COATED PM60 END MILLS

Perfect solution to protect Carbide chipping problems under vibrations.

- **Better performance than Coated Solid Carbide End Mills**
- **Better Hardness, Better Toughness than HSS Co8**
- **Dramatically reduced price of PM60 making it very competitive**

YG-1 CO., LTD.

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YG1YEOP160520001

YG-1 CO., LTD.

ONLY ONE
COATED PM60
END MILLS

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

HIGH QUALITY PRODUCTS AND ON TIME DELIVERY FOR WORLD-WIDE CUSTOMERS

Since 1982, our commitment to quality, reliability and striving for constant innovation has allowed us to expand our market share and our partners' global network. As one of the main leading tool manufacturers, we are dedicated in offering a unique customer experience by delivering high quality cutting tool solutions around the world. In order to be responsive and to offer local solutions, YG-1 has established a global network over 75 countries and has set up international logistic centers.This is our pledge to provide the best service in order to satisfy our customers' needs at all time.

GLOBAL COMPANY

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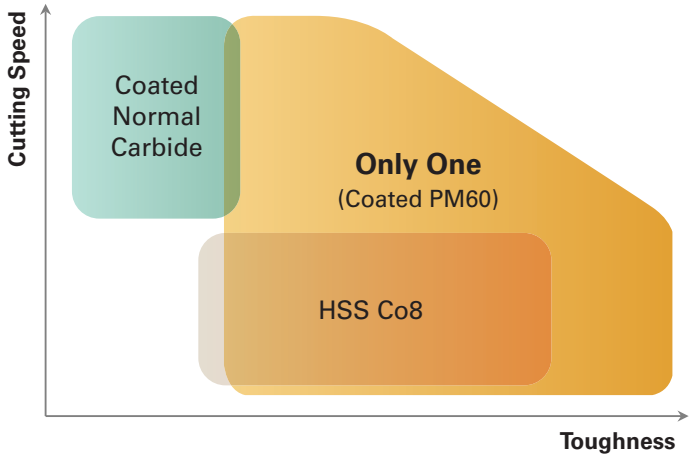
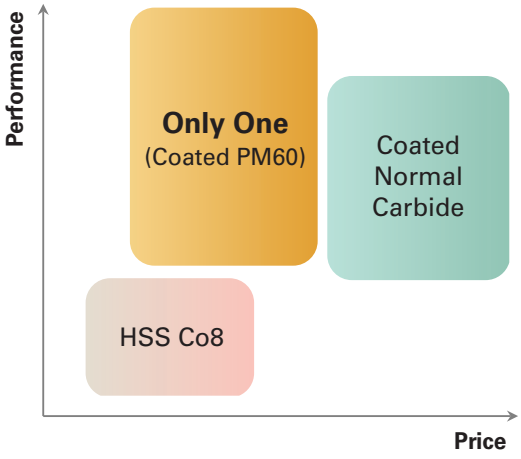
POSITIONING MAP

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.

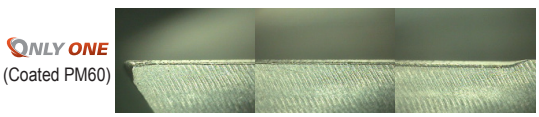
Better performance than HSS Co8,
Better price than Coated Normal Carbide.

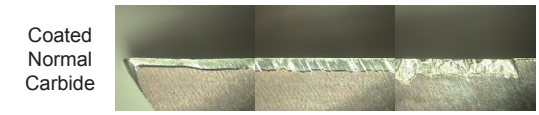
CASE STUDY 1

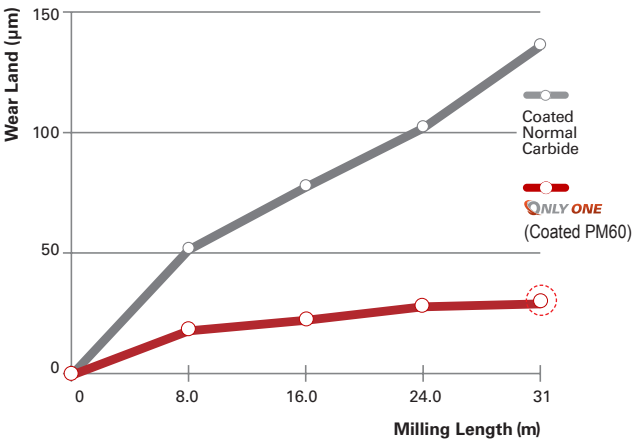
- **4 Flute Square End Mill, S45C – Carbide Cutting Condition**

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





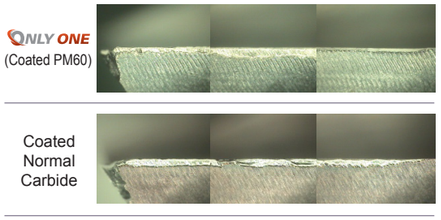


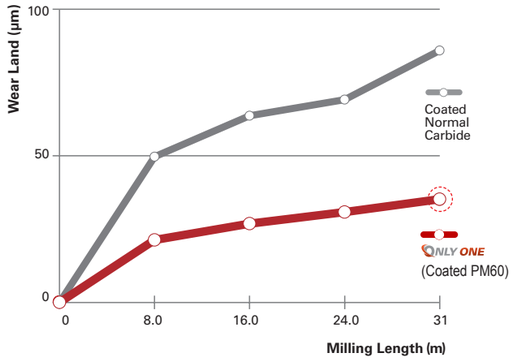
CASE STUDY 2

- **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

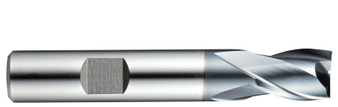
PM 60	Powder Metallurgy HSS
2 3 4	No. of Flute
M-Helix 30°	Helix Angle
R ±0.02	Tolerance of Ball Radius
FLAT	Type of Shank
FINE COARSE	Type of Periphery
	Cutting condition of tool see the page 000

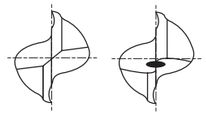
SELECTION GUIDE

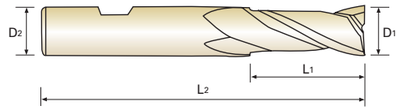
◎:Excellent ○:Good

ITEM	MODEL	DESCRIPTION	SIZE Min.	SIZE Max.	P Carbon Steels ~HB225	P Alloy Steels HB225~352	P Prehardened Steels HRc30~40	P Hardened Steels HRc40~45	M Stainless Steels	N Copper	N Cast Iron	N Aluminum	S Titanium	PAGE
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

2 FLUTE SHORT LENGTH (Center Cut)







PM60 | 2 | 30° | FLAT P. 16

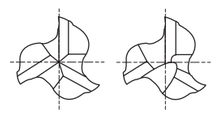
GYF99 SERIES

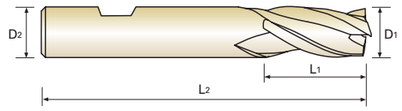
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
GYF99010	**1.0**	6	2.5	47
GYF99020	**2.0**	6	4	48
GYF99030	**3.0**	6	5	49
GYF99040	**4.0**	6	7	51
GYF99050	**5.0**	6	8	52
GYF99060	**6.0**	6	8	52
GYF99070	**7.0**	8	10	60
GYF99080	**8.0**	8	11	61
GYF99090	**9.0**	10	11	61
GYF99100	**10.0**	10	13	63
GYF99120	**12.0**	12	16	73
GYF99140	**14.0**	12	16	73
GYF99160	**16.0**	16	19	79
GYF99180	**18.0**	16	19	79
GYF99200	**20.0**	20	22	88
GYF99220	**22.0**	20	22	88
GYF99250	**25.0**	25	26	102

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

3 FLUTE SHORT LENGTH (Center Cut)





PM60 | 3 | 30° | FLAT P. 17~18

GYG01 SERIES

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
GYG01010	**1.0**	6	3	47
GYG01020	**2.0**	6	7	51
GYG01030	**3.0**	6	8	52
GYG01040	**4.0**	6	11	55
GYG01050	**5.0**	6	13	57
GYG01060	**6.0**	6	13	57
GYG01070	**7.0**	8	16	66
GYG01080	**8.0**	8	19	69
GYG01090	**9.0**	10	19	69
GYG01100	**10.0**	10	22	72
GYG01120	**12.0**	12	26	83
GYG01140	**14.0**	12	26	83
GYG01160	**16.0**	16	32	92
GYG01180	**18.0**	16	32	92
GYG01200	**20.0**	20	38	104
GYG01220	**22.0**	20	38	104
GYG01250	**25.0**	25	45	121

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

4 FLUTE SHORT LENGTH (Center Cut)

PM 60 | 4 | 30° | FLAT

P. 19

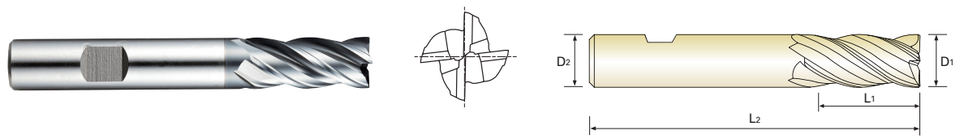
GYF96 SERIES

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
GYF96010	1.0	6	3	49
GYF96020	2.0	6	7	51
GYF96030	3.0	6	8	52
GYF96040	4.0	6	11	55
GYF96050	5.0	6	13	57
GYF96060	6.0	6	13	57
GYF96070	7.0	8	16	66
GYF96080	8.0	8	19	69
GYF96090	9.0	10	19	69
GYF96100	10.0	10	22	72
GYF96120	12.0	12	26	83
GYF96140	14.0	12	26	83
GYF96160	16.0	16	32	92
GYF96180	18.0	16	32	92
GYF96200	20.0	20	38	104
GYF96220	22.0	20	38	104
GYF96250	25.0	25	45	121

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

4 FLUTE MULTIPLE HELIX SHORT LENGTH (Center Cut)



PM 60 | 4 | M-Helix | FLAT

P. 20

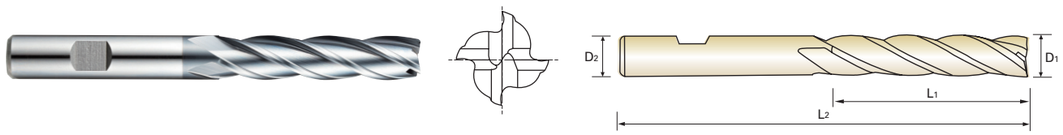
GYG52 SERIES

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
GYG52030	3.0	6	8	52
GYG52040	4.0	6	11	55
GYG52050	5.0	6	13	57
GYG52060	6.0	6	13	57
GYG52070	7.0	8	16	66
GYG52080	8.0	8	19	69
GYG52090	9.0	10	19	69
GYG52100	10.0	10	22	72
GYG52120	12.0	12	26	83
GYG52140	14.0	12	26	83
GYG52160	16.0	16	32	92
GYG52180	18.0	16	32	92
GYG52200	20.0	20	38	104
GYG52220	22.0	20	38	104
GYG52250	25.0	25	45	121

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

4 FLUTE LONG LENGTH (Center Cut)



PM60 | 4 | 30° | FLAT

P. 19

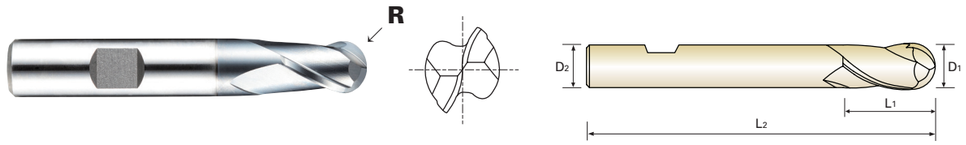
GYG02 SERIES

Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	D1	D2	L1	L2
GYG02020	**2.0**	6	10	54
GYG02030	**3.0**	6	12	56
GYG02040	**4.0**	6	19	63
GYG02050	**5.0**	6	24	68
GYG02060	**6.0**	6	24	68
GYG02070	**7.0**	8	30	80
GYG02080	**8.0**	8	38	88
GYG02090	**9.0**	10	38	88
GYG02100	**10.0**	10	45	95
GYG02120	**12.0**	12	53	110
GYG02140	**14.0**	12	53	110
GYG02160	**16.0**	16	63	123
GYG02180	**18.0**	16	63	123
GYG02200	**20.0**	20	75	141
GYG02220	**22.0**	20	75	141
GYG02250	**25.0**	25	90	166

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

2 FLUTE SHORT LENGTH BALL NOSE



PM60 | 2 | 30° | R ±0.02 | FLAT

P. 21

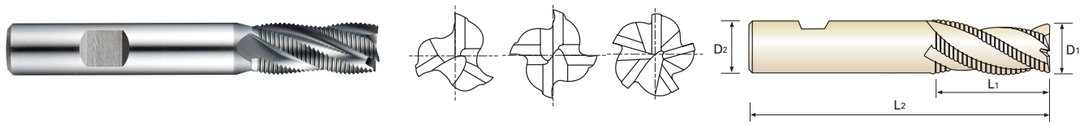
GYF97 SERIES

Unit : mm

EDP No.	Radius of Ball Nose	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D1	D2	L1	L2
GYF97010	R0.5	**1.0**	6	2.5	47
GYF97020	R1.0	**2.0**	6	4	48
GYF97030	R1.5	**3.0**	6	5	49
GYF97040	R2.0	**4.0**	6	7	51
GYF97050	R2.5	**5.0**	6	8	52
GYF97060	R3.0	**6.0**	6	8	52
GYF97070	R3.5	**7.0**	8	10	60
GYF97080	R4.0	**8.0**	8	11	61
GYF97090	R4.5	**9.0**	10	11	61
GYF97100	R5.0	**10.0**	10	13	63
GYF97120	R6.0	**12.0**	12	16	73
GYF97140	R7.0	**14.0**	12	16	73
GYF97160	R8.0	**16.0**	16	19	79
GYF97180	R9.0	**18.0**	16	19	79
GYF97200	R10.0	**20.0**	20	22	88
GYF97250	R12.5	**25.0**	25	26	102

Mill Dia. Tolerance(mm)	Shank Dia. Tolerance
0 ~ - 0.03	h6

MULTI FLUTE SHORT LENGTH ROUGHING - FINE (Center Cut)



PM60 | 3-5 | 30° | FINE | FLAT P. 21

GYF94 SERIES

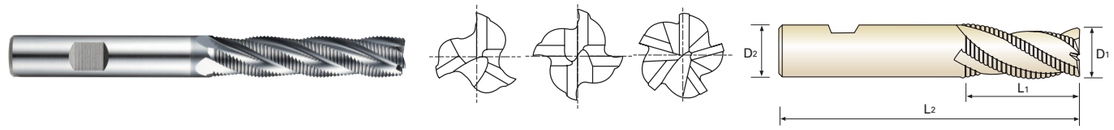
Unit : mm

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

MULTI FLUTE LONG LENGTH ROUGHING - FINE (Center Cut)



PM60 | 3-5 | 30° | FINE | FLAT P. 21

GYF98 SERIES

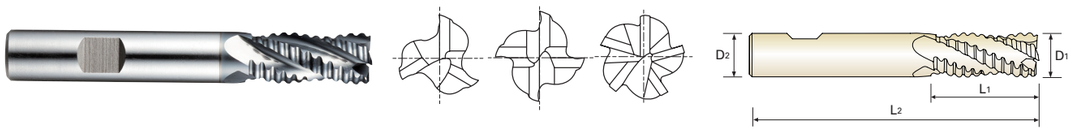
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
	D1	D2	L1	L2	
GYF98060	6.0	6	24	68	3
GYF98070	7.0	10	30	80	3
GYF98080	8.0	10	38	88	3
GYF98090	9.0	10	38	88	3
GYF98100	10.0	10	45	95	4
GYF98120	12.0	12	53	110	4
GYF98140	14.0	12	53	110	4
GYF98160	16.0	16	63	123	4
GYF98180	18.0	16	63	123	4
GYF98200	20.0	20	75	141	4
GYF98250	25.0	25	90	166	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

MULTI FLUTE SHORT LENGTH ROUGHING - COARSE (Center Cut)



PM 60 | 3-5 | 30° | COARSE | FLAT

P. 21

GYG03 SERIES

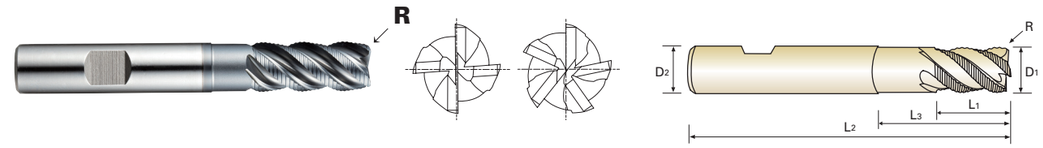
Unit : mm

EDP No.	Mill Diameter	Shank Diameter	Length of Cut	Overall Length	No. of Flute
	D1	D2	L1	L2	
GYG03060	**6.0**	6	13	57	3
GYG03070	**7.0**	10	16	66	3
GYG03080	**8.0**	10	19	69	3
GYG03090	**9.0**	10	19	69	3
GYG03100	**10.0**	10	22	72	4
GYG03120	**12.0**	12	26	83	4
GYG03140	**14.0**	12	26	83	4
GYG03160	**16.0**	16	32	92	4
GYG03180	**18.0**	16	32	92	4
GYG03200	**20.0**	20	38	104	4
GYG03250	**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

MULTI FLUTE MULTIPLE HELIX SHORT LENGTH CORNER RADIUS ROUGHING - FINE (Center Cut)



PM 60 | 4-5 | M-Helix | FINE | FLAT

P. 22

GYF95 SERIES

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Length Below Shank	Overall Length	No. of Flute
	R	D1	D2	L1	L3	L2	
GYF95060	R 0.5	**6.0**	6	13	-	57	4
GYF95070	R 0.5	**7.0**	10	16	-	66	4
GYF95080	R 0.5	**8.0**	10	19	-	69	4
GYF95090	R 0.5	**9.0**	10	19	-	69	4
GYF95100	R 0.5	**10.0**	10	22	31	72	4
GYF95120	R 0.5	**12.0**	12	26	37	83	4
GYF95140	R 1.0	**14.0**	12	26	-	83	5
GYF95160	R 1.0	**16.0**	16	32	44	92	5
GYF95180	R 1.0	**18.0**	16	32	-	92	5
GYF95200	R 1.0	**20.0**	20	38	54	104	5
GYF95250	R 1.0	**25.0**	25	45	63	121	5

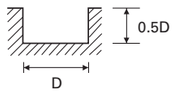
Tolerances according to DIN 7160 & 7161

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

GYF99 SERIES

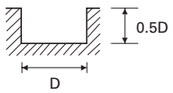
Only One Coated PM60, 2 FLUTE SHORT (Center Cut)

Material	P															
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels			
Hardness					~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc35			
Strength	~ 500N/㎟				500 ~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1100N/㎟			
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	8400	140	53	0.008	7080	110	44	0.008	5880	95	37	0.008	3780	80	24	0.011
3.0	6000	190	57	0.016	4920	160	46	0.016	4020	140	38	0.017	2760	95	26	0.017
4.0	5160	275	65	0.027	4320	210	54	0.024	3780	190	48	0.025	2400	110	30	0.023
5.0	4680	305	74	0.033	3900	240	61	0.031	3120	220	49	0.035	2040	120	32	0.029
6.0	4200	320	79	0.038	3480	250	66	0.036	2760	230	52	0.042	1740	130	33	0.037
8.0	3120	330	78	0.053	2640	290	66	0.055	2160	240	54	0.056	1380	140	35	0.051
10.0	2520	360	79	0.071	2160	320	68	0.074	1740	275	55	0.079	1080	150	34	0.069
12.0	2160	330	81	0.076	1740	290	66	0.083	1380	250	52	0.091	890	140	34	0.079
14.0	1920	320	84	0.083	1500	250	66	0.083	1200	235	53	0.098	760	130	33	0.086
16.0	1620	320	81	0.099	1380	235	69	0.085	1070	215	54	0.100	670	120	34	0.090
18.0	1380	290	78	0.105	1140	235	64	0.103	950	190	54	0.100	600	120	34	0.100
20.0	1140	265	72	0.116	940	200	59	0.106	840	180	53	0.107	530	110	33	0.104
22.0	1010	220	70	0.109	850	180	59	0.106	720	150	50	0.104	480	95	33	0.099
25.0	900	185	71	0.103	760	170	60	0.112	590	140	46	0.119	430	90	34	0.105



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

Material	P				M			
	Alloy Steels Tool Steels				Stainless Steels			
Hardness	HRc35 ~ HRc40							
Strength	1100 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	2400	50	15	0.010	2640	55	17	0.010
3.0	2160	75	20	0.017	2380	85	22	0.018
4.0	1920	90	24	0.023	2110	100	27	0.024
5.0	1620	90	25	0.028	1780	100	28	0.028
6.0	1380	100	26	0.036	1520	110	29	0.036
8.0	1070	100	27	0.047	1180	110	30	0.047
10.0	840	120	26	0.071	920	130	29	0.071
12.0	700	100	26	0.071	770	110	29	0.071
14.0	600	95	26	0.079	660	105	29	0.080
16.0	530	95	27	0.090	580	105	29	0.091
18.0	480	90	27	0.094	530	100	30	0.094
20.0	430	85	27	0.099	470	95	30	0.101
22.0	380	65	26	0.086	420	70	29	0.083
25.0	300	60	24	0.100	330	65	26	0.098

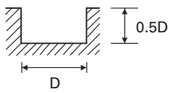


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

GYG01 SERIES

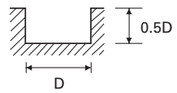
Only One Coated PM60, 3 FLUTE SHORT (Center Cut) - Slotting

Material	P															
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels			
Hardness					~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc35			
Strength	~ 500N/㎟				500 ~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1100N/㎟			
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	7800	85	49	0.004	6600	65	41	0.003	5760	55	36	0.003	3600	40	23	0.004
3.0	5520	120	52	0.007	4680	100	44	0.007	4020	60	38	0.005	2640	55	25	0.007
4.0	5160	170	65	0.011	4320	140	54	0.011	3600	95	45	0.009	2280	60	29	0.009
5.0	4560	190	72	0.014	3840	155	60	0.013	3120	110	49	0.012	2040	75	32	0.012
6.0	4020	275	76	0.023	3360	230	63	0.023	2760	170	52	0.021	1740	110	33	0.021
8.0	3120	290	78	0.031	2640	250	66	0.032	2160	180	54	0.028	1380	120	35	0.029
10.0	2520	300	79	0.040	2160	250	68	0.039	1680	190	53	0.038	1070	140	34	0.044
12.0	2160	330	81	0.051	1740	275	66	0.053	1440	205	54	0.047	890	140	34	0.052
14.0	1920	300	84	0.052	1620	265	71	0.055	1200	190	53	0.053	790	130	35	0.055
16.0	1620	290	81	0.060	1380	250	69	0.060	1070	180	54	0.056	670	120	34	0.060
18.0	1380	290	78	0.070	1070	230	61	0.072	950	180	54	0.063	600	115	34	0.064
20.0	1140	275	72	0.080	950	230	60	0.081	840	170	53	0.067	530	110	33	0.069
22.0	1010	275	70	0.091	880	235	61	0.089	720	180	50	0.083	480	115	33	0.080
25.0	900	290	71	0.107	760	250	60	0.110	590	190	46	0.107	430	120	34	0.093



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

Material	P				M			
	Alloy Steels Tool Steels				Stainless Steels			
Hardness	HRc35 ~ HRc40							
Strength	1100 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	2280	35	14	0.005	2510	40	16	0.005
3.0	2160	55	20	0.008	2380	60	22	0.008
4.0	1800	65	23	0.012	1980	70	25	0.012
5.0	1560	65	25	0.014	1720	70	27	0.014
6.0	1320	90	25	0.023	1450	100	27	0.023
8.0	1070	100	27	0.031	1180	110	30	0.031
10.0	820	110	26	0.045	900	120	28	0.044
12.0	700	110	26	0.052	770	120	29	0.052
14.0	600	100	26	0.056	660	110	29	0.056
16.0	530	100	27	0.063	580	110	29	0.063
18.0	480	95	27	0.066	530	105	30	0.066
20.0	430	95	27	0.074	470	105	30	0.074
22.0	380	100	26	0.088	420	110	29	0.087
25.0	300	100	24	0.111	330	110	26	0.111

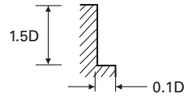


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

GYG01 SERIES

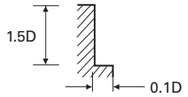
Only One Coated PM60, 3 FLUTE SHORT (Center Cut) - Side Cutting

Material	P															
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels			
Hardness					~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc35			
Strength	~ 500N/㎟				500 ~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1100N/㎟			
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	9840	120	62	0.004	8160	95	51	0.004	6600	80	41	0.004	4560	60	29	0.004
3.0	6960	175	66	0.008	5760	145	54	0.008	4560	90	43	0.007	3240	80	31	0.008
4.0	6240	220	78	0.012	5280	185	66	0.012	4200	130	53	0.010	2760	90	35	0.011
5.0	5640	250	89	0.015	4800	210	75	0.015	3480	150	55	0.014	2400	100	38	0.014
6.0	5040	360	95	0.024	4320	300	81	0.023	3120	230	59	0.025	2160	150	41	0.023
8.0	3840	395	97	0.034	3120	325	78	0.035	2400	240	60	0.033	1560	170	39	0.036
10.0	3000	420	94	0.047	2520	350	79	0.046	1920	250	60	0.043	1200	180	38	0.050
12.0	2520	420	95	0.056	2160	360	81	0.056	1680	275	63	0.055	1080	180	41	0.056
14.0	2160	420	95	0.065	1800	340	79	0.063	1380	250	61	0.060	940	170	41	0.060
16.0	1920	395	97	0.069	1560	330	78	0.071	1200	240	60	0.067	790	170	40	0.072
18.0	1620	370	92	0.076	1380	320	78	0.077	1070	235	61	0.073	700	155	40	0.074
20.0	1500	360	94	0.080	1260	305	79	0.081	940	230	59	0.082	620	150	39	0.081
22.0	1380	370	95	0.089	1140	320	79	0.094	890	235	62	0.088	560	155	39	0.092
25.0	1200	395	94	0.110	1010	330	79	0.109	760	250	60	0.110	500	160	39	0.107



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

Material	P				M			
	Alloy Steels Tool Steels				Stainless Steels			
Hardness	HRc35 ~ HRc40							
Strength	1100 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	2880	50	18	0.006	3170	55	20	0.006
3.0	2640	80	25	0.010	2900	90	27	0.010
4.0	2280	90	29	0.013	2510	100	32	0.013
5.0	2040	90	32	0.015	2240	100	35	0.015
6.0	1800	120	34	0.022	1980	130	37	0.022
8.0	1320	140	33	0.035	1450	155	36	0.036
10.0	1070	150	34	0.047	1180	165	37	0.047
12.0	890	150	34	0.056	980	165	37	0.056
14.0	760	145	33	0.064	840	160	37	0.063
16.0	660	140	33	0.071	730	155	37	0.071
18.0	600	130	34	0.072	660	145	37	0.073
20.0	530	130	33	0.082	580	145	36	0.083
22.0	480	130	33	0.090	530	145	37	0.091
25.0	430	145	34	0.112	470	160	37	0.113

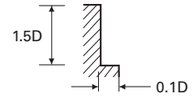


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

GYF96, GYG02 SERIES

Only One Coated PM60, 4 FLUTE (Center Cut)

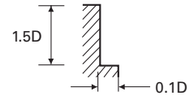
Material	P															
	Structural Steels Carbon Steels				Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels			
Hardness					~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc35			
Strength	~ 500N/㎟				500 ~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1100N/㎟			
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	11040	350	69	0.008	10080	290	63	0.007	7320	205	46	0.007	4920	150	31	0.008
3.0	7920	490	75	0.015	7200	420	68	0.015	5280	300	50	0.014	3240	215	31	0.017
4.0	6360	575	80	0.023	5640	480	71	0.021	4320	360	54	0.021	2760	240	35	0.022
5.0	5280	610	83	0.029	4800	505	75	0.026	3480	385	55	0.028	2400	265	38	0.028
6.0	4680	650	88	0.035	4320	540	81	0.031	3120	395	59	0.032	2160	275	41	0.032
8.0	3720	685	93	0.046	3120	575	78	0.046	2400	445	60	0.046	1680	290	42	0.043
10.0	2760	755	87	0.068	2520	635	79	0.063	1920	455	60	0.059	1200	320	38	0.067
12.0	2400	685	90	0.071	2160	575	81	0.067	1680	445	63	0.066	1070	290	40	0.068
14.0	2160	660	95	0.076	1920	550	84	0.072	1320	420	58	0.080	950	275	42	0.072
16.0	1920	610	97	0.079	1680	515	84	0.077	1200	410	60	0.085	820	265	41	0.081
18.0	1800	550	102	0.076	1500	480	85	0.080	1070	370	61	0.086	760	235	43	0.077
20.0	1500	530	94	0.088	1260	445	79	0.088	940	330	59	0.088	640	210	40	0.082
22.0	1260	490	87	0.097	1140	385	79	0.084	820	305	57	0.093	560	190	39	0.085
25.0	1200	445	94	0.093	1010	365	79	0.090	760	275	60	0.090	500	180	39	0.090



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

Material	P				M			
	Alloy Steels Tool Steels				Stainless Steels			
Hardness	HRc35 ~ HRc40							
Strength	1100 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
2.0	3960	100	25	0.006	4360	110	27	0.006
3.0	2880	150	27	0.013	3170	165	30	0.013
4.0	2400	180	30	0.019	2640	200	33	0.019
5.0	2040	190	32	0.023	2240	210	35	0.023
6.0	1740	215	33	0.031	1910	235	36	0.031
8.0	1380	220	35	0.040	1520	240	38	0.039
10.0	1070	240	34	0.056	1180	265	37	0.056
12.0	860	220	32	0.064	950	240	36	0.063
14.0	760	205	33	0.067	840	225	37	0.067
16.0	660	200	33	0.076	730	220	37	0.075
18.0	600	180	34	0.075	660	200	37	0.076
20.0	530	170	33	0.080	580	185	36	0.080
22.0	480	155	33	0.081	530	170	37	0.080
25.0	430	150	34	0.087	470	165	37	0.088

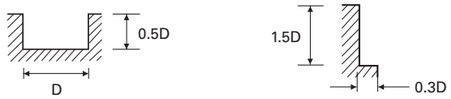


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

GYG52 SERIES

Only One Coated PM60, 4 FLUTE MULTIPLE HELIX SHORT (Center Cut)

Material	P												M			
	Structural Steels Carbon Steels Cast Irons				Carbon Steels Alloy Steels Tool Steels				Prehardened Steels Alloy Steels Tool Steels				Stainless Steels 300 Series			
Hardness	~ HRc20				HRc20 ~ HRc30				HRc30 ~ HRc35							
Strength	~ 800N/㎟				800 ~ 1000N/㎟				1000 ~ 1300N/㎟							
Diameter	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz	RPM	FEED	Vc	Fz
3.0	7410	155	70	0.005	6740	140	64	0.005	4720	95	44	0.005	5090	100	48	0.005
4.0	5560	180	70	0.008	5050	165	63	0.008	3540	115	44	0.008	3800	125	48	0.008
5.0	4440	205	70	0.012	4040	185	63	0.011	2830	130	44	0.011	3060	155	48	0.013
6.0	3710	240	70	0.016	3370	220	64	0.016	2360	155	44	0.016	2550	180	48	0.018
8.0	2780	310	70	0.028	2530	280	64	0.028	1770	195	44	0.028	1910	220	48	0.029
10.0	2450	380	77	0.039	2230	345	70	0.039	1560	240	49	0.038	1530	295	48	0.048
12.0	2050	385	77	0.047	1860	350	70	0.047	1300	245	49	0.047	1270	285	48	0.056
14.0	1750	340	77	0.049	1590	310	70	0.049	1110	220	49	0.050	1090	260	48	0.060
16.0	1530	325	77	0.053	1390	295	70	0.053	980	205	49	0.052	960	240	48	0.063
18.0	1360	320	77	0.059	1240	295	70	0.059	870	205	49	0.059	850	240	48	0.071
20.0	1220	320	77	0.065	1110	290	70	0.065	780	205	49	0.066	760	235	48	0.077
25.0	980	245	77	0.063	890	225	70	0.063	620	160	49	0.065	610	190	48	0.078

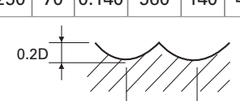


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

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



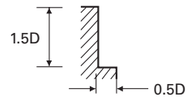
RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

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%.

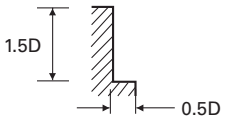


RPM = rev./min.
FEED = mm/min.
Vc = m/min.
Fz = mm/tooth

GYF95 SERIES

ONLY ONE COATED PM60, MULTI FLUTE MULTIPLE HELIX SHORT 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	4030	330	76	0.020	3170	260	60	0.021	2300	170	43	0.018	1870	150	35	0.020	2090	155	39	0.019
8.0	3460	420	87	0.030	2740	330	69	0.030	2020	230	51	0.028	1510	180	38	0.030	1730	205	43	0.030
10.0	2740	600	86	0.055	2160	455	68	0.053	1510	280	47	0.046	1280	230	40	0.045	1370	245	43	0.045
12.0	2300	600	87	0.065	1730	475	65	0.069	1300	330	49	0.063	1070	260	40	0.061	1150	295	43	0.064
14.0	2020	600	89	0.059	1510	475	66	0.063	1090	330	48	0.061	910	260	40	0.057	1000	295	44	0.059
16.0	1730	600	87	0.069	1370	475	69	0.069	950	330	48	0.069	790	260	40	0.066	860	295	43	0.069
18.0	1510	600	85	0.079	1280	475	72	0.074	880	330	50	0.075	710	260	40	0.073	790	295	45	0.075
20.0	1380	610	87	0.088	1090	475	68	0.087	770	330	48	0.086	640	260	40	0.081	700	295	44	0.084
25.0	1140	600	90	0.105	860	455	68	0.106	600	320	47	0.107	520	260	41	0.100	560	290	44	0.104



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