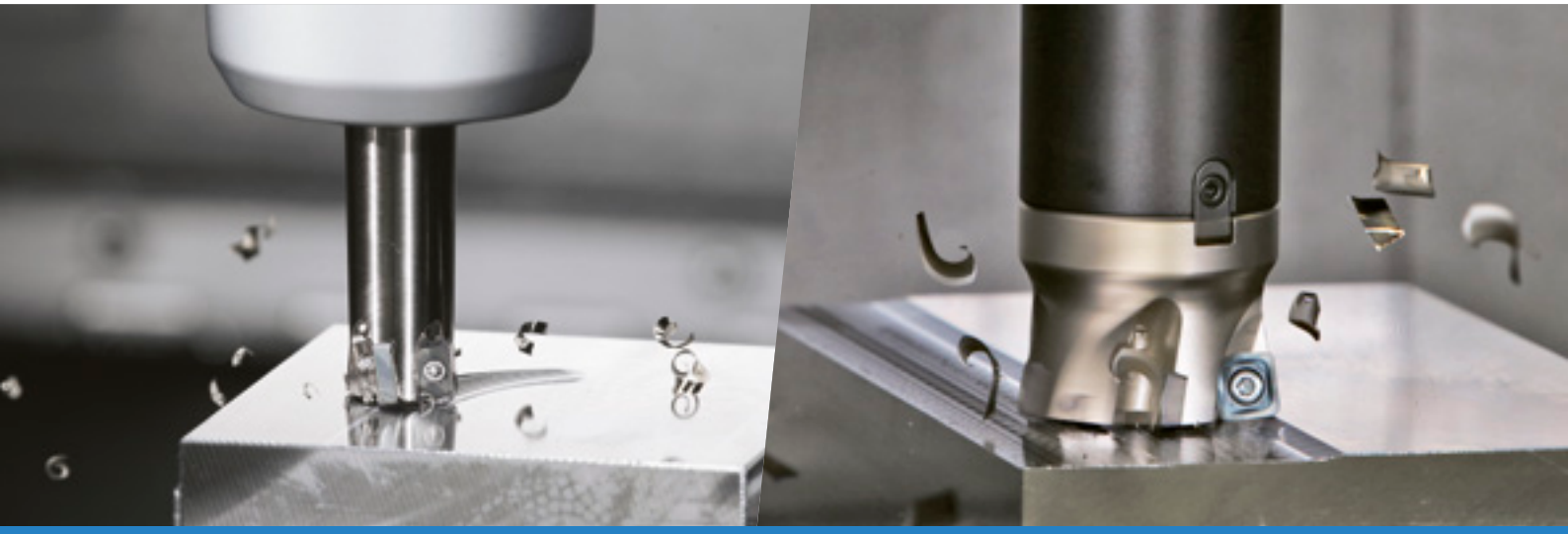
MFH Series



Stable machining with greater chatter resistance

Low cutting force with convex helical edge design
Long tool life across a wide range of materials
Compatible with small machining centres
Introducing MFH Harrier-D with 8-edge, double-sided insert NEW

Micro: P6, P15
Mini: P7, P18
Harrier: P8, P22
Harrier-D: P9, P30
Boost: P10, P34

KEEPS YOU AHEAD

High efficiency and high feed cutter

MFH Series

**Convex cutting edge design reduces chatter for high-efficiency rough machining.
Large line-up from Ø8 to Ø160 mm for various applications.**

1 Resistant to chatter and achieves stable high-feed machining

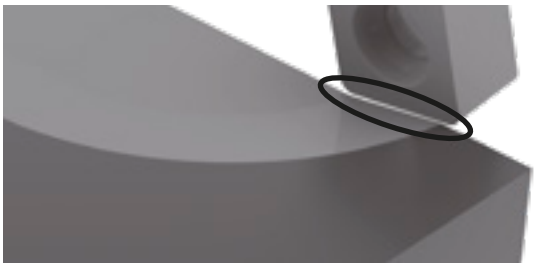
Proprietary technology of Kyocera, the »Convex Cutting Edge Geometry,« is implemented across the entire MFH series.

Reduces cutting force at initial impact and provides stable machining.

Initial contact with the workpiece (Image)

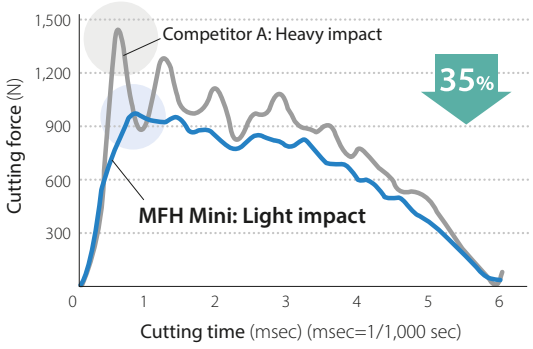
MFH series

Conventional high feed cutter



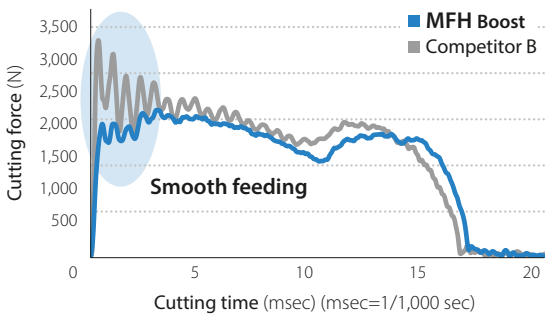
Cutting force when entering workpiece (Internal evaluation)

MFH Mini



Cutting conditions: Vc = 150 m/min., ap × ae = 0.5 × 8 mm, fz = 1.0 mm/t, Dry.
Cutter diameter DC = Ø16 mm (1 insert). Workpiece: C50.

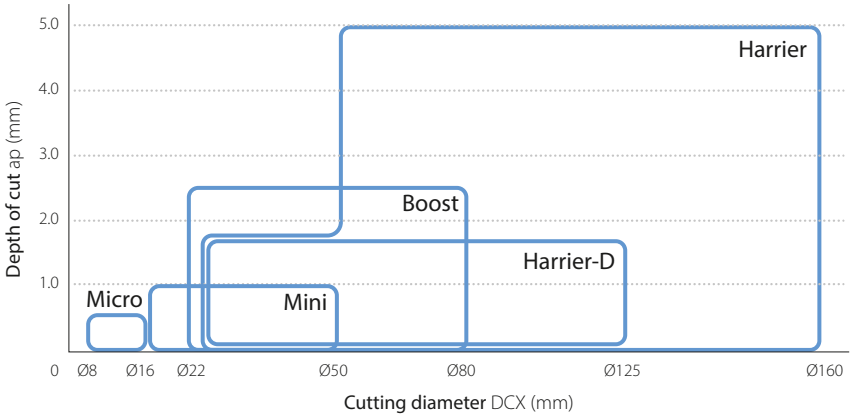
MFH Boost



Cutting conditions: Vc = 150 m/min., ap × ae = 2 × 25 mm, fz = 0.7 mm/t, Dry.
Cutter diameter DC = Ø50 mm (1 insert). Workpiece: BT50.

2 Large line-up for a wide range of applications

Introducing MFH Harrier-D with 8-edge, double-sided inserts. NEW



Harrier: High ap (2 – 5 mm) is only capable with LD chipbreaker.

Line-up and applications

	Micro P6, P15	Mini P7, P18	Harrier P8, P22	Harrier-D P9, P30	Boost P10, P34
					
End mill	Ø8 – **16**	Ø16 – **32**	Ø25 – **80**	Ø25 – **40**	Ø22 – **40**
Face mill	-	Ø40 – **50**	Ø50 – **160**	Ø50 – **125**	Ø40 – **80**
Modular	Ø8 – **16**	Ø16 – **32**	Ø25 – **40**	Ø25 – **40**	Ø22 – **42**
Insert	 2-edge, single-sided	 4-edge, double-sided	 4-edge, single-sided	 8-edge, double-sided	 4-edge, double-sided
Face milling / Shouldering	○	○	○	○	○
Slotting	○	○	○	○	○
Ramping	○	○	○	-	○
Helical milling	○	○	○	-	○
Pocketing	○	○	○	-	○
Contouring	○	○	○	○	○
Features	Extra small cutting diameter range of Ø16 or less Can be used in place of solid end mills to reduce costs	Fine pitch for high efficiency Suitable for Ø50 and smaller machining on small machining centres	Suitable for roughing with diameter Ø50 or more Supports various applications with large insert line-up	Suitable for roughing with diameter Ø50 or more Cost-efficient with 8-edge, double-sided inserts (Ramping is not recommended)	High efficiency with large depth of cut (Note the machine rigidity)

3 New PVD coating MEGACOAT NANO EX provides long tool life

Next-generation PVD coating for milling

NEW PR18 Series

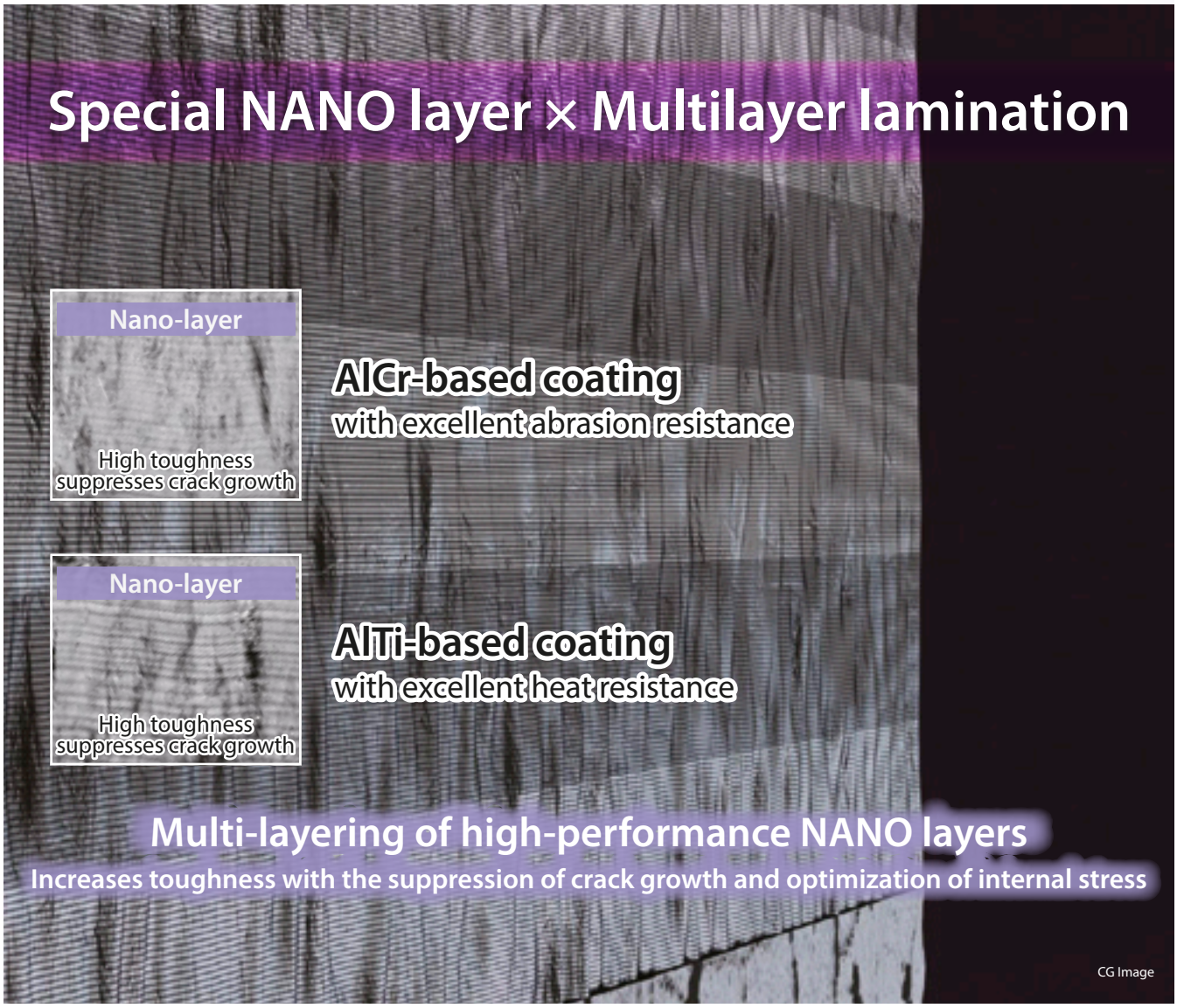
Double lamination technology with special nano layer.
MEGACOAT NANO EX provides longer tool life.
Available for various machining environments.

PR1825	P	For steel (Wear resistance oriented)
PR1835	M	For steel (Stability oriented) for Stainless Steel (1st recommendation)
PR1810	K	For cast iron

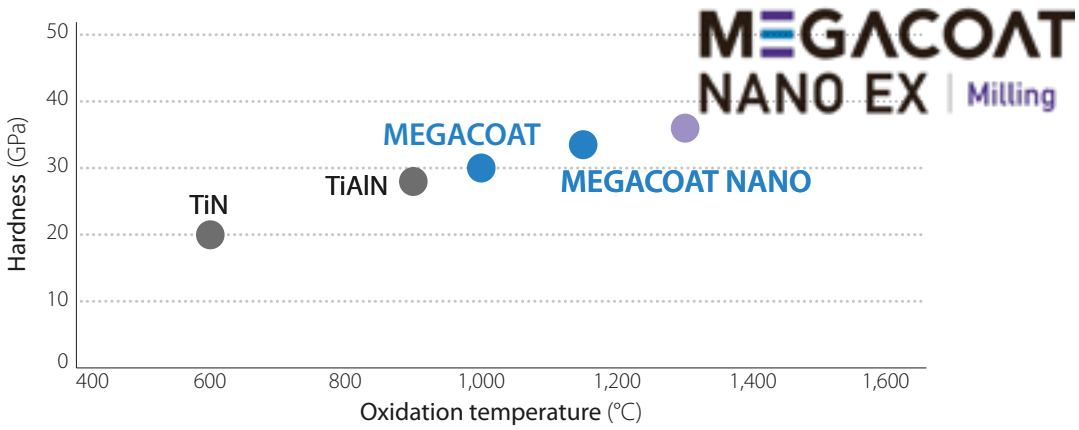
MEGACOAT NANO EX | Milling

Double lamination technology maintains longer tool life

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



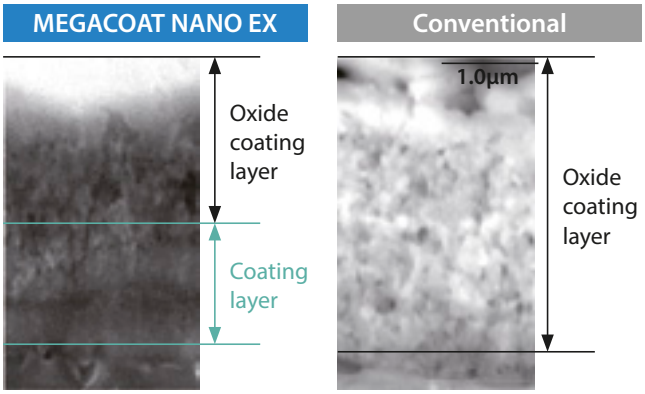
Coating characteristics (Internal evaluation)



Excellent oxidation resistance

Oxidation progression comparison (Internal evaluation)

Suppresses oxidation progression with excellent oxidation resistance

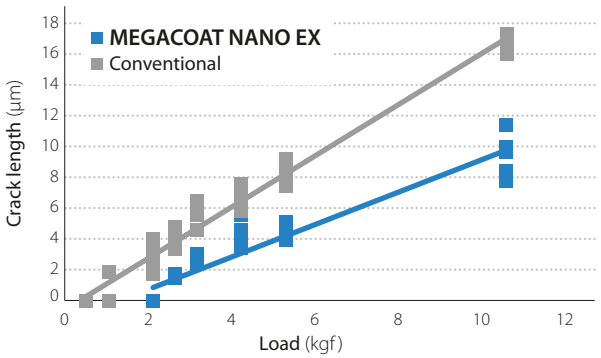


*Section after holding at 1,200 degrees for 30 minutes in air

High coating toughness

Coating layer toughness evaluation (Internal evaluation)

Excellent coating toughness with small crack length

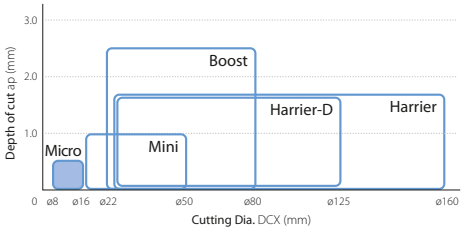


*Micro-Vickers measurement

Micro diameter cutter for high feed machining (Ø8 – 16 mm)

MFH Micro

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.

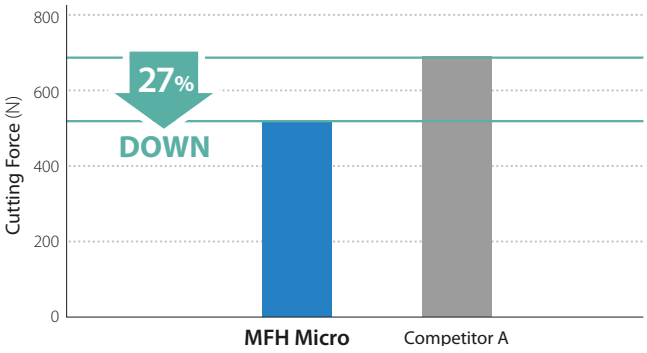


* With LD chipbreaker Harrier is capable of high ap = 2 – 5.0 mm (Ø50 – 160 mm). See page 3.

1 Low resistance and durable against chatter

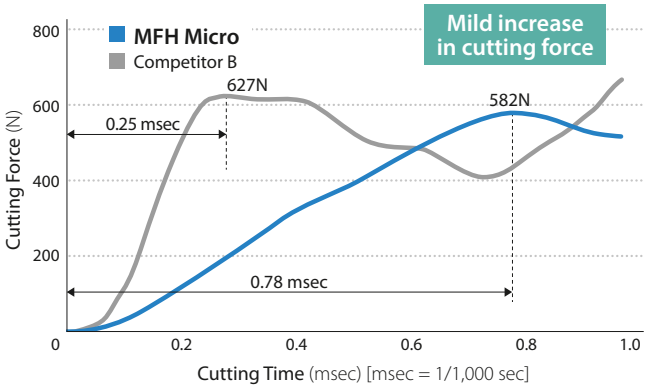
Moulded convex cutting edge controls initial impact when entering the workpiece.

Cutting force comparison (Internal evaluation)



Cutting conditions: Vc = 120 m/min., ap = 0.4 mm, fz = 0.6 mm/t.
Cutter diameter DC = Ø10 (1 insert), slotting, dry. Workpiece: C50.

Cutting force when entering workpiece comparison
(Internal evaluation)

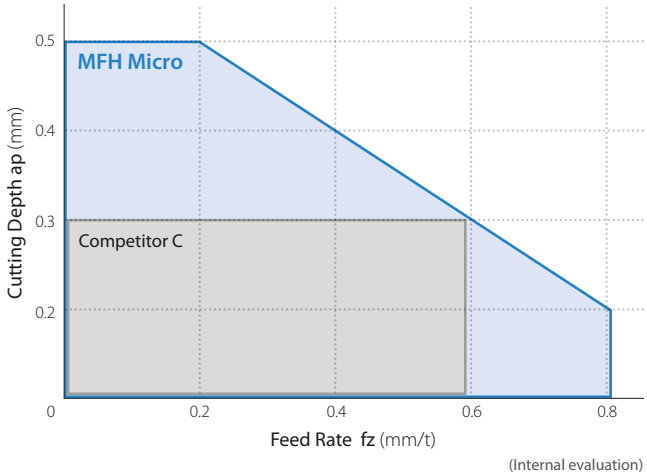


Cutting conditions: Vc = 120 m/min., ap × ae = 0.4 × 5 mm, fz = 0.6 mm/t.
Cutter diameter DC = Ø10 (1 insert), dry. Workpiece: C50.

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 centre (BT30).

Cutting performance map (Cutter diameter Ø10 mm)



(Internal evaluation)

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)

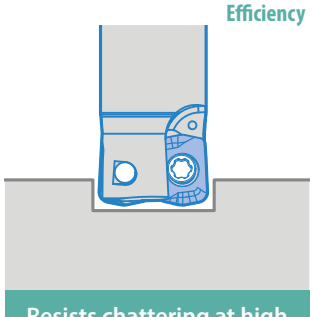
MFH Micro:
Q = 15.3 cc/min.

Vc = 150 m/min., ap × ae = 0.4 × 10 mm
fz = 0.4 mm/t. Dry
MFH10-S10-01-2T (2 inserts)
LPGT010210ER-GM

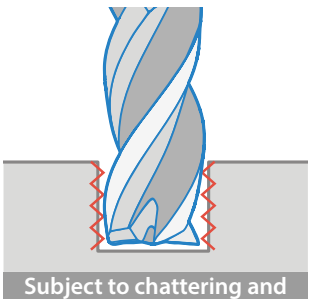
Solid end mill:
Q = 12.2 cc/min.

Vc = 80 m/min., ap × ae = 3 × 10 mm
fz = 0.04 mm/t. Dry
Ø10 (4 flutes)

× 1.25
Efficiency



Resists chattering at high feed rates (fz = 0.4 mm/t)

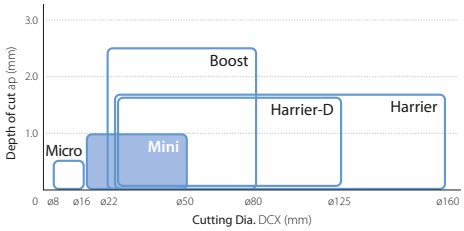


Subject to chattering and feed per tooth cannot be increased

Small diameter cutter for high feed machining (Ø16 – 50 mm)

MFH Mini

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

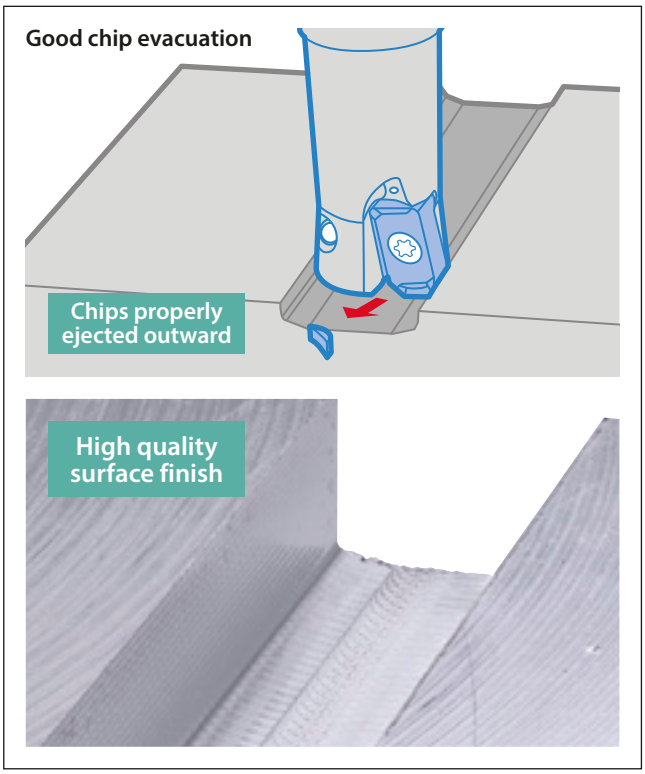


* With LD chipbreaker Harrier is capable of high ap = 2 – 5.0 mm (Ø50 – 160 mm). See page 3.

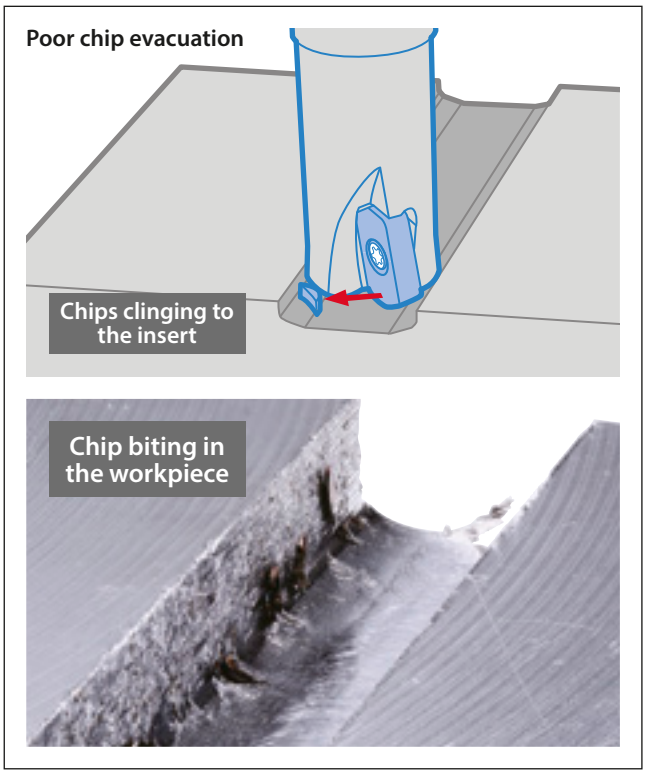
1 Good chip evacuation

MFH Mini controls chip biting with convex cutting edge

MFH Mini



Competitor high feed cutter

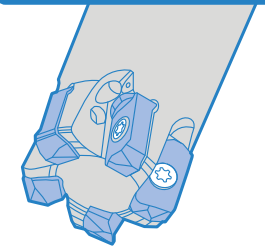


Cutting conditions: Cutter diameter DC = Ø16 mm (2 inserts), Vc = 150 m/min., ap = 0.5 mm (20 pass), fz = 0.6 mm/t: Total 10 mm × 16 mm. Dry. Workpiece: S235JR.

2 Fine pitch for efficient machining

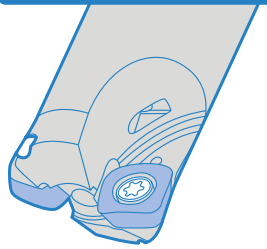
Cutter diameter 25 mm type

MFH Mini



5 inserts MFH25-S25-03-5T

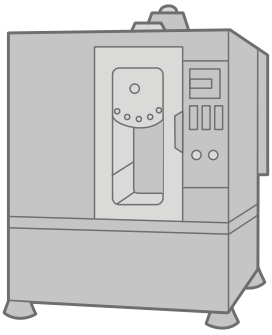
MFH Harrier



2 inserts MFH25-S25-10-2T

3 Suitable for roughing of moulds

High feed machining in small machining centres

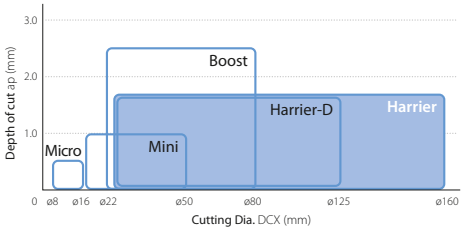


Applicable for BT30/BT40

Highly efficiency and high feed cutter (Ø25 – 160 mm)

MFH Harrier

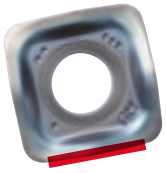
Wide range of products for high feed machining.
Large depths of cut and low cutting forces.



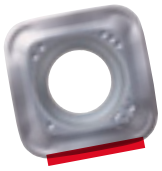
* With LD chipbreaker Harrier is capable of high ap = 2 – 5.0 mm (Ø50 – 160 mm). See page 3.

1 Large insert line-up for various applications

GM (General purpose) / GH (Tough edge)



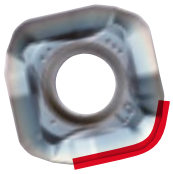
First recommendation for general machining



Excellent fracture resistance

Multiple metalworking processes.
Supports including face milling, ramping, and helical milling

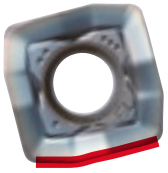
LP (Large ap)



Maximum ap = 5 mm

Available for scale removal as well as high feed cutting

FL (Wiper edge)



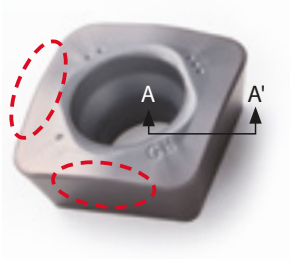
Wiper edge with low cutting forces

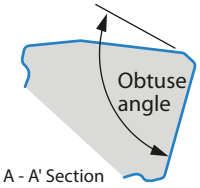
Excellent surface finish and reduced chattering

GH chipbreaker with excellent fracture resistance

Convex cutting edge design

Reduces impact force when entering workpiece.
Suppresses chattering and fracturing.





Tough edge design

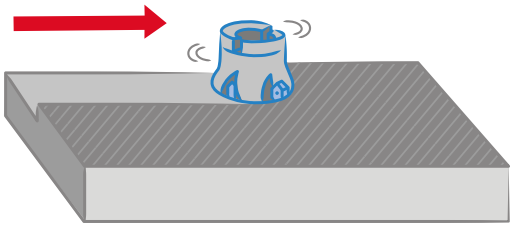
Combining with PR015S is suitable for machining hardened material.

Improved fracture resistance.

Featured product

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

Large ap for scale removal **ap = 4.0 mm**

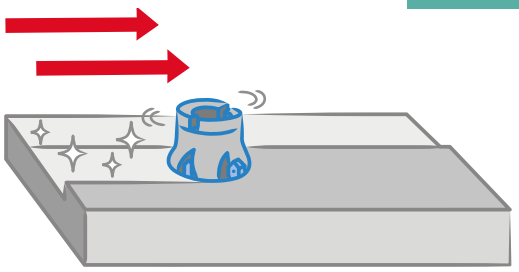


(fz = 0.25 mm/t, ap = 4 mm)

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

Roughing for scale removal (2 passes): Large ap
Vc = 200 m/min., ap × ae = 4 × 40 mm.
fz = 0.25 mm/t, Vf = 1,264 mm/min.

High feed rates after scale removal **fz = 1.5 mm/t**



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

Roughing (2 passes) after scale removal: High feed rate
Vc = 200 m/min., ap × ae = 2 × 40 mm.
fz = 1.5 mm/t, Vf = 7,583 mm/min.
Workpiece: S235JR

Conventional 45° cutter
Cutter diameter 63 mm, 5 inserts.

Roughing (4 passes): Constant D.O.C. and feed rate
Vc = 200 m/min., ap × ae = 3 × 40 mm.
fz = 0.25 mm/t, Vf = 1,264 mm/min.
Workpiece: S235JR

Chip evacuation

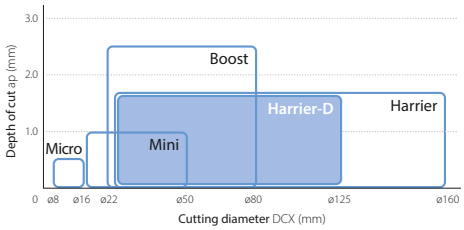
		Efficiency
MFH	**404** cc/min	× 2.6
Conventional cutter	**151** cc/min	

Large diameter cutter with double-sided insert (Ø25 – 125 mm)

MFH Harrier-D

NEW

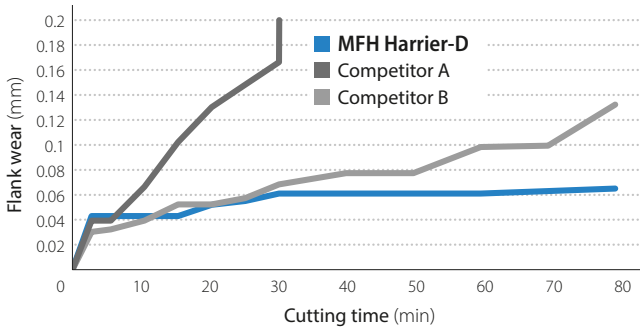
Cost-efficient with 8-edge, double-sided inserts.
High efficiency face milling.



* With LD chipbreaker Harrier is capable of high ap = 2 – 5.0 mm (Ø50 – 160 mm). See page 3.

1 Double-sided, 8-edge design for economy. Long tool life reduces overall machining costs.

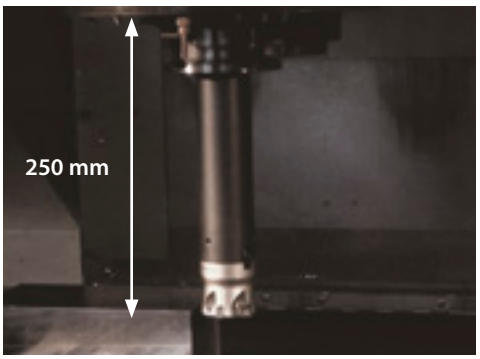
Wear resistance comparison (Internal evaluation)



Vc = 180 m/min., ap × ae = 1 × 37.7 mm, fz = 1.0 mm/t. Ø50 mm, 42CrMo4HT. Dry.

2 Low cutting force and excellent chatter resistance

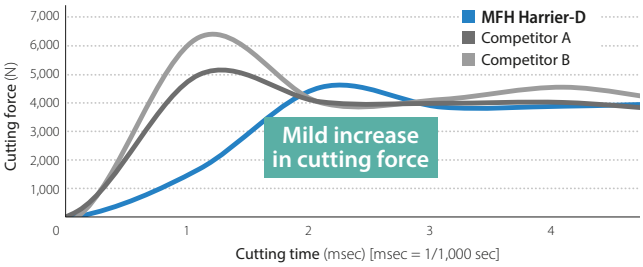
Achieves stable machining without chatter even with long overhang



Video

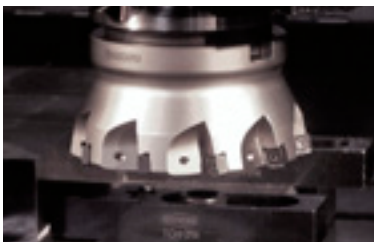
Low cutting force with convex helical edge design

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



Vc = 150 m/min., ap × ae = 1.5 × 25 mm, fz = 1.5 mm/t. Dry. Ø50 mm (1 insert) C50.

3 High-efficiency rough face milling



Vc = 180 m/min., ap = 1 mm.
fz = 1.0 mm/t. Dry. Ø125 mm (10 inserts) C50.

Efficiency simulation of face milling (Internal evaluation)

Roughing: MFH Harrier-D
Finishing: 45° cutter

Vf = 4,600 mm/min.

33% Cutting time

Roughing: 45° cutter
Finishing: 45° cutter

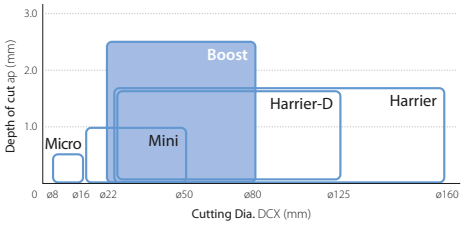
Vf = 1,400 mm/min.

Improved roughing efficiency contributes to reduction in total cutting time.

High feed and large depth of cut milling

MFH Boost

Maximum D.O.C. of 2.5 mm - high feed plus large D.O.C for greater milling capabilities. Excellent performance in a wide range of applications, including automotive parts, difficult-to-cut materials and moulds.



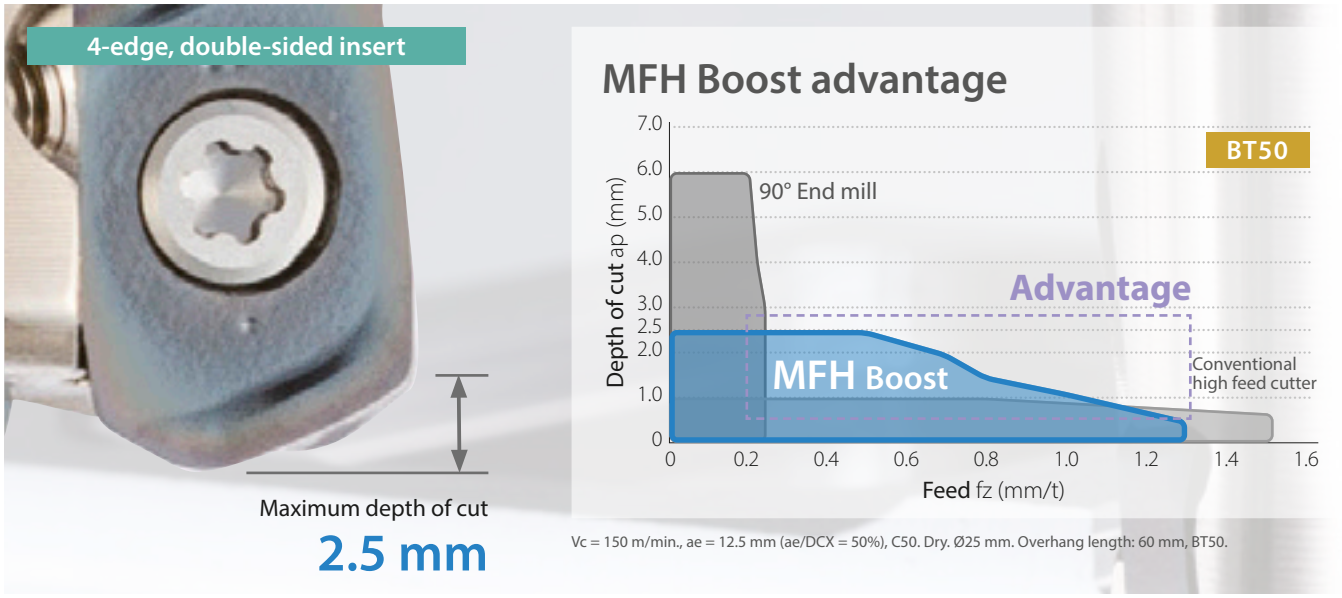
* With LD chipbreaker Harrier is capable of high ap = 2 – 5.0 mm (Ø50 – 160 mm). See page 3.

1 High feed milling with large depth of cut capabilities

Video

A small 04 size insert (4-edge, double-sided insert) supports depths of cut up to 2.5 mm with cutting diameter available from Ø22 mm.

Achieves high efficiency machining in various shouldering, slotting, helical milling, and ramping applications.



Vc = 150 m/min., ae = 12.5 mm (ae/DCX = 50%), C50. Dry. Ø25 mm. Overhang length: 60 mm, BT50.

New value with 2.5 mm maximum depth of cut

Automotive parts

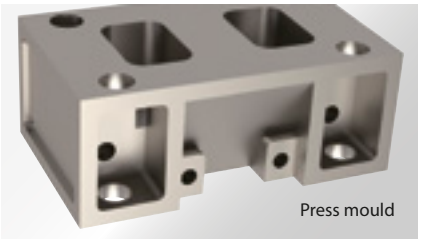
General steel machining.


Automotive suspension parts

- **Increased productivity with high feed rates**
- **High reliability in unstable machining environments**
  Long overhang length and better clamping rigidity. Stable machining with low rigidity machines.
- **High-efficiency ramping**
  Large ramping angle (Small diameter Ø25 mm: 3°) Dramatic efficiency improvement when ramping in pockets.
- **Longer tool life with high-efficiency machining.**

General parts / Mould (High roughing / Facing)

General parts, pressing and die casting.


Press mould

- **Higher productivity with large D.O.C.**
- **Long tool life and improved efficiency through the reduction of tool paths**
  Reduced machining time when machining workpieces with large variations in machining margins.
- **Longer tool life with high-efficiency machining.**

*MFH Mini/Harrier recommended for contouring with small depth of cut and high feed

Aircraft / Energy industry parts

Difficult-to-cut materials such as titanium alloy and stainless steel machining.


Aircraft landing gear parts

- **High feed rates increase productivity**
- **Long tool life through the reduction of tool paths**
- **Good combination with heat-resistant grade PR1835**
  Long tool life and stable machining.

2 Available for a variety of machining applications and environments

1 Solutions for **90°end mills** (Roughing to medium-finishing)

High feed rates dramatically improve machining efficiency

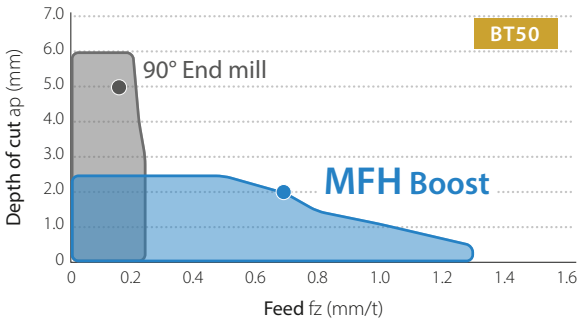
Machining efficiency simulation example

Pocketing: Vc = 150 m/min., ae = 12.5 mm

MFH Boost
Ø25 mm (3 inserts)
100 cc/min
Ap = **2.0** mm, fz = **0.7** mm/t

Machining efficiency ×1.8

Conventional 90° End mill
Ø25 mm (3 inserts)
54 cc/min
Ap = **5.0** mm, fz = **0.15** mm/t



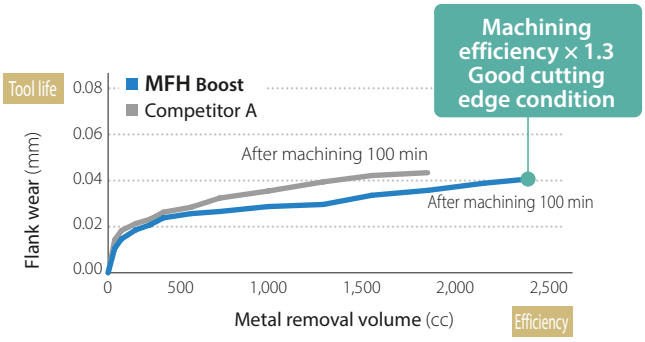
High efficiency and good tool life

Machining efficiency and cutting edge condition comparison (Internal evaluation)

Cutting edge condition after 100 min. machining

MFH Boost
ap = 1.6 mm, fz = **0.6** mm/t

Competitor A 90° end mill
ap = 5.0 mm, fz = **0.15** mm/t



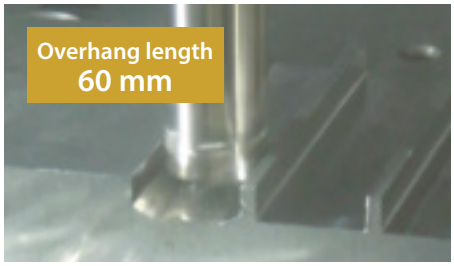
Vc = 150 m/min., ae = 12.5 mm. Dry. 42CrMo4 (H) Ø25 mm (1 insert) BT50.

High stability in unstable machining environment

Chatter resistance comparison (Internal evaluation)

Slotting
Ø25 mm (3 inserts)
External air
C50
BT50

Video



Machining efficiency

MFH Boost
103 cc/min
Vc = 120 m/min, ap = 1.5 mm, fz = **0.6** mm/t

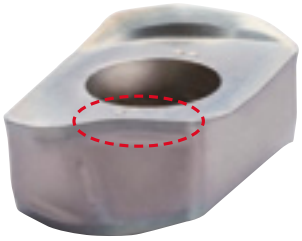
Machining efficiency ×4.5

Competitor B
90° End mill
31 cc/min **Chattering** (Machining was impossible)
Vc = 80 m/min., ap = 2 mm, fz = 0.2 mm/t
23 cc/min
Vc = 80 m/min., ap = 2 mm, fz = 0.15 mm/t

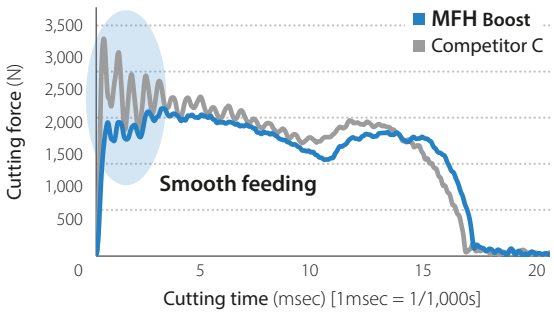
High efficiency and stable machining designs

Kyocera's original technology.

Convex cutting edge design reduces impact when entering workpiece.



Cutting force when entering workpiece (Internal evaluation)



Vc = 150 m/min., ap = 2.0 mm, ae = 25 mm, fz = 0.7 mm/t. Dry, C50, Ø50 mm (1 insert) BT50.

2 Better solution to **conventional high feed cutters**

Large D.O.C. dramatically improves machining efficiency

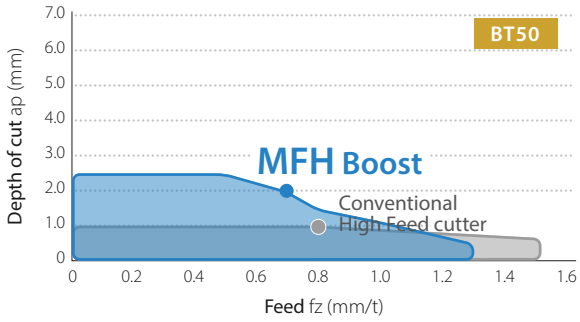
Machining efficiency simulation example

Multi-stage machining (Depth 30 mm): Vc = 150 m/min., ae = 12.5 mm.

MFH Boost
Ø25 mm (3 inserts)
100 cc/min
ap = 2.0 mm, fz = **0.7** mm/t

Machining efficiency x1.3

Conventional high feed cutter
Ø25 mm (4 inserts)
76 cc/min
ap = **1.0** mm, fz = **0.8** mm/t

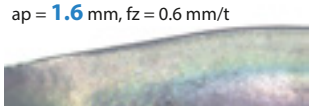


High efficiency and good tool life

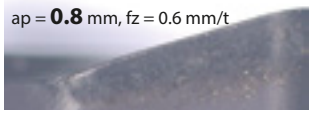
Machining efficiency and cutting edge condition comparison
(Internal evaluation)

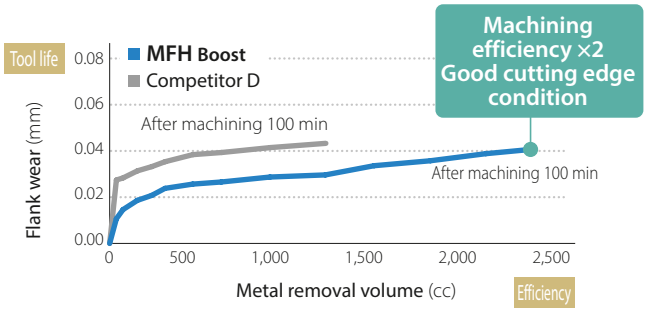
Cutting edge condition after 100 min. machining

MFH Boost
ap = **1.6** mm, fz = 0.6 mm/t



Competitor D high feed type
ap = **0.8** mm, fz = 0.6 mm/t





Vc = 150 m/min., ae = 12.5 mm. Dry, 42CrMo4 (H) Ø25 mm (1 insert) BT50.

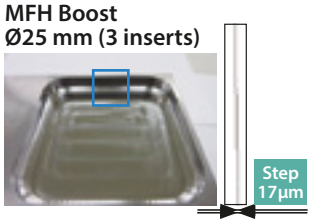
Excellent wall accuracy

Video

Machining efficiency and wall accuracy comparison (Internal evaluation)

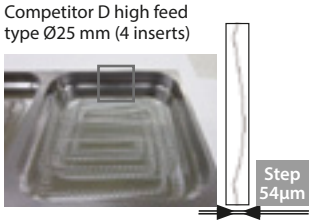
Pocketing (Depth 12 mm)

MFH Boost
Ø25 mm (3 inserts)



ap = **1.5** mm × **8** passes
Q = **115** cc/min.

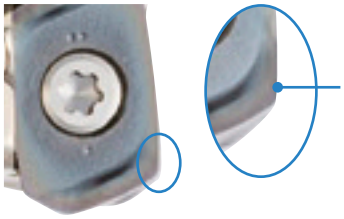
Competitor D high feed type Ø25 mm (4 inserts)



ap = **0.8** mm × **15** passes
Q = **81** cc/min.

Cutting conditions: Vc = 200 m/min., ae = 12.5 mm, fz = 0.8 mm/t. Dry, C50, BT50.

Superior wall accuracy



Wiper on outer periphery

Reduction of wall level variation in multi-pass machining.

3 Solutions for **machining difficult-to-cut materials**

Dramatic improvement in machining efficiency with titanium alloy, stainless steel machining, etc.

Video

Machining efficiency comparison (Internal evaluation)

Titanium alloy pocketing (Depth 6 mm)

MFH Boost
Approx. 1' 30"
ap = **1.5** mm × **4** Passes (fz = ~0.35 mm/t)

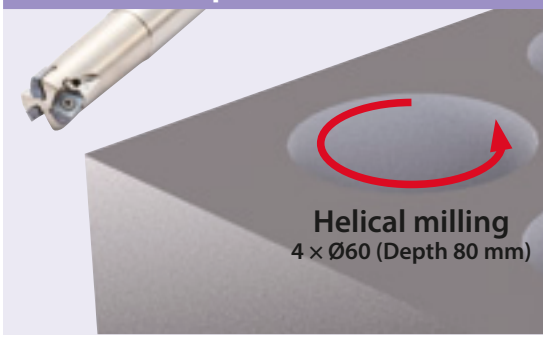
Machining efficiency x1.8

Competitor E
High Feed type
Approx. 2' 50"
ap = **0.6** mm × **10** Passes (fz = ~0.4 mm/t)

Vc = 50 m/min., ae = 12.5 mm (ae/DCX = 50%). Ramping angle 3° Ti-6Al-4V. Wet, Ø25 mm (3 inserts), BT50.

Valve parts • SCM 440

Vc = 180 m/min, ap × ae = 1.5 × 32 mm, fz = 0.35 mm/t, BT50



Helical milling
4 × Ø60 (Depth 80 mm)

MFH Boost
Ø32 (4 inserts)
Q = 132 cc/min

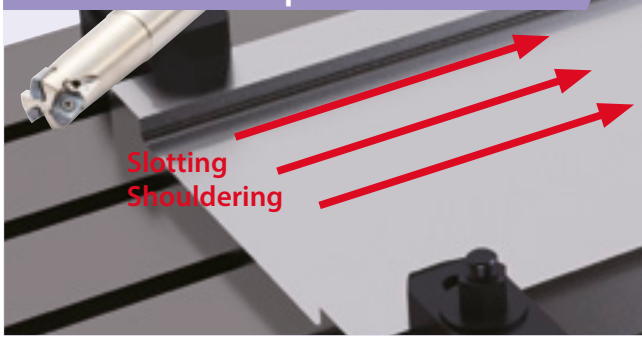
Conventional F
High Feed Type ø 32
(3 inserts)
Q = 38 cc/min

Machining efficiency × 3.5

The MFH boost achieved 3.5 times machining efficiency **by increasing the D.O.C. and number of inserts**. Even with 90mm overhang portion, ap = 1.5 mm large D.O.C. machining is possible.

Industrial parts • C50

Vc = 150 m/min., ap × ae = 1.0 × ~20 mm, fz = 0.36 mm/t, BT40



Slotting
Shouldering

MFH Boost
Ø25 (3 Inserts)
Q = 42 cc/min

Competitor G
90 ° end mill Ø25
(2 inserts)
Q = 13 cc/min

Machining efficiency × 3.2

The MFH boost achieved 3.2 times machining efficiency **by increasing cutting speed, feed, and number of inserts**. There is no problem with the value of the load meter when increasing to the cutting conditions above.

Mould parts pre hardened steel

Vc = 120 m/min., ap × ae = 1.5 × 30 mm, fz = 0.7 mm/t, Internal air

MFH Boost
Ø50 (7 inserts)
Q = 192 cc/min

Competitor H
High Feed Type Ø50
(7 inserts)
Q = 140 cc/min

Machining efficiency × 1.4

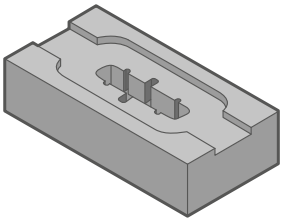
The MFH Boost provides a low cutting forces **even when the feed and ap are increased**. Machining efficiency 1.4 times. Even when machining where the depth of cut is doubled, distortion is equivalent to competitor D.

(User evaluation)

Case studies

Mould • X40CrMoV5-1

Vc = 90 m/min. (n = 2,400 min^{-1})
ap × ae = 0.3 × ~ 0.7 mm
fz = 0.27 mm/t (Vf = 1,930 mm/min.)
Dry
MFH12-S12-01-3T (3 inserts)
LPGT010210ER-GM PR1835



Chip evacuation

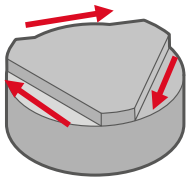
Efficiency × 1.3

MFH Micro	**4.5** cc/min.
Competitor J Ø12-3T	**3.4** cc/min.

MFH Micro shows 1.3 times machining efficiency compared to Competitor J. Good cutting edge condition after machining almost doubling the tool life. (User evaluation)

Industrial machine parts • X105CrMo17

Vc = 180 m/min. (n = 3,580 min^{-1})
ap × ae = 0.4 × 8 mm
fz = 0.4 mm/t (Vf = 5,730 mm/min.)
Wet
MFH16-S16-01-4T (4 inserts)
LPGT010210ER-GM PR1835



Cutting time

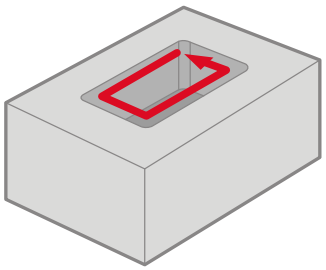
35% Cutting time

MFH Micro	**7** min.
Competitor K	**11** min.

MFH Micro shows 30% faster cycle time compared to competitor K. (User evaluation)

Mould 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 PR1835



Tool life

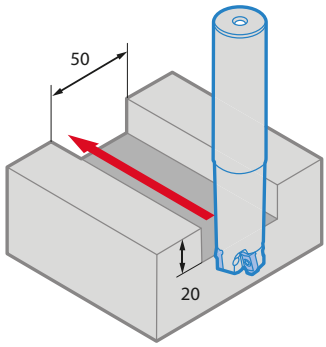
Tool life MAX ×2

MFH Mini	**2.0** H
Competitor L (4 inserts)	**1.0~1.5** H

MFH Mini shows lower cutting load compared to competitor L and can extend the machining time. (User evaluation)

Airplane parts • Precipitation hardened stainless steel

Vc = 120 m/min. (n = 1,530 min^{-1})
ap × ae = 0.7 × ~ 25 mm
fz = 0.6 mm/t (Vf = 3,670 mm/min.)
Dry
MFH25-S25-03-4T (4 inserts)
LOGU030310ER-GM PR1835



Number of workpieces

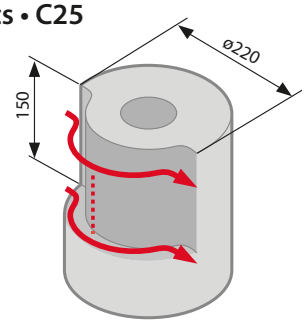
Tool life × 1.8

MFH Mini	**100** pcs
Competitor M (5 inserts)	**55** pcs

MFH Mini maintains good cutting edge condition after machining 100 pcs with stable machining. (User evaluation)

Construction machine parts • C25

Vc = 220 m/min. (n = 1,750 min^{-1})
ap × ae = 1.5 × 30 mm
fz = 0.7 mm/t (Vf = 4,900 mm/min.)
Dry
MFH40-S32-10-4T (4 inserts)
SOMT140520ER-GM PR1825



Cutting time

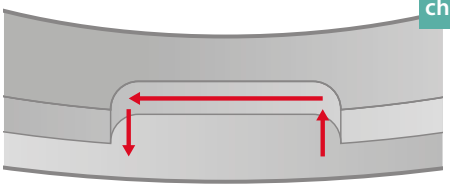
75% Cutting time

MFH Harrier	**950** sec
Competitor N (90° cutter)	**3,800** sec

MFH Harrier features a higher number of passes compared to Competitor N, but the machining time was reduced by 75% because the feed rate can be increased by 7 times. (User Evaluation)

Clutch • X8CrNiS18-9

Reduced chattering



Vc = 120 m/min. (n = 1,190 min^{-1}), ap × ae = 1.0 × 20 mm.
fz = 1.2 mm/t (Vf = 2,850 mm/min.). Dry.
MFH32-S32-10-2T (2 inserts), SOMT100420ER-GM PR1835.

Chip evacuation

Efficiency × 1.6

MFH Harrier	**58** cc/min.
Competitor O	**36** cc/min.

MFH Harrier shows stable machining while Competitor O generated chattering. MFH Harrier maintained a good cutting edge condition with stable machining. (User Evaluation)

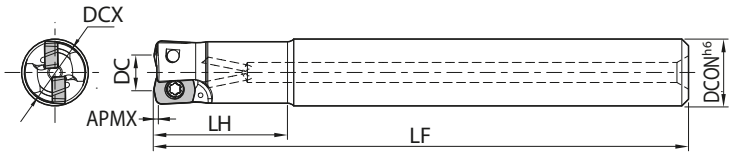


Fig.1

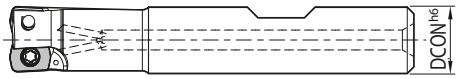


Fig.2

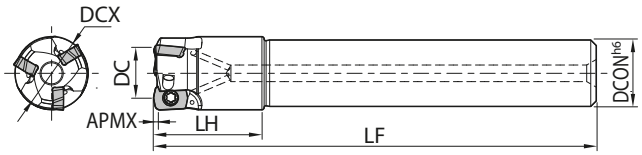


Fig.3

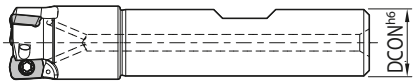


Fig.4

Toolholder dimensions (Shank type)

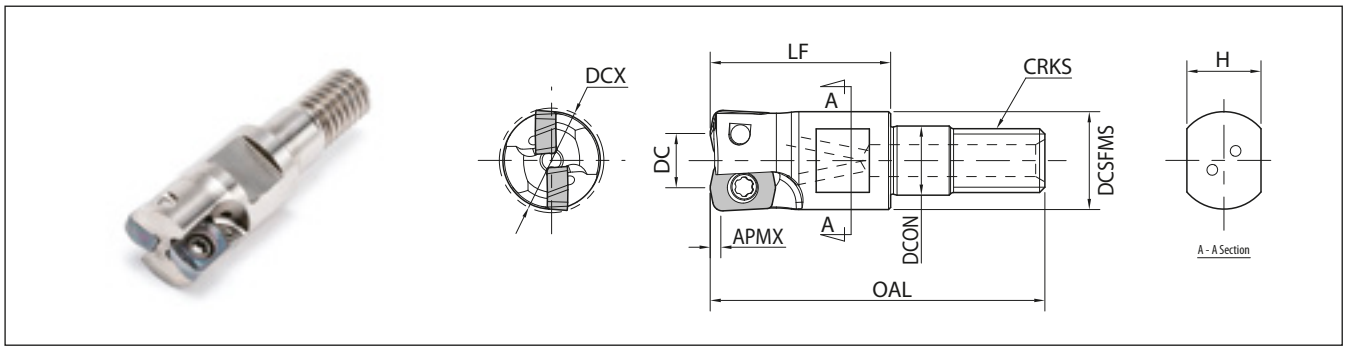
Shank	Description	Availability	No. of inserts	Dimensions (mm)						Maximum ramping angle	Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC	DCON	LF	LH	APMX		A.R.				
Standard shank (Cylindrical)	MFH08-S10-01-1T	●	1	8	4.2	10	75	16	0.5	4°	+5°	Yes	Fig.1	0.04	20,000
	MFH10-S10-01-2T	●	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 shank (Cylindrical)	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 maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available

Spare parts and applicable inserts

Description	Spare parts		Applicable inserts
	Insert screw	Wrench	
			
MFH…-01-…	SB-1840TRP	FTP-6	LPGT010210ER-GM
	Recommended torque for insert clamp: 0.5 Nm		



Toolholder dimensions

Description	Availability	No. of inserts	Dimensions (mm)									Maximum ramping angle	Rake angle	Coolant hole	Maximum revolution (min^{-1})
			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 – 14 mm screw size: M6 × P1.0)
Check screw specifications for the shank in use.

●: Available

Spare parts and applicable inserts

Description	Spare parts		Applicable inserts
	Insert screw	Wrench	
			
MFH…-01-…	SB-1840TRP	FTP-6	LPGT010210ER-GM
	Recommended torque for insert clamp: 0.5 Nm		

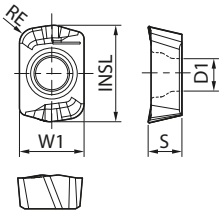
Caution with maximum revolution

Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.

Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

Applicable inserts MFH Micro

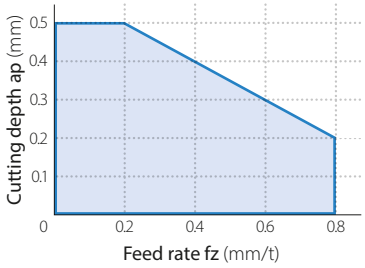
Classification of usage					
	P	Carbon steel / Alloy steel	★	☆	
		Mould steel	★	☆	
★: Roughing / 1st choice ☆: Roughing / 2nd choice ■: Finishing / 1st choice □: Finishing / 2nd choice	M	Austenitic stainless steel	☆	★	
		Martensitic stainless steel		☆	★
		Precipitation hardened stainless steel		★	
	K	Gray cast iron			
		Nodular cast iron			
	S	Ni-base heat-resistant alloy		☆	★
		Titanium alloy		★	
	H	High hardness steel			

Insert		Description	Dimensions (mm)					MEGACOAT NANO EX		CVD coated carbide
			W1	S	D1	INSL	RE	PR1825	PR1835	CA6535
 General purpose		LPGT 010210ER-GM	4.19	2.19	2.1	6.26	1.0	●	●	●

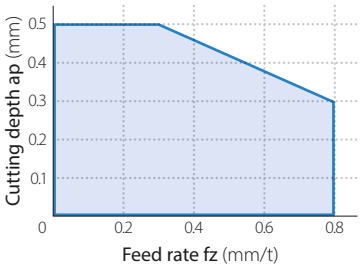
●: Available

MFH Micro Cutting performance

Cutting diameter: Ø8 – 12 mm



Cutting diameter: Ø14 – 16 mm



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

Chipbreaker	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 EX		CVD coated carbide
							PR1825	PR1835	CA6535
GM	Carbon steel	0.2 – **0.4** – 0.6			0.2 – **0.5** – 0.8		★ 120 – **180** – 250	☆ 120 – **180** – 250	–
	Alloy steel						★ 100 – **160** – 220	☆ 100 – **160** – 220	–
	Mould steel (~40HRC)	0.2 – **0.3** – 0.5			0.2 – **0.4** – 0.6		★ 80 – **140** – 180	☆ 80 – **140** – 180	–
	Mould steel (40~50HRC)	0.2 – **0.25** – 0.3			0.2 – **0.25** – 0.4		☆ 60 – **100** – 130	–	–
	Austenitic stainless steel	0.2 – **0.3** – 0.5			0.2 – **0.4** – 0.6		☆ 100 – **160** – 200	★ 100 – **160** – 200	–
	Martensitic stainless steel						–	☆ 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	0.2 – **0.25** – 0.3			0.2 – **0.25** – 0.4		–	☆ 20 – **30** – 50	★ 20 – **30** – 50
	Titanium alloy						–	★ 40 – **60** – 80	–

- The numbers shown in **bold font** indicate the recommended standard cutting conditions. Adjust the cutting speed and feed rate within the specified range according to the actual machining conditions.
- Machining with coolant is recommended for precipitation hardened stainless steel, Ni-base heat-resistant alloy, and titanium alloy.
- Machining with coolant may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
- Centre-through coolant is recommended for slotting.

Standard (Cylindrical)

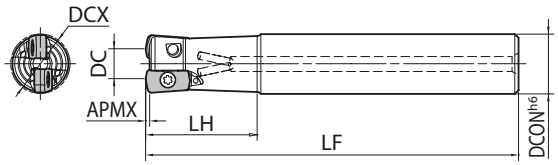


Fig.1

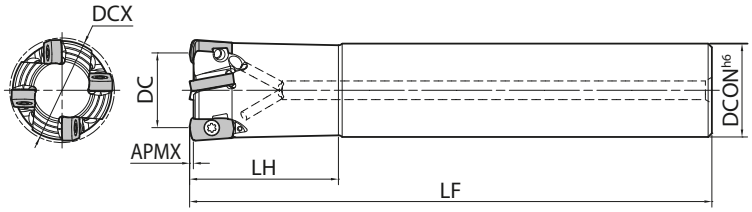


Fig.2

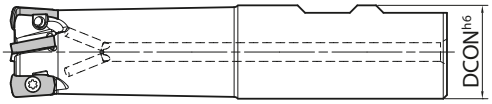
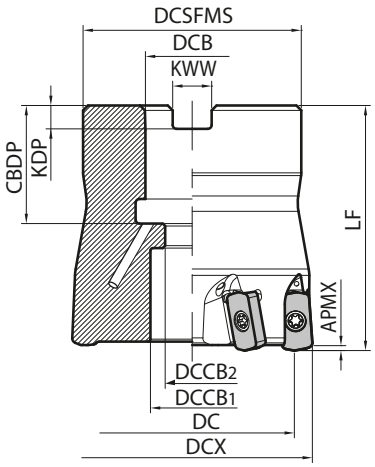


Fig.3

Toolholder dimensions

Shank	Description		Availability	No. of inserts	Dimensions (mm)						Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
					DCX	DC	DCON	LF	LH	APMX	A.R.				
Standard Shank (Cylindrical)	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 Shank (Cylindrical)	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 Shank (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 (Cylindrical)	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



Toolholder dimensions

Description		Availability	No. of inserts	Dimensions (mm)											Rake angle	Coolant hole	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R.			
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
	040R-03-6T-M	●	6														0.2	
	040R-03-7T-M-KUA	●	7			34											0.24	
	042R-03-5T-M-KUA	●	5	42	34	38											0.27	
	042R-03-7T-M-KUA	●	7			34											0.26	
	050R-03-5T-M-KUA	●	5	50	42	47	22	19	11	50	21	6.3	10.4				0.39	8.600
	050R-03-8T-M-KUA	●	8														0.41	
	050R-03-8T-M	●															0.5	
	052R-03-5T-M-KUA	●	5	52	44					40							0.43	
	052R-03-8T-M-KUA	●	8														0.43	
	063R-03-8T-M-KUA	●		63	55			50.7									0.57	
	066R-03-8T-M-KUA	●		66	58			53.7									0.6	

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available

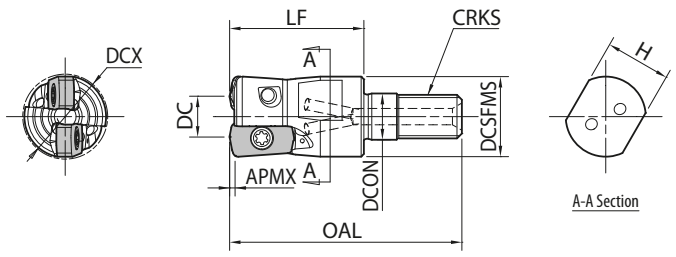
Spare parts and applicable inserts

Description	Spare parts			Applicable inserts
	Insert screw	Wrench	Arbor clamp bolt	
				
MFH…-03-…	SB-3065TRP	DTPM-8	-	LOGU030310ER-GM LOGU030310ER-GH
MFH040R-03-…-M	Recommended torque for insert clamp: 1.2 Nm		HH8×25	
MFH050R-03-8T-M			HH10×30	

Caution with maximum revolution

Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.

Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.



Toolholder dimensions

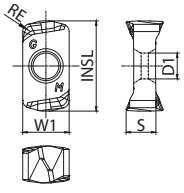
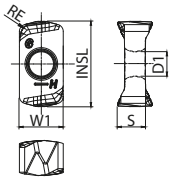
Description		Availability	No. of inserts	Dimensions (mm)									Rake angle	Coolant hole	Maximum revolution (min^{-1})
				DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R.		
MFH	16-M08-03-2T	●	2	16	8	14.7	8.5	42	25	M8×P1.25	12	1	−10°	Yes	18,880
	17-M08-03-2T	●		17	9						1				17,900
	18-M08-03-2T	●		18	10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

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available

Applicable inserts MFH Mini

Classification of usage							
★: Roughing / 1st choice ☆: Roughing / 2nd choice ■: Finishing / 1st choice □: Finishing / 2nd choice	P	Carbon steel / Alloy steel	★	☆			
		Mould steel	★	☆			
	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		★			
	H	Hardened materials				★	

Insert		Description	Dimensions (mm)					MEGACOAT NANO EX			MEGACOAT HARD	CVD coated carbide
			W1	S	D1	INSL	RE	PR1825	PR1835	PR1810	PR015S	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

Recommended cutting conditions MFH Mini ★ 1st recommendation ☆ 2nd recommendation

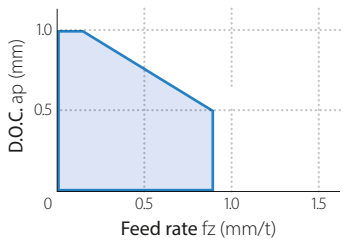
Chipbreaker	Workpiece		Holder description and feed rate (fz: mm/t) • Recommended feed ap = 0.5 mm (reference value)								Recommended insert grade (Vc: m/min.)				
			MFH16 -…-2T	MFH20 -…-3T	MFH20 -…-4T	MFH25 -…-4T	MFH25 -…-5T	MFH32 -…-5T	MFH32 -…-6T	MFH -…-R-03	MEGACOAT NANO EX			MEGACOAT HARD	CVD coated carbide
											PR1825	PR1835	PR1810	PR015S	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 – **0.8** – 1.5	★ 120 – **180** – 250	☆ 120 – **180** – 250	–	–	–
	Alloy steel										★ 100 – **160** – 220	☆ 100 – **160** – 220	–	–	–
	Mould 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 – **0.6** – 1.2	☆ 80 – **140** – 180	☆ 80 – **140** – 180	–	GH★ 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 – **0.3** – 0.6	☆ 60 – **100** – 130	–	–	GH★ 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 – **0.3** – 0.5	☆ 50 – **70** – 100	–	–	GH★ 50 – **70** – 100	–
		(55 - 60HRC)	0.03 – **0.06** – 0.1 (* Recommended only for GH chipbreaker)								–	–	–	GH☆ 50 – **60** – 70	–
	Austenitic 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	GM☆ 100 – **160** – 200	GM★ 100 – **160** – 200	–	–	–
	Martensitic stainless steel										–	☆ 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	–	–	★ 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	–	–	★ 100 – **150** – 200	–	–
	Ni-base heat-resistant alloy		0.2 – **0.3** – 0.6		0.2 – **0.25** – 0.4	0.2 – **0.4** – 0.8	0.2 – **0.25** – 0.4	0.2 – **0.4** – 0.8	0.2 – **0.25** – 0.4	0.2 – **0.25** – 0.4	–	☆ 20 – **30** – 50	–	–	★ 20 – **30** – 50
	Titanium alloy										–	GM★ 40 – **60** – 80	GM☆ 30 – **50** – 70	–	–

The numbers shown in **bold font** indicate the recommended standard cutting conditions.
Adjust the cutting speed and feed rate within the specified range according to the actual machining conditions.
Machining with coolant is recommended for Precipitation Hardened Stainless Steel, Ni-base Heat-Resistant Alloy, and Titanium Alloy.
Machining with coolant may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions. Slotting is not recommended in this situation.
Slotting or pocketing are not recommended for face mill types.
For face milling, it is recommended that width of cut should be set to 75% or less of the cutting diameter.
For long shank end mills, 75% or less of the recommended conditions is recommended for both D.O.C. and feed rate.

Standard pitch Fine pitch

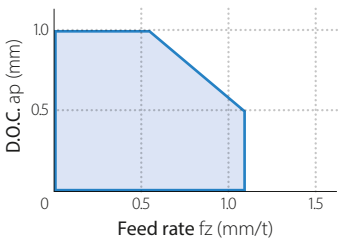
Cutting performance MFH Mini

Fine pitch end mill



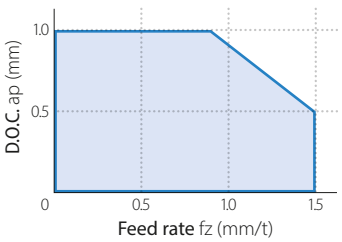
MFH20-…-4T, MFH22-…-4T,
MFH25-…-5T, MFH28-…-5T,
MF32-…-6T

Standard pitch end mill (Cutter diameter Ø16 – 22 mm)



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

Face mill (cutter diameter Ø40 – 50 mm) Standard pitch end mill (Cutter diameter Ø25 – 32 mm)



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

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

Standard (Cylindrical)

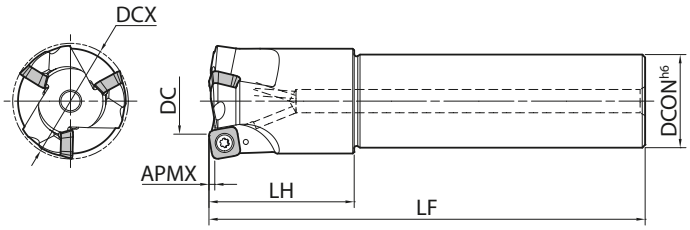


Fig.1

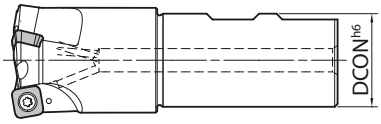
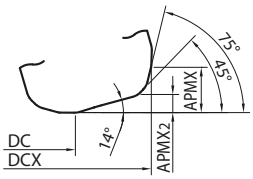


Fig.2

LD chipbreaker cutting edge dimensions



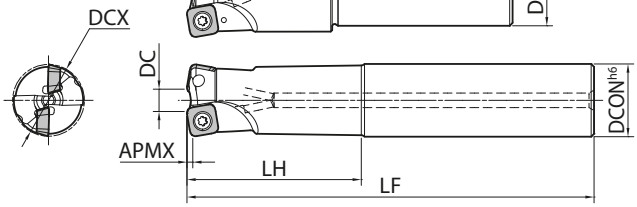


Fig.3

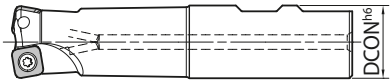


Fig.4

Toolholder dimensions (SOMT10 type)

Shank	Description		Availability	No. of inserts	Dimensions (mm)									Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
					DCX	DC			DCON	LF	LH	APMX	APMX2	A.R.				
						GM•GH	LD	FL										
Standard shank (Cylindrical)	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 shank (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 (Cylindrical)	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 (Cylindrical)	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
	Insert screw	Wrench	
			
MFH…-10-…	SB-4075TRP	DTPM-15	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
	Recommended torque for insert clamp: 3.5 Nm		

Caution with maximum revolution

Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.

Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

MFH Harrier End mill (SOMT14 type)

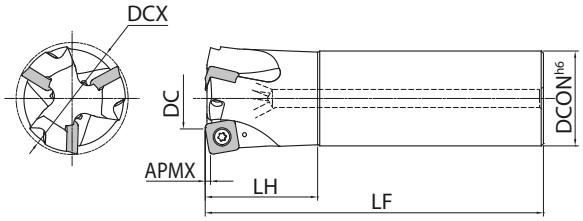
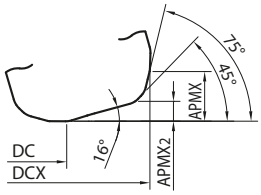


Fig.1

LD chipbreaker cutting edge dimensions



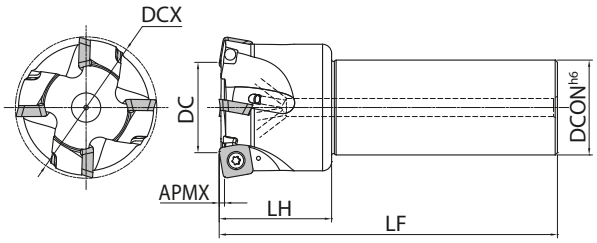


Fig.2

Toolholder dimensions (SOMT14 type)

Description	Availability	No. of inserts	Dimensions (mm)									Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
			DCX	DC			DCON	LF	LH	APMX	APMX2	A.R.				
				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
	Insert screw	Wrench	
			
MFH…-14-…	SB-50120TRP	TTP-20	SOMT140520ER-GM SOMT140520ER-GH SOMT140520ER-LD SOMT140514ER-FL
	Recommended torque for insert clamp: 4.5 Nm		

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

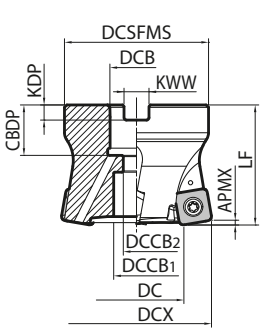


Fig.1

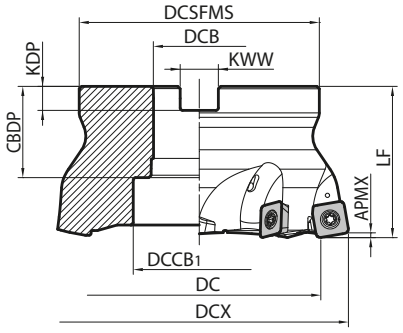


Fig.2

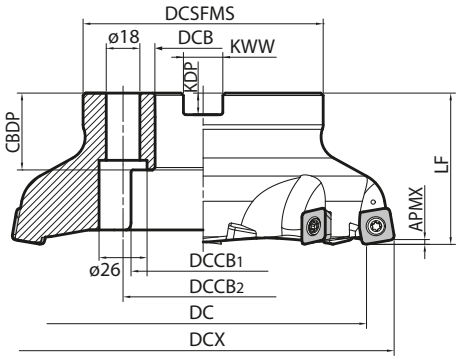


Fig.3

Toolholder dimensions (SOMT10 type)

Description		Availability	No. of inserts	Dimensions (mm)														Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC			DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	APMX2 *1	A.R.				
					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	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 25 *2 Dimension in ( ) is when mounting LD type

●: Available

Caution with maximum revolution

Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

Toolholder dimensions (SOMT14 type)

Description		Availability	No. of inserts	Dimensions (mm)														Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC			DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	APMX2 *1	A.R.				
					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						1.4	6,400
MFH	100R-14-6T-M	●	6	100	77	83	82	96	32	26	17	63	28	8	14.4					Fig. 2	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
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

* 1 Refer to the figure below for the APMX2. * 2 Dimension in ( ) is when mounting LD type

● : Available

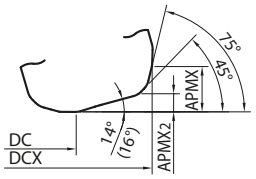
MHF050R-14-4T and MFH050R-14-4T-M have double screws.
Read the instruction manual attached to the toolholder for handling method.

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

Spare parts and applicable inserts

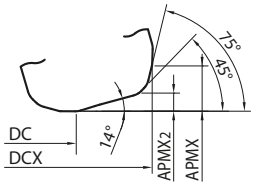
Description	Spare parts				Applicable inserts
	Insert screw	Wrench		Arbor clamp bolt	
		DTPM 	TTP 		
MFH050R-10-…(-M)	SB-4090TRPN	DTPM-15		HH10×30	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
MFH063R-10-…(-22M)				HH10×30	
MFH063R-10-…-27M				HH12×35	
MFH080R-10-…	Recommended torque for insert clamp: 4.5 Nm			HH16×40	
MFH080R-10-…-M				HH12×35	
MFH050R-14-…(-M)	SB-50120TRP	TTP-20		W10×31	SOMT140520ER-GM SOMT140520ER-GH SOMT140520ER-LD SOMT140514ER-FL
MFH063R-14-…(-22M)				HH10×30	
MFH063R-14-…-27M				HH12×35	
MFH080R-14-…				HH16×40	
MFH080R-14-…-M				HH12×35	
MFH100R-14-…				HH16×40	
MFH100R-14-…-M	Recommended torque for insert clamp: 3.5 Nm			-	
MFH125R-14-…				-	
MFH160R-14-…				-	

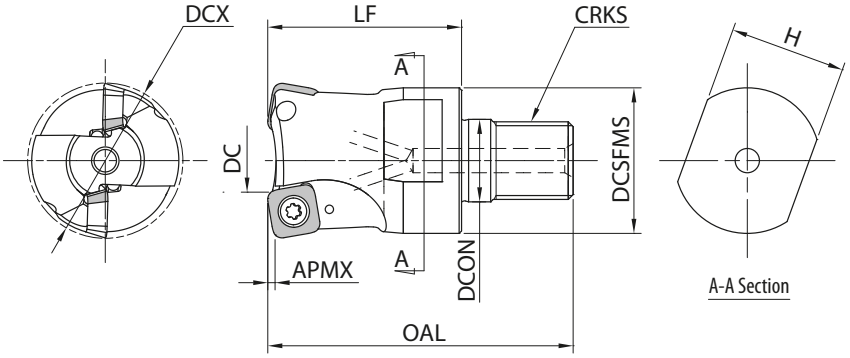
LD chipbreaker cutting edge dimensions



Angle in ( ) is for SOMT14 type.

LD chipbreaker cutting edge dimensions





Toolholder dimensions

Description		Availability	No. of inserts	Dimensions (mm)												Rake angle	Coolant hole	Maximum revolution (min^{-1})
				DCX	DC			DCSFMS	DCON	OAL	LF	CRKS	H	APMX	APMX2	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
	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
	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
	40-M16-10-4T	●	4	40	23	27.5	26.5	30	17	62	40	M16×P2.0	24					11,500

* Dimension in ( ) is when mounting LD type

●: Available

Caution with maximum revolution

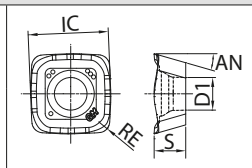
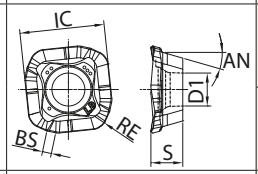
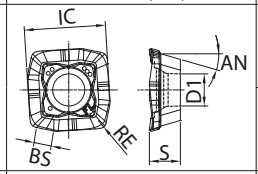
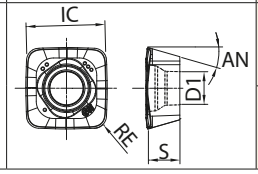
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

Spare parts and applicable inserts

Description	Spare parts		Applicable inserts
	Insert screw	Wrench	
			
MFH…-10-…	SB-4075TRP	DTPM-15	SOMT100420ER-GM SOMT100420ER-GH SOMT100420ER-LD SOMT100420ER-FL
	Recommended torque for insert clamp: 3.5 Nm		

Applicable inserts MFH Harrier

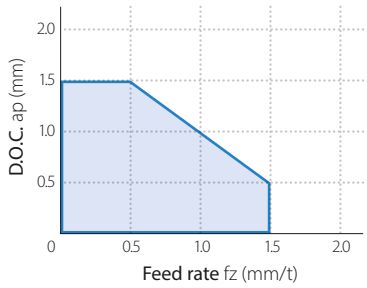
Classification of usage								
★ : Roughing / 1st Choice ☆ : Roughing / 2nd Choice ■ : Finishing / 1st Choice □ : Finishing / 2nd Choice	P	Carbon steel / Alloy steel	★	☆			
		Mould steel	★	☆			
	M	Austenitic stainless steel	☆	★			
		Martensitic stainless steel		☆			★
		Precipitation hardened stainless steel		★			
	K	Gray cast iron			★		
		Nodular cast iron			★		
	S	Ni-base heat-resistant alloy		☆			★
		Titanium alloy		★			
	H	High hardness steel				★	

Insert		Description	Dimensions (mm)					Angle (°)	MEGACOAT NANO			MEGACOAT HARD	CVD coated carbide
			IC	S	D1	BS	RE	AN	PR1825	PR1835	PR1810	PR015S	CA6535
 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	●	●	●	●	-

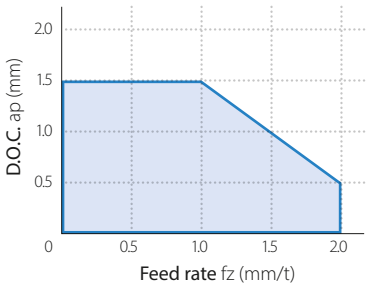
● : Available

Cutting performance MFH Harrier

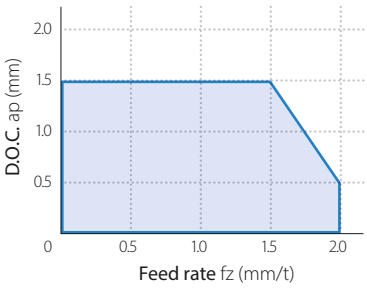
MFH25…



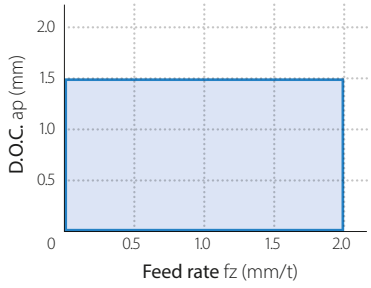
MFH32…/MFH35…



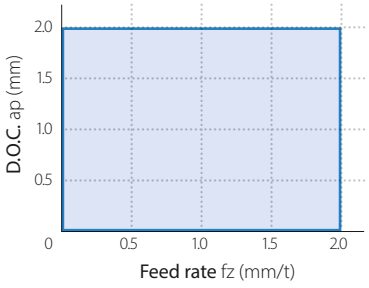
MFH40…



MFH050…~MFH080…



SOMT14 type



LD chipbreaker:

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

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

Chipbreaker	Workpiece		ap (mm)	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
									PR1825	PR1835	PR1810	PR015S	CA6535
GM GH	Carbon steel		≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0		★ 120 – **180** – 250	☆ 120 – **180** – 250	–	–	–
	Alloy steel		≦1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5							
	Mould steel	(- 40HRC)	≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0		★ 100 – **160** – 220	☆ 100 – **160** – 220	–	–	–
		(40 - 50HRC)	≦1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5							
		(50 - 55HRC)	≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		☆ 80 – **140** – 180	☆ 80 – **140** – 180	–	★ 80 – **140** – 180	–
		(55 - 60HRC)	≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Austenitic stainless steel		≦1.0	0.15 – **0.3** – 0.5	0.2 – **0.5** – 0.8	0.2 – **0.6** – 0.9	0.2 – **0.7** – 1.0		☆ 60 – **100** – 130	–	–	★ 60 – **100** – 130	–
	Martensitic stainless steel		≦1.5	0.15 – **0.2** – 0.25	0.2 – **0.3** – 0.45	0.2 – **0.5** – 0.7							
	Precipitation hardened stainless steel		≦1.0	0.15 – **0.25** – 0.4	0.15 – **0.35** – 0.6	0.15 – **0.4** – 0.7	0.2 – **0.5** – 0.8		☆ 50 – **70** – 100	–	–	★ 50 – **70** – 100	–
	Gray cast iron		≦1.0	0.03 – **0.06** – 0.1(ap ≦ 1.0mm) (* Recommended only for GH chipbreaker)					–	–	–	★ 50 – **60** – 70	–
	Nodular cast iron		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		GM☆ 100 – **160** – 200	GM☆ 100 – **160** – 200	–	–	–
	Ni-base heat-resistant alloy		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Titanium alloy		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		–	☆ 150 – **200** – 250	–	–	★ 180 – **240** – 300
LD	Carbon steel		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Alloy steel		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		–	★ 90 – **120** – 150	–	–	–
	Mould steel (- 40HRC)		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Mould steel (40 - 50HRC)		≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0		–	–	★ 120 – **180** – 250	–	–
	Austenitic stainless steel		≦1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5							
	Martensitic stainless steel		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		–	–	★ 100 – **150** – 200	–	–
	Precipitation hardened sta. steel		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Gray cast iron		≦1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2		–	☆ 20 – **30** – 50	–	–	★ 20 – **30** – 50
	Nodular cast iron		≦1.5	0.15 – **0.2** – 0.3	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.8							
	Ni-base heat-resistant alloy		≦1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2		–	GM★ 40 – **60** – 80	GM☆ 30 – **50** – 70	–	–
	Titanium alloy		≦1.5	0.15 – **0.2** – 0.3	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.8							
LD	Carbon steel		≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0	0.5 – **1.5** – 2.0	★ 120 – **180** – 250	☆ 120 – **180** – 250	–	–	–
			≦2.0	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.3	0.06 – **0.2** – 0.3	0.06 – **0.2** – 0.3						
			≦3.5					0.06 – **0.2** – 0.4					
			≦5.0	–	–	–	–						
	Alloy steel		≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0	0.5 – **1.5** – 2.0	★ 100 – **160** – 220	☆ 100 – **160** – 220	–	–	–
			≦2.0	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.3	0.06 – **0.2** – 0.3	0.06 – **0.2** – 0.3						
			≦3.5					0.06 – **0.2** – 0.4					
			≦5.0	–	–	–	–						
	Mould steel (- 40HRC)		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	0.5 – **1.2** – 1.8	★ 80 – **140** – 180	☆ 80 – **140** – 180	–	–	–
			≦2.0	0.06 – **0.08** – 0.15	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.2	0.06 – **0.15** – 0.2						
			≦3.5					0.06 – **0.15** – 0.3					
			≦5.0	–	–	–	–						
	Mould steel (40 - 50HRC)		≦1.0	0.2 – **0.3** – 0.5	0.2 – **0.5** – 0.8	0.2 – **0.6** – 0.9	0.2 – **0.7** – 1.0	0.2 – **0.7** – 1.0	★ 60 – **100** – 130	☆ 60 – **100** – 130	–	–	–
			≦2.0	0.03 – **0.05** – 0.1	0.03 – **0.08** – 0.15	0.03 – **0.1** – 0.15	0.03 – **0.1** – 0.15						
			≦3.5					0.03 – **0.1** – 0.2					
			≦5.0	–	–	–	–						
	Austenitic stainless steel		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	0.5 – **1.2** – 1.8	☆ 100 – **160** – 200	★ 100 – **160** – 200	–	–	–
			≦2.0	0.06 – **0.08** – 0.15	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.2	0.06 – **0.15** – 0.2						
			≦3.5					0.06 – **0.15** – 0.3					
			≦5.0	–	–	–	–						
	Martensitic stainless steel		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	0.5 – **1.2** – 1.8	–	☆ 150 – **200** – 250	–	–	★ 180 – **240** – 300
			≦2.0	0.06 – **0.08** – 0.15	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.2	0.06 – **0.15** – 0.2						
			≦3.5					0.06 – **0.15** – 0.3					
			≦5.0	–	–	–	–						
	Precipitation hardened stainless steel		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	0.5 – **1.2** – 1.8	–	★ 90 – **120** – 150	–	–	–
			≦2.0	0.06 – **0.08** – 0.15	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.2	0.06 – **0.15** – 0.2						
			≦3.5					0.06 – **0.15** – 0.3					
			≦5.0	–	–	–	–						
	Gray cast iron		≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0	0.5 – **1.5** – 2.0	–	–	★ 120 – **180** – 250	–	–
			≦2.0	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.3	0.06 – **0.2** – 0.3	0.06 – **0.2** – 0.3						
			≦3.5					0.06 – **0.2** – 0.4					
			≦5.0	–	–	–	–						
	Nodular cast iron		≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	0.5 – **1.2** – 1.8	–	–	★ 100 – **150** – 200	–	–
			≦2.0	0.06 – **0.08** – 0.15	0.06 – **0.1** – 0.2	0.06 – **0.15** – 0.2	0.06 – **0.15** – 0.2						
			≦3.5					0.06 – **0.15** – 0.3					
			≦5.0	–	–	–	–						
	Ni-base heat-resistant alloy		≦1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2	0.2 – **0.8** – 1.2	–	☆ 20 – **30** – 50	–	–	★ 20 – **30** – 50
			≦2.0	0.03 – **0.05** – 0.1	0.03 – **0.08** – 0.15	0.03 – **0.1** – 0.15	0.03 – **0.1** – 0.15						
			≦3.5					0.03 – **0.1** – 0.2					
			≦5.0	–	–	–	–						
	Titanium alloy		≦1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2	0.2 – **0.8** – 1.2	–	★ 40 – **60** – 80	☆ 30 – **50** – 70	–	–
			≦2.0	0.03 – **0.05** – 0.1	0.03 – **0.08** – 0.15	0.03 – **0.1** – 0.15	0.03 – **0.1** – 0.15						
			≦3.5					0.03 – **0.1** – 0.2					
			≦5.0	–	–	–	–						

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

Chipbreaker	Workpiece	Holder description and feed rate (fz: mm/t)						Recommended insert grade (Vc: m/min.)				
		ap (mm)	MFH25-	MFH32-	MFH40-	MFH…R-10	MFH…-14	MEGACOAT NANO EX			MEGACOAT HARD	CVD coated carbide
								PR1825	PR1835	PR1810	PR015S	CA6535
FL	Carbon steel (SxxC)	≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0		☆ 120 – **180** – 250	★ 120 – **180** – 250	–	–	–
		≦1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5							
	Alloy steel (SCM)	≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0		☆ 100 – **160** – 220	★ 100 – **160** – 220	–	–	–
		≦1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5							
	Mould steel (SKD) (- 40 HRC)	≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		☆ 80 – **140** – 180	★ 80 – **140** – 180	–	–	–
		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Die steel (SKD) (40 - 50 HRC)	≦1.0	0.15 – **0.3** – 0.5	0.2 – **0.5** – 0.8	0.2 – **0.6** – 0.9	0.2 – **0.7** – 1.0		☆ 60 – **100** – 130	★ 60 – **100** – 130	–	–	–
		≦1.5	0.15 – **0.2** – 0.25	0.2 – **0.3** – 0.45	0.2 – **0.5** – 0.7							
	Austenitic stainless steel	≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		★ 100 – **160** – 200	☆ 100 – **160** – 200	–	–	–
		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Martensitic stainless steel	≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		☆ 150 – **200** – 250	–	–	–	★ 180 – **240** – 300
		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Precipitation hardened stainless steel	≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		★ 90 – **120** – 150	–	–	–	–
		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Gray cast iron	≦1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0		–	–	★ 120 – **180** – 250	–	–
		≦1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5							
	Nodular cast iron	≦1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8		–	–	★ 100 – **150** – 200	–	–
		≦1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2							
	Ni-base heat-resistant alloy	≦1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2		☆ 20 – **30** – 50	–	–	–	★ 20 – **30** – 50
		≦1.5	0.15 – **0.2** – 0.3	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.8							
	Titanium alloy	≦1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2		★ 40 – **60** – 80	–	☆ 30 – **50** – 70	–	–
		≦1.5	0.15 – **0.2** – 0.3	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.8							

- The numbers shown in **bold font** indicate the recommended standard cutting conditions.
  Adjust the cutting speed and feed rate within the specified range according to the actual machining conditions.
- Machining with coolant is recommended for precipitation hardened stainless steel, Ni-base heat-resistant alloy, and titanium alloy.
- Machining with coolant may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
- Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions.
- Centre-through coolant is recommended for slotting.
- For long shank end mills, 75% or less of the recommended conditions is recommended for both D.O.C. and feed rate.

MFH Harrier-D End mill

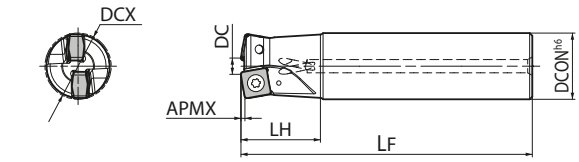


Fig.1

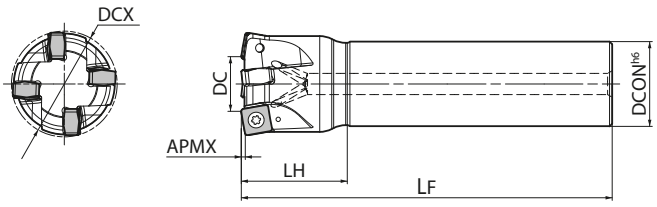


Fig.2

Toolholder dimensions

Description		Availability	No. of inserts	Dimensions (mm)						Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC	DCON	LF	LH	APMX	A.R.				
MFH	25-S25-10-2T-D	●	2	25	8.5	25	110	30	1.5	−6°	Yes	Fig.1	0.4	10,800
	32-S32-10-3T-D	●	3	32	15	32	120	40					0.6	9,600
	40-S32-10-4T-D	●	4	40	22.5		140					Fig.2	0.8	8,500

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available

MFH Harrier-D Face mill

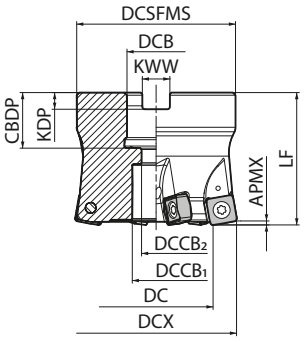


Fig.1

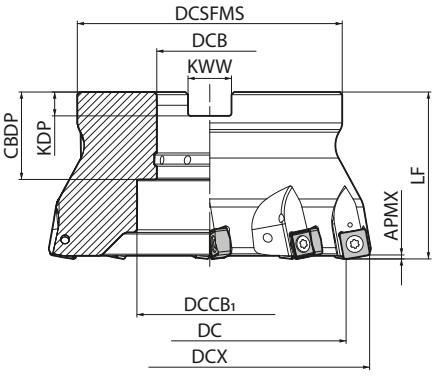


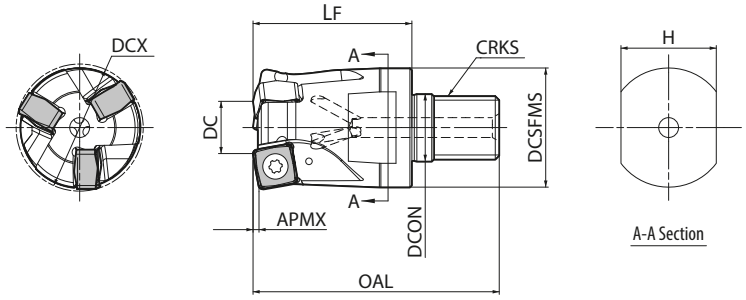
Fig.2

Toolholder dimensions

Description		Availability	No. of inserts	Dimensions (mm)											Rake angle	Coolant hole	Drawing	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC	DCSFMS	DCB	DCCB2	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R.				
MFH	050R-10-5T-D-M	●	5	50	32.5	48	22	18	11	50	21	6.3	10.4	1.5	−6°	Yes	Fig.1	0.4	7,600
	063R-10-6T-D-M	●	6	63	45.5	60												0.8	6,800
	080R-10-7T-D-M	●	7	80	62.5	76	27	20	13	63	24	7	12.4					1.5	6,000
	100R-10-8T-D-M	●	8	100	82.5	96	32	26	17		28	8	14.4					2.5	5,400
	125R-10-10T-D-M	●	10	125	107.5	100	40	55	-		33	9	16.4				Fig.2	3.1	4,800

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available



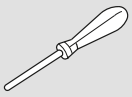
Toolholder dimensions

Description		Availability	No. of inserts	Dimensions (mm)									Rake angle	Coolant hole	Weight (kg)	Maximum revolution (min^{-1})
				DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R.			
MFH	25-M12-10-2T-D	●	2	25	8.5	23	12.5	56	35	M12×P1.75	19	1.5	−6°	Yes	0.1	10,800
	32-M16-10-3T-D	●	3	32	15	30	17	62	40	M16×P2.0	24				0.2	9,600
	35-M16-10-3T-D	●	3	35	17.5										0.2	9,100
	40-M16-10-4T-D	●	4	40	22.5										0.2	8,500

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

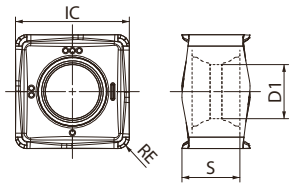
●: Available

Spare parts

Description		Insert screw	Wrench	Arbor clamp bolt
				
MFH	050R-10-5T-D-M	SB-4090TRP	DTPM-15	HH10×30
	063R-10-6T-D-M			
	080R-10-7T-D-M			HH12×35
	100R-10-8T-D-M			HH16×40
	125R-10-10T-D-M			-
	080R-10-7T-D	Recommended torque for insert clamp: 3.5 Nm		HH16×40
	100R-10-8T-D			
	125R-10-10T-D			-

Applicable inserts MFH Harrier-D

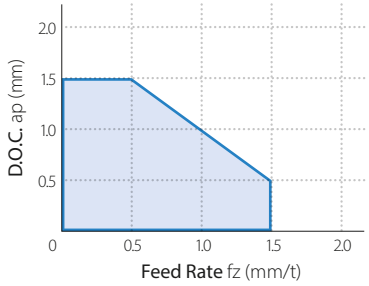
Usage classification					
★: Roughing / 1st choice ☆: Roughing / 2nd choice ■: Finishing / 1st choice □: Finishing / 2nd choice	P	Carbon steel/Alloy steel	★	☆	
		Mould steel	★	☆	
	M	Austenitic stainless steel	☆	★	
		Martensitic stainless steel		☆	
		Precipitation hardened stainless steel		★	
	K	Gray cast iron			★
		Nodular cast iron			★
	S	Ni-base heat-resistant alloy		☆	
		Titanium alloy		★	☆
	H	Hardened materials			

Insert		Description	Dimensions (mm)					MEGACOAT NANO EX		
			IC	S	D1	BS	RE	PR1825	PR1835	PR1810
 General purpose		SNMU100410ER-GM	10.0	5.09	4.72	-	1.0	●	●	●

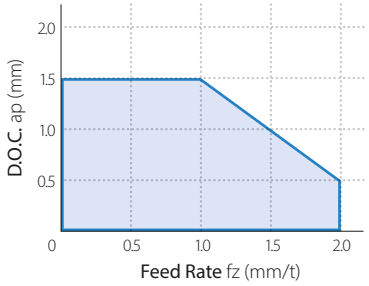
●: Available

Cutting performance MFH Harrier-D

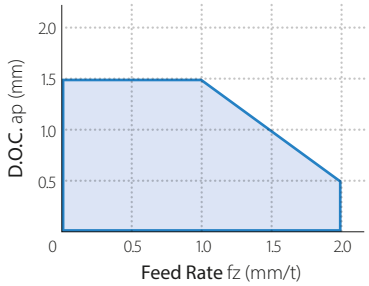
MFH25…



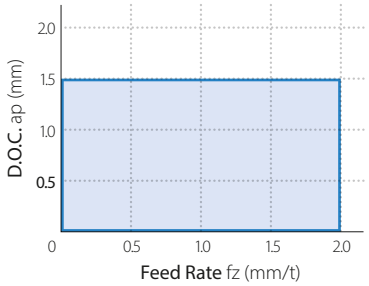
MFH32…/MFH35…



MFH40…



Face mill



- End Mill: Please refer to the application map above.
- Face Mill: Maximum feed rate (feed per tooth) fz = 2.0 mm/t

Recommended cutting conditions MFH Harrier-D ★ 1st recommendation ☆ 2nd recommendation

Chipbreaker	Workpiece	Holder description and feed rate (fz: mm/t)					Recommended insert grade (vc: m/min.)		
		ap (mm)	MFH25…D	MFH32…D	MFH40…D	MFH…R…	MEGACOAT NANO EX		
							PR1825	PR1835	PR1810
GM	Carbon steel	≤1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0	★ 120 – **180** – 250	☆ 120 – **180** – 250	–
		≤1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5	0.5 – **1.5** – 2.0			
	Alloy steel	≤1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0	★ 100 – **160** – 220	☆ 100 – **160** – 220	–
		≤1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5	0.5 – **1.5** – 2.0			
	Mould steel (- 40HRC)	≤1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	★ 80 – **140** – 180	☆ 80 – **140** – 180	–
		≤1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2	0.5 – **1.2** – 1.8			
	Mould steel (40 - 50HRC)	≤1.0	0.15 – **0.3** – 0.5	0.2 – **0.5** – 0.8	0.2 – **0.6** – 0.9	0.2 – **0.7** – 1.0	★ 60 – **100** – 130	–	–
		≤1.5	0.15 – **0.2** – 0.25	0.2 – **0.3** – 0.45	0.2 – **0.5** – 0.7	0.2 – **0.7** – 1.0			
	Mould steel (50 - 55HRC)	≤1.0	0.15 – **0.25** – 0.4	0.15 – **0.35** – 0.6	0.15 – **0.4** – 0.7	0.2 – **0.5** – 0.8	★ 50 – **70** – 100	–	–
	Austenitic stainless steel	≤1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	☆ 100 – **160** – 200	★ 100 – **160** – 200	–
		≤1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2	0.5 – **1.2** – 1.8			
	Martensitic stainless steel	≤1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	–	★ 150 – **200** – 250	–
		≤1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2	0.5 – **1.2** – 1.8			
	Precipitation hardened stainless steel	≤1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	–	★ 90 – **120** – 150	–
		≤1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2	0.5 – **1.2** – 1.8			
	Gray cast iron	≤1.0	0.5 – **0.8** – 1.0	0.5 – **1.0** – 1.5	0.5 – **1.2** – 1.8	0.5 – **1.5** – 2.0	–	–	★ 120 – **180** – 250
		≤1.5	0.2 – **0.4** – 0.5	0.3 – **0.7** – 1.0	0.4 – **1.0** – 1.5	0.5 – **1.5** – 2.0			
	Nodular cast iron	≤1.0	0.5 – **0.7** – 0.8	0.5 – **0.8** – 1.2	0.5 – **1.0** – 1.6	0.5 – **1.2** – 1.8	–	–	★ 100 – **150** – 200
		≤1.5	0.2 – **0.3** – 0.4	0.3 – **0.6** – 0.8	0.4 – **0.8** – 1.2	0.5 – **1.2** – 1.8			
	Ni-base heat-resistant alloy	≤1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2	–	★ 20 – **30** – 50	–
		≤1.5	0.15 – **0.2** – 0.3	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.8	0.2 – **0.8** – 1.2			
	Titanium alloy	≤1.0	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.9	0.2 – **0.6** – 1.0	0.2 – **0.8** – 1.2	–	★ 40 – **60** – 80	–
		≤1.5	0.15 – **0.2** – 0.3	0.2 – **0.4** – 0.6	0.2 – **0.5** – 0.8	0.2 – **0.8** – 1.2			

- 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 precipitation hardened stainless steel, Ni-base heat-resistant alloy and titanium alloy.
- Wet machining may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
- Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions. Slotting is not recommended in this situation.
- Centre-through coolant is recommended for slotting.
- Slotting or pocketing are not recommended for face mill types.
- For face milling, it is recommended that width of cut should be set to 75% or less of the cutting diameter.

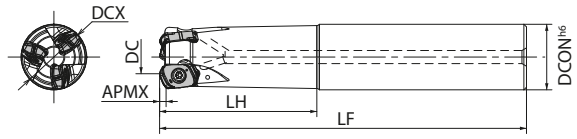


Fig.1

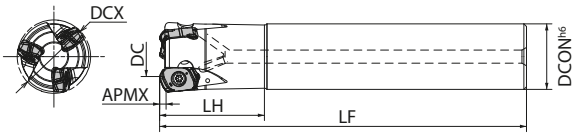


Fig.2

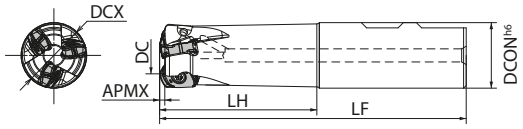


Fig.3

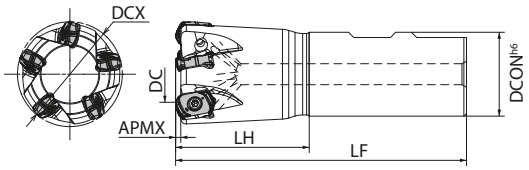


Fig.4

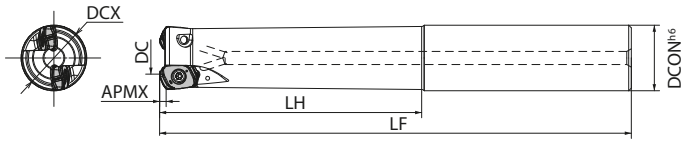


Fig.5

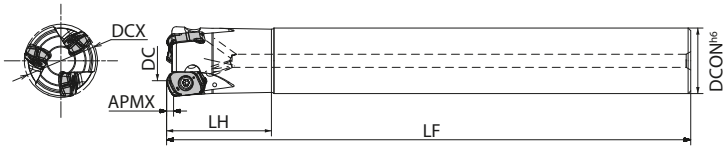


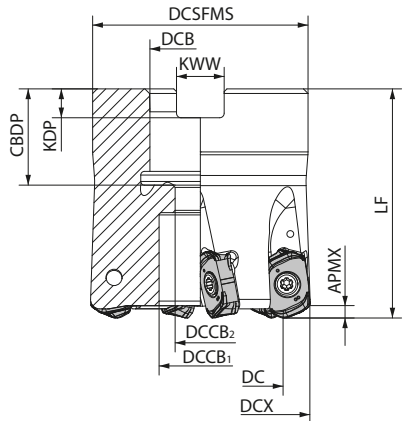
Fig.6

Toolholder dimensions

Shank	Description		Availability	No. of inserts	Dimensions (mm)						Rake angle	Coolant Hole	Shape	Weight (kg)	Maximum revolution (Min^{-1})
					DCX	DC	DCON	LH	LF	APMX	A.R.				
Standard shank (Cylindrical)	MFH	25-S25-04-2T	●	2	25	14	25	60	140	2.5	**–10°**	Yes	Fig. 1	0.5	12,700
		25-S25-04-3T	●	3										0.5	
		32-S32-04-4T	●	4	32	21	32	70	150					0.8	11,200
		32-S32-04-5T	●	5										0.8	
Over size shank (Cylindrical)	MFH	22-S20-04-2T	●	2	22	11	20	30	130	2.5	**–10°**	Yes	Fig. 2	0.3	13,600
		28-S25-04-3T	●	3	28	17	25	40	140					0.5	12,000
		28-S25-04-4T	●	4										0.5	
		35-S32-04-4T	●		35	24	32	50	150					0.8	10,700
		35-S32-04-5T	●	5										0.8	
		40-S32-04-5T	●		40	29								0.9	10,000
		40-S32-04-6T	●	6										0.9	
Standard shank (Weldon)	MFH	25-W25-04-2T	●	2	25	14	25	60	117	2.5	**–10°**	Yes	Fig. 3	0.4	12,700
		25-W25-04-3T	●	3										0.4	
		32-W32-04-4T	●	4	32	21	32	70	131					0.7	11,200
		32-W32-04-5T	●	5										0.7	
		40-W32-04-5T	●		40	29		50	111				Fig. 4	0.7	10,000
		40-W32-04-6T	●	6										0.7	
Long shank (Cylindrical)	MFH	25-S25-04-2T-180	●	2	25	14	25	100	180	2.5	**–10°**	Yes	Fig. 5	0.6	12,700
		25-S25-04-3T-180	●	3										0.6	
		28-S25-04-3T-200	●		28	17		40					Fig. 6	0.7	12,000
		32-S32-04-4T-200	●	4	32	21	32	120	200				Fig. 5	1.1	11,200
		35-S32-04-4T-200	●		35	24		50					Fig. 6	1.1	10,700
		40-S32-04-5T-250	●	5	40	29			250					1.5	10,000

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available



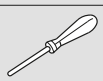
Toolholder dimensions

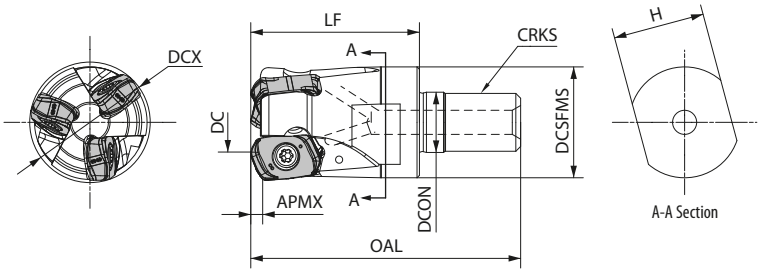
Description		Availability	No. of Inserts	Dimensions (mm)											Rake angle	Coolant hole	Weight (kg)	Maximum revolution (Min^{-1})
				DCX	DC	DCSFMS	DCB	DCCB1	DCCB2	LF	CBDP	KDP	KWW	APMX	A.R.			
MFH	040R-04-5T-M	●	5	40	29	38	16	15	9	40	19	5.6	8.4	2.5	–10°	Yes	0.2	10,000
	040R-04-6T-M	●	6														0.2	
	050R-04-6T-M	●		50	39	47	22	18	11	50	21	6.3	10.4				0.4	9,000
	050R-04-7T-M	●	7														0.4	
	052R-04-6T-M	●	6	52	41												0.5	8,800
	052R-04-7T-M	●	7														0.4	
	063R-04-7T-M	●		63	52	60											0.8	8,000
	063R-04-9T-M	●	9														0.8	
	063R-04-7T-27M	●	7				27	20	13		24	7.0	12.4				0.8	
	063R-04-9T-27M	●	9														0.7	
	080R-04-8T-M	●	8	80	69	76				63							1.8	7,100
	080R-04-10T-M	●	10														1.7	

Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

● : Available

Spare parts

Description	Parts		
	Insert screw	Wrench	Arbor clamp bolt
			
MFH…-S..-04-…	SB-3575TRP	DTPM-10	-
MFH…-W..-04-…			
MFH040R-04-…-M			HH8×25
MFH050R-04-…-M			HH10×30
MFH052R-04-…-M			
MFH063R-04-…-M			
MFH063R-04-…-27M			HH12×35
MFH080R-04-…-M	Recommended torque for insert clamp: 2.0 Nm		
MFH080R-04-…			HH16×40
MFH…-M..-04-…			-



Toolholder dimensions

Description		Availability	No. of inserts	Dimensions (mm)									Rake angle	Coolant hole	Maximum revolution (Min^{-1})
				DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R.		
MFH	22-M10-04-2T	●	2	22	11	18.7	10.5	48	30	M10XP1.5	15	2.5	−10°	Yes	13,600
	25-M12-04-2T	●	2	25	14	23	12.5	56	35	M12XP1.75	19				12,700
	25-M12-04-3T	●	3												
	28-M12-04-3T	●	3	28	17										12,000
	28-M12-04-4T	●	4												
	32-M16-04-4T	●	4	32	21	30	17	62	40	M16XP2.0	24				11,200
	32-M16-04-5T	●	5												
	35-M16-04-4T	●	4	35	24										10,700
	35-M16-04-5T	●	5												
	40-M16-04-5T	●	5	40	29										10,000
	40-M16-04-6T	●	6												
	42-M16-04-5T	●	5	42	31										9,800
	42-M16-04-6T	●	6												

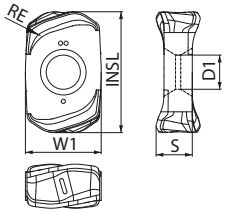
Caution with maximum revolution
Set the number of revolutions per minute within the recommended cutting speed for each workpiece material.
Do not use the end mill or cutter above the maximum revolution, as centrifugal force may cause inserts or components to be ejected even under no-load conditions.

●: Available

Applicable inserts MFH Boost

Usage classification							
★: Roughing / 1st choice ☆: Roughing / 2nd choice ■: Finishing / 1st choice □: Finishing / 2nd choice	P	Carbon steel / Alloy steel	★	☆		
		Mould steel	★	☆		
	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		★		
	H	Hardened materials				

Shape	Description	Dimensions (mm)					MEGACOAT NANO EX			CVD coated carbide
		W1	S	D1	INSL	RE	PR1825	PR1835	PR1810	CA6535
 4-edge, double-sided insert	LOMU 040410ER-GM	9.1	4.4	4.1	14.5	1.0	●	●	●	●



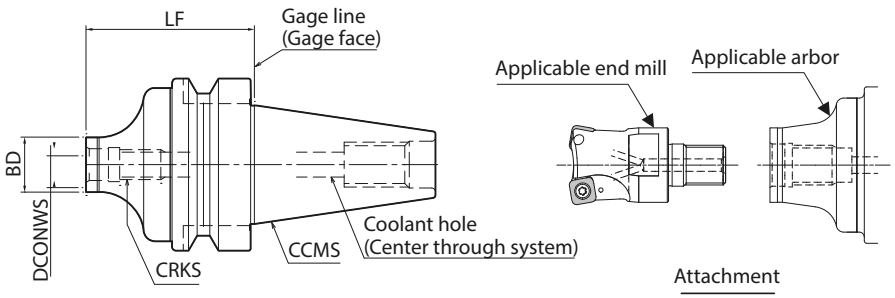
●: Available

Recommended cutting conditions MFH Boost ★ 1st recommendation ☆ 2nd recommendation

Chipbreaker	Workpiece		Toolholder description and feed (fz: mm/t)		Recommended insert grade (Vc: m/min.)			
			ap(mm)	MFH…04…	MEGACOAT NANO EX			CVD coated carbide
					PR1825	PR1835	PR1810	CA6535
GM	Carbon steel alloy steel	(- 280HB)	≦0.5	0.20 – **0.80** – 1.30	★ 120 – **160** – 220	☆ 120 – **160** – 220	–	–
			≦1.0	0.20 – **0.70** – 1.10				
			≦1.5	0.20 – **0.60** – 0.80				
			≦2.0	0.20 – **0.40** – 0.70				
			≦2.5	0.20 – **0.30** – 0.50				
		(- 350HB)	≦0.5	0.20 – **0.75** – 1.20	★ 100 – **140** – 200 (Dry machining recommended)	☆ 100 – **140** – 200 (Dry machining recommended)	–	–
			≦1.0	0.20 – **0.65** – 1.00				
			≦1.5	0.20 – **0.55** – 0.70				
			≦2.0	0.20 – **0.40** – 0.55				
			≦2.5	0.20 – **0.25** – 0.35				
	Mould steel	(- 40HRC)	≦0.5	0.20 – **0.60** – 1.10	★ 80 – **140** – 180 (Dry machining recommended)	☆ 80 – **140** – 180 (Dry machining recommended)	–	–
			≦1.0	0.20 – **0.50** – 0.90				
			≦1.5	0.20 – **0.40** – 0.65				
			≦2.0	0.20 – **0.30** – 0.55				
			≦2.5	0.20 – **0.25** – 0.35				
		(40 - 50HRC)	≦0.5	0.10 – **0.30** – 0.50	★ 60 – **100** – 130 (Dry machining recommended)	–	–	–
			≦1.0	0.10 – **0.25** – 0.40				
			≦1.5	0.10 – **0.20** – 0.30				
			≦2.0	–				
			≦2.5					
		(50 - 55HRC)	≦0.5	0.10 – **0.20** – 0.40	★ 50 – **70** – 100 (Dry machining recommended)	–	–	–
			≦1.0	0.10 – **0.15** – 0.25				
			≦1.5	–				
			≦2.0					
			≦2.5					
	Austenitic stainless steel		≦0.5	0.20 – **0.60** – 1.00	☆ 100 – **140** – 180	★ 100 – **140** – 180	–	–
			≦1.0	0.20 – **0.50** – 0.90				
			≦1.5	0.20 – **0.45** – 0.60				
			≦2.0	0.20 – **0.30** – 0.50				
			≦2.5	0.20 – **0.25** – 0.40				
	Martensitic stainless steel		≦0.5	0.20 – **0.60** – 1.00	–	☆ 100 – **150** – 200	–	★ 150 – **200** – 300
			≦1.0	0.20 – **0.50** – 0.90				
			≦1.5	0.20 – **0.45** – 0.60				
			≦2.0	0.20 – **0.30** – 0.50				
			≦2.5	0.20 – **0.25** – 0.40				
	Precipitation hardened stainless steel		≦0.5	0.10 – **0.30** – 0.50	–	★ 90 – **120** – 150	–	–
			≦1.0	0.10 – **0.25** – 0.45				
			≦1.5	0.10 – **0.15** – 0.25				
			≦2.0	–				
			≦2.5					
	Gray cast iron		≦0.5	0.20 – **0.80** – 1.30	–	–	★ 120 – **160** – 220	–
			≦1.0	0.20 – **0.70** – 1.10				
			≦1.5	0.20 – **0.60** – 0.80				
			≦2.0	0.20 – **0.40** – 0.70				
			≦2.5	0.20 – **0.30** – 0.50				
	Nodular cast iron		≦0.5	0.20 – **0.60** – 1.00	–	–	★ 100 – **150** – 200	–
			≦1.0	0.20 – **0.50** – 0.90				
			≦1.5	0.20 – **0.40** – 0.70				
			≦2.0	0.20 – **0.30** – 0.60				
			≦2.5	0.20 – **0.25** – 0.40				
	Ni-base heat-resistant alloy		≦0.5	0.10 – **0.30** – 0.45	–	☆ 20 – **30** – 50	–	★ 20 – **30** – 50
			≦1.0	0.10 – **0.25** – 0.40				
			≦1.5	0.10 – **0.15** – 0.20				
			≦2.0	–				
			≦2.5					
	Titanium alloy		≦0.5	0.10 – **0.30** – 0.50	–	★ 40 – **60** – 80	–	–
			≦1.0	0.10 – **0.25** – 0.45				
			≦1.5	0.10 – **0.15** – 0.25				
			≦2.0	–				
			≦2.5					

- The numbers shown in **bold font** indicate the recommended standard cutting conditions. Adjust the cutting speed and feed rate within the specified range according to the actual machining conditions.
- Machining with coolant is recommended for precipitation hardened stainless steel, Ni-base heat-resistant alloy, and titanium alloy.
- Machining with coolant may have a lower tool life than dry machining. Set the cutting speed, feed rate and D.O.C. lower than recommended conditions.
- Machining with BT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions. Slotting is not recommended in this situation.
- Centre-through coolant is recommended for slotting.
- Slotting or pocketing are not recommended for face mill types.
- For face milling, it is recommended that width of cut should be set to 75% or less of the cutting diameter.
- For long shank end mills, 75% or less of the recommended conditions is recommended for both D.O.C. and feed rate.

BT Arbor (For exchangeable head / Two-face clamping)

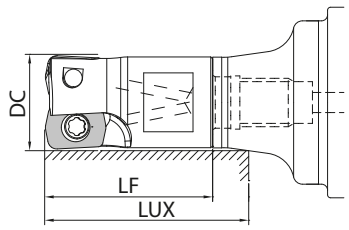


Dimension

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

●: Available

Effective depth of assembled tool



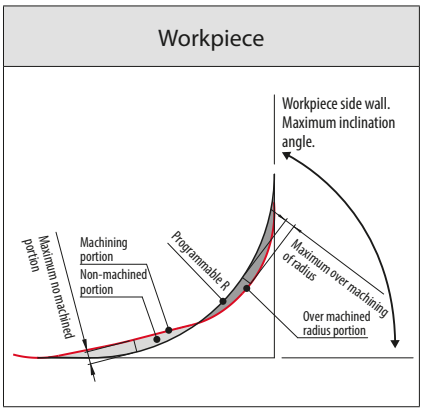
Arbor description		Applicable screw on type			Effective depth of assembled tool (mm)
		Description	Cutting diameter (mm)	Dimension (mm)	
			DC	LF	LUX
BT30K-	M08-45	MFH16-M08-01…	16	22	28.8
		MFH16-M08-03…	16	25	31.8
		MFH17-M08-03…	17	25	33.2
		MFH18-M08-03…	18	25	34.2
	M10-45	MFH20-M10-03…	20	30	36.8
		MFH22-M10-03…	22	30	39.2
		MFH22-M10-04…	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
		MFH22-M10-04…	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-…	35	40	60.2
		MFH40-M16-…	40	40	64.0
		MFH42-M16-04…	42	40	64.0

Arbor identification system

BT30 – **K** – **M12** – **45**

- BT30: Arbor size
- K: Two-face clamping spindle
- M12: Thread size for clamping
- 45: Length from the gage

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 = 12°. Workpiece side wall maximum inclination angle = 90°

MFH Harrier (GM • GH)						
Description	Insert	Cutting edge angle γ	Programmable R. (mm) (Recommended)	Max. over machining of radius (mm)	Max. 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°

MFH Harrier-D		
Programmable R. (mm)	Maximum over machining of radius (mm)	Maximum no machined portion (mm)
R1.0	0	1.12
R2.5 (Recommended)	0	1.02
R3.0	0.09	0.92

MFH Harrier-D		
Programmable R. (mm)	Maximum over machining of radius (mm)	Maximum no machined portion (mm)
R1.5	0	1.42
R2.0	0	1.24
R3.0 (Recommended)	0	0.87
R3.5	0.06	0.69

Ramping reference data

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

Description	Cutting diameter DCX (mm)	16	17	18	20	22	25	28	32	40	50
MFH Mini	Maximum 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 diameter DCX (mm)	25	28	32	35	40	50	63	80
MFH Harrier (MFH…-10-…)	Maximum 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 diameter DCX (mm)	50	63	80	100	125	160
MFH Harrier (MFH…-14-…)	Maximum 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

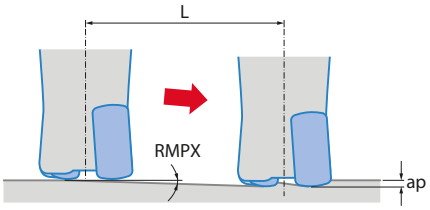
Description	Cutting diameter DCX (mm)	22	25	28	32	35	40	42	50	52	63	80
MFH Boost	Maximum ramping angle RMPX	3.9°	3.0°	2.4°	2.0°	1.7°	1.4°	1.3°	1.0°	1.0°	0.8°	0.6°
	tan RMPX	0.068	0.052	0.042	0.035	0.029	0.024	0.022	0.018	0.017	0.013	0.010

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%.

Formula for maximum cutting Length (L) at maximum ramping angle

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

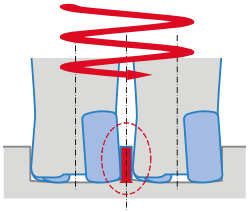


Helical milling tips

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

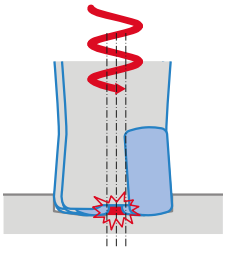
Exceeding maximum machining diameter

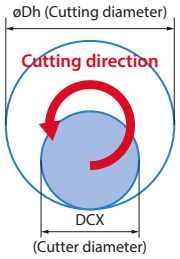
Centre core remains after machining



Under minimum machining diameter

Centre core hits holder body





Description	Min. cutting diameter øDh1	Max. cutting diameter øDh2	Max. 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
MFH Boost	2×DCX-11	2×DCX-2	2.5 mm

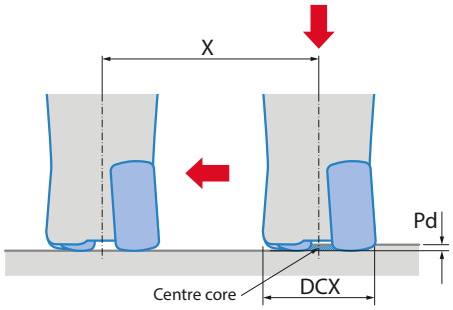
Keep machine depth per rotation less than maximum D.O.C. in cutter dimensions chart.
Use climb milling. Refer to the figure above.
Feed rates should be reduced to 50% of recommended cutting conditions.
Use caution to eliminate incidences caused by producing long chips.

Peck milling tips

Description	Maximum drilling depth Pd	Minimum cutting length X for flat bottom surface
MFH Micro	0.5	DCX-3.5
MFH Mini	1.0	DCX-9
MFH Boost	0.6	DCX-12

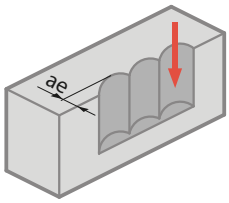
Unit: mm

Description	GM • GH		LD		FL	
	Maximum drilling depth Pd	Minimum cutting length X for flat bottom surface	Maximum drilling depth Pd	Minimum cutting length X for flat bottom surface	Maximum drilling depth Pd	Minimum 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 centre core is removed.
Axial feed rate recommendation per revolution is f < 0.2 mm/rev.

Plunging



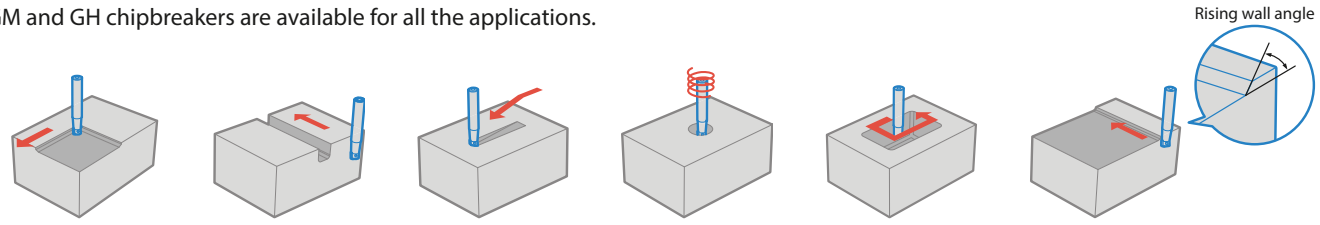
Reduce feed rate to fz ≤ 0.2 mm/t when plunging.

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)
MFH Harrier-D	8
MFH Boost	5

3D Machining (MFH Harrier)

GM and GH chipbreakers are available for all the applications.



Face milling / shouldering | Slotting | Ramping | Helical milling | Pocketing | Contouring

For using MFH Harrier

Insert	Ramping	Contouring (Rising wall angle)	Plunging	Helical milling	Pocketing
GM • GH	✓	✓ (90°)	✓	✓	✓
LD	✓	Limit (65°)	–	–	–
FL	✓	Limit (80°)	–	–	–

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

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