MITSUBISHI

TOOLS NEWS

B015G

Plunge milling cutter for finishing

PMF

Excellent face verticality, High surface accuracy.

Best for vertical milling of deep molds!

- Enables deep milling with a reciprocating motion.
- High precision milling with no hand finishing.
- High speed, high feed rates, and reciprocationg motion enables highly efficient machining.

Miracle Coated *VP15TF*

Miracle coating displays high welding resistance therefore it can be used for machining a wide range of workpiece materials such as Plain steels, Mild steels, Low carbon steels and Stainless steels.

MITSUBISHI CARBIDE

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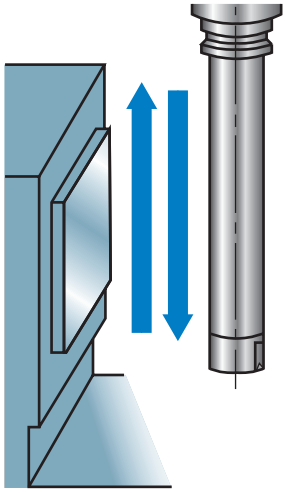
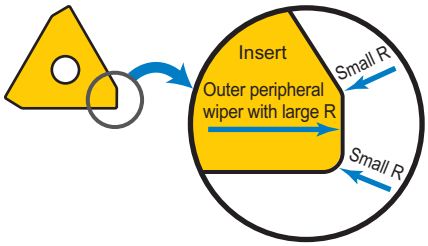
Features

Enables deep milling with a reciprocating motion.

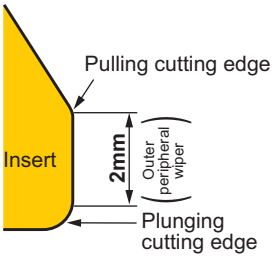


High precision milling with no hand finishing.



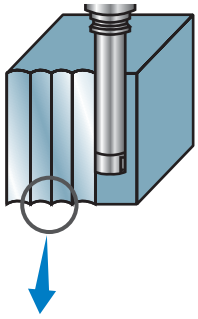
- High tool rigidity design prevents the tool from slipping and gives excellent straightness.
- Large radius of the outer peripheral wiper gives excellent surface accuracy.

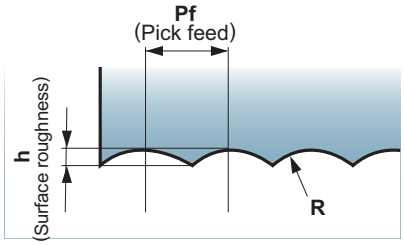
High speed, high feed rates, and reciprocationg motion enables highly efficient machining.



- CBN and AP coated inserts and a highly rigid body enable high speed machining.
- Wide width of the outer peripheral wiper and its multitooth design enables high feed rates.
- Having two cutting edges for plunging and pulling enables round-trip machining.

Theoretical finished surface roughness



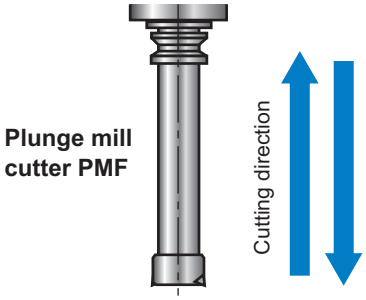


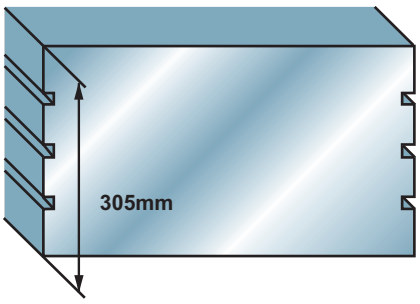
$$h(\text{Surface roughness}) = \frac{(Pf)^2}{8R} \times 1000(\mu m)$$

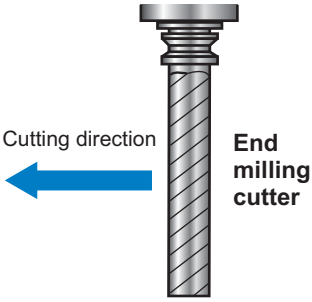
$$R : \frac{\text{Cutter diameter}}{2}$$

Cutting performance

Cast iron (JIS FC300)







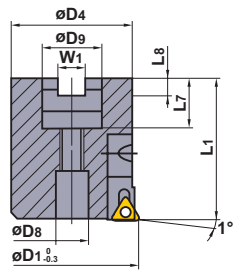
Tool			Plunge Mill PMF (Ø80, 8 teeth): MB710	Long end milling cutter made of high speed steel (Ø56, 6 theeth)
Cutting conditions	Cutting speed (m/min)		1507.2	9.7
	Table feed (mm/min)		6000 (17.2*)	41.25
	Depth of cut (mm)		0.1	0.1
	Cutting length (mm)		305	305
	Pick feed (mm)		1.0	-
Coolant			Dry	Dry
Result	Surface inclination (μm)		3	157
	Surface accuracy (μm)	Vertical direction	4	19
		Horizontal direction	4	15
Note			· To improve cutting accuracy, the long end milling cutter made of high speed steel required several machining passes. · Plunge Mill PMF produced desirable finished surface after single machining.	

* PMF's crossfeeding speed. It includes the time for the tool, being crossfed and running idle around the workpiece.

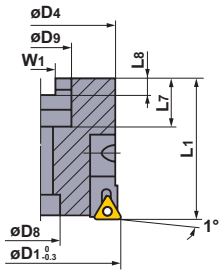
PMF

- Enables deep milling with a reciprocating motion.
- Excellent face verticality.
- High surface accuracy.

ø50

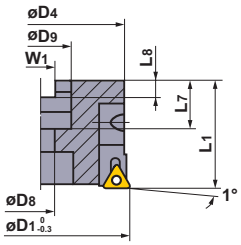


ø63



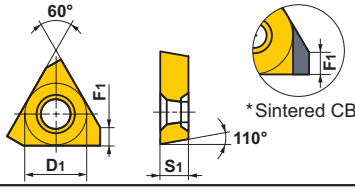
Right hand tool holder only. Tolerance when setting with master insert.

ø80



Order number	Stock	Number of teeth	Dimensions (mm)								Insert	Cartridge	Insert clamp screw	Radial adjusting screw	Cartridge set screw	Clamp screw	Wrench	Wrench
	R		D1	L1	D9	L7	D8	W1	L8	D4								
PMF05004A22R	●	4	50	63	22	20	12	10.4	6.3	48	TPEW 1303ZP ○R2	PMFA13R	TS254	TSS04005	HBH06012	①LS21	TKY08F	HKY40R HKY50R
06306A22R	●	6	63	63	22	20	18	10.4	6.3	60		PMFA13R	TS254	TSS04005	HBH06012	②HSC10050	TKY08F	HKY40R
08008A27R	●	8	80	50	27	23	13.5	12.4	7	75		PMFA13R	TS254	TSS04005	HBH06012	②HSC12040	TKY08F	HKY40R

Insert

Shape	ISO Order number	Class	Coated				CBN		Geometry	Dimensions (mm)		
			VP15TF	AP10H			MB710			D1	S1	F1
	TPEW1303ZPER2	E	●	●						7.94	3.18	2
*	**1303ZPTR2**	E					●			7.94	3.18	2

Recommended cutting conditions

	Workpiece	Hardness	Grade	Cutting speed (m/min)	Feed per tooth (mm/tooth)
P	Carbon steel Alloy steel (JIS S50C JIS SCM440 etc.)	180 - 280HB	**VP15TF**	250 (150 - 350)	0.1 (0.05 - 0.15)
		280 - 380HB	**VP15TF**	200 (100 - 300)	
K	Cast iron (JIS SFC250 etc.)	Tensile strength ≤350N/mm²	**AP10H**	350 (200 - 500)	0.1 (0.05 - 0.15)
			MB710	1500 (1000 - 2000)	

	Workpiece	Hardness	Grade	Cutting speed (m/min)	Feed per tooth (mm/tooth)
K	Ductile cast iron (JIS FCD450 etc.)	Tensile strength 360 - 500N/mm²	**AP10H**	250 (150 - 350)	0.1 (0.05 - 0.15)
			MB710	1000 (800 - 1200)	
	Ductile cast iron (JIS FCD600 etc.)	Tensile strength 500 - 800N/mm²	**AP10H**	200 (100 - 300)	0.1 (0.05 - 0.15)
			MB710	1000 (800 - 1200)	

- Revolution (min^{-1}) = (1000 x cutting speed) ÷ (3.14 x cutting diameter)
- Table feed (mm/min) = feed per tooth x number of teeth x cutter revolution

Note : 1) Recommended cutting depth to the diameter is 0.1mm.
2) For better efficiency, vertical milling from both directions is recommended.
3) In case of crossfeed cutting, lower the feed (mm/tooth) to 0.05 or lower.

● : Inventory maintained. No mark : Products not manufactured.

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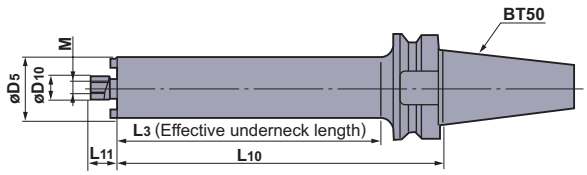
Long arbor standards



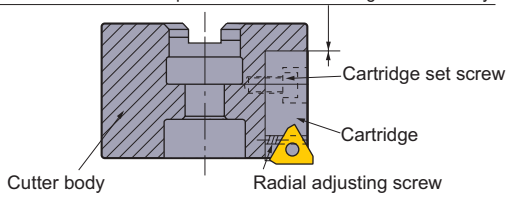
Order number	Stock	Dimensions (mm)						Weight (kg)	Applicable cutter
		D5	D10	L10	L11	L3	M		
BT50-22-250-050	●	47	22	250	18	202	10	6.5	PMF05004A22R
22-250-063	●	60	22	250	18	204	10	8.5	PMF06306A22R
27-300-080	●	75	27	300	22	252	12	12.5	PMF08008A27R

● : Inventory maintained.

How to adjust runout of the cutting edge

1

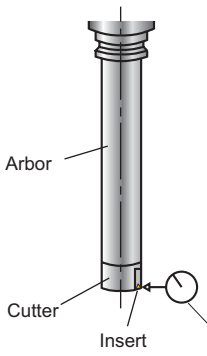
Please make sure there is no space between the cartridge and the body.



Adjust runout in outer peripheral directions by moving the radial adjusting screw.

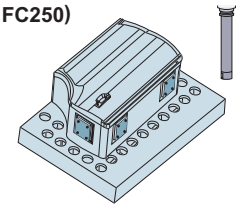
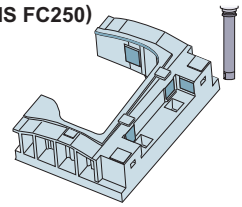
1. Fix cartridge to the body with the cartridge set screw.
2. Push radial adjusting screw into the body and adjust runout in outer directions by moving the screw.

2



Of all the cutting edges, make the most protruding one a reference point, and adjustrunout of other edges by radial adjusting screws until it becomes 10μm or smaller.

Application example

Tool		PMF08008A27R(AP10H)	PMF05004A22R(AP10H)
Workpiece		Cast iron (JIS FC250) 	Cast iron (JIS FC250) 
Component		Press mold	Press mold
Cutting conditions	Revolution (min-1)	2000	3200
	Cutting speed (m/min)	503	502
	Table feed (mm/min)	2000	1200
	Feed per tooth (mm/tooth)	0.125	0.047
	Depth of cut (mm)	0.2	0.3
	Pick feed (mm)	1.0	1.0
Result		Result after finishing 8 surfaces ①Finished surface roughness Vertical direction : ≤5μm Horisontal direction : ≤3μm ②Surface inclination 3μm/200mm	Result after finishing 8 surfaces ①Finished surface roughness Vertical direction : ≤5μm Horisontal direction : ≤5μm ②Surface inclination 3μm/135mm

For Your Safety
●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching chips or spare parts, please use the attached wrench or spanner. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

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(Tools specifications subject to change without notice.)

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