



2017 Master Catalog

WIDIA  TM

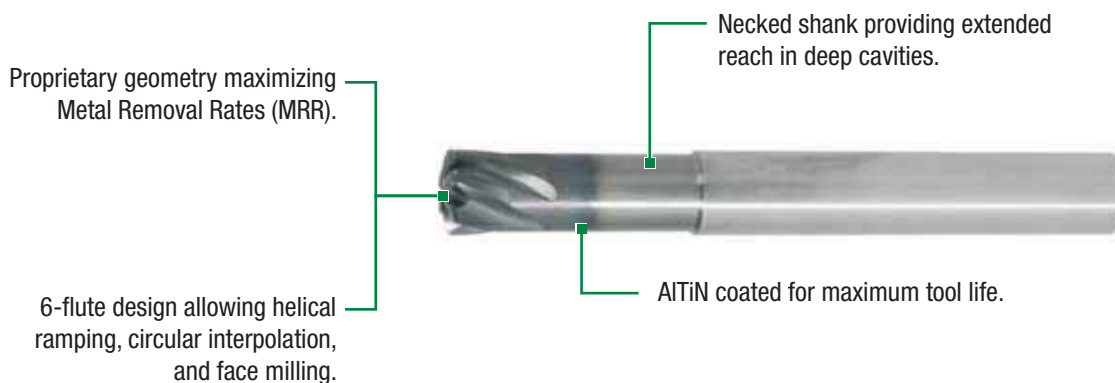
X-Feed™ End Mills for High-Feed Milling

X-Feed



X-Feed significantly reduces manufacturing time machining heat-treated steels up to 67 HRC hardness, having 50% more effective cutting edges than regular solid carbide tooling. X-Feed combines roughing and semi-finishing into one operation by taking shallow depths-of-cut at extremely high feed rates, maximizing Metal Removal Rates (MRR). X-Feed, which has a 3 x D neck and extended reach design, is perfectly suited for pocketing using 3D machining techniques such as ramping and helical interpolation. During face milling, the proprietary front-end geometry of X-Feed is entirely in contact with the workpiece, providing up to 55% engagement compared to the regular 5–10% provided by ball nose-type tooling.

- Proprietary 6-flute design for high productivity.
- One tool for roughing and semi-finishing operations.
- Covering hardened materials ranging from 37–67 HRC with two dedicated geometries.
- Custom solutions tailored for machining titanium and other high-temperature alloys available.



X-Feed™ Series

- Significantly reduces manufacturing time in machining hardened steels.
- Providing the benefits of indexable style high-feed milling starting as small as 1/4".
- Increases your capability to perform 3D machining, helical ramping, circular interpolation, face milling, and pocketing.
- One tool for roughing and semi-finishing.

7FN6 Series

- 6-flute.
- Extended neck for long-reach applications.
- Applicable for hardened steels from 40–52 HRC.



7FN7 Series

- 6-flute.
- Extended neck for long-reach applications.
- Applicable for hardened steels from 50–67 HRC.



Operation

Pocket Milling

Customer:

Die and Mold Manufacturer

Material:

AISI 4340 hardened steel (52 HRC)

Workpiece:

Mold

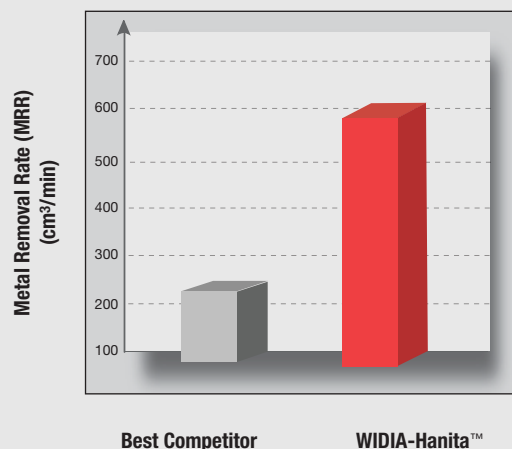
Results:

- 3x better Metal Removal Rate (MRR) than competitive tool!
- Machined at more than 3x faster feed!

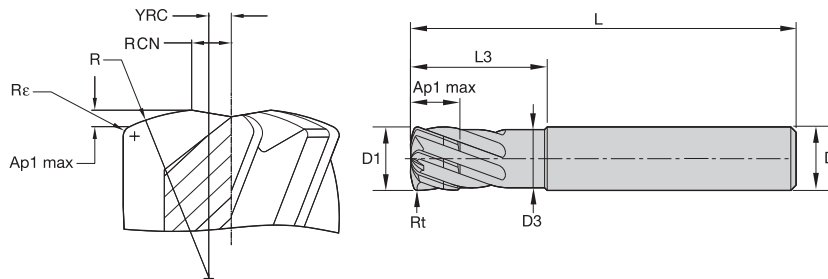
	COMPETITOR	WIDIA-Hanita™
tool:	6-flute H/P for die & mold	TM7FN613005
material:	medium-hardened steel (52 HRC)	medium-hardened steel (52 HRC)
surface speed:	400 SFM (120 m/min)	530 SFM (160 m/min)
feed per tooth:	.013" (0,34mm)	.013" (0,34mm)
depth of cut:	.031" (0,8mm)	.023" (0,6mm)
table feed:	170 in/min (4,331 mm/min)	600 in/min (15,287 mm/min)
metal removal rate:	1.4 in³ (22,8 cm³)	3.7 in³ (60,5 cm³)

Individual results may vary.

Increased Metal Removal Rate (MRR) by 191%



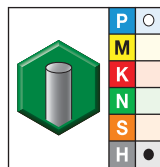
- Non-center cutting.
- High feed.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	< 1/8"	0/0.00024
		1/8–7/32"	0/0.00031
		1/4–3/8"	0/0.00035
		13/32–11/16"	0/0.00043
		23/32–1 3/16"	0/0.00051

■ Series 7FN6 • 37–52 HRC • Vision Plus X-Feed



grade AlTiN-MT1
AlTiN

- first choice
- alternate choice

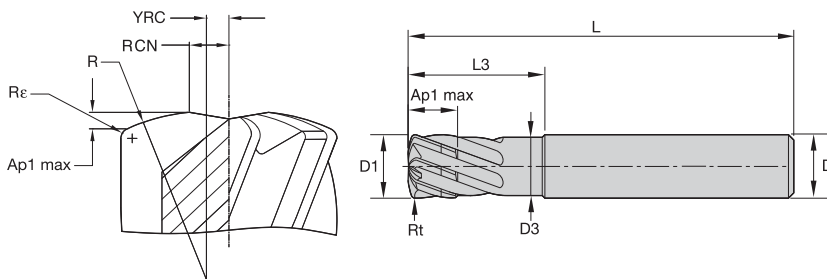
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rt
3484760	TM7FN607002	1/4	1/4	.21	.013	3/4	2 1/2	.027
3484761	TM7FN608003	5/16	5/16	.27	.017	1	3	.034
3484762	TM7FN610004	3/8	3/8	.34	.020	1 1/4	3 1/2	.040
3484763	TM7FN613005	1/2	1/2	.46	.027	1 1/2	4	.054
3484764	TM7FN616006	5/8	5/8	.59	.033	2	4 1/2	.067
3484765	TM7FN619007	3/4	3/4	.71	.040	2 1/2	5	.080

NOTE: YRC = distance from center line to the crown of the R radius.
 RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.
 R = the head radius size.
 Re = the shoulder radius or radius at the corner of the cutter.

■ Programming Data

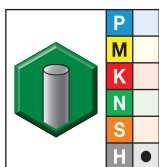
Tool List 7FN6															
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation						
									Circular Interpolation		Linear Interpolation				
									Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle				
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number			Ramp Angle (degree)				
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	flutes	Smallest	Largest	1	2	3	4	5
1/4	0.0133	1/4	0.0269	0.0160	0.0133	0.0313	0.0525	6	0.355	0.5	0.76	0.38	0.25	0.19	0.15
5/16	0.0166	5/16	0.0336	0.0200	0.0166	0.0391	0.0656	6	0.44375	0.625	0.95	0.48	0.32	0.24	0.19
3/8	0.0200	3/8	0.0399	0.0235	0.0200	0.0469	0.0788	6	0.5325	0.75	1.14	0.57	0.38	0.29	0.23
1/2	0.0266	1/2	0.0538	0.0320	0.0266	0.0625	0.1050	6	0.71	1	1.52	0.76	0.51	0.38	0.30
5/8	0.0333	5/8	0.0672	0.0400	0.0333	0.0781	0.1313	6	0.8875	1.25	1.91	0.95	0.63	0.48	0.38
3/4	0.0399	3/4	0.0798	0.0470	0.0399	0.0938	0.1575	6	1.065	1.5	2.29	1.14	0.76	0.57	0.46
1	0.0532	1	0.1059	0.0620	0.0532	0.1250	0.2100	6	1.42	2	3.05	1.52	1.02	0.76	0.61
Recommended Feed											100%	70%	50%	30%	10%

- Non-center cutting.
- High feed.
- Standard items listed. Additional styles and coatings made-to-order.


End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+0.000/-0.002	< 1/8"	0/0.00024
		1/8-7/32"	0/0.00031
		1/4-3/8"	0/0.00035
		13/32-11/16"	0/0.00043
		23/32-1 3/16"	0/0.00051

■ Series 7FN7 • >52 HRC • Vision Plus X-Feed



grade AlTiN-MT1
AlTiN

● first choice

○ alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rt
3484767	TM7FN707002	1/4	1/4	.21	.008	3/4	2 1/2	.024
3484768	TM7FN708003	5/16	5/16	.27	.010	1	3	.030
3484769	TM7FN710004	3/8	3/8	.34	.012	1 1/4	3 1/2	.036
3484770	TM7FN713005	1/2	1/2	.46	.016	1 1/2	4	.048
3484771	TM7FN716006	5/8	5/8	.59	.021	2	4 1/2	.061
3484772	TM7FN719007	3/4	3/4	.71	.025	2 1/2	5	.072

NOTE: YRC = distance from center line to the crown of the R radius.

RCN = distance from center line to the start of the cutting edge. This dimension can also help determine the minimum circle size when helical ramping.

R = the head radius size.

Re = the shoulder radius or radius at the corner of the cutter.

■ Programming Data

Tool List 7FN7															
Geometrical Parameters									Ramping Guide for Circular and Linear Interpolation						
									Circular Interpolation		Linear Interpolation				
									Allowed Range of Hole Diameter		Calculated Length (mm) per Ramp Angle				
											Ramp Angle (degree)				
diameter	Ap1 max	Rfm	Rt	Rc	Xfm	Yfm	YD	Number	Smallest	Largest	1	2	3	4	5
[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	[inch]	flutes							
1/4	.0082	3/8	.0242	.0160	.0082	.0313	.0550	6	0.36	0.5	0.47	0.24	0.16	0.12	0.09
5/16	.0103	1/2	.0303	.0200	.0103	.0391	.0688	6	0.45	0.625	0.59	0.29	0.20	0.15	0.12
3/8	.0123	9/16	.0358	.0240	.0123	.0469	.0825	6	0.54	0.75	0.71	0.35	0.24	0.18	0.14
1/2	.0164	3/4	.0484	.0320	.0164	.0625	.1100	6	0.72	1	0.94	0.47	0.31	0.23	0.19
5/8	.0205	15/16	.0605	.0400	.0205	.0781	.1375	6	0.9	1.25	1.18	0.59	0.39	0.29	0.23
3/4	.0246	1 1/8	.0716	.0470	.0246	.0938	.1650	6	1.08	1.5	1.41	0.71	0.47	0.35	0.28
1	.0328	1 1/2	.0948	.0620	.0328	.1250	.2200	6	1.44	2	1.88	0.94	0.63	0.47	0.38
Recommended Feed											100%	70%	50%	30%	10%

■ Series 7FN6 • Vision Plus X-Feed

Material Group													
		Profile Milling		AlTiN			Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A)						
		A		Cutting Speed — vc SFM			D1 — Diameter						
		ap	ae	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4
							dec.	.2500	.3130	.3750	.5000	.6250	.7500
P	4	0.05 x D	0.55 x D	528	—	594	IPT	.0130	.0160	.0190	.0250	.0260	.0280
H	1	0.05 x D	0.55 x D	462	—	528	IPT	.0130	.0160	.0190	.0250	.0260	.0280
	2	0.05 x D	0.55 x D	330	—	396	IPT	.0080	.0090	.0110	.0150	.0190	.0230

■ Series 7FN7 • Vision Plus X-Feed

Material Group													
		Profile Milling		AlTiN			Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A)						
		A		Cutting Speed – vc SFM				D1 – Diameter					
		ap	ae	min		max	frac.	1/4	5/16	3/8	1/2	5/8	3/4
H	2	0.03 x D	0.55 x D	330	–	396	IPT	.0080	.0090	.0110	.0150	.0190	.0230
	3	0.03 x D	0.55 x D	265	–	330	IPT	.0080	.0090	.0110	.0150	.0190	.0230
	4	0.03 x D	0.55 x D	165	–	230	IPT	.0060	.0080	.0090	.0130	.0160	.0190

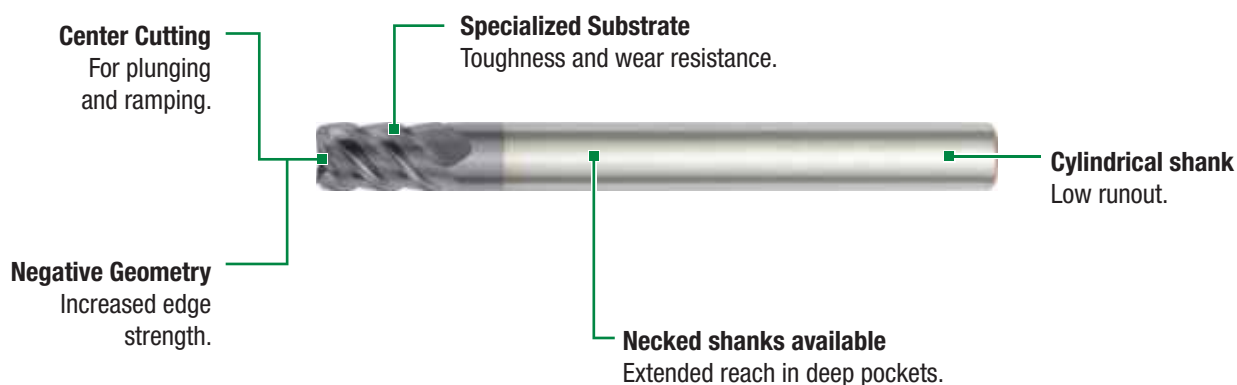
High-Performance Solid Carbide End Mills •
Vision Plus™

Vision Plus



Engineered to machine hardened steels up to 67 HRC at extreme speeds and feeds, Vision Plus solid carbide end mills are designed with a special substrate and geometries to extend tool life and lower manufacturing costs. Vision Plus end mills offer a complete portfolio for the die and mold industry or any application that requires machining of hardened workpiece materials. Vision Plus end mills will make your next application in hardened materials more productive and efficient.

- Capable of machining hardened steels up to 67 HRC.
- Complete line of Vision Plus micro end mills.
- Unique design allows higher feeds and speeds, increasing Metal Removal Rates (MRR).
- Wide range of diameters from 0.012–1" (0,3–25mm).
- AlTiN coating for maximum wear resistance.



Vision Plus™ Series

- Machine hardened materials up to 67 HRC.
- Long overall length for deep-reach applications.
- Reinforced core for better rigidity.
- High helix for better surface finishes.

7N02 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Extended neck for long-reach applications.
- JIS.
- Sharp corner.
- 0,3–3,1mm diameter range.



423034 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- 0,5–3mm diameter range.



7N01 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- JIS.
- 0,3–6mm diameter range.



7N21 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 0,5–3mm diameter range.



7S05 Series

- Center cutting.
- 4-, 5-, and 6-flutes.
- 50° helix.
- Sharp corner.
- 1/4–1" diameter range.



7S5F Series

- Center cutting.
- 4-flute.
- 15° helix.
- Ball nose.
- 1/8–3/4" diameter range.



7S7R Series

- Center cutting.
- 3-, 4-, and 6-flutes.
- 45° helix.
- Roughing end mill.
- Works in multiple materials.
- 5/32–1" diameter range.



75N2 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Radii corner.
- Extended neck for long-reach applications.
- 3–12mm diameter range.



422875 Series

- Center cutting.
- 2-flute.
- 20° helix.
- Extended neck for long-reach applications.
- Torus corner.
- 2–12mm diameter range.



7151 Series

- Center cutting.
- 2-flute.
- 15° helix.
- Ball nose.
- 1–20mm diameter range.



7061 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 1–12mm diameter range.



70N1 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 1–12mm diameter range.



422869 Series

- Center cutting.
- 2-flute.
- 30° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 1–16mm diameter range.



422870 Series

- Center cutting.
- 2-flute.
- 20° helix.
- Ball nose.
- Extended neck for long-reach applications.
- 2–12mm diameter range.

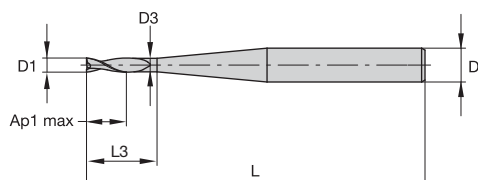


422873 Series

- Center cutting.
- 2-flute.
- 0° helix.
- Extended neck for long-reach applications.
- 3–10mm diameter range.



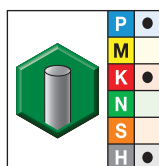
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



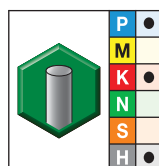
End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

Series 7N02 7N12 7N22 • Vision Plus Micro



grade AlTiN-MJ1
AlTiN



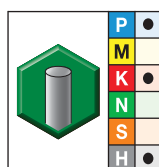
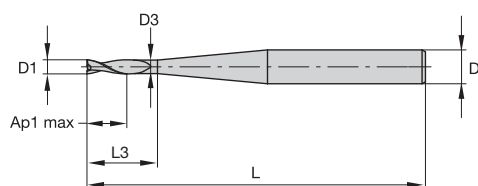
grade TiAlN-RJ1
TiAlN

- first choice
- alternate choice

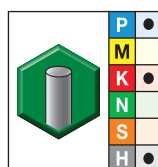
order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321518	7N0200302MJ	2256390	7N0200302RJ	0,3	6	0,84	0,40	0,40	50
3321529	7N2200400MJ	2256438	7N2200400RJ	0,4	3	0,34	0,60	2,00	38
3321530	7N2200410MJ	2256439	7N2200410RJ	0,4	3	0,34	0,60	4,00	38
—	—	2256391	7N0200402RJ	0,4	6	0,84	0,60	0,60	50
3089244	7N0200402MJ	—	—	0,4	6	—	0,60	0,60	50
3321531	7N2200500MJ	2256440	7N2200500RJ	0,5	3	0,44	0,70	2,00	38
3321532	7N2200510MJ	2256441	7N2200510RJ	0,5	3	0,44	0,70	4,00	38
3321533	7N2200520MJ	2256442	7N2200520RJ	0,5	3	0,44	0,70	6,00	38
3321519	7N0200502MJ	2256392	7N0200502RJ	0,5	6	0,44	0,70	1,50	50
3089248	7N1200502MJ	2256403	7N1200502RJ	0,5	6	0,44	0,70	2,50	60
3321534	7N2200600MJ	2256443	7N2200600RJ	0,6	3	0,54	0,90	2,00	38
3321535	7N2200610MJ	2256444	7N2200610RJ	0,6	3	0,54	0,90	4,00	38
3321536	7N2200620MJ	2256445	7N2200620RJ	0,6	3	0,54	0,90	6,00	38
3321520	7N0200602MJ	2256393	7N0200602RJ	0,6	6	0,54	0,90	1,80	50
3089249	7N1200602MJ	2256404	7N1200602RJ	0,6	6	0,54	0,90	3,00	60
3321537	7N2200701MJ	2256446	7N2200701RJ	0,7	4	0,64	1,00	2,00	50
3321538	7N2200711MJ	2256447	7N2200711RJ	0,7	4	0,64	1,00	4,00	50
3321539	7N2200721MJ	2256448	7N2200721RJ	0,7	4	0,64	1,00	6,00	50
3321540	7N2200801MJ	2256449	7N2200801RJ	0,8	4	0,74	1,20	4,00	50
3321541	7N2200811MJ	2256450	7N2200811RJ	0,8	4	0,74	1,20	6,00	50

(continued)

(Series 7N02 7N12 7N22 • Vision Plus Micro — continued)



grade AlTiN-MJ1
AlTiN



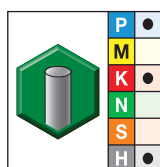
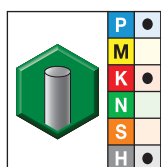
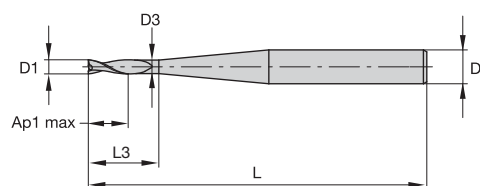
grade TiAlN-RJ1
TiAlN

● first choice
○ alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321542	7N2200821MJ	2256451	7N2200821RJ	0,8	4	0,74	1,20	8,00	50
3321521	7N0200802MJ	2256394	7N0200802RJ	0,8	6	0,74	1,20	2,40	50
3089250	7N1200802MJ	2256405	7N1200802RJ	0,8	6	0,74	1,20	4,00	60
3321543	7N2200901MJ	2256452	7N2200901RJ	0,9	4	0,84	1,35	6,00	50
3321544	7N2200911MJ	2256453	7N2200911RJ	0,9	4	0,84	1,35	8,00	50
3321545	7N2200921MJ	2256454	7N2200921RJ	0,9	4	0,84	1,35	10,00	50
3321546	7N2201001MJ	2256455	7N2201001RJ	1,0	4	0,94	1,50	6,00	50
3321547	7N2201011MJ	2256456	7N2201011RJ	1,0	4	0,94	1,50	8,00	50
3321548	7N2201021MJ	2256457	7N2201021RJ	1,0	4	0,94	1,50	10,00	50
3321549	7N2201031MJ	2256458	7N2201031RJ	1,0	4	0,94	1,50	12,00	50
3089245	7N0201002MJ	2256395	7N0201002RJ	1,0	6	0,94	1,50	2,50	50
3089251	7N1201002MJ	2256406	7N1201002RJ	1,0	6	0,94	1,50	5,00	60
3321550	7N2201201MJ	2256459	7N2201201RJ	1,2	4	1,14	1,50	6,00	50
3321551	7N2201211MJ	2256460	7N2201211RJ	1,2	4	1,14	1,80	8,00	50
3321552	7N2201221MJ	2256461	7N2201221RJ	1,2	4	1,14	1,80	10,00	50
3321553	7N2201231MJ	2256462	7N2201231RJ	1,2	4	1,14	1,80	12,00	50
3321522	7N0201202MJ	2256396	7N0201202RJ	1,2	6	1,14	1,80	3,00	50
3089252	7N1201202MJ	2256407	7N1201202RJ	1,2	6	1,14	1,80	6,00	60
3321554	7N2201401MJ	2256463	7N2201401RJ	1,4	4	1,34	2,10	6,00	50
3321555	7N2201411MJ	2256464	7N2201411RJ	1,4	4	1,34	2,10	8,00	50
3321556	7N2201421MJ	—	—	1,4	4	1,34	2,10	10,00	50
3321557	7N2201431MJ	2256466	7N2201431RJ	1,4	4	1,34	2,10	12,00	50
3321558	7N2201441MJ	2256467	7N2201441RJ	1,4	4	1,34	2,10	16,00	50
—	—	2256465	7N2201421RJ	1,4	4	1,35	2,10	10,00	50
3089246	7N0201402MJ	2256397	7N0201402RJ	1,4	6	1,34	2,10	3,50	50
3321527	7N1201402MJ	2256408	7N1201402RJ	1,4	6	1,34	2,10	7,00	60
—	—	3454427	7N2201561RJ	1,5	4	1,44	2,30	5,70	50
3321559	7N2201501MJ	2256468	7N2201501RJ	1,5	4	1,44	2,30	6,00	50
3321560	7N2201511MJ	2256469	7N2201511RJ	1,5	4	1,44	2,30	10,00	50
3321561	7N2201521MJ	2256470	7N2201521RJ	1,5	4	1,44	2,30	12,00	50
3321562	7N2201531MJ	2256471	7N2201531RJ	1,5	4	1,44	2,30	16,00	50
3321563	7N2201541MJ	2256472	7N2201541RJ	1,5	4	1,44	2,30	18,00	63

(continued)

(Series 7N02 7N12 7N22 • Vision Plus Micro — continued)



- first choice
- alternate choice

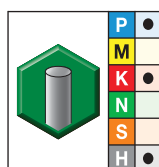
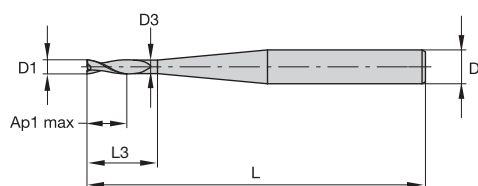
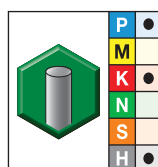
grade AlTiN-MJ1
AlTiN

grade TiAlN-RJ1
TiAlN

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321564	7N2201551MJ	2256473	7N2201551RJ	1,5	4	1,44	2,30	20,00	63
3321523	7N0201502MJ	2256398	7N0201502RJ	1,5	6	1,44	2,30	3,80	50
3089253	7N1201502MJ	2256409	7N1201502RJ	1,5	6	1,44	2,30	7,50	60
3321566	7N2201611MJ	2256475	7N2201611RJ	1,6	4	1,54	2,40	10,00	50
3321567	7N2201621MJ	2256476	7N2201621RJ	1,6	4	1,54	2,40	12,00	50
3321568	7N2201631MJ	2256477	7N2201631RJ	1,6	4	1,54	2,40	16,00	50
3321569	7N2201641MJ	2256478	7N2201641RJ	1,6	4	1,54	2,40	20,00	63
—	—	3454428	7N2201571RJ	1,6	4	1,54	2,80	11,70	50
3321565	7N2201601MJ	2256474	7N2201601RJ	1,6	4	1,57	2,40	6,00	50
3321524	7N0201602MJ	2256399	7N0201602RJ	1,6	6	1,54	2,40	4,00	50
3321528	7N1201602MJ	2256410	7N1201602RJ	1,6	6	1,54	2,40	8,00	60
3321570	7N2201701MJ	2256479	7N2201701RJ	1,7	4	1,64	2,60	6,00	50
3321571	7N2201711MJ	2256480	7N2201711RJ	1,7	4	1,64	2,60	10,00	50
3321572	7N2201721MJ	2256481	7N2201721RJ	1,7	4	1,64	2,60	12,00	50
3321573	7N2201731MJ	2256482	7N2201731RJ	1,7	4	1,64	2,60	16,00	50
3321574	7N2201741MJ	2256483	7N2201741RJ	1,7	4	1,64	2,60	20,00	63
3321575	7N2201801MJ	2256484	7N2201801RJ	1,8	4	1,74	2,70	6,00	50
3321576	7N2201811MJ	2256485	7N2201811RJ	1,8	4	1,74	2,70	10,00	50
3321577	7N2201821MJ	2256486	7N2201821RJ	1,8	4	1,74	2,70	12,00	50
3321578	7N2201831MJ	2256487	7N2201831RJ	1,8	4	1,74	2,70	16,00	50
3321579	7N2201841MJ	2256488	7N2201841RJ	1,8	4	1,74	2,70	20,00	63
3321525	7N0201802MJ	2256400	7N0201802RJ	1,8	6	1,74	2,70	4,50	50
3089254	7N1201802MJ	2256411	7N1201802RJ	1,8	6	1,74	2,70	9,00	60
3321580	7N2201901MJ	2256489	7N2201901RJ	1,9	4	1,84	2,80	6,00	50
3321581	7N2201911MJ	2256490	7N2201911RJ	1,9	4	1,84	2,80	10,00	50
3321582	7N2201921MJ	2256491	7N2201921RJ	1,9	4	1,84	2,80	12,00	50
3321583	7N2201931MJ	2256492	7N2201931RJ	1,9	4	1,84	2,80	16,00	50
3321584	7N2201941MJ	2256493	7N2201941RJ	1,9	4	1,84	2,80	20,00	63
3321585	7N2202001MJ	2256494	7N2202001RJ	2,0	4	1,96	3,00	6,00	50
3321586	7N2202011MJ	2256495	7N2202011RJ	2,0	4	1,96	3,00	10,00	50
3321587	7N2202021MJ	2256496	7N2202021RJ	2,0	4	1,96	3,00	16,00	50
3321588	7N2202031MJ	2256497	7N2202031RJ	2,0	4	1,96	3,00	20,00	63

(continued)

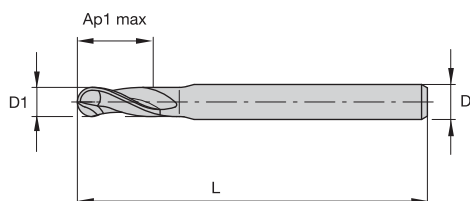
(Series 7N02 7N12 7N22 • Vision Plus Micro — continued)


 grade AlTiN-MJ1
AlTiN

 grade TiAlN-RJ1
TiAlN

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321589	7N2202041MJ	2256498	7N2202041RJ	2,0	4	1,96	3,00	20,00	75
3089247	7N0202002MJ	2256401	7N0202002RJ	2,0	6	1,96	3,00	5,00	50
3089255	7N1202002MJ	2256412	7N1202002RJ	2,0	6	1,96	3,00	10,00	60
—	—	3454429	7N2202051RJ	2,1	4	2,00	3,00	8,00	50
—	—	3454430	7N2202061RJ	2,1	4	2,00	3,00	12,00	50
—	—	3454431	7N2202071RJ	2,1	4	2,00	3,00	14,00	50
—	—	3454432	7N2202091RJ	2,1	4	2,00	3,00	25,00	63
3321590	7N2202501MJ	2256499	7N2202501RJ	2,5	4	2,40	3,70	8,00	50
3321591	7N2202511MJ	2256500	7N2202511RJ	2,5	4	2,40	3,70	10,00	50
3321592	7N2202521MJ	2256501	7N2202521RJ	2,5	4	2,44	3,70	16,00	63
3321593	7N2202531MJ	2256502	7N2202531RJ	2,5	4	2,44	3,70	20,00	63
3321594	7N2202541MJ	2256503	7N2202541RJ	2,5	4	2,44	3,70	30,00	80
3321526	7N0202502MJ	2256402	7N0202502RJ	2,5	6	2,44	3,70	5,00	50
3089256	7N1202502MJ	2256413	7N1202502RJ	2,5	6	2,44	3,70	12,50	60
3321595	7N2203002MJ	2256504	7N2203002RJ	3,0	6	2,94	4,50	8,00	50
3321596	7N2203012MJ	2256505	7N2203012RJ	3,0	6	2,94	4,50	10,00	50
3321597	7N2203022MJ	2256506	7N2203022RJ	3,0	6	2,94	4,50	16,00	63
3321598	7N2203032MJ	2256507	7N2203032RJ	3,0	6	2,94	4,50	20,00	63
3321599	7N2203042MJ	2256508	7N2203042RJ	3,0	6	2,94	4,50	20,00	80
—	—	3454433	7N2203052RJ	3,1	6	3,00	4,50	12,00	50
—	—	3454434	7N2203062RJ	3,1	6	3,00	4,50	25,00	76

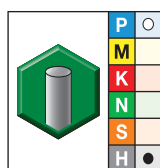
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

Series 423034 • Vision Plus Micro

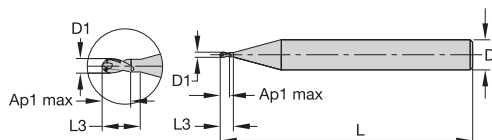


- first choice
- alternate choice

grade K10UF-DCHP
AlTiN

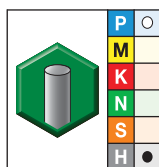
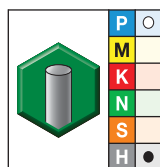
order #	catalog #	D1	D	length of cut Ap1 max	length L
2343490	423034-000005	0,5	3	1,50	38
2343492	423034-000006	0,6	3	1,60	38
2343494	423034-000008	0,8	3	1,80	38
2343496	423034-000010	1,0	3	2,00	38
2343498	423034-000012	1,2	3	2,20	38
2343500	423034-000015	1,5	3	2,50	38
2343502	423034-000020	2,0	3	3,00	38
2343504	423034-000025	2,5	3	4,00	38
2343506	423034-000030	3,0	3	5,00	38

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


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

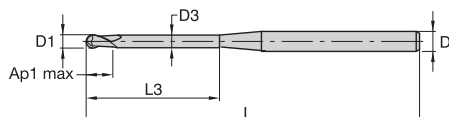
■ Series 7N01 • Vision Plus Micro


**grade AlTiN-MJ1
AlTiN**

**grade TiAlN-RJ1
TiAlN**

- first choice
- alternate choice

order #	catalog #	order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3321510	7N0100302MJ	2256358	7N0100302RJ	0,3	6	—	0,30	0,30	50
3321511	7N0100402MJ	2256359	7N0100402RJ	0,4	6	—	0,40	0,40	50
3089237	7N0100502MJ	2256360	7N0100502RJ	0,5	6	0,45	0,50	1,50	50
3089238	7N0100602MJ	2256361	7N0100602RJ	0,6	6	0,55	0,60	1,80	50
3321512	7N0100802MJ	2256362	7N0100802RJ	0,8	6	0,75	0,80	2,40	50
3321513	7N0101002MJ	2256363	7N0101002RJ	1,0	6	0,95	2,50	2,50	50
3089239	7N0101202MJ	2256364	7N0101202RJ	1,2	6	1,15	1,20	3,00	50
3089240	7N0101402MJ	2256365	7N0101402RJ	1,4	6	1,35	1,40	3,50	50
3321514	7N0101502MJ	2256366	7N0101502RJ	1,5	6	1,45	1,50	3,80	50
3089241	7N0101602MJ	2256367	7N0101602RJ	1,6	6	1,55	1,60	4,00	50
3089242	7N0101802MJ	2256368	7N0101802RJ	1,8	6	1,75	1,80	4,50	50
3321515	7N0102002MJ	2256369	7N0102002RJ	2,0	6	1,95	2,00	5,00	50
3321516	7N0102502MJ	2256370	7N0102502RJ	2,5	6	2,40	2,50	5,00	50
3321517	7N0103002MJ	2256371	7N0103002RJ	3,0	6	2,85	3,00	6,00	50
3089243	7N0104002MJ	2256372	7N0104002RJ	4,0	6	3,85	4,00	6,00	50
3091240	7N0106002MJ	2256373	7N0106002RJ	6,0	6	5,85	6,00	9,00	50

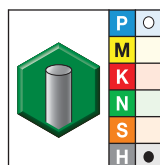
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

Series 7N21 • Vision Plus Micro



grade TiAlN-RT1
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
3665122	7N2100501RT	0,5	4	0,44	1,00	5,00	63
3665140	7N2100601RT	0,6	4	0,54	1,00	6,00	63
3665141	7N2100801RT	0,8	4	0,74	1,30	8,00	63
3665142	7N2101001RT	1,0	4	0,94	1,60	10,00	63
3665163	7N2101201RT	1,2	4	1,14	1,90	12,00	63
3665164	7N2101501RT	1,5	4	1,44	2,40	16,00	63
3665166	7N2102001RT	2,0	4	1,94	3,20	20,00	63
3665167	7N2102501RT	2,5	4	2,44	3,80	25,00	63
3665168	7N2103001RT	3,0	4	2,90	4,50	30,00	63

■ Series 7N02 7N12 7N22 • Vision Plus Micro

Material Group																		
		Side Milling (A) and Slotting (B)			AlTiN			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	mm	0.3	0.4	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	0	1.25 x D	0.25 x D	0.75 x D	492	–	656	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	1	1.25 x D	0.25 x D	0.75 x D	492	–	656	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	2	1.25 x D	0.25 x D	0.75 x D	459	–	623	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	3	1.25 x D	0.25 x D	0.75 x D	394	–	525	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0006	.0007
	4	1.25 x D	0.25 x D	0.5 x D	295	–	492	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006
	5	1.25 x D	0.25 x D	0.5 x D	197	–	328	IPT	.0001	.0001	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
K	1	1.25 x D	0.25 x D	0.75 x D	394	–	492	IPT	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0007	.0008
	2	1.25 x D	0.25 x D	0.5 x D	361	–	459	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0006	.0007
H	1	1.25 x D	0.25 x D	0.5 x D	262	–	459	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005	.0006
	2	1.25 x D	0.25 x D	0.3 x D	230	–	394	IPT	.0000	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004	.0005
	3	1.25 x D	0.25 x D	0.25 x D	197	–	295	IPT	.0000	.0000	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
 Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
 For tools with reach > 3 x D, reduce fz by 20%.
 For tools with reach > 5 x D, reduce fz by 30%.

■ Series 423034 • Vision Plus Micro

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Finishing								
				AITiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.04 x D	0.04 x D	1210	–	1613	IPT	.0005	.0006	.0008	.0010	.0015	.0020	.0025	.0031
	4	0.04 x D	0.04 x D	907	–	1512	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
H	1	0.03 x D	0.03 x D	806	–	1411	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
	2	0.03 x D	0.03 x D	706	–	1210	IPT	.0003	.0004	.0006	.0007	.0010	.0014	.0018	.0021
	3	0.02 x D	0.02 x D	605	–	907	IPT	.0003	.0003	.0004	.0005	.0008	.0011	.0014	.0017
	4	0.02 x D	0.02 x D	504	–	706	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Semi-Finishing								
				AITiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.1 x D	0.05 x D	840	—	1120	IPT	.0003	.0004	.0005	.0007	.0010	.0013	.0017	.0020
	4	0.1 x D	0.05 x D	630	—	1050	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
H	1	0.07 x D	0.1 x D	560	—	980	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
	2	0.05 x D	0.04 x D	490	—	840	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0012	.0014
	3	0.03 x D	0.03 x D	420	—	630	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011
	4	0.03 x D	0.03 x D	350	—	490	IPT	.0001	.0001	.0002	.0002	.0004	.0005	.0006	.0007

Material Group															
	Profile Milling		K10UF-DCHP				Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) – Roughing								
			AITiN												
	A		Cutting Speed – vc SFM					D1 – Diameter							
	ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.2 x D	0.1 x D	605	–	806	IPT	.0002	.0002	.0003	.0003	.0005	.0007	.0008	.0010
	4	0.2 x D	0.1 x D	454	–	756	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
H	1	0.15 x D	0.1 x D	403	–	706	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
	2	0.1 x D	0.075 x D	353	–	605	IPT	.0001	.0001	.0002	.0002	.0003	.0005	.0006	.0007
	3	0.05 x D	0.05 x D	302	–	454	IPT	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
	4	0.05 x D	0.05 x D	252	–	353	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Please use reference table for correction of vc based on average degree of the mold. See page M159.

■ Series 7N01 • Vision Plus Micro

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Finishing								
				AlTiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.04 x D	0.04 x D	1210	—	1613	IPT	.0005	.0006	.0008	.0010	.0015	.0020	.0025	.0031
	4	0.04 x D	0.04 x D	907	—	1512	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
H	1	0.03 x D	0.03 x D	806	—	1411	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
	2	0.03 x D	0.03 x D	706	—	1210	IPT	.0003	.0004	.0006	.0007	.0010	.0014	.0018	.0021
	3	0.02 x D	0.02 x D	605	—	907	IPT	.0003	.0003	.0004	.0005	.0008	.0011	.0014	.0017
	4	0.02 x D	0.02 x D	504	—	706	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011

Material Group																
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Semi-Finishing									
				AITiN												
		A		Cutting Speed — vc SFM				D1 — Diameter								
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0	
P	3	0.1 x D	0.05 x D	840	–	1120	IPT	.0003	.0004	.0005	.0007	.0010	.0013	.0017	.0020	
	4	0.1 x D	0.05 x D	630	–	1050	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019	
H	1	0.07 x D	0.1 x D	560	–	980	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019	
	2	0.05 x D	0.04 x D	490	–	840	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0012	.0014	
	3	0.03 x D	0.03 x D	420	–	630	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011	
	4	0.03 x D	0.03 x D	350	–	490	IPT	.0001	.0001	.0002	.0002	.0004	.0005	.0006	.0007	

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Roughing								
				AlTiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.2 x D	0.1 x D	605	–	806	IPT	.0002	.0002	.0003	.0003	.0005	.0007	.0008	.0010
	4	0.2 x D	0.1 x D	454	–	756	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
H	1	0.15 x D	0.1 x D	403	–	706	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
	2	0.1 x D	0.075 x D	353	–	605	IPT	.0001	.0001	.0002	.0002	.0003	.0005	.0006	.0007
	3	0.05 x D	0.05 x D	302	–	454	IPT	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
	4	0.05 x D	0.05 x D	252	–	353	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Please use reference table for correction of vc based on average degree of the mold. See page M159.

Series 7N21 • Vision Plus Micro

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Finishing								
				AlTiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.04 x D	0.04 x D	1210	–	1613	IPT	.0005	.0006	.0008	.0010	.0015	.0020	.0025	.0031
	4	0.04 x D	0.04 x D	907	–	1512	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
H	1	0.03 x D	0.03 x D	806	–	1411	IPT	.0005	.0005	.0007	.0009	.0014	.0019	.0023	.0028
	2	0.03 x D	0.03 x D	706	–	1210	IPT	.0003	.0004	.0006	.0007	.0010	.0014	.0018	.0021
	3	0.02 x D	0.02 x D	605	–	907	IPT	.0003	.0003	.0004	.0005	.0008	.0011	.0014	.0017
	4	0.02 x D	0.02 x D	504	–	706	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Semi-Finishing								
				AlTiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.1 x D	0.05 x D	840	—	1120	IPT	.0003	.0004	.0005	.0007	.0010	.0013	.0017	.0020
	4	0.1 x D	0.05 x D	630	—	1050	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
H	1	0.07 x D	0.1 x D	560	—	980	IPT	.0003	.0004	.0005	.0006	.0009	.0012	.0016	.0019
	2	0.05 x D	0.04 x D	490	—	840	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0012	.0014
	3	0.03 x D	0.03 x D	420	—	630	IPT	.0002	.0002	.0003	.0004	.0006	.0007	.0009	.0011
	4	0.03 x D	0.03 x D	350	—	490	IPT	.0001	.0001	.0002	.0002	.0004	.0005	.0006	.0007

Material Group															
		Profile Milling		K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Roughing								
				AlTiN											
		A		Cutting Speed — vc SFM				D1 — Diameter							
		ap	ae	min		max	mm	0.5	0.6	0.8	1.0	1.5	2.0	2.5	3.0
P	3	0.2 x D	0.1 x D	605	–	806	IPT	.0002	.0002	.0003	.0003	.0005	.0007	.0008	.0010
	4	0.2 x D	0.1 x D	454	–	756	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
H	1	0.15 x D	0.1 x D	403	–	706	IPT	.0002	.0002	.0002	.0003	.0005	.0006	.0008	.0009
	2	0.1 x D	0.075 x D	353	–	605	IPT	.0001	.0001	.0002	.0002	.0003	.0005	.0006	.0007
	3	0.05 x D	0.05 x D	302	–	454	IPT	.0001	.0001	.0001	.0002	.0003	.0004	.0005	.0006
	4	0.05 x D	0.05 x D	252	–	353	IPT	.0001	.0001	.0001	.0001	.0002	.0002	.0003	.0004

NOTE: Please use reference table for correction of vc based on average degree of the mold. See page M159.

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EXTREME **RESULTS.**

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WIDIA-Hanita™ provides exceptional application and design engineering services. Whether you need tools produced according to a blueprint, a finished part, or a drawing, assistance in process development, or expertise in optimizing an application, our world-renowned Advanced Engineering Team is available. Our engineering departments are fully integrated with specialized production cells located in our focused factories throughout the world. ISO-Certified manufacturing facilities, with state-of-the-art CNC equipment, simulation capabilities, CAD/CAM production, and inspection processes, ensure that customers receive the highest-quality product with accurate compliance to specifications and repeatability for future production.

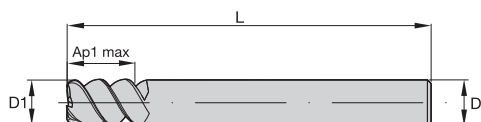
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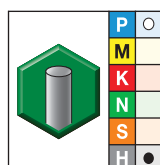
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance	D	tolerance h6 + / -
All	+.000/-0.002	≤ 1/8"	0/0.00024
		> 1/8-1/4"	0/0.00031
		> 1/4-3/8"	0/0.00035
		> 3/8-23/32"	0/0.00043
		> 23/32-1 3/16"	0/0.00051

■ Series 7S05 • Series 7S05 7S15 7S25 • Vision Plus

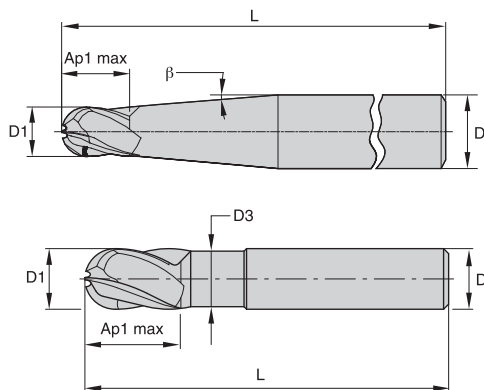


grade AlTiN-MT1
AlTiN

- first choice
- alternate choice

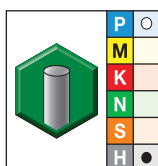
order #	catalog #	D1	D	length of cut Ap1 max	length L	ZU
3083618	TM7S0507002	1/4	1/4	3/8	3	4
3321600	TM7S1507002	1/4	1/4	5/8	3	4
3060845	TM7S2507002	1/4	1/4	7/8	3	4
3043480	TM7S0508000	5/16	5/16	1/2	4	4
3054914	TM7S1508000	5/16	5/16	3/4	4	4
3082394	TM7S2508000	5/16	5/16	1 1/8	4	4
3100520	TM7S0510004	3/8	3/8	9/16	4	4
3048589	TM7S1510004	3/8	3/8	15/16	4	5
3054915	TM7S2510004	3/8	3/8	1 5/16	4	5
3047518	TM7S0513005	1/2	1/2	3/4	5	4
3084183	TM7S1513005	1/2	1/2	1 1/4	5	6
3081614	TM7S2513005	1/2	1/2	1 3/4	5	6
3044788	TM7S0516006	5/8	5/8	1 5/16	5	4
3063997	TM7S1516006	5/8	5/8	1 9/16	5	6
3050197	TM7S2516006	5/8	5/8	2 3/16	5	6
3119082	TM7S0519007	3/4	3/4	1 1/8	6	4
3091702	TM7S1519007	3/4	3/4	1 7/8	6	6
3321602	TM7S2519007	3/4	3/4	2 5/8	6	6
3125355	TM7S0525008	1	1	1 1/2	6	5
3321601	TM7S1525008	1	1	2 1/2	6	6
3104294	TM7S2525008	1	1	3 1/2	6	6

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


End Mill Tolerances

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

■ Series 7S5F • Vision Plus

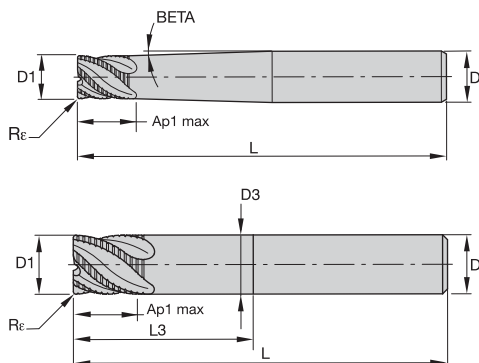
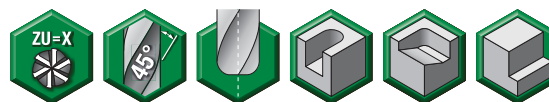


grade AlTiN-MT1
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	BETA
3047519	TM7S5F03002	1/8	1/4	—	1/8	1/8	3	2.5
3040874	TM7S5F04002	5/32	1/4	—	5/32	5/32	3	2.5
3062915	TM7S5F05002	3/16	1/4	—	3/16	3/16	3	2.5
3058580	TM7S5F07004	1/4	3/8	—	1/4	1/4	4	2.5
3061865	TM7S5F08004	5/16	3/8	—	5/16	5/16	4	2.5
3058738	TM7S5F10005	3/8	1/2	—	3/8	3/8	5	2.5
3062363	TM7S5F13006	1/2	5/8	—	1/2	1/2	5	2.5
3058739	TM7S5F16006	5/8	5/8	.59	5/8	3/4	5	—
3289670	TM7S5F19007	3/4	3/4	.71	3/4	3/4	6	—

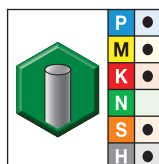
- Center cutting.
- Flat shallow profile.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance d11	D	tolerance h6 + / -
< 1/8"	-.0008/-0.0031	< 1/8"	0/.00024
1/8-7/32"	-.0012/-0.0041	1/8-7/32"	0/.00031
1/4-3/8"	-.0016/-0.0051	1/4-3/8"	0/.00035
13/32-11/16"	-.002/-0.0063	13/32-11/16"	0/.00043
23/32-1 3/16"	-.0026/-0.0077	23/32-1 3/16"	0/.00051

Series 7S7R • Vision Plus

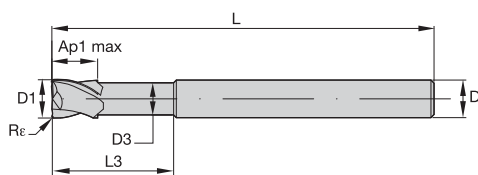


grade AlTiN-MT1
AlTiN

- first choice
- alternate choice

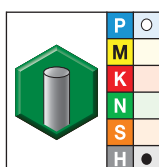
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε	BETA	ZU
3063998	TM7S7R04002A	5/32	1/4	—	5/32	5/32	3	.030	2.500	3
3096624	TM7S7R05002A	3/16	1/4	—	3/16	3/16	3	.030	2.500	3
3116104	TM7S7R07004A	1/4	3/8	—	1/4	1/4	4	.030	2.500	4
3119746	TM7S7R08004A	5/16	3/8	—	5/16	5/16	4	.030	2.500	4
3096974	TM7S7R10005A	3/8	1/2	—	3/8	3/8	5	.030	2.500	4
3116105	TM7S7R13006A	1/2	5/8	.470	1/2	—	5	.040	—	4
3113795	TM7S7R16006A	5/8	5/8	.588	5/8	5/8	5	.040	—	6
3044789	TM7S7R19007A	3/4	3/4	.705	3/4	3/4	6	.050	—	6
3061866	TM7S7R25008A	1	1	.940	1	1	6	.050	—	6

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


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 75N2 • Vision Plus

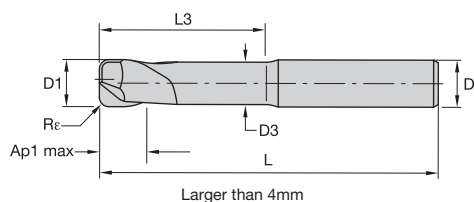
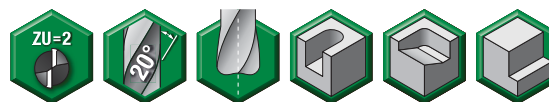


grade TiAlN-RT1
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Re
2544530	75N203022RT	3,0	6	2,80	3,00	9,00	75	0,30
2544735	75N203042RT	3,0	6	2,80	3,00	9,00	75	0,50
2544736	75N203062RT	3,0	6	2,80	3,00	9,00	75	1,00
2544737	75N204022RT	4,0	6	3,70	4,00	12,00	75	0,30
2544738	75N204042RT	4,0	6	3,70	4,00	12,00	75	0,50
2544739	75N204062RT	4,0	6	3,70	4,00	12,00	75	1,00
2544740	75N205022RT	5,0	6	4,60	5,00	15,00	75	0,30
2544741	75N205042RT	5,0	6	4,60	5,00	15,00	75	1,00
2544742	75N206032RT	6,0	6	5,50	6,00	18,00	75	0,30
2545163	75N206042RT	6,0	6	5,50	6,00	18,00	75	0,50
2545164	75N206052RT	6,0	6	5,50	6,00	18,00	75	0,75
2545166	75N206062RT	6,0	6	5,50	6,00	18,00	75	1,00
2545167	75N206072RT	6,0	6	5,50	6,00	18,00	75	1,50
2545168	75N208023RT	8,0	8	7,40	8,00	24,00	100	0,50
2545169	75N208043RT	8,0	8	7,40	8,00	24,00	100	1,00
2545170	75N208063RT	8,0	8	7,40	8,00	24,00	100	1,50
2545171	75N210024RT	10,0	10	9,20	10,00	30,00	100	0,50
2545172	75N210034RT	10,0	10	9,20	10,00	30,00	100	0,75
2545183	75N210044RT	10,0	10	9,20	10,00	30,00	100	1,00
2545184	75N210064RT	10,0	10	9,20	10,00	30,00	100	2,00
2545185	75N212025RT	12,0	12	11,00	12,00	36,00	125	0,50
2545186	75N212035RT	12,0	12	11,00	12,00	36,00	125	0,75
2545187	75N212045RT	12,0	12	11,00	12,00	36,00	125	1,00
2545188	75N212055RT	12,0	12	11,00	12,00	36,00	125	1,50
2545189	75N212065RT	12,0	12	11,00	12,00	36,00	125	2,00

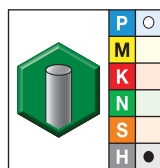
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

Series 422875 • Vision Plus

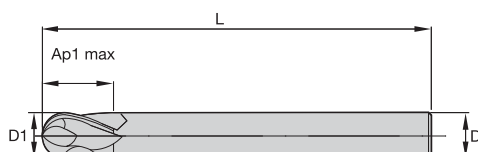


grade K10UF-DCHP
AITiN

- first choice
- alternate choice

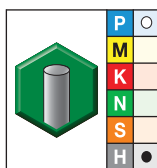
order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L	Rε
2343319	422875-002003	2,0	6	1,90	2,00	17,50	70	0,30
2343303	422875-002005	2,0	6	1,90	2,00	17,50	70	0,50
2343305	422875-003005	3,0	6	2,90	3,00	18,50	70	0,50
2343321	422875-003010	3,0	6	2,90	3,00	18,50	70	1,00
2343307	422875-004005	4,0	6	3,80	4,00	19,50	80	0,50
2343323	422875-004010	4,0	6	3,80	4,00	19,50	80	1,00
2343309	422875-005005	5,0	6	4,80	5,00	42,00	80	0,50
2343325	422875-005010	5,0	6	4,80	5,00	42,00	80	1,00
2343327	422875-006005	6,0	6	5,80	6,00	42,00	80	0,50
2343311	422875-006010	6,0	6	5,80	6,00	42,00	80	1,00
2629541	422875-008005	8,0	8	7,80	8,00	51,00	90	0,50
2343329	422875-008010	8,0	8	7,80	8,00	51,00	90	1,00
2629555	422875-008015	8,0	8	7,80	8,00	51,00	90	1,50
2343313	422875-008020	8,0	8	7,80	8,00	51,00	90	2,00
2629559	422875-010005	10,0	10	9,70	10,00	57,00	100	0,50
2629560	422875-010010	10,0	10	9,70	10,00	57,00	100	1,00
3048961	422875-010015	10,0	10	9,70	10,00	57,00	100	1,50
2343331	422875-010020	10,0	10	9,70	10,00	57,00	100	2,00
2343315	422875-010030	10,0	10	9,70	10,00	57,00	100	3,00
2629561	422875-012005	12,0	12	11,70	12,00	62,00	110	0,50
2629573	422875-012010	12,0	12	11,70	12,00	62,00	110	1,00
2343333	422875-012030	12,0	12	11,70	12,00	62,00	110	3,00
2343317	422875-012040	12,0	12	11,70	12,00	62,00	110	4,00

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


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 7151 • Vision Plus

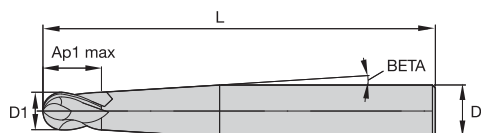


grade TiAlN-RT1
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L
1860036	715101000RT	1,0	3	3,00	38
1860090	715102000RT	2,0	3	3,00	38
1860103	715102500RT	2,5	3	3,00	38
1860106	715103000RT	3,0	3	3,00	38
1860109	715104001RT	4,0	4	4,00	50
1860111	715105001RT	5,0	5	5,00	50
1860112	715106002RT	6,0	6	6,00	50
1860133	715108003RT	8,0	8	8,00	63
1860134	715110004RT	10,0	10	10,00	76
1860135	715112005RT	12,0	12	12,00	76
1860136	715116006RT	16,0	16	16,00	89
1860137	715120007RT	20,0	20	20,00	104

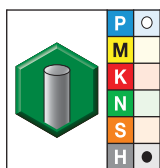
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

Series 7061 • Vision Plus

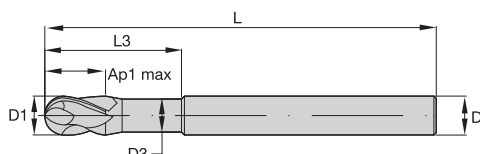


grade TiAlN-RT1
TiAlN

- first choice
- alternate choice

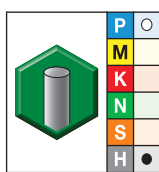
order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA
2495994	706101001RT	1,0	4	1,00	63	3.50
2495995	706102001RT	2,0	4	2,00	63	3.50
2495996	706102501RT	2,5	4	2,50	63	3.00
2495997	706103002RT	3,0	6	3,00	75	1.50
2495998	706104002RT	4,0	6	4,00	75	1.50
2495999	706105002RT	5,0	6	5,00	75	1.50
2496000	706106004RT	6,0	10	6,00	100	1.50
2496001	706108004RT	8,0	10	8,00	100	1.50
2496002	706110005RT	10,0	12	10,00	125	1.50
2496023	706112006RT	12,0	16	12,00	125	1.50

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


End Mill Tolerances

D1	tolerance e8	D	tolerance h6 + / -
≤ 3	-0,014/-0,028	≤ 3	0/0,006
> 3-6	-0,020/-0,038	> 3-6	0/0,008
> 6-10	-0,025/-0,047	> 6-10	0/0,009
> 10-18	-0,032/-0,059	> 10-18	0/0,011
> 18-30	-0,040/-0,073	> 18-30	0/0,013

■ Series 70N1 • Vision Plus

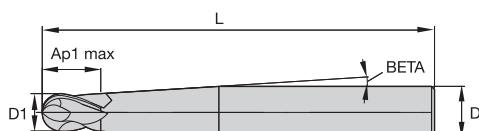


grade TiAlN-RT1
TiAlN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2545190	70N101001RT	1,0	4	0,80	1,00	3,00	63
2545191	70N101501RT	1,5	4	1,30	1,50	4,50	63
2545192	70N102002RT	2,0	6	1,80	2,00	6,00	76
2545213	70N103002RT	3,0	6	2,80	3,00	9,00	76
2545214	70N104002RT	4,0	6	3,70	4,00	12,00	76
2545215	70N105002RT	5,0	6	4,60	5,00	15,00	76
2545216	70N106002RT	6,0	6	5,50	6,00	18,00	76
2545217	70N108003RT	8,0	8	7,50	8,00	24,00	100
2545218	70N110004RT	10,0	10	9,50	10,00	30,00	100
2545219	70N112005RT	12,0	12	11,50	12,00	36,00	125

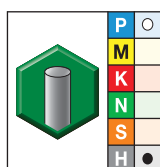
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

Series 422869 422868 • Vision Plus

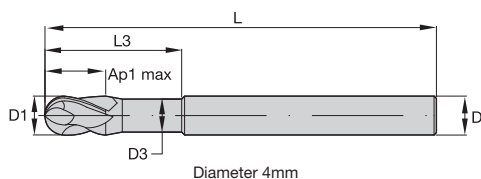


grade K10UF-DCHP
AITiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA
2343179	422869-000010	1,0	4	1,00	40	7.50
2343183	422869-000020	2,0	6	2,00	45	7.50
2343186	422869-000030	3,0	6	3,00	45	7.50
2343188	422869-000040	4,0	6	4,00	45	7.50
2343190	422869-000050	5,0	6	5,00	50	7.50
2343169	422868-000060	6,0	6	6,00	80	—
2343192	422869-000060	6,0	6	6,00	50	—
2343171	422868-000080	8,0	8	8,00	90	—
2343194	422869-000080	8,0	8	8,00	60	—
2343173	422868-000100	10,0	10	10,00	100	—
2343196	422869-000100	10,0	10	10,00	70	—
2343198	422869-000120	12,0	12	12,00	75	—
2343200	422869-000160	16,0	16	16,00	80	—

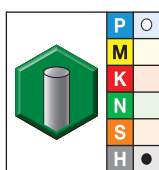
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h8 + / -	D	tolerance h6 + / -
≤ 3	0/0,014	≤ 3	0/0,006
> 3-6	0/0,018	> 3-6	0/0,008
> 6-10	0/0,022	> 6-10	0/0,009
> 10-18	0/0,027	> 10-18	0/0,011
> 18-30	0/0,033	> 18-30	0/0,013

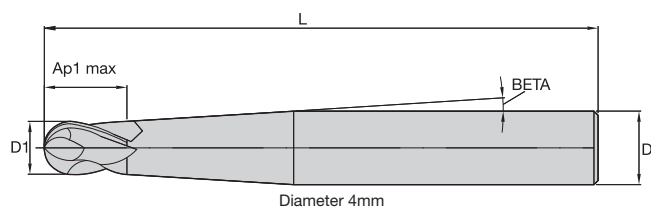
■ Series 422870 • Vision Plus


 grade K10UF-DCHP
 AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	D3	length of cut Ap1 max	L3	length L
2343202	422870-000020	2,0	6	1,90	2,00	17,50	70
2343204	422870-000030	3,0	6	2,90	3,00	18,50	70
2343206	422870-000040	4,0	6	3,80	4,00	19,50	80
2343208	422870-000050	5,0	6	4,80	5,00	39,00	80
2343210	422870-000060	6,0	6	5,80	6,00	42,00	80
2343212	422870-000080	8,0	8	7,80	8,00	52,00	90
2343214	422870-000100	10,0	10	9,70	10,00	58,00	100
2343216	422870-000120	12,0	12	11,70	12,00	63,00	110

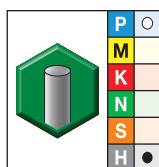
- Center cutting.
- Standard items listed. Additional styles and coatings made-to-order.



End Mill Tolerances

D1	tolerance h10 + / -	D	tolerance h6 + / -
≤ 3	0/0,040	≤ 3	0/0,006
> 3-6	0/0,048	> 3-6	0/0,008
> 6-10	0/0,058	> 6-10	0/0,009
> 10-18	0/0,070	> 10-18	0/0,011
> 18-30	0/0,084	> 18-30	0/0,013

Series 422873 • Vision Plus

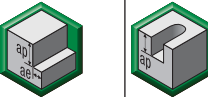


grade K10UF-DCHP
AlTiN

- first choice
- alternate choice

order #	catalog #	D1	D	length of cut Ap1 max	length L	BETA
2343265	422873-050100	5,0	8	6,00	100	1.75
2343269	422873-060100	6,0	10	8,00	100	2.52
2343275	422873-100100	10,0	12	15,00	100	1.83
2343277	422873-100150	10,0	12	15,00	150	0.80

■ Series 7S05 • Vision Plus

Material Group															
	Side Milling (A) and Slotting (B)			AlTiN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed – vc SFM			frac.	D1 – Diameter							
	ap	ae	ap	min		max	dec.	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	3	1 x D	0.4 x D	1 x D	390	–	520	IPT	.0017	.0021	.0025	.0032	.0037	.0042	.0050
	4	1 x D	0.4 x D	0.75 x D	300	–	490	IPT	.0015	.0019	.0022	.0029	.0033	.0036	.0043
H	1	1 x D	0.4 x D	0.75 x D	260	–	460	IPT	.0015	.0019	.0022	.0029	.0033	.0036	.0043
	2	1 x D	0.3 x D	0.5 x D	230	–	390	IPT	.0011	.0014	.0017	.0021	.0024	.0027	.0031
	3	1 x D	0.15 x D	0.3 x D	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0022	.0027
	4	1 x D	0.1 x D	0.15 x D	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

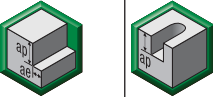
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

When using tools with 6 flutes, reduce slotting ap by 60%.

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

■ Series 7S15 • Vision Plus

Material Group																		
	Side Milling (A) and Slotting (B)			AlTiN-MT			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed — vc SFM			Cutting Speed — vc SFM			frac.	D1 — Diameter							
	ap	ae	ap	min		max	min		max	dec.	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	3	2.0 x D	0.3 x D	0.75 x D	390	–	520	390	–	520	IPT	.0017	.0021	.0025	.0032	.0038	.0042	.0050
	4	2.0 x D	0.25 x D	0.5 x D	300	–	490	300	–	490	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
H	1	2.0 x D	0.25 x D	0.5 x D	260	–	460	260	–	460	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
	2	2.0 x D	0.2 x D	0.4 x D	230	–	390	230	–	390	IPT	.0011	.0014	.0017	.0021	.0025	.0027	.0031
	3	2.0 x D	0.1 x D	0.2 x D	200	–	300	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0023	.0027
	4	2.0 x D	0.05 x D	0.05 x D	160	–	230	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

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

For better surface finish, reduce feed per tooth.

■ Series 7S25 • Vision Plus

Material Group																		
	Side Milling (A) and Slotting (B)			AlTiN-MT			TiAlN			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.								
	A		B	Cutting Speed — vc SFM			Cutting Speed — vc SFM			frac.	D1 — Diameter							
	ap	ae	ap	min		max	min		max	dec.	1/4	5/16	3/8	1/2	5/8	3/4	1	
P	3	3.0 x D	0.2 x D	0.5 x D	390	–	520	390	–	520	IPT	.0017	.0021	.0025	.0032	.0038	.0042	.0050
	4	3.0 x D	0.2 x D	0.3 x D	300	–	490	300	–	490	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
H	1	3.0 x D	0.2 x D	0.3 x D	260	–	460	260	–	460	IPT	.0015	.0019	.0022	.0028	.0033	.0037	.0042
	2	3.0 x D	0.15 x D	0.2 x D	230	–	390	230	–	390	IPT	.0011	.0014	.0017	.0021	.0025	.0027	.0031
	3	3.0 x D	0.05 x D	–	200	–	300	200	–	300	IPT	.0009	.0011	.0013	.0017	.0020	.0023	.0027
	4	3.0 x D	0.03 x D	–	160	–	230	160	–	230	IPT	.0006	.0008	.0009	.0011	.0013	.0015	.0018

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

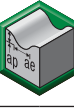
Above parameters are based on ideal conditions. For smaller taper machining centers, please adjust parameters on diameters >1/2".

For better surface finish, reduce feed per tooth.

■ Series 7S5F • Vision Plus

Material Group																		
		Profile Milling		TiAlN			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)											
		A		Cutting Speed — vc SFM				D1 — Diameter										
							frac.	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	
		ap	ae	min		max	dec.	.1250	.1563	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500	
P	3	0.5 x D	0.5 x D	910	—	1210	IPT	.0031	.0039	.0048	.0065	.0084	.0098	.0112	.0124	.0147	.0166	
	4	0.5 x D	0.5 x D	680	—	1130	IPT	.0029	.0036	.0044	.0059	.0075	.0088	.0099	.0110	.0129	.0145	
H	1	0.5 x D	0.5 x D	600	—	1060	IPT	.0029	.0036	.0044	.0059	.0075	.0088	.0099	.0110	.0129	.0145	
	2	0.5 x D	0.5 x D	530	—	910	IPT	.0022	.0027	.0033	.0044	.0056	.0066	.0074	.0082	.0096	.0107	
	3	0.5 x D	0.5 x D	450	—	680	IPT	.0017	.0021	.0026	.0035	.0044	.0052	.0059	.0066	.0078	.0089	
	4	0.5 x D	0.5 x D	380	—	530	IPT	.0011	.0014	.0017	.0023	.0030	.0035	.0039	.0044	.0052	.0058	

Material Group																		
		Profile Milling		TiAlN			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)											
		A		Cutting Speed — vc SFM				D1 — Diameter										
							frac.	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4	
		ap	ae	min		max	dec.	.1250	.1563	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500	
P	3	0.1 x D	0.1 x D	790	—	1050	IPT	.0022	.0027	.0033	.0046	.0059	.0069	.0078	.0087	.0102	.0116	
	4	0.1 x D	0.1 x D	590	—	980	IPT	.0020	.0025	.0030	.0041	.0052	.0061	.0069	.0077	.0090	.0101	
H	1	0.1 x D	0.1 x D	520	—	920	IPT	.0020	.0025	.0030	.0041	.0052	.0061	.0069	.0077	.0090	.0101	
	2	0.1 x D	0.1 x D	460	—	790	IPT	.0015	.0019	.0023	.0031	.0039	.0046	.0052	.0057	.0067	.0075	
	3	0.1 x D	0.1 x D	390	—	590	IPT	.0012	.0015	.0018	.0024	.0031	.0036	.0041	.0046	.0054	.0062	
	4	0.1 x D	0.1 x D	330	—	460	IPT	.0008	.0010	.0012	.0016	.0021	.0024	.0027	.0031	.0036	.0041	

Material Group																			
		Profile Milling		TiAlN			Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A)												
		A		Cutting Speed — vc SFM				D1 — Diameter											
							frac.	1/8	5/32	3/16	1/4	5/16	3/8	7/16	1/2	5/8	3/4		
		ap	ae	min		max	dec.	.1250	.1563	.1875	.2500	.3125	.3750	.4375	.5000	.6250	.7500		
P	3	0.2 x D	0.2 x D	510	—	680	IPT	.0009	.0012	.0014	.0020	.0025	.0030	.0034	.0038	.0044	.0050		
	4	0.2 x D	0.2 x D	380	—	640	IPT	.0009	.0011	.0013	.0018	.0023	.0027	.0030	.0033	.0039	.0044		
H	1	0.2 x D	0.2 x D	340	—	600	IPT	.0009	.0011	.0013	.0018	.0023	.0027	.0030	.0033	.0039	.0044		
	2	0.2 x D	0.2 x D	300	—	510	IPT	.0007	.0008	.0010	.0013	.0017	.0020	.0022	.0025	.0029	.0032		
	3	0.2 x D	0.2 x D	260	—	380	IPT	.0005	.0006	.0008	.0011	.0013	.0016	.0018	.0020	.0024	.0027		
	4	0.2 x D	0.2 x D	210	—	300	IPT	.0003	.0004	.0005	.0007	.0009	.0010	.0012	.0013	.0016	.0018		

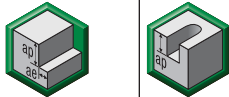
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

For better surface finish, reduce feed per tooth.

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

Series 7S7R • Vision Plus

Material Group																		
		Side Milling (A) and Slotting (B)			AlTiN			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.	5/32	3/16	1/4	5/16	3/8	1/2	5/8	3/4	1	
								dec.	.1563	.1875	.2500	.3125	.3750	.5000	.6250	.7500	1.000	
P	3	0.8 x D	0.5 x D	0.75 x D	390	—	520	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	4	0.8 x D	0.4 x D	0.5 x D	300	—	490	IPT	.0008	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039	
	5	0.8 x D	0.5 x D	0.75 x D	200	—	330	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	6	0.8 x D	0.4 x D	0.5 x D	160	—	250	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028	
M	1	0.8 x D	0.5 x D	0.75 x D	300	—	380	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	2	0.8 x D	0.4XD	0.75 x D	200	—	260	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	3	0.8 x D	0.4 x D	0.75 x D	200	—	230	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028	
K	1	0.8 x D	0.5 x D	0.75 x D	390	—	490	IPT	.0011	.0013	.0018	.0023	.0027	.0034	.0039	.0044	.0049	
	2	0.8 x D	0.5 x D	0.75 x D	360	—	460	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	3	0.8 x D	0.4 x D	0.75 x D	360	—	430	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
S	1	0.8 x D	0.4 x D	0.75 x D	160	—	300	IPT	.0009	.0011	.0015	.0020	.0023	.0029	.0034	.0039	.0045	
	2	0.8 x D	0.4 x D	0.75 x D	80	—	130	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024	
	3	0.8 x D	0.25 x D	0.3 x D	200	—	260	IPT	.0007	.0009	.0012	.0016	.0018	.0023	.0027	.0031	.0036	
	4	0.8 x D	0.3 x D	0.5 x D	160	—	200	IPT	.0006	.0008	.0011	.0014	.0017	.0021	.0025	.0028	.0033	
H	1	0.8 x D	0.5 x D	0.5 x D	260	—	460	IPT	.0008	.0010	.0014	.0017	.0020	.0026	.0030	.0034	.0039	
	2	0.8 x D	0.2 x D	0.3 x D	230	—	390	IPT	.0006	.0008	.0010	.0013	.0015	.0019	.0022	.0025	.0028	
	3	0.8 x D	0.15 x D	0.2 x D	200	—	300	IPT	.0005	.0006	.0008	.0010	.0012	.0015	.0018	.0021	.0024	

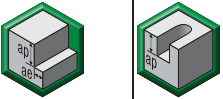
NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.

Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

When using tools with 6 flutes, reduce slotting ap by 40%.

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

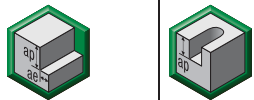
Series 75N2 • Vision Plus

Material Group																				
		Side Milling (A) and Slotting (B)			TiAlN		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	mm	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0
P	3	0.75 x D	0.1 x D	0.4 x D	390	–	520	IPT	.0007	.0009	.0012	.0014	.0020	.0024	.0028	.0031	.0034	.0037	.0040	.0045
	4	0.75 x D	0.1 x D	0.4 x D	300	–	490	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025	.0028	.0030	.0033	.0035	.0038
H	1	0.75 x D	0.1 x D	0.4 x D	260	–	460	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025	.0028	.0030	.0033	.0035	.0038
	2	0.75 x D	0.05 x D	0.3 x D	230	–	390	IPT	.0005	.0006	.0008	.0010	.0013	.0016	.0018	.0021	.0022	.0024	.0026	.0028
	3	0.75 x D	0.03 x D	0.2 x D	200	–	300	IPT	.0004	.0005	.0006	.0008	.0010	.0013	.0015	.0017	.0018	.0020	.0021	.0024
	4	0.75 x D	0.01 x D	0.1 x D	160	–	230	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0011	.0012	.0013	.0014	.0016

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.

Application Data • Series 422875 • Vision Plus™

Series 422875 • Vision Plus

Material Group																										
		Side Milling (A) and Slotting (B)			K10UF-DCHP			Recommended feed per tooth (IPT = inch/th) for side milling (A). For slotting (B), reduce IPT by 20%.																		
					AlTiN																					
		A		B		Cutting Speed — vc SFM				D1 — Diameter																
ap		ae		ap		min			max		mm		3.0		4.0		5.0		6.0		8.0		10.0		12.0	
P	3	0.5 x D	0.4 x D	0.3 x D	350	—	470	IPT	.0007	.0009	.0012	.0014	.0020	.0024	.0028											
	4	0.5 x D	0.4 x D	0.3 x D	270	—	440	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025											
H	1	0.5 x D	0.4 x D	0.3 x D	240	—	410	IPT	.0006	.0008	.0011	.0013	.0018	.0021	.0025											
	2	0.5 x D	0.3 x D	0.2 x D	210	—	350	IPT	.0005	.0006	.0008	.0010	.0013	.0016	.0018											
	3	0.5 x D	0.15 x D	0.15 x D	180	—	270	IPT	.0004	.0005	.0006	.0008	.0010	.0013	.0015											
	4	0.5 x D	0.1 x D	0.1 x D	150	—	210	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010											

NOTE: Lower value of cutting speed is used for high stock removal applications or for higher hardness (machinability) within group.
Higher value of cutting speed is used for finishing applications or for lower hardness (machinability) within group.
For better surface finish, reduce feed per tooth.

Series 7151 • Vision Plus

Material Group																					
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Finishing															
		A		Cutting Speed — vc SFM			D1 — Diameter														
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.05 x D	0.05 x D	905	–	1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148	.0160	.0171	
	4	0.05 x D	0.05 x D	679	–	1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
H	1	0.05 x D	0.05 x D	604	–	1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
	2	0.05 x D	0.05 x D	528	–	905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096	.0104	.0110	
	3	0.05 x D	0.05 x D	453	–	679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079	.0085	.0091	
	4	0.05 x D	0.05 x D	377	–	528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052	.0056	.0060	

Material Group																					
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) – Semi-Finishing															
		A		Cutting Speed – vc SFM			D1 – Diameter														
		ap	ae	min	max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0		
P	3	0.1 x D	0.1 x D	787	–	1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103	.0112	.0119	
	4	0.1 x D	0.1 x D	590	–	984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
H	1	0.1 x D	0.1 x D	525	–	918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
	2	0.1 x D	0.1 x D	459	–	787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067	.0072	.0077	
	3	0.1 x D	0.1 x D	394	–	590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055	.0060	.0064	
	4	0.1 x D	0.1 x D	328	–	459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036	.0039	.0042	

Material Group																					
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Roughing															
		A		Cutting Speed — vc SFM			D1 — Diameter														
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.2 x D	0.2 x D	512	–	682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045	.0048	.0052	
	4	0.2 x D	0.2 x D	384	–	640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
H	1	0.2 x D	0.2 x D	341	–	597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
	2	0.2 x D	0.2 x D	298	–	512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029	.0031	.0033	
	3	0.2 x D	0.2 x D	256	–	384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024	.0026	.0028	
	4	0.2 x D	0.2 x D	213	–	298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016	.0017	.0018	

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

■ Series 7061 • Vision Plus

Material Group																					
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Finishing															
		A		Cutting Speed — vc SFM			D1 — Diameter														
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.05 x D	0.05 x D	905	–	1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148	.0160	.0171	
	4	0.05 x D	0.05 x D	679	–	1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
H	1	0.05 x D	0.05 x D	604	–	1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149	
	2	0.05 x D	0.05 x D	528	–	905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096	.0104	.0110	
	3	0.05 x D	0.05 x D	453	–	679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079	.0085	.0091	
	4	0.05 x D	0.05 x D	377	–	528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052	.0056	.0060	

Material Group																					
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) – Semi-Finishing															
		A		Cutting Speed – vc SFM			D1 – Diameter														
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.1 x D	0.1 x D	787	–	1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103	.0112	.0119	
	4	0.1 x D	0.1 x D	590	–	984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
H	1	0.1 x D	0.1 x D	525	–	918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104	
	2	0.1 x D	0.1 x D	459	–	787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067	.0072	.0077	
	3	0.1 x D	0.1 x D	394	–	590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055	.0060	.0064	
	4	0.1 x D	0.1 x D	328	–	459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036	.0039	.0042	

Material Group																					
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Roughing															
		A		Cutting Speed — vc SFM			D1 — Diameter														
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.2 x D	0.2 x D	512	–	682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045	.0048	.0052	
	4	0.2 x D	0.2 x D	384	–	640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
H	1	0.2 x D	0.2 x D	341	–	597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045	
	2	0.2 x D	0.2 x D	298	–	512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029	.0031	.0033	
	3	0.2 x D	0.2 x D	256	–	384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024	.0026	.0028	
	4	0.2 x D	0.2 x D	213	–	298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016	.0017	.0018	

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

■ Series 70N1 • Vision Plus

Material Group																				
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Finishing														
		A		Cutting Speed — vc SFM			D1 — Diameter													
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0
P	3	0.05 x D	0.05 x D	905	–	1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148	.0160	.0171
	4	0.05 x D	0.05 x D	679	–	1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149
H	1	0.05 x D	0.05 x D	604	–	1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130	.0140	.0149
	2	0.05 x D	0.05 x D	528	–	905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096	.0104	.0110
	3	0.05 x D	0.05 x D	453	–	679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079	.0085	.0091
	4	0.05 x D	0.05 x D	377	–	528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052	.0056	.0060

Material Group																				
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Semi-Finishing														
		A		Cutting Speed — vc SFM			D1 — Diameter													
		ap	ae	min	max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0	
P	3	0.1 x D	0.1 x D	787	–	1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103	.0112	.0119
	4	0.1 x D	0.1 x D	590	–	984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104
H	1	0.1 x D	0.1 x D	525	–	918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091	.0098	.0104
	2	0.1 x D	0.1 x D	459	–	787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067	.0072	.0077
	3	0.1 x D	0.1 x D	394	–	590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055	.0060	.0064
	4	0.1 x D	0.1 x D	328	–	459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036	.0039	.0042

Material Group																				
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/profiling (A) — Roughing														
		A		Cutting Speed — vc SFM			D1 — Diameter													
		ap	ae	min		max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0	18.0	20.0
P	3	0.2 x D	0.2 x D	512	–	682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045	.0048	.0052
	4	0.2 x D	0.2 x D	384	–	640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045
H	1	0.2 x D	0.2 x D	341	–	597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039	.0042	.0045
	2	0.2 x D	0.2 x D	298	–	512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029	.0031	.0033
	3	0.2 x D	0.2 x D	256	–	384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024	.0026	.0028
	4	0.2 x D	0.2 x D	213	–	298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016	.0017	.0018

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

■ Series 422869 422868 • Vision Plus

Material Group																	
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Finishing											
		A		Cutting Speed — vc SFM		D1 — Diameter											
		ap	ae	min	max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	3	0.05 x D	0.05 x D	905	– 1207	IPT	.0010	.0019	.0024	.0029	.0040	.0050	.0061	.0085	.0102	.0119	.0148
	4	0.05 x D	0.05 x D	679	– 1132	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130
H	1	0.05 x D	0.05 x D	604	– 1056	IPT	.0009	.0018	.0022	.0027	.0036	.0046	.0056	.0076	.0091	.0106	.0130
	2	0.05 x D	0.05 x D	528	– 905	IPT	.0007	.0013	.0017	.0020	.0027	.0035	.0042	.0057	.0068	.0079	.0096
	3	0.05 x D	0.05 x D	453	– 679	IPT	.0005	.0011	.0013	.0016	.0022	.0027	.0033	.0045	.0054	.0063	.0079
	4	0.05 x D	0.05 x D	377	– 528	IPT	.0004	.0007	.0009	.0011	.0014	.0018	.0022	.0030	.0036	.0042	.0052

Material Group																	
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Semi-Finishing											
		A		Cutting Speed — vc SFM		D1 — Diameter											
		ap	ae	min	max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	3	0.1 x D	0.1 x D	787	– 1050	IPT	.0007	.0013	.0017	.0020	.0028	.0035	.0043	.0059	.0071	.0083	.0103
	4	0.1 x D	0.1 x D	590	– 984	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091
H	1	0.1 x D	0.1 x D	525	– 918	IPT	.0006	.0012	.0016	.0019	.0025	.0032	.0039	.0053	.0064	.0074	.0091
	2	0.1 x D	0.1 x D	459	– 787	IPT	.0005	.0009	.0012	.0014	.0019	.0024	.0029	.0040	.0048	.0055	.0067
	3	0.1 x D	0.1 x D	394	– 590	IPT	.0004	.0007	.0009	.0011	.0015	.0019	.0023	.0031	.0038	.0044	.0055
	4	0.1 x D	0.1 x D	328	– 459	IPT	.0002	.0005	.0006	.0007	.0010	.0013	.0015	.0021	.0025	.0029	.0036

Material Group																	
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Roughing											
		A		Cutting Speed — vc SFM		D1 — Diameter											
		ap	ae	min	max	mm	1.0	2.0	2.5	3.0	4.0	5.0	6.0	8.0	10.0	12.0	16.0
P	3	0.2 x D	0.2 x D	512	– 682	IPT	.0003	.0006	.0007	.0009	.0012	.0015	.0019	.0026	.0031	.0036	.0045
	4	0.2 x D	0.2 x D	384	– 640	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039
H	1	0.2 x D	0.2 x D	341	– 597	IPT	.0003	.0005	.0007	.0008	.0011	.0014	.0017	.0023	.0028	.0032	.0039
	2	0.2 x D	0.2 x D	298	– 512	IPT	.0002	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0021	.0024	.0029
	3	0.2 x D	0.2 x D	256	– 384	IPT	.0002	.0003	.0004	.0005	.0007	.0008	.0010	.0014	.0016	.0019	.0024
	4	0.2 x D	0.2 x D	213	– 298	IPT	.0001	.0002	.0003	.0003	.0004	.0005	.0007	.0009	.0011	.0013	.0016

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

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Material Group														
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Finishing								
		A		Cutting Speed — vc SFM		D1 — Diameter								
		ap	ae	min	max	mm	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	3	0.05 x D	0.05 x D	905	– 1207	IPT	.0019	.0029	.0040	.0050	.0061	.0085	.0102	.0119
	4	0.05 x D	0.05 x D	679	– 1132	IPT	.0018	.0027	.0036	.0046	.0056	.0076	.0091	.0106
H	1	0.05 x D	0.05 x D	604	– 1056	IPT	.0018	.0027	.0036	.0046	.0056	.0076	.0091	.0106
	2	0.05 x D	0.05 x D	528	– 905	IPT	.0013	.0020	.0027	.0035	.0042	.0057	.0068	.0079
	3	0.05 x D	0.05 x D	453	– 679	IPT	.0011	.0016	.0022	.0027	.0033	.0045	.0054	.0063
	4	0.05 x D	0.05 x D	377	– 528	IPT	.0007	.0011	.0014	.0018	.0022	.0030	.0036	.0042

Material Group														
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Semi-Finishing								
		A		Cutting Speed — vc SFM		D1 — Diameter								
		ap	ae	min	max	mm	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	3	0.1 x D	0.1 x D	787	– 1050	IPT	.0013	.0020	.0028	.0035	.0043	.0059	.0071	.0083
	4	0.1 x D	0.1 x D	590	– 984	IPT	.0012	.0019	.0025	.0032	.0039	.0053	.0064	.0074
H	1	0.1 x D	0.1 x D	525	– 918	IPT	.0012	.0019	.0025	.0032	.0039	.0053	.0064	.0074
	2	0.1 x D	0.1 x D	459	– 787	IPT	.0009	.0014	.0019	.0024	.0029	.0040	.0048	.0055
	3	0.1 x D	0.1 x D	394	– 590	IPT	.0007	.0011	.0015	.0019	.0023	.0031	.0038	.0044
	4	0.1 x D	0.1 x D	328	– 459	IPT	.0005	.0007	.0010	.0013	.0015	.0021	.0025	.0029

Material Group														
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Roughing								
		A		Cutting Speed — vc SFM		D1 — Diameter								
		ap	ae	min	max	mm	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	3	0.2 x D	0.2 x D	512	– 682	IPT	.0006	.0009	.0012	.0015	.0019	.0026	.0031	.0036
	4	0.2 x D	0.2 x D	384	– 640	IPT	.0005	.0008	.0011	.0014	.0017	.0023	.0028	.0032
H	1	0.2 x D	0.2 x D	341	– 597	IPT	.0005	.0008	.0011	.0014	.0017	.0023	.0028	.0032
	2	0.2 x D	0.2 x D	298	– 512	IPT	.0004	.0006	.0008	.0010	.0013	.0017	.0021	.0024
	3	0.2 x D	0.2 x D	256	– 384	IPT	.0003	.0005	.0007	.0008	.0010	.0014	.0016	.0019
	4	0.2 x D	0.2 x D	213	– 298	IPT	.0002	.0003	.0004	.0005	.0007	.0009	.0011	.0013

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

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Material Group													
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Finishing							
		A		Cutting Speed — vc SFM			D1 — Diameter						
		ap	ae	min		max	mm	3.0	4.0	5.0	6.0	8.0	10.0
P	3	0.05 x D	0.05 x D	905	–	1207	IPT	.0029	.0040	.0050	.0061	.0085	.0102
	4	0.05 x D	0.05 x D	679	–	1132	IPT	.0027	.0036	.0046	.0056	.0076	.0091
H	1	0.05 x D	0.05 x D	604	–	1056	IPT	.0027	.0036	.0046	.0056	.0076	.0091
	2	0.05 x D	0.05 x D	528	–	905	IPT	.0020	.0027	.0035	.0042	.0057	.0068
	3	0.05 x D	0.05 x D	453	–	679	IPT	.0016	.0022	.0027	.0033	.0045	.0054
	4	0.05 x D	0.05 x D	377	–	528	IPT	.0011	.0014	.0018	.0022	.0030	.0036

Material Group													
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Semi-Finishing							
		A		Cutting Speed — vc SFM			D1 — Diameter						
		ap	ae	min		max	mm	3.0	4.0	5.0	6.0	8.0	10.0
P	3	0.1 x D	0.1 x D	787	–	1050	IPT	.0020	.0028	.0035	.0043	.0059	.0071
	4	0.1 x D	0.1 x D	590	–	984	IPT	.0019	.0025	.0032	.0039	.0053	.0064
H	1	0.1 x D	0.1 x D	525	–	918	IPT	.0019	.0025	.0032	.0039	.0053	.0064
	2	0.1 x D	0.1 x D	459	–	787	IPT	.0014	.0019	.0024	.0029	.0040	.0048
	3	0.1 x D	0.1 x D	394	–	590	IPT	.0011	.0015	.0019	.0023	.0031	.0038
	4	0.1 x D	0.1 x D	328	–	459	IPT	.0007	.0010	.0013	.0015	.0021	.0025

Material Group													
		Profile Milling		TiAlN		Recommended feed per tooth (IPT = inch/th) for 3D milling/ profiling (A) — Roughing							
		A		Cutting Speed — vc SFM			D1 — Diameter						
		ap	ae	min		max	mm	3.0	4.0	5.0	6.0	8.0	10.0
P	3	0.2 x D	0.2 x D	512	–	682	IPT	.0009	.0012	.0015	.0019	.0026	.0031
	4	0.2 x D	0.2 x D	384	–	640	IPT	.0008	.0011	.0014	.0017	.0023	.0028
H	1	0.2 x D	0.2 x D	341	–	597	IPT	.0008	.0011	.0014	.0017	.0023	.0028
	2	0.2 x D	0.2 x D	298	–	512	IPT	.0006	.0008	.0010	.0013	.0017	.0021
	3	0.2 x D	0.2 x D	256	–	384	IPT	.0005	.0007	.0008	.0010	.0014	.0016
	4	0.2 x D	0.2 x D	213	–	298	IPT	.0003	.0004	.0005	.0007	.0009	.0011

NOTE: Please use the reference table to optimize your cutting speed based on the average cutting angle of the application. See page M159.

Calculation Examples

Table of Factor for Speed Calculation Ball Nose

Average Wall Angle	ap/D						
	0.003	0.006	0.010	0.016	0.020	0.025	0.030
0.0°	9.1	6.5	5.0	4.0	3.6	3.2	2.9
3.0°	6.2	4.9	4.0	3.3	3.0	2.8	2.6
5.0°	5.1	4.2	3.5	3.0	2.8	2.5	2.4
8.0°	4.1	3.4	3.0	2.6	2.4	2.3	2.1
10.0°	3.6	3.1	2.7	2.4	2.3	2.1	2.0
15.0°	2.8	2.5	2.2	2.0	1.9	1.8	1.7
20.0°	2.3	2.1	1.9	1.8	1.7	1.6	1.6
30.0°	1.7	1.6	1.5	1.4	1.4	1.3	1.3
40.0°	1.4	1.3	1.3	1.2	1.2	1.2	1.2
50.0°	1.2	1.2	1.1	1.1	1.1	1.1	1.1
55.0°	1.1	1.1	1.1	1.1	1.1	1.0	1.0

For calculating real cutting speed, use formula: Basic cutting speed * Factor

Choose the coefficient according to the ap/D and average wall angle.

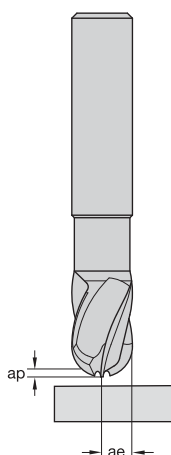
Example 1: For Tool = 3/8" and ap = .008" for average wall angle 0°, ap/D ratio equal .008/.375 = .02. Factor equal 3.6.

Example 2: For Tool = 5/16" and ap = .004" for average wall angle 10°, ap/D ratio equal .004"/.312 = 0.12. Factor will be between 2.7 and 2.4, choose 2.6.

Keep in mind shank diameter and length effect.

If tool length out of the chuck is more than 2 x D, please decrease feed per tooth by 15% each 1 x D.

Material Group	Basic vc for Factor Calculation		
	Min		Max
P3	160	—	180
P4	140	—	160
H1	100	—	140
H2	70	—	120
H3	60	—	90
H4	50	—	70



Application example #1 = face milling a flat surface

D = 3/8"

ap = .008"

Average wall angle = 0°

Finishing H2

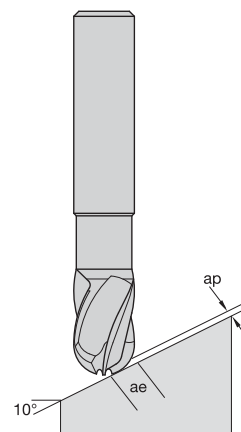
Starting vc from chart = 300 SFM

ap/D = 0.02

Factor from table = 3.6

vc to program into machine = 300 * 3.6 = 1080 SFM

RPM = 1080 * 12/3.14/.375 = 11000 RPM



Application example #2 = face milling a 10° average wall angle

D = 5/16"

ap = .004"

Average wall angle = 10°

Finishing H2

Starting vc from chart = 300 SFM

ap/D = 0.1/8 = .012

Factor from table = 2.6

vc to program into machine = 300 * 2.6 = 780 SFM

RPM = 780 * 12/3.14/.312 = 9554 RPM