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




























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SRG○○E	Insert (For SRM2 type end mill)	K033,L115,L120	T		
SRGCR/L○○○○○○	SP holder	C025,P019	TAB○○○○S○○	TAB type drill	P037
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VNMG○○○○○○-SH	Insert (Class M tolerance)	A088	WNMG○○○○○○-MW	Insert (Class M tolerance)	A093
VOX400-○○○A○R	VOX400 type face mill	L026,L027	WNMG○○○○○○-RM	Insert (Class M tolerance)	A094
VOX400R○○○○○○	VOX400 type face mill	L026	WNMG○○○○○○-RP	Insert (Class M tolerance)	A094
VPET○○○○○○R/L-SRF	Insert (Class E tolerance)	A125	WNMG○○○○○○-SA	Insert (Class M tolerance)	A092
VPGT○○○○○○R/L-SMG	Insert (Class G tolerance)	A125	WNMG○○○○○○-SH	Insert (Class M tolerance)	A091
VQ-4SVB	SMART MIRACLE end mill	J180	WNMG○○○○○○-SW	Insert (Class M tolerance)	A092
VQ-MHV	SMART MIRACLE end mill	J094	WNMG○○○○○○-SY	Insert (Class M tolerance)	A092
VQ-MHVRB	SMART MIRACLE end mill	J205	WOEW12T308PE○○8C	Wiper insert (For ASX400 type cutter)	K041,L033
VQ-MHVRB-F	SMART MIRACLE end mill	J207	WOEX1206PER5C	Wiper insert (For VOX400 type cutter)	K041,L026
VQ-MHZV	SMART MIRACLE end mill	J072	WPC42EEER/L10C	Wiper insert (For FBP415/QBP415 type cutter)	K041
VQ-MHZV-OH	SMART MIRACLE end mill	J074	WPC42W3GR	Wiper insert (For P425/DP type cutter)	K041
V-SD	VIOLET drill, Straight shank	N141	WPGT○○○○○○R/L-FS	Insert (Class G tolerance)	A128
VSD645 type	VSD645 type face mill	P030	WPMT○○○○○○-MV	Insert (Class M tolerance)	A128
V-TDS	VIOLET drill, Short, Taper shank	N143	WPSTN○○	Shim	P012
W			WPSWC43	Shim	P012
WBGTO○○○○○○R/L-F	Insert (Class G tolerance)	A126	WPSWN43	Shim	P012
WBMT○○○○○○R/L-MV	Insert (Class M tolerance)	A126	WS○○○○○○T	Clamp screw	P008
WCGT○○○○○○R/L	Insert (Class G tolerance)	A127	WS○○○○○○TPS	Clamp screw	N198
WCMT○○○○○○	Insert (Class M tolerance)	A127	WS○○LH	Stopper	N198
WCMW○○○○○○	Insert (Class M tolerance)	B062	WS1	Wedge screw	P008
WCS○○○○○○H	Shim screw	P008	X		
WEC○○AFOR10C	Wiper insert (For SE445 type cutter)	K040	XCMT○○○○○○-SVX	Insert (Class M tolerance)	A129
WEC○○AFOR5C	Wiper insert (For SE445/545 type cutter)	K040	XDGT1550PDR-G○○	Insert (For BXD type cutter)	K037,L063
WEC○○EFOR5C	Wiper insert (For SE415/515 type cutter)	K040,L025	XDGT1550PDR-GL○○	Insert (For BXD type cutter)	K037,L063
WEC42EFOR10C	Wiper insert (For SE415 type cutter)	K040	XDGX1750○○PDR-GL	Insert (For AXD4000 type cutter)	K037,L052
WEEW13T3AGOR3C	Wiper insert (For ASX445 type cutter)	K045,L013	XDGX2270○○PDR-GL	Insert (For AXD7000 type cutter)	K037,L057
WEEW13T3AGOR8C	Wiper insert (For ASX445 type cutter)	K040,L013	XNMU160○○○R-OS	Insert (For VFX5 type cutter)	K038,L101
WFC42ZFER2	Wiper insert (For BF407/QBF407 type cutter)	K045	XNMU190○○○R-OS	Insert (For VFX6 type cutter)	K038,L104
WNEU2006ZEN7C-WK	Wiper insert (For AHX640W type cutter)	K041,L020	XNMU190○○○R-MS	Insert (For VFX6 type cutter)	K038,L104
WNEU2007ZEN7C-WP	Wiper insert (For AHX640S type cutter)	K041,L018	XPGT○○○○PDR-G○○	Insert (For BAP3500 type cutter)	K039
WNMA○○○○○○	Insert (Class M tolerance)	A094	XPMT○○○○PDR-M○○	Insert (For BAP3500 type end mill)	K039
Z			ZCMX○○○○○○ER-○	Insert (For DCCC type end mill)	K039

ORDER NUMBER	PRODUCT NAME	PAGE	ORDER NUMBER	PRODUCT NAME	PAGE
ZR○○○C	C type head (For ZR type end mill)	P033			
ZR○○○T	T type head (For ZR type end mill)	P033			
ZRM○○○R-M○	Insert (For BAP300 type end mill)	K039			

NUMBER•OTHERS

01○	Insert (For brazed tools holder)	I002
02○	Insert (For brazed tools holder)	I002
03○	Insert (For brazed tools holder)	I002
04○	Insert (For brazed tools holder)	I002
05○	Insert (For brazed tools holder)	I002
06○	Insert (For brazed tools holder)	I002
07○	Insert (For brazed tools holder)	I003
08○	Insert (For brazed tools holder)	I003
09E1	Insert (For brazed tools holder)	I003
1LA	HSS end mill	J243
1MA	HSS end mill	J242
2LS	HSS end mill	J254
2MK	HSS end mill	J256
2MS	HSS end mill	J252
2SS	HSS end mill	J246
31○	31 type brazed tools holder	I005
32○	32 type brazed tools holder	I005
33○	33 type brazed tools holder	I005
34○	34 type brazed tools holder	I005
35○	35 type brazed tools holder	I005
36○	36 type brazed tools holder	I005
37○	37 type brazed tools holder	I006
38○	38 type brazed tools holder	I006
39○	39 type brazed tools holder	I006
3KD	Triangular shank drill, (Type 6.5)(Type 10)(Type 13) ...	N173
40○	40 type brazed tools holder	I006
41○	41 type brazed tools holder	I006
42○	42 type brazed tools holder	I006
43○	43 type brazed tools holder	I006
47○	47 type brazed tools holder	I007
49○	49 type brazed tools holder	I007
4LC	HSS end mill	J269
4MC	HSS end mill	J264
51○	51 type brazed tools holder	I007
95○	95 type brazed tools holder	I007

SAFETY OF CUTTING TOOL PRODUCTS

1. Use of Cutting Tool Products

Packages of Mitsubishi products carry a safety warning label. However, tools are not labeled with detailed warning indications. Please read the "Safety of Cutting Tool Products" in this catalogue before handling cutting tool products and cemented carbide materials. Moreover, as a part of your workers' safety education, please notify the contents of the "Safety of Cutting Tool Products" to all workers.

2. Basic Characteristics of Hard Tool Materials

In Terms of "Safety of Cutting Tool Products"

Hard Tool Materials : General term for tool materials like cemented carbide alloy, cermet, ceramics, sintered CBN, sintered diamond, high speed steel and alloy steel, etc.

Physical Characteristics

Appearance : Varies depending on the type of material. Eg. grey, black, gold, etc.

Smell : None

Hardness, Specific Gravity :

Hard Tool Materials	Hardness (HV)	Specific Gravity	Hard Tool Materials	Hardness (HV)	Specific Gravity
High Speed Steel (HSS)	200—1200kg/mm ²	7—9	Sintered CBN	2000—5000kg/mm ²	3—5
Cemented Carbide	500—3000kg/mm ²	9—16	Sintered Diamond	8000—12000kg/mm ²	3—5
Cermet	500—3000kg/mm ²	5—9	Alloy Steel	200—1200kg/mm ²	7—9
Ceramics	1000—4000kg/mm ²	2—7	Diamond Electroforming Product	8000—12000kg/mm ²	3—5

Constituents

Carbide, nitride, carbon nitride, oxide, such as W, Ti, Al, Si, Ta, B, V and metals such as Fe, Co, Ni, Cr, Mo.

3. Safety of Cutting Tool Products

○Hard tool materials have a large specific gravity. Thus, they require special attention as heavy materials when the size or quantity is large.

○Cutting tool products generate dust and mist during grinding operations or heating. This dust and mist can be harmful when coming in contact with the eyes or skin, or if substantial quantities are swallowed. When grinding and machining, it is recommended to use local exhaust ventilation and respirators, a dust protective mask, glasses, gloves etc. If dust makes contact with the hands, thoroughly wash the affected area with soap and water. Don't eat in the exposed area, and wash hands thoroughly before eating. Remove dust from the clothing by a cleaning or washing, but don't shake off.

○Cobalt and nickel contained in carbide or other cutting tool materials are reported as possibly carcinogenic to humans. It is also reported that cobalt and nickel dust and mist can affect the skin, respiratory organs and heart through repeated or prolonged contact.

○For further information, please refer to MSDS (Material Safety Data Sheet).

MSDS=Material Safety Data Sheet

Home page: <http://www.mitsubishicarbide.com/msds/>

4. Handling Cutting Tool Products

○Surface conditions affect toughness of cutting tools. Therefore, use a diamond grinding wheel for finishing.

○Hard tool materials are extremely hard and brittle at the same time. Thus, they may be broken by shocks and tightening with excess force.

○Hard tool materials and ferrous materials have different thermal expansion ratios. Shrinkage or swell fit products may suffer from cracks when applied temperature is higher or lower than the appropriate temperature for the tool.

○Pay special attention on storing hard tool materials. Toughness of hard tool materials is lowered when they corrode due to coolant and other liquid.

○When brazing hard tool materials, if the temperature is too high or too low from the melting point of the brazing material, loosening and breakage may occur.

○After regrinding cutting tools, make sure that there are no cracks.

○Machining hard tool materials on EDM may cause cracks on the surface due to electrons remaining after the EDM operation, resulting in lowering of the toughness. Eliminate these cracks by grinding, etc.

SUGGESTIONS ON HOW TO USE CUTTING TOOLS

Products	Hazard	Countermeasure
All Cutting Tools	⊙Cutting tools have sharp cutting edges. Handling them with bare hands may cause injuries.	*Take precautions such as wearing gloves especially when handling tools and during installation.
	⊙Improper use of tools and application of inappropriate cutting conditions may cause the tool to break and be expelled from the machine providing risk of injury.	*Ensure safety guards and goggles are used. *Refer to handling explanatory notes and catalogues. Use tools under recommended cutting conditions.
	⊙Impact load and rapid increase of cutting resistance due to excessive wear may cause the tool to break and be expelled from the machine providing risk of injury.	*Ensure safety guards and goggles are used. *Exchange tools before excessive wear occurs.
	⊙Cutting tools and workpieces become extremely hot during cutting. Touching them with bare hands may cause burns.	*Take precautions such as wearing gloves.
	⊙Expelled hot chips produced in cutting produces risk of injuries and burns.	*Ensure safety guards and goggles are used. *During swarf removal and machine cleaning ensure the machine is stopped and wear gloves. Please use tools, such as cutting nippers and cutting clippers.
	⊙In cutting, sparks, hot chips and heat generation caused by tool breakage provides a risk of igniting a fire.	*Avoid using cutting tools in places where there is a possibility of igniting a fire. *In case of using non-water soluble oil, make sure to have a fire prevention countermeasure.
	⊙Using machines, chucks, and tools with poor balance at high revolutions may cause tools to break providing risk of injuries.	*Ensure safety guards and goggles are used. *Check the machine for vibration, chattering, and abnormal noise.
	⊙Handling machined parts with burrs using bare hands may cause injuries.	*Wear gloves.
Indexable Inserts Type Tools	⊙If inserts and spare parts are not held securely, they may become loose and be expelled producing risk of injuries.	*Clean insert locating seat and spare parts before setting inserts. *Use the tool provided for setting inserts, and ensure the inserts and spare parts are clamped securely. Do not use the tool provided for things other than prescribed inserts and spare parts.
	⊙Clamping inserts and spare parts too tightly by using tools such as extension pipes may cause them to break and be expelled.	*Do not use extra tools for more leverage. Only use the tool provided.
	⊙When applying high cutting speed, spare parts and inserts may be expelled due to centrifugal force. Pay special attention on each safety guideline.	*Refer to the handling explanatory notes and catalogues. Use tools under recommended cutting conditions.
Cutters and Other Rotating Tools	⊙Milling cutters have sharp edges. Handling them with bare hands may cause injuries.	*Take precautions such as wearing gloves.
	⊙Poor balance or off center revolving of tools may cause vibration and chattering which could cause the tool to break and be expelled.	*Apply cutting speed within the range of recommended cutting conditions. *Adjust accuracy and balance of spindles and bearings periodically to prevent off center revolving and chattering caused by wear on these parts.
Drilling Tools	⊙Through cutting in cases when the workpiece revolves may produce a disk shaped peice with sharp edges when the cutting tool breaks through.	*Ensure safety guards and goggles are used. Also install a cover on the chuck.
	⊙Drills with an extremely small diameter have a very sharp point which may puncture the skin if not handled carefully. If the drill breaks during cutting, the broken pieces may be expelled.	*Handle with care. Take precautions such as wearing gloves and goggles.
Brazed Tools	⊙Weakening of the braze and breakage of inserts may cause injury.	*Before using them, ensure they are brazed securely. *Do not use them under conditions which produce very high temperature.
Others	⊙Machine and tools may be damaged if they are used for purposes other than the prescribed application.	*Use them strictly for the prescribed application.

INFORMATION

This catalogue completes the basic precautions for safety use of our company's products. For further information, please refer to the guideline, catalogs or contact us. We are not responsible for any accidents causing by modifying tools without our permission.