

THE NEW VALUE FRONTIER



4-edge Face Mills with Vertical Inserts
for Heavy Milling

MFLN

4-edge Face Mills with Vertical Inserts for Heavy Milling

MFLN



Rigid, Heavy Milling with Tough 4-edge Inserts for Large Depths of Cut and High Feed Rates

Tough and Reliable 4-edge Vertical Inserts for Stable Heavy Milling

Highly Efficient Milling with Large Depths of Cut ($a_p \approx 20\text{mm}$)

and High Feed Rates ($f_z \approx 0.4\text{mm/t}$)

Three Different Cutting Edge Angles Available



MFLN45

MFLN70

MFLN90

4-edge Face Mills with Vertical Inserts for Heavy Milling

MFLN

Tough 4-edge Vertical Inserts Provide High Reliability on Heavy Milling at Large Depths of Cut and High Feed Rates
Three Cutting Edge Angles Optimized for Various Machining Applications

1 Tough and Reliable Inserts for Stable Heavy Milling

22 mm long inserts offer increased rigidity

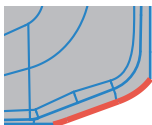
Tangentially mounted inserts provide 2 cutting edges on both sides

Corner Chamfer

(only available on MFLN90)

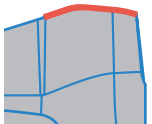
Both general corner-R type and chamfered corner type available

Prevents chattering and insert fracturing



Convex cutting edge ridge

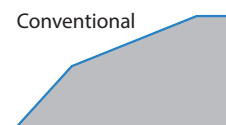
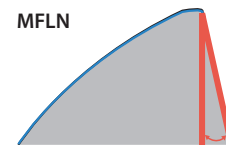
Reduced impact forces when entering the workpiece



Obtuse Edge Design

Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge (Image)



Wide Flat Mounting Surface

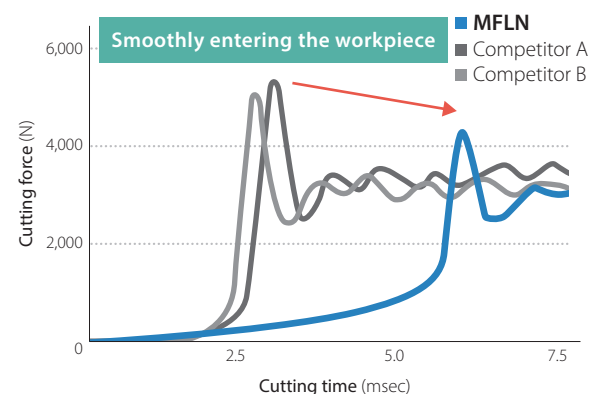
Hold an insert firmly in heavy milling

Tangentially mounted inserts increase rigidity

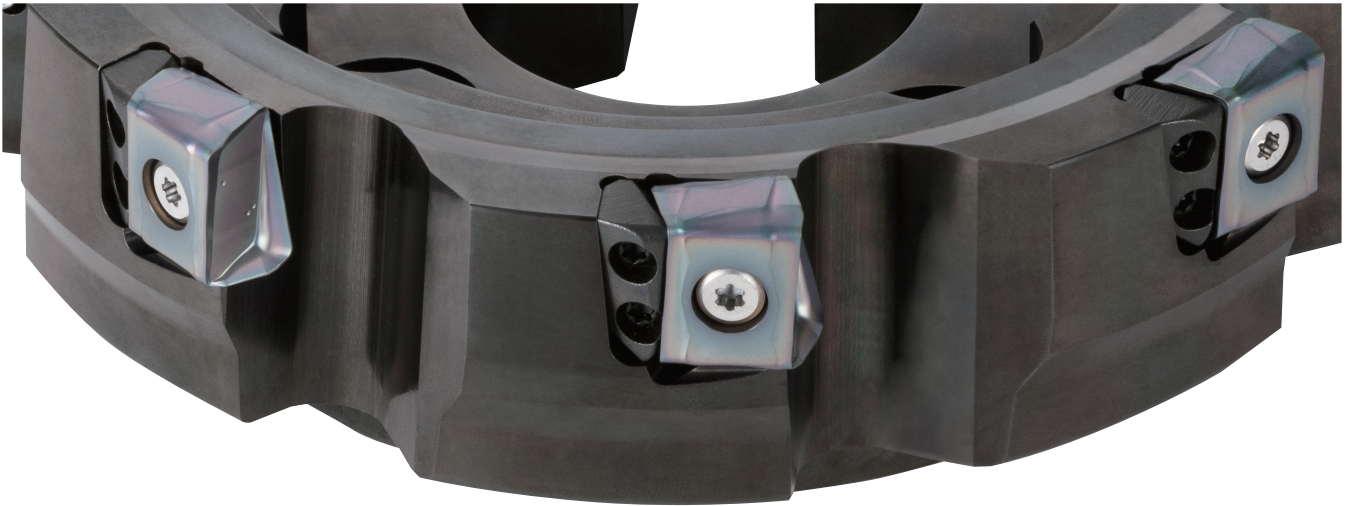


Cutting Forces when Entering the Workpiece (Internal evaluation)

MFLN90 (Insert : Chamfered corner type)



Cutting conditions : $V_c = 150$ m/min, $a_p \times a_e = 5 \times 75$ mm, $f_z = 0.3$ mm/t
 $\phi 125$ (1 insert), Dry Workpiece : S50C



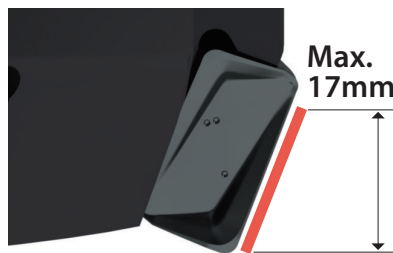
2 Large D.O.C. and High Feed Rates with 90°, 70°, and 45° Cutting Edge Angles Available

3 Cutter styles cover a wide variety of machining applications

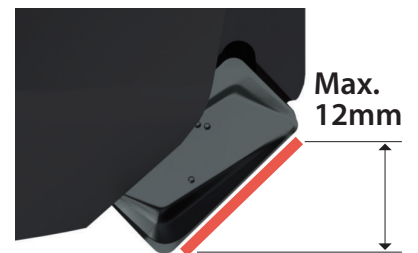
MFLN90
(Cutting edge angle 90°)



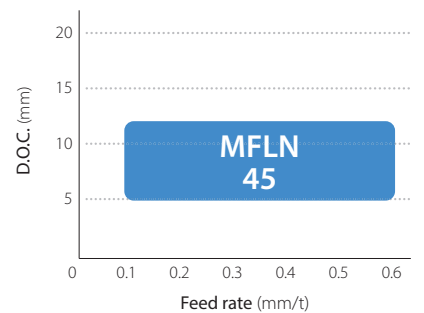
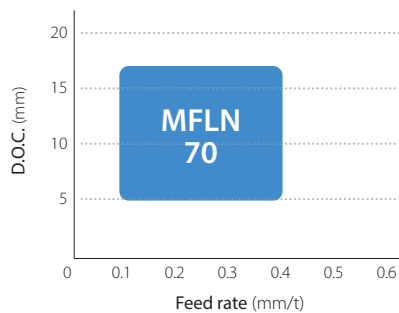
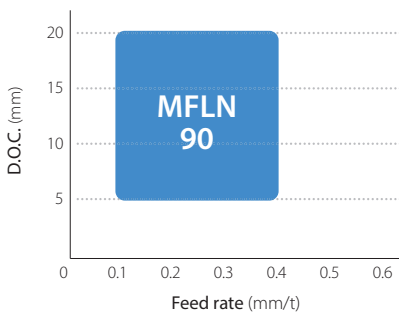
MFLN70
(Cutting edge angle 70°)



MFLN45
(Cutting edge angle 45°)



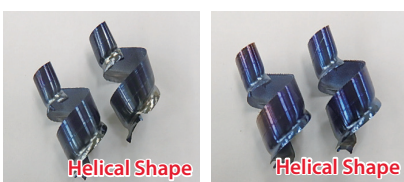
Applicable Range



Chip Comparison (Internal evaluation)

Helix-shaped chips prevent chip recutting and provide stable machining at high feed rates.

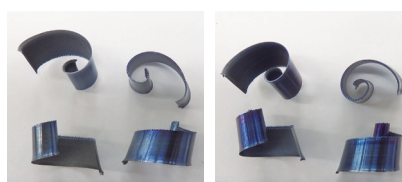
MFLN90 Stable



fz = 0.3 mm/t

fz = 0.4 mm/t

Competitor A Unstable



fz = 0.3 mm/t

fz = 0.4 mm/t

Competitor B Unstable



fz = 0.3 mm/t

fz = 0.4 mm/t

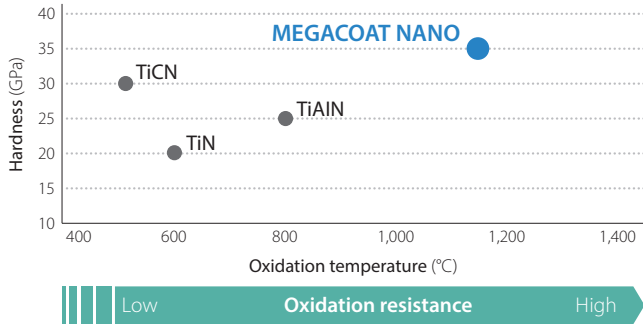
Cutting conditions : Vc = 150 m/min, ap x ae = 10 x 100 mm, fz = 0.3, 0.4 mm/t, ø125 (1 insert), Dry Workpiece : S50C

3

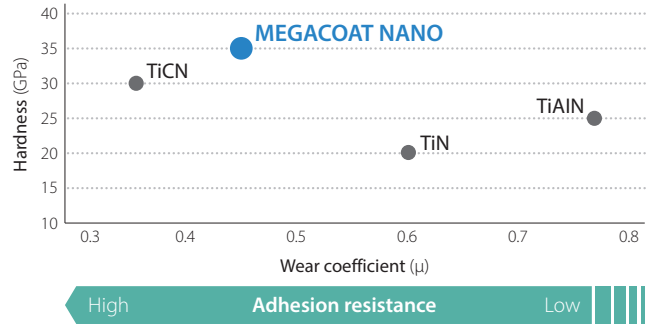
Stable machining and long tool life with MEGACOAT NANO

"MEGACOAT NANO" coating technology with high hardness (35GPa) and excellent oxidation resistance (oxidation temperature: 1,150 °C) improves wear resistance and chipping resistance.

Properties of Coating (Wear resistance)



Properties of Coating (Adhesion resistance)



Long tool life with the combination of a tough substrate and a special nano layer coating

Stable machining with excellent wear resistance

PR1525 : 1st recommendation for wear resistance. Great for scale removal and cast iron machining

PR1535 : Defect resistant, tough substrate for stable machining



Insert Description

Insert	Description	Dimensions (mm)					MEGACOAT NANO		Applicable Toolholders
		W1	S	D1	INSL	BS	PR1535	PR1525	
		Classification of usage P Carbon Steel • Alloy Steel ☆ ★ Mold Steel ☆ ★ ★ : 1st Recommendation ☆ : 2nd Recommendation K Gray Cast Iron ☆ ★ Nodular Cast Iron ☆ ★							
Corner-R 	LOGU 221616ER-GM	12.5	16.6	6.8	22.8	6.3	●	●	MFLN90.. MFLN70.. MFLN45..
Corner Chamfer 	LOGU 2216PAER-GM	12.5	16.9	6.8	22.8	4.8	●	●	MFLN90..

● : Standard Item

How to mount inserts

1. Completely eliminate chips and dust from the insert mounting side.
2. After mounting a clamp screw on the top edge of wrench, tighten the screw while keeping the insert pushed against the shim seat surface and holder surface(Fig.1,2)
3. Make sure that the identification on the top of the insert is the same in each pocket.(Fig.3)
4. Tighten the wrench (20IP) in while holding parallel to the clamp screw.
5. Tighten the insert clamp screw at an appropriate torque. (Recommended torque: 6.0 N-m)
6. After tightening, check that there is no gap between the insert and the surface of the shim, or between the side surface of insert and the holder surface. If there is a gap, remount the insert using the directions above.



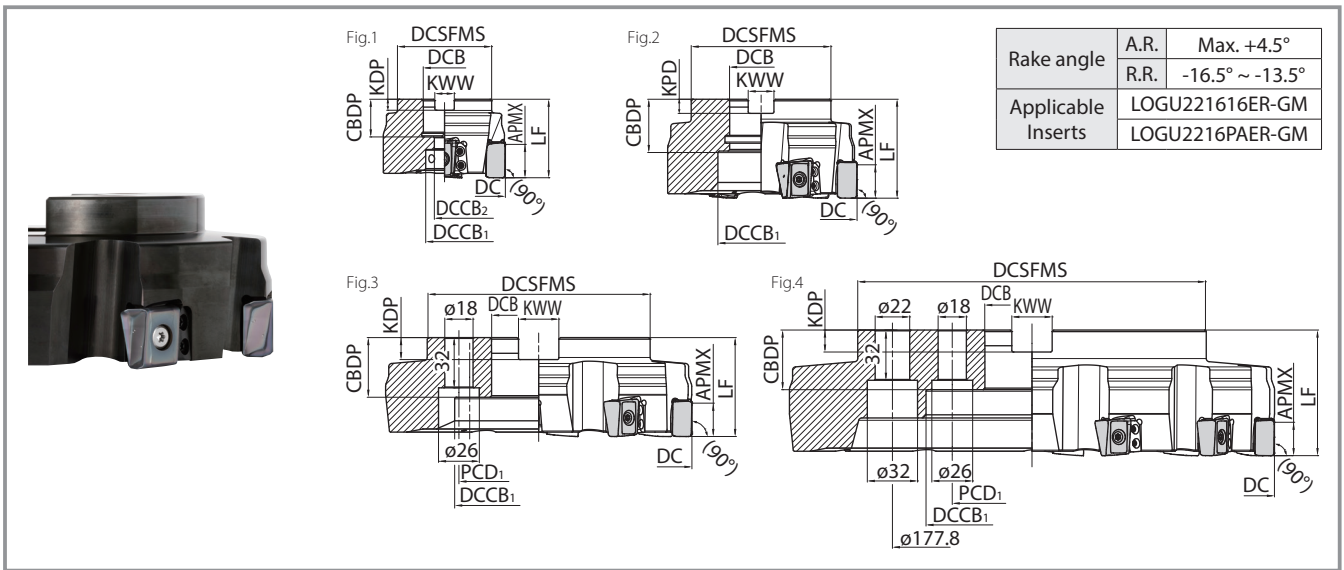
Fig.1



Fig.2



Fig.3



Toolholder Dimensions

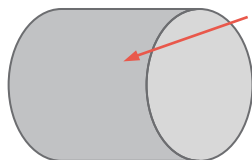
Description	Stock	No. of Inserts	Dimensions (mm)											Coolant Hole	Insert	Weight (kg)	
			DC	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	PCD ₁				
Inch Bore Dia.	MFLN 90080R-4T	●	4	80	60	25.4	24	13	50	27	6	9.5	20	-	Yes	Fig.1	1.0
	90100R-4T	●	4	100	70	31.75	45	34		8	12.7	Fig.2				1.6	
	90125R-6T	●	6	125	89	38.1	55	63	10	15.9	101.6	No	Fig.3	3.0			
	90160R-7T	●	7	160	110	50.8	90		11	19.1					4.6		
	90200R-8T	●	8	200	142	47.625	132		14	25.4	7.2						
	90250R-10T	●	10	250				172				10.5					
	90315R-12T	MTO	12	315	222	205	80	80	14	25.4	21.8	Fig.4					
Metric Bore Dia.	MFLN 90080R-4T-M	●	4	80	60	27	24	13	50	24	7	12.4	20	-	Yes	Fig.1	1.0
	90100R-4T-M	●	4	100	70	32	45	30		8	14.4	Fig.2				1.5	
	90125R-6T-M	●	6	125	89	40	55	63	33	9	16.4	66.7	No	Fig.3	2.9		
	90160R-7T-M	●	7	160	110											90	4.5
	90200R-8T-M	●	8	200	142	60	132		14	25.7	6.9						
	90250R-10T-M	●	10	250				172				10.3					
	90315R-12T-M	MTO	12	315	222	205	80	80	14	25.7	10.3	Fig.4	20.9				

● : Standard Item
MTO : Made to order

Case Study

Roll material, Alloy steel

Vc = 120 m/min
ap = 10 mm
fz = 0.27 mm/t Dry
MFLN90200R-8T-M (ø200-8 inserts)
LOGU2216PAER-GM PR1525



Chip Removal Volume

MFLN90 $v_f=412$ mm/min **Excellent** Cutting Edge

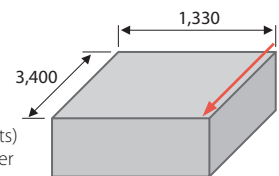
Competitor E $v_f=412$ mm/min

MFLN maintained good cutting edge condition and during scale removing.

(User evaluation)

Machining base FCD600

Vc = 120 m/min
ap = 11×165 mm
fz = 0.65 mm/t Dry
XMFLN70250R-13T-OH-M (ø250-13 Inserts)
Fine pitch, internal coolant, custom holder
LOGU221616ER-GM PR1525



Chip Removal Volume

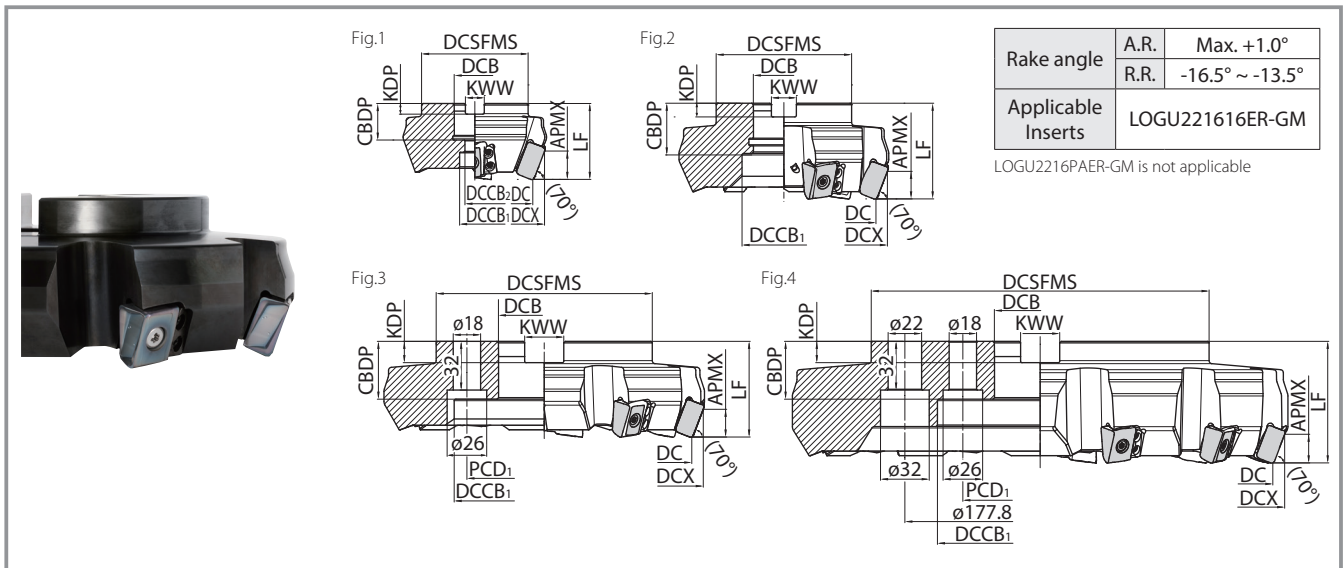
MFLN70 $Q=2,340$ cc/min **Milling Efficiency x1.1**

Competitor $Q=2,100$ cc/min

MFLN improved machining efficiency with lower cutting force.

Also it can be used both for roughing and finishing.

(User evaluation)



Toolholder Dimensions

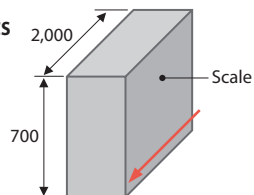
Description	Stock	No. of Inserts	Dimensions (mm)													Coolant Hole	Insert	Weight (kg)
			DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	PCD ₁				
Inch Bore Dia.	MFLN 70080R-4T	●	4	80	93	70	25.4	20	13	50	27	6	9.5	17	-	Yes	Fig.1	1.4
	70100R-4T	●	100	113	78	31.75	45	34	8		12.7	Fig.2	2.0					
	70125R-6T	●	6	125	138	89	38.1	55	63	38	10	15.9	101.6	No	Fig.3	3.5		
	70160R-7T	●	7	160	173	110	50.8	70			11	19.1				5.8		
	70200R-8T	●	8	200	213	142	47.625	120	80	14	25.4	101.6	No	Fig.3	8.5			
	70250R-10T	●	10	250	263	160		15.1										
	70315R-12T	MTO	12	315	328	222	215	17	101.6	No	Fig.4	22.2						
Metric Bore Dia.	MFLN 70080R-4T-M	●	4	80	93	70	27	20	13	50	24	7	12.4	17	-	Yes	Fig.1	1.4
	70100R-4T-M	●	100	113	78	32	45	30	8		14.4	Fig.2	1.9					
	70125R-6T-M	●	6	125	138	89	40	55	63	33	9	16.4	66.7	No	Fig.3	3.4		
	70160R-7T-M	●	7	160	173	110	90	17								101.6	8.2	
	70200R-8T-M	●	8	200	213	142	60	120	38	14	25.7	101.6	No	Fig.3	14.8			
	70250R-10T-M	●	10	250	263	160		21.9										
	70315R-12T-M	MTO	12	315	328	222	215	17	101.6	No	Fig.4	21.9						

● : Standard Item
MTO : Made to order

Case Study

Forging Die for Automotive Parts

Vc = 90 m/min
ap × ae = ~10 × ~80 mm
fz = 0.36 mm/t Dry
MFLN45080R-4T-M (ø80-4 Inserts)
LOGU221616ER-GM PR1535



Chip Removal Volume

MFLN45 (ø80-4 Inserts) **Q=416 cc/min**

Milling Efficiency
x1.2

Competitor H (ø100-5 Inserts) **Q=336 cc/min**

MFLN achieved 1.2 times machining efficiency.
Quieter machining and good chip shapes

(User evaluation)

About Applicable Insert

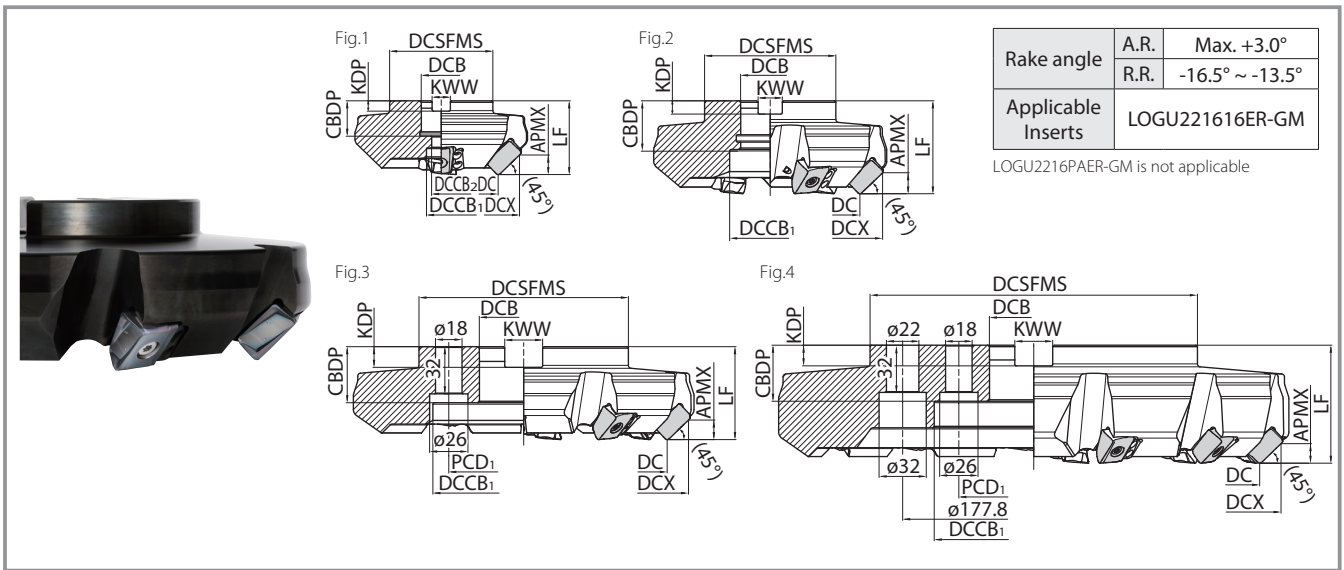
	LOGU221616ER-GM (Corner-R)	LOGU2216PWER-GM (Corner Chamfer)
MFLN 90	✓	✓
MFLN 70	✓	Not applicable
MFLN 45	✓	Not applicable

Max.Revolution(min⁻¹) for Each Cutting Diameter

Cutting Dia. DC (mm)	Max. Revolution n (min ⁻¹)
ø80	5,970
ø100	4,780
ø125	3,820
ø160	2,990
ø200	2,390
ø250	1,910
ø315	1,520

Common to MFLN90/70/45

MFLN45 Cutting edge angle 45°










Toolholder Dimensions

Description	Stock	No. of Inserts	Dimensions (mm)													Coolant Hole	Insert	Weight (kg)	
			DC	DCX	DCSFMS	DCB	DCCB ₁	DCCB ₂	LF	CBDP	KDP	KWW	APMX	PCD ₁					
Inch Bore Dia.	MFLN 45080R-4T	●	4	80	104	70	25.4	20	13									Fig.1	2.0
	MFLN 45100R-4T	●	4	100	124	78	31.75	45										Yes	2.7
	MFLN 45125R-6T	●	6	125	149	89	38.1	55									Fig.2		4.6
	MFLN 45160R-7T	●	7	160	184	110	50.8	90										No	6.8
	MFLN 45200R-8T	●	8	200	224	142		124									Fig.3		10.0
	MFLN 45250R-10T	●	10	250	274		47.625	160										Fig.4	17.1
	MFLN 45315R-12T	MTO	12	315	339	222		215									101.6		25.3
Metric Bore Dia.	MFLN 45080R-4T-M	●	4	80	104	70	27	20	13									Fig.1	2.0
	MFLN 45100R-4T-M	●	4	100	124	78	32	45										Yes	2.7
	MFLN 45125R-6T-M	●	6	125	149	89	40	55									Fig.2		4.6
	MFLN 45160R-7T-M	●	7	160	184	110		90										No	6.7
	MFLN 45200R-8T-M	●	8	200	224	142		124											Fig.3
	MFLN 45250R-10T-M	●	10	250	274		60	160										Fig.4	16.9
	MFLN 45315R-12T-M	MTO	12	315	339	222		215											101.6

● : Standard Item
MTO : Made to order

Parts List

Description	Parts						
	Clamp Screw	Wrench	Shim Sheet	Clamp Screw	Wrench	Coat Anti-seize Compound	Arbor Bolt
							
MFLN **080R-4T(-M)							HH12X35
MFLN **100R-4T(-M)	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	
MFLN ~	Tightening torque for clamping insert 6.0 N·m		Tightening torque for clamping shim sheet 3.5 N·m				
MFLN **315R-12T(-M)							

Recommended Cutting Conditions

★ : 1st Recommendation ☆ : 2nd Recommendation

	Workpiece	D.O.C. (mm)		Feed (fz : mm/t)	Recommended Insert Grades (Cutting Speed Vc : m/min)	
		Width of Cut (≤0.5×DC)	Width of Cut (>0.5×DC)		MEGACOAT NANO	
					PR1535	PR1525
MFLN 90	Carbon Steel	~18	~15	0.1 - 0.2 - 0.4	80 - 120 - 150	100 - 150 - 180
	Alloy Steel				80 - 120 - 150	100 - 150 - 180
	Die Steel				70 - 100 - 120	80 - 120 - 150
	Gray Cast Iron	~20	~18	0.1 - 0.2 - 0.4	80 - 120 - 150	100 - 150 - 180
	Nodular Cast Iron				80 - 120 - 150	100 - 150 - 180
MFLN 70	Carbon Steel	~15	~12	0.1 - 0.2 - 0.4	80 - 120 - 150	100 - 150 - 180
	Alloy Steel				80 - 120 - 150	100 - 150 - 180
	Die Steel				70 - 100 - 120	80 - 120 - 150
	Gray Cast Iron	~17	~15	0.1 - 0.2 - 0.4	80 - 120 - 150	100 - 150 - 180
	Nodular Cast Iron				80 - 120 - 150	100 - 150 - 180
MFLN 45	Carbon Steel	~10	~8	0.1 - 0.3 - 0.6	80 - 120 - 150	100 - 150 - 180
	Alloy Steel				80 - 120 - 150	100 - 150 - 180
	Die Steel				70 - 100 - 120	80 - 120 - 150
	Gray Cast Iron	~12	~10	0.1 - 0.3 - 0.6	80 - 120 - 150	100 - 150 - 180
	Nodular Cast Iron				80 - 120 - 150	100 - 150 - 180

The table above provides recommendations based on product specifications.

Before using the product, check the machine's specifications such as power.

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.

Dry machining is recommended.

How to replace the insert shim seat

1. Completely eliminate chips and dust from the shim mounting side.
2. Coat medium strength screw locking adhesive on the screws.
3. Tighten the screw keeping the shim pushed against the pocket surface of toolholder.
4. After tightening both screws temporarily, tighten them with appropriate torque. (Recommended torque:3.5 N·m)
5. Please check that there is no gap between the shim and the pocket surfaces of toolholder.

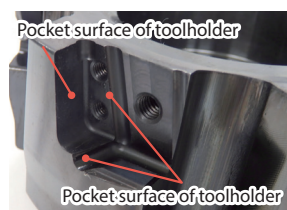


Fig.1

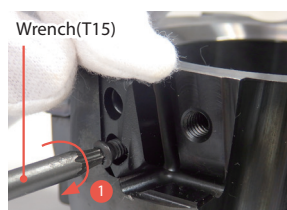


Fig.2

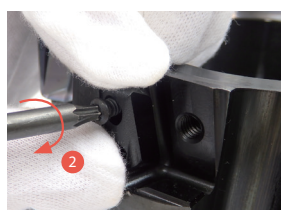


Fig.3



Fig.4