THE NEW VALUE FRONTIER

KYOCERA

4-edge face mills for heavy milling | MFLN

MFLN

Inserts for large depths of cut and high feed rates

Tough and reliable 4-edge tangencial inserts for stable heavy milling

Three different cutting edge angles available

Face mills for heavy milling

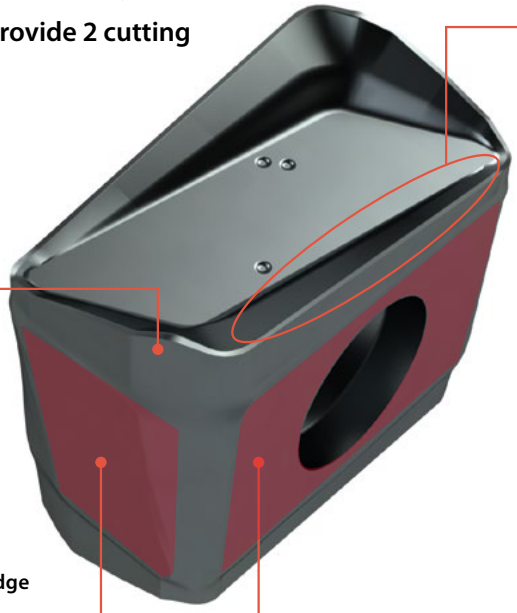
MFLN

Tough 4-edge tangencial 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

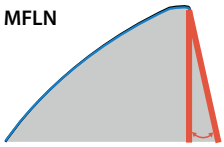


Obtuse edge design

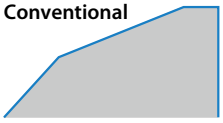
Increases the cutting edge angle only at the tip to maintain both strength and sharpness

Cross-section view of cutting edge

MFLN



Conventional

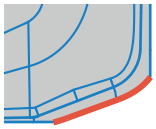


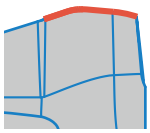
Corner chamfer

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

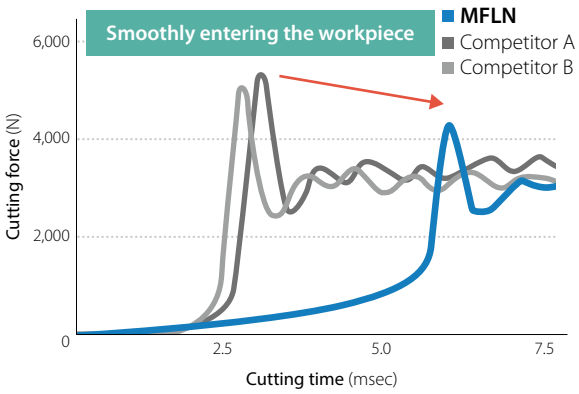
Wide flat mounting surface

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: Vc = 150 m/min, ap × ae = 5 × 75 mm, fz = 0.3 mm/t
ø125 (1 insert), dry, workpiece: C50

2 Large D.O.C. and high feed rates with 90°, 70° and 45° cutting edge angles available

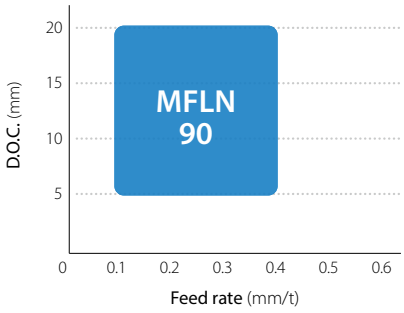
3 cutter styles cover a wide variety of machining applications

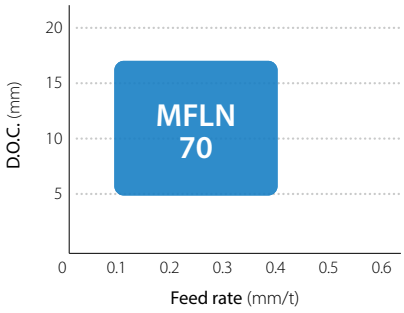
MFLN90
Cutting edge angle 90°

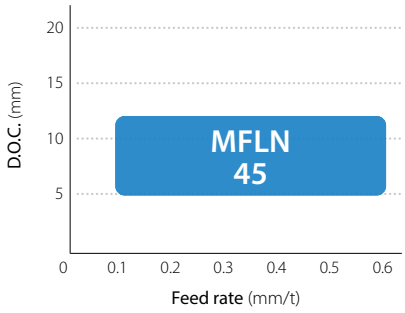
MFLN70
Cutting edge angle 70°

MFLN45
Cutting edge angle 45°

Applicable range



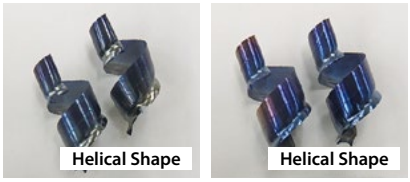




Chip comparison (Internal evaluation)

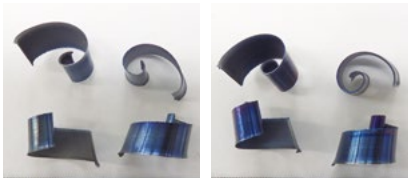
Helix-shaped chips prevent chip recutting and provide stable machining at high feed rates.

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

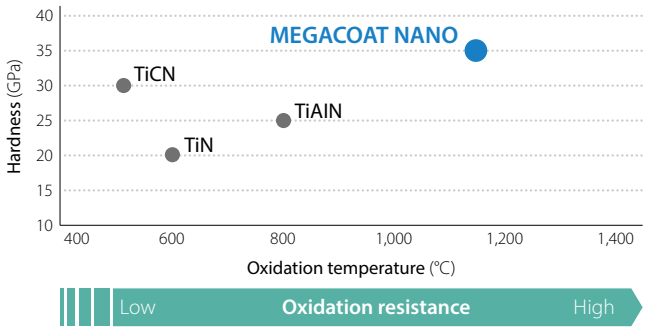
fz = 0.3 mm/t fz = 0.4 mm/t

Cutting conditions: Vc = 150 m/min, ap × ae = 10 × 100 mm, fz = 0.3, 0.4 mm/t, ø125 (1 insert), dry, workpiece: C50

3 Stable machining and long tool life with MEGACOAT NANO

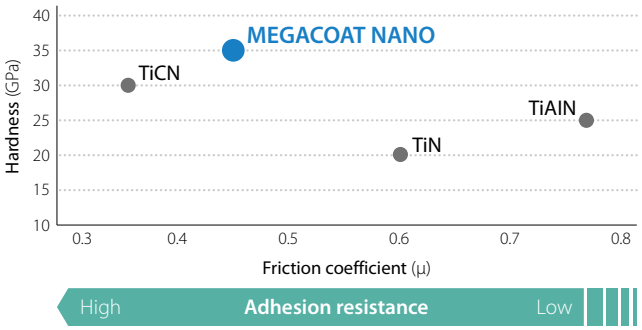
MEGACOAT NANO coating technology with high hardness (35 Gpa) and excellent oxidation resistance. Oxidation temperature (1,150 ˚C) improves wear resistance. Chipping resistance improved as well.

Properties of coating (Wear resistance)



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

Properties of coating (Adhesion resistance)

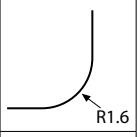
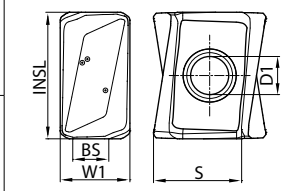
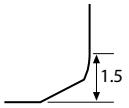


Stable machining with excellent adhesion resistance

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

PR1535 **Fracture resistant, tough substrate for stable machining.**

Insert description

Insert			Description		Dimensions (mm)					MEGACOAT NANO		Applicable toolholders
					W1	S	D1	INSL	BS	PR1535	PR1525	
 Corner-R	 R1.6	 INSL BS W1 S D1	LOGU 221616ER-GM		12.5	16.6	6.8	22.8	6.3	●	●	MFLN90.. MFLN70.. MFLN45..
 Corner chamfer	 1.5		LOGU 2216PAER-GM		12.5	16.9	6.8	22.8	4.8	●	●	MFLN90..

Classification of usage
★ : 1st recommendation
☆ : 2nd recommendation

P	Carbon steel • Alloy steel	☆	★
	Mold steel	☆	★
K	Gray cast iron	☆	★
	Nodular cast iron	☆	★

● : Available

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

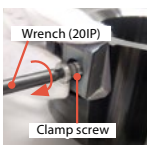


Fig.2


Fig.3

MFLN90 Cutting edge angle 90°

Fig.1

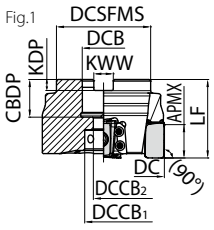
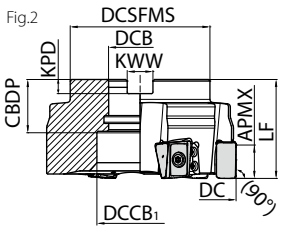


Fig.2



Rake angle	A.R.	Max. +4.5°
	R.R.	-16.5° ~ -13.5°
Applicable inserts	LOGU221616ER-GM	
	LOGU2216PAER-GM	

Fig.3

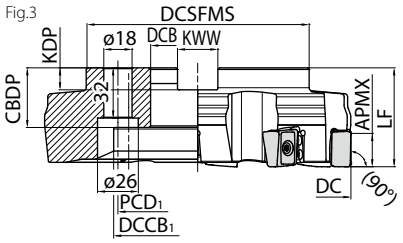
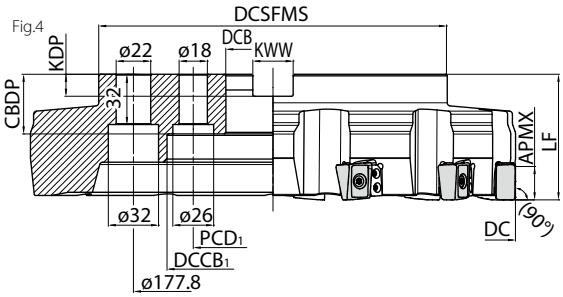


Fig.4



Toolholder dimensions

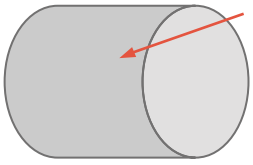
Description			Avail-ability	No. of inserts	Dimensions (mm)											Coolant hole	Drawing	Weight (kg)
					DC	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	PCD_1			
Metric bore dia.	MFLN	90080R-4T-M	●	4	80	60	27	24	13	50	24	7	12.4	20	–	Yes	Fig.1	1.0
		90100R-4T-M	●		100	70	32	45	–		30	8	14.4				Fig.2	1.5
		90125R-6T-M	●	6	125	89	40	55		63	33	9	16.4					2.9
		90160R-7T-M	●	7	160	110		90							66.7	No	Fig.3	4.5
		90200R-8T-M	●	8	200	142	60	132			38	14	25.7		101.6			6.9
		90250R-10T-M	●	10	250			172										10.3
		90315R-12T-M	MTO	12	315	222		205		80							Fig.4	20.9

●: Available
MTO : Made to order

Case study

Roll Alloy steel

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



Productivity

MFLN90 **Vf = 412 mm/min** Cutting edges are still available

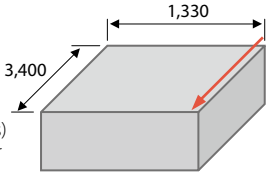
Competitor E **Vf = 412 mm/min**

MFLN maintained good cutting edge condition and during scale removing.

User evaluation

Machining base GGG60

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

Productivity efficiency

	Roughing	Finishing
MFLN70	**Q = 2,340 cc/min**	**Q = 2,340 cc/min** x1.1
Competitor	Roughing (Competitor F) Q = 2,100 cc/min	Finishing (Competitor G) Q = 1,970 cc/min

MFLN improved machining efficiency with lower cutting force.
Also it can be used both for roughing and finishing.

User evaluation

Fig.1

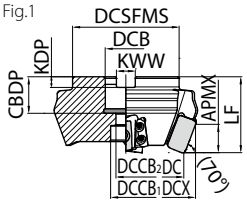
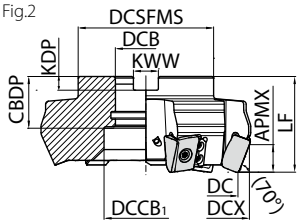


Fig.2



Rake angle	A.R.	Max. +1.0°
	R.R.	-16.5° ~ -13.5°
Applicable inserts	LOGU221616ER-GM	

LOGU2216PAER-GM is not applicable

Fig.3

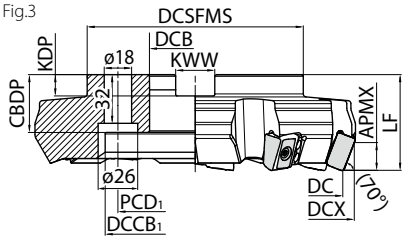
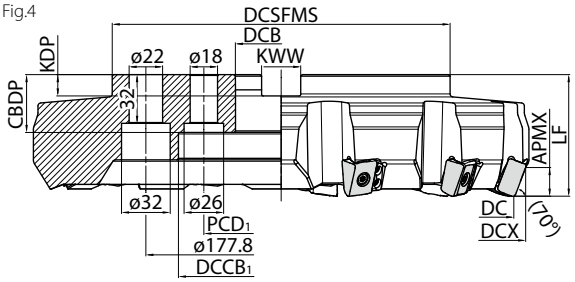


Fig.4



Toolholder dimensions

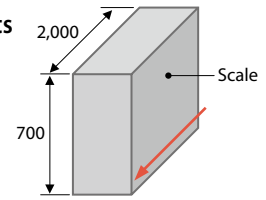
Description			Avail-ability	No. of inserts	Dimensions (mm)												Coolant hole	Drawing	Weight (kg)
					DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	PCD_1			
Metric bore dia.	MFLN	70080R-4T-M	●	4	80	93	70	27	20	13	50	24	7	12.4	17	–	Yes	Fig.1	1.4
		70100R-4T-M	●		100	113	78	32	45	–		30	8	14.4				Fig.2	1.9
		70125R-6T-M	●	6	125	138	89	40	55		63	33	9	16.4					3.4
		70160R-7T-M	●	7	160	173	110		90							66.7	No	Fig.3	5.3
		70200R-8T-M	●	8	200	213	142	60	120			38	14	25.7		101.6			8.2
		70250R-10T-M	●	10	250	263	222		160										14.8
		70315R-12T-M	MTO	12	315	328			215		80							Fig.4	21.9

● : Available
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)	LOGU2216PAER-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°

Fig.1

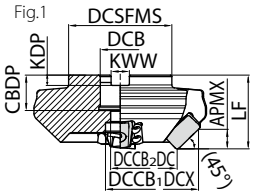
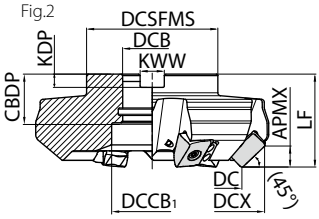


Fig.2



Rake angle	A.R.	Max. +3.0°
	R.R.	-16.5° ~ -13.5°
Applicable inserts	LOGU221616ER-GM	

LOGU2216PAER-GM is not applicable

Fig.3

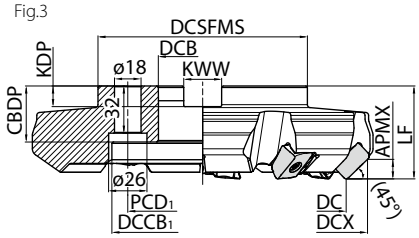
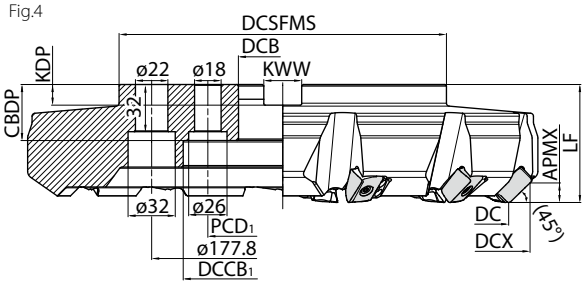


Fig.4

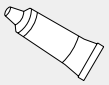


Toolholder dimensions

Description			Avail-ability	No. of inserts	Dimensions (mm)												Coolant hole	Drawing	Weight (kg)
					DC	DCX	DCSFMS	DCB	$DCCB_1$	$DCCB_2$	LF	CBDP	KDP	KWW	APMX	PCD_1			
Metric bore dia.	MFLN	45080R-4T-M	●	4	80	104	70	27	20	13	50	24	7	12.4	12	–	Yes	Fig.1	2.0
		45100R-4T-M	●		100	124	78	32	45	–		30	8	14.4				Fig.2	2.7
		45125R-6T-M	●	6	125	149	89	40	55		63	33	9	16.4					4.6
		45160R-7T-M	●	7	160	184	110		90							66.7	No	Fig.3	6.7
		45200R-8T-M	●	8	200	224	142	60	124			38	14	25.7		101.6			9.7
		45250R-10T-M	●	10	250	274	222		160										16.9
		45315R-12T-M	MTO	12	315	339			215		80							Fig.4	25.1

●: Available
MTO : Made to order

Spare parts

Description		Parts						
		Clamp screw	Wrench	Shim sheet	Clamp screw	Wrench	Coat anti-seize compound	Arbor bolt
								
MFLN	**080R-4T-M	SB-60200TRP	TTP-20	MAP-2216	SB-40140TR	DTM-15	P-37	HH12X35
	**100R-4T-M ~ **315R-12T-M	Tightening torque for clamping insert 6.0 N·m		Tightening torque for clamping shim sheet 3.5 N·m				–

Recommended cutting conditions

★ : 1st recommendation ☆ : 2nd recommendation

	Workpiece	D.O.C. (mm)		fz: mm/t	Recommended insert grades (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
	Mold 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
	Mold 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
	Mold 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.

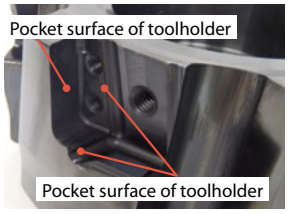


Fig.1

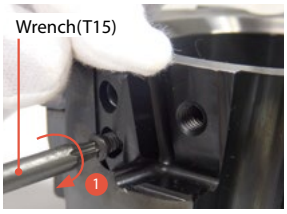


Fig.2

Fig.3


Fig.4

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