MITSUBISHI
MITSUBISHI MATERIALS

TOOLS NEWS

2008.9 Update B111G

Indexable End Mill for Deep Shoulder Milling

SPX

JM breaker addition!

Offers low cutting resistance for heavy machining & deep shoulder milling

- Wavy cutting edge geometry WH breaker breaks the chips into fine pieces.
- NEW The straight edge type JM breaker produces excellent surface finishes.

Indexable End Mill for Deep Shoulder Milling

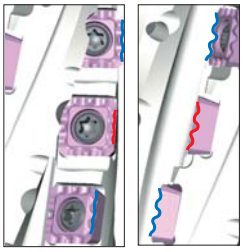
SPX

Features

Insert

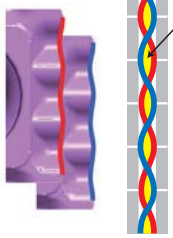
Wavy cutting edge type

WH Breaker		
Bottom Cutting Edge A	Bottom Cutting Edge B	Peripheral Cutting Edge
		



The wavy cutting edge gradually engages the workpiece.

Reduced impact when entering the workpiece.



Chip cross section

Uses the same cutting edge theory as a solid type roughing end mill.

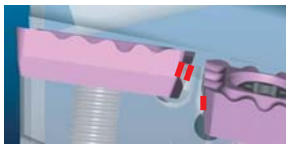
Lower cutting resistance

Straight cutting edge type

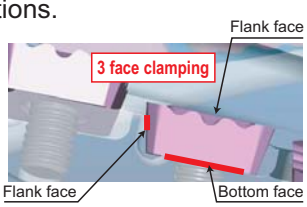
JM Breaker		
Bottom Cutting Edge A	Bottom Cutting Edge B	Peripheral Cutting Edge
		

High clamping rigidity

The high clamping and positional rigidity of the inserts prevents damage to the cutting edge even under the harshest conditions.



<Bottom cutting edge>



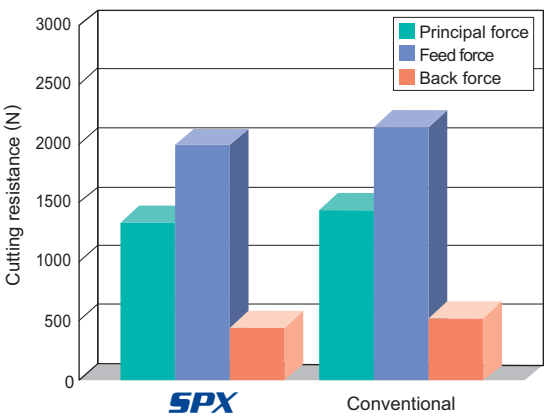
<Peripheral cutting edge>

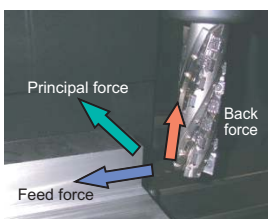
Spiral relief cut

Prevents chip packing and damage to the tool body without hindering the overall tool rigidity.

Cutting performance

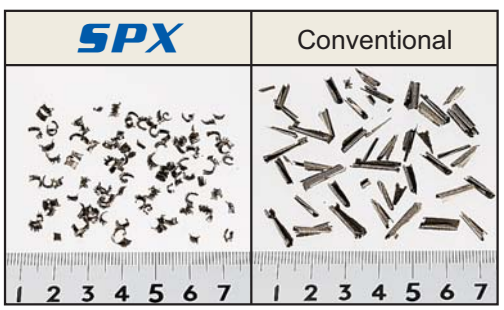
Low Cutting Resistance





<Cutting conditions>
Workpiece : JIS FCD450
Cutting speed : 100m/min
Feed per tooth : 0.20mm/tooth
Axial depth of cut : 50m
Width of cut : 5mm
Dry cutting

Chip Breaking



Indexable End Mill for Deep Shoulder Milling

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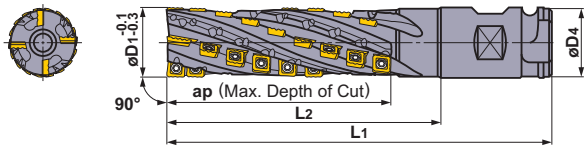
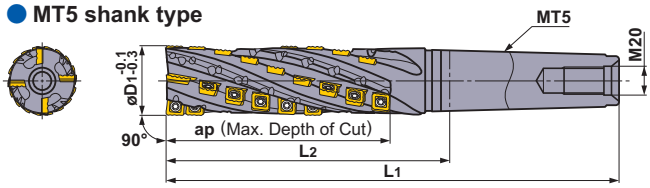
Holder

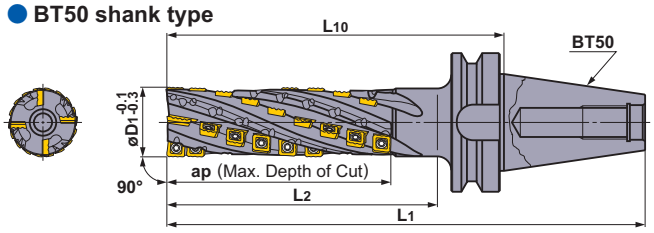
Straight shank type (Combination type)



MT5 shank type



BT50 shank type



Light Alloy	Cast Iron	General Steel	Alloy Tool Steel	Hardened Steel

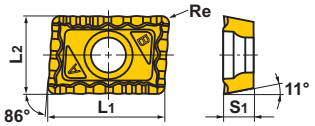
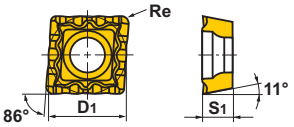
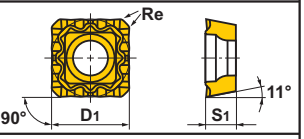
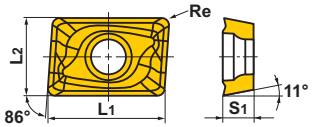
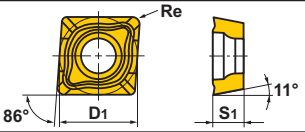
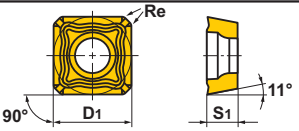
Type	Order Number	Stock	Number of Teeth			Dimensions (mm)						Number of Insert		
												Bottom Cutting Edge A	Bottom Cutting Edge B	Peripheral Cutting Edge
			Flutes	Total	Bottom	D_1	L_1	D_4	L_2	L_{10}	ap	JPMX 190412-○○	MPMX 120412-○○	SPMX 120408-○○
Straight Shank (Combination)	SPX4R05024WNS	●	2	24	4	50	220	50.8	140	—	110	2	2	20
	4R05034WNM	●	2	34	4	50	270	50.8	190	—	157	2	2	30
	4R05044WNL	●	2	44	4	50	320	50.8	240	—	205	2	2	40
BT50 Shank	SPX4R05024BT50NS	●	2	24	4	50	289.8	—	140	188	110	2	2	20
	4R05034BT50NM	●	2	34	4	50	339.8	—	190	238	157	2	2	30
	4R05044BT50NL	●	2	44	4	50	389.8	—	240	288	205	2	2	40
	4R06324BT50NS	●	2	24	4	63	289.8	—	140	188	110	2	2	20
	4R06334BT50NM	●	2	34	4	63	339.8	—	190	238	157	2	2	30
	4R06344BT50NL	●	2	44	4	63	389.8	—	240	288	205	2	2	40
	4R06356BT50NX	●	2	56	4	63	439.8	—	290	338	261	2	2	52
MT5 Shank	SPX4R05024MT5NS	●	2	24	4	50	279.5	—	150	—	110	2	2	20
	4R05034MT5NM	●	2	34	4	50	329.5	—	200	—	157	2	2	30
	4R05044MT5NL	●	2	44	4	50	379.5	—	250	—	205	2	2	40

Spare Parts

Holder					
	Insert			Clamp Screw	Wrench
	Bottom Cutting Edge A	Bottom Cutting Edge B	Peripheral Cutting Edge		
SPX	JPMX190412-WH	MPMX120412-WH	SPMX120408-WH	TS55	TKY25D
	JPMX190412-JM	MPMX120412-JM	SPMX120408-JM	TS55	TKY25D

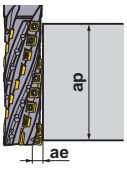
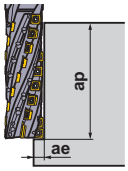
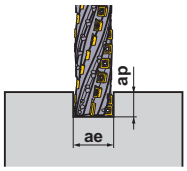
● : Inventory maintained.

Inserts

Type		Shape	Order Number	Class	Coated				Dimensions (mm)					Geometry
					VP15TF	VP20RT			L_1	L_2	D_1	S_1	Re	
Wavy Cutting Edge Type	Bottom Cutting Edge A		**JPMX190412-WH**	M	●	●			19.05	12.7	–	4.76	1.2	
	Bottom Cutting Edge B		**MPMX120412-WH**	M	●	●			–	–	12.7	4.76	1.2	
	Peripheral Cutting Edge		**SPMX120408-WH**	M	●	●			–	–	12.7	4.76	0.8	
NEW Straight Cutting Edge Type	Bottom Cutting Edge A		**JPMX190412-JM**	M	●	●			19.05	12.7	–	4.76	1.2	
	Bottom Cutting Edge B		**MPMX120412-JM**	M	●	●			–	–	12.7	4.76	1.2	
	Peripheral Cutting Edge		**SPMX120408-JM**	M	●	●			–	–	12.7	4.76	0.8	

● : **Inventory maintained.**

Recommended Cutting Conditions

Cutting Mode	A: Side milling	B: Shoulder Milling	C: Slot Milling
			

	Work Material	Hardness	Grade	Cutting Speed (m/min)	Cutting Mode	Revolution (min^{-1})	Table Feed (mm/min)	**ap** (mm)	**ae** (mm)
P	Alloy Tool Steel (JIS SKD11 etc.)	≤300HB	**VP20RT**	60 (50—80)	A	382	191	100—200	5—10
					B	382	191	100—200	5—10
					C	318	159	10	—
	Alloy Tool Steel (SX-105V etc.)	≤280HB	**VP20RT**	80 (60—100)	A	509	305	100—200	5—10
					B	509	305	100—200	5—10
					C	382	191	10	—
	Cast Tool Steel (GM190, GM241, ICD5 etc.)	≤250HB	**VP20RT**	80 (60—100)	A	509	356	100—200	5—10
					B	509	356	100—200	5—10
					C	—	—	—	—
K	Cast Iron (JIS FC250 etc.)	Tensile Strength ≤300MPa	**VP15TF**	100 (50—140)	A	636	509	100—200	5—10
					B	636	509	100—200	5—10
					C	318	127	50	—
	Ductile Cast Iron (JIS FCD450 etc.)	Tensile Strength ≤500MPa	**VP15TF**	100 (50—140)	A	636	509	100—200	5—10
					B	636	509	100—200	5—10
					C	318	127	40	—
	Ductile Cast Iron (JIS FCD700 etc.)	Tensile Strength ≤800MPa	**VP15TF**	100 (40—140)	A	509	407	100—200	5—10
					B	509	407	100—200	5—10
					C	254	102	30	—

Note 1) The above cutting conditions are determined based on high machine, workpiece and workpiece clamping rigidity, where no vibration occurred. If vibrations occur make adjustments according to the machining conditions.

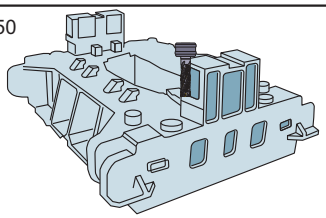
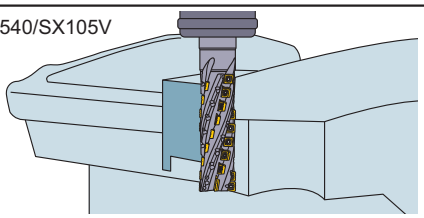
Note 2) Vibration is liable to occur in certain cases. Please change the cutting conditions in the following cases.

- When using SPX4R05044WNL / BT50NL, SPX4R06356BT50NX
  For A: side milling or B: shoulder milling, reduce the cutting speed and table feed by 10-20% and ae by 50%.
- If the cutting angle between the tool and workpiece exceeds 90° when machining corners
  Reduce the cutting speed and table feed by 10-20% and ae by 50%. Also if possible, set a radius cutting path for corners.

Indexable End Mill for Deep Shoulder Milling

SPX

Application Examples

Tool			SPX4R05034WNM	SPX4R05034WNM
Grade			VP15TF	VP20RT
Workpiece			JIS FC250 	FCD540/SX105V 
Component			Press moulds (base)	Press moulds (trim)
Cutting Conditions	Cutting Speed	(m/min)	100	100
	Table Feed	(mm/min)	509	445
	Feed per Tooth	(mm/tooth)	0.4	0.35
	Axial Depth of Cut	(mm)	125	50—100
	Width of Cut	(mm)	8—10	5—8
Coolant			Dry Cutting	Dry Cutting
Results			In comparison with the conventional product overall machining efficiency was doubled. Stable tool life due to effective chip control and low cutting resistance was also achieved.	In comparison with the conventional product overall machining efficiency was increased by 70%.

For Your Safety
●Don't handle inserts and chips without gloves. ●Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage. ●Please use safety covers and wear safety glasses. ●When using compounded cutting oils, please take fire precautions. ●When attaching inserts or spare parts, please use only the correct wrench or spanner.
●When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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(Tools specifications subject to change without notice.)

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