – 0.12
5.70	6	44	36	82	51300057HA	51300057HB	0.07 – 0.12
5.80	6	44	36	82	51300058HA	51300058HB	0.07 – 0.12
5.90	6	44	36	82	51300059HA	51300059HB	0.07 – 0.12
6.00	6	44	36	82	51300060HA	51300060HB	0.08 – 0.14
6.10	8	53	36	91	51300061HA	51300061HB	0.08 – 0.14
6.20	8	53	36	91	51300062HA	51300062HB	0.08 – 0.14
6.30	8	53	36	91	51300063HA	51300063HB	0.08 – 0.14
6.40	8	53	36	91	51300064HA	51300064HB	0.08 – 0.14
6.50	8	53	36	91	51300065HA	51300065HB	0.08 – 0.14
6.60	8	53	36	91	51300066HA	51300066HB	0.08 – 0.14
6.70	8	53	36	91	51300067HA	51300067HB	0.08 – 0.14
6.80	8	53	36	91	51300068HA	51300068HB	0.08 – 0.14
6.90	8	53	36	91	51300069HA	51300069HB	0.08 – 0.14
7.00	8	53	36	91	51300070HA	51300070HB	0.09 – 0.15
7.10	8	53	36	91	51300071HA	51300071HB	0.09 – 0.15
7.20	8	53	36	91	51300072HA	51300072HB	0.09 – 0.15
7.30	8	53	36	91	51300073HA	51300073HB	0.09 – 0.15
7.40	8	53	36	91	51300074HA	51300074HB	0.09 – 0.15
7.45	8	53	36	91	513000745HA	513000745HB	0.09 – 0.15
7.50	8	53	36	91	51300075HA	51300075HB	0.09 – 0.15
7.55	8	53	36	91	513000755HA	513000755HB	0.09 – 0.15
7.60	8	53	36	91	51300076HA	51300076HB	0.09 – 0.15
7.70	8	53	36	91	51300077HA	51300077HB	0.09 – 0.15
7.80	8	53	36	91	51300078HA	51300078HB	0.09 – 0.15
7.90	8	53	36	91	51300079HA	51300079HB	0.09 – 0.15
8.00	8	53	36	91	51300080HA	51300080HB	0.09 – 0.16
8.10	10	61	40	103	51300081HA	51300081HB	0.09 – 0.16
8.20	10	61	40	103	51300082HA	51300082HB	0.09 – 0.16
8.30	10	61	40	103	51300083HA	51300083HB	0.09 – 0.16

Artikelgruppe 111

*HE drill: same price, availability on request

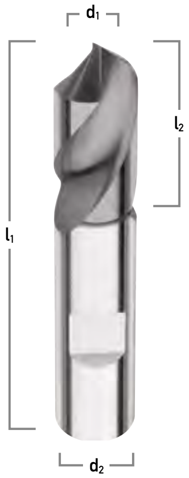
d_1 mm	d_2 mm	l_2 mm	l_3 mm	l_1 mm	HA Part No.	HB Part No.	Feed mm/rev
8.40	10	61	40	103	51300084HA	51300084HB	0.09 – 0.16
8.50	10	61	40	103	51300085HA	51300085HB	0.09 – 0.16
8.60	10	61	40	103	51300086HA	51300086HB	0.09 – 0.16
8.70	10	61	40	103	51300087HA	51300087HB	0.09 – 0.16
8.80	10	61	40	103	51300088HA	51300088HB	0.09 – 0.16
8.90	10	61	40	103	51300089HA	51300089HB	0.09 – 0.16
9.00	10	61	40	103	51300090HA	51300090HB	0.10 – 0.17
9.10	10	61	40	103	51300091HA	51300091HB	0.10 – 0.17
9.20	10	61	40	103	51300092HA	51300092HB	0.10 – 0.17
9.30	10	61	40	103	51300093HA	51300093HB	0.10 – 0.17
9.35	10	61	40	103	513000935HA	513000935HB	0.10 – 0.17
9.40	10	61	40	103	51300094HA	51300094HB	0.10 – 0.17
9.50	10	61	40	103	51300095HA	51300095HB	0.10 – 0.17
9.55	10	61	40	103	513000955HA	513000955HB	0.20 – 0.18
9.60	10	61	40	103	51300096HA	51300096HB	0.10 – 0.17
9.70	10	61	40	103	51300097HA	51300097HB	0.10 – 0.17
9.80	10	61	40	103	51300098HA	51300098HB	0.10 – 0.17
9.90	10	61	40	103	51300099HA	51300099HB	0.10 – 0.17
10.00	10	61	40	103	51300100HA	51300100HB	0.10 – 0.18
10.10	12	71	45	118	51300101HA	51300101HB	0.10 – 0.18
10.20	12	71	45	118	51300102HA	51300102HB	0.10 – 0.18
10.30	12	71	45	118	51300103HA	51300103HB	0.10 – 0.18
10.40	12	71	45	118	51300104HA	51300104HB	0.10 – 0.18
10.50	12	71	45	118	51300105HA	51300105HB	0.10 – 0.18
10.60	12	71	45	118	51300106HA	51300106HB	0.10 – 0.18
10.70	12	71	45	118	51300107HA	51300107HB	0.10 – 0.18
10.80	12	71	45	118	51300108HA	51300108HB	0.10 – 0.18
10.90	12	71	45	118	51300109HA	51300109HB	0.10 – 0.18
11.00	12	71	45	118	51300110HA	51300110HB	0.10 – 0.18
11.10	12	71	45	118	51300111HA	51300111HB	0.10 – 0.18
11.20	12	71	45	118	51300112HA	51300112HB	0.10 – 0.18
11.30	12	71	45	118	51300113HA	51300113HB	0.10 – 0.18
11.40	12	71	45	118	51300114HA	51300114HB	0.10 – 0.18
11.50	12	71	45	118	51300115HA	51300115HB	0.10 – 0.18
11.60	12	71	45	118	51300116HA	51300116HB	0.10 – 0.18
11.70	12	71	45	118	51300117HA	51300117HB	0.10 – 0.18
11.80	12	71	45	118	51300118HA	51300118HB	0.10 – 0.18
11.90	12	71	45	118	51300119HA	51300119HB	0.10 – 0.18
12.00	12	71	45	118	51300120HA	51300120HB	0.12 – 0.20
12.20	14	77	45	124	51300122HA	51300122HB	0.12 – 0.20
12.50	14	77	45	124	51300125HA	51300125HB	0.12 – 0.20
12.70	14	77	45	124	51300127HA	51300127HB	0.12 – 0.20
12.80	14	77	45	124	51300128HA	51300128HB	0.12 – 0.20
13.00	14	77	45	124	51300130HA	51300130HB	0.12 – 0.20
13.30	14	77	45	124	51300133HA	51300133HB	0.12 – 0.20
13.50	14	77	45	124	51300135HA	51300135HB	0.12 – 0.20
13.70	14	77	45	124	51300137HA	51300137HB	0.12 – 0.20
13.80	14	77	45	124	51300138HA	51300138HB	0.12 – 0.20
14.00	14	77	45	124	51300140HA	51300140HB	0.13 – 0.22
14.20	16	83	48	133	51300142HA	51300142HB	0.13 – 0.22
14.30	16	83	48	133	51300143HA	51300143HB	0.13 – 0.22
14.50	16	83	48	133	51300145HA	51300145HB	0.13 – 0.22
14.70	16	83	48	133	51300147HA	51300147HB	0.13 – 0.22
14.80	16	83	48	133	51300148HA	51300148HB	0.13 – 0.22
15.00	16	83	48	133	51300150HA	51300150HB	0.13 – 0.22
15.10	16	83	48	133	51300151HA	51300151HB	0.14 – 0.23
15.20	16	83	48	133	51300152HA	51300152HB	0.13 – 0.22
15.30	16	83	48	133	51300153HA	51300153HB	0.13 – 0.22
15.50	16	83	48	133	51300155HA	51300155HB	0.13 – 0.22
15.70	16	83	48	133	51300157HA	51300157HB	0.13 – 0.22
15.80	16	83	48	133	51300158HA	51300158HB	0.15 – 0.24
16.00	16	83	48	133	51300160HA	51300160HB	0.14 – 0.23
16.50	18	93	48	143	51300165HA	51300165HB	0.14 – 0.23
16.80	18	93	48	143	51300168HA	51300168HB	0.14 – 0.23
17.00	18	93	48	143	51300170HA	51300170HB	0.14 – 0.23
17.50	18	93	48	143	51300175HA	51300175HB	0.14 – 0.23
17.70	18	93	48	143	51300177HA	51300177HB	0.15 – 0.24
17.80	18	93	48	143	51300178HA	51300178HB	0.16 – 0.25
18.00	18	93	48	143	51300180HA	51300180HB	0.15 – 0.25
18.50	20	101	50	153	51300185HA	51300185HB	0.15 – 0.25
18.80	20	101	50	153	51300188HA	51300188HB	0.15 – 0.25
19.00	20	101	50	153	51300190HA	51300190HB	0.15 – 0.25
19.50	20	101	50	153	51300195HA	51300195HB	0.15 – 0.25
19.80	20	101	50	153	51300198HA	51300198HB	0.16 – 0.26
20.00	20	101	50	153	51300200HA	51300200HB	0.16 – 0.26

Material	Stainless steels	Stainless steels	Super alloys	Titanium materials
Tensile strength/Hardness	< 750 N/mm²	< 850 N/mm²	> 260 HB	< 1400 N/mm²
V_c (m/min)	90	70	40	55

50101

Uncoated | TiAlN | Z 2 | HB | VHM | 90° | Manu-facturer standard

Solid Carbide NC Spotting Drill
90°



d1	d2	l2	l1		Uncoated	Coated	Feed
mm	mm	mm	mm	Z	Part No.	Part No.	mm/rev
3.0	3	8	38	2	50101030	50101030TA	0.070 – 0.160
4.0	4	10	50	2	50101040	50101040TA	0.100 – 0.200
5.0	5	13	50	2	50101050	50101050TA	0.100 – 0.250
6.0	6	11	57	2	50101060	50101060TA	0.125 – 0.315
8.0	8	19	63	2	50101080	50101080TA	0.160 – 0.315
10.0	10	20	66	2	50101100	50101100TA	0.200 – 0.400
12.0	12	22	73	2	50101120	50101120TA	0.200 – 0.500
16.0	16	24	82	2	50101160	50101160TA	0.250 – 0.630
20.0	20	30	92	2	50101200	50101200TA	0.315 – 0.630

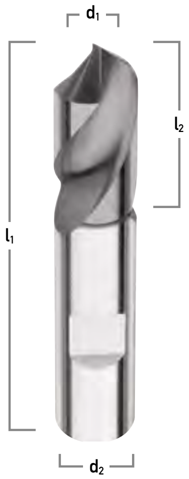
· For universal applications
· Exact point cuts for high geometrical and positional accuracy
· Stable due to short flutes
· **Application instruction:** Always calculate speed n based on the effective spotting drill diameter.

d1
h7

50103

Uncoated | TiAlN | Z 2 | HB | VHM | 100° | Manu-facturer standard

Solid Carbide NC Spotting Drill
100°



d1	d2	l2	l1		Uncoated	Coated	Feed
mm	mm	mm	mm	Z	Part No.	Part No.	mm/rev
3.0	3	8	38	2	50103030	50103030TA	0.070 – 0.160
4.0	4	10	50	2	50103040	50103040TA	0.100 – 0.200
5.0	5	13	50	2	50103050	50103050TA	0.100 – 0.250
6.0	6	11	57	2	50103060	50103060TA	0.125 – 0.315
8.0	8	19	63	2	50103080	50103080TA	0.160 – 0.315
10.0	10	20	66	2	50103100	50103100TA	0.200 – 0.400
12.0	12	22	73	2	50103120	50103120TA	0.200 – 0.500
16.0	16	24	82	2	50103160	50103160TA	0.250 – 0.630
20.0	20	30	92	2	50103200	50103200TA	0.315 – 0.630

· For universal applications
· Exact point cuts for high geometrical and positional accuracy
· Stable due to short flutes
· **Application instruction:** Always calculate speed n based on the effective spotting drill diameter.

d1
h7

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al alloys >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic	Super alloys	Titanium materials
Tensile strength/Hardness	< 450 N/mm^2	< 600 N/mm^2	> 600 N/mm^2	< 600 N/mm^2	< 600 N/mm^2			> 260 HB	< 1400 N/mm^2
V_c (m/min) Uncoated	180	150	100	65	70	100	110	20	25
V_c (m/min) TiAlN	220	180	140	80	85	115	130	35	40

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm^2	< 1000 N/mm^2	< 1000 N/mm^2	< 1000 N/mm^2	< 1000 N/mm^2	< 750 N/mm^2	< 800 N/mm^2	> 260 HB
V_c (m/min) Uncoated	90	80	80	45	65	55	120	40
V_c (m/min) TiAlN	110	100	100	65	85	75	140	60

Product family 160

50102

Uncoated | TiAlN | Z 2 | HB | VHM | 120° | Manu-facturer standard

Solid Carbide NC Spotting Drill
120°

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	Feed mm/rev
3.0	3	8	38	2	50102030	50102030TA	0.070 – 0.160
4.0	4	10	50	2	50102040	50102040TA	0.100 – 0.200
5.0	5	13	50	2	50102050	50102050TA	0.100 – 0.250
6.0	6	11	57	2	50102060	50102060TA	0.125 – 0.315
8.0	8	19	63	2	50102080	50102080TA	0.160 – 0.315
10.0	10	20	66	2	50102100	50102100TA	0.200 – 0.400
12.0	12	22	73	2	50102120	50102120TA	0.200 – 0.500
16.0	16	24	82	2	50102160	50102160TA	0.250 – 0.630
20.0	20	30	92	2	50102200	50102200TA	0.315 – 0.630

- For universal applications
- Exact point cuts for high geometrical and positional accuracy
- Stable due to short flutes
- **Application instruction:** Always calculate speed n based on the effective spotting drill diameter.

d_1
h7

50100

Uncoated | TiAlN | Z 2 | HB | VHM | 142° | Manu-facturer standard

Solid Carbide NC Spotting Drill
142°

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	Feed mm/rev
3.0	3	8	38	2	50100030	50100030TA	0.070 – 0.160
4.0	4	10	50	2	50100040	50100040TA	0.100 – 0.200
5.0	5	13	50	2	50100050	50100050TA	0.100 – 0.250
6.0	6	11	57	2	50100060	50100060TA	0.125 – 0.315
8.0	8	19	63	2	50100080	50100080TA	0.160 – 0.315
10.0	10	20	66	2	50100100	50100100TA	0.200 – 0.400
12.0	12	22	73	2	50100120	50100120TA	0.200 – 0.500
16.0	16	24	82	2	50100160	50100160TA	0.250 – 0.630
20.0	20	30	92	2	50100200	50100200TA	0.315 – 0.630

- For universal applications
- Exact point cuts for high geometrical and positional accuracy
- Stable due to short flutes
- **Application instruction:** Always calculate speed n based on the effective spotting drill diameter.

d_1
h7

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al alloys >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic	Super alloys	Titanium materials
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²			> 260 HB	< 1400 N/mm²
V_c (m/min) Uncoated	180	150	100	65	70	100	110	20	25
V_c (m/min) TiAlN	220	180	140	80	85	115	130	35	40

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Tool steels	Alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 1000 N/mm²	< 750 N/mm²	< 800 N/mm²	> 260 HB
V_c (m/min) Uncoated	90	80	80	45	65	55	120	40
V_c (m/min) TiAlN	110	100	100	65	85	75	140	60

Product family 160

50000

TiN | Z 3 | HA | VHM | Manu-facturer standard

Solid Carbide Thread Repair Drill

d_1
h7

for Threads	d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	Feed mm/rev
M4	3,3	6	15	50	3	50000033	0,01
M5	4,2	6	15	50	3	50000042	0,01
M6	5,0	6	15	50	3	50000050	0,01
M8	6,8	8	20	60	3	50000068	0,01
M10	8,5	10	25	70	3	50000085	0,01
M12	10,2	12	30	75	3	50000102	0,01
M14	12,0	12	30	75	3	50000120	0,01
M16	14,0	14	40	100	3	50000140	0,01
M18	15,5	16	40	100	3	50000155	0,01
M20	17,5	18	50	100	3	50000175	0,01

Operating instructions for solid carbide thread repair drill

Drilling-out operation needs to be carried out under dry conditions at approx. 1500 – 3500 rpm. Using the suitable tapping drill makes it easy to drill-out the core of the tap, with fully removing its residues from the drill hole.

The work-piece needs to be securely tightened to prevent from moving during high speed rates. When the tap has broken-off obliquely, first run the repair tool for several times to centralise the tap. Now you can start drilling-out. Additionally, repeat chips removal operation to remove all chips.

Shortly before drilling-out is completed, there will be a vibration. The repair drill should be removed then.

Now it is possible to cut a new thread using a tap.

Because of heavy strain during repair operation and to achieve best results, the edges of the solid carbide thread repair drill must be re-sharpened from time to time.

Metric sizes from M 4 – M 20 available in stock.

Other Types on request.

ToolFactory
Cutting Tool Solutions

Professional Line

Solid Carbide End Mills

Professional Line

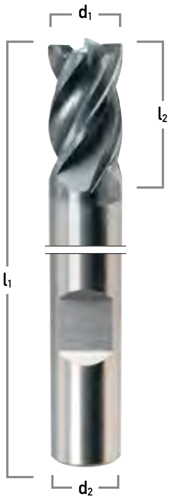
Quality
Precision
Efficiency

36380

Alcrona Pro | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

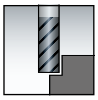
Solid Carbide HPC End Mill

Short version with protective chamfer

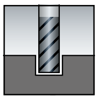


d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.02	4	54	4	36380020	0.007 – 0.022	0.007 – 0.019
2.5	6	0.02	4	54	4	36380025	0.007 – 0.022	0.007 – 0.019
3.0	6	0.03	6	54	4	36380030	0.007 – 0.031	0.007 – 0.027
4.0	6	0.04	8	54	4	36380040	0.011 – 0.031	0.010 – 0.027
5.0	6	0.05	9	54	4	36380050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.06	10	54	4	36380060	0.026 – 0.044	0.025 – 0.038
7.0	8	0.07	12	58	4	36380070	0.032 – 0.050	0.029 – 0.043
8.0	8	0.08	12	58	4	36380080	0.032 – 0.055	0.029 – 0.048
9.0	10	0.09	14	66	4	36380090	0.037 – 0.066	0.034 – 0.057
10.0	10	0.10	14	66	4	36380100	0.037 – 0.066	0.034 – 0.057
11.0	12	0.11	16	73	4	36380110	0.053 – 0.088	0.049 – 0.076
12.0	12	0.12	16	73	4	36380120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.14	18	75	4	36380140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.15	22	82	4	36380160	0.095 – 0.143	0.088 – 0.124
18.0	18	0.15	24	84	4	36380180	0.095 – 0.143	0.088 – 0.124
20.0	20	0.15	26	92	4	36380200	0.137 – 0.187	0.127 – 0.162

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 1.3xD



Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

35380

Alcrona Pro | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill

Short version with edge chamfer

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.13	6	54	4	35380030A	0.007 – 0.031	0.007 – 0.027
4.0	6	0.18	8	54	4	35380040A	0.007 – 0.039	0.007 – 0.033
5.0	6	0.20	9	54	4	35380050A	0.011 – 0.039	0.010 – 0.033
6.0	6	0.20	10	54	4	35380060A	0.016 – 0.044	0.015 – 0.038
7.0	8	0.20	12	58	4	35380070A	0.026 – 0.044	0.025 – 0.038
8.0	8	0.20	12	58	4	35380080A	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	14	66	4	35380090A	0.032 – 0.055	0.029 – 0.048
10.0	10	0.30	14	66	4	35380100A	0.037 – 0.077	0.034 – 0.067
11.0	12	0.30	16	73	4	35380110A	0.037 – 0.088	0.034 – 0.076
12.0	12	0.30	16	73	4	35380120A	0.053 – 0.099	0.049 – 0.086
13.0	14	0.30	18	75	4	35380130A	0.053 – 0.099	0.049 – 0.086
14.0	14	0.30	18	75	4	35380140A	0.063 – 0.121	0.059 – 0.105
16.0	16	0.40	22	82	4	35380160A	0.074 – 0.143	0.069 – 0.124
18.0	18	0.40	24	84	4	35380180A	0.095 – 0.143	0.088 – 0.124
20.0	20	0.50	26	92	4	35380200A	0.095 – 0.165	0.088 – 0.143

d_1	d_2
h10	h6

Peripheral milling
a_e = 0.5xD
a_p = 1.3xD

Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

Product family 159

ToolFactory Cutting Tool Solutions

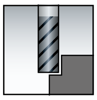
35381

Alcrona Pro | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill

Short version with edge chamfer

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.10	8	57	4	35381030A	0.007 – 0.031	0.007 – 0.027
4.0	6	0.18	11	57	4	35381040A	0.011 – 0.039	0.010 – 0.033
5.0	6	0.20	13	57	4	35381050A	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	13	57	4	35381060A	0.026 – 0.044	0.025 – 0.038
7.0	8	0.20	19	63	4	35381070A	0.032 – 0.050	0.029 – 0.043
8.0	8	0.20	19	63	4	35381080A	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	22	72	4	35381090A	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	22	72	4	35381100A	0.042 – 0.077	0.039 – 0.067
11.0	12	0.30	26	83	4	35381110A	0.053 – 0.088	0.049 – 0.076
12.0	12	0.30	26	83	4	35381120A	0.063 – 0.099	0.059 – 0.086
14.0	14	0.30	26	83	4	35381140A	0.074 – 0.012	0.069 – 0.010
16.0	16	0.40	32	92	4	35381160A	0.095 – 0.014	0.088 – 0.012
18.0	18	0.40	32	92	4	35381180A	0.116 – 0.017	0.108 – 0.014
20.0	20	0.50	38	104	4	35381200A	0.137 – 0.019	0.127 – 0.016



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.5xD$

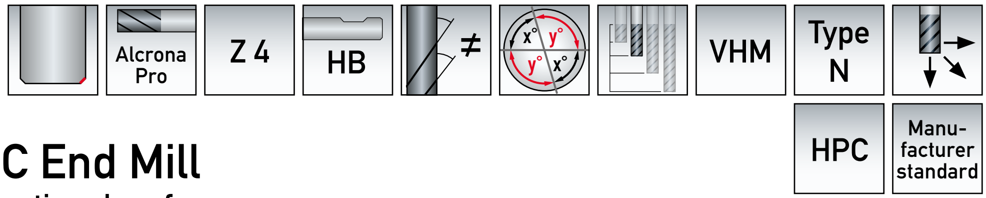
- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

d_1	d_2
h10	h6

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

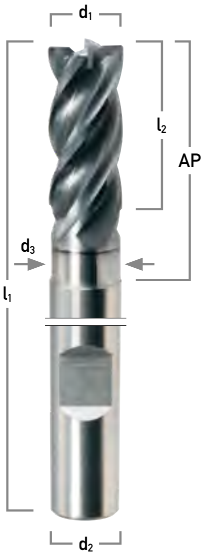
Product family 159

36382

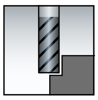


Solid Carbide HPC End Mill

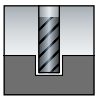
Standard length with protective chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.02	6	57	–	–	4	36382020	0.007 – 0.022	0.007 – 0.019
2.5	6	0.02	6	57	–	–	4	36382025	0.007 – 0.022	0.007 – 0.019
3.0	6	0.03	8	57	2.8	18	4	36382030	0.007 – 0.031	0.007 – 0.027
4.0	6	0.04	11	57	3.8	21	4	36382040	0.011 – 0.031	0.010 – 0.027
5.0	6	0.05	13	57	4.8	21	4	36382050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.06	13	57	5.5	21	4	36382060	0.026 – 0.044	0.025 – 0.038
7.0	8	0.07	19	63	6.5	27	4	36382070	0.032 – 0.050	0.029 – 0.043
8.0	8	0.08	19	63	7.5	27	4	36382080	0.032 – 0.055	0.029 – 0.048
9.0	10	0.09	22	72	8.5	32	4	36382090	0.037 – 0.066	0.034 – 0.057
10.0	10	0.10	22	72	9.5	32	4	36382100	0.037 – 0.066	0.034 – 0.057
11.0	12	0.11	26	83	10.5	38	4	36382110	0.053 – 0.088	0.049 – 0.076
12.0	12	0.12	26	83	11.5	38	4	36382120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.14	26	83	13.5	42	4	36382140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.15	32	92	15.5	44	4	36382160	0.095 – 0.143	0.088 – 0.124
18.0	18	0.15	32	92	17.5	50	4	36382180	0.095 – 0.143	0.088 – 0.124
20.0	20	0.15	38	104	19.5	54	4	36382200	0.137 – 0.187	0.127 – 0.162



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

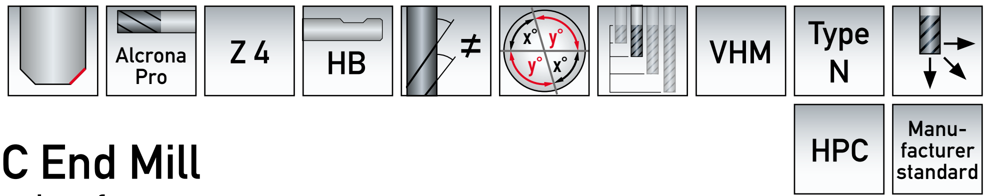


Full slot milling
$a_p = 1.5xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

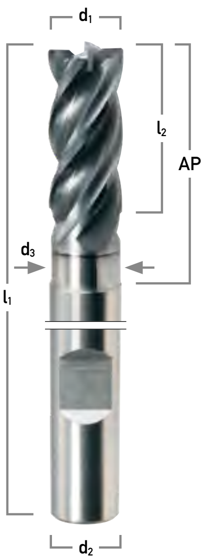
d_1	d_2
h10	h6

35382

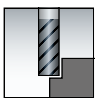


Solid Carbide HPC End Mill

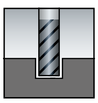
Standard length with edge chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	0.02	3	57	0.9	5	4	35382010A	0.006 – 0.017	0.006 – 0.014
1.5	6	0.02	4.5	57	1.4	8	4	35382015A	0.006 – 0.017	0.006 – 0.014
2.0	6	0.02	6	57	1.8	10	4	35382020A	0.007 – 0.022	0.007 – 0.019
2.5	6	0.02	7	57	2.3	11	4	35382025A	0.007 – 0.022	0.007 – 0.019
3.0	6	0.13	8	57	2.8	18	4	35382030A	0.007 – 0.031	0.007 – 0.027
4.0	6	0.18	11	57	3.8	21	4	35382040A	0.011 – 0.039	0.010 – 0.033
5.0	6	0.20	13	57	4.8	21	4	35382050A	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	13	57	5.5	21	4	35382060A	0.026 – 0.044	0.025 – 0.038
7.0	8	0.20	19	63	6.5	27	4	35382070A	0.032 – 0.050	0.029 – 0.043
8.0	8	0.20	19	63	7.5	27	4	35382080A	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	22	72	8.5	32	4	35382090A	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	22	72	9.5	32	4	35382100A	0.042 – 0.077	0.039 – 0.067
11.0	12	0.30	26	83	10.5	38	4	35382110A	0.053 – 0.088	0.049 – 0.076
12.0	12	0.30	26	83	11.5	38	4	35382120A	0.063 – 0.099	0.059 – 0.086
13.0	14	0.30	26	83	12.5	42	4	35382130A	0.074 – 0.099	0.069 – 0.086
14.0	14	0.30	26	83	13.5	42	4	35382140A	0.074 – 0.121	0.069 – 0.105
16.0	16	0.40	32	92	15.5	44	4	35382160A	0.095 – 0.143	0.088 – 0.124
18.0	18	0.40	32	92	17.5	50	4	35382180A	0.116 – 0.143	0.108 – 0.124
20.0	20	0.50	38	104	19.5	54	4	35382200A	0.137 – 0.187	0.127 – 0.162



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

d_1	d_2
h10	h6

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

Product family 159

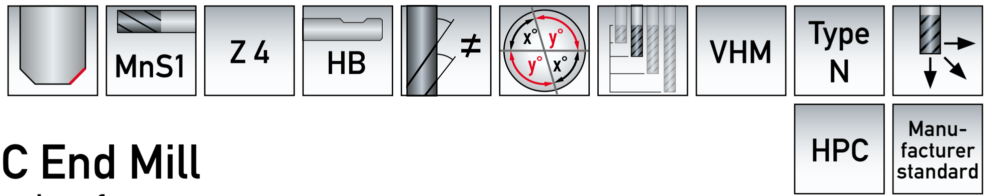
Solid Carbide HPC High-Performance End Mill

- Solid carbide end mill of the latest generation made from wear-resistant ultra-micro grain solid carbide
- Newly developed cutting geometry with unequal spacing, dynamic helix angles, cutting edge prepara-tion, **edge chamfer**, large flutes in the front area and **reinforced core**
- MnS1 coating, based on the latest coating technology for high resistance to thermal and abrasive wear
- Very smooth running and low-noise operation
- **Maximum stability, service life and process reliability**

Application:

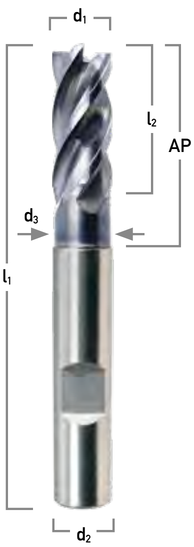
- Can be used with a wide range of materials
- For roughing and finishing up to 1.5xD into solid

35402



Solid Carbide HPC End Mill

Standard length with edge chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.13	8	57	2.8	18	4	35402030	0.007 – 0.031	0.007 – 0.027
4.0	6	0.18	11	57	3.8	21	4	35402040	0.011 – 0.039	0.010 – 0.033
5.0	6	0.20	13	57	4.8	21	4	35402050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	13	57	5.5	21	4	35402060	0.026 – 0.044	0.025 – 0.038
7.0	8	0.20	19	63	6.5	27	4	35402070	0.032 – 0.050	0.029 – 0.043
8.0	8	0.20	19	63	7.5	27	4	35402080	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	22	72	8.5	32	4	35402090	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	22	72	9.5	32	4	35402100	0.042 – 0.077	0.039 – 0.067
11.0	12	0.30	26	83	10.5	38	4	35402110	0.053 – 0.088	0.049 – 0.076
12.0	12	0.30	26	83	11.5	38	4	35402120	0.063 – 0.099	0.059 – 0.086
13.0	14	0.30	26	83	12.5	42	4	35402130	0.074 – 0.099	0.069 – 0.086
14.0	14	0.30	26	83	13.5	42	4	35402140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.40	32	92	15.5	44	4	35402160	0.095 – 0.143	0.088 – 0.124
18.0	18	0.40	32	92	17.5	50	4	35402180	0.116 – 0.143	0.108 – 0.124
20.0	20	0.50	38	104	19.5	54	4	35402200	0.137 – 0.187	0.127 – 0.162

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.5xD$

d_1	d_2
h10	h6

35402 in action

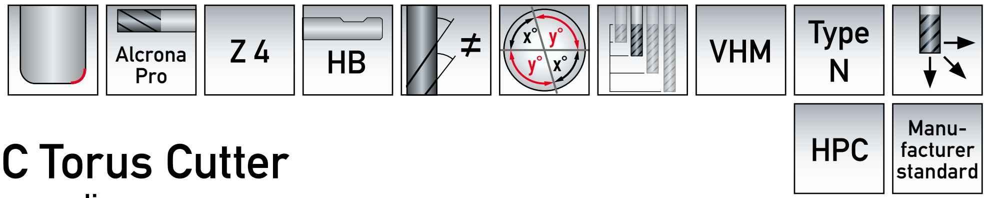
Visit YouTube to watch our high-performance end mill in action machining steel grade 42CrMo4.

https://www.youtube.com/watch?v=mAI_gnptJe0

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	220	190	180	160	130	110	160	130	90
Trimming a_e = 0,2xD	310	280	250	220	190	160	220	190	110

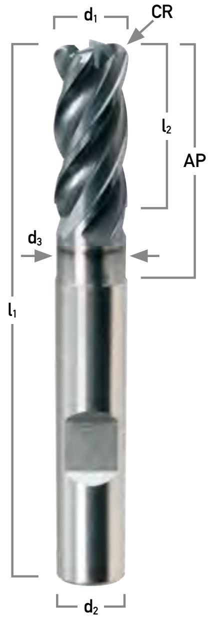
Product family 159

35384



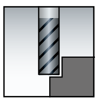
Solid Carbide HPC Torus Cutter

Standard length with corner radius

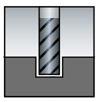


d1	d2
h10	h6

d1 mm	d2 mm	l2 mm	l1 mm	CR +/- 0.02	d3 mm	AP mm	Z	Coated Part No.	fz Roughing mm/Z	fz Finishing mm/Z
4.0	6	11	57	0.25	3.8	21	4	3538440025A	0.011 – 0.039	0.010 – 0.033
4.0	6	11	57	0.50	3.8	21	4	353844005A	0.011 – 0.039	0.010 – 0.033
4.0	6	11	57	1.00	3.8	21	4	353844010A	0.011 – 0.039	0.010 – 0.033
5.0	6	13	57	0.50	4.8	21	4	353845005A	0.016 – 0.039	0.015 – 0.033
5.0	6	13	57	1.00	4.8	21	4	353845010A	0.016 – 0.039	0.015 – 0.033
5.0	6	13	57	1.50	4.8	21	4	353845015A	0.016 – 0.039	0.015 – 0.033
6.0	6	13	57	0.50	5.5	21	4	353846005A	0.026 – 0.044	0.025 – 0.038
6.0	6	13	57	1.00	5.5	21	4	353846010A	0.026 – 0.044	0.025 – 0.038
6.0	6	13	57	1.50	5.5	21	4	353846015A	0.026 – 0.044	0.025 – 0.038
6.0	6	13	57	2.00	5.5	21	4	353846020A	0.026 – 0.044	0.025 – 0.038
8.0	8	19	63	0.50	7.5	27	4	353848005A	0.032 – 0.055	0.029 – 0.048
8.0	8	19	63	1.00	7.5	27	4	353848010A	0.032 – 0.055	0.029 – 0.048
8.0	8	19	63	1.50	7.5	27	4	353848015A	0.032 – 0.055	0.029 – 0.048
8.0	8	19	63	2.00	7.5	27	4	353848020A	0.032 – 0.055	0.029 – 0.048
10.0	10	22	72	0.50	9.5	32	4	353841005A	0.042 – 0.077	0.039 – 0.067
10.0	10	22	72	1.00	9.5	32	4	353841010A	0.042 – 0.077	0.039 – 0.067
10.0	10	22	72	1.50	9.5	32	4	353841015A	0.042 – 0.077	0.039 – 0.067
10.0	10	22	72	2.00	9.5	32	4	353841020A	0.042 – 0.077	0.039 – 0.067
12.0	12	26	83	0.50	11.5	38	4	353841205A	0.063 – 0.099	0.059 – 0.086
12.0	12	26	83	1.00	11.5	38	4	353841210A	0.063 – 0.099	0.059 – 0.086
12.0	12	26	83	1.50	11.5	38	4	353841215A	0.063 – 0.099	0.059 – 0.086
12.0	12	26	83	2.00	11.5	38	4	353841220A	0.063 – 0.099	0.059 – 0.086
14.0	14	26	83	1.00	13.5	42	4	353841410A	0.084 – 0.121	0.078 – 0.105
14.0	14	26	83	2.00	13.5	42	4	353841420A	0.084 – 0.121	0.078 – 0.105
16.0	16	32	92	1.00	15.5	44	4	353841610A	0.095 – 0.143	0.088 – 0.124
16.0	16	32	92	1.50	15.5	44	4	353841615A	0.095 – 0.143	0.088 – 0.124
16.0	16	32	92	2.00	15.5	44	4	353841620A	0.095 – 0.143	0.088 – 0.124
16.0	16	32	92	2.50	15.5	44	4	353841625A	0.095 – 0.143	0.088 – 0.124
18.0	18	32	92	1.50	17.5	50	4	353841815A	0.126 – 0.165	0.118 – 0.143
18.0	18	32	92	2.50	17.5	50	4	353841825A	0.126 – 0.165	0.118 – 0.143
20.0	20	38	104	1.00	19.5	54	4	353842010A	0.137 – 0.187	0.127 – 0.162
20.0	20	38	104	1.50	19.5	54	4	353842015A	0.137 – 0.187	0.127 – 0.162
20.0	20	38	104	2.00	19.5	54	4	353842020A	0.137 – 0.187	0.127 – 0.162
20.0	20	38	104	2.50	19.5	54	4	353842025A	0.137 – 0.187	0.127 – 0.162
20.0	20	38	104	3.00	19.5	54	4	353842030A	0.137 – 0.187	0.127 – 0.162
20.0	20	38	104	4.00	19.5	54	4	353842040A	0.137 – 0.187	0.127 – 0.162
20.0	20	38	104	5.00	19.5	54	4	353842050A	0.137 – 0.187	0.127 – 0.162



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.5xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness /etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

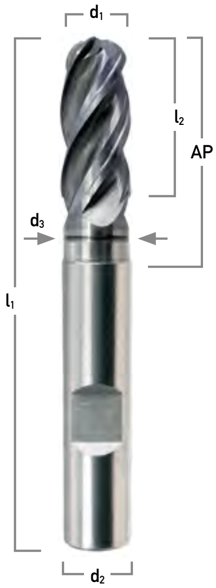
Product family 159

35582

Alcrona Pro | Z 4 | HB | VHM | Type N | HPC | Manu-facturer standard

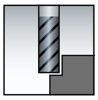
Solid Carbide HPC End Mill

Standard length with neck and full radius

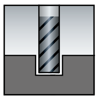


d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	8	57	2.8	18	4	35582030	0.007 – 0.031	0.007 – 0.027
4.0	6	11	57	3.8	21	4	35582040	0.011 – 0.039	0.010 – 0.033
5.0	6	13	57	4.8	21	4	35582050	0.016 – 0.039	0.015 – 0.033
6.0	6	13	57	5.5	21	4	35582060	0.026 – 0.044	0.025 – 0.038
8.0	8	19	63	7.5	27	4	35582080	0.032 – 0.055	0.029 – 0.048
10.0	10	22	72	10.0	32	4	35582100	0.042 – 0.077	0.039 – 0.067
12.0	12	26	83	11.5	38	4	35582120	0.063 – 0.099	0.059 – 0.086
14.0	14	26	83	13.5	42	4	35582140	0.084 – 0.121	0.078 – 0.105
16.0	16	32	92	15.5	44	4	35582160	0.095 – 0.143	0.088 – 0.124
20.0	20	38	104	19.5	54	4	35582200	0.137 – 0.187	0.127 – 0.162

d_1	d_2
h10	h6



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

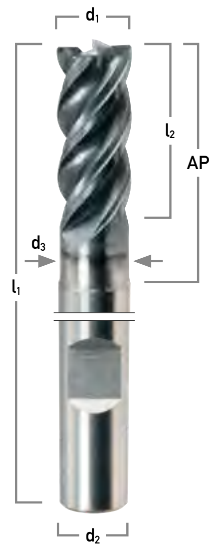
- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- **Tip:** incline for maximum cutting performance

30382

Alcrona Pro | Z 4 | HB | VHM | Type N | MTC | Manu-facturer standard

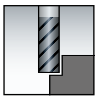
Solid Carbide MTC End Mill

Standard length with edge chamfer

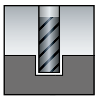


d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.13	8	57	2.8	18	4	30382030	0.007 – 0.031	0.007 – 0.027
4.0	6	0.18	11	57	3.8	21	4	30382040	0.011 – 0.031	0.010 – 0.027
5.0	6	0.20	13	57	4.8	21	4	30382050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	13	57	5.5	21	4	30382060	0.026 – 0.044	0.025 – 0.038
8.0	8	0.20	19	63	7.5	27	4	30382080	0.032 – 0.055	0.029 – 0.048
10.0	10	0.30	22	72	9.5	32	4	30382100	0.037 – 0.066	0.034 – 0.057
12.0	12	0.30	26	83	11.5	38	4	30382120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.30	26	83	13.5	42	4	30382140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.40	32	92	15.5	44	4	30382160	0.095 – 0.143	0.088 – 0.124
20.0	20	0.50	38	104	19.5	54	4	30382200	0.137 – 0.187	0.127 – 0.162

d_1	d_2
h10	h6



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- high machining performance in HPC area up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life
- Especially suitable for the use in milling and turning centres and low performance machines

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

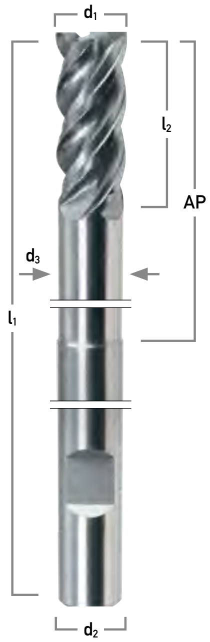
Product family 159

30389

Alcrona Pro | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

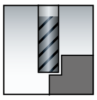
Solid Carbide HPC End Mill

Long version with edge chamfer



d1 mm	d2 mm	Corner chamfer	l2 mm	l1 mm	d3 mm	AP mm	Z	Coated Part No.	fz Roughing mm/Z	fz Finishing mm/Z
5.0	6	0.20	13	63	4.5	29	4	30389050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	13	63	5.5	29	4	30389060	0.026 – 0.044	0.025 – 0.038
8.0	8	0.20	19	80	7.5	40	4	30389080	0.032 – 0.055	0.029 – 0.048
10.0	10	0.30	22	80	9.5	40	4	30389100	0.037 – 0.066	0.034 – 0.057
12.0	12	0.30	26	100	11.5	50	4	30389120	0.063 – 0.099	0.059 – 0.086
16.0	16	0.40	32	115	15.5	65	4	30389160	0.095 – 0.143	0.088 – 0.124
20.0	20	0.50	38	130	19.5	80	4	30389200	0.137 – 0.187	0.127 – 0.162

d1	d2
h10	h6



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.5xD$

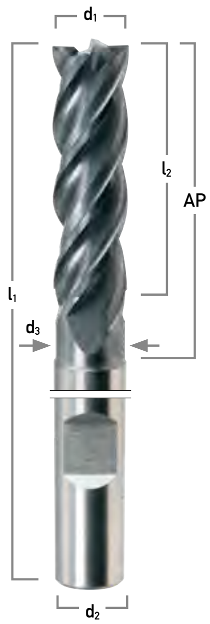
- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing

36388

Alcrona Pro | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill

Long version with protective chamfer



d1 mm	d2 mm	Corner chamfer	l2 mm	l1 mm	d3 mm	AP mm	Z	Coated Part No.	fz Roughing mm/Z	fz Finishing mm/Z
5.0	6	0.05	22	63	4.8	29	4	36388050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.06	22	63	5.5	29	4	36388060	0.026 – 0.044	0.025 – 0.038
8.0	8	0.08	28	80	7.5	36	4	36388080	0.032 – 0.055	0.029 – 0.048
10.0	10	0.10	33	80	9.5	43	4	3638810080	0.037 – 0.066	0.034 – 0.057
10.0	10	0.10	33	100	9.5	54	4	36388100	0.037 – 0.066	0.034 – 0.057
12.0	12	0.12	33	100	11.5	54	4	36388120	0.063 – 0.099	0.059 – 0.086
12.0	12	0.12	33	120	11.5	69	4	36388120120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.14	48	100	13.5	54	4	36388140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.15	53	125	15.5	69	4	36388160125	0.095 – 0.143	0.088 – 0.124
16.0	16	0.15	53	150	15.5	84	4	36388161	0.095 – 0.143	0.088 – 0.124
20.0	20	0.15	68	150	19.5	84	4	36388200	0.137 – 0.187	0.127 – 0.162

d1	d2
h10	h6

Peripheral milling
$a_e = 0.4xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.0xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

Product family 159

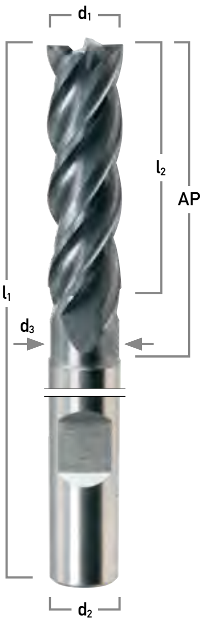
ToolFactory Cutting Tool Solutions

35388

Alcrona Pro | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

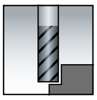
Solid Carbide HPC End Mill

Long version with edge chamfer

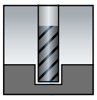


d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
5.0	6	0.20	22	63	4.8	29	4	35388050A	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	22	63	5.5	29	4	35388060A	0.026 – 0.044	0.025 – 0.038
7.0	8	0.20	28	80	6.5	36	4	35388070A	0.032 – 0.055	0.029 – 0.048
8.0	8	0.20	28	80	7.5	36	4	35388080A	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	33	80	8.5	43	4	35388090A	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	33	80	9.5	43	4	35388100A	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	33	100	9.5	54	4	35388101A	0.037 – 0.066	0.034 – 0.057
11.0	12	0.30	33	100	10.5	54	4	35388110A	0.063 – 0.099	0.059 – 0.086
12.0	12	0.30	33	100	11.5	54	4	35388120A	0.063 – 0.099	0.059 – 0.086
12.0	12	0.30	42	100	11.5	54	4	35388121A	0.063 – 0.099	0.059 – 0.086
13.0	14	0.30	48	100	12.5	54	4	35388130A	0.074 – 0.121	0.069 – 0.105
14.0	14	0.30	48	100	13.5	54	4	35388140A	0.074 – 0.121	0.069 – 0.105
16.0	16	0.40	53	125	15.5	69	4	35388160A	0.095 – 0.143	0.088 – 0.124
16.0	16	0.40	53	150	15.5	84	4	35388161A	0.095 – 0.143	0.088 – 0.124
18.0	18	0.40	53	150	17.5	69	4	35388180A	0.095 – 0.143	0.088 – 0.124
20.0	20	0.50	68	150	19.5	84	4	35388200A	0.137 – 0.187	0.127 – 0.162

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

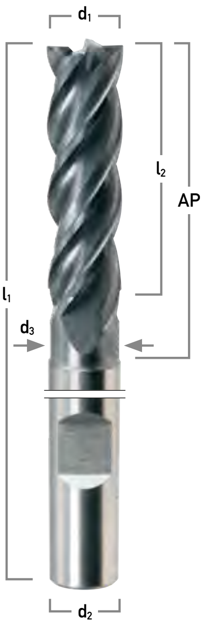
30388

Increased core diameter

Alcrona Pro | Z 4 | HB | ≠ | VHM | HPC | TPM | Manu-facturer standard

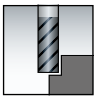
VHM-HPC/TPM End Mill

Long version with protective chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	0.06	22	63	5.5	29	4	30388060	0.026 – 0.044	0.025 – 0.038
8.0	8	0.08	28	80	7.5	36	4	30388080	0.032 – 0.055	0.029 – 0.048
10.0	10	0.10	33	80	9.5	43	4	30388100	0.037 – 0.066	0.034 – 0.057
12.0	12	0.12	33	100	11.5	54	4	30388120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.14	48	100	13.5	54	4	30388140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.15	53	125	15.5	69	4	30388160	0.095 – 0.143	0.088 – 0.124
20.0	20	0.15	68	150	19.5	84	4	30388200	0.137 – 0.187	0.127 – 0.162

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- Smooth running due to axial and radial unequal spacing
- With increased core best suitable with low cutting depths (finishing)
- Maximum side feed (a_e) 0.5xD
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

Product family 159

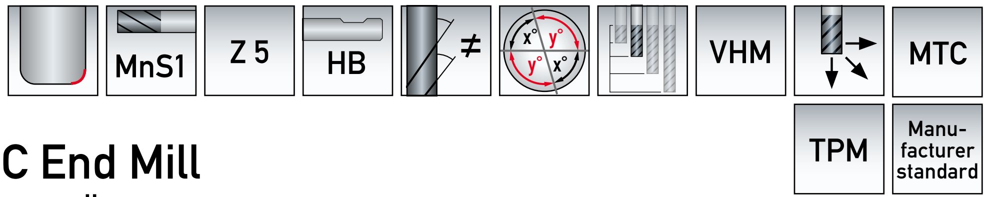
Solid Carbide HPC High-Performance End Mill

- Solid carbide end mill of the latest generation made from wear-resistant ultra-micro grain solid carbide
- **High material remove rate and long tool life**
- Newly developed cutting geometry with unequal pitch, dynamic helix pitch, cutting edge preparation, **corner radius**
- Optimized facing geometry for plunging
- MnS1 coating, based on the latest coating technology for high resistance to thermal and abrasive wear
- Highest stability and process reliability

Application:

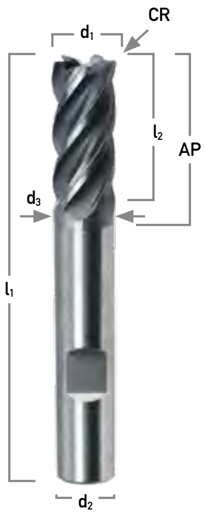
- Versatile use in all steel grades
- **For full slotting, roughing, and finishing, up to 2xD into solid**
- Trochoidale machining

35502

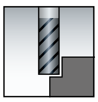


Solid Carbide HPC End Mill

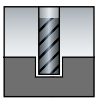
Standard length with corner radius



d_1	d_2	l_2	l_1	d_3	CR	AP		Coated	f_z (mm/Z)				
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \leq 1.0xd$	$a_e \leq 0.4xd$	ae≤0.25 xd	ae≤0.1xd ß≤38°	ae≤0.05xd ß≤26°
6.0	6	13	57	5.5	0.50	21	5	35502060	0.030	0.040	0.055	0.070	0.100
8.0	8	19	63	7.5	0.50	27	5	35502080	0.040	0.055	0.070	0.100	0.140
10.0	10	22	72	9.5	1.00	32	5	35502100	0.050	0.070	0.090	0.120	0.160
12.0	12	26	83	11.5	1.00	38	5	35502120	0.070	0.100	0.120	0.170	0.200
16.0	16	32	92	15.5	1.00	44	5	35502160	0.090	0.120	0.170	0.220	0.260
20.0	20	38	104	19.5	1.00	54	5	35502200	0.120	0.150	0.180	0.240	0.280



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 2.0xD$

d_1	d_2
h10	h6

V_c (m/min)	Non-alloy Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic
Tensile strength / Hardness / etc.	850–1000 N/mm²	<1200 N/mm²	<450 N/mm²	<650 N/mm²	1.4301	1.4571
Ramp/Helix ≤	≤6°	≤4°	≤1,5°	≤1,5°	≤6°	≤4°
a_e = 1xD	160	80	140	120	–	–
a_e = 0,4xD	220	140	170	150	90	80
a_e = 0,25xD	260	160	210	160	110	100
a_e = 0,1xD	300	180	240	185	120	110
a_e = 0,05xD	380	230	360	240	150	140

Product family 159

Solid Carbide Trochoidal End Mill

- Solid carbide end mill of the latest generation made from ultra-micro grain solid carbide with a special AlTiN coating
- **Geometry with improved shearing action for machines with lower driving power under difficult machining conditions and unstable conditions**
- Protection of the cutting edges through edge chamfer for longer tool life
- Cutting edges with chip breakers reduce the cutting forces and provide for short chips

Application:

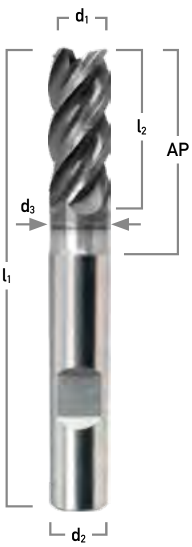
- Also suitable for slot milling
- For trochoidal milling with the use of the whole length of the cutting edge at highest cutting parameters
- Finish milling (trimming) at high cutting parameters and best surface finishing
- **Note:** For finishing. we recommend the use in a chuck with high system rotation accuracy (e.g. hydraulic chuck. shrink fit chuck. etc.)

37130

AlTiN | Z 4 | HB | VHM | MTC | TPM | Manu-facturer standard

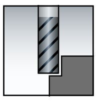
Solid carbide trochoidal end mill

2xD with edge chamfer

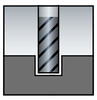


d_1	d_2
h10	h6

d_1	d_2	Corner chamfer	l_2	l_1	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)			HPC Full slot
mm	mm		mm	mm	mm	mm	Z	Part No.	$a_e \le 0.5xd$ $\varphi_s \le 90°$	$a_e \le 0.25xd$ $\varphi_s \le 60°$	$a_e \le 0.1xd$ $\varphi_s \le 38°$	$a_e \le 1.0 x d$ $a_p \le 1.0 x d$
3.0	6	0.13	8	57	2.8	18	4	37130030	0.013	0.030	0.050	0.008
4.0	6	0.18	11	57	3.8	21	4	37130040	0.020	0.040	0.070	0.009
5.0	6	0.20	13	57	4.8	21	4	37130050	0.025	0.045	0.085	0.015
6.0	6	0.20	13	57	5.5	21	4	37130060	0.030	0.045	0.095	0.022
8.0	8	0.20	19	63	7.5	27	4	37130080	0.040	0.045	0.135	0.028
10.0	10	0.30	22	72	9.5	32	4	37130100	0.050	0.065	0.150	0.038
12.0	12	0.30	26	83	11.5	38	4	37130120	0.070	0.075	0.195	0.055
14.0	14	0.30	26	83	13.5	42	4	37130140	0.080	0.100	0.210	0.075
16.0	16	0.40	32	92	15.5	44	4	37130160	0.115	0.125	0.225	0.085
20.0	20	0.50	38	104	19.5	54	4	37130200	0.155	0.160	0.240	0.120



Peripheral milling
$a_e = 0.15xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.0xD$

- Smaller tool diameter than for HPC machining for increased cutting performance
- Lateral infeed for normal materials (good machinability). approx. half of the maximum values specified (a_e)
- Lateral infeed for demanding materials (poor machinability). approx. 1/3 of the maximum values specified (a_e)
- Cooling only in exceptional cases. such as special alloys

Trochoidal / Trimming								
V_c (m/min)	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray. ductile. malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	500–850 N/mm²	≤ 1000 N/mm²	850–1000 N/mm²	1000–1200 N/mm²	<1400 N/mm²	<450 N/mm²	> 260 HB	1.4301
$a_e = 1xD$	240	225	195	–	–	130	105	100
$a_e = 0.5xD$	300	280	245	195	–	160	130	125
$a_e = 0.25xD$	330	310	270	215	150	180	145	140
$a_e = 0.1xD$	370	345	300	230	160	200	160	150

Product family 159

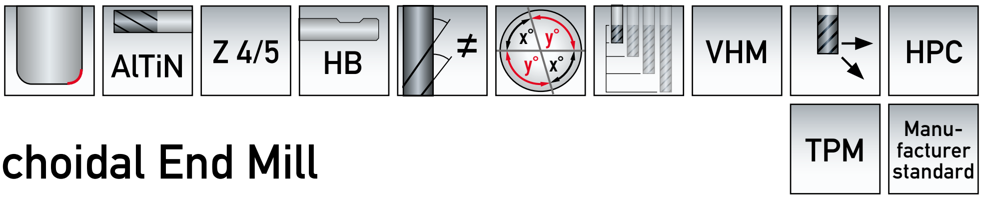
Solid Carbide Trochoidal End Mill

- Solid carbide end mill of the latest generation made from ultra-micro grain solid carbide with a special AlTiN coating
- Optimized geometry with increased core and large flutes in the front area
- High machining performance
- Protection of the cutting edges through corner radius for longer tool life
- Cutting edges with chip breakers reduce the cutting forces and provide for short chips

Application:

- For trochoidal milling with the use of the whole length of the cutting edge at highest cutting parameters
- Finish milling (trimming) at high cutting parameters and best surface finishing

37131

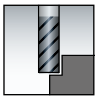


Solid Carbide Trochoidal End Mill

3xD with corner radius

d1	d2
h10	h6

d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)				max. chip thickness	HPC Full slot f_z (mm/Z)
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \leq 0.15xd$ $\varphi_s \leq 45.6°$	$a_e \leq 0.15xd$ $\varphi_s \leq 36.9°$	$a_e \leq 0.075xd$ $\varphi_s \leq 31.8°$	$a_e \leq 0.05xd$ $\varphi_s \leq 25.8°$	$h_{max.}$	$a_e \leq 1.0xd$ $a_p \leq 1.0xd$
6.0	6	20	57	0.10	–	–	4	37131060	0.050	0.06	0.069	0.084	0.036	0.020 – 0.040
8.0	8	26	63	0.10	–	–	4	37131080	0.066	0.08	0.092	0.112	0.048	0.030 – 0.050
10.0	10	32	72	0.10	–	–	5	37131100	0.082	0.10	0.115	0.140	0.060	0.040 – 0.072
12.0	12	38	83	0.12	–	–	5	37131120	0.100	0.12	0.138	0.168	0.072	0.060 – 0.090
14.0	14	44	100	0.15	–	–	5	37131140	0.115	0.14	0.161	0.196	0.084	0.085 – 0.110
16.0	16	52	115	0.15	–	–	5	37131160	0.132	0.16	0.184	0.224	0.096	0.090 – 0.120
20.0	20	62	131	0.20	–	–	5	37131200	0.165	0.20	0.230	0.280	0.120	0.110 – 0.140



Peripheral milling
$a_e = 0.15xD$
$a_p = 3.0xD$

Our trochoidal end mills' performance show

Visit YouTube to watch our trochoidal end mills machining C45E.

https://www.youtube.com/watch?v=8bVfFQaGVdw

V_c (m/min)	Trochoidal / Trimming General structural steels	Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	500–850 N/mm²	≤ 1000 N/mm²	850–1000 N/mm²	1000–1200 N/mm²	<1400 N/mm²	<450 N/mm²	> 260 HB	1.4301
$a_e = 0{,}15xD$	240	225	195	–	–	130	105	100
$a_e = 0{,}1xD$	300	280	245	195	–	160	130	125
$a_e = 0{,}075xD$	330	310	270	215	150	180	145	140
$a_e = 0{,}05xD$	370	345	300	230	160	200	160	150

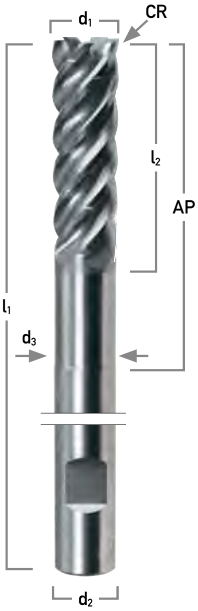
Product family 159

37132

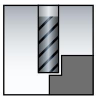
AlTiN | Z 4/5 | HB | ≠ | VHM | HPC | TPM | Manu-facturer standard

Solid Carbide Trochoidal End Mill

3xD with corner radius



d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)			max. chip thickness
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \leq 0.15 \times d$ $\varphi_s \leq 36.9°$	$a_e \leq 0.075 \times d$ $\varphi_s \leq 31.8°$	$a_e \leq 0.05 \times d$ $\varphi_s \leq 25.8°$	$h_{max.}$
6.0	6	20	75	0.10	5.5	32	4	37132060	0.060	0.069	0.084	0.036
8.0	8	26	85	0.10	7.5	42	4	37132080	0.080	0.092	0.112	0.048
10.0	10	32	100	0.10	9.5	52	5	37132100	0.100	0.115	0.140	0.060
12.0	12	38	110	0.12	11.5	62	5	37132120	0.120	0.138	0.168	0.072
14.0	14	44	125	0.15	13.5	72	5	37132140	0.140	0.161	0.196	0.084
16.0	16	52	140	0.15	15.5	82	5	37132160	0.160	0.184	0.224	0.096
20.0	20	62	165	0.20	19.5	102	5	37132200	0.200	0.230	0.280	0.120



Peripheral milling
$a_e = 0.1xD$
$a_p = 3.0xD$

d_1	d_2
h10	h6

37151

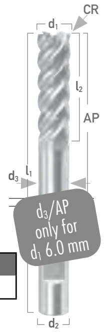
AlTiN | Z 4/5 | HB | ≠ | VHM | HPC | TPM | Manu-facturer standard

Solid Carbide Trochoidal End Mill

5xD with corner radius

d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)			max. chip thickness
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \leq 0.15 \times d$ $\varphi_s \leq 36.9°$	$a_e \leq 0.075 \times d$ $\varphi_s \leq 31.8°$	$a_e \leq 0.05 \times d$ $\varphi_s \leq 25.8°$	$h_{max.}$
6.0	6	25	75	0.10	5.5	32	4	37151060	0.060	0.069	0.084	0.036
8.0	8	42	85	0.10	–	–	4	37151080	0.080	0.092	0.112	0.048
10.0	10	52	100	0.10	–	–	5	37151100	0.100	0.115	0.140	0.060
12.0	12	62	110	0.12	–	–	5	37151120	0.120	0.138	0.168	0.072
14.0	14	72	125	0.15	–	–	5	37151140	0.140	0.161	0.196	0.084
16.0	16	82	140	0.15	–	–	5	37151160	0.160	0.184	0.224	0.096
20.0	20	102	165	0.20	–	–	5	37151200	0.200	0.230	0.280	0.120

Peripheral milling
$a_e = 0.1xD$
$a_p = 5.0xD$



d3/AP only for d1 6.0 mm

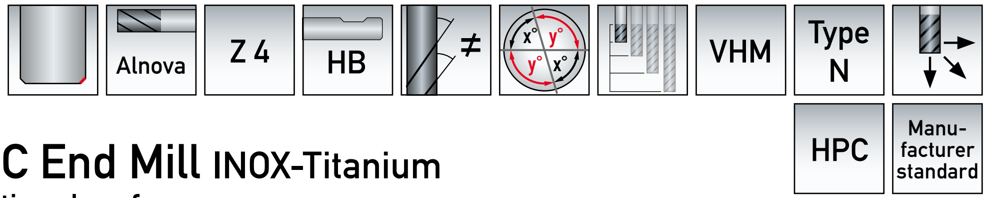
d_1	d_2
h10	h6

3xD	Trochoidal / Trimming							
V_c (m/min)	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	500–850 N/mm²	≤ 1000 N/mm²	850–1000 N/mm²	1000–1200 N/mm²	<1400 N/mm²	<450 N/mm²	> 260 HB	1.4301
a_e = 0,15xD	240	225	195	–	–	130	105	100
a_e = 0,1xD	300	280	245	195	–	160	130	125
a_e = 0,075xD	330	310	270	215	150	180	145	140
a_e = 0,05xD	370	345	300	230	160	200	160	150

5xD	Trochoidal / Trimming							
V_c (m/min)	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	500–850 N/mm²	≤ 1000 N/mm²	850–1000 N/mm²	1000–1200 N/mm²	<1400 N/mm²	<450 N/mm²	> 260 HB	1.4301
a_e = 0,1xD	220	205	180	–	–	160	130	–
a_e = 0,075xD	240	225	200	150	110	180	145	120
a_e = 0,05xD	260	245	210	170	120	200	160	140

Product family 159

30386

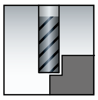


Solid Carbide HPC End Mill INOX-Titanium

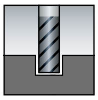
Short version with protective chamfer

d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.03	6	54	4	30386030	0.011 – 0.017	0.010 – 0.014
4.0	6	0.04	8	54	4	30386040	0.015 – 0.022	0.014 – 0.019
5.0	6	0.05	9	54	4	30386050	0.019 – 0.026	0.018 – 0.023
6.0	6	0.06	10	54	4	30386060	0.021 – 0.031	0.020 – 0.027
8.0	8	0.08	12	58	4	30386080	0.032 – 0.042	0.029 – 0.036
10.0	10	0.10	14	66	4	30386100	0.042 – 0.055	0.039 – 0.048
12.0	12	0.12	16	73	4	30386120	0.047 – 0.061	0.044 – 0.052
14.0	14	0.14	18	75	4	30386140	0.053 – 0.066	0.049 – 0.057
16.0	16	0.15	22	82	4	30386160	0.074 – 0.088	0.069 – 0.076
20.0	20	0.15	26	92	4	30386200	0.074 – 0.099	0.069 – 0.086



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

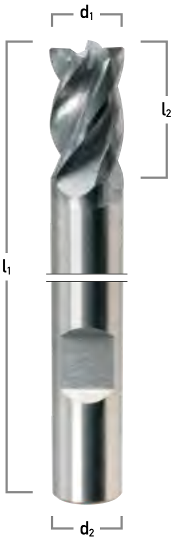
V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength / Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

Product family 159

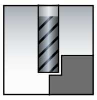
35386

Alnova | Z 4 | HB | VHM | Type N | HPC | Manu-facturer standard

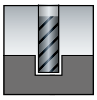
Solid Carbide HPC End Mill INOX-Titanium
Short version with edge chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.13	6	54	4	35386030AN	0.011 – 0.017	0.010 – 0.014
4.0	6	0.18	8	54	4	35386040AN	0.015 – 0.022	0.014 – 0.019
5.0	6	0.20	9	54	4	35386050AN	0.019 – 0.026	0.018 – 0.023
6.0	6	0.20	10	54	4	35386060AN	0.021 – 0.031	0.020 – 0.027
7.0	8	0.20	12	58	4	35386070AN	0.032 – 0.042	0.029 – 0.036
8.0	8	0.20	12	58	4	35386080AN	0.032 – 0.042	0.029 – 0.036
9.0	10	0.30	14	66	4	35386090AN	0.042 – 0.055	0.039 – 0.048
10.0	10	0.30	14	66	4	35386100AN	0.042 – 0.055	0.039 – 0.048
11.0	12	0.30	16	73	4	35386110AN	0.047 – 0.061	0.044 – 0.052
12.0	12	0.30	16	73	4	35386120AN	0.047 – 0.061	0.044 – 0.052
14.0	14	0.30	18	75	4	35386140AN	0.053 – 0.066	0.049 – 0.057
16.0	16	0.40	22	82	4	35386160AN	0.074 – 0.088	0.069 – 0.076
18.0	18	0.40	24	84	4	35386180AN	0.074 – 0.099	0.069 – 0.086
20.0	20	0.50	26	92	4	35386200AN	0.074 – 0.099	0.069 – 0.086



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD



Full slot milling
a_p = 1.0xD

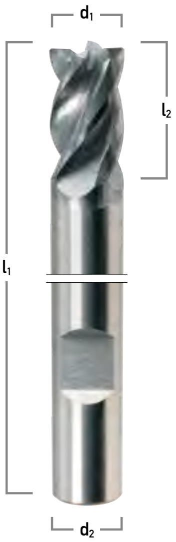
- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

d_1	d_2
h10	h6

35383

Alnova | Z 4 | HB | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill INOX-Titanium
Standard length with edge chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
4.0	6	0.18	11	57	4	35383040AN	0.015 – 0.022	0.014 – 0.019
5.0	6	0.20	13	57	4	35383050AN	0.019 – 0.026	0.018 – 0.023
6.0	6	0.20	13	57	4	35383060AN	0.021 – 0.031	0.020 – 0.027
7.0	8	0.20	19	63	4	35383070AN	0.032 – 0.042	0.029 – 0.036
8.0	8	0.20	19	63	4	35383080AN	0.032 – 0.042	0.029 – 0.036
9.0	10	0.30	22	72	4	35383090AN	0.042 – 0.055	0.039 – 0.048
10.0	10	0.30	22	72	4	35383100AN	0.042 – 0.055	0.039 – 0.048
11.0	12	0.30	26	83	4	35383110AN	0.047 – 0.061	0.044 – 0.052
12.0	12	0.30	26	83	4	35383120AN	0.047 – 0.061	0.044 – 0.052
14.0	14	0.30	26	83	4	35383140AN	0.053 – 0.066	0.049 – 0.057
16.0	16	0.40	32	92	4	35383160AN	0.074 – 0.088	0.069 – 0.076
18.0	18	0.40	32	92	4	35383180AN	0.074 – 0.099	0.069 – 0.086
20.0	20	0.50	38	104	4	35383200AN	0.074 – 0.099	0.069 – 0.086

Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

d_1	d_2
h10	h6

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength / Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

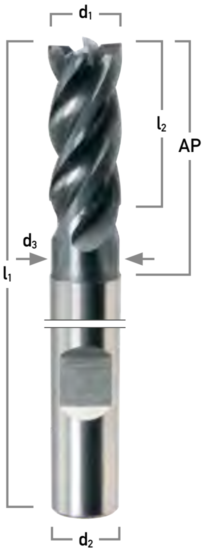
Product family 159

30385

Alnova · Z 4 · HB · ≠ · VHM · Type N · HPC · Manu-facturer standard

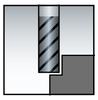
Solid Carbide HPC End Mill INOX-Titanium

Standard length with neck and protective chamfer



d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.03	8	57	2.8	12	4	30385030	0.0105 – 0.0170	0.0098 – 0.0140
4.0	6	0.04	11	57	3.8	15	4	30385040	0.0147 – 0.0220	0.0137 – 0.0190
5.0	6	0.05	13	57	4.8	17	4	30385050	0.0189 – 0.0260	0.0176 – 0.0230
6.0	6	0.06	13	57	5.5	21	4	30385060	0.0210 – 0.0310	0.0196 – 0.0270
8.0	8	0.08	19	63	7.5	27	4	30385080	0.0315 – 0.0420	0.0294 – 0.0360
10.0	10	0.10	22	72	9.5	32	4	30385100	0.0420 – 0.0550	0.0392 – 0.0480
12.0	12	0.12	26	83	11.5	38	4	30385120	0.0473 – 0.0610	0.0441 – 0.0520
14.0	14	0.14	26	83	13.5	42	4	30385140	0.0525 – 0.0660	0.0490 – 0.0570
16.0	16	0.15	32	92	15.5	44	4	30385160	0.0735 – 0.0880	0.0686 – 0.0760
20.0	20	0.15	38	104	19.5	54	4	30385200	0.0735 – 0.0990	0.0686 – 0.0860



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength / Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

Product family 159

35385

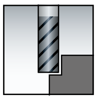
Alnova | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill INOX-Titanium

Standard length with neck and edge chamfer

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	0.02	3	57	0.9	5	4	35385010AN	0.0040 – 0.0100	0.0030 – 0.0090
1.5	6	0.02	4.5	57	1.4	8	4	35385015AN	0.0060 – 0.0120	0.0050 – 0.0110
2.0	6	0.02	6	57	1.8	10	4	35385020AN	0.0070 – 0.0130	0.0060 – 0.0120
2.5	6	0.02	7	57	2.3	11	4	35385025AN	0.0080 – 0.0150	0.0070 – 0.0130
3.0	6	0.13	8	57	2.8	12	4	35385030AN	0.0105 – 0.0170	0.0098 – 0.0140
4.0	6	0.18	11	57	3.8	15	4	35385040AN	0.0147 – 0.0220	0.0137 – 0.0190
5.0	6	0.20	13	57	4.8	17	4	35385050AN	0.0189 – 0.0260	0.0176 – 0.0230
6.0	6	0.20	13	57	5.5	21	4	35385060AN	0.0210 – 0.0310	0.0196 – 0.0270
7.0	8	0.20	19	63	6.5	27	4	35385070AN	0.0315 – 0.0420	0.0294 – 0.0360
8.0	8	0.20	19	63	7.5	27	4	35385080AN	0.0315 – 0.0420	0.0294 – 0.0360
9.0	10	0.30	22	72	8.5	32	4	35385090AN	0.0420 – 0.0550	0.0392 – 0.0480
10.0	10	0.30	22	72	9.5	32	4	35385100AN	0.0420 – 0.0550	0.0392 – 0.0480
11.0	12	0.30	26	83	10.5	38	4	35385110AN	0.0473 – 0.0610	0.0441 – 0.0520
12.0	12	0.30	26	83	11.5	38	4	35385120AN	0.0473 – 0.0610	0.0441 – 0.0520
13.0	14	0.30	26	83	12.5	42	4	35385130AN	0.0525 – 0.0660	0.0490 – 0.0570
14.0	14	0.30	26	83	13.5	42	4	35385140AN	0.0525 – 0.0660	0.0490 – 0.0570
16.0	16	0.40	32	92	15.5	44	4	35385160AN	0.0735 – 0.0880	0.0686 – 0.0760
18.0	18	0.40	32	92	17.5	50	4	35385180AN	0.0735 – 0.0990	0.0686 – 0.0860
20.0	20	0.50	38	104	19.5	54	4	35385200AN	0.0735 – 0.0990	0.0686 – 0.0860

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength / Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

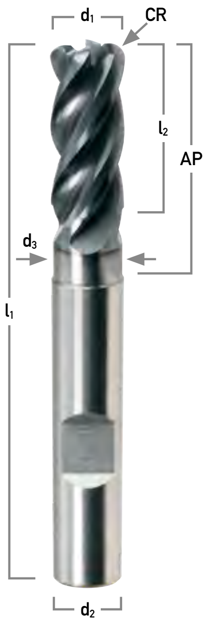
Product family 159

35387

Alnova | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

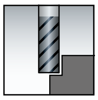
Solid Carbide HPC Torus Cutter INOX-Titanium

Standard length with neck and corner radius

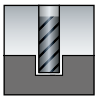


d_1	d_2	l_2	l_1	CR +/- 0.02	d_3	AP		Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z			mm/Z		
3.0	6	8	57	0.50	2.8	12	4	3538703005	0.012	–	0.020	0.010	–	0.018
4.0	6	11	57	0.50	3.8	15	4	3538704005	0.015	–	0.022	0.014	–	0.019
4.0	6	11	57	1.00	3.8	15	4	3538704010	0.015	–	0.022	0.014	–	0.019
5.0	6	13	57	0.50	4.8	17	4	3538705005	0.019	–	0.026	0.018	–	0.023
5.0	6	13	57	1.00	4.8	17	4	3538705010	0.019	–	0.026	0.018	–	0.023
6.0	6	13	57	0.50	5.5	21	4	3538706005	0.021	–	0.031	0.020	–	0.027
6.0	6	13	57	1.00	5.5	21	4	3538706010	0.021	–	0.031	0.020	–	0.027
6.0	6	13	57	2.00	5.5	21	4	3538706020	0.021	–	0.031	0.020	–	0.027
8.0	8	19	63	0.50	7.5	27	4	3538708005	0.032	–	0.042	0.029	–	0.036
8.0	8	19	63	1.00	7.5	27	4	3538708010	0.032	–	0.042	0.029	–	0.036
8.0	8	19	63	2.00	7.5	27	4	3538708020	0.032	–	0.042	0.029	–	0.036
10.0	10	22	72	0.50	9.5	32	4	3538710005	0.042	–	0.055	0.039	–	0.048
10.0	10	22	72	1.00	9.5	32	4	3538710010	0.042	–	0.055	0.039	–	0.048
10.0	10	22	72	2.00	9.5	32	4	3538710020	0.042	–	0.055	0.039	–	0.048
12.0	12	26	83	0.50	11.5	38	4	3538712005	0.047	–	0.061	0.044	–	0.052
12.0	12	26	83	1.00	11.5	38	4	3538712010	0.047	–	0.061	0.044	–	0.052
12.0	12	26	83	2.00	11.5	38	4	3538712020	0.047	–	0.061	0.044	–	0.052
16.0	16	32	92	1.00	15.5	44	4	3538716010	0.074	–	0.088	0.069	–	0.076
16.0	16	32	92	2.00	15.5	44	4	3538716020	0.074	–	0.088	0.069	–	0.076
20.0	20	38	104	1.00	19.5	54	4	3538720010	0.074	–	0.099	0.069	–	0.086
20.0	20	38	104	2.00	19.5	54	4	3538720020	0.074	–	0.099	0.069	–	0.086
20.0	20	38	104	3.00	19.5	54	4	3538720030	0.074	–	0.099	0.069	–	0.086
20.0	20	38	104	5.00	19.5	54	4	3538720050	0.074	–	0.099	0.069	–	0.086

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD



Full slot milling
a_p = 1.0xD

- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength / Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

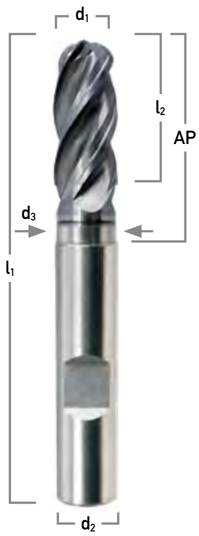
Product family 159

35585

Alnova | Z 4 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill INOX-Titanium

Standard length with neck and full radius



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	8	57	2.8	12	4	35585030	0.0105 – 0.0170	0.0098 – 0.0140
4.0	6	11	57	3.8	15	4	35585040	0.0150 – 0.0220	0.0140 – 0.0190
5.0	6	13	57	4.8	17	4	35585050	0.0190 – 0.0260	0.0180 – 0.0230
6.0	6	13	57	5.5	21	4	35585060	0.0210 – 0.0310	0.0200 – 0.0270
8.0	8	19	63	7.5	27	4	35585080	0.0320 – 0.0420	0.0290 – 0.0360
10.0	10	22	72	9.5	32	4	35585100	0.0420 – 0.0550	0.0390 – 0.0480
12.0	12	26	83	11.5	38	4	35585120	0.0470 – 0.0610	0.0440 – 0.0520
14.0	14	26	83	13.5	42	4	35585140	0.0525 – 0.0660	0.0490 – 0.0570
16.0	16	32	92	15.5	44	4	35585160	0.0740 – 0.0880	0.0690 – 0.0760
20.0	20	38	104	19.5	54	4	35585200	0.0740 – 0.0990	0.0690 – 0.0860

Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

- High-performance end mill for roughing and finishing in INOX, titanium and heat-resisting alloys
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- **Tip:** incline for maximum cutting performance

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength / Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

Product family 159

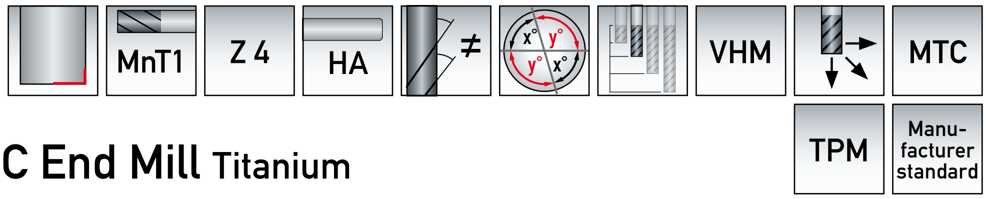
VHM End Mill for titanium machining

- Solid carbide end mill made of highly wear-resistant ultra-micro grain solid carbide
- MnT1 coating, based on the latest coating technology for high resistance to thermal and abrasive wear
- Specially designed for machining high-temperature resistant materials such as titanium
- Modern improved shearing action geometry with unequal spacing
- High running smoothness and cutting performance

Application:

- Full-slot milling, trimming, multipass milling, and trochoidal machining
- Finish milling at best surface finishing

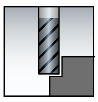
37001



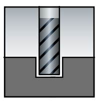
Solid Carbide HPC End Mill Titanium

4 flutes – square end

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Part no.	f_z Profiling mm/Z	f_z Slotting mm/Z
2.0	4	6	50	37001020	0.008 – 0.018	0.005 – 0.014
2.5	4	6	50	37001025	0.008 – 0.018	0.005 – 0.014
3.0	4	9	50	37001030	0.010 – 0.021	0.008 – 0.017
4.0	4	11	50	37001040	0.012 – 0.024	0.009 – 0.020
4.5	6	11	50	37001045	0.012 – 0.024	0.009 – 0.020
5.0	6	13	50	37001050	0.015 – 0.028	0.011 – 0.024
6.0	6	16	50	37001060	0.016 – 0.030	0.012 – 0.026
8.0	8	20	60	37001080	0.022 – 0.042	0.017 – 0.035
10.0	10	25	72	37001100	0.030 – 0.050	0.025 – 0.042
12.0	12	30	75	37001120	0.040 – 0.062	0.035 – 0.055
14.0	14	32	80	37001140	0.050 – 0.070	0.041 – 0.063
16.0	16	36	100	37001160	0.055 – 0.080	0.050 – 0.072
20.0	20	45	100	37001200	0.065 – 0.110	0.060 – 0.090



Profiling
$a_e \leq 0.25xD$
$a_p \leq 1.5xD$



Slotting
$a_e \leq 1.0xD$
$a_p \leq 1.0xD$

D	Tolerance
D<16	0/-0,03
D>16	0/-0,04

Profiling	
Material	Titanium alloy
V_c (m/min)	80

Slotting	
Material	Titanium alloy
V_c (m/min)	55

Product family 159

37002

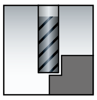
MnT1 | Z 4 | HA | ≠ | VHM | MTC | HPC | TPM | Manu-facturer standard

Solid Carbide HPC Torus Cutter Titanium

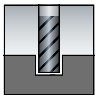
4 flutes – with corner radius

D	Tolerance
D<6	0/-0,02
6>D<16	0/-0,03
D>16	0/-0,04

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	Part no.	f_z Profiling mm/Z	f_z Slotting mm/Z
2.0	4	6	50	0.20	3700202002	0.008 – 0.018	0.005 – 0.014
3.0	4	9	50	0.30	3700203003	0.010 – 0.021	0.008 – 0.017
3.0	4	9	50	0.50	3700203005	0.010 – 0.021	0.008 – 0.017
4.0	4	11	50	0.50	3700204005	0.012 – 0.024	0.009 – 0.020
4.0	4	11	50	1.00	3700204010	0.012 – 0.024	0.009 – 0.020
5.0	6	13	50	0.50	3700205005	0.015 – 0.028	0.011 – 0.024
6.0	6	16	50	0.50	3700206005	0.016 – 0.030	0.012 – 0.026
6.0	6	16	50	1.00	3700206010	0.016 – 0.030	0.012 – 0.026
8.0	8	20	60	0.50	3700208005	0.022 – 0.042	0.017 – 0.035
8.0	8	20	60	1.00	3700208010	0.022 – 0.042	0.017 – 0.035
10.0	10	25	72	0.50	3700210005	0.030 – 0.050	0.025 – 0.042
10.0	10	25	72	1.00	3700210010	0.030 – 0.050	0.025 – 0.042
10.0	10	25	72	2.00	3700210020	0.030 – 0.050	0.025 – 0.042
12.0	12	30	75	1.00	3700212010	0.040 – 0.062	0.035 – 0.055
12.0	12	30	75	2.00	3700212020	0.040 – 0.062	0.035 – 0.055
12.0	12	30	75	3.00	3700212030	0.040 – 0.062	0.035 – 0.055
16.0	16	36	100	1.00	3700216010	0.055 – 0.080	0.050 – 0.072
16.0	16	36	100	2.00	3700216020	0.055 – 0.080	0.050 – 0.072
16.0	16	36	100	3.00	3700216030	0.055 – 0.080	0.050 – 0.072
16.0	16	36	100	4.00	3700216040	0.055 – 0.080	0.050 – 0.072
20.0	20	45	100	1.00	3700220010	0.065 – 0.110	0.060 – 0.090
20.0	20	45	100	2.00	3700220020	0.065 – 0.110	0.060 – 0.090
20.0	20	45	100	3.00	3700220030	0.065 – 0.110	0.060 – 0.090



Profiling
$a_e \leq 0.25xD$
$a_p \leq 1.5xD$



Slotting
$a_e \leq 1.0xD$
$a_p \leq 1.0xD$

Profiling	
Material	Titanium alloy
V_c (m/min)	80

Slotting	
Material	Titanium alloy
V_c (m/min)	55

37006

R>1 +/-0.02 | MnT1 | Z 4 | HA | ≠ | VHM | MTC | HPC | TPM | Manu-facturer standard

Solid Carbide HPC Ball-Nosed End Mill Titanium

4 flutes – with ball nose

D	Tolerance
R>1	+/-0,02

d_1 mm	d_2 mm	l_2 mm	l_1 mm	R mm	Part no.	f_z Profiling mm/Z
2.0	6	4	50	1.00	37006020	0.015 – 0.022
3.0	6	6	50	1.50	37006030	0.022 – 0.028
4.0	6	8	50	2.00	37006040	0.028 – 0.035
5.0	6	10	50	2.50	37006050	0.037 – 0.045
6.0	6	12	50	3.00	37006060	0.030 – 0.055
8.0	8	14	60	4.00	37006080	0.040 – 0.068
10.0	10	18	75	5.00	37006100	0.048 – 0.075
12.0	12	22	75	6.00	37006120	0.053 – 0.085
16.0	16	30	100	8.00	37006160	0.065 – 0.100
20.0	20	38	100	10.00	37006200	0.085 – 0.145

Profiling
$a_e \leq 0.3xD$
$a_p \leq 0.2xD$

Profiling	
Material	Titanium alloy
V_c (m/min)	75

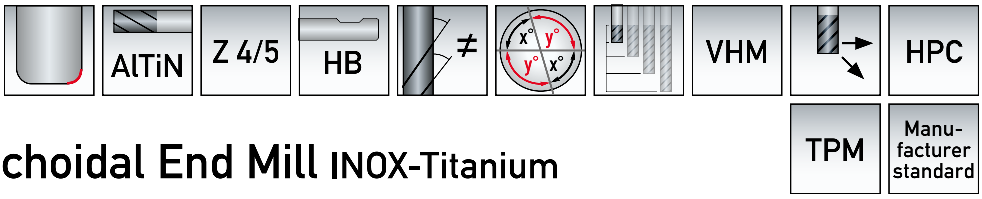
Solid Carbide Trochoidal End Mill INOX-Titanium

- Solid carbide end mill of the latest generation made from ultra-micro grain solid carbide with a special AlTiN coating
- Optimized geometry with increased core and large flutes in the front area
- High machining performance
- Protection of the cutting edges through corner radius for longer tool life
- Cutting edges with chip breakers reduce the cutting forces and provide for short chips

Application:

- For trochoidal milling with the use of the whole length of the cutting edge at highest cutting parameters
- Finish milling (trimming) at high cutting parameters and best surface finishing

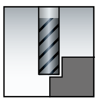
37231



Solid Carbide Trochoidal End Mill INOX-Titanium

3xD with corner radius

d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)			max. chip thickness	HPC Full slot f_z mm/tooth
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \leq 0.1 \times d$ $\varphi_s \leq 36.9°$	$a_e \leq 0.075 \times d$ $\varphi_s \leq 31.8°$	$a_e \leq 0.05 \times d$ $\varphi_s \leq 25.8°$	$h_{max.}$	$a_e \leq 1.0 \times d$ $a_p \leq 1.0 \times d$
6.0	6	20	57	0.10	–	–	4	37231060	0.06	0.069	0.084	0.030	0.020–0.030
8.0	8	26	63	0.10	–	–	4	37231080	0.08	0.092	0.112	0.039	0.030–0.040
10.0	10	32	72	0.10	–	–	5	37231100	0.10	0.115	0.140	0.049	0.040–0.050
12.0	12	38	83	0.12	–	–	5	37231120	0.12	0.138	0.168	0.060	0.045–0.060
14.0	14	44	100	0.15	–	–	5	37231140	0.14	0.161	0.196	0.690	0.050–0.062
16.0	16	52	115	0.15	–	–	5	37231160	0.16	0.184	0.224	0.079	0.070–0.090
20.0	20	62	131	0.20	–	–	5	37231200	0.20	0.230	0.280	0.099	0.070–0.100



Peripheral milling
$a_e = 0.15xD$
$a_p = 3.0xD$

d_1	d_2
h10	h6

Trochoidal / Trimming							
V_c (m/min)	Stainless martensitic	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Nickel-based alloys	Titanium alloy
Tensile strength, classification	1.4034	1.4301	1.4571	Duplex	≤1200 N/mm²	≤1300 N/mm²	≤ 850 N/mm²
$a_e = 0{,}15xD$	170	160	140	–	–	–	70
$a_e = 0{,}1xD$	190	180	160	140	80	70	90
$a_e = 0{,}075xD$	210	200	180	160	90	80	100
$a_e = 0{,}05xD$	230	220	200	180	100	90	110

Please use cooling emulsion!

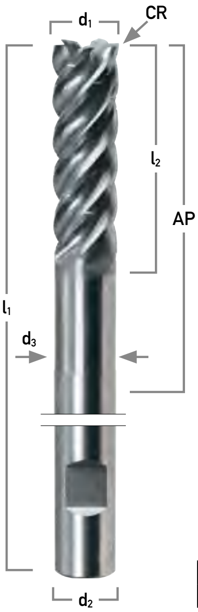
Product family 159

37232

AlTiN | Z 4/5 | HB | VHM | HPC | TPM | Manu-facturer standard

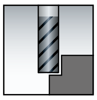
Solid Carbide Trochoidal End Mill INOX-Titanium

3xD with corner radius



d1	d2
h10	h6

d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)			max. chip thickness
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \le 0.1 \times d$ $\varphi_s \le 36.9°$	$a_e \le 0.75 \times d$ $\varphi_s \le 31.8°$	$a_e \le 0.05 \times d$ $\varphi_s \le 25.8°$	$h_{max.}$
6.0	6	20	75	0.10	5.5	32	4	37232060	0.06	0.069	0.084	0.030
8.0	8	26	85	0.10	7.5	42	4	37232080	0.08	0.092	0.112	0.039
10.0	10	32	100	0.10	9.5	52	5	37232100	0.10	0.115	0.140	0.049
12.0	12	38	110	0.12	11.5	62	5	37232120	0.12	0.138	0.168	0.060
14.0	14	44	125	0.15	13.5	72	5	37232140	0.14	0.161	0.196	0.690
16.0	16	52	140	0.15	15.5	82	5	37232160	0.16	0.184	0.224	0.079
20.0	20	62	165	0.20	19.5	102	5	37232200	0.20	0.230	0.280	0.099



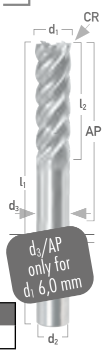
Peripheral milling
$a_e = 0.1xD$
$a_p = 3.0xD$

37251

AlTiN | Z 4/5 | HB | VHM | HPC | TPM | Manu-facturer standard

Solid Carbide Trochoidal End Mill INOX-Titanium

5xD with corner radius



d1	d2
h10	h6

d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	Trochoidal / Trimming f_z (mm/Z)			max. chip thickness
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	$a_e \le 0.1 \times d$ $\varphi_s \le 36.9°$	$a_e \le 0.75 \times d$ $\varphi_s \le 31.8°$	$a_e \le 0.05 \times d$ $\varphi_s \le 25.8°$	$h_{max.}$
6.0	6	25	75	0.10	5.5	32	4	37251060	0.050	0.057	0.070	0.030
8.0	8	42	85	0.10	–	–	4	37251080	0.066	0.076	0.093	0.039
10.0	10	52	100	0.10	–	–	5	37251100	0.082	0.094	0.115	0.049
12.0	12	62	110	0.12	–	–	5	37251120	0.100	0.115	0.140	0.060
14.0	14	72	125	0.15	–	–	5	37251140	0.115	0.132	0.161	0.690
16.0	16	82	140	0.15	–	–	5	37251160	0.132	0.152	0.185	0.079
20.0	20	102	165	0.20	–	–	5	37251200	0.165	0.190	0.231	0.099

Peripheral milling
$a_e = 0.1xD$
$a_p = 5.0xD$

3xD	Trochoidal / Trimming						
V_c (m/min)	Stainless martensitic	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Nickel-based alloys	Titanium alloy
Tensile strength, classification	1.4034	1.4301	1.4571	Duplex	≤1200 N/mm²	≤1300 N/mm²	≤ 850 N/mm²
a_e = 0,15xD	170	160	140	–	–	–	70
a_e = 0,1xD	190	180	160	140	80	70	90
a_e = 0,075xD	210	200	180	160	90	80	100
a_e = 0,05xD	230	220	200	180	100	90	110

5xD	Trochoidal / Trimming						
V_c (m/min)	Stainless martensitic	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Nickel-based alloys	Titanium alloy
Tensile strength, classification	1.4034	1.4301	1.4571	Duplex	≤1200 N/mm²	≤1300 N/mm²	≤ 850 N/mm²
a_e = 0,1xD	170	160	140	–	–	–	70
a_e = 0,075xD	190	180	160	120	70	60	80
a_e = 0,05xD	210	200	180	140	80	70	90

Please use cooling emulsion!

Product family 159

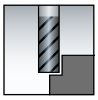
28550AD

AlTiN | Z 6–10 | HA | 50° | VHM | Type N | HRC ≤63 | HSC | Manu-facturer standard

Solid Carbide Finishing End Mill
With corner radius

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	Z	Coated Part No.	f_z Finishing mm/Z
3.0	6	13	57	0.25	6	28550030AD	0.002 – 0.013
4.0	6	13	57	0.25	6	28550040AD	0.006 – 0.024
5.0	6	13	57	0.25	6	28550050AD	0.010 – 0.025
6.0	6	13	57	0.25	6	28550060AD	0.013 – 0.033
7.0	8	16	63	0.25	6	28550070AD	0.016 – 0.040
8.0	8	19	63	0.25	6	28550080AD	0.019 – 0.047
9.0	10	19	72	0.25	6	28550090AD	0.021 – 0.051
10.0	10	22	72	0.25	6	28550100AD	0.025 – 0.060
12.0	12	26	83	0.25	8	28550120AD	0.030 – 0.072
14.0	14	26	83	0.25	8	28550140AD	0.035 – 0.080
16.0	16	32	92	0.25	10	28550160AD	0.038 – 0.088
18.0	18	32	92	0.25	10	28550180AD	0.042 – 0.095
20.0	20	38	104	0.25	10	28550200AD	0.045 – 0.100



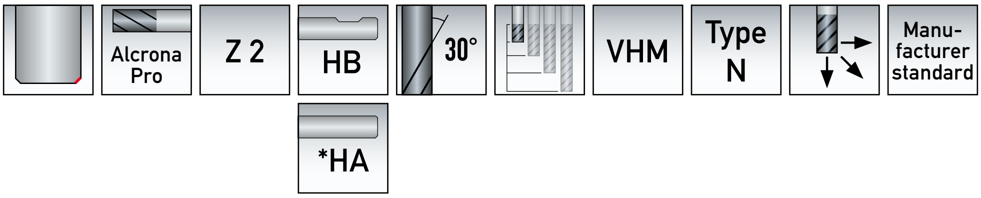
Peripheral milling
$a_e = 0.05xD$
$a_p = 2.0xD$

· Stable version due to increased core
· Smooth running due to 6 teeth at the minimum

Material	Tool steels	Tool steels	Hardened steels	Hardened steels	Cast iron	Cast iron	Spheroidal Graphitee & malleable iron	Spheroidal Graphitee & malleable iron
Tensile strength / Hardness / etc.	< 850 N/mm²	850 – 1000 N/mm²	< 40 – 48 HRC	< 48 – 60 HRC	< 240 HB	< 300 HB	< 240 HB	< 300 HB
V_c (m/min)	175	175	70	60	300	280	250	220

Product family 160

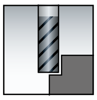
20201



Solid Carbide High-Performance End Mill Short version with protective chamfer

d_1	d_2
e8	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.00	3*	0.02	3	54	2	20201010	0.006 – 0.017	0.006 – 0.014
1.50	3*	0.02	4	54	2	20201015	0.006 – 0.017	0.006 – 0.014
1.80	3*	0.02	4	54	2	20201018	0.007 – 0.022	0.007 – 0.019
2.00	6	0.02	4	54	2	20201020	0.007 – 0.022	0.007 – 0.019
2.50	6	0.02	4	54	2	20201025	0.007 – 0.022	0.007 – 0.019
2.80	6	0.03	6	54	2	20201028	0.007 – 0.031	0.007 – 0.027
3.00	6	0.03	6	54	2	20201030	0.007 – 0.031	0.007 – 0.027
3.80	6	0.04	8	54	2	20201038	0.011 – 0.031	0.010 – 0.027
4.00	6	0.04	8	54	2	20201040	0.011 – 0.039	0.010 – 0.033
4.80	6	0.05	9	54	2	20201048	0.016 – 0.039	0.015 – 0.033
5.00	6	0.05	9	54	2	20201050	0.016 – 0.039	0.015 – 0.033
5.75	6	0.06	10	54	2	202010575	0.026 – 0.044	0.025 – 0.038
6.00	6	0.06	10	54	2	20201060	0.026 – 0.044	0.025 – 0.038
6.75	8	0.07	12	58	2	202010675	0.032 – 0.050	0.029 – 0.043
7.00	8	0.07	12	58	2	20201070	0.032 – 0.050	0.029 – 0.043
7.75	8	0.08	12	58	2	202010775	0.032 – 0.055	0.029 – 0.048
8.00	8	0.08	12	58	2	20201080	0.032 – 0.055	0.029 – 0.048
8.70	10	0.09	14	66	2	20201087	0.037 – 0.066	0.034 – 0.057
9.00	10	0.09	14	66	2	20201090	0.037 – 0.066	0.034 – 0.057
9.70	10	0.10	14	66	2	20201097	0.037 – 0.066	0.034 – 0.057
10.00	10	0.10	14	66	2	20201100	0.042 – 0.077	0.039 – 0.067
11.70	12	0.12	16	73	2	20201117	0.063 – 0.099	0.059 – 0.086
12.00	12	0.12	16	73	2	20201120	0.063 – 0.099	0.059 – 0.086
14.00	14	0.14	18	75	2	20201140	0.074 – 0.121	0.069 – 0.105



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

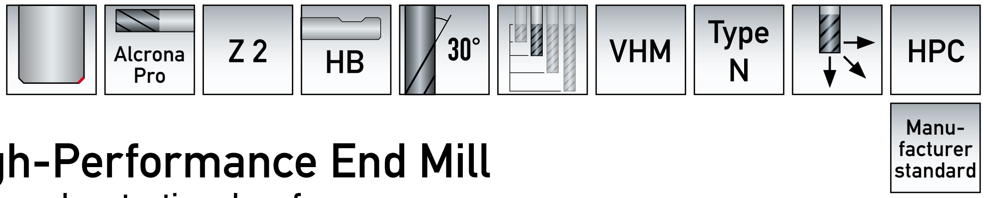
Full slot milling
$a_p = 1.0xD$

- Universal high-performance end mill
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- The undersize values are suitable for cutting keyways
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

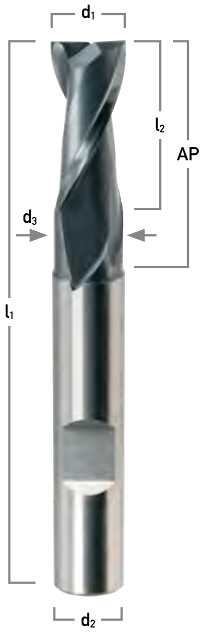
Product family 160

20203



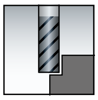
Solid Carbide High-Performance End Mill

Standard length with neck and protective chamfer

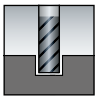


d_1	d_2
e8	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.00	6	0.02	6	57	–	–	2	20203020	0.007 – 0.022	0.007 – 0.019
2.50	6	0.02	6	57	–	–	2	20203025	0.007 – 0.022	0.007 – 0.019
2.80	6	0.03	8	57	–	–	2	20203028	0.007 – 0.031	0.007 – 0.027
3.00	6	0.03	8	57	2.8	18	2	20203030	0.007 – 0.031	0.007 – 0.027
3.80	6	0.04	11	57	3.6	21	2	20203038	0.011 – 0.031	0.010 – 0.027
4.00	6	0.04	11	57	3.8	21	2	20203040	0.011 – 0.039	0.010 – 0.033
4.80	6	0.05	13	57	4.6	21	2	20203048	0.016 – 0.039	0.015 – 0.033
5.00	6	0.05	13	57	4.8	21	2	20203050	0.016 – 0.039	0.015 – 0.033
5.75	6	0.06	13	57	5.5	21	2	202030575	0.026 – 0.044	0.025 – 0.038
6.00	6	0.06	13	57	5.5	21	2	20203060	0.026 – 0.044	0.025 – 0.038
6.75	8	0.07	19	63	6.5	27	2	202030675	0.032 – 0.050	0.029 – 0.043
7.00	8	0.07	19	63	6.5	27	2	20203070	0.032 – 0.050	0.029 – 0.043
7.75	8	0.08	19	63	7.4	27	2	202030775	0.032 – 0.055	0.029 – 0.048
8.00	8	0.08	19	63	7.5	27	2	20203080	0.032 – 0.055	0.029 – 0.048
8.70	10	0.09	22	72	8.4	32	2	20203087	0.037 – 0.066	0.034 – 0.057
9.00	10	0.09	22	72	8.5	32	2	20203090	0.037 – 0.066	0.034 – 0.057
9.70	10	0.10	22	72	9.2	32	2	20203097	0.037 – 0.066	0.034 – 0.057
10.00	10	0.10	22	72	9.5	32	2	20203100	0.042 – 0.077	0.039 – 0.067
11.70	12	0.12	26	83	11.2	38	2	20203117	0.063 – 0.099	0.059 – 0.086
12.00	12	0.12	26	83	11.5	38	2	20203120	0.063 – 0.099	0.059 – 0.086
14.00	14	0.14	26	83	13.5	42	2	20203140	0.074 – 0.121	0.069 – 0.105



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

- Universal high-performance end mill
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- The undersize values are suitable for cutting keyways

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

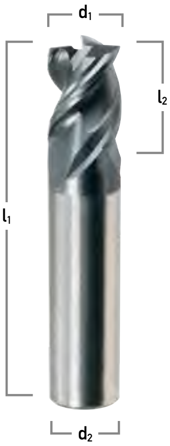
Product family 160

20305

Alcrona Pro | Z 3 | HA | VHM | Type N | HPC | Manu-facturer standard

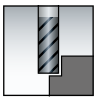
Solid Carbide HPC End Mill

Short version with protective chamfer



d_1	d_2
e8	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.00	3	0.02	2	40	3	20305010	0.006 – 0.017	0.006 – 0.014
1.50	3	0.02	3	40	3	20305015	0.006 – 0.017	0.006 – 0.014
2.00	6	0.02	3	40	3	20305020	0.007 – 0.022	0.007 – 0.019
2.50	6	0.02	3	40	3	20305025	0.007 – 0.022	0.007 – 0.019
2.80	6	0.03	5	40	3	20305028	0.007 – 0.022	0.007 – 0.019
3.00	6	0.03	5	40	3	20305030	0.007 – 0.031	0.007 – 0.027
3.80	6	0.04	7	40	3	20305038	0.007 – 0.031	0.007 – 0.027
4.00	6	0.04	7	40	3	20305040	0.011 – 0.031	0.010 – 0.027
4.80	6	0.05	8	40	3	20305048	0.011 – 0.039	0.010 – 0.033
5.00	6	0.05	8	40	3	20305050	0.016 – 0.039	0.015 – 0.033
5.75	6	0.06	8	40	3	203050575	0.016 – 0.039	0.015 – 0.033
6.00	6	0.06	8	40	3	20305060	0.026 – 0.044	0.025 – 0.038
6.75	8	0.07	11	45	3	203050675	0.026 – 0.044	0.025 – 0.038
7.00	8	0.07	11	45	3	20305070	0.032 – 0.050	0.029 – 0.043
7.75	8	0.08	11	45	3	203050775	0.032 – 0.050	0.029 – 0.043
8.00	8	0.08	11	45	3	20305080	0.032 – 0.055	0.029 – 0.048
8.70	10	0.09	13	50	3	20305087	0.032 – 0.055	0.029 – 0.048
9.00	10	0.09	13	50	3	20305090	0.037 – 0.066	0.034 – 0.057
9.70	10	0.10	13	50	3	20305097	0.037 – 0.066	0.034 – 0.057
10.00	10	0.10	13	50	3	20305100	0.037 – 0.066	0.034 – 0.057
11.70	12	0.12	15	55	3	20305117	0.042 – 0.077	0.039 – 0.067
12.00	12	0.12	15	55	3	20305120	0.063 – 0.099	0.059 – 0.086
13.70	14	0.14	15	58	3	20305137	0.063 – 0.099	0.059 – 0.086
14.00	14	0.14	15	58	3	20305140	0.074 – 0.121	0.069 – 0.105
15.70	16	0.15	18	62	3	20305157	0.074 – 0.121	0.069 – 0.105
16.00	16	0.15	18	62	3	20305160	0.095 – 0.143	0.088 – 0.124
18.00	18	0.15	18	70	3	20305180	0.116 – 0.165	0.108 – 0.143
20.00	20	0.15	22	75	3	20305200	0.137 – 0.187	0.127 – 0.162



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

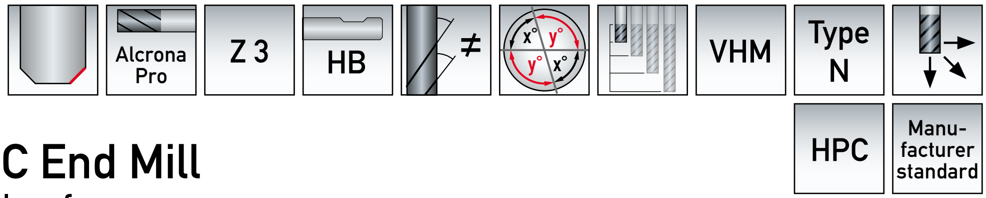
Full slot milling
a_p = 1,0.xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

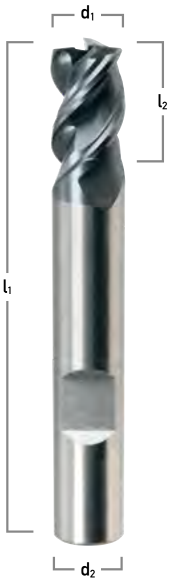
Product family 160

20300



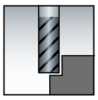
Solid Carbide HPC End Mill

Short version with edge chamfer

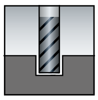


d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.10	4	54	3	20300020	0.007 – 0.022	0.007 – 0.019
2.5	6	0.10	4	54	3	20300025	0.007 – 0.022	0.007 – 0.019
3.0	6	0.13	6	54	3	20300030	0.007 – 0.031	0.007 – 0.027
3.5	6	0.13	6	54	3	20300035	0.007 – 0.031	0.007 – 0.027
4.0	6	0.18	8	54	3	20300040	0.011 – 0.031	0.010 – 0.027
5.0	6	0.20	9	54	3	20300050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	10	54	3	20300060	0.026 – 0.044	0.025 – 0.038
7.0	8	0.20	12	58	3	20300070	0.032 – 0.050	0.029 – 0.043
8.0	8	0.20	12	58	3	20300080	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	14	66	3	20300090	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	14	66	3	20300100	0.037 – 0.066	0.034 – 0.057
12.0	12	0.30	16	73	3	20300120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.30	18	75	3	20300140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.40	22	82	3	20300160	0.095 – 0.143	0.088 – 0.124
20.0	20	0.50	26	92	3	20300200	0.137 – 0.187	0.127 – 0.162



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD



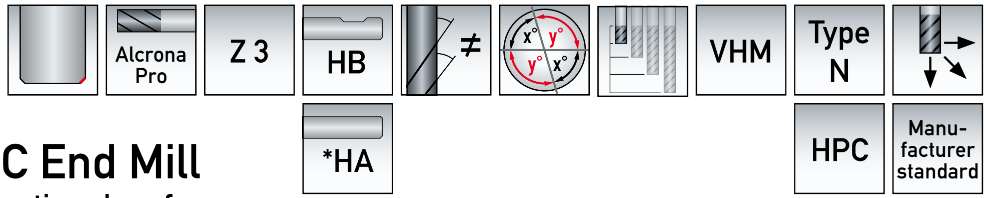
Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

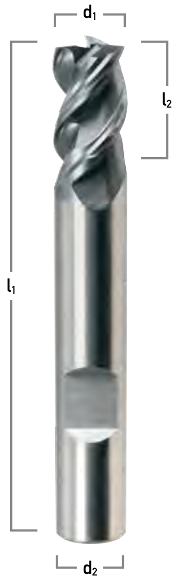
Product family 160

20301



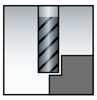
Solid Carbide HPC End Mill

Standard length with protective chamfer



d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.00	3*	0.02	3	54	3	20301010	0.006 – 0.017	0.006 – 0.014
1.50	3*	0.02	4	54	3	20301015	0.006 – 0.017	0.006 – 0.014
2.00	6	0.02	4	54	3	20301020	0.007 – 0.022	0.007 – 0.019
2.50	6	0.02	4	54	3	20301025	0.007 – 0.022	0.007 – 0.019
2.80	6	0.03	6	54	3	20301028	0.007 – 0.022	0.007 – 0.019
3.00	6	0.03	6	54	3	20301030	0.007 – 0.031	0.007 – 0.027
3.80	6	0.04	8	54	3	20301038	0.007 – 0.031	0.007 – 0.027
4.00	6	0.04	8	54	3	20301040	0.011 – 0.031	0.010 – 0.027
4.80	6	0.05	9	54	3	20301048	0.011 – 0.039	0.010 – 0.033
5.00	6	0.05	9	54	3	20301050	0.016 – 0.039	0.015 – 0.033
5.75	6	0.06	10	54	3	203010575	0.016 – 0.039	0.015 – 0.033
6.00	6	0.06	10	54	3	20301060	0.026 – 0.044	0.025 – 0.038
6.75	8	0.07	12	58	3	203010675	0.026 – 0.044	0.025 – 0.038
7.00	8	0.07	12	58	3	20301070	0.032 – 0.050	0.029 – 0.043
7.75	8	0.08	12	58	3	203010775	0.032 – 0.050	0.029 – 0.043
8.00	8	0.08	12	58	3	20301080	0.032 – 0.055	0.029 – 0.048
8.70	10	0.09	14	66	3	20301087	0.032 – 0.055	0.029 – 0.048
9.00	10	0.09	14	66	3	20301090	0.037 – 0.066	0.034 – 0.057
9.70	10	0.10	14	66	3	20301097	0.037 – 0.066	0.034 – 0.057
10.00	10	0.10	14	66	3	20301100	0.037 – 0.066	0.034 – 0.057
11.70	12	0.12	16	73	3	20301117	0.042 – 0.077	0.039 – 0.067
12.00	12	0.12	16	73	3	20301120	0.063 – 0.099	0.059 – 0.086
13.70	14	0.14	18	75	3	20301137	0.063 – 0.099	0.059 – 0.086
14.00	14	0.14	18	75	3	20301140	0.074 – 0.121	0.069 – 0.105
15.70	16	0.15	22	82	3	20301157	0.074 – 0.121	0.069 – 0.105
16.00	16	0.15	22	82	3	20301160	0.095 – 0.143	0.088 – 0.124
18.00	18	0.15	24	84	3	20301180	0.116 – 0.165	0.108 – 0.143
20.00	20	0.15	26	92	3	20301200	0.137 – 0.187	0.127 – 0.162



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

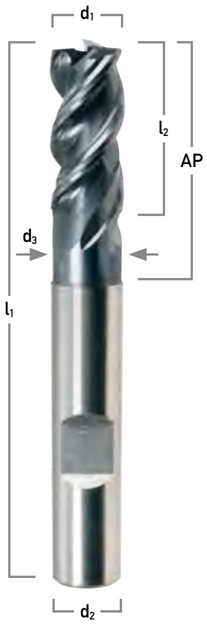
Product family 160

20302

Alcrona Pro | Z 3 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

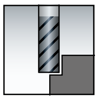
Solid Carbide HPC End Mill

Standard length with neck and edge chamfer

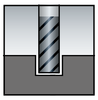


d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.13	8	57	2.8	18	3	20302030	0.007 – 0.031	0.007 – 0.027
3.5	6	0.13	8	57	3.3	18	3	20302035	0.011 – 0.031	0.010 – 0.027
4.0	6	0.18	11	57	3.8	21	3	20302040	0.011 – 0.039	0.010 – 0.033
5.0	6	0.20	13	57	4.8	21	3	20302050	0.016 – 0.039	0.015 – 0.033
6.0	6	0.20	13	57	5.5	21	3	20302060	0.026 – 0.044	0.025 – 0.038
7.0	8	0.20	19	63	6.5	27	3	20302070	0.032 – 0.050	0.029 – 0.043
8.0	8	0.20	19	63	7.5	27	3	20302080	0.032 – 0.055	0.029 – 0.048
9.0	10	0.30	22	72	8.5	32	3	20302090	0.037 – 0.066	0.034 – 0.057
10.0	10	0.30	22	72	9.5	32	3	20302100	0.042 – 0.077	0.039 – 0.067
12.0	12	0.30	26	83	11.5	38	3	20302120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.30	26	83	13.5	42	3	20302140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.40	32	92	15.5	44	3	20302160	0.095 – 0.143	0.088 – 0.124
20.0	20	0.50	38	104	19.5	54	3	20302200	0.137 – 0.187	0.127 – 0.162



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

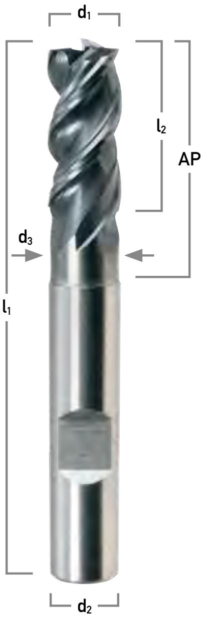
Product family 160

20303

Alcrona Pro | Z 3 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

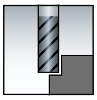
Solid Carbide HPC End Mill

Standard length with neck and protective chamfer



d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.02	6	57	–	–	3	20303020	0.007 – 0.022	0.007 – 0.019
2.5	6	0.02	6	57	–	–	3	20303025	0.007 – 0.022	0.007 – 0.019
3.0	6	0.03	8	57	2.8	18	3	20303030	0.007 – 0.031	0.007 – 0.027
3.5	6	0.03	8	57	3.3	18	3	20303035	0.007 – 0.031	0.007 – 0.027
4.0	6	0.04	11	57	3.8	21	3	20303040	0.011 – 0.031	0.010 – 0.027
4.5	6	0.04	11	57	4.3	21	3	20303045	0.011 – 0.031	0.010 – 0.027
5.0	6	0.05	13	57	4.8	21	3	20303050	0.016 – 0.039	0.015 – 0.033
5.5	6	0.05	13	57	5.3	21	3	20303055	0.016 – 0.039	0.015 – 0.033
6.0	6	0.06	13	57	5.5	21	3	20303060	0.026 – 0.044	0.025 – 0.038
7.0	8	0.07	19	63	6.5	27	3	20303070	0.032 – 0.050	0.029 – 0.043
8.0	8	0.08	19	63	7.5	27	3	20303080	0.032 – 0.055	0.029 – 0.048
9.0	10	0.09	22	72	8.5	32	3	20303090	0.037 – 0.066	0.034 – 0.057
10.0	10	0.10	22	72	9.5	32	3	20303100	0.037 – 0.066	0.034 – 0.057
12.0	12	0.12	26	83	11.5	38	3	20303120	0.063 – 0.099	0.059 – 0.086
14.0	14	0.14	26	83	13.5	42	3	20303140	0.074 – 0.121	0.069 – 0.105
16.0	16	0.15	32	92	15.5	44	3	20303160	0.095 – 0.143	0.088 – 0.124
18.0	18	0.15	32	92	17.5	50	3	20303180	0.095 – 0.143	0.088 – 0.124
20.0	20	0.15	38	104	19.5	54	3	20303200	0.137 – 0.187	0.127 – 0.162



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

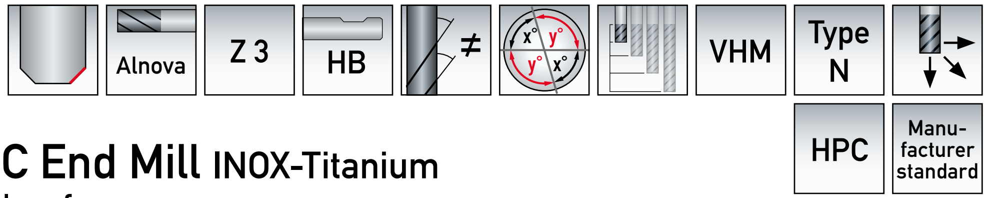
Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining Pprformance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength / Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	200	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	300	270	240	210	180	150	210	180	90

Product family 160

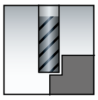
21300



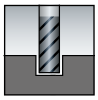
Solid Carbide HPC End Mill INOX-Titanium

Short version with edge chamfer

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.10	4	54	3	21300020	0.006 – 0.011	0.006 – 0.010
2.5	6	0.10	4	54	3	21300025	0.006 – 0.011	0.006 – 0.010
3.0	6	0.13	6	54	3	21300030	0.011 – 0.017	0.010 – 0.014
3.5	6	0.13	6	54	3	21300035	0.011 – 0.017	0.010 – 0.014
4.0	6	0.18	8	54	3	21300040	0.015 – 0.022	0.014 – 0.019
5.0	6	0.20	9	54	3	21300050	0.019 – 0.026	0.018 – 0.023
6.0	6	0.20	10	54	3	21300060	0.021 – 0.031	0.020 – 0.027
7.0	8	0.20	12	58	3	21300070	0.021 – 0.031	0.020 – 0.027
8.0	8	0.20	12	58	3	21300080	0.032 – 0.042	0.029 – 0.036
9.0	10	0.30	14	66	3	21300090	0.032 – 0.042	0.029 – 0.036
10.0	10	0.30	14	66	3	21300100	0.042 – 0.055	0.039 – 0.048
12.0	12	0.30	16	73	3	21300120	0.047 – 0.061	0.044 – 0.052
14.0	14	0.30	18	75	3	21300140	0.053 – 0.066	0.049 – 0.057
16.0	16	0.40	22	82	3	21300160	0.074 – 0.088	0.069 – 0.076
20.0	20	0.50	26	92	3	21300200	0.074 – 0.099	0.069 – 0.086



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD



Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With edge chamfer 45° for a maximum tool life

d_1	d_2
h10	h6

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength/ Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

Product family 160

21301

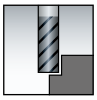
Alnova | Z 3 | HB | *HA | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill INOX-Titanium

Short version with protective chamfer

d_1	d_2
e8	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.00	3*	0.02	3	54	3	21301010	0.002 – 0.007	0.002 – 0.006
1.50	3*	0.02	4	54	3	21301015	0.002 – 0.007	0.002 – 0.006
2.00	6	0.02	4	54	3	21301020	0.006 – 0.011	0.006 – 0.010
2.50	6	0.02	4	54	3	21301025	0.006 – 0.011	0.006 – 0.010
2.80	6	0.03	6	54	3	21301028	0.006 – 0.011	0.006 – 0.010
3.00	6	0.03	6	54	3	21301030	0.011 – 0.017	0.010 – 0.014
3.80	6	0.04	8	54	3	21301038	0.011 – 0.017	0.010 – 0.014
4.00	6	0.04	8	54	3	21301040	0.015 – 0.022	0.014 – 0.019
4.80	6	0.05	9	54	3	21301048	0.015 – 0.022	0.014 – 0.019
5.00	6	0.05	9	54	3	21301050	0.019 – 0.026	0.018 – 0.023
5.75	6	0.06	10	54	3	213010575	0.019 – 0.026	0.018 – 0.023
6.00	6	0.06	10	54	3	21301060	0.021 – 0.031	0.020 – 0.027
6.75	8	0.07	12	58	3	213010675	0.021 – 0.031	0.020 – 0.027
7.00	8	0.07	12	58	3	21301070	0.021 – 0.031	0.020 – 0.027
7.75	8	0.08	12	58	3	213010775	0.032 – 0.042	0.029 – 0.036
8.00	8	0.08	12	58	3	21301080	0.032 – 0.042	0.029 – 0.036
8.70	10	0.09	14	66	3	21301087	0.032 – 0.042	0.029 – 0.036
9.00	10	0.09	14	66	3	21301090	0.032 – 0.042	0.029 – 0.036
9.70	10	0.10	14	66	3	21301097	0.042 – 0.055	0.039 – 0.048
10.00	10	0.10	14	66	3	21301100	0.042 – 0.055	0.039 – 0.048
11.70	12	0.12	16	73	3	21301117	0.473 – 0.055	0.441 – 0.048
12.00	12	0.12	16	73	3	21301120	0.047 – 0.061	0.044 – 0.052
13.00	14	0.13	18	75	3	21301130	0.047 – 0.099	0.044 – 0.086
13.70	14	0.14	18	75	3	21301137	0.047 – 0.061	0.044 – 0.052
14.00	14	0.14	18	75	3	21301140	0.053 – 0.066	0.049 – 0.057
15.00	16	0.15	22	82	3	21301150	0.053 – 0.066	0.049 – 0.057
15.70	16	0.15	22	82	3	21301157	0.053 – 0.066	0.049 – 0.057
16.00	16	0.15	22	82	3	21301160	0.053 – 0.066	0.049 – 0.057
17.70	18	0.15	24	84	3	21301177	0.074 – 0.088	0.069 – 0.076
18.00	18	0.15	24	84	3	21301180	0.074 – 0.088	0.069 – 0.076
19.70	20	0.15	26	92	3	21301197	0.074 – 0.088	0.069 – 0.076
20.00	20	0.15	26	92	3	21301200	0.074 – 0.099	0.069 – 0.086



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength/ Hardness / etc.	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

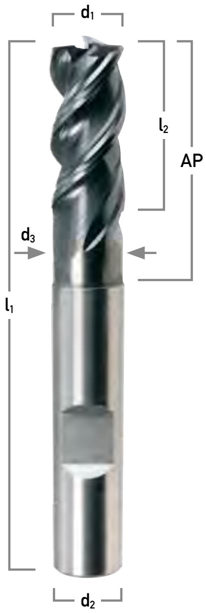
Product family 160

21302

Alnova | Z 3 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

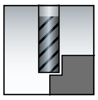
Solid Carbide HPC End Mill INOX-Titanium

Standard length with neck and edge chamfer



d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.13	8	57	2.8	12	3	21302030	0.011 – 0.017	0.010 – 0.014
3.5	6	0.13	8	57	3.3	12	3	21302035	0.011 – 0.017	0.010 – 0.014
4.0	6	0.18	11	57	3.8	15	3	21302040	0.015 – 0.022	0.014 – 0.019
5.0	6	0.20	13	57	4.8	17	3	21302050	0.019 – 0.026	0.018 – 0.023
6.0	6	0.20	13	57	5.5	21	3	21302060	0.021 – 0.031	0.020 – 0.027
7.0	8	0.20	19	63	6.5	27	3	21302070	0.021 – 0.031	0.020 – 0.027
8.0	8	0.20	19	63	7.5	27	3	21302080	0.032 – 0.042	0.029 – 0.036
9.0	10	0.30	22	72	8.5	32	3	21302090	0.032 – 0.042	0.029 – 0.036
10.0	10	0.30	22	72	9.5	32	3	21302100	0.042 – 0.055	0.039 – 0.048
12.0	12	0.30	26	83	11.5	38	3	21302120	0.047 – 0.061	0.044 – 0.052
14.0	14	0.30	26	83	13.5	42	3	21302140	0.053 – 0.066	0.049 – 0.057
16.0	16	0.40	32	92	15.5	44	3	21302160	0.053 – 0.066	0.049 – 0.057
20.0	20	0.50	38	104	19.5	54	3	21302200	0.074 – 0.099	0.069 – 0.086



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength/Hardness	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

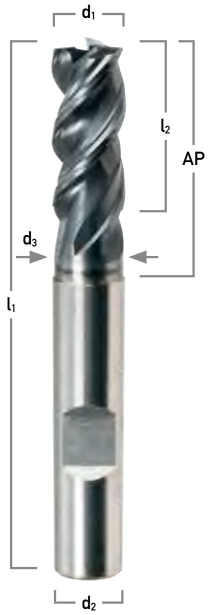
Product family 160

21303

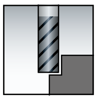
Alnova | Z 3 | HB | ≠ | VHM | Type N | HPC | Manu-facturer standard

Solid Carbide HPC End Mill INOX-Titanium

Standard length with neck and protective chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.02	6	57	–	–	3	21303020	0.006 – 0.011	0.006 – 0.010
2.5	6	0.02	6	57	–	–	3	21303025	0.006 – 0.011	0.006 – 0.010
3.0	6	0.03	8	57	2.8	12	3	21303030	0.011 – 0.017	0.010 – 0.014
3.5	6	0.03	8	57	3.3	12	3	21303035	0.011 – 0.017	0.010 – 0.014
4.0	6	0.04	11	57	3.8	15	3	21303040	0.015 – 0.022	0.014 – 0.019
5.0	6	0.05	13	57	4.8	17	3	21303050	0.019 – 0.026	0.018 – 0.023
6.0	6	0.06	13	57	5.5	21	3	21303060	0.021 – 0.031	0.020 – 0.027
7.0	8	0.07	19	63	6.5	27	3	21303070	0.021 – 0.031	0.020 – 0.027
8.0	8	0.08	19	63	7.5	27	3	21303080	0.032 – 0.042	0.029 – 0.036
9.0	10	0.09	22	72	8.5	32	3	21303090	0.032 – 0.042	0.029 – 0.036
10.0	10	0.10	22	72	9.5	32	3	21303100	0.042 – 0.055	0.039 – 0.048
12.0	12	0.12	26	83	11.5	38	3	21303120	0.047 – 0.061	0.044 – 0.052
14.0	14	0.14	26	83	13.5	42	3	21303140	0.053 – 0.066	0.049 – 0.057
16.0	16	0.15	32	92	15.5	44	3	21303160	0.074 – 0.088	0.069 – 0.076
20.0	20	0.15	38	104	19.5	54	3	21303200	0.074 – 0.099	0.069 – 0.086



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

- Universal high-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with high-performance coating Alnova
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing
- With the minimum protective chamfer best suitable for low cutting depths (finishing)

d_1	d_2
h10	h6

V_c (m/min)	General structural steels	Alloyed Q & T steels	Cast iron (gray, ductile, malleable)	Stainless austenitic	Stainless acid-resistant austenitic	Stainless ferritic-austenitic	Heat-resistant materials	Titanium alloy
Tensile strength/Hardness	≤ 850 N/mm²	≤ 1100 N/mm²	> 260 HB	1.4301	1.4571	Duplex	≤1200 N/mm²	≤850 N/mm²
Full slot a_e = 1xD	180	120	60	100	90	65	35	50
Trimming a_e = 0,2xD	270	180	90	130	117	85	46	75

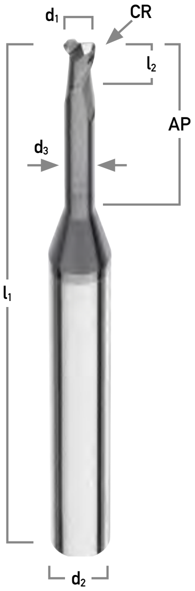
Product family 160

28601

AlTiN | Z 2 | HA | 30° | VHM | Type H | HRC ≤ 63 | Manu-facturer standard

Solid Carbide Mini Torus Cutter

Extra-long version

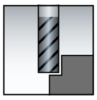


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Finishing mm/Z
0.3	6	0.45	50	0.05	0.27	1	2	286010031AD	0.002 – 0.004
0.3	6	0.45	50	0.05	0.27	2	2	286010032AD	0.002 – 0.004
0.3	6	0.45	50	0.05	0.27	3	2	286010033AD	0.002 – 0.004
0.3	6	0.45	50	0.05	0.27	5	2	286010035AD	0.002 – 0.004
0.4	6	0.60	50	0.05	0.37	2	2	286010042AD	0.002 – 0.007
0.4	6	0.60	50	0.05	0.37	4	2	286010044AD	0.002 – 0.007
0.4	6	0.60	50	0.05	0.37	6	2	286010046AD	0.002 – 0.007
0.5	6	0.70	50	0.05	0.47	2	2	286010052AD	0.003 – 0.008
0.5	6	0.70	50	0.05	0.47	4	2	286010054AD	0.003 – 0.008
0.5	6	0.70	50	0.05	0.47	6	2	286010056AD	0.003 – 0.008
0.6	6	0.90	50	0.06	0.57	2	2	286010062AD	0.003 – 0.009
0.6	6	0.90	50	0.06	0.57	4	2	286010064AD	0.003 – 0.009
0.6	6	0.90	50	0.06	0.57	6	2	286010066AD	0.003 – 0.009
0.6	6	0.90	50	0.06	0.57	8	2	286010068AD	0.003 – 0.009
0.8	6	1.20	50	0.08	0.76	2	2	286010082AD	0.004 – 0.007
0.8	6	1.20	50	0.08	0.76	4	2	286010084AD	0.004 – 0.007
0.8	6	1.20	50	0.08	0.76	6	2	286010086AD	0.004 – 0.007
0.8	6	1.20	50	0.08	0.76	8	2	286010088AD	0.004 – 0.007
0.8	6	1.20	50	0.08	0.76	10	2	2860100810AD	0.004 – 0.007
1.0	6	1.60	50	0.10	0.96	3	2	286010103AD	0.005 – 0.010
1.0	6	1.60	50	0.10	0.96	4	2	286010104AD	0.005 – 0.010
1.0	6	1.60	50	0.10	0.96	5	2	286010105AD	0.005 – 0.010
1.0	6	1.60	50	0.10	0.96	6	2	286010106AD	0.005 – 0.010
1.0	6	1.60	50	0.10	0.96	8	2	286010108AD	0.005 – 0.010
1.0	6	1.60	50	0.10	0.96	10	2	286010110AD	0.005 – 0.010
1.0	6	1.60	55	0.10	0.96	12	2	286010112AD	0.005 – 0.010
1.0	6	1.60	55	0.10	0.96	15	2	286010115AD	0.005 – 0.010
1.0	6	1.60	60	0.10	0.96	20	2	286010120AD	0.005 – 0.010
1.0	6	1.60	65	0.10	0.96	25	2	286010125AD	0.005 – 0.010
1.0	6	1.60	70	0.10	0.96	30	2	286010130AD	0.005 – 0.010
1.2	6	1.90	50	0.12	1.15	4	2	2860101204AD	0.005 – 0.013
1.2	6	1.90	50	0.12	1.15	6	2	2860101206AD	0.005 – 0.013
1.2	6	1.90	50	0.12	1.15	8	2	2860101208AD	0.005 – 0.013
1.2	6	1.90	50	0.12	1.15	10	2	2860101210AD	0.005 – 0.013
1.2	6	1.90	55	0.12	1.15	12	2	2860101212AD	0.005 – 0.013
1.2	6	1.90	55	0.12	1.15	15	2	2860101215AD	0.005 – 0.013
1.2	6	1.90	60	0.12	1.15	20	2	2860101220AD	0.005 – 0.013
1.2	6	1.90	65	0.12	1.15	25	2	2860101225AD	0.005 – 0.013
1.5	6	2.40	50	0.15	1.44	5	2	2860101505AD	0.006 – 0.018
1.5	6	2.40	50	0.15	1.44	6	2	2860101506AD	0.006 – 0.018
1.5	6	2.40	50	0.15	1.44	8	2	2860101508AD	0.006 – 0.018
1.5	6	2.40	50	0.15	1.44	10	2	2860101510AD	0.006 – 0.018
1.5	6	2.40	55	0.15	1.44	12	2	2860101512AD	0.006 – 0.018
1.5	6	2.40	55	0.15	1.44	15	2	2860101515AD	0.006 – 0.018
1.5	6	2.40	60	0.15	1.44	20	2	2860101520AD	0.006 – 0.018
1.5	6	2.40	65	0.15	1.44	25	2	2860101525AD	0.006 – 0.018
1.5	6	2.40	70	0.15	1.44	30	2	2860101530AD	0.006 – 0.018
2.0	6	2.80	50	0.20	1.92	6	2	2860102006AD	0.010 – 0.020
2.0	6	2.80	50	0.20	1.92	8	2	2860102008AD	0.010 – 0.020
2.0	6	2.80	50	0.20	1.92	10	2	2860102010AD	0.010 – 0.020
2.0	6	2.80	55	0.20	1.92	12	2	2860102012AD	0.010 – 0.020
2.0	6	2.80	55	0.20	1.92	15	2	2860102015AD	0.010 – 0.020
2.0	6	2.80	60	0.20	1.92	20	2	2860102020AD	0.010 – 0.020
2.0	6	2.80	65	0.20	1.92	25	2	2860102025AD	0.010 – 0.020
2.0	6	2.80	70	0.20	1.92	30	2	2860102030AD	0.010 – 0.020
3.0	6	3.00	50	0.50	2.88	5	2	2860103005AD	0.012 – 0.024
3.0	6	3.00	55	0.50	2.88	8	2	2860103008AD	0.012 – 0.024
3.0	6	3.00	55	0.50	2.88	10	2	2860103010AD	0.012 – 0.024
3.0	6	3.00	60	0.50	2.88	15	2	2860103015AD	0.012 – 0.024
3.0	6	3.00	65	0.50	2.88	20	2	2860103020AD	0.012 – 0.024
3.0	6	3.00	70	0.50	2.88	25	2	2860103025AD	0.012 – 0.024
3.0	6	3.00	75	0.50	2.88	30	2	2860103030AD	0.012 – 0.024

Product family 160

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Finishing mm/Z
4.0	6	4.00	55	0.50	3.85	10	2	2860104010AD	0.018 – 0.032
4.0	6	4.00	60	0.50	3.85	15	2	2860104015AD	0.018 – 0.032
4.0	6	4.00	65	0.50	3.85	20	2	2860104020AD	0.018 – 0.032
4.0	6	4.00	70	0.50	3.85	25	2	2860104025AD	0.018 – 0.032
4.0	6	4.00	75	0.50	3.85	30	2	2860104030AD	0.018 – 0.032
5.0	6	5.00	65	0.50	4.85	10	2	2860105010AD	0.030 – 0.035
5.0	6	5.00	65	0.50	4.85	15	2	2860105015AD	0.030 – 0.035
5.0	6	5.00	65	0.50	4.85	20	2	2860105020AD	0.030 – 0.035
5.0	6	5.00	75	0.50	4.85	30	2	2860105030AD	0.030 – 0.035
5.0	6	5.00	80	0.50	4.85	40	2	2860105040AD	0.030 – 0.035
6.0	6	6.00	60	0.50	5.85	10	2	2860106010AD	0.040 – 0.045
6.0	6	6.00	65	0.50	5.85	15	2	2860106015AD	0.040 – 0.045
6.0	6	6.00	65	0.50	5.85	20	2	2860106020AD	0.040 – 0.045
6.0	6	6.00	75	0.50	5.85	30	2	2860106030AD	0.040 – 0.045
6.0	6	6.00	90	0.50	5.85	40	2	2860106040AD	0.040 – 0.045
6.0	6	6.00	100	0.50	5.85	50	2	2860106050AD	0.040 – 0.045



Peripheral milling
$a_e = 0.02xD$
$a_p = 0.05xD$

Full slot milling
$a_p = 0.2xD$

- For machining hard materials, steel and cast material
- Perfect for copy milling with hard materials

Material	General structural steels	Free machining steels	Tool steels	Non-alloy case-hardened steels	Alloy case-hardened steels	Cast iron	Cast iron (gray, ductile, malleable)	Hard materials
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	< 750 N/mm²	1000 – 1200 N/mm²	< 300 HB	> 260 HB	48 – 60 HRC
V_c (m/min)	90	70	70	95	60	110	90	30

Product family 160

20450

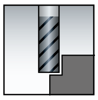
Alcrona Pro | Z 4 | HB | VHM | Type HR | HPC | Manu-facturer standard

VHM-HPC-Schruppfräser

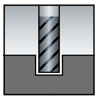
Kurze Ausführung mit Corner chamfer

d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z
4.0	6	0.18	8	54	4	20450040	0.011 – 0.039
5.0	6	0.20	9	54	4	20450050	0.016 – 0.039
6.0	6	0.20	10	54	4	20450060	0.026 – 0.044
8.0	8	0.20	12	58	4	20450080	0.032 – 0.055
10.0	10	0.30	14	66	4	20450100	0.042 – 0.077
12.0	12	0.30	16	73	4	20450120	0.063 – 0.099
14.0	14	0.30	18	75	4	20450140	0.074 – 0.121
16.0	16	0.40	22	82	4	20450160	0.095 – 0.143
18.0	18	0.40	24	84	4	20450180	0.116 – 0.165
20.0	20	0.50	26	92	4	20450200	0.137 – 0.187



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

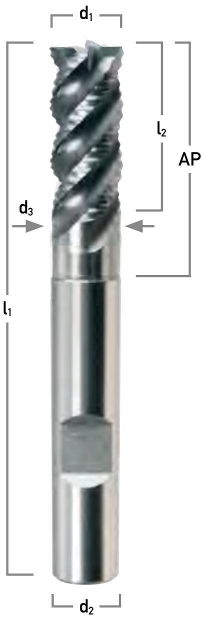
- Universal high-performance roughing end mill with HR knurled profile
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- Perfect for low performance machines

20452

Alcrona Pro | Z 4 | HB | VHM | Type HR | HPC | Manu-facturer standard

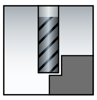
Solid Carbide HPC Roughing End Mill

Standard length with neck



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z
6.0	6	0.20	13	57	5.5	21	4	20452060	0.026 – 0.044
8.0	8	0.20	19	63	7.5	27	4	20452080	0.032 – 0.055
10.0	10	0.30	22	72	9.5	32	4	20452100	0.037 – 0.066
12.0	12	0.30	26	83	11.5	38	4	20452120	0.063 – 0.099
14.0	14	0.30	26	83	13.5	42	4	20452140	0.074 – 0.121
16.0	16	0.40	32	92	15.5	44	4	20452160	0.095 – 0.143
18.0	18	0.50	32	92	17.5	50	4	20452180	0.116 – 0.165
20.0	20	0.50	38	104	19.5	54	4	20452200	0.137 – 0.187
25.0	25	0.50	50	125	24.5	65	4	20452250	0.158 – 0.209

d_1	d_2
h10	h6



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.5xD$

- Universal high-performance roughing end mill with HR knurled profile
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- Perfect for low performance machines

V_c (m/min)	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	280	230	200	180	160	200	160	100

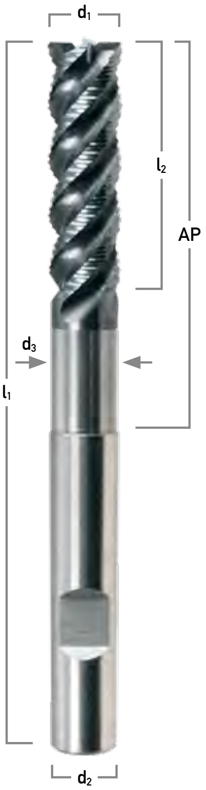
Product family 160

20454

Alcrona Pro | Z 4 | HB | VHM | Type HR | HPC | Manu-facturer standard

Solid Carbide HPC Roughing End Mill

Long version with neck



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z
6.0	6	0.20	22	63	5.5	29	4	20454060	0.026 – 0.044
8.0	8	0.20	28	80	7.5	36	4	20454080	0.032 – 0.055
10.0	10	0.30	33	100	9.5	54	4	20454100	0.037 – 0.066
12.0	12	0.30	33	100	11.5	54	4	20454120	0.063 – 0.099
14.0	14	0.30	48	100	13.5	54	4	20454140	0.074 – 0.121
16.0	16	0.40	53	125	15.5	69	4	20454160	0.095 – 0.143
18.0	18	0.40	53	150	17.5	84	4	20454180	0.116 – 0.165
20.0	20	0.50	68	150	19.5	84	4	20454200	0.137 – 0.187

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.0xD$

- Universal high-performance roughing end mill with HR knurled profile
- Ultra-micro grain solid carbide with high-performance coating Alcrona Pro
- High machining performance up to 1.0xD into solid
- Smooth running due to axial and radial unequal spacing
- Perfect for low performance machines

d_1	d_2
h10	h6

V_c (m/min)	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)	Stainless austenitic
Tensile strength/ Hardness / etc.	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB	1.4301
Full slot a_p=1xD	180	160	140	120	100	140	120	60
Trimming a_e = 0,2xD	280	230	200	180	160	200	160	100

Product family 160

28650

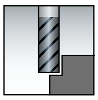
AlTiN | Z 6–10 | HA | 50° | VHM | Type H | HRC ≤ 63 | DIN 6527L | HHC

Solid Carbide Finishing End Mill

With corner radius

d_1	d_2
h10	h6

d_1 mm	d_2 mm	CR mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Finishing mm/Z
5.0	6	0.25	13	57	6	286505000AD	0.010 – 0.025
6.0	6	0.25	13	57	6	286506000AD	0.013 – 0.033
6.0	6	0.50	13	57	6	286506005AD	0.013 – 0.033
6.0	6	1.00	13	57	6	286506010AD	0.013 – 0.033
8.0	8	0.25	19	63	6	286508000AD	0.019 – 0.047
8.0	8	0.50	19	63	6	286508005AD	0.019 – 0.047
8.0	8	1.00	19	63	6	286508010AD	0.019 – 0.047
10.0	10	0.25	22	72	6	286501000AD	0.025 – 0.059
10.0	10	0.50	22	72	6	286501005AD	0.025 – 0.059
10.0	10	1.00	22	72	6	286501010AD	0.025 – 0.059
10.0	10	1.50	22	72	6	286501015AD	0.025 – 0.059
12.0	12	0.25	26	83	8	286501200AD	0.030 – 0.072
12.0	12	0.50	26	83	8	286501205AD	0.030 – 0.072
12.0	12	1.00	26	83	8	286501210AD	0.030 – 0.072
12.0	12	1.50	26	83	8	286501215AD	0.030 – 0.072
12.0	12	2.00	26	83	8	286501220AD	0.030 – 0.072
12.0	12	2.50	26	83	8	286501225AD	0.030 – 0.072
14.0	14	0.25	26	83	8	286501400AD	0.034 – 0.080
16.0	16	0.25	32	92	10	286501600AD	0.034 – 0.080
16.0	16	0.50	32	92	10	286501605AD	0.034 – 0.080
16.0	16	1.00	32	92	10	286501610AD	0.034 – 0.080
16.0	16	1.50	32	92	10	286501615AD	0.034 – 0.080
16.0	16	2.00	32	92	10	286501620AD	0.034 – 0.080
18.0	18	0.25	32	92	10	286501800AD	0.041 – 0.095
20.0	20	0.25	38	104	10	286502000AD	0.045 – 0.100
20.0	20	2.00	38	104	10	286502020AD	0.045 – 0.100



Peripheral milling
a_e = 0.05xD
a_p = 1.5xD

- Stable version due to increased core
- Smooth running due to 6 teeth at the minimum

Material	Tool steels	Tool steels	Hardened steels	Hardened steels	Cast iron	Cast iron	Spheroidal Graphitee & malleable iron	Spheroidal Graphitee & malleable iron
Tensile strength/Hardness	< 850 N/mm²	850 – 1000 N/mm²	< 40 – 48 HRC	< 48 – 60 HRC	< 240 HB	< 300 HB	< 240 HB	< 300 HB
V_c (m/min) Finishing	180	180	70	60	300	280	245	220

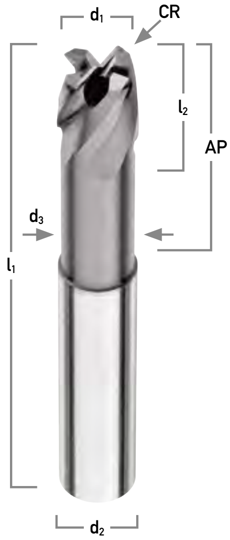
Product family 160

28600

Aldura | Z 4 | HA | 30° | VHM | Type H | HRC ≤ 63 | HHC | Manu-facturer standard

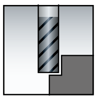
Solid Carbide Torus Cutter

Long version



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	4	57	0.20	1.8	21	4	286002002AD	0.003 – 0.008	0.002 – 0.006
2.0	6	4	57	0.50	1.8	21	4	286002005AD	0.003 – 0.008	0.002 – 0.006
3.0	6	6	57	0.20	2.8	21	4	286003002AD	0.005 – 0.010	0.003 – 0.008
3.0	6	6	57	0.50	2.8	21	4	286003005AD	0.005 – 0.010	0.003 – 0.008
4.0	6	6	57	0.20	3.6	21	4	286004002AD	0.005 – 0.015	0.003 – 0.010
4.0	6	6	57	0.50	3.6	21	4	286004005AD	0.005 – 0.015	0.003 – 0.010
4.0	6	6	57	1.00	3.6	21	4	286004010AD	0.005 – 0.015	0.003 – 0.010
5.0	6	6	57	0.20	4.6	21	4	286005002AD	0.010 – 0.025	0.080 – 0.020
5.0	6	6	57	0.50	4.6	21	4	286005005AD	0.010 – 0.025	0.080 – 0.020
5.0	6	6	57	1.00	4.6	21	4	286005010AD	0.010 – 0.025	0.080 – 0.020
5.0	6	6	57	1.50	4.6	21	4	286005015AD	0.010 – 0.025	0.080 – 0.020
5.0	6	6	57	2.00	4.6	21	4	286005020AD	0.010 – 0.025	0.080 – 0.020
6.0	6	7	57	0.20	5.5	21	4	286006002AD	0.017 – 0.039	0.015 – 0.035
6.0	6	7	57	0.30	5.5	21	4	286006003AD	0.017 – 0.039	0.015 – 0.035
6.0	6	7	57	0.50	5.5	21	4	286006005AD	0.017 – 0.039	0.015 – 0.035
6.0	6	7	57	1.00	5.5	21	4	286006010AD	0.017 – 0.039	0.015 – 0.035
6.0	6	7	57	1.50	5.5	21	4	286006015AD	0.017 – 0.039	0.015 – 0.035
6.0	6	7	57	2.00	5.5	21	4	286006020AD	0.017 – 0.039	0.015 – 0.035
8.0	8	9	63	0.50	7.4	27	4	286008005AD	0.024 – 0.055	0.020 – 0.050
8.0	8	9	63	1.00	7.4	27	4	286008010AD	0.024 – 0.055	0.020 – 0.050
8.0	8	9	63	1.50	7.4	27	4	286008015AD	0.024 – 0.055	0.020 – 0.050
8.0	8	9	63	2.00	7.4	27	4	286008020AD	0.024 – 0.055	0.020 – 0.050
10.0	10	11	72	0.50	9.2	32	4	286001005AD	0.030 – 0.065	0.025 – 0.060
10.0	10	11	72	1.00	9.2	32	4	286001010AD	0.030 – 0.065	0.025 – 0.060
10.0	10	11	72	1.50	9.2	32	4	286001015AD	0.030 – 0.065	0.025 – 0.060
10.0	10	11	72	2.00	9.2	32	4	286001020AD	0.030 – 0.065	0.025 – 0.060
12.0	12	12	83	0.50	11.0	38	4	286001205AD	0.036 – 0.079	0.031 – 0.075
12.0	12	12	83	1.00	11.0	38	4	286001210AD	0.036 – 0.079	0.031 – 0.075
12.0	12	12	83	1.50	11.0	38	4	286001215AD	0.036 – 0.079	0.031 – 0.075
12.0	12	12	83	2.00	11.0	38	4	286001220AD	0.036 – 0.079	0.031 – 0.075
16.0	16	16	92	2.00	15.0	44	4	286001620AD	0.045 – 0.095	0.040 – 0.090



Peripheral milling
$a_e = 0.2xD$
$a_p = 0.2xD$

Full slot milling
$a_p = 1.0xD$

- Universal torus cutter for roughing and finishing
- Short cutting edges for highest stability
- High machining performance up to 1xD into solid
- Perfect for copy milling

Material	Tool steels	Non-alloy Q & T steels	Alloy Q & T steels	Cast iron (gray, ductile, malleable)	Hard materials	Special and Titanium alloys
Tensile strength/Hardness	850 – 1200 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	< 300 HB	48 – 60 HRC	850 – 1200 N/mm²
V_c (m/min) Finishing	80	80	80	90	35	45
V_c (m/min) Roughing	60	65	65	70	25	30

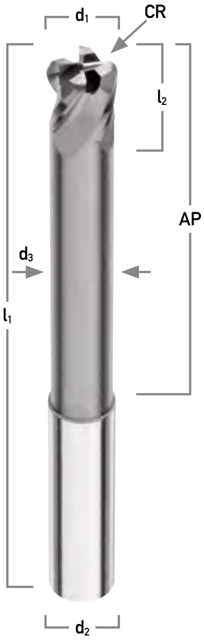
Product family 160

28610

Aldura | Z 4 | HA | 30° | VHM | Type H | HRC ≤ 63 | HHC | Manu-facturer standard

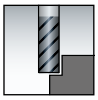
Solid Carbide Torus Cutter

Extra-long version

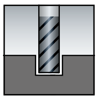


d_1	d_2
h10	h6

d_1	d_2	l_2	l_1	CR	d_3	AP		Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z			mm/Z		
4.0	6	7	80	0.50	3.60	44	4	286104005AD	0.004	–	0.017	0.002	–	0.015
6.0	6	7	80	0.20	5.50	44	4	286106002AD	0.008	–	0.024	0.006	–	0.022
6.0	6	7	80	0.50	5.50	44	4	286106005AD	0.008	–	0.024	0.006	–	0.022
6.0	6	7	80	1.00	5.50	44	4	286106010AD	0.008	–	0.024	0.006	–	0.022
6.0	6	7	80	1.50	5.50	44	4	286106015AD	0.008	–	0.024	0.006	–	0.022
6.0	6	7	80	2.00	5.50	44	4	286106020AD	0.008	–	0.024	0.006	–	0.022
8.0	8	9	100	1.00	7.40	54	4	286108010AD	0.012	–	0.032	0.010	–	0.030
8.0	8	9	100	1.50	7.40	54	4	286108015AD	0.012	–	0.032	0.010	–	0.030
8.0	8	9	100	2.00	7.40	54	4	286108020AD	0.012	–	0.032	0.010	–	0.030
10.0	10	11	100	1.00	9.20	60	4	286101010AD	0.015	–	0.038	0.013	–	0.035
10.0	10	11	100	1.50	9.20	60	4	286101015AD	0.015	–	0.038	0.013	–	0.035
10.0	10	11	100	2.00	9.20	60	4	286101020AD	0.015	–	0.038	0.013	–	0.035
12.0	12	12	120	1.00	11.00	75	4	286101210AD	0.018	–	0.046	0.015	–	0.043
12.0	12	12	120	1.50	11.00	75	4	286101215AD	0.018	–	0.046	0.015	–	0.043
12.0	12	12	120	2.00	11.00	75	4	286101220AD	0.018	–	0.046	0.015	–	0.043
12.0	12	12	120	3.00	11.00	75	4	286101230AD	0.018	–	0.046	0.015	–	0.043
16.0	16	16	150	2.00	15.00	92	4	286101620AD	0.024	–	0.062	0.020	–	0.059



Peripheral milling
$a_e = 0.2xD$
$a_p = 0.2xD$



Full slot milling
$a_p = 0.5xD$

- Universal torus cutter for roughing and finishing
- Short cutting edges for highest stability
- High machining performance up to 1xD into solid
- Perfect for copy milling

Material	Non-alloy Q & T steels	Alloy Q & T steels	Tool steels	Cast iron (gray, ductile, malleable)	Hard materials	Special and Titanium alloys
Tensile strength/Hardness	850 – 1000 N/mm²	1000 – 1200 N/mm²	850 – 1200 N/mm²	< 300 HB	48 – 60 HRC	850 – 1200 N/mm²
V_c (m/min) Finishing	50	55	55	65	25	30
V_c (m/min) Roughing	35	40	40	50	20	25

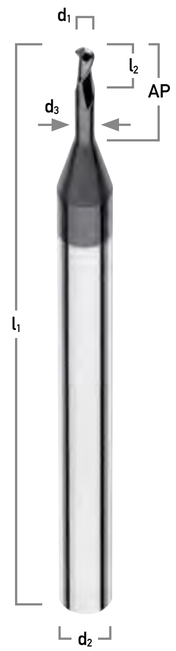
Product family 160

28612

r_p = + 0.000 - 0.005 | AlTiN | Z 2 | HA | 30° | VHM | Type N | HRC ≤ 63 | HHC | 0,005 mm | Manu-facturer standard

Solid Carbide Ball-Nosed Mini End Mill

Extra-long version



d1	d2
h10	h6

d1 mm	d2 mm	l2 mm	l1 mm	d3 mm	AP mm	Z	Coated Part No.	fz Finishing mm/Z
0.4	4	0.32	50	0.37	2	2	286120042AD	0.002 – 0.003
0.4	4	0.32	50	0.37	4	2	286120044AD	0.002 – 0.003
0.5	4	0.40	50	0.47	3	2	286120053AD	0.002 – 0.004
0.5	4	0.40	50	0.47	5	2	286120055AD	0.002 – 0.004
0.6	4	0.48	50	0.57	2	2	286120062AD	0.002 – 0.005
0.6	4	0.48	50	0.57	4	2	286120064AD	0.002 – 0.005
0.6	4	0.48	50	0.57	6	2	286120066AD	0.002 – 0.005
0.8	4	0.64	50	0.76	4	2	286120084AD	0.003 – 0.006
0.8	4	0.64	50	0.76	6	2	286120086AD	0.003 – 0.006
0.8	4	0.64	50	0.76	8	2	286120088AD	0.003 – 0.006
0.8	4	0.64	50	0.76	10	2	2861200810AD	0.003 – 0.006
1.0	4	0.80	50	0.96	5	2	2861201005AD	0.004 – 0.010
1.0	4	0.80	50	0.96	10	2	2861201010AD	0.004 – 0.010
1.0	4	0.80	55	0.96	15	2	2861201015AD	0.004 – 0.010
1.0	4	0.80	60	0.96	20	2	2861201020AD	0.004 – 0.010
1.0	4	0.80	65	0.96	25	2	2861201025AD	0.004 – 0.010
1.2	4	0.96	50	1.15	6	2	2861201206AD	0.004 – 0.013
1.2	4	0.96	55	1.15	12	2	2861201212AD	0.004 – 0.013
1.2	4	0.96	60	1.15	18	2	2861201218AD	0.004 – 0.013
1.2	4	0.96	65	1.15	25	2	2861201225AD	0.004 – 0.013
1.5	4	1.20	50	1.44	4	2	2861201504AD	0.005 – 0.018
1.5	4	1.20	50	1.44	8	2	2861201508AD	0.005 – 0.018
1.5	4	1.20	55	1.44	12	2	2861201512AD	0.005 – 0.018
1.5	4	1.20	55	1.44	16	2	2861201516AD	0.005 – 0.018
1.5	4	1.20	60	1.44	20	2	2861201520AD	0.005 – 0.018
1.5	4	1.20	65	1.44	25	2	2861201525AD	0.005 – 0.018
2.0	4	1.60	50	1.92	5	2	2861202005AD	0.010 – 0.020
2.0	4	1.60	50	1.92	10	2	2861202010AD	0.010 – 0.020
2.0	4	1.60	55	1.92	15	2	2861202015AD	0.010 – 0.020
2.0	4	1.60	60	1.92	20	2	2861202020AD	0.010 – 0.020
2.0	4	1.60	65	1.92	25	2	2861202025AD	0.010 – 0.020
2.0	4	1.60	70	1.92	30	2	2861202030AD	0.010 – 0.020
3.0	4	2.40	50	2.88	5	2	2861203005AD	0.015 – 0.024
3.0	4	2.40	55	2.88	10	2	2861203010AD	0.015 – 0.024
3.0	4	2.40	60	2.88	15	2	2861203015AD	0.015 – 0.024
3.0	4	2.40	65	2.88	20	2	2861203020AD	0.015 – 0.024
3.0	4	2.40	70	2.88	25	2	2861203025AD	0.015 – 0.024
3.0	4	2.40	75	2.88	30	2	2861203030AD	0.015 – 0.024
4.0	6	3.20	55	3.85	10	2	2861204010AD	0.018 – 0.032
4.0	6	3.20	60	3.85	15	2	2861204015AD	0.018 – 0.032
4.0	6	3.20	65	3.85	20	2	2861204020AD	0.018 – 0.032
4.0	6	3.20	70	3.85	25	2	2861204025AD	0.018 – 0.032
4.0	6	3.20	75	3.85	30	2	2861204030AD	0.018 – 0.032
5.0	6	4.00	65	4.85	10	2	2861205010AD	0.030 – 0.035
5.0	6	4.00	65	4.85	20	2	2861205020AD	0.030 – 0.035
5.0	6	4.00	75	4.85	30	2	2861205030AD	0.030 – 0.035
5.0	6	4.00	80	4.85	40	2	2861205040AD	0.030 – 0.035
6.0	6	4.80	60	5.85	10	2	2861206010AD	0.040 – 0.050
6.0	6	4.80	65	5.85	20	2	2861206020AD	0.040 – 0.050
6.0	6	4.80	75	5.85	30	2	2861206030AD	0.040 – 0.050
6.0	6	4.80	90	5.85	40	2	2861206040AD	0.040 – 0.050
6.0	6	4.80	100	5.85	50	2	2861206050AD	0.040 – 0.050

Peripheral milling
a_e = 0.02xD
a_p = 0.05xD

Full slot milling
a_p = 0.2xD

- High precision ball-nosed end mill for copying and finishing
- Short cutting edges for highest stability
- For universal applications

Material	General structural steels	Tool steels	Non-alloy case-hardened steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)	Hard materials	Aluminium
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	< 750 N/mm²	< 750 N/mm²	< 300 HB	> 260 HB	48 – 60 HRC	< 600 N/mm²
V_c (m/min) Finishing	90	70	100	35	110	90	30	175

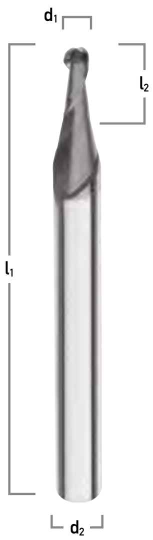
Product family 160

29102

Uncoated | AlTiN | Z 2 | HA | 30° | VHM | Type H | HRC ≤ 63 | HHC | Manu-facturer standard

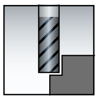
Solid Carbide Ball-Nosed Mini End Mill

Short version

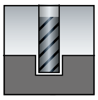


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Finishing mm/Z
0.25	3	0.5	38	2	291020025	291020025AD	0.002 – 0.010
0.30	3	1	38	2	29102003	29102003AD	0.002 – 0.010
0.40	3	1	38	2	29102004	29102004AD	0.002 – 0.010
0.50	3	1.5	38	2	29102005	29102005AD	0.005 – 0.020
0.60	3	1.5	38	2	29102006	29102006AD	0.005 – 0.020
0.70	3	2	38	2	29102007	29102007AD	0.005 – 0.020
0.80	3	2	38	2	29102008	29102008AD	0.005 – 0.020
0.90	3	2.5	38	2	29102009	29102009AD	0.005 – 0.020
1.00	3	3	38	2	29102010	29102010AD	0.005 – 0.020
1.10	3	3	38	2	29102011	29102011AD	0.012 – 0.032
1.20	3	3	38	2	29102012	29102012AD	0.012 – 0.032
1.40	3	4	38	2	29102014	29102014AD	0.012 – 0.032
1.50	3	4	38	2	29102015	29102015AD	0.012 – 0.032
1.60	3	5	38	2	29102016	29102016AD	0.012 – 0.032
1.80	3	5	38	2	29102018	29102018AD	0.012 – 0.032
2.00	3	5	38	2	29102020	29102020AD	0.012 – 0.032



Peripheral milling
$a_e = 0.02xD$
$a_p = 0.05xD$



Full slot milling
$a_p = 0.1xD$

- Ball-nosed end mill for copying and finishing
- For universal applications

Material	Non-alloy Q & T steels	Alloy Q & T steels	Tool steels	Cast iron (gray, ductile, malleable)	Hard materials	Special and Titanium alloys
Tensile strength/Hardness	850 – 1000 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 300 HB	48 – 60 HRC	> 600 N/mm²
V_c (m/min) Uncoated	40	40	40	55	50	110
V_c (m/min) AlTin	70	70	70	85	80	140

Product family 160

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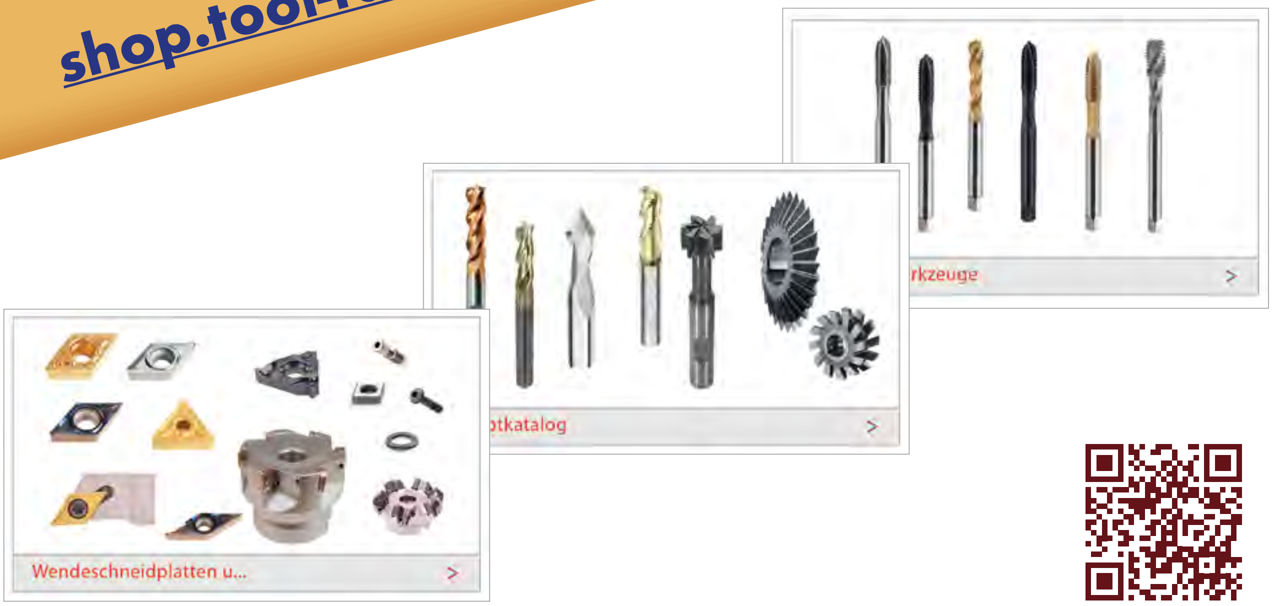


28611

AlTiN | Z 2 | HA | 30° | VHM | Type H | HRC ≤ 63 | HHC | Manu-facturer standard

Solid Carbide Ball-Nosed Mini End Mill

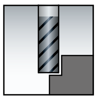
Extra-long version

d_1	d_2
h10	h6

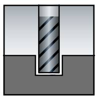
d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Finishing mm/Z
0.3	6	0.24	50	0.27	1	2	286110031AD	0.002 – 0.010
0.3	6	0.24	50	0.27	2	2	286110032AD	0.002 – 0.010
0.3	6	0.24	50	0.27	3	2	286110033AD	0.002 – 0.010
0.3	6	0.24	50	0.27	5	2	286110035AD	0.002 – 0.010
0.4	6	0.32	50	0.37	2	2	286110042AD	0.002 – 0.010
0.4	6	0.32	50	0.37	4	2	286110044AD	0.002 – 0.010
0.4	6	0.32	50	0.37	6	2	286110046AD	0.002 – 0.010
0.5	6	0.40	50	0.47	2	2	286110052AD	0.002 – 0.010
0.5	6	0.40	50	0.47	4	2	286110054AD	0.002 – 0.010
0.5	6	0.40	50	0.47	6	2	286110056AD	0.002 – 0.010
0.6	6	0.48	50	0.57	2	2	286110062AD	0.002 – 0.010
0.6	6	0.48	50	0.57	4	2	286110064AD	0.002 – 0.010
0.6	6	0.48	50	0.57	6	2	286110066AD	0.002 – 0.010
0.6	6	0.48	50	0.57	8	2	286110068AD	0.002 – 0.010
0.7	6	0.56	50	0.67	6	2	286110076AD	0.002 – 0.010
0.7	6	0.56	50	0.67	8	2	286110078AD	0.002 – 0.010
0.8	6	0.64	50	0.76	4	2	286110084AD	0.002 – 0.010
0.8	6	0.64	50	0.76	6	2	286110086AD	0.002 – 0.010
0.8	6	0.64	50	0.76	8	2	286110088AD	0.002 – 0.010
0.8	6	0.64	50	0.76	10	2	2861100810AD	0.002 – 0.010
0.9	6	0.72	50	0.86	6	2	286110096AD	0.002 – 0.010
1.0	6	0.80	50	0.96	4	2	286110104AD	0.002 – 0.010
1.0	6	0.80	55	0.96	6	2	286110106AD	0.002 – 0.010
1.0	6	0.80	55	0.96	8	2	286110108AD	0.002 – 0.010
1.0	6	0.80	60	0.96	10	2	2861101010AD	0.002 – 0.010
1.0	6	0.80	65	0.96	12	2	2861101012AD	0.002 – 0.010
1.0	6	0.80	70	0.96	15	2	2861101015AD	0.002 – 0.010
1.0	6	0.80	50	0.96	20	2	2861101020AD	0.002 – 0.010
1.0	6	0.80	50	0.96	25	2	2861101025AD	0.002 – 0.010
1.0	6	0.80	50	0.96	30	2	2861101030AD	0.002 – 0.010
1.2	6	0.96	50	1.15	5	2	2861101205AD	0.004 – 0.014
1.2	6	0.96	50	1.15	6	2	2861101206AD	0.004 – 0.014
1.2	6	0.96	50	1.15	8	2	2861101208AD	0.004 – 0.014
1.2	6	0.96	50	1.15	10	2	2861101210AD	0.004 – 0.014
1.2	6	0.96	55	1.15	12	2	2861101212AD	0.004 – 0.014
1.2	6	0.96	55	1.15	15	2	2861101215AD	0.004 – 0.014
1.2	6	0.96	60	1.15	20	2	2861101220AD	0.004 – 0.014
1.2	6	0.96	65	1.15	25	2	2861101225AD	0.004 – 0.014
1.5	6	1.20	50	1.44	6	2	2861101506AD	0.005 – 0.020
1.5	6	1.20	50	1.44	8	2	2861101508AD	0.005 – 0.020
1.5	6	1.20	50	1.44	10	2	2861101510AD	0.005 – 0.020
1.5	6	1.20	55	1.44	12	2	2861101512AD	0.005 – 0.020
1.5	6	1.20	55	1.44	15	2	2861101515AD	0.005 – 0.020
1.5	6	1.20	60	1.44	20	2	2861101520AD	0.005 – 0.020
1.5	6	1.20	65	1.44	25	2	2861101525AD	0.005 – 0.020
1.5	6	1.20	70	1.44	30	2	2861101530AD	0.005 – 0.020
2.0	6	1.60	50	1.92	6	2	2861102006AD	0.012 – 0.032
2.0	6	1.60	50	1.92	8	2	2861102008AD	0.012 – 0.032
2.0	6	1.60	50	1.92	10	2	2861102010AD	0.012 – 0.032
2.0	6	1.60	55	1.92	12	2	2861102012AD	0.012 – 0.032
2.0	6	1.60	55	1.92	15	2	2861102015AD	0.012 – 0.032
2.0	6	1.60	60	1.92	20	2	2861102020AD	0.012 – 0.032
2.0	6	1.60	65	1.92	25	2	2861102025AD	0.012 – 0.032
2.0	6	1.60	70	1.92	30	2	2861102030AD	0.012 – 0.032
3.0	6	2.40	50	2.88	5	2	2861103005AD	0.012 – 0.032
3.0	6	2.40	55	2.88	10	2	2861103010AD	0.012 – 0.032
3.0	6	2.40	60	2.88	15	2	2861103015AD	0.012 – 0.032
3.0	6	2.40	65	2.88	20	2	2861103020AD	0.012 – 0.032
3.0	6	2.40	70	2.88	25	2	2861103025AD	0.012 – 0.032
3.0	6	2.40	75	2.88	30	2	2861103030AD	0.012 – 0.032
4.0	6	3.20	55	3.85	10	2	2861104010AD	0.030 – 0.045
4.0	6	3.20	60	3.85	15	2	2861104015AD	0.030 – 0.045
4.0	6	3.20	65	3.85	20	2	2861104020AD	0.030 – 0.045
4.0	6	3.20	70	3.85	25	2	2861104025AD	0.030 – 0.045

Product family 160

d_1	d_2	l_2	l_1	d_3	AP		Coated	f_z Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z
4.0	6	3.20	75	3.85	30	2	2861104030AD	0.030 – 0.045
5.0	6	4.00	65	4.85	10	2	2861105010AD	0.030 – 0.045
5.0	6	4.00	65	4.85	15	2	2861105015AD	0.030 – 0.045
5.0	6	4.00	65	4.85	20	2	2861105020AD	0.030 – 0.045
5.0	6	4.00	70	4.85	25	2	2861105025AD	0.030 – 0.045
5.0	6	4.00	75	4.85	30	2	2861105030AD	0.030 – 0.045
5.0	6	4.00	80	4.85	40	2	2861105040AD	0.030 – 0.045
6.0	6	6.00	60	5.85	10	2	2861106010AD	0.030 – 0.045
6.0	6	6.00	65	5.85	15	2	2861106015AD	0.030 – 0.045
6.0	6	6.00	65	5.85	20	2	2861106020AD	0.030 – 0.045
6.0	6	6.00	70	5.85	25	2	2861106025AD	0.030 – 0.045
6.0	6	6.00	75	5.85	30	2	2861106030AD	0.030 – 0.045
6.0	6	6.00	90	5.85	40	2	2861106040AD	0.030 – 0.045
6.0	6	6.00	100	5.85	50	2	2861106050AD	0.030 – 0.045



Peripheral milling
$a_e = 0.02xD$
$a_p = 0.05xD$



Full slot milling
$a_p = 0.1xD$

- Ball-nosed end mill for copying and finishing
- Short cutting edges for highest stability
- For universal applications

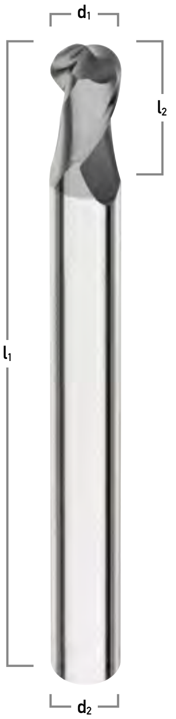
Material	Non-alloy Q & T steels	Non-alloy case-hardened steels	Alloy case-hardened steels	Tool steels	Cast iron (gray, ductile, malleable)	Hard materials
Tensile strength/Hardness	850 – 1000 N/mm²	< 750 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	< 300 HB	48 – 60 HRC
V_c (m/min)	70	100	85	70	90	30

31202

±0,003 | Aldura | Z 2 | HA | 30° | VHM | Type H | HRC ≤ 63

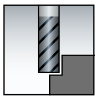
HHC | HSC | 0,005 mm | Manu-facturer standard

Solid Carbide High Precision Ball-Nosed End Mill Long version

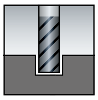


d_1	d_2	R
h10	h6	± 0.003

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	1.5	50	2	31202010	0.012 – 0.025	0.010 – 0.020
1.5	6	2.5	50	2	31202015	0.012 – 0.025	0.010 – 0.020
2.0	6	3	50	2	31202020	0.022 – 0.035	0.020 – 0.030
2.5	6	4	50	2	31202025	0.022 – 0.035	0.020 – 0.030
3.0	6	6	75	2	31202030	0.042 – 0.055	0.040 – 0.050
4.0	6	8	75	2	31202040	0.052 – 0.075	0.050 – 0.070
5.0	6	10	75	2	31202050	0.072 – 0.095	0.070 – 0.090
6.0	6	12	100	2	31202060	0.082 – 0.125	0.080 – 0.120
8.0	8	14	100	2	31202080	0.092 – 0.155	0.090 – 0.150
10.0	10	18	100	2	31202100	0.122 – 0.185	0.120 – 0.180
12.0	12	22	150	2	31202120	0.132 – 0.205	0.130 – 0.200
14.0	14	26	150	2	31202140	0.142 – 0.215	0.140 – 0.210
16.0	16	30	150	2	31202160	0.152 – 0.235	0.150 – 0.230
18.0	18	34	150	2	31202180	0.162 – 0.245	0.160 – 0.240
20.0	20	38	150	2	31202200	0.172 – 0.255	0.170 – 0.250



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD



Full slot milling
a_p = 1.0xD

- High precision ball-nosed end mill for copying and finishing
- Short cutting edges for highest stability
- For universal applications

Material	Free machining steels	Non-alloy Q & T steels	Non-alloy case-hardened steels	Alloy case-hardened steels	Tool steels	Cast iron	Cast iron (gray, ductile, malleable)	Hard materials
Tensile strength/Hardness	< 1000 N/mm²	< 1000 N/mm²	< 750 N/mm²	< 1000 N/mm²	< 1400 N/mm²	< 180 HB – > 180 HB	> 260 HB	48 – 60 HRC
V_c (m/min) Finishing	115	90	150	110	90	90	115	45
V_c (m/min) Roughing	100	75	135	95	75	75	100	30

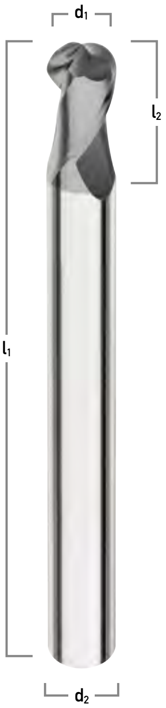
Product family 164

ToolFactory Cutting Tool Solutions

31002

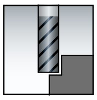
Uncoated | Aldura | Z 2 | HA | 30° | VHM | Type H | HRC ≤63 | HHC | Manu-facturer standard

Solid Carbide High Performance Ball-Nosed End Mill Long version

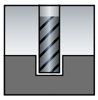


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	3	1.5	50	2	31002010	31002010AD	0.012 – 0.025	0.010 – 0.020
1.5	3	2.5	50	2	31002015	31002015AD	0.012 – 0.025	0.010 – 0.020
2.0	3	3	50	2	31002020	31002020AD	0.022 – 0.035	0.020 – 0.030
2.5	3	4	50	2	31002025	31002025AD	0.022 – 0.035	0.020 – 0.030
3.0	3	6	75	2	31002030	31002030AD	0.042 – 0.055	0.040 – 0.050
4.0	4	8	75	2	31002040	31002040AD	0.052 – 0.075	0.050 – 0.070
5.0	5	10	75	2	31002050	31002050AD	0.072 – 0.095	0.070 – 0.090
6.0	6	12	100	2	31002060	31002060AD	0.082 – 0.125	0.080 – 0.120
8.0	8	14	100	2	31002080	31002080AD	0.092 – 0.155	0.090 – 0.150
10.0	10	18	100	2	31002100	31002100AD	0.122 – 0.185	0.120 – 0.180
12.0	12	22	150	2	31002120	31002120AD	0.132 – 0.205	0.130 – 0.200
14.0	14	26	150	2	31002140	31002140AD	0.142 – 0.215	0.140 – 0.210
16.0	16	30	150	2	31002160	31002160AD	0.152 – 0.235	0.150 – 0.230
18.0	18	34	150	2	31002180	31002180AD	0.162 – 0.245	0.160 – 0.240
20.0	20	38	150	2	31002200	31002200AD	0.172 – 0.255	0.170 – 0.250



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD



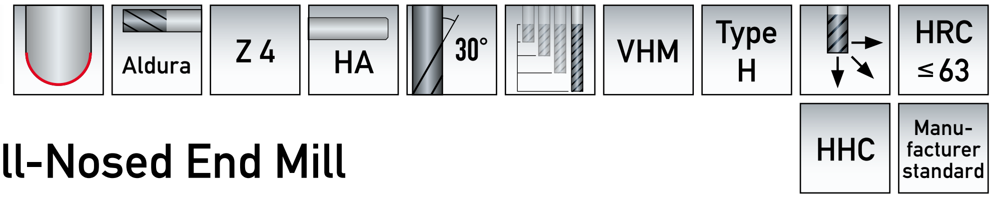
Full slot milling
a_p = 1.0xD

- High performance ball-nose end mill for roughing and finishing
- Short cutting edges for highest stability
- For universal applications

Material	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Cast iron (gray, ductile, malleable)	Hard materials
Tensile strength/Hardness	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 300 HB	48 – 60 HRC
V_c (m/min) Uncoated	55	75	65	55	90	25
V_c (m/min) Aldura	90	110	100	90	145	50

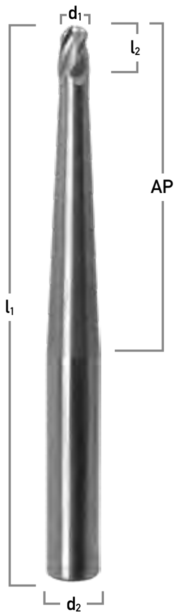
Product family 160

30042AD

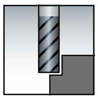


Solid Carbide Ball-Nosed End Mill

Extra-long version



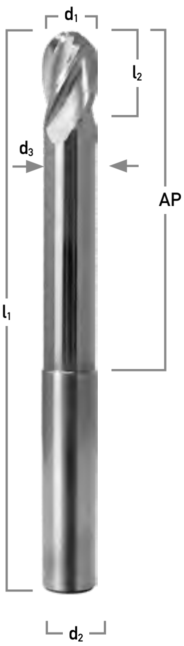
d_1 mm	d_2 mm	l_2 mm	l_1 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	4	5	65	45	4	30042020AD	0.010 – 0.018	0.008 – 0.016
3.0	4	6	65	45	4	30042030AD	0.013 – 0.024	0.010 – 0.022
4.0	6	8	75	54	4	30042040AD	0.023 – 0.030	0.021 – 0.028
5.0	6	8	75	54	4	30042050AD	0.026 – 0.032	0.024 – 0.030
6.0	10	9	100	60	4	30042060AD	0.029 – 0.041	0.027 – 0.039
8.0	10	12	100	60	4	30042080AD	0.042 – 0.058	0.040 – 0.056



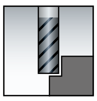
Peripheral milling
a_e = 0.25xD
a_p = 1.0xD

Full slot milling
a_p = 0.5xD

- Ball-nosed end mill for roughing and finishing
- With 4 cutting edges for highest cutting performance
- Short cutting edges for highest stability
- For universal applications



d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
10.0	10	16	100	9.5	60	4	30042100AD	0.053 – 0.073	0.051 – 0.071
12.0	12	20	100	11.5	60	4	30042120AD	0.063 – 0.090	0.061 – 0.088



Peripheral milling
a_e = 0.25xD
a_p = 1.0xD

Full slot milling
a_p = 0.5xD

- Ball-nosed end mill for roughing and finishing
- With 4 cutting edges for highest cutting performance
- Short cutting edges for highest stability
- For universal applications

d_1	d_2
h10	h6

Material	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Cast iron (gray, ductile, malleable)	Hard materials
Tensile strength/Hardness	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 300 HB	48 – 60 HRC
V_c (m/min) Aldura	190	240	210	190	235	80

Product family 160

Innovative Solutions

For Efficient Cutting Performance

A perfect solution would be if you can get all products from one source and can rely on good quality.

Simply try and check out our indexable inserts and holders for turning and milling.

You can also rely on our machine taps.

70560

r_p = ± 0,003 | Diamant | Z 2 | HA | 30° | VHM | Type N | Graphite | HSC | 0,005 mm | Manu-facturer standard

Solid Carbide High Precision Torus Cutter

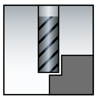
Extra-long version with diamond coating

d_1	d_2
h10	h6

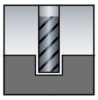
d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
0.2	4	0.20	50	0.05	0.17	1	2	705600201	0.003	0.002
0.3	4	0.30	50	0.05	0.27	1	2	705600301	0.003	0.003
0.3	4	0.30	50	0.05	0.27	3	2	705600303	0.003	0.003
0.4	4	0.40	50	0.05	0.37	2	2	705600402	0.004	0.003
0.4	4	0.40	50	0.05	0.37	4	2	705600404	0.004	0.003
0.4	4	0.40	50	0.05	0.37	8	2	705600408	0.004	0.003
0.5	4	0.50	50	0.05	0.47	2	2	705600502	0.005	0.003
0.5	4	0.50	50	0.05	0.47	5	2	705600505	0.005	0.003
0.5	4	0.50	50	0.05	0.47	10	2	705600510	0.005	0.003
0.6	4	0.80	50	0.06	0.57	3	2	705600603	0.007	0.004
0.6	4	0.80	50	0.06	0.57	6	2	705600606	0.007	0.004
0.6	4	0.80	50	0.06	0.57	9	2	705600609	0.007	0.004
0.6	4	0.80	55	0.06	0.57	12	2	705600612	0.007	0.004
0.8	4	1.00	50	0.08	0.76	4	2	705600804	0.010	0.006
0.8	4	1.00	50	0.08	0.76	8	2	705600808	0.010	0.006
0.8	4	1.00	55	0.08	0.76	12	2	705600812	0.010	0.006
0.8	4	1.00	55	0.08	0.76	16	2	705600816	0.010	0.006
1.0	4	1.00	50	0.10	0.96	5	2	705601005	0.015	0.010
1.0	4	1.00	50	0.10	0.96	10	2	705601010	0.015	0.010
1.0	4	1.00	55	0.10	0.96	15	2	705601015	0.015	0.010
1.0	4	1.00	60	0.10	0.96	20	2	705601020	0.015	0.010
1.0	4	1.00	65	0.10	0.96	25	2	705601025	0.015	0.010
1.2	4	1.50	50	0.12	1.15	5	2	705601205	0.015	0.010
1.2	4	1.50	50	0.12	1.15	10	2	705601210	0.015	0.010
1.2	4	1.50	55	0.12	1.15	15	2	705601215	0.015	0.010
1.5	4	2.00	50	0.15	1.44	5	2	705601505	0.020	0.012
1.5	4	2.00	50	0.15	1.44	8	2	7056015075	0.020	0.012
1.5	4	2.00	50	0.15	1.44	10	2	705601510	0.020	0.012
1.5	4	2.00	55	0.15	1.44	15	2	705601515	0.020	0.012
1.5	4	2.00	60	0.15	1.44	20	2	705601520	0.020	0.012
1.5	4	2.00	65	0.15	1.44	25	2	705601525	0.020	0.012
1.8	4	2.00	50	0.18	1.74	10	2	705601810	0.020	0.012
1.8	4	2.00	60	0.18	1.74	20	2	705601820	0.020	0.012
2.0	4	2.00	50	0.20	1.92	10	2	705602010	0.025	0.015
2.0	4	2.00	55	0.20	1.92	15	2	705602015	0.025	0.015
2.0	4	2.00	60	0.20	1.92	20	2	705602020	0.025	0.015
2.0	4	2.00	65	0.20	1.92	25	2	705602025	0.025	0.015
2.0	4	2.00	50	0.50	1.92	10	2	7056020105	0.025	0.015
2.0	4	2.00	55	0.50	1.92	15	2	7056020155	0.025	0.015
2.0	4	2.00	60	0.50	1.92	20	2	7056020205	0.025	0.015
2.0	4	2.00	65	0.50	1.92	25	2	7056020255	0.025	0.015
3.0	6	3.00	60	0.30	2.88	15	2	705603015	0.030	0.020
3.0	6	3.00	70	0.30	2.88	25	2	705603025	0.030	0.020
3.0	6	3.00	55	0.50	2.88	10	2	705603010	0.030	0.020
3.0	6	3.00	60	0.50	2.88	15	2	7056030155	0.030	0.020
3.0	6	3.00	65	0.50	2.88	20	2	705603020	0.030	0.020
3.0	6	3.00	70	0.50	2.88	25	2	7056030255	0.030	0.020
3.0	6	3.00	75	0.50	2.88	30	2	705603030	0.030	0.020
4.0	6	4.00	60	0.40	3.85	15	2	705604015	0.040	0.030
4.0	6	4.00	65	0.40	3.85	25	2	705604025	0.040	0.030
4.0	6	4.00	70	0.50	3.85	20	2	705604020	0.040	0.030
4.0	6	4.00	75	0.50	3.85	30	2	705604030	0.040	0.030
4.0	6	4.00	80	0.50	3.85	40	2	705604040	0.040	0.030
5.0	6	5.00	65	0.50	4.85	20	2	705605020	0.050	0.040
5.0	6	5.00	75	0.50	4.85	30	2	705605030	0.050	0.040
5.0	6	5.00	80	0.50	4.85	40	2	705605040	0.050	0.040
5.0	6	5.00	100	0.50	4.85	50	2	705605050	0.050	0.040

Product family 165

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	6.00	75	0.50	5.85	30	2	705606030	0.060	0.050
6.0	6	6.00	90	0.50	5.85	40	2	705606040	0.060	0.050
6.0	6	6.00	100	0.50	5.85	50	2	705606050	0.060	0.050
6.0	6	6.00	100	0.50	5.85	60	2	705606060	0.060	0.050
6.0	6	6.00	75	1.00	5.85	30	2	7056060301	0.060	0.050
6.0	6	6.00	90	1.00	5.85	40	2	7056060401	0.060	0.050
8.0	8	8.00	80	0.50	7.80	30	2	705608030	0.080	0.060
8.0	8	8.00	100	0.50	7.80	60	2	705608060	0.080	0.060
8.0	8	8.00	80	1.00	7.80	30	2	7056080301	0.080	0.060
8.0	8	8.00	100	1.00	7.80	60	2	7056080601	0.080	0.060
10.0	10	10.00	80	0.50	9.80	30	2	7056010030	0.100	0.080
10.0	10	10.00	100	0.50	9.80	60	2	7056010060	0.100	0.080
10.0	10	10.00	80	1.00	9.80	30	2	70560100301	0.100	0.080
10.0	10	10.00	100	1.00	9.80	60	2	70560100601	0.100	0.080
12.0	12	12.00	80	0.50	11.80	30	2	7056012030	0.120	0.100
12.0	12	12.00	100	0.50	11.80	60	2	7056012060	0.120	0.100
12.0	12	12.00	80	1.00	11.80	30	2	70560120301	0.120	0.100
12.0	12	12.00	100	1.00	11.80	60	2	70560120601	0.120	0.100



Peripheral milling
$a_e = 0.2xD$
$a_p = 0.1xD$



Full slot milling
$a_e = 0.5xD$
$a_p = 0.1xD$

- Torus cutter for roughing and finishing in Graphitee
- Short cutting edges for highest stability
- Perfect for copy milling

Material	Graphite
V_c (m/min) Finishing	400
V_c (m/min) Roughing	450

70561

r_p = ±0,003 | Diamant | Z 2 | HA | 30° | VHM | Type N | Graphite | HSC | 0,005 mm | Manu-facturer standard

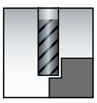
Solid Carbide High Precision Ball-Nosed End Mill

Extra-long version with diamond coating

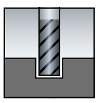
d_1	d_2
h10	h6

- Ball-nosed end mill for roughing and finishing in graphite
- Short cutting edges for highest stability
- Perfect for copy milling

d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
0.2	4	0.2	50	0.17	1	2	705610201	0.003	0.002
0.3	4	0.3	50	0.27	1	2	705610301	0.003	0.003
0.3	4	0.3	50	0.27	3	2	705610303	0.003	0.003
0.3	4	0.3	50	0.27	5	2	705610305	0.003	0.003
0.3	4	0.3	50	0.27	8	2	705610308	0.003	0.003
0.4	4	0.4	50	0.37	4	2	705610404	0.004	0.003
0.4	4	0.4	50	0.37	6	2	705610406	0.004	0.003
0.4	4	0.4	50	0.37	8	2	705610408	0.004	0.003
0.5	4	0.5	50	0.47	5	2	705610505	0.005	0.003
0.5	4	0.5	50	0.47	10	2	705610510	0.005	0.003
0.6	4	0.8	50	0.57	6	2	705610606	0.007	0.004
0.6	4	0.8	50	0.57	9	2	705610609	0.007	0.004
0.6	4	0.8	55	0.57	12	2	705610612	0.007	0.004
0.7	4	0.9	50	0.67	7	2	705610707	0.007	0.005
0.7	4	0.9	55	0.67	14	2	705610714	0.007	0.005
0.8	4	1.0	50	0.76	8	2	705610808	0.010	0.006
0.8	4	1.0	55	0.76	12	2	705610812	0.010	0.006
0.8	4	1.0	55	0.76	16	2	705610816	0.010	0.006
1.0	4	1.0	50	0.96	5	2	705611005	0.015	0.010
1.0	4	1.0	50	0.96	10	2	705611010	0.015	0.010
1.0	4	1.0	55	0.96	15	2	705611015	0.015	0.010
1.0	4	1.0	60	0.96	20	2	705611020	0.015	0.010
1.0	4	1.0	65	0.96	25	2	705611025	0.015	0.010
1.0	4	1.0	70	0.96	30	2	705611030	0.015	0.010
1.2	4	1.5	50	1.15	5	2	705611205	0.015	0.010
1.2	4	1.5	50	1.15	10	2	705611210	0.015	0.010
1.2	4	1.5	55	1.15	15	2	705611215	0.015	0.010
1.5	4	2.0	50	1.44	5	2	705611505	0.020	0.012
1.5	4	2.0	50	1.44	10	2	705611510	0.020	0.012
1.5	4	2.0	55	1.44	15	2	705611515	0.020	0.012
1.5	4	2.0	60	1.44	20	2	705611520	0.020	0.012
1.5	4	2.0	65	1.44	25	2	705611525	0.020	0.012
1.8	4	2.0	50	1.74	10	2	705611810	0.020	0.012
1.8	4	2.0	60	1.74	20	2	705611820	0.020	0.012
2.0	4	2.0	50	1.92	10	2	705612010	0.025	0.015
2.0	4	2.0	55	1.92	15	2	705612015	0.025	0.015
2.0	4	2.0	60	1.92	20	2	705612020	0.025	0.015
2.0	4	2.0	65	1.92	25	2	705612025	0.025	0.015
2.0	4	2.0	70	1.92	30	2	705612030	0.025	0.015
3.0	6	3.0	55	2.88	10	2	705613010	0.030	0.020
3.0	6	3.0	60	2.88	15	2	705613015	0.030	0.020
3.0	6	3.0	65	2.88	20	2	705613020	0.030	0.020
3.0	6	3.0	70	2.88	25	2	705613025	0.030	0.020
3.0	6	3.0	75	2.88	30	2	705613030	0.030	0.020
4.0	6	4.0	65	3.85	20	2	705614020	0.040	0.030
4.0	6	4.0	75	3.85	30	2	705614030	0.040	0.030
4.0	6	4.0	80	3.85	40	2	705614040	0.040	0.030
5.0	6	5.0	65	4.85	20	2	705615020	0.050	0.040
5.0	6	5.0	75	4.85	30	2	705615030	0.050	0.040
5.0	6	5.0	80	4.85	40	2	705615040	0.050	0.040
5.0	6	5.0	100	4.85	50	2	705615050	0.050	0.040
6.0	6	6.0	75	5.85	30	2	705616030	0.060	0.050
6.0	6	6.0	90	5.85	40	2	705616040	0.060	0.050
6.0	6	6.0	90	5.85	50	2	705616050	0.060	0.050
6.0	6	6.0	90	5.85	60	2	705616060	0.060	0.050
8.0	8	8.0	80	7.80	30	2	705618030	0.060	0.060
8.0	8	8.0	100	7.80	60	2	705618060	0.080	0.060
10.0	10	10.0	80	9.80	30	2	7056110030	0.100	0.080
10.0	10	10.0	100	9.80	60	2	7056110060	0.100	0.080
12.0	12	12.0	83	11.80	30	2	7056112030	0.120	0.100
12.0	12	12.0	100	11.80	60	2	7056112060	0.120	0.100



Peripheral milling
a_e = 0.2xD
a_p = 0.1xD



Full slot milling
a_p = 0.1xD

Material	Graphite
V_c (m/min) Finishing	400
V_c (m/min) Roughing	450

Artikelgruppe 165

Aluminium Line
Solid Carbide End Mills

Aluminium Line

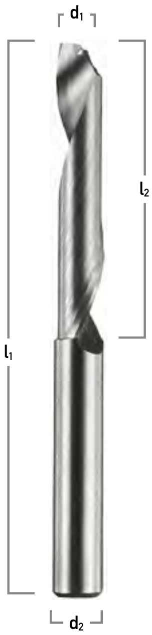
High Performance
Precision
Volume

20100

Uncoated | Z 1 | HA | 26° | VHM | Type W | HSC | Manu-facturer standard

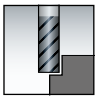
Solid Carbide Single-Flute End Mill

Long version

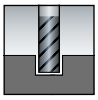


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Finishing mm/Z
1.5	3	6	50	1	20100015	0.020 – 0.025
2.0	3	8	50	1	20100020	0.025 – 0.028
3.0	3	12	50	1	20100030	0.030 – 0.034
4.0	4	15	60	1	20100040	0.035 – 0.050
5.0	5	17	60	1	20100050	0.040 – 0.060
6.0	6	20	65	1	20100060	0.050 – 0.070
8.0	8	22	65	1	20100080	0.055 – 0.075
10.0	10	25	75	1	20100100	0.060 – 0.080
12.0	12	30	80	1	20100120	0.070 – 0.100



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 1.0xD$

- For Aluminium and Plastics
- Long version
- Large chip space
- Perfect for plunge milling and contouring
- More versions as well as HSS single-flute end mills available upon request

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al alloys >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	700	600	600	180	175	400	390

Product family 160

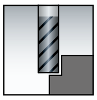
31045

Uncoated | Z 2 | HB | 45° | VHM | Type W | Manu-facturer standard

Solid Carbide End Mill For Aluminium
Short version

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	5	50	2	31045020	0.006 – 0.010	0.004 – 0.008
3.0	6	5	50	2	31045030	0.009 – 0.020	0.007 – 0.015
4.0	6	8	54	2	31045040	0.017 – 0.028	0.012 – 0.023
5.0	6	9	54	2	31045050	0.017 – 0.030	0.014 – 0.025
6.0	6	10	54	2	31045060	0.019 – 0.036	0.017 – 0.031
8.0	8	12	58	2	31045080	0.026 – 0.047	0.024 – 0.042
10.0	10	14	66	2	31045100	0.032 – 0.055	0.030 – 0.050
12.0	12	16	73	2	31045120	0.038 – 0.064	0.036 – 0.059
14.0	14	18	75	2	31045140	0.044 – 0.068	0.042 – 0.063
16.0	16	22	82	2	31045160	0.050 – 0.076	0.048 – 0.071
18.0	18	24	84	2	31045180	0.056 – 0.085	0.054 – 0.080
20.0	20	26	92	2	31045200	0.060 – 0.095	0.058 – 0.090



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD

Full slot milling
a_p = 1.0xD

31145

Uncoated | Z 2 | HB | 45° | VHM | Type W | Manu-facturer standard

Solid Carbide End Mill For Aluminium
Long version

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	8	57	2	31145020	0.006 – 0.010	0.004 – 0.008
3.0	6	8	57	2	31145030	0.009 – 0.020	0.007 – 0.015
4.0	6	11	57	2	31145040	0.017 – 0.028	0.012 – 0.023
5.0	6	13	57	2	31145050	0.016 – 0.030	0.014 – 0.025
6.0	6	13	57	2	31145060	0.019 – 0.036	0.017 – 0.031
8.0	8	19	63	2	31145080	0.026 – 0.047	0.024 – 0.042
10.0	10	22	72	2	31145100	0.032 – 0.055	0030 – 0.050
12.0	12	26	83	2	31145120	0.038 – 0.064	0.036 – 0.059
14.0	14	26	83	2	31145140	0.044 – 0.068	0.042 – 0.063
16.0	16	32	92	2	31145160	0.050 – 0.076	0.048 – 0.071
18.0	18	32	92	2	31145180	0.056 – 0.085	0.054 – 0.080
20.0	20	38	104	2	31145200	0.060 – 0.095	0.058 – 0.090

Peripheral milling
a_e = 0.5xD
a_p = 1.0xD

Full slot milling
a_p = 1.0xD

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al alloys >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	330	160	130	75	75	90	80
V_c (m/min) Roughing	300	140	115	60	60	75	65

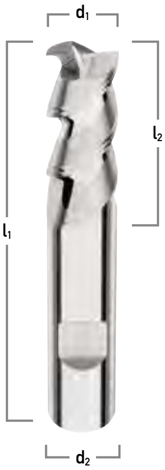
Product family 160

31055

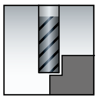
Uncoated | Z 2 | HB | 55° | VHM | Type W | DIN 6527L

Solid Carbide End Mill For Aluminium

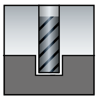
Long version, lapped



d1	d2	l2	l1		Uncoated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	Z	Part No.	mm/Z	mm/Z
3.0	6	8	57	2	31055030	0.009 – 0.020	0.007 – 0.015
4.0	6	11	57	2	31055040	0.017 – 0.028	0.012 – 0.023
5.0	6	13	57	2	31055050	0.017 – 0.030	0.014 – 0.025
6.0	6	13	57	2	31055060	0.019 – 0.036	0.017 – 0.031
8.0	8	19	63	2	31055080	0.026 – 0.047	0.024 – 0.042
10.0	10	22	72	2	31055100	0.032 – 0.055	0030 – 0.050
12.0	12	26	83	2	31055120	0.038 – 0.064	0.036 – 0.059
14.0	14	26	83	2	31055140	0.044 – 0.068	0.042 – 0.063
16.0	16	32	92	2	31055160	0.050 – 0.076	0.048 – 0.071
18.0	18	32	92	2	31055180	0.056 – 0.085	0.054 – 0.080
20.0	20	38	104	2	31055200	0.060 – 0.095	0.058 – 0.090



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 1.0xD$

- For Aluminium and Plastics
- Sharp cutting edges

d1	d2
h10	h6

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al alloys >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	410	200	165	100	95	115	100
V_c (m/min) Roughing	395	185	150	85	85	100	85

Product family 160

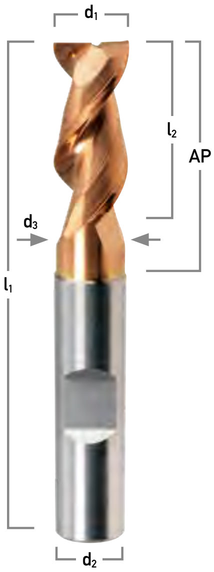
ToolFactory Cutting Tool Solutions

22200

ZrCN | Z 2 | HB | 45° | VHM | Type W | HPC | Manu-facturer standard

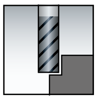
Solid Carbide HPC End Mill For Aluminium

With protective chamfer

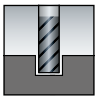


d_1 h10	d_2 h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.03	6	57	–	–	2	22200020	0.026 – 0.055	0.025 – 0.048
3.0	6	0.03	8	57	2.8	18	2	22200030	0.037 – 0.077	0.034 – 0.067
4.0	6	0.04	11	57	3.8	18	2	22200040	0.042 – 0.088	0.039 – 0.076
5.0	6	0.05	13	57	4.8	21	2	22200050	0.047 – 0.099	0.044 – 0.086
6.0	6	0.06	13	57	5.5	21	2	22200060	0.063 – 0.132	0.059 – 0.114
8.0	8	0.08	21	63	7.5	27	2	22200080	0.084 – 0.176	0.078 – 0.152
10.0	10	0.10	22	72	9.5	32	2	22200100	0.095 – 0.198	0.088 – 0.171
12.0	12	0.10	26	83	11.5	38	2	22200120	0.105 – 0.220	0.098 – 0.190
14.0	14	0.10	26	83	13.5	38	2	22200140	0.116 – 0.220	0.108 – 0.190
16.0	16	0.10	36	92	15.5	44	2	22200160	0.126 – 0.231	0.118 – 0.200
18.0	18	0.10	36	92	17.5	44	2	22200180	0.137 – 0.231	0.127 – 0.200
20.0	20	0.10	41	104	19.5	54	2	22200200	0.147 – 0.242	0.137 – 0.209



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD



Full slot milling
a_p = 1.5xD

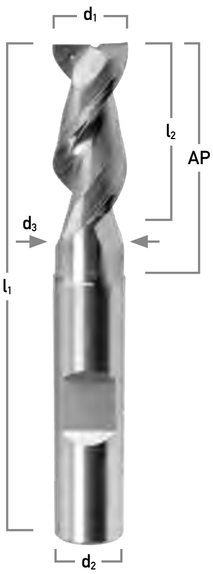
- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrCN coating preventing from built-up edge
- High machining performance up to 1.5xD into solid
- With protective chamfer for longer tool life

22200U

Uncoated | Z 2 | HB | 45° | VHM | Type W | HPC | Manu-facturer standard

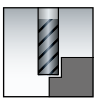
Solid Carbide HPC End Mill For Aluminium

With protective chamfer, uncoated



d_1 h10	d_2 h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	0.03	6	57	–	–	2	22200020U	0.026 – 0.055	0.025 – 0.048
3.0	6	0.03	8	57	2.8	18	2	22200030U	0.037 – 0.077	0.034 – 0.067
4.0	6	0.04	11	57	3.8	18	2	22200040U	0.042 – 0.088	0.039 – 0.076
5.0	6	0.05	13	57	4.8	21	2	22200050U	0.047 – 0.099	0.044 – 0.086
6.0	6	0.06	13	57	5.5	21	2	22200060U	0.063 – 0.132	0.059 – 0.114
8.0	8	0.08	21	63	7.5	27	2	22200080U	0.084 – 0.176	0.078 – 0.152
10.0	10	0.10	22	72	9.5	32	2	22200100U	0.095 – 0.198	0.088 – 0.171
12.0	12	0.10	26	83	11.5	38	2	22200120U	0.105 – 0.220	0.098 – 0.190
14.0	14	0.10	26	83	13.5	38	2	22200140U	0.116 – 0.220	0.108 – 0.190
16.0	16	0.10	36	92	15.5	44	2	22200160U	0.126 – 0.231	0.118 – 0.200
18.0	18	0.10	36	92	17.5	44	2	22200180U	0.137 – 0.231	0.127 – 0.200
20.0	20	0.10	41	104	19.5	54	2	22200200U	0.147 – 0.242	0.137 – 0.209



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

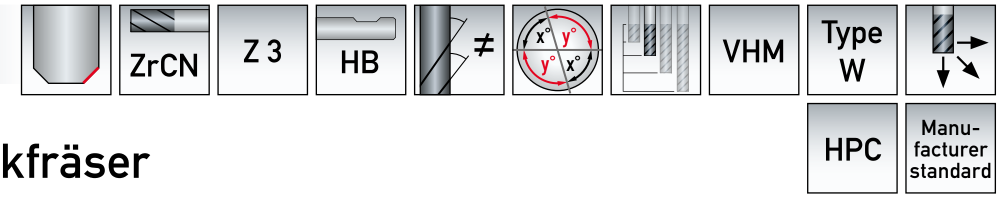
Full slot milling
a_p = 1.5xD

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide
- High machining performance up to 1.5xD into solid
- With protective chamfer for longer tool life

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	350	300	300	280	350	420
V_c (m/min) Roughing	300	280	200	250	300	360

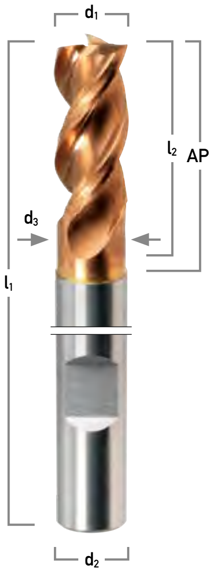
Product family 160

22303



VHM-HPC-Shankfräser

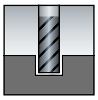
Mit Schutzfase



d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.03	8	57	2.8	18	3	22303030	0.037 – 0.077	0.034 – 0.067
4.0	6	0.04	11	57	3.8	18	3	22303040	0.042 – 0.088	0.039 – 0.076
5.0	6	0.05	13	57	4.8	21	3	22303050	0.047 – 0.099	0.044 – 0.086
6.0	6	0.06	13	57	5.5	21	3	22303060	0.063 – 0.132	0.059 – 0.114
8.0	8	0.08	21	63	7.5	27	3	22303080	0.084 – 0.176	0.078 – 0.152
10.0	10	0.10	22	72	9.5	32	3	22303100	0.095 – 0.198	0.088 – 0.171
12.0	12	0.10	26	83	11.5	38	3	22303120	0.105 – 0.220	0.098 – 0.190
14.0	14	0.10	26	83	13.5	38	3	22303140	0.116 – 0.220	0.108 – 0.190
16.0	16	0.10	36	92	15.5	44	3	22303160	0.126 – 0.231	0.118 – 0.200
18.0	18	0.10	36	92	17.5	44	3	22303180	0.137 – 0.231	0.127 – 0.200
20.0	20	0.10	41	104	19.5	54	3	22303200	0.147 – 0.242	0.137 – 0.209
25.0	25	0.10	50	125	24.5	65	3	22303250	0.168 – 0.264	0.157 – 0.228

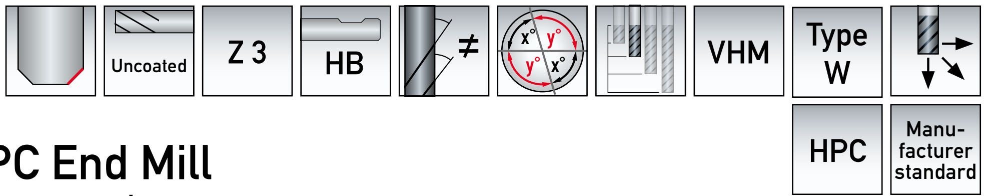
Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.5xD$

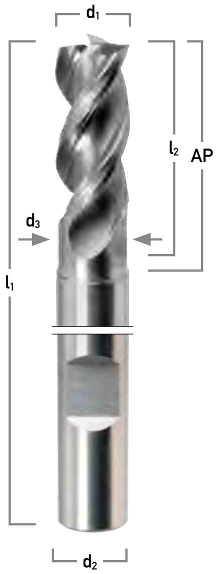
- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrCN coating preventing from built-up edge
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With protective chamfer for longer tool life

22303U

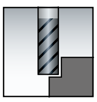


Solid Carbide HPC End Mill

With protective chamfer, uncoated



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	0.03	8	57	2.8	18	3	22303030U	0.037 – 0.077	0.034 – 0.067
4.0	6	0.04	11	57	3.8	18	3	22303040U	0.042 – 0.088	0.039 – 0.076
5.0	6	0.05	13	57	4.8	21	3	22303050U	0.047 – 0.099	0.044 – 0.086
6.0	6	0.06	13	57	5.5	21	3	22303060U	0.063 – 0.132	0.059 – 0.114
8.0	8	0.08	21	63	7.5	27	3	22303080U	0.084 – 0.176	0.078 – 0.152
10.0	10	0.10	22	72	9.5	32	3	22303100U	0.095 – 0.198	0.088 – 0.171
12.0	12	0.10	26	83	11.5	38	3	22303120U	0.105 – 0.220	0.098 – 0.190
14.0	14	0.10	26	83	13.5	38	3	22303140U	0.116 – 0.220	0.108 – 0.190
16.0	16	0.10	36	92	15.5	44	3	22303160U	0.126 – 0.231	0.118 – 0.200
18.0	18	0.10	36	92	17.5	44	3	22303180U	0.137 – 0.231	0.127 – 0.200
20.0	20	0.10	41	104	19.5	54	3	22303200U	0.147 – 0.242	0.137 – 0.209
25.0	25	0.10	50	125	24.5	65	3	22303250U	0.168 – 0.264	0.157 – 0.228



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.5xD$

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With protective chamfer for longer tool life

d_1	d_2
h10	h6

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	350	300	300	280	350	420
V_c (m/min) Roughing	300	280	200	250	300	360

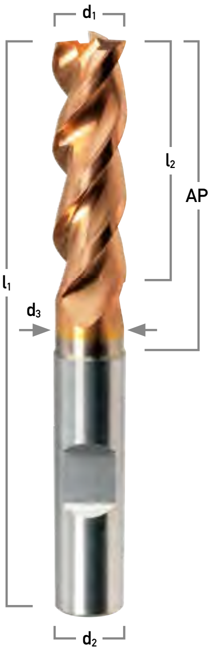
Product family 160

22301

ZrCN | Z 3 | HB | ≠ | VHM | Type W | HPC | Manufacturer standard

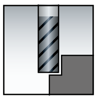
Solid Carbide High-Performance End Mill For Aluminium

With protective chamfer



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
5.0	6	0.05	22	63	4.8	29	3	22301050	0.047 – 0.099	0.044 – 0.086
6.0	6	0.06	22	63	5.5	29	3	22301060	0.063 – 0.132	0.059 – 0.114
8.0	8	0.08	28	80	7.5	36	3	22301080	0.084 – 0.176	0.078 – 0.152
10.0	10	0.10	33	80	9.5	43	3	22301100	0.095 – 0.198	0.088 – 0.171
12.0	12	0.10	33	100	11.5	54	3	22301120	0.105 – 0.220	0.098 – 0.190
14.0	14	0.10	48	100	13.5	54	3	22301140	0.116 – 0.220	0.108 – 0.190
16.0	16	0.10	53	125	15.5	69	3	22301160	0.126 – 0.231	0.118 – 0.200
20.0	20	0.10	68	150	19.5	84	3	22301200	0.147 – 0.242	0.137 – 0.209

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.5xD

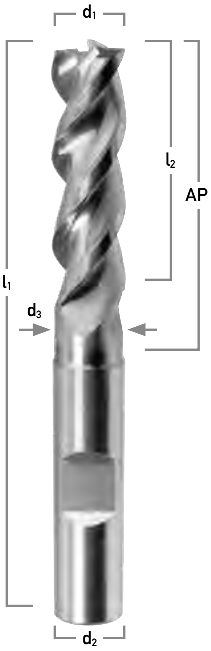
- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrCN coating preventing from built-up edge
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With protective chamfer for longer tool life

22301U

Uncoated | Z 3 | HB | ≠ | VHM | Type W | HPC | Manufacturer standard

Solid Carbide High-Performance End Mill For Aluminium

With protective chamfer, uncoated



d_1 mm	d_2 mm	Corner chamfer	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
5.0	6	0.05	22	63	4.8	29	3	22301050U	0.047 – 0.099	0.044 – 0.086
6.0	6	0.06	22	63	5.5	29	3	22301060U	0.063 – 0.132	0.059 – 0.114
8.0	8	0.08	28	80	7.5	36	3	22301080U	0.084 – 0.176	0.078 – 0.152
10.0	10	0.10	33	80	9.5	43	3	22301100U	0.095 – 0.198	0.088 – 0.171
12.0	12	0.10	33	100	11.5	54	3	22301120U	0.105 – 0.220	0.098 – 0.190
14.0	14	0.10	48	100	13.5	54	3	22301140U	0.116 – 0.220	0.108 – 0.190
16.0	16	0.10	53	125	15.5	69	3	22301160U	0.126 – 0.231	0.118 – 0.200
20.0	20	0.10	68	150	19.5	84	3	22301200U	0.147 – 0.242	0.137 – 0.209

d_1	d_2
h10	h6

Peripheral milling
a_e = 0.5xD
a_p = 1.5xD

Full slot milling
a_p = 1.5xD

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing
- With protective chamfer for longer tool life

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	350	300	300	280	350	420
V_c (m/min) Roughing	300	280	200	250	300	360

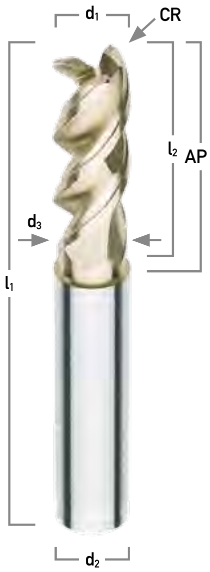
Product family 160

31845

ZrN | Z 3 | HA | VHM | Type W | HPC | DIN 6527 L

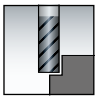
Solid Carbide HPC Torus Cutter

With corner radius



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
5.0	6	13	57	1.00	4.80	18	3	31845050	0.016 – 0.030	0.014 – 0.025
6.0	6	13	57	0.50	5.80	18	3	31845060	0.019 – 0.036	0.017 – 0.031
6.0	6	13	57	1.00	5.80	18	3	31845061	0.019 – 0.036	0.017 – 0.031
8.0	8	21	63	0.50	7.80	25	3	31845080	0.026 – 0.047	0.024 – 0.042
8.0	8	21	63	1.00	7.80	25	3	31845081	0.026 – 0.047	0.024 – 0.042
10.0	10	22	72	0.50	9.70	30	3	31845100	0.032 – 0.055	0.030 – 0.050
10.0	10	22	72	1.00	9.70	30	3	31845101	0.032 – 0.055	0.030 – 0.050
12.0	12	26	83	0.50	11.70	36	3	31845120	0.038 – 0.064	0.036 – 0.059
12.0	12	26	83	1.00	11.70	36	3	31845121	0.038 – 0.064	0.036 – 0.059
16.0	16	36	92	2.00	15.70	42	3	31845160	0.047 – 0.076	0.045 – 0.071
16.0	16	36	92	4.00	15.70	42	3	31845161	0.047 – 0.076	0.045 – 0.071
20.0	20	41	104	4.00	19.50	52	3	31845200	0.060 – 0.095	0.058 – 0.090
25.0	25	50	125	5.00	24.50	65	3	31845250	0.079 – 0.130	0.078 – 0.125



Peripheral milling
a_e = 1.0xD
a_p = 1.5xD

Full slot milling
a_p = 1.5xD

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrN coating
- High machining performance up to 1.5xD into solid
- Smooth running due to axial and radial unequal spacing

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	410	200	165	100	95	115	100
V_c (m/min) Roughing	395	185	150	85	85	100	85

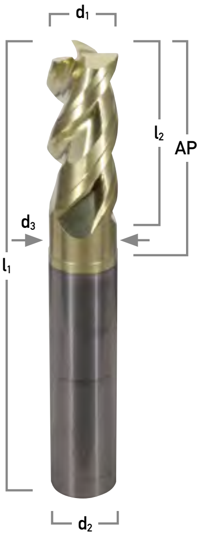
Product family 160

31645

ZrN | Z 3 | HA | VHM | Type W | Manu-facturer standard

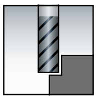
VHM-Shankfräser für Aluminium

Lange Ausführung mit Corner chamfer, geläppt

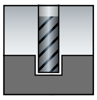


d_1 mm	d_2 mm	l_2 mm	l_1 mm	Corner chamfer	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	8	57	0.10	2.80	12	3	31645030	0.009 – 0.020	0.007 – 0.015
4.0	6	11	57	0.10	3.80	18	3	31645040	0.014 – 0.028	0.012 – 0.023
5.0	6	13	57	0.10	4.80	18	3	31645050	0.016 – 0.030	0.014 – 0.025
6.0	6	13	57	0.20	5.80	18	3	31645060	0.019 – 0.036	0.017 – 0.031
6.0	6	13	80	0.20	5.80	42	3	31645061	0.019 – 0.036	0.017 – 0.031
8.0	8	21	63	0.20	7.80	25	3	31645080	0.026 – 0.047	0.024 – 0.042
8.0	8	21	100	0.20	7.80	62	3	31645081	0.026 – 0.047	0.024 – 0.042
10.0	10	22	72	0.20	9.70	30	3	31645100	0.032 – 0.010	0.030 – 0.050
10.0	10	22	100	0.20	9.70	58	3	31645101	0.032 – 0.010	0.030 – 0.050
12.0	12	26	83	0.20	11.70	36	3	31645120	0.038 – 0.064	0.036 – 0.059
12.0	12	26	120	0.20	11.70	73	3	31645121	0.038 – 0.064	0.036 – 0.059
16.0	16	36	92	0.20	15.70	42	3	31645160	0.047 – 0.076	0.045 – 0.071
16.0	16	36	150	0.20	15.70	100	3	31645161	0.047 – 0.076	0.045 – 0.071
18.0	18	36	92	0.20	17.60	42	3	31645180	0.056 – 0.088	0.054 – 0.083
18.0	18	36	150	0.20	17.60	100	3	31645181	0.056 – 0.088	0.054 – 0.083
20.0	20	41	104	0.20	19.50	52	3	31645200	0.063 – 0.095	0.058 – 0.090
20.0	20	41	150	0.20	19.50	98	3	31645201	0.063 – 0.095	0.058 – 0.090
25.0	25	50	125	0.30	24.50	65	3	31645250	0.080 – 0.130	0.078 – 0.125

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.0xD

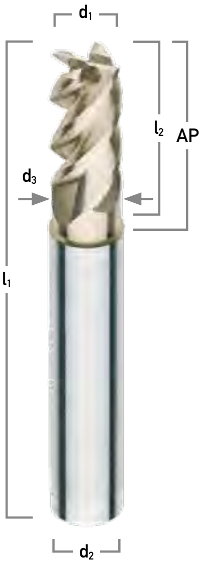
- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrN coating
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing

31745

ZrN | Z 4 | HA | VHM | Type W | HPC | Manu-facturer standard

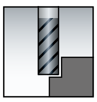
Solid Carbide HPC End Mill für Aluminium

Long version with Corner chamfer

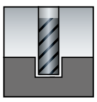


d_1 mm	d_2 mm	l_2 mm	l_1 mm	Corner chamfer	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	8	57	0.10	2.80	12	4	31745030	0.007 – 0.015	0.006 – 0.013
4.0	6	11	57	0.10	3.80	18	4	31745040	0.012 – 0.023	0.010 – 0.021
5.0	6	13	57	0.10	4.80	18	4	31745050	0.014 – 0.025	0.012 – 0.023
6.0	6	13	57	0.20	5.80	18	4	31745060	0.017 – 0.031	0.015 – 0.029
6.0	6	13	80	0.20	5.80	42	4	31745061	0.017 – 0.031	0.015 – 0.029
7.0	8	21	63	0.20	6.80	25	4	31745070	0.020 – 0.037	0.018 – 0.035
8.0	8	21	63	0.20	7.80	25	4	31745080	0.024 – 0.042	0.022 – 0.040
8.0	8	21	100	0.20	7.80	62	4	31745081	0.024 – 0.042	0.022 – 0.040
10.0	10	22	72	0.20	9.70	30	4	31745100	0.030 – 0.050	0.028 – 0.048
10.0	10	22	100	0.20	9.70	58	4	31745101	0.030 – 0.050	0.028 – 0.048
12.0	12	26	83	0.20	11.70	36	4	31745120	0.036 – 0.059	0.034 – 0.057
12.0	12	26	120	0.20	11.70	73	4	31745121	0.036 – 0.059	0.034 – 0.057
16.0	16	36	92	0.20	15.70	42	4	31745160	0.045 – 0.071	0.043 – 0.069
16.0	16	36	150	0.20	15.70	100	4	31745161	0.045 – 0.071	0.043 – 0.069
18.0	18	36	92	0.20	17.60	42	4	31745180	0.054 – 0.083	0.052 – 0.081
18.0	18	36	150	0.20	17.60	100	4	31745181	0.054 – 0.083	0.052 – 0.081
20.0	20	41	104	0.20	19.50	52	4	31745200	0.058 – 0.090	0.056 – 0.089
20.0	20	41	150	0.20	19.50	98	4	31745201	0.058 – 0.090	0.056 – 0.089
25.0	25	50	125	0.30	24.50	65	4	31745250	0.078 – 0.125	0.076 – 0.123

d_1	d_2
h10	h6



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.0xD

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrN coating
- High machining performance up to 1xD into solid
- Smooth running due to axial and radial unequal spacing

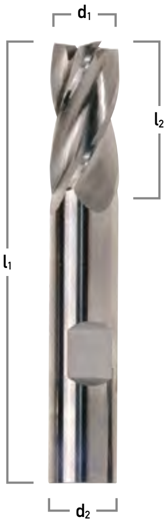
Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	410	200	165	100	95	115	100
V_c (m/min) Roughing	395	185	150	85	80	100	85

Artikelgruppe 160

10509

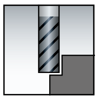
Uncoated | Z 4 | HB | 39° | VHM | Type W | Manu- facturer standard

Solid Carbide End Mill For Aluminium
Long version

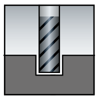


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
4.0	6	8	62	4	10509040	0.012 – 0.021	0.080 – 0.054
5.0	6	15	62	4	10509050	0.012 – 0.023	0.010 – 0.021
6.0	6	18	62	4	10509060	0.015 – 0.029	0.013 – 0.027
8.0	8	24	68	4	10509080	0.022 – 0.040	0.020 – 0.038
10.0	10	30	80	4	10509100	0.028 – 0.048	0.026 – 0.046
12.0	12	36	93	4	10509120	0.034 – 0.059	0.032 – 0.055
16.0	16	48	108	4	10509160	0.043 – 0.069	0.041 – 0.067
20.0	20	60	126	4	10509200	0.056 – 0.091	0.054 – 0.086



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 0.5xD$

- For Aluminium, Brass and Plastics
- Sharp cutting edges

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	350	300	300	280	350	420
V_c (m/min) Roughing	300	280	200	250	300	360

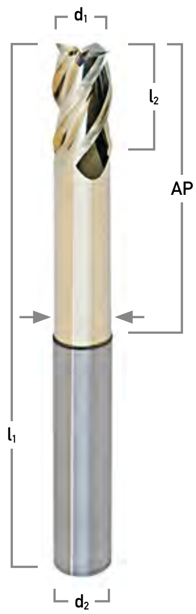
Product family 163

31940

ZrN | Z 3–4 | HA | VHM | Type W | HPC | Manu-facturer standard

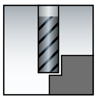
VSolid Carbide HPC End Mill For Aluminium

Extra-long version

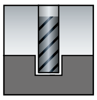


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	8	70	2.7	20	3	31940030	0.007 – 0.015	0.006 – 0.013
4.0	6	11	70	3.7	25	3	31940040	0.012 – 0.023	0.010 – 0.021
5.0	6	13	70	4.7	30	3	31940050	0.014 – 0.025	0.012 – 0.023
6.0	6	13	70	5.7	30	3	31940060	0.017 – 0.031	0.015 – 0.029
8.0	8	20	80	7.4	35	3	31940080	0.024 – 0.042	0.022 – 0.040
10.0	10	22	90	9.2	45	3	31940100	0.030 – 0.050	0.028 – 0.048
12.0	12	26	100	11.0	55	4	31940120	0.036 – 0.059	0.034 – 0.057
16.0	16	36	115	15.0	65	4	31940160	0.045 – 0.071	0.043 – 0.069
20.0	20	41	125	19.0	75	4	31940200	0.058 – 0.090	0.056 – 0.089
25.0	25	52	150	24.0	95	4	31940250	0.078 – 0.125	0.076 – 0.123



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

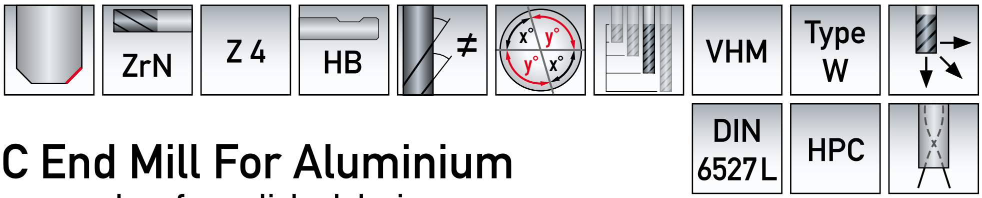


Full slot milling
$a_p = 0.75xD$

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrN coating
- High machining performance up to 0.75xD into solid material
- Smooth running due to axial and radial unequal spacing

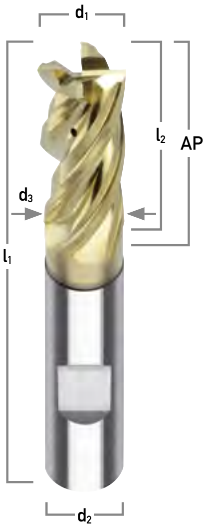
Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	410	200	165	100	95	115	100
V_c (m/min) Roughing	395	185	150	85	80	100	85

60408



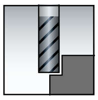
Solid Carbide HPC End Mill For Aluminium

With internal coolant and corner chamfer, polished design



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Corner chamfer	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	6	11	57	0.15x45°	2.8	18	4	60408030	0.010 – 0.018	0.008 – 0.016
4.0	6	12	57	0.15x45°	3.6	21	4	60408040	0.018 – 0.025	0.016 – 0.023
5.0	6	15	57	0.15x45°	4.5	21	4	60408050	0.025 – 0.033	0.023 – 0.031
6.0	6	15	57	0.2x45°	5.5	21	4	60408060	0.033 – 0.040	0.031 – 0.038
8.0	8	21	63	0.2x45°	7.5	28	4	60408080	0.040 – 0.047	0.038 – 0.045
10.0	10	22	72	0.3x45°	9.5	32	4	60408100	0.047 – 0.055	0.045 – 0.053
12.0	12	28	83	0.3x45°	11.5	38	4	60408120	0.055 – 0.062	0.053 – 0.060
14.0	14	30	83	0.3x45°	13.5	42	4	60408140	0.062 – 0.069	0.060 – 0.067
16.0	16	35	92	0.4x45°	15.5	45	4	60408160	0.069 – 0.076	0.067 – 0.075
20.0	20	41	104	0.5x45°	19.5	55	4	60408200	0.076 – 0.083	0.074 – 0.080
25.0	25	51	110	0.5x45°	24	65	4	60408250	0.118 – 0.125	0.115 – 0.122



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.0xD

- High-performance end mill for roughing and finishing
- Ultra-micro grain solid carbide with ZrN coating
- High machining performance up to 0.75xD into solid material
- Smooth running due to axial and radial unequal spacing

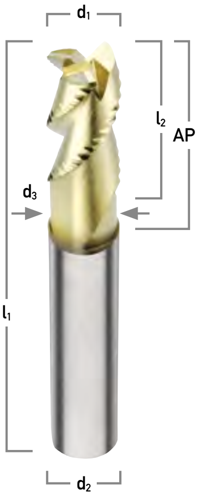
Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic	Bronze	Kupfer
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²				
V_c (m/min) Finishing	500	400	240	100	95	115	100	160	135
V_c (m/min) Roughing	485	385	225	85	80	100	85	145	120

Artikelgruppe 164

31901

ZrN | Z 3 | HA | 30° | VHM | Typ WR | Manu-facturer standard

Solid Carbide Roughing End Mill For Aluminium
Long version



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Corner chamfer	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	22	63	0.4	5.7	29	3	31901060	0.019 – 0.036	0.017 – 0.031
8.0	8	28	80	0.4	7.4	36	3	31901080	0.026 – 0.047	0.024 – 0.042
10.0	10	33	80	0.4	9.2	43	3	31901100	0.032 – 0.055	0.030 – 0.050
12.0	12	33	100	0.4	11.0	54	3	31901120	0.038 – 0.064	0.036 – 0.059
16.0	16	55	125	0.4	15.0	69	3	31901160	0.047 – 0.076	0.045 – 0.071
20.0	20	68	150	0.4	19.4	84	3	31901200	0.060 – 0.095	0.058 – 0.090

Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 2.0xD

- High-performance end mill for roughing
- Ultra-micro grain solid carbide with ZrN coating
- High machining performance up to 2xD into solid material

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	515	415	255	110	105	130	115
V_c (m/min) Roughing	500	400	240	95	90	115	100

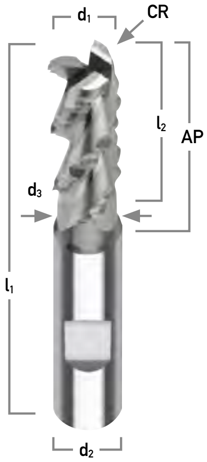
Product family 160

31445

Uncoated | Z 3 | HB | 45° | VHM | Type WR | Manu-facturer standard

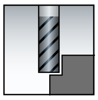
Solid Carbide Roughing End Mill For Aluminium

Long version, corner radius

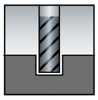


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	d_3 mm	AP mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	16	60	0.4	4.7	25	3	31445060	0.019 – 0.032	0.017 – 0.031
8.0	8	25	78	0.5	6.3	33	3	31445080	0.026 – 0.047	0.024 – 0.042
10.0	10	28	78	0.6	8.2	35	3	31445100	0.032 – 0.055	0.030 – 0.050
12.0	12	32	89	0.8	10.2	40	3	31445120	0.038 – 0.064	0.036 – 0.059
14.0	14	32	89	1.0	12.0	40	3	31445140	0.044 – 0.068	0.042 – 0.063
16.0	16	36	96	1.0	14.0	45	3	31445160	0.047 – 0.076	0.045 – 0.071
20.0	20	45	111	1.2	17.5	60	3	31445200	0.060 – 0.095	0.058 – 0.090



Peripheral milling
a_e = 0,5xD
a_p = 2,0xD



Full slot milling
a_p = 1,5xD

- High-performance end mill for roughing
- Ultra-micro grain solid carbide
- High machining performance up to 1.5xD into solid

Material	Alu & Al Alloys	Alu & Al alloys <10% Si	Alu & Al-Leg. >10% Si	Brass, short-chipping	Brass, long-chipping	Plastics, thermosetting	Plastics, thermoplastic
Tensile strength/Hardness	< 450 N/mm²	< 600 N/mm²	> 600 N/mm²	< 600 N/mm²	< 600 N/mm²		
V_c (m/min) Finishing	425	215	185	115	110	135	115
V_c (m/min) Roughing	410	200	170	100	95	120	100

Product family 160

ToolFactory
Cutting Tool Solutions

Composite Line

Solid Carbide Routers

Composite Line

Versatility
Precision
Efficiency

53002

Uncoated | HA | VHM | GRP | CFRP | Graphite | Manu-facturer standard

Solid Carbide Fibre Glass Router
No End

d_1	d_2	l_2	l_1	Uncoated
mm	mm	mm	mm	Part No.
1.6	3	5	38	53002001
2.4	3	9.5	38	53002004
3.0	3	12	38	53002007
4.0	4	16	50	53002010
4.0	6	16	50	53002013
6.0	6	19	50	53002016
6.0	6	19	63	53002019
6.0	6	25	75	53002022
8.0	8	25	63	53002025
10.0	10	25	75	53002028
12.0	12	25	75	53002031

Speed	vf
U/min	mm/min
40.000 – 44.840	100 – 1.500
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
15.000 – 20.000	600 – 1.400
15.000 – 20.000	550 – 1.350
10.000 – 15.000	500 – 1.300

d_2
h8

53003

Uncoated | HA | VHM | GRP | CFRP | Graphite | Manu-facturer standard

Solid Carbide Fibre Glass Router
Bur End

d_1	d_2	l_2	l_1	Uncoated
mm	mm	mm	mm	Part No.
1.6	3	5	38	53003001
2.4	3	9.5	38	53003004
3.0	3	12	38	53003007
4.0	4	16	50	53003010
4.0	6	16	50	53003013
6.0	6	19	50	53003016
6.0	6	19	63	53003019
6.0	6	25	75	53003022
8.0	8	25	63	53003025
10.0	10	25	75	53003028
12.0	12	25	75	53003031

Speed	vf
U/min	mm/min
40.000 – 44.840	100 – 1.500
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
20.000 – 24.000	800 – 1.600
15.000 – 20.000	600 – 1.400
15.000 – 20.000	550 – 1.350
10.000 – 15.000	500 – 1.300

d_2
h8

Product family 160

ToolFactory Cutting Tool Solutions

53004

Uncoated | HA | VHM | GRP | CFRP | Graphite | Manu-facturer standard

Solid Carbide Fibre Glass Router

End Mill End

d_1	d_2	l_2	l_1	Uncoated	Speed	vf
mm	mm	mm	mm	Part No.	U/min	mm/min
1,6	3	5	38	53004001	40,000 – 44,840	100 – 1,500
2,4	3	9,5	38	53004004	20,000 – 24,000	800 – 1,600
3,0	3	12	38	53004007	20,000 – 24,000	800 – 1,600
4,0	4	16	50	53004010	20,000 – 24,000	800 – 1,600
4,0	6	16	50	53004013	20,000 – 24,000	800 – 1,600
6,0	6	19	50	53004016	20,000 – 24,000	800 – 1,600
6,0	6	19	63	53004019	20,000 – 24,000	800 – 1,600
6,0	6	25	75	53004022	20,000 – 24,000	800 – 1,600
8,0	8	25	63	53004025	15,000 – 20,000	600 – 1,400
10,0	10	25	75	53004028	15,000 – 20,000	550 – 1,350
12,0	12	25	75	53004031	10,000 – 15,000	500 – 1,300

d_2
h8

53005

Uncoated | HA | VHM | GRP | CKF | Graphite | Manu-facturer standard

Solid Carbide Fibre Glass Router

Drill End

d_1	d_2	l_2	l_1	Uncoated	Speed	vf
mm	mm	mm	mm	Part No.	U/min	mm/min
1.6	3	5	38	53005001	40.000 – 44.840	100 – 1.500
2.4	3	9.5	38	53005004	20.000 – 24.000	800 – 1.600
3.0	3	12	38	53005007	20.000 – 24.000	800 – 1.600
4.0	4	16	50	53005010	20.000 – 24.000	800 – 1.600
4.0	6	16	50	53005013	20.000 – 24.000	800 – 1.600
6.0	6	19	50	53005016	20.000 – 24.000	800 – 1.600
6.0	6	19	63	53005019	20.000 – 24.000	800 – 1.600
6.0	6	25	75	53005022	20.000 – 24.000	800 – 1.600
8.0	8	25	63	53005025	15.000 – 20.000	600 – 1.400
10.0	10	25	75	53005028	15.000 – 20.000	550 – 1.350
12.0	12	25	75	53005031	10.000 – 15.000	500 – 1.300

d_2
h8

Standard Line

Solid Carbide End Mills

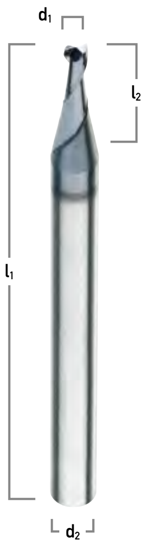
Standard Line

Performance
Tool Life
Selection

29002

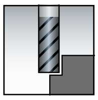
Uncoated | Alcrona Pro | Z 2 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide Micro End Mill



d_1	d_2
h10	h6

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Finishing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
0.10	3	0.3	38	2	29002001	29002001A	0.002 – 0.008
0.15	3	0.3	38	2	290020015	290020015A	0.002 – 0.008
0.20	3	0.5	38	2	29002002	29002002A	0.002 – 0.008
0.25	3	0.5	38	2	290020025	290020025A	0.002 – 0.008
0.30	3	1.0	38	2	29002003	29002003A	0.002 – 0.008
0.40	3	1.0	38	2	29002004	29002004A	0.002 – 0.008
0.50	3	1.5	38	2	29002005	29002005A	0.002 – 0.008
0.60	3	1.5	38	2	29002006	29002006A	0.002 – 0.008
0.70	3	2.0	38	2	29002007	29002007A	0.002 – 0.008
0.80	3	2.0	38	2	29002008	29002008A	0.002 – 0.008
0.90	3	2.5	38	2	29002009	29002009A	0.002 – 0.008
1.00	3	3.0	38	2	29002010	29002010A	0.003 – 0.010
1.10	3	3.0	38	2	29002011	29002011A	0.003 – 0.010
1.20	3	4.0	38	2	29002012	29002012A	0.003 – 0.010
1.40	3	4.0	38	2	29002014	29002014A	0.003 – 0.010
1.50	3	4.0	38	2	29002015	29002015A	0.005 – 0.018
1.60	3	4.0	38	2	29002016	29002016A	0.005 – 0.018
1.70	3	4.0	38	2	29002017	29002017A	0.005 – 0.018
1.80	3	5.0	38	2	29002018	29002018A	0.005 – 0.018
1.90	3	5.0	38	2	29002019	29002019A	0.010 – 0.020
2.00	3	5.0	38	2	29002020	29002020A	0.010 – 0.020



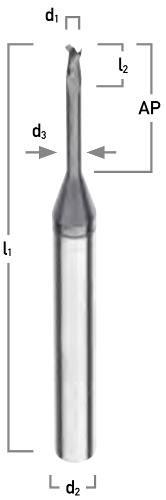
Peripheral milling
$a_e = 0.02xD$
$a_p = 0.05xD$

Full slot milling
$a_p = 0.5xD$

29302

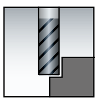
Alcrona Pro | Z 2 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide Miniature End Mill

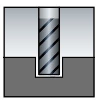


d_1	d_2
h10	h6

d_1	d_2	d_3	AP	l_2	l_1		Coated	f_z Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z
0.80	4	0.76	6	1.2	50	2	293020806A	0.002 – 0.005
0.90	4	0.86	6	1.4	50	2	293020906A	0.002 – 0.005
1.00	4	0.96	6	1.5	50	2	293021006A	0.003 – 0.010
1.00	4	0.96	12	1.5	55	2	293021012A	0.003 – 0.010
1.20	4	1.15	8	1.8	50	2	293021208A	0.003 – 0.010
1.20	4	1.15	12	1.8	55	2	293021212A	0.003 – 0.010
1.40	4	1.34	12	2.1	55	2	293021412A	0.003 – 0.010
1.50	4	1.44	14	2.3	55	2	293021514A	0.005 – 0.018
1.60	4	1.54	16	2.4	55	2	293021616A	0.005 – 0.018
1.80	4	1.74	16	2.7	55	2	293021816A	0.005 – 0.018
2.00	4	1.92	8	3.0	50	2	293022008A	0.010 – 0.020
2.00	4	1.92	12	3.0	50	2	293022012A	0.010 – 0.020
2.00	4	1.92	16	3.0	55	2	293022016A	0.010 – 0.020
2.00	4	1.92	20	3.0	60	2	293022020A	0.010 – 0.020
2.50	4	2.40	14	3.7	55	2	293022514A	0.012 – 0.025
3.00	6	2.88	12	4.5	55	2	293023012A	0.018 – 0.030
3.00	6	2.88	20	4.5	60	2	293023020A	0.018 – 0.030



Peripheral milling
$a_e = 0.02xD$
$a_p = 0.05xD$



Full slot milling
$a_p = 0.2xD$

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Non-alloy case-hardened steels	Tool steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)	Aluminium
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 1400 N/mm²	< 850 N/mm²	< 180 HB – > 180 HB	> 260 HB	> 600 N/mm²
V_c (m/min) Finishing	85	70	70	100	70	45	110	90	200

Product family 160

25021

Uncoated | Alcrona Pro | Z 2 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	3	3	38	2	25021010	25021010A	0.004 – 0.009	0.002 – 0.004
1.5	3	5	38	2	25021015	25021015A	0.004 – 0.009	0.002 – 0.004
2.0	3	7	38	2	25021020	25021020A	0.004 – 0.010	0.002 – 0.005
2.5	3	7	38	2	25021025	25021025A	0.004 – 0.010	0.002 – 0.005
3.0	3	9	38	2	25021030	25021030A	0.005 – 0.015	0.003 – 0.010
3.5	4	11	50	2	25021035	25021035A	0.005 – 0.015	0.003 – 0.010
4.0	4	11	50	2	25021040	25021040A	0.009 – 0.023	0.007 – 0.018
4.5	5	11	50	2	25021045	25021045A	0.009 – 0.023	0.007 – 0.018
5.0	5	10	50	2	25021050	25021050A	0.011 – 0.025	0.009 – 0.020
5.5	6	10	57	2	25021055	25021055A	0.011 – 0.025	0.009 – 0.020
6.0	6	10	57	2	25021060	25021060A	0.013 – 0.029	0.011 – 0.024
6.75	8	13	63	2	250210675	250210675A	0.013 – 0.029	0.011 – 0.024
7.0	8	13	63	2	25021070	25021070A	0.016 – 0.034	0.014 – 0.029
7.75	8	16	63	2	250210775	250210775A	0.016 – 0.034	0.014 – 0.029
8.0	8	16	63	2	25021080	25021080A	0.018 – 0.037	0.016 – 0.032
8.7	10	19	72	2	25021087	25021087A	0.018 – 0.037	0.016 – 0.032
9.0	10	16	72	2	25021090	25021090A	0.021 – 0.041	0.019 – 0.036
9.7	10	19	72	2	25021097	25021097A	0.021 – 0.041	0.019 – 0.036
10.0	10	19	72	2	25021100	25021100A	0.023 – 0.043	0.021 – 0.038
11.0	12	22	72	2	25021110	25021110A	0.026 – 0.047	0.024 – 0.043
11.7	12	22	83	2	25021117	25021117A	0.026 – 0.047	0.024 – 0.043
12.0	12	22	83	2	25021120	25021120A	0.028 – 0.051	0.026 – 0.046
13.7	14	22	83	2	25021137	25021137A	0.032 – 0.055	0.030 – 0.050
14.0	14	22	83	2	25021140	25021140A	0.032 – 0.055	0.030 – 0.050
15.7	16	26	92	2	25021157	25021157A	0.034 – 0.058	0.032 – 0.054
16.0	16	26	92	2	25021160	25021160A	0.034 – 0.058	0.032 – 0.054
17.7	18	26	92	2	25021177	25021177A	0.036 – 0.067	0.034 – 0.062
18.0	18	26	92	2	25021180	25021180A	0.038 – 0.069	0.036 – 0.064
19.7	20	32	104	2	25021197	25021197A	0.038 – 0.069	0.036 – 0.064
20.0	20	32	104	2	25021200	25021200A	0.040 – 0.071	0.038 – 0.066
22.0	22	32	104	2	25021220	25021220A	0.043 – 0.074	0.041 – 0.069
25.0	25	32	104	2	25021250	25021250A	0.064 – 0.089	0.062 – 0.084
32.0	32	32	104	2	25021320	25021320A	0.097 – 0.115	0.095 – 0.110

Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

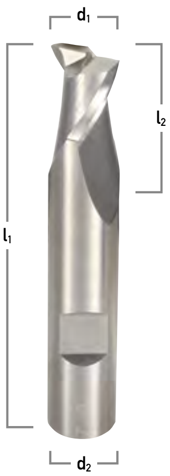
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Non-alloy case-hardened steels	Tool steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)	Aluminium
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 1400 N/mm²	< 850 N/mm²	< 180 HB – > 180 HB	> 260 HB	> 600 N/mm²
V_c (m/min) Finishing	90	70	70	100	95	45	110	90	200
V_c (m/min) Roughing	75	55	55	85	80	30	95	75	180

Product family 160

26001

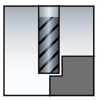
Uncoated | Alcrona Pro | Z 2 | HB | 30° | VHM | Type N | Manu-facturer standard

VHM-Shankfräser

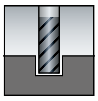


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	3	50	2	26001020	26001020A	0.004 – 0.010	0.002 – 0.005
2.5	6	3	50	2	26001025	26001025A	0.004 – 0.010	0.002 – 0.005
3.0	6	4	50	2	26001030	26001030A	0.006 – 0.015	0.004 – 0.010
3.5	6	4	50	2	26001035	26001035A	0.006 – 0.015	0.004 – 0.010
4.0	6	5	54	2	26001040	26001040A	0.009 – 0.023	0.007 – 0.018
5.0	6	6	54	2	26001050	26001050A	0.011 – 0.025	0.009 – 0.020
6.0	6	7	54	2	26001060	26001060A	0.013 – 0.029	0.011 – 0.025
7.0	8	8	58	2	26001070	26001070A	0.016 – 0.035	0.014 – 0.030
8.0	8	9	58	2	26001080	26001080A	0.016 – 0.037	0.016 – 0.032
9.0	10	10	66	2	26001090	26001090A	0.021 – 0.039	0.019 – 0.034
10.0	10	11	66	2	26001100	26001100A	0.023 – 0.043	0.021 – 0.038
12.0	12	12	73	2	26001120	26001120A	0.028 – 0.051	0.026 – 0.046
14.0	14	14	75	2	26001140	26001140A	0.031 – 0.049	0.029 – 0.044
16.0	16	16	82	2	26001160	26001160A	0.034 – 0.059	0.032 – 0.054
18.0	18	18	84	2	26001180	26001180A	0.037 – 0.063	0.035 – 0.058
20.0	20	20	92	2	26001200	26001200A	0.040 – 0.071	0.038 – 0.066



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD



Full slot milling
a_p = 1.0xD

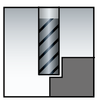
26021

Uncoated | Alcrona Pro | Z 2 | HB | 30° | VHM | Typ N | Manu-facturer standard

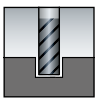
Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	5	50	2	26021010	26021010A	0.004 – 0.009	0.002 – 0.004
1.5	6	5	50	2	26021015	26021015A	0.004 – 0.009	0.002 – 0.004
2.0	6	5	50	2	26021020	26021020A	0.004 – 0.010	0.002 – 0.005
2.5	6	5	50	2	26021025	26021025A	0.004 – 0.010	0.002 – 0.005
3.0	6	7	57	2	26021030	26021030A	0.005 – 0.015	0.003 – 0.010
3.5	6	7	57	2	26021035	26021035A	0.005 – 0.015	0.003 – 0.010
4.0	6	8	57	2	26021040	26021040A	0.009 – 0.023	0.007 – 0.018
4.5	6	8	57	2	26021045	26021045A	0.009 – 0.023	0.007 – 0.018
5.0	6	10	57	2	26021050	26021050A	0.011 – 0.025	0.009 – 0.020
5.5	6	10	57	2	26021055	26021055A	0.011 – 0.025	0.009 – 0.020
6.0	6	10	57	2	26021060	26021060A	0.013 – 0.029	0.011 – 0.024
7.0	8	13	63	2	26021070	26021070A	0.015 – 0.034	0.013 – 0.029
8.0	8	16	63	2	26021080	26021080A	0.018 – 0.037	0.016 – 0.032
9.0	10	16	72	2	26021090	26021090A	0.021 – 0.040	0.019 – 0.035
10.0	10	19	72	2	26021100	26021100A	0.023 – 0.043	0.021 – 0.038
12.0	12	22	83	2	26021120	26021120A	0.028 – 0.051	0.026 – 0.046
14.0	14	22	83	2	26021140	26021140A	0.031 – 0.055	0.029 – 0.050
16.0	16	26	92	2	26021160	26021160A	0.034 – 0.059	0.032 – 0.054
18.0	18	26	92	2	26021180	26021180A	0.037 – 0.063	0.035 – 0.058
20.0	20	32	104	2	26021200	26021200A	0.043 – 0.071	0.038 – 0.066



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD



Full slot milling
a_p = 1.0xD

Material	General structural steels	Free machining steels	Alloy Q & T steels	Non-alloy case-hardened steels	Tool steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)	Aluminium
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 1400 N/mm²	< 850 N/mm²	< 180 HB – > 180 HB	> 260 HB	> 600 N/mm²
V_c (m/min) Finishing	90	70	70	100	95	45	110	90	200
V_c (m/min) Roughing	75	55	55	85	80	30	95	75	185

Product family 160

ToolFactory Cutting Tool Solutions

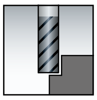
10209

TiAlN | Z 2 | HB | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	5	50	2	10209010	0.004 – 0.009	0.002 – 0.004
2.0	6	6	50	2	10209020	0.004 – 0.010	0.002 – 0.005
3.0	6	6	50	2	10209030	0.005 – 0.015	0.003 – 0.010
4.0	6	8	50	2	10209040	0.009 – 0.023	0.007 – 0.018
5.0	6	8	50	2	10209050	0.011 – 0.025	0.009 – 0.020
6.0	6	16	50	2	10209060	0.013 – 0.029	0.011 – 0.024
8.0	8	20	60	2	10209080	0.018 – 0.037	0.016 – 0.032
10.0	10	22	70	2	10209100	0.023 – 0.043	0.021 – 0.038
12.0	12	22	70	2	10209120	0.028 – 0.051	0.026 – 0.046
16.0	16	25	75	2	10209160	0.034 – 0.059	0.032 – 0.054
20.0	20	32	100	2	10209200	0.043 – 0.071	0.038 – 0.066



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD

Full slot milling
a_p = 1.0xD

- For universal applications
- Centre-cut

Material	General structural steels	Free machining steels	Alloy Q & T steels	Non-alloy case-hardened steels	Tool steels	Stainless steels	Cast iron	Cast iron (gray, ductile, malleable)	Aluminium
Tensile strength/Hardness	< 850 N/mm²	< 1000 N/mm²	< 1200 N/mm²	< 750 N/mm²	< 1400 N/mm²	< 850 N/mm²	< 180 HB – > 180 HB	> 260 HB	> 600 N/mm²
V_c (m/min) Finishing	90	70	70	100	40	45	115	90	200
V_c (m/min) Roughing	75	55	55	85	25	30	100	75	180

Product family 163

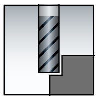
25321

Uncoated | Alcrona Pro | Z 2 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	19	57	2	25321030	25321030A	0.005 – 0.012	0.003 – 0.010
4.0	4	19	57	2	25321040	25321040A	0.009 – 0.020	0.007 – 0.018
4.5	5	25	75	2	25321045	25321045A	0.009 – 0.020	0.007 – 0.018
5.0	5	25	75	2	25321050	25321050A	0.011 – 0.022	0.009 – 0.020
5.5	6	30	75	2	25321055	25321055A	0.011 – 0.022	0.009 – 0.020
6.0	6	30	75	2	25321060	25321060A	0.013 – 0.026	0.011 – 0.024
8.0	8	30	75	2	25321080	25321080A	0.018 – 0.034	0.016 – 0.032
10.0	10	32	75	2	25321100	25321100A	0.023 – 0.040	0.021 – 0.038
12.0	12	45	100	2	25321120	25321120A	0.028 – 0.046	0.026 – 0.046
14.0	14	45	100	2	25321140	25321140A	0.028 – 0.046	0.026 – 0.046
16.0	16	45	100	2	25321160	25321160A	0.034 – 0.056	0.032 – 0.054
18.0	18	45	100	2	25321180	25321180A	0.034 – 0.056	0.032 – 0.054
20.0	20	45	100	2	25321200	25321200A	0.040 – 0.068	0.038 – 0.066
25.0	25	45	100	2	25321250	25321250A	0.040 – 0.068	0.038 – 0.066



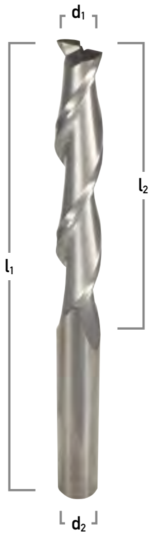
Peripheral milling
a_e = 0.5xD
a_p = 1.0xD

Full slot milling
a_p = 1.0xD

28002

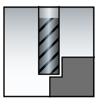
Uncoated | Alcrona Pro | Z 2 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

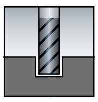


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	20	60	2	28002030	28002030A	0.005 – 0.012	0.003 – 0.010
4.0	4	25	60	2	28002040	28002040A	0.009 – 0.020	0.007 – 0.018
5.0	5	32	100	2	28002050	28002050A	0.011 – 0.022	0.009 – 0.020
6.0	6	38	100	2	28002060	28002060A	0.013 – 0.026	0.011 – 0.024
8.0	8	45	100	2	28002080	28002080A	0.018 – 0.034	0.016 – 0.032
10.0	10	45	100	2	28002100	28002100A	0.023 – 0.040	0.021 – 0.038
12.0	12	75	150	2	28002120	28002120A	0.028 – 0.046	0.026 – 0.046
14.0	14	75	150	2	28002140	28002140A	0.028 – 0.046	0.026 – 0.046
16.0	16	75	150	2	28002160	28002160A	0.034 – 0.056	0.032 – 0.054
18.0	18	75	150	2	28002180	28002180A	0.034 – 0.056	0.032 – 0.054
20.0	20	75	150	2	28002200	28002200A	0.040 – 0.068	0.038 – 0.066
25.0	25	75	150	2	28002250	28002250A	0.040 – 0.068	0.038 – 0.066



Peripheral milling
a_e = 0.5xD
a_p = 1.0xD



Full slot milling
a_p = 1.0xD

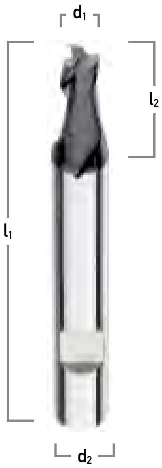
Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	105	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 160

23001

Alcrona Pro | Z 3 | HB | 30° | VHM | Typ N | Manu-facturer standard

Solid Carbide End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	2	50	3	23001010A	0.004 – 0.009	0.002 – 0.004
1.8	6	2	50	3	23001018A	0.004 – 0.010	0.002 – 0.005
2.0	6	4	50	3	23001020A	0.004 – 0.010	0.002 – 0.005
2.8	6	4	50	3	23001028A	0.005 – 0.015	0.003 – 0.010
3.0	6	5	50	3	23001030A	0.005 – 0.015	0.003 – 0.010
3.8	6	5	50	3	23001038A	0.009 – 0.023	0.007 – 0.018
4.0	6	7	50	3	23001040A	0.009 – 0.023	0.007 – 0.018
4.8	6	7	50	3	23001048A	0.011 – 0.025	0.009 – 0.020
5.0	6	8	50	3	23001050A	0.011 – 0.025	0.009 – 0.020
5.8	6	8	50	3	23001058A	0.015 – 0.028	0.012 – 0.025

Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 66

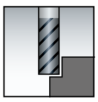
25031

Uncoated | Alcrona Pro | Z 3 | HA | 30° | VHM | Type N | Manu-facturer standard

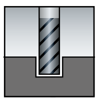
Solid Carbide End Mill

d_1	d_2
h10	h6

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z			mm/Z		
1.0	3	3	38	3	25031010	25031010A	0.004	–	0.009	0.002	–	0.004
1.5	3	5	38	3	25031015	25031015A	0.004	–	0.009	0.002	–	0.004
2.0	3	7	38	3	25031020	25031020A	0.004	–	0.010	0.002	–	0.005
2.5	3	7	38	3	25031025	25031025A	0.004	–	0.010	0.002	–	0.005
3.0	3	9	38	3	25031030	25031030A	0.005	–	0.015	0.003	–	0.010
3.5	4	11	50	3	25031035	25031035A	0.005	–	0.015	0.003	–	0.010
4.0	4	11	50	3	25031040	25031040A	0.009	–	0.023	0.007	–	0.018
4.5	5	11	50	3	25031045	25031045A	0.009	–	0.023	0.007	–	0.018
5.0	5	10	50	3	25031050	25031050A	0.011	–	0.025	0.009	–	0.020
5.5	6	10	57	3	25031055	25031055A	0.011	–	0.025	0.009	–	0.020
6.0	6	10	57	3	25031060	25031060A	0.013	–	0.029	0.011	–	0.024
6.75	8	13	63	3	250310675	250310675A	0.013	–	0.029	0.011	–	0.024
7.0	8	13	63	3	25031070	25031070A	0.016	–	0.034	0.014	–	0.029
7.75	8	16	63	3	250310775	250310775A	0.016	–	0.034	0.014	–	0.029
8.0	8	16	63	3	25031080	25031080A	0.018	–	0.037	0.016	–	0.032
8.7	10	19	72	3	25031087	25031087A	0.018	–	0.037	0.016	–	0.032
9.0	10	16	72	3	25031090	25031090A	0.021	–	0.041	0.019	–	0.036
9.7	10	19	72	3	25031097	25031097A	0.021	–	0.041	0.019	–	0.036
10.0	10	19	72	3	25031100	25031100A	0.023	–	0.043	0.021	–	0.038
11.0	12	22	72	3	25031110	25031110A	0.026	–	0.048	0.024	–	0.043
11.7	12	22	83	3	25031117	25031117A	0.026	–	0.048	0.024	–	0.043
12.0	12	22	83	3	25031120	25031120A	0.028	–	0.051	0.026	–	0.046
13.7	14	22	83	3	25031137	25031137A	0.032	–	0.055	0.030	–	0.050
14.0	14	22	83	3	25031140	25031140A	0.032	–	0.055	0.030	–	0.050
15.7	16	26	92	3	25031157	25031157A	0.034	–	0.059	0.032	–	0.054
16.0	16	26	92	3	25031160	25031160A	0.034	–	0.059	0.032	–	0.054
17.7	18	26	92	3	25031177	25031177A	0.036	–	0.067	0.034	–	0.062
18.0	18	26	92	3	25031180	25031180A	0.038	–	0.069	0.036	–	0.064
19.7	20	32	104	3	25031197	25031197A	0.038	–	0.069	0.036	–	0.064
20.0	20	32	104	3	25031200	25031200A	0.040	–	0.071	0.038	–	0.066
22.0	22	32	104	3	25031220	25031220A	0.043	–	0.074	0.041	–	0.069
25.0	25	32	104	3	25031250	25031250A	0.064	–	0.089	0.062	–	0.084
32.0	32	32	104	3	25031320	25031320A	0.097	–	0.115	0.095	–	0.110



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 1.0xD$

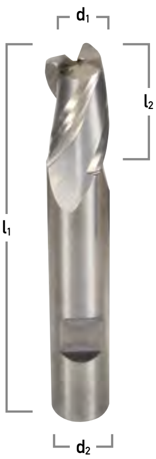
Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 160

26031

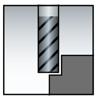
Uncoated | Alcrona Pro | Z 3 | HB | 30° | VHM | Type N | DIN 6527

VHM-Shankfräser



d_1	d_2
h10	h6

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z			mm/Z		
1.0	6	5	50	3	26031010	26031010A	0.012	–	0.042	0.010	–	0.040
1.5	6	5	50	3	26031015	26031015A	0.012	–	0.042	0.010	–	0.040
2.0	6	5	50	3	26031020	26031020A	0.012	–	0.042	0.010	–	0.040
2.5	6	5	50	3	26031025	26031025A	0.012	–	0.042	0.010	–	0.040
3.0	6	7	57	3	26031030	26031030A	0.012	–	0.042	0.010	–	0.040
3.5	6	7	57	3	26031035	26031035A	0.012	–	0.042	0.010	–	0.040
4.0	6	8	57	3	26031040	26031040A	0.022	–	0.062	0.020	–	0.060
4.5	6	8	57	3	26031045	26031045A	0.022	–	0.062	0.020	–	0.060
5.0	6	10	57	3	26031050	26031050A	0.022	–	0.062	0.020	–	0.060
5.5	6	10	57	3	26031055	26031055A	0.022	–	0.062	0.020	–	0.060
6.0	6	10	57	3	26031060	26031060A	0.052	–	0.082	0.050	–	0.080
7.0	8	13	63	3	26031070	26031070A	0.052	–	0.082	0.050	–	0.080
8.0	8	16	63	3	26031080	26031080A	0.052	–	0.082	0.050	–	0.080
9.0	10	16	72	3	26031090	26031090A	0.052	–	0.082	0.050	–	0.080
10.0	10	19	72	3	26031100	26031100A	0.082	–	0.132	0.080	–	0.130
12.0	12	22	83	3	26031120	26031120A	0.082	–	0.132	0.080	–	0.130
14.0	14	22	83	3	26031140	26031140A	0.082	–	0.132	0.080	–	0.130
16.0	16	26	92	3	26031160	26031160A	0.142	–	0.212	0.140	–	0.210
18.0	18	26	92	3	26031180	26031180A	0.142	–	0.212	0.140	–	0.210
20.0	20	32	104	3	26031200	26031200A	0.142	–	0.212	0.140	–	0.210



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

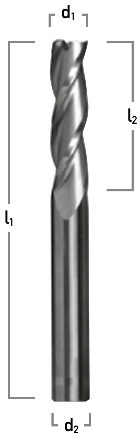
Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 160

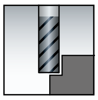
25331

Uncoated | Alcrona Pro | Z 3 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill



d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z			mm/Z		
3.0	3	19	57	3	25331030	25331030A	0.009	–	0.030	0.007	–	0.028
4.0	4	19	57	3	25331040	25331040A	0.012	–	0.037	0.010	–	0.035
4.5	5	25	75	3	25331045	25331045A	0.012	–	0.037	0.010	–	0.035
5.0	5	25	75	3	25331050	25331050A	0.017	–	0.037	0.015	–	0.035
5.5	6	30	75	3	25331055	25331055A	0.017	–	0.037	0.015	–	0.035
6.0	6	30	75	3	25331060	25331060A	0.027	–	0.042	0.025	–	0.040
8.0	8	30	75	3	25331080	25331080A	0.032	–	0.052	0.030	–	0.050
10.0	10	32	75	3	25331100	25331100A	0042	–	0.072	0.040	–	0.070
12.0	12	45	100	3	25331120	25331120A	0.062	–	0.092	0.060	–	0.090
14.0	14	45	100	3	25331140	25331140A	0.072	–	0.112	0.070	–	0.110
16.0	16	45	100	3	25331160	25331160A	0.092	–	0.132	0.090	–	0.130
18.0	18	45	100	3	25331180	25331180A	0.112	–	0.152	0.110	–	0.150
20.0	20	45	100	3	25331200	25331200A	0.132	–	0.172	0.130	–	0.170
25.0	25	45	100	3	25331250	25331250A	0.152	–	0.192	0.150	–	0.190



Peripheral milling
$a_e = 0.25xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 0.5xD$

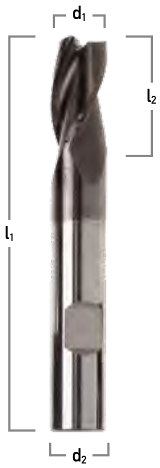
d_1	d_2
h10	h6

Product family 160

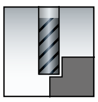
10309

TiAlN | Z 3 | HB | 30° | VHM | Type N | Manu-facturer standard

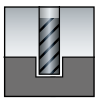
Solid Carbide End Mill



d_1	d_2	l_2	l_1		Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	Z	Part No.	mm/Z			mm/Z		
1.0	6	5	50	3	10309010	0.008	–	0.017	0.006	–	0.015
2.0	6	6	50	3	10309020	0.008	–	0.017	0.006	–	0.015
3.0	6	6	50	3	10309030	0.009	–	0.030	0.007	–	0.028
4.0	6	8	50	3	10309040	0.012	–	0.037	0.010	–	0.035
5.0	6	8	50	3	10309050	0.017	–	0.037	0.015	–	0.035
6.0	6	16	50	3	10309060	0.027	–	0.042	0.025	–	0.040
8.0	8	20	60	3	10309080	0.032	–	0.052	0.030	–	0.050
10.0	10	22	70	3	10309100	0.042	–	0.072	0.040	–	0.070
12.0	12	22	70	3	10309120	0.062	–	0.092	0.060	–	0.090
16.0	16	25	75	3	10309160	0.092	–	0.132	0.090	–	0.130
20.0	20	32	100	3	10309200	0.132	–	0.172	0.130	–	0.170



Peripheral milling
$a_e = 0.25xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 0.5xD$

d_1	d_2
h10	h6

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 163

46031

Uncoated | Alcrona Pro | Z 3 | HB | *HA | 45° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d1	d2
h10	h6

d1 mm	d2 mm	l2 mm	l1 mm	Z	Uncoated Part No.	Coated Part No.
1.0	3*	2	38	3	46031010	46031010A
1.5	3*	3	38	3	46031015	46031015A
2.0	6	6	57	3	46031020	46031020A
2.5	6	7	57	3	46031025	46031025A
3.0	6	7	57	3	46031030	46031030A
3.5	6	8	57	3	46031035	46031035A
4.0	6	8	57	3	46031040	46031040A
4.5	6	10	57	3	46031045	46031045A
5.0	6	10	57	3	46031050	46031050A
5.5	6	10	57	3	46031055	46031055A
6.0	6	10	57	3	46031060	46031060A
6.5	8	16	63	3	46031065	46031065A
7.0	8	16	63	3	46031070	46031070A
7.5	8	19	63	3	46031075	46031075A
8.0	8	19	63	3	46031080	46031080A
9.0	10	19	72	3	46031090	46031090A
10.0	10	22	72	3	46031100	46031100A
12.0	12	22	83	3	46031120	46031120A
14.0	14	22	83	3	46031140	46031140A
16.0	16	26	92	3	46031160	46031160A
18.0	18	26	92	3	46031180	46031180A
20.0	20	32	104	3	46031200	46031200A

f_z Roughing mm/Z	f_z Finishing mm/Z
0.004 – 0.010	0.002 – 0.006
0.004 – 0.010	0.002 – 0.006
0.005 – 0.010	0.003 – 0.008
0.005 – 0.010	0.003 – 0.008
0.006 – 0.015	0.004 – 0.010
0.009 – 0.030	0.007 – 0.028
0.012 – 0.037	0.010 – 0.035
0.012 – 0.037	0.010 – 0.035
0.017 – 0.037	0.015 – 0.035
0.017 – 0.037	0.015 – 0.035
0.027 – 0.042	0.025 – 0.040
0.015 – 0.030	0.013 – 0.025
0.018 – 0.034	0.016 – 0.029
0.018 – 0.034	0.016 – 0.029
0.032 – 0.052	0.030 – 0.050
0.024 – 0.041	0.022 – 0.036
0.042 – 0.072	0.040 – 0.070
0.062 – 0.092	0.060 – 0.090
0.072 – 0.112	0.070 – 0.110
0.092 – 0.132	0.090 – 0.130
0.112 – 0.152	0.110 – 0.150
0.132 – 0.172	0.130 – 0.170

Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.0xD

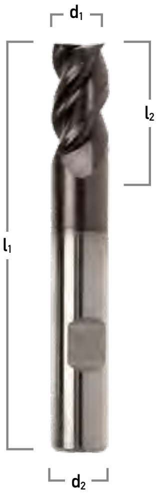
Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 160

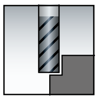
10319

TiAlN | Z 3 | HB | 45° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill



d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	5	57	3	10319010	0.004 – 0.010	0.002 – 0.006
2.0	6	6	57	3	10319020	0.005 – 0.010	0.003 – 0.008
3.0	6	7	57	3	10319030	0.009 – 0.030	0.007 – 0.028
4.0	6	8	57	3	10319040	0.012 – 0.037	0.010 – 0.035
5.0	6	10	57	3	10319050	0.017 – 0.037	0.015 – 0.035
6.0	6	10	57	3	10319060	0.027 – 0.042	0.025 – 0.040
8.0	8	16	63	3	10319080	0.032 – 0.052	0.030 – 0.050
10.0	10	19	72	3	10319100	0.042 – 0.072	0.040 – 0.070
12.0	12	22	83	3	10319120	0.062 – 0.092	0.060 – 0.090
16.0	16	26	92	3	10319160	0.092 – 0.132	0.090 – 0.130
20.0	20	32	104	3	10319200	0.132 – 0.172	0.130 – 0.170



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.0xD

d_1	d_2
h10	h6

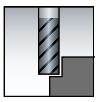
Product family 163

28003

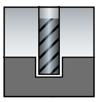
Uncoated | Alcrona Pro | Z 3 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	20	60	3	28003030	28003030A	0.009 – 0.030	0.007 – 0.028
4.0	4	25	60	3	28003040	28003040A	0.012 – 0.037	0.010 – 0.035
5.0	5	32	100	3	28003050	28003050A	0.017 – 0.037	0.015 – 0.035
6.0	6	38	100	3	28003060	28003060A	0.027 – 0.042	0.025 – 0.040
8.0	8	45	100	3	28003080	28003080A	0.032 – 0.052	0.030 – 0.050
10.0	10	45	100	3	28003100	28003100A	0.042 – 0.072	0.040 – 0.070
12.0	12	75	150	3	28003120	28003120A	0.062 – 0.092	0.060 – 0.090
14.0	14	75	150	3	28003140	28003140A	0.072 – 0.112	0.070 – 0.110
16.0	16	75	150	3	28003160	28003160A	0.092 – 0.132	0.090 – 0.130
18.0	18	75	150	3	28003180	28003180A	0.112 – 0.152	0.110 – 0.150
20.0	20	75	150	3	28003200	28003200A	0.132 – 0.172	0.130 – 0.170
25.0	25	75	150	3	28003250	28003250A	0.152 – 0.192	0.150 – 0.190



Peripheral milling
a_e = 0.2xD
a_p = 3.0xD



Full slot milling
a_p = 0.25xD

d_1	d_2
h10	h6

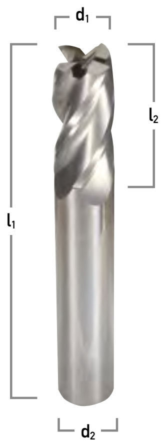
Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 160

25041

Uncoated | Alcrona Pro | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	3	3	38	4	25041010	25041010A	0.003 – 0.010	0.002 – 0.005
1.5	3	5	38	4	25041015	25041015A	0.003 – 0.010	0.002 – 0.005
2.0	3	7	38	4	25041020	25041020A	0.004 – 0.014	0.003 – 0.010
2.5	3	7	38	4	25041025	25041025A	0.004 – 0.014	0.003 – 0.010
3.0	3	9	38	4	25041030	25041030A	0.007 – 0.019	0.004 – 0.015
3.5	4	11	50	4	25041035	25041035A	0.007 – 0.019	0.004 – 0.015
4.0	4	11	50	4	25041040	25041040A	0.012 – 0.026	0.005 – 0.020
4.5	5	11	50	4	25041045	25041045A	0.012 – 0.026	0.005 – 0.020
5.0	5	13	50	4	25041050	25041050A	0.014 – 0.028	0.010 – 0.015
5.5	6	13	57	4	25041055	25041055A	0.014 – 0.028	0.010 – 0.015
6.0	6	13	57	4	25041060	25041060A	0.017 – 0.039	0.015 – 0.020
7.0	8	16	63	4	25041070	25041070A	0.024 – 0.053	0.020 – 0.025
8.0	8	16	63	4	25041080	25041080A	0.028 – 0.060	0.025 – 0.045
9.0	10	19	72	4	25041090	25041090A	0.028 – 0.060	0.025 – 0.045
10.0	10	22	72	4	25041100	25041100A	0.035 – 0.065	0.030 – 0.050
11.0	12	22	72	4	25041110	25041110A	0.040 – 0.072	0.035 – 0.060
12.0	12	26	83	4	25041120	25041120A	0.060 – 0.083	0.055 – 0.070
14.0	14	26	83	4	25041140	25041140A	0.070 – 0.090	0.065 – 0.085
16.0	16	32	92	4	25041160	25041160A	0.080 – 0.110	0.075 – 0.105
18.0	18	32	92	4	25041180	25041180A	0.095 – 0.120	0.085 – 0.115
20.0	20	38	104	4	25041200	25041200A	0.110 – 0.130	0.095 – 0.125
22.0	22	38	104	4	25041220	25041220A	0.130 – 0.155	0.120 – 0.150
25.0	25	38	104	4	25041250	25041250A	0.140 – 0.175	0.135 – 0.165
32.0	32	38	104	4	25041320	25041320A	0.180 – 0.200	0.160 – 0.190

Peripheral milling
$a_e = 0.3xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 0.75xD$

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

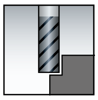
26041

Uncoated | Alcrona Pro | Z 4 | HB | 30° | VHM | Type N | DIN 6527

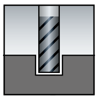
Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	5	50	4	26041010	26041010A	0.003 – 0.010	0.002 – 0.005
1.5	6	5	50	4	26041015	26041015A	0.003 – 0.010	0.002 – 0.005
2.0	6	5	50	4	26041020	26041020A	0.004 – 0.014	0.003 – 0.010
2.5	6	8	50	4	26041025	26041025A	0.004 – 0.014	0.003 – 0.010
3.0	6	8	57	4	26041030	26041030A	0.007 – 0.019	0.005 – 0.012
3.5	6	10	57	4	26041035	26041035A	0.007 – 0.019	0.005 – 0.012
4.0	6	11	57	4	26041040	26041040A	0.012 – 0.026	0.010 – 0.017
4.5	6	11	57	4	26041045	26041045A	0.012 – 0.026	0.010 – 0.017
5.0	6	13	57	4	26041050	26041050A	0.014 – 0.028	0.012 – 0.022
5.5	6	13	57	4	26041055	26041055A	0.014 – 0.028	0.012 – 0.022
6.0	6	13	57	4	26041060	26041060A	0.017 – 0.039	0.015 – 0.025
7.0	8	16	63	4	26041070	26041070A	0.020 – 0.045	0.018 – 0.035
8.0	8	19	63	4	26041080	26041080A	0.024 – 0.053	0.021 – 0.045
9.0	10	19	72	4	26041090	26041090A	0.028 – 0.060	0.024 – 0.045
10.0	10	22	72	4	26041100	26041100A	0.030 – 0.065	0.026 – 0.050
12.0	12	26	83	4	26041120	26041120A	0.036 – 0.079	0.029 – 0.060
14.0	14	26	83	4	26041140	26041140A	0.040 – 0.086	0.035 – 0.070
16.0	16	32	92	4	26041160	26041160A	0.045 – 0.095	0.040 – 0.080
18.0	18	32	92	4	26041180	26041180A	0.050 – 0.105	0.045 – 0.090
20.0	20	38	104	4	26041200	26041200A	0.057 – 0.110	0.050 – 0.100



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 0.75xD$

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

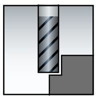
Product family 160

25341

Uncoated | Alcrona Pro | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z	mm/Z
3.0	3	19	57	4	25341030	25341030A	0.003 – 0.010	0.002 – 0.005
4.0	4	19	57	4	25341040	25341040A	0.005 – 0.019	0.003 – 0.010
5.0	5	25	75	4	25341050	25341050A	0.006 – 0.020	0.005 – 0.015
6.0	6	30	75	4	25341060	25341060A	0.008 – 0.025	0.006 – 0.020
8.0	8	30	75	4	25341080	25341080A	0.012 – 0.032	0.010 – 0.025
10.0	10	32	75	4	25341100	25341100A	0.015 – 0.039	0.013 – 0.030
12.0	12	45	100	4	25341120	25341120A	0.018 – 0.048	0.015 – 0.040
14.0	14	45	100	4	25341140	25341140A	0.021 – 0.053	0.018 – 0.045
16.0	16	45	100	4	25341160	25341160A	0.023 – 0.058	0.021 – 0.050
18.0	18	45	100	4	25341180	25341180A	0.025 – 0.066	0.023 – 0.055
20.0	20	45	100	4	25341200	25341200A	0.028 – 0.073	0.025 – 0.060



Peripheral milling
a_e = 0.3xD
a_p = 1.0xD

Full slot milling
a_p = 0.35xD

Product family 160

10409

TiAlN | Z 4 | HB | 30° | VHM | Type N | Manu-facturer standard

VHM-Shankfräser

d_1	d_2	l_2	l_1		Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	Z	Part No.	mm/Z	mm/Z
1.0	6	5	50	4	10409010	0.003 – 0.010	0.002 – 0.005
2.0	6	7	50	4	10409020	0.003 – 0.010	0.002 – 0.005
3.0	6	8	50	4	10409030	0.004 – 0.014	0.003 – 0.010
4.0	6	11	50	4	10409040	0.005 – 0.019	0.003 – 0.010
5.0	6	13	50	4	10409050	0.006 – 0.020	0.005 – 0.015
6.0	6	16	50	4	10409060	0.008 – 0.025	0.006 – 0.020
8.0	8	20	60	4	10409080	0.012 – 0.032	0.010 – 0.025
10.0	10	22	70	4	10409100	0.015 – 0.039	0.013 – 0.030
12.0	12	22	70	4	10409120	0.018 – 0.048	0.015 – 0.040
16.0	16	25	75	4	10409160	0.023 – 0.058	0.021 – 0.050
20.0	20	32	100	4	10409200	0.028 – 0.073	0.025 – 0.060

d_1	d_2
h10	h6

Peripheral milling
a_e = 0.25xD
a_p = 2.0xD

Full slot milling
a_p = 1.0xD

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 163

10419

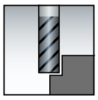
TiAlN | Z 4 | HB | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.
1.0	6	3	50	4	10419010
2.0	6	4	50	4	10419020
3.0	6	6	50	4	10419030
4.0	6	8	50	4	10419040
5.0	6	8	50	4	10419050
6.0	6	13	57	4	10419060
8.0	8	19	63	4	10419080
10.0	10	22	72	4	10419100
12.0	12	26	83	4	10419120
16.0	16	32	92	4	10419160
20.0	20	38	104	4	10419200

f_z Roughing mm/Z	f_z Finishing mm/Z
0.003 – 0.010	0.002 – 0.005
0.003 – 0.010	0.002 – 0.005
0.004 – 0.014	0.003 – 0.010
0.005 – 0.019	0.003 – 0.010
0.006 – 0.020	0.005 – 0.015
0.008 – 0.025	0.006 – 0.020
0.012 – 0.032	0.010 – 0.025
0.015 – 0.039	0.013 – 0.030
0.018 – 0.048	0.015 – 0.040
0.023 – 0.058	0.021 – 0.050
0.028 – 0.073	0.025 – 0.060



Peripheral milling
$a_e = 0.25xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.0xD$

10429

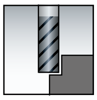
TiAlN | Z 4 | HB | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

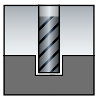
d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.
3.0	6	12	50	4	10429030
4.0	6	15	50	4	10429040
5.0	6	20	60	4	10429050
6.0	6	20	60	4	10429060
8.0	8	25	70	4	10429080
10.0	10	30	90	4	10429100
12.0	12	30	90	4	10429120
16.0	16	50	110	4	10429160
20.0	20	55	110	4	10429200

f_z Roughing mm/Z	f_z Finishing mm/Z
0.009 – 0.030	0.007 – 0.028
0.012 – 0.037	0.010 – 0.035
0.017 – 0.037	0.015 – 0.035
0.027 – 0.042	0.025 – 0.040
0.032 – 0.052	0.030 – 0.050
0.042 – 0.072	0.040 – 0.070
0.062 – 0.092	0.060 – 0.090
0.092 – 0.132	0.090 – 0.130
0.132 – 0.172	0.130 – 0.170



Peripheral milling
$a_e = 0.2xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 0.3xD$

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

Product family 163

28004

Uncoated | Alcrona Pro | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	20	60	4	28004030	28004030A	0.004 – 0.015	0.002 – 0.010
4.0	4	25	60	4	28004040	28004040A	0.007 – 0.024	0.005 – 0.019
5.0	5	32	100	4	28004050	28004050A	0.008 – 0.025	0.006 – 0.020
6.0	6	38	100	4	28004060	28004060A	0.010 – 0.035	0.008 – 0.025
8.0	8	45	100	4	28004080	28004080A	0.014 – 0.037	0.012 – 0.032
10.0	10	45	100	4	28004100	28004100A	0.017 – 0.044	0.015 – 0.039
12.0	12	75	150	4	28004120	28004120A	0.020 – 0.053	0.018 – 0.048
14.0	14	75	150	4	28004140	28004140A	0.023 – 0.059	0.021 – 0.054
16.0	16	75	150	4	28004160	28004160A	0.025 – 0.063	0.023 – 0.058
18.0	18	75	150	4	28004180	28004180A	0.027 – 0.069	0.025 – 0.064
20.0	20	75	150	4	28004200	28004200A	0.030 – 0.078	0.028 – 0.073
25.0	25	75	150	4	28004250	28004250A	0.038 – 0.103	0.035 – 0.098

Peripheral milling
$a_e = 0.2xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 0.3xD$

Material	Steel	Stainless	Cast	Alu	Titanium
Tensile strength/Hardness	< 1200 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²	<850 N/mm²
V_c (m/min) Finishing	100	65	125	220	70
V_c (m/min) Roughing	85	45	105	200	50

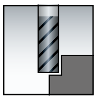
Product family 160

10609

TiAlN | Z 6–8 | HB | 45° | VHM | Type N | Manu-facturer standard

Solid Carbide Finishing End Mill

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z			f_z Finishing mm/Z		
6.0	6	13	57	6	10609060	0.030	–	0.040	0.025	–	0.040
8.0	8	19	63	6	10609080	0.040	–	0.050	0.030	–	0.045
10.0	10	22	72	6	10609100	0.050	–	0.065	0.040	–	0.065
12.0	12	26	83	6	10609120	0.060	–	0.080	0.050	–	0.080
16.0	16	32	92	6	10609160	0.070	–	0.095	0.060	–	0.095
20.0	20	38	104	8	10609200	0.090	–	0.120	0.075	–	0.115



Peripheral milling
$a_e = 0.3xD$
$a_p = 3.0xD$

Full slot milling
$a_p = 0.25xD$

d_1	d_2
h10	h6

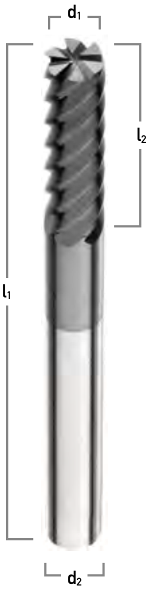
Material	Steel	Stainless	Cast
Tensile strength/Hardness	< 750N/mm²	< 900 N/mm²	< 800 N/mm²
V_c (m/min) Finishing	110	70	110
V_c (m/min) Roughing	90	50	90

Artikelgruppe 163

28550A

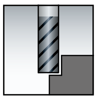
Alrcona Pro | Z 6–8 | HA | 50° | VHM | Type N | Manu-facturer standard

Solid Carbide Finishing End Mill

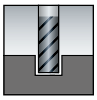


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Finishing mm/Z
3.0	6	13	57	6	28550030A	0.002 – 0.013
4.0	6	13	57	6	28550040A	0.006 – 0.024
5.0	6	13	57	6	28550050A	0.010 – 0.025
6.0	6	13	57	6	28550060A	0.013 – 0.033
7.0	8	16	63	6	28550070A	0.016 – 0.040
8.0	8	19	63	6	28550080A	0.019 – 0.047
9.0	10	19	72	6	28550090A	0.021 – 0.051
10.0	10	22	72	6	28550100A	0.025 – 0.060
12.0	12	26	83	6	28550120A	0.030 – 0.072
14.0	14	26	83	6	28550140A	0.035 – 0.080
16.0	16	32	92	8	28550160A	0.038 – 0.088
18.0	18	32	92	8	28550180A	0.042 – 0.095
20.0	20	38	104	8	28550200A	0.045 – 0.100



Peripheral milling
a_e = 0.3xD
a_p = 3.0xD



Full slot milling
a_p = 0.25xD

Material	Steel	Stainless	Cast
Tensile strength/Hardness	< 750N/mm²	< 900 N/mm²	< 800 N/mm²
V_c (m/min) Finishing	110	70	110

Product family 160

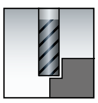
28620

AlTiN | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard | HPC

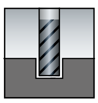
Solid Carbide Torus Cutter

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	CR mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	6	50	0.3	4	286203003	0.003 – 0.008	0.002 – 0.006
3.0	3	6	50	0.5	4	286203005	0.003 – 0.008	0.002 – 0.006
4.0	4	8	60	0.3	4	286204003	0.005 – 0.015	0.003 – 0.013
4.0	4	8	60	0.5	4	286204005	0.005 – 0.015	0.003 – 0.013
4.0	4	8	60	1.0	4	286204010	0.005 – 0.015	0.003 – 0.013
4.0	4	8	60	1.5	4	286204015	0.005 – 0.015	0.003 – 0.013
5.0	5	10	60	0.3	4	286205003	0.010 – 0.025	0.008 – 0.023
5.0	5	10	60	0.5	4	286205005	0.010 – 0.025	0.008 – 0.023
5.0	5	10	60	1.0	4	286205010	0.010 – 0.025	0.008 – 0.023
5.0	5	10	60	1.5	4	286205015	0.010 – 0.025	0.008 – 0.023
5.0	5	10	60	2.0	4	286205020	0.010 – 0.025	0.008 – 0.023
6.0	6	12	70	0.3	4	286206003	0.017 – 0.030	0.015 – 0.028
6.0	6	12	70	0.5	4	286206005	0.017 – 0.030	0.015 – 0.028
6.0	6	12	70	1.0	4	286206010	0.017 – 0.030	0.015 – 0.028
6.0	6	12	70	1.5	4	286206015	0.017 – 0.030	0.015 – 0.028
6.0	6	12	70	2.0	4	286206020	0.017 – 0.030	0.015 – 0.028
6.0	6	12	70	2.5	4	286206025	0.017 – 0.030	0.015 – 0.028
8.0	8	16	70	0.3	4	286208003	0.024 – 0.035	0.022 – 0.033
8.0	8	16	70	0.5	4	286208005	0.024 – 0.035	0.022 – 0.033
8.0	8	16	70	1.0	4	286208010	0.024 – 0.035	0.022 – 0.033
8.0	8	16	70	1.5	4	286208015	0.024 – 0.035	0.022 – 0.033
8.0	8	16	70	2.0	4	286208020	0.024 – 0.035	0.022 – 0.033
8.0	8	16	70	2.5	4	286208025	0.024 – 0.035	0.022 – 0.033
8.0	8	16	70	3.0	4	286208030	0.024 – 0.035	0.022 – 0.033
10.0	10	20	70	0.3	4	2862010003	0.030 – 0.065	0.028 – 0.063
10.0	10	20	70	0.5	4	2862010005	0.030 – 0.065	0.028 – 0.063
10.0	10	20	70	1.0	4	2862010010	0.030 – 0.065	0.028 – 0.063
10.0	10	20	70	1.5	4	2862010015	0.030 – 0.065	0.028 – 0.063
10.0	10	20	70	2.0	4	2862010020	0.030 – 0.065	0.028 – 0.063
10.0	10	20	70	2.5	4	2862010025	0.030 – 0.065	0.028 – 0.063
10.0	10	20	70	3.0	4	2862010030	0.030 – 0.065	0.028 – 0.063
12.0	12	24	80	0.3	4	2862012003	0.036 – 0.079	0.034 – 0.077
12.0	12	24	80	0.5	4	2862012005	0.036 – 0.079	0.034 – 0.077
12.0	12	24	80	1.0	4	2862012010	0.036 – 0.079	0.034 – 0.077
12.0	12	24	80	1.5	4	2862012015	0.036 – 0.079	0.034 – 0.077
12.0	12	24	80	2.0	4	2862012020	0.036 – 0.079	0.034 – 0.077
12.0	12	24	80	2.5	4	2862012025	0.036 – 0.079	0.034 – 0.077
12.0	12	24	80	3.0	4	2862012030	0.036 – 0.079	0.034 – 0.077
14.0	14	28	90	0.5	4	2862014005	0.040 – 0.083	0.038 – 0.081
14.0	14	28	90	1.0	4	2862014010	0.040 – 0.083	0.038 – 0.081
14.0	14	28	90	1.5	4	2862014015	0.040 – 0.083	0.038 – 0.081
14.0	14	28	90	2.0	4	2862014020	0.040 – 0.083	0.038 – 0.081
14.0	14	28	90	2.5	4	2862014025	0.040 – 0.083	0.038 – 0.081
14.0	14	28	90	3.0	4	2862014030	0.040 – 0.083	0.038 – 0.081
16.0	16	32	90	1.0	4	2862016010	0.045 – 0.095	0.043 – 0.093
16.0	16	32	90	2.0	4	2862016020	0.045 – 0.095	0.043 – 0.093
16.0	16	32	90	3.0	4	2862016030	0.045 – 0.095	0.043 – 0.093
20.0	20	40	120	1.0	4	2862020010	0.081 – 0.131	0.079 – 0.129
20.0	20	40	120	2.0	4	2862020020	0.081 – 0.131	0.079 – 0.129
20.0	20	40	120	3.0	4	2862020030	0.081 – 0.131	0.079 – 0.129



Peripheral milling
$a_e = 0.25xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.0xD$

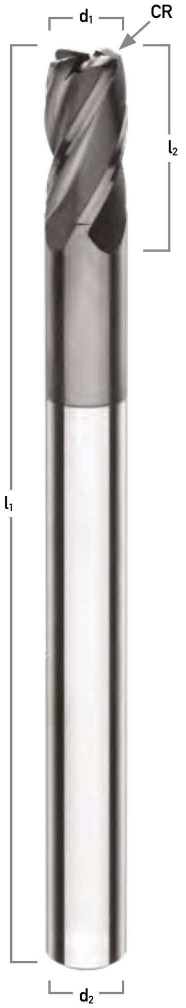
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Hardened steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	40 – 50 HRC	850 – 1200 N/mm²	< 850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Finishing	75	75	70	35	70	50	90	45
V_c (m/min) Roughing	60	60	55	25	55	35	75	30

Product family 160

28630

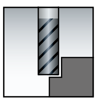
AlTiN | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard | HPC

Solid Carbide Torus Cutter

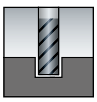


d1	d2
h10	h6

d1 mm	d2 mm	l2 mm	l1 mm	CR mm	Z	Coated Part No.	fz Roughing mm/Z	fz Finishing mm/Z
3.0	3	6	70	0.3	4	286303003	0.002 – 0.015	0.002 – 0.013
3.0	3	6	70	0.5	4	286303005	0.002 – 0.015	0.002 – 0.013
4.0	4	8	80	0.3	4	286304003	0.004 – 0.017	0.003 – 0.015
4.0	4	8	80	0.5	4	286304005	0.004 – 0.017	0.003 – 0.015
4.0	4	8	80	1.0	4	286304010	0.004 – 0.017	0.003 – 0.015
4.0	4	8	80	1.5	4	286304015	0.004 – 0.017	0.003 – 0.015
5.0	5	10	100	0.3	4	286305003	0.006 – 0.021	0.005 – 0.019
5.0	5	10	100	0.5	4	286305005	0.006 – 0.021	0.005 – 0.019
5.0	5	10	100	1.0	4	286305010	0.006 – 0.021	0.005 – 0.019
5.0	5	10	100	1.5	4	286305015	0.006 – 0.021	0.005 – 0.019
5.0	5	10	100	2.0	4	286305020	0.006 – 0.021	0.005 – 0.019
6.0	6	12	100	0.3	4	286306003	0.008 – 0.024	0.006 – 0.022
6.0	6	12	100	0.5	4	286306005	0.008 – 0.024	0.006 – 0.022
6.0	6	12	100	1.0	4	286306010	0.008 – 0.024	0.006 – 0.022
6.0	6	12	100	1.5	4	286306015	0.008 – 0.024	0.006 – 0.022
6.0	6	12	100	2.0	4	286306020	0.008 – 0.024	0.006 – 0.022
6.0	6	12	100	2.5	4	286306025	0.008 – 0.024	0.006 – 0.022
8.0	8	16	100	0.3	4	286308003	0.012 – 0.032	0.010 – 0.030
8.0	8	16	100	0.5	4	286308005	0.012 – 0.032	0.010 – 0.030
8.0	8	16	100	1.0	4	286308010	0.012 – 0.032	0.010 – 0.030
8.0	8	16	100	1.5	4	286308015	0.012 – 0.032	0.010 – 0.030
8.0	8	16	100	2.0	4	286308020	0.012 – 0.032	0.010 – 0.030
8.0	8	16	100	2.5	4	286308025	0.012 – 0.032	0.010 – 0.030
8.0	8	16	100	3.0	4	286308030	0.012 – 0.032	0.010 – 0.030
10.0	10	20	120	0.3	4	2863010003	0.015 – 0.038	0.013 – 0.036
10.0	10	20	120	0.5	4	2863010005	0.015 – 0.038	0.013 – 0.036
10.0	10	20	120	1.0	4	2863010010	0.015 – 0.038	0.013 – 0.036
10.0	10	20	120	1.5	4	2863010015	0.015 – 0.038	0.013 – 0.036
10.0	10	20	120	2.0	4	2863010020	0.015 – 0.038	0.013 – 0.036
10.0	10	20	120	2.5	4	2863010025	0.015 – 0.038	0.013 – 0.036
10.0	10	20	120	3.0	4	2863010030	0.015 – 0.038	0.013 – 0.036
12.0	12	24	120	0.3	4	2863012003	0.018 – 0.046	0.016 – 0.042
12.0	12	24	120	0.5	4	2863012005	0.018 – 0.046	0.016 – 0.042
12.0	12	24	120	1.0	4	2863012010	0.018 – 0.046	0.016 – 0.042
12.0	12	24	120	1.5	4	2863012015	0.018 – 0.046	0.016 – 0.042
12.0	12	24	120	2.0	4	2863012020	0.018 – 0.046	0.016 – 0.042
12.0	12	24	120	2.5	4	2863012025	0.018 – 0.046	0.016 – 0.042
12.0	12	24	120	3.0	4	2863012030	0.018 – 0.046	0.016 – 0.042
14.0	14	28	120	0.5	4	2863014005	0.021 – 0.054	0.019 – 0.052
14.0	14	28	120	1.0	4	2863014010	0.021 – 0.054	0.019 – 0.052
14.0	14	28	120	1.5	4	2863014015	0.021 – 0.054	0.019 – 0.052
14.0	14	28	120	2.0	4	2863014020	0.021 – 0.054	0.019 – 0.052
14.0	14	28	120	2.5	4	2863014025	0.021 – 0.054	0.019 – 0.052
14.0	14	28	120	3.0	4	2863014030	0.021 – 0.054	0.019 – 0.052
16.0	16	32	120	1.0	4	2863016010	0.024 – 0.062	0.022 – 0.060
16.0	16	32	120	2.0	4	2863016020	0.024 – 0.062	0.022 – 0.060
16.0	16	32	120	3.0	4	2863016030	0.024 – 0.062	0.022 – 0.060
20.0	20	40	160	1.0	4	2863020010	0.036 – 0.094	0.034 – 0.092
20.0	20	40	160	2.0	4	2863020020	0.036 – 0.094	0.034 – 0.092
20.0	20	40	160	3.0	4	2863020030	0.036 – 0.094	0.034 – 0.092



Peripheral milling
$a_e = 0.1xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 0.5xD$

Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Hardened steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	40 – 50 HRC	850 – 1200 N/mm²	< 850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Finishing	75	75	70	35	70	50	90	45
V_c (m/min) Roughing	60	60	55	25	55	35	75	30

Product family 160

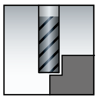
10229

TiAlN | Z 2 | HB | 30° | VHM | Type N | Manu-facturer standard

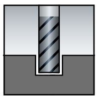
Solid Carbide Ball-Nosed End Mill

d1	d2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	3	50	2	10229010	0.005 – 0.017	0.003 – 0.012
2.0	6	4	50	2	10229020	0.007 – 0.019	0.005 – 0.014
3.0	6	5	50	2	10229030	0.012 – 0.024	0.010 – 0.019
4.0	6	6	50	2	10229040	0.020 – 0.030	0.018 – 0.025
5.0	6	7	50	2	10229050	0.022 – 0.033	0.020 – 0.028
6.0	6	7	51	2	10229060	0.026 – 0.044	0.024 – 0.039
8.0	8	9	59	2	10229080	0.034 – 0.058	0.032 – 0.053
10.0	10	10	60	2	10229100	0.040 – 0.070	0.038 – 0.065
12.0	12	14	71	2	10229120	0.047 – 0.084	0.045 – 0.079
16.0	16	16	76	2	10229160	0.056 – 0.100	0.054 – 0.095
20.0	20	20	82	2	10229200	0.068 – 0.115	0.066 – 0.110



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 1.0xD$

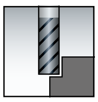
10239

TiAlN | Z 2 | HB | 30° | VHM | Type N | Manu-facturer standard

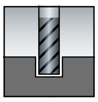
Solid Carbide Ball-Nosed End Mill

d1	d2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	10	57	2	10239060	0.026 – 0.044	0.024 – 0.039
8.0	8	16	63	2	10239080	0.034 – 0.058	0.032 – 0.053
10.0	10	19	72	2	10239100	0.040 – 0.070	0.038 – 0.065
12.0	12	22	83	2	10239120	0.047 – 0.084	0.045 – 0.079
16.0	16	26	92	2	10239160	0.056 – 0.100	0.054 – 0.095
20.0	20	32	104	2	10239200	0.068 – 0.115	0.066 – 0.110



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 1.0xD$

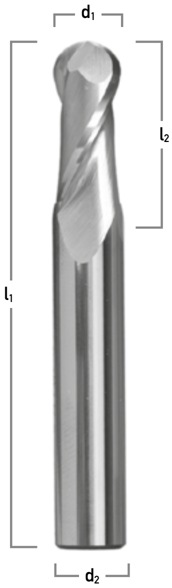
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) TiAlN	155	130	165	150	125	90	160	30

Artikelgruppe 163

25022

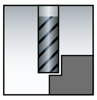
Uncoated | Alcrona Pro | Z 2 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide Ball-Nosed End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	3	3	38	2	25022010	25022010A	0.005 – 0.017	0.003 – 0.012
1.5	3	5	38	2	25022015	25022015A	0.005 – 0.017	0.003 – 0.012
2.0	3	7	38	2	25022020	25022020A	0.007 – 0.019	0.005 – 0.014
2.5	3	7	38	2	25022025	25022025A	0.007 – 0.019	0.005 – 0.014
3.0	3	9	38	2	25022030	25022030A	0.012 – 0.024	0.010 – 0.019
3.5	4	12	50	2	25022035	25022035A	0.012 – 0.024	0.010 – 0.019
4.0	4	14	50	2	25022040	25022040A	0.020 – 0.030	0.018 – 0.025
4.5	5	14	50	2	25022045	25022045A	0.020 – 0.030	0.018 – 0.025
5.0	5	16	50	2	25022050	25022050A	0.022 – 0.033	0.020 – 0.028
5.5	6	19	64	2	25022055	25022055A	0.022 – 0.033	0.020 – 0.028
6.0	6	19	64	2	25022060	25022060A	0.026 – 0.044	0.024 – 0.039
7.0	8	19	64	2	25022070	25022070A	0.030 – 0.047	0.028 – 0.042
8.0	8	21	64	2	25022080	25022080A	0.034 – 0.058	0.032 – 0.053
9.0	10	22	70	2	25022090	25022090A	0.037 – 0.064	0.035 – 0.059
10.0	10	22	70	2	25022100	25022100A	0.040 – 0.070	0.038 – 0.065
11.0	12	25	70	2	25022110	25022110A	0.043 – 0.077	0.041 – 0.072
12.0	12	25	75	2	25022120	25022120A	0.047 – 0.084	0.045 – 0.079
14.0	14	30	90	2	25022140	25022140A	0.053 – 0.093	0.051 – 0.088
16.0	16	32	90	2	25022160	25022160A	0.056 – 0.100	0.054 – 0.095
18.0	18	35	100	2	25022180	25022180A	0.065 – 0.110	0.063 – 0.105
20.0	20	38	100	2	25022200	25022200A	0.068 – 0.115	0.066 – 0.110
22.0	22	38	100	2	25022220	25022220A	0.071 – 0.120	0.069 – 0.115
25.0	25	38	100	2	25022250	25022250A	0.080 – 0.135	0.078 – 0.130



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$

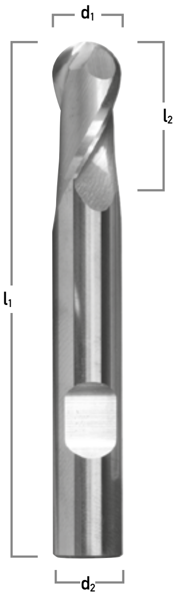
Full slot milling
$a_p = 1.0xD$

Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

26022

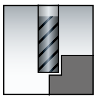
Uncoated | Alcrona Pro | Z 2 | HB | 30° | VHM | Type N | DIN 6527L

Solid Carbide Ball-Nosed End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	6	50	2	26022020	26022020A	0.007 – 0.019	0.005 – 0.014
2.5	6	6	50	2	26022025	26022025A	0.007 – 0.019	0.005 – 0.014
3.0	6	7	57	2	26022030	26022030A	0.012 – 0.024	0.010 – 0.019
4.0	6	8	57	2	26022040	26022040A	0.020 – 0.030	0.018 – 0.025
5.0	6	10	57	2	26022050	26022050A	0.022 – 0.033	0.020 – 0.028
6.0	6	10	57	2	26022060	26022060A	0.026 – 0.044	0.024 – 0.039
7.0	8	13	63	2	26022070	26022070A	0.030 – 0.052	0.028 – 0.047
8.0	8	16	63	2	26022080	26022080A	0.034 – 0.058	0.032 – 0.053
9.0	10	16	72	2	26022090	26022090A	0.038 – 0.063	0.036 – 0.059
10.0	10	19	72	2	26022100	26022100A	0.040 – 0.070	0.038 – 0.065
12.0	12	22	83	2	26022120	26022120A	0.047 – 0.077	0.045 – 0.072
14.0	14	22	83	2	26022140	26022140A	0.054 – 0.093	0.052 – 0.088
16.0	16	26	92	2	26022160	26022160A	0.056 – 0.100	0.054 – 0.095
18.0	18	26	92	2	26022180	26022180A	0.060 – 0.105	0.058 – 0.100
20.0	20	32	104	2	26022200	26022200A	0.068 – 0.115	0.066 – 0.110



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

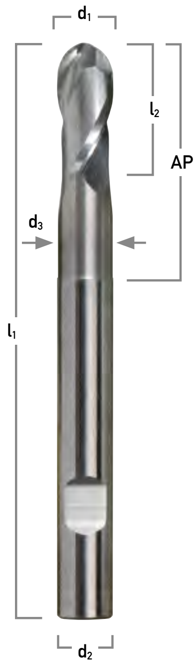
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

32002

Uncoated | Alcrona Pro | Z 2 | HB | 30° | VHM | Type N | Manu-facturer standard | HPC

Carbide HPC Copying Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	20	100	1.8	40	2	320022040	320022040A	0.012 – 0.023	0.010 – 0.018
3.0	6	20	100	2.8	40	2	320023040	320023040A	0.018 – 0.029	0.016 – 0.024
4.0	6	20	100	3.8	40	2	320024040	320024040A	0.025 – 0.035	0.023 – 0.030
5.0	6	20	100	4.8	40	2	320025040	320025040A	0.028 – 0.037	0.026 – 0.032
6.0	6	20	100	5.8	40	2	320026040	320026040A	0.031 – 0.046	0.029 – 0.041
8.0	8	20	100	7.8	40	2	320028040	320028040A	0.044 – 0.063	0.042 – 0.058
10.0	10	20	100	9.8	40	2	320021040	320021040A	0.055 – 0.078	0.053 – 0.073
10.0	10	20	150	9.8	60	2	320021060	320021060A	0.055 – 0.078	0.053 – 0.073
12.0	12	20	100	11.7	40	2	320021240	320021240A	0.065 – 0.095	0.063 – 0.090
12.0	12	20	150	11.7	60	2	320021260	320021260A	0.065 – 0.095	0.063 – 0.090
16.0	16	30	150	15.7	70	2	320021670	320021670A	0.081 – 0.115	0.079 – 0.110
18.0	18	30	150	17.7	70	2	320021870	320021870A	0.090 – 0.125	0.088 – 0.120
20.0	20	30	150	19.7	80	2	320022080	320022080A	0.099 – 0.135	0.097 – 0.130

Peripheral milling
a_e = 0.25xD
a_p = 1.0xD

Full slot milling
a_p = 1.0xD

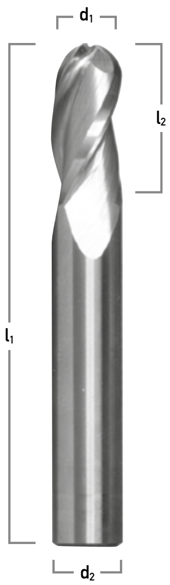
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

25032

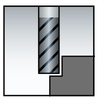
Uncoated | Alcrona Pro | Z 3 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide Ball-Nosed End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	3	3	38	3	25032010	25032010A	0.005 – 0.017	0.003 – 0.012
1.5	3	5	38	3	25032015	25032015A	0.005 – 0.017	0.003 – 0.012
2.0	3	7	38	3	25032020	25032020A	0.007 – 0.019	0.005 – 0.014
2.5	3	7	38	3	25032025	25032025A	0.007 – 0.019	0.005 – 0.014
3.0	3	9	38	3	25032030	25032030A	0.012 – 0.024	0.010 – 0.019
3.5	4	12	50	3	25032035	25032035A	0.012 – 0.024	0.010 – 0.019
4.0	4	14	50	3	25032040	25032040A	0.020 – 0.030	0.018 – 0.025
4.5	5	14	50	3	25032045	25032045A	0.020 – 0.030	0.018 – 0.025
5.0	5	16	50	3	25032050	25032050A	0.022 – 0.033	0.020 – 0.028
5.5	6	19	64	3	25032055	25032055A	0.022 – 0.033	0.020 – 0.028
6.0	6	19	64	3	25032060	25032060A	0.026 – 0.041	0.024 – 0.039
7.0	8	19	64	3	25032070	25032070A	0.030 – 0.047	0.028 – 0.042
8.0	8	21	64	3	25032080	25032080A	0.034 – 0.058	0.032 – 0.053
8.5	10	22	70	3	25032085	25032085A	0.034 – 0.058	0.032 – 0.053
9.0	10	22	70	3	25032090	25032090A	0.037 – 0.064	0.035 – 0.059
10.0	10	22	70	3	25032100	25032100A	0.040 – 0.070	0.038 – 0.065
11.0	12	25	70	3	25032110	25032110A	0.043 – 0.077	0.041 – 0.072
12.0	12	25	75	3	25032120	25032120A	0.047 – 0.084	0.045 – 0.079
14.0	14	30	90	3	25032140	25032140A	0.053 – 0.093	0.051 – 0.088
16.0	16	32	90	3	25032160	25032160A	0.056 – 0.100	0.054 – 0.095
18.0	18	35	100	3	25032180	25032180A	0.065 – 0.110	0.063 – 0.105
20.0	20	38	100	3	25032200	25032200A	0.068 – 0.115	0.066 – 0.110
22.0	22	38	100	3	25032220	25032220A	0.071 – 0.120	0.069 – 0.115
25.0	25	38	100	3	25032250	25032250A	0.080 – 0.135	0.078 – 0.130



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

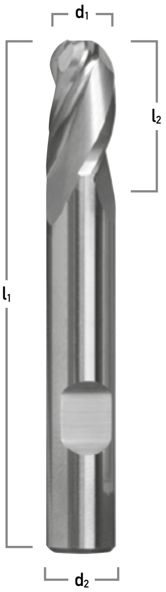
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

26032

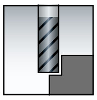
Uncoated | Alcrona Pro | Z 3 | HB | 30° | VHM | Type N | DIN 6527L

Solid Carbide Ball-Nosed End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	6	50	3	26032020	26032020A	0.007 – 0.019	0.005 – 0.014
2.5	6	6	50	3	26032025	26032025A	0.007 – 0.019	0.005 – 0.014
3.0	6	7	57	3	26032030	26032030A	0.012 – 0.024	0.010 – 0.019
4.0	6	8	57	3	26032040	26032040A	0.020 – 0.030	0.018 – 0.025
5.0	6	10	57	3	26032050	26032050A	0.022 – 0.033	0.020 – 0.028
6.0	6	10	57	3	26032060	26032060A	0.026 – 0.044	0.024 – 0.039
7.0	8	13	63	3	26032070	26032070A	0.030 – 0.052	0.028 – 0.047
8.0	8	16	63	3	26032080	26032080A	0.034 – 0.058	0.032 – 0.053
9.0	10	16	72	3	26032090	26032090A	0.038 – 0.064	0.036 – 0.059
10.0	10	19	72	3	26032100	26032100A	0.040 – 0.070	0.038 – 0.065
12.0	12	22	83	3	26032120	26032120A	0.047 – 0.077	0.045 – 0.072
14.0	14	22	83	3	26032140	26032140A	0.054 – 0.093	0.052 – 0.088
16.0	16	26	92	3	26032160	26032160A	0.056 – 0.100	0.054 – 0.095
18.0	18	26	92	3	26032180	26032180A	0.060 – 0.105	0.058 – 0.100
20.0	20	32	104	3	26032200	26032200A	0.068 – 0.115	0.066 – 0.110



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

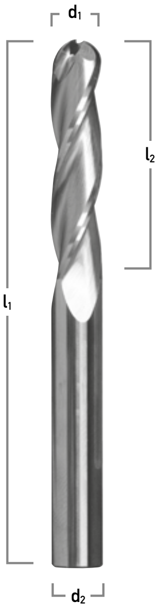
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

28103

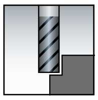
Uncoated | Alcrona Pro | Z 3 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide Ball-Nosed End Mill

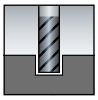


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	20	60	3	28103030	28103030A	0.012 – 0.024	0.010 – 0.019
4.0	4	25	60	3	28103040	28103040A	0.020 – 0.030	0.018 – 0.025
5.0	5	32	100	3	28103050	28103050A	0.022 – 0.033	0.020 – 0.028
6.0	6	38	100	3	28103060	28103060A	0.026 – 0.044	0.024 – 0.039
8.0	8	45	100	3	28103080	28103080A	0.034 – 0.058	0.032 – 0.053
10.0	10	45	100	3	28103100	28103100A	0.040 – 0.070	0.038 – 0.065
12.0	12	75	150	3	28103120	28103120A	0.047 – 0.077	0.045 – 0.072
14.0	14	75	150	3	28103140	28103140A	0.054 – 0.093	0.052 – 0.088
16.0	16	75	150	3	28103160	28103160A	0.056 – 0.100	0.054 – 0.095
18.0	18	75	150	3	28103180	28103180A	0.060 – 0.105	0.058 – 0.100
20.0	20	75	150	3	28103200	28103200A	0.068 – 0.115	0.066 – 0.110
25.0	25	75	150	3	28103250	28103250A	0.076 – 0.123	0.075 – 0.119



Peripheral milling
$a_e = 0.1xD$
$a_p = 3.0xD$

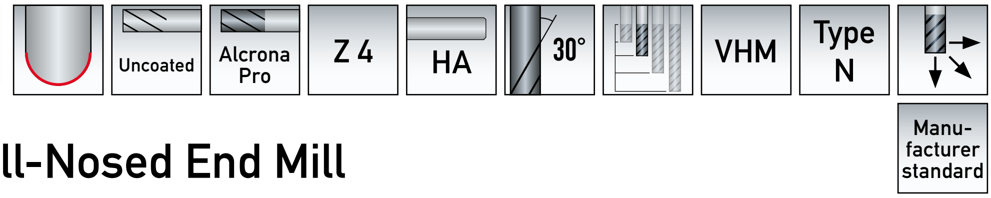


Full slot milling
$a_p = 0.5xD$

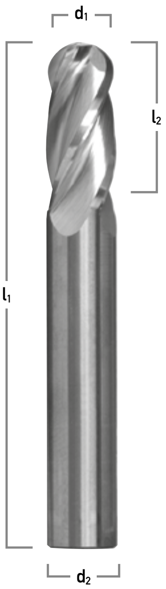
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

25042

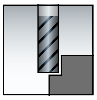


Solid Carbide Ball-Nosed End Mill



d1	d2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	3	3	38	4	25042010	25042010A	0.005 – 0.017	0.003 – 0.012
1.5	3	5	38	4	25042015	25042015A	0.005 – 0.017	0.003 – 0.012
2.0	3	7	38	4	25042020	25042020A	0.007 – 0.019	0.005 – 0.014
2.5	3	7	38	4	25042025	25042025A	0.007 – 0.019	0.005 – 0.014
3.0	3	9	38	4	25042030	25042030A	0.012 – 0.024	0.010 – 0.019
3.5	4	12	50	4	25042035	25042035A	0.012 – 0.024	0.010 – 0.019
4.0	4	14	50	4	25042040	25042040A	0.020 – 0.030	0.018 – 0.025
4.5	5	14	50	4	25042045	25042045A	0.020 – 0.030	0.018 – 0.025
5.0	5	16	50	4	25042050	25042050A	0.022 – 0.033	0.020 – 0.028
5.5	6	19	64	4	25042055	25042055A	0.022 – 0.033	0.020 – 0.028
6.0	6	19	64	4	25042060	25042060A	0.026 – 0.044	0.024 – 0.039
7.0	8	19	64	4	25042070	25042070A	0.030 – 0.047	0.028 – 0.042
8.0	8	21	64	4	25042080	25042080A	0.034 – 0.058	0.032 – 0.053
9.0	10	22	70	4	25042090	25042090A	0.037 – 0.064	0.035 – 0.059
10.0	10	22	70	4	25042100	25042100A	0.040 – 0.070	0.038 – 0.065
11.0	12	25	70	4	25042110	25042110A	0.043 – 0.077	0.041 – 0.072
12.0	12	25	75	4	25042120	25042120A	0.047 – 0.084	0.045 – 0.079
14.0	14	30	90	4	25042140	25042140A	0.053 – 0.093	0.051 – 0.088
16.0	16	32	90	4	25042160	25042160A	0.056 – 0.100	0.054 – 0.095
18.0	18	35	100	4	25042180	25042180A	0.065 – 0.110	0.063 – 0.105
20.0	20	38	100	4	25042200	25042200A	0.068 – 0.115	0.066 – 0.110
22.0	22	38	100	4	25042220	25042220A	0.071 – 0.120	0.069 – 0.115
25.0	25	38	100	4	25042250	25042250A	0.080 – 0.135	0.078 – 0.130



Peripheral milling
a_e = 0.25xD
a_p = 1.0xD

Full slot milling
a_p = 1.0xD

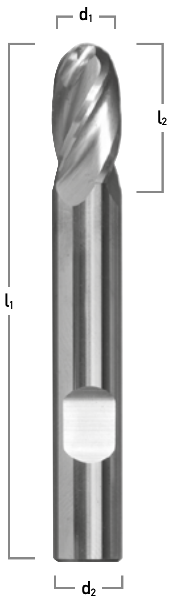
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

26042

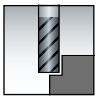
Uncoated | Alcrona Pro | Z 4 | HB | 30° | VHM | Type N | DIN 6527L

Solid Carbide Ball-Nosed End Mill

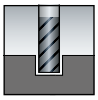


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	6	50	4	26042020	26042020A	0.005 – 0.010	0.003 – 0.008
2.5	6	6	50	4	26042025	26042025A	0.005 – 0.010	0.003 – 0.008
3.0	6	7	57	4	26042030	26042030A	0.010 – 0.016	0.008 – 0.014
4.0	6	8	57	4	26042040	26042040A	0.018 – 0.024	0.016 – 0.022
5.0	6	10	57	4	26042050	26042050A	0.020 – 0.026	0.020 – 0.024
6.0	6	10	57	4	26042060	26042060A	0.024 – 0.029	0.022 – 0.027
7.0	8	13	63	4	26042070	26042070A	0.028 – 0.032	0.026 – 0.030
8.0	8	16	63	4	26042080	26042080A	0.032 – 0.042	0.030 – 0.040
9.0	10	16	72	4	26042090	26042090A	0.036 – 0.050	0.034 – 0.048
10.0	10	19	72	4	26042100	26042100A	0.038 – 0.053	0.036 – 0.051
12.0	12	22	83	4	26042120	26042120A	0.046 – 0.063	0.044 – 0.061
14.0	14	22	83	4	26042140	26042140A	0.050 – 0.071	0.048 – 0.069
16.0	16	26	92	4	26042160	26042160A	0.054 – 0.079	0.052 – 0.077
18.0	18	26	92	4	26042180	26042180A	0.063 – 0.090	0.061 – 0.088
20.0	20	32	104	4	26042200	26042200A	0.066 – 0.097	0.064 – 0.095



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 1.0xD$

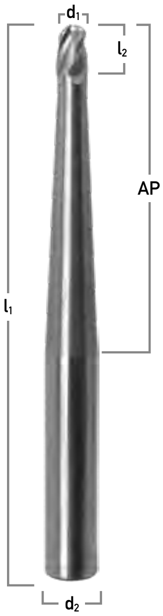
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

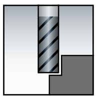
30042

Alcrona Pro | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard

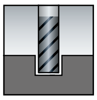
Solid Carbide High Performance Ball-Nosed End Mill



d_1	d_2	l_2	l_1	AP		Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	mm	Z	Part No.	mm/Z	mm/Z
2.0	4	5	65	45	4	30042020A	0.010 – 0.018	0.008 – 0.016
3.0	4	6	65	45	4	30042030A	0.013 – 0.024	0.010 – 0.022
4.0	6	8	75	54	4	30042040A	0.023 – 0.030	0.021 – 0.028
5.0	6	8	75	54	4	30042050A	0.026 – 0.032	0.024 – 0.030
6.0	10	9	100	60	4	30042060A	0.029 – 0.041	0.027 – 0.039
8.0	10	12	100	60	4	30042080A	0.042 – 0.058	0.040 – 0.056

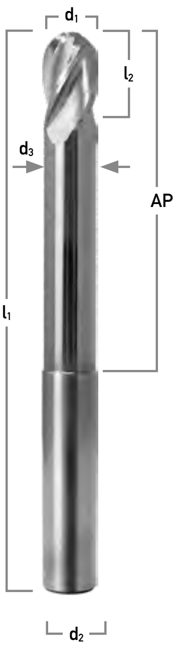


Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$

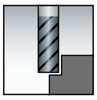


Full slot milling
$a_p = 0.5xD$

- Ball-nosed end mill for roughing and finishing
- With 4 cutting edges for highest cutting performance
- Short cutting edges for highest stability
- For universal applications



d_1	d_2	l_2	l_1	d_3	AP		Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z	mm/Z
10.0	10	16	100	9.5	60	4	30042100A	0.053 – 0.073	0.051 – 0.071
12.0	12	20	100	11.5	60	4	30042120A	0.063 – 0.090	0.061 – 0.088



Peripheral milling
$a_e = 0.25xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 0.5xD$

- Ball-nosed end mill for roughing and finishing
- With 4 cutting edges for highest cutting performance
- Short cutting edges for highest stability
- For universal applications

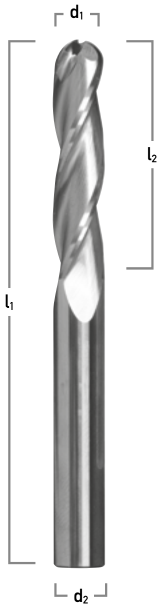
d_1	d_2
h10	h6

Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

28104

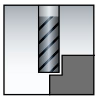
Uncoated | Alcrona Pro | Z 4 | HA | 30° | VHM | Type N | Manu-facturer standard

Solid Carbide Ball-Nosed End Mill

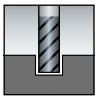


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.0	3	20	60	4	28104030	28104030A	0.010 – 0.016	0.008 – 0.014
4.0	4	25	60	4	28104040	28104040A	0.018 – 0.024	0.016 – 0.022
5.0	5	32	100	4	28104050	28104050A	0.020 – 0.026	0.020 – 0.024
6.0	6	38	100	4	28104060	28104060A	0.024 – 0.029	0.022 – 0.027
8.0	8	45	100	4	28104080	28104080A	0.032 – 0.042	0.030 – 0.040
10.0	10	45	100	4	28104100	28104100A	0.038 – 0.053	0.036 – 0.051
12.0	12	75	150	4	28104120	28104120A	0.046 – 0.063	0.044 – 0.061
14.0	14	75	150	4	28104140	28104140A	0.050 – 0.071	0.048 – 0.069
16.0	16	75	150	4	28104160	28104160A	0.054 – 0.079	0.052 – 0.077
18.0	18	75	150	4	28104180	28104180A	0.063 – 0.090	0.061 – 0.088
20.0	20	75	150	4	28104200	28104200A	0.066 – 0.097	0.064 – 0.095
25.0	25	75	150	4	28104250	28104250A	0.076 – 0.125	0.074 – 0.119



Peripheral milling
$a_e = 0.1xD$
$a_p = 1.0xD$



Full slot milling
$a_p = 0.5xD$

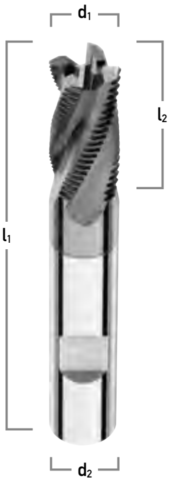
Material	General structural steels	Non-alloy Q & T steels	Alloy Q & T steels	Nitrided steels	Tool steels	Stainless steels	Cast iron (gray, ductile, malleable)	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Uncoated	95	80	100	90	80	65	95	–
V_c (m/min) Alcrona Pro	155	130	165	150	125	90	160	30

Product family 160

28510

Aldura | Z 4 | HB | 25° | VHM | Type HR | HRC ≤ 63 | Manu-facturer standard

Solid Carbide Roughing End Mill



d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z
3.0	6	6	57	4	28510030AD	0.012 – 0.038
4.0	6	8	57	4	28510040AD	0.012 – 0.038
5.0	6	10	57	4	28510050AD	0.015 – 0.044
6.0	6	13	57	4	28510060AD	0.015 – 0.044
8.0	8	19	63	4	28510080AD	0.021 – 0.058
10.0	10	22	72	4	28510100AD	0.027 – 0.063
12.0	12	26	83	4	28510120AD	0.032 – 0.084
16.0	16	32	92	4	28510160AD	0.040 – 0.100
20.0	20	38	104	4	28510200AD	0.047 – 0.115
25.0	25	38	104	4	28510250AD	0.067 – 0.135

Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

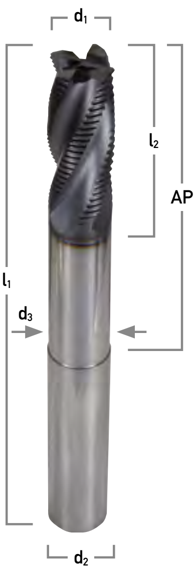
Full slot milling
a_p = 1.5xD

d_1	d_2
h10	h6

28512

AlTiN | Z 4 | HA | 25° | VHM | Type HR | HRC ≤ 63 | Manu-facturer standard

VHM-Schruppfräser



d_1 mm	d_2 mm	l_2 mm	l_1 mm	d_3 mm	AP mm	Z	Coated Part No.	f_z Roughing mm/Z
6.0	6	15	80	5.5	44	4	28512060AD	0.015 – 0.044
8.0	8	21	85	7.5	49	4	28512080AD	0.024 – 0.058
10.0	10	24	100	9.5	60	4	28512100AD	0.027 – 0.070
12.0	12	28	110	11.5	65	4	28512120AD	0.032 – 0.084
14.0	14	28	110	13.5	65	4	28512140AD	0.036 – 0.095
16.0	16	34	125	15.5	77	4	28512160AD	0.040 – 0.100
18.0	18	34	125	17.5	77	4	28512180AD	0.043 – 0.110
20.0	20	42	140	19.5	90	4	28512200AD	0.047 – 0.115

Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.5xD

d_1	d_2
h10	h6

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloy Q & T steels	Tool steels	Stainless steels	Cast iron	Hard materials	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 850 N/mm²	< 300 HB	48 – 60 HRC	850 – 1200 N/mm²
V_c (m/min) Finishing	115	95	95	95	95	70	125	50	65
V_c (m/min) Roughing	100	80	80	80	80	55	110	35	45

Product family 160

28515

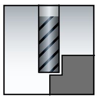
Aldura | Z 4 | HB | 25° | VHM | Type HR | HRC ≤ 63 | Manu-facturer standard

Solid Carbide High Performance Roughing End Mill

With Internal Coolant

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Coated Part No.	f_z Roughing mm/Z
5.0	6	13	57	4	28515050AD	0.012 – 0.045
6.0	6	13	57	4	28515060AD	0.019 – 0.053
7.0	8	16	63	4	28515070AD	0.022 – 0.018
8.0	8	16	63	4	28515080AD	0.027 – 0.020
9.0	10	19	72	4	28515090AD	0.032 – 0.079
10.0	10	22	72	4	28515100AD	0.035 – 0.087
12.0	12	26	83	4	28515120AD	0.041 – 0.105
14.0	14	26	83	4	28515140AD	0.044 – 0.117
16.0	16	32	92	4	28515160AD	0.051 – 0.126
18.0	18	32	92	4	28515180AD	0.056 – 0.132
20.0	20	38	104	4	28515200AD	0.061 – 0.145



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.5xD

- For universal applications
- With internal coolant for long tool life

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloy Q & T steels	Tool steels	Stainless steels	Cast iron	Hard materials	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 850 N/mm²	< 300 HB	48 – 60 HRC	850 – 1200 N/mm²
V_c (m/min) Finishing	115	95	95	95	95	70	125	50	65
V_c (m/min) Roughing	100	80	80	80	80	55	110	35	45

Product family 160

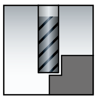
28505

Uncoated | Alcrona Pro | Z 4 | HA | 30° | VHM | Type NF | Manu-facturer standard

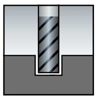
Solid Carbide Roughing / Finishing End Mill

d1	d2
h10	h6

d1 mm	d2 mm	l2 mm	l1 mm	Z	Uncoated Part No.	Coated Part No.	fz Roughing mm/Z	fz Finishing mm/Z
3.0	3	25	64	4	28505030	28505030A	0.004 – 0.015	0.002 – 0.010
4.0	4	25	75	4	28505040	28505040A	0.007 – 0.024	0.005 – 0.019
5.0	5	25	75	4	28505050	28505050A	0.008 – 0.025	0.006 – 0.020
6.0	6	30	75	4	28505060	28505060A	0.010 – 0.030	0.008 – 0.025
8.0	8	30	75	4	28505080	28505080A	0.014 – 0.037	0.012 – 0.032
10.0	10	45	100	4	28505100	28505100A	0.020 – 0.044	0.015 – 0.039
12.0	12	45	100	4	28505120	28505120A	0.023 – 0.053	0.018 – 0.048
16.0	16	60	110	4	28505160	28505160A	0.025 – 0.063	0.023 – 0.058
20.0	20	80	150	4	28505200	28505200A	0.032 – 0.078	0.028 – 0.073



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

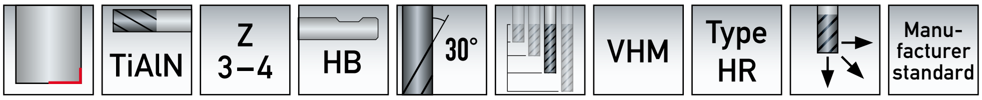


Full slot milling
a_p = 1.5xD

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloy Q & T steels	Tool steels	Stainless steels	Cast iron	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	Titanium alloys	850 – 1000 N/mm²	< 850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Finishing	105	90	85	85	80	70	135	50
V_c (m/min) Roughing	65	55	50	50	45	45	85	30

Product family 160

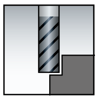
10709



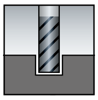
Solid Carbide Roughing End Mill

d1	d2
h10	h6

d_1	d_2	l_2	l_1		Coated	f_z Roughing
mm	mm	mm	mm	Z	Art.Nr.	mm/Z
3.0	6	6	57	3	10709030	0.012 – 0.038
4.0	6	8	57	3	10709040	0.012 – 0.038
5.0	6	10	57	3	10709050	0.015 – 0.044
6.0	6	16	57	3	10709060	0.015 – 0.044
8.0	8	16	63	3	10709080	0.021 – 0.058
10.0	10	22	72	4	10709100	0.027 – 0.063
12.0	12	26	83	4	10709120	0.032 – 0.084
16.0	16	32	92	4	10709160	0.040 – 0.100
20.0	20	38	104	4	10709200	0.047 – 0.115



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

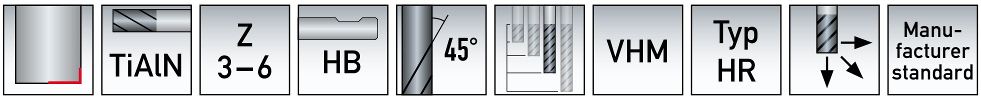


Full slot milling
a_p = 2.0xD

Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloy Q & T steels	Tool steels	Stainless steels	Cast iron	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	Titanium alloys	850 – 1000 N/mm²	< 850 N/mm²	< 300 HB	850 – 1200 N/mm²
V_c (m/min) Finishing	115	95	95	95	95	70	125	65
V_c (m/min) Roughing	100	80	80	80	80	55	110	45

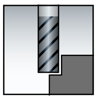
Artikelgruppe 163

10719



Solid Carbide Roughing End Mill

d_1	d_2	l_2	l_1		Coated	f_z Roughing
mm	mm	mm	mm	Z	Part No.	mm/Z
4.0	6	11	57	3	10719040	0.022 – 0.045
5.0	6	13	57	4	10719050	0.027 – 0.055
6.0	6	16	57	4	10719060	0.032 – 0.065
8.0	8	16	69	4	10719080	0.042 – 0.075
10.0	10	22	72	4	10719100	0.062 – 0.085
12.0	12	28	83	4	10719120	0.082 – 0.105
16.0	16	32	92	5	10719160	0.122 – 0.155
20.0	20	38	104	6	10719200	0.142 – 0.205



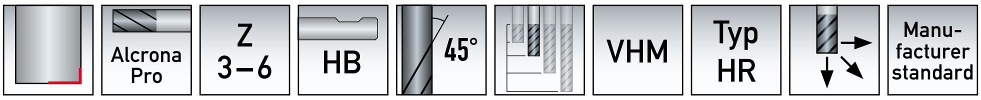
Peripheral milling
$a_e = 0.4xD$
$a_p = 2.5xD$

Full slot milling
$a_p = 1.0xD$

d_1	d_2
h10	h6

Product family 163

28520



Solid Carbide Roughing End Mill INOX/Titanium

d_1	d_2	l_2	l_1		Coated	f_z Roughing
mm	mm	mm	mm	Z	Part No.	mm/Z
4.0	6	11	57	3	28520040A	0.022 – 0.045
5.0	6	13	57	4	28520050A	0.027 – 0.055
6.0	6	16	57	4	28520060A	0.032 – 0.065
7.0	8	16	63	4	28520070A	0.047 – 0.070
8.0	8	16	63	4	28520080A	0.050 – 0.075
9.0	10	19	72	4	28520090A	0.052 – 0.080
10.0	10	22	72	4	28520100A	0.062 – 0.085
12.0	12	26	83	4	28520120A	0.082 – 0.105
14.0	14	26	83	5	28520140A	0.102 – 0.125
16.0	16	32	92	5	28520160A	0.122 – 0.155
20.0	20	38	104	6	28520200A	0.142 – 0.205
25.0	25	45	121	6	28520250A	0.182 – 0.355

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

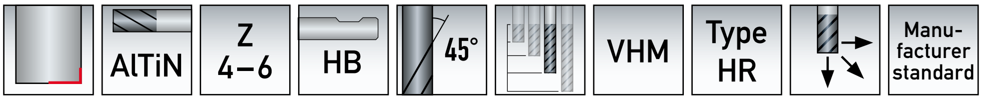
Full slot milling
$a_p = 2.0xD$

d_1	d_2
h10	h6

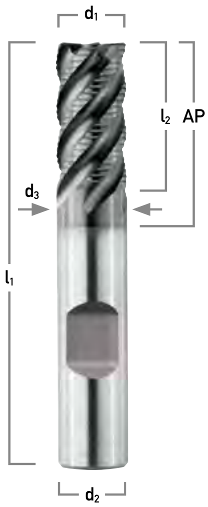
Material	Alloy Steel	Stainless steels, martensitic	Hardox, Inconel, Waspaloy	Special and Titanium alloys
Tensile strength/Hardness	400 – 800 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1500 N/mm²
V_c (m/min) Finishing	185	175	65	95
V_c (m/min) Roughing	170	160	50	80

Product family 160

28521

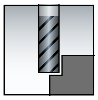


Solid Carbide Roughing End Mill INOX/Titanium



d1	d2	l2	l1	d3	AP		Coated
mm	mm	mm	mm	mm	mm	Z	Part No.
6.0	6	16	57	5.50	20	4	28521060A
8.0	8	16	63	7.50	26	4	28521080A
10.0	10	22	72	9.50	31	4	28521100A
12.0	12	26	83	11.50	37	4	28521120A
16.0	16	32	100	15.50	51	5	28521160A
20.0	20	38	110	19.50	59	6	28521200A

f_z Roughing mm/Z
0.032 – 0.065
0.042 – 0.075
0.062 – 0.085
0.082 – 0.105
0.122 – 0.155
0.142 – 0.205



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.5xD

d1	d2
h10	h6

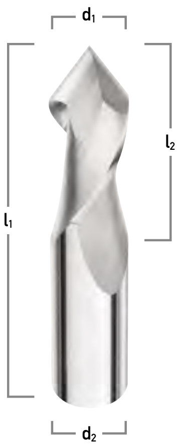
Material	Alloy Steel	Stainless steels, martensitic	Hardox, Inconel, Waspaloy	Special and Titanium alloys
Tensile strength/Hardness	400 – 800 N/mm²	< 1200 N/mm²	< 1400 N/mm²	< 1500 N/mm²
V_c (m/min) Finishing	185	175	65	95
V_c (m/min) Roughing	170	160	50	80

Product family 160

35060

Uncoated | Z 2 | HA | 30° | VHM | Type N | 60° | Manu-facturer standard

Solid Carbide Multi-Functional Tool
60°



d_1	d_2
h10	h6

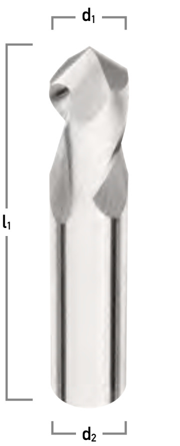
d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Bohren & Senken U/min	V-Nut-Fräsen U/min	Fasen/Fräsen/Zirkularfräsen U/min
3.0	4	6	50	2	35060030	0.045 – 0.050	0.004 – 0.008	0.006 – 0.010
4.0	5	8	50	2	35060040	0.050 – 0.070	0.005 – 0.010	0.008 – 0.012
5.0	6	10	50	2	35060050	0.060 – 0.080	0.006 – 0.012	0.009 – 0.012
6.0	8	12	60	2	35060060	0.070 – 0.090	0.007 – 0.015	0.013 – 0.012
8.0	10	16	70	2	35060080	0.090 – 0.150	0.009 – 0.020	0.020 – 0.030
10.0	12	18	90	2	35060100	0.110 – 0.190	0.010 – 0.025	0.025 – 0.035
12.0	12	20	90	2	35060120	0.160 – 0.200	0.013 – 0.033	0.036 – 0.050
16.0	16	26	92	2	35060160	0.200 – 0.270	0.018 – 0.045	0.045 – 0.053
20.0	20	32	100	2	35060200	0.250 – 0.350	0.027 – 0.056	0.060 – 0.070

· Universal tool for spot drilling, chamfering, deburring and drilling

35090

Uncoated | Z 2 | HA | 30° | VHM | Type N | 90° | Manu-facturer standard

Solid Carbide Multi-Functional Tool
90°



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Bohren & Senken U/min	V-Nut-Fräsen U/min	Fasen/Fräsen/Zirkularfräsen U/min
3.0	4	6	50	2	35090030	0.045 – 0.050	0.004 – 0.008	0.006 – 0.010
4.0	5	8	50	2	35090040	0.050 – 0.070	0.005 – 0.010	0.008 – 0.012
5.0	6	10	50	2	35090050	0.060 – 0.080	0.006 – 0.012	0.009 – 0.012
6.0	8	12	60	2	35090060	0.070 – 0.090	0.007 – 0.015	0.013 – 0.012
8.0	10	16	70	2	35090080	0.090 – 0.150	0.009 – 0.020	0.020 – 0.030
10.0	12	18	90	2	35090100	0.110 – 0.190	0.010 – 0.025	0.025 – 0.035
12.0	12	20	90	2	35090120	0.160 – 0.200	0.013 – 0.033	0.036 – 0.050
16.0	16	26	92	2	35090160	0.200 – 0.270	0.018 – 0.045	0.045 – 0.053
20.0	20	32	100	2	35090200	0.250 – 0.350	0.027 – 0.056	0.060 – 0.070

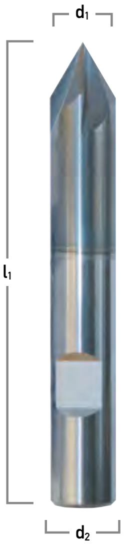
· Universal tool for spot drilling, chamfering, deburring and drilling

Material	General structural steels	Free machining steels	Alloy case-hardened steels	Stainless steels	Cast iron (gray, ductile, malleable)	Aluminium	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	< 850 N/mm²	< 300 HB	< 600 N/mm²	850 – 1200 N/mm²
V_c (m/min)	150	100	100	70	120	200	50

34060

Uncoated | Alcrona Pro | Aldura | Z 4 | HB | *HA | VHM | Type N | 60° | DIN 6527

Solid Carbide NC Deburring Cutter
60°



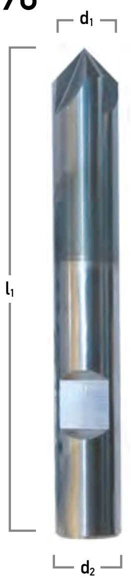
d_1	d_2
h10	h6

d_1 Ø	d_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Alcrona Pro Part No.	Coated Aldura Part No.	Fasen/Entgraten U/min
4.0	4*	54	4	34060040	34060040A	34060040AD	0.008 – 0.015
6.0	6	57	4	34060060	34060060A	34060060AD	0.010 – 0.020
8.0	8	63	4	34060080	34060080A	34060080AD	0.015 – 0.030
10.0	10	72	4	34060100	34060100A	34060100AD	0.025 – 0.040
12.0	12	83	4	34060120	34060120A	34060120AD	0.035 – 0.050
16.0	16	92	4	34060160	34060160A	34060160AD	0.045 – 0.065
20.0	20	104	4	34060200	34060200A	34060200AD	0.060 – 0.075

34090

Uncoated | Alcrona Pro | Aldura | Z 3–4 | HB | *HA | VHM | Type N | 90° | DIN 6527

Solid Carbide NC Deburring Cutter
90°



d_1	d_2
h10	h6

d_1 Ø	d_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Alcrona Pro Part No.	Coated Aldura Part No.	Fasen/Entgraten U/min
1.0	3*	38	3	34090010	34090010A	–	0.002 – 0.005
2.0	3*	38	3	34090020	34090020A	–	0.004 – 0.007
3.0	3*	38	4	34090030	34090030A	–	0.006 – 0.010
4.0	4*	54	4	34090040	34090040A	34090040AD	0.008 – 0.015
6.0	6	57	4	34090060	34090060A	34090060AD	0.010 – 0.020
8.0	8	63	4	34090080	34090080A	34090080AD	0.015 – 0.030
10.0	10	72	4	34090100	34090100A	34090100AD	0.025 – 0.040
12.0	12	83	4	34090120	34090120A	34090120AD	0.035 – 0.050
16.0	16	92	4	34090160	34090160A	34090160AD	0.045 – 0.065
20.0	20	104	4	34090200	34090200A	34090200AD	0.060 – 0.075

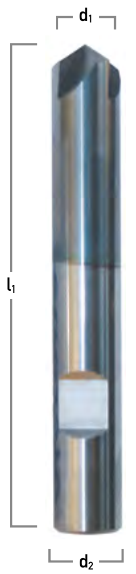
Material	General structural steels	Alloy case-hardened steels	Free machining steels	Stainless steels	Cast iron (gray, ductile, malleable)	Aluminium	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 850 N/mm²	< 300 HB	< 600 N/mm²	850 – 1200 N/mm²
V_c (m/min) Uncoated	100	60	100	70	100	100	50
V_c (m/min) Alcrona Pro	120	80	120	80	120	150	60
V_c (m/min) Aldura	150	100	150	90	150	200	70

Product family 162

34120

Uncoated | Alcrona Pro | Aldura | Z 4 | HB | *HA | VHM | Type N | 120° | DIN 6527

Solid Carbide NC Deburring Cutter
120°



d_1 Ø	d_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Alcrona Pro Part No.	Coated Aldura Part No.	Fasen/Entgraten U/min
4.0	4*	54	4	34120040	34120040A	34120040AD	0.008 – 0.015
6.0	6	57	4	34120060	34120060A	34120060AD	0.010 – 0.020
8.0	8	63	4	34120080	34120080A	34120080AD	0.015 – 0.030
10.0	10	72	4	34120100	34120100A	34120100AD	0.025 – 0.040
12.0	12	83	4	34120120	34120120A	34120120AD	0.035 – 0.050
16.0	16	92	4	34120160	34120160A	34120160AD	0.045 – 0.065
20.0	20	104	4	34120200	34120200A	34120200AD	0.060 – 0.075

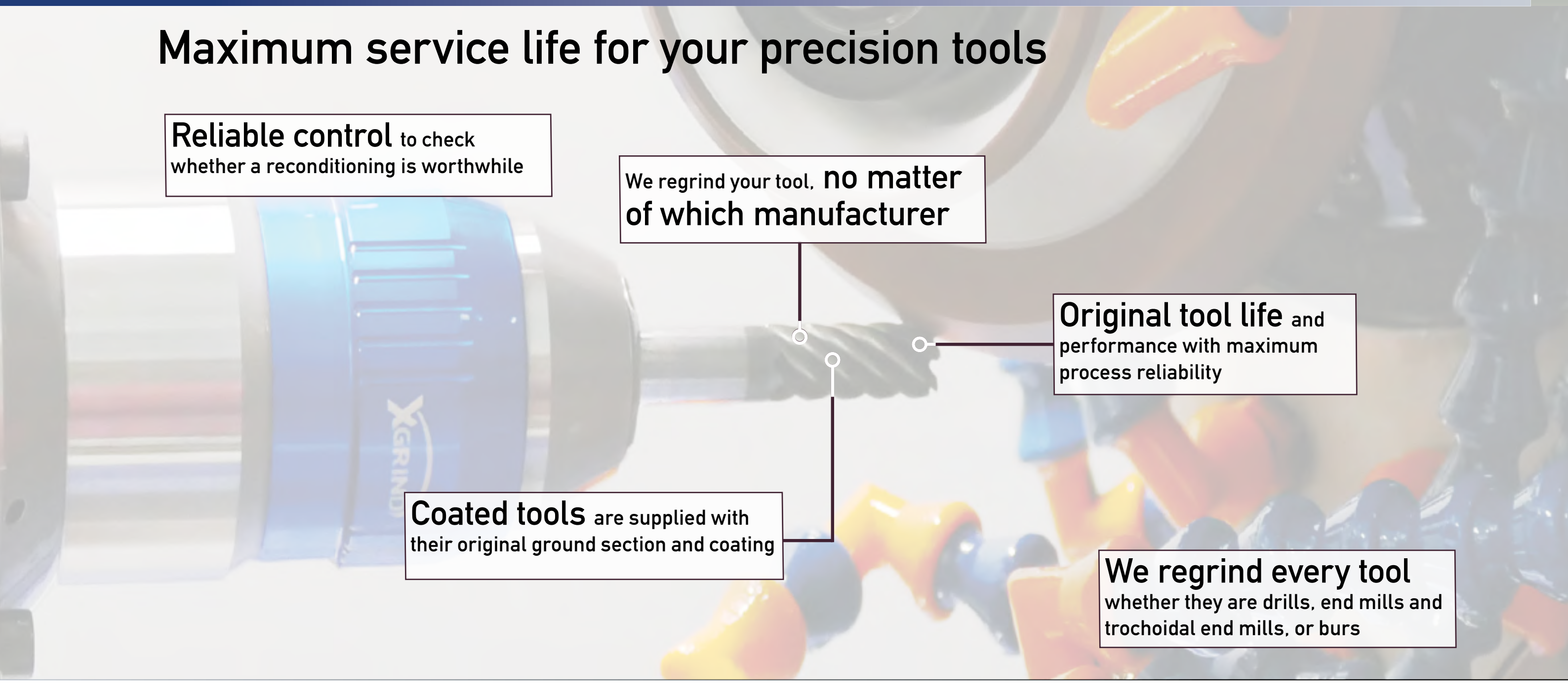
d_1	d_2
h10	h6

Material	General structural steels	Alloy case-hardened steels	Free machining steels	Stainless steels	Cast iron (gray, ductile, malleable)	Aluminium	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	1000 – 1200 N/mm²	850 – 1000 N/mm²	< 850 N/mm²	< 300 HB	< 600 N/mm²	850 – 1200 N/mm²
V_c (m/min) Uncoated	100	60	100	70	100	100	50
V_c (m/min) Alcrona Pro	120	80	120	80	120	150	60
V_c (m/min) Aldura	150	100	150	90	150	200	70

Product family 162

Do you already know our regrinding service?

Maximum service life for your precision tools



33060

Uncoated | Alcrona Pro | Aldura | Z 3 | HA | VHM | Type N | 60° | Manu-facturer standard

Solid Carbide Countersink
60°

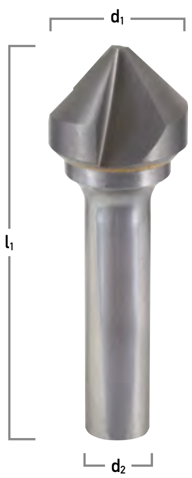
d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Alcrona Pro Part No.	Coated Aldura Part No.	Senken U/min
4.30	6	50	3	330600436	330600436A	330600436AD	0.02 – 0.10
6.30	6	51	3	330600636	330600636A	330600636AD	0.05 – 0.11
8.30	6	55	3	330600836	330600836A	330600836AD	0.05 – 0.12
10.40	6	56	3	330601046	330601046A	330601046AD	0.06 – 0.13
12.40	8	59	3	330601248	330601248A	330601248AD	0.07 – 0.14
16.50	10	63	3	330601651	330601651A	330601651AD	0.08 – 0.16
20.50	10	67	3	330602051	330602051A	330602051AD	0.13 – 0.18
25.00	10	73	3	330602501	330602501A	330602501AD	0.14 – 0.20
31.00	10	79	3	330603101	330603101A	330603101AD	0.16 – 0.25

33090

Uncoated | Alcrona Pro | Aldura | Z 3 | HA | VHM | Type N | 90° | Manu-facturer standard

Solid Carbide Countersink
90°



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Alcrona Pro Part No.	Coated Aldura Part No.	Senken U/min
4.30	6	50	3	330900436	330900436A	330900436AD	0.02 – 0.10
6.30	6	51	3	330900636	330900636A	330900636AD	0.05 – 0.11
8.30	6	52	3	330900836	330900836A	330900836AD	0.04 – 0.12
10.40	6	53	3	330901046	330901046A	330901046AD	0.06 – 0.13
12.40	8	55	3	330901248	330901248A	330901248AD	0.07 – 0.14
16.50	10	58	3	330901651	330901651A	330901651AD	0.08 – 0.16
20.50	10	61	3	330902051	330902051A	330902051AD	0.13 – 0.18
25.00	10	64	3	330902501	330902501A	330902501AD	0.14 – 0.20
31.00	10	68	3	330903101	330903101A	330903101AD	0.16 – 0.25

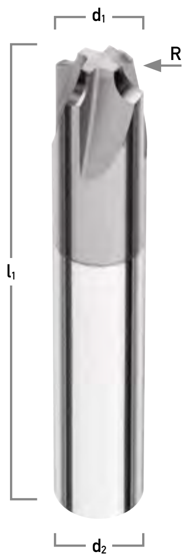
Material	General structural steels	Free machining steels	Alloy case-hardened steels	Stainless steels	Cast iron (gray, ductile, malleable)	Aluminium	Plastics	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	< 850 N/mm²	< 300 HB	< 600 N/mm²		850 – 1200 N/mm²
V_c (m/min) Uncoated	60	65	55	20	35	100	200	20
V_c (m/min) Alcrona Pro	70	75	65	25	45	125	245	25
V_c (m/min) Aldura	85	95	80	30	55	155	305	30

Product family 161

36040

Uncoated	TiAlN	Z 4	HA		VHM	Type N	Manu-facturer standard

Solid Carbide Corner Rounding Cutter, Concave



d1	d2
h10	h6

Radius	d1 mm	d2 mm	l1 mm	Z	Uncoated Part No.	Coated Part No.	Fasen mm/U
0.50	7	8	70	4	36040005	36040005A	0.010 – 0.020
1.00	6	8	70	4	36040010	36040010A	0.010 – 0.020
1.50	7	10	75	4	36040015	36040015A	0.015 – 0.030
2.00	6	10	75	4	36040020	36040020A	0.020 – 0.040
2.50	7	12	75	4	36040025	36040025A	0.020 – 0.040
3.00	6	12	75	4	36040030	36040030A	0.025 – 0.050
3.50	9	16	80	4	36040035	36040035A	0.025 – 0.050
4.00	8	16	80	4	36040040	36040040A	0.030 – 0.060
4.50	7	16	80	4	36040045	36040045A	0.030 – 0.060
5.00	10	20	80	4	36040050	36040050A	0.035 – 0.070
6.00	8	20	80	4	36040060	36040060A	0.040 – 0.080
8.00	9	25	100	4	36040080	36040080A	0.060 – 0.090
10.00	5	25	100	4	36040100	36040100A	0.065 – 0.100

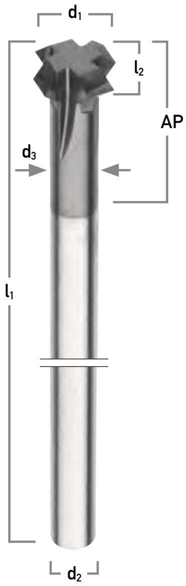
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloy case-hardened steels	Stainless steels	Chilled cast	Cast iron (gray, ductile, malleable)	Aluminium	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	< 850 N/mm²	> 350 HB	< 300 HB	< 600 N/mm²	850 – 1200 N/mm²
V_c (m/min) Uncoated	70	65	65	50	35	50	60	285	30
V_c (m/min) Alcrona Pro	80	75	75	60	45	60	70	320	35

Product family 160

38040

Alcrona Pro | Z 3–4 | HA | VHM | Type N | Manufacturer standard

Solid Carbide Forward / Backward Deburring Cutter, Angle 45°



d_1	d_2	l_2	l_1	d_3	AP		Coated	f_z
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z
2.0	4	1.0	75	1.4	9	3	38040020AS4	0.004 – 0.010
3.0	4	1.5	75	2.2	12	4	38040030AS4	0.005 – 0.010
4.0	4	2.0	75	2.7	17	4	38040040AS4	0.005 – 0.013

d_1	d_2	l_2	l_1	d_3	AP		Coated	f_z
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z
2.0	6	1.4	100	1.2	8	3	38040020A	0.004 – 0.010
3.0	6	2.0	100	2.0	8	4	38040030A	0.005 – 0.010
4.0	6	3.0	100	2.0	10	4	38040040A	0.005 – 0.013
5.0	6	4.0	100	3.5	15	4	38040050A	0.005 – 0.013
6.0	6	4.0	100	4.0	15	4	38040060A	0.008 – 0.015
8.0	6	3.2	100	–	–	4	38040080A	0.010 – 0.018
10.0	6	4.3	100	–	–	4	38040100A	0.010 – 0.020
12.0	6	5.0	100	–	–	4	38040120A	0.012 – 0.023
16.0	10	8.0	100	–	–	4	38040160A	0.015 – 0.030

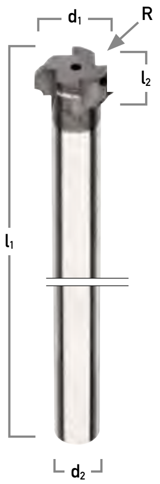
- up to d1=6 mm Face tapering to a point
- from d1=8 mm tip flattened

d_1	d_2
h10	h6

39040

Alcrona Pro | Z 4 | HA | VHM | Type N | Manufacturer standard

Solid Carbide Forward / Backward Corner Rounding Cutter



Radius	largest Cutting Ø d_1	smallest Cutting Ø d_1	d_2	l_2	l_1		Coated	f_z
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z
0.2	8	7.6	6	2	100	4	39040020A	0.010 – 0.050
0.3	8	7.4	6	2	100	4	39040030A	0.010 – 0.050
0.4	8	7.2	6	2	100	4	39040040A	0.010 – 0.050
0.5	8	7.0	6	2	100	4	39040050A	0.010 – 0.050
0.8	10	8.4	6	4	100	4	39040080A	0.020 – 0.060
1.0	10	8.0	6	4	100	4	39040100A	0.020 – 0.060
1.2	10	7.6	6	4	100	4	39040120A	0.020 – 0.060
1.5	10	7.0	6	4	100	4	39040150A	0.020 – 0.060

d_1	d_2
h10	h6

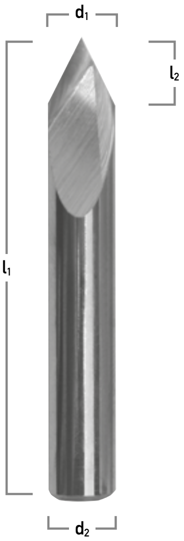
Material	General structural steels	Free machining steels	Non-alloy Q & T steels	Alloy case-hardened steels	Stainless steels	Chilled cast	Cast iron (gray, ductile, malleable)	Aluminium	Special and Titanium alloys
Tensile strength/Hardness	500 – 850 N/mm²	850 – 1000 N/mm²	850 – 1000 N/mm²	1000 – 1200 N/mm²	< 850 N/mm²	> 350 HB	< 300 HB	< 600 N/mm²	850 – 1200 N/mm²
V_c (m/min) Alcrona Pro	80	75	75	60	40	60	70	320	35

Product family 162

52000

Uncoated | Z 1 | HA | VHM | Type N | 60° | Manu-facturer standard

Solid Carbide Engraving Cutter
60°



d1
h11

d_1 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Vorschub mm/Z
3.0	15	40	1	52000030	0.010 – 0.020
4.0	15	40	1	52000040	0.015 – 0.027
6.0	15	40	1	52000060	0.020 – 0.032

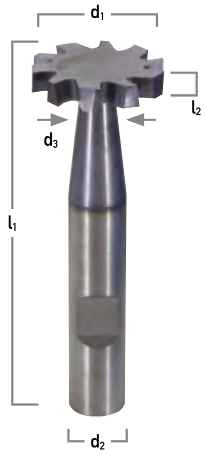
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 1000 N/mm²	< 600 N/mm²
V_c (m/min)	65	40	55	140

Product family 161

58501

Alcrona Pro | Z 6–10 | HB | VHM | Type N | DIN 850B

Solid Carbide Keyseating Cutter
For Slot Milling Acc. To DIN 6888 Fit P9



d_1	d_2	l_2	l_1	d_3		Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	mm	Z	Part No.	mm/Z			mm/Z		
10.5	6	2	50	4.0	6	58501105020	0.030	–	0.040	0.028	–	0.035
10.5	6	3	50	4.2	6	58501105030	0.030	–	0.040	0.028	–	0.035
13.5	10	2	56	4.6	8	58501135020	0.030	–	0.040	0.028	–	0.035
13.5	10	3	56	4.6	8	58501135030	0.030	–	0.040	0.028	–	0.035
13.5	10	4	56	4.6	8	58501135040	0.030	–	0.040	0.028	–	0.035
16.5	10	3	56	4.6	10	58501165030	0.030	–	0.040	0.028	–	0.035
16.5	10	4	56	4.6	10	58501165040	0.030	–	0.040	0.028	–	0.035
19.5	10	3	63	5.6	10	58501195030	0.030	–	0.040	0.028	–	0.035
19.5	10	4	63	5.6	10	58501195040	0.030	–	0.040	0.028	–	0.035
22.5	10	4	63	6.6	10	58501225040	0.035	–	0.045	0.033	–	0.040
25.5	10	5	63	7.5	10	58501255050	0.035	–	0.045	0.033	–	0.040
28.5	10	5	63	8.5	10	58501285050	0.035	–	0.045	0.033	–	0.040
32.5	12	5	71	8.5	10	58501325050	0.038	–	0.050	0.036	–	0.045
38.5	12	10	71	11.8	10	58501385100	0.038	–	0.050	0.036	–	0.045
45.5	12	10	71	11.8	10	58501455100	0.038	–	0.050	0.036	–	0.045

d_1	d_2	l_2
h11	h6	e8

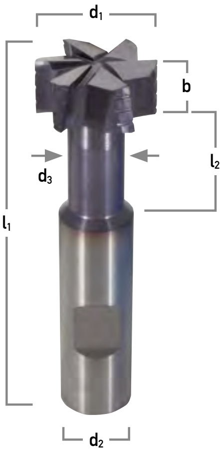
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 900 N/mm²	< 900 N/mm²	< 1000 N/mm²	< 500 N/mm²
V_c (m/min) Finishing	65	40	50	75
V_c (m/min) Roughing	50	25	35	60

Product family 160

58511

Alcrona Pro | Z 6 | HB | VHM | Type N | DIN 851B

Solid Carbide T-Slot Cutter



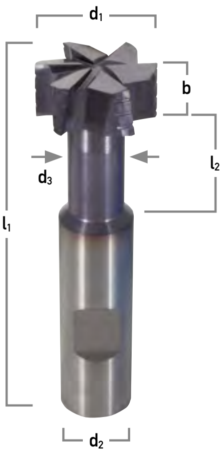
d_1 mm	d_2 mm	Corner chamfer	b mm	l_2 mm	l_1 mm	d_3 mm	Z	t-Nuten DIN 650	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
12.5	10	0.20	6	7	57	5	6	6	58511125060	0.030 – 0.040	0.028 – 0.035
16.0	10	0.20	8	10	62	7	6	8	58511160080	0.030 – 0.040	0.028 – 0.035
18.0	12	0.20	8	13	70	8	6	10	58511180080	0.030 – 0.040	0.028 – 0.035
21.0	12	0.20	9	16	74	10	6	12	58511210090	0.035 – 0.045	0.033 – 0.040
25.0	16	0.20	11	17	82	12	6	14	58511250110	0.035 – 0.045	0.033 – 0.040
28.0	16	0.20	12	22	85	13	6	16	58511280120	0.035 – 0.045	0.033 – 0.040
32.0	16	0.20	14	22	90	15	6	18	58511320140	0.038 – 0.050	0.036 – 0.045

d_1	d_2	b
d11	h6	d11

58512

Alcrona Pro | Z 6 | HB | VHM | Type NF | DIN 851B

Solid Carbide Roughing / Finishing T-Slot Cutter



d_1 mm	d_2 mm	Corner chamfer	b mm	l_2 mm	l_1 mm	d_3 mm	Z	t-Nuten DIN 650	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
12.5	10	0.20	6	7	57	5	6	6	58512125060	0.030 – 0.040	0.028 – 0.035
16.0	10	0.20	8	10	62	7	6	8	58512160080	0.030 – 0.040	0.028 – 0.035
18.0	12	0.20	8	13	70	8	6	10	58512180080	0.030 – 0.040	0.028 – 0.035
21.0	12	0.20	9	16	74	10	6	12	58512210090	0.035 – 0.045	0.033 – 0.040
25.0	16	0.20	11	17	82	12	6	14	58512250110	0.035 – 0.045	0.033 – 0.040
28.0	16	0.20	12	22	85	13	6	16	58512280120	0.035 – 0.045	0.033 – 0.040
32.0	16	0.20	14	22	90	15	6	18	58512320140	0.038 – 0.050	0.036 – 0.045

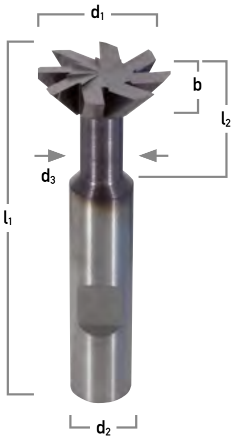
d_1	d_2	b
d11	h6	d11

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 900 N/mm²	< 900 N/mm²	< 1000 N/mm²	< 500 N/mm²
V_c (m/min) Finishing	70	40	55	75
V_c (m/min) Roughing	55	25	40	65

51833C

Alcrona Pro | Z 6–9 | HB | VHM | Type N | DIN 1833C

Solid Carbide Dovetail Cutter
45°



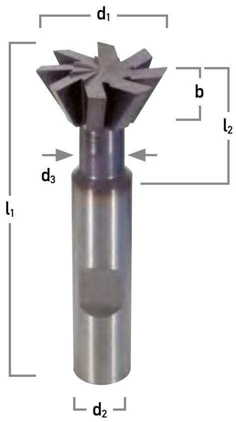
Angle	d_1 mm	d_2 mm	Corner chamfer	b mm	l_2 mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
45°	16	10	0.20	4	14	60	6.7	6	51833C4516	0.040 – 0.050	0.035 – 0.045
45°	20	12	0.20	5	11	63	7	8	51833C4520	0.040 – 0.050	0.035 – 0.045
45°	22	12	0.20	6	14	67	8	8	51833C4522	0.040 – 0.050	0.035 – 0.045
45°	25	12	0.20	6.3	14	67	8	8	51833C4525	0.045 – 0.055	0.040 – 0.050
45°	28	16	0.20	7.5	20	80	8.5	9	51833C4528	0.045 – 0.055	0.040 – 0.050
45°	32	16	0.20	8	14	71	13	9	51833C4532	0.045 – 0.055	0.040 – 0.050
45°	38	16	0.20	10	20	80	15	9	51833C4538	0.045 – 0.060	0.045 – 0.055

d_1	d_2	b
js16	h6	js14

51833C

Alcrona Pro | Z 6–9 | HB | VHM | Type N | DIN 1833C

Solid Carbide Dovetail Cutter
60°



Angle	d_1 mm	d_2 mm	Corner chamfer	b mm	l_2 mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
60°	16	10	0.20	6.3	11	60	6.7	6	51833C6016	0.040 – 0.050	0.035 – 0.045
60°	20	12	0.20	8	7	63	7	8	51833C6020	0.040 – 0.050	0.035 – 0.045
60°	22	12	0.20	9	11	67	8	8	51833C6022	0.040 – 0.050	0.035 – 0.045
60°	25	12	0.20	10	11	67	8	8	51833C6025	0.045 – 0.055	0.040 – 0.050
60°	28	16	0.20	11	17	80	8.5	9	51833C6028	0.045 – 0.055	0.040 – 0.050
60°	32	16	0.20	12.5	10	71	13	9	51833C6032	0.045 – 0.055	0.040 – 0.050
60°	38	16	0.20	16	14	80	15	9	51833C6038	0.045 – 0.060	0.045 – 0.055

d_1	d_2	b
js16	h6	js14

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 900 N/mm²	< 900 N/mm²	< 1000 N/mm²	< 500 N/mm²
V_c (m/min) Finishing	70	40	55	75
V_c (m/min) Roughing	55	25	40	65

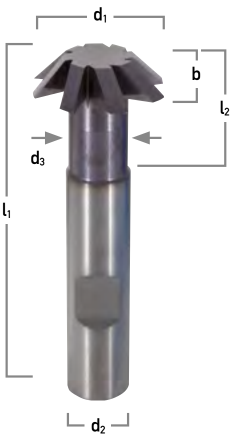
Product family 160

51833D

Alcrona Pro | Z 6–9 | HB | VHM | Type N | DIN 1833D

Solid Carbide Dovetail Cutter

45°



Angle	d1 mm	d2 mm	Corner chamfer	b mm	l2 mm	l1 mm	d3 mm	Z	Coated Part No.
45°	16	10	0.20	4	14	60	6.7	6	51833D4516
45°	20	12	0.20	5	11	63	7	8	51833D4520
45°	22	12	0.20	6	14	67	8	8	51833D4522
45°	25	12	0.20	6.3	15	67	8	8	51833D4525
45°	28	16	0.20	7.5	20	80	8.5	9	51833D4528
45°	32	16	0.20	8	13	71	13	9	51833D4532
45°	38	16	0.20	10	21	80	15	9	51833D4538

f_z Roughing mm/Z	f_z Finishing mm/Z
0.040 – 0.050	0.035 – 0.045
0.040 – 0.050	0.035 – 0.045
0.040 – 0.050	0.035 – 0.045
0.045 – 0.055	0.040 – 0.050
0.045 – 0.055	0.040 – 0.050
0.045 – 0.055	0.040 – 0.050
0.045 – 0.060	0.045 – 0.055

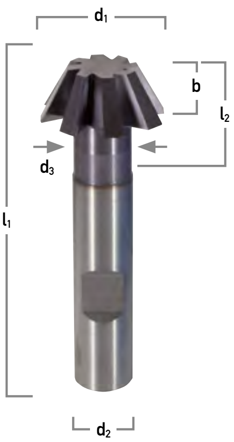
d1	d2	b
js16	h6	js14

51833D

Alcrona Pro | Z 6–9 | HB | VHM | Type N | DIN 1833D

Solid Carbide Dovetail Cutter

60°



Angle	d1 mm	d2 mm	Corner chamfer	b mm	l2 mm	l1 mm	d3 mm	Z	Coated Part No.
60°	16	10	0.20	6.3	12	60	6.7	6	51833D6016
60°	20	12	0.20	8	8	63	7	8	51833D6020
60°	22	12	0.20	9	10	67	8	8	51833D6022
60°	25	12	0.20	10	12	67	8	8	51833D6025
60°	28	16	0.20	11	17	80	8.5	9	51833D6028
60°	32	16	0.20	12.5	9	71	13	9	51833D6032
60°	38	16	0.20	16	15	80	15	9	51833D6038

f_z Roughing mm/Z	f_z Finishing mm/Z
0.040 – 0.050	0.035 – 0.045
0.040 – 0.050	0.035 – 0.045
0.040 – 0.050	0.035 – 0.045
0.045 – 0.055	0.040 – 0.050
0.045 – 0.055	0.040 – 0.050
0.045 – 0.055	0.040 – 0.050
0.045 – 0.060	0.045 – 0.055

d1	d2	b
js16	h6	js14

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 900 N/mm²	< 900 N/mm²	< 1000 N/mm²	< 500 N/mm²
V_c (m/min) Finishing	70	40	55	75
V_c (m/min) Roughing	55	25	40	65

HSS Line

PM & HSS End Mills

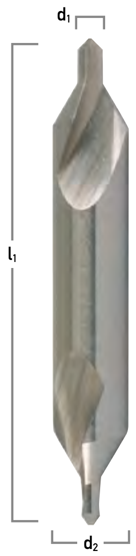
HSS Line

Performance
Endurance
Affordable

AZ333A

	Uncoated	TiN	Z 2	60°	Shape A	DIN 333A

HSS Center Drill



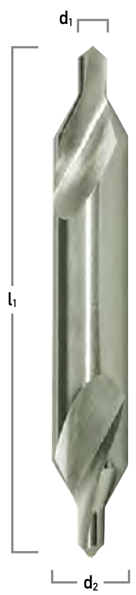
d_1 mm	d_2 mm	l_1 mm	Uncoated Part No.	Coated Part No.	f mm/min^{-1}
1.00	3.15	31.5	AZ333A0100	AZ333A0100TIN	0.02
1.25	3.15	31.5	AZ333A0125	AZ333A0125TIN	0.02
1.60	4.00	35.5	AZ333A0160	AZ333A0160TIN	0.02
2.00	5.00	40.0	AZ333A0200	AZ333A0200TIN	0.02
2.50	6.30	45.0	AZ333A0250	AZ333A0250TIN	0.03
3.15	8.00	50.0	AZ333A0315	AZ333A0315TIN	0.03
4.00	10.00	56.0	AZ333A0400	AZ333A0400TIN	0.03
5.00	12.50	63.0	AZ333A0500	AZ333A0500TIN	0.04
6.30	16.00	71.0	AZ333A0630	AZ333A0630TIN	0.05

d_1		d_2
1–2.5	0/+0.14	h9
3.15–5	0/+0.18	
6.3	0/+0.22	

AZ333A

	Uncoated	Z 2	60°	HSS-Co8	Form A	DIN 333A

HSS-Co8 Zentrierbohrer



d_1 mm	d_2 mm	l_1 mm	Uncoated Part No.	f mm/min^{-1}
1.00	3.15	31.5	AZ333A0100E	0.02
1.60	4.00	35.5	AZ333A0160E	0.02
2.00	5.00	40.0	AZ333A0200E	0.02
2.50	6.30	45.0	AZ333A0250E	0.03
3.15	8.00	50.0	AZ333A0315E	0.03
4.00	10.00	56.0	AZ333A0400E	0.03
5.00	12.50	63.0	AZ333A0500E	0.04

d_1		d_2
1–2.5	0/+0.14	h9
3.15–5	0/+0.18	

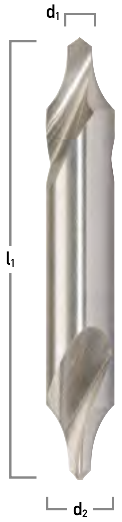
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 900 N/mm²	< 750 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min)	30	10	15	70

Product family 333

AZ333R

Uncoated | Z 2 | 60° | HSS | Shape R | DIN 333R

HSS Center Drill Radius Type



d_1	d_2	l_1	Uncoated	f
mm	mm	mm	Part No.	mm/min^{-1}
1.00	3.15	31.5	AZ333R0100	0.02
1.25	3.15	31.5	AZ333R0125	0.02
1.60	4.00	35.5	AZ333R0160	0.02
2.00	5.00	40.0	AZ333R0200	0.02
2.50	6.30	45.0	AZ333R0250	0.03
3.15	8.00	50.0	AZ333R0315	0.03
4.00	10.00	56.0	AZ333R0400	0.03
5.00	12.50	63.0	AZ333R0500	0.04
6.30	16.00	71.0	AZ333R0630	0.05

d_1		d_2
1 – 2.5	0/+0.14	h9
3.15 – 5	0/+0.18	
6.3	0/+0.22	

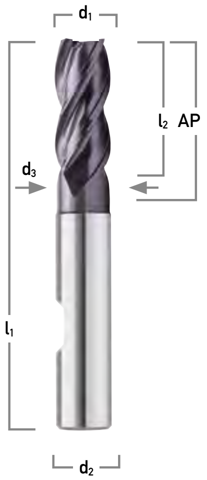
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 900 N/mm^2	< 750 N/mm^2	< 800 N/mm^2	< 600 N/mm^2
V_c (m/min)	30	10	15	70

Product family 333

PM 35382

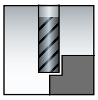
Alcrona Pro | Z 4 | HB | ≠ | PM | Type N | HPC | Manu-facturer standard

PM HPC End Mill

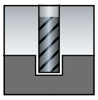


d_1	d_2
h10	h6

d_1 mm	d_2 mm	Corner chamfer	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	0.20	13	21.5	57	5.5	4	PM3538206A	0.026 – 0.044	0.025 – 0.038
8.0	10	0.20	19	29.0	63	7.5	4	PM3538208A	0.032 – 0.055	0.029 – 0.048
10.0	10	0.20	22	32.0	72	9.5	4	PM3538210A	0.042 – 0.077	0.039 – 0.067
12.0	12	0.20	26	38.0	83	11.5	4	PM3538212A	0.063 – 0.099	0.059 – 0.086
16.0	16	0.20	32	44.0	92	15.5	5	PM3538216A	0.095 – 0.143	0.088 – 0.124
18.0	16	0.20	32	43.5	92	15.5	5	PM3538218A	0.116 – 0.143	0.108 – 0.124
20.0	20	0.20	38	54.0	104	19.5	5	PM3538220A	0.137 – 0.187	0.127 – 0.162
25.0	25	0.20	45	64.0	121	24.5	6	PM3538225A	0.145 – 0.205	0.130 – 0.180



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB
Full slot a_p=1xD	70	60	55	55	50	50	70	60
Trimming a_e = 0,2xD	95	80	75	75	70	70	100	80

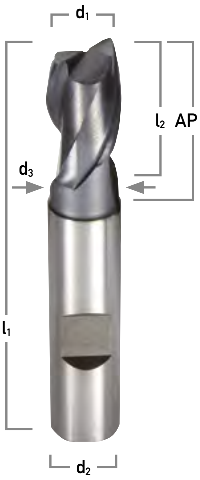
V_c (m/min)	Stainless austenitic	Stainless Acid-resistant austenitic	Heat-resistant materials	Titanium alloy	Alu & Al Alloys	Alu & Al Alloys
Tensile strength/Hardness	1.4301	1.4571	≤1200 N/mm²	≤850 N/mm²	< 10 % Si	> 10 % Si
Full slot a_p=1xD	40	30	60	40	155	95
Trimming a_e = 0,2xD	60	40	80	60	195	130

Product family 48

PM 122-0

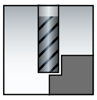
Alcrona Pro | Z 2 | HB | 30° | PM | Type N | DIN 327

PM End Mill

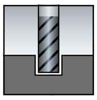


d_1	d_2
e10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
4.0	6	7	–	51	–	2	PM122004A	0.014 – 0.014	0.012 – 0.025
5.0	6	8	–	52	–	2	PM122005A	0.014 – 0.028	0.012 – 0.025
6.0	6	8	16	52	5.5	2	PM122006A	0.025 – 0.045	0.025 – 0.042
7.0	10	10	–	60	–	2	PM122007A	0.025 – 0.045	0.025 – 0.042
8.0	10	11	–	61	–	2	PM122008A	0.032 – 0.065	0.030 – 0.062
9.0	10	11	–	61	–	2	PM122009A	0.032 – 0.065	0.030 – 0.062
10.0	10	13	22	63	10	2	PM122010A	0.052 – 0.080	0.052 – 0.077
12.0	12	16	27	73	11	2	PM122012A	0.053 – 0.095	0.052 – 0.092
14.0	12	16	–	73	–	2	PM122014A	0.075 – 0.118	0.075 – 0.115
16.0	16	19	29	79	15	2	PM122016A	0.080 – 0.128	0.080 – 0.125
18.0	16	19	–	79	–	2	PM122018A	0.082 – 0.153	0.080 – 0.150
20.0	20	22	35	88	19	2	PM122020A	0.082 – 0.153	0.082 – 0.150



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

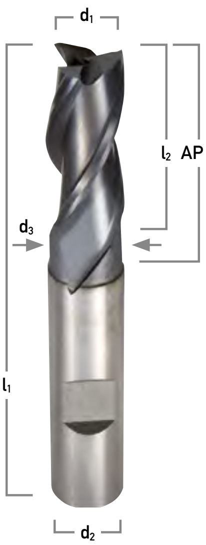


Full slot milling
$a_p = 1.5xD$

PM 132-2

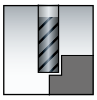
Alcrona Pro | Z 3 | HB | 30° | PM | Type N | DIN 844

PM End Mill



d_1	d_2
e10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	7	–	51	–	3	PM132202A	0.008 – 0.015	0.008 – 0.012
3.0	6	8	–	52	–	3	PM132203A	0.010 – 0.015	0.008 – 0.012
4.0	6	11	–	55	–	3	PM132204A	0.014 – 0.028	0.012 – 0.025
5.0	6	13	–	57	–	3	PM132205A	0.014 – 0.028	0.012 – 0.025
6.0	6	13	21	57	5.5	3	PM132206A	0.025 – 0.045	0.025 – 0.042
7.0	10	16	–	66	–	3	PM132207A	0.025 – 0.045	0.025 – 0.042
8.0	10	19	–	69	–	3	PM132208A	0.032 – 0.065	0.030 – 0.062
9.0	10	19	–	69	–	3	PM132209A	0.032 – 0.065	0.030 – 0.062
10.0	10	22	31	72	9	3	PM132210A	0.052 – 0.080	0.052 – 0.077
12.0	12	26	37	83	11	3	PM132212A	0.053 – 0.095	0.052 – 0.092
14.0	12	26	–	83	–	3	PM132214A	0.075 – 0.118	0.075 – 0.115
16.0	16	32	–	92	–	3	PM132216A	0.080 – 0.128	0.080 – 0.125
18.0	16	32	–	92	–	3	PM132218A	0.082 – 0.153	0.080 – 0.150
20.0	20	38	52	104	19	3	PM132220A	0.082 – 0.153	0.082 – 0.150
25.0	25	45	64	121	24	3	PM132225A	0.084 – 0.158	0.082 – 0.155



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

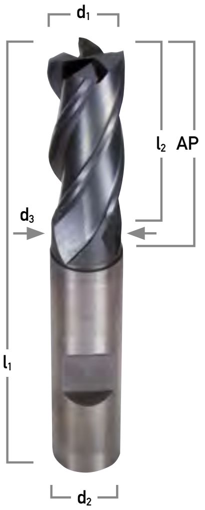
Full slot milling
$a_p = 1.5xD$

Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

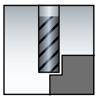
PM 142-2

Alcrona Pro | Z 4 | HB | 30° | PM | Type N | DIN 844

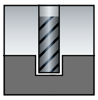
PM End Mill



d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	7	–	51	–	4	PM142202A	0.008 – 0.015	0.008 – 0.012
3.0	6	8	–	52	–	4	PM142203A	0.010 – 0.015	0.008 – 0.012
4.0	6	11	–	55	–	4	PM142204A	0.014 – 0.014	0.012 – 0.025
5.0	6	13	–	57	–	4	PM142205A	0.014 – 0.028	0.012 – 0.025
6.0	6	13	21	57	5.5	4	PM142206A	0.025 – 0.045	0.025 – 0.042
7.0	10	16	–	66	–	4	PM142207A	0.025 – 0.045	0.025 – 0.042
8.0	10	19	–	69	–	4	PM142208A	0.032 – 0.065	0.030 – 0.062
9.0	10	19	–	69	–	4	PM142209A	0.032 – 0.065	0.030 – 0.062
10.0	10	22	32	72	9	4	PM142210A	0.052 – 0.080	0.052 – 0.077
12.0	12	26	–	83	–	4	PM142212A	0.053 – 0.095	0.052 – 0.092
14.0	12	26	–	83	–	4	PM142214A	0.075 – 0.118	0.075 – 0.115
16.0	16	32	42	92	15	4	PM142216A	0.080 – 0.128	0.080 – 0.125
18.0	16	32	–	92	–	4	PM142218A	0.082 – 0.153	0.080 – 0.150
20.0	20	38	52	104	19	4	PM142220A	0.082 – 0.153	0.082 – 0.150



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$



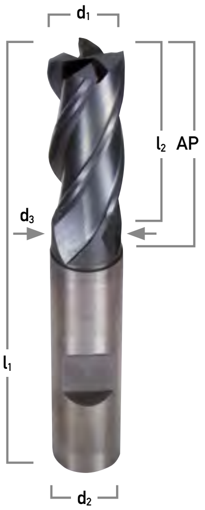
Full slot milling
$a_p = 1.5xD$

d_1	d_2
k10	h6

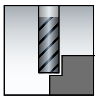
PM 162-2

Alcrona Pro | Z 6 | HB | 30° | PM | Type N | DIN 844

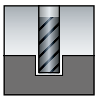
PM End Mill



d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
25,0	25	45	64	121	24	6	PM162225A	0,084 – 0,158	0,082 – 0,155
30,0	25	45	–	121	–	6	PM162230A	0,084 – 0,158	0,082 – 0,155
32,0	32	53	71	133	31	6	PM162232A	0,084 – 0,158	0,082 – 0,155



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.5xD$

d_1	d_2
k10	h6

Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

Product family 48

PM 142-4

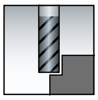
Alcrona Pro | Z 4 | HB | 30° | PM | Type N | DIN 844L

PM End Mill

d_1	d_2
k10	h6

d_1	d_2	l_2	AP	l_1	d_3		Coated
mm	mm	mm	mm	mm	mm	Z	Part No.
6.0	6	24	32	68	5.5	4	PM142406A
8.0	10	38	–	88	–	4	PM142408A
10.0	10	45	54	95	9	4	PM142410A
12.0	12	53	64	110	–	4	PM142412A
14.0	12	53	–	110	–	4	PM142414A
16.0	16	63	73	123	15	4	PM142416A
18.0	16	63	–	123	–	4	PM142418A
20.0	20	75	89	141	19	4	PM142420A

f_z Roughing mm/z	f_z Finishing mm/z
0.025 – 0.045	0.025 – 0.042
0.032 – 0.065	0.030 – 0.062
0.052 – 0.080	0.052 – 0.077
0.053 – 0.095	0.052 – 0.092
0.075 – 0.118	0.075 – 0.115
0.080 – 0.128	0.080 – 0.125
0.082 – 0.153	0.080 – 0.150
0.082 – 0.153	0.082 – 0.150



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.5xD$

PM 162-4

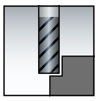
Alcrona Pro | Z 6 | HB | 30° | PM | Type N | DIN 844L

PM End Mill

d_1	d_2
k10	h6

d_1	d_2	l_2	AP	l_1	d_3		Coated
mm	mm	mm	mm	mm	mm	Z	Part No.
25.0	25	90	108	166	24	6	PM162425A
32.0	32	106	124	186	31	6	PM162432A

f_z Roughing mm/z	f_z Finishing mm/z
0.084 – 0.158	0.082 – 0.155
0.084 – 0.158	0.082 – 0.155



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

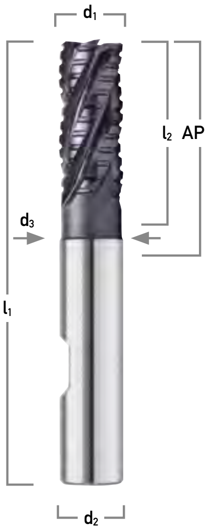
Full slot milling
$a_p = 1.5xD$

Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

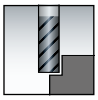
PM 442-4

Alcrona Pro | Z 4-5 | HB | 30° | PM | Type NF | DIN 844

PM Roughing / Finishing End Mill



d_1	d_2	l_2	AP	l_1	d_3		Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z	mm/Z
6.0	6	13	21.5	57	5.5	4	PM442406A	0.025 – 0.045	0.025 – 0.042
8.0	10	19	23.0	69	7.5	4	PM442408A	0.032 – 0.065	0.030 – 0.062
10.0	10	22	32.0	72	9.5	5	PM442410A	0.052 – 0.080	0.052 – 0.077
12.0	12	26	38.0	83	11.5	5	PM442412A	0.053 – 0.095	0.052 – 0.092
14.0	12	26	37.0	83	11.4	5	PM442414A	0.075 – 0.118	0.075 – 0.115
16.0	16	32	44.0	92	15.5	5	PM442416A	0.080 – 0.128	0.080 – 0.125
20.0	20	38	53.0	104	19.5	5	PM442420A	0.082 – 0.153	0.082 – 0.150



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

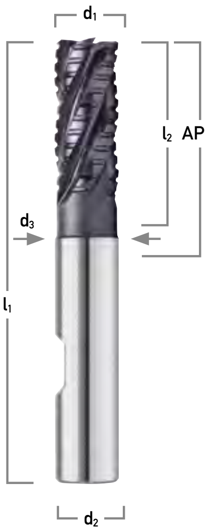
Full slot milling
$a_p = 2.0xD$

d_1	d_2
k12	h6

PM 542-4

Alcrona Pro | Z 5 | HB | 30° | PM | Type NF | DIN 844

PM Roughing / Finishing End Mill



d_1	d_2	l_2	AP	l_1	d_3		Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z	mm/Z
6.0	6	24	33.5	68	5.5	4	PM542406A	0.025 – 0.045	0.025 – 0.042
8.0	10	38	38.0	88	7.5	4	PM542408A	0.032 – 0.065	0.030 – 0.062
10.0	10	45	54.0	95	9.5	4	PM542410A	0.052 – 0.080	0.052 – 0.077
12.0	12	53	64.0	110	11.5	4	PM542412A	0.053 – 0.095	0.052 – 0.092
16.0	16	63	74.0	123	15.5	4	PM542416A	0.080 – 0.128	0.080 – 0.125
20.0	20	75	90.0	141	19.5	4	PM542420A	0.082 – 0.153	0.082 – 0.150

d_1	d_2
k12	h6

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 2.0xD$

V_c (m/min)	General structural steels		Free machining steels	Non-alloy Q & T steels	Alloyed Q & T steels	Tool steels	Cast iron (GG)	Cast iron (gray, ductile, malleable)
Tensile strength/ Hardness / etc.	≤ 500 N/mm²	≤ 850 N/mm²	≤ 1.000 N/mm²	≤ 1.000 N/mm²	≤ 1.200 N/mm²	≤ 1.300 N/mm²	< 450 N/mm²	> 260 HB
Full slot a_p=1xD	70	60	55	55	50	30	70	60
Trimming a_e = 0,2xD	90	80	75	75	70	70	100	80

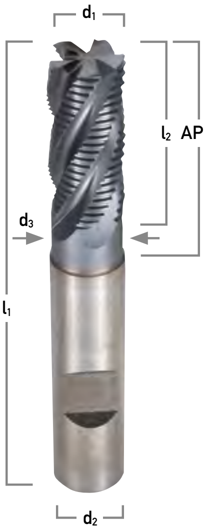
V_c (m/min)	Stainless austenitic	Stainless Acid-resistant austenitic	Heat-resistant materials	Titanium alloy
Tensile strength/Hardness	1.4301	1.4571	≤1200 N/mm²	≤850 N/mm²
Full slot a_p=1xD	40	30	60	40
Trimming a_e = 0,2xD	60	40	80	60

Product family 48

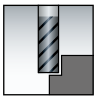
PM 642-2

Alcrona Pro | Z 4 | HB | 30° | PM | Type HR | DIN 844

PM Roughing End Mill



d1	d2	l2	AP	l1	d3		Coated	f_z Roughing		
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z		
6.0	6	13	21	57	5.5	4	PM642206A	0.025	–	0.045
7.0	10	16	–	66	–	4	PM642207A	0.025	–	0.045
8.0	10	19	–	69	–	4	PM642208A	0.032	–	0.065
9.0	10	19	–	69	–	4	PM642209A	0.032	–	0.065



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

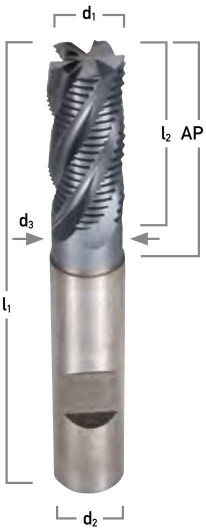
Full slot milling
$a_p = 2.0xD$

d1	d2
k12	h6

PM 652-2

Alcrona Pro | Z 5 | HB | 30° | PM | Type HR | DIN 844

PM Roughing End Mill



d1	d2	l2	AP	l1	d3		Coated	f_z Roughing		
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z		
10.0	10	22	31	72	9	5	PM652210A	0.052	–	0.080
12.0	12	26	37	83	11	5	PM652212A	0.053	–	0.095
14.0	12	26	–	83	–	5	PM652214A	0.075	–	0.118
16.0	16	32	42	92	15	5	PM652216A	0.080	–	0.128
18.0	16	32	–	92	–	5	PM652218A	0.082	–	0.153
20.0	20	38	52	104	19	5	PM652220A	0.082	–	0.153
22.0	20	38	–	104	–	5	PM652222A	0.082	–	0.153
25.0	25	45	64	121	24	5	PM652225A	0.048	–	0.158
30.0	25	45	–	121	–	5	PM652230A	0.084	–	0.158

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 2.0xD$

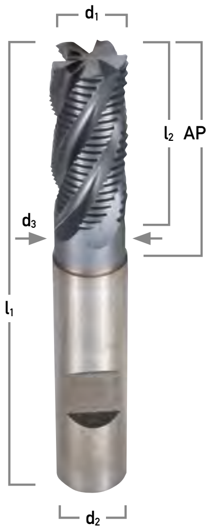
d1	d2
k12	h6

Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

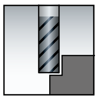
PM 662-2

Alcrona Pro | Z 6 | HB | 30° | PM | Type HR | DIN 844

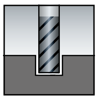
PM Roughing End Mill



d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z
32.0	32	53	71	133	31	6	PM662232A	0.084 – 0.158



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 2.0xD$

d_1	d_2
k12	h6

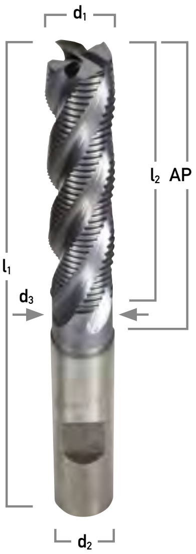
Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

Product family 48

PM 642-4

Alcrona Pro | Z 4 | HB | 30° | PM | Type HR | DIN 844L

PM Roughing End Mill



d_1	d_2	l_2	AP	l_1	d_3		Coated	f_z Roughing		
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z		
6.0	6	24	32	68	5.5	4	PM642406A	0.025	–	0.045
8.0	10	38	–	88	–	4	PM642408A	0.032	–	0.065
10.0	10	45	54	95	9	4	PM642410A	0.052	–	0.080
12.0	12	53	64	110	11	4	PM642412A	0.053	–	0.095
14.0	12	53	–	110	–	4	PM642414A	0.075	–	0.118
16.0	16	63	73	123	15	4	PM642416A	0.080	–	0.128
18.0	16	63	–	123	–	4	PM642418A	0.082	–	0.153
20.0	20	75	89	141	19	4	PM642420A	0.082	–	0.153

Peripheral milling
$a_e = 0.3xD$
$a_p = 2.0xD$

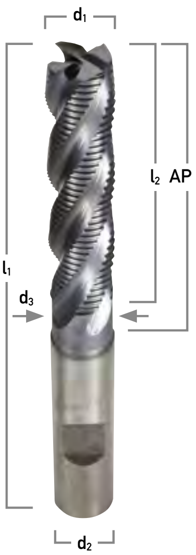
Full slot milling
$a_p = 2.0xD$

d_1	d_2
k12	h6

PM 652-4

Alcrona Pro | Z 5 | HB | 30° | PM | Type HR | DIN 844L

PM Roughing End Mill



d_1	d_2	l_2	AP	l_1	d_3		Coated	f_z Roughing		
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z		
25.0	25	90	108	166	24	5	PM652425A	0.048	–	0.158

Peripheral milling
$a_e = 0.3xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 2.0xD$

d_1	d_2
k12	h6

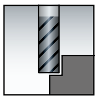
Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

PM 662-4

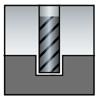
Alcrona Pro | Z 6 | HB | 30° | PM | Type HR | DIN 844L

PM Roughing End Mill

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z
32.0	32	106	124	186	31	6	PM662432A	0.084 – 0.158



Peripheral milling
$a_e = 0.3xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 2.0xD$

d_1	d_2
k12	h6

Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

Product family 48

PM 645-2

Alcrona Pro | Z 4 | HB | 45° | PM | Type HR | DIN 844

PM Roughing End Mill

d_1	d_2
k12	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z
6.0	6	13	20	57	5.5	4	PM645206A	0.025 – 0.045
7.0	10	16	–	66	–	4	PM645207A	0.025 – 0.045
8.0	10	19	–	69	–	4	PM645208A	0.032 – 0.065
9.0	10	19	–	69	–	4	PM645209A	0.032 – 0.065
10.0	10	22	31	72	9	4	PM645210A	0.052 – 0.080
12.0	12	26	37	83	11	4	PM645212A	0.053 – 0.095
14.0	12	26	–	83	–	4	PM645214A	0.075 – 0.118

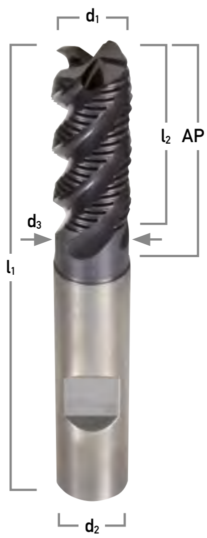
Peripheral milling
$a_e = 0.3xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 2.0xD$

PM 645-2

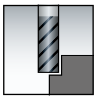
Alcrona Pro | Z 5 | HB | 45° | PM | Type HR | DIN 844

PM Roughing End Mill

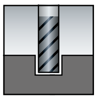


d_1	d_2
k12	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Coated Part No.	f_z Roughing mm/Z
16.0	16	32	42	92	15	5	PM645216A	0.080 – 0.128
18.0	16	32	–	92	–	5	PM645218A	0.082 – 0.153
20.0	20	38	52	104	19	5	PM645220A	0.082 – 0.153
22.0	20	38	–	104	–	5	PM645222A	0.082 – 0.153
25.0	25	45	64	121	24	5	PM645225A	0.084 – 0.158



Peripheral milling
$a_e = 0.3xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 2.0xD$

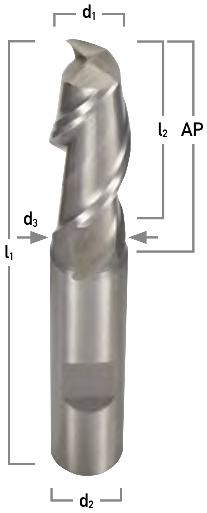
Material	Steel	Stainless	Cast	Alu	Special and Titanium alloys
Tensile strength/Hardness	< 850 N/mm²	< 1100 N/mm²	< 800 N/mm²	< 600 N/mm²	< 1400 N/mm²
V_c (m/min) Finishing	85	60	75	195	60
V_c (m/min) Roughing	65	40	50	155	40

Product family 48

AG 022-2

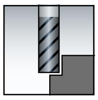
Uncoated | Z 2 | HB | 40° | HSS | Type W | DIN 327

HSS End Mill For Aluminium

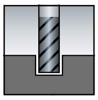


d_1	d_2
e10	h6

d_1	d_2	l_2	AP	l_1	d_3		Uncoated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z			mm/Z		
2.0	6	7	–	51	–	2	AG022202	0.003	–	0.007	0.001	–	0.005
2.5	6	8	–	52	–	2	AG0222025	0.003	–	0.007	0.001	–	0.005
3.0	6	8	–	52	–	2	AG022203	0.005	–	0.012	0.003	–	0.010
3.5	6	10	–	54	–	2	AG0222035	0.005	–	0.012	0.003	–	0.010
4.0	6	11	–	55	–	2	AG022204	0.007	–	0.017	0.005	–	0.015
4.5	6	13	–	57	–	2	AG0222045	0.007	–	0.017	0.005	–	0.015
5.0	6	13	–	57	–	2	AG022205	0.009	–	0.022	0.007	–	0.020
5.5	6	13	–	57	–	2	AG0222055	0.009	–	0.022	0.007	–	0.020
6.0	6	13	21	57	5.5	2	AG022206	0.011	–	0.026	0.009	–	0.024
6.5	8	16	–	60	–	2	AG0222065	0.011	–	0.026	0.009	–	0.024
7.0	8	16	–	60	–	2	AG022207	0.014	–	0.031	0.012	–	0.029
7.5	8	19	–	63	–	2	AG0222075	0.014	–	0.031	0.012	–	0.029
8.0	8	19	33	69	7.5	2	AG022208	0.016	–	0.034	0.014	–	0.032
8.5	10	19	–	69	–	2	AG0222085	0.016	–	0.034	0.014	–	0.032
9.0	10	19	–	69	–	2	AG022209	0.018	–	0.037	0.016	–	0.035
9.5	10	22	–	72	–	2	AG0222095	0.018	–	0.037	0.016	–	0.035
10.0	10	22	32	72	9.0	2	AG022210	0.020	–	0.040	0.018	–	0.038
11.0	12	22	–	79	–	2	AG022211	0.020	–	0.040	0.018	–	0.038
12.0	12	26	38	83	11.0	2	AG022212	0.024	–	0.048	0.022	–	0.046
13.0	12	26	–	83	–	2	AG022213	0.026	–	0.055	0.024	–	0.053
14.0	12	26	–	83	–	2	AG022214	0.026	–	0.055	0.024	–	0.053
15.0	16	32	–	92	–	2	AG022215	0.029	–	0.056	0.027	–	0.054
16.0	16	32	44	92	15.0	2	AG022216	0.029	–	0.056	0.027	–	0.054
18.0	16	32	–	92	–	2	AG022218	0.035	–	0.062	0.033	–	0.060
20.0	20	38	54	104	19.0	2	AG022220	0.035	–	0.062	0.033	–	0.060
22.0	20	38	–	104	–	2	AG022222	0.038	–	0.065	0.036	–	0.063
24.0	25	45	–	121	–	2	AG022224	0.041	–	0.068	0.039	–	0.066
25.0	25	45	65	121	24.0	2	AG022225	0.041	–	0.068	0.039	–	0.066
28.0	25	45	–	121	–	2	AG022228	0.050	–	0.077	0.048	–	0.075
30.0	25	45	–	121	–	2	AG022230	0.050	–	0.077	0.048	–	0.075



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

Material	ALU	Plastics	Brass	Bronze
Tensile strength/Hardness	< 600 N/mm²		< 600 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	120	125	95	60
V_c (m/min) Roughing	80	85	55	35

Product family 45

ToolFactory Cutting Tool Solutions

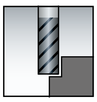
AG 022-4

Uncoated | Z 2 | HB | 40° | HSS | Type W | DIN 844L

HSS End Mill For Aluminium

d_1	d_2
e10	h6

d_1	d_2	l_2	l_1		Uncoated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	Z	Part No.	mm/Z			mm/Z		
2.5	6	10	54	2	AG0224025	0.003	–	0.007	0.001	–	0.005
3.0	6	12	56	2	AG022403	0.005	–	0.012	0.003	–	0.010
4.0	6	19	63	2	AG022404	0.007	–	0.017	0.005	–	0.015
5.0	6	24	68	2	AG022405	0.009	–	0.022	0.007	–	0.020
6.0	6	24	68	2	AG022406	0.011	–	0.026	0.009	–	0.024
7.0	8	30	74	2	AG022407	0.014	–	0.031	0.012	–	0.029
8.0	8	38	82	2	AG022408	0.016	–	0.034	0.014	–	0.032
9.0	10	38	88	2	AG022409	0.018	–	0.037	0.016	–	0.035
10.0	10	45	95	2	AG022410	0.020	–	0.040	0.018	–	0.038
11.0	12	45	102	2	AG022411	0.020	–	0.040	0.018	–	0.038
12.0	12	53	110	2	AG022412	0.024	–	0.048	0.022	–	0.046
14.0	12	53	110	2	AG022414	0.026	–	0.055	0.024	–	0.053
16.0	16	63	123	2	AG022416	0.029	–	0.056	0.027	–	0.054
18.0	16	63	123	2	AG022418	0.035	–	0.062	0.033	–	0.060
20.0	20	75	141	2	AG022420	0.035	–	0.062	0.033	–	0.060
22.0	20	75	141	2	AG022422	0.038	–	0.065	0.036	–	0.063
25.0	25	90	166	2	AG022425	0.041	–	0.068	0.039	–	0.066
28.0	25	90	166	2	AG022428	0.050	–	0.077	0.048	–	0.075
30.0	25	90	166	2	AG022430	0.050	–	0.077	0.048	–	0.075
32.0	32	106	186	2	AG022432	0.054	–	0.082	0.052	–	0.080

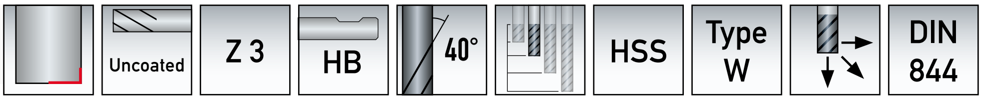


Peripheral milling
$a_e = 0.2xD$
$a_p = 1.5xD$

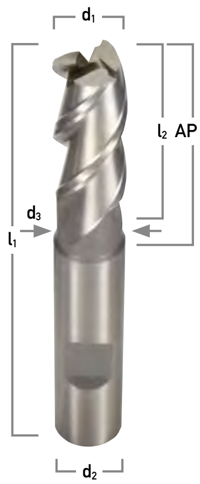
Full slot milling
$a_p = 1.0xD$

Material	ALU	Plastics	Brass	Bronze
Tensile strength/Hardness	< 600 N/mm²		< 600 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	120	125	95	60
V_c (m/min) Roughing	80	85	55	35

AG 032-2

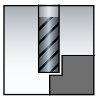


HSS End Mill For Aluminium

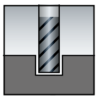


d1	d2
h10	h6

d1 mm	d2 mm	l2 mm	AP mm	l1 mm	d3 mm	Z	Uncoated Part No.	fz Roughing mm/Z	fz Finishing mm/Z
2.0	6	7	–	51	–	3	AG032202	0.003 – 0.007	0.001 – 0.005
2.5	6	8	–	52	–	3	AG0322025	0.003 – 0.007	0.001 – 0.005
3.0	6	8	–	52	–	3	AG032203	0.005 – 0.012	0.003 – 0.010
3.5	6	10	–	54	–	3	AG0322035	0.005 – 0.012	0.003 – 0.010
4.0	6	11	–	55	–	3	AG032204	0.007 – 0.017	0.005 – 0.015
4.5	6	13	–	57	–	3	AG0322045	0.007 – 0.017	0.005 – 0.015
5.0	6	13	–	57	–	3	AG032205	0.009 – 0.022	0.007 – 0.020
5.5	6	13	–	57	–	3	AG0322055	0.009 – 0.022	0.007 – 0.020
6.0	6	13	21	57	5.5	3	AG032206	0.011 – 0.026	0.009 – 0.024
6.5	8	16	–	60	–	3	AG0322065	0.011 – 0.026	0.009 – 0.024
7.0	8	16	–	60	–	3	AG032207	0.014 – 0.031	0.012 – 0.029
7.5	8	19	–	63	–	3	AG0322075	0.014 – 0.031	0.012 – 0.029
8.0	8	19	33	69	7.5	3	AG032208	0.016 – 0.034	0.014 – 0.032
8.5	10	19	–	69	–	3	AG0322085	0.016 – 0.034	0.014 – 0.032
9.0	10	19	–	69	–	3	AG032209	0.018 – 0.037	0.016 – 0.035
9.5	10	22	–	72	–	3	AG0322095	0.018 – 0.037	0.016 – 0.035
10.0	10	22	32	72	9.0	3	AG032210	0.020 – 0.040	0.018 – 0.038
11.0	12	22	–	79	–	3	AG032211	0.020 – 0.040	0.018 – 0.038
12.0	12	26	38	83	11.0	3	AG032212	0.024 – 0.048	0.022 – 0.046
13.0	12	26	–	83	–	3	AG032213	0.026 – 0.055	0.024 – 0.053
14.0	12	26	–	83	–	3	AG032214	0.026 – 0.055	0.024 – 0.053
15.0	16	32	–	92	–	3	AG032215	0.029 – 0.056	0.027 – 0.054
16.0	16	32	44	92	15.0	3	AG032216	0.029 – 0.056	0.027 – 0.054
18.0	16	32	–	92	–	3	AG032218	0.035 – 0.062	0.033 – 0.060
20.0	20	38	54	104	19.0	3	AG032220	0.035 – 0.062	0.033 – 0.060
22.0	20	38	–	104	–	3	AG032222	0.038 – 0.065	0.036 – 0.063
24.0	25	45	–	121	–	3	AG032224	0.041 – 0.068	0.039 – 0.066
25.0	25	45	65	121	24.0	3	AG032225	0.041 – 0.068	0.039 – 0.066
28.0	25	45	–	121	–	3	AG032228	0.050 – 0.077	0.048 – 0.075
30.0	25	45	–	121	–	3	AG032230	0.050 – 0.077	0.048 – 0.075



Peripheral milling
$a_e = 0.2xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

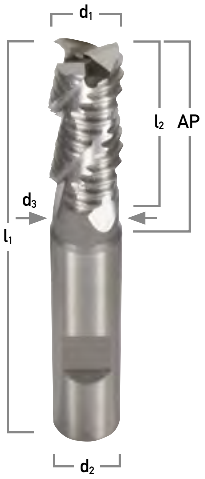
Material	ALU	Plastics	Brass	Bronze
Tensile strength/Hardness	< 600 N/mm²		< 600 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	120	125	95	60
V_c (m/min) Roughing	80	85	55	35

Product family 45

AG 832-2

Uncoated | Z 3 | HB | 40° | HSS | Type WR | DIN 844

HSS Roughing End Mill For Aluminium



d₁	d₂	l₂	AP	l₁	d₃		Uncoated	f_z Roughing		
mm	mm	mm	mm	mm	mm	Z	Part No.	mm/Z		
6.0	6	13	21	57	5.5	3	AG832206	0.008	–	0.015
8.0	8	19	33	69	7.5	3	AG832208	0.012	–	0.021
10.0	10	22	32	72	9.0	3	AG832210	0.015	–	0.027
12.0	12	26	38	83	11.0	3	AG832212	0.018	–	0.032
14.0	12	26	–	83	–	3	AG832214	0.020	–	0.034
16.0	16	32	–	92	–	3	AG832216	0.022	–	0.040
18.0	16	32	–	92	–	3	AG832218	0.024	–	0.043
20.0	20	38	54	104	19.0	3	AG832220	0.025	–	0.047
25.0	25	45	65	121	24.0	3	AG832225	0.037	–	0.062
30.0	25	45	–	121	–	3	AG832230	0.045	–	0.074

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 2.0xD$

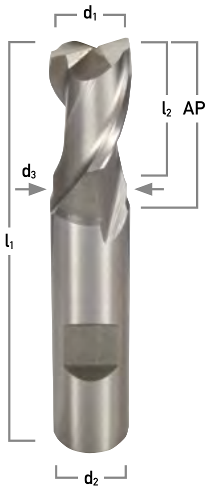
d₁	d₂
js14	h6

Material	ALU	Plastics	Brass	Bronze
Tensile strength/Hardness	< 600 N/mm²		< 600 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	120	125	95	60
V_c (m/min) Roughing	80	85	55	35

AG 122-0

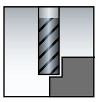
Uncoated | Alcrona Pro | Z 2 | HB | 30° | HSS | Type N | DIN 327

HSS End Mill

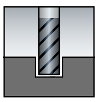


d_1	d_2
e10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	6	3	–	48	–	2	AG122001	AG122001A	0.003 – 0.006	0.001 – 0.004
1.5	6	3	–	48	–	2	AG1220015	AG1220015A	0.003 – 0.006	0.001 – 0.004
2.0	6	4	–	48	–	2	AG122002	AG122002A	0.003 – 0.007	0.001 – 0.005
2.5	6	5	–	49	–	2	AG1220025	AG1220025A	0.003 – 0.007	0.001 – 0.005
2.8	6	5	–	49	–	2	AG1220028	AG1220028A	0.005 – 0.012	0.003 – 0.010
3.0	6	5	–	49	–	2	AG122003	AG122003A	0.005 – 0.012	0.003 – 0.010
3.5	6	6	–	50	–	2	AG1220035	AG1220035A	0.005 – 0.012	0.003 – 0.010
3.8	6	7	–	51	–	2	AG1220038	AG1220038A	0.007 – 0.017	0.005 – 0.015
4.0	6	7	–	51	–	2	AG122004	AG122004A	0.007 – 0.017	0.005 – 0.015
4.5	6	8	–	52	–	2	AG1220045	AG1220045A	0.007 – 0.017	0.005 – 0.015
4.8	6	8	–	52	–	2	AG1220048	AG1220048A	0.009 – 0.022	0.007 – 0.020
5.0	6	8	–	52	–	2	AG122005	AG122005A	0.009 – 0.022	0.007 – 0.020
5.5	6	8	–	52	–	2	AG1220055	AG1220055A	0.009 – 0.022	0.007 – 0.020
5.75	6	8	–	52	–	2	AG12200575	AG12200575A	0.011 – 0.026	0.009 – 0.024
6.0	6	8	16	52	5.5	2	AG122006	AG122006A	0.011 – 0.026	0.009 – 0.024
6.5	8	10	–	54	–	2	AG1220065	AG1220065A	0.011 – 0.026	0.009 – 0.024
6.75	8	10	–	54	–	2	AG12200675	AG12200675A	0.014 – 0.031	0.012 – 0.029
7.0	8	10	–	54	–	2	AG122007	AG122007A	0.014 – 0.031	0.012 – 0.029
7.5	8	11	–	55	–	2	AG1220075	AG1220075A	0.014 – 0.031	0.012 – 0.029
7.75	8	11	–	55	–	2	AG12200775	AG12200775A	0.016 – 0.034	0.014 – 0.032
8.0	8	11	19	55	7.5	2	AG122008	AG122008A	0.016 – 0.034	0.014 – 0.032
8.5	10	11	–	61	–	2	AG1220085	AG1220085A	0.016 – 0.034	0.014 – 0.032
8.7	10	11	–	61	–	2	AG1220087	AG1220087A	0.018 – 0.037	0.016 – 0.035
9.0	10	11	–	61	–	2	AG122009	AG122009A	0.018 – 0.037	0.016 – 0.035
9.5	10	13	–	63	–	2	AG1220095	AG1220095A	0.018 – 0.037	0.016 – 0.035
9.7	10	13	–	63	–	2	AG1220097	AG1220097A	0.020 – 0.040	0.018 – 0.038
10.0	10	13	23	63	9.0	2	AG122010	AG122010A	0.020 – 0.040	0.018 – 0.038
10.5	12	13	–	70	–	2	AG1220105	AG1220105A	0.020 – 0.040	0.018 – 0.038
11.0	12	13	–	70	–	2	AG122011	AG122011A	0.022 – 0.045	0.020 – 0.043
11.7	12	16	–	73	–	2	AG1220117	AG1220117A	0.024 – 0.048	0.022 – 0.046
12.0	12	16	28	73	11.0	2	AG122012	AG122012A	0.024 – 0.048	0.022 – 0.046
13.0	12	16	–	73	–	2	AG122013	AG122013A	0.026 – 0.055	0.024 – 0.053
14.0	12	16	–	73	–	2	AG122014	AG122014A	0.026 – 0.055	0.024 – 0.053
15.0	16	19	–	79	–	2	AG122015	AG122015A	0.029 – 0.056	0.027 – 0.054
16.0	16	19	31	79	15.0	2	AG122016	AG122016A	0.029 – 0.056	0.027 – 0.054
17.0	16	19	–	79	–	2	AG122017	AG122017A	0.032 – 0.058	0.030 – 0.056
18.0	16	19	–	79	–	2	AG122018	AG122018A	0.035 – 0.062	0.033 – 0.060
19.0	20	22	–	88	–	2	AG122019	AG122019A	0.035 – 0.062	0.033 – 0.060
20.0	20	22	38	88	19.0	2	AG122020	AG122020A	0.035 – 0.062	0.033 – 0.060
21.0	20	22	–	88	–	2	AG122021	AG122021A	0.038 – 0.065	0.036 – 0.063
22.0	20	22	–	88	–	2	AG122022	AG122022A	0.038 – 0.065	0.036 – 0.063
24.0	25	26	–	102	–	2	AG122024	AG122024A	0.041 – 0.068	0.039 – 0.066
25.0	25	26	46	102	24.0	2	AG122025	AG122025A	0.041 – 0.068	0.039 – 0.066
26.0	25	26	–	102	–	2	AG122026	AG122026A	0.043 – 0.071	0.041 – 0.068
28.0	25	26	–	102	–	2	AG122028	AG122028A	0.050 – 0.077	0.048 – 0.075
30.0	25	26	–	102	–	2	AG122030	AG122030A	0.050 – 0.077	0.048 – 0.075
32.0	32	32	52	112	31.0	2	AG122032	AG122032A	0.054 – 0.081	0.052 – 0.079
36.0	32	32	–	112	–	2	AG122036	AG122036A	0.062 – 0.089	0.060 – 0.087
40.0	40	38	60	130	39.0	2	AG122040	AG122040A	0.066 – 0.093	0.064 – 0.091



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

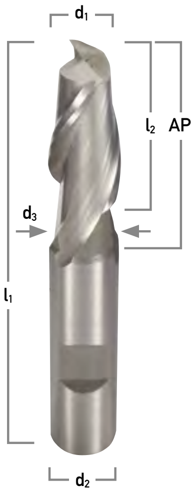
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	70	55	65	135
V_c (m/min) Roughing	50	35	45	115

Product family 45

AG 122-2

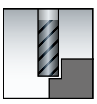
Uncoated | Alcrona Pro | Z 2 | HB | 30° | HSS | Type N | DIN 844

HSS End Mill



d1	d2
e10	h6

d1 mm	d2 mm	l2 mm	AP mm	l1 mm	d3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.5	6	7	–	51	–	2	AG1222015	AG1222015A	0.003 – 0.006	0.001 – 0.004
2.0	6	7	–	51	–	2	AG122202	AG122202A	0.003 – 0.007	0.001 – 0.005
2.5	6	8	–	52	–	2	AG1222025	AG1222025A	0.003 – 0.007	0.001 – 0.005
2.8	6	8	–	52	–	2	AG1222028	AG1222028A	0.005 – 0.012	0.003 – 0.010
3.0	6	8	–	52	–	2	AG122203	AG122203A	0.005 – 0.012	0.003 – 0.010
3.5	6	10	–	54	–	2	AG1222035	AG1222035A	0.005 – 0.012	0.003 – 0.010
3.8	6	11	–	55	–	2	AG1222038	AG1222038A	0.007 – 0.017	0.005 – 0.015
4.0	6	11	–	55	–	2	AG122204	AG122204A	0.007 – 0.017	0.005 – 0.015
4.5	6	13	–	57	–	2	AG1222045	AG1222045A	0.007 – 0.017	0.005 – 0.015
4.8	6	13	–	57	–	2	AG1222048	AG1222048A	0.009 – 0.022	0.007 – 0.020
5.0	6	13	–	57	–	2	AG122205	AG122205A	0.009 – 0.022	0.007 – 0.020
5.5	6	13	–	57	–	2	AG1222055	AG1222055A	0.009 – 0.022	0.007 – 0.020
5.75	6	13	–	57	–	2	AG12220575	AG12220575A	0.011 – 0.026	0.009 – 0.024
6.0	6	13	21	57	5.5	2	AG122206	AG122206A	0.011 – 0.026	0.009 – 0.024
6.5	8	16	–	60	–	2	AG1222065	AG1222065A	0.011 – 0.026	0.009 – 0.024
6.75	8	16	–	60	–	2	AG12220675	AG12220675A	0.014 – 0.031	0.012 – 0.029
7.0	8	16	–	60	–	2	AG122207	AG122207A	0.014 – 0.031	0.012 – 0.029
7.5	8	19	–	63	–	2	AG1222075	AG1222075A	0.014 – 0.031	0.012 – 0.029
7.75	8	19	–	63	–	2	AG12220775	AG12220775A	0.016 – 0.034	0.014 – 0.032
8.0	8	19	33	69	7.5	2	AG122208	AG122208A	0.016 – 0.034	0.014 – 0.032
8.5	10	19	–	69	–	2	AG1222085	AG1222085A	0.016 – 0.034	0.014 – 0.032
8.7	10	19	–	69	–	2	AG1222087	AG1222087A	0.018 – 0.037	0.016 – 0.035
9.0	10	19	–	69	–	2	AG122209	AG122209A	0.018 – 0.037	0.016 – 0.035
9.5	10	22	–	72	–	2	AG1222095	AG1222095A	0.018 – 0.037	0.016 – 0.035
9.7	10	22	–	72	–	2	AG1222097	AG1222097A	0.020 – 0.040	0.018 – 0.038
10.0	10	22	32	72	9.0	2	AG122210	AG122210A	0.020 – 0.040	0.018 – 0.038
11.0	12	22	–	79	–	2	AG122211	AG122211A	0.022 – 0.045	0.020 – 0.043
12.0	12	26	38	83	11.0	2	AG122212	AG122212A	0.024 – 0.048	0.022 – 0.046
13.0	12	26	–	83	–	2	AG122213	AG122213A	0.026 – 0.055	0.024 – 0.053
14.0	12	26	–	83	–	2	AG122214	AG122214A	0.026 – 0.055	0.024 – 0.053
15.0	16	32	–	92	–	2	AG122215	AG122215A	0.029 – 0.056	0.027 – 0.054
16.0	16	32	44	92	15.0	2	AG122216	AG122216A	0.029 – 0.056	0.027 – 0.054
17.0	16	32	–	92	–	2	AG122217	AG122217A	0.032 – 0.058	0.030 – 0.056
18.0	16	32	–	92	–	2	AG122218	AG122218A	0.035 – 0.062	0.033 – 0.060
19.0	20	38	–	104	–	2	AG122219	AG122219A	0.035 – 0.062	0.033 – 0.060
20.0	20	38	54	104	19.0	2	AG122220	AG122220A	0.035 – 0.062	0.033 – 0.060
21.0	20	38	–	104	–	2	AG122221	AG122221A	0.038 – 0.065	0.036 – 0.063
22.0	20	38	–	104	–	2	AG122222	AG122222A	0.038 – 0.065	0.036 – 0.063
24.0	25	45	–	121	–	2	AG122224	AG122224A	0.041 – 0.068	0.039 – 0.066
25.0	25	45	65	121	24.0	2	AG122225	AG122225A	0.041 – 0.068	0.039 – 0.066
28.0	25	45	–	121	–	2	AG122228	AG122228A	0.050 – 0.077	0.048 – 0.075
30.0	25	45	–	121	–	2	AG122230	AG122230A	0.050 – 0.077	0.048 – 0.075
32.0	32	53	73	133	31.0	2	AG122232	AG122232A	0.054 – 0.081	0.052 – 0.079
36.0	32	53	–	133	–	2	AG122236	AG122236A	0.062 – 0.089	0.060 – 0.087
40.0	40	63	85	155	39.0	2	AG122240	AG122240A	0.066 – 0.093	0.064 – 0.091



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	70	55	65	135
V_c (m/min) Roughing	50	35	45	115

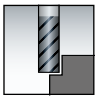
AG 122-3

Uncoated | Alcrona Pro | Z 2 | HB | 30° | HSS | Type N | DIN 844

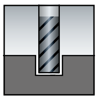
HSS End Mill

d_1	d_2
e10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z			f_z Finishing mm/Z		
2.5	6	8	56	2	AG1223025	AG1223025A	0.003	–	0.007	0.001	–	0.005
3.0	6	8	56	2	AG122303	AG122303A	0.005	–	0.012	0.003	–	0.010
3.5	6	10	59	2	AG1223035	AG1223035A	0.005	–	0.012	0.003	–	0.010
4.0	6	11	63	2	AG122304	AG122304A	0.007	–	0.017	0.005	–	0.015
4.5	6	11	63	2	AG1223045	AG1223045A	0.007	–	0.017	0.005	–	0.015
5.0	6	13	68	2	AG122305	AG122305A	0.009	–	0.022	0.007	–	0.020
5.5	6	13	68	2	AG1223055	AG1223055A	0.009	–	0.022	0.007	–	0.020
6.0	6	13	68	2	AG122306	AG122306A	0.011	–	0.026	0.009	–	0.024
6.5	10	16	80	2	AG1223065	AG1223065A	0.011	–	0.026	0.009	–	0.024
7.0	10	16	80	2	AG122307	AG122307A	0.014	–	0.031	0.012	–	0.029
8.0	10	19	88	2	AG122308	AG122308A	0.016	–	0.034	0.014	–	0.032
10.0	10	22	95	2	AG122310	AG122310A	0.020	–	0.040	0.018	–	0.038
12.0	12	26	110	2	AG122312	AG122312A	0.024	–	0.048	0.022	–	0.046
14.0	12	26	110	2	AG122314	AG122314A	0.026	–	0.055	0.024	–	0.053
16.0	16	32	123	2	AG122316	AG122316A	0.029	–	0.056	0.027	–	0.054
18.0	16	32	123	2	AG122318	AG122318A	0.035	–	0.062	0.033	–	0.060
20.0	20	38	141	2	AG122320	AG122320A	0.035	–	0.062	0.033	–	0.060
22.0	20	38	141	2	AG122322	AG122322A	0.038	–	0.065	0.036	–	0.063
24.0	25	45	166	2	AG122324	AG122324A	0.041	–	0.068	0.039	–	0.066
25.0	25	45	166	2	AG122325	AG122325A	0.041	–	0.068	0.039	–	0.066



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	70	55	65	135
V_c (m/min) Roughing	50	35	45	115

Product family 45

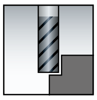
AG 122-4

Uncoated | Alcrona Pro | Z 2 | HB | 30° | HSS | Type N | DIN 844L

HSS End Mill

d_1	d_2
e10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
3.5	6	12	56	2	AG1224035	AG1224035A	0.005 – 0.012	0.003 – 0.010
4.0	6	19	63	2	AG122404	AG122404A	0.007 – 0.017	0.005 – 0.015
5.0	6	24	68	2	AG122405	AG122405A	0.009 – 0.022	0.007 – 0.020
6.0	6	24	68	2	AG122406	AG122406A	0.011 – 0.026	0.009 – 0.024
7.0	8	30	74	2	AG122407	AG122407A	0.014 – 0.031	0.012 – 0.029
8.0	8	38	82	2	AG122408	AG122408A	0.016 – 0.034	0.014 – 0.032
9.0	10	38	88	2	AG122409	AG122409A	0.018 – 0.037	0.016 – 0.035
10.0	10	45	95	2	AG122410	AG122410A	0.020 – 0.040	0.018 – 0.038
11.0	12	45	102	2	AG122411	AG122411A	0.022 – 0.045	0.020 – 0.043
12.0	12	53	110	2	AG122412	AG122412A	0.024 – 0.048	0.022 – 0.046
14.0	12	53	110	2	AG122414	AG122414A	0.026 – 0.055	0.024 – 0.053
16.0	16	63	123	2	AG122416	AG122416A	0.029 – 0.056	0.027 – 0.054
18.0	16	63	123	2	AG122418	AG122418A	0.035 – 0.062	0.033 – 0.060
20.0	20	75	141	2	AG122420	AG122420A	0.035 – 0.062	0.033 – 0.060
22.0	20	75	141	2	AG122422	AG122422A	0.038 – 0.065	0.036 – 0.063
25.0	25	90	166	2	AG122425	AG122425A	0.041 – 0.068	0.039 – 0.066
28.0	25	90	166	2	AG122428	AG122428A	0.050 – 0.077	0.048 – 0.075
30.0	25	90	166	2	AG122430	AG122430A	0.050 – 0.077	0.048 – 0.075

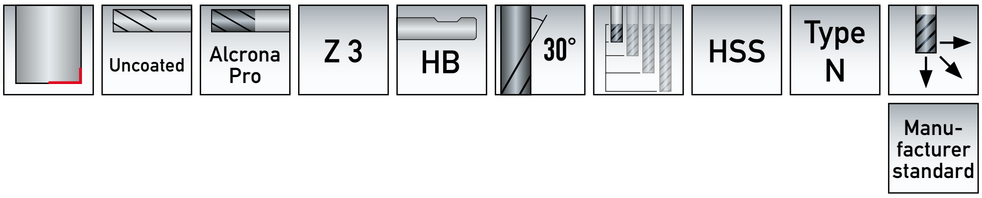


Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	70	55	65	135
V_c (m/min) Roughing	50	35	45	115

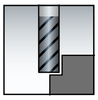
AG 112-0



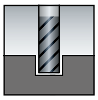
HSS End Mill

d_1	d_2
h10	h6

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z	mm/Z
1.0	6	2.0	34	3	AG112001	AG112001A	0.003 – 0.006	0.001 – 0.004
1.5	6	3.0	34	3	AG1120015	AG1120015A	0.003 – 0.006	0.001 – 0.004
1.8	6	3.0	34	3	AG1120018	AG1120018A	0.003 – 0.007	0.001 – 0.005
2.0	6	4.5	35	3	AG112002	AG112002A	0.003 – 0.007	0.001 – 0.005
2.3	6	4.0	35	3	AG1120023	AG1120023A	0.003 – 0.007	0.001 – 0.005
2.5	6	5.5	36	3	AG1120025	AG1120025A	0.003 – 0.007	0.001 – 0.005
2.8	6	5.5	36	3	AG1120028	AG1120028A	0.005 – 0.012	0.003 – 0.010
3.0	6	5.5	37	3	AG112003	AG112003A	0.005 – 0.012	0.003 – 0.010
3.3	6	6.0	37	3	AG1120033	AG1120033A	0.005 – 0.012	0.003 – 0.010
3.5	6	6.5	38	3	AG1120035	AG1120035A	0.005 – 0.012	0.003 – 0.010
3.8	6	7.5	38	3	AG1120038	AG1120038A	0.007 – 0.017	0.005 – 0.015
4.0	6	7.5	38	3	AG112004	AG112004A	0.007 – 0.017	0.005 – 0.015
4.3	6	7.5	38	3	AG1120043	AG1120043A	0.007 – 0.017	0.005 – 0.015
4.5	6	7.5	38	3	AG1120045	AG1120045A	0.009 – 0.022	0.007 – 0.020
4.8	6	8.5	39	3	AG1120048	AG1120048A	0.009 – 0.022	0.007 – 0.020
5.0	6	8.5	39	3	AG112005	AG112005A	0.009 – 0.022	0.007 – 0.020
5.3	6	8.0	39	3	AG1120053	AG1120053A	0.009 – 0.022	0.007 – 0.020
5.5	6	8.5	39	3	AG1120055	AG1120055A	0.011 – 0.026	0.009 – 0.024
5.75	6	8.5	39	3	AG11200575	AG11200575A	0.011 – 0.026	0.009 – 0.024
6.0	6	8.5	39	3	AG112006	AG112006A	0.014 – 0.031	0.012 – 0.029
6.5	8	10.0	42	3	AG1120065	AG1120065A	0.014 – 0.031	0.012 – 0.029
7.0	8	10.0	42	3	AG112007	AG112007A	0.014 – 0.031	0.012 – 0.029
8.0	8	11.0	43	3	AG112008	AG112008A	0.016 – 0.034	0.014 – 0.032
8.5	10	11.0	48	3	AG1120085	AG1120085A	0.018 – 0.037	0.016 – 0.035
9.0	10	11.0	48	3	AG112009	AG112009A	0.018 – 0.037	0.016 – 0.035
10.0	10	13.0	50	3	AG112010	AG112010A	0.020 – 0.040	0.018 – 0.038
12.0	12	16.0	58	3	AG112012	AG112012A	0.024 – 0.048	0.022 – 0.046
16.0	16	19.0	64	3	AG112016	AG112016A	0.029 – 0.056	0.027 – 0.054
20.0	20	22.0	78	3	AG112020	AG112020A	0.035 – 0.062	0.033 – 0.060



Peripheral milling
a_e = 0.3xD
a_p = 1.0xD



Full slot milling
a_p = 1.0xD

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	65	55	65	130
V_c (m/min) Roughing	45	35	45	115

Product family 45

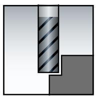
AG 112-4

Uncoated | Alcrona Pro | Z 3 | HB | 30° | HSS | Type N | Manu-facturer standard

HSS End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.5	6	7.5	38	3	AG1124015	AG1124015A	0.003 – 0.006	0.001 – 0.004
2.0	6	7.5	38	3	AG112402	AG112402A	0.003 – 0.007	0.001 – 0.005
2.5	6	8.5	39	3	AG1124025	AG1124025A	0.003 – 0.007	0.001 – 0.005
3.0	6	8.5	39	3	AG112403	AG112403A	0.005 – 0.012	0.003 – 0.010
3.5	6	10.5	41	3	AG1124035	AG1124035A	0.005 – 0.012	0.003 – 0.010
4.0	6	11.5	42	3	AG112404	AG112404A	0.007 – 0.017	0.005 – 0.015
4.5	6	11.5	42	3	AG1124045	AG1124045A	0.007 – 0.017	0.005 – 0.015
5.0	6	13.5	44	3	AG112405	AG112405A	0.009 – 0.022	0.007 – 0.020
5.5	6	13.5	44	3	AG1124055	AG1124055A	0.009 – 0.022	0.007 – 0.020
6.0	6	13.5	44	3	AG112406	AG112406A	0.011 – 0.026	0.009 – 0.024
6.5	8	16.0	48	3	AG1124065	AG1124065A	0.011 – 0.026	0.009 – 0.024
7.0	8	16.0	48	3	AG112407	AG112407A	0.014 – 0.031	0.012 – 0.029
8.0	8	19.0	51	3	AG112408	AG112408A	0.016 – 0.034	0.014 – 0.032
9.0	10	19.0	56	3	AG112409	AG112409A	0.018 – 0.037	0.016 – 0.035
10.0	10	22.0	59	3	AG112410	AG112410A	0.020 – 0.040	0.018 – 0.038

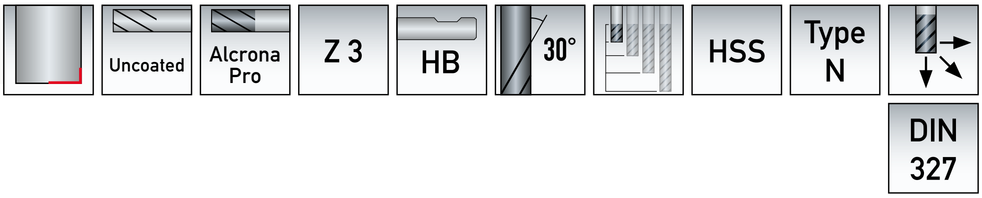


Peripheral milling
a_e = 0.3xD
a_p = 1.5xD

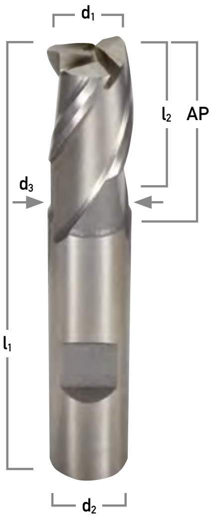
Full slot milling
a_p = 1.0xD

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	65	55	65	130
V_c (m/min) Roughing	45	35	45	115

AG 132-0

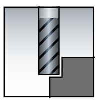


HSS End Mill

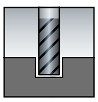


d1	d2
h10	h6

d1	d2	l2	AP	l1	d3		Uncoated	Coated	fz Roughing	fz Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z	mm/Z
2.0	6	4	–	48	–	3	AG132002	AG132002A	0.003 – 0.007	0.001 – 0.005
2.5	6	5	–	49	–	3	AG1320025	AG1320025A	0.003 – 0.007	0.001 – 0.005
2.8	6	5	–	49	–	3	AG1320028	AG1320028A	0.005 – 0.012	0.003 – 0.010
3.0	6	5	–	49	–	3	AG132003	AG132003A	0.005 – 0.012	0.003 – 0.010
3.5	6	6	–	50	–	3	AG1320035	AG1320035A	0.005 – 0.012	0.003 – 0.010
3.8	6	7	–	51	–	3	AG1320038	AG1320038A	0.007 – 0.017	0.005 – 0.015
4.0	6	7	–	51	–	3	AG132004	AG132004A	0.007 – 0.017	0.005 – 0.015
4.5	6	8	–	52	–	3	AG1320045	AG1320045A	0.007 – 0.017	0.005 – 0.015
4.8	6	8	–	52	–	3	AG1320048	AG1320048A	0.009 – 0.022	0.007 – 0.020
5.0	6	8	–	52	–	3	AG132005	AG132005A	0.009 – 0.022	0.007 – 0.020
5.5	6	8	–	52	–	3	AG1320055	AG1320055A	0.009 – 0.022	0.007 – 0.020
5.75	6	8	–	52	–	3	AG13200575	AG13200575A	0.011 – 0.026	0.009 – 0.024
6.0	6	8	16	52	5.5	3	AG132006	AG132006A	0.011 – 0.026	0.009 – 0.024
6.5	8	10	–	54	–	3	AG1320065	AG1320065A	0.011 – 0.026	0.009 – 0.024
6.75	8	10	–	54	–	3	AG13200675	AG13200675A	0.014 – 0.031	0.012 – 0.029
7.0	8	10	–	54	–	3	AG132007	AG132007A	0.014 – 0.031	0.012 – 0.029
7.5	8	11	–	55	–	3	AG1320075	AG1320075A	0.014 – 0.031	0.012 – 0.029
7.75	8	11	–	55	–	3	AG13200775	AG13200775A	0.016 – 0.034	0.014 – 0.032
8.0	8	11	19	55	7.5	3	AG132008	AG132008A	0.016 – 0.034	0.014 – 0.032
8.5	10	11	–	61	–	3	AG1320085	AG1320085A	0.016 – 0.034	0.014 – 0.032
8.7	10	11	–	61	–	3	AG1320087	AG1320087A	0.018 – 0.037	0.016 – 0.035
9.0	10	11	–	61	–	3	AG132009	AG132009A	0.018 – 0.037	0.016 – 0.035
9.5	10	13	–	63	–	3	AG1320095	AG1320095A	0.018 – 0.037	0.016 – 0.035
9.7	10	13	–	63	–	3	AG1320097	AG1320097A	0.020 – 0.040	0.018 – 0.038
10.0	10	13	23	63	9.0	3	AG132010	AG132010A	0.020 – 0.040	0.018 – 0.038
11.0	12	13	–	70	–	3	AG132011	AG132011A	0.022 – 0.045	0.020 – 0.043
12.0	12	16	28	73	11.0	3	AG132012	AG132012A	0.024 – 0.048	0.022 – 0.046
13.0	12	16	–	73	–	3	AG132013	AG132013A	0.026 – 0.055	0.024 – 0.053
14.0	12	16	–	73	–	3	AG132014	AG132014A	0.026 – 0.055	0.024 – 0.053
15.0	16	19	–	79	–	3	AG132015	AG132015A	0.029 – 0.056	0.027 – 0.054
16.0	16	19	31	79	15.0	3	AG132016	AG132016A	0.029 – 0.056	0.027 – 0.054
17.0	16	19	–	79	–	3	AG132017	AG132017A	0.032 – 0.058	0.030 – 0.056
18.0	16	19	–	79	–	3	AG132018	AG132018A	0.035 – 0.062	0.033 – 0.060
19.0	20	22	–	88	–	3	AG132019	AG132019A	0.035 – 0.062	0.033 – 0.060
20.0	20	22	38	88	19.0	3	AG132020	AG132020A	0.035 – 0.062	0.033 – 0.060
21.0	20	22	–	88	–	3	AG132021	AG132021A	0.038 – 0.065	0.036 – 0.063
22.0	20	22	–	88	–	3	AG132022	AG132022A	0.038 – 0.065	0.036 – 0.063
24.0	25	26	–	102	–	3	AG132024	AG132024A	0.041 – 0.068	0.039 – 0.066
25.0	25	26	46	102	24.0	3	AG132025	AG132025A	0.041 – 0.068	0.039 – 0.066
28.0	25	26	–	102	–	3	AG132028	AG132028A	0.050 – 0.077	0.048 – 0.075
30.0	25	26	–	102	–	3	AG132030	AG132030A	0.050 – 0.077	0.048 – 0.075
32.0	32	32	52	112	31.0	3	AG132032	AG132032A	0.054 – 0.081	0.052 – 0.079
36.0	32	32	–	112	–	3	AG132036	AG132036A	0.062 – 0.089	0.060 – 0.087
40.0	40	38	60	130	39.0	3	AG132040	AG132040A	0.066 – 0.093	0.064 – 0.091



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 1.0xD$

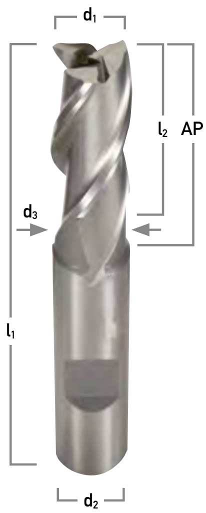
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	65	55	65	130
V_c (m/min) Roughing	45	35	45	115

Product family 45

AG 132-2

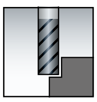
Uncoated | Alcrona Pro | Z 3 | HB | 30° | HSS | Type N | DIN 844

HSS End Mill



d_1	d_2
e10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.5	6	7	–	51	–	3	AG1322015	AG1322015A	0.003 – 0.006	0.001 – 0.004
2.0	6	7	–	51	–	3	AG132202	AG132202A	0.003 – 0.007	0.001 – 0.005
2.5	6	8	–	52	–	3	AG1322025	AG1322025A	0.003 – 0.007	0.001 – 0.005
2.8	6	8	–	52	–	3	AG1322028	AG1322028A	0.005 – 0.012	0.003 – 0.010
3.0	6	8	–	52	–	3	AG132203	AG132203A	0.005 – 0.012	0.003 – 0.010
3.5	6	10	–	54	–	3	AG1322035	AG1322035A	0.005 – 0.012	0.003 – 0.010
3.8	6	11	–	55	–	3	AG1322038	AG1322038A	0.007 – 0.017	0.005 – 0.015
4.0	6	11	–	55	–	3	AG132204	AG132204A	0.007 – 0.017	0.005 – 0.015
4.5	6	13	–	57	–	3	AG1322045	AG1322045A	0.007 – 0.017	0.005 – 0.015
4.8	6	13	–	57	–	3	AG1322048	AG1322048A	0.009 – 0.022	0.007 – 0.020
5.0	6	13	–	57	–	3	AG132205	AG132205A	0.009 – 0.022	0.007 – 0.020
5.5	6	13	–	57	–	3	AG1322055	AG1322055A	0.009 – 0.022	0.007 – 0.020
5.75	6	13	–	57	–	3	AG13220575	AG13220575A	0.011 – 0.026	0.009 – 0.024
6.0	6	13	21	57	5.5	3	AG132206	AG132206A	0.011 – 0.026	0.009 – 0.024
6.5	8	16	–	60	–	3	AG1322065	AG1322065A	0.011 – 0.026	0.009 – 0.024
6.75	8	16	–	60	–	3	AG13220675	AG13220675A	0.014 – 0.031	0.012 – 0.029
7.0	8	16	–	60	–	3	AG132207	AG132207A	0.014 – 0.031	0.012 – 0.029
7.5	8	19	–	63	–	3	AG1322075	AG1322075A	0.014 – 0.031	0.012 – 0.029
7.75	8	19	–	63	–	3	AG13220775	AG13220775A	0.016 – 0.034	0.014 – 0.032
8.0	8	19	33	69	7.5	3	AG132208	AG132208A	0.016 – 0.034	0.014 – 0.032
8.5	10	19	–	69	–	3	AG1322085	AG1322085A	0.016 – 0.034	0.014 – 0.032
8.7	10	19	–	69	–	3	AG1322087	AG1322087A	0.018 – 0.037	0.016 – 0.035
9.0	10	19	–	69	–	3	AG132209	AG132209A	0.018 – 0.037	0.016 – 0.035
9.5	10	22	–	72	–	3	AG1322095	AG1322095A	0.018 – 0.037	0.016 – 0.035
9.7	10	22	–	72	–	3	AG1322097	AG1322097A	0.020 – 0.040	0.018 – 0.038
10.0	10	22	32	72	9.0	3	AG132210	AG132210A	0.020 – 0.040	0.018 – 0.038
11.0	12	22	–	79	–	3	AG132211	AG132211A	0.022 – 0.045	0.020 – 0.043
12.0	12	26	38	83	11.0	3	AG132212	AG132212A	0.024 – 0.048	0.022 – 0.046
13.0	12	26	–	83	–	3	AG132213	AG132213A	0.026 – 0.055	0.024 – 0.053
14.0	12	26	–	83	–	3	AG132214	AG132214A	0.026 – 0.055	0.024 – 0.053
15.0	16	32	–	92	–	3	AG132215	AG132215A	0.029 – 0.056	0.027 – 0.054
16.0	16	32	44	92	15.0	3	AG132216	AG132216A	0.029 – 0.056	0.027 – 0.054
17.0	16	32	–	92	–	3	AG132217	AG132217A	0.032 – 0.058	0.030 – 0.056
18.0	16	32	–	92	–	3	AG132218	AG132218A	0.035 – 0.062	0.033 – 0.060
19.0	20	38	–	104	–	3	AG132219	AG132219A	0.035 – 0.062	0.033 – 0.060
20.0	20	38	54	104	19.0	3	AG132220	AG132220A	0.035 – 0.062	0.033 – 0.060
21.0	20	38	–	104	–	3	AG132221	AG132221A	0.038 – 0.065	0.036 – 0.063
22.0	20	38	–	104	–	3	AG132222	AG132222A	0.038 – 0.065	0.036 – 0.063
24.0	25	45	–	121	–	3	AG132224	AG132224A	0.041 – 0.068	0.039 – 0.066
25.0	25	45	65	121	24.0	3	AG132225	AG132225A	0.041 – 0.068	0.039 – 0.066
28.0	25	45	–	121	–	3	AG132228	AG132228A	0.050 – 0.077	0.048 – 0.075
30.0	25	45	–	121	–	3	AG132230	AG132230A	0.050 – 0.077	0.048 – 0.075
32.0	32	53	73	133	31.0	3	AG132232	AG132232A	0.054 – 0.081	0.052 – 0.079
36.0	32	53	–	133	–	3	AG132236	AG132236A	0.062 – 0.089	0.060 – 0.087
40.0	40	63	85	155	39.0	3	AG132240	AG132240A	0.066 – 0.093	0.064 – 0.091



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	65	55	65	130
V_c (m/min) Roughing	45	35	45	115

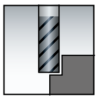
AG 132-4

Uncoated | Alcrona Pro | Z 3 | HB | 30° | HSS | Type N | DIN 844L

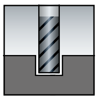
HSS End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	10	54	3	AG132402	AG132402A	0.003 – 0.007	0.001 – 0.005
2.5	6	10	54	3	AG1324025	AG1324025A	0.003 – 0.007	0.001 – 0.005
3.0	6	12	56	3	AG132403	AG132403A	0.005 – 0.012	0.003 – 0.010
3.5	6	15	59	3	AG1324035	AG1324035A	0.005 – 0.012	0.003 – 0.010
4.0	6	19	63	3	AG132404	AG132404A	0.007 – 0.017	0.005 – 0.015
4.5	6	19	63	3	AG1324045	AG1324045A	0.007 – 0.017	0.005 – 0.015
5.0	6	24	68	3	AG132405	AG132405A	0.009 – 0.022	0.007 – 0.020
5.5	6	24	68	3	AG1324055	AG1324055A	0.009 – 0.022	0.007 – 0.020
6.0	6	24	68	3	AG132406	AG132406A	0.011 – 0.026	0.009 – 0.024
7.0	8	30	74	3	AG132407	AG132407A	0.014 – 0.031	0.012 – 0.029
8.0	8	38	82	3	AG132408	AG132408A	0.016 – 0.034	0.014 – 0.032
9.0	10	38	88	3	AG132409	AG132409A	0.018 – 0.037	0.016 – 0.035
10.0	10	45	95	3	AG132410	AG132410A	0.020 – 0.040	0.018 – 0.038
11.0	12	45	102	3	AG132411	AG132411A	0.022 – 0.045	0.020 – 0.043
12.0	12	53	110	3	AG132412	AG132412A	0.024 – 0.048	0.022 – 0.046
14.0	12	53	110	3	AG132414	AG132414A	0.026 – 0.055	0.024 – 0.053
16.0	16	63	123	3	AG132416	AG132416A	0.029 – 0.056	0.027 – 0.054
18.0	16	63	123	3	AG132418	AG132418A	0.035 – 0.062	0.033 – 0.060
20.0	20	75	141	3	AG132420	AG132420A	0.035 – 0.062	0.033 – 0.060
22.0	20	75	141	3	AG132422	AG132422A	0.038 – 0.065	0.036 – 0.063
24.0	25	90	166	3	AG132424	AG132424A	0.041 – 0.068	0.039 – 0.066
25.0	25	90	166	3	AG132425	AG132425A	0.041 – 0.068	0.039 – 0.066
30.0	25	90	166	3	AG132430	AG132430A	0.050 – 0.077	0.048 – 0.075



Peripheral milling
a_e = 0.3xD
a_p = 1.5xD



Full slot milling
a_p = 0.5xD

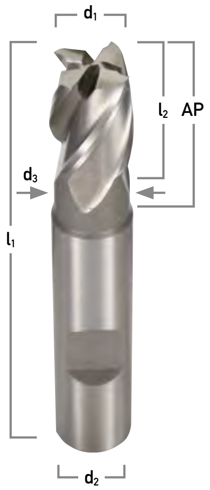
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	65	55	65	130
V_c (m/min) Roughing	45	35	45	115

Product family 45

AG 142-0

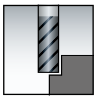
Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type N | DIN 844

HSS End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	4	–	48	–	4	AG142002	AG142002A	0.003 – 0.008	0.001 – 0.006
2.5	6	5	–	49	–	4	AG1420025	AG1420025A	0.003 – 0.008	0.001 – 0.006
3.0	6	5	–	49	–	4	AG142003	AG142003A	0.004 – 0.012	0.002 – 0.010
3.5	6	6	–	50	–	4	AG1420035	AG1420035A	0.004 – 0.012	0.002 – 0.010
4.0	6	7	–	51	–	4	AG142004	AG142004A	0.007 – 0.017	0.005 – 0.015
4.5	6	8	–	52	–	4	AG1420045	AG1420045A	0.007 – 0.017	0.005 – 0.015
5.0	6	8	–	52	–	4	AG142005	AG142005A	0.008 – 0.022	0.006 – 0.020
6.0	6	8	16	52	5.5	4	AG142006	AG142006A	0.010 – 0.027	0.008 – 0.025
7.0	8	10	–	54	–	4	AG142007	AG142007A	0.011 – 0.031	0.009 – 0.029
8.0	8	11	19	55	7.5	4	AG142008	AG142008A	0.014 – 0.034	0.012 – 0.032
9.0	10	11	–	61	–	4	AG142009	AG142009A	0.014 – 0.034	0.012 – 0.032
9.5	10	13	–	63	–	4	AG1420095	AG1420095A	0.017 – 0.041	0.015 – 0.039
10.0	10	13	23	63	9.0	4	AG142010	AG142010A	0.017 – 0.041	0.015 – 0.039
12.0	12	16	28	73	11.0	4	AG142012	AG142012A	0.020 – 0.050	0.018 – 0.048
14.0	12	16	–	73	–	4	AG142014	AG142014A	0.022 – 0.057	0.020 – 0.055
16.0	16	19	31	79	15.0	4	AG142016	AG142016A	0.025 – 0.060	0.023 – 0.058
18.0	16	19	–	79	–	4	AG142018	AG142018A	0.027 – 0.067	0.025 – 0.065
20.0	20	22	38	88	19.0	4	AG142020	AG142020A	0.030 – 0.075	0.028 – 0.073
22.0	20	22	–	88	–	4	AG142022	AG142022A	0.032 – 0.078	0.031 – 0.076
24.0	25	26	–	102	–	4	AG142024	AG142024A	0.036 – 0.081	0.034 – 0.079
25.0	25	26	46	102	24.0	4	AG142025	AG142025A	0.039 – 0.084	0.037 – 0.082
28.0	25	26	–	102	–	4	AG142028	AG142028A	0.043 – 0.088	0.041 – 0.086
30.0	25	26	–	102	–	4	AG142030	AG142030A	0.046 – 0.091	0.044 – 0.089



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.0xD$

Full slot milling
$a_p = 1.0xD$

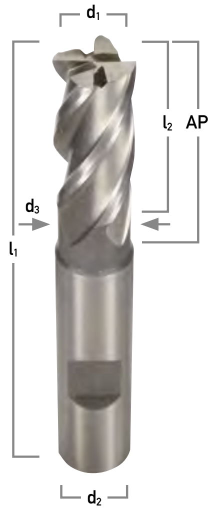
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	55	70	150
V_c (m/min) Roughing	55	35	50	130

Product family 45

AG 142-2

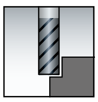
Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type N | DIN 844

HSS End Mill

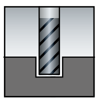


d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	7	–	51	–	4	AG142202	AG142202A	0.003 – 0.008	0.001 – 0.006
2.5	6	8	–	52	–	4	AG1422025	AG1422025A	0.003 – 0.008	0.001 – 0.006
2.8	6	8	–	52	–	4	AG1422028	AG1422028A	0.004 – 0.012	0.002 – 0.010
3.0	6	8	–	52	–	4	AG142203	AG142203A	0.004 – 0.012	0.002 – 0.010
3.5	6	10	–	54	–	4	AG1422035	AG1422035A	0.004 – 0.012	0.002 – 0.010
3.8	6	11	–	55	–	4	AG1422038	AG1422038A	0.007 – 0.017	0.005 – 0.015
4.0	6	11	–	55	–	4	AG142204	AG142204A	0.007 – 0.017	0.005 – 0.015
4.5	6	13	–	57	–	4	AG1422045	AG1422045A	0.007 – 0.017	0.005 – 0.015
4.8	6	13	–	57	–	4	AG1422048	AG1422048A	0.008 – 0.022	0.006 – 0.020
5.0	6	13	–	57	–	4	AG142205	AG142205A	0.008 – 0.022	0.006 – 0.020
5.5	6	13	–	57	–	4	AG1422055	AG1422055A	0.008 – 0.022	0.006 – 0.020
5.75	6	13	–	57	–	4	AG14220575	AG14220575A	0.010 – 0.027	0.008 – 0.025
6.0	6	13	21	57	5.5	4	AG142206	AG142206A	0.010 – 0.027	0.008 – 0.025
6.5	8	16	–	60	–	4	AG1422065	AG1422065A	0.010 – 0.027	0.008 – 0.025
6.75	8	16	–	60	–	4	AG14220675	AG14220675A	0.011 – 0.031	0.009 – 0.029
7.0	8	16	–	60	–	4	AG142207	AG142207A	0.011 – 0.031	0.009 – 0.029
7.5	8	19	–	63	–	4	AG1422075	AG1422075A	0.011 – 0.031	0.009 – 0.029
7.75	8	19	–	63	–	4	AG14220775	AG14220775A	0.014 – 0.034	0.012 – 0.032
8.0	8	19	33	69	7.5	4	AG142208	AG142208A	0.014 – 0.034	0.012 – 0.032
8.5	10	19	–	69	–	4	AG1422085	AG1422085A	0.014 – 0.034	0.012 – 0.032
8.7	10	19	–	69	–	4	AG1422087	AG1422087A	0.014 – 0.034	0.012 – 0.032
9.0	10	19	–	69	–	4	AG142209	AG142209A	0.014 – 0.034	0.012 – 0.032
9.5	10	22	–	72	–	4	AG1422095	AG1422095A	0.014 – 0.034	0.012 – 0.032
9.7	10	22	–	72	–	4	AG1422097	AG1422097A	0.017 – 0.041	0.015 – 0.039
10.0	10	22	32	72	9.0	4	AG142210	AG142210A	0.017 – 0.041	0.015 – 0.039
10.5	12	22	–	79	–	4	AG1422105	AG1422105A	0.017 – 0.041	0.015 – 0.039
11.0	12	22	–	79	–	4	AG142211	AG142211A	0.018 – 0.047	0.016 – 0.045
11.5	12	26	–	83	–	4	AG1422115	AG1422115A	0.018 – 0.047	0.016 – 0.045
12.0	12	26	38	83	11.0	4	AG142212	AG142212A	0.020 – 0.050	0.018 – 0.048
13.0	12	26	–	83	–	4	AG142213	AG142213A	0.020 – 0.050	0.018 – 0.048
14.0	12	26	–	83	–	4	AG142214	AG142214A	0.022 – 0.057	0.020 – 0.055
15.0	16	32	–	92	–	4	AG142215	AG142215A	0.022 – 0.057	0.020 – 0.055
16.0	16	32	44	92	15.0	4	AG142216	AG142216A	0.025 – 0.060	0.023 – 0.058
17.0	16	32	–	92	–	4	AG142217	AG142217A	0.025 – 0.060	0.023 – 0.058
18.0	16	32	–	92	–	4	AG142218	AG142218A	0.027 – 0.067	0.025 – 0.065
19.0	20	38	–	104	–	4	AG142219	AG142219A	0.027 – 0.067	0.025 – 0.065
20.0	20	38	54	104	19.0	4	AG142220	AG142220A	0.030 – 0.075	0.028 – 0.073
21.0	20	38	–	104	–	4	AG142221	AG142221A	0.032 – 0.078	0.031 – 0.076



Peripheral milling
a_e = 0.3xD
a_p = 1.5xD



Full slot milling
a_p = 1.0xD

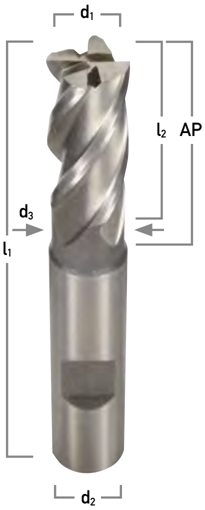
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	55	70	150
V_c (m/min) Roughing	55	35	50	130

Product family 45

AG 152-2

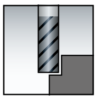
Uncoated | Alcrona Pro | Z 5 | HB | 35° | HSS | Type N | DIN 844

HSS End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
22.0	20	38	–	104	–	5	AG152222	AG152222A	0.032 – 0.078	0.031 – 0.076
24.0	25	45	–	121	–	5	AG152224	AG152224A	0.036 – 0.081	0.034 – 0.079
25.0	25	45	65	121	24.0	5	AG152225	AG152225A	0.039 – 0.084	0.037 – 0.082



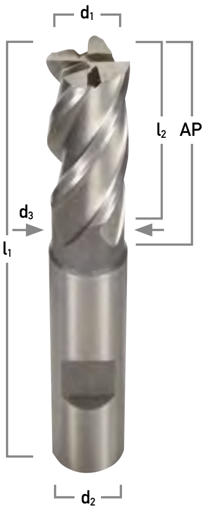
Peripheral milling
a_e = 0.3xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

AG 162-2

Uncoated | Alcrona Pro | Z 6 | HB | 30° | HSS | Type N | DIN 844

HSS End Mill



d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
22.0	20	38	–	104	–	6	AG162222	AG162222A	0.032 – 0.078	0.031 – 0.076
24.0	25	45	–	121	–	6	AG162224	AG162224A	0.036 – 0.081	0.034 – 0.079
26.0	25	45	–	121	–	6	AG162226	AG162226A	0.039 – 0.084	0.037 – 0.082
28.0	25	45	–	121	–	6	AG162228	AG162228A	0.043 – 0.088	0.041 – 0.086
30.0	25	45	–	121	–	6	AG162230	AG162230A	0.046 – 0.091	0.044 – 0.089
32.0	32	53	73	133	31.0	6	AG162232	AG162232A	0.049 – 0.094	0.047 – 0.092
36.0	32	53	–	133	–	6	AG162236	AG162236A	0.058 – 0.100	0.056 – 0.083
40.0	40	63	85	155	39.0	6	AG162240	AG162240A	0.062 – 0.120	0.060 – 0.087

Peripheral milling
a_e = 0.3xD
a_p = 1.5xD

Full slot milling
a_p = 1.0xD

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	55	70	150
V_c (m/min) Roughing	55	35	50	130

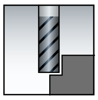
AG 142-4

Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type N | DIN 844L

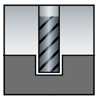
HSS End Mill

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
2.0	6	10	54	4	AG142402	AG142402A	0.003 – 0.008	0.001 – 0.006
2.5	6	10	54	4	AG1424025	AG1424025A	0.003 – 0.008	0.001 – 0.006
3.0	6	12	56	4	AG142403	AG142403A	0.004 – 0.012	0.002 – 0.010
3.5	6	15	59	4	AG1424035	AG1424035A	0.004 – 0.012	0.002 – 0.010
4.0	6	19	63	4	AG142404	AG142404A	0.007 – 0.017	0.005 – 0.015
4.5	6	19	63	4	AG1424045	AG1424045A	0.007 – 0.017	0.005 – 0.015
5.0	6	24	68	4	AG142405	AG142405A	0.008 – 0.022	0.006 – 0.020
5.5	6	24	68	4	AG1424055	AG1424055A	0.008 – 0.022	0.006 – 0.020
6.0	6	24	68	4	AG142406	AG142406A	0.010 – 0.027	0.008 – 0.025
7.0	8	30	74	4	AG142407	AG142407A	0.011 – 0.031	0.009 – 0.029
8.0	8	38	82	4	AG142408	AG142408A	0.014 – 0.034	0.012 – 0.032
9.0	10	38	88	4	AG142409	AG142409A	0.014 – 0.034	0.012 – 0.032
10.0	10	45	95	4	AG142410	AG142410A	0.017 – 0.041	0.015 – 0.039
11.0	12	45	102	4	AG142411	AG142411A	0.018 – 0.047	0.016 – 0.045
12.0	12	53	110	4	AG142412	AG142412A	0.020 – 0.050	0.018 – 0.048
14.0	12	53	110	4	AG142414	AG142414A	0.022 – 0.057	0.020 – 0.055
16.0	16	63	123	4	AG142416	AG142416A	0.025 – 0.060	0.023 – 0.058
18.0	16	63	123	4	AG142418	AG142418A	0.027 – 0.067	0.025 – 0.065
20.0	20	75	141	4	AG142420	AG142420A	0.030 – 0.075	0.028 – 0.073
22.0	20	75	141	4	AG142422	AG142422A	0.032 – 0.078	0.031 – 0.076

d_1	d_2
h10	h6



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$



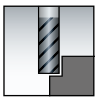
Full slot milling
$a_p = 0.5xD$

AG 152-4

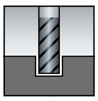
Uncoated | Alcrona Pro | Z 5 | HB | 30° | HSS | Type N | DIN 844L

HSS End Mill

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
22,0	20	75	141	5	AG152422	AG152422A	0,032 – 0,078	0,031 – 0,076
25,0	25	90	166	5	AG152425	AG152425A	0,039 – 0,084	0,037 – 0,082



Peripheral milling
$a_e = 0.3xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 0.5xD$

d_1	d_2
h10	h6

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	55	70	150
V_c (m/min) Roughing	55	35	50	130

Product family 45

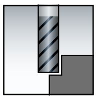
AG 162-4

Uncoated | Alcrona Pro | Z 6 | HB | 38° | HSS | Type N | DIN 844L

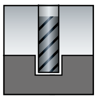
HSS End Mill

d_1	d_2
h10	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
22.0	20	75	141	6	AG162422	AG162422A	0.033 – 0.079	0.032 – 0.077
25.0	25	90	166	6	AG162425	AG162425A	0.040 – 0.085	0.038 – 0.083
28.0	25	90	166	6	AG162428	AG162428A	0.044 – 0.089	0.042 – 0.08
30.0	25	90	166	6	AG162430	AG162430A	0.044 – 0.089	0.042 – 0.08
32.0	32	106	186	6	AG162432	AG162432A	0.049 – 0.089	0.047 – 0.092
36.0	32	106	186	6	AG162436	AG162436A	0.058 – 0.091	0.056 – 0.083
40.0	40	125	217	6	AG162440	AG162440A	0.062 – 0.093	0.060 – 0.087



Peripheral milling
a_e = 0.3xD
a_p = 1.5xD



Full slot milling
a_p = 0.5xD

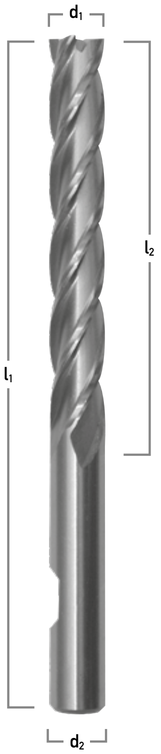
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	55	70	150
V_c (m/min) Roughing	55	35	50	130

AG 140-4

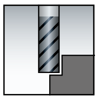
Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type N

Manu-facturer standard

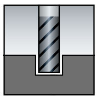
HSS End Mill



d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing			f_z Finishing		
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z			mm/Z		
6.0	6	40	100	4	AG140406	AG140406A	0.010	–	0.027	0.008	–	0.025
8.0	8	65	115	4	AG140408	AG140408A	0.014	–	0.034	0.012	–	0.032
10.0	10	65	115	4	AG140410	AG140410A	0.017	–	0.041	0.015	–	0.039
12.0	12	75	132	4	AG140412	AG140412A	0.020	–	0.050	0.018	–	0.048
14.0	12	80	137	4	AG140414	AG140414A	0.022	–	0.057	0.020	–	0.055
16.0	16	100	160	4	AG140416	AG140416A	0.025	–	0.060	0.023	–	0.058
18.0	16	100	160	4	AG140418	AG140418A	0.027	–	0.067	0.025	–	0.065
20.0	20	100	166	4	AG140420	AG140420A	0.030	–	0.075	0.028	–	0.073
20.0	20	125	191	4	AG140520	AG140520A	0.030	–	0.075	0.028	–	0.073
22.0	20	110	176	4	AG140422	AG140422A	0.032	–	0.078	0.028	–	0.078
25.0	25	125	201	4	AG140425	AG140425A	0.039	–	0.084	0.037	–	0.082
25.0	25	140	216	4	AG140525	AG140525A	0.039	–	0.084	0.037	–	0.082
25.0	25	160	236	4	AG140625	AG140625A	0.039	–	0.084	0.037	–	0.082
28.0	25	140	216	4	AG140428	AG140428A	0.043	–	0.088	0.041	–	0.086
28.0	25	160	236	4	AG140528	AG140528A	0.043	–	0.088	0.041	–	0.086
30.0	25	140	216	4	AG140430	AG140430A	0.046	–	0.091	0.044	–	0.089
32.0	32	140	220	4	AG140432	AG140432A	0.049	–	0.094	0.047	–	0.092
32.0	32	160	240	4	AG140532	AG140532A	0.049	–	0.094	0.047	–	0.092
32.0	32	180	260	4	AG140632	AG140632A	0.049	–	0.094	0.047	–	0.092



Peripheral milling
$a_e = 0.2xD$
$a_p = 1.5xD$



Full slot milling
$a_p = 0.3xD$

d_1	d_2
h10	h6

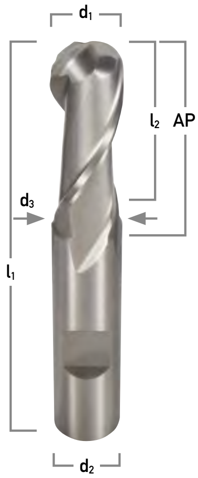
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	60	45	60	120
V_c (m/min) Roughing	40	30	40	90

Product family 45

AQ 122-2

Uncoated | Alcrona Pro | Z 2 | HB | 30° | HSS | Type N | DIN 844

HSS Ball-Nosed End Mill



d1	d2
e10	h6

d_1	d_2	l_2	AP	l_1	d_3		Uncoated	Coated	f_z Roughing	f_z Finishing
mm	mm	mm		mm		Z	Part No.	Part No.	mm/Z	mm/Z
3.0	6	8	–	52	–	2	AQ122203	AQ122203A	0.005 – 0.012	0.003 – 0.010
3.5	6	10	–	54	–	2	AQ1222035	AQ1222035A	0.005 – 0.012	0.003 – 0.010
4.0	6	11	–	55	–	2	AQ122204	AQ122204A	0.008 – 0.017	0.006 – 0.015
5.0	6	13	–	57	–	2	AQ122205	AQ122205A	0.009 – 0.022	0.007 – 0.020
6.0	6	13	21	57	5.5	2	AQ122206	AQ122206A	0.011 – 0.027	0.009 – 0.025
7.0	8	16	–	60	–	2	AQ122207	AQ122207A	0.013 – 0.029	0.011 – 0.027
8.0	8	19	33	69	7.5	2	AQ122208	AQ122208A	0.016 – 0.032	0.014 – 0.030
9.0	10	19	–	69	–	2	AQ122209	AQ122209A	0.018 – 0.035	0.016 – 0.033
10.0	10	22	32	72	9.0	2	AQ122210	AQ122210A	0.020 – 0.037	0.018 – 0.035
11.0	12	22	–	79	–	2	AQ122211	AQ122211A	0.022 – 0.045	0.020 – 0.043
12.0	12	26	38	83	11.0	2	AQ122212	AQ122212A	0.024 – 0.047	0.022 – 0.045
14.0	12	26	–	83	–	2	AQ122214	AQ122214A	0.028 – 0.054	0.026 – 0.052
16.0	16	32	44	92	15.0	2	AQ122216	AQ122216A	0.029 – 0.057	0.027 – 0.055
18.0	16	32	–	92	–	2	AQ122218	AQ122218A	0.032 – 0.064	0.030 – 0.062
20.0	20	38	54	104	19.0	2	AQ122220	AQ122220A	0.035 – 0.066	0.033 – 0.065
22.0	20	38	–	104	–	2	AQ122222	AQ122222A	0.038 – 0.073	0.036 – 0.071
25.0	25	45	65	121	24.0	2	AQ122225	AQ122225A	0.047 – 0.082	0.045 – 0.080
28.0	25	45	–	121	–	2	AQ122228	AQ122228A	0.056 – 0.090	0.054 – 0.089
30.0	25	45	–	121	–	2	AQ122230	AQ122230A	0.065 – 0.100	0.063 – 0.098

Peripheral milling
$a_e = 0.5xD$
$a_p = 1.5xD$

Full slot milling
$a_p = 1.0xD$

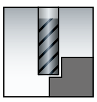
AQ 122-4

Uncoated | Alcrona Pro | Z 2 | HB | 30° | HSS | Type N | DIN 844L

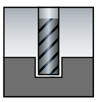
HSS Ball-Nosed End Mill

d1	d2
e10	h6

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z	mm/Z
2.0	6	7	54	2	AQ122402	AQ122402A	0.003 – 0.006	0.001 – 0.004
3.0	6	8	56	2	AQ122403	AQ122403A	0.005 – 0.012	0.003 – 0.010
4.0	6	19	63	2	AQ122404	AQ122404A	0.008 – 0.017	0.006 – 0.015
5.0	6	24	68	2	AQ122405	AQ122405A	0.009 – 0.022	0.007 – 0.020
6.0	6	24	68	2	AQ122406	AQ122406A	0.011 – 0.027	0.009 – 0.025
7.0	8	30	74	2	AQ122407	AQ122407A	0.013 – 0.029	0.011 – 0.027
8.0	8	38	82	2	AQ122408	AQ122408A	0.016 – 0.032	0.014 – 0.030
9.0	10	38	88	2	AQ122409	AQ122409A	0.018 – 0.035	0.016 – 0.033
10.0	10	45	95	2	AQ122410	AQ122410A	0.020 – 0.037	0.018 – 0.035
11.0	12	45	102	2	AQ122411	AQ122411A	0.022 – 0.045	0.020 – 0.043
12.0	12	53	110	2	AQ122412	AQ122412A	0.024 – 0.047	0.022 – 0.045
14.0	12	53	110	2	AQ122414	AQ122414A	0.028 – 0.054	0.026 – 0.052
16.0	16	63	123	2	AQ122416	AQ122416A	0.029 – 0.057	0.027 – 0.055
18.0	16	63	123	2	AQ122418	AQ122418A	0.032 – 0.064	0.030 – 0.062
20.0	20	75	141	2	AQ122420	AQ122420A	0.035 – 0.066	0.033 – 0.065
22.0	20	75	141	2	AQ122422	AQ122422A	0.038 – 0.073	0.036 – 0.071
25.0	25	90	166	2	AQ122425	AQ122425A	0.047 – 0.082	0.045 – 0.080
28.0	25	90	166	2	AQ122428	AQ122428A	0.056 – 0.090	0.054 – 0.089
30.0	25	90	166	2	AQ122430	AQ122430A	0.065 – 0.100	0.063 – 0.098



Peripheral milling
$a_e = 0.5xD$
$a_p = 1.0xD$



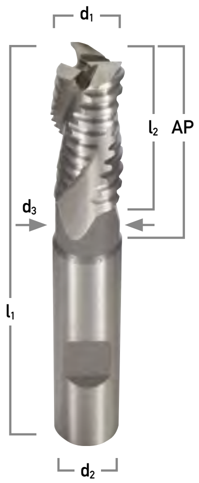
Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	60	50	55	110
V_c (m/min) Roughing	40	30	35	90

AG 932-2

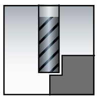
Uncoated | Alcrona Pro | Z 3 | HB | 30° | HSS | Type NF | DIN 844

HSS Roughing / Finishing End Mill

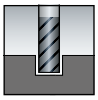


d_1	d_2
js14	h6

d_1 mm	d_2 mm	l_2 mm	AP mm	l_1 mm	d_3 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
6.0	6	13	21	57	5.5	3	AG932206	AG932206A	0.008 – 0.015	0.006 – 0.013
8.0	8	19	33	69	7.5	3	AG932208	AG932208A	0.012 – 0.021	0.010 – 0.019
10.0	10	22	32	72	9.0	3	AG932210	AG932210A	0.015 – 0.027	0.013 – 0.025
12.0	12	26	38	83	11.0	3	AG932212	AG932212A	0.018 – 0.032	0.016 – 0.030
14.0	12	26	–	83	–	3	AG932214	AG932214A	0.020 – 0.036	0.018 – 0.034
16.0	16	32	44	92	15.0	3	AG932216	AG932216A	0.022 – 0.040	0.020 – 0.038
18.0	16	32	–	92	–	3	AG932218	AG932218A	0.023 – 0.043	0.021 – 0.041
20.0	20	38	54	104	19.0	3	AG932220	AG932220A	0.025 – 0.047	0.023 – 0.045
22.0	20	38	–	104	–	3	AG932222	AG932222A	0.027 – 0.051	0.025 – 0.049
25.0	25	45	–	121	–	3	AG932225	AG932225A	0.031 – 0.055	0.029 – 0.053
28.0	25	45	–	121	–	3	AG932228	AG932228A	0.035 – 0.059	0.033 – 0.057
30.0	25	45	–	121	–	3	AG932230	AG932230A	0.037 – 0.061	0.035 – 0.059
32.0	32	53	73	133	31.0	3	AG932232	AG932232A	0.040 – 0.065	0.038 – 0.063
36.0	32	53	–	133	–	3	AG932236	AG932236A	0.046 – 0.070	0.044 – 0.068
40.0	32	63	85	155	39.0	3	AG932240	AG932240A	0.052 – 0.076	0.050 – 0.074



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

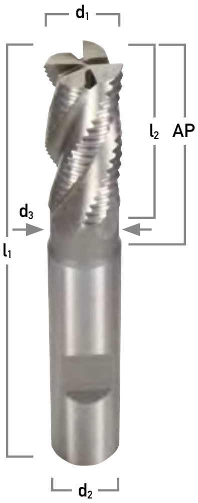
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

Product family 45

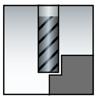
AG 632-2

Uncoated | Alcrona Pro | Z 3 | HB | 30° | HSS | Type HR | DIN 844

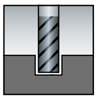
HSS Roughing End Mill



d1	d2	l2	AP	l1	d3		Uncoated	Coated	fz Roughing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
6.0	6	13	21	57	5.5	3	AG632206	AG632206A	0.008 – 0.015
8.0	10	19	–	63	–	3	AG632208	AG632208A	0.012 – 0.021



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



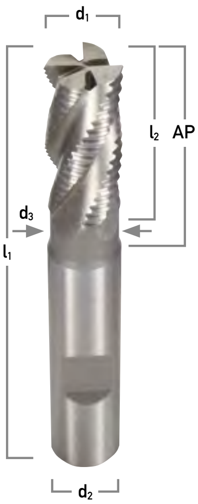
Full slot milling
a_p = 1.5xD

d1	d2
js14	h6

AG 642-2

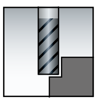
Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type HR | DIN 844

HSS Roughing End Mill

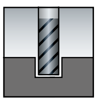


d1	d2	l2	AP	l1	d3		Uncoated	Coated	fz Roughing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
4.0	6	11	–	55	–	4	AG642204	AG642204A	0.005 – 0.010
5.0	6	13	–	57	–	4	AG642205	AG642205A	0.007 – 0.012
6.0	6	13	21	57	5.5	4	AG642206	AG642206A	0.008 – 0.015
7.0	8	16	–	60	–	4	AG642207	AG642207A	0.010 – 0.018
8.0	8	19	33	69	7.5	4	AG642208	AG642208A	0.012 – 0.021
9.0	10	19	–	69	–	4	AG642209	AG642209A	0.014 – 0.025
10.0	10	22	32	72	9.0	4	AG642210	AG642210A	0.015 – 0.027
11.0	12	22	–	79	–	4	AG642211	AG642211A	0.018 – 0.032
12.0	12	26	38	83	11.0	4	AG642212	AG642212A	0.020 – 0.036
13.0	12	26	–	83	–	4	AG642213	AG642213A	0.022 – 0.040
14.0	12	26	–	83	–	4	AG642214	AG642214A	0.020 – 0.036
15.0	16	32	–	92	–	4	AG642215	AG642215A	0.021 – 0.038
16.0	16	32	44	92	15.0	4	AG642216	AG642216A	0.022 – 0.040
17.0	16	32	–	92	–	4	AG642217	AG642217A	0.023 – 0.043
18.0	16	32	–	92	–	4	AG642218	AG642218A	0.023 – 0.043
19.0	20	38	–	104	–	4	AG642219	AG642219A	0.025 – 0.047
20.0	20	38	54	104	19.0	4	AG642220	AG642220A	0.025 – 0.047
22.0	20	38	–	104	–	4	AG642222	AG642222A	0.027 – 0.051

d1	d2
js14	h6



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



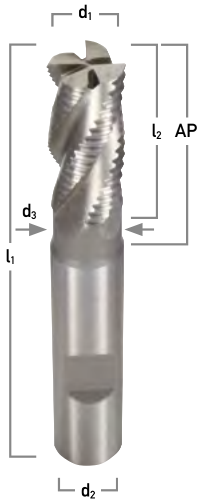
Full slot milling
a_p = 1.5xD

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

AG 652-2

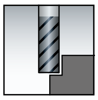
Uncoated | Alcrona Pro | Z 5 | HB | 35° | HSS | Type HR | DIN 844

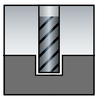
HSS Roughing End Mill



d_1	d_2
js14	h6

d_1	d_2	l_2	AP	l_1	d_3		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
25.0	25	45	65	121	24.0	5	AG652225	AG652225A	0.032 – 0.057

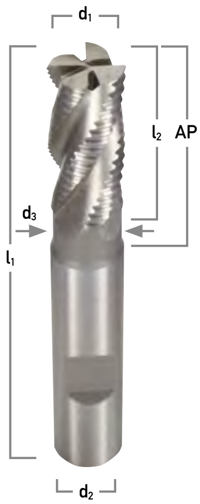

Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$


Full slot milling
$a_p = 1.5xD$

AG 662-2

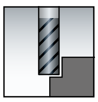
Uncoated | Alcrona Pro | Z 6 | HB | 30° | HSS | Type HR | DIN 844

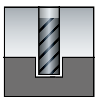
HSS Roughing End Mill



d_1	d_2
js14	h6

d_1	d_2	l_2	AP	l_1	d_3		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
26.0	25	45	–	121	–	6	AG662226	AG662226A	0.035 – 0.059
28.0	25	45	–	121	–	6	AG662228	AG662228A	0.037 – 0.062
30.0	25	45	–	121	–	6	AG662230	AG662230A	0.039 – 0.063
32.0	32	53	73	133	31.0	6	AG662232	AG662232A	0.039 – 0.063
36.0	32	53	–	133	–	6	AG662236	AG662236A	0.043 – 0.067
40.0	40	63	85	155	39.0	6	AG662240	AG662240A	0.046 – 0.070


Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$


Full slot milling
$a_p = 1.5xD$

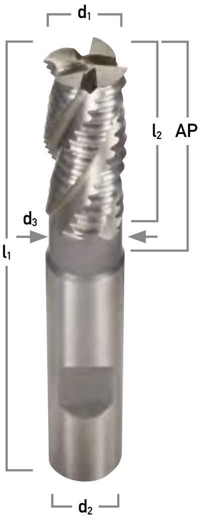
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

Product family 45

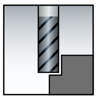
AG 732-2

Uncoated | Alcrona Pro | Z 3 | HB | 30° | HSS | Type NR | DIN 844

HSS Roughing End Mill



d_1	d_2	l_2	AP	l_1	d_3		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
6.0	6	13	21	57	5.5	3	AG732206	AG732206A	0.008 – 0.015
7.0	10	16	–	66	–	3	AG732207	AG732207A	0.010 – 0.018
8.0	10	19	33	69	7.5	3	AG732208	AG732208A	0.012 – 0.021
9.0	10	19	–	69	–	3	AG732209	AG732209A	0.014 – 0.025
10.0	10	22	32	72	9.0	3	AG732210	AG732210A	0.015 – 0.027
12.0	12	26	38	83	11.0	3	AG732212	AG732212A	0.018 – 0.032
14.0	12	26	–	83	–	3	AG732214	AG732214A	0.020 – 0.036
16.0	16	32	44	92	15.0	3	AG732216	AG732216A	0.022 – 0.040
18.0	16	32	–	92	–	3	AG732218	AG732218A	0.023 – 0.043
20.0	20	38	54	104	19.0	3	AG732220	AG732220A	0.025 – 0.047
22.0	20	38	–	104	–	3	AG732222	AG732222A	0.027 – 0.051
25.0	25	45	65	121	24.0	3	AG732225	AG732225A	0.031 – 0.055



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

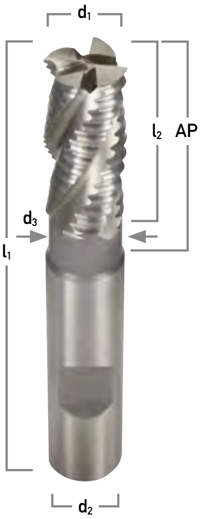
Full slot milling
a_p = 1.5xD

d_1	d_2
js14	h6

AG 742-2

Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type NR | DIN 844

HSS Roughing End Mill



d_1	d_2	l_2	AP	l_1	d_3		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/z
5.0	6	13	–	57	–	4	AG742205	AG742205A	0.007 – 0.012
6.0	6	13	21	57	5.5	4	AG742206	AG742206A	0.008 – 0.015
7.0	8	16	–	60	–	4	AG742207	AG742207A	0.010 – 0.018
8.0	8	19	33	69	7.5	4	AG742208	AG742208A	0.012 – 0.021
9.0	10	19	–	69	–	4	AG742209	AG742209A	0.014 – 0.025
10.0	10	22	32	72	9.0	4	AG742210	AG742210A	0.015 – 0.027
11.0	12	22	–	79	–	4	AG742211	AG742211A	0.018 – 0.032
12.0	12	26	38	83	11.0	4	AG742212	AG742212A	0.020 – 0.036
13.0	12	26	–	83	–	4	AG742213	AG742213A	0.020 – 0.036
14.0	12	26	–	83	–	4	AG742214	AG742214A	0.022 – 0.040
15.0	16	32	–	92	–	4	AG742215	AG742215A	0.021 – 0.038
16.0	16	32	44	92	15.0	4	AG742216	AG742216A	0.022 – 0.040
18.0	16	32	–	92	–	4	AG742218	AG742218A	0.023 – 0.043
20.0	20	38	54	104	19.0	4	AG742220	AG742220A	0.025 – 0.047

Peripheral milling
a_e = 0.5xD
a_p = 2.0xD

Full slot milling
a_p = 1.5xD

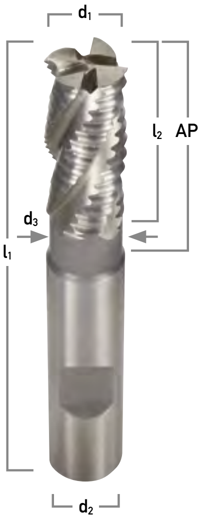
d_1	d_2
js14	h6

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

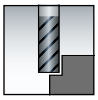
AG 752-2

Uncoated | Alcrona Pro | Z 5 | HB | 30° | HSS | Type NR | DIN 844

HSS Roughing End Mill



d1 mm	d2 mm	l2 mm	AP mm	l1 mm	d3 mm	Z	Uncoated Part No.	Coated Part No.	fz Roughing mm/z
22.0	20	38	–	104	–	5	AG752222	AG752222A	0.027 – 0.051
24.0	25	45	–	121	–	5	AG752224	AG752224A	0.029 – 0.053
25.0	25	45	65	121	24.0	5	AG752225	AG752225A	0.035 – 0.059
26.0	25	45	–	121	–	5	AG752226	AG752226A	0.035 – 0.059
28.0	25	45	–	121	–	5	AG752228	AG752228A	0.037 – 0.062
30.0	25	45	–	121	–	5	AG752230	AG752230A	0.039 – 0.063



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

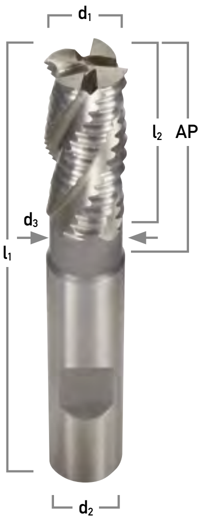
Full slot milling
$a_p = 1.5xD$

d1	d2
js14	h6

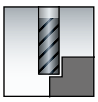
AG 762-2

Uncoated | Alcrona Pro | Z 6 | HB | 38° | HSS | Type NR | DIN 844

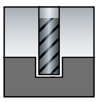
HSS-HSS Roughing End Mill



d1 mm	d2 mm	l2 mm	AP mm	l1 mm	d3 mm	Z	Uncoated Part No.	Coated Part No.	fz Roughing mm/z
26.0	25	45	–	121	–	6	AG762226	AG762226A	0.035 – 0.059
28.0	25	45	–	121	–	6	AG762228	AG762228A	0.037 – 0.062
30.0	25	45	–	121	–	6	AG762230	AG762230A	0.039 – 0.063
32.0	32	53	73	133	31.0	6	AG762232	AG762232A	0.039 – 0.063
36.0	32	53	–	133	–	6	AG762236	AG762236A	0.042 – 0.068
40.0	40	63	85	155	39.0	6	AG762240	AG762240A	0.052 – 0.076



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.5xD$

d1	d2
js14	h6

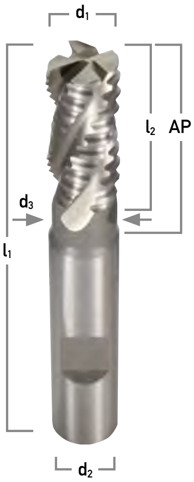
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

Product family 45

AG 942-2

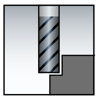
Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type NF | DIN 844

HSS Roughing / Finishing End Mill



d1	d2	l2	AP	l1	d3		Uncoated	Coated	fz Roughing	fz Finishing
mm	mm	mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z	mm/Z
6.0	6	13	21	57	5.5	4	AG942206	AG942206A	0.008 – 0.015	0.006 – 0.013
7.0	8	16	–	60	–	4	AG942207	AG942207A	0.010 – 0.018	0.008 – 0.016
8.0	8	19	33	69	7.5	4	AG942208	AG942208A	0.012 – 0.021	0.010 – 0.019
9.0	10	19	–	69	–	4	AG942209	AG942209A	0.014 – 0.025	0.012 – 0.022
10.0	10	22	32	72	9.0	4	AG942210	AG942210A	0.015 – 0.027	0.013 – 0.025
11.0	12	22	–	79	–	4	AG942211	AG942211A	0.018 – 0.032	0.016 – 0.030
12.0	12	26	38	83	11.0	4	AG942212	AG942212A	0.020 – 0.036	0.018 – 0.034
14.0	12	26	–	83	–	4	AG942214	AG942214A	0.022 – 0.040	0.020 – 0.038
16.0	16	32	44	92	15.0	4	AG942216	AG942216A	0.022 – 0.040	0.020 – 0.038
18.0	16	32	–	92	–	4	AG942218	AG942218A	0.023 – 0.043	0.021 – 0.041
20.0	20	38	54	104	19.0	4	AG942220	AG942220A	0.025 – 0.047	0.023 – 0.045
22.0	20	38	–	104	–	4	AG942222	AG942222A	0.027 – 0.051	0.025 – 0.049
24.0	25	45	–	121	–	4	AG942224	AG942224A	0.029 – 0.053	0.027 – 0.051

d1	d2
js14	h6


Peripheral milling
a_e = 0.5xD
a_p = 2.0xD


Full slot milling
a_p = 1.5xD

AG 642-4

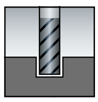
Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type HR | DIN 844

HSS Roughing End Mill

d1	d2	l2	l1		Uncoated	Coated	fz Roughing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
6.0	6	24	68	4	AG642406	AG642406A	0.008 – 0.015
8.0	8	38	88	4	AG642408	AG642408A	0.012 – 0.021
10.0	10	45	95	4	AG642410	AG642410A	0.015 – 0.027
12.0	12	53	110	4	AG642412	AG642412A	0.020 – 0.036
14.0	12	53	110	4	AG642414	AG642414A	0.022 – 0.040
16.0	16	63	123	4	AG642416	AG642416A	0.022 – 0.040
18.0	16	63	123	4	AG642418	AG642418A	0.023 – 0.043
20.0	20	75	141	4	AG642420	AG642420A	0.025 – 0.047
25.0	25	90	166	4	AG642425	AG642425A	0.035 – 0.059

d1	d2
js14	h6


Peripheral milling
a_e = 0.5xD
a_p = 2.0xD


Full slot milling
a_p = 1.5xD

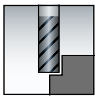
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

AG 652-4

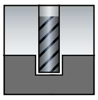
Uncoated | Alcrona Pro | Z 5 | HB | 30° | HSS | Type HR | DIN 844

HSS Roughing End Mill

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing		
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z		
22.0	20	75	141	5	AG652422	AG652422A	0.027	–	0.051
25.0	25	90	166	5	AG652425	AG652425A	0.035	–	0.059



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.0xD

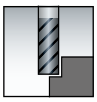
d_1	d_2
js14	h6

AG 662-4

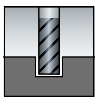
Uncoated | Alcrona Pro | Z 6 | HB | 30° | HSS | Type HR | DIN 844

HSS Roughing End Mill

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing		
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z		
28.0	25	90	166	6	AG662428	AG662428A	0.037	–	0.062
30.0	25	90	166	6	AG662430	AG662430A	0.039	–	0.063



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.0xD

d_1	d_2
js14	h6

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

Product family 45

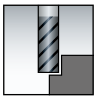
AG 742-4

Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type NR | DIN 844

HSS Roughing End Mill

d_1	d_2
js14	h6

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z
6.0	6	24	68	4	AG742406	AG742406A	0.008 – 0.015
8.0	8	38	88	4	AG742408	AG742408A	0.012 – 0.021
10.0	10	45	95	4	AG742410	AG742410A	0.015 – 0.027
11.0	12	45	102	4	AG742411	AG742411A	0.016 – 0.040
12.0	12	53	110	4	AG742412	AG742412A	0.020 – 0.040
14.0	12	53	110	4	AG742414	AG742414A	0.022 – 0.040
16.0	16	63	123	4	AG742416	AG742416A	0.022 – 0.040
18.0	16	63	123	4	AG742418	AG742418A	0.023 – 0.043
20.0	20	75	141	4	AG742420	AG742420A	0.025 – 0.047
22.0	20	75	141	4	AG742422	AG742422A	0.027 – 0.051



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$

Full slot milling
$a_p = 1.5xD$

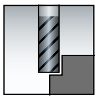
Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

AG 752-4

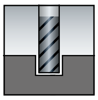
Uncoated | Alcrona Pro | Z 5 | HB | 30° | HSS | Type NR | DIN 844

HSS Roughing End Mill

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
22.0	20	75	141	5	AG752422	AG752422A	0.027 – 0.051
25.0	25	90	166	5	AG752425	AG752425A	0.035 – 0.059
28.0	25	90	166	5	AG752428	AG752428A	0.037 – 0.062
30.0	25	90	166	5	AG752430	AG752430A	0.039 – 0.063



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.5xD

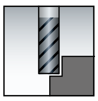
d_1	d_2
js14	h6

AG 762-4

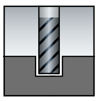
Uncoated | Alcrona Pro | Z 6 | HB | 38° | HSS | Type NR | DIN 844

HSS Roughing End Mill

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
28.0	25	90	166	6	AG762428	AG762428A	0.037 – 0.062
30.0	25	90	166	6	AG762430	AG762430A	0.039 – 0.063
32.0	32	106	186	6	AG762432	AG762432A	0.039 – 0.063
36.0	32	106	186	6	AG762436	AG762436A	0.041 – 0.065
40.0	32	125	217	6	AG762440	AG762440A	0.045 – 0.068
45.0	32	125	217	6	AG762445	AG762445A	0.049 – 0.073



Peripheral milling
a_e = 0.5xD
a_p = 2.0xD



Full slot milling
a_p = 1.5xD

d_1	d_2
js14	h6

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	75	60	70	135
V_c (m/min) Roughing	55	40	50	115

Product family 45

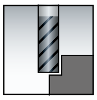
AG 740-4

Uncoated | Alcrona Pro | Z 4 | HB | 30° | HSS | Type NR | Werks-norm

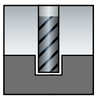
HSS Roughing End Mill

d_1	d_2
js14	h6

d_1	d_2	l_2	l_1		Uncoated	Coated	f_z Roughing
mm	mm	mm	mm	Z	Part No.	Part No.	mm/Z
6.0	6	40	100	4	AG740406	AG740406A	0.010 – 0.027
8.0	8	65	115	4	AG740408	AG740408A	0.014 – 0.034
10.0	10	65	115	4	AG740410	AG740410A	0.017 – 0.041
12.0	12	75	132	4	AG740412	AG740412A	0.020 – 0.050
14.0	12	80	137	4	AG740414	AG740414A	0.022 – 0.057
16.0	16	100	160	4	AG740416	AG740416A	0.025 – 0.060
18.0	16	100	160	4	AG740418	AG740418A	0.027 – 0.067
20.0	20	100	166	4	AG740420	AG740420A	0.030 – 0.075
20.0	20	125	191	4	AG740520	AG740520A	0.030 – 0.075
22.0	20	110	176	4	AG740422	AG740422A	0.032 – 0.078
25.0	25	125	201	4	AG740425	AG740425A	0.039 – 0.084
25.0	25	140	216	4	AG740525	AG740525A	0.039 – 0.084
25.0	25	160	236	4	AG740625	AG740625A	0.039 – 0.084
28.0	25	140	216	4	AG740428	AG740428A	0.043 – 0.088
28.0	25	160	236	4	AG740528	AG740528A	0.043 – 0.088
30.0	25	140	216	4	AG740430	AG740430A	0.046 – 0.091
32.0	32	140	220	4	AG740432	AG740432A	0.049 – 0.094
32.0	32	160	240	4	AG740532	AG740532A	0.049 – 0.094
32.0	32	180	260	4	AG740632	AG740632A	0.049 – 0.094



Peripheral milling
$a_e = 0.5xD$
$a_p = 2.0xD$



Full slot milling
$a_p = 1.0xD$

Material	Steel	Stainless	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 850 N/mm²	< 800 N/mm²	< 600 N/mm²
V_c (m/min) Finishing	60	45	55	120
V_c (m/min) Roughing	40	30	35	90

AX 850B

Uncoated | Z 6–12 | HB | HSS-Co5 | Type N | DIN 850B

HSS-Co5 Keyseating Cutter
For Slot Milling Acc. To DIN 6888 Fit P9

d_1	d_2
h12	h6

l_2
e8

d_1 mm	d_2 mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
4.5	6	1	50	6	AX850B04510	0.06	0.03
7.5	6	1.5	50	6	AX850B07515	0.06	0.03
7.5	6	2	50	6	AX850B07520	0.06	0.03
10.5	6	2	50	6	AX850B10520	0.075	0.045
10.5	6	2.5	50	6	AX850B10525	0.075	0.045
10.5	6	3	50	6	AX850B10530	0.075	0.045
13.5	10	2	56	6	AX850B13520	0.075	0.045
13.5	10	3	56	6	AX850B13530	0.075	0.045
13.5	10	4	56	6	AX850B13540	0.075	0.045
16.5	10	3	56	6	AX850B16530	0.09	0.06
16.5	10	4	56	6	AX850B16540	0.09	0.06
16.5	10	5	56	6	AX850B16550	0.09	0.06
19.5	10	3	63	8	AX850B19530	0.09	0.06
19.5	10	4	63	8	AX850B19540	0.09	0.06
19.5	10	5	63	8	AX850B19550	0.09	0.06
19.5	10	6	63	8	AX850B19560	0.09	0.06
22.5	10	4	63	8	AX850B22540	0.11	0.08
22.5	10	5	63	8	AX850B22550	0.11	0.08
22.5	10	6	63	8	AX850B22560	0.11	0.08
22.5	10	8	63	8	AX850B22580	0.11	0.08
25.5	10	5	63	10	AX850B25550	0.11	0.08
25.5	10	6	63	10	AX850B25560	0.11	0.08
28.5	10	6	63	10	AX850B28560	0.11	0.08
28.5	10	8	63	10	AX850B28580	0.11	0.08
28.5	12	10	71	10	AX850B28510	0.11	0.08
32.5	12	6	71	10	AX850B32560	0.12	0.09
32.5	12	7	71	10	AX850B32570	0.12	0.09
32.5	12	8	71	12	AX850B32580	0.12	0.09
32.5	12	10	71	12	AX850B32510	0.12	0.09
38.5	12	8	71	12	AX850B38580	0.12	0.09
45.5	12	8	71	12	AX850B45580	0.12	0.09
45.5	12	10	71	12	AX850B45510	0.12	0.09

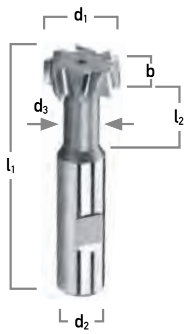
Material	Steel	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 800 N/mm²	< 450 N/mm²
V_c (m/min) Finishing	46	45	190
V_c (m/min) Roughing	26	25	170

Product family 45

AX 851B

Uncoated | Z 6–10 | HB | HSS-Co5 | Type N | DIN 851B

HSS-Co5 T-Slot Cutter



d_1	d_2
d11	h6

d_3	b
h12	d11

d_1	d_2	b	l_2	l_1	d_3		T-Nuten	Uncoated	f_z Roughing	f_z Finishing
mm	mm	mm	mm	mm	mm	Z	DIN 650	Part No.	mm/Z	mm/Z
11.0	10	4	6.5	53.5	4	6	5	AX851B11040	0.09	0.06
12.5	10	6	7	57	5	6	6	AX851B12560	0.09	0.06
16.0	10	8	10	62	7	6	8	AX851B16080	0.09	0.06
18.0	12	8	13	70	8	6	10	AX851B18080	0.09	0.06
19.0	12	9	13	71	8	6	>8	AX851B19090	0.09	0.06
21.0	12	9	16	74	10	6	12	AX851B21090	0.11	0.08
22.0	12	10	17	75	10	6	>10	AX851B22100	0.11	0.08
25.0	16	11	17	82	12	8	14	AX851B25110	0.11	0.08
28.0	16	12	22	85	13	8	>13	AX851B28120	0.11	0.08
32.0	16	14	22	90	15	8	18	AX851B32140	0.12	0.09
36.0	25	16	22	103	17	8	>17	AX851B36160	0.12	0.09
40.0	25	18	27	108	19	10	22	AX851B40180	0.12	0.09
45.0	25	20	34	113	21	10	>21	AX851B45200	0.14	0.11
50.0	32	22	34	124	25	10	28	AX851B50220	0.14	0.11
60.0	32	28	43	139	30	10	36	AX851B60280	0.14	0.11

Material	Steel	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 800 N/mm²	< 450 N/mm²
V_c (m/min) Finishing	46	45	190
V_c (m/min) Roughing	26	25	170

AX 1833C

Uncoated	Z 10–12	HB		HSS-Co5	Type N	DIN 1833C

HSS-Co5 Dovetail Cutter
45° | 60°

Angle	d_1 mm	d_2 mm	b mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
45°	16.0	12	4	60	10	AX1833C4516	0.09	0.06
45°	20.0	12	5	63	10	AX1833C4520	0.11	0.08
45°	25.0	12	6.3	67	10	AX1833C4525	0.11	0.08
45°	32.0	16	8	71	12	AX1833C4532	0.12	0.09
60°	16.0	12	6.3	60	10	AX1833C6016	0.09	0.06
60°	20.0	12	8	63	10	AX1833C6020	0.11	0.08
60°	25.0	12	10	67	10	AX1833C6025	0.11	0.08
60°	32.0	16	12.5	71	12	AX1833C6032	0.12	0.09

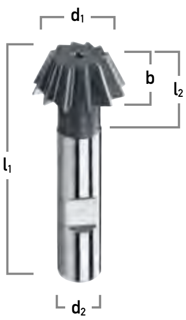
d_1	d_2
js16	h6

b
js14

AX 1833D

Uncoated	Z 10–12	HB		HSS-Co5	Type N	DIN 1833D

HSS-Co5 Dovetail Cutter
45° | 60°°



Angle	d_1 mm	d_2 mm	b mm	l_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
45°	16.0	12	4	–	60	10	AX1833D4516	0.09	0.06
45°	20.0	12	5	–	63	10	AX1833D4520	0.11	0.08
45°	25.0	12	6.3	14	67	10	AX1833D4525	0.11	0.08
45°	32.0	16	8	14	71	12	AX1833D4532	0.12	0.09
60°	16.0	12	6.3	–	60	10	AX1833D6016	0.09	0.06
60°	20.0	12	8	–	63	10	AX1833D6020	0.11	0.08
60°	25.0	12	10	10	67	10	AX1833D6025	0.11	0.08
60°	32.0	16	12.5	10	71	12	AX1833D6032	0.12	0.09

d_1	d_2
js16	h6

b
js14

Material	Steel	Cast	Alu
Tensile strength/Hardness	< 850 N/mm²	< 800 N/mm²	< 450 N/mm²
V_c (m/min) Finishing	46	45	190
V_c (m/min) Roughing	26	25	170

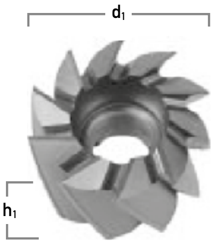
Product family 45

ToolFactory Cutting Tool Solutions

AX 514

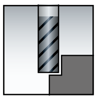
Uncoated	Alcrona Pro	Z 8–14	30°	HSS	Type N	DIN 1880

HSS Shell End Mill



d_1 mm	h_1 mm	d	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
40.0	32	16	8	AX514001	AX514001A	0.070	0.050
50.0	36	22	8	AX514002	AX514002A	0.075	0.055
63.0	40	27	10	AX514003	AX514003A	0.080	0.060
80.0	45	27	10	AX514004	AX514004A	0.095	0.075
100.0	50	32	10	AX514005	AX514005A	0.105	0.085
125.0	56	40	14	AX514006	AX514006A	0.120	0.100

d_1	d
js16	H7

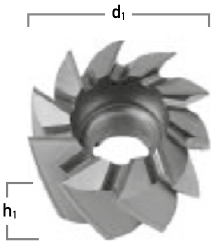


Peripheral milling
$a_e = 0.75xD$
$a_p = 0.5xD$

AX 814

Uncoated	Alcrona Pro	Z 8–12	30°	HSS-Co5	Type N	DIN 1880

HSS-Co5 Shell End Mill



d_1 mm	h_1 mm	d	Z	Uncoated Part No.	Coated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
40.0	32	16	8	AX814001	AX814001A	0.070	0.050
50.0	36	22	8	AX814002	AX814002A	0.075	0.055
63.0	40	27	8	AX814003	AX814003A	0.080	0.060
80.0	45	27	10	AX814004	AX814004A	0.095	0.075
100.0	50	32	12	AX814005	AX814005A	0.105	0.085

d_1	d
js16	H7

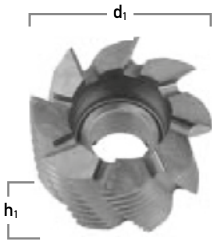
Peripheral milling
$a_e = 0.75xD$
$a_p = 0.5xD$

Material	Steel	Stainless	Cast
Tensile strength/Hardness	< 850 N/mm²	< 750 N/mm²	< 800 N/mm²
V_c (m/min) Finishing	40	25	30
V_c (m/min) Roughing	25	15	20

AX 518

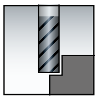
Uncoated | Alcrona Pro | Z 6–12 | 30° | HSS | Type NR | DIN 1880

HSS Shell End Mill



d_1	h_1	d		Uncoated	Coated	f_z Roughing
mm	mm		Z	Part No.	Part No.	mm/Z
40.0	32	16	6	AX518001	AX518001A	0.070
50.0	36	22	6	AX518002	AX518002A	0.075
63.0	40	27	8	AX518003	AX518003A	0.080
80.0	45	27	8	AX518004	AX518004A	0.095
100.0	50	32	10	AX518005	AX518005A	0.105
125.0	56	40	12	AX518006	AX518006A	0.120

d_1	d
js16	H7

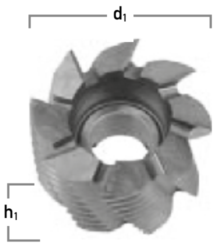


Peripheral milling
$a_e = 0.75xD$
$a_p = 0.5xD$

AX 818

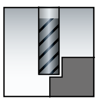
Uncoated | Alcrona Pro | Z 6–10 | 30° | HSS-Co5 | Type NR | DIN 1880

HSS-Co5 Shell End Mill



d_1	h_1	d		Uncoated	Coated	f_z Roughing
mm	mm		Z	Part No.	Part No.	mm/Z
40.0	32	16	6	AX818001	AX818001A	0.070
50.0	36	22	6	AX818002	AX818002A	0.075
63.0	40	27	8	AX818003	AX818003A	0.080
80.0	45	27	8	AX818004	AX818004A	0.095
100.0	50	32	10	AX818005	AX818005A	0.105

d_1	d
js16	H7



Peripheral milling
$a_e = 0.75xD$
$a_p = 0.5xD$

Material	Steel	Stainless	Cast
Tensile strength/Hardness	< 850 N/mm²	< 750 N/mm²	< 800 N/mm²
V_c (m/min) Finishing	40	25	30
V_c (m/min) Roughing	25	15	20

Product family 45

AX 842A

Uncoated | Z 14–28 | HSS | Type N | DIN 842A

HSS Angle Milling Cutter

d₁

d₁	S
js16	js14

d
H7

Angle	d_1 mm	S mm	d mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
45°	40	10	10	14	AX842A4540	0.027 – 0.027	0.025 – 0.028
45°	50	13	13	16	AX842A4550	0.032 – 0.032	0.030 – 0.033
45°	63	18	16	18	AX842A4563	0.037 – 0.037	0.035 – 0.039
45°	80	22	22	20	AX842A4580	0.042 – 0.042	0.040 – 0.044
45°	100	28	27	22	AX842A45100	0.047 – 0.047	0.045 – 0.050
45°	125	36	32	24	AX842A45125	0.057 – 0.057	0.055 – 0.060
45°	160	45	40	28	AX842A45160	0.072 – 0.072	0.070 – 0.075
60°	40	13	10	14	AX842A6040	0.027 – 0.030	0.025 – 0.028
60°	50	16	13	16	AX842A6050	0.032 – 0.035	0.030 – 0.033
60°	63	20	16	18	AX842A6063	0.037 – 0.041	0.035 – 0.039
60°	80	25	22	20	AX842A6080	0.042 – 0.046	0.040 – 0.044
60°	100	32	27	22	AX842A60100	0.047 – 0.052	0.045 – 0.050
60°	125	40	32	26	AX842A60125	0.057 – 0.062	0.055 – 0.060
60°	160	50	40	28	AX842A60160	0.072 – 0.077	0.070 – 0.075

AX 847

Uncoated | Z 22–28 | HSS | Type N | DIN 847

HSS Angle Milling Cutter

d₁

d₁	S
js16	js16

d
H7

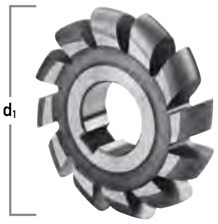
Angle	d_1 mm	S mm	d mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
45°	50	8	16	22	AX8474550	0.032 – 0.035	0.030 – 0.033
45°	63	10	22	24	AX8474563	0.037 – 0.041	0.035 – 0.039
45°	80	12	27	26	AX8474580	0.042 – 0.046	0.040 – 0.044
45°	100	18	32	28	AX84745100	0.047 – 0.052	0.045 – 0.050
60°	50	10	16	18	AX8476050	0.032 – 0.035	0.030 – 0.033
60°	63	14	22	20	AX8476063	0.037 – 0.041	0.035 – 0.039
60°	80	18	27	22	AX8476080	0.042 – 0.046	0.040 – 0.044
60°	100	25	32	24	AX84760100	0.047 – 0.052	0.045 – 0.050
90°	50	14	16	16	AX8479050	0.032 – 0.035	0.030 – 0.033
90°	63	20	22	18	AX8479063	0.037 – 0.041	0.035 – 0.039
90°	80	22	27	20	AX8479080	0.042 – 0.046	0.040 – 0.044
90°	100	32	32	24	AX84790100	0.047 – 0.052	0.045 – 0.050

Material	Steel	Cast	Alu	Plastics
Tensile strength/Hardness	< 850 N/mm²	< 240 N/mm²	< 450 N/mm²	
V_c (m/min) Finishing	35	30	190	120
V_c (m/min) Roughing	30	20	170	100

AX 856

Uncoated | Z 10–14 | HSS-E | Type N | DIN 856

HSS-E Convex Milling Cutter



R	d$_1$
k11	js16

S	d
s10	H7

R mm	d$_1$ mm	R mm	d mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.00	50	2	16	14	AX8565010	0.082 – 0.090	0.080 – 0.088
1.25	50	2.5	16	14	AX85650125	0.082 – 0.090	0.080 – 0.088
1.60	50	3.2	16	14	AX8565016	0.082 – 0.090	0.080 – 0.088
2.00	50	4	16	14	AX8565020	0.082 – 0.090	0.080 – 0.088
2.50	63	5	22	12	AX8566325	0.102 – 0.112	0.100 – 0.110
3.00	63	6	22	12	AX8566330	0.102 – 0.112	0.100 – 0.110
3.15	63	6.3	22	12	AX85663315	0.102 – 0.112	0.100 – 0.110
3.50	63	7	22	12	AX8566335	0.102 – 0.112	0.100 – 0.110
4.00	63	8	22	12	AX8566340	0.102 – 0.112	0.100 – 0.110
4.50	63	9	22	12	AX8566345	0.102 – 0.112	0.100 – 0.110
5.00	63	10	22	12	AX8566350	0.102 – 0.112	0.100 – 0.110
6.00	80	12	27	12	AX8568060	0.122 – 0.134	0.120 – 0.132
6.30	80	12.6	27	12	AX8568063	0.122 – 0.134	0.120 – 0.132
7.00	80	14	27	12	AX8568070	0.122 – 0.134	0.120 – 0.132
8.00	80	16	27	12	AX8568080	0.122 – 0.134	0.120 – 0.132
9.00	100	18	32	12	AX85610090	0.142 – 0.154	0.140 – 0.152
10.00	100	20	32	12	AX856100100	0.142 – 0.154	0.140 – 0.152
12.00	100	24	32	12	AX856100120	0.142 – 0.154	0.140 – 0.152
12.50	100	25	32	12	AX856100125	0.142 – 0.154	0.140 – 0.152
16.00	125	32	32	10	AX856125160	0.162 – 0.174	0.160 – 0.172
20.00	125	40	32	10	AX856125200	0.162 – 0.174	0.160 – 0.172

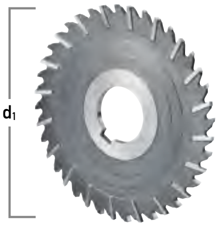
Material	Steel	Cast	Alu	Plastics
Tensile strength/Hardness	< 850 N/mm^2	< 240 N/mm^2	< 450 N/mm^2	
V_c (m/min) Finishing	50	40	190	120
V_c (m/min) Roughing	30	20	170	100

Product family 45

AX 1834A

Uncoated	Z 24–52	HSS-Co5	Type N		DIN 1834A

HSS-Co5 Side Milling Cutter



d_1	s
js16	k11

d
H7

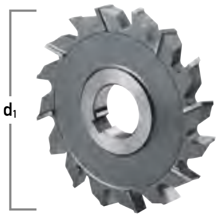
d_1 mm	s mm	d mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
50.0	1.6	16	24	AX1834A5016	0.052 – 0.057	0.050 – 0.055
50.0	2.0	16	24	AX1834A5020	0.052 – 0.057	0.050 – 0.055
50.0	2.5	16	24	AX1834A5025	0.052 – 0.057	0.050 – 0.055
50.0	3.0	16	24	AX1834A5030	0.052 – 0.057	0.050 – 0.055
63.0	1.6	22	28	AX1834A6316	0.062 – 0.062	0.062 – 0.062
63.0	2.0	22	28	AX1834A6320	0.062 – 0.062	0.062 – 0.062
63.0	2.5	22	28	AX1834A6325	0.062 – 0.062	0.062 – 0.062
63.0	3.0	22	28	AX1834A6330	0.062 – 0.062	0.062 – 0.062
63.0	4.0	22	28	AX1834A6340	0.062 – 0.062	0.062 – 0.062
63.0	5.0	22	28	AX1834A6350	0.062 – 0.062	0.062 – 0.062
63.0	6.0	22	28	AX1834A6360	0.062 – 0.062	0.062 – 0.062
80.0	1.6	27	32	AX1834A8016	0.072 – 0.079	0.070 – 0.077
80.0	2.0	27	32	AX1834A8020	0.072 – 0.079	0.070 – 0.077
80.0	2.5	27	32	AX1834A8025	0.072 – 0.079	0.070 – 0.077
80.0	3.0	27	32	AX1834A8030	0.072 – 0.079	0.070 – 0.077
80.0	4.0	27	32	AX1834A8040	0.072 – 0.079	0.070 – 0.077
80.0	5.0	27	32	AX1834A8050	0.072 – 0.079	0.070 – 0.077
80.0	6.0	27	32	AX1834A8060	0.072 – 0.079	0.070 – 0.077
100.0	1.6	32	36	AX1834A10016	0.082 – 0.090	0.080 – 0.088
100.0	2.0	32	36	AX1834A10020	0.082 – 0.090	0.080 – 0.088
100.0	2.5	32	36	AX1834A10025	0.082 – 0.090	0.080 – 0.088
100.0	3.0	32	36	AX1834A10030	0.082 – 0.090	0.080 – 0.088
100.0	4.0	32	36	AX1834A10040	0.082 – 0.090	0.080 – 0.088
100.0	5.0	32	36	AX1834A10050	0.082 – 0.090	0.080 – 0.088
100.0	6.0	32	36	AX1834A10060	0.082 – 0.090	0.080 – 0.088
100.0	8.0	32	28	AX1834A10080	0.082 – 0.090	0.080 – 0.088
125.0	1.6	32	40	AX1834A12516	0.092 – 0.101	0.090 – 0.099
125.0	2.0	32	40	AX1834A12520	0.092 – 0.101	0.090 – 0.099
125.0	2.5	32	40	AX1834A12525	0.092 – 0.101	0.090 – 0.099
125.0	3.0	32	40	AX1834A12530	0.092 – 0.101	0.090 – 0.099
125.0	4.0	32	40	AX1834A12540	0.092 – 0.101	0.090 – 0.099
125.0	5.0	32	40	AX1834A12550	0.092 – 0.101	0.090 – 0.099
125.0	6.0	32	40	AX1834A12560	0.092 – 0.101	0.090 – 0.099
125.0	8.0	32	32	AX1834A12580	0.092 – 0.101	0.090 – 0.099
125.0	10.0	32	32	AX1834A125100	0.092 – 0.101	0.090 – 0.099
160.0	2.0	40	48	AX1834A16020	0.092 – 0.101	0.090 – 0.099
160.0	2.5	40	48	AX1834A16025	0.092 – 0.101	0.090 – 0.099
160.0	3.0	40	48	AX1834A16030	0.092 – 0.101	0.090 – 0.099
160.0	4.0	40	48	AX1834A16040	0.092 – 0.101	0.090 – 0.099
160.0	5.0	40	48	AX1834A16050	0.092 – 0.101	0.090 – 0.099
160.0	6.0	40	48	AX1834A16060	0.092 – 0.101	0.090 – 0.099
160.0	8.0	40	36	AX1834A16080	0.092 – 0.101	0.090 – 0.099
160.0	10.0	40	36	AX1834A160100	0.092 – 0.101	0.090 – 0.099
160.0	12.0	40	36	AX1834A160120	0.092 – 0.101	0.090 – 0.099
200.0	2.0	40	52	AX1834A20020	0.092 – 0.101	0.090 – 0.099
200.0	2.5	40	52	AX1834A20025	0.092 – 0.101	0.090 – 0.099
200.0	3.0	40	52	AX1834A20030	0.092 – 0.101	0.090 – 0.099
200.0	4.0	40	52	AX1834A20040	0.092 – 0.101	0.090 – 0.099
200.0	5.0	40	52	AX1834A20050	0.092 – 0.101	0.090 – 0.099
200.0	6.0	40	52	AX1834A20060	0.092 – 0.101	0.090 – 0.099
200.0	8.0	40	40	AX1834A20080	0.092 – 0.101	0.090 – 0.099
200.0	10.0	40	40	AX1834A200100	0.092 – 0.101	0.090 – 0.099
200.0	12.0	40	40	AX1834A200120	0.092 – 0.101	0.090 – 0.099

Material	Steel	Cast	Alu	Plastics
Tensile strength/Hardness	< 850 N/mm²	< 240 N/mm²	< 450 N/mm²	
V_c (m/min) Finishing	40	40	190	120
V_c (m/min) Roughing	30	25	170	100

AX 885A

Uncoated	Z 12–24	HSS-Co5	Type N	DIN 885A

HSS-Co5 Side Milling Cutter



d_1	s
js16	k11

d
H7

d_1 mm	s mm	d mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
50.0	4	16	12	AX885A5040	0.052 – 0.057	0.050 – 0.055
50.0	5	16	12	AX885A5050	0.052 – 0.057	0.050 – 0.055
50.0	6	16	12	AX885A5060	0.052 – 0.057	0.050 – 0.055
50.0	8	16	12	AX885A5080	0.052 – 0.057	0.050 – 0.055
50.0	10	16	12	AX885A50100	0.052 – 0.057	0.050 – 0.055
63.0	4	22	12	AX885A6340	0.062 – 0.062	0.062 – 0.062
63.0	5	22	12	AX885A6350	0.062 – 0.062	0.062 – 0.062
63.0	6	22	12	AX885A6360	0.062 – 0.062	0.062 – 0.062
63.0	8	22	12	AX885A6380	0.062 – 0.062	0.062 – 0.062
63.0	10	22	12	AX885A63100	0.062 – 0.062	0.062 – 0.062
63.0	12	22	12	AX885A63120	0.062 – 0.062	0.062 – 0.062
63.0	14	22	12	AX885A63140	0.062 – 0.062	0.062 – 0.062
63.0	16	22	12	AX885A63160	0.062 – 0.062	0.062 – 0.062
63.0	18	22	12	AX885A63180	0.062 – 0.062	0.062 – 0.062
80.0	4	27	14	AX885A8040	0.072 – 0.079	0.070 – 0.077
80.0	5	27	14	AX885A8050	0.072 – 0.079	0.070 – 0.077
80.0	6	27	14	AX885A8060	0.072 – 0.079	0.070 – 0.077
80.0	8	27	14	AX885A8080	0.072 – 0.079	0.070 – 0.077
80.0	10	27	14	AX885A80100	0.072 – 0.079	0.070 – 0.077
80.0	12	27	14	AX885A80120	0.072 – 0.079	0.070 – 0.077
80.0	14	27	14	AX885A80140	0.072 – 0.079	0.070 – 0.077
80.0	16	27	14	AX885A80160	0.072 – 0.079	0.070 – 0.077
80.0	18	27	14	AX885A80180	0.072 – 0.079	0.070 – 0.077
80.0	20	27	14	AX885A80200	0.072 – 0.079	0.070 – 0.077
100.0	4	32	14	AX885A1004	0.082 – 0.090	0.080 – 0.088
100.0	5	32	14	AX885A1005	0.082 – 0.090	0.080 – 0.088
100.0	6	32	14	AX885A1006	0.082 – 0.090	0.080 – 0.088
100.0	8	32	14	AX885A1008	0.082 – 0.090	0.080 – 0.088
100.0	10	32	14	AX885A10010	0.082 – 0.090	0.080 – 0.088
100.0	12	32	14	AX885A10012	0.082 – 0.090	0.080 – 0.088
100.0	14	32	14	AX885A10014	0.082 – 0.090	0.080 – 0.088
100.0	16	32	14	AX885A10016	0.082 – 0.090	0.080 – 0.088
100.0	18	32	14	AX885A10018	0.082 – 0.090	0.080 – 0.088
100.0	20	32	14	AX885A10020	0.082 – 0.090	0.080 – 0.088
100.0	25	32	14	AX885A10025	0.082 – 0.090	0.080 – 0.088
125.0	6	32	16	AX885A12560	0.092 – 0.101	0.090 – 0.099
125.0	8	32	16	AX885A12580	0.092 – 0.101	0.090 – 0.099
125.0	10	32	16	AX885A12510	0.092 – 0.101	0.090 – 0.099
125.0	12	32	16	AX885A12512	0.092 – 0.101	0.090 – 0.099
125.0	14	32	16	AX885A12514	0.092 – 0.101	0.090 – 0.099
125.0	16	32	16	AX885A12516	0.092 – 0.101	0.090 – 0.099
125.0	18	32	16	AX885A12518	0.092 – 0.101	0.090 – 0.099
125.0	20	32	16	AX885A12520	0.092 – 0.101	0.090 – 0.099
125.0	25	32	16	AX885A12525	0.092 – 0.101	0.090 – 0.099
125.0	28	32	16	AX885A12528	0.092 – 0.101	0.090 – 0.099
160.0	6	40	18	AX885A1606	0.092 – 0.101	0.090 – 0.099
160.0	8	40	18	AX885A1608	0.092 – 0.101	0.090 – 0.099
160.0	10	40	18	AX885A16010	0.092 – 0.101	0.090 – 0.099
160.0	12	40	18	AX885A16012	0.092 – 0.101	0.090 – 0.099
160.0	14	40	18	AX885A16014	0.092 – 0.101	0.090 – 0.099
160.0	16	40	18	AX885A16016	0.092 – 0.101	0.090 – 0.099
160.0	18	40	18	AX885A16018	0.092 – 0.101	0.090 – 0.099
160.0	20	40	18	AX885A16020	0.092 – 0.101	0.090 – 0.099
160.0	25	40	18	AX885A16025	0.092 – 0.101	0.090 – 0.099
160.0	32	40	18	AX885A16032	0.092 – 0.101	0.090 – 0.099
200.0	8	40	24	AX885A2008	0.092 – 0.101	0.090 – 0.099
200.0	10	40	24	AX885A20010	0.092 – 0.101	0.090 – 0.099
200.0	12	40	24	AX885A20012	0.092 – 0.101	0.090 – 0.099
200.0	14	40	24	AX885A20014	0.092 – 0.101	0.090 – 0.099
200.0	16	40	24	AX885A20016	0.092 – 0.101	0.090 – 0.099
200.0	18	40	24	AX885A20018	0.092 – 0.101	0.090 – 0.099
200.0	20	40	24	AX885A20020	0.092 – 0.101	0.090 – 0.099
200.0	25	40	24	AX885A20025	0.092 – 0.101	0.090 – 0.099
200.0	32	40	24	AX885A20032	0.092 – 0.101	0.090 – 0.099

Material	Steel	Cast	Alu	Plastics
Tensile strength/Hardness	< 850 N/mm²	< 240 N/mm²	< 450 N/mm²	
V_c (m/min) Finishing	40	40	190	120
V_c (m/min) Roughing	30	25	170	100

Product family 45

335

Uncoated | Alcrona Pro | Z 3 | HA | HSS | Type N | 90° | DIN 335C

HSS Countersink

d_1 mm	d min mm	d_2 mm	l_1 mm	Z	Uncoated Part No.	Coated Part No.	Vorschub mm/U
6.3	1.5	5	45	3	335063	335063A	0.040 – 0.120
8.3	2.0	6	50	3	335083	335083A	0.050 – 0.140
10.4	2.5	6	50	3	335104	335104A	0.050 – 0.140
12.4	2.8	8	56	3	335124	335124A	0.060 – 0.180
15.0	3.2	10	60	3	335150	335150A	0.060 – 0.180
16.5	3.2	10	60	3	335165	335165A	0.080 – 0.200
20.5	3.5	10	63	3	335205	335205A	0.090 – 0.240
25.0	3.8	10	67	3	335250	335250A	0.120 – 0.300
31.0	4.2	12	71	3	335310	335310A	0.120 – 0.300

Material	Steel	Stainless	Cast	Alu	Plastics
Tensile strength/Hardness	< 1000 N/mm²	< 750 N/mm²	< 830 N/mm²	< 600 N/mm²	
V_c (m/min)	23	7	14	50	50

AX 6518B

Uncoated | Z 4–6 | HB | HSS-Co8 | Type N | DIN 6518

HSS-Co8 Corner Rounding Cutter
Radially And Axially Backed-Off

d_2	R
h6	H11

Radius	d_1 mm	d_2 mm	l_1 mm	Z	Uncoated Part No.	f_z Roughing mm/Z	f_z Finishing mm/Z
1.0	8	10	60	4	AX6518B1010	0.002 – 0.004	0.002 – 0.003
1.5	9	10	60	4	AX6518B1510	0.003 – 0.006	0.002 – 0.005
1.6	10	10	60	4	AX6518B1610	0.003 – 0.006	0.002 – 0.005
2.0	10	10	60	4	AX6518B2010	0.003 – 0.006	0.002 – 0.005
2.5	11	10	60	4	AX6518B2510	0.003 – 0.006	0.002 – 0.005
3.0	12	12	60	4	AX6518B3012	0.003 – 0.006	0.002 – 0.005
3.5	13	12	60	4	AX6518B3512	0.004 – 0.007	0.003 – 0.006
4.0	14	12	60	4	AX6518B4012	0.004 – 0.007	0.003 – 0.006
4.5	15	12	60	4	AX6518B4512	0.004 – 0.007	0.003 – 0.006
5.0	16	12	60	4	AX6518B5012	0.004 – 0.007	0.003 – 0.006
5.5	19	16	67	4	AX6518B5516	0.006 – 0.009	0.006 – 0.006
6.0	20	16	67	4	AX6518B6016	0.006 – 0.009	0.006 – 0.006
6.5	21	16	71	4	AX6518B6516	0.009 – 0.012	0.008 – 0.011
7.0	22	16	71	4	AX6518B7016	0.009 – 0.012	0.008 – 0.011
7.5	23	16	71	4	AX6518B7516	0.009 – 0.012	0.008 – 0.011
8.0	24	16	71	4	AX6518B8016	0.009 – 0.012	0.008 – 0.011
8.5	25	25	85	4	AX6518B8525	0.014 – 0.017	0.013 – 0.016
9.0	26	25	85	4	AX6518B9025	0.014 – 0.017	0.013 – 0.016
9.5	27	25	85	4	AX6518B9525	0.014 – 0.017	0.013 – 0.016
10.0	28	25	85	4	AX6518B10025	0.014 – 0.017	0.013 – 0.016
10.5	31	25	90	4	AX6518B10525	0.021 – 0.024	0.020 – 0.023
11.0	32	25	90	4	AX6518B11025	0.021 – 0.024	0.020 – 0.023
12.0	34	25	90	4	AX6518B12025	0.021 – 0.024	0.020 – 0.023
12.5	41	25	100	6	AX6518B12525	0.021 – 0.024	0.020 – 0.023
13.0	42	25	100	6	AX6518B13025	0.021 – 0.024	0.020 – 0.023
14.0	44	25	100	6	AX6518B14025	0.021 – 0.024	0.020 – 0.023
15.0	46	25	100	6	AX6518B15025	0.025 – 0.028	0.024 – 0.027
16.0	48	25	100	6	AX6518B16025	0.025 – 0.028	0.024 – 0.027
18.0	52	32	112	6	AX6518B18032	0.030 – 0.034	0.029 – 0.033
20.0	56	32	112	6	AX6518B20032	0.033 – 0.037	0.032 – 0.036

Material	Steel	Stainless	Cast	Alu	Plastics
Tensile strength/Hardness	< 1000 N/mm²	< 850 N/mm²	< 240 N/mm²	< 450 N/mm²	
V_c (m/min) Finishing	35	25	35	100	135
V_c (m/min) Roughing	20	15	20	85	125

Product family 45

Rotary Line

Carbide Burs

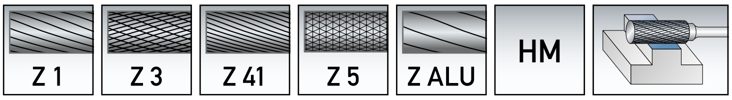
Rotary Line

Performance
Tool Life
Selection

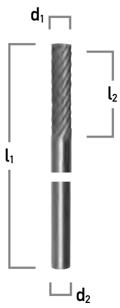
The right flute design for each application:

		**Z Alu** Aluminium cut, suitable for: Aluminium and its alloys, magnesium, non-alloy and non-metallic materials and hard plastics, natural rubber, wood etc.
		**Z 1** Normal cut, for general works, for cast iron, for steel, for deburring, chamfering, clean surface
		**Z 41** Fine cut, same application as normal cut, but resulting in a better surface quality.
		**Z 3** Double cut (standard). The double cut is characterized by its high chip removal rate. For smooth even surfaces.
		**Z 5** Diamond cut, for machining hardened and brittle materials.

ZYA

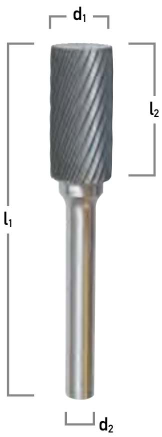


Cylinder Shape, w/o End Cut, Type ZYA



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
1.5	3	6	38	H5011	H5013	H50141	H5015
2.5	3	11	38	H5021	H5023	H50241	H5025
3.0	3	13	38	H5031	H5033	H50341	H5035
3.0	3	14	75	H503L1	H503L3	–	–
4.0	3	12	38	H5041	H5043	H50441	H5045
5.0	3	12	38	H5051	H5053	H50541	–
6.0	3	13	51	H5061	H5063	H50641	H5065
6.0	3	7	38	H5071	H5073	–	–



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
4.0	6	16	51	H60001	H60003	H600041	H60005	–
6.0	6	16	51	H60011	H60013	H600141	H60015	H6001ALU
8.0	6	20	64	H60031	H60033	H600341	H60035	H6003ALU
10.0	6	20	64	H60051	H60053	H600541	H60055	H6005ALU
11.0	6	25	70	H60061	H60063	H600641	H60065	H6006ALU
12.0	6	25	70	H60071	H60073	H600741	H60075	H6007ALU
16.0	6	25	70	H60081	H60083	H600841	H60085	H6008ALU
19.0	6	25	70	H60091	H60093	H600941	H60095	H6009ALU
25.0	6	25	70	H60101	H60103	H601041	H60105	H6010ALU

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
12.0	8	25	70	H60071S8	H60073S8	H600741S8	H60075S8	H6007ALUS8
16.0	8	25	70	H60081S8	H60083S8	H600841S8	H60085S8	H6008ALUS8
19.0	8	25	70	H60091S8	H60093S8	H600941S8	H60095S8	H6009ALUS8
25.0	8	25	70	H60101S8	H60103S8	H601041S8	H60105S8	H6010ALUS8

Recommended Speed

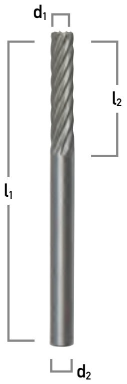
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

ZYA-S

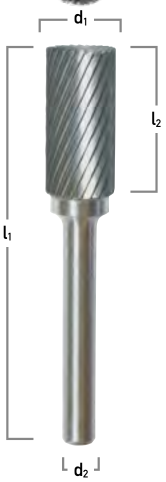
Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM

Cylinder Shape, w/ End Cut, Type ZYA-S



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
1.5	3	5	38	H50111	H50113	–	–
2.5	3	11	38	H50211	H50213	–	–
3.0	3	14	38	H50311	H50313	H503141	H50315
4.0	3	12	38	H50411	H50413	–	–
5.0	3	12	38	H50511	H50513	–	–
6.0	3	13	51	H50611	H50613	H506141	H50615
6.0	3	7	38	H50711	H50713	–	–



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
4.0	6	16	51	H6001	H6003	H60041	H6005	–
6.0	6	16	51	H6011	H6013	H60141	H6015	H601ALU
8.0	6	20	64	H6031	H6033	H60341	H6035	H603ALU
10.0	6	20	64	H6051	H6053	H60541	H6055	H605ALU
11.0	6	25	70	H6061	H6063	H60641	H6065	–
12.0	6	25	70	H6071	H6073	H60741	H6075	H607ALU
16.0	6	25	70	H6081	H6083	H60841	H6085	H608ALU
19.0	6	25	70	H6091	H6093	H60941	H6095	–
25.0	6	25	70	H6101	H6103	H61041	H6105	–

Shank Ø 8 mm

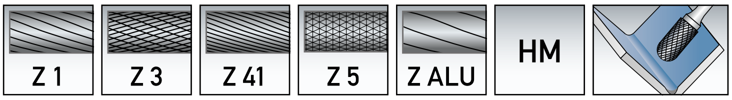
d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
12.0	8	25	70	H6071S8	H6073S8	H60741S8	H6075S8	H607ALUS8
16.0	8	25	70	H6081S8	H6083S8	H60841S8	H6085S8	H608ALUS8
19.0	8	25	70	H6091S8	H6093S8	H60941S8	H6095S8	–

Recommended Speed

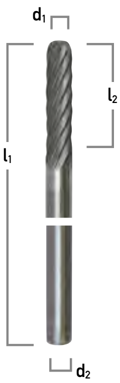
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

WRC



Ball-Nosed Cylinder Shape, Type WRC



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
2.5	3	11	38	H5111	H5113	H51141	H5115
3.0	3	13	38	H5121	H5123	H51241	H5125
3.0	3	14	75	H512L1	H512L3	–	–
4.0	3	12	38	H5131	H5133	H51341	H5135
5.0	3	12	38	H5141	H5143	–	–
6.0	3	13	51	H5151	H5153	H51541	H5155

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
4.0	6	16	51	H61101	H61103	H611041	H61105	–
6.0	6	16	51	H6111	H6113	H61141	H6115	H611ALU
6.0	6	16	200	H611L1	H611L3	–	–	–
8.0	6	18	63	H6131	H6133	H61341	H6135	–
8.0	6	20	200	H613L1	H613L3	–	–	–
10.0	6	20	65	H6151	H6153	H61541	H6155	H615ALU
11.0	6	25	70	H61501	H61503	H615041	H61505	–
10.0	6	38	83	H6161	H6163	H61641	H6165	–
10.0	6	20	200	H615L1	H615L3	–	–	–
12.0	6	25	70	H6171	H6173	H61741	H6175	H617ALU
12.0	6	25	200	H617L1	H617L3	–	–	–
16.0	6	25	70	H6181	H6183	H61841	H6185	H618ALU
16.0	6	25	200	H618L1	H618L3	–	–	–
19.0	6	25	70	H6191	H6193	H61941	H6195	H619ALU
25.0	6	25	70	H61901	H61903	H619041	H61905	–

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
10.0	8	20	200	H615L1S8	H615L3S8	–	–	–
12.0	8	25	70	H6171S8	H6173S8	H61741S8	H6175S8	H617ALUS8
12.0	8	25	200	H617L1S8	H617L3S8	–	–	–
16.0	8	25	70	H6181S8	H6183S8	H61841S8	H6185S8	H618ALUS8
19.0	8	25	70	H6191S8	H6193S8	H61941S8	H6195S8	H619ALUS8

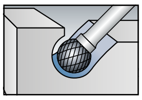
Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

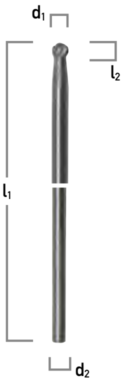
Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

KUD

Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM



Ball Shape, Type KUD



Shank Ø 3 mm

d1	d2	l2	l1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
1.0	3	1	38	H5721	H5723	–	–
1.5	3	1.5	38	H5731	H5733	–	–
2.0	3	1.8	38	H5741	H5743	–	–
2.5	3	2.5	38	H5751	H5753	H57541	H5755
3.0	3	2.8	38	H5761	H5763	H57641	H5765
3.0	3	2.8	75	H576L1	H576L3	–	–
5.0	3	4	43	H5771	H5773	H57741	H5775
6.0	3	5	44	H5781	H5783	H57841	H5785

Shank Ø 6 mm

d1	d2	l2	l1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
3.0	6	3	51	H6701	H6703	H67041	H6705	–
6.0	6	5	51	H6711	H6713	H67141	H6715	H671ALU
6.0	6	5	200	H671L1	H671L3	–	–	–
8.0	6	7	52	H6731	H6733	H67341	H6735	–
8.0	6	7	200	H673L1	H673L3	–	–	–
10.0	6	9	52	H6751	H6753	H67541	H6755	H675ALU
10.0	6	9	200	H675L1	H675L3	–	–	–
12.0	6	11	56	H6771	H6773	H67741	H6775	H677ALU
12.0	6	11	200	H677L1	H677L3	–	–	–
16.0	6	14	59	H6791	H6793	H67941	H6795	H679ALU
16.0	6	14	200	H679L1	H679L3	–	–	–
19.0	6	17	62	H6801	H6803	H68041	H6805	H680ALU
25.0	6	24	68	H68011	H68013	H680141	H68015	–

Shank Ø 8 mm

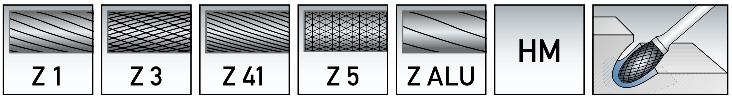
d1	d2	l2	l1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
10.0	8	10	200	H675L1S8	H675L3S8	–	–	–
12.0	8	11	56	H6771S8	H6773S8	H67741S8	H6775S8	H677ALUS8
12.0	8	11	200	H677L1S8	H677L3S8	–	–	–
16.0	8	14	59	H6791S8	H6793S8	H67941S8	H6795S8	H679ALUS8
16.0	8	14	200	H679L1S8	H679L3S8	–	–	–
19.0	8	17	62	H6801S8	H6803S8	H68041S8	H6805S8	H680ALUS8

Recommended Speed

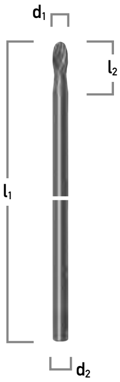
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

TRE



Oval Shape, Type TRE



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
3.0	3	6	38	H5451	H5453	H54541	H5455
3.0	3	6	75	H545L1	H545L3	–	–
5.0	3	7	38	H5461	H5463	H54641	–
6.0	3	9	48	H5471	H5473	H54741	H5475

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
6.0	6	10	51	H6411	H6413	H64141	H6415	–
6.0	6	10	200	H641L1	H641L3	–	–	–
8.0	6	16	60	H6421	H6423	H64241	H6425	–
8.0	6	16	200	H642L1	H642L3	–	–	–
10.0	6	20	60	H6431	H6433	H64341	H6435	H643ALU
10.0	6	20	200	H643L1	H643L3	–	–	–
12.0	6	25	67	H6451	H6453	H64541	H6455	H645ALU
12.0	6	25	200	H645L1	H645L3	–	–	–
16.0	6	25	70	H6471	H6473	H64741	H6475	H647ALU
19.0	6	25	70	H6491	H6493	H64941	H6495	H649ALU

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
10.0	8	20	200	H643L1S8	H643L3S8	–	–	–
12.0	8	22	67	H6451S8	H6453S8	H64541S8	H6455S8	H645ALUS8
12.0	8	25	200	H645L1S8	H645L3S8	–	–	–
16.0	8	25	70	H6471S8	H6473S8	H64741S8	H6475S8	H647ALUS8
19.0	8	25	70	H6491S8	H6493S8	H64941S8	H6495S8	H649ALUS8

Recommended Speed

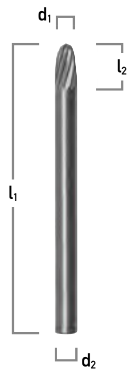
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

RBF

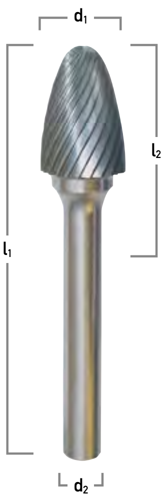
Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM

Ball-Nosed Tree Shape, Type RBF



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
2.0	3	6	38	H5341	H5343	H53441	H5345
3.0	3	6	38	H5351	H5353	H53541	H5355
3.0	3	13	38	H5361	H5363	H53641	H5365
5.0	3	12	38	H5371	H5373	H53741	–
6.0	3	13	51	H5381	H5383	H53841	H5385



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
6.0	6	18	51	H6311	H6313	H63141	H6315	–
6.0	6	18	200	H631L1	H631L3	–	–	–
8.0	6	18	64	H6331	H6333	H63341	H6335	–
8.0	6	20	200	H633L1	H633L3	–	–	–
10.0	6	20	64	H6351	H6353	H63541	H6355	H635ALU
10.0	6	20	200	H635L1	H635L3	–	–	–
12.0	6	20	64	H6361	H6363	H63641	H6365	–
12.0	6	25	70	H6371	H6373	H63741	H6375	H637ALU
12.0	6	25	200	H637L1	H637L3	–	–	–
16.0	6	25	70	H6381	H6383	H63841	H6385	H638ALU
19.0	6	25	70	H6391	H6393	H63941	H6395	–

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
10.0	8	20	200	H635L1S8	H635L3S8	–	–	–
12.0	8	25	70	H6371S8	H6373S8	H63741S8	H6375S8	H637ALUS8
12.0	8	25	200	H637L1S8	H637L3S8	–	–	–
16.0	8	25	70	H6381S8	H6383S8	H63841S8	H6385S8	H638ALUS8
19.0	8	25	70	H6391S8	H6393S8	H63941S8	H6395S8	–

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
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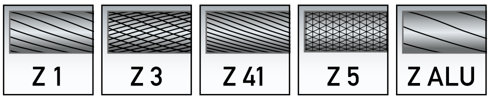
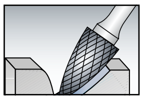
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

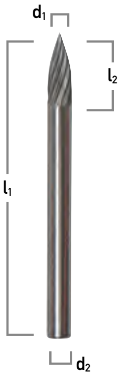
SPG



HM



Spitzbogenform, Typ SPG



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
2.5	3	6	38	H5241	H5243	H52441	H5245
3.0	3	6	38	H5251	H5253	H52541	H5255
3.0	3	8	38	H5261	H5263	H52641	H5265
3.0	3	8	75	H526L1	H526L3	–	–
3.0	3	10	38	H5271	H5273	H52741	H5275
3.0	3	10	75	H527L1	H527L3	–	–
3.0	3	13	38	H52711	H52713	H527141	H52715
3.0	3	13	75	H5271L1	H5271L3	–	–
5.0	3	12	38	H5281	H5283	–	–
6.0	3	13	51	H5291	H5293	H52941	H5295

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
6.0	6	18	51	H6211	H6213	H62141	H6215
6.0	6	18	200	H621L1	H621L3	–	–
8.0	6	18	64	H6221	H6223	H62241	H6225
8.0	6	18	200	H622L1	H622L3	–	–
10.0	6	20	64	H6231	H6233	H62341	H6235
10.0	6	20	200	H623L1	H623L3	–	–
12.0	6	20	64	H6261	H6263	H62641	H6265
12.0	6	25	70	H6271	H6273	H62741	H6275
12.0	6	25	200	H627L1	H627L3	–	–
16.0	6	25	70	H6281	H6283	H62841	H6285
19.0	6	25	70	H6291	H6293	H62941	H6295

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
10.0	8	20	200	H623L1S8	H623L3S8	–	–
12.0	8	25	70	H6271S8	H6273S8	H62741S8	H6275S8
12.0	8	25	200	H627L1S8	H627L3S8	–	–
16.0	8	25	70	H6281S8	H6283S8	H62841S8	H6285S8
19.0	8	25	70	H6291S8	H6293S8	H62941S8	H6295S8

Recommended Speed

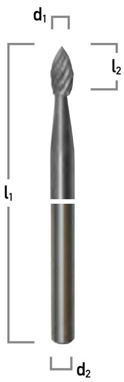
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

HMB

Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM

Flame Shape, Type HMB



Shank Ø 3 mm

d1	d2	l2	l1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
3.0	3	6	38	H5551	H5553	H55541	H5555
3.0	3	6	75	H555L1	H555L3	–	–
5.0	3	10	38	H5561	H5563	–	–
6.0	3	13	43	H5571	H5573	H55741	–

Shank Ø 6 mm

d1	d2	l2	l1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
6.0	6	18	51	H6811	H6813	H68141	H6815
6.0	6	18	200	H681L1	H681L3	–	–
8.0	6	20	64	H6831	H6833	H68341	H6835
8.0	6	20	200	H683L1	H683L3	–	–
10.0	6	25	64	H6851	H6853	–	H6855
10.0	6	25	200	H685L1	H685L3	–	–
12.0	6	32	76	H6871	H6873	H68741	H6875
12.0	6	32	200	H687L1	H687L3	–	–
16.0	6	36	81	H6881	H6883	H68841	H6885
19.0	6	42	86	H6891	H6893	H68941	H6895

Shank Ø 8 mm

d1	d2	l2	l1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
10.0	8	25	200	H685L1S8	H685L3S8	–	–
12.0	8	32	200	H687L1S8	H687L3S8	–	–
16.0	8	36	81	H6881S8	H6883S8	H68841S8	H6885S8
19.0	8	42	86	H6891S8	H6893S8	H68941S8	H6895S8

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
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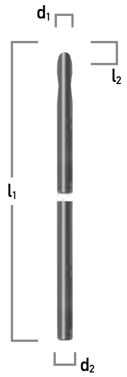
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

Product family 20

KSJ

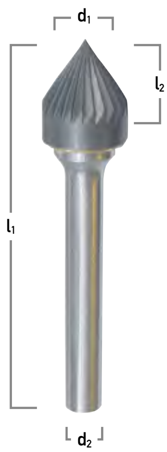
Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM

Cone Shape 60°, Type KSJ



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
3.0	3	2	38	H5901	H5903	H59041	H5905



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
6.0	6	5	51	H6611	H6613	H66141	H6615
10.0	6	8	52	H66201	H66203	H662041	H66205
13.0	6	11	56	H66211	H66213	H662141	H66215
16.0	6	14	59	H6651	H6653	H66541	H6655
19.0	6	18	62	H66501	H66503	H665041	H66505
25.0	6	24	68	H66511	H66513	H665141	H66515

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
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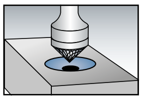
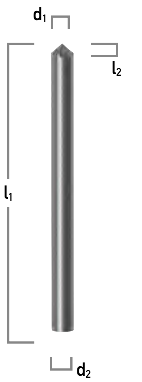
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

KSK

Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM

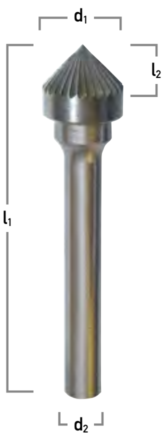


Cone Shape 90°, Type KSK



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
3.0	3	2	38	H5911	H5913	H59141	H5915



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
6.0	6	3	51	H6631	H6633	H66341	H6635
10.0	6	5	49	H66401	H66403	H664041	H66405
13.0	6	6	51	H66411	H66413	H664141	H66415
16.0	6	8	52	H6671	H6673	H66741	H6675
19.0	6	10	54	H66701	H66703	H667041	H66705
25.0	6	13	57	H66711	H66713	H667141	H66715

Recommended Speed

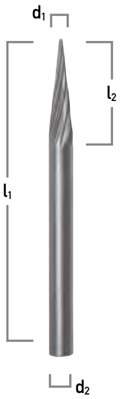
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

SKM

Z 1 | Z 3 | Z 41 | Z 5 | Z ALU | HM

Pointed Cone Shape, Type SKM



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
2.0	3	8	38	H5941	H5943	H59441	H5945
3.0	3	10	38	H5951	H5953	H59541	H5955
3.0	3	13	38	H5961	H5963	H59641	H5965
3.0	3	11	75	H596L1	H596L3	–	–
3.0	3	16	38	H5971	H5973	H59741	H5975
6.0	3	13	51	H5991	H5993	H59941	H5995

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
6.0	6	13	51	H6511	H6513	H65141	H6515	–
6.0	6	20	51	H65101	H65103	H651041	H65105	–
6.0	6	25	51	H6521	H6523	H65241	H6525	–
10.0	6	19	64	H6551	H6553	H65541	H6555	–
12.0	6	25	70	H6571	H6573	H65741	H6575	H657ALU
16.0	6	25	73	H6581	H6583	H65841	H6585	–

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
12.0	8	25	70	H6571S8	H6573S8	H65741S8	H6575S8	H657ALUS8
16.0	8	25	73	H6581S8	H6583S8	H65841S8	H6585S8	–

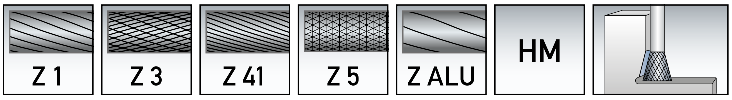
Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

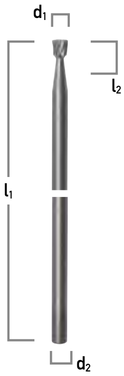
Please note:

1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

WKN



Inverted Cone, w/o End Cut, Type WKN



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
2.5	3	3	38	H5801	H5803	H58041	H5805
3.0	3	3	38	H5811	H5813	H58141	H5815
3.0	3	7	38	H58111	H58113	–	–
5.0	3	5	38	H5821	H5823	–	–
6.0	3	6	44	H5831	H5833	H58341	H5835
6.0	3	8	44	H58311	H58313	–	–

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
6.0	6	6	51	H66001	H66003	H660041	H66005
10.0	6	10	54	H66011	H66013	H660141	H66015
13.0	6	13	64	H66021	H66023	H660241	H66025
16.0	6	19	64	H66031	H66033	H660341	H66035

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

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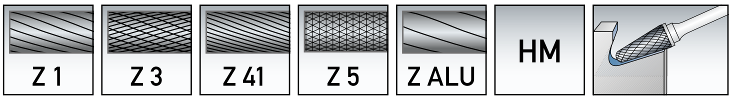
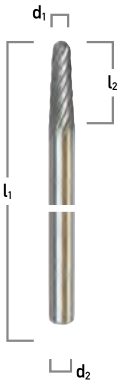
6. Too high speeds can cause edges to break-off

KEL

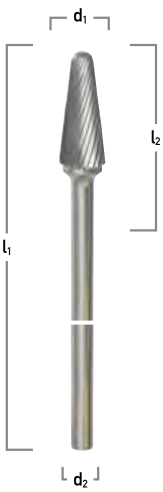


Ball-Nosed Cone Shape, Type KEL



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.			Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5
3.0	3	10	38	H5601	H5603	H56041	H5605
3.0	3	13	38	H5611	H5613	H56141	H5615
3.0	3	13	75	H561L1	H561L3	–	–
5.0	3	13	38	H5621	H5623	–	–



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
6.0	6	16	51	H6911	H6913	H69141	H6915	–
6.0	6	16	200	H691L1	H691L3	–	–	–
8.0	6	22	67	H6931	H6933	H69341	H6935	–
8.0	6	22	200	H693L1	H693L3	–	–	–
10.0	6	27	71	H6951	H6953	H69541	H6955	H695ALU
10.0	6	27	200	H695L1	H695L3	–	–	–
12.0	6	30	73	H6971	H6973	H69741	H6975	H697ALU
12.0	6	30	200	H697L1	H697L3	–	–	–
16.0	6	30	78	H6991	H6993	H69941	H6995	H699ALU
19.0	6	38	83	H69901	H69903	H699041	H69905	H6990ALU

Shank Ø 8 mm

d_1	d_2	l_2	l_1	Part No.			Part No.	Part No.
mm	mm	mm	mm	Z 1	Z 3	Z 41	Z 5	Z ALU
10	8	30	200	H695L1S8	H695L3S8	–	–	–
12	8	30	73	H6971S8	H6973S8	H69741S8	H6975S8	H697ALUS8
12	8	30	200	H697L1S8	H697L3S8	–	–	–
20	8	38	83	H69901S8	H69903S8	H699041S8	H69905S8	H6990ALUS8

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

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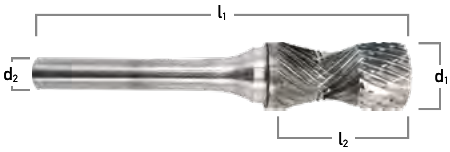
6. Too high speeds can cause edges to break-off

H10

Z 1 | Z 3 | HM

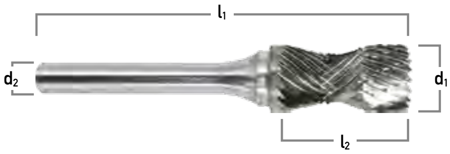
Radius Shape Cylinder



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1003

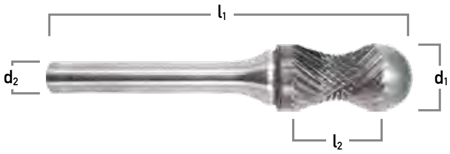
Radius Shape Cylinder w/ End Cut



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1013

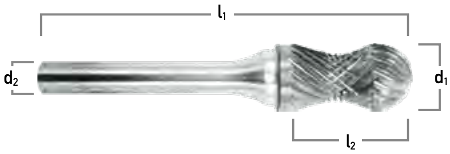
Radius Shape Cylinder, Ball, w/o End Cut



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 1
12.7	6	25	70	H1021

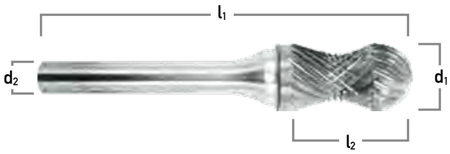
Radius Shape Cylinder, Ball, w/ End Cut



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 1
12.7	6	25	70	H1031

Radius Shape Cylinder, Ball, w/ End Cut



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1043

Recommended Speed

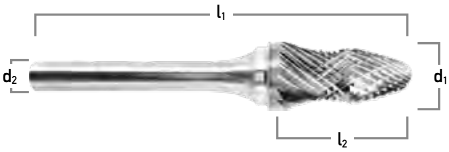
Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

Please note:
1. Only an optimum speed allows for best results
2. Use lower speeds for hardened steels
3. Apply equal pressure at a constant speed
4. Too high speeds can reduce performance
5. Basically use 1/3 of the length
6. Too high speeds can cause edges to break-off

H10

Z 3 | HM

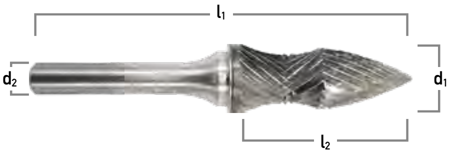
Radius Shape Cylinder, Ball Nose



Shank Ø 6 mm

d1	d2	l2	l1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1053

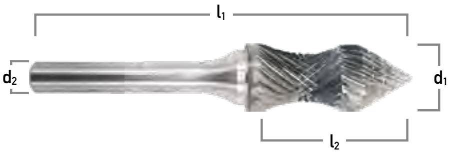
Radius Shape Cylinder, Pointed Tree



Shank Ø 6 mm

d1	d2	l2	l1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	35	80	H1063

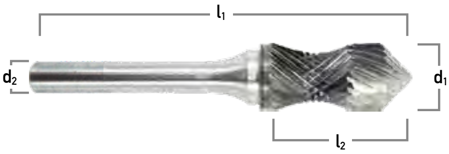
Radius Shape Cylinder, Taper 60°



Shank Ø 6 mm

d1	d2	l2	l1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	31	76	H1073

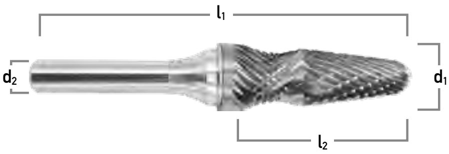
Radius Shape Cylinder, Taper 90°



Shank Ø 6 mm

d1	d2	l2	l1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	28	73	H1083

Radius Shape Cylinder, Ball-Nosed Cone



Shank Ø 6 mm

d1	d2	l2	l1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	35	80	H1093

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

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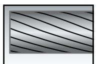
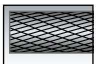
6. Too high speeds can cause edges to break-off

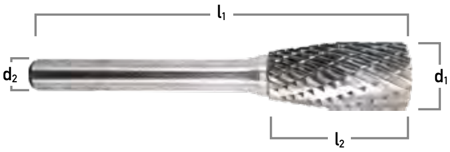
H11


Z 1


Z 3

HM

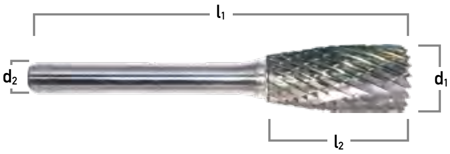
Cylinder Shape, w/ Corner Radius



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1103

Cylinder Cone Shape, w/ End Cut



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1113

Ball Shape

Shank Ø 6 mm

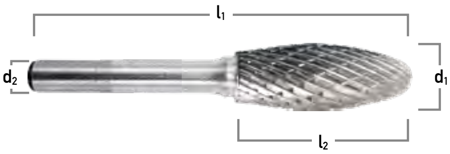
d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 1
12.7	6	20	65	H1121

Ball Shape

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	20	65	H1133

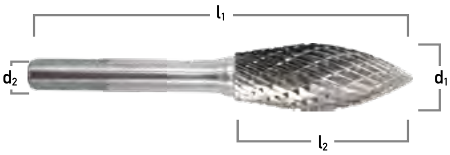
Ball-Nosed Tree Shape



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	32	77	H1143

Pointed Tree Shape



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	32	77	H1153

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

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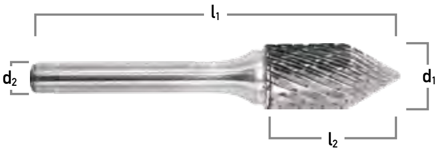
Product family 20

H11

Z 3

HM

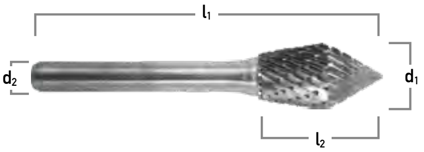
Cylinder, Taper 60°



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1163

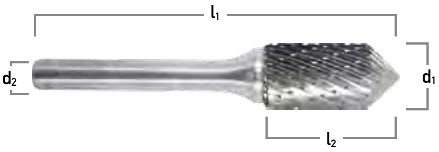
Cylinder, Taper 60°



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	23	68	H1173

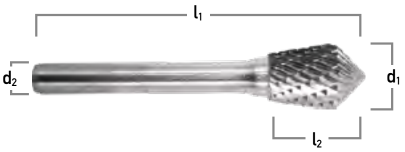
Cylinder, Taper 90°



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1183

Cylinder, Taper 90°



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	18	64	H1193

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
Brass, cast iron, copper, bronze	9,500 – 23,000	10,000 – 25,000	10,000 – 28,000	11,000 – 30,000	12,000 – 33,000	13,000 – 36,000	15,000 – 40,000	16,000 – 43,000	19,000 – 47,000	20,000 – 53,000	24,000 – 60,000	29,000 – 69,000	35,000 – 78,000	45,000 – 90,000
Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

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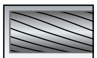
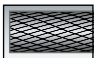
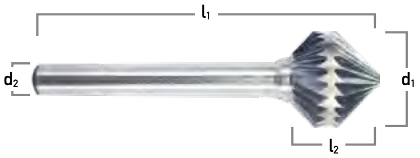
H12

 Z 1	 Z 3	HM

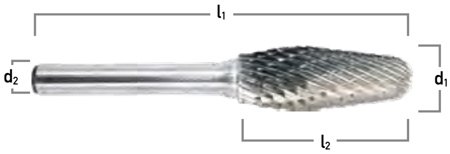
Cone shape 90°



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 1
16.0	6	15	60	H1201

Ball-Nosed Cone



Shank Ø 6 mm

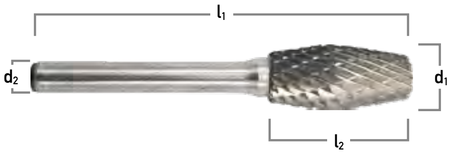
d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	32	77	H1213

Pointed Cone Shape

Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	35	80	H1223

Cone Shapes



Shank Ø 6 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
12.7	6	25	70	H1233

Recommended Speed

Head Ø	16	15	14	13	12	11	10	9	8	7	6	5	4	3
Cast iron	8,000 – 30,000	8,000 – 33,000	8,500 – 35,000	8,500 – 40,000	8,700 – 42,000	9,000 – 45,000	10,000 – 50,000	11,000 – 54,000	12,000 – 58,000	15,000 – 62,000	18,000 – 70,000	21,000 – 75,000	25,000 – 80,000	30,000 – 90,000
Hardened steels High strength materials	12,000 – 19,000	13,000 – 20,000	15,000 – 22,000	16,000 – 24,000	18,000 – 25,000	19,000 – 27,000	20,000 – 30,000	21,000 – 33,000	24,000 – 36,000	26,000 – 40,000	30,000 – 47,000	38,000 – 55,000	45,000 – 67,000	58,000 – 90,000
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Unhardened steel	18,000 – 23,000	18,500 – 25,000	20,000 – 27,000	21,000 – 30,000	23,000 – 31,000	25,000 – 35,000	28,000 – 39,000	30,000 – 43,000	35,000 – 48,000	39,000 – 52,000	41,000 – 57,000	47,000 – 65,000	51,000 – 75,000	59,000 – 90,000

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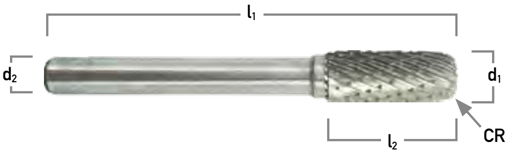
H12

Z 3

HM

Cylinder Shape, w/ Corner Radius



Shank Ø 3 mm

d_1	d_2	l_2	l_1	Part No.
mm	mm	mm	mm	Z 3
3.0	3	14	38	H1243
6.0	6	18	50	H1253
8.0	6	20	64	H1263
9.5	6	19	64	H1273
12.7	6	25	70	H1283
16.0	6	25	70	H1293

Prices for reconditioning

Part No.	Head Ø	Part No.	Head Ø
HMSN 1-3	1.0 – 3.0	HMSA 24	2.0 – 3.9
HMSN 3.1-6	3.1 – 6.0	HMSA 47	4.0 – 6.9
HMSN 6.1-10	6.1 – 10.0	HMSA 710	7.0 – 9.9
HMSN 10.1-14.0	10.1 – 14.0	HMSA 1014	10.0 – 13.9
HMSN 14.1-18.0	14.1 – 18.0	HMSA 1418	14.0 – 17.9
HMSN 18.1-20.0	18.1 – 20.0	HMSA 1825	18.0 – 24.9
HMSN 20.1-25.0	20.1 – 25.0	HMSA 2530	25.0 – 29.9

General Terms and Conditions

§ 1 Scope of application – Privacy

1. Our General Terms and Conditions shall apply exclusively to all our deliveries and services including any associated consulting and information services. We do not accept any Terms and Conditions contradicting or dissenting from our Terms unless we had explicitly consented to their application in written form.
2. Our Terms and Conditions shall also apply, if we fully execute delivery to the customer knowing any conflicting or differing Terms and Conditions of the customer.
3. These Terms shall also apply to all future contractual relations with entrepreneurs according to § 310 BGB (German Civil Code). Terms and Conditions that are identified as such shall also apply to them.
4. Within a business relationship between entrepreneurs, receipt of our deliveries and services implies that the customer accepts the legal validity of our Terms and Conditions. Any agreements including collateral agreements that differ from our Terms and Conditions or contain any kind of confirmation from our side shall only be effective in writing.
5. Customer information will be saved (acc. to Sections 28, 33 BDSG, German Federal Data Protection Act).

§ 2 Quotations – Conclusion of the contract

1. The customer's order shall be binding. Upon our choice, we shall be entitled to accept this order within 14 days by providing an order confirmation or by shipping the ordered goods.
2. Our quotations in business transactions with companies shall always be non-binding unless otherwise provided in the order confirmation. Oral agreements and confirmations only apply if we have confirmed the same in writing.

§ 3 Prices – Delivery and payment terms

1. Unless another price agreement has been agreed upon in written form, our prices are net plus applicable VAT according to our latest catalogues and price lists valid on the day of order. Catalogues and price lists are accessible at our premises or can be ordered from us.
2. Our deliveries are supplied carriage paid including packaging from an net order value of €200,00. Any other orders will be shipped at the owner's expense.
3. Unless otherwise agreed, our invoices are payable within 8 days from date of invoice with 2% discount or 30 days net. Checks and payment orders will only be accepted on account of performance. Payment shall be deemed completed when the amount is credited to our account.
4. The customer is in default at the latest, if he fails to pay within 30 days when an invoice is due or after the receipt of the invoice or another payment schedule. Thereupon, we shall be be entitled to charge the applicable default interest and charge € 10,00 for each payment reminder. We shall reserve the right to furnish proof of higher damage caused by default.
5. Any discounts or periods allowed for payment granted by us can be refused if the customer defaults on payment of previous invoices or following filings for insolvency. In these cases we shall be entitled to declare all due as well as any deferred invoice amounts immediately payable. In such cases, delivery of ordered goods will only be made on cash payment.
6. Set off rights can only be granted to the Buyer, if his counter claims have been stated legally binding, undisputed or recognized by our company. The customer's rights of retention only exist for counter claims resulting from the same contractual relationship.
7. In the case of the case of returned goods, we shall be entitled to retain a fee of 20% of the goods value as contribution to the coverage of costs. We can only take back tools in good order and condition and without any labels or with the TOOL FACTORY label only. Special tools and products with customized labelling are excluded from return. If the return shall be due to a fault of TOOL FACTORY, the take-back is free of charge to the customer. Only tools delivered within the last 6 months can be returned.

§ 4 Delivery terms – Receipt of the goods

1. Delivery times or dates shall only be binding upon agreement in writing.
2. Particularly in the case of larger deliveries, we shall be entitled for part-in deliveries to an extent that is reasonable for the customer.
3. As long as the customer is in delay with trade accounts payable, our obligation to deliver is in rest.
4. From our part, delivery term shall be deemed complied when the delivered goods have been sent to the customer prior to its expiry. The delivery period shall be reasonably extended against the background of measures taken within the scope of industrial action, particularly with regard to strikes and lockouts, as well as upon the occurrence of unforeseeable obstacles that are beyond our will, as far as such obstacles have a provable material influence on the delivery objects' completion or delivery. This shall also apply to circumstances which may occur at sub-suppliers. The aforementioned circumstances shall also be deemed to be beyond our control if they arise from a pre-existing delay. In important cases, we will inform the customer as soon as possible of the beginning and the end of such circumstances. If delivery or performance is rendered impossible or unreasonable by virtue of the indicated circumstances, we are relieved from the delivery obligation.
5. If we are in default towards companies due to reasons for which we bear responsibility, the client is entitled to a reimbursement for damages caused by arrears to the sum of 1% of the value of the declared value of goods for each full week of the delay, limited however to a maximum of 15% of the value of goods. Any additional claims due to delay of delivery are exclusively subject to § 8 of these Conditions.
6. If we are in default and if the customer – under the consideration of the statutory exceptions – grants to us a reasonable period of time for performance and if this period of time is not adhered to, the customer shall be entitled to withdrawal in accordance with statutory regulations. Any additional claims due to delay of delivery are exclusively subject to § 8 of these Conditions.
7. If the customer defaults in taking delivery or infringes other duties to cooperate, we shall be entitled to claim compensation for the damage suffered by us, including any additional expenses. In this case, the risk of accidental loss or of accidental degradation of the item purchased shall transfer to the customer at the time the customer falls into default of acceptance.
8. Where the customer does not accept the goods within the extension period, we are entitled, to request compensation for damages without any special proof due to non-fulfilment to an amount of 20% of the rejected goods value, as well as the incurred shipping cost plus applicable VAT. Both the customer and we reserve the right to provide evidence of higher or lower damages in the individual case.

§ 5 Transfer of risk – Dispatch

1. The goods shall be delivered or dispatched at the customer's risk in any case. Typee and route of dispatch are left to us, unless otherwise agreed upon. As soon as the goods have been handed over to the forwarder/carrier, or, at the latest, when they have left our warehouse, the risk for the goods shall pass on to the customer.
2. If dispatch is delayed due to circumstances for which the customer bears responsibility, then the risk shall be transferred to the customer from the day on which the goods are ready for dispatch.
3. Delivered items shall be accepted by the customer even if there is evidence of minor faults, regardless of the rights arising from § 7.

§ 6 Retention of title

1. We shall retain full title of the goods that have been delivered in accordance with the delivery contract until the receipt of the full payment.
2. If the realisable value of the securities held by us exceeds the total value of our claims by more than 20%, we shall be obliged by request of the customer to the release of securities of our own choice.
3. The customer must inform us immediately in writing in relation to any attachments asserted by third parties, or any other such interventions, and it is also required to inform the attaching creditor of the existence of the retention of title.
4. In case of breach of contract by the client, in particular in case of default of payment, we shall be entitled to take back the object of sale. Our repossession of the object of sale shall not constitute a withdrawal from the contract, unless we make explicit written declaration thereof or imperative provisions of the consumer credit act shall apply to the contract. If we obtain the attachment of the object of sale this shall always be construed as a cancellation of the contract. We shall be entitled to re-market goods taken back from the company by implementing a resale at our sole discretion, provided that we have given advance reasonable notice of the threat of resale. After taking back the purchased goods, we shall be entitled to dispose of them. We shall offset the proceeds from such a sale against the client's liabilities, less appropriate administrative cost, in general 10% of the goods value.
5. If we are entitled to take back the goods, the customer is obliged to enable one of our employees to perform a stock check of the reserved goods.

§ 7 Defects of quality

1. We bear liability for defects as to quality as follows: All those parts which within the limitation period prove to have a defect, shall at our choice and at no expense to us be either repaired, delivered anew or performed again, insofar as the cause for the defect existed at the time of the transfer of risk.
2. The customer shall notify us in writing of any defects of quality immediately after their discovery.
3. If notice is given of defects, payments by the customer shall only be retained to such extent as is justified in proportion to the defects that have occurred. The customer may withhold payments only if the complaint as to defects is justified and incontestable. If the complaint is unjustified, we shall be entitled to demand from the customer reimbursement of the incurred expenses.
4. First, we must get the opportunity to provide subsequent fulfilment within a reasonable period.
5. If the subsequent fulfilment fails, the customer may withdraw from the contract or reduce the remuneration irrespective of any eventual indemnification claims pursuant to § 8.
6. There shall be no claims for defects where the discrepancy from the agreed condition is insignificant, where the impairment of use is insignificant, where there is normal wear and tear or where damages arise after the passing of risk as a consequence of incorrect or careless handling, excessive operational demands, unsuitable equipment or as a consequence of special exterior influences which in the agreement were not assumed. If improper modifications are made by the customer or third parties, they are not entitled to assert claims for damages on these goods and the consequences resulting thereof.
7. Claims by the customer concerning the expenses necessary for the purpose of supplementary performance, in particular costs of transport, travel, labour and material are precluded insofar as the expenses have risen because the delivery item has been moved to a different location subsequently, unless the move conforms to its intended use.

§ 8 Other claims for damages

1. Claims to damages and reimbursement of expenditure of the customer (hereinafter claims to damages), shall be excluded irrespective of their legal basis, including, but not limited to, the breach of duties under the law of obligations and under tort.
2. Claims for damages due to the infringement of material contractual duties, however, shall be limited to contract-Typeical, predictable damages, provided there is no intent or gross negligence, or that liability is assumed on account of damage to life, physical injury or damage to health. A change of the burden of proof to the disadvantage of the client is not associated with the aforementioned conditions.
3. Insofar as the customer is entitled to claims for damages in accordance with this section, they become statute-barred according to § 7 art. 2 of these conditions after the expiration of the limitation period applicable for claims for defects of quality. The legal provisions for limitation periods shall apply to claims for damage in accordance with the German product liability law.

§ 9 Place of fulfilment and court of jurisdiction

1. Though we ship the goods to the customer, our registered office shall remain the place of fulfilment.
2. Provided the customer is a company (entrepreneur), the court of jurisdiction shall be our registered office, however, upon our choice, also the company's registered office.

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