MITSUBISHI MATERIALS

MP6100/MP7100/ MP9100

NEW PVD COATED GRADES



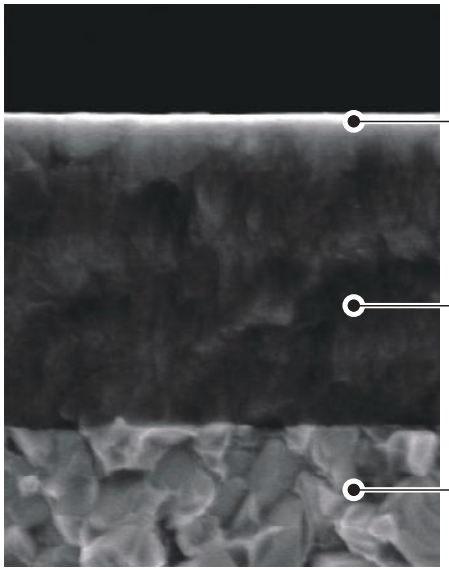


TOOL NEWS **B208A**

New PVD Coated Grades
MP6100/MP7100/MP9100

Wide range of grades for specific materials

MIRACLE SIGMA accumulated Al-Ti-Cr-N based PVD coating



Features	MP6120/MP6130	MP7130/MP7140	MP9120/MP9130
	Improved thermal conductivity	Improved layer toughness	Low affinity at high temperature
Shape			

ISO		Coated Carbide PVD
P Steel	P10	MP6120
	P20	MP6120 / MP6130
	P30	MP6130
	P40	MP6130

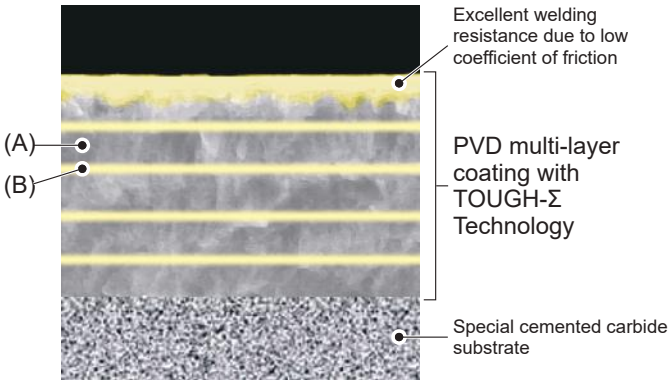
ISO		Coated Carbide PVD
M Stainless Steel	M10	MP7130
	M20	MP7130
	M30	MP7130 / MP7140
	M40	MP7140

ISO		Coated Carbide PVD
S Heat Resistant Alloy • Ti Alloy	S10	MP9120
	S20	MP9120 / MP9130
	S30	MP9130
	S40	MP9130

MP6100, MP7100, MP9100 - With accumulated Al-Ti-Cr-N based PVD coating

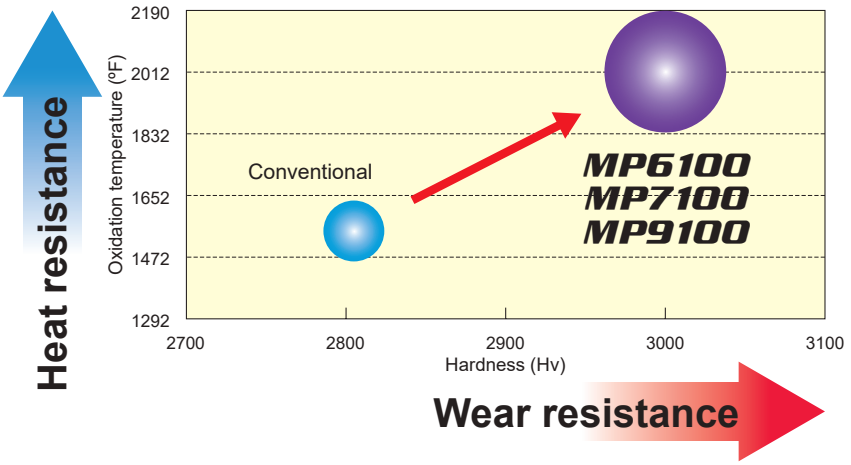
TOUGH-Σ Technology

A fusion of the separate coating technologies; PVD and multi-layering provides extra toughness.



	Work material	Grade	Coating		Coefficient of friction		
			Base layer (A)	Optimized layer for work material (B)	Measured at 1112° F		
					1055	304	Ti-6Al-4V
P	Carbon Steel, Alloy Steel	MP6100	**High Al-(Al, Ti)N** The new technology Al-(Al, Ti)N provides stability of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.	(Al, Cr) N based Tough! Resists Chipping	0.4		
M	Stainless Steel	MP7100		TiN based Tough! Resists Notching		0.5	
S	Titanium Alloy, Heat Resistant Alloy	MP9100		CrN based Tough! Resists Thermal Cracking			0.3
				Conventional	0.7	0.7	0.7

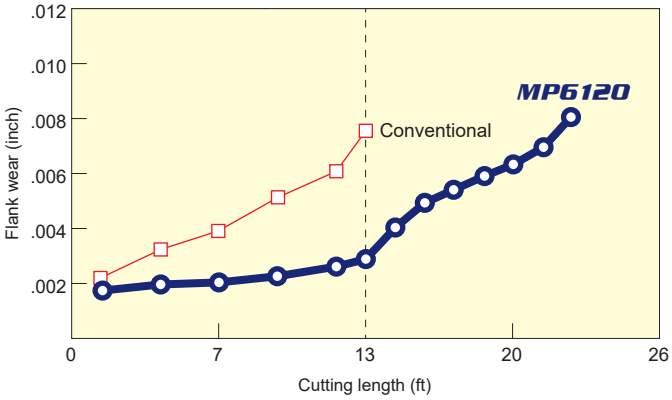
Dramatically improving the heat and wear resistance!

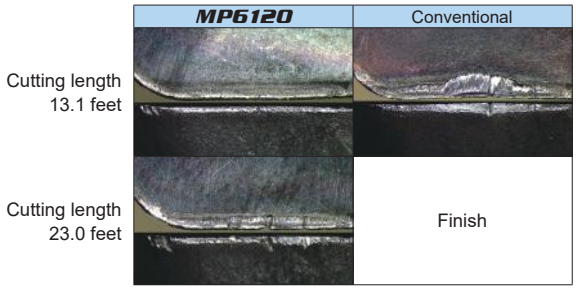


Cutting Performance

General Steel and Alloy Steel machining

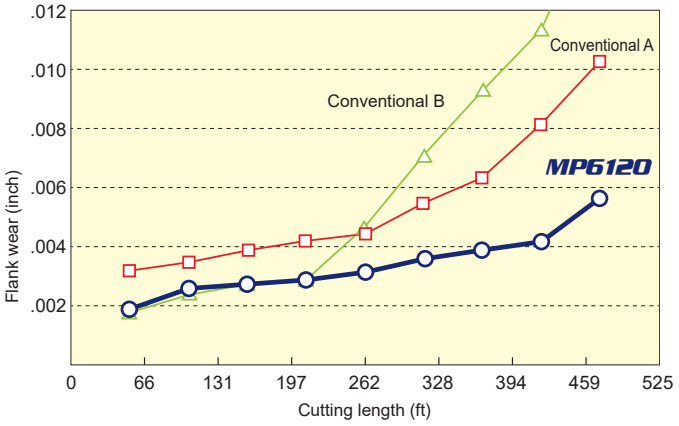
Wear Resistance

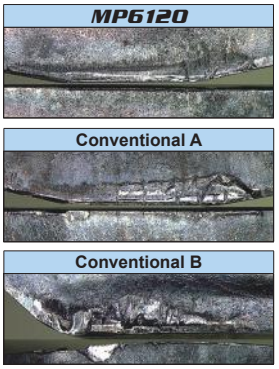




<Cutting conditions>
Workpiece : Alloy steel
Tool : ASX445R12508E
Insert : SEMT13T3AGSN-JM
Cutting speed : 985 SFM
Feed per tooth : .008 IPT
Depth of cut : .079 inch
Cutting mode : Dry cutting

Crater Wear Resistance





Cutting length :4.593 feet

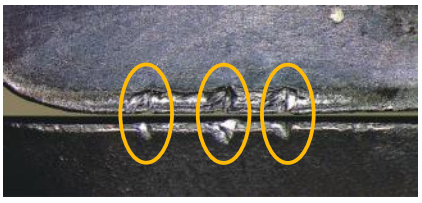
<Cutting conditions>
Workpiece : Alloy steel
Tool : AJX14-063A04R
Insert : JDMT140520ZDSR-JM
Cutting speed : 655 SFM
Feed per tooth : .059 IPT
Depth of cut : ap = .039" ae = 1.97"
Cutting mode : Dry cutting

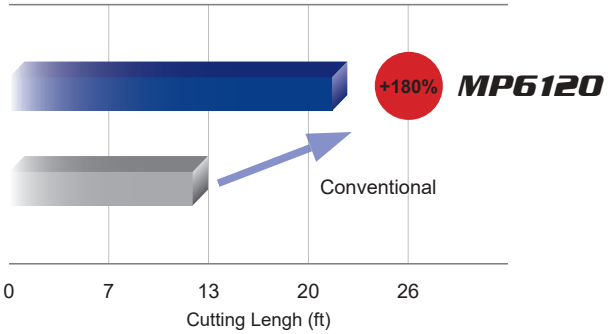
Helps to prevent occurrence and progression of thermal cracking

MP6120



Conventional

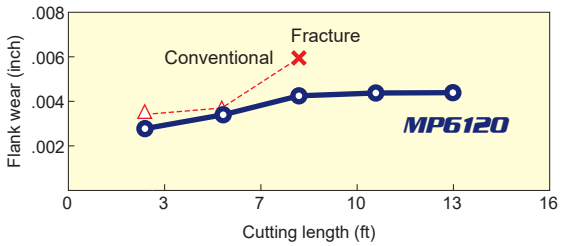




<Cutting Conditions>
Workpiece : Alloy steel
Tool : ASX445R12508E
Insert : SEMT13TAGSN-JM
Cutting Speed : 985 SFM
Feed per Tooth : .008 IPT
Depth of Cut : ae 3.937", ap .079"
Cutting mode : Dry Cutting

Helps to prevent occurrence and progression of thermal cracking.

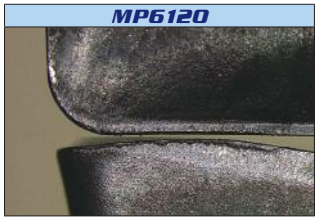
Wear Resistance



<Cutting conditions>

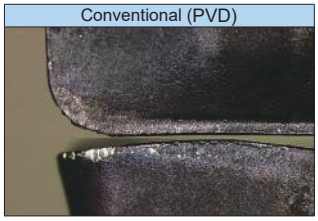
Workpiece	: Alloy steel	Feed per tooth	: .006 IPT
Tool	: ASX400-063A05R	Axial depth of cut	: .118 inch
Insert	: SOMT12T308PEER-JM	Radial depth of cut	: 1.969 inch
Cutting speed	: 655 SFM	Cutting mode	: Dry cutting

MP6120



Cutting length 13.1 feet

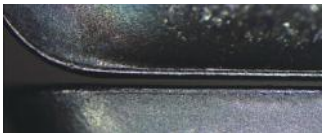
Conventional (PVD)



Cutting length 7.8 feet

Wear Resistance

MP6120



Cutting length 91.9 feet
Can continue machining up to 150.9 feet

Conventional A



Cutting length 91.9 feet

Conventional B



Cutting length 49.2 feet

<Cutting conditions>

Workpiece	: AISI 1055
Tool	: APX3000R324SA32SA
Insert	: AOMT123608PEER-M
Cutting speed	: 655 SFM
Feed per tooth	: .004 IPT
Width of cut	: .315 inch
Depth of cut	: .315 inch
Cutting mode	: Dry cutting

Stainless steel machining

Chipping Resistance

MP7140 JM breaker



Cutting length :4.6 feet

Conventional



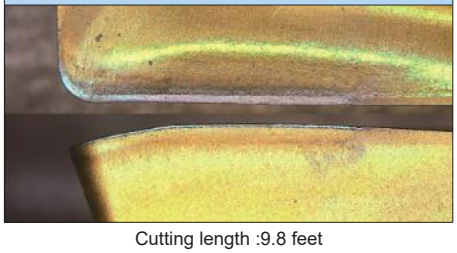
Cutting length :2.6 feet

<Cutting conditions>

Workpiece	: AISI 304
Tool	: ASX445R12508E
Insert	: SEMT13T3AGSN-JM
Cutting speed	: 655 SFM
Feed per tooth	: .008 IPT
Depth of cut	: ap = .079" ae = 3.937"
Cutting mode	: Dry cutting

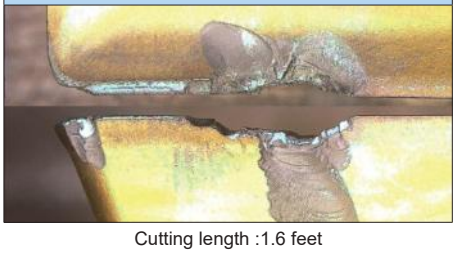
Fracture Resistance

MP7130 JM breaker



Cutting length :9.8 feet

Conventional



Cutting length :1.6 feet

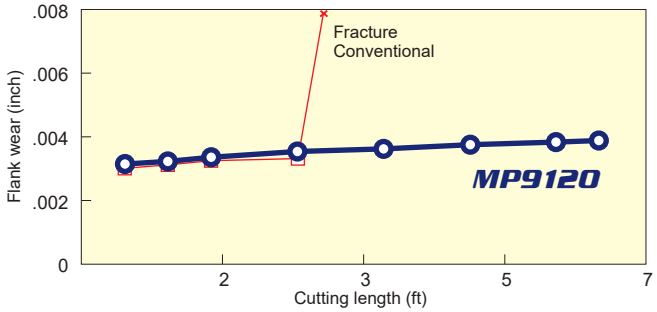
<Cutting conditions>

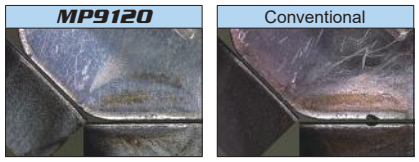
Workpiece	: AISI 304
Tool	: ASX400R12508E
Insert	: SOMT12T308PEER-JM
Cutting speed	: 395 SFM
Feed per tooth	: .006 IPT
Depth of cut	: ap = .236" ae = .630"
Cutting mode	: Wet cutting Single insert

Cutting Performance

Titanium alloy and Heat treated steel machining

Wear Resistance





<Cutting conditions>
Workpiece : Titanium alloy
Tool : ASX445R804S32
Insert : SEMT13T3AGSN-JM
Cutting speed : 165 SFM
Feed per tooth : .006 IPT
Depth of cut : .059 inch
Cutting mode : Wet cutting

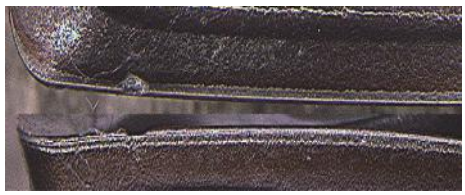
Wear and Chipping Resistance

MP9130



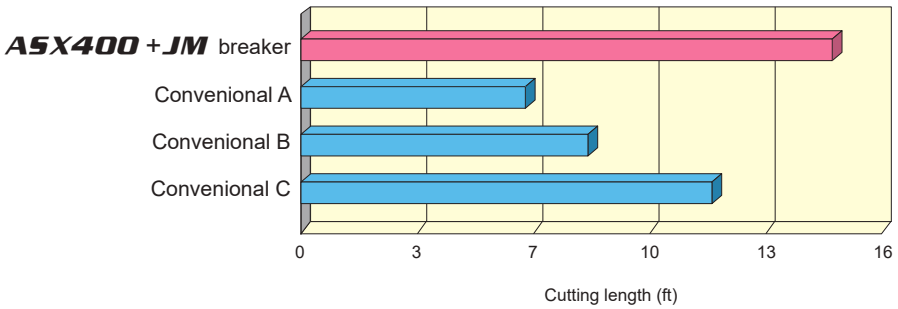
Cutting length 3.9 feet

Conventional



Cutting length 2.5 feet

<Cutting conditions>
Workpiece : Titanium alloy
Tool : APX3000R323SA32SA
Insert : AOMT123608PEER-M
Cutting speed : 100 SFM
Feed per tooth : .006 IPT
Width of cut : .315 inch
Depth of cut : .315 inch
Cutting mode : Wet cutting



<Cutting conditions>
Workpiece : Titanium alloy
Tool : ASX400-063A04R
Insert : SOMT12T308PEER-JM
Cutting speed : 195 SFM
Feed per tooth : .004 IPT
Axial depth of cut : .315 inch
Radial depth of cut : .236 inch
Cutting mode : Wet cutting

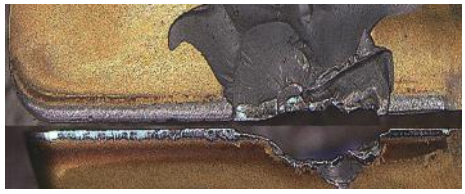
Wear and Chipping Resistance

MP9130



Cutting length 4.9 feet

Conventional

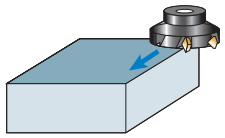
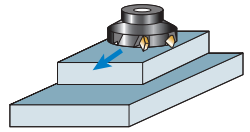
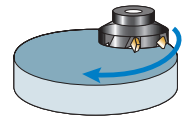
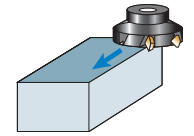


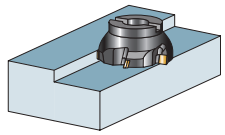
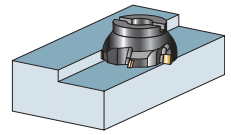
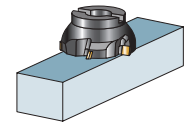
Cutting length 3.9 feet

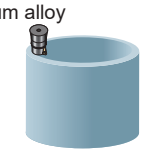
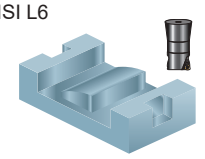
<Cutting conditions>
Workpiece : Inconel®718
Tool : APX3000R324SA32SA
Insert : AOMT123608PEER-M
Cutting speed : 100 SFM
Feed per tooth : .006 IPT
Width of cut : .315 inch
Depth of cut : .315 inch
Cutting mode : Wet cutting

APPLICATION EXAMPLES

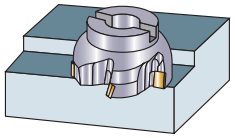
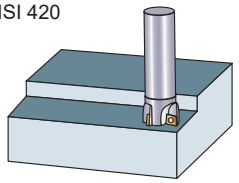
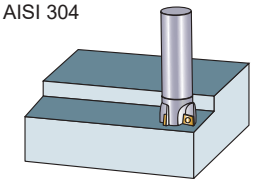
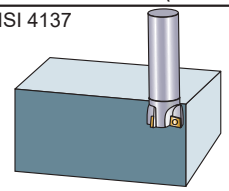
The following application examples are customer's application examples, so it can be different from a maker's recommended conditions.

Tool		ASX445R08004C	ASX445R12508E	ASX445R12508E	ASX445-063A04R
Insert (Grade)		SEMT13T3AGSN-JM (MP9130)	SEMT13T3AGSN-JM (MP6120)	SEET13T3AGEN-JL (MP9120)	SEMT13T3AGSN-JM (MP9130)
Workpiece		15-5PH(Stainless steel) 	AISI 4140 	Titanium alloy 	ASTM304(Stainless steel) 
Component		Aerospace parts	Machine parts	Aerospace parts	Machine parts
Cutting Conditions	Cutting Speed (SFM)	490	820	250	195
	Feed per Tooth (IPT)	.005	.004 - .008	.004	.004
	Depth of cut (inch)	ap: .079, ae: 2.99	.079 - .197	.010	ap: .079, ae: 2.48
Cutting mode		Dry cutting	Dry cutting	Wet cutting	Dry cutting
Results		MP9130 provides double tool life compared to conventional cutters and achieves high efficiency cutting by shortening the time required to replace a tool.	MP6120 shows only a small amount of wear thereby achieving 1.5 times longer tool life compared to conventional cutters.	Machining time can be extended 3 times longer without chipping.	MP9130 achieves double tool life without burr formation compared to conventional cutters.

Tool		ASX400-050A04R	ASX400-050A05R	ASX400-050A04R
Insert (Grade)		SOMT12T308PEER-JM (MP6120)	SOMT12T308PEER-JM (MP6130)	SOMT12T308PEER-JM (MP7130)
Workpiece		AISI 1045 	AISI 4140 	AISI 316 
Component		Machine parts	Machine parts	Structural component
Cutting Conditions	Cutting Speed (SFM)	500	590	290
	Feed per Tooth (IPT)	.006	.008	.004
	Depth of cut (inch)	.150	.071	≤ .079
	Width of cut (inch)	.244	1.25	≤ .079
Cutting mode		Dry cutting	Wet cutting	Wet cutting
Results		MP6120 achieves 3 times longer tool life compared to conventional cutters.	MP6130 achieves 1.3 times longer tool life with suppressed chipping compared to conventional cutters.	MP7130 can continue machining without fracture.

Tool		AJX12R08006D	AJX12-080A06R	AJX12-080A06R	AJX14R10006D
Insert (Grade)		JL breaker (MP9130)	JL breaker (MP9120)	JL breaker (MP9130)	JM breaker (MP6120)
Workpiece		Co-Cr Alloy 	INCONEL 625 	Titanium alloy 	AISI L6 
Component		Medical component	Aerospace component	Aerospace component	Press mould
Cutting Conditions	Cutting Speed (SFM)	165	115	165	330
	Feed per Tooth (IPT)	.024	.024	.015	.024
	Depth of cut (inch)	.020	.031	.040	.059
	Width of cut (inch)	2.36	2.56	1.97	2.76
	Overhang length (inch)	–	–	–	3.15
Cutting mode		Wet cutting	Wet cutting	Wet cutting	Air blow
Results		The reduced wear displayed by MP9130 grade with JL breaker gave an increase in efficiency of 40%.	JL breaker + MP9120 achieves 1.5 times longer tool life compared to conventional products.	The increased tool life and reduced wear displayed by MP9130 grade with JL breaker gave an increase in efficiency of 40%.	Achieved twice the tool life compared to a conventional product.

APPLICATION EXAMPLES

	Tool	APX3000-040A06RA	APX3000R203SA20SA	APX3000R254SA25SA	APX3000R254SA25SA
	Insert (Grade)	AOMT123608PEER-M(MP9130)	AOMT123608PEER-M(MP7130)	AOMT123608PEER-M(MP7130)	AOMT123616PEER-M(MP6130)
	Workpiece	WASPALOY® 	AISI 420 	AISI 304 	AISI 4137 
Cutting Conditions	Cutting Speed (SFM)	100	400	460	655
Cutting Conditions	Feed per Tooth (IPT)	.001	.004	.004	.005
Cutting Conditions	Depth of cut (inch)	.055	.010	.079	.098
Cutting Conditions	Width of cut (inch)	.630	.020	.984	—
	Cutting mode	Wet	Dry	Dry	Dry
	Result	Double tool life compared to conventional products which enabled to cut continuously without interruption.	Actual cutting time has been nearly doubleed compared to conventional products.	Tool life has been improved by 25% compared to conventional products because of the superior fracture resistance.	1.5 times longer tool life provided 140% processing efficiency.

Please note that the machining performed in the application examples is dependent on the rigidity of the machine used and the rigidity of the workpiece and clamping.

Products equipped with
MP6100/MP7100/MP9100


WSX445


AHX


ASX


AJX


APX


ARP


AXD


SRM2


VFX

Memo

MTEC

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- Basic Milling
- Basic Turning
- Advanced Drilling
- Advanced End Milling
- Advanced Turning
- Basic Threading
- Advanced Face Milling
- Basic Workpiece Materials
- Tool Grades
- Advanced Workpiece Materials

TRAINING COURSES

Programs are designed for several levels of skill development – from basic understanding to advance manufacturing with digital solutions, complementing to your valued experience in CNC machining environment. Participate in machining demonstrations with Mitsubishi Materials' skilled engineers. Discover methods to reduce setup and cycle time, optimize programs and enhance your knowledge base.

Information on course schedule, course description, and accommodations

MTECTRAINING.INFO

Follow the QR Code for a virtual facility tour

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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 driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

www.mmc-carbide.com/us

Tools specifications subject to change without notice.

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