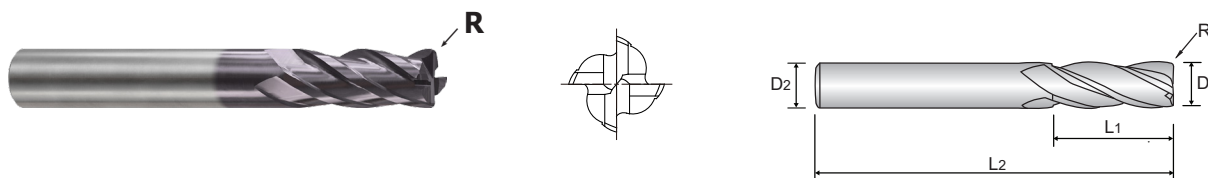


END MILLS for HARDENED MATERIAL



CARBIDE, 4 FLUTE CORNER RADIUS SHORT LENGTH

- Designed for machining high-hardened materials, dry cutting, and high-speed cutting.
- Consistently delivers an exceptional workpiece finish and boasts high wear resistance.



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Size	Mill Dia.Tolerance (mm)	Shank Dia.Tolerance
up to Ø6	0 ~ - 0.012	h5
over Ø6	0 ~ - 0.015	

GFJ71 SERIES

Unit : mm

EDP No.	Corner Radius	Mill Diameter	Shank Diameter	Length of Cut	Overall Length
	R	D1	D2	L1	L2
GFJ7103002	R0.2	3.0	6	8	50
GFJ7103003	R0.3	3.0	6	8	50
GFJ7103005	R0.5	3.0	6	8	50
GFJ7104002	R0.2	4.0	6	11	50
GFJ7104003	R0.3	4.0	6	11	50
GFJ7104005	R0.5	4.0	6	11	50
GFJ7105002	R0.2	5.0	6	13	50
GFJ7106002	R0.2	6.0	6	16	50
GFJ7106005	R0.5	6.0	6	16	50
GFJ7106010	R1.0	6.0	6	16	50
GFJ7108003	R0.3	8.0	8	20	60
GFJ7108005	R0.5	8.0	8	20	60
GFJ7108010	R1.0	8.0	8	20	60
GFJ7108015	R1.5	8.0	8	20	60
GFJ7108020	R2.0	8.0	8	20	60
GFJ7110003	R0.3	10.0	10	25	75
GFJ7110005	R0.5	10.0	10	25	75
GFJ7110010	R1.0	10.0	10	25	75
GFJ7110015	R1.5	10.0	10	25	75
GFJ7110020	R2.0	10.0	10	25	75
GFJ7112005	R0.5	12.0	12	32	75
GFJ7112010	R1.0	12.0	12	32	75
GFJ7112015	R1.5	12.0	12	32	75
GFJ7112020	R2.0	12.0	12	32	75

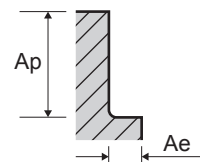
RECOMMENDED CUTTING CONDITIONS

Vc = (m/min.)
fz = (mm/tooth)
RPM = (rev/min.)
FEED = (mm/min.)

GFJ71 SERIES

4 FLUTE CORNER RADIUS - SIDE CUTTING

ISO	VDI 3323	Material Description	Ae(mm)	Ap(mm)	Parameter	Diameter (Ø)						
						3.0	4.0	5.0	6.0	8.0	10.0	12.0
P	1-4	Non-alloy steel	0.1D	1.0D	Vc	88	100	104	110	111	107	109
					fz	0.009	0.019	0.024	0.030	0.042	0.047	0.047
					RPM	9,350	7,950	6,600	5,850	4,400	3,400	2,900
					FEED	335	600	630	695	745	640	545
	5	Non-alloy steel	0.02D	1.0D	Vc	55	61	62	67	67	66	66
					fz	0.009	0.019	0.024	0.030	0.038	0.038	0.038
					RPM	5,850	4,850	3,950	3,550	2,650	2,100	1,750
					FEED	210	370	380	430	400	315	265
	6-7	Low alloy steel	0.1D	1.0D	Vc	88	100	104	110	111	107	109
					fz	0.009	0.019	0.024	0.030	0.042	0.047	0.047
					RPM	9,350	7,950	6,600	5,850	4,400	3,400	2,900
					FEED	335	600	630	695	745	640	545
	8-9	Low alloy steel	0.02D	1.0D	Vc	55	61	62	67	67	66	66
					fz	0.009	0.019	0.024	0.030	0.038	0.038	0.038
					RPM	5,850	4,850	3,950	3,550	2,650	2,100	1,750
					FEED	210	370	380	430	400	315	265
	10	High alloyed steel, and tool steel	0.1D	1.0D	Vc	88	100	104	110	111	107	109
					fz	0.009	0.019	0.024	0.030	0.042	0.047	0.047
					RPM	9,350	7,950	6,600	5,850	4,400	3,400	2,900
					FEED	335	600	630	695	745	640	545
	11.1 11.2	High alloyed steel, and tool steel	0.02D	1.0D	Vc	55	61	62	67	67	66	66
					fz	0.009	0.019	0.024	0.030	0.038	0.038	0.038
					RPM	5,850	4,850	3,950	3,550	2,650	2,100	1,750
					FEED	210	370	380	430	400	315	265
M	14.1	Stainless steel	0.1D	1.0D	Vc	46	51	52	57	55	55	55
					fz	0.009	0.018	0.024	0.029	0.042	0.045	0.043
					RPM	4,850	4,050	3,300	3,000	2,200	1,750	1,450
					FEED	180	295	315	345	370	315	250
H	38.1 - 38.2	Hardened steel	0.02D	1.0D	Vc	33	39	38	40	44	46	45
					fz	0.005	0.005	0.008	0.010	0.016	0.016	0.018
					RPM	3,550	3,100	2,450	2,100	1,750	1,450	1,200
					FEED	65	65	75	85	115	95	85
	39.1 - 39.2	Hardened steel	0.02D	1.0D	Vc	19	19	20	22	23	22	23
					fz	0.007	0.009	0.011	0.012	0.015	0.014	0.017
					RPM	2,000	1,550	1,300	1,150	900	700	600
					FEED	55	55	55	55	55	40	40
	40	Chilled Cast Iron	0.02D	1.0D	Vc	55	61	62	67	67	66	66
					fz	0.009	0.019	0.024	0.030	0.038	0.038	0.038
					RPM	5,850	4,850	3,950	3,550	2,650	2,100	1,750
					FEED	210	370	380	430	400	315	265
	41	Hardened steel Chilled Cast Iron	0.02D	1.0D	Vc	33	39	38	40	44	46	45
					fz	0.005	0.005	0.008	0.010	0.016	0.016	0.018
					RPM	3,550	3,100	2,450	2,100	1,750	1,450	1,200
					FEED	65	65	75	85	115	95	85



SOLID CARBIDE, END MILLS for Hardened Material

Specially optimized geometry and coating
for machining Hardened steels up to 65 HRC

◎ : Excellent ○ : Good

ISO	VDI 3323	Material Description	Composition / Structure / Heat Treatment		HB	HRC		
P	1	Non-alloy steel	About 0.15% C	Annealed	125			
	2		About 0.45% C	Annealed	190	13		
	3		About 0.45% C	Quenched & Tempered	250	25		
	4		About 0.75% C	Annealed	270	28		
	5		About 0.75% C	Quenched & Tempered	300	32	○	○
	6	Low alloy steel		Annealed	180	10		
	7			Quenched & Tempered	275	29		
	8			Quenched & Tempered	300	32	○	○
	9			Quenched & Tempered	350	38	○	○
	10	High alloyed steel, and tool steel		Annealed	200	15		
	11			Quenched & Tempered	325	35	◎	◎
M	12	Stainless steel	Ferritic / Martensitic	Annealed	200	15		
	13		Martensitic	Quenched & Tempered	240	23		
	14		Austenitic		180	10		
K	15	Grey cast iron	Pearlitic / ferritic		180	10		
	16		Pearlitic (Martensitic)		260	26		
	17	Nodular cast iron	Ferritic		160	3		
	18		Pearlitic		250	25		
	19	Malleable cast iron	Ferritic		130			
	20		Pearlitic		230	21		
N	21	Aluminum- wrought alloy	Not Curable		60			
	22		Curable	Hardened	100			
	23	Aluminum-cast, alloyed	≤ 12% Si, Not Curable		75			
	24		≤ 12% Si, Curable	Hardened	90			
	25		> 12% Si, Not Curable		130			
	26	Copper and Copper Alloys (Bronze / Brass)	Cutting Alloys, PB>1%		110			
	27		CuZn, CuSnZn (Brass)		90			
	28		CuSn, lead-free copper and electrolytic copper		100			
	29	Non Metallic Materials	Duroplastic, Fiber Reinforced Plastic					
	30		Rubber, Wood, etc.					
S	31	Heat Resistant Super Alloys	Fe Based	Annealed	200	15		
	32			Cured	280	30		
	33		Ni or Co Based	Annealed	250	25		
	34			Cured	350	38		
	35			Cast	320	34		
	36	Titanium Alloys	Pure Titanium		400 Rm			
	37		Alpha + Beta Alloys		1050 Rm			
H	38	Hardened steel		Hardened	550	55	◎	◎
	39			Hardened	630	60	◎	◎
	40	Chilled Cast Iron		Cast	400	42	◎	◎
	41	Hardened Cast Iron		Hardened	550	55	◎	◎

Recommended cutting conditions : p.75~82

SERIES

FLUTE

HELIX ANGLE

CUTTING EDGE SHAPE

SIZE MIN

SIZE MAX

PAGE

GFJ69

GFJ68

2

2

30°

30°

BALL NOSE

BALL NOSE

R0.2

R0.1

R2.0

R6.0

66

69

LONG LENGTH

-

Z-VG Coating

Z-VG Coating



GFJ70	GFJ71	GFJ74	GFJ72	GFJ73
4	4	6	2	4
30°	30°	45°	30°	30°
CORNER RADIUS	CORNER RADIUS	SQUARE	SQUARE	SQUARE
D6.0	D3.0	D6.0	D0.4	D1.0
D12.0	D12.0	D20.0	D20.0	D20.0
70	71	72	73	74
-	SHORT LENGTH	-	STUB LENGTH	STUB LENGTH
Z-VG Coating	Z-VG Coating	Z-VG Coating	Z-VG Coating	Z-VG Coating
				
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◎	◎	◎	◎	41

SUPER HARDENED
HSS END MILL

COATED CARBIDE END MILL
FOR GENERAL

COATED CARBIDE END MILL
FOR HEAVY CUTTING

COATED CARBIDE END MILL
FOR HARDENED MATERIAL

COATED CARBIDE DRILL
FOR GENERAL