



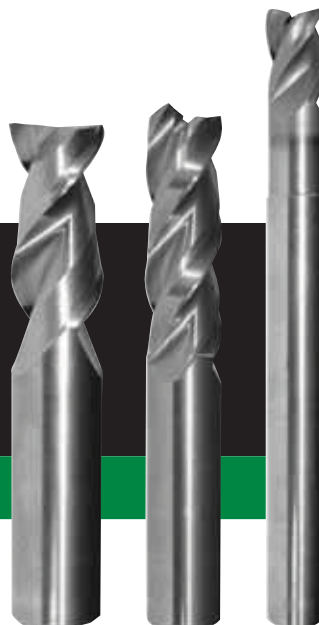
2017 Master Catalog

WIDIA  TM

High-Performance Solid Carbide End Mills •

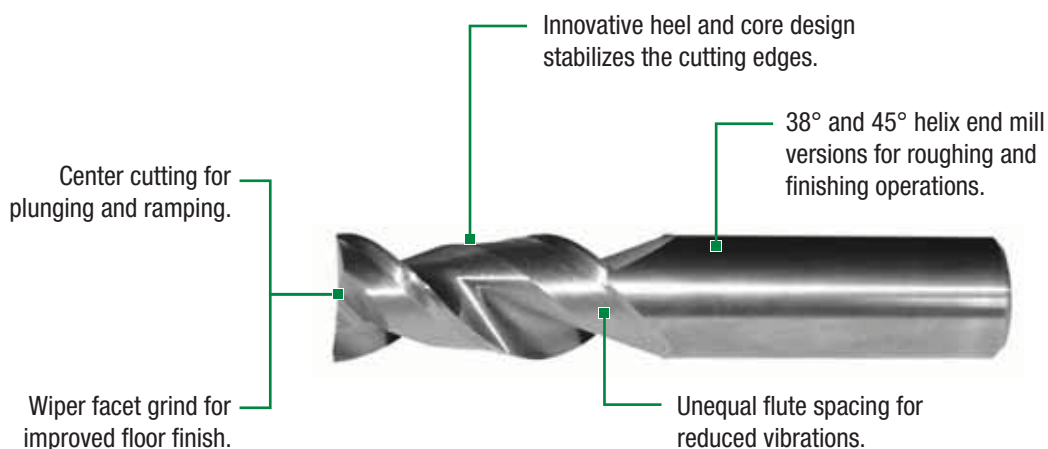
AluSurf™

AluSurf Aluminum



AluSurf provides extraordinary Metal Removal Rates (MRR) by combining roughing and finishing operations for any aluminum plunging, slotting, and profiling application. Its proprietary flute geometry is designed for rigidity and improved chip evacuation generating exceptional wall-to-floor perpendicularity, even in thin wall applications. To ensure a superior floor surface finish the AluSurf front geometry is equipped with a wiper facet grind.

- One tool for roughing and finishing operations.
- Slotting depths up to $1 \times D$ and peripheral milling up to $1.5 \times D$ axial at $.5 \times D$ radially.
- Unequal flute spacing for chatter-free performance (3-flute series only).
- Multiple corner radii and extended neck configurations available as standard.



AluSurf™ Series

- Increase your output due to less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Less passes due to 1 x D slotting capability.
- Perfect for MQL (Minimum Quantity Lubrication) methods.

5A02 Series

- 2-flute, 45° helix.
- Radii and sharp corner configuration.



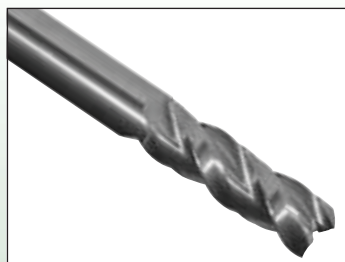
5AN2 Series

- 2-flute, 45° helix.
- Extended neck for long-reach applications.
- Radii and sharp corner configuration.



5A03 Series

- 3-flute, 38° helix.
- Unequal flute spacing.
- Radii and sharp corner configuration.



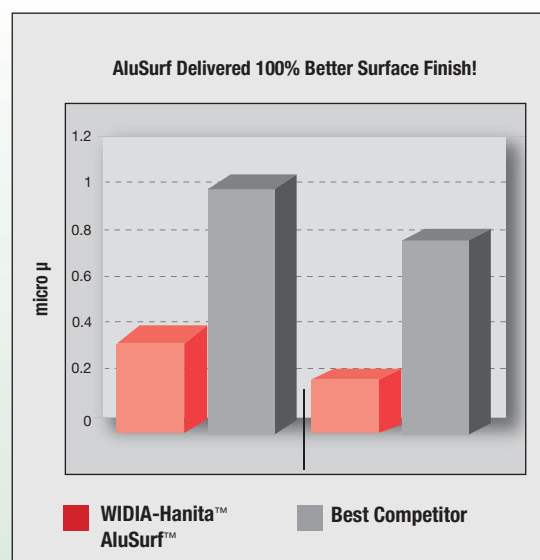
5AN3 Series

- 3-flute, 38° helix.
- Unequal flute spacing.
- Extended neck for long-reach applications.
- Radii and sharp corner configuration.

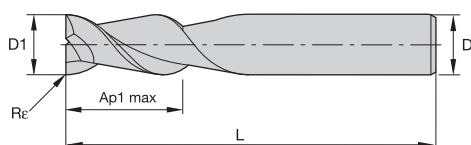


Operation	Slotting
Customer:	Aluminum Block
Material:	6061 Aluminum
Workpiece:	AluSurf solid carbide end mill.
Results:	100% better surface finish on walls and floor.

	COMPETITOR	WIDIA-Hanita™
tool:	uncoated tools	uncoated tools
end mill:	5/8" (16mm) 3-flute	5/8" (16mm) 3-flute
material:	aluminum	aluminum
depth of cut (ap):	.3150" (8mm)	.3150" (8mm)
width of cut (ae):	.3150" (8mm)	.3150" (8mm)
speed (Vc):	2,000 SFM (610 m/min)	2,000 SFM (610 m/min)
RPM (N):	12,000 RPM	12,000 RPM
feed rate (Vf):	142 IPM (3,600 mm/min)	142 IPM (3,600 mm/min)
chip load per tooth (Fz):	.004 in/th (0,1 mm/th)	.004 in/th (0,1 mm/th)
metal removal rate:	14 in³/min (230 cm³/min)	14 in³/min (230 cm³/min)



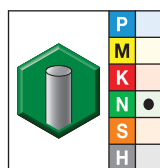
- Center cutting.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 5A02 • AluSurf



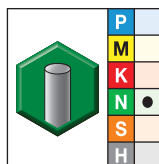
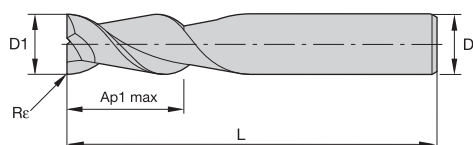
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3336099	5A0207002A	1/4	1/4	1/2	2 1/2	.015
3649650	5A0207002B	1/4	1/4	1/2	2 1/2	.030
3738203	5A0207002C	1/4	1/4	1/2	2 1/2	.060
3336098	5A0207002	1/4	1/4	1/2	2 1/2	—
3336101	5A0208003B	5/16	5/16	5/8	2 1/2	.030
3336100	5A0208003	5/16	5/16	5/8	2 1/2	—
3336103	5A0210004B	3/8	3/8	3/4	2 1/2	.030
3649651	5A0210004C	3/8	3/8	3/4	2 1/2	.060
3336102	5A0210004	3/8	3/8	3/4	2 1/2	—
3336105	5A0213015B	1/2	1/2	1 1/4	3	.030
3649652	5A0213015C	1/2	1/2	1 1/4	3	.060
3738879	5A0213015D	1/2	1/2	1 1/4	3	.090
3649753	5A0213015E	1/2	1/2	1 1/4	3	.120
3336104	5A0213015	1/2	1/2	1 1/4	3	—
3738881	5A0216006B	5/8	5/8	1 1/4	3 1/2	.030
3336107	5A0216006C	5/8	5/8	1 1/4	3 1/2	.060
3738882	5A0216006D	5/8	5/8	1 1/4	3 1/2	.090
3336106	5A0216006	5/8	5/8	1 1/4	3 1/2	—
3649754	5A0219007B	3/4	3/4	1 1/2	4	.030
3336109	5A0219007C	3/4	3/4	1 1/2	4	.060

(continued)

(Series 5A02 • AluSurf — continued)

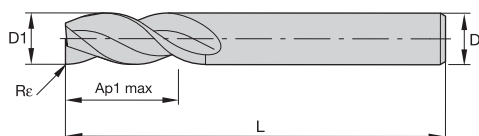


grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3738923	5A0219007D	3/4	3/4	1 1/2	4	.090
3649755	5A0219007E	3/4	3/4	1 1/2	4	.120
3336108	5A0219007	3/4	3/4	1 1/2	4	—
3649756	5A0225008B	1	1	1 1/2	4	.030
3336111	5A0225008C	1	1	1 1/2	4	.060
3738928	5A0225008D	1	1	1 1/2	4	.090
3649757	5A0225008E	1	1	1 1/2	4	.120
3336110	5A0225008	1	1	1 1/2	4	—

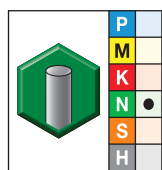
- Center cutting.
- Unequal flute spacing.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 5A03 • AluSurf



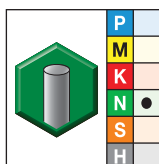
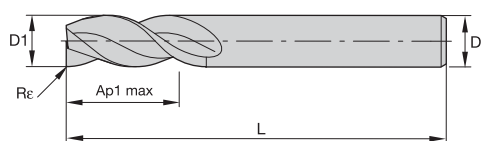
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3336113	5A0307002A	1/4	1/4	1/2	2 1/2	.015
3649758	5A0307002B	1/4	1/4	1/2	2 1/2	.030
3738929	5A0307002C	1/4	1/4	1/2	2 1/2	.060
3336112	5A0307002	1/4	1/4	1/2	2 1/2	—
3336115	5A0308003B	5/16	5/16	5/8	2 1/2	.030
3336114	5A0308003	5/16	5/16	5/8	2 1/2	—
3336117	5A0310004B	3/8	3/8	3/4	2 1/2	.030
3649759	5A0310004C	3/8	3/8	3/4	2 1/2	.060
3336116	5A0310004	3/8	3/8	3/4	2 1/2	—
3336119	5A0313015B	1/2	1/2	1 1/4	3	.030
3649760	5A0313015C	1/2	1/2	1 1/4	3	.060
3739147	5A0313015D	1/2	1/2	1 1/4	3	.090
3649761	5A0313015E	1/2	1/2	1 1/4	3	.120
3336118	5A0313015	1/2	1/2	1 1/4	3	—
3738933	5A0316006B	5/8	5/8	1 1/4	3 1/2	.030
3336121	5A0316006C	5/8	5/8	1 1/4	3 1/2	.060
3738934	5A0316006D	5/8	5/8	1 1/4	3 1/2	.090
3336120	5A0316006	5/8	5/8	1 1/4	3 1/2	—
3649762	5A0319007B	3/4	3/4	1 1/2	4	.030
3336123	5A0319007C	3/4	3/4	1 1/2	4	.060

(continued)

(Series 5A03 • AluSurf — continued)

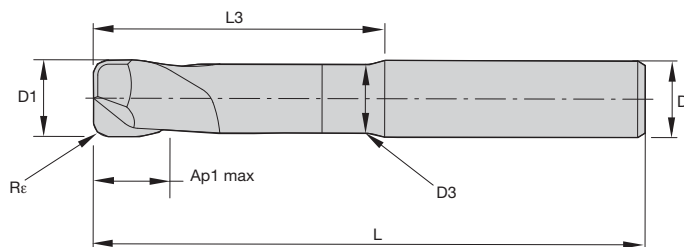


grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
3738937	5A0319007D	3/4	3/4	1 1/2	4	.090
3649763	5A0319007E	3/4	3/4	1 1/2	4	.120
3336122	5A0319007	3/4	3/4	1 1/2	4	—
3649764	5A0325008B	1	1	1 1/2	4	.030
3336125	5A0325008C	1	1	1 1/2	4	.060
3649765	5A0325008E	1	1	1 1/2	4	.120
3336124	5A0325008	1	1	1 1/2	4	—

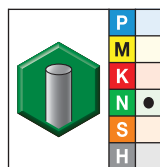
- Center cutting.
- Wiper facet design for improved floor finishes.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 5AN2 • AluSurf



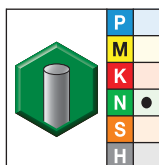
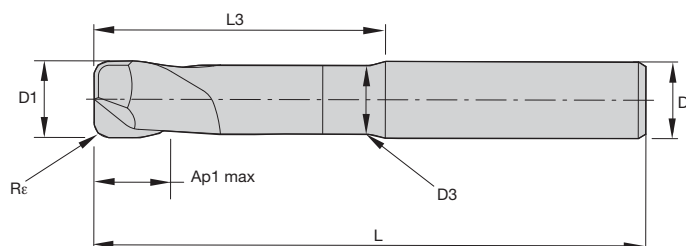
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3336000	5AN203042A	1/8	1/4	.12	3/16	1/2	3	.015
3336001	5AN205042A	3/16	1/4	.18	1/4	9/16	3	.015
3336002	5AN207042A	1/4	1/4	.23	5/16	3/4	3	.015
3659287	5AN207042	1/4	1/4	.23	5/16	3/4	3	—
3683906	5AN207012B	1/4	1/4	.23	3/8	2 1/4	4	.030
3659288	5AN207012	1/4	1/4	.23	3/8	2 1/4	4	—
3336083	5AN208043B	5/16	5/16	.29	3/8	1	4	.030
3683907	5AN208023B	5/16	5/16	.29	3/8	2	4	.030
3659289	5AN208023	5/16	5/16	.29	3/8	2	4	—
3336084	5AN210044B	3/8	3/8	.35	7/16	1 1/8	4	.030
3683908	5AN210044C	3/8	3/8	.35	7/16	1 1/8	4	.060
3659290	5AN210044	3/8	3/8	.35	7/16	1 1/8	4	—
3683909	5AN210014B	3/8	3/8	.35	7/16	2 1/4	4	.030
3683910	5AN210014C	3/8	3/8	.35	7/16	2 1/4	4	.060
3474843	5AN210014	3/8	3/8	.35	7/16	2 1/4	4	—
3336085	5AN213045B	1/2	1/2	.47	9/16	1 1/2	5	.030
3683911	5AN213045C	1/2	1/2	.47	9/16	1 1/2	5	.060
3683912	5AN213045D	1/2	1/2	.47	9/16	1 1/2	5	.090
3659292	5AN213045	1/2	1/2	.47	9/16	1 1/2	5	—
3683913	5AN213005B	1/2	1/2	.47	9/16	2 1/4	5	.030

(continued)

(Series 5AN2 • AluSurf — continued)

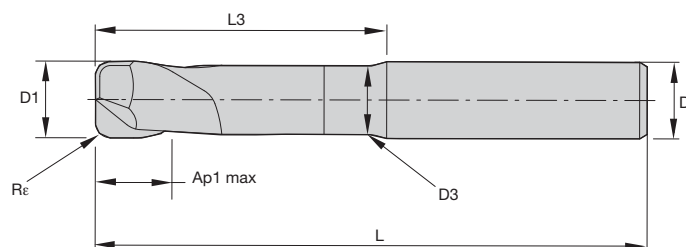


grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3683914	5AN213005C	1/2	1/2	.47	9/16	2 1/4	5	.060
3683915	5AN213005D	1/2	1/2	.47	9/16	2 1/4	5	.090
3474844	5AN213005	1/2	1/2	.47	9/16	2 1/4	5	—
3683916	5AN213015B	1/2	1/2	.47	9/16	3 1/4	6	.030
3683917	5AN213015C	1/2	1/2	.47	9/16	3 1/4	6	.060
3683918	5AN213015D	1/2	1/2	.47	9/16	3 1/4	6	.090
3659487	5AN213015	1/2	1/2	.47	9/16	3 1/4	6	—
3336086	5AN216046C	5/8	5/8	.59	3/4	2	5	.060
3683919	5AN216016B	5/8	5/8	.59	3/4	3 1/4	6	.030
3683920	5AN216016C	5/8	5/8	.59	3/4	3 1/4	6	.060
3683921	5AN216016D	5/8	5/8	.59	3/4	3 1/4	6	.090
3659488	5AN216016	5/8	5/8	.59	3/4	3 1/4	6	—
3336087	5AN219047C	3/4	3/4	.70	7/8	2 1/2	5	.060
3683922	5AN219057B	3/4	3/4	.70	1	1 1/2	6	.030
3683923	5AN219057C	3/4	3/4	.70	1	1 1/2	6	.060
3683924	5AN219057D	3/4	3/4	.70	1	1 1/2	6	.090
3659489	5AN219057	3/4	3/4	.70	1	1 1/2	6	—
3683925	5AN219077B	3/4	3/4	.70	1	2 1/4	6	.030
3683926	5AN219077C	3/4	3/4	.70	1	2 1/4	6	.060
3683927	5AN219077D	3/4	3/4	.70	1	2 1/4	6	.090
3659490	5AN219077	3/4	3/4	.70	1	2 1/4	6	—
3683928	5AN219017B	3/4	3/4	.70	1	3 1/4	6	.030
3683929	5AN219017C	3/4	3/4	.70	1	3 1/4	6	.060
3683930	5AN219017D	3/4	3/4	.70	1	3 1/4	6	.090
3659491	5AN219017	3/4	3/4	.70	1	3 1/4	6	—
3683931	5AN225048B	1	1	.94	1 1/8	3	5 1/2	.030
3336088	5AN225048C	1	1	.94	1 1/8	3	5 1/2	.060
3659492	5AN225048	1	1	.94	1 1/8	3	5 1/2	—
3683932	5AN225028B	1	1	.94	1 1/8	4 1/4	7	.030
3683933	5AN225028C	1	1	.94	1 1/8	4 1/4	7	.060
3659493	5AN225028	1	1	.94	1 1/8	4 1/4	7	—

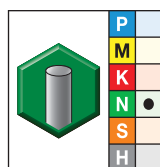
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End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 5AN3 • AluSurt



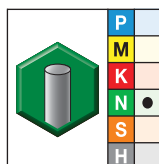
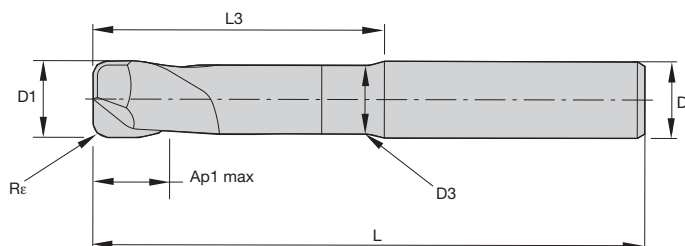
grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3336089	5AN303042A	1/8	1/4	.12	3/16	1/2	3	.015
3336090	5AN305042A	3/16	1/4	.18	1/4	9/16	3	.015
3336091	5AN307042A	1/4	1/4	.23	5/16	3/4	3	.015
3336092	5AN308043B	5/16	5/16	.29	3/8	1	4	.030
3336093	5AN310044B	3/8	3/8	.35	7/16	1 1/8	4	.030
3474848	5AN310044C	3/8	3/8	.35	7/16	1 1/8	4	.060
3663015	5AN310044	3/8	3/8	.35	7/16	1 1/8	4	—
3684127	5AN310014B	3/8	3/8	.35	7/16	2 1/4	4	.030
3684128	5AN310014C	3/8	3/8	.35	7/16	2 1/4	4	.060
3474847	5AN310014	3/8	3/8	.35	7/16	2 1/4	4	—
3336094	5AN313045B	1/2	1/2	.47	9/16	1 1/2	5	.030
3684129	5AN313045C	1/2	1/2	.47	9/16	1 1/2	5	.060
3684130	5AN313045D	1/2	1/2	.47	9/16	1 1/2	5	.090
3664610	5AN313045	1/2	1/2	.47	9/16	1 1/2	5	—
3684131	5AN313005B	1/2	1/2	.47	9/16	2 1/4	5	.030
3684132	5AN313005C	1/2	1/2	.47	9/16	2 1/4	5	.060
3684143	5AN313005D	1/2	1/2	.47	9/16	2 1/4	5	.090
3664611	5AN313005	1/2	1/2	.47	9/16	2 1/4	5	—
3684144	5AN313015B	1/2	1/2	.47	9/16	3 1/4	6	.030
3684145	5AN313015C	1/2	1/2	.47	9/16	3 1/4	6	.060

(continued)

(Series 5AN3 • AluSurf — continued)

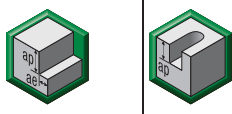


grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
3684146	5AN313015D	1/2	1/2	.47	9/16	3 1/4	6	.090
3664636	5AN313015	1/2	1/2	.47	9/16	3 1/4	6	—
3336095	5AN316046C	5/8	5/8	.59	3/4	2	5	.060
3684147	5AN316016B	5/8	5/8	.59	3/4	3 1/4	6	.030
3684148	5AN316016C	5/8	5/8	.59	3/4	3 1/4	6	.060
3684149	5AN316016D	5/8	5/8	.59	3/4	3 1/4	6	.090
3664637	5AN316016	5/8	5/8	.59	3/4	3 1/4	6	—
3336096	5AN319047C	3/4	3/4	.70	7/8	2 1/2	5	.060
3684150	5AN319057B	3/4	3/4	.70	1	1 1/2	6	.030
3684151	5AN319057C	3/4	3/4	.70	1	1 1/2	6	.060
3684152	5AN319057D	3/4	3/4	.70	1	1 1/2	6	.090
3474883	5AN319057	3/4	3/4	.70	1	1 1/2	6	—
3684153	5AN319077B	3/4	3/4	.70	1	2 1/4	6	.030
3684154	5AN319077C	3/4	3/4	.70	1	2 1/4	6	.060
3684155	5AN319077D	3/4	3/4	.70	1	2 1/4	6	.090
3664639	5AN319077	3/4	3/4	.70	1	2 1/4	6	—
3684156	5AN319017B	3/4	3/4	.70	1	3 1/4	6	.030
3684157	5AN319017C	3/4	3/4	.70	1	3 1/4	6	.060
3684158	5AN319017D	3/4	3/4	.70	1	3 1/4	6	.090
3664640	5AN319017	3/4	3/4	.70	1	3 1/4	6	—
3684159	5AN319067B	3/4	3/4	.70	1	4 1/4	7	.030
3664641	5AN319067	3/4	3/4	.70	1	4 1/4	7	—
3684160	5AN325048B	1	1	.94	1 1/8	3	5 1/2	.030
3336097	5AN325048C	1	1	.94	1 1/8	3	5 1/2	.060
3664642	5AN325048	1	1	.94	1 1/8	3	5 1/2	—
3684161	5AN325028B	1	1	.94	1 1/8	4 1/4	7	.030
3664694	5AN325028C	1	1	.94	1 1/8	4 1/4	7	.060
3684162	5AN325028D	1	1	.94	1 1/8	4 1/4	7	.090
3664693	5AN325028	1	1	.94	1 1/8	4 1/4	7	—

■ Series 5A02 5A03 • AluSurf

Material Group															
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed – vc SFM				D1 – Diameter							
	ap	ae	ap	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1	
							dec.	.2500	.3130	.3750	.5000	.6250	.7500	1.000	
N	1	1.5 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0023	.0028	.0034	.0045	.0056	.0068	.0090
	2	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0018	.0023	.0027	.0036	.0045	.0054	.0072
	3	1.5 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	4	1.5 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0016	.0020	.0024	.0032	.0039	.0047	.0063
	5	1.5 x D	0.5 x D	1 x D	820	–	3280	IPT	.0020	.0025	.0030	.0041	.0051	.0061	.0081

NOTE: For cutting aluminum with high silicon, coating is recommended.

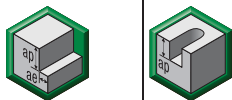
For spindles with ceramic bearings, multiply ap by 0.5.

For better surface finish, reduce feed per tooth.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 5AN2 5AN3 • AluSurf™

■ Series 5AN2 5AN3 • AluSurf

Material Group																	
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B	Cutting Speed — vc SFM				D1 — Diameter									
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
N	1	1 x D	0.5 x D	1 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.5 x D	1 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.

Slot milling applications — For longest reach (L3) tools, reduce ap by 30%.

For cutting aluminum with high silicon, coating is recommended.

For spindles with ceramic bearings, multiply ap by 0.5.

For better surface finish, reduce feed per tooth.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Putting your round tools in a position to succeed



EXTREME **CHALLENGES.**
EXTREME **RESULTS.**

Precision Collet Chuck

- Minimizes runout to dramatically boost performance.
- Creates an upsurge in tool life.
- Eliminates pullout with **SAFE-LOCK®** by HAIMER option.
- Chatter-free refined balancing to G2.5@25,000 RPM.
- Extreme versatility for use with most rotating applications.

To learn more about our innovations, contact your local Authorized Distributor or visit **widia.com**.

WIDIA 

High-Performance Solid Carbide End Mills •

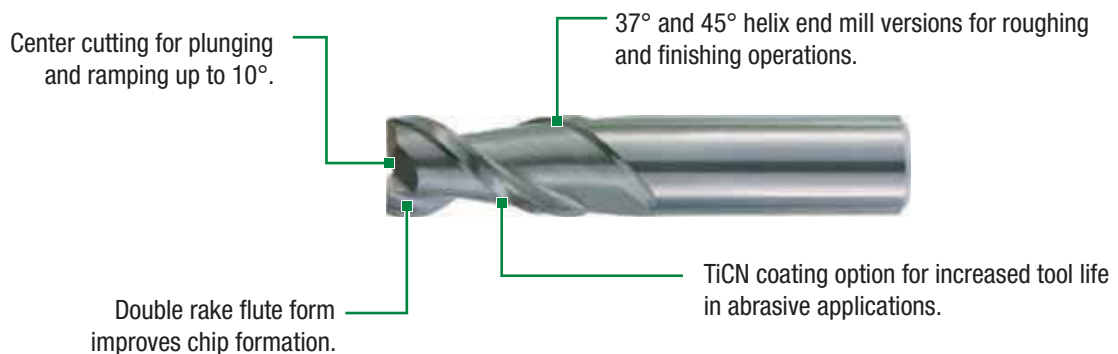
ArCut™

ArCut Aluminum



ArCut end mills are equipped with a double rake face chip flute form, having a smaller than normal contact zone. This accelerates the chip during formation, resulting in a short curled chip, improving chip evacuation and surface quality. Due to the short curled chips, machining corners is drastically improved as chip packing is avoided. ArCut end mills are also a preferred choice when highly accurate machined straight walls are required.

- One tool for roughing and finishing operations.
- Slotting depths up to 1 x D.
- Double rake design to manage chip formation.



ArCut™ Series

- Increase your output due to less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Optimize chip formation and evacuation.

4K02 Series

- 2-flute, 45° helix.
- Radii and sharp corner configuration.

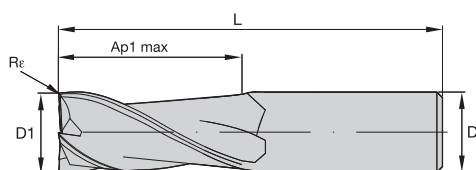


4K03 Series

- 3-flute, 37° helix.
- Radii and sharp corner configuration.



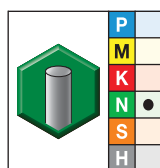
- Center cutting.
- Maximum ramp angle = 10°.
- Double rake flute form for chatter-free machining.



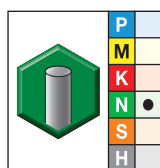
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/- .002	< 1/8"	0/.00024
		1/8-7/32"	0/.00031
		1/4-3/8"	0/.00035
		13/32-11/16"	0/.00043
		23/32-1 3/16"	0/.00051

■ Series 4K02 • Series 4K02 4K12 4K22 4K42 4K62 • ArCut



grade UNCOATED



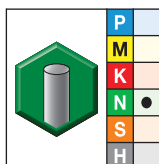
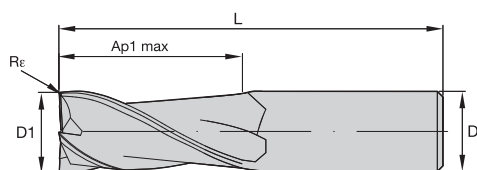
grade TiCN-CT
TiCN

- first choice
- alternate choice

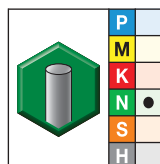
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863577	4K4203071	2841813	TC4K4203071	1/8	1/8	1/4	2	—
3638629	4K0203071A	—	—	1/8	1/8	1/2	2	.015
2863838	4K0203071	2842224	TC4K0203071	1/8	1/8	1/2	2	—
2863570	4K4205070	2841803	TC4K4205070	3/16	3/16	5/16	2	—
3638630	4K0205070A	—	—	3/16	3/16	5/8	2	.015
2863833	4K0205070	2842214	TC4K0205070	3/16	3/16	5/8	2	—
3638631	4K4207072B	—	—	1/4	1/4	3/8	2	.030
2863566	4K4207072	2841793	TC4K4207072	1/4	1/4	3/8	2	—
3638632	4K0207072A	—	—	1/4	1/4	3/4	2 1/2	.015
3638643	4K0207072B	—	—	1/4	1/4	3/4	2 1/2	.030
2863826	4K0207072	2842204	TC4K0207072	1/4	1/4	3/4	2 1/2	—
3638644	4K1207072A	—	—	1/4	1/4	1 1/4	3 1/4	.015
3638645	4K1207072B	—	—	1/4	1/4	1 1/4	3 1/4	.030
2863728	4K1207072	2842046	TC4K1207072	1/4	1/4	1 1/4	3 1/4	—
3638646	4K2207072A	—	—	1/4	1/4	1 3/4	4	.015
3638647	4K2207072B	—	—	1/4	1/4	1 3/4	4	.030
2863644	4K2207072	2841908	TC4K2207072	1/4	1/4	1 3/4	4	—
3638648	4K4208073B	—	—	5/16	5/16	7/16	2	.030
2863560	4K4208073	2841784	TC4K4208073	5/16	5/16	7/16	2	—
3638649	4K0208073B	—	—	5/16	5/16	13/16	2 1/2	.030

(continued)

(Series 4K02 • Series 4K02 4K12 4K22 4K42 4K62 • ArCut — continued)



grade UNCOATED

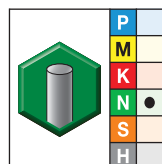
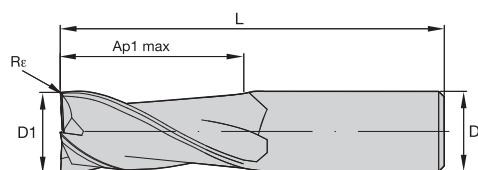

 grade TiCN-CT
TiCN

- first choice
- alternate choice

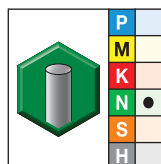
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
3638650	4K0208073C	—	—	5/16	5/16	13/16	2 1/2	.060
2863820	4K0208073	2842193	TC4K0208073	5/16	5/16	13/16	2 1/2	—
3638651	4K1208073B	—	—	5/16	5/16	1 1/4	3 1/4	.030
2863722	4K1208073	2842037	TC4K1208073	5/16	5/16	1 1/4	3 1/4	—
3638652	4K4210074B	—	—	3/8	3/8	1/2	2	.030
2863552	4K4210074	2841772	TC4K4210074	3/8	3/8	1/2	2	—
3638653	4K0210074B	—	—	3/8	3/8	7/8	2 1/2	.030
3638654	4K0210074C	—	—	3/8	3/8	7/8	2 1/2	.060
2863815	4K0210074	2842183	TC4K0210074	3/8	3/8	7/8	2 1/2	—
3638655	4K1210074B	—	—	3/8	3/8	1 1/2	4	.030
3638656	4K1210074C	—	—	3/8	3/8	1 1/2	4	.060
2863715	4K1210074	2842027	TC4K1210074	3/8	3/8	1 1/2	4	—
3638657	4K2210074B	—	—	3/8	3/8	2 1/2	4	.030
3638658	4K2210074C	—	—	3/8	3/8	2 1/2	4	.060
2863638	4K2210074	2841899	TC4K2210074	3/8	3/8	2 1/2	4	—
2863810	4K021107A	2983521	TC4K021107A	7/16	7/16	7/8	2 1/2	—
3638659	4K4213075B	—	—	1/2	1/2	5/8	2 1/2	.030
3638660	4K4213075C	—	—	1/2	1/2	5/8	2 1/2	.060
2863546	4K4213075	2841762	TC4K4213075	1/2	1/2	5/8	2 1/2	—
2863804	4K0213075	2842170	TC4K0213075	1/2	1/2	1	3	—
3638661	4K0213085B	—	—	1/2	1/2	1 1/4	3	.030
3638662	4K0213085C	—	—	1/2	1/2	1 1/4	3	.060
3638663	4K0213085E	—	—	1/2	1/2	1 1/4	3	.120
3061880	4K0213085	2842163	TC4K0213085	1/2	1/2	1 1/4	3	—
3638664	4K6213055B	—	—	1/2	1/2	1 1/2	4	.030
3638665	4K6213055C	—	—	1/2	1/2	1 1/2	4	.060
2863499	4K6213055	3041444	TC4K6213055	1/2	1/2	1 1/2	4	—
3638666	4K1213075B	—	—	1/2	1/2	2	4	.030
3638667	4K1213075C	—	—	1/2	1/2	2	4	.060
2863709	4K1213075	2842016	TC4K1213075	1/2	1/2	2	4	—
3638668	4K6213065B	—	—	1/2	1/2	2 1/2	5	.030
3638669	4K6213065C	—	—	1/2	1/2	2 1/2	5	.060
2863497	4K6213065	3048586	TC4K6213065	1/2	1/2	2 1/2	5	—
3638670	4K2213075B	—	—	1/2	1/2	3	5	.030
3061692	4K2213075	2841890	TC4K2213075	1/2	1/2	3	5	—
2863541	4K4216076	2841753	TC4K4216076	5/8	5/8	3/4	3	—

(continued)

(Series 4K02 • Series 4K02 4K12 4K22 4K42 4K62 • ArCut — continued)



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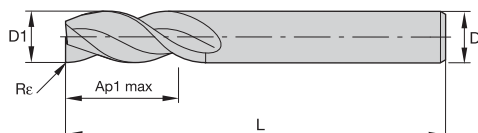


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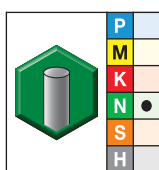
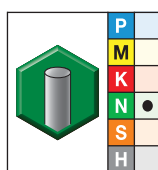
- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863794	4K0216076	2842154	TC4K0216076	5/8	5/8	1 1/4	3 1/2	—
3638675	4K6216076C	—	—	5/8	5/8	1 5/8	3 1/2	.060
2863494	4K6216076	2841675	TC4K6216076	5/8	5/8	1 5/8	3 1/2	—
3638676	4K1216076C	—	—	5/8	5/8	2 1/4	5	.060
2863704	4K1216076	2842007	TC4K1216076	5/8	5/8	2 1/4	5	—
3638677	4K2216076C	—	—	5/8	5/8	3	5 1/4	.060
2863628	4K2216076	3048585	TC4K2216076	5/8	5/8	3	5 1/4	—
3638678	4K4219077B	—	—	3/4	3/4	7/8	3	.030
3638679	4K4219077C	—	—	3/4	3/4	7/8	3	.060
3638680	4K4219077E	—	—	3/4	3/4	7/8	3	.120
2863534	4K4219077	2841743	TC4K4219077	3/4	3/4	7/8	3	—
3638681	4K0219077B	—	—	3/4	3/4	1 1/2	4	.030
3638682	4K0219077C	—	—	3/4	3/4	1 1/2	4	.060
3638683	4K0219077E	—	—	3/4	3/4	1 1/2	4	.120
2863788	4K0219077	2842145	TC4K0219077	3/4	3/4	1 1/2	4	—
2863491	4K6219067	2841672	TC4K6219067	3/4	3/4	1 5/8	4	—
3638684	4K1219077B	—	—	3/4	3/4	2 1/4	5	.030
3638685	4K1219077C	—	—	3/4	3/4	2 1/4	5	.060
2863698	4K1219077	2841997	TC4K1219077	3/4	3/4	2 1/4	5	—
3638686	4K6219077B	—	—	3/4	3/4	3	5 1/4	.030
3738131	4K6219077C	—	—	3/4	3/4	3	5 1/4	.060
2863488	4K6219077	2991957	TC4K6219077	3/4	3/4	3	5 1/4	—
2863623	4K2219077	3082933	TC4K2219077	3/4	3/4	4	6 1/4	—
3638689	4K0225078B	—	—	1	1	1 1/2	4	.030
3638690	4K0225078C	—	—	1	1	1 1/2	4	.060
3638691	4K0225078E	—	—	1	1	1 1/2	4	.120
2863782	4K0225078	2971373	TC4K0225078	1	1	1 1/2	4	—
2863485	4K6225078	3048587	TC4K6225078	1	1	2	4 1/2	—
3638692	4K1225078B	—	—	1	1	2 1/4	5	.030
3638693	4K1225078C	—	—	1	1	2 1/4	5	.060
2863691	4K1225078	2841987	TC4K1225078	1	1	2 1/4	5	—
3638694	4K2225078B	—	—	1	1	3	5 1/2	.030
3638695	4K2225078C	—	—	1	1	3	5 1/2	.060
2863617	4K2225078	3056326	TC4K2225078	1	1	3	5 1/2	—
2863482	4K6225088	3048588	TC4K6225088	1	1	4	7	—

- Center cutting.
- Maximum ramp angle = 10°.
- Double rake flute form for chatter-free machining.


End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+ .000/- .002	< 1/8"	0/.00024
		1/8–7/32"	0/.00031
		1/4–3/8"	0/.00035
		13/32–11/16"	0/.00043
		23/32–1 3/16"	0/.00051

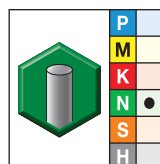
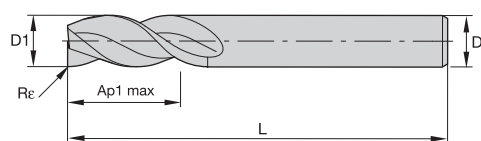
■ Series 4K03 • Series 4K03 4K13 4K23 4K43 4K63 • ArCut

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**grade TiCN-CT
TiCN**

- first choice
- alternate choice

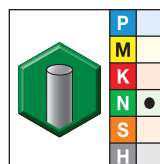
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
3638696	4K4307072B	–	–	1/4	1/4	3/8	2	.030
2863529	4K4307072	2841733	TC4K4307072	1/4	1/4	3/8	2	–
3638697	4K0307072A	–	–	1/4	1/4	3/4	2 1/2	.015
3638698	4K0307072B	–	–	1/4	1/4	3/4	2 1/2	.030
2863775	4K0307072	2842127	TC4K0307072	1/4	1/4	3/4	2 1/2	–
3638699	4K1307072A	–	–	1/4	1/4	1 1/4	3 1/4	.015
3638700	4K1307072B	–	–	1/4	1/4	1 1/4	3 1/4	.030
2863686	4K1307072	2841978	TC4K1307072	1/4	1/4	1 1/4	3 1/4	–
3638701	4K2307072A	–	–	1/4	1/4	1 3/4	4	.015
3638702	4K2307072B	–	–	1/4	1/4	1 3/4	4	.030
2863610	4K2307072	2841870	TC4K2307072	1/4	1/4	1 3/4	4	–
3638743	4K4308073B	–	–	5/16	5/16	7/16	2	.030
2863525	4K4308073	3019793	TC4K4308073	5/16	5/16	7/16	2	–
3638744	4K0308073B	–	–	5/16	5/16	13/16	2 1/2	.030
3638745	4K0308073C	–	–	5/16	5/16	13/16	2 1/2	.060
2863769	4K0308073	2842118	TC4K0308073	5/16	5/16	13/16	2 1/2	–
3638746	4K1308073B	–	–	5/16	5/16	1 1/4	3 1/4	.030
2863679	4K1308073	2841967	TC4K1308073	5/16	5/16	1 1/4	3 1/4	–
3638747	4K4310074B	–	–	3/8	3/8	1/2	2	.030
2863521	4K4310074	2841716	TC4K4310074	3/8	3/8	1/2	2	–

(continued)

(Series 4K03 • Series 4K03 4K13 4K23 4K43 4K63 • ArCut — continued)



grade UNCOATED



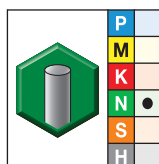
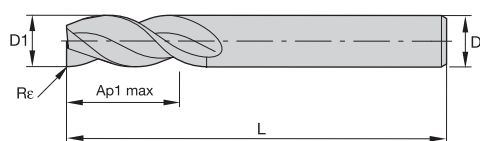
grade TiCN-CT
TiCN

- first choice
- alternate choice

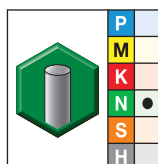
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
3638748	4K0310074B	—	—	3/8	3/8	7/8	2 1/2	.030
3638749	4K0310074C	—	—	3/8	3/8	7/8	2 1/2	.060
2863765	4K0310074	2842108	TC4K0310074	3/8	3/8	7/8	2 1/2	—
3638750	4K1310074B	—	—	3/8	3/8	1 1/2	4	.030
3638751	4K1310074C	—	—	3/8	3/8	1 1/2	4	.060
2863674	4K1310074	2841958	TC4K1310074	3/8	3/8	1 1/2	4	—
3638752	4K2310074B	—	—	3/8	3/8	2 1/2	4	.030
3638753	4K2310074C	—	—	3/8	3/8	2 1/2	4	.060
2863605	4K2310074	2841858	TC4K2310074	3/8	3/8	2 1/2	4	—
2863761	4K031107A	2842103	TC4K031107A	7/16	7/16	7/8	2 1/2	—
3638754	4K4313075B	—	—	1/2	1/2	5/8	2 1/2	.030
3638755	4K4313075C	—	—	1/2	1/2	5/8	2 1/2	.060
2863515	4K4313075	2841705	TC4K4313075	1/2	1/2	5/8	2 1/2	—
2863754	4K0313075	2990466	TC4K0313075	1/2	1/2	1	3	—
3638756	4K0313085B	—	—	1/2	1/2	1 1/4	3	.030
3638758	4K0313085C	—	—	1/2	1/2	1 1/4	3	.060
3638759	4K0313085E	—	—	1/2	1/2	1 1/4	3	.120
2863752	4K0313085	2842087	TC4K0313085	1/2	1/2	1 1/4	3	—
3638760	4K6313055B	—	—	1/2	1/2	1 1/2	4	.030
3638761	4K6313055C	—	—	1/2	1/2	1 1/2	4	.060
2863479	4K6313055	2870236	TC4K6313055	1/2	1/2	1 1/2	4	—
3638762	4K1313075B	—	—	1/2	1/2	2	4	.030
3638763	4K1313075C	—	—	1/2	1/2	2	4	.060
2863667	4K1313075	2841948	TC4K1313075	1/2	1/2	2	4	—
3638764	4K6313065B	—	—	1/2	1/2	2 1/2	5	.030
3638765	4K6313065C	—	—	1/2	1/2	2 1/2	5	.060
2863476	4K6313065	2841665	TC4K6313065	1/2	1/2	2 1/2	5	—
3638766	4K2313075B	—	—	1/2	1/2	3	5	.030
3638767	4K2313075C	—	—	1/2	1/2	3	5	.060
2863599	4K2313075	2841848	TC4K2313075	1/2	1/2	3	5	—
3638768	4K4316076C	—	—	5/8	5/8	3/4	3	.060
3638769	4K4316076E	—	—	5/8	5/8	3/4	3	.120
2863507	4K4316076	2841695	TC4K4316076	5/8	5/8	3/4	3	—
3638770	4K0316076C	—	—	5/8	5/8	1 1/4	3 1/2	.060
2863746	4K0316076	2990464	TC4K0316076	5/8	5/8	1 1/4	3 1/2	—
3638771	4K6316076C	—	—	5/8	5/8	1 5/8	3 1/2	.060

(continued)

(Series 4K03 • Series 4K03 4K13 4K23 4K43 4K63 • ArCut — continued)



grade UNCOATED


 grade TiCN-CT
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	Re
2863473	4K6316076	2841660	TC4K6316076	5/8	5/8	1 5/8	3 1/2	—
3638772	4K1316076C	—	—	5/8	5/8	2 1/4	5	.060
2863661	4K1316076	2841939	TC4K1316076	5/8	5/8	2 1/4	5	—
3638773	4K2316076C	—	—	5/8	5/8	3	5 1/4	.060
2863595	4K2316076	2841844	TC4K2316076	5/8	5/8	3	5 1/4	—
3638774	4K4319077B	—	—	3/4	3/4	7/8	3	.030
3638775	4K4319077C	—	—	3/4	3/4	7/8	3	.060
3638776	4K4319077E	—	—	3/4	3/4	7/8	3	.120
2863502	4K4319077	2841686	TC4K4319077	3/4	3/4	7/8	3	—
3638777	4K0319077B	—	—	3/4	3/4	1 1/2	4	.030
3638778	4K0319077C	—	—	3/4	3/4	1 1/2	4	.060
3638779	4K0319077E	—	—	3/4	3/4	1 1/2	4	.120
2863739	4K0319077	2842066	TC4K0319077	3/4	3/4	1 1/2	4	—
2863470	4K6319067	2841655	TC4K6319067	3/4	3/4	1 5/8	4	—
3638780	4K1319077B	—	—	3/4	3/4	2 1/4	5	.030
3638781	4K1319077C	—	—	3/4	3/4	2 1/4	5	.060
2863656	4K1319077	2841928	TC4K1319077	3/4	3/4	2 1/4	5	—
3638782	4K6319077B	—	—	3/4	3/4	3	5 1/4	.030
3738132	4K6319077C	—	—	3/4	3/4	3	5 1/4	.060
2530382	4K6319077	2841650	TC4K6319077	3/4	3/4	3	5 1/4	—
3638783	4K2319077B	—	—	3/4	3/4	4	6 1/4	.030
3638784	4K2319077C	—	—	3/4	3/4	4	6 1/4	.060
2530406	4K2319077	2841834	TC4K2319077	3/4	3/4	4	6 1/4	—
3638785	4K0325078B	—	—	1	1	1 1/2	4	.030
3638786	4K0325078C	—	—	1	1	1 1/2	4	.060
3638787	4K0325078E	—	—	1	1	1 1/2	4	.120
2863734	4K0325078	2842056	TC4K0325078	1	1	1 1/2	4	—
2863464	4K6325078	2841645	TC4K6325078	1	1	2	4 1/2	—
3638788	4K1325078B	—	—	1	1	2 1/4	5	.030
3638789	4K1325078C	—	—	1	1	2 1/4	5	.060
2863650	4K1325078	2990465	TC4K1325078	1	1	2 1/4	5	—
3638790	4K2325078B	—	—	1	1	3	5 1/2	.030
3638791	4K2325078C	—	—	1	1	3	5 1/2	.060
2863584	4K2325078	2841823	TC4K2325078	1	1	3	5 1/2	—
2863461	4K6325088	2841640	TC4K6325088	1	1	4	7	—

■ Series 4K02 4K03 • ArCut

Material Group																		
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B	Cutting Speed – vc SFM			D1 – Diameter											
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
N	1	Ap1 max	0.5 x D	1.0 x D	1640	–	6560	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090	
	2	Ap1 max	0.5 x D	1.0 x D	1640	–	4920	IPT	.0009	.0014	.0018	.0023	.0027	.0036	.0045	.0054	.0072	
	3	Ap1 max	0.5 x D	1.0 x D	1640	–	4920	IPT	.0008	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063	
	4	Ap1 max	0.5 x D	1.0 x D	1310	–	2460	IPT	.0008	.0012	.0016	.0020	.0024	.0032	.0039	.0047	.0063	
	5	Ap1 max	0.5 x D	1.0 x D	820	–	3280	IPT	.0010	.0015	.0020	.0025	.0030	.0041	.0051	.0061	.0081	

NOTE: For cutting aluminum with high silicon, coating is recommended.

For spindles with ceramic bearings, multiply ap by 0.5.

For better surface finish, reduce feed per tooth.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

NOVO KNOWS CAD/CAM

With the addition of NOVO™ to your team, your CAD/CAM capabilities become much more accurate, streamlined, and productive.

Before NOVO: The programmer would be in their CAD/CAM software, programming a part. Using the outdated method of finding a tool in a catalog, and then manually inputting the tooling information from the catalog into the CAD/CAM software.

The concern is that assumptions are made, and only partial tooling information is entered.

With NOVO: The powerful digital intelligence of NOVO not only helps the programmer find the right tool for the metalcutting job, but also automatically integrates all the tooling data into a complete CAD/CAM solution.

The integration of all the tooling data increases the viability of the part being programmed, and is delivered quickly — saving you time.

NOVO can ensure you have the right tools on your machines, in the right sequence. Resulting in flawless execution that accelerates every job, and maximizes every shift. widia.com/novo



**High-Performance Aluminum
Solid Carbide End Mills**

HP Aluminum End Mills Series



WIDIA™ solid carbide end mills provide maximum Metal Removal Rates (MRR) and superior surface quality while reducing machining time in aluminum. The center cutting design allows for plunging, slotting, and profiling applications in any type of aluminum workpiece materials. The proprietary flute geometry is designed to deliver exceptional chip evacuation while generating floor-to-wall straightness, especially thin wall applications. With many styles to choose from, you can be sure WIDIA will have a solution for your aluminum applications.

- Capable of slotting depths up to 1 x D and side milling up to 1.5 x D axially at 0.5 x D radially (please follow application data for specific tool).
- Unequal flute spacing for chatter-free performance with 3-flute series.
- Multiple corner radii and extended neck configurations available as standard.

HP Aluminum End Mills Series

- Increase your output due to less tool changes and increased Metal Removal Rates (MRR).
- No specific tools for roughing and finishing necessary.
- Less passes due to 1 x D slotting capability.
- Perfect for MQL (Minimum Quantity Lubrication) applications.

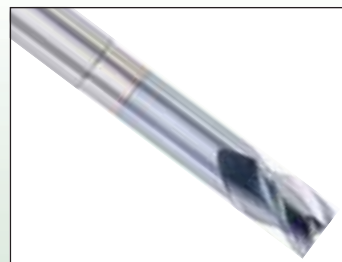
4AN2 Series

- 2-flute, 37° helix.
- Extended neck for long-reach applications.
- TiCN coated option for abrasive aluminum applications.
- Sharp corner configuration.



4AN3 Series

- 3-flute, 37° helix.
- Extended neck for long-reach applications.
- TiCN coated option for abrasive aluminum applications.
- Sharp corner configuration.



4AP2 Series

- 2-flute, 37° helix.
- Sharp corner configuration.



4AP3 Series

- 3-flute, 38° helix.
- Unequal flute spacing Radii and sharp corner configuration.



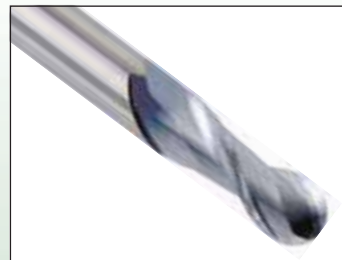
4B02 Series

- 2-flute, 30° helix.
- TiCN coated option for abrasive aluminum applications.
- Protective radii configuration.



4A01 Series

- 2-flute, 37° helix.
- TiCN coated option for abrasive aluminum applications.



4AN1 Series

- 2-flute, 37° helix.
- Extended neck for long-reach applications.
- TiCN coated option for abrasive aluminum applications.



4A0R Series

- 3-flute, 30° helix.
- Coarse cord style roughing profile.

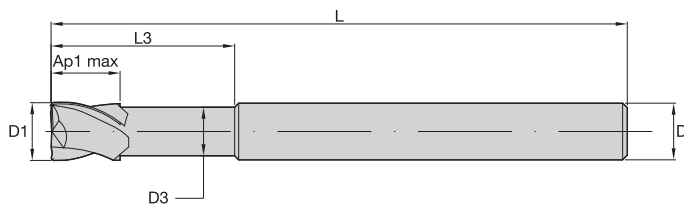
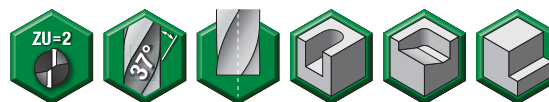


4A0B Series

- 3-flute, 30° helix.
- Coarse cord style roughing profile.



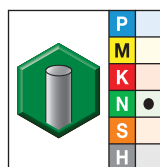
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



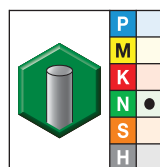
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 4AN2



grade UNCOATED



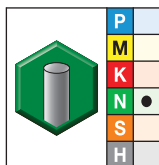
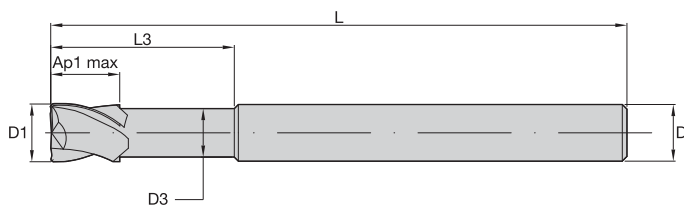
grade TiCN-CT
TiCN

- first choice
- alternate choice

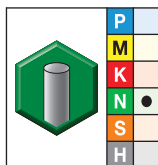
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2870516	4AN203001	2965251	TC4AN203001	1/8	1/8	.12	1/4	1/2	3
2870513	4AN203011	2950852	TC4AN203011	1/8	1/8	.12	1/4	3/4	3
2870511	4AN203021	3056325	TC4AN203021	1/8	1/8	.12	1/4	1	3
2870509	4AN205000	3035269	TC4AN205000	3/16	3/16	.18	1/4	1/2	3
2870508	4AN205010	3105270	TC4AN205010	3/16	3/16	.18	1/4	3/4	3
2870505	4AN205020	2898545	TC4AN205020	3/16	3/16	.18	1/4	1	3
2870503	4AN207022	2870295	TC4AN207022	1/4	1/4	.24	3/8	1	4
2870501	4AN207032	2950851	TC4AN207032	1/4	1/4	.24	3/8	1 1/2	4
2864276	4AN207012	2842805	TC4AN207012	1/4	1/4	.24	3/8	2 1/4	4
2870500	4AN208003	3320921	TC4AN208003	5/16	5/16	.29	7/16	1	4
2870498	4AN208013	3320922	TC4AN208013	5/16	5/16	.29	7/16	1 1/2	4
2951832	4AN208023	–	–	5/16	5/16	.29	7/16	2	4
2870495	4AN210034	3032084	TC4AN210034	3/8	3/8	.35	1/2	3/4	4
3965508	4AN210024	–	–	3/8	3/8	.34	1/2	1 1/8	2 1/2
2870493	4AN210044	–	–	3/8	3/8	.35	1/2	1 1/8	4
2864265	4AN210014	2842798	TC4AN210014	3/8	3/8	.35	1/2	2 1/4	4
3965513	4AN213055	–	–	1/2	1/2	.47	5/8	1 1/8	3
2870491	4AN213035	3005443	TC4AN213035	1/2	1/2	.47	5/8	1 1/8	5
2870489	4AN213045	3041429	TC4AN213045	1/2	1/2	.47	5/8	1 1/2	5
3965514	4AN213065	–	–	1/2	1/2	.47	5/8	2 1/4	4

(continued)

(Series 4AN2 — continued)



grade UNCOATED

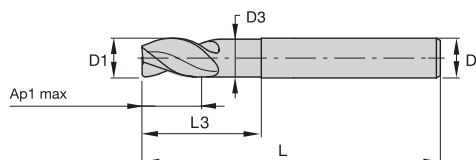
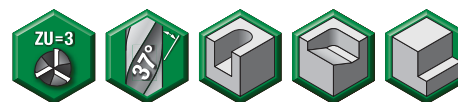


grade TiCN-CT
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2864258	4AN213005	2842788	TC4AN213005	1/2	1/2	.47	5/8	2 1/4	5
2864255	4AN213015	2842784	TC4AN213015	1/2	1/2	.47	5/8	3 1/4	6
2864252	4AN213025	2842778	TC4AN213025	1/2	1/2	.47	5/8	4	6
3965515	4AN216026	—	—	5/8	5/8	.59	3/4	1 1/2	4
2870485	4AN216046	—	—	5/8	5/8	.59	3/4	1 1/2	5
2864245	4AN216006	2842772	TC4AN216006	5/8	5/8	.59	3/4	2 1/4	5
2864244	4AN216016	2842766	TC4AN216016	5/8	5/8	.59	3/4	3 1/4	6
2870487	4AN216036	2870289	TC4AN216036	5/8	5/8	.59	3/4	4	6
3965516	4AN219027	—	—	3/4	3/4	.70	1	1 1/2	4
2870481	4AN219057	3133433	TC4AN219057	3/4	3/4	.71	1	1 1/2	6
3965517	4AN219097	—	—	3/4	3/4	.70	1	2 1/4	4
3965518	4AN219087	—	—	3/4	3/4	.70	1	2 1/4	5
—	—	2842754	TC4AN219007	3/4	3/4	.71	1	2 1/4	5
2870477	4AN219077	2870284	TC4AN219077	3/4	3/4	.71	1	2 1/4	6
2870484	4AN219047	3165768	TC4AN219047	3/4	3/4	.71	1	2 3/4	6
2864233	4AN219017	2842749	TC4AN219017	3/4	3/4	.71	1	3 1/4	6
2870479	4AN219067	3367685	TC4AN219067	3/4	3/4	.71	1	4 1/4	7
3965519	4AN225058	—	—	1	1	.94	1 1/8	1 1/2	4
3048583	4AN225038	3320925	TC4AN225038	1	1	.94	1 1/8	1 1/2	6
3965520	4AN225068	—	—	1	1	.94	1 1/8	2 1/4	5
2870475	4AN225078	—	—	1	1	.94	1 1/8	2 1/4	6
2898628	4AN225048	3320926	TC4AN225048	1	1	.94	1 1/8	2 3/4	6
2864212	4AN225018	—	—	1	1	.94	1 1/8	3 1/4	6
2864209	4AN225028	1902255	TC4AN225028	1	1	.94	1 1/8	4 1/4	7

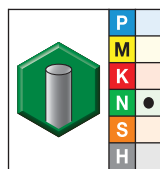
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



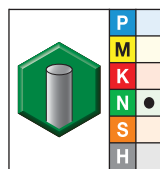
End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0.00024	< 1/8"	0.00024
1/8–7/32"	0.00031	1/8–7/32"	0.00031
1/4–3/8"	0.00035	1/4–3/8"	0.00035
13/32–11/16"	0.00043	13/32–11/16"	0.00043
23/32–1 3/16"	0.00051	23/32–1 3/16"	0.00051

Series 4AN3



grade UNCOATED



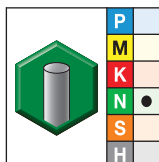
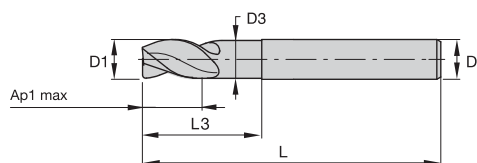
grade TiCN-CT
TiCN

- first choice
- alternate choice

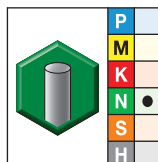
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2870471	4AN310034	2870278	TC4AN310034	3/8	3/8	.35	1/2	3/4	4
3965521	4AN310024	–	–	3/8	3/8	.34	1/2	1 1/8	2 1/2
2870470	4AN310044	2870275	TC4AN310044	3/8	3/8	.35	1/2	1 1/8	4
2870474	4AN310014	2870281	TC4AN310014	3/8	3/8	.35	1/2	2 1/4	4
3965522	4AN313025	–	–	1/2	1/2	.47	5/8	1 1/8	3
2870463	4AN313035	2870269	TC4AN313035	1/2	1/2	.47	5/8	1 1/8	5
2870461	4AN313045	2870266	TC4AN313045	1/2	1/2	.47	5/8	1 1/2	5
3965523	4AN313055	–	–	1/2	1/2	.47	5/8	2 1/4	4
2870468	4AN313005	2870272	TC4AN313005	1/2	1/2	.47	5/8	2 1/4	5
2870466	4AN313015	2951772	TC4AN313015	1/2	1/2	.47	5/8	3 1/4	5
3965524	4AN316026	–	–	5/8	5/8	.59	3/4	1 1/2	4
2870455	4AN316046	3133261	TC4AN316046	5/8	5/8	.59	3/4	1 1/2	5
2870459	4AN316006	3133262	TC4AN316006	5/8	5/8	.59	3/4	2 1/4	5
2870457	4AN316016	2870263	TC4AN316016	5/8	5/8	.59	3/4	3 1/4	6
3965553	4AN319037	–	–	3/4	3/4	.70	1	1 1/2	4
2870444	4AN319057	3320928	TC4AN319057	3/4	3/4	.71	1	1 1/2	6
3965528	4AN319087	–	–	3/4	3/4	.70	1	2 1/4	4
3965526	4AN319097	–	–	3/4	3/4	.70	1	2 1/4	5
2870438	4AN319077	–	–	3/4	3/4	.71	1	2 1/4	6
2870447	4AN319047	3122745	TC4AN319047	3/4	3/4	.71	1	2 3/4	6

(continued)

(Series 4AN3 — continued)



grade UNCOATED

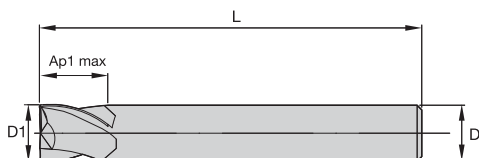
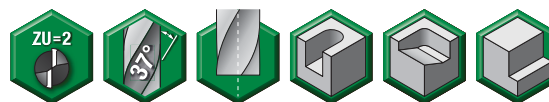


grade TiCN-CT
TiCN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2870451	4AN319017	2973503	TC4AN319017	3/4	3/4	.71	1	3 1/4	6
2870441	4AN319067	3019217	TC4AN319067	3/4	3/4	.71	1	4 1/4	7
3965529	4AN325058	—	—	1	1	.94	1	1 1/2	4
3965531	4AN325068	—	—	1	1	.94	1	2 1/4	5
2870427	4AN325038	3320929	TC4AN325038	1	1	.94	1 1/8	1 1/2	6
3022868	4AN325078	—	—	1	1	.94	1 1/8	2 1/4	6
2870424	4AN325048	—	—	1	1	.94	1 1/8	2 3/4	6
2870432	4AN325018	—	—	1	1	.94	1 1/8	3 1/4	6
2870430	4AN325028	—	—	1	1	.94	1 1/8	4 1/4	7

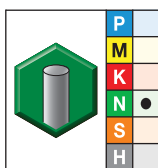
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8-7/32"	0/.00031	1/8-7/32"	0/.00031
1/4-3/8"	0/.00035	1/4-3/8"	0/.00035
13/32-11/16"	0/.00043	13/32-11/16"	0/.00043
23/32-1 3/16"	0/.00051	23/32-1 3/16"	0/.00051

Series 4AP2

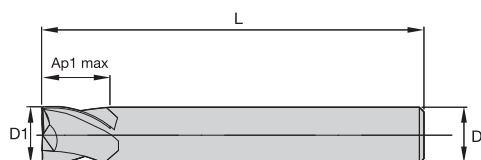


grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
2870421	4AP203001	1/8	1/8	1/4	3
2870418	4AP205000	3/16	3/16	1/4	3
2870415	4AP207012	1/4	1/4	3/8	4
2870409	4AP210014	3/8	3/8	1/2	4
2870406	4AP213005	1/2	1/2	5/8	5
2870403	4AP216006	5/8	5/8	3/4	5
2870400	4AP216026	5/8	5/8	3/4	8
2870397	4AP219017	3/4	3/4	1	6
2870394	4AP219027	3/4	3/4	1	8
2870391	4AP225018	1	1	1 1/8	6
2870388	4AP225028	1	1	1 1/8	8

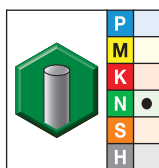
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 4AP3

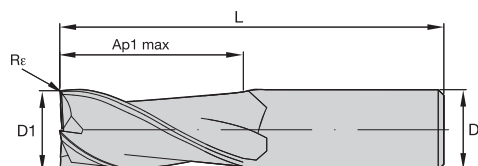
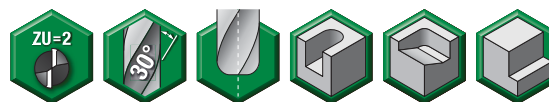


grade UNCOATED

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
2870382	4AP310014	3/8	3/8	1/2	4
2870379	4AP313005	1/2	1/2	5/8	5
2870372	4AP316006	5/8	5/8	3/4	5
2870369	4AP319017	3/4	3/4	1	6
2870363	4AP325018	1	1	1 1/8	6

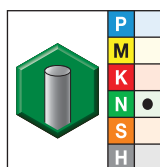
- Center cutting.
- For heavy stock removal.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8–7/32"	0/.00031	1/8–7/32"	0/.00031
1/4–3/8"	0/.00035	1/4–3/8"	0/.00035
13/32–11/16"	0/.00043	13/32–11/16"	0/.00043
23/32–1 3/16"	0/.00051	23/32–1 3/16"	0/.00051

Series 4B02

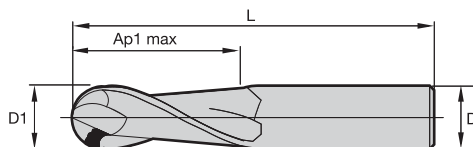


grade UNCOATED

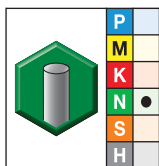
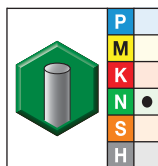
- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	Rε
2864060	4B0207072A	1/4	1/4	3/8	2	.018
2864057	4B0208073A	5/16	5/16	1/2	2	.018
2864051	4B0210074A	3/8	3/8	9/16	2	.018
2864041	4B0213075A	1/2	1/2	3/4	3	.030
2864035	4B0216076A	5/8	5/8	1	3	.030
2864029	4B0219077A	3/4	3/4	1 1/8	4	.030
2864024	4B0225078A	1	1	1 1/2	4	.030

- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.


End Mill Tolerances

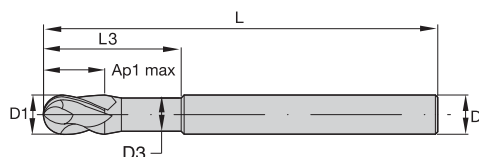
D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8-7/32"	0/.00031	1/8-7/32"	0/.00031
1/4-3/8"	0/.00035	1/4-3/8"	0/.00035
13/32-11/16"	0/.00043	13/32-11/16"	0/.00043
23/32-1 3/16"	0/.00051	23/32-1 3/16"	0/.00051

■ Series 4A01 • Series 4A01 4A11 4A41

grade UNCOATED

**grade TiCN-CT
TiCN**

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
2864388	4A4103001	2842903	TC4A4103001	1/8	1/8	1/4	2
2864580	4A0103001	2843170	TC4A0103001	1/8	1/8	1/2	2
2864385	4A4105000	2842899	TC4A4105000	3/16	3/16	5/16	2
2864576	4A0105000	2843165	TC4A0105000	3/16	3/16	5/8	2
2864382	4A4107002	2842891	TC4A4107002	1/4	1/4	3/8	2
2864573	4A0107002	2843160	TC4A0107002	1/4	1/4	3/4	2 1/2
2864482	4A1107002	2843015	TC4A1107002	1/4	1/4	1 1/4	3 1/4
2864570	4A0108003	2898548	TC4A0108003	5/16	5/16	13/16	2 1/2
2864567	4A0110004	2843156	TC4A0110004	3/8	3/8	7/8	2 1/2
2864476	4A1110004	2843006	TC4A1110004	3/8	3/8	1 1/2	4
2864373	4A4113005	2842886	TC4A4113005	1/2	1/2	5/8	2 1/2
2864560	4A0113005	2843149	TC4A0113005	1/2	1/2	1	3
2864558	4A0113015	2843144	TC4A0113015	1/2	1/2	1 1/4	3
2864473	4A1113005	2843001	TC4A1113005	1/2	1/2	2	4
2864370	4A4116006	—	—	5/8	5/8	3/4	3
2864555	4A0116006	2843139	TC4A0116006	5/8	5/8	1 1/4	3 1/2
2864470	4A1116006	—	—	5/8	5/8	2 1/4	5
2864367	4A4119007	—	—	3/4	3/4	7/8	3
2864552	4A0119007	2843134	TC4A0119007	3/4	3/4	1 1/2	4
2864466	4A1119007	—	—	3/4	3/4	2 1/2	5
2864549	4A0125008	2843129	TC4A0125008	1	1	1 1/2	4
2864464	4A1125008	—	—	1	1	2 1/4	5

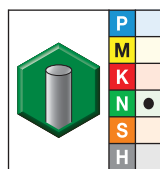
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
< 1/8"	0/.00024	< 1/8"	0/.00024
1/8-7/32"	0/.00031	1/8-7/32"	0/.00031
1/4-3/8"	0/.00035	1/4-3/8"	0/.00035
13/32-11/16"	0/.00043	13/32-11/16"	0/.00043
23/32-1 3/16"	0/.00051	23/32-1 3/16"	0/.00051

Series 4AN1

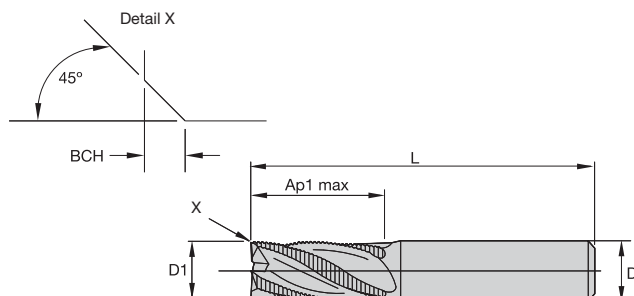
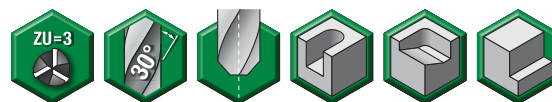


grade UNCOATED

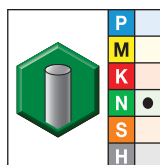
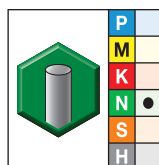
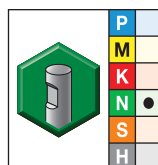
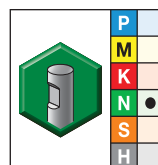
- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2864330	4AN107012	1/4	1/4	.24	3/8	2 1/4	4
2864327	4AN110014	3/8	3/8	.35	1/2	2 1/4	4
2864323	4AN113005	1/2	1/2	.47	5/8	2 1/4	5
2864320	4AN113015	1/2	1/2	.47	5/8	3 1/4	6
2864318	4AN113025	1/2	1/2	.47	5/8	4	6
2864314	4AN116006	5/8	5/8	.59	3/4	2 1/4	5
2864311	4AN116016	5/8	5/8	.59	3/4	3 1/4	6
2864308	4AN116026	5/8	5/8	.59	3/4	4 1/4	7
2864305	4AN119007	3/4	3/4	.71	1	2 1/4	5
2864303	4AN119017	3/4	3/4	.71	1	3 1/4	6
2864300	4AN119027	3/4	3/4	.71	1	4 1/4	7
2864297	4AN125008	1	1	.94	1 1/8	2 1/4	5
2864293	4AN125018	1	1	.94	1 1/8	3 1/4	6
2864291	4AN125028	1	1	.94	1 1/8	4 1/4	7

- Center cutting.
- Coarse profile.
- Standard items listed. Additional styles and coatings made-to-order.


End Mill Tolerances

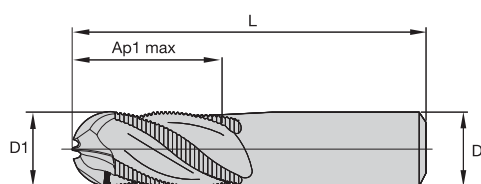
D1	d11	D	tolerance h6 + / -
< 1/8"	-.0008/- .0031	< 1/8"	0/.00024
1/8-7/32"	-.0012/- .0041	1/8-7/32"	0/.00031
1/4-3/8"	-.0016/- .0051	1/4-3/8"	0/.00035
13/32-11/16"	-.002/- .0063	13/32-11/16"	0/.00043
23/32-1 3/16"	-.0026/- .0077	23/32-1 3/16"	0/.00051

Series 4A0R • Series 4A0R 4A1R 4A4R

grade UNCOATED

**grade TiCN-CT
TiCN**

grade UNCOATED-WW

**grade TiCN-CW
TiCN**

- first choice
- alternate choice

order #	catalog #	order #	catalog #	order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L	BCH
2864498	4A0R07002	2843045	TC4A0R07002	-	-	-	-	1/4	1/4	3/4	2 1/2	.024
2864345	4A4R10004	-	-	-	-	-	-	3/8	3/8	1/2	2	.024
-	-	-	-	2864495	4A0R10004	2843040	TC4A0R10004	3/8	3/8	7/8	2 1/2	.024
2864342	4A4R13005	-	-	-	-	-	-	1/2	1/2	5/8	2 1/2	.040
-	-	-	-	2864492	4A0R13005	2843035	TC4A0R13005	1/2	1/2	1	3	.040
2864420	4A1R13005	-	-	-	-	2842926	TC4A1R13005	1/2	1/2	2	4 1/2	.040
-	-	-	-	2864490	4A0R16006	2843030	TC4A0R16006	5/8	5/8	1 1/4	3 1/2	.040
2864419	4A1R16006	-	-	-	-	2842921	TC4A1R16006	5/8	5/8	2 1/4	5	.040
-	-	-	-	2864488	4A0R19007	2843025	TC4A0R19007	3/4	3/4	1 1/2	4	.040
2864416	4A1R19007	-	-	-	-	2842915	TC4A1R19007	3/4	3/4	2 1/4	5	.040
-	-	-	-	2864485	4A0R25008	2843020	TC4A0R25008	1	1	1 1/2	4	.040
2864412	4A1R25008	-	-	-	-	2842911	TC4A1R25008	1	1	2 1/4	5	.040

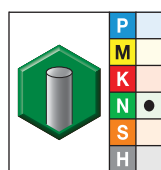
- Center cutting.
- Coarse profile.
- Standard items listed. Additional styles and coatings made-to-order.



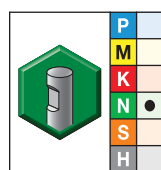
End Mill Tolerances

D1	d11	D	tolerance h6 + / -
< 1/8"	-.0008/- .0031	< 1/8"	0/.00024
1/8-7/32"	-.0012/- .0041	1/8-7/32"	0/.00031
1/4-3/8"	-.0016/- .0051	1/4-3/8"	0/.00035
13/32-11/16"	-.002/- .0063	13/32-11/16"	0/.00043
23/32-1 3/16"	-.0026/- .0077	23-32-1 3/16"	0/.00051

Series 4A0B



grade UNCOATED

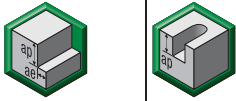


grade UNCOATED-WW

- first choice
- alternate choice

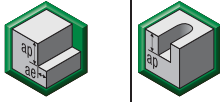
order #	catalog #	order #	catalog #	D1	D	length of cut Ap1 max	length L
3320818	4A0B07002	—	—	1/4	1/4	3/4	2 1/2
—	—	3320819	4A0B10004	3/8	3/8	7/8	2 1/2
—	—	3320820	4A0B13005	1/2	1/2	1	3
—	—	3320821	4A0B16006	5/8	5/8	1 1/4	3 1/2
—	—	3320822	4A0B19007	3/4	3/4	1 1/2	4

■ Series 4AN2 4AN3 4AP2 4AP3

Material Group																	
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B	Cutting Speed – vc SFM			D1 – Diameter										
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
N	1	1 x D	0.5 x D	1.0 x D	1640	–	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100
	2	1 x D	0.5 x D	1.0 x D	1640	–	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080
	3	1 x D	0.5 x D	1.0 x D	1640	–	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	4	1 x D	0.5 x D	1.0 x D	1310	–	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070
	5	1 x D	0.5 x D	1.0 x D	820	–	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090

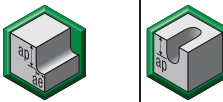
NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — For longest reach (L3) tools, reduce ap by 30%.
For cutting, aluminum with high silicon, coating is recommended.
For spindles with ceramic bearings, multiply ap by 0.5.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters > 1/2".

Application Data • Series 4B02
■ Series 4B02

Material Group																	
	For Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.										
	A		B	Cutting Speed – vc SFM			D1 – Diameter										
	ap	ae	ap	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1			
N	1	1 x D	0.5 x D	1.5 x D	1600	–	6500	IPT	.0100	.0150	.0200	.0300	.0350	.0450	.0500		
	2	1 x D	0.5 x D	1.5 x D	1600	–	4500	IPT	.0100	.0150	.0030	.0300	.0350	.0450	.0500		

NOTE: For cutting aluminum with high silicon, coating is recommended.
For spindles with ceramic bearings, multiply ap by 0.5.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters > 1/2".

Series 4A01 4A41

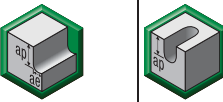
Material Group																		
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B	Cutting Speed — vc SFM			D1 — Diameter											
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
							dec.	.1250	.1880	.2500	.3130	.3750	.5000	.6250	.7500	1.000		
N	1	1 x D	0.5 x D	1 x D	1640	—	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100	
	2	1 x D	0.5 x D	1 x D	1640	—	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080	
	3	1 x D	0.5 x D	1 x D	1640	—	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070	
	4	1 x D	0.5 x D	1 x D	1310	—	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070	
	5	1 x D	0.5 x D	1 x D	820	—	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090	

NOTE: For cutting aluminum with high silicon, coating is recommended.

For spindles with ceramic bearings, multiply ap by 0.5.

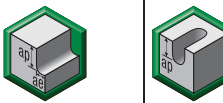
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Series 4A11

Material Group																		
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B	Cutting Speed — vc SFM			D1 — Diameter											
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
							dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.000		
N	1	1 x D	0.25 x D	0.5 x D	1640	—	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100	
	2	1 x D	0.25 x D	0.5 x D	1640	—	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080	
	3	1 x D	0.25 x D	0.5 x D	1640	—	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070	
	4	1 x D	0.25 x D	0.5 x D	1310	—	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070	
	5	1 x D	0.25 x D	0.5 x D	820	—	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090	

Application Data • Series 4AN1

Series 4AN1

Material Group																		
	Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.											
	A		B	Cutting Speed — vc SFM			D1 — Diameter											
	ap	ae	ap	min		max	frac.	1/8	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1		
							dec.	.1250	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.000		
N	1	1 x D	0.25 x D	0.5 x D	1640	—	6560	IPT	.0013	.0019	.0025	.0031	.0038	.0050	.0063	.0075	.0100	
	2	1 x D	0.25 x D	0.5 x D	1640	—	4920	IPT	.0010	.0015	.0020	.0025	.0030	.0040	.0050	.0060	.0080	
	3	1 x D	0.25 x D	0.5 x D	1640	—	4920	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070	
	4	1 x D	0.25 x D	0.5 x D	1310	—	2460	IPT	.0009	.0013	.0018	.0022	.0026	.0035	.0044	.0053	.0070	
	5	1 x D	0.25 x D	0.5 x D	820	—	3280	IPT	.0011	.0017	.0023	.0028	.0034	.0045	.0056	.0068	.0090	

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.

Slot milling applications — For longest reach (L3) tools, reduce ap by 30%.

For cutting aluminum with high silicon, coating is recommended.

For spindles with ceramic bearings, multiply ap by 0.5.

For better surface finish, reduce feed per tooth.

Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Series 4A0R

Material Group															
		Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
		A		B	Cutting Speed — vc SFM				D1 — Diameter						
		ap	ae	ap	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
N	1	1.5 x D	0.5 x D	1 x D	1640	—	6560	IPT	.0030	.0038	.0045	.0060	.0075	.0090	.0120
	2	1.5 x D	0.5 x D	1 x D	1640	—	4920	IPT	.0024	.0030	.0036	.0048	.0060	.0072	.0096
	3	1.5 x D	0.5 x D	1 x D	1640	—	4920	IPT	.0021	.0026	.0032	.0042	.0053	.0063	.0084
	4	1.5 x D	0.5 x D	1 x D	1310	—	2460	IPT	.0021	.0026	.0032	.0042	.0053	.0063	.0084
	5	1.5 x D	0.5 x D	1 x D	820	—	3280	IPT	.0027	.0034	.0041	.0054	.0068	.0081	.0108

NOTE: Side milling applications — For longest reach (L3) tools, reduce ae by 30%.
Slot milling applications — For longest reach (L3) tools, reduce ap by 30%.
For cutting aluminum with high silicon, coating is recommended.
For spindles with ceramic bearings, multiply ap by 0.5.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".

Application Data • Series 4A0B
Series 4A0B

Material Group															
		Side Milling (A) and Slotting (B)			uncoated			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.							
		A		B	Cutting Speed — vc SFM				D1 — Diameter						
		ap	ae	ap	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4	1
N	1	1.5 x D	0.5 x D	1 x D	1640	—	6560	IPT	.0028	.0034	.0041	.0055	.0069	.0083	.0110
	2	1.5 x D	0.5 x D	1 x D	1640	—	4920	IPT	.0022	.0028	.0033	.0044	.0055	.0066	.0088
	3	1.5 x D	0.5 x D	1 x D	1640	—	4920	IPT	.0019	.0024	.0029	.0039	.0048	.0058	.0077
	4	1.5 x D	0.5 x D	1 x D	1310	—	2460	IPT	.0019	.0024	.0029	.0039	.0048	.0058	.0077
	5	1.5 x D	0.5 x D	1 x D	820	—	3280	IPT	.0025	.0031	.0037	.0050	.0062	.0074	.0099

NOTE: For cutting aluminum with high silicon, coating is recommended.
For spindles with ceramic bearings, multiply ap by 0.5.
For better surface finish, reduce feed per tooth.
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters accordingly on diameters >1/2".