

MITSUBISHI

MITSUBISHI CARBIDE

TOOLS NEWS

2004.2.Update B017G

MIRACLE[®]
coated inserts
Series
expansion

General Use Screw-on Insert type Face Milling Cutter

ASX445

Carbide sheet and proprietary Anti-Fly Insert employed.

**Stable face milling even
under heavy cutting
conditions.**

- Easily and securely installed inserts.
- High heat- and oxidation-resistant body.
- Higher efficiency and improved quality.



MIRACLE[®] Coating

VP15TF

Effective in machining a wide range of materials

NEW

VP30RT

Ideal for heavy interrupted cutting of general steel and stainless steel

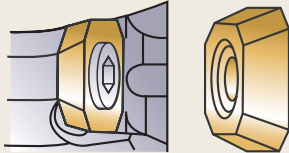
General Use Screw-on Insert type Face Milling Cutter

ASX445

Features

Cutter body designed to achieve stability, long life, and high accuracy

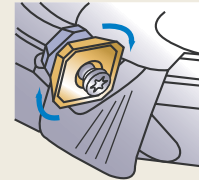
A carbide shim with Mitsubishi's proprietary Anti-Fly Insert (AFI) mechanism provides excellent setting characteristics, permitting stable cutting even under high load conditions.



The cutter body is made from a special alloy that provides high strength at high temperature. A special surface treatment improves the corrosion resistance.

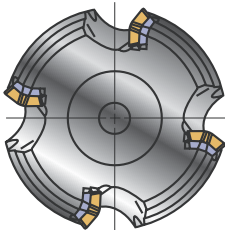


The **ASX** cutter uses screw-on type inserts that allow easy clamping of the inserts with high location precision. Indexing of the inserts can be performed without completely removing the screw.

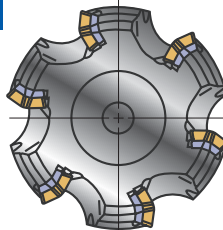


Cutter bodies for a wide range of applications

Coarse Pitch type

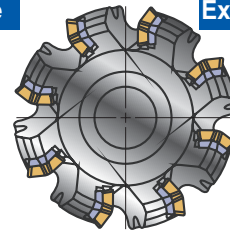


1. The 1st recommended type for cutting general steel and stainless steel.
2. For deep cutting with high feed rates and large-volume chip discharge.
3. Longer overhang for relatively low machining rigidity.



Fine Pitch type

1. The 1st recommended type for cutting cast iron, hardened steel and heat-resistant alloys.
2. For shallow cutting with low feed rates and low-volume chip discharge.



Extra Fine Pitch type

1. The 1st recommended for cutting of cast iron.
2. For cutting operations where chip discharge volume is small and high table feed is desired.

Chipbreakers for a wide range of applications

JL Finishing to Light cutting Breaker



High accuracy peripherally ground type inserts. High rake angle and low resistance.

- ① Workpiece rigidity is low.

JM Light to Semi-heavy cutting Breaker



High accuracy molded type inserts. Applicable for various workpieces and cutting conditions.

- ① General cutting.

JH Medium to Heavy cutting Breaker



High accuracy molded type inserts. Strengthening of the cutter edge prevents chipping and thus fracturing.

- ① Interrupted cutting.
- ② Scaling.

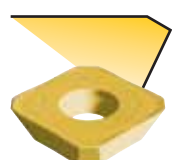
JP Aluminum alloy cutting Breaker



High accuracy peripherally ground type inserts. Excellent sharpness and welding resistance due to the large rake angle and mirror finish.

- ① Aluminum alloy cutting.
- ② High feed cutting.

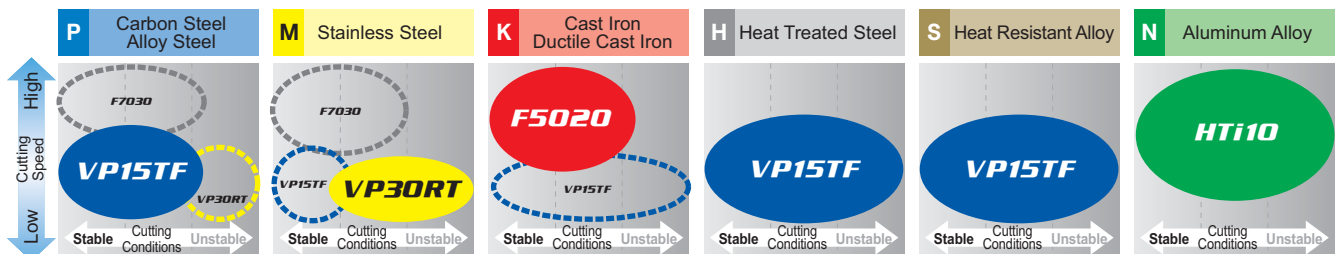
FT Cast iron cutting Breaker



High accurate molded inserts. Higher fracture-resistant flat inserts.

- ① For rough machining of scaled cast iron.

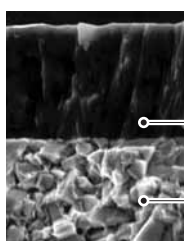
Insert grades for a wide range of materials



*When machining steel or stainless steel and putting weight on surface finish, use cermet grade NX4545.

Stable Cutting : Continuous cutting, Constant depth of cut, Pre-machined securely clamped component cutting
Unstable Cutting : Heavy interrupted cutting, Irregular depth of cut, Low clamping rigidity cutting

MIRACLE[®] coated VP15TF

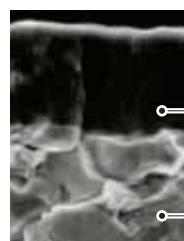


● Due to the cemented carbide with high wear resistance and fracture resistance, the **VP15TF** realized stable machining operation.

MIRACLE[®] coating (Al,Ti)N

Cemented carbide substrate **TF15**

MIRACLE[®] coated VP30RT



● A combination of tough special cemented carbide substrate and **MIRACLE** coating provides excellent fracture resistance. Ideal for heavy interrupted cutting of stainless steel and general steel.

MIRACLE[®] coating (Al,Ti)N

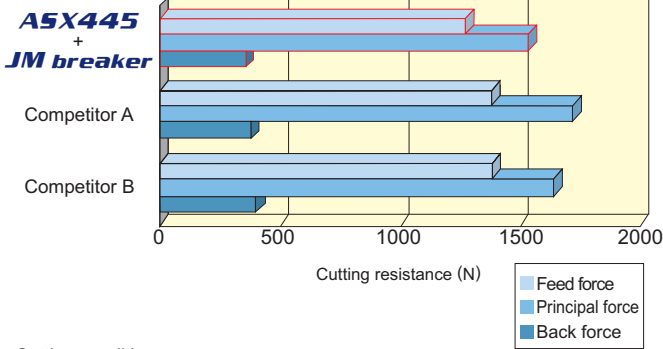
Tough special cemented carbide substrate

Cutting Performance

Cutting of General Steel

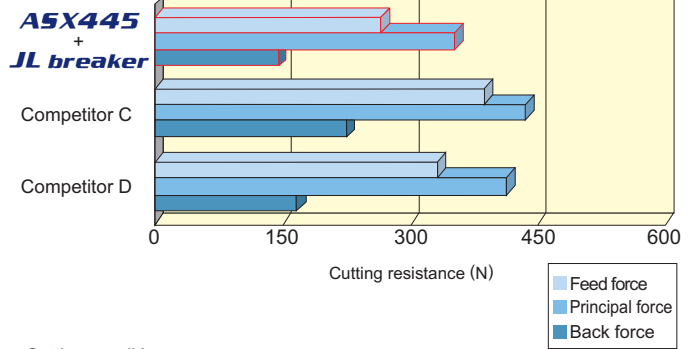
● Cutting Resistance

■ General cutting



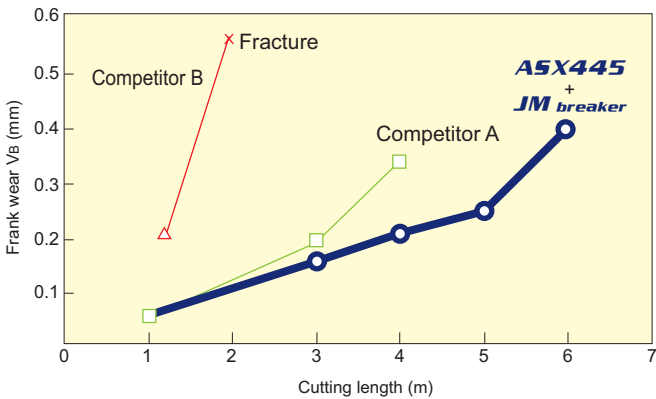
<Cutting conditions>
 Workpiece : JIS SCM440 Cutting speed : 220m/min
 Tool : ASX445R12506E Feed : 0.24mm/tooth
 Insert : SEMT13T3AGSN-JM Depth of cut : 3mm
 Grade : F7030 Dry cutting

■ Finishing



<Cutting conditions>
 Workpiece : JIS SCM440 Cutting speed : 200m/min
 Tool : ASX445R10005D Feed : 0.2mm/tooth
 Insert : SEET13T3AGEN-JL Depth of cut : 0.5mm
 Grade : F7030 Dry cutting

● Wear Resistance

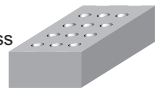


<Cutting conditions>
 Workpiece : JIS SCM440 Cutting speed : 220m/min
 Tool : ASX445R12506E Feed : 0.24mm/tooth
 Insert : SEMT13T3AGSN-JM Depth of cut : 3mm
 Grade : F7030 Dry cutting

● Fracture Resistance (Heavy interrupted cutting)

	Feed (mm/tooth)			
	0.26	0.28	0.30	0.32
JH breaker (F7030)	○	○	○	○
JM breaker (F7030)	○	○	×	×
Competitor A (P20 suit)	○	×	○	○

<Cutting conditions>
 Workpiece : JIS SCM440 Cutting speed : 200m/min
 Tool : ASX445R12506E Depth of cut : 2.5mm
 Insert : SEMT13T3AGSN-JH Cutting time : 2min/pass
 SEMT13T3AGSN-JM Dry cutting
 Grade : F7030

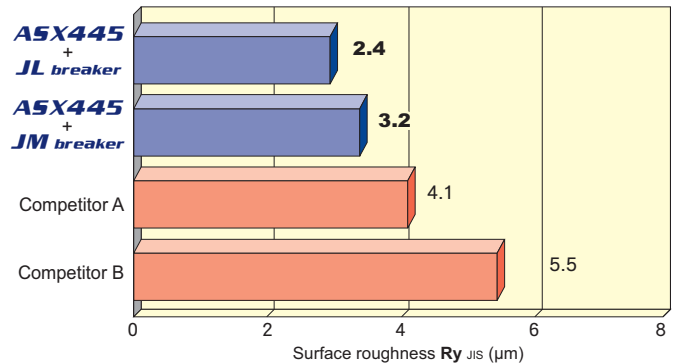


● Chip Control

	Depth of cut (mm)	
	0.5	3.0
ASX445 + JM breaker		
Wedge lock clamp type cutter + No-chip breaker		

<Cutting conditions>
 Workpiece : JIS SS400 Grade : F7030
 Tool : ASX445R12506E Cutting speed : 300m/min
 Insert : SEMT13T3AGSN-JM Depth of cut : 0.5mm, 3.0mm
 (SEMT13T3AGSN-JM insert) Feed : 0.3mm/tooth
 Wedge lock clamp type cutter Dry cutting
 (No-chip breaker)

● Surface Roughness



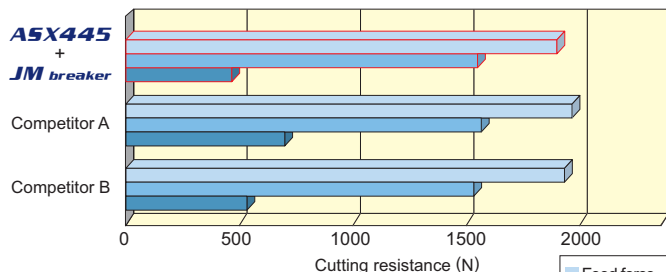
<Cutting conditions>
 Workpiece : JIS SCM440 Grade : F7030
 Tool : ASX445R12506E Cutting speed : 220m/min
 Insert : SEET13T3AGEN-JL Feed : 0.1mm/tooth
 SEMT13T3AGSN-JM Depth of cut : 0.5mm
 Dry cutting

ASX445

Cutting Performance

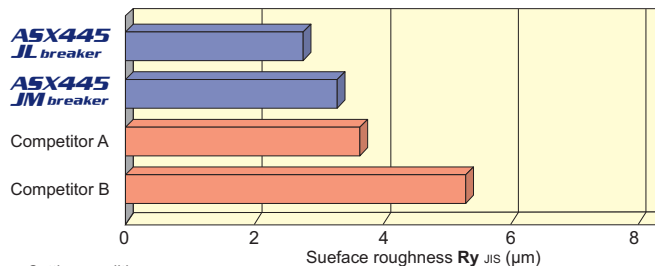
Cutting of Stainless Steel

Cutting Resistance



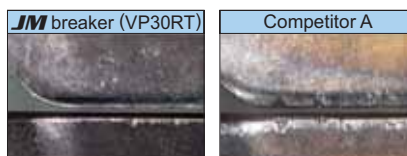
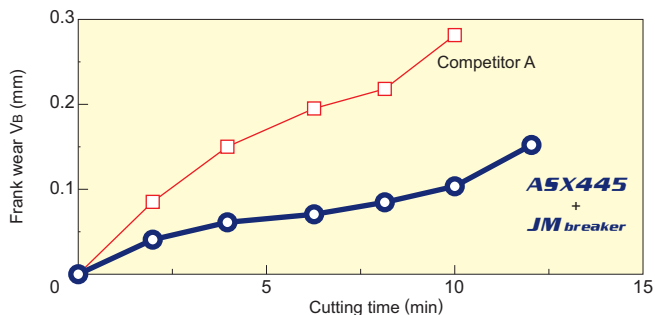
<Cutting conditions>
 Workpiece : JIS SUS304 Cutting speed : 200m/min
 Tool : ASX445R12506E Feed : 0.2mm/tooth
 Insert : SEMT13T3AGSN-JM Depth of cut : 3mm
 Grade : VP30RT Dry cutting

Surface Roughness



<Cutting conditions>
 Workpiece : JIS SUS304 Cutting speed : 200m/min
 Tool : ASX445R12506E Feed : 0.1mm/tooth
 Insert : SEET13T3AGSN-JL Depth of cut : 0.5mm
 SEMT13T3AGSN-JM Dry cutting
 Grade : VP30RT

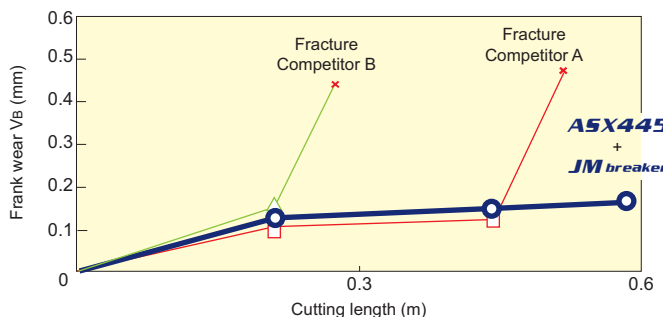
Wear Resistance



<Cutting conditions>
 Workpiece : JIS SUS304 Cutting speed : 250m/min
 Tool : ASX445R12508E Feed : 0.2mm/tooth
 Insert : SEMT13T3AGSN-JM Depth of cut : 2.0mm
 Grade : VP130RT Dry cutting

Cutting of Heat Treated Steel

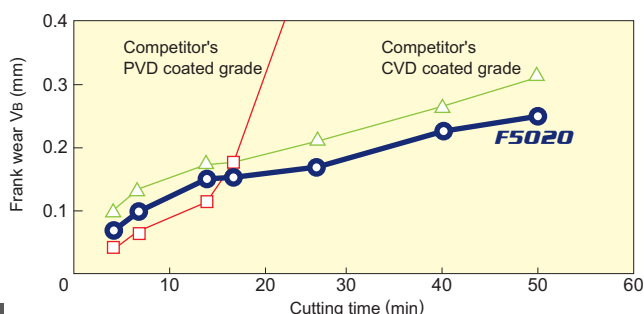
Wear Resistance



<Cutting conditions>
 Workpiece : JIS SKD61 (43HRC) Cutting speed : 100m/min
 Tool : ASX445R12506E Feed : 0.12mm/tooth
 Insert : SEMT13T3AGSN-JM Depth of cut : 2.0mm
 Grade : VP15TF Dry cutting

Cutting of Cast iron

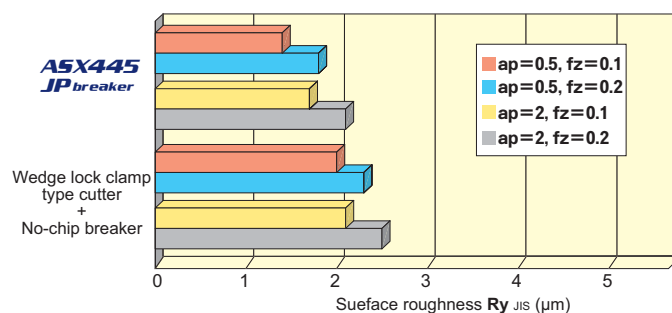
Wear Resistance



<Cutting conditions>
 Workpiece : JIS FC300 Cutting speed : 300m/min
 Tool : ASX445R12508E Feed : 0.2mm/tooth
 Insert : SEMT13T3AGSN-JM Depth of cut : 2.0mm
 Grade : F5020 Wet cutting

Cutting of Aluminum alloy

Surface Roughness



<Cutting conditions>
 Workpiece : JIS A6061 Cutting speed : 700m/min
 Tool : ASX445R10005D Feed : 0.1, 0.2mm/tooth
 Insert : SEG13T3AGFN-JP Depth of cut (ap) : 0.5, 2mm
 Grade : HT10 Dry cutting

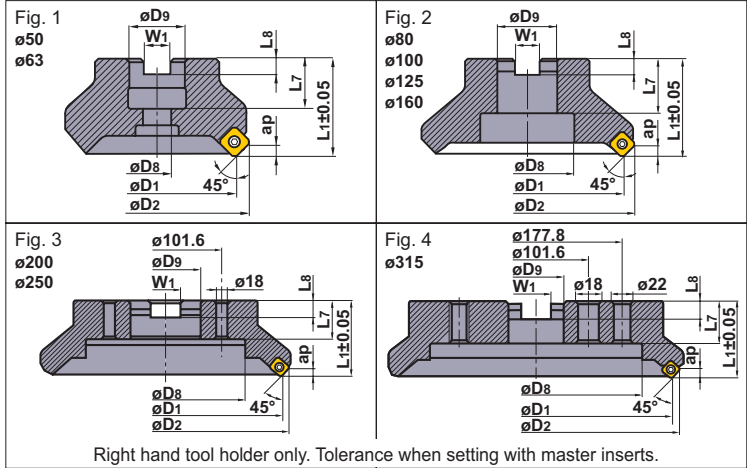
Recommended Cutting Conditions

Workpiece	Hardness	Insert Grade	Cutting Speed (m/min)	Finish-Light cutting		Light - Semi-heavy cutting		Medium - Heavy cutting		
				Feed per tooth (mm/tooth)	Breaker	Feed per tooth (mm/tooth)	Breaker	Feed per tooth (mm/tooth)	Breaker	
P Mild steel (JIS SS400, S10C etc.)	≤180HB	F7030	280 (210–350)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		VP15TF	250 (200–300)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		VP30RT	230 (180–280)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		NX4545	180 (130–230)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	–	–	
	Carbon steel Alloy steel (JIS S45C, SCM440 etc.)	180–280HB	F7030	250 (200–300)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH
			VP15TF	220 (170–270)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH
			VP30RT	200 (150–250)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH
			NX4545	150 (120–180)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	–	–
Carbon steel Alloy steel (JIS S45C, SCM440 etc.)	280–350HB	F7030	180 (130–230)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		VP15TF	140 (100–180)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		VP30RT	120 (80–160)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		NX4545	100 (80–120)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	–	–	
M Stainless steel (JIS SUS304 etc.)	≤270HB	VP15TF	220 (170–270)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		VP30RT	200 (150–250)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		NX4545	150 (120–180)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	–	–	
K Cast iron Ductile Cast Iron (JIS FC250, FCD400 etc.)	Tensile strength ≤450N/mm ²	F5010	200 (150–250)	–	–	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
		F5020	200 (150–250)	–	–	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	FT	
		VP15TF	180 (130–250)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	0.3 (0.2–0.4)	JH	
H Heat Treated Steel	≥40HRC	VP15TF	80 (60–100)	0.1 (0.05–0.15)	JL	0.15 (0.1–0.2)	JM	0.2 (0.1–0.3)	JH	
S Heat Resistant Alloy (Inconel, Waspalloy etc.)	–	VP15TF	40 (20–50)	0.15 (0.1–0.2)	JL	0.2 (0.1–0.3)	JM	–	–	
N Aluminum Alloy	–	HTi10	300–	0.15 (0.1–0.2)	JP	0.2 (0.1–0.3)	JP	0.3 (0.2–0.4)	JP	

● 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

ASX445

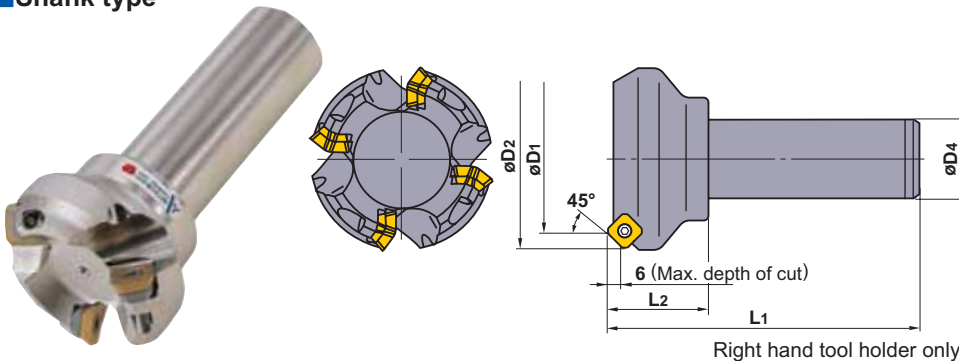
Arbor type



Light alloy	Cast iron	General steel	Stainless steel	Hardened steel
➔				

Type	Order Number	Stock R	Number of Teeth	Dimensions (mm)								Tool Weight (kg)	Max. Depth of Cut ap	Figure
				D1	D2	L1	D9	L7	D8	W1	L8			
Coarse Pitch	ASX445-050A03R	●	3	50	63.0	40	22	20	11	10.4	6.3	0.5	6	Fig. 1
	-063A04R	●	4	63	75.9	40	22	20	11	10.4	6.3	0.7	6	Fig. 1
	R08004C	●	4	80	93.2	50	25.4	26	38	9.5	6	1.1	6	Fig. 2
	R10005D	●	5	100	113.2	50	31.75	32	45	12.7	8	1.8	6	Fig. 2
	R12506E	●	6	125	138.0	63	38.1	35	60	15.9	10	2.9	6	Fig. 2
	R16007F	●	7	160	173.0	63	50.8	38	80	19	11	4.7	6	Fig. 2
	R20008K	●	8	200	212.9	63	47.625	35	140	25.4	14	7.9	6	Fig. 3
	R25010K	●	10	250	262.9	63	47.625	35	180	25.4	14	12.9	6	Fig. 3
Fine Pitch	R31514P	●	14	315	327.9	63	47.625	40	245	25.4	14	22.4	6	Fig. 4
	ASX445-050A04R	●	4	50	63.0	40	22	20	11	10.4	6.3	0.4	6	Fig. 1
	-063A05R	●	5	63	75.9	40	22	20	11	10.4	6.3	0.6	6	Fig. 1
	R08006C	●	6	80	93.2	50	25.4	26	38	9.5	6	1.0	6	Fig. 2
	R10007D	●	7	100	113.2	50	31.75	32	45	12.7	8	1.7	6	Fig. 2
	R12508E	●	8	125	138.0	63	38.1	35	60	15.9	10	2.8	6	Fig. 2
	R16010F	●	10	160	173.0	63	50.8	38	80	19	11	4.6	6	Fig. 2
	R20012K	●	12	200	212.9	63	47.625	35	140	25.4	14	7.8	6	Fig. 3
Extra fine Pitch	R25014K	●	14	250	262.9	63	47.625	35	180	25.4	14	12.8	6	Fig. 3
	R31518P	●	18	315	327.9	63	47.625	40	245	25.4	14	22.2	6	Fig. 4
	ASX445-050A05R	●	5	50	63.0	40	22	20	11	10.4	6.3	0.4	6	Fig. 1
	-063A06R	●	6	63	75.9	40	22	20	11	10.4	6.3	0.6	6	Fig. 1
	R08008C	●	8	80	93.2	50	25.4	26	38	9.5	6	1.1	6	Fig. 2
	R10010D	●	10	100	113.2	50	31.75	32	45	12.7	8	1.8	6	Fig. 2
	R12512E	●	12	125	138.0	63	38.1	35	60	15.9	10	2.9	6	Fig. 2
	R16016F	●	16	160	173.0	63	50.8	38	80	19	11	4.7	6	Fig. 2
	R20020K	●	20	200	212.9	63	47.625	35	140	25.4	14	7.8	6	Fig. 3
	R25024K	●	24	250	262.9	63	47.625	35	180	25.4	14	12.8	6	Fig. 3
	R31528P	●	28	315	327.9	63	47.625	40	245	25.4	14	21.8	6	Fig. 4


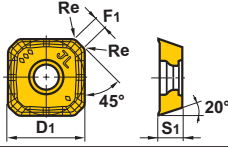

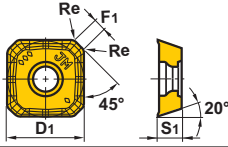

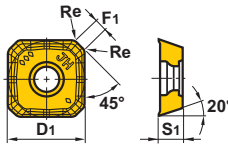

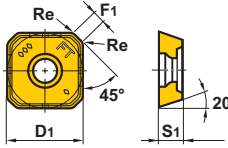

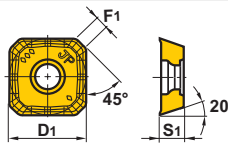
Shank type



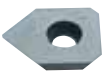
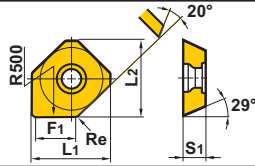

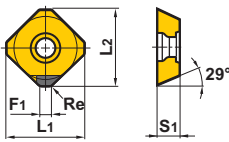
SPARE PARTS	
Holder	ASX445
	STASX445N
	WCS503507H
	TPS35
	TIP15T
	HKY35R

Order Number	Stock R	Number of Teeth	Dimensions (mm)				
			D1	D2	L1	D4	L2
ASX445R503S32	●	3	50	63.0	125	32	40
634S32	●	4	63	75.9	125	32	40
804S32	●	4	80	93.2	125	32	40

INSERTS

Shape	Order Number	Class	Coated					Cermet	Carbide	Geometry	Dimensions (mm)			
			F7030	F5010	F5020	VP15TF	VP30RT				NX4545	HT10	D1	S1
	SEET13T3AGEN-JL	E	●			●	●				13.4	3.97	1.9	1.5
	SEMT13T3AGSN-JM	M	●	●	●	●	●				13.4	3.97	1.9	1.5
	SEMT13T3AGSN-JH	M	●	●	●	●					13.4	3.97	1.9	1.5
	SEMT13T3AGSN-FT	M		●							13.4	3.97	1.9	1.5
	SEGT13T3AGFN-JP	G						●			13.4	3.97	2.2	—

WIPER INSERTS

Shape	Order Number	Cermet				Carbide		CBN	PCD	Geometry	Dimensions (mm)				
		NX2525	HT105T	MB710	MD220	L1	L2				S1	F1	Re		
	WEEW13T3AGER8C		●							16.48	16.60	3.97	8.2	1.5	
	WEEW13T3AGTR8C	●								16.48	16.60	3.97	8.1	1.5	
	WEEW13T3AGFR3C						●			16.48	16.60	3.97	3.0	1.5	
	WEEW13T3AGTR3C			●						16.48	16.60	3.97	3.0	1.5	

Instructions for Using Inserts

1. Instructions for using JP breaker

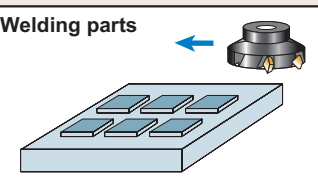
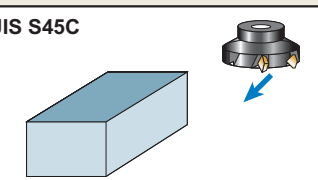
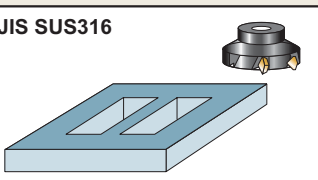
- JP breaker has sharp cutting edges. Wear gloves in handling JP breaker to prevent injury.
- In machining of aluminum alloy, welding to the cutting edge tends to occur, often leading to insert failure. To prevent this, conduct wet cutting, using coolant oil.

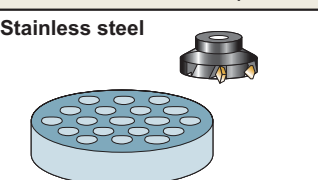
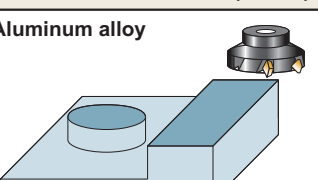
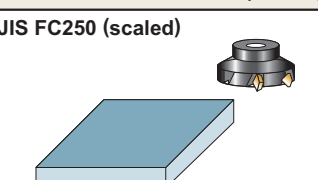
2. Instructions for using wiper insert



- Wiper inserts for the ASX445 are single-cornered.
- When installing the wiper insert, place the insert in the way that the chamfer is located at the far back of insert seat. (Refer to the figure at the left.)

Application Examples

Cutter Body	ASX445R16007F	ASX445R16010F	ASX445R25010K						
Insert (Grade)	SEMT13T3AGSN-JM (VP15TF)	SEMT13T3AGSN-JM (F7030)	SEMT13T3AGSN-JM (VP30RT)						
Workpiece	Welding parts 	JIS S45C 	JIS SUS316 						
Component	Machine parts	Machine parts	Ship parts						
Cutting Conditions	Cutting Speed(m/min)	200	157						
	Feed (mm/tooth)	0.27	0.15						
	Depth of Cut (mm)	3	3.5						
Coolant	Dry cutting	Wet cutting	Dry cutting						
Results	<p>Cutting time (min/corner)</p> <table border="1"> <tr> <td>ASX445 + VP15TF</td> <td>75</td> <td>150</td> </tr> </table> <p>Normal wear condition</p> <p>Competitors coating Fracture</p>	ASX445 + VP15TF	75	150	<p>Workpieces machined (pieces/edge)</p> <table border="1"> <tr> <td>ASX445 + F7030</td> <td>5</td> <td>10</td> </tr> </table> <p>Competitors (Screw on clamp type)</p>	ASX445 + F7030	5	10	<p>VP30RT lengthen the life of inserts fourfold without causing fractures. Inserts for previous cutters experienced fractures, resulting in short life.</p>
ASX445 + VP15TF	75	150							
ASX445 + F7030	5	10							

Cutter Body	ASX445R16007F	ASX445R12506E	ASX445R25014K			
Insert (Grade)	SEET13T3AGEN-JL (NX4545)	SEGT13T3AGFN-JP (HTi10)	SEMT13T3AGSN-FT (F5020)			
Workpiece	Stainless steel 	Aluminum alloy 	JIS FC250 (scaled) 			
Component	Machine parts	Machine parts	Table			
Cutting Conditions	Cutting Speed(m/min)	150	180			
	Feed (mm/tooth)	0.06	0.3			
	Depth of Cut (mm)	1.5	(Rough cutting) 2 (Finishing) 0.25			
Coolant	Dry cutting	Dry cutting	Dry cutting			
Results	<p>Workpieces machined (pieces/edge)</p> <table border="1"> <tr> <td>JL breaker NX4545</td> <td>15</td> <td>30</td> </tr> </table> <p>Conventional products</p>	JL breaker NX4545	15	30	<p>Good finished surface without vibration. Vibration occurred when using the previous cutters due to low rigid work.</p>	<p>No fractures and much longer tool life. The conventional cutters' inserts broke due to hardened work surface.</p>
JL breaker NX4545	15	30				

Wrench	<p>1. Wrench The ASX400 uses a TORXPLUS® clamp screw. The attached wrench is for the exclusive use of this screw. To ensure the effectiveness of TORXPLUS® only use the attached wrench.</p> <p>2. Hexagonal wrench The attached hexagonal wrench is for use with the seat and the shim. The wrench size is 3.5mm.</p>
Spare Parts	Only use the original parts that were supplied when purchased. If other parts are used the performance and safety can not be assured.

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.

MITSUBISHI MATERIALS CORPORATION



Overseas Operations Center :
Cutting Tools

KFC bldg., 7F, 1-6-1, Yokoami, Sumida-ku, Tokyo 130-0015, Japan
TEL 81-3-5819-8771 FAX 81-3-5819-8774

MMC HARTMETALL GmbH

Comeniusstr.2, 40670, Meerbusch GERMANY
TEL 49-2159-9189-0 FAX 49-2159-50462

MITSUBISHI MATERIALS U.S.A. CORPORATION
Headquarters

17401, Eastman Street, Irvine, California, 92614, USA
TEL 1-949-862-5100 FAX 1-949-862-5180

MMC METAL SINGAPORE PTE LTD.

10, Arumugam Road, #04-00 Lion Industrial Bldg., 409957, SINGAPORE
TEL 65-6743-9370 FAX 65-6749-1469

Mitsubishi Carbides Home page : <http://www.mitsubishicarbide.com>
(Tools specifications subject to change without notice.)