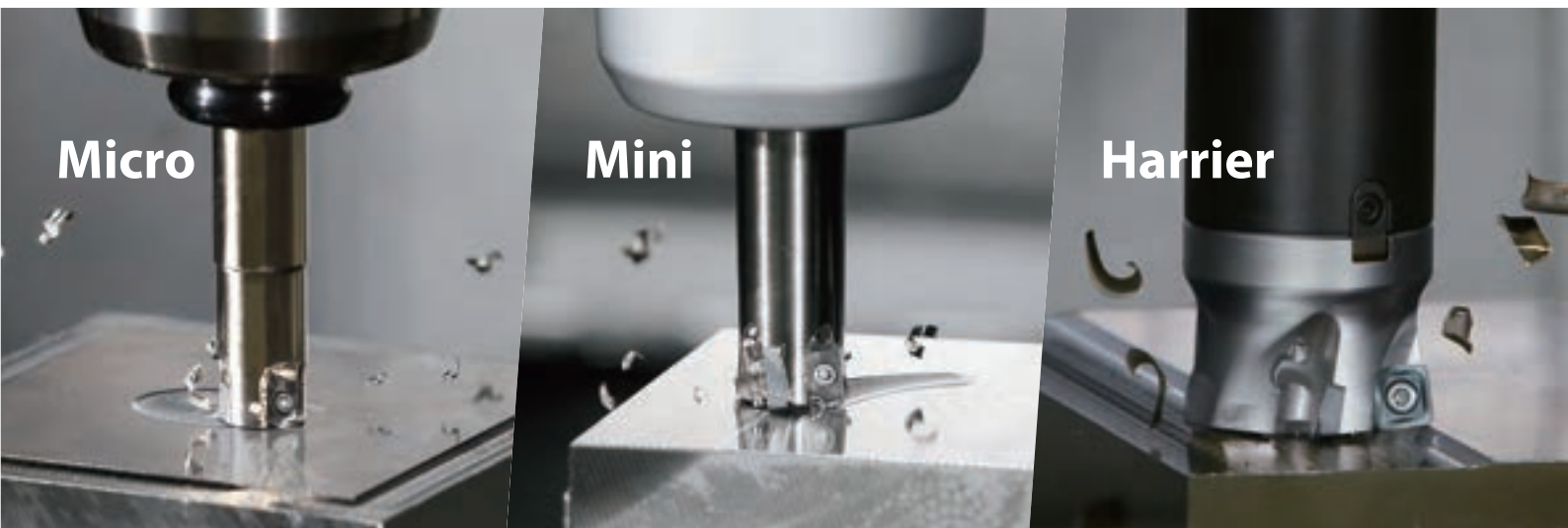


High Efficiency and High Feed Cutter

MFH Series



Micro

Mini

Harrier

Stable Machining with Greater Chatter Resistance

Cutting Diameters Starting at $\varnothing 8\text{mm}$

Reduce Cycle Time During Roughing Applications

MFH Mini / Micro High Feed Mills for Small Machining Centers

NEW

New PR18 Series Grades Are Now Available

PR1810/PR1825/PR1835



MFH Micro
 $\varnothing 8\sim\varnothing 16$

MFH Mini
 $\varnothing 16\sim\varnothing 50$

MFH Harrier
 $\varnothing 25\sim\varnothing 160$

High Efficiency and High Feed Cutter

MFH Series

Convex Cutting Edge Design Reduces Chatter for High-efficiency Rough Machining

Large Tooling Lineup from $\phi 8$ to $\phi 160$ to Cover a Wide Application Range for Multiple Metalworking Processes

MFH Micro

Replaces Solid End Mills to Reduce Machining Costs



Cutter Dia.
• End Mill $\phi 8 \sim \phi 16$
• Modular $\phi 8 \sim \phi 16$

MFH Mini

Economical Inserts with 4 Cutting Edges



Cutter Dia.
• End Mill $\phi 16 \sim \phi 32$
• Face Mill $\phi 40, \phi 50$
• Modular $\phi 16 \sim \phi 32$

MFH Harrier

3 Different Insert Designs Offer a Variety of Machining Options



Cutter Dia.
• End Mill (SOMT10 Type) $\phi 25 \sim \phi 40$
(SOMT14 Type) $\phi 50, \phi 63, \phi 80$
• Face Mill (SOMT10 Type) $\phi 50, \phi 63, \phi 80$
(SOMT14 Type) $\phi 50 \sim \phi 160$
• Modular (SOMT10 Type) $\phi 25 \sim \phi 40$

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

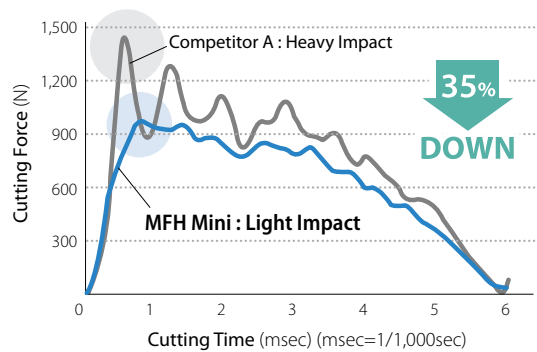


MFH Mini



MFH Harrier

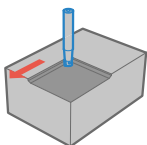
Cutting Force and Vibration when Approaching the Workpiece (Internal Evaluation)
(ap: Half of Cutter Diameter)



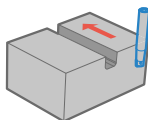
Cutting Conditions: $V_c = 150$ m/min, $f_z = 1.0$ mm/t, $a_p \times a_e = 0.5 \times 8$ mm, Dry
Cutter Dia. DC = $\phi 16$ mm Workpiece: S50C

2

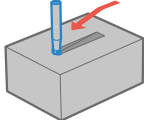
Wide Application Range for Multiple Metalworking Processes



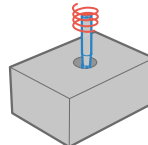
Face Milling & Shouldering



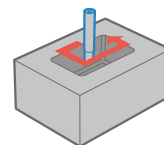
Slotting



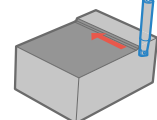
Ramping



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)

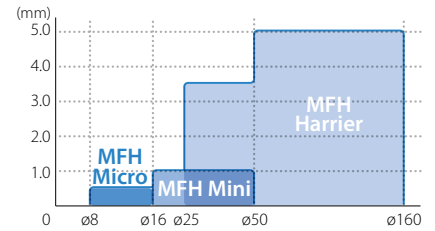
Micro Dia. Cutter for High Feed Machining

MFH Micro

Cutter Dia. $\phi 8 - \phi 16$

Low Resistance and Durable Against Chatter for Highly Efficient Machining

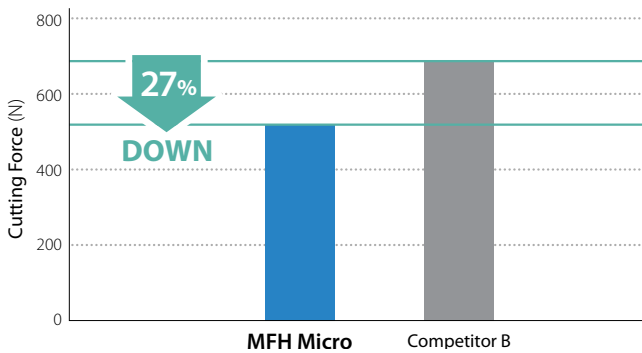
Maximum ap 0.5 mm. Stable High Feed Machining on a Wide Range of Applications



1 Low Resistance and Durable Against Chatter

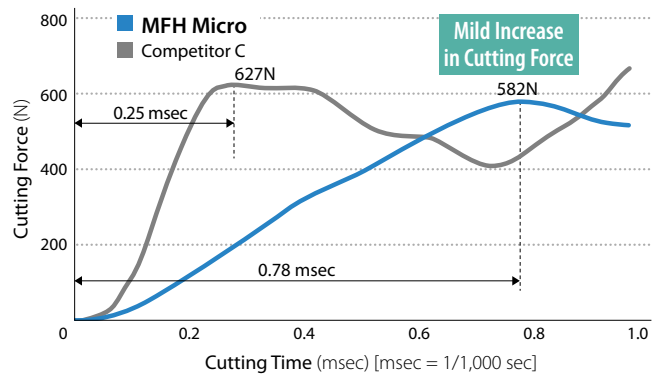
Molded Convex Cutting Edge Controls Initial Impact when Entering the Workpiece

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 = $\phi 10$ mm, Slotting, Dry Workpiece: S50C

Cutting Force when Entering Workpiece Comparison (Internal Evaluation)



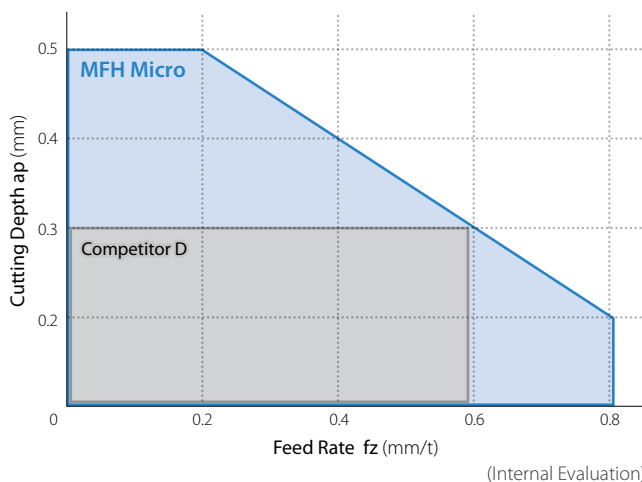
Cutting Conditions : $V_c = 120$ m/min, $f_z = 0.6$ mm/t, $a_p \times a_e = 0.4 \times 5$ mm
Cutter Dia. DC = $\phi 10$ mm, Dry Workpiece: S50C

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. $\phi 10$ mm)

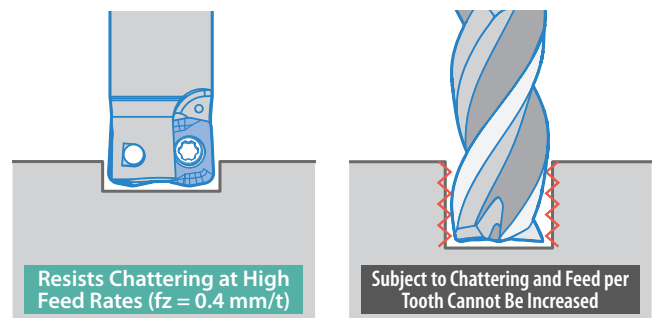


3 Replaces Solid End Mills to Reduce Machining Costs

Suppresses Chattering and Increases Milling Efficiency

MFH Micro Compared to Solid End Mills (Mechanical Parts, Slotting, Workpiece S50C)

| MFH Micro | Solid End Mill |
|--|--|
| $Q = 15.3$ cc/min | $Q = 12.2$ cc/min |
| $V_c = 150$ m/min, $f_z = 0.4$ mm/t | $V_c = 80$ m/min, $f_z = 0.04$ mm/t |
| $a_p \times a_e = 0.4 \times 10$ mm, Dry | $a_p \times a_e = 3 \times 10$ mm, Dry |
| MFH10-S10-01-2T (2 Inserts) | $\phi 10$ (4 Flutes) |
| LPGT010210ER-GM | |
| | x 1.25 Efficiency |



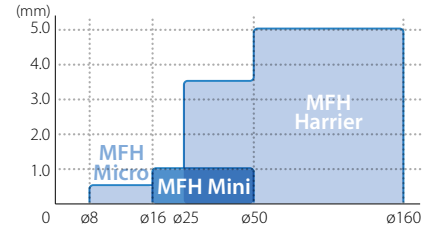
Small Dia. Cutter for High Feed Machining

MFH Mini

Cutter Dia. $\phi 16 - \phi 50$

Economical Inserts with 4 Cutting Edges

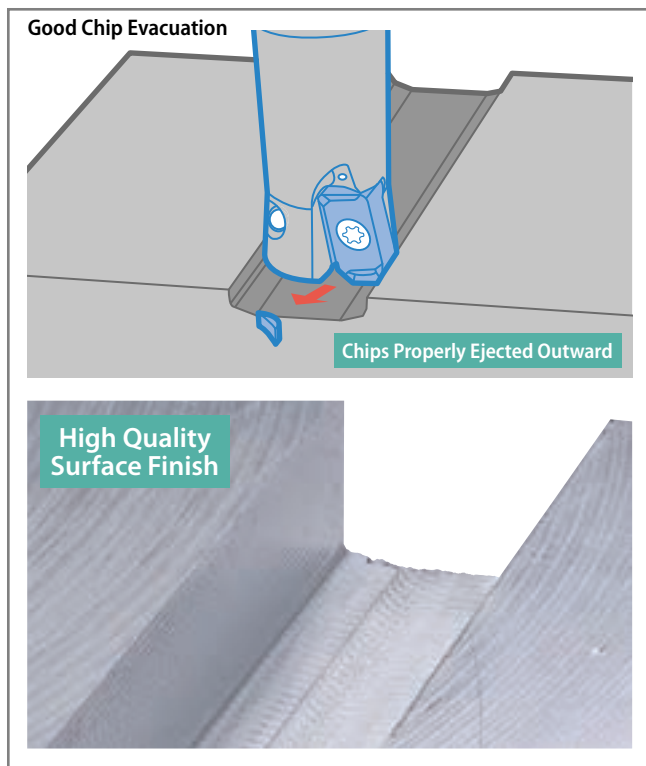
Small Dia. Fine Pitch Type for High Efficiency and High Feed Machining



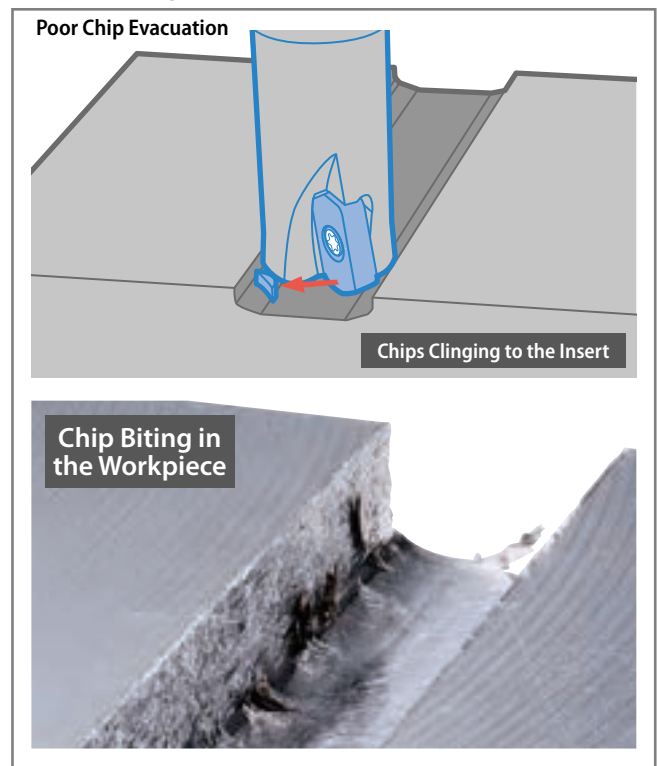
1 Good Chip Evacuation

MFH Mini Controls Chip Biting with Convex Cutting Edge

MFH Mini



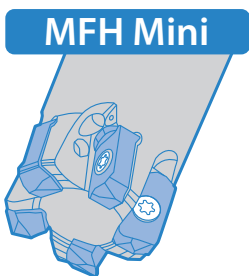
Competitor High Feed Cutter



Cutting Conditions: Cutter Dia. DC = $\phi 16$ mm (2 Inserts), $V_c = 150$ m/min, $f_z = 0.6$ mm/t, $a_p = 0.5$ mm (20pass): Total 10 mm x 16 mm, Dry Workpiece: SS400

2 Fine Pitch for Efficient Machining

Cutter Dia. 25 mm Type



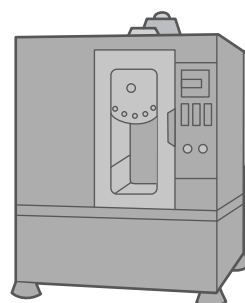
5 Inserts MFH25-S25-03-5T



2 Inserts MFH25-S25-10-2T

3 Suitable for Roughing of Molds

High Feed Machining in Small Machining Centers



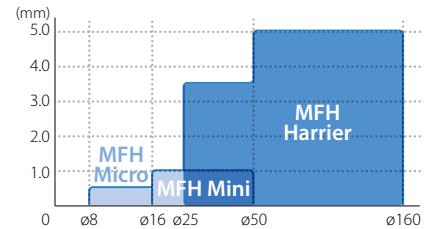
Applicable for BT30/ BT40

Highly Efficiency and High Feed Cutter

MFH Harrier

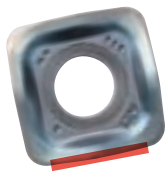
Cutter Dia. $\phi 25 - \phi 160$

Wide Range of Products for High Feed Machining
Large Depths of Cut and Low Cutting Forces



1 GH Chipbreaker is Now Available. Large Insert Lineup for Various Applications

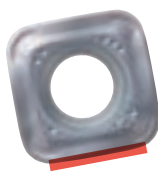
GM (General Purpose)



First Recommendation for General Machining

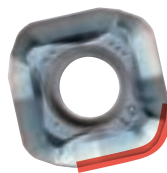
Multiple Metalworking Processes

GH (Tough Edge)



Excellent Fracture Resistance

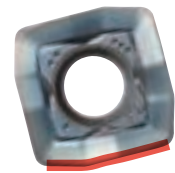
LP (Large ap)



MAX. ap = 5 mm

Available for Scale Removal as well as High Feed Cutting

FL (Wiper Edge)



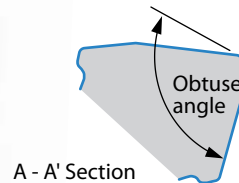
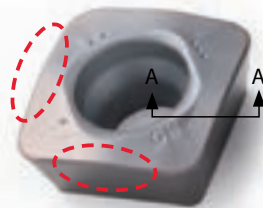
Wiper Edge with Low Cutting Forces

Excellent Surface Finish and Reduced Chattering

GH Chipbreaker with Excellent Fracture Resistance

Convex Cutting Edge Design

Reduces cutting force when entering workpiece
Suppresses chattering and fracturing



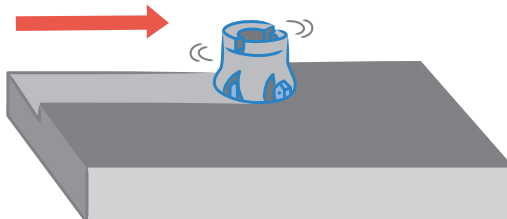
Tough Edge Design

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

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

Large ap for Scale Removal

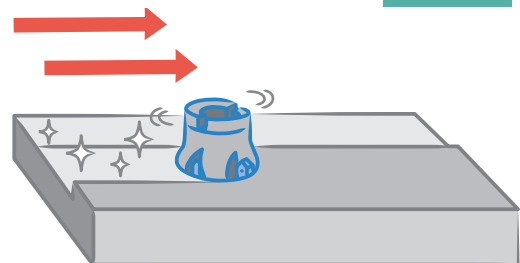
ap = 4.0 mm



(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 : 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 x ae = 3 x 40 mm, Vf = 1,264 mm/min
Workpiece : SS400

Chip Evacuation

MFH

404 cc/min

Efficiency

x2.6

Conventional Cutter

151 cc/min

Next-generation PVD coating for milling

NEW

PR18 Series

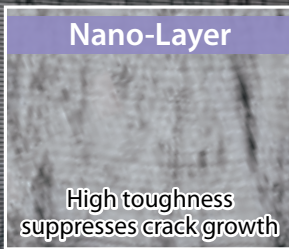
Double lamination technology with special nano layer
 MEGACOAT NANO EX provides longer tool life
 Features 3 grades: PR1825/PR1835/PR1810



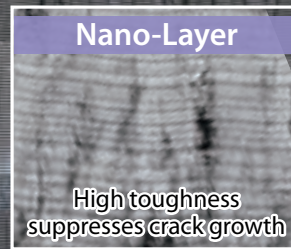
Double Lamination Technology Maintains Longer Tool Life

Multi-layer structure with two unique nano layers
 Superior abrasion resistance and fracture resistance

Special Nano Layer x Multilayer Lamination



AlCr-based coating
 with excellent abrasion
 resistance



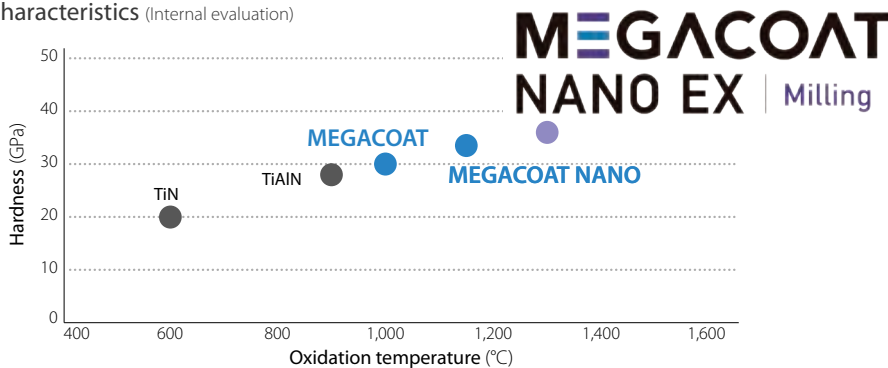
AlTi-based coating
 with excellent heat
 resistance

Multi-layering of high-performance nano layers

Increases toughness with the suppression of crack growth and optimization of internal stress

CG Image

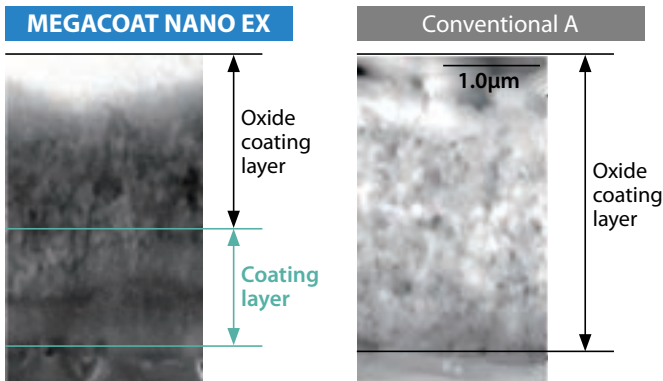
Coating characteristics (Internal evaluation)



Excellent oxidation resistance

Oxidation progression comparison (Internal evaluation)

Suppresses oxidation progression with excellent oxidation resistance

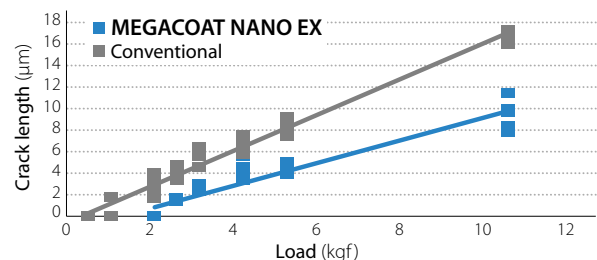
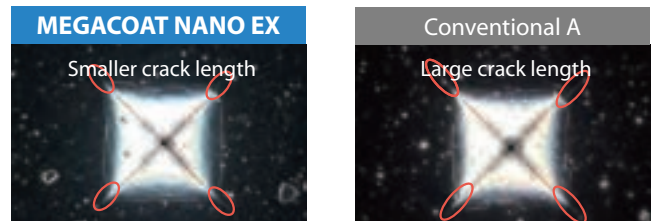


*Section after holding at 1,200 degrees for 30 minutes in air

High coating toughness

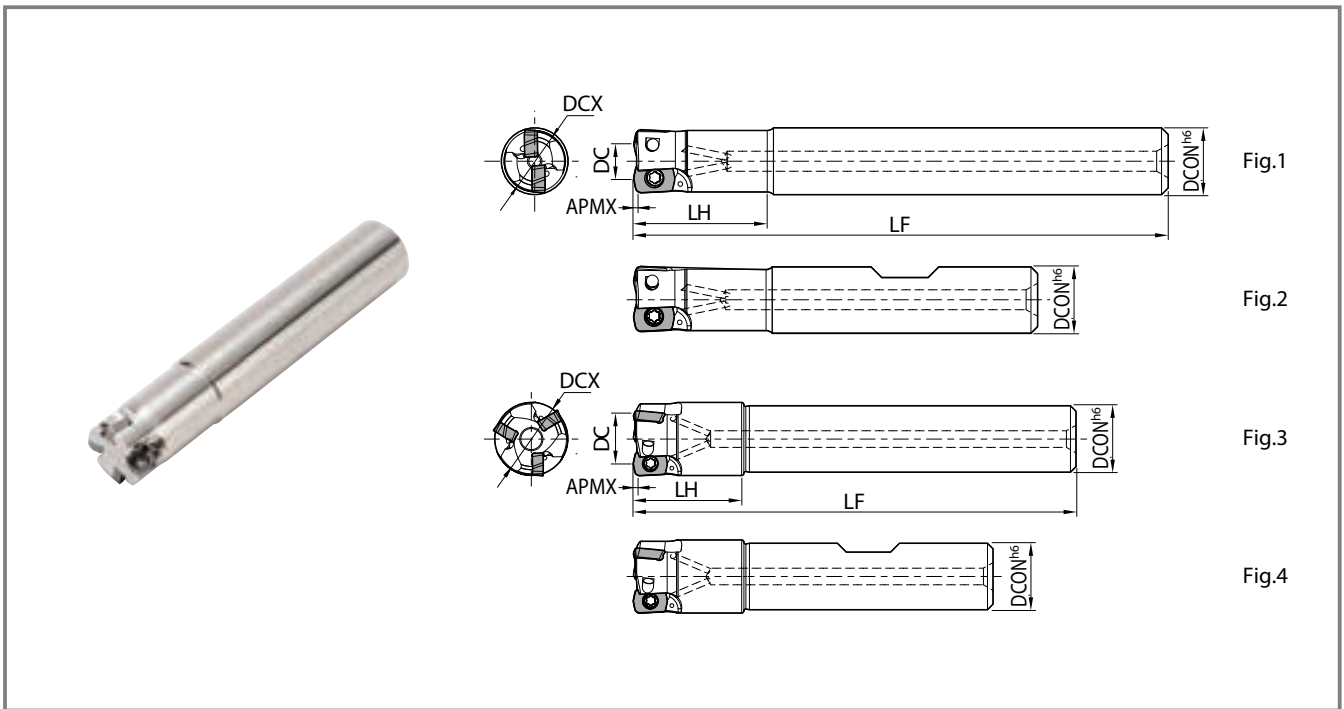
Coating layer toughness evaluation (Internal evaluation)

Excellent coating toughness with small crack length



*Micro-Vickers measurement

MFH Micro | End Mill



Toolholder Dimensions (Shank Type)

| Shank | Description | Stock | No. of Inserts | Dimensions (mm) | | | | | | Max. Ramping Angle | Rake Angle | Coolant Hole | Drawing | Weight (kg) | Max. Revolution (min ⁻¹) |
|----------------------|-----------------|-------|----------------|-----------------|------|------|----|----|------|--------------------|------------|--------------|---------|-------------|--------------------------------------|
| | | | | DCX | DC | DCON | LF | LH | APMX | | | | | | |
| 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 |

● : Std. Item

• Caution with Max. Revolution

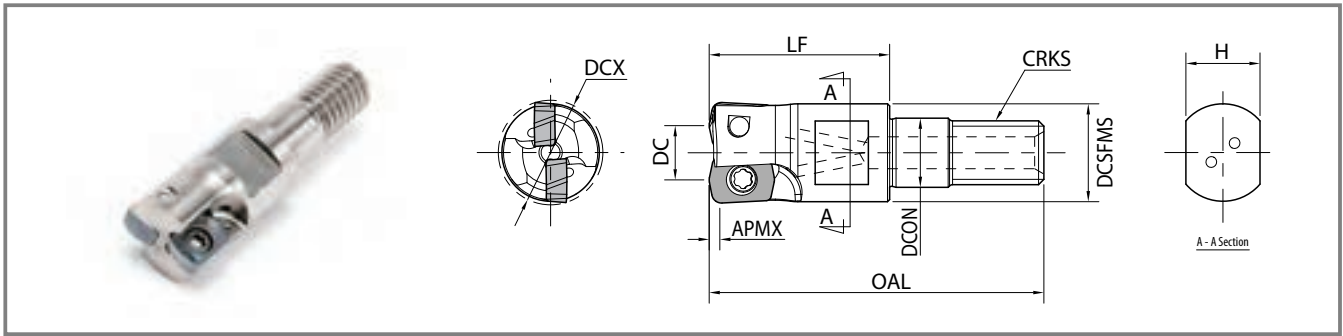
Set the number of revolutions per minute within the recommended cutting speed specified by the workpiece on page 8.
Do not use the end mill or cutter at the maximum revolution or higher since the centrifugal force may cause chips and parts to scatter even under no load.

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 0.5N·m | | | | |

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

MFH Micro | Head



Toolholder Dimensions

| Description | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | | Max. Ramping Angle | Rake Angle A.R. | Coolant Hole | Max. Revolution (min ⁻¹) |
|-----------------|-------|----------------|-----------------|------|--------|------|------|----|----------|----|------|--------------------|-----------------|--------------|--------------------------------------|
| | | | DCX | DC | DCSFMS | DCON | OAL | LF | CRKS | H | APMX | | | | |
| 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 | 8.5 | 39 | 22 | M8×P1.25 | 12 | 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.

● : Std. Item

Spare Parts and Applicable Inserts

| Description | Spare Parts | | | Applicable Inserts |
|---------------|--|-----------|---------------------|--------------------|
| | Clamp Screw | Wrench | Anti-Seize Compound | |
| MFH...-01-... | SB-1840TRP Recommended Torque for Insert Clamp 0.5N·m | FTP-6 | P-37 | LPGT010210ER-GM |

- **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 inserts 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

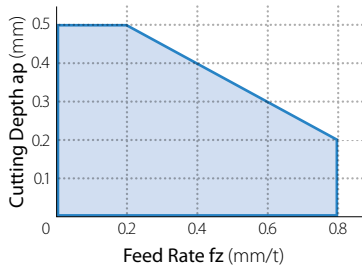
MFH Micro | Applicable Inserts

| Insert | Description | Dimensions (mm) | | | | | MEGACOAT NANO | | CVD Coated Carbide |
|-------------------------|------------------|-----------------|------|-----|------|-----|---------------|--------|--------------------|
| | | W1 | S | D1 | INSL | RE | PR1835 | PR1825 | CA6535 |
| General Purpose | LPGT 010210ER-GM | 4.19 | 2.19 | 2.1 | 6.26 | 1.0 | ● | ● | ● |

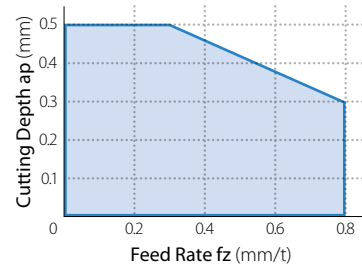
● : Std. Item

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

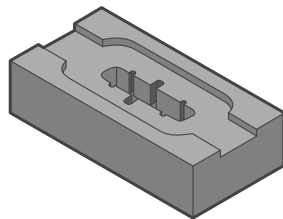
| Insert | Workpiece | Holder Description and Feed Rate (fz: mm/t) Recommended Feed ap = 0.3 mm (reference value) | | | | | Recommended Insert Grade (Vc: m/min) | | |
|--------|---|--|------------------|------------------|------------------|------------------|--------------------------------------|-------------------|--------------------|
| | | MFH08-... -1T | MFH10-... -2T | MFH12-... -3T | MFH14-... -3T | MFH16-... -4T | MEGACOAT NANO | | CVD Coated Carbide |
| | | | | | | | PR1825 | PR1835 | CA6535 |
| GM | Carbon Steel (SxxC) | 0.2 - 0.4 - 0.6 | | | 0.2 - 0.5 - 0.8 | | ★ 120 - 180 - 250 | ☆ 120 - 180 - 250 | - |
| | Alloy Steel (SCM) | 0.2 - 0.4 - 0.6 | | | 0.2 - 0.5 - 0.8 | | ★ 100 - 160 - 220 | ☆ 100 - 160 - 220 | - |
| | Die Steel (SKD)(~40HRC) | 0.2 - 0.3 - 0.5 | | | 0.2 - 0.4 - 0.6 | | ★ 80 - 140 - 180 | ☆ 80 - 140 - 180 | - |
| | Die Steel (SKD)(40~50HRC) | 0.2 - 0.25 - 0.3 | | | 0.2 - 0.25 - 0.4 | | ☆ 60 - 100 - 130 | - | - |
| | Austenitic Stainless Steel (SUS304) | 0.2 - 0.3 - 0.5 | | | 0.2 - 0.4 - 0.6 | | ☆ 100 - 160 - 200 | ★ 100 - 160 - 200 | - |
| | Martensitic Stainless Steel (SUS403) | 0.2 - 0.3 - 0.5 | | | 0.2 - 0.4 - 0.6 | | - | ☆ 150 - 200 - 250 | ★ 180 - 240 - 300 |
| | Precipitation Hardened Stainless Steel (SUS630) | 0.2 - 0.3 - 0.5 | | | 0.2 - 0.4 - 0.6 | | - | ★ 90 - 120 - 150 | - |
| | Gray Cast Iron (FC) | 0.2 - 0.4 - 0.6 | | | 0.2 - 0.5 - 0.8 | | ★ 120 - 180 - 250 | - | - |
| | Nodular Cast Iron (FCD) | 0.2 - 0.3 - 0.5 | | | 0.2 - 0.4 - 0.6 | | ★ 100 - 150 - 200 | - | - |
| | Ni-base Heat-Resistant Alloy | 0.2 - 0.25 - 0.3 | | | 0.2 - 0.25 - 0.4 | | - | ☆ 20 - 30 - 50 | ★ 20 - 30 - 50 |
| | Titanium Alloy (Ti-6Al-4V) | 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 SKD61

Vc = 90 m/min (n = 2,400 min⁻¹)
 ap x ae = 0.3 x ~ 0.7 mm
 fz = 0.27 mm/t (Vf = 1,930 mm/min)
 Dry
 MFH12-S12-01-3T (3 Inserts)
 LPGT010210ER-GM PR1535



Chip Evacuation

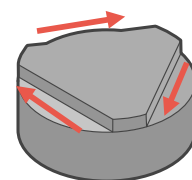
PR1535 $\varnothing 12-3T$ **4.5 cc/min** ↑ Efficiency **x1.3**

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 SUS440C

Vc = 180 m/min (n = 3,580 min⁻¹)
 ap x ae = 0.4 x 8 mm
 fz = 0.4 mm/t (Vf = 5,730 mm/min)
 Wet
 MFH16-S16-01-4T (4 Inserts)
 LPGT010210ER-GM PR1535



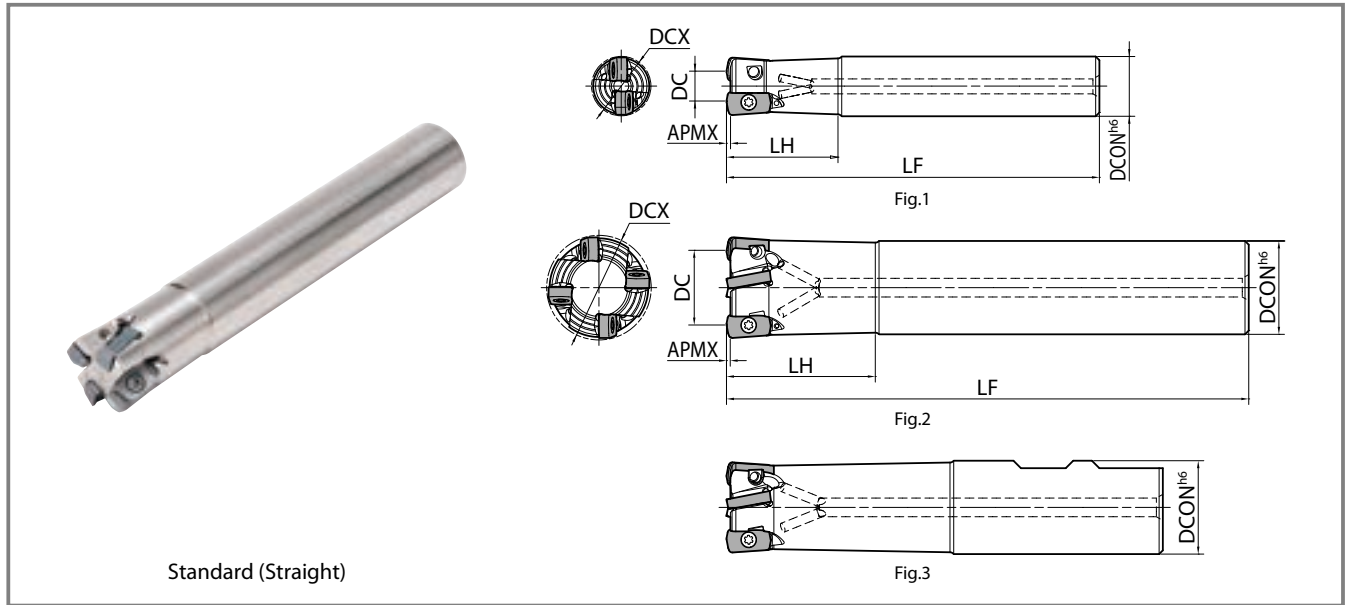
Cutting Time

PR1535 **7 min** ↓ 35% Cutting Time

Competitor G **11 min**

PR1535 shows 30% faster cycle time compared to competitor G
 (User Evaluation)

MFH Mini | End Mill



Toolholder Dimensions

| Shank | Description | Stock | 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 | | | | 1 | -10° | Yes | 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 | | | | 1 | -10° | Yes | 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 | | | | | | | 1 | -10° | Yes |
| | 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 | | | | | | | |

● : Std. Item

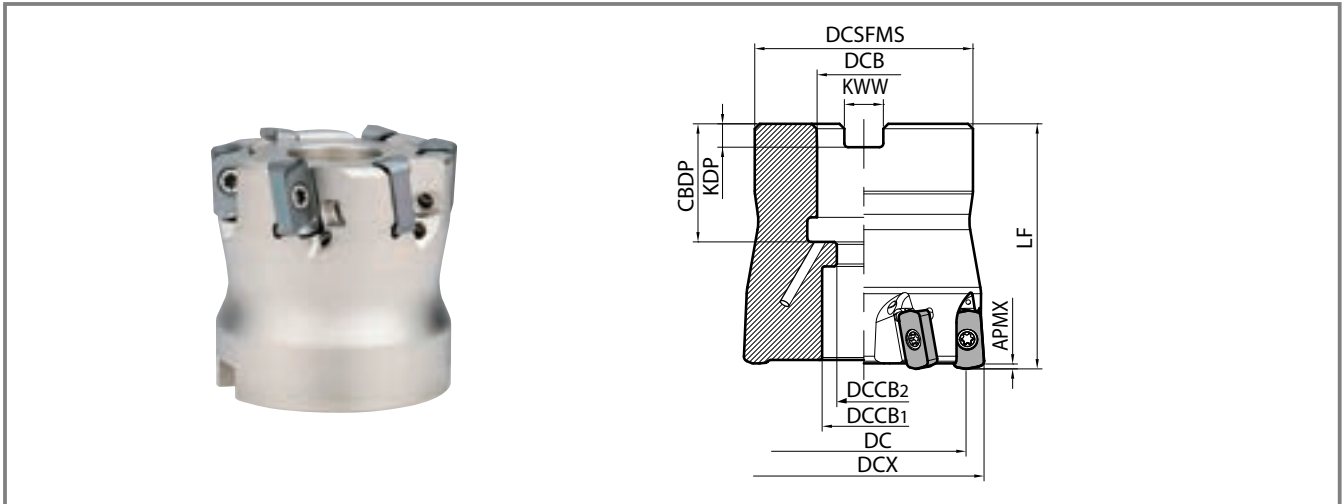
Spare Parts and Applicable Inserts

| Description | Spare Parts | | | | Applicable Inserts |
|------------------|--|--------|---------------------|------------------|------------------------------------|
| | Clamp Screw | Wrench | Anti-Seize Compound | Arbor Clamp Bolt | |
| MFH...-03-... | SB-3065TRP | DTPM-8 | P-37 | - | LOGU030310ER-GM LOGU030310ER-GH |
| MFH040R-03-...-M | Recommended Torque for Insert Clamp 1.2N·m | | | HH8×25 | |
| MFH050R-03-8T-M | Recommended Torque for Insert Clamp 1.2N·m | | | HH10×30 | |

- **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 inserts 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

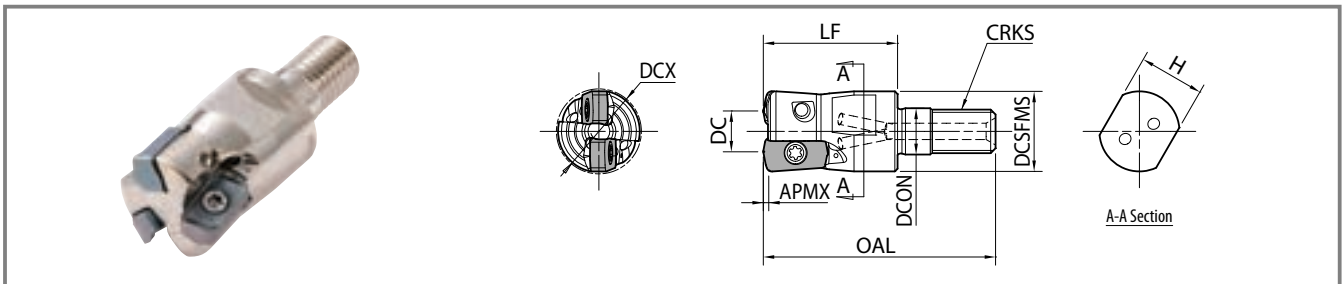
| Bore Dia. | Description | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | | | Rake Angle | | Coolant Hole | Weight (kg) | Max. Revolution (min ⁻¹) |
|-------------|------------------|-------|----------------|-----------------|----|-------|-----|-------------------|-------------------|----|------|-----|------|------------|------|--------------|-------------|--------------------------------------|
| | | | | DCX | DC | DCSFS | DCB | DCCB ₁ | DCCB ₂ | LF | CBDP | KDP | KWW | APMX | A.R. | | | |
| Metric Spec | 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 | | | | | 8,600 |
| | MFH 050R-03-8T-M | ● | 8 | 50 | 42 | 47 | 22 | 19 | 11 | 50 | 21 | 6.3 | 10.4 | | | | 0.5 | 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 inserts and parts to scatter even under no load.

● : Std. Item

MFH Mini | Head



Toolholder Dimensions

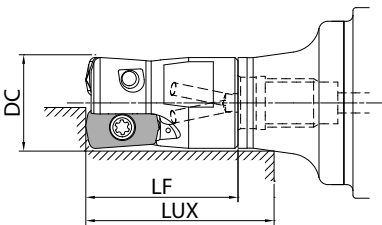
| Description | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | | | Rake Angle | | Coolant Hole | Max. Revolution (min ⁻¹) |
|------------------|-------|----------------|-----------------|----|-------|------|-----|----|-----------|----|------|------|------------|--------|--------------|--------------------------------------|
| | | | DCX | DC | DCSFS | DCON | OAL | LF | CRKS | H | APMX | A.R. | | | | |
| 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 | | | | 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 | | | | 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 | | | | 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 | | | | 11,400 | | |

• 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 inserts and parts to scatter even under no load.

● : Std. Item


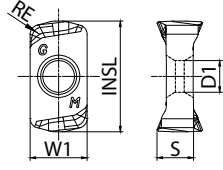

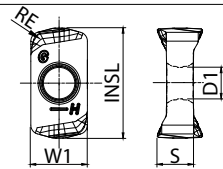
Actual End Mill Depth



| Arbor Description | Applicable End Mill (Head) | | | Actual End Mill Depth (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

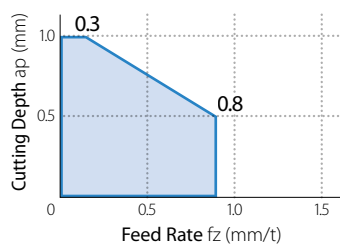
MFH Mini | Applicable Inserts

| Insert | Description | Dimensions (mm) | | | | | MEGACOAT NANO | | | MEGACOAT HARD | CVD Coated Carbide |
|--|-----------------|-----------------|------|------|------|-----|---------------|--------|--------|---------------|--------------------|
| | | W1 | S | D1 | INSL | RE | PR1835 | PR1825 | PR1810 | 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 | ● | ● | ● | ● | - |

●: Std. Item

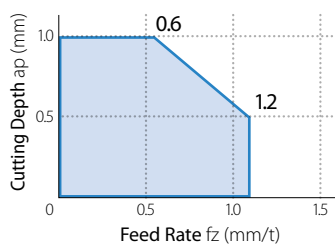
MFH Mini | Cutting Performance

Fine Pitch



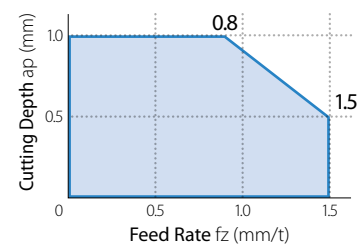
MFH20-...-4T, MFH22-...-4T,
MFH25-...-5T, MFH28-...-5T,
MF32-...-6T

Standard Pitch (Cutter Dia. 16 – 22 mm)



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

Face Mill (Cutter Dia. 40 – 50 mm) Standard Pitch (Cutter Dia. 25 – 32 mm)



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

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 |
| | | | | | | | | | | PR1835 | PR1825 | PR1810 | PR0155 | CA6535 |
| GM GH | 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 | 0.2 - 0.5 - 0.8 | ☆ | ★ | - | - | - | |
| | Alloy Steel (SCM) | | | | | | | | 120 - 180 - 250 | 120 - 180 - 250 | - | - | - | |
| | 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 | 0.2 - 0.4 - 0.6 | ☆ | ☆ | - | GH★ | - |
| | | (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★ | - |
| | | (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★ | - |
| | | (55~60HRC) | 0.03 - 0.06 - 0.1 (* Recommended only for GH chipbreaker) | | | | | | | - | - | - | GH☆ | - |
| | Austenitic Stainless Steel (SUS304) | | | | | | | | GM★ | GM☆ | - | - | - | |
| Martensitic Stainless Steel (SUS403) | 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 | ☆ | - | - | - | ★ | |
| Precipitation Hardened Stainless Steel (SUS630) | | | | | | | | | 150 - 200 - 250 | - | - | - | 180 - 240 - 300 | |
| 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 | 0.2 - 0.5 - 0.8 | 0.2 - 0.5 - 0.8 | - | - | ★ | - | - | |
| 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 | 0.2 - 0.4 - 0.6 | 0.2 - 0.4 - 0.6 | - | - | ★ | - | - | |
| 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 | 0.2 - 0.25 - 0.4 | 0.2 - 0.25 - 0.4 | ☆ | - | - | - | ★ | |
| Titanium Alloy (Ti-6Al-4V) | | | | | | | | | 20 - 30 - 50 | - | - | - | 20 - 30 - 50 | |
| | | | | | | | | | GM★ | - | GM☆ | - | - | |
| | | | | | | | | | 40 - 60 - 80 | - | 30 - 50 - 70 | - | - | |

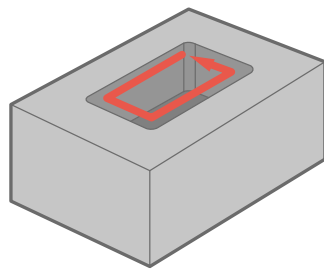
- The number in bold font is recommended starting conditions. Adjust the cutting speed and the feed rate within the above conditions according to the actual machining situation
- Machining with coolant is recommended for Ni-base Heat Resistant Alloy and Titanium Alloy
- Machining with BT30 or equivalent, 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.

Standard Pitch Fine Pitch

Case Studies

Mold Parts Pre-hardened Steel

Vc = 220 m/min (n = 3,500 min⁻¹)
 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**

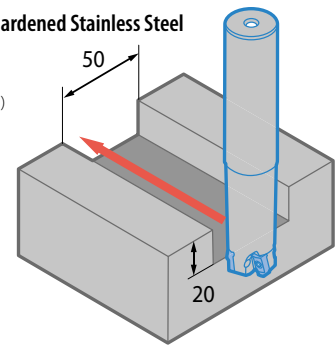
Competitor H (4 Inserts) **1.0~1.5 H**

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⁻¹)
 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

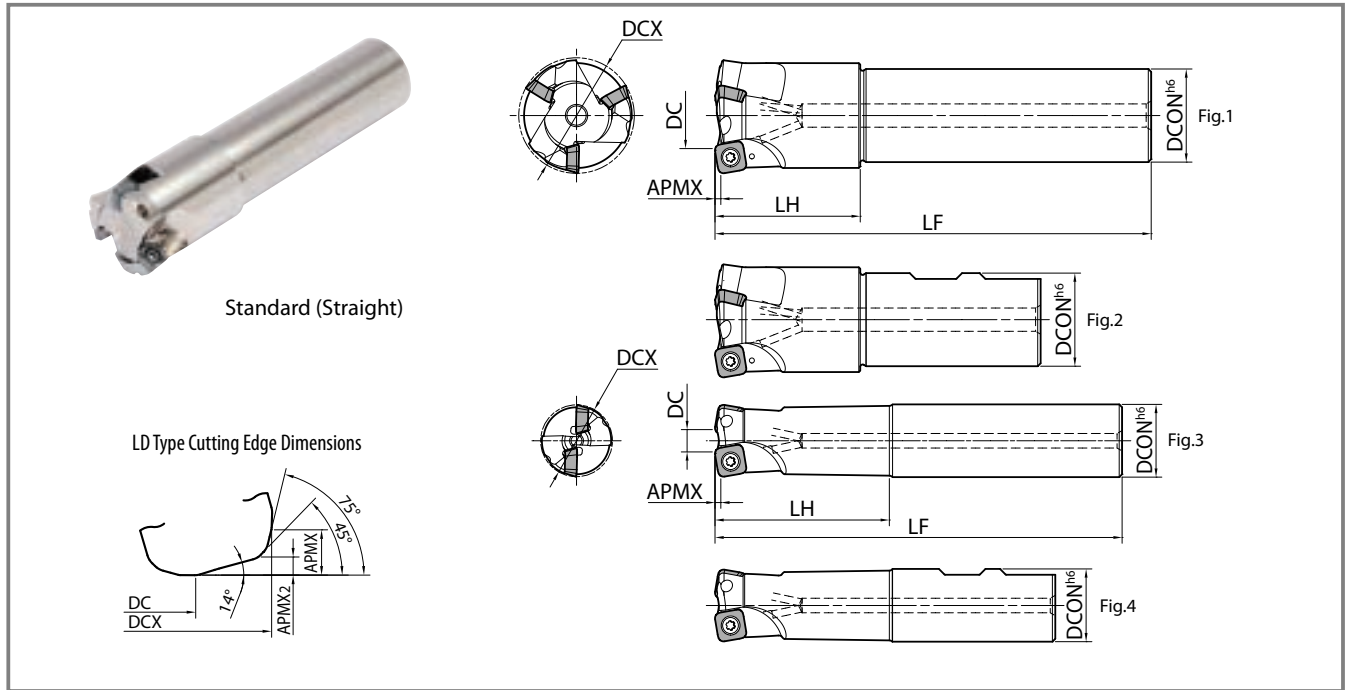
PR1535 **100 pcs** ↑ **x1.8**

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 | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | Rake Angle | Coolant Hole | Drawing | Weight (kg) | Max. Revolution (min ⁻¹) | |
|-----------------------------|----------------------|-------|----------------|-----------------|-------|------|------|------|-----|-----|-------------------|------------|--------------|---------|-------------|--------------------------------------|-------------------|
| | | | | DCX | GM-GH | LD | FL | DCON | LF | LH | APMX | | | | | | APMX ₂ |
| 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 |
| | MFH 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 |
| | MFH 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 |
| Standard (Weldon) | MFH 40-S32-10-4T | ● | 4 | 40 | 23 | 27.5 | 26.5 | 32 | 150 | 50 | 1.5 (3.5) * | 1.2 | +10° | Yes | Fig.4 | 0.4 | 17,000 |
| | MFH 25-W25-10-2T | ● | 2 | 25 | 8 | 12.5 | 11.5 | 25 | 117 | 60 | | | | | | 0.7 | 14,000 |
| | MFH 32-W32-10-3T | ● | 3 | 32 | 15 | 19.5 | 18.5 | 32 | 131 | 70 | | | | | Fig.2 | 0.7 | 11,500 |
| | MFH 40-W32-10-3T | ● | 3 | 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 | | | | | | 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 (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 | | | | Fig.1 | 1.8 | 11,500 | |

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

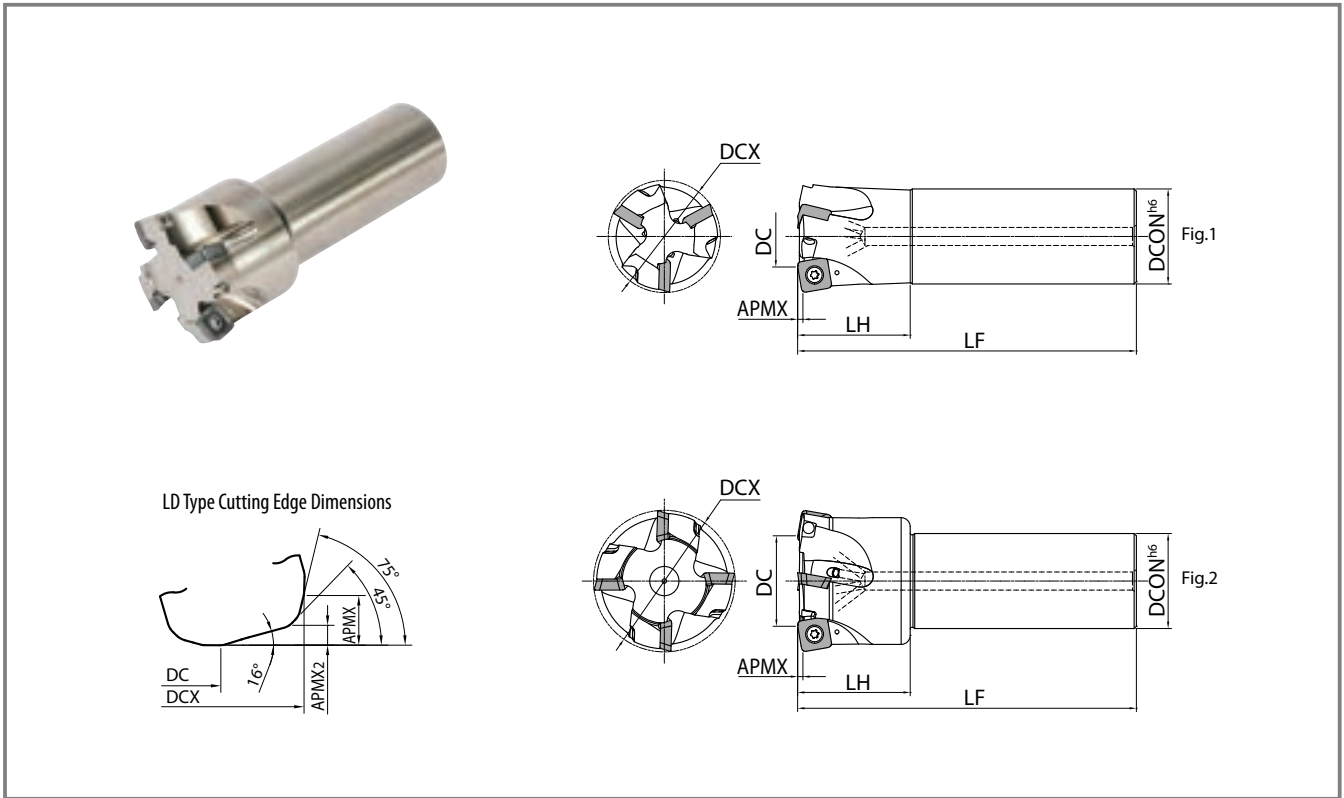
Spare Parts and Applicable Inserts

| Description | Spare Parts | | | Applicable Inserts |
|---------------|--|---------|---------------------|--|
| | Clamp Screw | Wrench | Anti-Seize Compound | |
| MFH...-10-... | SB-4075TRP | DTPM-15 | P-37 | SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL |
| | Recommended Torque for Insert Clamp 3.5N·m | | | |

- **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 inserts 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 | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | | Rake Angle | Coolant Hole | Drawing | Weight (kg) | Max. Revolution (min ⁻¹) |
|-----------------|-------|----------------|-----------------|----|----|----|------|-----|----|-----------|-------------------|------------|--------------|---------|-------------|--------------------------------------|
| | | | DCX | DC | | | DCON | LF | LH | APMX | APMX ₂ | | | | | |
| GM-GH | LD | FL | | | | | | | | | | | | | | |
| MFH50-S42-14-3T | ● | 3 | 50 | 27 | 33 | 32 | 42 | 150 | 50 | | | | | Fig. 1 | 1.4 | 8,800 |
| MFH63-S42-14-4T | ● | 4 | 63 | 40 | 46 | 45 | 42 | 150 | 50 | 2 *(5) | 2 | +10° | Yes | 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 ●: Std. Item

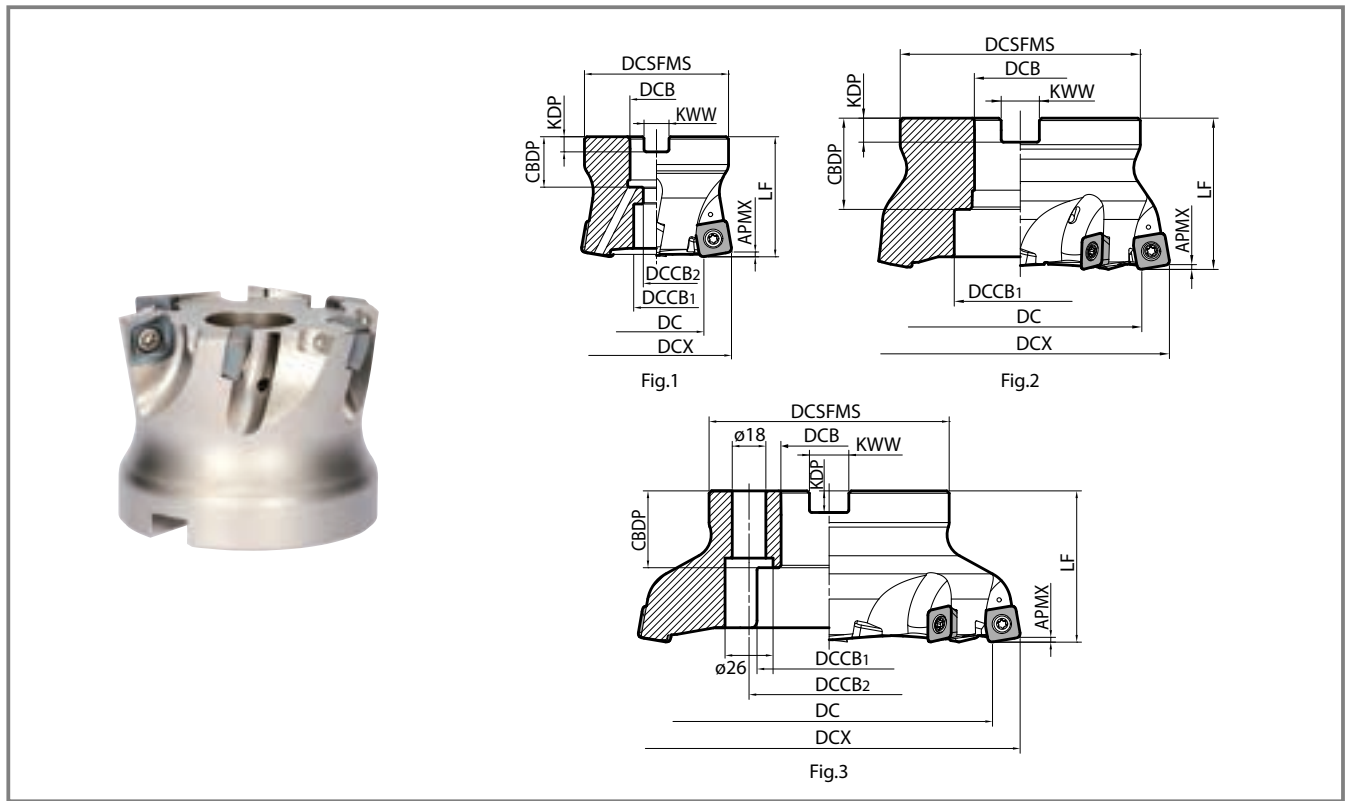
Spare Parts and Applicable Inserts

| Description | Spare Parts | | | Applicable Inserts |
|---------------|--|---|---|--|
| | Clamp Screw | Wrench | Anti-Seize Compound | |
| MFH...-14-... |  SB-50120TRP Recommended Torque for Insert Clamp 4.5N·m |  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 inserts 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)

| Bore Dia. | Description | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | | | | | | Rake Angle | Coolant Hole | Drawing | Weight (kg) | Max. Revolution (min ⁻¹) | | | | |
|-------------|--------------------|-------|----------------|-----------------|-------|------|------|--------|--------|-------------------|-------------------|----|------|-----|------|--------------------|------------|--------------|--------------------|-------------|--------------------------------------|---------------------------------|-------|-----|--------|
| | | | | DCX | DC | | | DCSFMS | DCB | DCCB ₁ | DCCB ₂ | LF | CBDP | KDP | KWW | APMX | | | | | | APMX ₂ ^{*1} | A.R. | | |
| | | | | | GM-GH | 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 (3,5) *2 | 1.2 | +10° | 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 | | | | | | 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 | | | | | | 0.7 | 8,800 | | | |
| | 063R-10-6T | ● | 6 | 63 | 46 | 50.5 | 49.5 | 60 | 22.225 | 19 | 11 | 50 | 19 | 5 | 8.4 | | | | | | 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 | | | | | | 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 | | | | 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 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 | | | | | | | | |

• 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 inserts and parts to scatter even under no load.

* 1 Refer to APMX₂ on Page 16 * 2 Dimension in () is when mounting LD Type ● : 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) | |
|-------------|--------------------|-------|----------------|-----------------|-------|-----|-----|--------|--------|-------------------|-------------------|----|------|-----|------|----------------|----------------------|------------|-------|--------------|---------|-------------|--------------------------------------|--|
| | | | | DCX | DC | | | DCSFMS | DCB | DCCB ₁ | DCCB ₂ | LF | CBDP | KDP | KWW | APMX | APMX ₂ *1 | A.R. | | | | | | |
| | | | | | GM-GH | LD | FL | | | | | | | | | | | | | | | | | |
| Inch Spec | MFH 050R-14-4T | ● | 4 | 50 | 27 | 33 | 32 | 47 | 22.225 | 12 | — | 50 | 19 | 5 | 8.4 | 2 (5) *2 | 2 | +10° | Yes | Fig.1 | 0.4 | 8,800 | | |
| | MFH 063R-14-4T | ● | 4 | 63 | 40 | 46 | 45 | 60 | 22.225 | 19 | 11 | 50 | 19 | 5 | 8.4 | | | | | | 0.6 | 7,400 | | |
| | 063R-14-5T | ● | 5 | 63 | 40 | 46 | 45 | 60 | 22.225 | 19 | 11 | 50 | 19 | 5 | 8.4 | | | | | | 0.6 | 7,400 | | |
| | MFH 080R-14-5T | ● | 5 | 80 | 57 | 63 | 62 | 76 | 31.75 | 26 | 17 | 63 | 32 | 8 | 12.7 | | | | | | 1.3 | 6,400 | | |
| | 080R-14-6T | ● | 6 | 80 | 57 | 63 | 62 | 76 | 31.75 | 26 | 17 | 63 | 32 | 8 | 12.7 | | | | | | 1.3 | 6,400 | | |
| | MFH 100R-14-6T | ● | 6 | 100 | 77 | 83 | 82 | 96 | 31.75 | 26 | 17 | 63 | 32 | 8 | 12.7 | | | | | | 2.4 | 5,600 | | |
| | 100R-14-7T | ● | 7 | 100 | 77 | 83 | 82 | 96 | 31.75 | 26 | 17 | 63 | 32 | 8 | 12.7 | | | | | | 2.4 | 5,600 | | |
| | MFH 125R-14-7T | ● | 7 | 125 | 102 | 108 | 107 | 100 | 38.1 | 55 | — | 63 | 38 | 10 | 15.9 | | | | | | 2.9 | 4,800 | | |
| Metric Spec | MFH 160R-14-8T | ● | 8 | 160 | 137 | 143 | 142 | 100 | 50.8 | 72 | — | 63 | 38 | 11 | 19.1 | 3.9 | 4,200 | No | Fig.2 | | | | | |
| | 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 | | |
| Metric Spec | 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 | | |
| Metric Spec | 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 | | |
| Metric Spec | 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 | | | | | | 1.4 | 6,400 | | |
| Metric Spec | 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 | | | | | 2.4 | 5,600 | | | |
| Metric Spec | 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 | | | | | 3.7 | 4,200 | No | Fig.3 | |

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

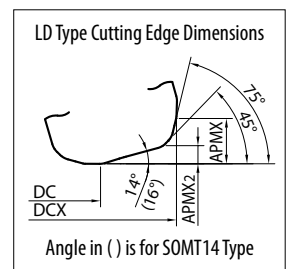
*1 Refer to APMX₂ on Page 16 *2 Dimension in () is when mounting LD Type ●: Std. Item

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 inserts and parts to scatter even under no load.

Spare Parts and Applicable Inserts

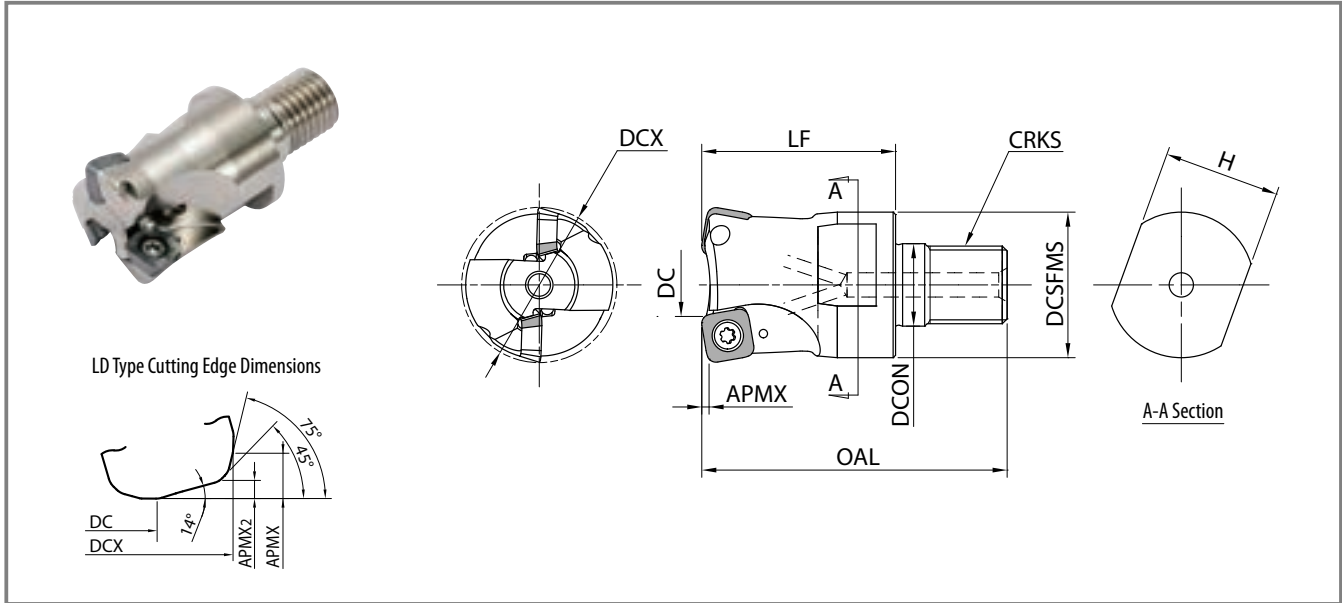
| Description | Spare Parts | | | | | Applicable Inserts | | | | |
|--|-------------|--------|------|---------------------|------------------|--|--|--|--|--|
| | Clamp Screw | Wrench | | Anti-Seize Compound | Arbor Clamp Bolt | | | | | |
| MFH050R-10-...(-M) | SB-4090TRPN | DTPM | TTP | P-37 | HH10×30 | SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL | | | | |
| MFH063R-10-...(-22M) | | | | | | | | | | |
| MFH063R-10-...-27M | | | | | | | | | | |
| MFH080R-10-... | | | | | | | | | | |
| MFH080R-10-...-M | | | | | | | | | | |
| Recommended Torque for Insert Clamp 3.5N·m | | | | | | | | | | |
| MFH050R-14-...(-M) | SB-50120TRP | TTP-20 | P-37 | W10×31 | HH10×30 | | | | | |
| MFH063R-14-...(-22M) | | | | | | | | | | |
| MFH063R-14-...-27M | | | | | | | | | | |
| MFH080R-14-... | | | | | | | | | | |
| MFH080R-14-...-M | | | | | | | | | | |
| Recommended Torque for Insert Clamp 4.5N·m | | | | | | | | | | |
| MFH100R-14-... | | | | | | | | | | |
| MFH100R-14-...-M | | | | | | | | | | |
| MFH125R-14-... | | | | | | | | | | |
| MFH160R-14-... | | | | | | | | | | |



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

Recommended Cutting Conditions → P19, P20

MFH Harrier | Head



Toolholder Dimensions

| Description | Stock | No. of Inserts | Dimensions (mm) | | | | | | | | | | | Rake Angle | Coolant Hole | Max. Revolution (min ⁻¹) | |
|------------------|-------|----------------|-----------------|----|------|------|--------|------|-----|----|-----------|----|-------------------|------------|--------------|--------------------------------------|-------------------|
| | | | DCX | DC | | | DCSFMS | DCON | OAL | LF | CRKS | H | APMX | | | | APMX ₂ |
| 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 inserts and parts to scatter even under no load.

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


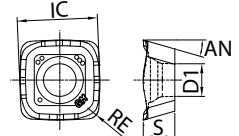
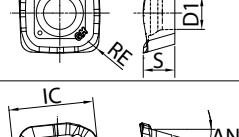

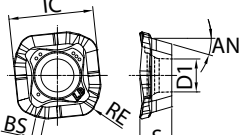
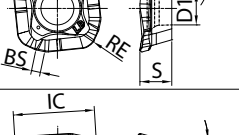

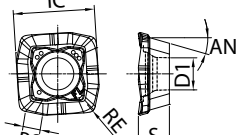
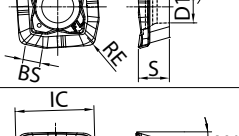

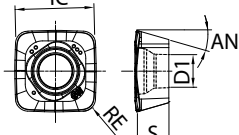
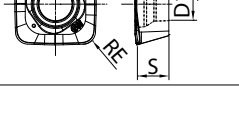
Spare Parts and Applicable Inserts

| Description | Spare Parts | | | Applicable Inserts |
|---------------|--|-------------|---------------------|--|
| | Clamp Screw | Wrench | Anti-Seize Compound | |
| MFH...-10-... | SB-4075TRP Recommended Torque for Insert Clamp 3.5N·m | 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

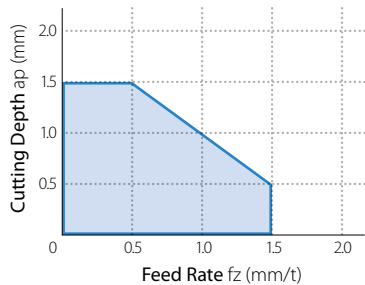
MFH Harrier | Applicable Inserts

| 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 | PR1835 | PR1825 | | | PR1810 | |
|  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 | ● | ● | ● | ● | - | | |

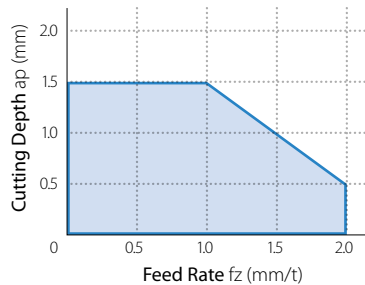
● : Std. Item

MFH Harrier | Cutting Performance (GM/GH/FL)

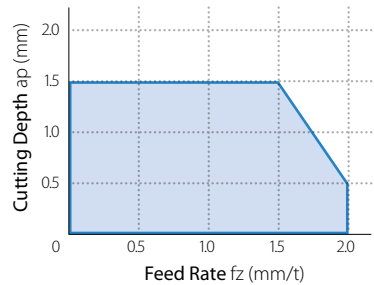
MFH25-S25-10-2T



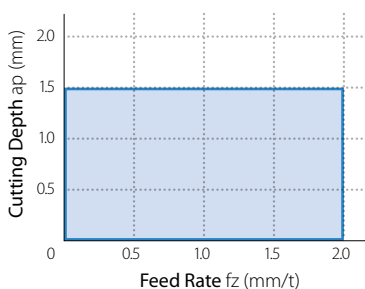
MFH32-S32-10-○T



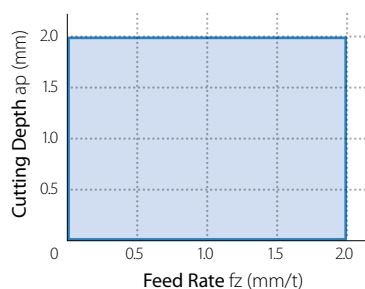
MFH40-S32-10-○T



MFH050R~080R-10-○T



MFH..-14-○T



LD Chipbreaker:

- MAX D.O.C. for LD chipbreaker is 5mm (3.5mm for SOMT10 Type)
- 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

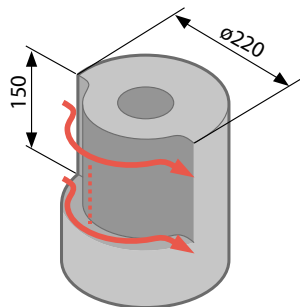
| Insert | Workpiece | Holder Description and Feed Rate (fz: mm/t) | | | | | Recommended Insert Grade (Vc: m/min) | | | | | |
|----------------------------|---|---|---|--|--|--|--------------------------------------|------------------------|----------------------|---------------|-----------------------|---|
| | | MFH25- | MFH32- | MFH40- | MFH...R-10 | MFH...-14 | MEGACOAT NANO | | | MEGACOAT HARD | CVD Coated Carbide | |
| | | | | | | | PR1835 | PR1825 | PR1810 | PR015S | CA6535 | |
| GM GH | 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 | - | 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 (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 | | GM☆ 100 - 160 - 200 | GM☆ 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 | | GM★ 40 - 60 - 80 | - | GM☆ 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 | - | - | |

| 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 |
| | | | | | | | PR1835 | PR1825 | PR1810 | PR0155 | 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 | - | - | |

- 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 S25C



Vc = 220 m/min (n = 1,750 min⁻¹)
 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

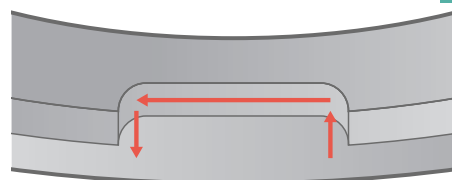
75%
Cutting Time

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 SUS304F



Vc = 120 m/min (n = 1,190 min⁻¹), 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 Evacuation

PR1535

58 cc/min

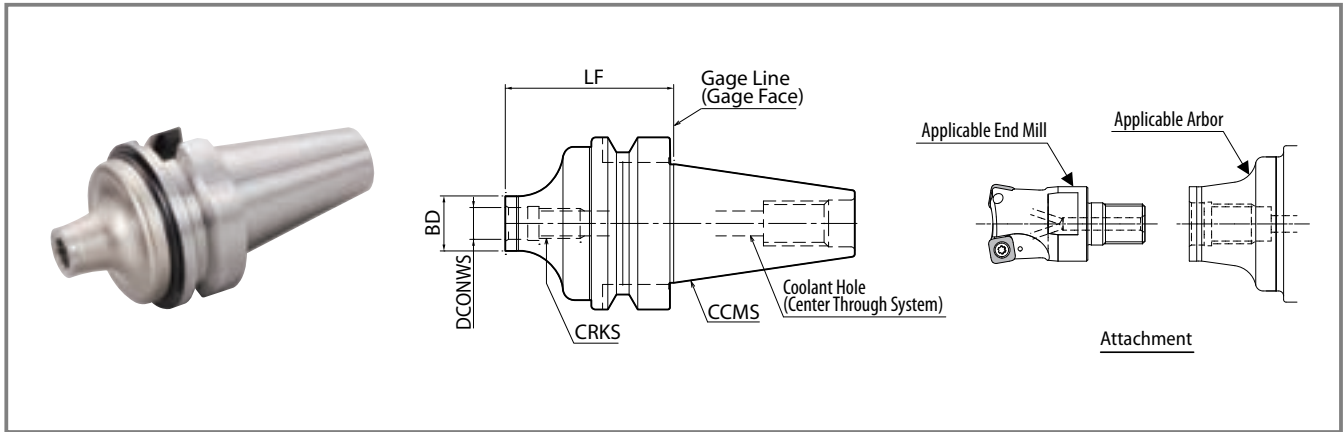
Efficiency
x 1.6

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

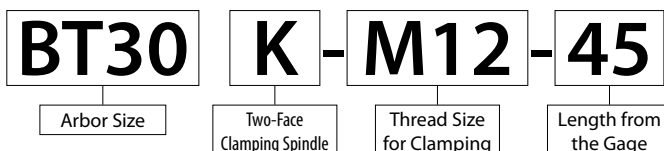
| Description | Stock | Dimensions (mm) | | | | Coolant Hole | Arbor (Two-face clamping) | Applicable End Mill (Head) |
|---------------|-------|-----------------|------|--------|-----------|--------------|---------------------------|----------------------------|
| | | LF | BD | DCONWS | CRKS | | | |
| 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-... |

● : Std. Item

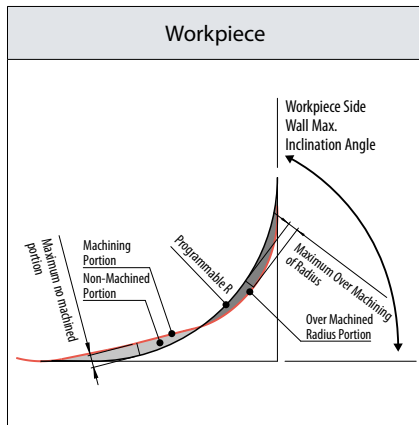
Actual End Mill Depth

| Arbor Description | Applicable End Mill (Head) | | | Actual End Mill Depth (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 | |
| | MFH18-M08-03... | 18 | 25 | 34.3 | |
| M10-60 | MFH20-M10-03... | 20 | 30 | 38.7 | |
| | MFH22-M10-03... | 22 | 30 | 44.5 | |
| M12-55 | MFH25-M12-... | 25 | 35 | 44.6 | |
| | MFH28-M12-... | 28 | 35 | 47.6 | |
| M16-65 | MFH32-M16-... | 32 | 40 | 51.2 | |
| | MFH35-M16-10... | 35 | 40 | 60.2 | |
| | 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 |

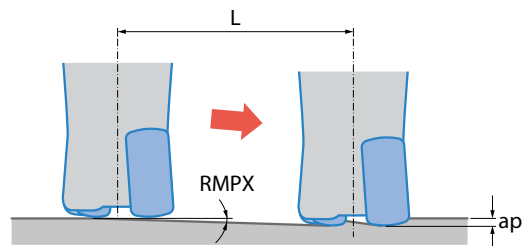
| Description | Cutting Dia. DCX (mm) | 25 | 28 | 32 | 35 | 40 | 50 | 63 | 80 |
|-----------------------------|-------------------------|-------|-------|-------|-------|-------|-------|-------|-------|
| MFH Harrier (MFH...-10-...) | Max. Ramping Angle RMPX | 5° | 4.5° | 4° | 3.5° | 3° | 2.5° | 2° | 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 Tips

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

$$\text{Formula for Max. Cutting Length (L) at Max. Ramping Angle} \quad L = \frac{ap}{\tan \text{RMPX}}$$

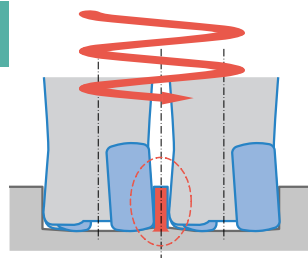


Helical Milling Tips

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

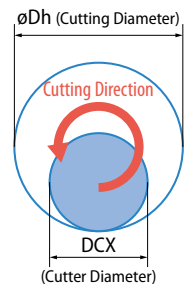
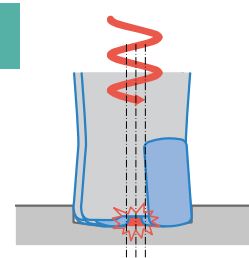
Exceeding Max. Machining Dia.

Center Core Remains After Machining



Under Min. Machining Dia.

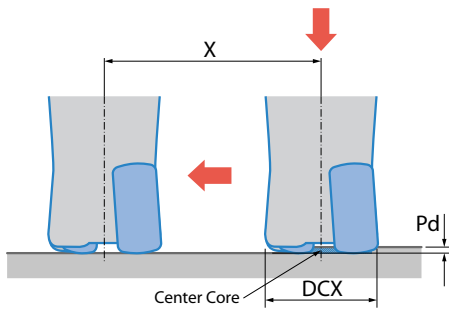
Center Core Hits Holder Body



| Description | Min. Cutting Dia. 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.

Drilling Tips



| Description | Max. Drilling Depth Pd | Min. Cutting Length X for Flat Bottom Surface |
|-------------|------------------------|---|
| MFH Micro | 0.5 | DCX-3.5 |
| MFH Mini | 1.0 | DCX-9 |

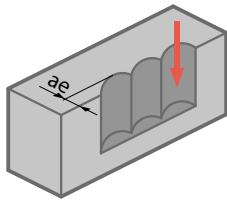
Unit: mm

| Description | GM • GH | | LD | | FL | |
|-----------------------------|------------------------|---|------------------------|---|------------------------|---|
| | Max. 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 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.

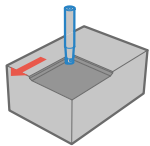
Reduce feed rate to $f_z \leq 0.2\text{mm/t}$ when plunging.

Unit: mm

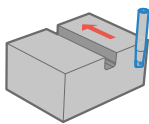
| Description | Maximum Width of Cut (ae) |
|-----------------------------|---------------------------|
| MFH Micro | 1.7 |
| MFH Mini | 3.5 |
| MFH Harrier (MFH...-10-...) | 8 (GM • GH) |
| MFH Harrier (MFH...-14-...) | 11.5 (GM • GH) |

3D Machining (MFH Harrier)

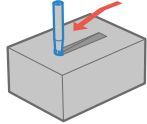
GM and GH chipbreakers are available for all the applications.



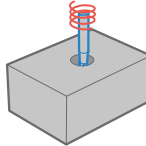
Face Milling & Shouldering



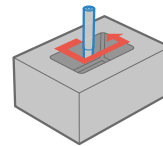
Slotting



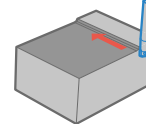
Ramping



Helical Milling

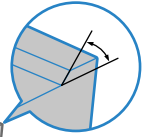


Pocketing



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