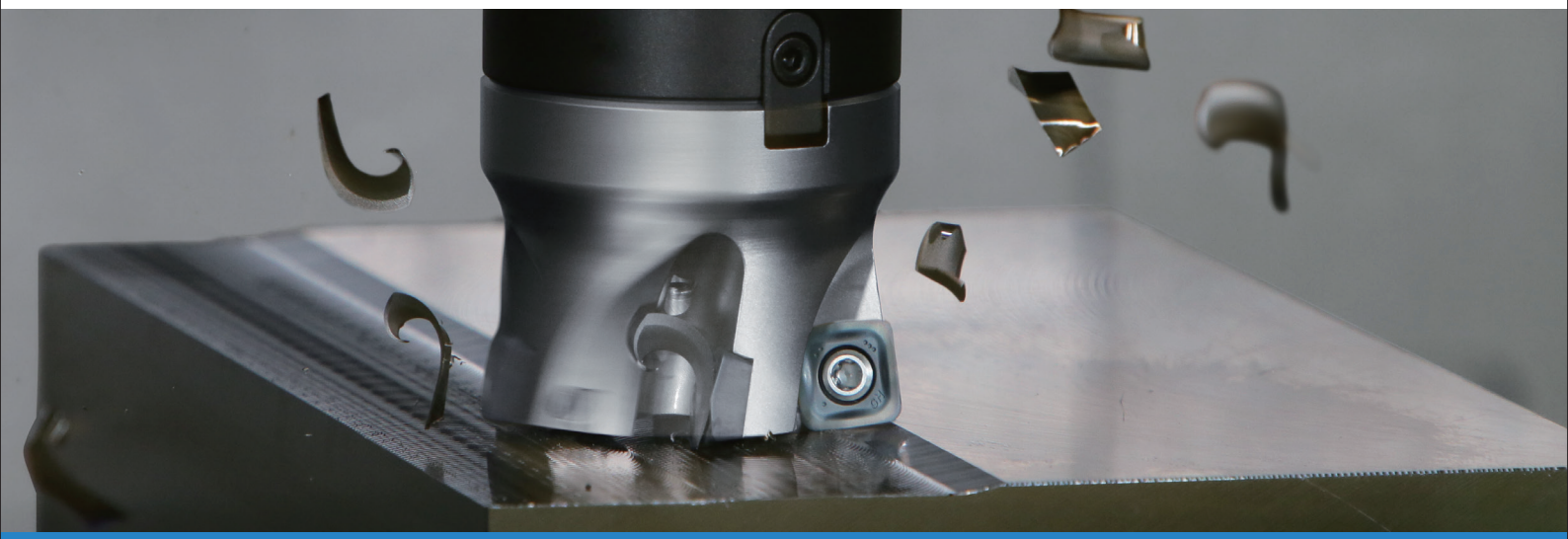
THE NEW VALUE FRONTIER

KYOCERA

High Efficiency and High Feed Cutter

MFH



Stable Machining with Greater Chatter Resistance

Reduce Cycle Time During Roughing Applications

Multi-Functional for Various Applications

MFH Mini High Feed Mills for Small Machining Centers

MFH Mini
ø16 – ø32

MFH Harrier
ø25 – ø160

High Efficiency and High Feed Cutter

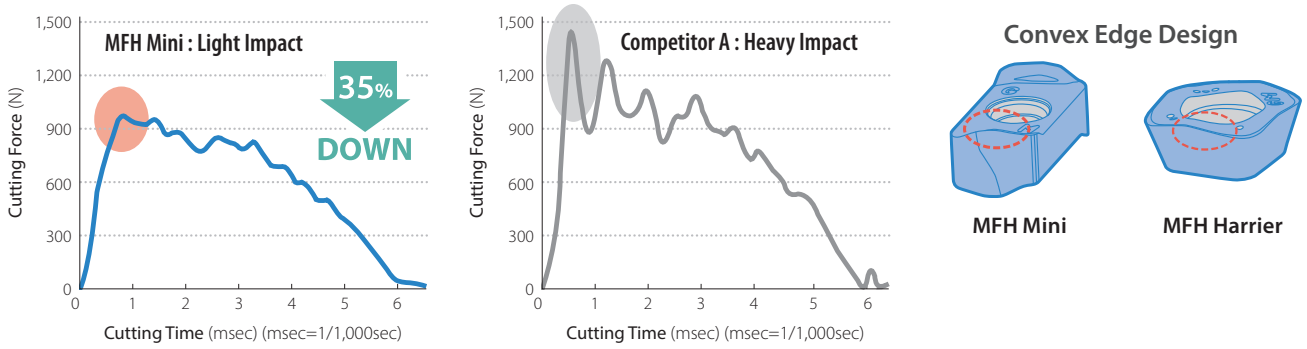
MFH

Chatter Resistant and Highly Efficient for Roughing Applications
Now Including the MFH Mini High Feed Mills for Small Machining Centers

1 Reduced Chattering with Convex Cutting Edge Design

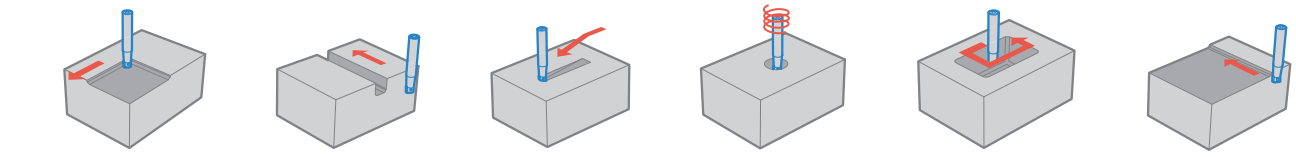
Reduces Cutting Forces at Initial Impact with a Convex Helical Edge Design

Cutting Force and Vibration when Approaching the Workpiece (ap: Half of Cutter Diameter)



Cutting Conditions: Cutter Dia. Dc = ø16 mm, Vc = 150 m/min, fz = 1.0 mm/t, ap × ae = 0.5 × 8 mm, Dry Workpiece: S50C

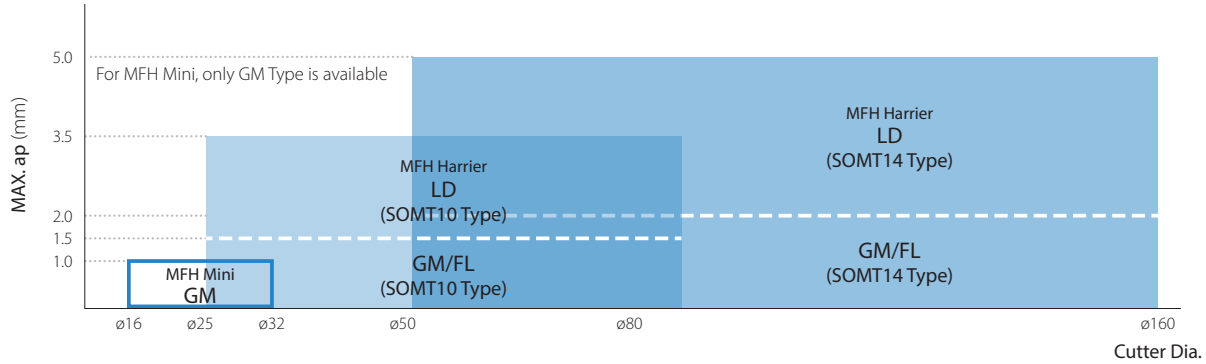
2 Wide Application Range for Multiple Metalworking Processes



Face Milling & Shouldering | Slotting | Ramping | Helical Milling | Pocketing | Contouring

For Using MFH Harrier
GM chipbreaker is available for all the above applications. LD and FL chipbreakers are not available for helical milling, plunging and contouring of rising wall. (Please refer to back cover)

Application Range



Small Dia. Cutter for High Feed Machining

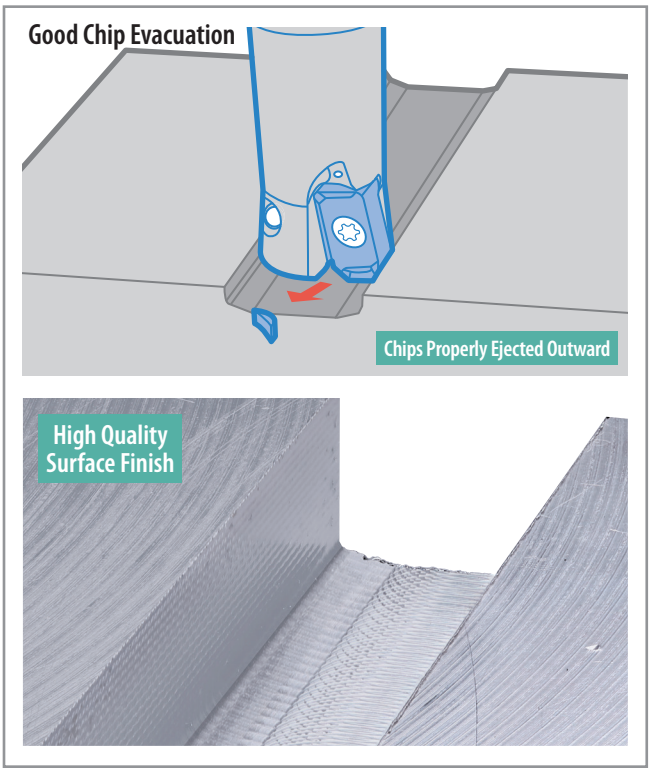
MFH Mini Cutter Dia. ø16 – ø32

Economical Inserts with 4 Cutting Edges
Small Dia. Fine Pitch Type for High Efficiency and High Feed Machining

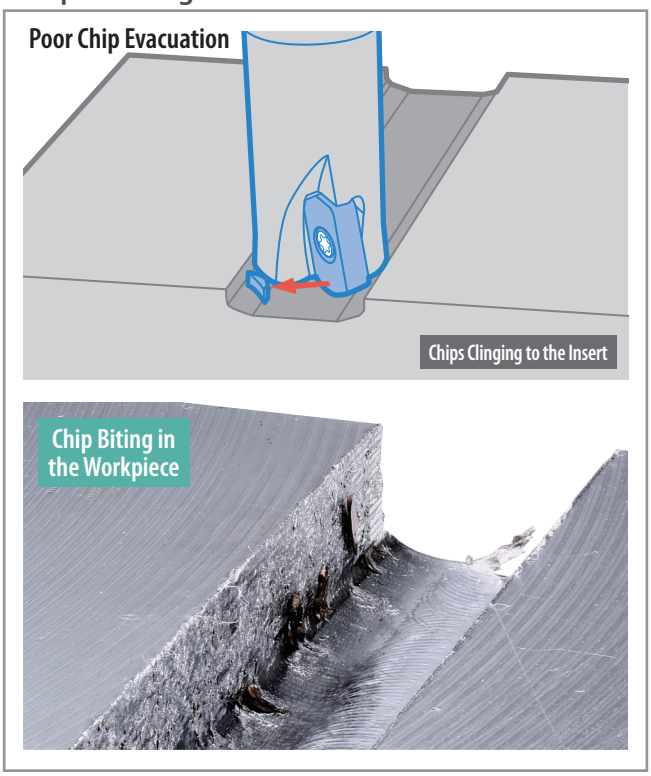
1 Good Chip Evacuation

MFH Mini Controls Chip Biting with Convex Cutting Edge

MFH Mini



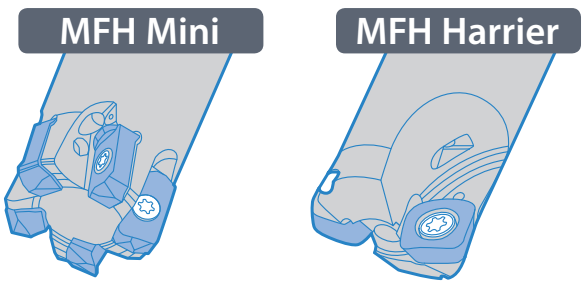
Competitor High Feed Cutter



Cutting Conditions: Cutter Dia. Dc = ø16 mm, Vc = 150 m/min, fz = 0.6 mm/t, ap = 0.5 mm (20pass): Total 10 mm × 16 mm, Dry Workpiece: SS400

2 Fine Pitch for Efficient Machining

Cutter Dia. 25 mm Type

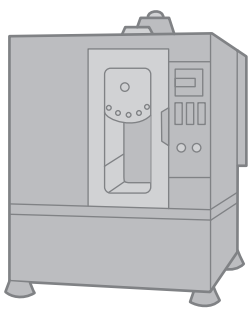


5 Inserts MFH25-S25-03-5T

2 Inserts MFH25-S25-10-2T

3 Suitable for Roughing of Molds

High Feed Machining in Small Machining Centers



Applicable for BT30/ BT40

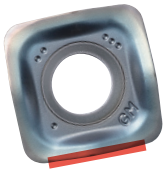
Highly Efficiency and High Feed Cutter

MFH Harrier Cutter Dia. ø25 – ø160

Wide Produce Lineup for High Feed Machining
Large Depths of Cut and Low Cutting Forces

1 3 Different Insert Designs Offer a Variety of Machining Options

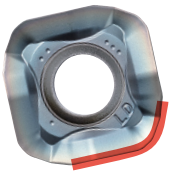
GM (General Purpose)



First Recommendation for General Machining

Multiple Metalworking Processes

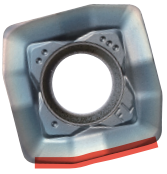
LD (Large ap)



MAX. ap = 5 mm

Available for Scale Removal as Well as High Feed Cutting

FL (Wiper Edge)

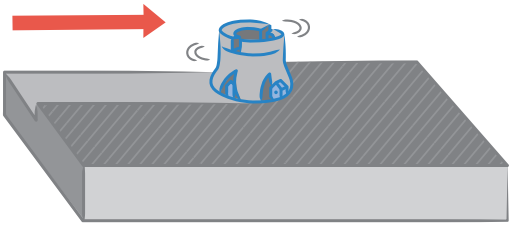


Wiper Edge with Low Cutting Forces

Excellent Surface Finish and Reduced Chattering

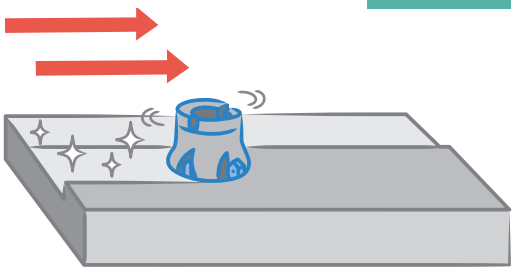
Advice LD Chipbreaker Can Be Used for Both Large ap and High Feed Machining

Large ap for Scale Removal **ap: 4.0 mm**



(fz = 0.25 mm/t, ap = 4 mm)

High Feed Rates After Scale Removal **fz = 1.5 mm/t**



(fz = 1.5 mm/t, ap = 2 mm)

MFH Harrier MFH063R-14-5T-22M (Cutter Dia. 63 mm, 5 Inserts)

① Roughing for Scale Removal (2 Passes): Large ap

Vc = 200 m/min, fz = 0.25 mm/t
ap × ae = 4 × 40 mm
Vf = 1,264 mm/min

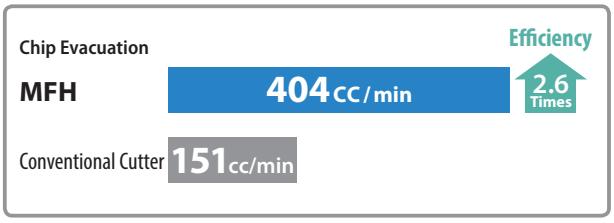
② Roughing (2 Passes) After Scale Removal: High Feed Rate

Vc = 200 m/min, fz = 1.5 mm/t
ap × ae = 2 × 40 mm, Vf = 7,583 mm/min
Workpiece: SS400

Conventional 45° Cutter Cutter Dia. 63 mm, 5 Inserts

Roughing (4 Passes):
Constant D.O.C. and Feed Rate

Vc = 200 m/min, fz = 0.25 mm/t
ap × ae = 3 × 40 mm, Vf = 1,264 mm/min
Workpiece: SS400



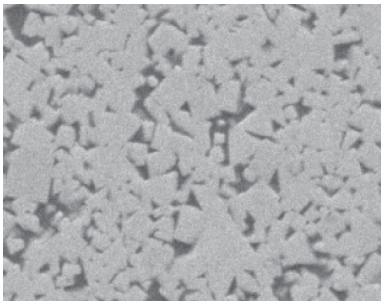
MEGACOAT NANO PR1535

MEGACOAT NANO Grade PR1535 for stable machining of difficult-to-cut materials such as heat-resistant alloy, titanium alloy and precipitation hardened stainless steel

1 Toughening by a New Cobalt Mixing Ratio

An increase in cobalt content yields a substrate with greater toughness. Fracture toughness values are improved by 23% over previous grades.

High Toughness Carbide Base Material



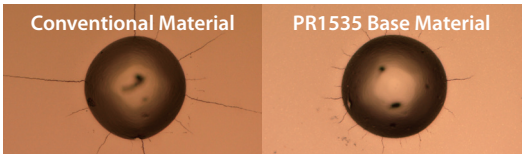
23% Fracture Toughness

2 Stability Improvement

The coarse grain structure and uniform particle size correspond to improved heat resistance, with conductivity values decreased by 11%. The uniform structure also reduces crack propagation.

Cracking Comparison by Diamond Indentor (In-house Evaluation)

Shock Resistance



Long Cracks　　Short Cracks

Thin Film CVD Coated Carbide **CA6535** Wear Resistance Oriented

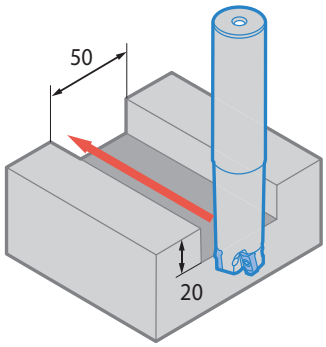
MEGACOAT NANO **PR1525** For Steel

MEGACOAT NANO **PR1510** For Cast Iron

Case Studies

MFH Mini
Aircraft Parts
Precipitation Hardened Stainless Steel

Vc = 120 m/min
fz = 0.6 mm/t
ap × ae = 0.7 × ~25 mm Dry
MFH25-S25-03-4T (4 inserts)
LOGU030310ER-GM PR1535



Machining Efficiency　　Tool Life

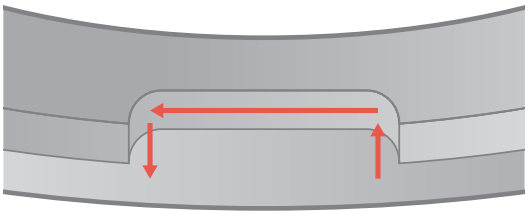
PR1535	**100 pcs**	1.8 Times
Competitor B (5 Inserts)	**55 pcs**	

PR1535 maintained good edge condition and stable machining after 100 pcs.

(User Evaluation)

MFH Harrier
Clutch SUS304F

Reduced Chattering



Vc = 120 m/min, fz = 1.2 mm/t, ap × ae = 1.0 × 20 mm
Dry MFH32-S32-10-2T (2 inserts) SOMT100420ER-GM PR1535

Chip Evacuation　　Efficiency

PR1535	**58 cc/min**	1.6 Times
Competitor C	**36 cc/min**	

MFH showed stable machining while Competitor C showed chattering.

(User Evaluation)

Standard (Straight)

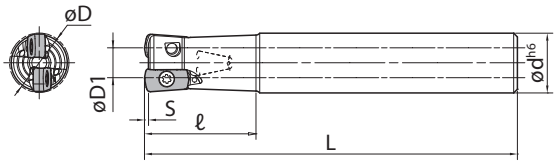


Fig.1

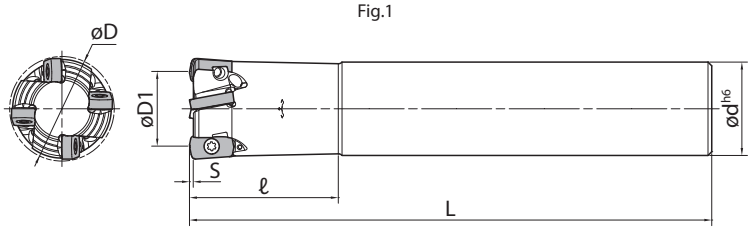


Fig.2

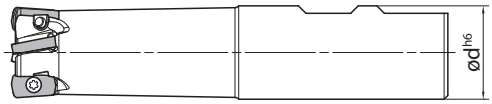


Fig.3

Toolholder Dimensions

Shank	Description	Stock	No. of Inserts	Dimensions (mm)						Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				øD	øD1	ød	L	ℓ	S	A.R.	R.R.				
Standard (Straight)	MFH 16-S16-03-2T	●	2	16	8	16	100	30	1	−10°	−15°	Yes	Fig.1	0.1	18,800
	MFH 20-S20-03-3T	●	3	20	12	20	130	50					Fig.1	0.3	15,700
	20-S20-03-4T	●	4	20	12	20	130	50					Fig.1	0.3	15,700
	MFH 25-S25-03-4T	●	4	25	17	25	140	60					Fig.1	0.5	13,400
	25-S25-03-5T	●	5	25	17	25	140	60					Fig.1	0.5	13,400
	MFH 32-S32-03-5T	●	5	32	24	32	150	70					Fig.1	0.8	11,400
	32-S32-03-6T	●	6	32	24	32	150	70					Fig.1	0.8	11,400
Over Size (Straight)	MFH 17-S16-03-2T	●	2	17	9	16	100	20					Fig.2	0.1	17,900
	MFH 18-S16-03-2T	●	2	18	10	16	100	20					Fig.2	0.1	17,000
	MFH 22-S20-03-3T	●	3	22	14	20	130	30					Fig.2	0.3	14,700
	22-S20-03-4T	●	4	22	14	20	130	30					Fig.2	0.3	14,700
	MFH 28-S25-03-4T	●	4	28	20	25	140	40					Fig.2	0.5	12,400
	28-S25-03-5T	●	5	28	20	25	140	40					Fig.2	0.5	12,400
Standard (Weldon)	MFH 16-W16-03-2T	●	2	16	8	16	79	30					Fig.3	0.1	18,800
	MFH 20-W20-03-3T	●	3	20	12	20	101	50					Fig.3	0.2	15,700
	20-W20-03-4T	●	4	20	12	20	101	50					Fig.3	0.2	15,700
	MFH 25-W25-03-4T	●	4	25	17	25	117	60					Fig.3	0.4	13,400
	25-W25-03-5T	●	5	25	17	25	117	60					Fig.3	0.4	13,400
	MFH 32-W32-03-5T	●	5	32	24	32	131	70					Fig.3	0.7	11,400
	32-W32-03-6T	●	6	32	24	32	131	70					Fig.3	0.7	11,400
Long Shank (Straight)	MFH 16-S16-03-2T-150	●	2	16	8	16	150	50					Fig.1	0.2	18,800
	MFH 20-S20-03-3T-160	●	3	20	12	20	160	80					Fig.1	0.3	15,700
	MFH 25-S25-03-4T-180	●	4	25	17	25	180	100					Fig.1	0.6	13,400
	MFH 32-S32-03-5T-200	●	5	32	24	32	200	120					Fig.1	1.1	11,400

● : Std. Item

Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts
	Clamp Screw	Wrench	Anti-Seize Compound	
				
MFH···-03-···	SB-3065TRP	DTPM-8 Recommended Torque for Insert Clamp 1.2N·m	MP-1	LOGU030310ER-GM

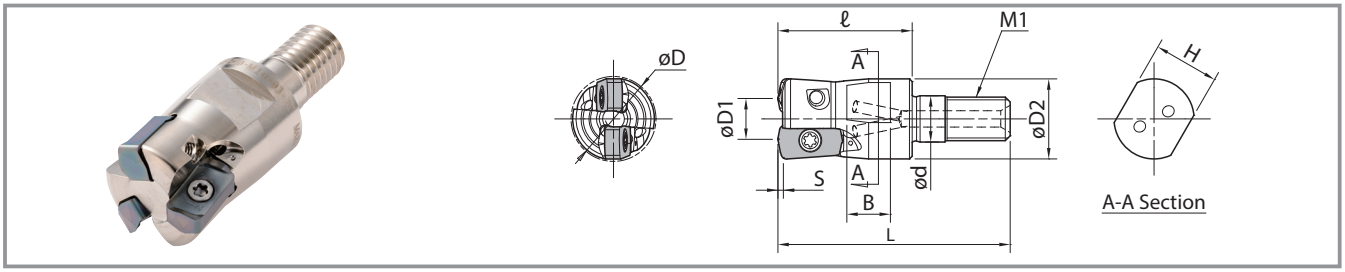
Recommended Cutting Conditions → P7

Caution with Max. Revolution

When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.

Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

MFH Mini | Head

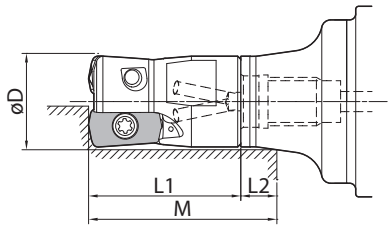


Toolholder Dimensions

Description	Stock	No. of Inserts	Dimensions (mm)										Rake Angle (°)		Coolant Hole	Max. Revolution (min^{-1})
			øD	øD1	øD2	ød	L	ℓ	M1	H	B	S	A.R.	R.R.		
MFH 16-M08-03-2T	●	2	16	8	14.7	8.5	43	25	M8×P1.25	12	8	1	−10°	−15°	Yes	18,880
MFH 17-M08-03-2T	●	2	17	9	14.7	8.5	43	25	M8×P1.25	12	8					17,900
MFH 18-M08-03-2T	●	2	18	10	14.7	8.5	43	25	M8×P1.25	12	8					17,000
MFH 20-M10-03-3T	●	3	20	12	18.7	10.5	49	30	M10×P1.5	15	9					15,700
20-M10-03-4T	●	4	20	12	18.7	10.5	49	30	M10×P1.5	15	9					15,700
MFH 22-M10-03-3T	●	3	22	14	18.7	10.5	49	30	M10×P1.5	15	9					14,700
22-M10-03-4T	●	4	22	14	18.7	10.5	49	30	M10×P1.5	15	9					14,700
MFH 25-M12-03-4T	●	4	25	17	23	12.5	57	35	M12×P1.75	19	10					13,400
25-M12-03-5T	●	5	25	17	23	12.5	57	35	M12×P1.75	19	10					13,400
MFH 28-M12-03-4T	●	4	28	20	23	12.5	57	35	M12×P1.75	19	10					12,400
28-M12-03-5T	●	5	28	20	23	12.5	57	35	M12×P1.75	19	10					12,400
MFH 32-M16-03-5T	●	5	32	24	30	17	63	40	M16×P2.0	24	12					11,400
32-M16-03-6T	●	6	32	24	30	17	63	40	M16×P2.0	24	12					11,400

● : Std. Item

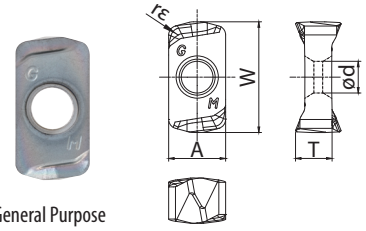
Actual End Mill Depth



Arbor Description	Applicable End Mill			Actual End Mill Depth (mm)	
	Description	Cutting Dia.	Dimension	M	L2
		øD	L1		
BT30K-M08-45	MFH16-M08-03···	ø16	25	31.8	6.8
	MFH17-M08-03···	ø17	25	33.2	8.2
	MFH18-M08-03···	ø18	25	34.2	9.2
BT30K-M10-45	MFH20-M10-03···	ø20	30	36.8	6.8
	MFH22-M10-03···	ø22	30	39.2	9.2
BT30K-M12-45	MFH25-M12-03···	ø25	35	42.8	7.8
	MFH28-M12-03···	ø28	35	45.5	10.5
BT40K-M08-55	MFH16-M08-03···	ø16	25	31.7	6.7
	MFH17-M08-03···	ø17	25	33.2	8.2
	MFH18-M08-03···	ø18	25	34.3	9.3
BT40K-M10-60	MFH20-M10-03···	ø20	30	38.7	8.7
	MFH22-M10-03···	ø22	30	44.5	14.5
BT40K-M12-55	MFH25-M12-03···	ø25	35	44.6	9.6
	MFH28-M12-03···	ø28	35	47.6	12.6
BT40K-M16-65	MFH32-M16-03···	ø32	40	51.2	11.2

→ For BT Type Arbor, See Page 14

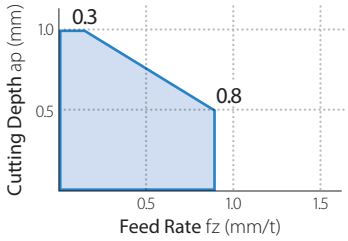
Applicable Inserts

Insert	Description	Dimensions (mm)						Angle (°)	MEGACOAT NANO			CVD Coated Carbide
		A	T	ød	W	Z	rε	α	PR1535	PR1525	PR1510	CA6535
 General Purpose	LOGU030310ER-GM	6.2	3.96	3.45	11.9	—	1.0	—	●	●	●	●

● : Std. Item

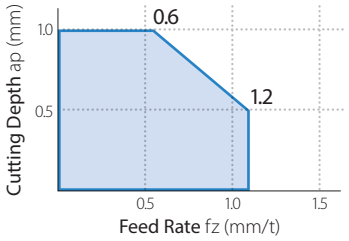
MFH Mini | Cutting Performance (GM Chipbreaker)

Fine Pitch



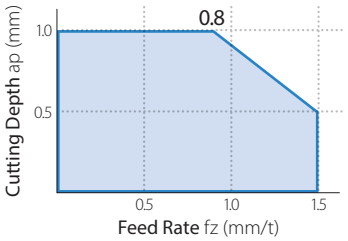
MFH20-····-4T, MFH22-····-4T, MFH25-····-5T
MFH28-····-5T, MF32-····-6T

Standard Pitch (Cutter Dia. 16 – 22 mm)



MFH16-····-2T, MFH17-····-2T, MFH18-····-2T
MFH20-····-3T, MFH22-····-3T

Standard Pitch (Cutter Dia. 25 – 32 mm)



MFH25-····-4T, MFH28-····-4T, MFH32-····-5T

Caution:
When using fine pitch, reduce the cutting conditions compared with standard type

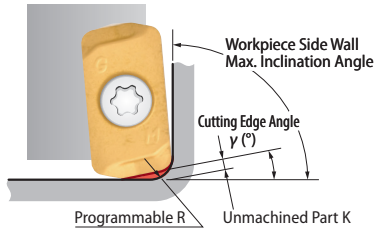
Recommended Cutting Conditions ★ 1st Recommendation ☆ 2nd Recommendation

Insert	Workpiece	Holder Description and Feed Rate (fz: mm/t) Recommended Feed ap = 0.5 mm(reference value)							Recommended Insert Grade (Vc: m/min)			
		MFH16 -····-2T	MFH20 -····-3T	MFH20 -····-4T	MFH25 -····-4T	MFH25 -····-5T	MFH32 -····-5T	MFH32 -····-6T	MEGACOAT NANO			CVD Coated Carbide
									PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel (SxxC)	0.2 - **0.7** - 1.2		0.2 - **0.5** - 0.8	0.2 - **0.8** - 1.5	0.2 - **0.5** - 0.8	0.2 - **0.8** - 1.5	0.2 - **0.5** - 0.8	☆ 120 - **180** - 250	★ 120 - **180** - 250	—	—
	Alloy Steel (SCM)								☆ 100 - **160** - 220	★ 100 - **160** - 220	—	—
	Die Steel (SKD)(~40HRC)	0.2 - **0.5** - 0.9		0.2 - **0.4** - 0.6	0.2 - **0.6** - 1.2	0.2 - **0.4** - 0.6	0.2 - **0.6** - 1.2	0.2 - **0.4** - 0.6	☆ 80 - **140** - 180	★ 80 - **140** - 180	—	—
	Die Steel (SKD)(40~50HRC)	0.2 - **0.3** - 0.5		0.2 - **0.25** - 0.3	0.2 - **0.3** - 0.6	0.2 - **0.25** - 0.3	0.2 - **0.3** - 0.6	0.2 - **0.25** - 0.3	☆ 60 - **100** - 130	★ 60 - **100** - 130	—	—
	Austenitic Stainless Steel (SUS304)	0.2 - **0.5** - 0.9		0.2 - **0.4** - 0.6	0.2 - **0.6** - 1.2	0.2 - **0.4** - 0.6	0.2 - **0.6** - 1.2	0.2 - **0.4** - 0.6	★ 100 - **160** - 200	☆ 100 - **160** - 200	—	—
	Martensitic Stainless Steel (SUS403)								☆ 150 - **200** - 250	—	—	★ 180 - **240** - 300
	Precipitation Hardened Stainless Steel (SUS630)								★ 90 - **120** - 150	—	—	—
	Gray Cast Iron (FC)	0.2 - **0.7** - 1.2		0.2 - **0.5** - 0.8	0.2 - **0.8** - 1.5	0.2 - **0.5** - 0.8	0.2 - **0.8** - 1.5	0.2 - **0.5** - 0.8	—	—	★ 120 - **180** - 250	—
	Nodular Cast Iron (FCD)	0.2 - **0.5** - 0.9		0.2 - **0.4** - 0.6	0.2 - **0.6** - 1.2	0.2 - **0.4** - 0.6	0.2 - **0.6** - 1.2	0.2 - **0.4** - 0.6	—	—	★ 100 - **150** - 200	—
	Ni-base Heat-Resistant Alloy	0.2 - **0.3** - 0.6		0.2 - **0.25** - 0.4	0.2 - **0.4** - 0.8	0.2 - **0.25** - 0.4	0.2 - **0.4** - 0.8	0.2 - **0.25** - 0.4	☆ 20 - **30** - 50	—	—	★ 20 - **30** - 50
	Titanium Alloy (Ti-6Al-4V)								★ 40 - **60** - 80	—	☆ 30 - **50** - 70	—

- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation
- Machining with CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications

Standard Pitch Close Pitch

Approximate Programming Radius Adjustment

Shape	Holder	Insert	Cutting Edge Angle γ (°)	Programmable R (mm)	Unmachined Part K (mm)	Side Wall Max. Inclination Angle (°)
	MFH····03-····	GM	12°	1.6	0.39	90°

Ramping Reference Data

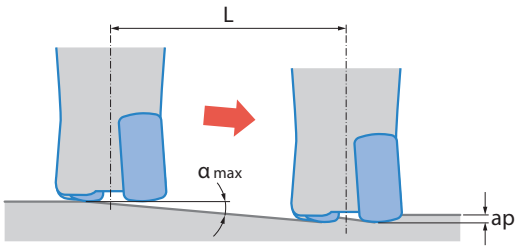
Description	Cutter Dia. øD (mm)	16	17	18	20	22	25	28	32
MFH···-03-···	Max. Ramping Angle	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1°	0.8°
	tan α max	0.049	0.042	0.037	0.03	0.024	0.021	0.017	0.014

Ramping Tips

- Recommended ramping angle is ≤ max (see chart above for recommended ramp angle)
- Reduce recommended feed rate by 70%

Formula for Max. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{ap}{\tan \alpha_{max}}$$

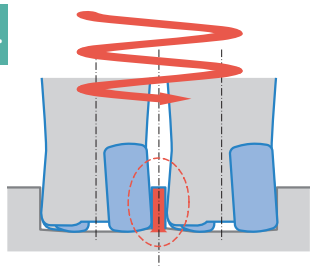


Helical Milling Tips

Min. & Max. Machining Diameter for Helical Milling

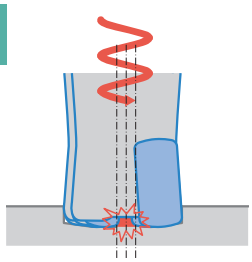
Exceeding Max. Machining Dia.

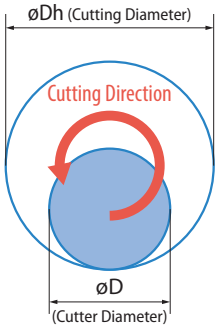
Center Core Remains After Machining



Under Min. Machining Dia.

Center Core Hits Holder Body



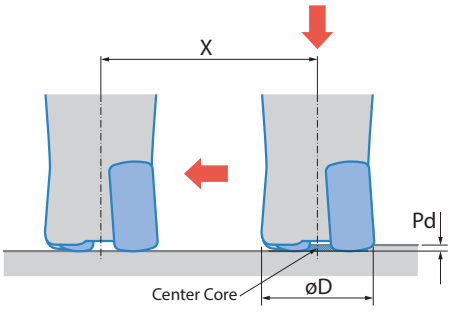


Description	Min. Cutting Dia. øDh1	Max. Cutting Dia. øDh2
MFH···-03-···	2×D−8	2×D−2

Unit : mm

- Keep machine depth per rotation less than max ap (1mm)
- Use climb milling. (Refer to detail on right)
- Feed rate should be reduced to 50% of recommended cutting condition
- Use caution to eliminate incidences caused by producing long chips

Drilling Tips

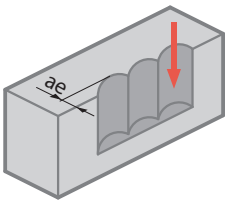


Description	GM	
	Max. Cutting Depth Pd	Min. Cutting Length X for Flat Bottom Surface
MFH···-03-···	1.0	ø D−9

Unit : mm

Plunging After Drilling
- It is recommended to reduce feed by 25% of recommended cutting conditions until center core is removed
- Axial feed rate recommendation per revolution is f ≤ 0.2mm/rev while drilling

Plunging



Insert Description	Max. Width of Cut (ae)
LOGU03 Type	3.5 mm

Reduce feed rate to f ≤ 0.2mm/t when plunging

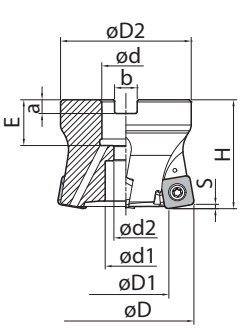


Fig.1

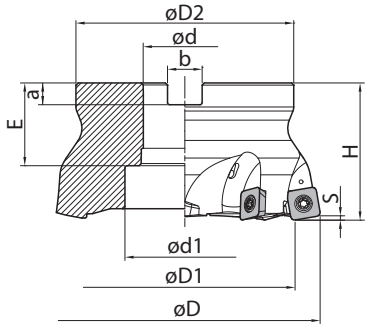


Fig.2

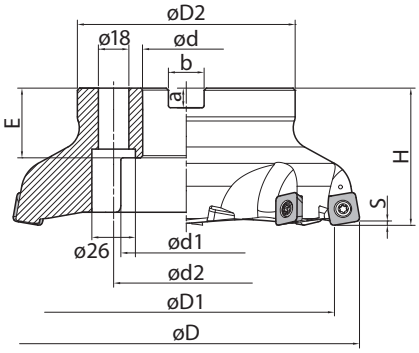


Fig.3

Toolholder Dimensions (SOMT10 Type)

Bore Dia.	Description	Stock	No. of Inserts	Dimensions (mm)														Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				øD	øD1			øD2	ød	ød1	ød2	H	E	a	b	S	S_L *1	A.R.	R.R.				
					GM	LD	FL																
Inch Spec	MFH 050R-10-4T	●	4	50	33	37.5	36.5	47	22.225	19	11	50	19	5	8.4	1.5 (1.2) *2	3.5	+10°	−5°	Yes	Fig.1	0.4	10,000
	050R-10-5T	●	5	50	33	37.5	36.5	47	22.225	19	11	50	19	5	8.4			+10°	−5°			0.4	10,000
	MFH 063R-10-5T	●	5	63	46	50.5	49.5	60	22.225	19	11	50	19	5	8.4			+10°	−4°			0.7	8,800
	063R-10-6T	●	6	63	46	50.5	49.5	60	22.225	19	11	50	19	5	8.4			+10°	−4°			0.7	8,800
	MFH 080R-10-7T	●	7	80	63	67.5	66.5	76	31.75	26	17	63	32	8	12.7			+10°	−4°			1.3	7,600
Metric Spec	MFH 050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4			+10°	−5°			0.4	10,000
	050R-10-5T-M	●	5	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4			+10°	−5°			0.4	10,000
	MFH 063R-10-5T-22M	●	5	63	46	50.5	49.5	60	22	19	11	50	21	6.3	10.4			+10°	−4°			0.7	8,800
	063R-10-6T-22M	●	6	63	46	50.5	49.5	60	22	19	11	50	21	6.3	10.4			+10°	−4°	Yes	Fig.1	0.7	8,800
	063R-10-5T-27M	●	5	63	46	50.5	49.5	60	27	20	13	50	24	7	12.4			+10°	−4°			0.7	8,800
	063R-10-6T-27M	●	6	63	46	50.5	49.5	60	27	20	13	50	24	7	12.4			+10°	−4°			0.7	8,800
	MFH 080R-10-7T-M	●	7	80	63	67.5	66.5	76	27	20	13	63	24	7	12.4			+10°	−4°			1.6	7,600

*1 Refer to LD cutting edge dimensions in figure on Page 10 *2 Dimension in ( ) is when mounting LD ● : Std. Item

Toolholder Dimensions (SOMT14 Type)

Bore Dia.	Description	Stock	No. of Inserts	Dimensions (mm)														Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				øD	øD1			øD2	ød	ød1	ød2	H	E	a	b	S	S_L*1	A.R.	R.R.				
					GM	LD	FL																
Inch Spec	MFH 063R-14-4T	●	4	63	40	46	45	60	22.225	19	11	50	19	5	8.4	2	5	+10°	−10°	Yes	Fig.1	0.6	7,400
	063R-14-5T	●	5	63	40	46	45	60	22.225	19	11	50	19	5	8.4				−10°	Yes	Fig.1	0.6	7,400
	MFH 080R-14-5T	●	5	80	57	63	62	76	31.75	26	17	63	32	8	12.7				−8°	Yes	Fig.1	1.3	6,400
	080R-14-6T	●	6	80	57	63	62	76	31.75	26	17	63	32	8	12.7				−8°	Yes	Fig.1	1.3	6,400
	MFH 100R-14-6T	●	6	100	77	83	82	96	31.75	26	17	63	32	8	12.7				−7°	Yes	Fig.1	2.4	5,600
	100R-14-7T	●	7	100	77	83	82	96	31.75	26	17	63	32	8	12.7				−7°	Yes	Fig.1	2.4	5,600
	MFH 125R-14-7T	●	7	125	102	108	107	100	38.1	55	–	63	38	10	15.9				−7°	Yes	Fig.2	2.9	4,800
	MFH 160R-14-8T	●	8	160	137	143	142	100	50.8	72	–	63	38	11	19.1				−6°	No	Fig.2	3.9	4,200
Metric Spec	MFH 063R-14-4T-22M	●	4	63	40	46	45	60	22	19	11	50	21	6.3	10.4	2	5	+10°	−10°	Yes	Fig.1	0.6	7,400
	063R-14-5T-22M	●	5	63	40	46	45	60	22	19	11	50	21	6.3	10.4				−10°	Yes	Fig.1	0.6	7,400
	063R-14-4T-27M	●	4	63	40	46	45	60	27	20	13	50	24	7	12.4				−10°	Yes	Fig.1	0.6	7,400
	063R-14-5T-27M	●	5	63	40	46	45	60	27	20	13	50	24	7	12.4				−10°	Yes	Fig.1	0.6	7,400
	MFH 080R-14-5T-M	●	5	80	57	63	62	76	27	20	13	63	24	7	12.4				−8°	Yes	Fig.1	1.4	6,400
	080R-14-6T-M	●	6	80	57	63	62	76	27	20	13	63	24	7	12.4				−8°	Yes	Fig.1	1.4	6,400
	MFH 100R-14-6T-M	●	6	100	77	83	82	96	32	26	17	63	28	8	14.4				−7°	Yes	Fig.2	2.4	5,600
	100R-14-7T-M	●	7	100	77	83	82	96	32	26	17	63	28	8	14.4				−7°	Yes	Fig.2	2.4	5,600
	MFH 125R-14-7T-M	●	7	125	102	108	107	100	40	55	–	63	33	9	16.4				−7°	Yes	Fig.2	2.8	4,800
	MFH 160R-14-8T-M	●	8	160	137	143	142	100	40	68	66.7	63	32	9	16.4				−6°	No	Fig.3	3.7	4,200

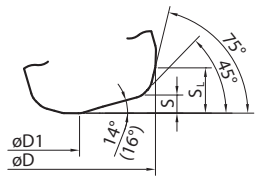
*1 Refer to LD cutting edge dimensions in figure below ●: Std. Item

Spare Parts and Applicable Inserts

Description	Spare Parts					Applicable Inserts
	Clamp Screw	Wrench		Anti-Seize Compound	Mounting Bolt	
		DTPM 	TTP 			
MFH050R-10-···(-M)	SB-4090TRPN	DTPM-15 Recommended Torque for Insert Clamp 3.5N·m		MP-1	HH10×30	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL
MFH063R-10-···(-22M)					HH10×30	
MFH063R-10-····27M					HH12×35	
MFH080R-10-···					HH16×40	
MFH080R-10-····M					HH12×35	
MFH063R-14-···(-22M)	SB-50120TRP	TTP-20 Recommended Torque for Insert Clamp 4.5N·m		MP-1	HH10×30	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL
MFH063R-14-····27M					HH12×35	
MFH080R-14-···					HH16×40	
MFH080R-14-····M					HH12×35	
MFH100R-14-···					HH16×40	
MFH100R-14-····M					—	
MFH125R-14-···					—	
MFH160R-14-···					—	

Recommended Cutting Conditions → P16, P17

LD Type Cutting Edge Dimensions



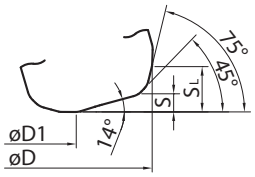
Angle in ( ) is for SOMT14 Type

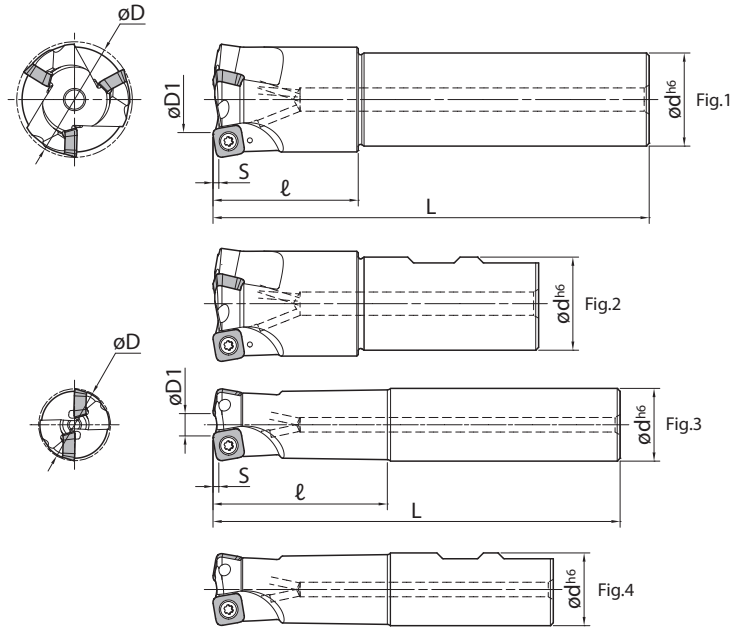
Caution with Max. Revolution

When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force. Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Standard (Straight)

LD Type Cutting Edge Dimensions





Toolholder Dimensions (SOMT10 Type)

	Description	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
				øD	øD1			ød	L	ℓ	S	S_L	A.R.	R.R.				
					GM	LD	FL											
Standard (Straight)	MFH 25-S25-10-2T	●	2	25	8	12.5	11.5	25	140	60	1.5 (1.2) *	3.5	+10°	−5°	Yes	Fig.3	0.4	17,000
	MFH 28-S25-10-2T	●	2	28	11	15.5	14.5	25	140	40						Fig.1	0.5	15,500
	MFH 32-S32-10-2T	●	2	32	15	19.5	18.5	32	150	70						Fig.3	0.8	14,000
	32-S32-10-3T	●	3	32	15	19.5	18.5	32	150	70						Fig.3	0.8	14,000
	MFH 35-S32-10-2T	●	2	35	18	22.5	21.5	32	150	50						Fig.1	0.8	13,000
	35-S32-10-3T	●	3	35	18	22.5	21.5	32	150	50						Fig.1	0.8	13,000
	MFH 40-S32-10-3T	●	3	40	23	27.5	26.5	32	150	50						Fig.1	0.9	11,500
	40-S32-10-4T	●	4	40	23	27.5	26.5	32	150	50						Fig.1	0.9	11,500
Standard (Weldon)	MFH 25-W25-10-2T	●	2	25	8	12.5	11.5	25	117	60	1.5 (1.2) *	3.5	+10°	−5°	Yes	Fig.4	0.4	17,000
	MFH 32-W32-10-3T	●	3	32	15	19.5	18.5	32	131	70						Fig.4	0.7	14,000
	MFH 40-W32-10-3T	●	3	40	23	27.5	26.5	32	112	50						Fig.2	0.7	11,500
	40-W32-10-4T	●	4	40	23	27.5	26.5	32	112	50						Fig.2	0.7	11,500
Long Shank (Straight)	MFH 25-S25-10-2T-200	●	2	25	8	12.5	11.5	25	200	120	1.5 (1.2) *	3.5	+10°	−5°	Yes	Fig.3	0.6	17,000
	MFH 28-S25-10-2T-200	●	2	28	11	15.5	14.5	25	200	40						Fig.1	0.7	15,500
	MFH 32-S32-10-2T-200	●	2	32	15	19.5	18.5	32	200	120						Fig.3	1.0	14,000
	MFH 35-S32-10-2T-200	●	2	35	18	22.5	21.5	32	200	50						Fig.1	1.4	13,000
	MFH 40-S32-10-4T-250	●	4	40	23	27.5	26.5	32	250	50						Fig.1	1.5	11,500
Extra Long Shank (Straight)	MFH 25-S25-10-2T-300	●	2	25	8	12.5	11.5	25	300	180	1.5 (1.2) *	3.5	+10°	−5°	Yes	Fig.3	1.0	17,000
	MFH 28-S25-10-2T-300	●	2	28	11	15.5	14.5	25	300	40						Fig.1	1.1	15,500
	MFH 32-S32-10-2T-300	●	2	32	15	19.5	18.5	32	300	180						Fig.3	1.6	14,000
	MFH 35-S32-10-2T-300	●	2	35	18	22.5	21.5	32	300	50						Fig.1	1.7	13,000
	MFH 40-S32-10-4T-300	●	4	40	23	27.5	26.5	32	300	50						Fig.1	1.8	11,500

∗ Dimension in ( ) is when mounting LD Type ● : Std. Item

Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts
	Clamp Screw	Wrench	Anti-Seize Compound	
				
MFH····-10-····	SB-4075TRP	DTPM-15 Recommended Torque for Insert Clamp 3.5N·m	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL

Recommended Cutting Conditions → P16, P17

Caution with Max. Revolution

When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

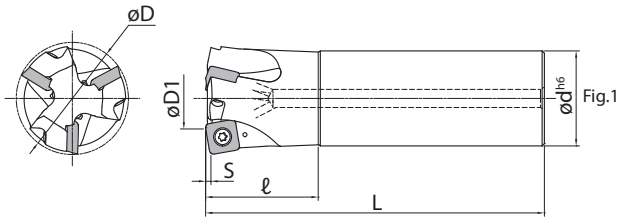
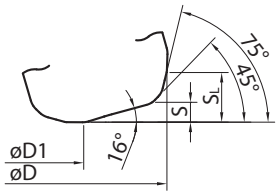


Fig.1

LD Type Cutting Edge Dimensions



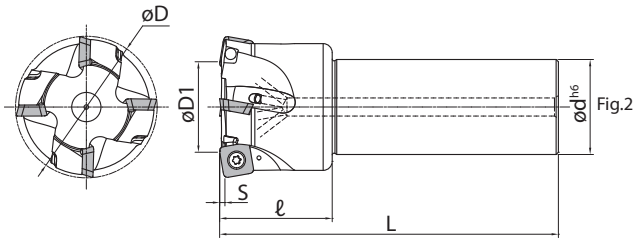


Fig.2

Toolholder Dimensions (SOMT14 Type)

Description	Stock	No. of Inserts	Dimensions (mm)									Rake Angle (°)		Coolant Hole	Drawing	Weight (kg)	Max. Revolution (min^{-1})
			øD	øD1			ød	L	ℓ	S	S_L	A.R.	R.R.				
				GM	LD	FL											
MFH50-S42-14-3T	●	3	50	27	33	32	42	150	50	2	5	+10°	−10°	Yes	Fig.1	1.4	8,800
MFH63-S42-14-4T	●	4	63	40	46	45	42	150	50	2	5	+10°	−10°	Yes	Fig.2	1.7	7,400
MFH80-S42-14-5T	●	5	80	57	63	62	42	150	50	2	5	+10°	−8°	Yes	Fig.2	2.3	6,400

● : Std. Item

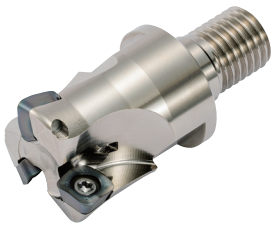
Spare Parts and Applicable Inserts

Description	Spare Parts			Applicable Inserts
	Clamp Screw	Wrench	Anti-Seize Compound	
				
MFH····-14-····	SB-50120TRP	TTP-20 Recommended Torque for Insert Clamp 4.5N·m	MP-1	SOMT140520ER-GM SOMT140520ER-LD SOMT140514ER-FL

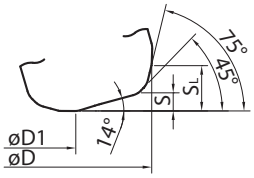
Caution with Max. Revolution

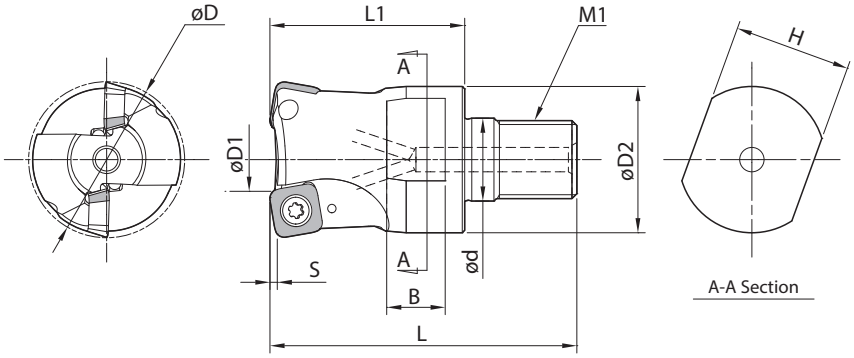
When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Recommended Cutting Conditions → P16, P17



LD Type Cutting Edge Dimensions





Toolholder Dimensions

Description	Stock	No. of Inserts	Dimensions (mm)													Rake Angle (°)		Coolant Hole	Max. Revolution (min^{-1})
			øD	øD1			øD2	ød	L	L1	M1	H	B	S	S_L	A.R.	R.R.		
				GM	LD	FL													
MFH 25-M12-10-2T	●	2	25	8	12.5	11.5	23	12.5	57	35	M12×P1.75	19	10	1.5 (1.2) *	3.5	+10°	−5°	Yes	17,000
MFH 28-M12-10-2T	●	2	28	11	15.5	14.5	23	12.5	57	35	M12×P1.75	19	10						15,500
MFH 32-M16-10-2T	●	2	32	15	19.5	18.5	30	17	63	40	M16×P2.0	24	12						14,000
32-M16-10-3T	●	3	32	15	19.5	18.5	30	17	63	40	M16×P2.0	24	12						14,000
MFH 35-M16-10-2T	●	2	35	18	22.5	21.5	30	17	63	40	M16×P2.0	24	12						13,000
35-M16-10-3T	●	3	35	18	22.5	21.5	30	17	63	40	M16×P2.0	24	12						13,000
MFH 40-M16-10-3T	●	3	40	23	27.5	26.5	30	17	63	40	M16×P2.0	24	12						11,500
40-M16-10-4T	●	4	40	23	27.5	26.5	30	17	63	40	M16×P2.0	24	12						11,500

* Dimension in ( ) is when attaching LD Type ● : Std. Item

Spare Parts and Applicable Inserts

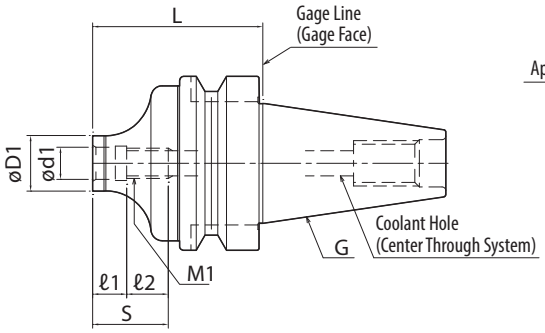
Description	Spare Parts			Applicable Inserts
	Clamp Screw	Wrench	Anti-Seize Compound	
				
MFH····10-····	SB-4075TRP	DTPM-15 Recommended Torque for Insert Clamp 3.5N·m	MP-1	SOMT100420ER-GM SOMT100420ER-LD SOMT100420ER-FL

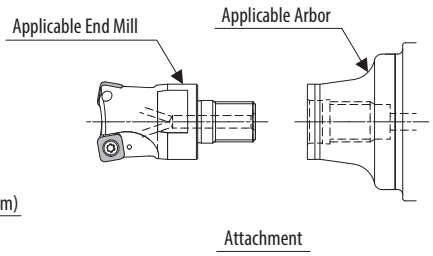
Caution with Max. Revolution

When running an end mill or a cutter at the maximum revolution, the insert or cutter may be damaged by centrifugal force.
Coat Anti-Seize Compound (MP-1) thinly on portion of taper and thread prior to installation.

Recommended Cutting Conditions → P16, P17

MFH Harrier | BT Arbor (for exchangeable head/two face contact)



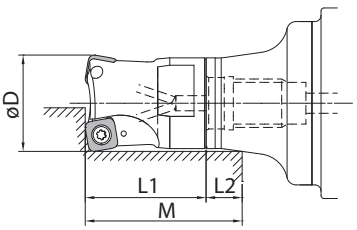


Dimensions

Description	Stock	Dimensions (mm)							Coolant Hole	Arbor (Two-face clamping)	Applicable End Mill (Head)
		L	øD1	ød1	S	ℓ1	ℓ2	M1		G	
BT30K- M08-45	●	45	14.7	8.5	20	9	11	M8×P1.25	Yes	BT30	MFH..-M08-..
M10-45	●	45	18.7	10.5	21		12	M10×P1.5		BT30	MFH..-M10-..
M12-45	●	45	23	12.5	24		15	M12×P1.75		BT30	MFH..-M12-..
BT40K- M08-55	●	55	14.7	8.5	20	9	11	M8×P1.25	Yes	BT40	MFH..-M08-..
M10-60	●	60	18.7	10.5	21		12	M10×P1.5		BT40	MFH..-M10-..
M12-55	●	55	23	12.5	24		15	M12×P1.75		BT40	MFH..-M12-..
M16-65	●	65	30	17	25		16	M16×P2.0		BT40	MFH..-M16-..

● : Std. Item

Actual End Mill Depth



Arbor Description		Applicable End Mill (Head)			Actual End Mill Depth (mm)	
		Description	Cutting Dia.	Dimension	M	L2
			øD	L1		
BT30K- M08-45		...16-M08-...	ø16	25	31.8	6.8
		...17-M08-...	ø17	25	33.2	8.2
		...18-M08-...	ø18	25	34.2	9.2
	M10-45	...20-M10-...	ø20	30	36.8	6.8
		...22-M10-...	ø22	30	39.2	9.2
	M12-45	...25-M12-...	ø25	35	42.8	7.8
		...28-M12-...	ø28	35	45.5	10.5
BT40K- M08-55		...16-M08-...	ø16	25	31.7	6.7
		...17-M08-...	ø17	25	33.2	8.2
		...18-M08-...	ø18	25	34.3	9.3
	M10-60	...20-M10-...	ø20	30	38.7	8.7
		...22-M10-...	ø22	30	44.5	14.5
	M12-55	...25-M12-...	ø25	35	44.6	9.6
		...28-M12-...	ø28	35	47.6	12.6
	M16-65	...32-M16-...	ø32	40	51.2	11.2
		...35-M16-...	ø35	40	60.2	20.2
		...40-M16-...	ø40	40	64	24

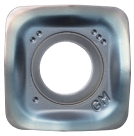
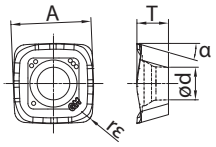
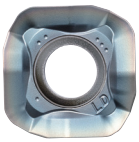
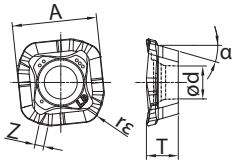
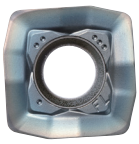
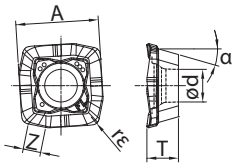
Arbor Identification System

BT30 | **K** | **M12** | **45**

- BT30 — Arbor Size
- K — Two-Face Clamping Spindle
- M12 — Thread Size for Clamping
- 45 — Length from the Gage

MFH Harrier | Applicable Inserts

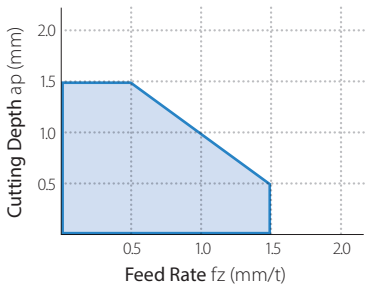
Classification of Usage							Applicable Toolholders
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon Steel / Alloy Steel	☆	★			
		Die Steel	☆	★			
	M	Austenitic Stainless Steel	★	☆			
		Martensitic Stainless Steel	☆			★	
	K	Gray Cast Iron			★		
		Nodular Cast Iron			★		
	S	Ni-base Heat-Resistant Alloy	★			☆	
		Titanium Alloy	★		☆		
	H	High Hardness Steel		□			

Insert		Description	Dimensions (mm)					Angle (°)	MEGACOAT NANO			CVD Coated Carbide	
			A	T	ød	Z	rε	α	PR1535	PR1525	PR1510	CA6535	
 General Purpose		SOMT100420ER-GM	10.30	4.58	4.6	—	2.0	16	●	●	●	●	P.9 〜 P.13
		SOMT140520ER-GM	14.14	5.56	5.8	—	2.0	16	●	●	●	●	
 Large ap		SOMT100420ER-LD	10.45	4.58	4.6	0.9	2.0	16	●	●	●	●	
		SOMT140520ER-LD	14.76	5.56	5.8	1.6	2.0	16	●	●	●	●	
 Wiper Edge		SOMT100420ER-FL	10.44	4.58	4.6	1.4	2.0	16	●	●	●	●	
		SOMT140514ER-FL	14.57	5.56	5.8	3.1	1.4	16	●	●	●	●	

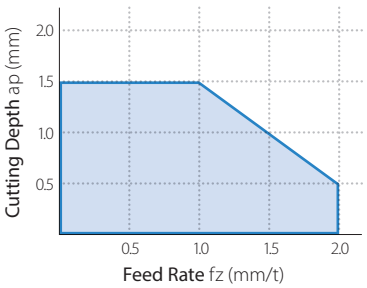
● : Std. Item

Cutting Performance (GM, FL)

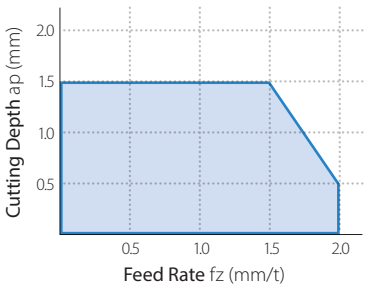
MFH25-S25-10-2T



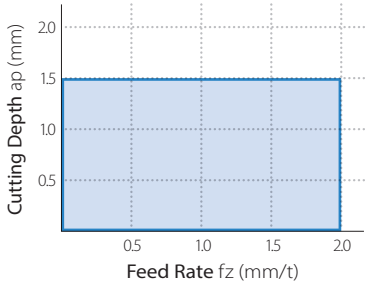
MFH32-S32-10-○T



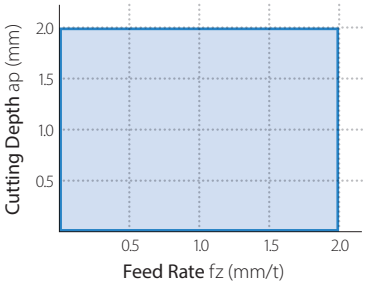
MFH40-S32-10-○T



MFH050R ~ 080R-10-○T



MFH···14-○T



LD Chipbreaker:
- MAX D.O.C. for LD chipbreaker is 5mm (3.5mm for SOMT10 Type)
  Please refer to page 16 for feed rate
- End Mill:
  Please refer to the application map above
- Face Mill:
  Maximum feed rate (feed per tooth) fz = 2.0mm/t

MFH Harrier | Recommended Cutting Conditions ★1st Recommendation ☆2nd Recommendation

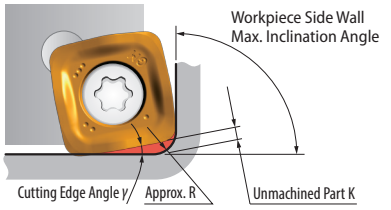
Insert	Workpiece	Holder Description and Feed Rate (fz: mm/t)					Recommended Insert Grade (Vc: m/min)			
		MFH25-	MFH32-	MFH40-	MFH···R-10	MFH····14	MEGACOAT NANO			CVD Coated Carbide
							PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel (SxxC)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.2 - **0.4** - 0.5(ap≦1.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.3 - **0.7** - 1.0(ap≦1.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.4 - **1.0** - 1.5(ap≦1.5mm)	0.5 - **1.5** - 2.0		☆ 120 - **180** - 250	★ 120 - **180** - 250	—	—
	Alloy Steel (SCM)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.2 - **0.4** - 0.5(ap≦1.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.3 - **0.7** - 1.0(ap≦1.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.4 - **1.0** - 1.5(ap≦1.5mm)	0.5 - **1.5** - 2.0		☆ 100 - **160** - 220	★ 100 - **160** - 220	—	—
	Die Steel (SKD)(~40HRC)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		☆ 80 - **140** - 180	★ 80 - **140** - 180	—	—
	Die Steel (SKD)(40~50HRC)	0.15 - **0.3** - 0.5(ap≦1.0mm) 0.15 - **0.2** - 0.25(ap≦1.5mm)	0.2 - **0.5** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.45(ap≦1.5mm)	0.2 - **0.6** - 0.9(ap≦1.0mm) 0.2 - **0.5** - 0.7(ap≦1.5mm)	0.2 - **0.7** - 1.0		☆ 60 - **100** - 130	★ 60 - **100** - 130	—	—
	Austenitic Stainless Steel (SUS304)	0.5 - **0.7** - 0.8(ap=z≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		☆ 100 - **160** - 200	☆ 100 - **160** - 200	—	—
	Martensitic Stainless Steel (SUS403)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		☆ 150 - **200** - 250	—	—	★ 180 - **240** - 300
	Precipitation Hardened Stainless Steel (SUS630)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		★ 90 - **120** - 150	—	—	—
	Gray Cast Iron (FC)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.2 - **0.4** - 0.5(ap≦1.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.3 - **0.7** - 1.0(ap≦1.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.4 - **1.0** - 1.5(ap≦1.5mm)	0.5 - **1.5** - 2.0		—	—	★ 120 - **180** - 250	—
	Nodular Cast Iron (FCD)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		—	—	★ 100 - **150** - 200	—
	Ni-base Heat-Resistant Alloy	0.2 - **0.4** - 0.6(ap≦1.0mm) 0.15 - **0.2** - 0.3(ap≦1.5mm)	0.2 - **0.5** - 0.9(ap≦1.0mm) 0.2 - **0.4** - 0.6(ap≦1.5mm)	0.2 - **0.6** - 1.0(ap≦1.0mm) 0.2 - **0.5** - 0.8(ap≦1.5mm)	0.2 - **0.8** - 1.2		☆ 20 - **30** - 50	—	—	★ 20 - **30** - 50
	Titanium Alloy (Ti-6Al-4V)	0.2 - **0.4** - 0.6(ap≦1.0mm) 0.15 - **0.2** - 0.3(ap≦1.5mm)	0.2 - **0.5** - 0.9(ap≦1.0mm) 0.2 - **0.4** - 0.6(ap≦1.5mm)	0.2 - **0.6** - 1.0(ap≦1.0mm) 0.2 - **0.5** - 0.8(ap≦1.5mm)	0.2 - **0.8** - 1.2		★ 40 - **60** - 80	—	☆ 30 - **50** - 70	—
LD	Carbon Steel (SxxC)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.06 - **0.15** - 0.3(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.2** - 0.3(ap≦3.5mm)	0.5 - **1.5** - 2.0(ap≦1.0mm) 0.06 - **0.2** - 0.3(ap≦3.5mm)	0.5 - **1.5** - 2.0(ap≦2.0mm) 0.06 - **0.2** - 0.4(ap≦5.0mm)	☆ 120 - **180** - 250	★ 120 - **180** - 250	—	—
	Alloy Steel (SCM)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.06~**0.15**~0.3(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.2** - 0.3(ap≦3.5mm)	0.5 - **1.5** - 2.0(ap≦1.0mm) 0.06 - **0.2** - 0.3(ap≦3.5mm)	0.5 - **1.5** - 2.0(ap≦2.0mm) 0.06 - **0.2** - 0.4(ap≦5.0mm)	☆ 100 - **160** - 220	★ 100 - **160** - 220	—	—
	Die Steel (SKD)(~40HRC)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.06 - **0.08** - 0.15(ap≦3.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦2.0mm) 0.06 - **0.15** - 0.3(ap≦5.0mm)	☆ 80 - **140** - 180	★ 80 - **140** - 180	—	—
	Die Steel (SKD)(40~50HRC)	0.2 - **0.3** - 0.5(ap≦1.0mm) 0.03 - **0.05** - 0.1(ap≦3.5mm)	0.2 - **0.5** - 0.8(ap≦1.0mm) 0.03 - **0.08** - 0.15(ap≦3.5mm)	0.2 - **0.6** - 0.9(ap≦1.0mm) 0.03 - **0.1** - 0.15(ap≦3.5mm)	0.2 - **0.7** - 1.0(ap≦1.0mm) 0.03 - **0.1** - 0.15(ap≦3.5mm)	0.2 - **0.7** - 1.0(ap≦2.0mm) 0.03 - **0.1** - 0.2(ap≦5.0mm)	☆ 60 - **100** - 130	★ 60 - **100** - 130	—	—
	Austenitic Stainless Steel (SUS304)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.06 - **0.08** - 0.15(ap≦3.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦2.0mm) 0.06 - **0.15** - 0.3(ap≦5.0mm)	★ 100 - **160** - 200	☆ 100 - **160** - 200	—	—
	Martensitic Stainless Steel (SUS403)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.06 - **0.08** - 0.15(ap≦3.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦2.0mm) 0.06 - **0.15** - 0.3(ap≦5.0mm)	☆ 150 - **200** - 250	—	—	★ 180 - **240** - 300
	Precipitation Hardened Stainless Steel (SUS630)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.06 - **0.08** - 0.15(ap≦3.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦2.0mm) 0.06 - **0.15** - 0.3(ap≦5.0mm)	★ 90 - **120** - 150	—	—	—
	Gray Cast Iron (FC)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.06 - **0.15** - 0.3(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.2** - 0.3(ap≦3.5mm)	0.5 - **1.5** - 2.0(ap≦1.0mm) 0.06 - **0.2** - 0.3(ap≦3.5mm)	0.5 - **1.5** - 2.0(ap≦2.0mm) 0.06 - **0.2** - 0.4(ap≦5.0mm)	—	—	★ 120 - **180** - 250	—
	Nodular Cast Iron (FCD)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.06 - **0.08** - 0.15(ap≦3.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.06 - **0.1** - 0.2(ap≦3.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.06 - **0.15** - 0.2(ap≦3.5mm)	0.5 - **1.2** - 1.8(ap≦2.0mm) 0.06 - **0.15** - 0.3(ap≦5.0mm)	—	—	★ 100 - **150** - 200	—
	Ni-base Heat-Resistant Alloy	0.2 - **0.4** - 0.6(ap≦1.0mm) 0.03 - **0.05** - 0.1(ap≦3.5mm)	0.2 - **0.5** - 0.9(ap≦1.0mm) 0.03 - **0.08** - 0.15(ap≦3.5mm)	0.2 - **0.6** - 1.0(ap≦1.0mm) 0.03 - **0.1** - 0.15(ap≦3.5mm)	0.2 - **0.8** - 1.2(ap≦1.0mm) 0.03 - **0.1** - 0.15(ap≦3.5mm)	0.2 - **0.8** - 1.2(ap≦2.0mm) 0.03 - **0.1** - 0.2(ap≦5.0mm)	☆ 20 - **30** - 50	—	—	★ 20 - **30** - 50
	Titanium Alloy (Ti-6Al-4V)	0.2 - **0.4** - 0.6(ap≦1.0mm) 0.03 - **0.05** - 0.1(ap≦3.5mm)	0.2 - **0.5** - 0.9(ap≦1.0mm) 0.03 - **0.08** - 0.15(ap≦3.5mm)	0.2 - **0.6** - 1.0(ap≦1.0mm) 0.03 - **0.1** - 0.15(ap≦3.5mm)	0.2 - **0.8** - 1.2(ap≦1.0mm) 0.03 - **0.1** - 0.15(ap≦3.5mm)	0.2 - **0.8** - 1.2(ap≦2.0mm) 0.03 - **0.1** - 0.2(ap≦5.0mm)	★ 40 - **60** - 80	—	☆ 30 - **50** - 70	—

MFH Harrier | Recommended Cutting Conditions ★1st Recommendation ☆2nd Recommendation

Insert	Workpiece	Holder Description and Feed Rate (fz: mm/t)					Recommended Insert Grade (Vc: m/min)			
		MFH25-	MFH32-	MFH40-	MFH···R-10	MFH····-14	MEGACOAT NANO			CVD Coated Carbide
							PR1535	PR1525	PR1510	CA6535
FL	Carbon Steel (SxxC)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.2 - **0.4** - 0.5(ap≦1.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.3 - **0.7** - 1.0(ap≦1.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.4 - **1.0** - 1.5(ap≦1.5mm)	0.5 - **1.5** - 2.0		☆ 120 - **180** - 250	★ 120 - **180** - 250	—	—
	Alloy Steel (SCM)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.2 - **0.4** - 0.5(ap≦1.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.3 - **0.7** - 1.0(ap≦1.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.4 - **1.0** - 1.5(ap≦1.5mm)	0.5 - **1.5** - 2.0		☆ 100 - **160** - 220	★ 100 - **160** - 220	—	—
	Die Steel (SKD)(~40HRC)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		☆ 80 - **140** - 180	★ 80 - **140** - 180	—	—
	Die Steel (SKD)(40~50HRC)	0.15 - **0.3** - 0.5(ap≦1.0mm) 0.15 - **0.2** - 0.25(ap≦1.5mm)	0.2 - **0.5** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.45(ap≦1.5mm)	0.2 - **0.6** - 0.9(ap≦1.0mm) 0.2 - **0.5** - 0.7(ap≦1.5mm)	0.2 - **0.7** - 1.0		☆ 60 - **100** - 130	★ 60 - **100** - 130	—	—
	Austenitic Stainless Steel (SUS304)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		★ 100 - **160** - 200	☆ 100 - **160** - 200	—	—
	Martensitic Stainless Steel (SUS403)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		☆ 150 - **200** - 250	—	—	★ 180 - **240** - 300
	Precipitation Hardened Stainless Steel (SUS630)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		★ 90 - **120** - 150	—	—	—
	Gray Cast Iron (FC)	0.5 - **0.8** - 1.0(ap≦1.0mm) 0.2 - **0.4** - 0.5(ap≦1.5mm)	0.5 - **1.0** - 1.5(ap≦1.0mm) 0.3 - **0.7** - 1.0(ap≦1.5mm)	0.5 - **1.2** - 1.8(ap≦1.0mm) 0.4 - **1.0** - 1.5(ap≦1.5mm)	0.5 - **1.5** - 2.0		—	—	★ 120 - **180** - 250	—
	Nodular Cast Iron (FCD)	0.5 - **0.7** - 0.8(ap≦1.0mm) 0.2 - **0.3** - 0.4(ap≦1.5mm)	0.5 - **0.8** - 1.2(ap≦1.0mm) 0.3 - **0.6** - 0.8(ap≦1.5mm)	0.5 - **1.0** - 1.6(ap≦1.0mm) 0.4 - **0.8** - 1.2(ap≦1.5mm)	0.5 - **1.2** - 1.8		—	—	★ 100 - **150** - 200	—
	Ni-base Heat-Resistant Alloy	0.2 - **0.4** - 0.6(ap≦1.0mm) 0.15 - **0.2** - 0.3(ap≦1.5mm)	0.2 - **0.5** - 0.9(ap≦1.0mm) 0.2 - **0.4** - 0.6(ap≦1.5mm)	0.2 - **0.6** - 1.0(ap≦1.0mm) 0.2 - **0.5** - 0.8(ap≦1.5mm)	0.2 - **0.8** - 1.2		☆ 20 - **30** - 50	—	—	★ 20 - **30** - 50
	Titanium Alloy (Ti-6Al-4V)	0.2 - **0.4** - 0.6(ap≦1.0mm) 0.15 - **0.2** - 0.3(ap≦1.5mm)	0.2 - **0.5** - 0.9(ap≦1.0mm) 0.2 - **0.4** - 0.6(ap≦1.5mm)	0.2 - **0.6** - 1.0(ap≦1.0mm) 0.2 - **0.5** - 0.8(ap≦1.5mm)	0.2 - **0.8** - 1.2		★ 40 - **60** - 80	—	☆ 30 - **50** - 70	—

- Machining with coolant is recommended for Ni-base Heat-Resistant Alloy and Titanium Alloy
- The figure in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation
- Feed rate should be reduced to 25% of recommended cutting conditions
- Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications
- For finishing, maximum recommended feed is f = 1.5mm/rev for SOMT14-LD Type, f = 0.9mm/rev for SOMT10-LD Type, f = 3.0mm/rev for SOMT14-FL Type, f = 1.4mm/rev for SOMT10-FL Type

Approximate Programming Radius Adjustment

Shape	Holder	Insert	Cutting Edge Angle γ (°)	Programmable R (mm)	Unmachined Part K (mm)	Side Wall Max. Inclination Angle (°)
	MFH···-10-···	GM	10°	3.0	0.85	90°
		LD	14°	3.5	0.69	65°
		FL	14°	3.0	0.89	80°
	MFH···-14-···	GM	10°	3.5	1.37	90°
		LD	16°	5.0	1.06	65°
		FL	13°	3.0	1.36	80°

Ramping Reference Data

MFH···-10-···

Cutter Dia. øD (mm)	25	28	32	35	40	50	63	80
Max. Ramping Angle α max (°)	5°	4.5°	4°	3.5°	3°	2.5°	2°	1°
tan α max	0.087	0.078	0.070	0.061	0.052	0.043	0.035	0.017

MFH···-14-···

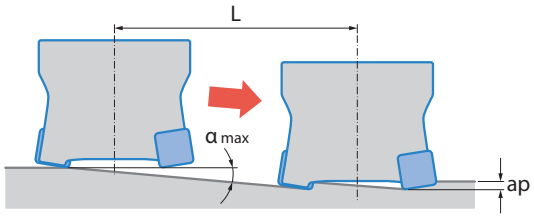
Cutter Dia. øD (mm)	50	63	80	100	125	160
Max. Ramping Angle α max (°)	2°	1.8°	1°	0.5°	0.4°	0.2°
tan α max	0.035	0.031	0.017	0.009	0.007	0.003

Ramping Tips

- Ramping angle should be under α max (maximum ramping angle) in the above cutting conditions
- Reduce recommended feed rate in cutting conditions above by 70%

Formula for Max. Cutting Length (L) at Max. Ramping Angle

$$L = \frac{ap}{\tan \alpha_{max}}$$

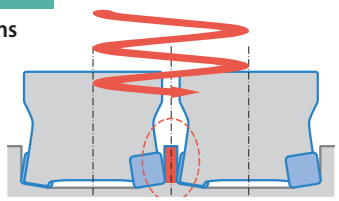


Helical Milling Tips

For Helical milling, use between Min. drilling dia. and Max. drilling dia.

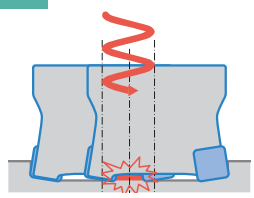
Exceeding Max. Machining Dia.

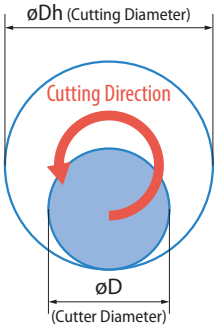
Center Core Remains After Machining



Under Min. Machining Dia.

Center Core Hits Holder Body





Description	Min. Cutting Dia.	Max. Cutting Dia.
MFH···-10-···	2×D−18	2×D−2
MFH···-14-···	2×D−25	2×D−2

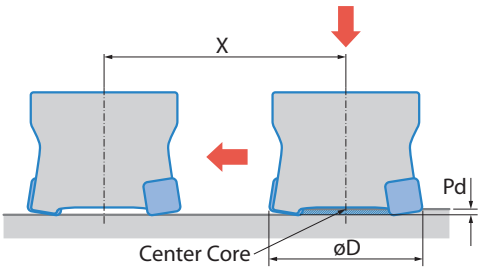
Unit : mm

- Keep machine depth (h) per rotation less than Max. ap (S) in the cutter dimensions chart
- Use climb milling. (Refer to detail on right)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

Drilling Tips

Description	GM		LD		FL	
	Max. Drilling Depth Pd	Min. Cutting Length X for Flat Bottom Surface	Max. Drilling Depth Pd	Min. Cutting Length X for Flat Bottom Surface	Max. Drilling Depth Pd	Min. Cutting Length X for Flat Bottom Surface
MFH···-10-···	1.5	D−18	1.5	D−14	1.5	D−15
MFH···-14-···	2	D−24	2	D−18	2	D−19

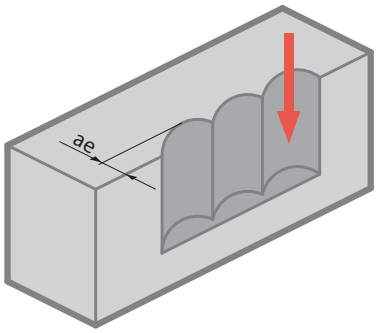
Unit : mm



[Drilling Depth]
Please see Max. Drilling Depth (Pd) in the above cutting conditions

[Traversing after Drilling]
① It is recommended to reduce feed by 25% of recommendation until the center core is removed
② Axial feed rate recommendation per revolution is f < 0.2mm/rev

Plunging



Insert Description	Maximum Width of Cut (ae)
SOMT10 Type	8 mm
SOMT14 Type	11.5 mm

- LD and FL chipbreakers are not available for plunging
- Reduce feed rate to fz ≤ 0.2mm/t when plunging

3D Machining

Insert	Ramping	Contouring (Rising Wall Angle)	Plunging	Helical Milling	Pocketing
GM	Good	Good (90°)	Good	Good	Good
LD	Good	Limit (65°)	Bad	Bad	Bad
FL	Good	Limit (80°)	Bad	Bad	Bad

- Some applications are not available depending on chipbreaker
- For FL and LD Type, there is a limit of rising wall angle during contouring