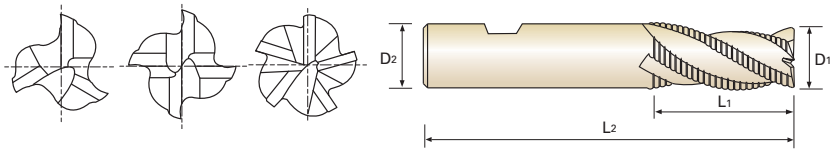
MULTI FLUTE SHORT LENGTH ROUGHING - FINE (Center Cut)



PM 60 | 3-5 | 30° | FINE | FLAT

P. 21

GYF94 SERIES

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
	D1	D2	L1	L2	
GYF94060	**6.0**	6	13	57	3
GYF94070	**7.0**	10	16	66	3
GYF94080	**8.0**	10	19	69	3
GYF94090	**9.0**	10	19	69	3
GYF94100	**10.0**	10	22	72	4
GYF94120	**12.0**	12	26	83	4
GYF94140	**14.0**	12	26	83	4
GYF94160	**16.0**	16	32	92	4
GYF94180	**18.0**	16	32	92	4
GYF94200	**20.0**	20	38	104	4
GYF94250	**25.0**	25	45	121	5

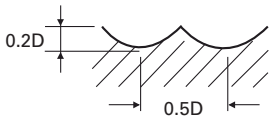
Tolerances according to DIN 7160 & 7161

	Tolerance range in ㎛		
	Nominal-Diameter in ㎛		
	over 6 to 10	over 10 to 18	over 18 to 30
js12	±75	±90	±105
h6	0 –9	0 –11	0 –13

GYF97 SERIES

Only One Coated PM60, 2 FLUTE SHORT BALL

Material	P																M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc40							
Strength	~ 500N/㎟				500 ~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
R1.5×3.0	8760	410	83	0.023	6960	275	66	0.020	4680	150	44	0.016	2400	65	23	0.014	2640	70	25	0.013
R2.0×4.0	7200	515	90	0.036	5540	350	70	0.032	3600	190	45	0.026	1920	90	24	0.023	2110	95	27	0.023
R3.0×6.0	5280	575	100	0.054	4200	385	79	0.046	2760	215	52	0.039	1440	100	27	0.035	1580	115	30	0.036
R4.0×8.0	4020	635	101	0.079	3120	420	78	0.067	2160	240	54	0.056	1070	100	27	0.047	1180	115	30	0.049
R5.0×10.0	3300	720	104	0.109	2520	480	79	0.095	1680	275	53	0.082	820	120	26	0.073	900	130	28	0.072
R6.0×12.0	2760	635	104	0.115	2160	420	81	0.097	1440	240	54	0.083	700	100	26	0.071	770	115	29	0.075
R8.0×16.0	2040	575	103	0.141	1560	385	78	0.123	1070	215	54	0.100	530	95	27	0.090	590	110	30	0.093
R10.0×20.0	1620	505	102	0.156	1200	335	75	0.140	820	180	52	0.110	430	85	27	0.099	480	95	30	0.099
R12.5×25.0	1140	370	90	0.162	890	250	70	0.140	560	140	44	0.125	300	60	24	0.100	330	65	26	0.098



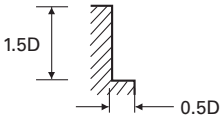
RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

GYF94, GYF98, GYG03 SERIES

Only One Coated PM60, MULTI FLUTE ROUGHING (Center Cut)

Material	P																M			
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels			
Hardness					~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc40							
Strength	~ 500N/㎟				500 ~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
6.0	3360	275	63	0.027	2640	215	50	0.027	1920	140	36	0.024	1560	125	29	0.027	1740	130	33	0.025
8.0	2880	350	72	0.041	2280	275	57	0.040	1680	190	42	0.038	1260	150	32	0.040	1440	170	36	0.039
10.0	2280	500	72	0.055	1800	380	57	0.053	1260	235	40	0.047	1070	190	34	0.044	1140	205	36	0.045
12.0	1920	500	72	0.065	1440	395	54	0.069	1080	275	41	0.064	890	215	34	0.060	960	245	36	0.064
14.0	1680	500	74	0.074	1260	395	55	0.078	910	275	40	0.076	760	215	33	0.071	830	245	37	0.074
16.0	1440	500	72	0.087	1140	395	57	0.087	790	275	40	0.087	660	215	33	0.081	720	245	36	0.085
18.0	1260	500	71	0.099	1070	395	61	0.092	730	275	41	0.094	590	215	33	0.091	660	245	37	0.093
20.0	1150	510	72	0.111	910	395	57	0.109	640	275	40	0.107	530	215	33	0.101	580	245	36	0.106
22.0	1070	510	74	0.095	780	395	54	0.101	560	275	39	0.098	480	215	33	0.090	520	245	36	0.094
25.0	950	500	75	0.105	720	380	57	0.106	500	265	39	0.106	430	215	34	0.100	470	240	37	0.102

The FEED, in long & extra long types, should be reduced by around 50%.



RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

PRODUCT INTRODUCTION

A. The ONLY ONE material is based on powder metallurgy that ensures **High Toughness** performance which is one of the advantages of Cobalt HSS.

B. The ONLY ONE has **Exceptional Wear Resistance** which is another advantage of the micro-grain carbide tools.

C. The ONLY ONE has **very strong toughness which can bring out better performances also on machines with unstable conditions such as vibration and irregular composition of work materials.**

D. The ONLY ONE performs better without causing chipping than Normal coated carbide end mills under the same carbide cutting conditions.

E. Excellent performance for Stainless Steels Pre-hardened Steels, Carbon steels, Alloy steels and Cast Iron.

Note Limited performance can occur under the rigid clamping, high speed machining and/or high hardness materials above HRc45.

PRODUCT PHILOSOPHY

A. For whom did we develop 'ONLY ONE'?

- For every CNC machining center & Conventional milling machine, **for users who pursue to Increase productivity.**
- **'Only One' can replace all of both Coated Solid Carbide & HSS Co8 End Mills.**

B. It can replace;

- **Both Coated and uncoated Solid Carbide End Mills.**
  - Better Tool Life & Cheaper Price than Coated Solid Carbide End Mills.
- All of **HSS Co8(M42) End Mills.**

C. High Technologies applied;

- YG-1's advanced "Y" coating technology applied, which is an AlCrN based coating
- 4 flutes and roughers are with multiple helix (from Ø3mm to Ø25mm)

Parameters	HSS Co8	Only One (Coated PM60)	Coated Normal Carbide
Cutting Speed	(↓)	(↑)	(↑)
Toughness		(↑)	(↑)
Price	(↓)(↓) Low	(↓) Medium	(↑) High

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Cutting Speed	(↓)	(↑)	(↑)
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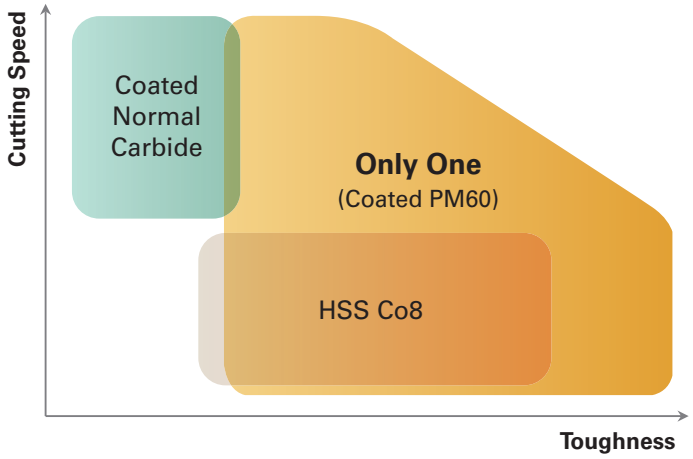
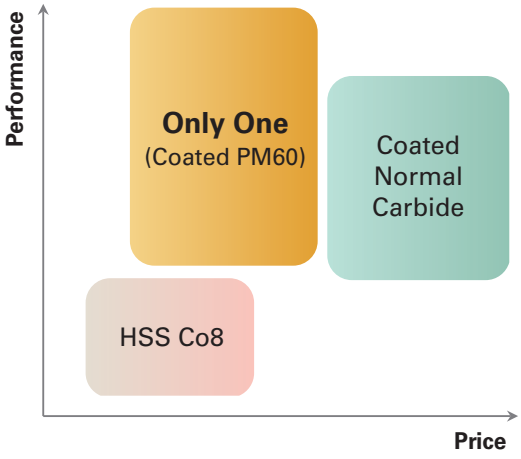
Price	(↓)(↓) Low	(↓) Medium	(↑) High

POSITIONING MAP

To protect chipping problems under the unstable machining conditions with vibration,





Higher Toughness than HSS Co8,
Cutting Speed (Vc) is as high as Coated Normal Carbide.

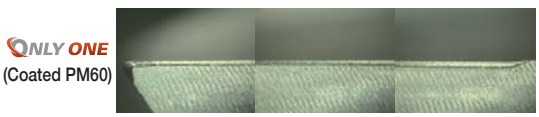
Better performance than HSS Co8,
Better price than Coated Normal Carbide.

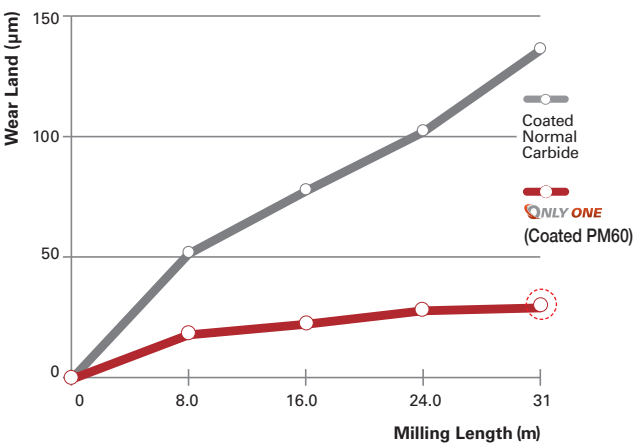
CASE STUDY 1

- **4 Flute Square End Mill, S45C – Carbide Cutting Condition**

Result	Only One Coated PM60 > Coated Normal Carbide	
Tool List	Only One Coated PM60	Coated Normal Carbide
Size	Ø10xØ10x22x72	Ø10xØ10x22x70
Work Material	- JIS : S45C - DIN : C45	- KS : SM45C - AISI : 1045
RPM	2750 rev/min.	
Feed	520 mm/rev.	
Milling Method	Down & Side Cutting	
Milling Depth	Axial : 3 mm	Radial : 1 mm
Coolant	Wet Cut	
Machine	Machining Center	

Cutting Edges Condition



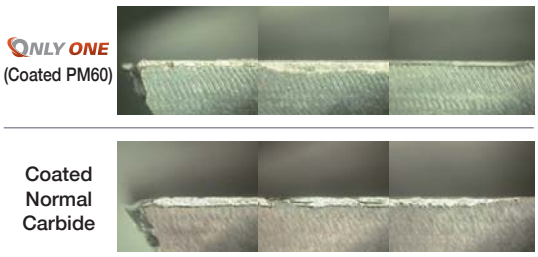


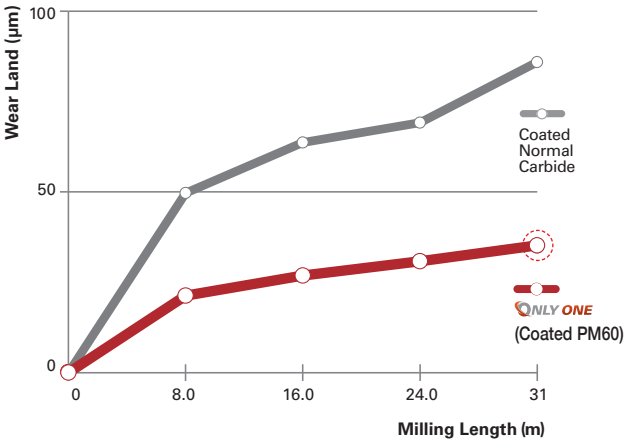
CASE STUDY 2

- **4 Flute Square End Mill, S45C(HRc30) – Carbide Cutting Condition**

Result	Only One Coated PM60 > Coated Normal Carbide	
Tool List	Only One Coated PM60	Coated Normal Carbide
Size	Ø10xØ10x22x72	Ø10xØ10x22x70
Work Material	- JIS : S45C - DIN : C45	- KS : SM45C - AISI : 1045
RPM	2750 rev/min.	
Feed	520 mm/rev.	
Milling Method	Down & Side Cutting	
Milling Depth	Axial : 10 mm	Radial : 1 mm
Coolant	Wet Cut	
Machine	Machining Center	

Cutting Edges Condition





ICON GUIDE

PM 60	Powder Metallurgy HSS
2 3 4	No. of Flute
M-Helix 30°	Helix Angle
R ±0.02	Tolerance of Ball Radius
FLAT	Type of Shank
FINE COARSE	Type of Periphery
	Cutting condition of tool see the page 000

◎:Excellent ○:Good

ITEM	MODEL	DESCRIPTION	SIZE		P				M	N			S	PAGE
			Min.	Max.	Carbon Steels ~HB225	Alloy Steels HB225~352	Prehardened Steels HRc30~40	Hardened Steels HRc40~45	Stainless Steels	Copper	Cast Iron	Aluminum	Titanium	
GYF99		PM60, 2 FLUTE SHORT LENGTH (Center Cut)	D1.0	D25.0	◎	◎	○		◎	○	◎			6
GYG01		PM60, 3 FLUTE SHORT LENGTH (Center Cut)	D1.0	D25.0	◎	◎	○		◎	○	◎			7
GYF96		PM60, 4 FLUTE SHORT LENGTH (Center Cut)	D1.0	D25.0	◎	◎	○		◎	○	◎			8
GYG52	MULTIPLE HELIX 	PM60, 4 FLUTE MULTIPLE HELIX SHORT LENGTH (Center Cut)	D3.0	D25.0	◎	◎	○		◎	○	◎			9
GYG02		PM60, 4 FLUTE LONG LENGTH (Center Cut)	D2.0	D25.0	◎	◎	○		◎	○	◎			10
GYF97		PM60, 2 FLUTE SHORT LENGTH BALL NOSE	R0.5	R12.5	◎	◎	○		◎	○	◎			11
GYF94		PM60, MULTI FLUTE SHORT LENGTH ROUGHING - FINE (Center Cut)	D6.0	D25.0	◎	◎	○		◎	○	◎			12
GYF98		PM60, MULTI FLUTE LONG LENGTH ROUGHING - FINE (Center Cut)	D6.0	D25.0	◎	◎	○		◎	○	◎			13
GYG03		PM60, MULTI FLUTE SHORT LENGTH ROUGHING - COARSE (Center Cut)	D6.0	D25.0	◎	◎	○		◎	○	◎			14
GYF95	MULTIPLE HELIX 	PM60, MULTI FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS ROUGHING - FINE (Center Cut)	D6.0	D25.0	◎	◎	○		◎	○	◎			15