KYOCERA

AHB TOOLING & MACHINERY

Complete Metalworking Solutions
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ISO Certified
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MFH-MAX

High-Feed Milling Series

High Feed Milling with a Larger Depth of Cut

Cutting diameters available from Ø1.000" (Ø22mm) and up to 0.098" (2.5mm) depth of cut

Excellent performance in a wide range of applications, including automotive parts, difficult-to-cut materials, and molds providing multiple solutions for various machining environments

Large lineup of end mills, face mills, and modular types available

MFH-MAX

High Feed Milling with a Larger Depth of Cut

Product Video

View Online

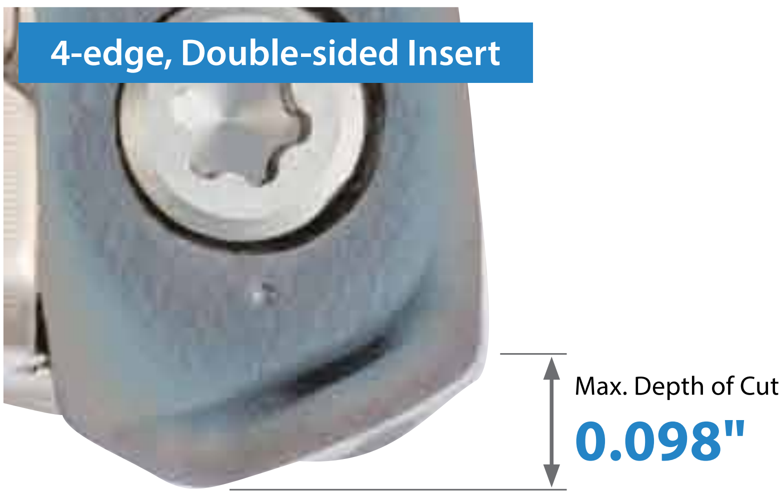
Newest Addition to the MFH High Feed Milling Family with Larger D.O.C. Capabilities

Excellent Performance in Various Applications, including Automotive Parts, Difficult-to-cut Materials, and Mold Machining

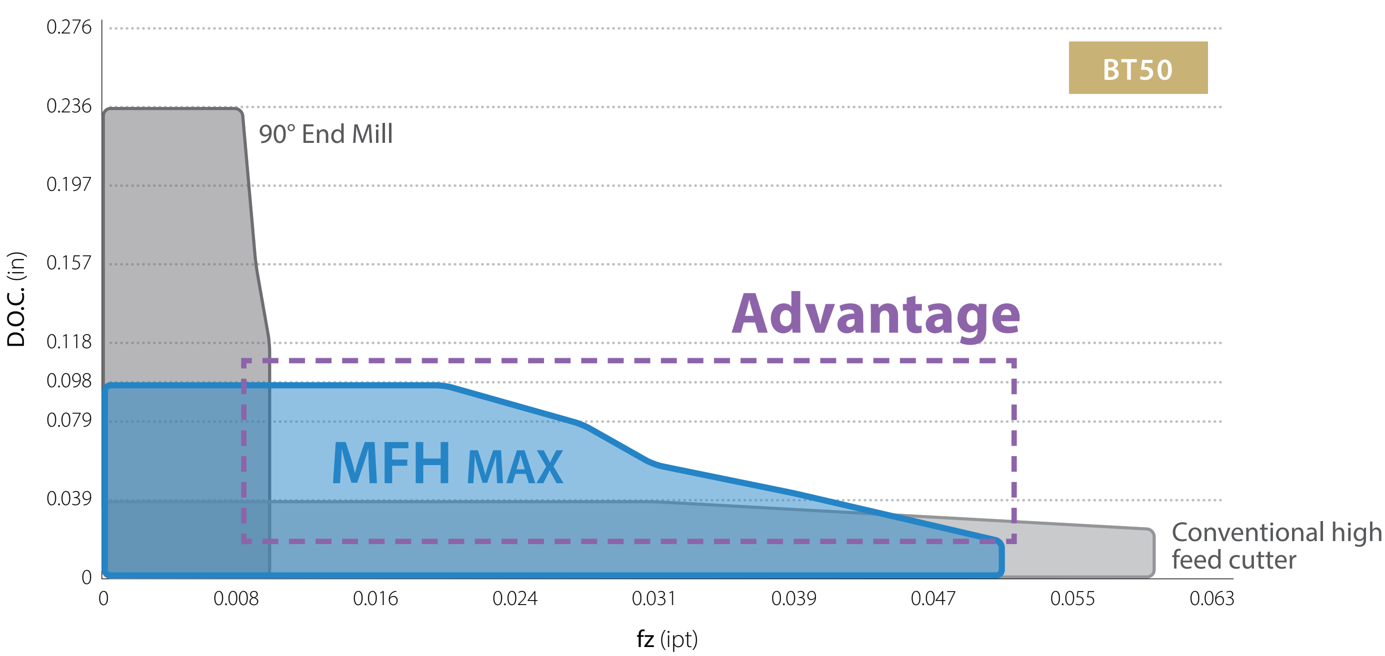
1 High Feed Milling with Large Depth of Cut Capabilities

A small 4-edge, double-sided insert supports depths of cut up to 0.098" (2.5mm) with cutting diameters available from Ø1.000" and Ø22mm.

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



The MFH MAX Advantage



Vc = 490 sfm, ae = 0.492" (ae/DCX = 50%), 1049 Dry Ø1.000" Overhang length 2.362" BT50

Higher Efficiency at 0.098" Max. Depth of Cut

1 Better Alternative to Conventional 90° End Mills (Roughing to Medium-Finishing)

Automotive Suspension Parts

Automotive Parts

General Steel Machining

- **Increased productivity with large D.O.C. machining**
- **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 dia. Ø25mm: 3°)
  Dramatic efficiency improvement when ramping in pockets
- **Longer tool life**

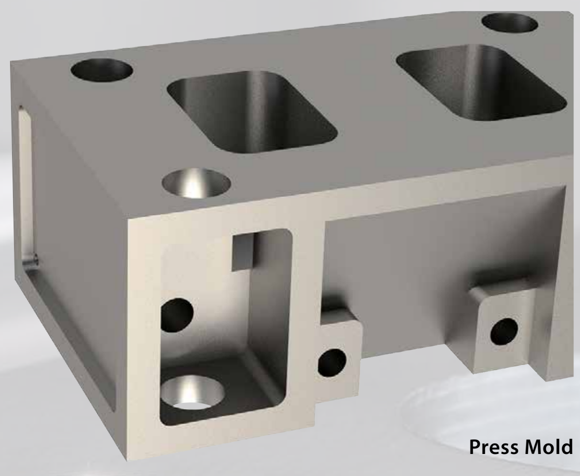
2 More Capabilitites than Conventional High Feed Cutters

General Parts/Molds (Roughing/Facing)

General Parts, Pressing and Die Casting

- **Higher productivity with larger 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/RAPTOR recommended for contouring with small depth of cut and high feed



Press Mold

3 Excellent Solution for Machining Difficult-to-cut Materials

Aircraft Landing Gear Parts

Aircraft/Energy Industry Parts

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

- **High feed rates increase productivity**
- **Long tool life through the reduction of tool paths**
- **Heat-resistant grade PR1535 provides long tool life and stable machining**

Improve Productivity and Reduce Machining Costs

2 The MFH-MAX can cover a Large Variety of Machining Applications and Environments

1 A Better Alternative to 90° End Mills (Rough to Medium-Finish Machining)

High Feed Rates Dramatically Improve Machining Efficiency

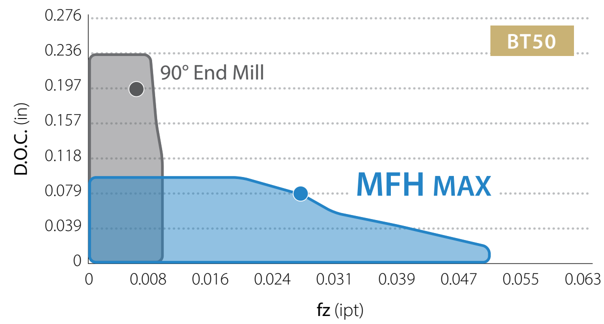
Machining Efficiency Simulation Example

Pocketing: Vc = 490 m/min, ae = 0.492"

MFH MAX Ø1.000" (3 Flute) — **100 cc/min**
D.O.C. = **0.079"**, fz = **0.028** ipt

Machining Efficiency x 1.8

Conventional 90° End Mill Ø1.000" (3 Flute) — **54 cc/min**
D.O.C. = **0.197"**, fz = **0.006** ipt

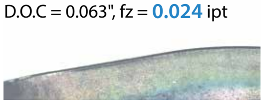


High Efficiency and Good Tool Life

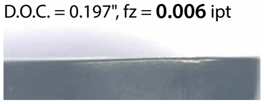
Machining Efficiency and Cutting Edge Condition Comparison
(Internal Evaluation)

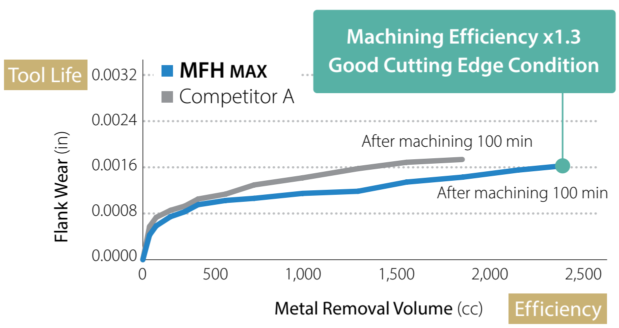
Cutting edge condition after machining 100 min

MFH MAX
D.O.C = 0.063", fz = **0.024** ipt



Competitor A 90° End Mill
D.O.C. = 0.197", fz = **0.006** ipt





Vc = 490 sfm, ae = 0.492", Dry 4140Ⓗ Ø1.000" BT50

Higher Stability in Unstable Machining Environment

Chatter Resistance Comparison (Internal evaluation)

Slotting
Ø1.000" (3 Flute)
External air
1049
BT50

Video

Machining Efficiency

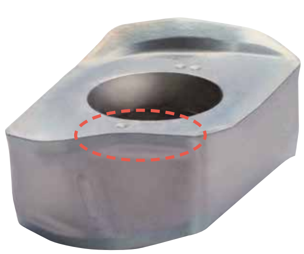
MFH MAX — **103 cc/min**
Vc = 390 sfm, D.O.C. = 0.059", fz = **0.024** ipt

Machining Efficiency x 4.5

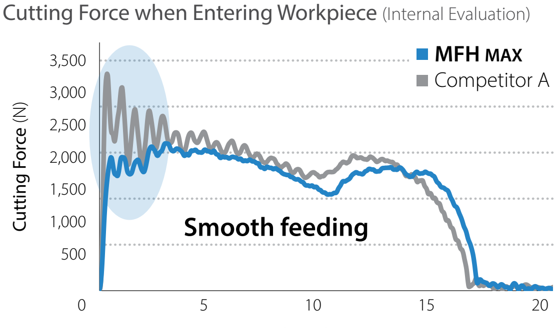
Competitor A 90 ° End Mill
31 cc/min **Chattering (Machining was impossible)**
Vc = 260 sfm, D.O.C. = 0.079", fz = 0.008 ipt
23 cc/min
Vc = 260 sfm, D.O.C. = 0.079", fz = 0.006 ipt

Innovative Insert Design

Convex cutting edge design reduces impact when entering workpiece



Cutting Force when Entering Workpiece (Internal Evaluation)



Vc = 490 sfm, D.O.C. = 0.079", ae = 1.000", fz = 0.028 ipt, Dry 1049 Ø2.000" BT50

2 When Compared to Conventional High Feed Cutters

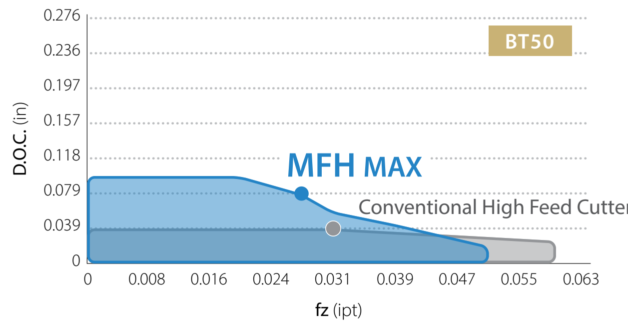
A Larger D.O.C. Dramatically Improves Machining Efficiency

Machining Efficiency Simulation Example

Multistage Machining (Depth 1.181"): Vc = 490 sfm, ae = 0.492"

MFH MAX Ø1.000" (3 Flute) — **100 cc/min** — Machining Efficiency x 1.3
D.O.C. = **0.079"**, fz = **0.028** ipt

Conventional High Feed Cutter Ø1.000" (3 Flute) — **76 cc/min**
D.O.C. = **0.039"**, fz = **0.031** ipt

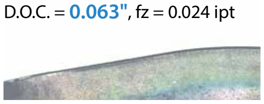


High Efficiency and Good Tool Life

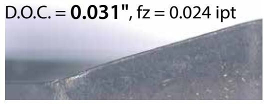
Machining Efficiency and Cutting Edge Condition Comparison
(Internal Evaluation)

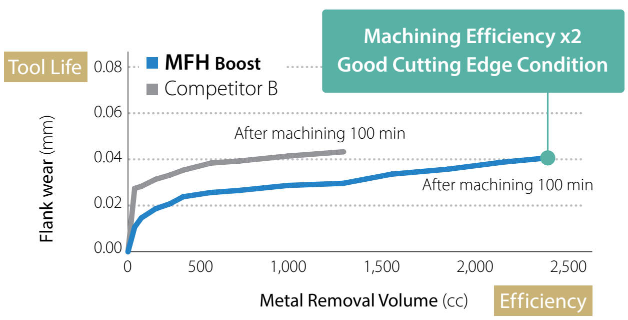
Cutting Edge Condition after 100 min machining

MFH MAX
D.O.C. = **0.063"**, fz = 0.024 ipt



Competitor B High Feed Type
D.O.C. = **0.031"**, fz = 0.024 ipt





Vc = 490 sfm, ae = 0.492", Dry 4140 Ø1.000" BT50

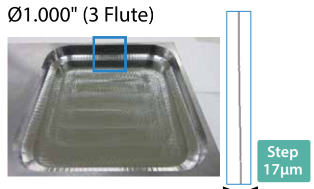
Excellent Wall Accuracy

View Video

Machining Efficiency and Wall Comparisons
(Internal Evaluation)

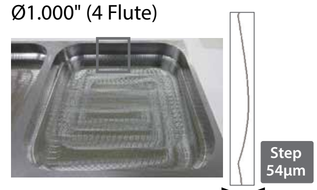
Pocketing (Depth 0.472")

MFH MAX
Ø1.000" (3 Flute)



D.O.C. = **0.059"** × **8** Passes
Q = **115** cc/min

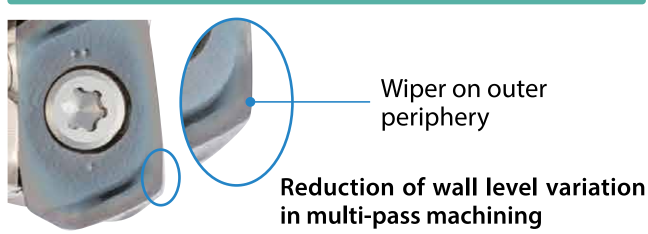
Competitor B High Feed Type
Ø1.000" (4 Flute)



D.O.C. = **0.031"** × **15** Passes
Q = **81** cc/min

Cutting Conditions: Vc = 660 sfm, ae = 0.492", fz = 0.031 ipt, Dry 1049 BT50

Superior Wall Accuracy



3 A Powerful Tool for Difficult-to-cut Materials

The MFH-MAX gained dramatic improvements in efficiency when machining titanium alloy, stainless steel, etc.

Machining Efficiency Comparison (Internal Evaluation)

Titanium Alloy Pocketing (Depth 0.236")

MFH MAX — Approx. **1' 30"** — Machining Efficiency x 1.8
D.O.C. = **0.059"** × **4** Passes (fz = ~0.014 ipt)

Competitor C High Feed Type — Approx. **2' 50"**
D.O.C. = **0.024"** × **10** Passes (fz = ~0.016 ipt)

Vc = 160 sfm, ae = 0.492" (ae/DCX = 50%), Ramping Angle 3° Ti-6Al-4V Wet Ø1.000" (3 Flute) BT50

View Video

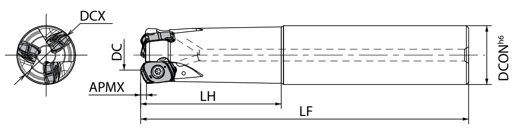


Fig.1

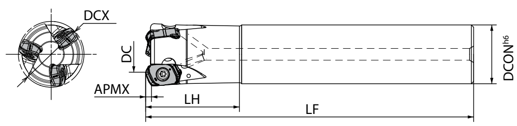


Fig.2

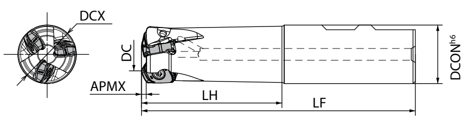


Fig.3

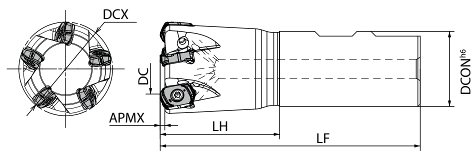


Fig.4

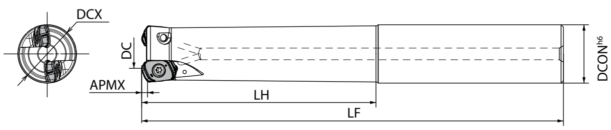


Fig.5

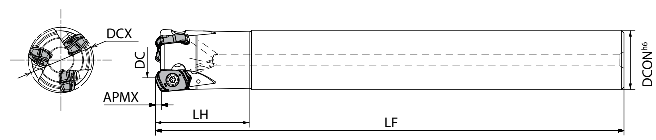


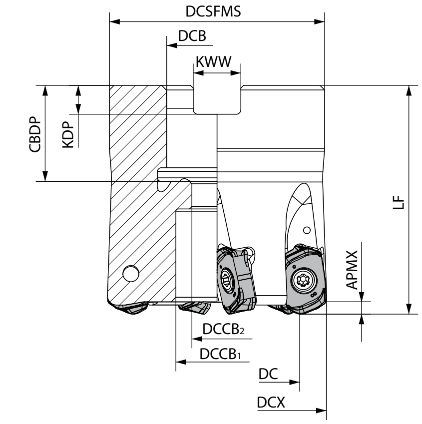
Fig.6

Toolholder Dimensions

Part Number			Stock	Unit	No. of Inserts	Dimensions						Rake Angle	Coolant Hole	Drawing	Weight (kg)	Max. Revolution (RPM)
						DCX	DC	DCON	LH	LF	APMX	A.R.				
Cylindrical	Standard Shank	**MFH** 1000-S100-04-3T	●	inch	3	1.000	0.567	1.000	2.500	5.500	0.098	-10°	Yes	Fig.1	0.4	12,500
		1250-S125-04-5T	●		5	1.250	0.817	1.250	2.750	6.000					0.7	11,000
	Long Shank	**MFH** 1000-S100-04-3T-7	●	inch	3	1.000	0.567	1.000	4.000	7.000	0.098	-10°	Yes	Fig.5	0.7	12,500
		1250-S125-04-4T-8	●		4	1.250	0.817	1.250	4.750	8.000					1.1	11,000
Weldon	Standard Shank	**MFH** 1000-W100-04-3T	●	inch	3	1.000	0.567	1.000	2.000	4.600	0.098	-10°	Yes	Fig.3	0.4	12,500
		1250-W125-04-5T	●		5	1.250	0.817	1.250	2.750	5.150					0.7	11,000
Cylindrical	Standard Shank	**MFH** 25-S25-04-2T	●	mm	2	25	14	25	60	140	2.5	-10°	Yes	Fig.1	0.5	12,700
		25-S25-04-3T	●		3										0.5	12,700
		32-S32-04-4T	●		4	32	21	32	70	150					0.8	11,200
		32-S32-04-5T	●		5										0.8	11,200
	Oversize	**MFH** 22-S20-04-2T	●	mm	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	12,000
		35-S32-04-4T	●			35	24	32	50	150					0.8	10,700
		35-S32-04-5T	●		5										0.8	10,700
		40-S32-04-5T	●			40	29								0.9	10,000
		40-S32-04-6T	●		6										0.9	10,000
	Long Shank	**MFH** 25-S25-04-2T-180	●	mm	2	25	14	25	100	180	2.5	-10°	Yes	Fig.5	0.6	12,700
		25-S25-04-3T-180	●		3										0.6	12,700
		28-S25-04-3T-200	●			28	17		40	200				Fig.6	0.7	12,000
		32-S32-04-4T-200	●		4	32	21	32	120					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
Weldon	Standard Shank	**MFH** 25-W25-04-2T	●	mm	2	25	14	25	60	117	2.5	-10°	Yes	Fig.3	0.4	12,700
		25-W25-04-3T	●		3										0.4	12,700
		32-W32-04-4T	●		4	32	21	32	70	131					0.7	11,200
		32-W32-04-5T	●		5										0.7	11,200
		40-W32-04-5T	●			40	29		50	111				Fig.4	0.7	10,000
		40-W32-04-6T	●		6										0.7	10,000

●: Standard Item

Caution with Max. Revolution
Set the number of revolutions per minute within the recommended cutting speed on **P10**
When running an end mill or a cutter at the maximum revolution, the insert or the cutter may be damaged by centrifugal force.



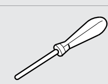
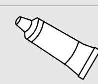
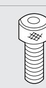
Toolholder Dimensions

Bore	Part Number		Stock	Unit	No. of Inserts	DCX	DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	Rake Angle A.R.	Coolant Hole	Weight (kg)	Max. Revolution (RPM)
Inch Bore	**MFH**	**1500R-04-6T**	●	inch	6	1.500	1.067	1.400	0.500	0.433	0.276	1.575	0.709	0.156	0.250	0.098	-10°	Yes	0.2	10,200
		2000R-04-7T	●		7	2.000	1.567	1.750	0.750	0.669	0.433	1.969	0.947	0.188	0.313				0.5	8,600
		2500R-04-9T	●		9	2.500	2.067	2.250					0.750						0.7	8,000
		3000R-04-10T	●		10	3.000	2.567	2.750	1.000	0.866	0.551	2.480	1.063	0.236	0.375				1.3	7,500
	MFH	**080R-04-8T**	●	mm	8	80	69	76	1.250"	26	17	63	1.260"	0.315"	0.500"	2.5	-10°	Yes	1.6	7,100
		080R-04-10T	●		10														1.6	
Metric Bore	**MFH**	**040R-04-5T-M**	●	mm	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 Max. Revolution
Set the number of revolutions per minute within the recommended cutting speed on **P10**
When running an end mill or a cutter at the maximum revolution, the insert or the cutter may be damaged by centrifugal force.

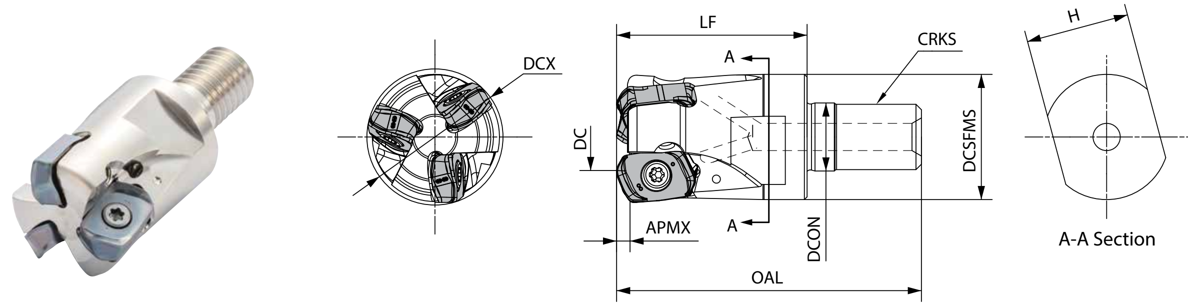
●: Standard Item

Spare Parts and Applicable Inserts

Part Number				Spare Parts: Insert Screw 	Spare Parts: Wrench 	Spare Parts: Anti-Seize Compound 	Spare Parts: Arbor Bolt 	Applicable Inserts
End Mills		**MFH**	**…-04-…**	SB-3575TRP	DTPM-10	P-37	-	LOMU040410ER-GM
Face Mills	Inch Bore	**MFH**	**1500R-04-6T**	SB-3575TRP	DTPM-10	P-37	HH1/4-0.75(H)	
			2000R-04-7T				HH3/8-1.25(H)	
			2500R-04-9T				HH3/8-1.25(H)	
			3000R-04-10T				HH1/2-1.25(H)	
		MFH	**080R-04-...-8T**				HH16X40(H)	
			080R-04-...-10T				HH16X40(H)	
	Metric Bore	**MFH**	**040R-04-…-M**	SB-3575TRP	DTPM-10	P-37	HH8X25(H)	
			050R-04-…-M				HH10X30(H)	
			052R-04-...-M				HH10X30(H)	
			063R-04-...-M				HH10X30(H)	
			080R-04-...-M				HH12X35(H)	
Modular End Mills		**MFH**	**…-04-…**	SB-3575TRP	DTPM-10	P-37	-	

Recommended torque for insert screw 2.0 Nm

(H) Optional coolant-through bolt available



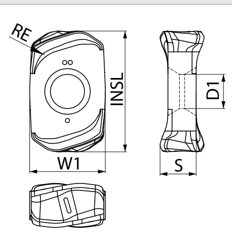
Toolholder Dimensions

Part Number	Stock	Unit	No. of Inserts	Dimensions									Rake Angle	Coolant Hole	Max. Revolution (RPM)
				DCX	DC	DCSFMS	DCON	OAL	LF	CRKS	H	APMX	A.R.		
MFH 1000-M12-04-3T	●	inch	3	1.000	0.567	0.900	0.492	2.205	1.380	M12xP1.75	0.748	0.098	-10°	Yes	12,500
1250-M16-04-5T	●		5	1.250	0.817	1.180	0.669	2.441	1.580	M16xP2.0	0.945				11,000
MFH 22-M10-04-2T	●	mm	2	22	11	18.7	10.5	48	30	M10XP1.5	15	2.5	-10°	Yes	13,600
25-M12-04-2T	●			25	14	23	12.5	56	35	M12XP1.75	19				12,700
25-M12-04-3T	●		3												
28-M12-04-3T	●			28	17										12,000
28-M12-04-4T	●		4												
32-M16-04-4T	●			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	●			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 Max. Revolution
Set the number of revolutions per minute within the recommended cutting speed on **P10**
When running an end mill or a cutter at the maximum revolution, the insert or the cutter may be damaged by centrifugal force.

● : Standard Item

Applicable Inserts

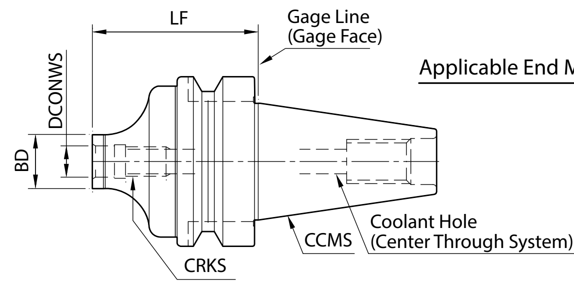
Insert		Part Number	Dimensions (in)					MEGACOAT NANO			CVD Coating
			W1	S	D1	INSL	RE	PR1535	PR1525	PR1510	CA6535
 4-Edge Double-Sided	 RE INSL D1 W1 S	**LOMU 040410ER-GM**	0.358	0.173	0.161	0.571	0.039	●	●	●	●

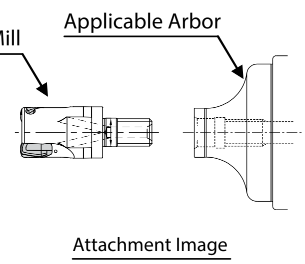
● : Standard Item

Insert Grade:

PR1535 For Steel Machining (Stability Oriented Machining), Titanium Alloy, Austenitic/Precipitation Hardened Stainless Steel, etc.
PR1525 For Steel Machining (General Use)
PR1510 For Cast Iron Machining
CA6535 For Martensitic Stainless Steel, Ni-base Heat-Resistant Alloy, etc.

BT Arbor for Exchangeable Head / Double-face Clamping Spindle



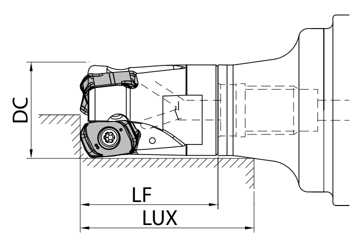


Toolholder Dimensions

Part Number		Stock	Dimensions (mm)				Coolant Hole	Arbor (Double-face clamping spindle)	Applicable End Mill
			LF	BD	DCONWS	CRKS		CCMS	
BT30K-	M10-45	●	45	18.7	10.5	M10×P1.5	Yes	BT30	MFH..-M10..
	M12-45	●	45	23	12.5	M12×P1.75			MFH..-M12..
BT40K-	M10-60	●	60	18.7	10.5	M10×P1.5	Yes	BT40	MFH..-M10..
	M12-55	●	55	23	12.5	M12×P1.75			MFH..-M12..
	M16-65	●	65	30	17	M16×P2.0			MFH..-M16..

●: Standard Item

Actual End Mill Depth



Arbor Part Number		Applicable Modular End Mill			Actual End Mill Depth
		Part Number	Cutting Dia. DC (mm)	Dimensions LF (mm)	LUX (mm)
BT30K-	M10-45	MFH22-M10...	22	30	39.2
	M12-45	MFH25-M12...	25	35	42.8
		MFH28-M12...	28	35	45.5
BT40K-	M10-60	MFH22-M10...	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...	42	40	64.0

Full MFH-Series Expansive High-Feed Lineup for Various Applications and Machining Environments

MFH-MAX

Small Diameter/
Larger Depth of Cut

MFH MAX
Ø1.000" ~ Ø3.000"
Ø22mm ~ Ø80mm

MFH-RAPTOR MICRO

Micro Diameter

MFH Micro
Ø0.375" ~ Ø0.625"
Ø8mm ~ Ø16mm

MFH-RAPTOR MINI

Small Diameter/
Fine Pitch Type

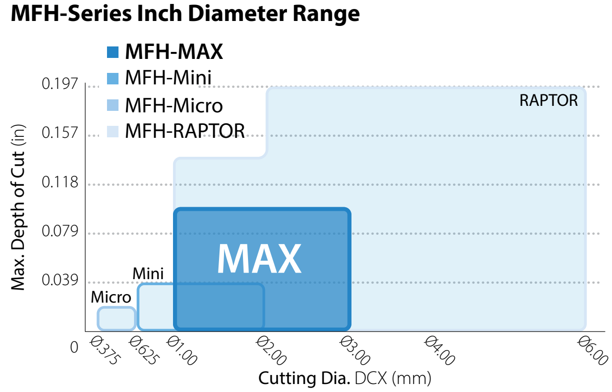
MFH Mini
Ø0.625" ~ Ø2.000"
Ø16mm ~ Ø50mm

MFH-RAPTOR

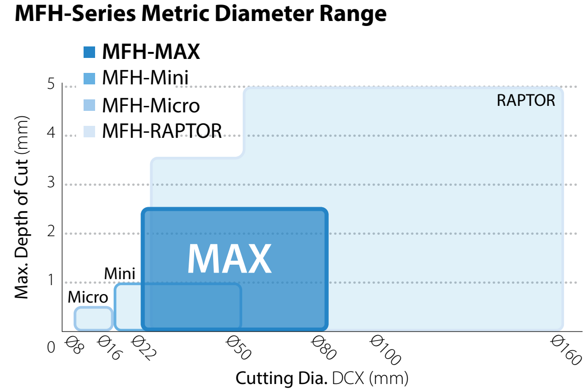
Large Diameter

MFH RAPTOR
Ø1.000" ~ Ø6.000"
Ø25mm ~ Ø160mm

MFH-Series Inch Diameter Range



MFH-Series Metric Diameter Range

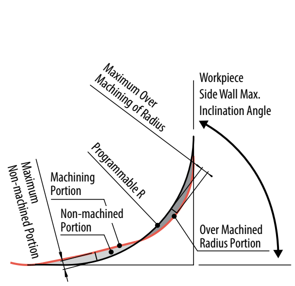


Recommended Cutting Conditions ★ 1st Recommendation ☆ 2nd Recommendation

Chipbreaker	Workpiece		Holder Part Number and Feed Rate (fz: ipt)		Recommended Insert Grade (Vc: m/min)			
			D.O.C. (in)	MFH…04…	MEGACOAT NANO			CVD Coating
					PR1535	PR1525	PR1510	CA6535
GM	Carbon Steel Alloy Steel	(~ 280HB)	≤ 0.020	0.008 – **0.032** – 0.051	☆ 390 – **520** – 720	★ 390 – **520** – 720	–	–
			≤ 0.039	0.008 – **0.028** – 0.043				
			≤ 0.059	0.008 – **0.024** – 0.032				
			≤ 0.079	0.008 – **0.016** – 0.028				
			≤ 0.098	0.008 – **0.012** – 0.020				
		(~ 350HB)	≤ 0.020	0.008 – **0.030** – 0.047	☆ 330 – **490** – 660 (Dry Machining Recommended)	★ 330 – **490** – 660 (Dry Machining Recommended)	–	–
			≤ 0.039	0.008 – **0.026** – 0.039				
			≤ 0.059	0.008 – **0.022** – 0.028				
			≤ 0.079	0.008 – **0.016** – 0.022				
			≤ 0.098	0.008 – **0.010** – 0.014				
	Mold Steel	(~ 40HRC)	≤ 0.020	0.008 – **0.024** – 0.043	☆ 260 – **390** – 520 (Dry Machining Recommended)	★ 260 – **390** – 520 (Dry Machining Recommended)	–	–
			≤ 0.039	0.008 – **0.020** – 0.035				
			≤ 0.059	0.008 – **0.016** – 0.026				
			≤ 0.079	0.008 – **0.012** – 0.022				
			≤ 0.098	0.008 – **0.010** – 0.014				
		(40 ~ 50HRC)	≤ 0.020	0.004 – **0.012** – 0.020	–	★ 200 – **330** – 430 (Dry Machining Recommended)	–	–
			≤ 0.039	0.004 – **0.010** – 0.016				
			≤ 0.059	0.004 – **0.008** – 0.012				
			≤ 0.079	–				
			≤ 0.098					
		(50 ~ 55HRC)	≤ 0.020	0.004 – **0.008** – 0.016	–	★ 160 – **230** – 330 (Dry Machining Recommended)	–	–
			≤ 0.039	0.004 – **0.006** – 0.010				
			≤ 0.059	–				
			≤ 0.079					
			≤ 0.098					
	Austenitic Stainless Steel		≤ 0.020	0.008 – **0.024** – 0.039	★ 330 – **460** – 590	☆ 330 – **460** – 590	–	–
			≤ 0.039	0.008 – **0.020** – 0.035				
			≤ 0.059	0.008 – **0.018** – 0.024				
			≤ 0.079	0.008 – **0.012** – 0.020				
			≤ 0.098	0.008 – **0.010** – 0.016				
	Martensitic StainlessSteel		≤ 0.020	0.008 – **0.024** – 0.039	☆ 330 – **490** – 660	–	–	★ 490 – **660** – 980
			≤ 0.039	0.008 – **0.020** – 0.035				
			≤ 0.059	0.008 – **0.018** – 0.024				
			≤ 0.079	0.008 – **0.012** – 0.020				
			≤ 0.098	0.008 – **0.010** – 0.016				
	Precipitation Hardened Stainless Steel		≤ 0.020	0.004 – **0.012** – 0.020	★ 300 – **390** – 490	–	–	–
			≤ 0.039	0.004 – **0.010** – 0.018				
			≤ 0.059	0.004 – **0.006** – 0.010				
			≤ 0.079	–				
			≤ 0.098					
	Gray Cast Iron		≤ 0.020	0.008 – **0.032** – 0.051	–	–	★ 390 – **520** – 720	–
			≤ 0.039	0.008 – **0.028** – 0.043				
			≤ 0.059	0.008 – **0.024** – 0.032				
			≤ 0.079	0.008 – **0.016** – 0.028				
			≤ 0.098	0.008 – **0.012** – 0.020				
	Nodular Cast Iron		≤ 0.020	0.008 – **0.024** – 0.039	–	–	★ 330 – **490** – 660	–
			≤ 0.039	0.008 – **0.020** – 0.035				
			≤ 0.059	0.008 – **0.016** – 0.028				
			≤ 0.079	0.008 – **0.012** – 0.024				
			≤ 0.098	0.008 – **0.010** – 0.016				
	Ni-base Heat-Resistant Alloy		≤ 0.020	0.004 – **0.012** – 0.018	☆ 70 – **100** – 160	–	–	★ 70 – **100** – 160
			≤ 0.039	0.004 – **0.010** – 0.016				
			≤ 0.059	0.004 – **0.006** – 0.008				
			≤ 0.079	–				
			≤ 0.098					
	Titanium Alloy		≤ 0.020	0.004 – **0.012** – 0.020	★ 130 – **200** – 260	–	–	–
			≤ 0.039	0.004 – **0.010** – 0.018				
			≤ 0.059	0.004 – **0.006** – 0.010				
			≤ 0.079	–				
			≤ 0.098					

- 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.
- 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 CAT30 or equivalent, feed rate should be reduced to 25% of recommended cutting conditions. Slotting is not recommended in this situation.
- Center through air 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.

Approximate Programming Radius Adjustment



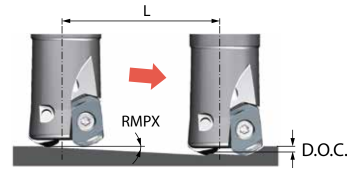
Shape	Programmable R (in)	Max. Over Machined Radius Portion (in)	Max. Non-machined Portion (in)
	0.059	0	0.0559
	0.079	0	0.0488
	0.118 (Recommended)	0	0.0343
	0.138	0.0024	0.0272

Ramping Tips

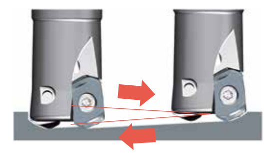
- Ramping angle should be under RMPX (maximum ramping angle) in table below
- Reduce recommended feed rate in recommended cutting conditions by 70%

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

$$L = \frac{D.O.C.}{\tan RMPX}$$



- When ramping from both the front and outer periphery, set the maximum ramping angle RMPX to 50%.



Ramping Reference Table

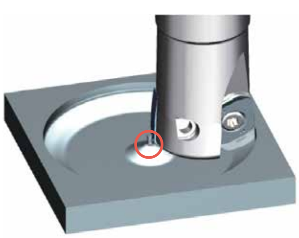
Part Number	Cutter Dia. DCX (in)	-	1.000"	-	1.250"	-	1.500"	-	2.000"	-	2.500"	3.000"
	Cutter Dia. DCX (mm)	22mm	25mm	28mm	32mm	35mm	40mm	42mm	50mm	52mm	63mm	80mm
MFH… -04- …	Max. Ramping Angle RMPX	3.9°	3.0°	2.4°	2.0°	1.7°	1.4°	1.3°	1.0°	1.0°	0.8°	0.6°
	tan RMPX	0.068	0.052	0.042	0.035	0.029	0.024	0.022	0.018	0.017	0.013	0.010

Helical Milling Tips

For Helical milling, use between Min. Drilling Dia. and Max. Drilling Dia.

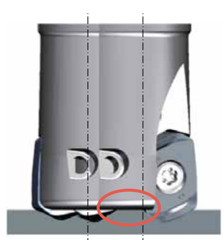
Exceeding Max. Machining Dia.

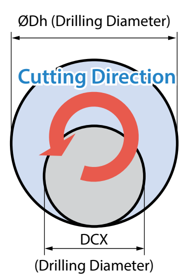
Center Core Remains After Machining



Under Min. Machining Dia.

Center Core Hits Holder Body

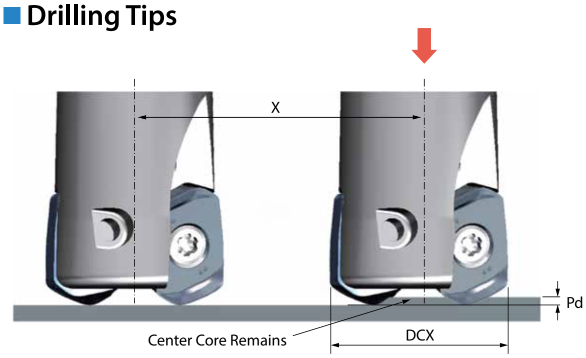




Part Number	Min. Drilling Dia.	Max. Drilling Dia.
MFH… -04- …	2 × DCX - 0.433"	2 × DCX - 0.079"

- Maximum ramping depth per cycle to be under maximum D.O.C. Max D.O.C. (0.098")
- Use climb milling. (Refer to the above figure)
- Feed rates should be reduced to 50% of recommended cutting conditions
- Use caution to eliminate incidences caused by producing long chips

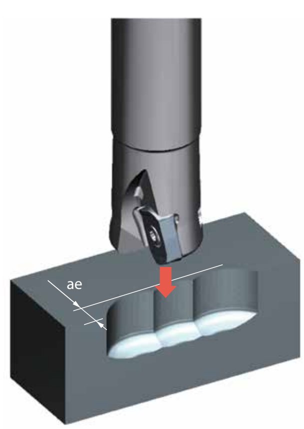
Drilling Tips



Part Number	GM Chipbreaker	
	Max. Drilling Depth (Pd)	Min. Cutting Length (X) for Flat Bottom Surface
MFH… -04- …	0.024"	DCX - 0.472"

- It is recommended to reduce feed by 25% of recommendation until the center core is removed
- Axial feed rate recommendation per revolution is f ≤ 0.008 ipr while drilling

Plunging



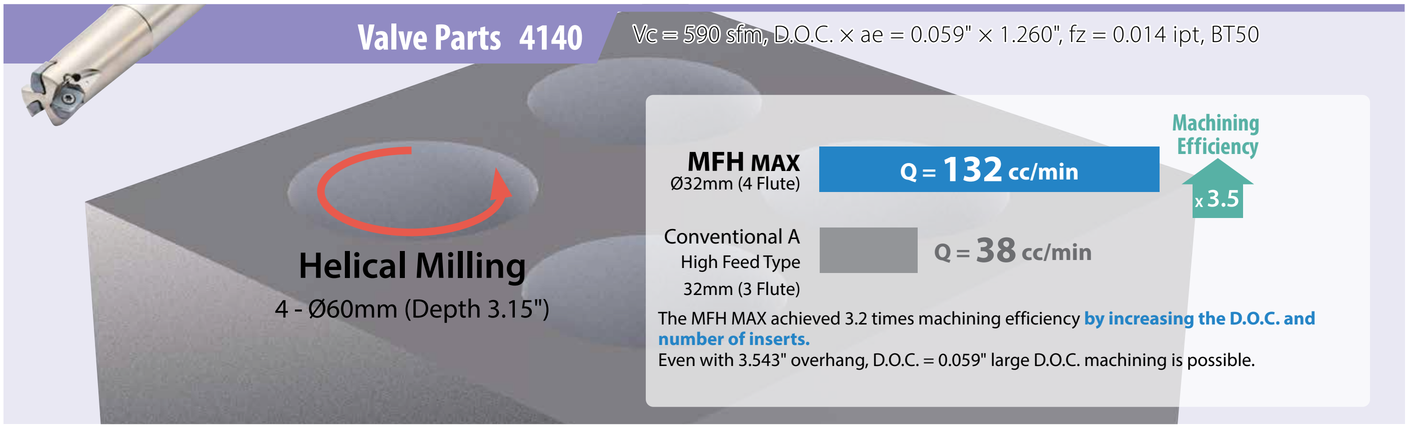
Insert Part Number	Maximum Width of Cut (ae)
LOMU04...	0.197"

- Reduce feed rate to fz ≤ 0.008 ipt when plunging

Fast, Strong, and Efficient

Valve Parts 4140

Vc = 590 sfm, D.O.C. × ae = 0.059" × 1.260", fz = 0.014 ipt, BT50

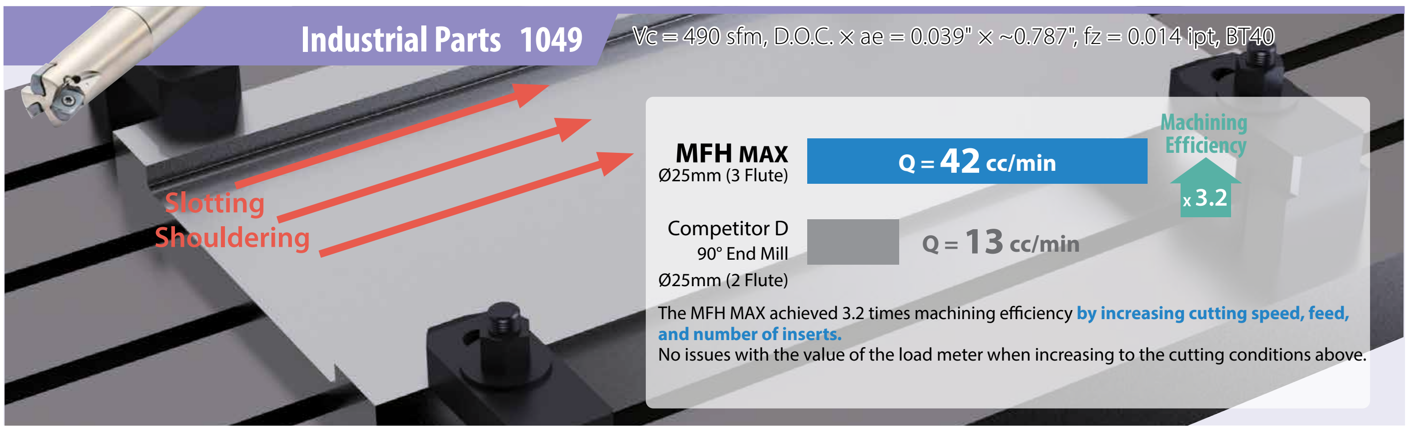


		Machining Efficiency
MFH MAX Ø32mm (4 Flute)	Q = 132 cc/min	x 3.5
Conventional A High Feed Type 32mm (3 Flute)	Q = 38 cc/min	

The MFH MAX achieved 3.2 times machining efficiency **by increasing the D.O.C. and number of inserts.**
Even with 3.543" overhang, D.O.C. = 0.059" large D.O.C. machining is possible.

Industrial Parts 1049

Vc = 490 sfm, D.O.C. × ae = 0.039" × ~0.787", fz = 0.014 ipt, BT40

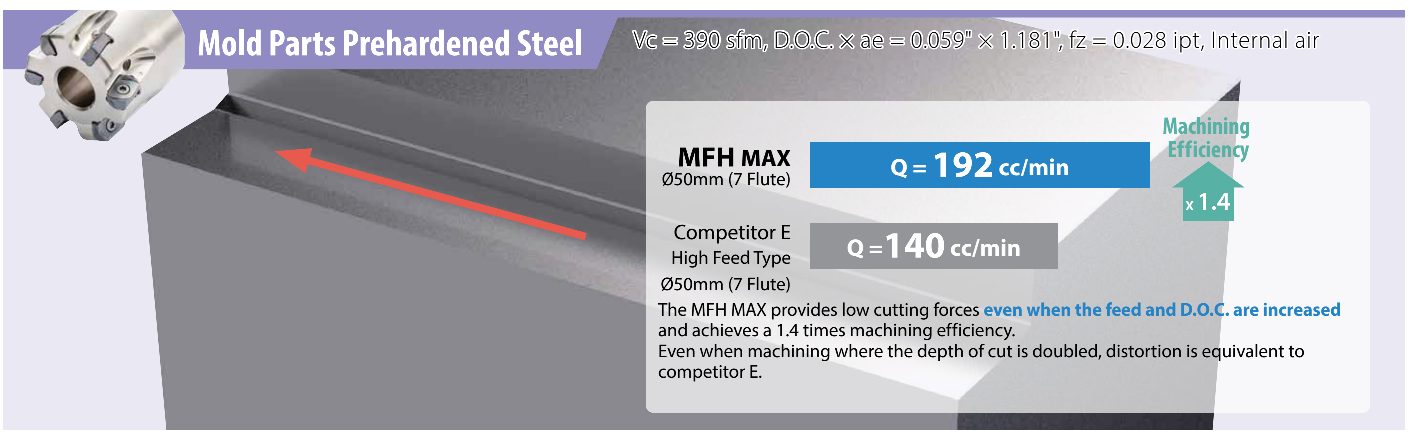


		Machining Efficiency
MFH MAX Ø25mm (3 Flute)	Q = 42 cc/min	x 3.2
Competitor D 90° End Mill Ø25mm (2 Flute)	Q = 13 cc/min	

The MFH MAX achieved 3.2 times machining efficiency **by increasing cutting speed, feed, and number of inserts.**
No issues with the value of the load meter when increasing to the cutting conditions above.

Mold Parts Prehardened Steel

Vc = 390 sfm, D.O.C. × ae = 0.059" × 1.181", fz = 0.028 ipt, Internal air



		Machining Efficiency
MFH MAX Ø50mm (7 Flute)	Q = 192 cc/min	x 1.4
Competitor E High Feed Type Ø50mm (7 Flute)	Q = 140 cc/min	

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

(User Evaluations)

KYOCERA

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