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MITSUBISHI MATERIALS

MITSUBISHI CARBIDE

2009.3 Update B111E

Indexable End Mill for Deep Shoulder Milling

SPX

Offers low cutting resistance for deep shoulder milling

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

Indexable End Mill for Deep Shoulder Milling

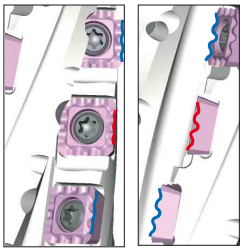
SPX

Features

Insert

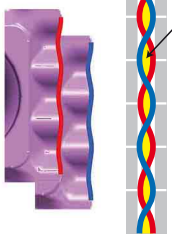
Wavy cutting edge type

WH Breaker		
Bottom A	Bottom B	Peripheral
		



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.

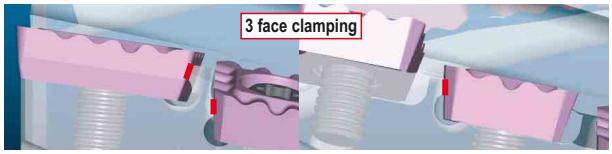
Lower cutting resistance

Straight cutting edge type

JM Breaker		
Bottom A	Bottom B	Peripheral
		

High clamping rigidity

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

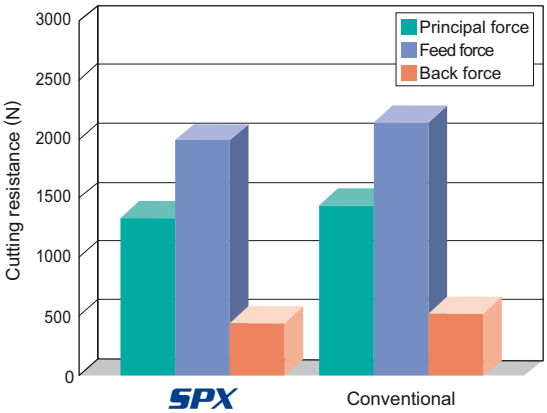


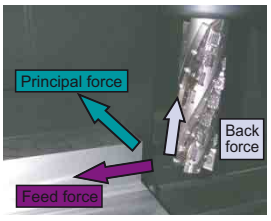
Spiral relief cut

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

Cutting performance

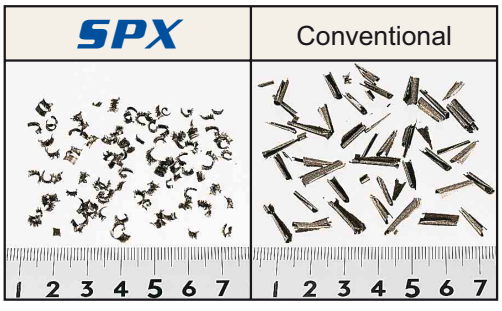
Low Cutting Resistance





<Cutting conditions>
Workpiece : DIN GGG45
Cutting speed : 100m/min
Feed per tooth : 0.20mm/tooth
Axial depth of cut : 50m
Width of cut : 5mm
Dry cutting

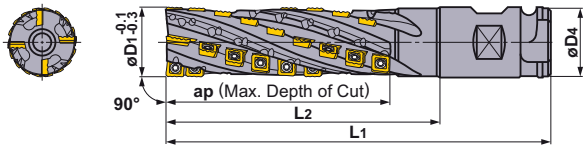
Chip Breaking



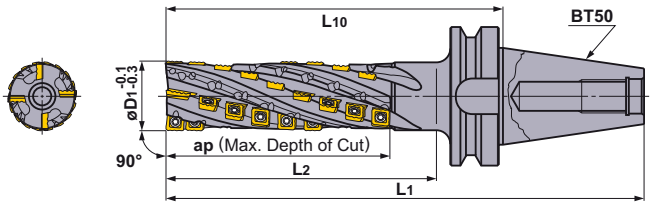
SPX

Holder

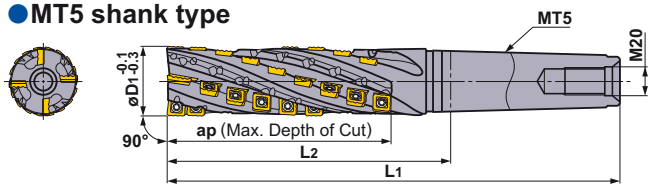
Straight shank (Combination type)



BT50 shank

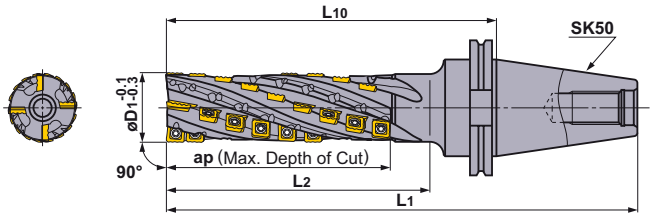


MT5 shank type



Light Alloy	Cast Iron	General Steel	Alloy Tool Steel	Hardened Steel

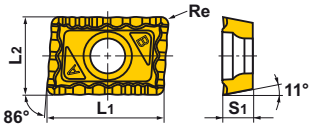
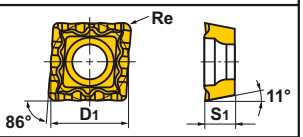
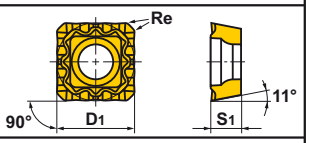
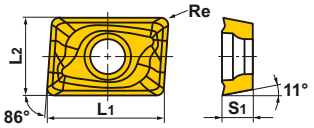
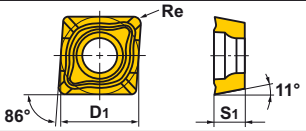
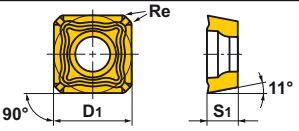
SK50 shank



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	D1	L1	D4	L2	L10	ap	JPMX 190412-○○	MPMX 120412-○○	SPMX 120408-○○
Straight Shank (Combination)	Short	SPX4R05016WNES	★	2	16	4	50	180	50.8	100	–	72	2	2	12
	Standard	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	Short	SPX4R05016BT50NES	★	2	16	4	50	249.8	–	100	148	72	2	2	12
	Standard	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
SK50 Shank	Standard	NEW SPX4R05024SK50NS	●	2	24	4	50	289.6	–	140	188	110	2	2	20
		NEW 4R05034SK50NM	●	2	34	4	50	339.6	–	190	238	157	2	2	30
		NEW 4R05044SK50NL	●	2	44	4	50	389.6	–	240	288	205	2	2	40
		NEW 4R06324SK50NS	●	2	24	4	63	289.6	–	140	188	110	2	2	20
		NEW 4R06334SK50NM	●	2	34	4	63	339.6	–	190	238	157	2	2	30
		NEW 4R06344SK50NL	●	2	44	4	63	389.6	–	240	288	205	2	2	40
		NEW 4R06356SK50NX	●	2	56	4	63	439.6	–	290	338	261	2	2	52
MT5 Shank	Standard	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

● : Inventory maintained. ★ : Inventory maintained in Japan.

Inserts

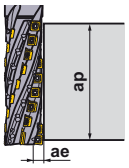
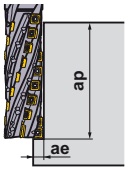
Type		Shape	Order Number	Class	Coated				Dimensions (mm)					Geometry
					VP15TF	VP20RT			L_1	L_2	D_1	S_1	Re	
Wavy Cutting Edge Type	Bottom A		**JPMX190412-WH**	M	●	●			19.05	12.7	–	4.76	1.2	
	Bottom B		**MPMX120412-WH**	M	●	●			–	–	12.7	4.76	1.2	
	Peripheral		**SPMX120408-WH**	M	●	●			–	–	12.7	4.76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

★ : Inventory maintained in Japan.

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

Recommended Cutting Conditions

Cutting Mode	A: Side milling	B: Shoulder 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	≤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	≤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	≤250HB	**VP20RT**	80 (60—100)	A	509	356	100—200	5—10
					B	509	356	100—200	5—10
					C	—	—	—	—
K	Cast Iron	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	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	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%.
- When slotting

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www.mitsubishicarbide.com

MMC HARTMETALL GmbH
Comeniusstr. 2, 40670 Meerbusch Germany
Tel. +49-2159-9189-0 Fax +49-2159-918966
e-mail admin@mmchg.de

MMC HARDMETAL U.K. LTD.
Mitsubishi House, Galena Close, Tamworth, Staffs. B77 4AS, U.K.
Tel. +44-1827-312312 Fax +44-1827-312314
e-mail sales@mitsubishicarbide.co.uk

MMC METAL FRANCE s.a.r.l.
6, Rue Jacques Monod, 91400 Orsay, France
Tel. +33-1-69 35 53 53 Fax +33-1-69 35 53 50
e-mail mmfsales@mmc-metal-france.fr

MITSUBISHI MATERIALS ESPAÑA, S.A.
Calle Emperador 2, 46136 Museros/Valencia, Spain
Tel. +34-96-144-1711 Fax +34-96-144-3786
e-mail mme@mmevalencia.com

MMC ITALIA S.r.l.
V.le Delle Industrie 20/5, 20020 Milano Italy
Tel. +39-02 93 77 03 1 Fax +39-02 93 58 90 93
e-mail info@mmc-italia.it

MMC HARDMETAL POLAND SP. z o.o.
Al..Armii Krajowej 61, 50-541 Wroclaw, Poland
Tel. +48-71335-16-20 Fax +48-71335-16-21
e-mail sales@mitsubishicarbide.com.pl

MMC HARDMETAL RUSSIA OOO LTD.
UL. Bolschaja Pochtovaja, 36 Bldg.1, 105082 Moscow, Russia
Tel. +7-495-72558-85 Fax +7-495-98139-73
e-mail mmc@carbide.ru

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