SERIES

Square **UGMF72**
Corner Radius **UGMF74**
Ball Nose **UGMH10**

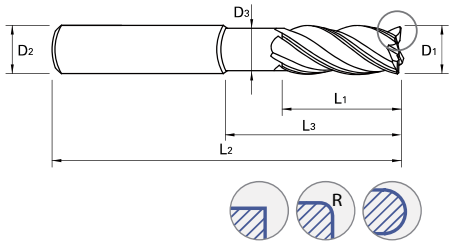
Y-Coated SOLID CARBIDE END MILLS
4 FLUTE EXTENDED LENGTH (PLAIN SHANK)

- Special flute geometry and multiple helix eliminate vibrations
- Excellent performance for stainless steels, mild steels, cast iron, low/medium hardness materials and all exotic materials up to HRc40
- Advanced coating for superior performance and tool life

Square

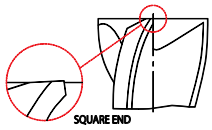
Corner Radius

Ball Nose



BALL KEYS ON PAGE 11

Reinforced cutting edge



CARBIDE | 4 | 35°/37° | PLAIN | R ±.0008 | P. 32-33

Unit : INCH

OD (D_1)	SD (D_2)	LOC (L_1)	LBS (L_3)	OAL (L_2)	Neck Dia (D_3)	Square End	Corner Radius								Ball Nose Mill
							.010	.015	.030	.060	.090	.125	.190	.250	
						EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.
		5/32	3/8	3	.113	UGMF72008	UGMF74008		UGMF74913						UGMH10008
1/8	1/8	5/32	1/2	3	.113	UGMF72913	UGMF74914		UGMF74915						UGMH10901
		5/32	5/8	3	.113	UGMF72914	UGMF74916		UGMF74917						UGMH10902
		7/32	1/2	3	.176	UGMF72012	UGMF74012		UGMF74918						UGMH10012
3/16	3/16	7/32	3/4	3	.176	UGMF72915	UGMF74919		UGMF74920						UGMH10903
		7/32	1	3	.176	UGMF72916	UGMF74921		UGMF74922						UGMH10904
		3/8	3/4	4	.230	UGMF72016		UGMF74016	UGMF74923	UGMF74924					UGMH10016
1/4	1/4	3/8	1-1/8	4	.230	UGMF72901		UGMF74901	UGMF74925	UGMF74926					UGMH10905
		3/8	2-1/8	4	.230	UGMF72902		UGMF74902	UGMF74927	UGMF74928					UGMH10906
		1/2	1-1/8	4	.344	UGMF72024		UGMF74929	UGMF74024	UGMF74930	UGMF74931				UGMH10024
		1/2	2-1/8	4	.344	UGMF72903		UGMF74932	UGMF74903	UGMF74933	UGMF74934				UGMH10907
3/8	3/8	1/2	3-1/8	5	.344	UGMF72922		UGMF74815	UGMF74816	UGMF74817	UGMF74818				UGMH10922
		1/2	3-1/8	6	.344	UGMF72904		UGMF74935	UGMF74904	UGMF74936	UGMF74937				UGMH10908
		1/2	4-1/8	6	.344	UGMF72917		UGMF74938	UGMF74939	UGMF74940	UGMF74941				UGMH10909
		5/8	1-1/2	4	.461	UGMF72032		UGMF74942	UGMF74032	UGMF74943	UGMF74944	UGMF74945			UGMH10032
		5/8	2-1/4	4	.461	UGMF72905		UGMF74946	UGMF74905	UGMF74947	UGMF74948	UGMF74949			UGMH10910
1/2	1/2	5/8	3-3/8	5	.461	UGMF72923		UGMF74819	UGMF74820	UGMF74821	UGMF74822	UGMF74823			UGMH10923
		5/8	3-3/8	6	.461	UGMF72906		UGMF74950	UGMF74906	UGMF74951	UGMF74952	UGMF74953			UGMH10911
		5/8	4-1/8	6	.461	UGMF72918		UGMF74954	UGMF74955	UGMF74956	UGMF74957	UGMF74958			UGMH10912

▶ Length of cut in excess of 3 x D on 37° single-helix requires feed reduction of approximately 50%

NEXT PAGE ▶

Mill Dia. Tolerance (inch)	Shank Dia.Tolerance
0 ~ -.0012	h5 (≥ Ø1/2" : h6)

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

ISO	N										S							H			
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend											○	○	○	○	○	○	○				

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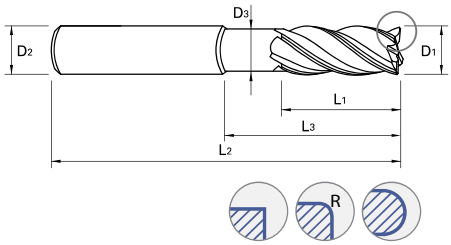
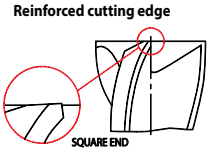


BALL KEYS ON PAGE 11



CARBIDE | 4 | 35°/37° | PLAIN | R ±.0008 | P. 32-33

Unit : INCH

OD (D_1)	SD (D_2)	LOC (L_1)	LBS (L_3)	OAL (L_2)	Neck Dia (D_3)	Square End	Corner Radius .010	.015	.030	.060	.090	.125	.190	.250	Ball Nose Mill
						EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.	EDP No.
5/8	5/8	3/4	1-5/8	4	.586	UGMF72040			UGMF74040	UGMF74959	UGMF74960	UGMF74961			UGMH10040
		3/4	2-3/8	5	.586	UGMF72924			UGMF74824	UGMF74825	UGMF74826	UGMF74827			UGMH10924
		3/4	3-3/8	5	.586	UGMF72925			UGMF74828	UGMF74829	UGMF74830	UGMF74831			UGMH10925
		3/4	2-3/8	6	.586	UGMF72907			UGMF74907	UGMF74962	UGMF74963	UGMF74964			UGMH10913
		3/4	3-3/8	6	.586	UGMF72908			UGMF74908	UGMF74965	UGMF74966	UGMF74967			UGMH10914
		3/4	4-1/8	6	.586	UGMF72919			UGMF74968	UGMF74969	UGMF74970	UGMF74971			UGMH10915
3/4	3/4	1	2	4	.711	UGMF72048			UGMF74048	UGMF74972	UGMF74973	UGMF74974	UGMF74975	UGMF74976	UGMH10048
		1	3	5	.711	UGMF72926			UGMF74832	UGMF74833	UGMF74834	UGMF74835	UGMF74836	UGMF74837	UGMH10926
		1	2-1/2	6	.711	UGMF72920			UGMF74977	UGMF74978	UGMF74979	UGMF74980	UGMF74981	UGMF74982	UGMH10916
		1	3	6	.711	UGMF72909			UGMF74909	UGMF74983	UGMF74984	UGMF74985	UGMF74986	UGMF74987	UGMH10917
		1	4	6	.711	UGMF72910			UGMF74910	UGMF74988	UGMF74989	UGMF74990	UGMF74991	UGMF74992	UGMH10918
1	1	1-1/8	2	4	.961	UGMF72064			UGMF74064	UGMF74993	UGMF74994	UGMF74995	UGMF74996	UGMF74997	UGMH10064
		1-1/8	2-5/8	5	.961	UGMF72927			UGMF74838	UGMF74839	UGMF74840	UGMF74841	UGMF74842	UGMF74843	UGMH10927
		1-1/8	3	5	.961	UGMF72928			UGMF74844	UGMF74845	UGMF74846	UGMF74847	UGMF74848	UGMF74849	UGMH10928
		1-1/8	2-5/8	6	.961	UGMF72921			UGMF74998	UGMF74999	UGMF74801	UGMF74802	UGMF74803	UGMF74804	UGMH10919
		1-1/8	3	6	.961	UGMF72911			UGMF74911	UGMF74805	UGMF74806	UGMF74807	UGMF74808	UGMF74809	UGMH10920
		1-1/8	4	6	.961	UGMF72912			UGMF74912	UGMF74810	UGMF74811	UGMF74812	UGMF74813	UGMF74814	UGMH10921

- Length of cut in excess of 3xD on 37° single-helix requires feed reduction of approximately 50%

Mill Dia. Tolerance (inch)	Shank Dia.Tolerance
0 ~ -.0012	h5 (≥ Ø1/2" : h6)

◎ : Excellent ○ : Good

ISO	P											M			K					
Material Description	Non-alloy steel					Low alloy steel				High alloyed steel, and tool steel		Stainless steel			Grey cast iron		Nodular cast iron		Malleable cast iron	
VDI 3323	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
HRc		13	25	28	32	10	29	32	38	15	35	15	23	10	10	26	3	25		21
HB	125	190	250	270	300	180	275	300	350	200	325	200	240	180	180	260	160	250	130	230
Recommend	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎	◎

ISO	N										S							H			
Material Description	Aluminum-wrought alloy		Aluminum-cast, alloyed			Copper and Copper Alloys (Bronze / Brass)			Non Metallic Materials		Heat Resistant Super Alloys					Titanium Alloys		Hardened steel		Chilled Cast Iron	Hardened Cast Iron
VDI 3323	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
HRc											15	30	25	38	34			55	60	42	55
HB	60	100	75	90	130	110	90	100			200	280	250	350	320	400 Rm	1050 Rm	550	630	400	550
Recommend											○	○	○	○	○	○	○				

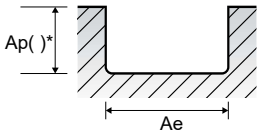
UGMF68, UGMF69, UGMF70, UGMF71, UGMF72 UGMF73, UGMF74, UGMF75, UGMF76, UGMF77 SERIES

4 FLUTE - SIDE & SLOTTING

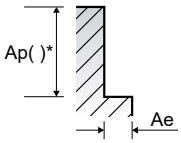
SFM = ft./min. fz = in./tooth
RPM = rev./min. FEED = in./min.

ISO	VDI 3323	Material Description	Ae Side	Ae Slotting	Ap Side	Ap Slotting	Parameter	Diameter (Ø) 1/8	5/32	3/16	7/32	1/4	9/32	5/16	11/32	3/8	7/16	1/2	5/8	3/4	1
P	1-4	Non-alloy steel	0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	500	500	500	500	500	500	500	525	550	550	550	550	550	550
							fz	.0002	.0003	.0004	.0005	.0006	.0008	.0011	.0013	.0015	.0017	.0019	.0021	.0026	.0025
							RPM	15249	12200	10166	8714	7625	6778	6100	5834	5616	4811	4210	3368	2806	2105
							FEED	12.01	15.37	17.61	18.53	19.21	22.95	25.94	29.86	33.59	32.20	31.16	28.11	28.73	21.21
	5	Low alloy steel	0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	350	350	350	350	350	350	350	370	385	385	385	385	385	385
							fz	.0002	.0003	.0004	.0005	.0006	.0008	.0011	.0013	.0015	.0017	.0018	.0021	.0026	.0025
							RPM	10727	8581	7151	6129	5363	4767	4291	4089	3912	3353	2934	2347	1956	1467
							FEED	8.45	10.81	12.39	13.03	13.51	16.14	18.24	20.93	23.41	22.44	21.71	19.59	20.02	14.78
	6-7		0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	500	500	500	500	500	500	500	525	550	550	550	550	550	550
							fz	.0002	.0003	.0004	.0005	.0006	.0008	.0011	.0013	.0015	.0017	.0019	.0021	.0026	.0025
							RPM	15249	12200	10166	8714	7625	6778	6100	5834	5616	4811	4210	3368	2806	2105
							FEED	12.01	15.37	17.61	18.53	19.21	22.95	25.94	29.86	33.59	32.20	31.16	28.11	28.73	21.21
	8-9		0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	350	350	350	350	350	350	350	370	385	385	385	385	385	385
							fz	.0002	.0003	.0004	.0005	.0006	.0008	.0011	.0013	.0015	.0017	.0018	.0021	.0026	.0025
							RPM	10727	8581	7151	6129	5363	4767	4291	4089	3912	3353	2934	2347	1956	1467
							FEED	8.45	10.81	12.39	13.03	13.51	16.14	18.24	20.93	23.41	22.44	21.71	19.59	20.02	14.78
	10-11.1	High alloyed steel, and tool steel	0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	210	210	210	210	210	210	210	220	230	230	230	230	230	230
							fz	.0001	.0002	.0003	.0004	.0004	.0006	.0007	.0009	.0011	.0012	.0013	.0015	.0018	.0018
							RPM	6418	5134	4278	3667	3209	2852	2567	2445	2343	2008	1757	1406	1171	879
							FEED	3.03	4.85	5.39	5.49	5.56	6.74	7.68	8.86	9.96	9.33	8.86	8.19	8.30	6.23
M	12-13	Stainless steel	0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	485	485	485	485	485	485	485	485	485	485	485	485	485	485
							fz	.0002	.0002	.0004	.0004	.0005	.0007	.0009	.0011	.0013	.0014	.0015	.0018	.0022	.0022
							RPM	14852	11882	9901	8487	7426	6601	5941	5401	4951	4243	3713	2970	2475	1857
							FEED	9.36	11.23	14.03	14.7	15.2	18.48	20.58	23.81	26.51	24.39	22.8	21.05	21.44	16.08
	14.1		0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	350	350	350	350	350	350	350	350	350	350	350	350	350	350
							fz	.0002	.0003	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0022	.0024	.0030	.0030
							RPM	10635	8508	7090	6077	5317	4727	4254	3867	3545	3039	2659	2127	1772	1329
							FEED	8.37	10.72	14.51	14.83	15.07	17.12	18.76	23.14	26.8	24.64	23.03	20.77	21.49	16.12
	14.2		0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	310	310	310	310	310	310	310	310	310	310	310	310	310	310
							fz	.0002	.0003	.0005	.0006	.0007	.0009	.0011	.0015	.0019	.0020	.0022	.0024	.0030	.0030
							RPM	9535	7628	6356	5448	4767	4238	3814	3467	3178	2724	2384	1907	1589	1192
							FEED	7.51	9.61	13.01	13.30	13.51	15.35	16.82	20.75	24.02	22.09	20.65	18.62	19.02	14.26
K	15-20	Grey cast iron	0.5D	1.0D	1.5D (1.2D)	1.0D (0.8D)	SFM(Vc)	365	365	365	365	365	365	365	385	405	405	405	405	405	405
							fz	.0002	.0004	.0006	.0007	.0008	.0011	.0013	.0016	.0019	.0021	.0023	.0026	.0032	.0031
							RPM	11216	8972	7477	6409	5608	4985	4486	4290	4115	3527	3087	2469	2058	1543
							FEED	10.60	14.13	16.48	17.16	17.66	21.19	24.02	27.70	31.11	29.44	28.19	25.28	26.25	19.20
S	31-35	Heat Resistant Super Alloys	0.25D	1.0D	1.0D	0.5D	SFM(Vc)	85	85	85	85	85	85	85	85	85	85	85	85	85	85
							fz	.0002	.0003	.0003	.0004	.0005	.0006	.0007	.0010	.0013	.0014	.0015	.0017	.0021	.0020
							RPM	2598	2078	1732	1484	1299	1154	1039	945	866	742	649	520	433	325
							FEED	2.05	2.29	2.18	2.34	2.45	2.82	3.11	3.87	4.5	4.15	3.89	3.52	3.68	2.66
	36-37	Titanium Alloys	0.35D	1.0D	1.0D	0.5D	SFM(Vc)	190	190	190	190	190	190	190	190	190	190	190	190	190	190
							fz	.0002	.0003	.0004	.0005	.0006	.0008	.0010	.0013	.0017	.0018	.0020	.0022	.0027	.0027
							RPM	5806	4645	3871	3318	2903	2581	2323	2111	1935	1659	1452	1161	968	726
							FEED	3.66	5.12	6.71	7.05	7.32	8.33	9.14	11.14	12.80	12.02	11.43	10.06	10.36	7.89

*( ) : Short length & Neck type



Slotting



Side Cutting

NOTES:
- Feed to be reduced by approximately 50% if L.O.C. (Length Of Cut) is over 3xD
- The above recommendations are based on ideal conditions; for smaller taper machining centers or less rigid conditions please adjust parameters accordingly on diameters greater than 1/2"
- In profile operations, engaging more that 2xD, reduce the radial depth of cut by 50%-60%
- Finish cuts typically require reduced cutting feeds and speeds; also, it is recommended the radial width of cut (AE) should not exceed 2%xD1

YU-VP20

BEST VALUE IN THE WORLD OF CUTTING TOOLS

FOR TOUGH STEEL, CAST IRON, STAINLESS STEEL AND EXOTIC MATERIALS:

NOTHING CUTS IT BETTER

V7 PlusA

INDUSTRY-LEADING HIGH-PERFORMANCE CARBIDE END MILLS:

- 4 Flute & 6 Flute
- Square, Chamfer, Radius, Ball Nose
- Standard & Extended Length
- Plain & Weldon Flat Shanks
- Inch & Metric Sizes

NEW

6 Flute Chip Splitter
Size Expansion in 1/2" x 1/2" x 1-1/4" x3"

Over 1,500 Items in Stock.

V7 Plus A

When The Cut Calls For High-Performance Carbide, **We Have More Options** To Meet Your Needs.

YG-1 is the undisputed world leader in carbide end mill offerings. And now, with our newly expanded V7 Plus A line, you have even more high-performance choices than ever before. Choose from a full array of 4 Flute and 6 Flute standard-stocked or custom-designed solutions. No matter what your machining challenge, we have a product for you.

How Our Innovative V7 Plus A Design Started a **REVOLUTION** in End Mill Technology

We didn't create the great cutting performance of our V7 Plus A end mills line by just doing what others have done. We engineered our line from the tip of flute to end of shank with performance-enhancing technology in mind. It's what makes the V7 Plus A line the top choice in end mill performance.

For excellent performance in stainless steels, mild steels, low/medium hardness materials and exotic materials to boot, the V7 Plus A's advanced geometry provides:

- Excellent material removal rates and surface finishes
- Unequal indexing for reduced chatter (harmonics) and improved stability
- Advanced coating for superior performance and tool life
- Improved flute geometry for impressive chip formation and evacuation
- Noticeably smooth operation in high-speed machining and peel-milling applications
- Superior slotting and profiling in most ferrous materials for more flexible use
- Excellent performance in high-speed trochoidal milling applications for improved accuracy, reduced vibration and better heat displacement
- Premium-grade carbide substrate for longer tool life

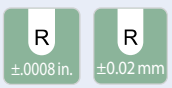
GUIDE TO ICONS

The tool is made of micrograin carbide

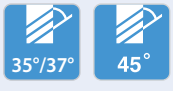
No. of Flutes

Cutting Conditions

Tolerance of Ball Radius



Helix Angle



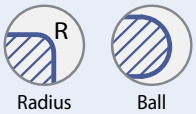
Type of Shank

Plain shank

Weldon flat

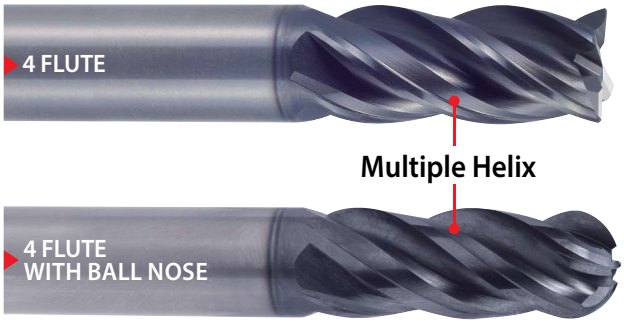
Tool Ends

Square Chamfer



Radius Ball

V7 Plus A **4 FLUTE** END MILLS



Setting a Higher Standard in 4 Flute Design

You asked for it. Now you can have state-of-the-art performance in an innovative 4 Flute design. First, you'll notice reduced vibration, optimal chip formation and excellent chip evacuation. And best of all, you'll get longer tool life in heavy cutting conditions. Available in ball nose, too.

NEW

V7 Plus A **6 FLUTE CHIP SPLITTER**

Unequal Index

Exclusively Designed Unique Geometry applied to Reduce Vibration and also to achieve Excellent Surface Finish

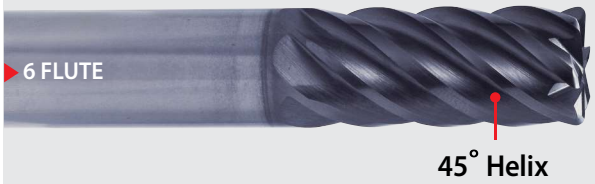
Corner Geometries

YG-1's High Performance Corner Geometries Including Corner Radius, applied for Longer Tool Life with Higher Cutting Speed

Chip Splitters

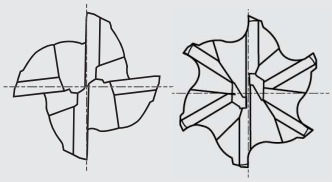
Special Chip Splitter Design Shorter Chip Length at High Axial Machining, improving Chip Removal from both the Component and the Machine

V7 Plus A **6 FLUTE** END MILLS



Better by Every Measure

From its higher stability for lower vibration to its improved performance in high-speed and trochoidal milling applications, the V7 Plus A 6 Flute solid carbide, 45-degree helix, was designed with longer tool life and higher productivity in mind.

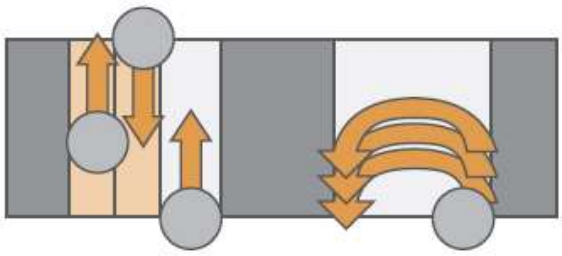


UNEQUAL INDEX WITH HIGH-PERFORMANCE CORNER GEOMETRIES INCLUDING CORNER RADIUS

Trochoidal Milling

With our V7 Plus A 6 Flute's unique cutting geometry, we made it easier to apply a small radial width-of-cut along with higher cutting speeds and excellent feed per tooth. That's why we perform better in trochoidal milling application. Here's why:

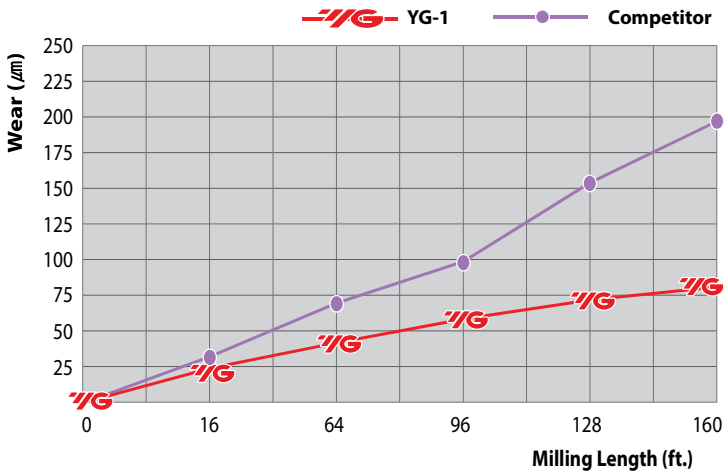
- Smaller arc engagement provides lower cutting force and better heat displacement
- More flutes provide deeper depth of cut for more productivity and reduced wear
- Stability-inducing geometry reduces vibration for increased accuracy and longer tool life
- Aggressive feed-per-tooth provides excellent chip evacuation



HIGH-PERFORMANCE SOLID CARBIDE
4 FLUTE END MILLS

CASE STUDY

4 Flute vs Competitor



	V7 Plus A	Competitor
Wear(㎛)	83.518	203.381
Milling Length (ft.)	160	160
Size (mm)	Ø10 x Ø10 x 22 x 72	
Work Material	- JIS : S45C(HRc30) - DIN : C45 - WR : 1.0503 - AISI: 1405	
Cutting Speed	755 ft/min.	
RPM	7,324 rev./min.	
Feed	57.64 inch/min.	
Feed per tooth	.002 inch/tooth	
Milling Method	Down & Side Cutting	
Milling Depth	Axial : .394 inch, Radial : .118 inch	
Coolant	Wet Cut	
Overhang	1.339 inch	
Machine	Machining Center	