

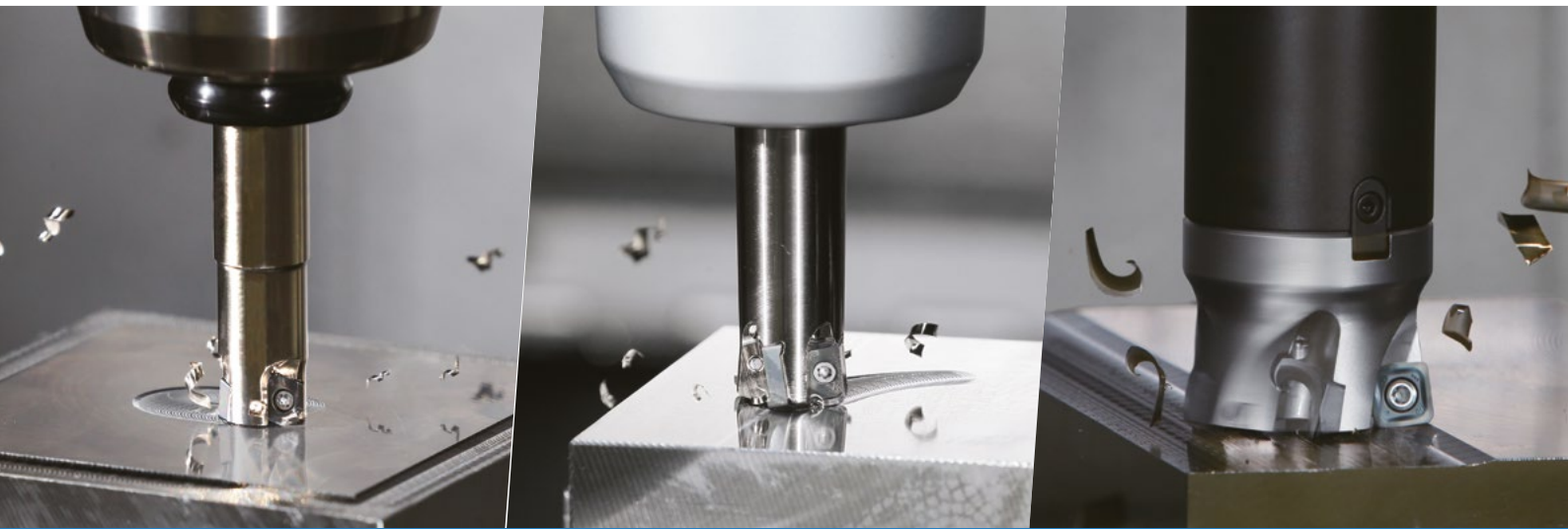
THE NEW VALUE FRONTIER



High efficiency and  
high feed cutter

**MFH Series**

# MFH Series



**Stable machining with greater chatter resistance**

Cutting diameters starting at  $\varnothing 8$  mm

Reduce cycle time during roughing applications

MFH Mini / Micro high feed mills for small machining centers

**NEW** GH chipbreaker and PR015S added to lineup



MFH Micro  
 $\varnothing 8 - \varnothing 16$

MFH Mini  
 $\varnothing 16 - \varnothing 52$

MFH Harrier  
 $\varnothing 25 - \varnothing 160$

High efficiency and high feed cutter

# MFH Series

Convex cutting edge design reduces chatter for high-efficiency rough machining  
 Large tooling lineup from  $\varnothing 8$  to  $\varnothing 160$  to cover a wide application range for multiple metalworking processes.

## MFH Micro

Replaces solid end mills to reduce machining costs



## MFH Mini

Economical inserts with 4 cutting edges



## MFH Harrier

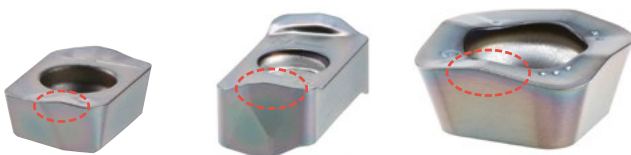
3 Different insert designs offer a variety of machining options



## 1 Stable machining with excellent chattering resistance

Reduces cutting forces at initial impact with a convex helical edge design

Convex helical edge design

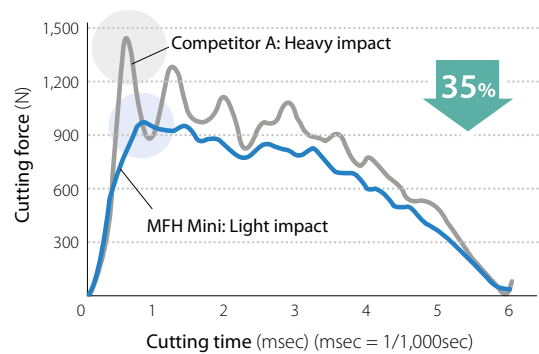


MFH Micro

MFH Mini

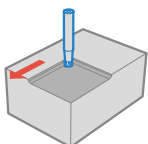
MFH Harrier

Cutting force and vibration when approaching the workpiece (internal evaluation)  
 ap: half of cutter diameter

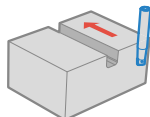


Cutting conditions:  $V_c = 150$  m/min,  $f_z = 1.0$  mm/t,  $a_p \times a_e = 0.5 \times 8$  mm, dry  
 Cutter dia. DC =  $\varnothing 16$  mm, workpiece: C50

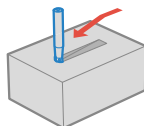
## 2 Wide application range for multiple metalworking processes



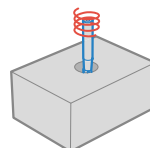
Face milling & shouldering



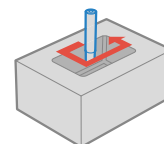
Slotting



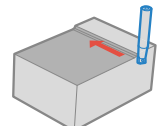
Ramping



Helical milling



Pocketing



Contouring

For using MFH Harrier:

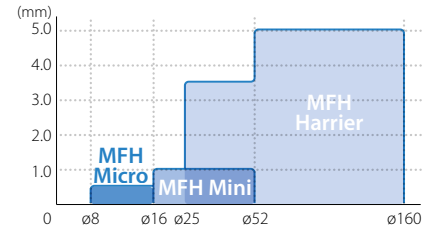
GM / GH chipbreaker are available for all the above applications. LD and FL chipbreakers are not available for helical milling, plunging and contouring of rising wall. Please refer to back cover.

Micro diameter cutter for high feed machining

# MFH Micro

Cutter dia.  $\varnothing 8 - \varnothing 16$

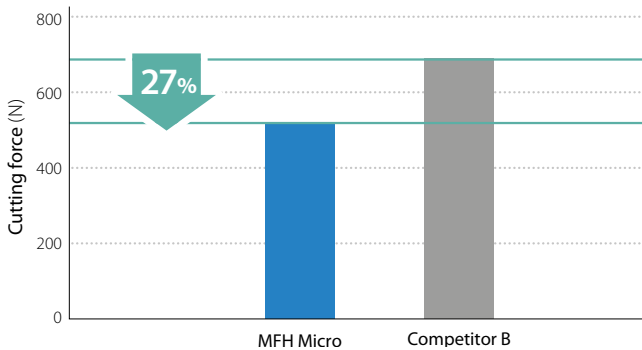
Low resistance and durable against chatter for highly efficient machining. Maximum ap 0.5 mm. Stable high feed machining on a wide range of applications.



## 1 Low resistance and durable against chatter

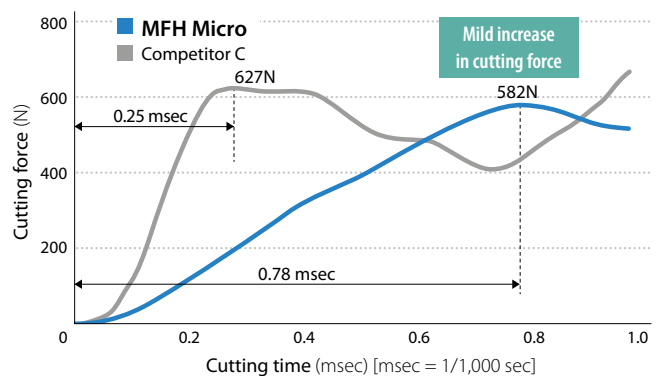
Molded convex cutting edge controls initial impact when entering the workpiece

Cutting force comparison (internal evaluation)



Cutting conditions:  $V_c = 120$  m/min,  $f_z = 0.6$  mm/t,  $a_p = 0.4$  mm  
Cutter dia. DC =  $\varnothing 10$  mm, slotting, dry, workpiece: C50

Cutting force when entering workpiece comparison (internal evaluation)



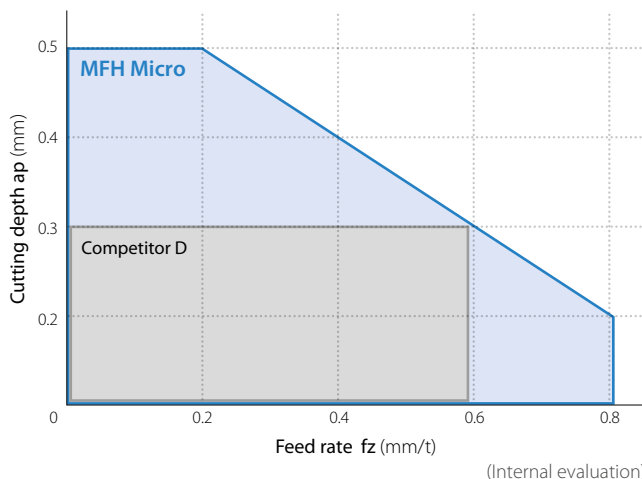
Cutting conditions:  $V_c = 120$  m/min,  $f_z = 0.6$  mm/t,  $a_p \times a_e = 0.4 \times 5$  mm  
Cutter dia. DC =  $\varnothing 10$  mm, dry, workpiece: C50

## 2 Wide range of machining applications

Wide range of machining applications at a maximum depth of cut of 0.5 mm

Stable machining even with small machining center (BT30)

Cutting performance map (cutter dia.  $\varnothing 10$  mm)



## 3 Replaces solid end mills to reduce machining costs

Suppresses chattering and increases milling efficiency

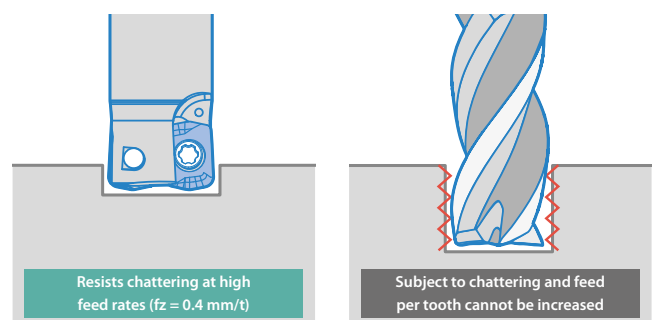
MFH micro compared to solid end mills (mechanical parts, slotting, workpiece C50)

**MFH Micro**  $Q = 15.3$  cc/min     **Solid end mill**  $Q = 12.2$  cc/min

$V_c = 150$  m/min,  $f_z = 0.4$  mm/t  
 $a_p \times a_e = 0.4 \times 10$  mm, dry  
MFH10-S10-01-2T (2 inserts)  
LPGT010210ER-GM (PR1525)

x 1.25  
Efficiency

$V_c = 80$  m/min,  $f_z = 0.04$  mm/t  
 $a_p \times a_e = 3 \times 10$  mm, dry  
 $\varnothing 10$  (4 flutes)

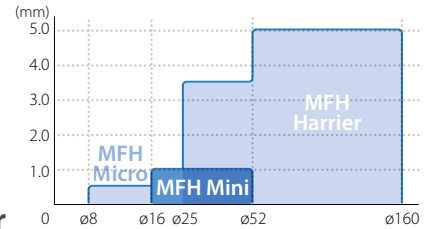


Small dia. cutter for high feed machining

# MFH Mini

Cutter dia.  $\phi 16 - \phi 52$

Economical inserts with 4 cutting edges. Small diameter fine pitch type for high efficiency and high feed machining.



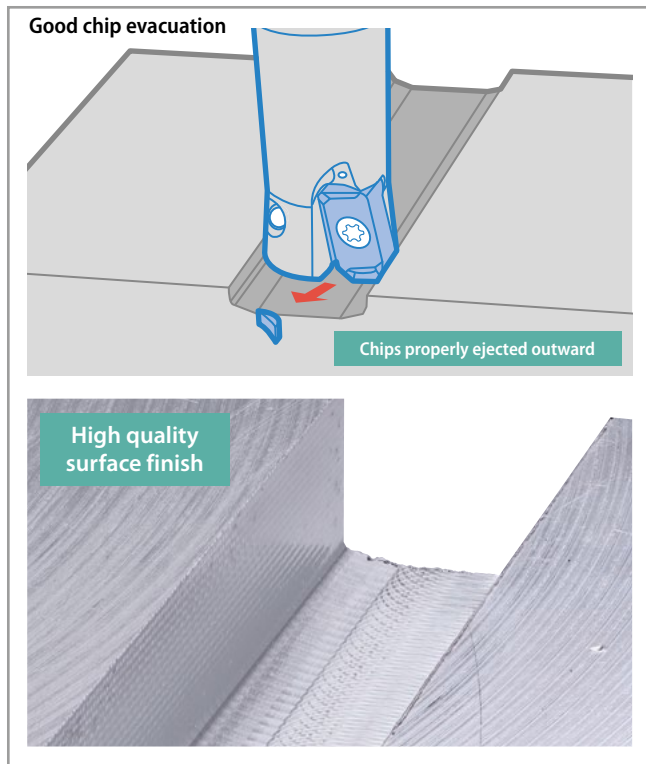
## 1 Good chip evacuation

**NEW** GH chipbreaker now available

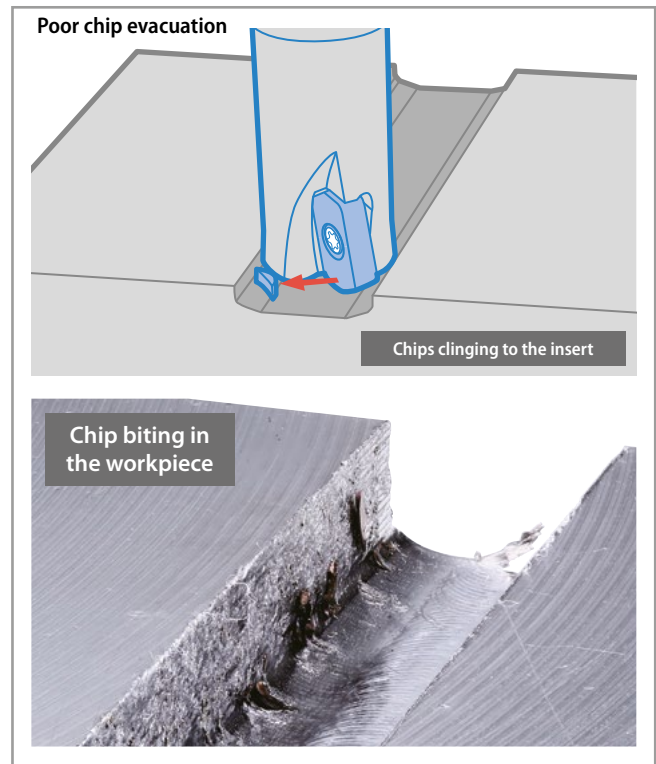


MFH mini controls chip biting with convex cutting edge

MFH Mini



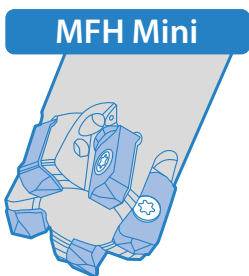
Competitor high feed cutter



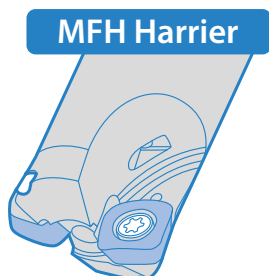
Cutting conditions: Cutter dia. DC =  $\phi 16$  mm (2 inserts),  $V_c = 150$  m/min,  $f_z = 0.6$  mm/t,  $a_p = 0.5$  mm (20 pass): Total 10 mm  $\times$  16 mm, dry, workpiece: ST44-2

## 2 Fine pitch for efficient machining

Cutter dia. 25 mm type



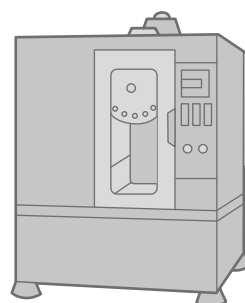
5 inserts MFH25-S25-03-5T



2 inserts MFH25-S25-10-2T

## 3 Suitable for roughing of molds

High feed machining in small machining centers



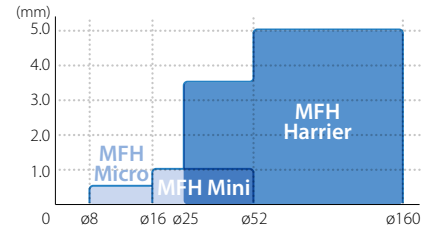
Applicable for BT30/ BT40

Highly efficiency and high feed cutter

# MFH Harrier

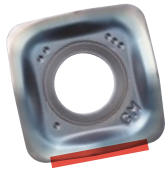
Cutter dia.  $\varnothing 25 - \varnothing 160$

Wide range of products for high feed machining  
Large depths of cut and low cutting forces.



## 1 Large insert lineup for various applications

**GM** (general purpose)

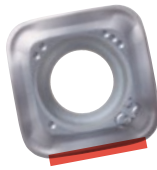


First recommendation for general machining

Multiple metalworking processes

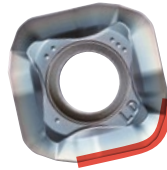
**GH** (tough edge)

**NEW**



Excellent fracture resistance

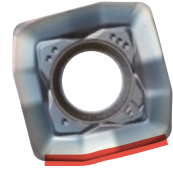
**LD** (large ap)



MAX. ap = 5 mm

Available for scale removal as well as high feed cutting

**FL** (wiper edge)



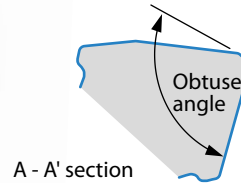
Wiper edge with low cutting forces

Excellent surface finish and reduced chattering

GH chipbreaker with excellent fracture resistance

Convex cutting edge design

Reduces impact force when entering workpiece  
Suppresses chattering and fracturing



Tough edge design

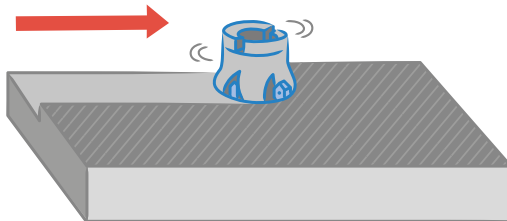
Combining with PR015S is suitable for machining hardened material  
Improved fracture resistance

Feature

LD chipbreaker can be used for both large ap and high feed machining

Large ap for scale removal

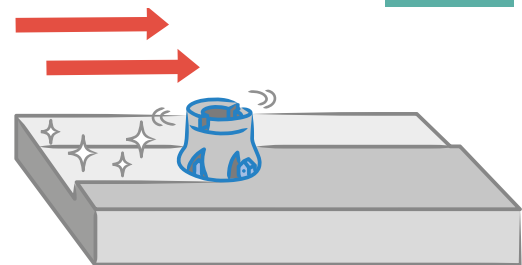
ap = 4.0 mm



(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)

Roughing for scale removal (2 passes): Large ap

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

Roughing (2 passes) after scale removal: High feed rate

Vc = 200 m/min, fz = 1.5 mm/t  
ap x ae = 2 x 40 mm, Vf = 7,583 mm/min  
Workpiece: ST44-2

**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 x ae = 3 x 40 mm, Vf = 1,264 mm/min  
Workpiece: ST44-2

Chip evacuation

**MFH**

**404 cc/min**

**x2.6**

Conventional cutter

**151 cc/min**

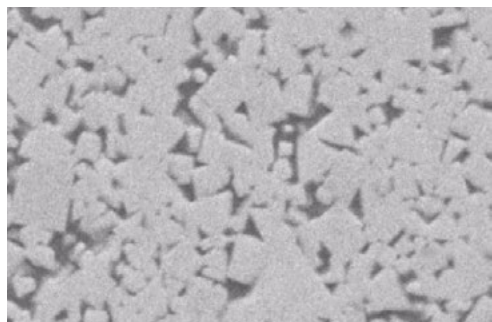
For general steel / alloy steel / difficult-to-cut material

# 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 \*internal evaluation

High toughness carbide base material



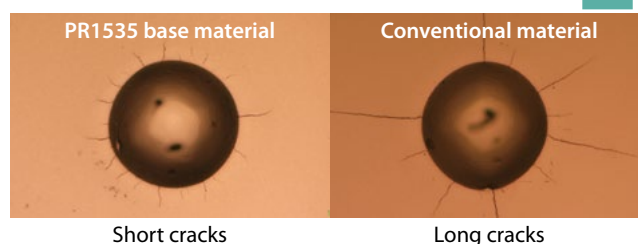
↑ 23%

## 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 indenter (internal evaluation)

↑ Shock Resistance

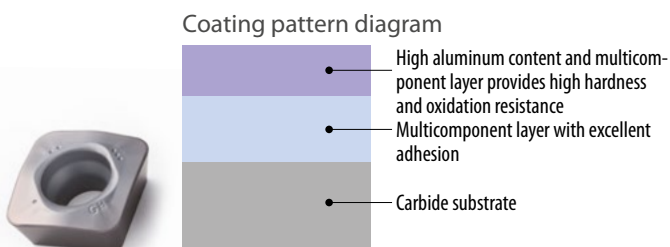


For hardened material

# MEGACOAT HARD PR015S

Excellent thermal property of the substrate reduces cracks and notch wear. High hardness and heat resistant coating improves wear resistance. The combination enables stable machining in hardened materials.

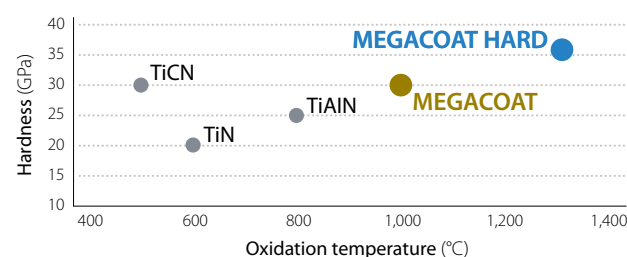
## High hardness and high heat-resistant PVD layer MEGACOAT HARD improves wear resistance



Combining GH chipbreaker and PR015S reduces heat-cracks and improves fracture resistance

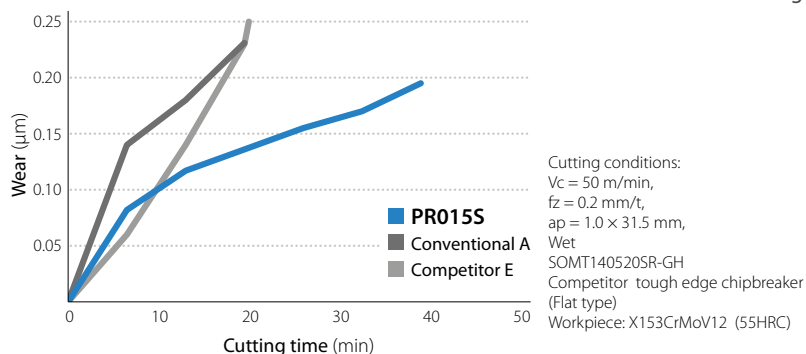
Stable machining in hardened material

Coating properties (Internal evaluation)

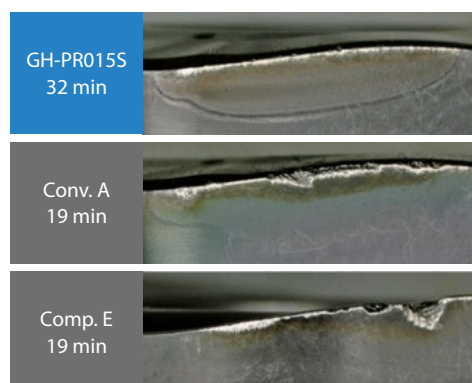


Low Oxidation resistance High

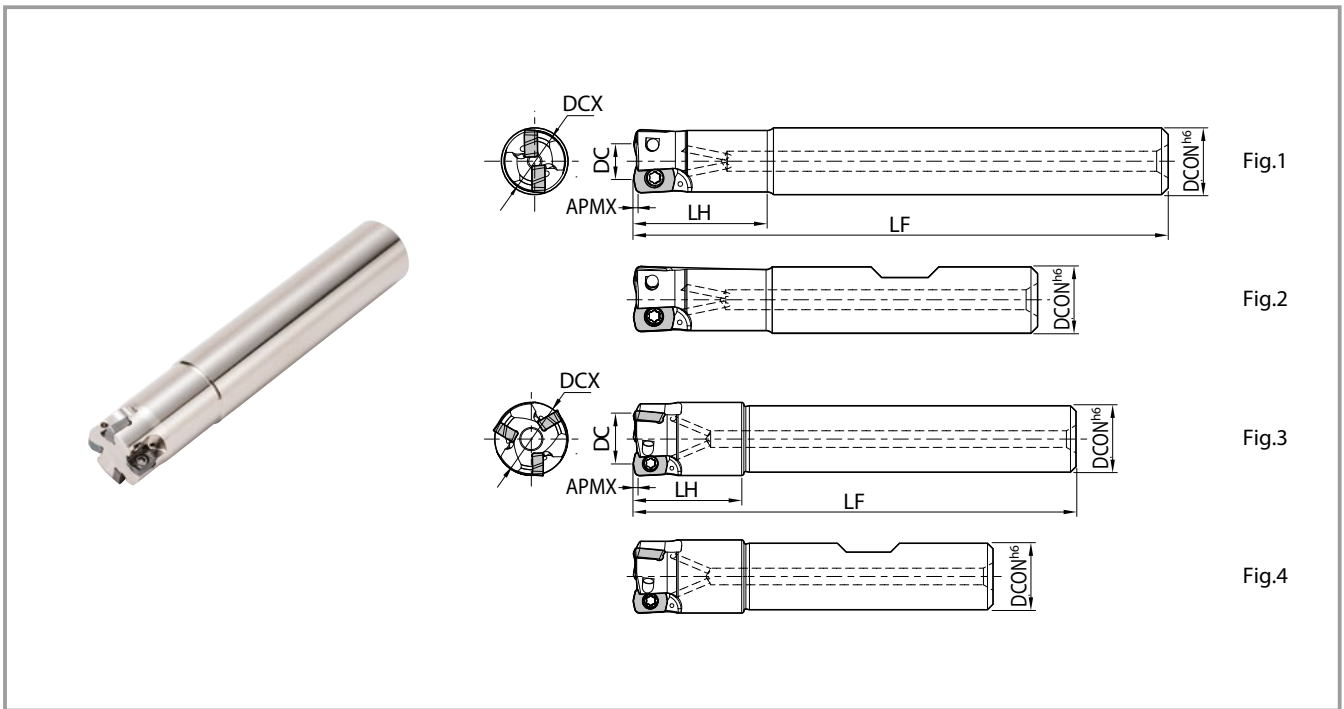
Cutting performance comparison (internal evaluation)



Cutting edge



# MFH Micro | End mill



## Toolholder dimensions (shank type)

Shank	Description	Availability	No. of inserts	Dimensions (mm)						Max. ramping angle	Rake angle	Coolant hole	Drawing	Weight (kg)	Max. revolution (min <sup>-1</sup> )
				DCX	DC	DCON	LF	LH	APMX		A.R.				
Standard (Straight)	MFH08-S10-01-1T	●	1	8	4.2	10	75	16	0.5	4°	+5°	Yes	Fig.1	0.04	20,000
	MFH10-S10-01-2T	●	2	10	6.2	10	80	20		3°				0.04	16,200
	MFH12-S12-01-3T	●	3	12	8.2	12	80	20		2°				0.06	14,000
	MFH16-S16-01-4T	●	4	16	12.2	16	90	25		1.2°				0.12	11,400
Over size (Straight)	MFH14-S12-01-3T	●	3	14	10.2	12	80	20	0.5	1.5°	+5°	Yes	Fig.3	0.07	12,500
Standard (Weldon)	MFH08-W10-01-1T	●	1	8	4.2	10	58	16	0.5	4°	+5°	Yes	Fig.2	0.03	20,000
	MFH10-W10-01-2T	●	2	10	6.2	10	60	20		3°				0.03	16,200
	MFH12-W12-01-3T	●	3	12	8.2	12	65	20		2°				0.05	14,000
	MFH16-W16-01-4T	●	4	16	12.2	16	73	25		1.2°				0.1	11,400
Over size (Weldon)	MFH14-W12-01-3T	●	3	14	10.2	12	65	20	0.5	1.5°	+5°	Yes	Fig.4	0.05	12,500

### Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 8. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

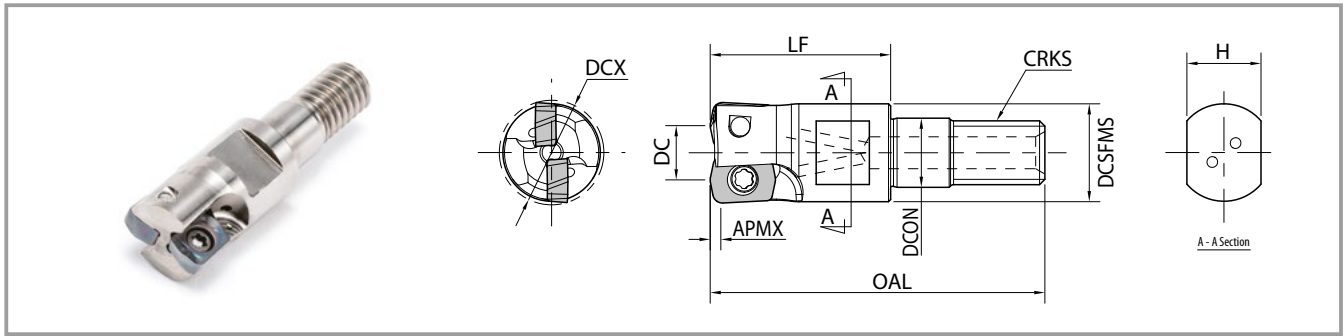
● : Available

## Spare parts and applicable inserts

Description	Spare parts			Applicable inserts
	Clamp screw	Wrench	Anti-Seize compound	
MFH...-01-...	SB-1840TRP	FTP-6	P-37	LPGT010210ER-GM
Recommended torque for insert clamp 0.5 nm				

Coat anti-seize compound (P-37) thinly on portion of taper and thread prior to installation.

# MFH Micro | Screw on type



## Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)									Max. ramping angle	Rake angle		Coolant hole	Max. revolution (min <sup>-1</sup> )
			DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX		A.R.			
MFH08-M06-01-1T	●	1	8	4.2	9.2	6.5	30.5	17	M6×P1.0	7	0.5	4°	+5°	Yes	20,000	
MFH10-M06-01-2T	●	2	10	6.2								3°			16,200	
MFH12-M06-01-3T	●	3	12	8.2	11.2	2°	14,000									
MFH14-M06-01-3T	●	3	14	10.2		1.5°	12,500									
MFH16-M08-01-4T	●	4	16	12.2	14.7	8.5	39	22	M8×P1.25	12	1.2°	11,400				

Industry standard threads for adapting to common toolholders (For ø8 - ø14 screw size: M6 x P1.0). Check screw specifications for the shank in use.

●: Available

## Spare parts and applicable inserts

Description	Spare Parts			Applicable Inserts
	Clamp Screw	Wrench	Anti-Seize Compound	
MFH...-01-...	SB-1840TRP	FTP-6	P-37	LPGT010210ER-GM
Recommended torque for insert clamp 0.5 nm				

### Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 8.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.


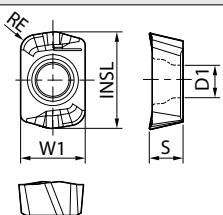
Coat anti-seize compound (P-37) thinly on portion of taper and thread prior to installation.

## Actual end mill depth (MFH16-M08-01-4T)

Arbor description	Applicable end mill (head)			Actual end mill depth (mm)
	Description	Cutter dia.	Dimensions	LUX
		DC	LF	
BT30K-M08-45	MFH16-M08-01...	16	22	28.8
BT40K-M08-55	MFH16-M08-01...	16	22	28.7

For BT type arbor, see page 21

## MFH Micro | Applicable inserts

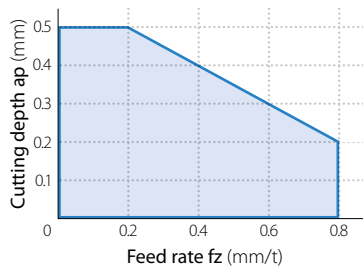
Insert	Description	Dimensions (mm)					MEGACOAT NANO		CVD coated carbide	
		W1	S	D1	INSL	RE	PR1535	PR1525	CA6535	
 General purpose		LPGT 010210ER-GM	4.19	2.19	2.1	6.26	1.0	●	●	●

●: Availability

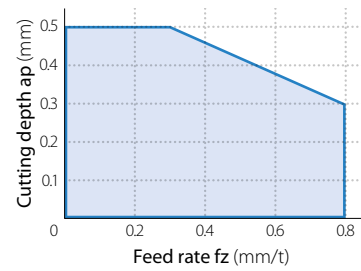


## MFH Micro | Cutting performance

Cutting diameter:  $\varnothing 8 - \varnothing 12$



Cutting diameter:  $\varnothing 14 - \varnothing 16$



## MFH Micro | Recommended cutting conditions ★1st recommendation ☆2nd recommendation

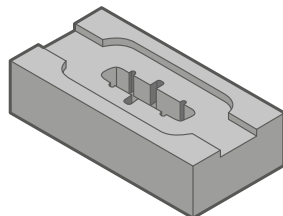
Insert	Workpiece	Holder description and feed rate ( $f_z$ : mm/t) Recommended feed $a_p = 0.3$ mm (reference value)					Recommended insert grade ( $V_c$ : m/min)		
		MFH08-... -1T	MFH10-... -2T	MFH12-... -3T	MFH14-... -3T	MFH16-... -4T	MEGACOAT NANO		CVD coated carbide
							PR1525	PR1535	CA6535
GM	Carbon steel	0.2 - 0.4 - 0.6			0.2 - 0.5 - 0.8		★ 120 - 180 - 250	☆ 120 - 180 - 250	-
	Alloy steel	0.2 - 0.4 - 0.6			0.2 - 0.5 - 0.8		★ 100 - 160 - 220	☆ 100 - 160 - 220	-
	Die steel ~40 HRC	0.2 - 0.3 - 0.5			0.2 - 0.4 - 0.6		★ 80 - 140 - 180	☆ 80 - 140 - 180	-
	Die steel 40~50 HRC	0.2 - 0.25 - 0.3			0.2 - 0.25 - 0.4		★ 60 - 100 - 130	☆ 60 - 100 - 130	-
	Austenitic stainless steel						☆ 100 - 160 - 200	★ 100 - 160 - 200	-
	Martensitic stainless steel	0.2 - 0.3 - 0.5			0.2 - 0.4 - 0.6		-	☆ 150 - 200 - 250	★ 180 - 240 - 300
	Precipitation hardened stainless steel						-	★ 90 - 120 - 150	-
	Gray cast iron	0.2 - 0.4 - 0.6			0.2 - 0.5 - 0.8		★ 120 - 180 - 250	-	-
	Nodular cast iron	0.2 - 0.3 - 0.5			0.2 - 0.4 - 0.6		★ 100 - 150 - 200	-	-
	Ni-base heat-resistant alloy						-	☆ 20 - 30 - 50	★ 20 - 30 - 50
	Titanium alloy	0.2 - 0.25 - 0.3			0.2 - 0.25 - 0.4		-	★ 40 - 60 - 80	-

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. Internal coolant is recommended for slotting applications.

### Case studies

#### Mold X40CrMoV5-1

$V_c = 90$  m/min ( $n = 2,400$  min<sup>-1</sup>)  
 $a_p \times a_e = 0.3 \times \sim 0.7$  mm  
 $f_z = 0.27$  mm/t ( $V_f = 1,930$  mm/min)  
 Dry  
 MFH12-S12-01-3T (3 inserts)  
 LPGT010210ER-GM PR1535



Chip removal ratio

**PR1535  $\varnothing 12$ -3T** **4.5 cc/min** x1.3

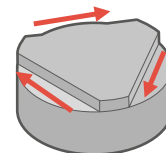
Competitor F  $\varnothing 12$ -3T **3.4 cc/min**

PR1535 shows 1.3 times machining efficiency compared to Competitor F  
 Good cutting edge condition after machining almost doubling the tool life

User evaluation

#### Industrial machine parts X105CrMo17

$V_c = 180$  m/min ( $n = 3,580$  min<sup>-1</sup>)  
 $a_p \times a_e = 0.4 \times 8$  mm  
 $f_z = 0.4$  mm/t ( $V_f = 5,730$  mm/min)  
 Wet  
 MFH16-S16-01-4T (4 inserts)  
 LPGT010210ER-GM PR1535



Cutting time

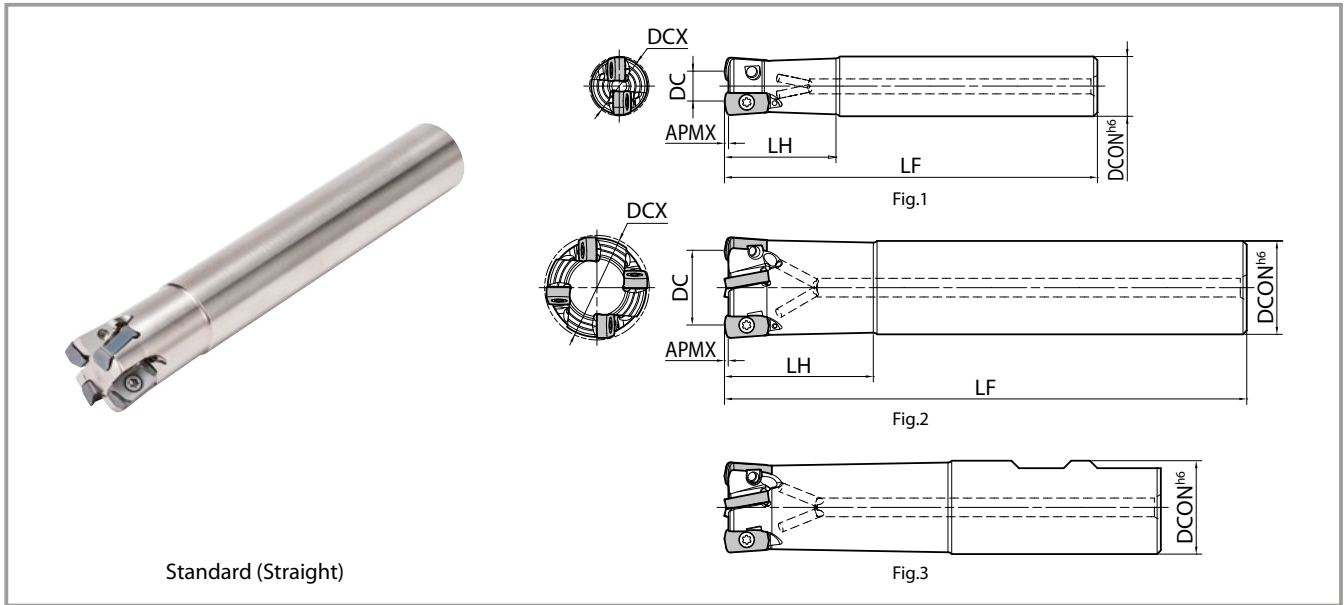
**PR1535** **7 min** 35%

Competitor G **11 min**

PR1535 shows 30% faster cycle time compared to competitor G

User evaluation

# MFH Mini | End mill






## Toolholder dimensions

Shank	Description	Availability	No. of inserts	Dimensions (mm)						Rake angle	Coolant hole	Drawing	Weight (kg)	Max. revolution (min-1)	
				DCX	DC	DCON	LF	LH	APMX	A.R.					
Standard (Straight)	MFH 16-S16-03-2T	●	2	16	8	16	100	30	1	-10°	Yes	Fig.1	0.1	18,800	
	MFH 20-S20-03-3T	●	3	20	12	20	130	50					0.3	15,700	
	20-S20-03-4T	●	4	20	12	20	130	50					0.3	15,700	
	MFH 25-S25-03-4T	●	4	25	17	25	140	60					0.5	13,400	
	25-S25-03-5T	●	5	25	17	25	140	60					0.5	13,400	
	MFH 32-S32-03-5T	●	5	32	24	32	150	70					0.8	11,400	
32-S32-03-6T	●	6	32	24	32	150	70	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					0.1	17,000	
	MFH 22-S20-03-3T	●	3	22	14	20	130	30					0.3	14,700	
	22-S20-03-4T	●	4	22	14	20	130	30					0.3	14,700	
	MFH 28-S25-03-4T	●	4	28	20	25	140	40					0.5	12,400	
	28-S25-03-5T	●	5	28	20	25	140	40					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						0.2	15,700
	20-W20-03-4T	●	4	20	12	20	101	50						0.2	15,700
	MFH 25-W25-03-4T	●	4	25	17	25	117	60						0.4	13,400
	25-W25-03-5T	●	5	25	17	25	117	60						0.4	13,400
	MFH 32-W32-03-5T	●	5	32	24	32	131	70	0.7	11,400					
32-W32-03-6T	●	6	32	24	32	131	70	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		0.3	15,700				
	MFH 25-S25-03-4T-180	●	4	25	17	25	180	100		0.6	13,400				
	MFH 32-S32-03-5T-200	●	5	32	24	32	200	120		1.1	11,400				

●: Available

## Spare parts and applicable inserts

Description	Spare parts			Applicable Inserts
	Clamp screw	Wrench	Anti-Seize compound	
MFH...-03-...	 SB-3065TRP Recommended torque for insert clamp 1.2 nm	 DTPM-8	 P-37	LOGU030310ER-GM LOGU030310ER-GH

### Caution with max. revolution

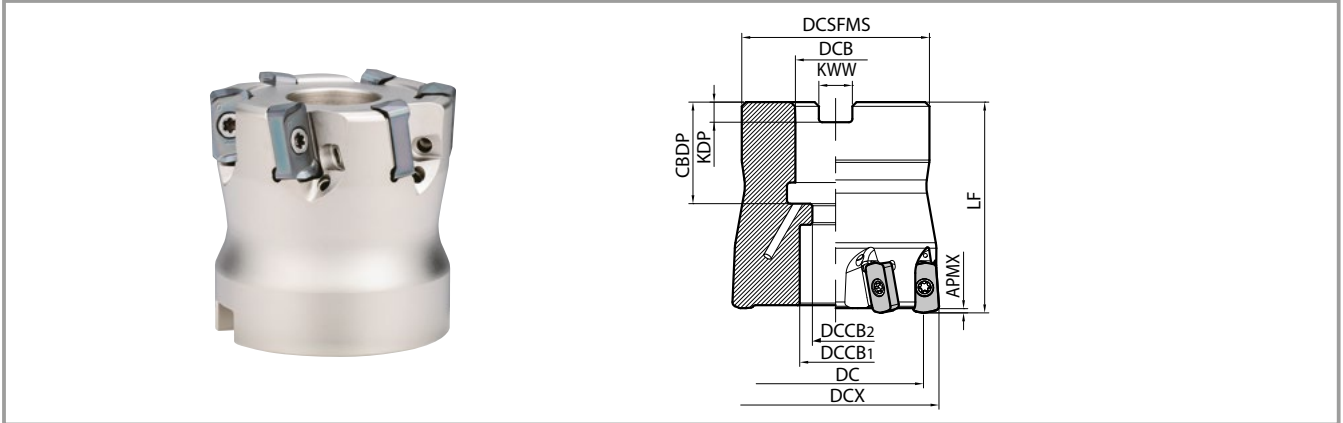
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 12.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

Coat anti-seize compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended cutting conditions → P12

## MFH Mini | Face mill



### Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)										Rake angle A.R.	Coolant hole	Weight (kg)	Max. revolution (min-1)	
			DCX	DC	DCSFMS	DCB	DCCB <sup>1</sup>	DCCB <sup>2</sup>	LF	CBDP	KDP	KWW					APMX
MFH 040R-03-5T-M	●	5	40	32	38	16	15	9	40	19	5.6	8.4	1	-10°	Yes	0.2	9,900
MFH 040R-03-6T-M	●	6	40	32	38	16	15	9	40	19	5.6	8.4					
MFH 040R-03-7T-M	●	7	40	32	34	16	14	9	40	19	5.6	8.4					
MFH 042R-03-7T-M	●	7	42	34	34	16	15	9	40	19	5.6	8.4	1	-10°	Yes	0.25	9,900
MFH 050R-03-8T-M	●	8	50	42	47	22	19	11	50	21	6.3	10.4				0.5	8,600
MFH 052R-03-8T-M	●	8	52	44	47	22	19	11	40	21	6.3	10.4				0.41	8,600

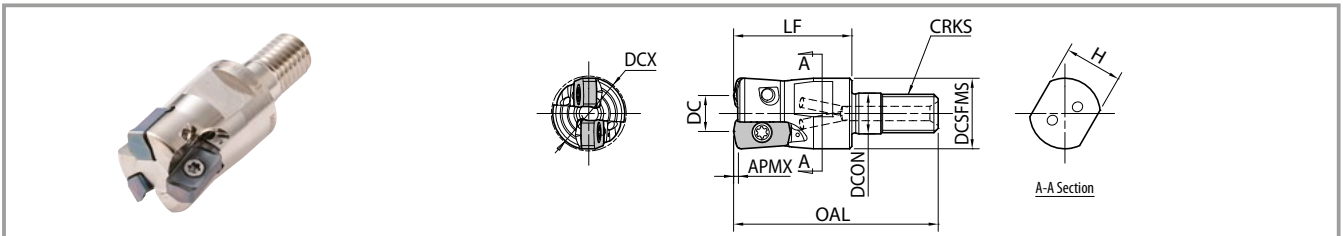
Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 12.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

● : Available

## MFH Mini | Screw on type



### Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)										Rake angle A.R.	Coolant hole	Max. revolution (min-1)
			DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX				
MFH 16-M08-03-2T	●	2	16	8	14.7	8.5	42	25	M8×P1.25	12	1	-10°	Yes	18,880	
MFH 17-M08-03-2T	●	2	17	9	14.7	8.5	42	25	M8×P1.25	12				17,900	
MFH 18-M08-03-2T	●	2	18	10	14.7	8.5	42	25	M8×P1.25	12				17,000	
MFH 20-M10-03-3T	●	3	20	12	18.7	10.5	48	30	M10×P1.5	15	1	-10°	Yes	15,700	
MFH 20-M10-03-4T	●	4	20	12	18.7	10.5	48	30	M10×P1.5	15				15,700	
MFH 22-M10-03-3T	●	3	22	14	18.7	10.5	48	30	M10×P1.5	15				14,700	
MFH 22-M10-03-4T	●	4	22	14	18.7	10.5	48	30	M10×P1.5	15	1	-10°	Yes	14,700	
MFH 25-M12-03-4T	●	4	25	17	23	12.5	56	35	M12×P1.75	19				13,400	
MFH 25-M12-03-5T	●	5	25	17	23	12.5	56	35	M12×P1.75	19				13,400	
MFH 28-M12-03-4T	●	4	28	20	23	12.5	56	35	M12×P1.75	19	1	-10°	Yes	12,400	
MFH 28-M12-03-5T	●	5	28	20	23	12.5	56	35	M12×P1.75	19				12,400	
MFH 32-M16-03-5T	●	5	32	24	30	17	62	40	M16×P2.0	24				11,400	
MFH 32-M16-03-6T	●	6	32	24	30	17	62	40	M16×P2.0	24	1	-10°	Yes	11,400	
MFH 35-M16-03-6T	●	6	35	27	30	17	63	40	M16×P2.0	24				11,400	
MFH 42-M16-03-7T	●	7	42	34	30	17	63	40	M16×P2.0	24				9,900	

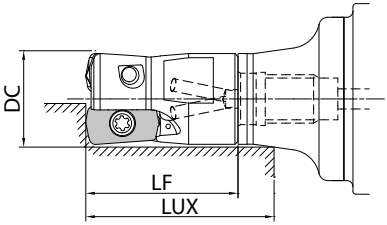
Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 12.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

● : Available



Effective depth of assembled tool



Arbor description	Applicable screw on type			Effective depth of assembled tool (mm)
	Description	Cutting dia.	Dimension	
		DC	LF	LUX
BT30K-M08-45	MFH16-M08-03...	16	25	31.8
	MFH17-M08-03...	17	25	33.2
	MFH18-M08-03...	18	25	34.2
BT30K-M10-45	MFH20-M10-03...	20	30	36.8
	MFH22-M10-03...	22	30	39.2
BT30K-M12-45	MFH25-M12-03...	25	35	42.8
	MFH28-M12-03...	28	35	45.5
BT40K-M08-55	MFH16-M08-03...	16	25	31.7
	MFH17-M08-03...	17	25	33.2
	MFH18-M08-03...	18	25	34.3
BT40K-M10-60	MFH20-M10-03...	20	30	38.7
	MFH22-M10-03...	22	30	44.5
BT40K-M12-55	MFH25-M12-03...	25	35	44.6
	MFH28-M12-03...	28	35	47.6
BT40K-M16-65	MFH32-M16-03...	32	40	51.2

For BT type arbor, see page 21

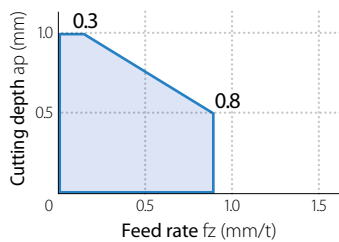
MFH Mini | Applicable inserts

Insert	Description	Dimensions (mm)					MEGACOAT NANO			MEGACOAT HARD	CVD coated carbide
		W1	S	D1	INSL	RE	PR1535	PR1525	PR1510	PR0155	CA6535
 General purpose	LOGU030310ER-GM	6.2	3.96	3.45	11.9	1.0	●	●	●	-	●
 Tough edge	LOGU030310ER-GH	6.2	3.96	3.45	11.9	1.0	●	●	●	●	-

● : Available

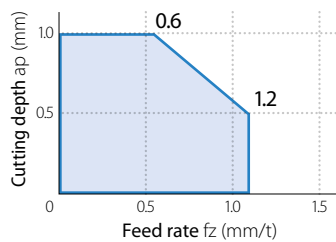
MFH Mini | Cutting performance

Fine pitch



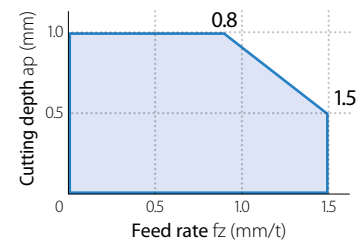
MFH20-...-4T, MFH22-...-4T,  
MFH25-...-5T, MFH28-...-5T,  
MF32-...-6T

Standard pitch (cutter dia. 16 – 22 mm)



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

Face mill (cutter dia. 40 – 52 mm)  
Standard pitch (cutter dia. 25 – 32 mm)



MFH25-...-4T, MFH28-...-4T,  
MFH32-...-5T, MFH040R-...,  
MFH050R-..., MFH052R-...

Caution:

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

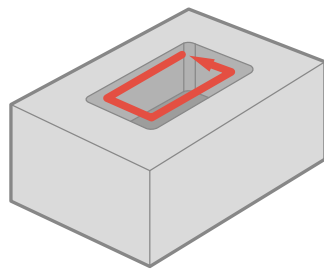
Insert	Workpiece	Holder description and feed rate (fz: mm/t) Recommended feed ap = 0.5 mm (reference value)							Recommended insert grade (vc: m/min)					
		MFH16 -...-2T	MFH20 -...-3T	MFH20 -...-4T	MFH25 -...-4T	MFH25 -...-5T	MFH32 -...-5T	MFH32 -...-6T	MFH -...-R-03	MEGACOAT NANO			MEGACOAT HARD	CVD coated carbide
										PR1535	PR1525	PR1510	PR0155	CA6535
GM GH	Carbon steel	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	0.2 - 0.5 - 0.8	☆	★	-	-	-	
	120 - 180 - 250								120 - 180 - 250					
	Alloy steel								☆	★	-	-	-	
									100 - 160 - 220	100 - 160 - 220				
	Die steel	~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	0.2 - 0.4 - 0.6	☆	☆	-	GH★	-
										80 - 140 - 180	80 - 140 - 180		80 - 140 - 180	
		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	0.2 - 0.25 - 0.3	-	☆	-	GH★	-
										60 - 100 - 130			60 - 100 - 130	
	50~55HRC	0.1 - 0.3 - 0.5	0.1 - 0.2 - 0.3	0.1 - 0.3 - 0.5	0.1 - 0.2 - 0.3	0.1 - 0.3 - 0.5	0.1 - 0.2 - 0.3	0.1 - 0.2 - 0.3	-	☆	-	GH★	-	
										50 - 70 - 100			50 - 70 - 100	
55~60HRC	0.03 - 0.06 - 0.1 (* Recommended only for GH chipbreaker)							-	-	-	GH☆	-		
												50 - 60 - 70		
Austenitic stainless steel									GM★	GM☆	-	-	-	
									100 - 160 - 200	100 - 160 - 200				
Martensitic stainless steel	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	0.2 - 0.4 - 0.6	0.2 - 0.4 - 0.6	☆	-	-	-	★	
									150 - 200 - 250				180 - 240 - 300	
Precipitation hardened stainless steel									★	-	-	-	-	
									90 - 120 - 150					
Gray cast iron	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	0.2 - 0.5 - 0.8	0.2 - 0.5 - 0.8	-	-	★	-	-	
											120 - 180 - 250			
Nodular cast iron	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	0.2 - 0.4 - 0.6	0.2 - 0.4 - 0.6	-	-	★	-	-	
											100 - 150 - 200			
Ni-base heat-resistant alloy									☆	-	-	-	★	
									20 - 30 - 50				20 - 30 - 50	
Titanium 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	0.2 - 0.25 - 0.4	0.2 - 0.25 - 0.4	GM★	-	GM☆	-	-	
									40 - 60 - 80		30 - 50 - 70			

- 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 coolant is recommended for Ni-base heat resistant alloy and titanium alloy
- Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications
- Slotting and pocketing are not recommended for face mill type.

### Case studies

#### Mold Parts Pre-hardened steel

Vc = 220 m/min (n = 3,500 min<sup>-1</sup>)  
 ap x ae = 0.5 x 14 mm  
 fz = 0.05 mm/t (Vf = 700 mm/min)  
 Dry  
 MFH20-S20-03-4T (4 inserts)  
 LOGU030310ER-GM PR1535



Tool life

**PR1535** **2.0 h** max. x2

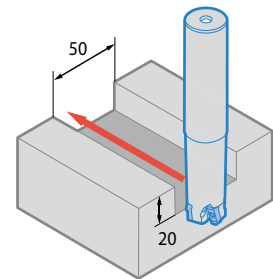
Competitor H  
4 Inserts **1.0-1.5 h**

PR1535 shows lower cutting load compared to competitor H and can extend the machining time.

User evaluation

#### Airplane parts Precipitation hardened stainless steel

Vc = 120 m/min (n = 1,530 min<sup>-1</sup>)  
 ap x ae = 0.7 x ~ 25 mm  
 fz = 0.6 mm/t (Vf = 3,670 mm/min)  
 Dry  
 MFH25-S25-03-4T (4 inserts)  
 LOGU030310ER-GM PR1535



Number of workpieces

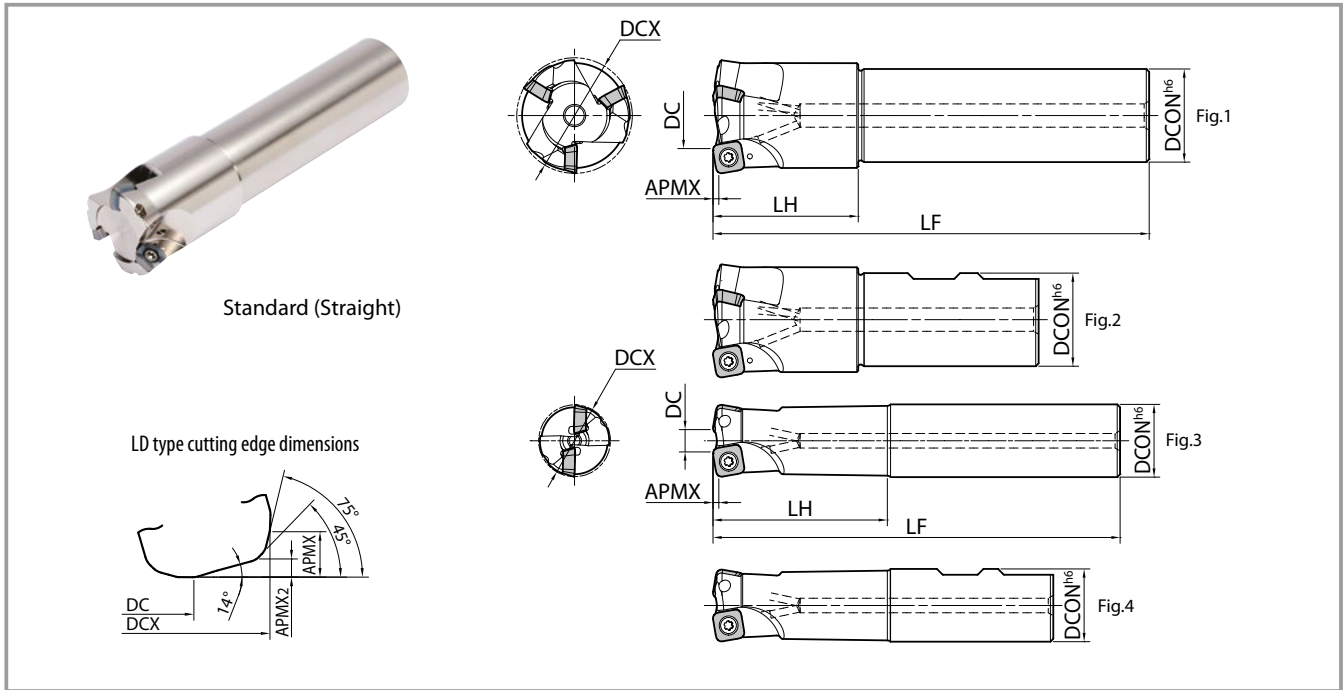
**PR1535** **100 pcs** x1.8

Competitor I  
5 inserts **55 pcs**

PR1535 maintains good cutting edge condition after machining 100 pcs with stable machining.

User evaluation

# MFH Harrier | End mill (SOMT10 type)



## Toolholder dimensions (SOMT10 type)

Shank	Description	Availability	No. of inserts	Dimensions (mm)							Rake angle	Coolant hole	Drawing	Weight (kg)	Max. revolution (min-1)		
				DCX	DC			DCON	LF	LH						APMX	APMX <sup>2</sup>
Standard (Straight)	MFH 25-S25-10-2T	●	2	25	8	12.5	11.5	25	140	60	1.5 (3.5) *	1.2	+10°	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						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						0.8	13,000
	MFH 40-S32-10-3T	●	3	40	23	27.5	26.5	32	150	50						0.9	11,500
	40-S32-10-4T	●	4	40	23	27.5	26.5	32	150	50						0.9	11,500
Standard (Weldon)	MFH 25-W25-10-2T	●	2	25	8	12.5	11.5	25	117	60	1.5 (3.5) *	1.2	+10°	Yes	Fig.4	0.4	17,000
	MFH 32-W32-10-3T	●	3	32	15	19.5	18.5	32	131	70					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						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 (3.5) *	1.2	+10°	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						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 (3.5) *	1.2	+10°	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						1.8	11,500

\* Dimension in ( ) is when mounting LD type ●: Available

## Spare parts and applicable inserts

Description	Spare parts			Applicable inserts
	Clamp screw	Wrench	Anti-Seize compound	
MFH...-10-...	SB-4075TRP	DTPM-15	P-37	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
Recommended Torque for Insert Clamp 3.5 nm				

### Caution with max. revolution

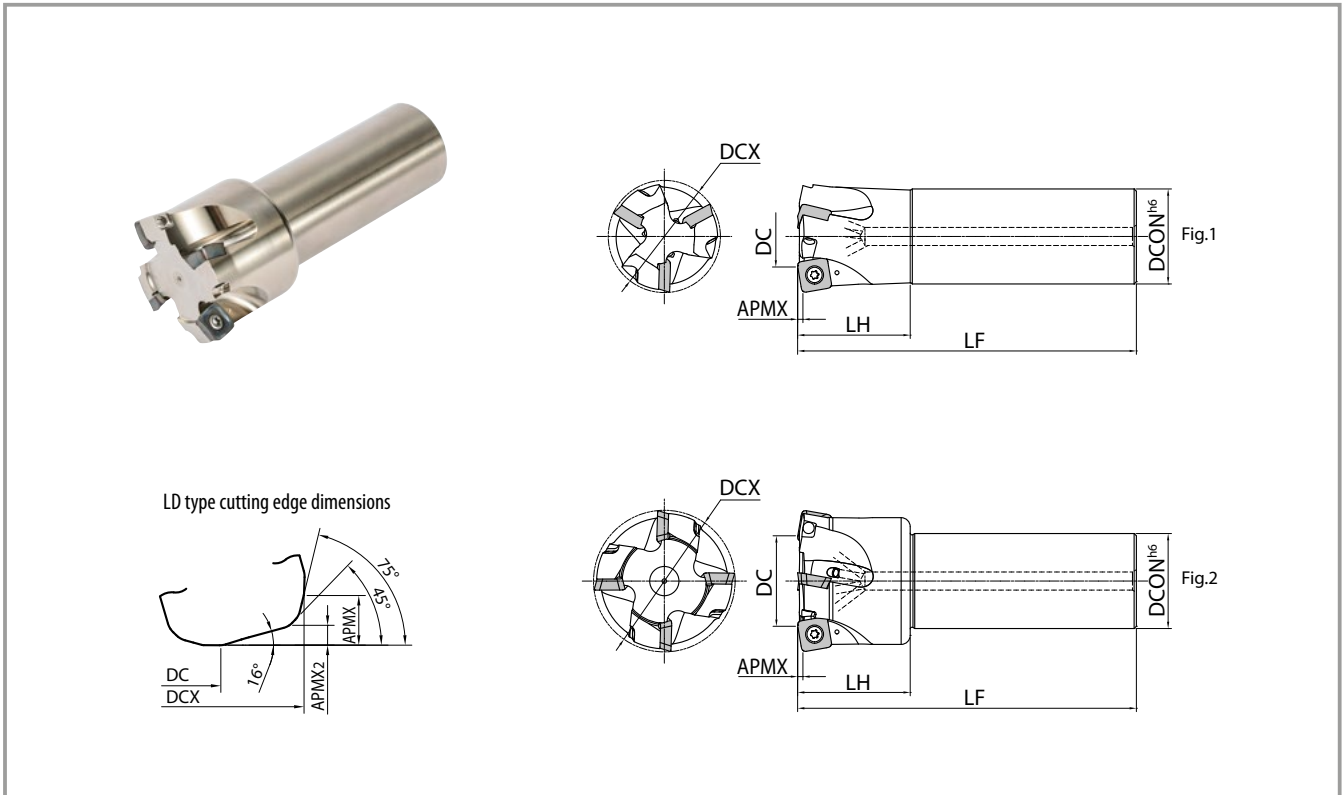
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 19-20.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

Coat anti-seize compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended cutting conditions → P19, P20

# MFH Harrier | End mill (SOMT14 type)






## Toolholder dimensions (SOMT14 type)

Description	Availability	No. of inserts	Dimensions (mm)								A.R.	Coolant hole	Drawing	Weight (kg)	Max. revolution (min-1)	
			DCX	DC			DCON	LF	LH	APMX						APMX <sup>2</sup>
GM-GH	LD	FL														
MFH50-S42-14-3T	●	3	50	27	33	32	42	150	50	2 *(5)	2	+10°	Yes	Fig. 1	1.4	8,800
MFH63-S42-14-4T	●	4	63	40	46	45	42	150	50					Fig. 2	1.7	7,400
MFH80-S42-14-5T	●	5	80	57	63	62	42	150	50					2.3	6,400	

\* Dimension in ( ) is when mounting LD type ● : Available

## Spare parts and applicable inserts

Description	Spare parts			Applicable inserts
	Clamp screw	Wrench	Anti-Seize compound	
MFH...-14-...	 SB-50120TRP Recommended torque for insert clamp 4.5 nm	 TTP-20	 P-37	SOMT140520ER-GM SOMT140520ER-GH SOMT140520ER-LD SOMT140514ER-FL

### Caution with max. revolution

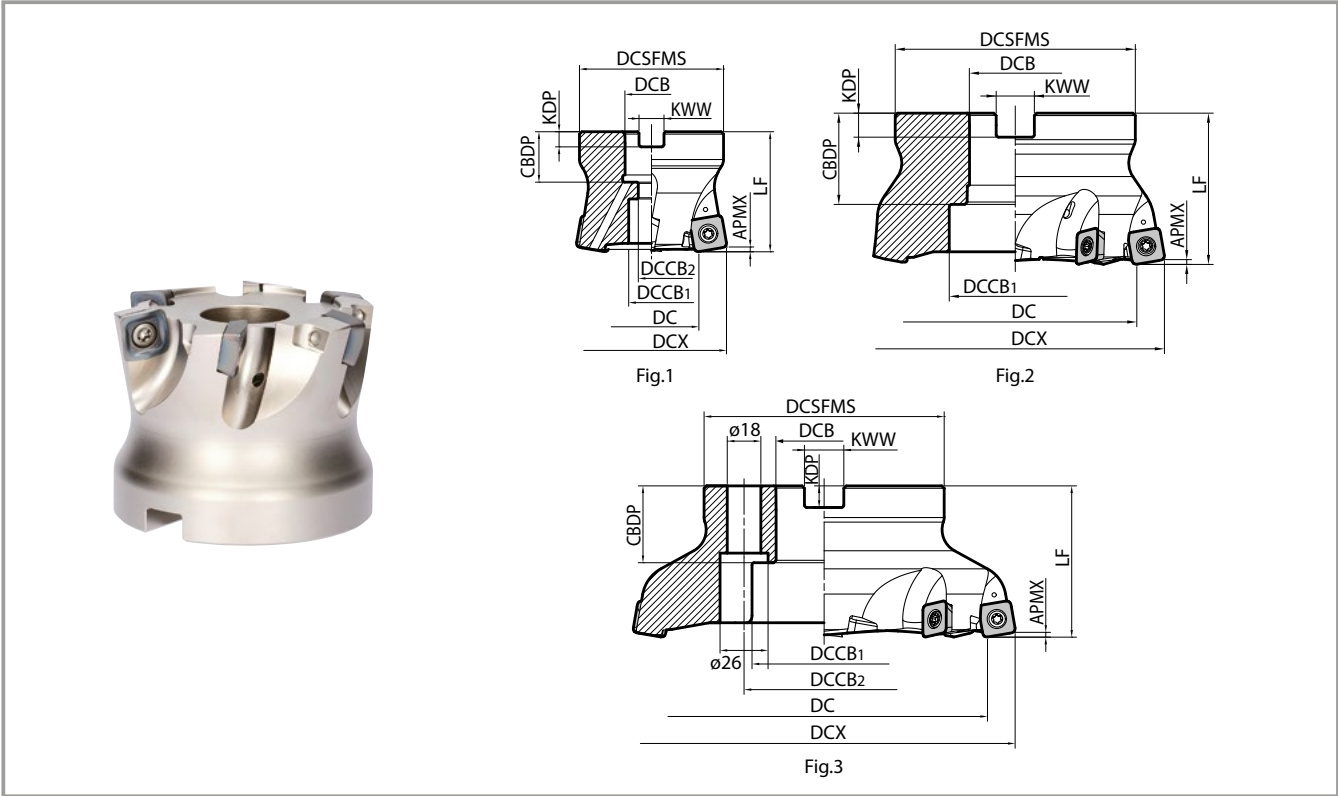
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 19-20.

Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

Coat anti-seize compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended cutting conditions → P19, P20

# MFH Harrier | Face mill



## Toolholder dimensions (SOMT10 type)

Description	Availability	No. of inserts	Dimensions (mm)											Rake angle A.R.	Coolant hole	Drawing	Weight (kg)	Max. revolution (min-1)			
			DCX	DC			DCSFMS	DCB	DCCB <sup>1</sup>	DCCB <sup>2</sup>	Lf	CBDP	KDP						KWW	APMX	APMX <sup>2</sup> *1
GM-GH	LD	FL																			
MFH 050R-10-4T-M	●	4	50	33	37.5	36.5	47	22	19	11	50	21	6.3	10.4	1.5 (3.5) *2	1.2	+10°	Yes	Fig.1	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						0.4	10,000
MFH 052R-10-4T-M	●	4	52	35	39.5	38.5	47	22	19	11	50	21	6.3	10.4						0.4	10,000
052R-10-5T-M	●	5	52	35	39.5	38.5	47	22	19	11	50	21	6.3	10.4						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						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						0.7	8,800
063R-10-5T-27M	●	5	63	46	50.5	49.5	60	27	20	13	50	24	7	12.4						0.7	8,800
063R-10-6T-27M	●	6	63	46	50.5	49.5	60	27	20	13	50	24	7	12.4						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	1.6	7,600					

\*1 Refer to APMX 2 on Page 16 \*2 Dimension in ( ) is when mounting LD type ●: Available

### Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 19-20. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.



## Toolholder dimensions (SOMT14 type)

Description	Avail-ability	No. of in-serts	Dimensions (mm)												Rake angle A.R.	Coolant hole	Drawing	Weight (kg)	Max. revolution (min-1)			
			DCX	DC			DCSFMS	DCB	DCCB <sup>1</sup>	DCCB <sup>2</sup>	LF	CBDP	KDP	KWW						APMX	APMX <sup>2</sup> *1	
				GM-GH	LD	FL																
MFH 050R-14-4T-M	●	4	50	27	33	32	47	22	12	-	50	21	6.3	10.4	2 (5) *2	2	+10°	Yes	Fig.1	0.4	8,800	
MFH 063R-14-4T-22M	●	4	63	40	46	45	60	22	19	11	50	21	6.3	10.4						0.6	7,400	
063R-14-5T-22M	●	5	63	40	46	45	60	22	19	11	50	21	6.3	10.4						0.6	7,400	
063R-14-4T-27M	●	4	63	40	46	45	60	27	20	13	50	24	7	12.4						0.6	7,400	
063R-14-5T-27M	●	5	63	40	46	45	60	27	20	13	50	24	7	12.4						0.6	7,400	
MFH 080R-14-5T-M	●	5	80	57	63	62	76	27	20	13	63	24	7	12.4						1.4	6,400	
080R-14-6T-M	●	6	80	57	63	62	76	27	20	13	63	24	7	12.4								
MFH 066R-14-4T-22M	●	4	66	43	49	48	60	22	19	11	50	21	6.3	10.4						0.6	7,400	
066R-14-5T-22M	●	5	66	43	49	48	60	22	19	11	50	21	6.3	10.4								
066R-14-4T-27M	●	4	66	43	49	48	60	27	20	13	50	24	7	12.4								
066R-14-5T-27M	●	5	66	43	49	48	60	27	20	13	50	24	7	12.4								
MFH 100R-14-6T-M	●	6	100	77	83	82	96	32	26	17	63	28	8	14.4					2.4	5,600		
100R-14-7T-M	●	7	100	77	83	82	96	32	26	17	63	28	8	14.4								
MFH 125R-14-7T-M	●	7	125	102	108	107	100	40	55	-	63	33	9	16.4					2.8	4,800		
MFH 160R-14-8T-M	●	8	160	137	143	142	100	40	68	66.7	63	32	9	16.4					No	Fig.3	3.7	4,200

MFH050R-14-4T and MFH050R-14-4T-M have double screws. Read the instruction manual attached to the toolholder for handling method.

\*1 Refer to APMX 2 on Page 16 \*2 Dimension in ( ) is when mounting LD type ●: Available

### Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 19-20.

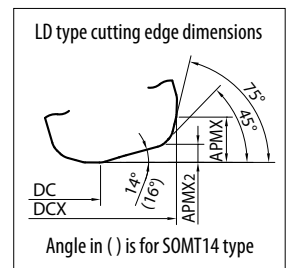
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

## Spare parts and applicable inserts

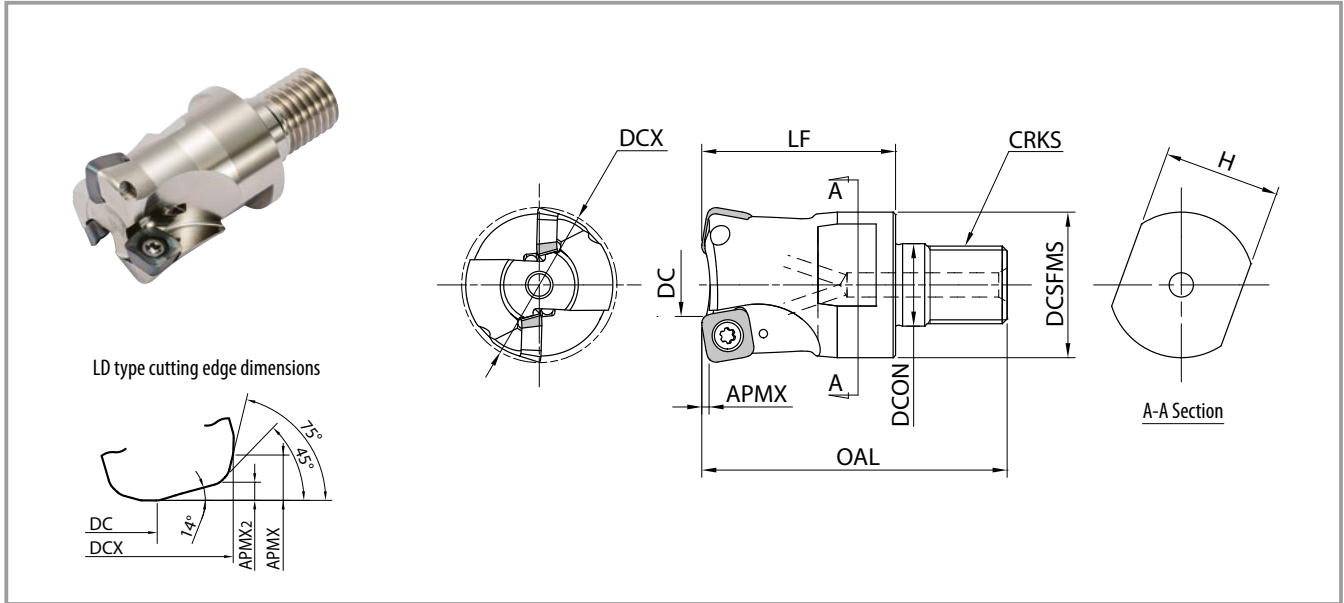
Description	Spare parts					Applicable inserts
	Clamp screw	Wrench		Anti-Seize compound	Arbor clamp bolt	
MFH050R-10-...-M	SB-4090TRPN	DTPM	TTP	P-37	HH10×30	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
MFH063R-10-...-22					HH10×30	
MFH063R-10-...-27M					HH12×35	
MFH080R-10-...-M					HH12×35	
MFH050R-14-...-M	SB-50120TRP	TTP-20	P-37	W10×31	SOMT140520ER-GM SOMT140520ER-GH SOMT140520ER-LD SOMT140514ER-FL	
MFH063R-14-...-22M				HH10×30		
MFH063R-14-...-27M				HH12×35		
MFH080R-14-...-M				HH12×35		
MFH100R-14-...-M					-	

• Coat anti-seize compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended cutting conditions → P19, P20



# MFH Harrier | Screw on type



## Toolholder dimensions




Description	Availability	No. of inserts	Dimensions (mm)												Rake angle	Coolant hole	Max. revolution (min-1)
			DCX	DC			DCSFMS	DCON	OAL	LF	CRKS	H	APMX	APMX <sup>2</sup>	A.R.		
GM-GH	LD	FL															
MFH 25-M12-10-2T	●	2	25	8	12.5	11.5	23	12.5	56	35	M12×P1.75	19	1.5 (3.5) *	1.2	+10°	Yes	17,000
MFH 28-M12-10-2T	●	2	28	11	15.5	14.5	23	12.5	56	35	M12×P1.75	19					15,500
MFH 32-M16-10-2T	●	2	32	15	19.5	18.5	30	17	62	40	M16×P2.0	24					14,000
MFH 32-M16-10-3T	●	3	32	15	19.5	18.5	30	17	62	40	M16×P2.0	24					14,000
MFH 35-M16-10-2T	●	2	35	18	22.5	21.5	30	17	62	40	M16×P2.0	24					13,000
MFH 35-M16-10-3T	●	3	35	18	22.5	21.5	30	17	62	40	M16×P2.0	24					13,000
MFH 40-M16-10-3T	●	3	40	23	27.5	26.5	30	17	62	40	M16×P2.0	24					11,500
MFH 40-M16-10-4T	●	4	40	23	27.5	26.5	30	17	62	40	M16×P2.0	24					11,500

### Caution with max. revolution

Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 19-20. Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

\* Dimension in ( ) is when mounting LD type ●: Available


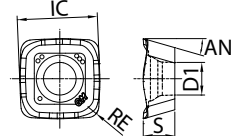
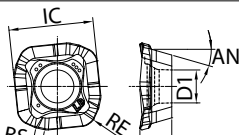
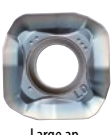
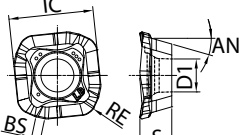
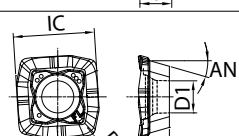

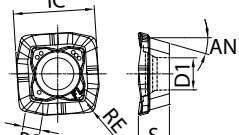
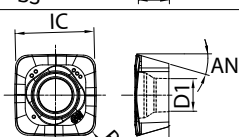

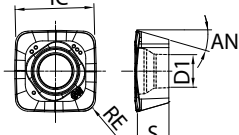
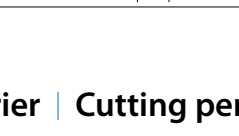
## Spare parts and applicable inserts

Description	Spare parts			Applicable inserts
	Clamp screw	Wrench	Anti-Seize compound	
MFH...-10-...	 SB-4075TRP Recommended torque for insert clamp 3.5 Nm	 DTPM-15	 P-37	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL

• Coat Anti-Seize Compound (P-37) thinly on portion of taper and thread prior to installation.

Recommended cutting conditions → p19, p20

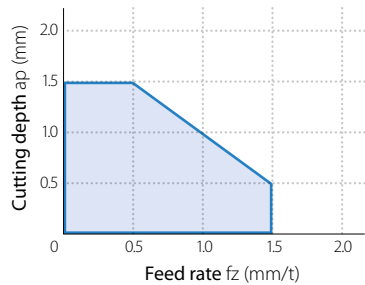
# MFH Harrier | Applicable inserts

Classification of usage	P	Carbon steel / alloy steel		☆	★									
		Die steel		☆	★									
★ : Roughing / 1st choice ☆ : Roughing / 2nd choice ■ : Finishing / 1st choice □ : Finishing / 2nd choice	M	Austenitic stainless steel		★	☆									
		Martensitic stainless steel		☆									★	
		Precipitation hardened stainless steel		★										
	K	Gray cast iron										★		
		Nodular cast iron											★	
	S	Ni-base heat-resistant alloy		★										☆
		Titanium alloy (ti-6al-4v)		★								☆		
	H	High hardness steel										□		
Insert	Description	Dimensions (mm)					Angle (°)	MEGACOAT NANO			MEGACOAT HARD	CVD coated carbide		
		IC	S	D1	BS	RE		AN	PR1535	PR1525			PR1510	PR0155
 General purpose	 SOMT100420ER-GM	10.30	4.58	4.6	-	2.0	16	●	●	●	-	●		
	 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	●	●	●	-	●		
 Tough edge	 SOMT100420ER-GH	10.43	4.57	4.55	-	2.0	16	●	●	●	●	-		
	 SOMT140520ER-GH	14.17	5.56	5.8	-	2.0	16	●	●	●	●	-		

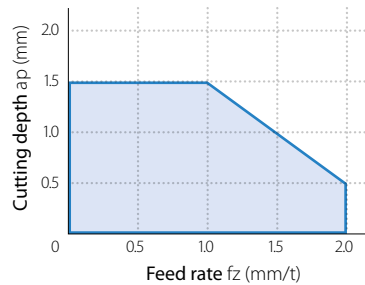
● : Available

# MFH Harrier | Cutting performance (GM/GH/FL)

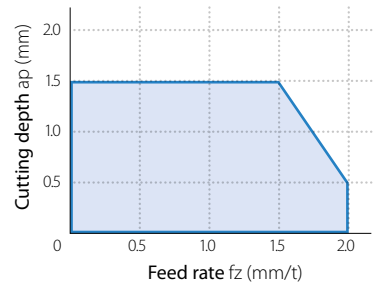
MFH25-S25-10-2T



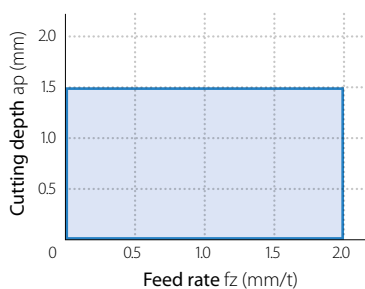
MFH32-S32-10-○T



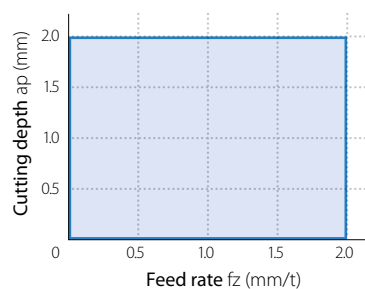
MFH40-S32-10-○T



MFH050R~080R-10-○T



MFH..-14-○T



**LD chipbreaker:**

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

**MFH Harrier | Recommended cutting conditions** ★ 1st recommendation ☆ 2nd recommendation

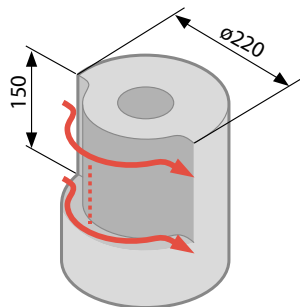
Insert	Workpiece	Holder description and feed rate (fz: mm/t)					Recommended insert grade (Vc: m/min)					
		MFH25-	MFH32-	MFH40-	MFH...R-10	MFH...-14	MEGACOAT NANO			MEGACOAT HARD	CVD coated carbide	
							PR1535	PR1525	PR1510	PR0155	CA6535	
GM GH	Carbon steel	0.5 - 0.8 - 1.0 (ap≤1.0mm) 0.2 - 0.4 - 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	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	~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	-	GH ★ 80 - 140 - 180	-
		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	-	GH ★ 60 - 100 - 130	-
		50~55HRC	0.15 - 0.25 - 0.4 (ap≤1.0mm)	0.15 - 0.35 - 0.6 (ap≤1.0mm)	0.15 - 0.4 - 0.7 (ap≤1.0mm)	0.2 - 0.5 - 0.8		-	☆ 50 - 70 - 100	-	GH ★ 50 - 70 - 100	-
		55~60HRC	0.03 - 0.06 - 0.1 (ap≤1.0mm) (* Recommended only for GH chipbreaker)					-	-	-	GH ☆ 50 - 60 - 70	-
	Austenitic stainless steel	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		GM ☆ 100 - 160 - 200	GM ☆ 100 - 160 - 200	-	-	-	
	Martensitic stainless steel	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	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	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	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	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		GM ★ 40 - 60 - 80	-	GM ☆ 30 - 50 - 70	-	-	
LD	Carbon steel	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	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 ~40 HRC	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 40~50 HRC	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	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	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	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	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	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	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	-	-	

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			MEGACOAT HARD	CVD coated carbide
							PR1535	PR1525	PR1510	PR0155	CA6535
FL	Carbon steel	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	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 ~40 HRC	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 40~50 HRC	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	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	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	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	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	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	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	-	-	

- 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
- Machining with coolant is recommended for Ni-base heat-resistant alloy and titanium alloy
- Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions
- Internal coolant is recommended for slotting applications

### Case studies

#### Construction machine parts C25E



Vc = 220 m/min (n = 1,750 min<sup>-1</sup>)  
 ap x ae = 1.5 x 30 mm  
 fz = 0.7 mm/t (Vf = 4,900 mm/min)  
 Dry  
 MFH40-S32-10-4T (4 inserts)  
 SOMT140520ER-GM PR1525

Cutting time

**PR1525**

**950 sec**



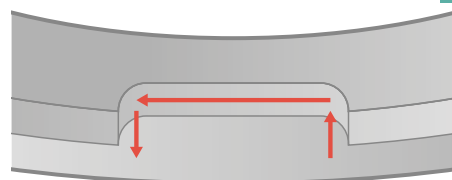
Competitor J (90° Cutter)

**3,800 sec**

PR1525 features a higher number of passes compared to Competitor J, but the machining time was reduced by 75% because the feed rate can be increased by 7 times.

User evaluation

#### Clutch X5CrNi18-10



Vc = 120 m/min (n = 1,190 min<sup>-1</sup>), ap x ae = 1.0 x 20 mm  
 fz = 1.2 mm/t (Vf = 2,850 mm/min), dry  
 MFH32-S32-10-2T (2 inserts), SOMT100420ER-GM PR1535

Chip removal ratio

**PR1535**

**58 cc/min**



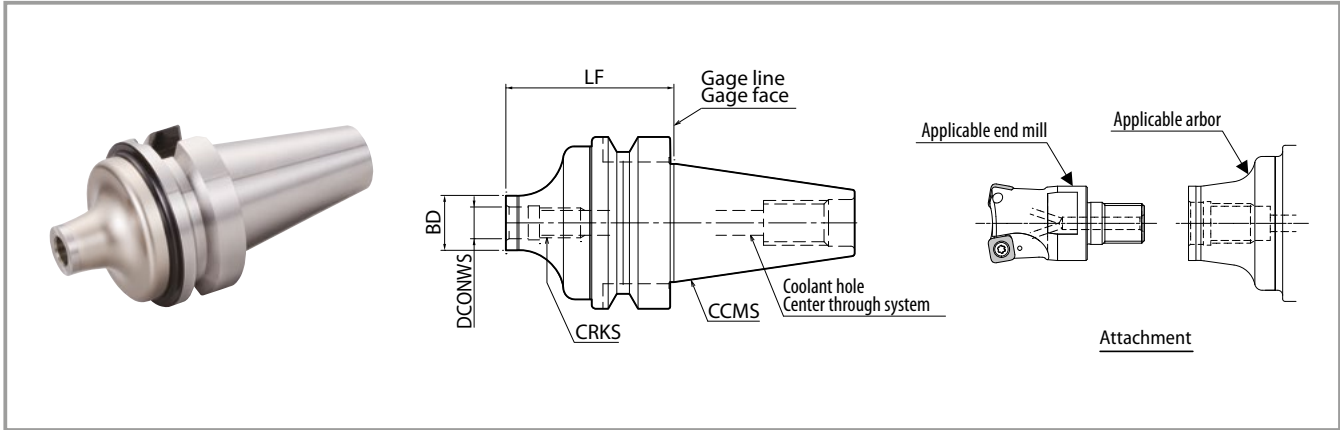
Competitor K

**36 cc/min**

PR1535 shows stable machining while Competitor K generated chattering. PR1535 maintained a good cutting edge condition with stable machining.

User evaluation

# BT arbor for exchangeable head/two-face clamping



## Dimensions

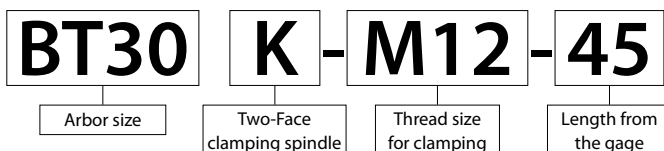
Description	Availability	Dimensions (mm)				Coolant hole	Arbor Two-face clamping	Applicable end mill (Head)
		LF	BD	DCONWS	CRKS			
BT30K- M08-45	●	45	14.7	8.5	M8×P1.25	Yes	BT30	MFH.-M08-...
	●	45	18.7	10.5	M10×P1.5			MFH.-M10-...
	●	45	23	12.5	M12×P1.75			MFH.-M12-...
BT40K- M08-55	●	55	14.7	8.5	M8×P1.25	Yes	BT40	MFH.-M08-...
	●	60	18.7	10.5	M10×P1.5			MFH.-M10-...
	●	55	23	12.5	M12×P1.75			MFH.-M12-...
	●	65	30	17	M16×P2.0			MFH.-M16-...

● : Available

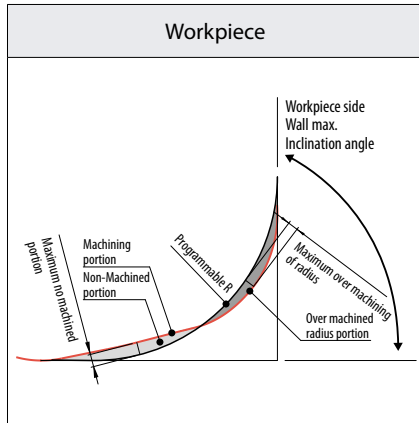
## Effective depth of assembled tool

Arbor description	Applicable screw on type			Effective depth of assembled tool (mm)	
	Description	Cutting dia. (mm)	Dimensions (mm)		
			DC	LF	LUX
BT30K- M08-45	MFH16-M08-01...	16	22	28.8	
	MFH16-M08-03...	16	25	31.8	
	MFH17-M08-03...	17	25	33.2	
	MFH18-M08-03...	18	25	34.2	
	M10-45	MFH20-M10-03...	20	30	36.8
	M10-45	MFH22-M10-03...	22	30	39.2
M12-45	MFH25-M12-...	25	35	42.8	
	MFH28-M12-...	28	35	45.5	
BT40K- M08-55	MFH16-M08-01...	16	22	28.7	
	MFH16-M08-03...	16	25	31.7	
	MFH17-M08-03...	17	25	33.2	
M10-60	MFH18-M08-03...	18	25	34.3	
	M10-60	MFH20-M10-03...	20	30	38.7
M10-60	MFH22-M10-03...	22	30	44.5	
	M12-55	MFH25-M12-...	25	35	44.6
M12-55	MFH28-M12-...	28	35	47.6	
	M16-65	MFH32-M16-...	32	40	51.2
	M16-65	MFH35-M16-10...	35	40	60.2
M16-65	MFH40-M16-10...	40	40	64	

## Arbor identification system



# Approximate programming radius adjustment



MFH Micro			MFH Mini		
Programmable R. (mm)	Maximum over machining of radius (mm)	Maximum no machined portion (mm)	Programmable R. (mm)	Maximum over machining of radius (mm)	Maximum no machined portion (mm)
R1.0	0	0.21	R1.6 (Recommended)	0	0.39
R1.2 (Recommended)	0	0.17	R2.0	0.09	0.35
R1.5	0.08	0.1	R2.5	0.26	0.26
R2.0	0.28	0.01	R3.0	0.46	0.17

\*Cutting edge Angle for MFH Micro/MFH Mini is 12° Workpiece side wall Max. inclination angle is 90°

MFH Harrier (GM - GH)						
Description	Insert	Cutting edge angle γ	Programmable R. (mm) (Recommended)	Maximum over machining of radius (mm)	Maximum no machined portion (mm)	Workpiece side wall max. Inclination angle
MFH...-10-...	GM - GH	10°	R3.0	0	0.85	90°
	LD	14°	R3.5	0	0.69	65°
	FL	14°	R3.0	0	0.89	80°
MFH...-14-...	GM - GH	10°	R3.5	0	1.37	90°
	LD	16°	R5.0	0	1.06	65°
	FL	13°	R3.0	0	1.36	80°

## Ramping reference data

Description	Cutting dia. DCX (mm)	8	10	12	14	16
MFH Micro	Max. ramping angle RMPX	4°	3°	2°	1.5°	1.2°
	tan RMPX	0.070	0.052	0.035	0.026	0.021

Description	Cutting dia. DCX (mm)	16	17	18	20	22	25	28	32	40	50
MFH Mini	Max. ramping angle RMPX	2.8°	2.5°	2.1°	1.7°	1.4°	1.2°	1°	0.8°	0.5°	0.4°
	tan RMPX	0.049	0.042	0.037	0.030	0.024	0.021	0.017	0.014	0.009	0.007

Description	Cutting dia. DCX (mm)	25	28	32	35	40	50	63	80
MFH Harrier (MFH...-10-...)	Max. ramping angle RMPX	5°	4.5°	4°	3.5°	3°	2.5°	2°	1°
	tan RMPX	0.087	0.078	0.070	0.061	0.052	0.043	0.035	0.017

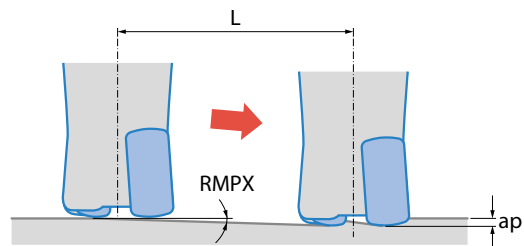
Description	Cutting dia. DCX (mm)	50	63	80	100	125	160
MFH Harrier (MFH...-14-...)	Max. ramping angle RMPX	2°	1.8°	1°	0.5°	0.4°	0.2°
	tan RMPX	0.035	0.031	0.017	0.009	0.007	0.003

## Ramping

Ramping angle should be under RMPX (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

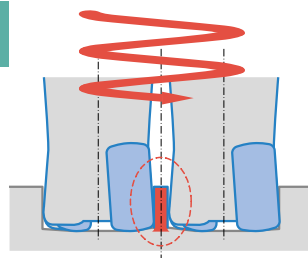
$$L = \frac{ap}{\tan RMPX}$$



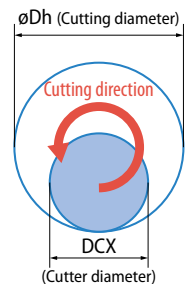
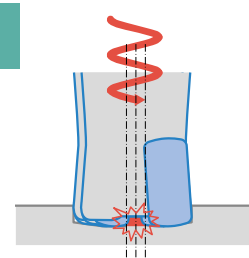
## Helical milling

For helical milling, use between minimum and maximum cutting diameter.

**Exceeding max. machining dia.**  
Center core remains after machining



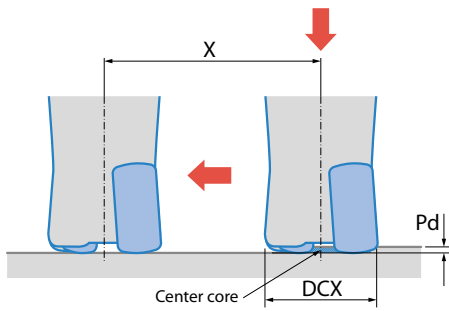
**Under min. machining dia.**  
Center core hits holder body



Description	Min. Cutting dia. øDh1	Max. Cutting dia. øDh2	Maximum ramping depth per cycle
MFH Micro	2 × DCX - 3.5	2 × DCX - 2	0.5 mm
MFH Mini	2 × DCX - 8	2 × DCX - 2	1 mm
MFH Harrier (MFH...-10-...)	2 × DCX - 18	2 × DCX - 2	GM = 1.5 mm
MFH Harrier (MFH...-14-...)	2 × DCX - 25	2 × DCX - 2	GM = 2 mm

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.

## Peck milling



Description	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH Micro	0.5	DCX-3.5
MFH Mini	1.0	DCX-9

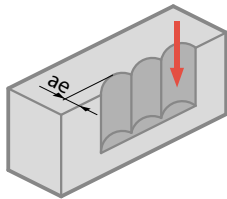
Unit: mm

Description	GM - GH		LD		FL	
	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface	Max. cutting depth Pd	Min. cutting length X for flat bottom surface
MFH Harrier (MFH...-10-...)	1.5	DCX-18	1.5	DCX-14	1.5	DCX-15
MFH Harrier (MFH...-14-...)	2.0	DCX-24	2.0	DCX-18	2.0	DCX-19

It is recommended to reduce feed by 25% of recommendation until the center core is removed.

Axial feed rate recommendation per revolution is  $f < 0.2\text{mm/rev}$ .

## Plunging



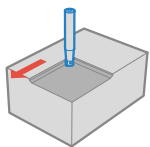
LD and FL chipbreakers are not available for plunging.  
Reduce feed rate to  $f_z \leq 0.2\text{mm/t}$  when plunging.

Unit: mm

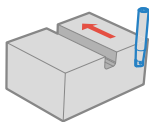
Description	Maximum width of cut (ae)
MFH Micro	1.7
MFH Mini	3.5
MFH Harrier (MFH...-10-...)	8 (GM - GH)
MFH Harrier (MFH...-14-...)	11.5 (GM - GH)

## 3D machining (MFH Harrier)

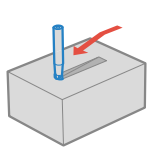
GM and GH chipbreakers are available for all the applications.



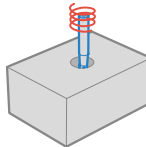
Face milling & shoudering



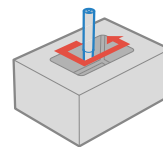
Slotting



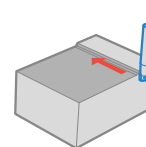
Ramping



Helical milling



Pocketing



Contouring

Rising wall angle

For using MFH Harrier

Insert	Ramping	Contouring (Rising wall angle)	Plunging	Helical milling	Pocketing
GM - GH	○	○ (90°)	○	○	○
LD	○	△ (65°)	×	×	×
FL	○	△ (80°)	×	×	×

\*For FL and LD Type, there is a limit of rising wall angle during contouring