

 **MITSUBISHI MATERIALS**

AHB
TOOLING & MACHINERY

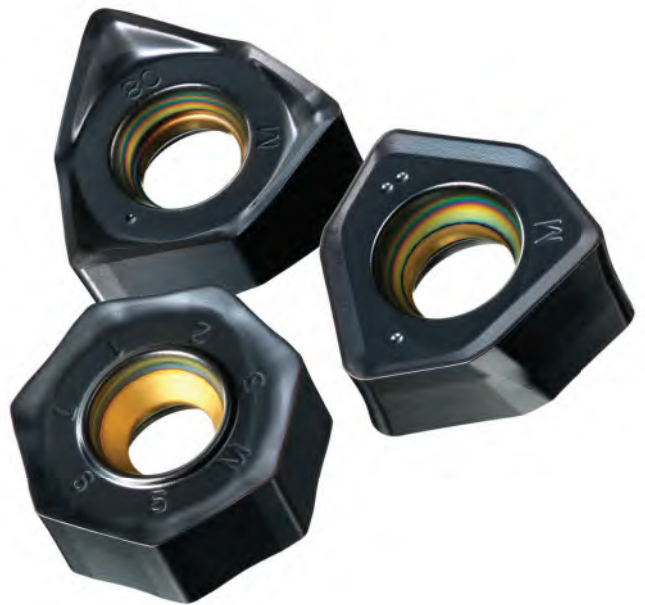
**COMPLETE
METALWORKING
SOLUTIONS**

(800) 991-4225
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MV1000 Series

**COATED CARBIDE GRADE
FOR MILLING**

**MV1020 + WSX, WWX,
MV1030 + VPX, WJX etc.**



TOOL NEWS B270A

Coated Carbide Grade for Milling

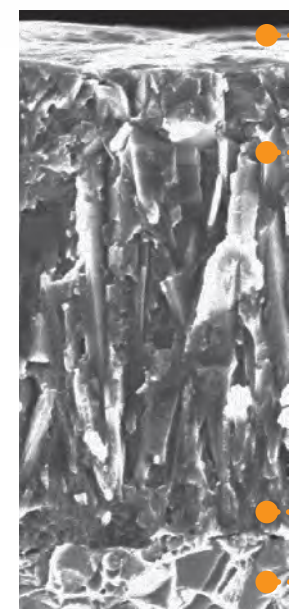
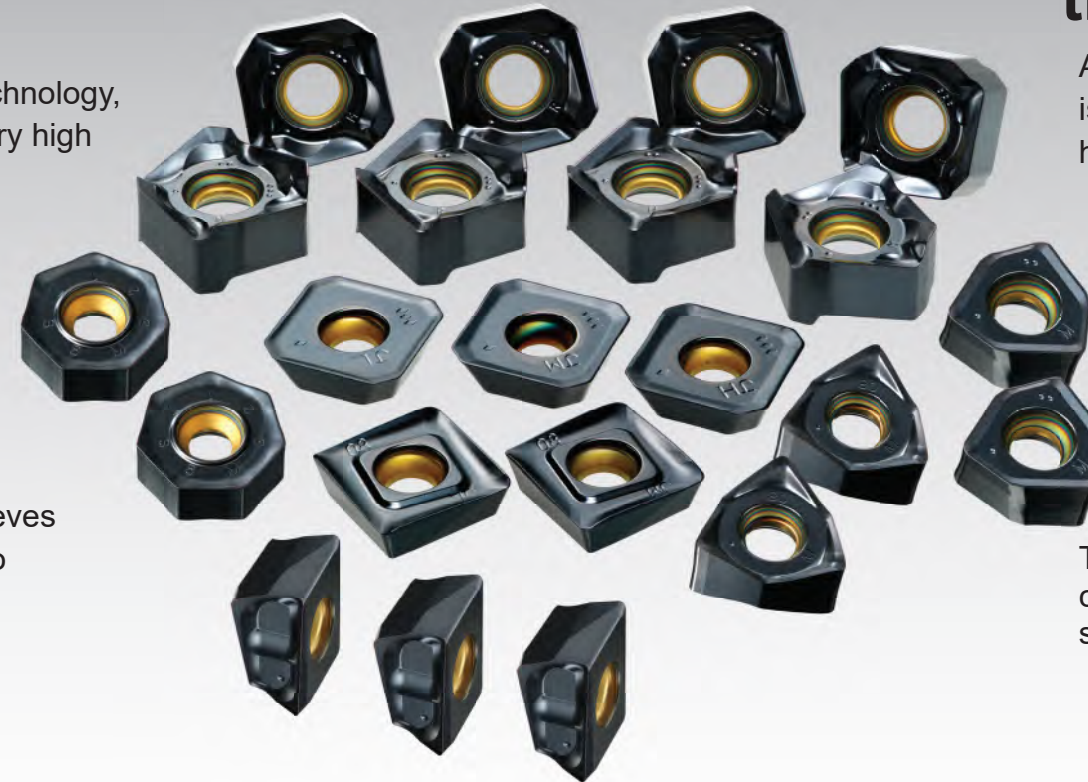
MV1000 Series

Advanced Wear Resistance

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance.

Advanced Thermal Shock Resistance

The extreme heat resistance of this new series achieves amazing stability, not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking.



Excellent welding resistance
Smooth surface

Outstanding wear resistance
Newly developed Al-Rich coating

Excellent chipping resistance for stable machining
Newly developed bonding layer

Fracture resistance for the ultimate stability
Exclusive cemented carbide substrate

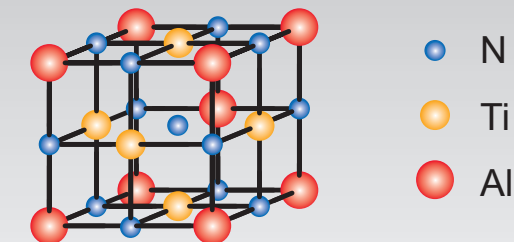
*Graphical Representation.

Complete Coating Technology that Topples Current Tool Life Standards

Due to

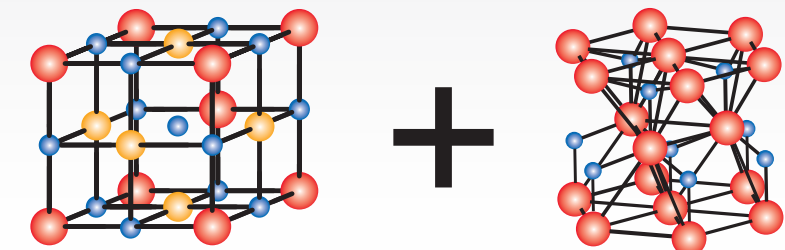
the Newly Developed Al-Rich Coating

Aluminum titanium nitride (Al,Ti)N is a compound of aluminum and titanium that is widely used as a coating for cutting tools due to its extremely hard and heat-resistant properties.



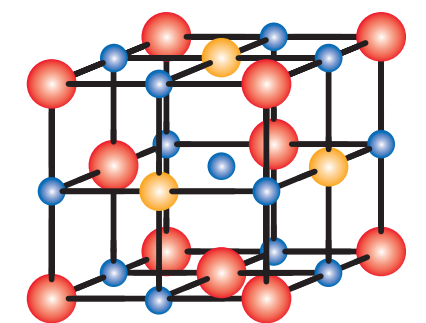
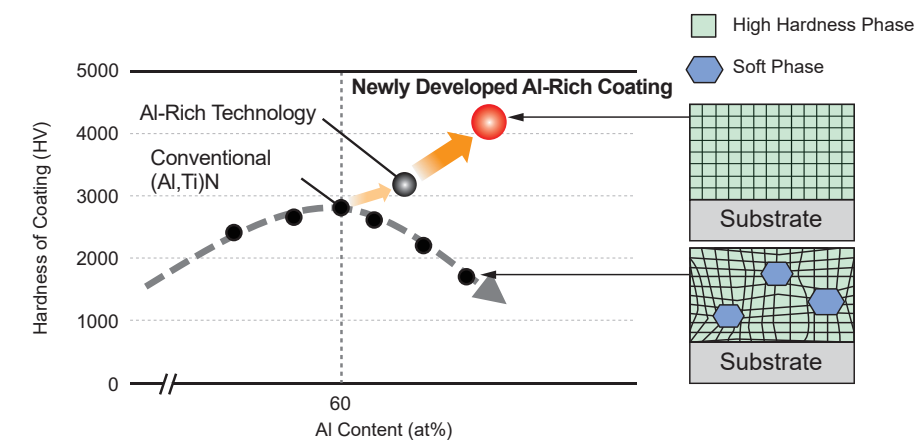
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

The hardness of (Al,Ti)N increases as the Al content ratio increases, but with conventional technology, when the Al content ratio exceeds 60%, the crystal structure changes and the hardness of (Al,Ti)N decreases.



When the Al ratio is over 60%, a softer crystal phase is formed.

Using a new coating process based on Mitsubishi Materials' own original technology, a way in which an Al-Rich coating does not change its crystal structure even when the Al content is increased was developed. This also achieves a higher Al content and high the hardness of (Al,Ti)N.



Crystal image of MV1000 series

Coated Carbide Grade for Milling

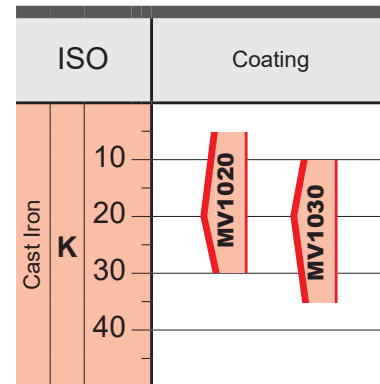
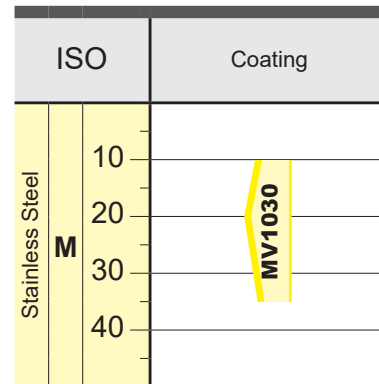
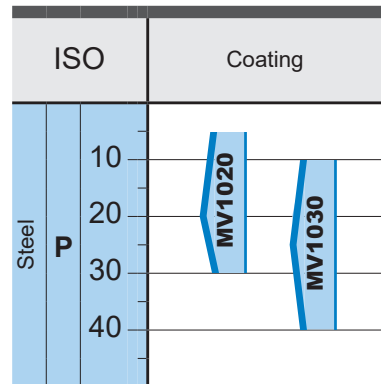
MV1020

This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds, especially when machining steel and ductile cast iron, thus greatly reducing work time.

Coated Carbide Grade for Milling

MV1030

The new Al-Rich coating also provides excellent wear resistance. An unprecedented performance against sudden breakage was also realized, especially during problematic wet cutting and when machining stainless steels.



Note 1) Dry cutting is recommended for machining stainless steel with MV1030.

Inserts


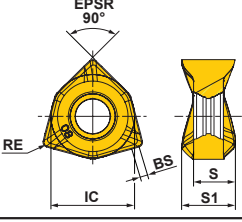
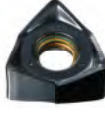
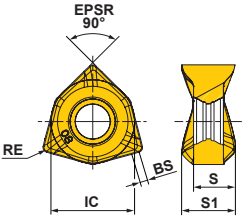
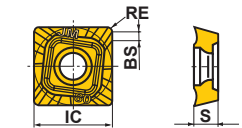
Shape	Application	Order Number	Class	Edge Preparation		Coated		IC	S	S1	BS	RE	Geometry
				MV1020	MV1030	NEW	NEW						
Face Milling													
	Low Cutting Resistance	SNGU140812ANER-L	G	E	●	●		.551	.248	.331	.059	.047	
	General Purpose Cutting	SNGU140812ANER-M	G	E	●	●		.551	.248	.331	.059	.047	
		SNMU140812ANER-M	M	E	●	●		.551	.248	.331	.059	.047	
	General Purpose Cutting (Left Hand)	SNMU140812ANEL-M	M	E	●	●		.551	.248	.331	.059	.047	
	Cutting Edge Strength	SNMU140812ANER-R	M	E	●	●		.551	.248	.331	.059	.047	
SNMU140812ANER-H		M	E	●	●		.551	.248	.331	.059	.047		
	Finish - Light Cutting	SEET13T3AGEN-JL	E	E	●	●		.528	.156	-	.075	.059	
	Light - Rough Cutting	SEMT13T3AGSN-JM	M	S	●	●		.528	.156	-	.075	.059	
		SEMT13T3AGSN-JH	M	S	●	●		.528	.156	-	.075	.059	
	Roughing For Cast Iron	SEMT13T3AGSN-FT	M	S	●	●		.528	.156	-	.075	.059	
	Low Cutting Resistance	NNMU130508ZER-L	M	E	●	●		.528	.227	-	.039	.031	
	General Purpose Cutting	NNMU130508ZEN-M	M	E	●	●		.528	.219	-	.039	.031	
		NNMU130532ZEN-M	M	E	●	●		.528	.219	-	-	.126	
Cutting Edge Strength	NNMU130532ZEN-R	M	E	●	●		.528	.215	-	-	.126		
	General Cutting For Steel	NNMU200708ZEN-M	M	E	●	●		.787	.315	-	.039	.031	
	General Cutting For Cast Iron	NNMU200608ZEN-MK	M	E	●	●		.787	.258	-	.039	.031	
	Cutting Edge Strength For Cast Iron	NNMU200608ZEN-HK	M	E	●	●		.787	.258	-	.039	.031	
	For Titanium Alloys and Heat Resistant Alloys	NNMU200712ZER-L	M	E	●	●		.787	.315	-	.039	.047	
	High Efficiency Cutting For Cast Iron	SNMU1206C05ZNER-M	M	E	★	★		.500	.236	.244	.063	.020	

● = NEW

● : USA Stock ★ : Stocked in Japan (10 inserts in one case)


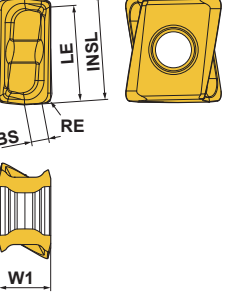
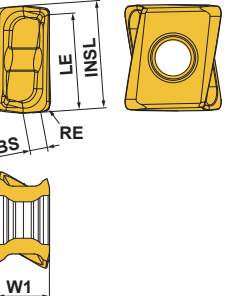
Coated Carbide Grade for Milling

(inch)

Shape	Application	Order Number	Class	Edge Preparation		Coated		IC	S	S1	BS	RE	Geometry	
				MV1020	MV1030	NEW	NEW							
Shoulder Milling														
	Low Cutting Resistance	6NGU0906040PNER-L	G	E	●	●		.354	.209	.240	.063	.016		
		6NGU0906080PNER-L	G	E	●	●		.354	.209	.240	.047	.031		
	General Purpose Cutting	6NMU0906040PNER-M	M	E	●	●		.354	.209	.240	.063	.016		
		6NMU0906080PNER-M	M	E	●	●		.354	.209	.240	.047	.031		
Cutting Edge Strength	6NMU0906080PNER-R	M	E	●	●		.354	.209	.240	.047	.031			
	Low Cutting Resistance	6NGU1409040PNER-L	G	E	●	●		.551	.276	.354	.067	.016		
		6NGU1409080PNER-L	G	E	●	●		.551	.276	.354	.051	.031		
	General Purpose Cutting	6NGU1409040PNER-M	G	E	●	●		.551	.276	.354	.067	.016		
		6NGU1409080PNER-M	G	E	●	●		.551	.276	.354	.051	.031		
		6NMU1409040PNER-M	M	E	●	●		.551	.276	.354	.067	.016		
		6NMU1409080PNER-M	M	E	●	●		.551	.276	.354	.051	.031		
		6NMU1409160PNER-M	M	E	●	●		.551	.276	.354	.020	.063		
		6NMU1409200PNER-M	M	E	●	●		.551	.276	.354	.020	.079		
	Cutting Edge Strength	6NMU1409080PNER-R	M	E	●	●		.551	.276	.354	.051	.031		
		6NMU1409160PNER-R	M	E	●	●		.551	.276	.354	.020	.063		
6NMU1409200PNER-R	M	E	●	●		.551	.276	.354	.020	.079				
	ASX400	SOET12T308PEER-JL	E	E	●	●		.500	.156	-	.055	.031		
		SOMT12T308PEER-JM	M	E	●	●		.500	.156	-	.055	.031		
		SOMT12T308PEER-JH	M	E	●	●		.500	.156	-	.055	.031		
SOMT12T320PEER-FT		M	E	●	●		.500	.156	-	.020	.079			


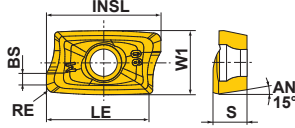
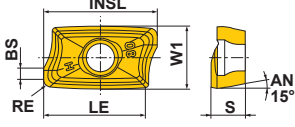

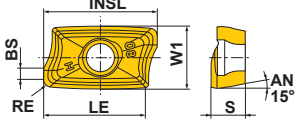
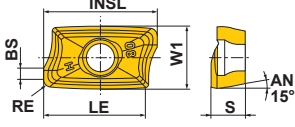
● = NEW

(inch)

Shape	Application	Order Number	Class	Edge Preparation		Coated		INSL	W1	LE	BS	RE	Geometry			
				MV1020	MV1030	NEW	NEW									
Multi-Functional Milling																
	Low Cutting Resistance	LOGU0904020PNER-L	G	E	●	●		.343	.169	.299	.067	.008				
		LOGU0904040PNER-L	G	E	●	●		.343	.169	.299	.063	.016				
		LOGU0904080PNER-L	G	E	●	●		.343	.169	.299	.047	.031				
		LOGU0904100PNER-L	G	E	●	●		.343	.169	.299	.039	.039				
		LOGU0904120PNER-L	G	E	●	●		.343	.169	.299	.035	.047				
		LOGU0904160PNER-L	G	E	●	●		.343	.169	.299	.020	.063				
	General Purpose Cutting	LOGU0904020PNER-M	G	E	●	●		.343	.169	.299	.067	.008				
		LOGU0904040PNER-M	G	E	●	●		.343	.169	.299	.059	.016				
		LOGU0904080PNER-M	G	E	●	●		.343	.169	.299	.047	.031				
		LOGU0904100PNER-M	G	E	●	●		.343	.169	.299	.039	.039				
		LOGU0904120PNER-M	G	E	●	●		.343	.169	.299	.031	.047				
		LOGU0904160PNER-M	G	E	●	●		.343	.169	.299	.020	.063				
		VPX300	Low Cutting Resistance	LOGU1207020PNER-L	G	E	●	●		.488	.276	.445		.118	.008	
				LOGU1207040PNER-L	G	E	●	●		.488	.276	.445		.110	.016	
LOGU1207080PNER-L	G			E	●	●		.488	.276	.445	.102	.031				
LOGU1207100PNER-L	G			E	●	●		.488	.276	.445	.098	.039				
LOGU1207120PNER-L	G		E	●	●		.488	.276	.445	.094	.047					
LOGU1207160PNER-L	G		E	●	●		.488	.276	.445	.071	.063					
LOGU1207200PNER-L	G		E	●	●		.488	.276	.445	.055	.079					
LOGU1207240PNER-L	G		E	●	●		.488	.276	.445	.047	.094					
General Purpose Cutting	LOGU1207300PNER-L	G	E	●	●		.488	.276	.445	.024	.118					
	LOGU1207320PNER-L	G	E	●	●		.488	.276	.445	.016	.126					
	LOGU1207020PNER-M	G	E	●	●		.488	.276	.445	.118	.008					
	LOGU1207040PNER-M	G	E	●	●		.488	.276	.445	.110	.016					
LOGU1207080PNER-M	G	E	●	●		.488	.276	.445	.094	.031						
LOGU1207100PNER-M	G	E	●	●		.488	.276	.445	.091	.039						
LOGU1207120PNER-M	G	E	●	●		.488	.276	.445	.083	.047						
LOGU1207160PNER-M	G	E	●	●		.488	.276	.445	.067	.063						
LOGU1207200PNER-M	G	E	●	●		.488	.276	.445	.055	.079						
LOGU1207240PNER-M	G	E	●	●		.488	.276	.445	.039	.094						
LOGU1207300PNER-M	G	E	●	●		.488	.276	.445	.020	.118						
LOGU1207320PNER-M	G	E	●	●		.488	.276	.445	.012	.126						


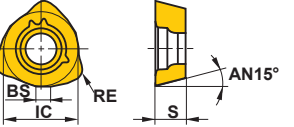
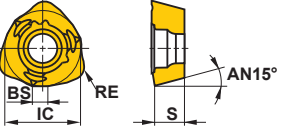
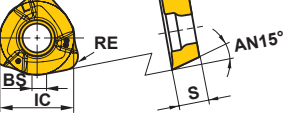
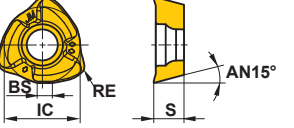
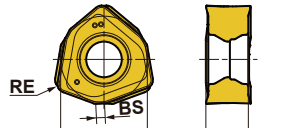
● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

Coated Carbide Grade for Milling

Shape	Application	Order Number	Class	Edge Preparation	Coated		INSL	LE	W1	S	BS	RE	Geometry	
					NEW	NEW								
					MV1020	MV1030								
	General Purpose Cutting	AOMT123602PEER-M	M	E	●	●	.472	.394	.260	.142	.071	.008		
		AOMT123604PEER-M	M	E	●	●	.472	.394	.260	.142	.063	.016		
		AOMT123608PEER-M	M	E	●	●	.472	.394	.260	.142	.047	.031		
		AOMT123610PEER-M	M	E	●	●	.472	.394	.260	.142	.039	.039		
		AOMT123612PEER-M	M	E	●	●	.472	.394	.260	.142	.031	.047		
		AOMT123616PEER-M	M	E	●	●	.472	.394	.260	.142	.016	.063		
		AOMT123620PEER-M	M	E	●	●	.472	.394	.260	.142	.016	.079		
		AOMT123624PEER-M	M	E	●	●	.472	.394	.260	.142	.016	.094		
		AOMT123630PEER-M	M	E	●	●	.472	.394	.260	.142	.016	.118		
	AOMT123632PEER-M	M	E	●	●	.472	.394	.260	.142	.016	.126			
	Cutting Edge Strength	AOMT123604PEER-H	M	E	●	●	.472	.394	.260	.142	.063	.016		
		AOMT123608PEER-H	M	E	●	●	.472	.394	.260	.142	.047	.031		
AOMT123616PEER-H		M	E	●	●	.472	.394	.260	.142	.016	.063			
	General Purpose Cutting	AOMT184804PEER-M	M	E	●	●	.709	.591	.354	.189	.071	.016		
		AOMT184808PEER-M	M	E	●	●	.709	.591	.354	.189	.055	.031		
		AOMT184810PEER-M	M	E	●	●	.709	.591	.354	.189	.039	.039		
		AOMT184812PEER-M	M	E	●	●	.709	.591	.354	.189	.031	.047		
		AOMT184816PEER-M	M	E	●	●	.709	.591	.354	.189	.016	.063		
		AOMT184820PEER-M	M	E	●	●	.709	.591	.354	.189	.016	.079		
	Cutting Edge Strength	AOMT184804PEER-H	M	E	●	●	.709	.591	.354	.189	.071	.016		
		AOMT184808PEER-H	M	E	●	●	.709	.591	.354	.189	.055	.031		
		AOMT184816PEER-H	M	E	●	●	.709	.591	.354	.189	.016	.063		

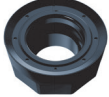
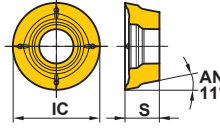
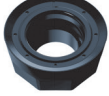
● = NEW

● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

Shape	Application	Order Number	Class	Edge Preparation	Coated		AN	IC	S	BS	RE	Geometry
					NEW	NEW						
					MV1020	MV1030						
	General Purpose Cutting	JOMW06T215ZZSR-FT	M	S	●	●	13°	.250	.109	.047	.059	
		JOMW080320ZZSR-FT	M	S	●	●	13°	.315	.125	.055	.079	
		JDMW09T320ZDSR-FT	M	S	●	●	15°	.375	.156	.071	.079	
		JDMW120420ZDSR-FT	M	S	●	●	15°	.472	.187	.098	.079	
		JDMW140520ZDSR-FT	M	S	●	●	15°	.551	.219	.110	.079	
		JDMW140520ZDSR-FT	M	S	●	●	15°	.551	.219	.110	.079	
	Cutting Edge Strength	JDMT120420ZDSR-ST	M	S	●	●	15°	.472	.187	.098	.079	
		JDMT140520ZDSR-ST	M	S	●	●	15°	.551	.219	.110	.079	
	Low Cutting Resistance For Difficult-to-cut Materials	JOMT06T216ZZER-JL	M	E	●	●	13°	.250	.109	.047	.063	
		JOMT080322ZZER-JL	M	E	●	●	13°	.315	.125	.055	.087	
		JDMT09T323ZDER-JL	M	E	●	●	15°	.375	.156	.071	.091	
		JDMT120423ZDER-JL	M	E	●	●	15°	.472	.187	.098	.091	
Low Cutting Resistance	JDMT140523ZDER-JL	M	E	●	●	15°	.551	.219	.110	.091		
	JOMT06T215ZZSR-JM	M	S	●	●	13°	.250	.109	.047	.059		
	JOMT080320ZZSR-JM	M	S	●	●	13°	.315	.125	.055	.079		
	JDMT09T320ZDSR-JM	M	S	●	●	15°	.375	.156	.071	.079		
	JDMT120420ZDSR-JM	M	S	●	●	15°	.472	.187	.098	.079		
	JDMT140520ZDSR-JM	M	S	●	●	15°	.551	.219	.110	.079		
WJX09 WJX14	Low Cutting Resistance	JOMU090512ZZER-L	M	E	●	●	-	.375	.186	.035	.047	
		JOMU140715ZZER-L	M	E	●	●	-	.551	.259	.051	.059	
General Purpose Cutting	JOMU090512ZZER-M	M	E	●	●	-	.375	.187	.035	.047		
	JOMU140715ZZER-M	M	E	●	●	-	.551	.261	.051	.059		
Cutting Edge Strength	Low Cutting Resistance	JOMU090512ZZER-R	M	E	●	●	-	.375	.190	.035	.047	
		JOMU140715ZZER-R	M	E	●	●	-	.551	.266	.051	.059	

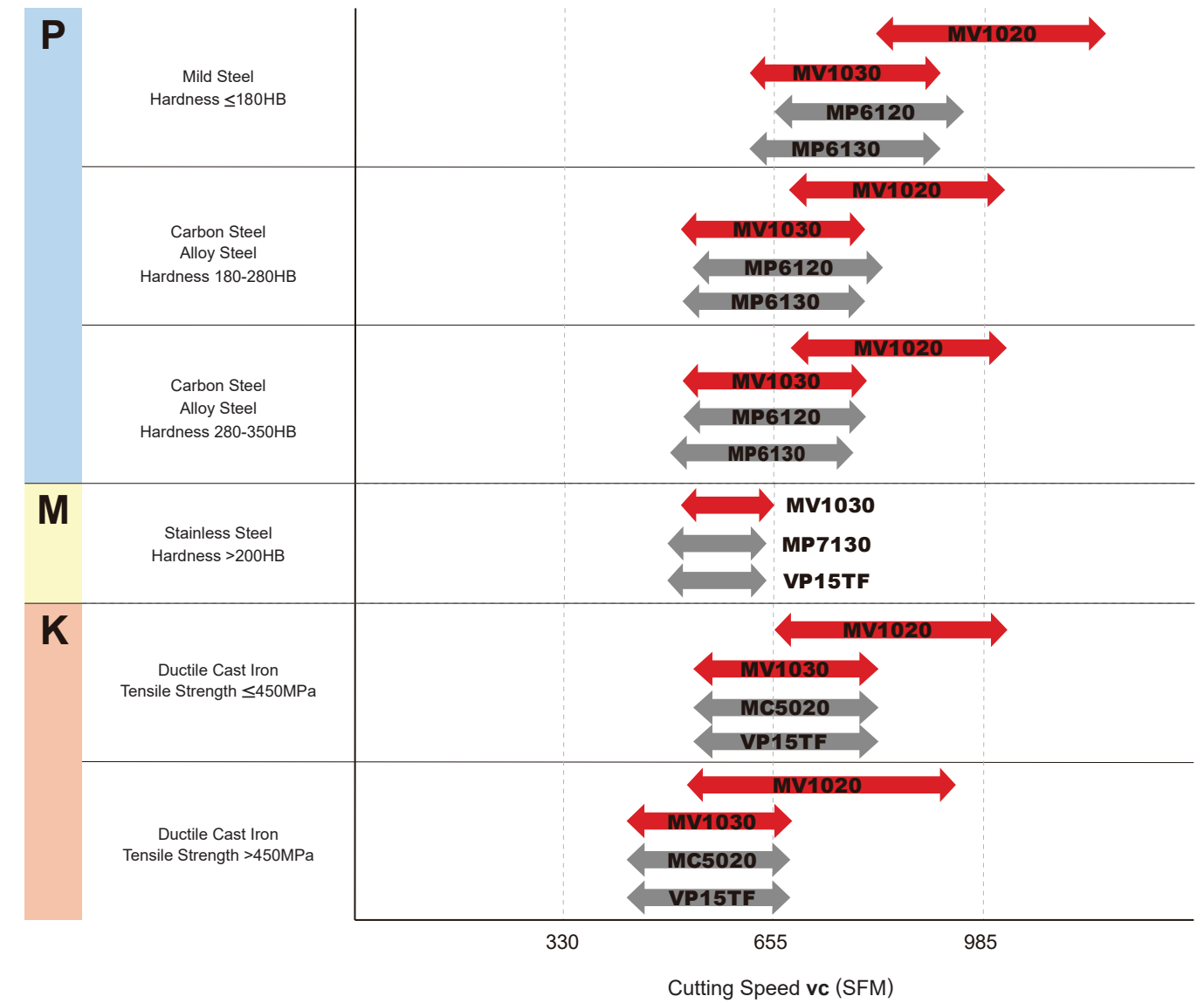
● = NEW

Coated Carbide Grade for Milling

Inserts (inch)											
Shape	Application	Order Number	Class	Edge Preparation	Coated		IC	S	APMX		Geometry
					MV1020	MV1030			4 Seats	8 Seats	
	Low Cutting Resistance 8 Seats	RPMT1040M0E8-L1	M	E	●	●	.394	.156	.197	.055	
	Low Cutting Resistance High Rigidity	RPMT1040M0E4-L2	M	E	●	●	.394	.156	.197	-	
	General Purpose Cutting 8 Seats	RPMT1040M0E8-M1	M	E	●	●	.394	.156	.197	.055	
	General Purpose Cutting High Rigidity	RPMT1040M0E4-M2	M	E	●	●	.394	.156	.197	-	
	Cutting Edge Strength 8 Seats	RPMT1040M0E8-R1	M	E	●	●	.394	.156	.197	.055	
	Cutting Edge Strength High Rigidity	RPMT1040M0E4-R2	M	E	●	●	.394	.156	.197	-	
	Low Cutting Resistance 8 Seats	RPMT1248M0E8-L1	M	E	●	●	.472	.187	.236	.067	
	Low Cutting Resistance High Rigidity	RPMT1248M0E4-L2	M	E	●	●	.472	.187	.236	-	
	General Purpose Cutting 8 Seats	RPMT1248M0E8-M1	M	E	●	●	.472	.187	.236	.067	
	General Purpose Cutting High Rigidity	RPMT1248M0E4-M2	M	E	●	●	.472	.187	.236	-	
	Cutting Edge Strength 8 Seats	RPMT1248M0E8-R1	M	E	●	●	.472	.187	.236	.067	
	Cutting Edge Strength High Rigidity	RPMT1248M0E4-R2	M	E	●	●	.472	.187	.236	-	

● = NEW

Covers a wide range of cutting speeds (Dry cutting with WWX400)



● : USA Stock ★ : Stocked in Japan
(10 inserts in one case)

Recommended Cutting Conditions

WWX200/400 Cutting Speed Dry Cutting

(inch)

Material	Properties	Cutting Conditions	MV1020			MV1030			
			Width of Cut ae			Width of Cut ae			
			0.5DC≥	0.8DC≥	DC(Slot)	0.5DC≥	0.8DC≥	DC(Slot)	
Cutting Speed vc (SFM)			Cutting Speed vc (SFM)						
P	Mild Steel	Hardness ≤180HB	●	985(820-1150)	920(755-1080)	820(655-985)	755(620-885)	690(560-820)	620(490-755)
			●	950(785-1115)	850(690-1050)	785(620-950)	755(620-885)	690(560-820)	620(490-755)
	Carbon Steel Alloy Steel	Hardness 180-350HB	●	850(690-1015)	785(620-920)	690(525-850)	655(525-785)	590(460-720)	525(395-655)
			●	820(655-985)	755(590-885)	655(490-820)	655(525-785)	590(460-720)	525(395-655)
M	Stainless Steel	-	●	-	-	-	590(525-655)	525(460-590)	-
			●	-	-	-	560(490-620)	490(425-560)	-
K	Ductile Cast Iron	Tensile Strength ≤450MPa	●	785(655-1015)	720(560-920)	655(490-850)	690(560-820)	620(490-755)	560(425-690)
			●	755(620-985)	690(525-885)	620(460-820)	690(560-820)	620(490-755)	560(425-690)
		Tensile Strength ≤800MPa	●	690(525-920)	620(460-820)	525(395-690)	560(425-690)	490(360-620)	425(295-560)
			●	655(490-885)	590(425-785)	490(360-655)	560(425-690)	490(360-620)	425(295-560)

WWX200/400 Cutting Speed Wet Cutting

(inch)

Material	Properties	Cutting Conditions	MV1020			MV1030			
			Width of Cut ae			Width of Cut ae			
			0.5DC≥	0.8DC≥	DC(Slot)	0.5DC≥	0.8DC≥	DC(Slot)	
Cutting Speed vc (SFM)			Cutting Speed vc (SFM)						
P	Mild Steel	Hardness ≤180HB	●	720(690-755)	620(590-690)	590(525-620)	460(425-490)	395(360-425)	360(330-395)
			●	690(655-720)	590(560-655)	560(490-590)	460(425-490)	395(360-425)	360(330-395)
	Carbon Steel Alloy Steel	Hardness 180-350HB	●	655(620-690)	560(525-620)	525(490-560)	460(425-490)	395(360-425)	360(330-395)
			●	620(590-655)	525(490-590)	490(460-525)	460(425-490)	395(360-425)	360(330-395)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	●	655(590-785)	590(490-720)	490(425-655)	525(460-590)	460(395-525)	395(330-460)
			●	620(560-755)	560(460-690)	460(395-620)	525(460-590)	460(395-525)	395(330-460)
		Tensile Strength ≤800MPa	●	590(560-690)	525(490-620)	460(395-525)	490(460-525)	425(395-460)	360(330-395)
			●	560(525-655)	490(460-590)	395(360-490)	490(460-525)	425(395-460)	360(330-395)

Note 1) The recommended cutting speed has been calculated for a depth of cut 2mm. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

WWX200 Depth of Cut / Feed per Tooth Dry and Wet Cutting

(inch)

Material	Properties	Cutting Conditions	Width of Cut ae									
			0.5DC≥			0.8DC≥			DC(Slot)			
			Chipbreaker	Depth of Cut ap	Feed fz (IPT)	Chipbreaker	Depth of Cut ap	Feed fz (IPT)	Chipbreaker	Depth of Cut ap	Feed fz (IPT)	
P	Mild Steel	Hardness ≤180HB	● ●	L-M	≤.118	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.118	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-
	Carbon Steel Alloy Steel	Hardness 180-350HB	● ●	L-M	≤.118	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.118	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-
K	Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	L-M	≤.118	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.118	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-
		Tensile Strength ≤800MPa	● ●	L-M	≤.118	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.118	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-

Note 1) Refer to the above table and set up cutting conditions according to cutting applications.

WWX400 Depth of Cut / Feed per Tooth Dry and Wet Cutting

(inch)

Material	Properties	Cutting Conditions	Width of Cut ae									
			0.5DC≥			0.8DC≥			DC(Slot)			
			Chipbreaker	Depth of Cut ap	Feed fz (IPT)	Chipbreaker	Depth of Cut ap	Feed fz (IPT)	Chipbreaker	Depth of Cut ap	Feed fz (IPT)	
P	Mild Steel	Hardness ≤180HB	● ●	L-M	≤.157	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.157	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-
	Carbon Steel Alloy Steel	Hardness 180-350HB	● ●	L-M	≤.157	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.157	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-
M	Stainless Steel	-	● ●	L-M	≤.079	.005(.004-.006)	L-M	≤.079	.005(.004-.006)	-	-	-
K	Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	L-M	≤.157	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.157	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-
		Tensile Strength ≤800MPa	● ●	L-M	≤.157	.005(.004-.006)	L-M	≤.118	.005(.004-.006)	L-M	≤.079	.005(.004-.006)
			●	M-R	≤.157	.006(.004-.008)	M-R	≤.118	.006(.004-.008)	-	-	-

Note 1) Refer to the above table and set up cutting conditions according to cutting applications.

Recommended Cutting Conditions

WSX445 Cutting Speed Dry and Wet Cutting

(inch)

Material	Properties	MV1020		MV1030	
		Cutting Speed vc (SFM)		Cutting Speed vc (SFM)	
		Dry Cutting	Wet Cutting	Dry Cutting	Wet Cutting
P Mild Steel	Hardness ≤180HB	985(655-1310)	720(395-1050)	820(655-985)	490(330-655)
	Carbon Steel Alloy Steel	Hardness 180-350HB	850(560-1150)	655(330-985)	720(560-885)	395(260-525)
		Hardness 280-350HB	590(330-820)	490(330-655)	590(330-820)	395(260-525)
M Stainless Steel	—	—	—	655(490-820)	—
K Ductile Cast Iron	Tensile Strength ≤450MPa	785(425-1150)	655(425-820)	525(360-785)	490(330-655)
	Tensile Strength ≤800MPa	720(260-1150)	590(260-755)	590(360-820)	460(260-655)

WSX445 Depth of Cut / Feed per Tooth Dry and Wet Cutting

(inch)

Material	Properties	Depth of Cut ap / Feed per Tooth fz									
		Finish-Light Cutting		Light Cutting		Medium Cutting		Rough Cutting		Heavy Cutting	
		fz (IPT)	ap	fz (IPT)	ap	fz (IPT)	ap	fz (mm/t.)	ap	fz (IPT)	ap
P Mild Steel	Hardness ≤180HB	L Chipbreaker		L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
		.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	.008 (.006-.010)	≤.157	.010 (.008-.012)	≤.197
		.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	.008 (.006-.010)	≤.157	.010 (.008-.012)	≤.197
Carbon Steel Alloy Steel	Hardness 180-280HB	.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	.008 (.006-.010)	≤.157	.010 (.008-.012)	≤.197
	Hardness 280-350HB	.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	.008 (.006-.010)	≤.157	.010 (.008-.012)	≤.197
M Stainless Steel	—	L Chipbreaker		L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
		.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	—	—	—	—
K Ductile Cast Iron	Tensile Strength ≤450MPa	L Chipbreaker		L,M Chipbreaker		M Chipbreaker		M,R Chipbreaker		R,H Chipbreaker	
		.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	.008 (.006-.010)	≤.157	.010 (.008-.012)	≤.197
	Tensile Strength ≤800MPa	.006 (.004-.008)	≤.039	.006 (.004-.008)	≤.079	.008 (.006-.010)	≤.118	.008 (.006-.010)	≤.157	.010 (.008-.012)	≤.197

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

Chipbreaker Selection Table

WJX09

(inch)

Material	Properties	L Chipbreaker		M Chipbreaker		R Chipbreaker	
		Cutting Conditions	Depth of Cut ap	Cutting Conditions	Depth of Cut ap	Cutting Conditions	Depth of Cut ap
P Mild Steel	Hardness ≤180HB	● ●	≤.039	● ●	≤.059	● ✖	≤.059
		● ●	≤.039	● ●	≤.059	● ✖	≤.059
Carbon Steel Alloy Steel	Hardness 180-350HB	● ●	≤.039	● ●	≤.059	● ✖	≤.059
		● ●	≤.039	● ●	≤.059	● ✖	≤.059
M Stainless Steel	—	● ●	≤.039	● ●	≤.039	—	—
K Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	≤.039	● ●	≤.059	● ✖	≤.059
	Tensile Strength ≤800MPa	● ●	≤.039	● ●	≤.039	● ✖	≤.039

WJX14

(inch)

Material	Properties	L Chipbreaker		M Chipbreaker		R Chipbreaker	
		Cutting Conditions	Depth of Cut ap	Cutting Conditions	Depth of Cut ap	Cutting Conditions	Depth of Cut ap
P Mild Steel	Hardness ≤180HB	● ●	≤.079	● ●	≤.118	● ✖	≤.118
		● ●	≤.079	● ●	≤.118	● ✖	≤.118
Carbon Steel Alloy Steel	Hardness 180-350HB	● ●	≤.079	● ●	≤.118	● ✖	≤.118
		● ●	≤.079	● ●	≤.118	● ✖	≤.118
M Stainless Steel	—	● ●	≤.059	● ●	≤.059	—	—
K Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	≤.079	● ●	≤.118	—	—
	Tensile Strength ≤800MPa	● ●	≤.079	● ●	≤.079	—	—

Recommended Cutting Conditions

WJX09 Cutting Speed Dry Cutting

(inch)

Material	Properties	MV1020	MV1030
		Cutting Speed v_c (SFM)	Cutting Speed v_c (SFM)
P Mild Steel	Hardness $\leq 180\text{HB}$	755(590–920)	525(330–720)
	Carbon Steel Alloy Steel Hardness 180–350HB	720(560–885)	490(260–720)
M Stainless Steel	Hardness $\leq 200\text{HB}$	–	525(425–655)
	Hardness $> 200\text{HB}$	–	460(260–655)
K Ductile Cast Iron	Tensile Strength $\leq 450\text{MPa}$	690(525–850)	525(395–690)
	Tensile Strength $\leq 800\text{MPa}$	620(460–785)	425(295–560)

WJX14 Cutting Speed Dry Cutting

(inch)

Material	Properties	MV1020	MV1030
		Cutting Speed v_c (SFM)	Cutting Speed v_c (SFM)
P Mild Steel	Hardness $\leq 180\text{HB}$	720(560–885)	425(260–590)
	Carbon Steel Alloy Steel Hardness 180–350HB	655(490–820)	395(195–590)
M Stainless Steel	Hardness $\leq 200\text{HB}$	–	525(425–655)
	Hardness $> 200\text{HB}$	–	460(330–655)
K Ductile Cast Iron	Tensile Strength $\leq 450\text{MPa}$	655(490–820)	490(330–655)
	Tensile Strength $\leq 800\text{MPa}$	590(425–755)	395(260–525)

WJX09 Depth of Cut / Feed per Tooth Dry Cutting

(inch)

Material	Properties	Chipbreaker	Depth of Cut a_p	Cutting Dia. Max. DCX=1.000", 1.125", 25mm, 28mm (Z=2)	Cutting Dia. Max. DCX=1.000", 1.125", 25mm, 28mm (Z=3)	Cutting Dia. Max. DCX $\geq 1.250"$, 32 mm
				Feed f_z (IPT)	Feed f_z (IPT)	Feed f_z (IPT)
P Mild Steel	Hardness $\leq 180\text{HB}$	M, R	$\leq .020$	.051(.016–.079)	.051(.016–.079)	.059(.020–.079)
			$\leq .039$	.039(.012–.051)	.031(.012–.039)	.047(.016–.059)
			$\leq .059$	.024(.012–.039)	–	.031(.016–.047)
		L	$\leq .020$	.047(.016–.063)	.047(.016–.063)	.047(.016–.063)
			$\leq .039$	.031(.012–.047)	.031(.012–.039)	.039(.016–.098)
			$\leq .059$	.024(.012–.039)	.024(.012–.039)	.024(.012–.039)
Carbon Steel Alloy Steel	Hardness 180–350HB	M, R	$\leq .020$	.051(.016–.067)	.051(.016–.067)	.059(.016–.079)
			$\leq .039$	.031(.012–.039)	.028(.012–.035)	.039(.012–.051)
			$\leq .059$	.020(.012–.028)	–	.028(.012–.039)
		L	$\leq .020$	.047(.012–.059)	.047(.012–.059)	.047(.012–.059)
			$\leq .039$	.028(.008–.039)	.028(.008–.035)	.028(.008–.039)
			$\leq .059$	.024(.008–.031)	.024(.008–.031)	.024(.008–.031)
M Stainless Steel	–	L	$\leq .020$	.031(.012–.039)	.031(.012–.039)	.031(.012–.039)
			$\leq .039$	.039(.016–.047)	.039(.016–.047)	.039(.016–.047)
			$\leq .059$	.024(.008–.031)	.024(.008–.031)	.024(.008–.031)
		M	$\leq .020$	.024(.008–.031)	.024(.008–.031)	.024(.008–.031)
			$\leq .039$	.031(.012–.039)	.031(.012–.039)	.031(.012–.039)
			$\leq .059$	.024(.008–.031)	.024(.008–.031)	.024(.008–.031)
K Ductile Cast Iron	Tensile Strength $\leq 450\text{MPa}$	M, R	$\leq .020$	.051(.016–.067)	.051(.016–.067)	.059(.016–.079)
			$\leq .039$	.031(.012–.039)	.028(.012–.035)	.039(.012–.051)
			$\leq .059$	.020(.012–.028)	–	.028(.012–.039)
		L	$\leq .020$	.039(.012–.051)	.039(.012–.051)	.039(.012–.051)
			$\leq .039$	.031(.008–.039)	.028(.008–.035)	.031(.008–.047)
			$\leq .059$	.024(.008–.031)	.024(.008–.031)	.024(.008–.031)
	Tensile Strength $\leq 800\text{MPa}$	M, R	$\leq .020$	.039(.008–.059)	.039(.008–.059)	.051(.012–.067)
			$\leq .039$	.031(.008–.039)	.024(.008–.031)	.039(.012–.047)
			$\leq .059$	.024(.008–.031)	.024(.008–.031)	.024(.008–.031)
		L	$\leq .020$	.031(.012–.047)	.031(.012–.047)	.031(.012–.047)
			$\leq .039$	.020(.008–.031)	.020(.008–.031)	.020(.008–.031)
			$\leq .059$	.020(.008–.031)	.020(.008–.031)	.020(.008–.031)

Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.

Note 2) When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25%.

Note 3) When large vibration occurs, reduce the cutting conditions.

Note 4) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

Recommended Cutting Conditions

WJX14 Depth of Cut / Feed per Tooth Dry Cutting

(inch)

Material	Properties	Chipbreaker	Depth of Cut ap	Cutting Dia. Max. DCX=2.000", 50 mm, 52 mm	Cutting Dia. Max. DCX≥2.500", 63 mm	
				Feed fz (IPT)	Feed fz (IPT)	
P Mild Steel	Hardness ≤180HB	M,R	≤.039	.059(.024-.098)	.067(.024-.110)	
			≤.059	.051(.024-.079)	.059(.024-.098)	
			≤.079	.047(.024-.079)	.051(.024-.098)	
		≤.098	.031(.012-.059)	.039(.012-.063)		
		≤.118	.016(.008-.039)	.020(.008-.047)		
		L	≤.039	.047(.016-.079)	.047(.016-.079)	
	≤.059		.039(.016-.071)	.039(.016-.098)		
	≤.079		.031(.016-.067)	.031(.016-.067)		
	Carbon Steel Alloy Steel	Hardness 180-350HB	M,R	≤.039	.059(.020-.079)	.067(.020-.098)
				≤.059	.047(.020-.067)	.051(.020-.087)
				≤.079	.039(.020-.059)	.047(.020-.079)
			≤.098	.028(.012-.047)	.035(.012-.059)	
≤.118			.012(.008-.031)	.016(.008-.039)		
L			≤.039	.039(.012-.067)	.039(.012-.067)	
	≤.059	.031(.012-.059)	.031(.012-.059)			
	≤.079	.028(.012-.047)	.028(.012-.047)			
M Stainless Steel	Hardness ≤200HB	M	≤.039	.039(.020-.047)	.039(.020-.047)	
			≤.059	.039(.020-.039)	.039(.020-.039)	
		L	≤.039	.031(.012-.047)	.031(.012-.047)	
	≤.059	.031(.012-.039)	.031(.012-.039)			
	Hardness >200HB	M	≤.039	.039(.020-.047)	.039(.020-.047)	
		≤.059	.039(.020-.039)	.039(.020-.039)		
L		≤.039	.031(.012-.047)	.031(.012-.047)		
≤.059	.031(.012-.039)	.031(.012-.039)				
K Ductile Cast Iron	Tensile Strength ≤450MPa	M	≤.039	.059(.020-.079)	.067(.020-.098)	
			≤.059	.051(.020-.071)	.059(.020-.079)	
			≤.079	.047(.020-.071)	.051(.020-.079)	
		≤.098	.028(.012-.047)	.035(.012-.059)		
		≤.118	.012(.008-.031)	.016(.008-.039)		
		L	≤.039	.047(.012-.079)	.047(.012-.079)	
			≤.059	.039(.012-.067)	.039(.012-.067)	
			≤.079	.031(.012-.059)	.031(.012-.059)	
		Tensile Strength ≤800MPa	M	≤.039	.051(.016-.071)	.059(.016-.079)
	≤.059			.047(.016-.059)	.051(.016-.071)	
	≤.079			.039(.016-.059)	.047(.016-.071)	
	L		≤.039	.039(.012-.067)	.039(.012-.067)	
			≤.059	.031(.012-.059)	.031(.012-.059)	
			≤.079	.028(.012-.047)	.028(.012-.047)	

Note 1) To discharge chips effectively, use an air blow when machining. When the air blow is less effective at discharging chips, we recommend wet cutting.

Note 2) When wet cutting, tool life may become shorter than dry cutting. When carrying out wet cutting for the applications recommended with dry cutting, reduce the cutting speed by 25%.

Note 3) When large vibration occurs, reduce the cutting conditions.

Note 4) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

VPX200/300 Cutting Speed Dry Cutting

(inch)

Material	Properties	Cutting Conditions	Recommended		Width of Cut ae							
			1st	2nd	≤0.25DC		0.25-0.5DC		0.5-0.75DC		DC(Slot)	
					MV1020	MV1030	MV1020	MV1030	MV1020	MV1030	MV1020	MV1030
P Mild Steel	Hardness ≤180HB	● ●	L	M	920	755	885	720	720	590	720	590
					(720-1080)	(590-885)	(690-1050)	(560-850)	(560-850)	(460-690)	(560-850)	(460-690)
Carbon Steel Alloy Steel	Hardness 180-280HB	● ●	L	M	720	590	690	560	560	460	560	560
					(560-850)	(460-690)	(525-785)	(425-655)	(425-655)	(360-525)	(425-655)	(425-655)
M Stainless Steel	Hardness 280-350HB	● ●	L	M	590	590	560	560	460	460	460	460
					(460-690)	(460-690)	(425-655)	(425-655)	(360-525)	(360-525)	(360-525)	(360-525)
K Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	M	L	655	490	620	460	560	410	560	330
					(490-920)	(330-655)	(460-885)	(295-620)	(425-785)	(260-560)	(425-785)	(260-395)
K Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	M	L	590	490	560	460	490	410	490	490
					(460-820)	(330-655)	(425-785)	(295-620)	(395-690)	(260-560)	(395-690)	(395-690)

Cutting Mode : Wet Cutting

(inch)

Material	Properties	Cutting Conditions	Recommended		Width of Cut ae							
			1st	2nd	≤0.25DC		0.25-0.5DC		0.5-0.75DC		DC(Slot)	
					MV1020	MV1030	MV1020	MV1030	MV1020	MV1030	MV1020	MV1030
P Mild Steel	Hardness ≤180HB	● ●	L	M	690	460	655	425	490	330	490	330
					(490-950)	(330-620)	(460-885)	(295-590)	(360-590)	(230-395)	(360-590)	(230-395)
Carbon Steel Alloy Steel	Hardness 180-280HB	● ●	L	M	590	395	560	360	490	330	490	330
					(460-690)	(295-460)	(395-655)	(260-425)	(360-590)	(230-395)	(360-590)	(230-395)
K Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	M	L	460	395	425	360	395	330	395	395
					(360-525)	(295-460)	(295-490)	(260-425)	(260-460)	(230-395)	(260-460)	(260-460)
K Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	M	L	590	425	560	395	490	345	490	345
					(490-785)	(260-590)	(460-755)	(230-560)	(425-655)	(195-490)	(425-655)	(195-490)
K Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	M	L	525	425	490	395	425	345	425	345
					(425-690)	(260-590)	(395-655)	(230-560)	(360-560)	(195-490)	(360-560)	(195-490)

Recommended Cutting Conditions

VPX200 Depth of Cut / Feed per Tooth Dry and Wet Cutting

(inch)

Material	Properties	Width of Cut ae	Cutting Conditions	DC					
				ø.625-ø.750(ø16mm-18mm)		ø.875-ø1.000(ø20mm-25mm)		ø1.125-ø2.500(ø28mm-63mm)	
				Depth of Cut ap	Feed fz (IPT)	Depth of Cut ap	Feed fz (IPT)	Depth of Cut ap	Feed fz (IPT)
P Mild Steel	Hardness ≤180HB	≤0.25DC	● ●	≤.236	.004-.006	≤.315	.004-.008	≤.315	.004-.010
		0.25-0.5DC	● ●	≤.197	.003-.005	≤.315	.004-.006	≤.315	.004-.008
		0.5-0.75DC	● ●	≤.157	.003-.005	≤.236	.003-.005	≤.236	.004-.006
		DC(Slot)	● ●	≤.079	.002-.004	≤.157	.002-.004	≤.157	.003-.005
Carbon Steel Alloy Steel	Hardness 180-280HB	≤0.25DC	● ●	≤.236	.004-.006	≤.315	.004-.008	≤.315	.004-.010
		0.25-0.5DC	● ●	≤.197	.003-.005	≤.315	.004-.006	≤.315	.004-.008
		0.5-0.75DC	● ●	≤.157	.003-.005	≤.236	.003-.005	≤.236	.004-.006
		DC(Slot)	● ●	≤.079	.002-.004	≤.157	.002-.004	≤.157	.003-.005
	Hardness 280-350HB	≤0.25DC	● ●	≤.236	.004-.006	≤.315	.004-.006	≤.315	.004-.008
		0.25-0.5DC	● ●	≤.197	.003-.005	≤.315	.003-.005	≤.315	.004-.006
		0.5-0.75DC	● ●	≤.157	.003-.005	≤.236	.002-.004	≤.236	.003-.005
		DC(Slot)	● ●	≤.079	.002-.004	≤.157	.002-.004	≤.157	.002-.004
M Stainless Steel	-	≤0.25DC	● ●	≤.236	.004-.006	≤.315	.004-.008	≤.315	.004-.008
		0.25-0.5DC	● ●	≤.197	.003-.005	≤.315	.003-.006	≤.315	.003-.006
		0.5-0.75DC	● ●	≤.157	.002-.004	≤.236	.003-.005	≤.236	.003-.005
		DC(Slot)	● ●	≤.079	.002-.004	≤.157	.002-.004	≤.157	.002-.004
K Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	● ●	≤.236	.004-.006	≤.315	.004-.008	≤.315	.004-.008
		0.25-0.5DC	● ●	≤.197	.003-.005	≤.315	.004-.006	≤.315	.004-.006
		0.5-0.75DC	● ●	≤.157	.003-.005	≤.236	.003-.005	≤.236	.003-.005
		DC(Slot)	● ●	≤.079	.002-.004	≤.157	.002-.004	≤.157	.002-.004

VPX300 Depth of Cut / Feed per Tooth Dry and Wet Cutting

(inch)

Material	Properties	Width of Cut ae	Cutting Conditions	DC			
				ø1.000(ø25mm)		ø1.125-ø3.000(ø28mm-80mm)	
				Depth of Cut ap	Feed fz (IPT)	Depth of Cut ap	Feed fz (IPT)
P Mild Steel	Hardness ≤180HB	≤0.25DC	● ●	≤.433	.004-.008	≤.433	.004-.012
		0.25-0.5DC	● ●	≤.433	.004-.006	≤.433	.004-.010
		0.5-0.75DC	● ●	≤.315	.003-.005	≤.315	.004-.008
		DC(Slot)	● ●	≤.197	.002-.004	≤.197	.003-.006
Carbon Steel Alloy Steel	Hardness 180-280HB	≤0.25DC	● ●	≤.433	.004-.008	≤.433	.004-.012
		0.25-0.5DC	● ●	≤.433	.004-.006	≤.433	.004-.010
		0.5-0.75DC	● ●	≤.315	.003-.005	≤.315	.004-.008
		DC(Slot)	● ●	≤.197	.002-.004	≤.197	.003-.006
	Hardness 280-350HB	≤0.25DC	● ●	≤.433	.004-.006	≤.433	.004-.010
		0.25-0.5DC	● ●	≤.433	.003-.005	≤.433	.004-.008
		0.5-0.75DC	● ●	≤.315	.002-.004	≤.315	.004-.006
		DC(Slot)	● ●	≤.197	.002-.004	≤.197	.003-.005
M Stainless Steel	-	≤0.25DC	● ●	≤.433	.004-.008	≤.433	.004-.008
		0.25-0.5DC	● ●	≤.433	.003-.006	≤.433	.003-.006
		0.5-0.75DC	● ●	≤.315	.003-.005	≤.315	.003-.005
		DC(Slot)	● ●	≤.197	.002-.004	≤.197	.002-.004
K Ductile Cast Iron	Tensile Strength ≤800MPa	≤0.25DC	● ●	≤.433	.004-.008	≤.433	.004-.010
		0.25-0.5DC	● ●	≤.433	.004-.006	≤.433	.004-.008
		0.5-0.75DC	● ●	≤.315	.003-.005	≤.315	.004-.006
		DC(Slot)	● ●	≤.197	.002-.004	≤.197	.003-.005

Note 1) These cutting conditions should be referenced for standard shank types (last letter in designation is S) and arbor shank types. If there is chatter, insert chipping, etc. during machining, alter conditions accordingly.

Note 2) Chattering vibration is more likely under the following circumstances. Use a cut and feed per tooth that are at minimum recommended conditions or below.

- When tool overhang is long (using a long shank, screw-in type, etc.).
- Rigidity of machine, workpiece material or attachment of workpiece material is low.
- Corner radius during pocket milling

Note 3) A type with fewer teeth is recommended when the depth of cut in the radius direction (ae) is 0.5 DC or more.

Note 4) Wet cutting is recommended, when focusing on the surface finish. (Service life is shorter than for dry cutting.)

Note 5) When using under higher than recommended cutting conditions, or for long periods of time, the clamp screw may become fatigued and break during machining. Please change out the clamp screw periodically.

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

AHX440S Dry Cutting

(inch)

Material	Properties	Cutting Speed vc (SFM)		Feed fz (IPT)	Depth of Cut ap	Width of Cut ae		
		MV1020	MV1030					
P Mild Steel	Hardness ≤180HB	985(655-1310)	805(620-985)	.012(.008-.016)	≤.118	≤0.8DC		
		Carbon Steel Alloy Steel	Hardness 180-280HB	850(560-1150)	690(490-885)	.012(.008-.016)	≤.118	≤0.8DC
				Carbon Steel Alloy Steel	Hardness 280-350HB	590(330-820)	490(295-590)	.012(.008-.016)	≤.118	≤0.8DC
M Stainless Steel	Hardness ≤200HB	-	605(395-820)			.008(.004-.012)	≤.118	≤0.8DC
		Hardness >200HB	-	460(260-655)	.008(.004-.012)	≤.118	≤0.8DC	
K Ductile Cast Iron	Tensile Strength ≤450MPa		785(425-1150)	605(395-820)	.008(.004-.012)	≤.118	≤0.8DC	
		Tensile Strength ≤800MPa	720(260-1150)	490(330-655)	.008(.004-.012)	≤.118	≤0.8DC	

(Note 1) Refer to the above table and set up cutting conditions according to cutting applications.

(Note 2) When placing emphasis on surface finish quality, wet cutting is recommended. (Tool life is lowered as compared to dry cutting)

(Note 3) The recommended depth of cut differs according to insert geometry.

(Note 4) When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30%.

(Note 5) Recommended wet cutting for good surface finishing of stainless steel. (Tool life is short compared to wet cutting.)

AHX475S Dry Cutting

(inch)

Material	Properties	Chipbreaker	Cutting Speed vc (SFM)		Feed fz (IPT)	Depth of Cut ap	Width of Cut ae
			MV1020	MV1030			
P Mild Steel	Hardness ≤180HB	R	720(560-885)	460(260-655)	.024	≤.063	≤0.5DC
		R	720(560-885)	460(260-655)	.031	≤.063	0.5DC<ae≤0.8DC
		M	720(560-885)	460(260-655)	.039	≤.063	0.8DC<ae≤DC
Carbon Steel Alloy Steel	Hardness 180-280HB	R	655(490-820)	395(195-590)	.024	≤.063	≤0.5DC
		R	655(490-820)	395(195-590)	.031	≤.063	0.5DC<ae≤0.8DC
		M	655(490-820)	395(195-590)	.039	≤.063	0.8DC<ae≤DC
Carbon Steel Alloy Steel	Hardness 280-350HB	R	490(330-655)	295(100-490)	.020	≤.063	≤0.5DC
		R	490(330-655)	295(100-490)	.024	≤.063	0.5DC<ae≤0.8DC
		R	490(330-655)	295(100-490)	.028	≤.063	0.8DC<ae≤DC
K Ductile Cast Iron	Tensile Strength ≤450MPa	R	655(490-820)	460(260-655)	.024	≤.063	≤0.5DC
		R	655(490-820)	460(260-655)	.031	≤.063	0.5DC<ae≤0.8DC
	Tensile Strength ≤800MPa	M	655(490-820)	460(260-655)	.039	≤.063	0.8DC<ae≤DC
		R	590(425-755)	460(260-655)	.020	≤.063	≤0.5DC
R	590(425-755)	460(260-655)	.024	≤.063	0.5DC<ae≤0.8DC		
R	590(425-755)	460(260-655)	.028	≤.063	0.8DC<ae≤DC		

(Note 1) When clamp rigidity is low and tool overhang is long, we recommended to reduce the cutting speed and the feed rate by 30%.

Recommended Cutting Conditions

WSF406W
Dry Cutting

(inch)

Material	Properties	Cutting Conditions	Depth of Cut ap	Cutting Speed vc (SFM)		Feed fz (IPT)	Width of Cut ae
				MV1020	MV1030		
Gray Cast Iron (FC300 etc.)	Tensile Strength ≤350MPa	●	ap ≤.020	985(820-985)	490(330-655)	.005(.003-.008)	≤0.8DC
			ap ≤.079	820(690-985)	490(330-655)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	720(620-850)	460(260-655)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	655(590-755)	360(195-525)	.004(.003-.006)	≤0.8DC
		●	ap ≤.020	820(690-985)	490(330-655)	.005(.003-.008)	≤0.8DC
			ap ≤.079	720(620-850)	490(330-655)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	655(590-755)	460(260-655)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	590(525-690)	360(195-525)	.004(.003-.006)	≤0.8DC
		⊕	ap ≤.020	720(620-850)	460(260-655)	.005(.003-.008)	≤0.8DC
			ap ≤.079	655(590-755)	460(260-655)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	590(525-690)	360(195-525)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	490(330-590)	260(130-395)	.004(.003-.006)	≤0.8DC
Ductile Cast Iron (FCD450 etc.)	Tensile Strength ≤450MPa	●	ap ≤.020	755(655-820)	360(195-525)	.005(.003-.008)	≤0.8DC
			ap ≤.079	655(560-755)	360(195-525)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	590(490-690)	295(165-425)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	525(425-620)	230(130-330)	.004(.003-.006)	≤0.8DC
		●	ap ≤.020	655(560-755)	360(195-525)	.005(.003-.008)	≤0.8DC
			ap ≤.079	590(490-690)	360(195-525)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	525(425-620)	295(165-425)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	460(360-560)	230(130-330)	.004(.003-.006)	≤0.8DC
		⊕	ap ≤.020	590(490-690)	295(165-425)	.005(.003-.008)	≤0.8DC
			ap ≤.079	525(425-620)	295(165-425)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	460(360-560)	230(130-330)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	395(295-490)	195(100-295)	.004(.003-.006)	≤0.8DC
Ductile Cast Iron (FCD700 etc.)	Tensile Strength ≤800MPa	●	ap ≤.020	755(655-820)	360(195-525)	.005(.003-.008)	≤0.8DC
			ap ≤.079	655(560-755)	360(195-525)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	590(490-690)	295(165-425)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	525(425-620)	230(130-330)	.004(.003-.006)	≤0.8DC
		●	ap ≤.020	655(560-755)	360(195-525)	.005(.003-.008)	≤0.8DC
			ap ≤.079	590(490-690)	360(195-525)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	525(425-620)	295(165-425)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	460(360-560)	230(130-330)	.004(.003-.006)	≤0.8DC
		⊕	ap ≤.020	590(490-690)	295(165-425)	.005(.003-.008)	≤0.8DC
			ap ≤.079	525(425-620)	295(165-425)	.006(.004-.010)	≤0.8DC
			.079 < ap ≤.157	460(360-560)	230(130-330)	.005(.004-.008)	≤0.8DC
			.157 < ap ≤.295	395(295-490)	195(100-295)	.004(.003-.006)	≤0.8DC

Cutting Conditions (Guide) :
● : Stable Cutting ● : General Cutting ⊕ : Unstable Cutting

ASX445
Dry and Wet Cutting

(inch)

Material	Properties	Cutting Speed vc (m/min)		Finish-Light Cutting		Light-Rough Cutting		Medium-Heavy Cutting		
		MV1020	MV1030	Feed fz (IPT)	Chipbreaker	Feed fz (IPT)	Chipbreaker	Feed fz (IPT)	Chipbreaker	
P	Mild Steel	Hardness ≤180HB	985(655-1310)	900(655-1150)	.006(.004-.008)	JL	.008(.004-.012)	JM	.012(.008-.016)	JH
			Carbon Steel Alloy Steel	Hardness 180-280HB	850(560-1150)	770(560-985)	.006(.004-.008)	JL	.008(.004-.012)	JM	.012(.008-.016)	JH
		Hardness 280-350HB		590(330-820)	540(330-755)	.006(.004-.008)	JL	.008(.004-.012)	JM	.012(.008-.016)	JH
M	Stainless Steel	-	-	720(560-885)	.006(.004-.008)	JL	.008(.004-.012)	JM	.012(.008-.016)	JH
K	Ductile Cast Iron	Tensile Strength ≤450MPa	785(425-1150)	620(425-820)	.006(.004-.008)	JL	.008(.004-.012)	JM	.012(.008-.016)	JH FT
		Tensile Strength >450MPa	720(260-1150)	360(260-490)	.006(.004-.008)	JL	.008(.004-.012)	JM	.012(.008-.016)	JH FT

ASX400
Dry and Wet Cutting

(inch)

Material	Properties	Cutting Speed vc (m/min)		Finish-Light Cutting		Light-Rough Cutting		Medium-Heavy Cutting		
		MV1020	MV1030	Feed fz (IPT)	Chipbreaker	Feed fz (IPT)	Chipbreaker	Feed fz (IPT)	Chipbreaker	
P	Mild Steel	Hardness ≤180HB	985(655-1310)	900(655-1150)	.007(.003-.011)	JL	.008(.004-.012)	JM	.010(.004-.014)	JH
			Carbon Steel Alloy Steel	Hardness 180-280HB	850(560-1150)	770(560-985)	.006(.003-.009)	JL	.007(.004-.011)	JM	.010(.004-.014)	JH
		Hardness 280-350HB		590(330-820)	540(330-755)	.005(.002-.008)	JL	.006(.004-.010)	JM	.007(.004-.011)	JH
M	Stainless Steel	-	-	720(560-885)	.006(.003-.009)	JL	.007(.004-.011)	JM	.008(.004-.012)	JH FT
K	Ductile Cast Iron	Tensile Strength ≤450MPa	785(425-1150)	620(425-820)	.007(.003-.011)	JL	.008(.004-.012)	JM	.010(.004-.014)	JH FT
		Tensile Strength >450MPa	720(260-1150)	360(260-490)	.007(.003-.011)	JL	.008(.004-.012)	JM	.010(.004-.014)	JH FT

Recommended Cutting Conditions

Cutting Conditions (Guide) :
 ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

APX3000/4000 Cutting Speed (inch)

Material	Properties	Cutting Conditions	Recommended		Width of Cut ae								
			1st	2nd	≤0.25DC		0.25-0.5DC		0.5-0.75DC		DC(Slot)		
					MV1020	MV1030	MV1020	MV1030	MV1020	MV1030	MV1020	MV1030	
P	Mild Steel	Hardness ≤180HB	● ●	L	M	920 (720-1080)	755 (590-885)	885 (690-1050)	720 (560-850)	720 (560-850)	590 (460-690)	720 (560-850)	590 (460-690)
	Carbon Steel Alloy Steel	Hardness 180-280HB	● ●	L	M	720 (560-850)	590 (460-690)	690 (525-785)	560 (425-655)	560 (425-655)	460 (360-525)	560 (425-655)	560 (425-655)
		Hardness 280-350HB	● ●	L	M	590 (460-690)	590 (460-690)	560 (425-655)	560 (425-655)	460 (360-525)	460 (360-525)	460 (360-525)	460 (360-525)
M	Stainless Steel	Hardness ≤200HB	● ●	L	M	-	590 (460-690)	-	560 (425-655)	-	460 (360-525)	-	460 (360-525)
		Hardness >200HB	● ●	L	M	-	490 (360-590)	-	460 (330-525)	-	360 (260-425)	-	360 (260-425)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	● ●	M	L	590 (460-690)	590 (460-690)	560 (425-655)	560 (425-655)	460 (360-525)	460 (360-525)	460 (360-525)	460 (360-525)
		Tensile Strength ≤800MPa	● ●	M	L	590 (460-690)	590 (460-690)	560 (425-655)	560 (425-655)	460 (360-525)	460 (360-525)	460 (360-525)	460 (360-525)

APX3000 Depth of Cut / Feed per Tooth (inch)

Material	Properties	Width of Cut ae	DC					
			ø.500-ø.625(ø12mm-16mm)		ø.750-ø1.000(ø20mm-25mm)		ø1.250-ø3.000(ø28mm-100mm)	
			Depth of Cut ap	Feed per Tooth fz (IPT)	Depth of Cut ap	Feed per Tooth fz (IPT)	Depth of Cut ap	Feed per Tooth fz (IPT)
P	Mild Steel	≤.25DC	≤.157	.006	≤.197	.010	≤.197	.008
			.157-.276	.004	.197-.276	.008	.197-.276	.006
			-	-	.276-.335	.006	.276-.335	.004
		.25-.5DC	≤.079	.006	≤.118	.010	≤.118	.008
			.078-.197	.004	.118-.217	.008	.118-.217	.004
			-	-	.217-.315	.006	.217-.315	.003
	Carbon Steel Alloy Steel	.5-.75DC	≤.157	.004	≤.157	.006	≤.118	.004
			-	-	.157-.394	.004	.118-.276	.003
			≤.118	.004	≤.157	.004	≤.118	.004
		DC(Slot)	-	-	.157-.276	.003	.118-.197	.003
			≤.157	.006	≤.197	.008	≤.197	.008
			.157-.276	.004	.197-.276	.006	.197-.276	.006
M	Stainless Steel	≤.25DC	≤.157	.006	≤.197	.008	≤.197	.008
			.157-.276	.004	.197-.276	.006	.197-.276	.006
			-	-	.276-.335	.004	.276-.335	.004
		.25-.5DC	≤.079	.006	≤.118	.008	≤.118	.008
			.078-.197	.004	.118-.217	.006	.118-.217	.006
			-	-	.217-.315	.004	.217-.315	.004
	.5-.75DC	≤.157	.004	≤.157	.004	≤.118	.004	
		-	-	.157-.394	.003	.118-.276	.003	
		≤.157	.004	≤.157	.004	≤.118	.004	
		-	-	.157-.276	.003	.118-.197	.003	
		≤.157	.006	≤.197	.008	≤.197	.008	
		.157-.276	.003	.197-.276	.006	.197-.276	.006	
K	Ductile Cast Iron	≤.25DC	≤.157	.004	≤.197	.008	≤.197	.008
			.157-.276	.003	.197-.276	.006	.197-.276	.006
			-	-	.276-.335	.004	.276-.335	.004
		.25-.5DC	≤.079	.004	≤.118	.008	≤.118	.008
			.079-.197	.003	.118-.217	.006	.118-.217	.006
			-	-	.217-.315	.004	.217-.315	.004
	.5-.75DC	≤.157	.003	≤.157	.004	≤.118	.004	
		-	-	.157-.394	.003	.118-.276	.003	
		≤.157	.003	≤.157	.004	≤.118	.004	
		-	-	.157-.276	.003	.118-.197	.003	
		≤.118	.003	≤.157	.004	≤.118	.004	
		-	-	.157-.276	.003	.118-.197	.003	

APX4000 Depth of Cut / Feed per Tooth (inch)

Material	Properties	Width of Cut ae	Depth of Cut ap	Feed per Tooth fz (IPT)		
				DC		
				ø.750-ø1.500 (ø25mm-40mm)	ø2.000-ø3.000 (ø50mm-80mm)	ø4.000 (ø100mm-160mm)
P	Mild Steel	≤.5DC	≤.197	.012	.012	.010
			.197-.295	.010	.010	.008
			.295-.394	.008	.008	.006
			.394-.492	.006	.006	.004
			.492-.591	.004	.004	.003
			≤.197	.008	.008	.006
	.5-.75DC	.295-.394	.006	.006	.004	
		.394-.591	.004	.004	.003	
		≤.197	.006	.006	.006	
		.197-.295	.004	.004	.004	
		.295-.394	.003	.003	.003	
		DC(Slot)	≤.197	.006	.006	
M	Stainless Steel	≤.5DC	≤.197	.010	.010	.008
			.197-.295	.008	.008	.006
			.295-.394	.006	.006	.004
			.394-.492	.004	.004	.003
			.492-.591	.004	.003	.003
			≤.197	.008	.006	.006
	.5-.75DC	.295-.394	.006	.004	.004	
		.394-.591	.004	.003	.003	
		≤.197	.006	.006	.006	
		.197-.295	.004	.004	.004	
		.295-.394	.003	.003	.003	
		DC(Slot)	≤.197	.006	.006	
K	Ductile Cast Iron	≤.5DC	≤.197	.010	.010	.008
			.197-.295	.008	.008	.006
			.295-.394	.006	.006	.004
			.394-.492	.004	.004	.003
			.492-.591	.003	.003	.003
			≤.197	.008	.008	.006
	.5-.75DC	.295-.394	.006	.004	.004	
		.394-.591	.004	.004	.003	
		≤.197	.006	.006	.006	
		.197-.295	.004	.004	.004	
		.295-.394	.003	.003	.003	
		DC(Slot)	≤.197	.006	.006	

Recommended Cutting Conditions

ARP5/6 Dry Cutting

Material	Properties	Cutting Mode	MV1030	MV1020	Feed per Tooth fz (IPT)	
			First recommendation	For high-efficiency machining		
			Cutting Speed vc (SFM)	Cutting Speed vc (SFM)		
M	Austenitic Stainless Steel	Hardness ≤200HB	Dry	720(560-885)	820(655-985)	.008(.004-.014)
		Wet	490(330-655)	590(425-755)	.008(.004-.014)	
	Austenitic Stainless Steel	Hardness >200HB	Dry	620(460-785)	720(560-885)	.008(.004-.014)
		Wet	425(260-590)	490(330-655)	.008(.004-.014)	
	Duplex Stainless Steel	Hardness ≤280HB	Dry	720(560-885)	820(655-985)	.008(.004-.014)
		Wet	490(330-655)	590(425-755)	.008(.004-.014)	
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	Dry	785(620-950)	885(720-1050)	.008(.004-.014)
		Wet	560(395-720)	620(460-785)	.008(.004-.014)	
	Ferritic and Martensitic Stainless Steel	Hardness >200HB	Dry	785(620-950)	885(720-1050)	.008(.004-.014)
		Wet	560(395-720)	620(460-785)	.008(.004-.014)	
	Precipitation Hardening Stainless Steel	Hardness >450HB	Dry	560(395-720)	620(460-785)	.008(.004-.014)
		Wet	395(230-560)	425(260-590)	.008(.004-.014)	

(Note 1) Actual cutting conditions are estimated to avoid chatter vibration with high rigidity of a machine or workpiece material. Make appropriate adjustments when chatter and/or insert chipping occurs during cutting. Use with lowered conditions when there is a big overhang and/or when pocket-cutting.

(Note 2) Feed rate for recommended cutting conditions table above based when axial depth of cut is ap=.098" with ARP5, and when depth of cut is ap=.118" with ARP6. Due to the chip thinning effect when the axial depth of cut fluctuates, feed rate compensation table below shows (correction values "F") to help calculate correct feed. Example: Feed recommended for ARP5, 304 Stainless steel, MP7130, ap=.039" is .008IPTx1.5(correction values "F")=.012 IPT.

(Note 3) For slotting, use 70% of the recommended feed rate listed above. For ramping, helical cutting, and plunging, use 50% of the recommended feed rate listed above.

(Note 4) Internal coolant is recommended in titanium alloy and heat resistant alloy machining.

Feed rate compensation table, (correction values "F") based on axial depth of cut "ap" fluctuation.

Holder Type	ap = .020"	ap = .039"	ap = .059"	ap = .079"	ap = .098"	ap = .118"	ap = .138"	ap = .157"	ap = .197"	ap = .236"
ARP5	2.3	1.5	1.2	1.1	1.0	.9	.8	.8	.8	-
ARP6	2.5	1.7	1.3	1.1	1.0	1.0	.9	.9	.8	.8

Tool body durability may weaken, when the amount of axial cutting exceeds ARP5=.197" and ARP6=.236".

Cutting Conditions (Guide) :

● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting

AJX Cutting Speed

Material	Properties	MV1020	MV1030	
		Cutting Speed vc (SFM)	Cutting Speed vc (SFM)	
P	Mild Steel	Hardness ≤180HB	755(590-920)	525(330-720)
		Carbon Steel Alloy Steel	Hardness 180-280HB	720(560-885)	490(260-720)
	Carbon Steel Alloy Steel	Hardness 280-350HB	590(330-820)	460(230-690)
		Alloy Tool Steel	Hardness ≤350HB (Annealing)	590(330-820)	460(230-690)
M	Stainless Steel	Hardness ≤200HB	-	525(425-655)
		Hardness >200HB	-	460(260-655)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	690(525-850)	525(395-690)
		Tensile Strength ≤800MPa	620(460-785)	425(295-560)

AJX Depth of Cut / Feed per Tooth

Material	Properties	DCX=.625", .688" (16 mm, 17 mm) Shank Type			DCX=.750", .875" (20 mm, 22 mm) Shank Type			DCX=.750" (20 mm) Shank Type			DCX=1.000", 1.125" (25 mm, 28 mm) Shank Type				
		AJXU06 Type			AJXU08 Type			AJXU06 Type			AJXU09 Type				
		2 (Number of Teeth)			2 (Number of Teeth)			3 (Number of Teeth)			2 (Number of Teeth)				
		Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)		
P	Mild Steel	Hardness ≤180HB	5.5	.031	.031	6.3	.039	.039	6.3	.035	.035	6.7	.039	.047	
			7.0	.024	.024	8.3	.031	.031	8.3	.028	.028	9.0	.031	.039	
			8.2	.016	.016	9.4	.024	.024	9.4	.020	.020	11.5	.024	.031	
		Carbon Steel Alloy Steel	Hardness 180-280HB	5.5	.031	.031	6.3	.039	.039	6.3	.035	.035	6.7	.039	.047
				7.0	.024	.024	8.3	.031	.031	8.3	.028	.028	9.0	.031	.039
				8.2	.016	.016	9.4	.024	.024	9.4	.020	.020	11.5	.024	.031
	Carbon Steel Alloy Steel	Hardness 280-350HB	5.5	.028	.031	6.3	.031	.039	6.3	.028	.035	6.7	.031	.047	
			7.0	.020	.024	8.3	.024	.031	8.3	.020	.028	9.0	.024	.039	
			8.2	.012	.016	9.4	.016	.024	9.4	.016	.020	11.5	.016	.031	
	Alloy Tool Steel	Hardness ≤350HB (Annealing)	5.5	.028	.031	6.3	.031	.039	6.3	.028	.035	6.7	.031	.047	
			7.0	.020	.024	8.3	.024	.031	8.3	.020	.028	9.0	.024	.039	
			8.2	.012	.016	9.4	.016	.024	9.4	.016	.020	11.5	.016	.031	
M	Stainless Steel	Hardness ≤200HB	5.5	.031	.028	6.3	.039	.031	6.3	.035	.028	6.7	.039	.039	
			7.0	.024	.020	8.3	.031	.024	8.3	.028	.020	9.0	.031	.031	
			8.2	.016	.012	9.4	.024	.016	9.4	.020	.012	11.5	.024	.024	
K	Ductile Cast Iron	Tensile Strength ≤800MPa	5.5	.028	.031	6.3	.031	.039	6.3	.028	.035	6.7	.031	.047	
			7.0	.020	.024	8.3	.024	.031	8.3	.020	.028	9.0	.024	.039	
			8.2	.012	.016	9.4	.016	.024	9.4	.016	.020	11.5	.016	.031	

Depth of cut of JL chipbreaker is up to .024 inch. (06 size)

Depth of cut of JL chipbreaker is up to .047 inch. (09, 12 size)

Depth of cut of JL chipbreaker is up to .035 inch. (08 size)

Recommended Cutting Conditions

AJX Depth of Cut / Feed per Tooth

(inch)

Material	Properties	DCX=1.000" (25 mm) Shank Type			DCX=1.250" (32 mm) Shank Type			DCX=1.250" (32 mm) Shank Type			DCX=1.500" (40 mm) 1.250" Shank			
		AJXU08 Type			AJXU12 Type			AJXU09 Type			AJXU12 Type			
		3 (Number of Teeth)			2 (Number of Teeth)			3 (Number of Teeth)			3 (Number of Teeth)			
		Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	
P	Mild Steel	Hardness ≤180HB	6.7	.035	.039	7.0	.047	.055	7.0	.043	.047	7.0	.040	.055
			9.0	.028	.031	9.0	.039	.047	9.0	.035	.039	9.5	.039	.047
			11.5	.020	.024	11.0	.031	.039	11.5	.028	.031	12.0	.031	.039
	Carbon Steel Alloy Steel	Hardness 180–280HB	6.7	.035	.039	7.0	.047	.055	7.0	.043	.047	7.0	.047	.055
			9.0	.028	.031	9.0	.039	.047	9.0	.035	.039	9.5	.039	.047
			11.5	.020	.024	11.0	.031	.039	11.5	.028	.031	12.0	.031	.039
	Carbon Steel Alloy Steel	Hardness 280–350HB	6.7	.028	.039	7.0	.039	.055	7.0	.035	.047	7.0	.039	.055
			9.0	.020	.031	9.0	.031	.047	9.0	.028	.039	9.5	.031	.047
			11.5	.016	.024	11.0	.024	.039	11.5	.020	.031	12.0	.024	.039
Alloy Tool Steel	Hardness ≤350HB (Annealing)	6.7	.028	.039	7.0	.039	.055	7.0	.035	.047	7.0	.039	.055	
		9.0	.020	.031	9.0	.031	.047	9.0	.028	.039	9.5	.031	.047	
		11.5	.016	.024	11.0	.024	.039	11.5	.020	.031	12.0	.024	.039	
M	Stainless Steel	Hardness ≤200HB	6.7	.035	.035	7.0	.047	.047	7.0	.043	.039	7.0	.047	.047
			9.0	.028	.028	9.0	.039	.039	9.0	.035	.031	9.5	.039	.039
			11.5	.020	.020	11.0	.031	.031	11.5	.028	.024	12.0	.031	.031
K	Ductile Cast Iron	Tensile Strength ≤800MPa	6.7	.028	.039	7.0	.039	.055	7.0	.035	.047	7.0	.039	.055
			9.0	.020	.031	9.0	.031	.047	9.0	.028	.039	9.5	.031	.047
			11.5	.016	.024	11.0	.024	.039	11.5	.020	.031	12.0	.024	.039

Material	Properties	DCX=1.500" (40 mm) 1.250" Shank			DCX=1.500" (40 mm) 1.500" Shank			DCX=2.000" (50 mm) Shank Type			DCX=2.000", 2.500" (50 mm, 63 mm) Arbor Type			
		AJXU09 Type			AJXU12 Type			AJXU14 Type			AJXU12 Type(2.000") AJXU14 Type(2.500")			
		4 (Number of Teeth)			3 (Number of Teeth)			3 (Number of Teeth)			3 or 4 (Number of Teeth)			
		Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	
P	Mild Steel	Hardness ≤180HB	7.0	.043	.047	7.0	.047	.059	7.0	.055	.059	6.0	.059	.059
			9.5	.035	.039	9.5	.039	.051	9.5	.047	.051	10.0	.051	.051
			12.0	.028	.031	12.0	.031	.043	—	—	—	14.0	.043	.043
	Carbon Steel Alloy Steel	Hardness 180–280HB	7.0	.043	.047	7.0	.047	.059	7.0	.055	.059	6.0	.059	.059
			9.5	.035	.039	9.5	.039	.051	9.5	.047	.051	10.0	.051	.051
			12.0	.028	.031	12.0	.031	.043	—	—	—	14.0	.043	.043
	Carbon Steel Alloy Steel	Hardness 280–350HB	7.0	.035	.047	7.0	.039	.059	7.0	.047	.059	6.0	.051	.059
			9.5	.028	.039	9.5	.031	.051	9.5	.039	.051	10.0	.043	.051
			12.0	.020	.031	12.0	.024	.043	—	—	—	14.0	.035	.043
Alloy Tool Steel	Hardness ≤350HB (Annealing)	7.0	.035	.047	7.0	.039	.059	7.0	.047	.059	6.0	.051	.059	
		9.5	.028	.039	9.5	.031	.051	9.5	.039	.051	10.0	.043	.051	
		12.0	.020	.031	12.0	.024	.043	—	—	—	14.0	.035	.043	
M	Stainless Steel	Hardness ≤200HB	7.0	.043	.039	7.0	.047	.051	7.0	.055	.067	6.0	.059	.067
			9.5	.035	.031	9.5	.039	.043	9.5	.047	.059	10.0	.051	.059
			12.0	.028	.024	12.0	.031	.035	—	—	—	14.0	.043	.051
K	Ductile Cast Iron	Tensile Strength ≤800MPa	7.0	.035	.047	7.0	.039	.059	7.0	.047	.059	6.0	.051	.059
			9.5	.028	.039	9.5	.031	.051	9.5	.039	.051	10.0	.043	.051
			12.0	.020	.031	12.0	.024	.043	—	—	—	14.0	.035	.043

Depth of cut of JL chipbreaker is up to .024 inch. (06 size)

Depth of cut of JL chipbreaker is up to .047 inch. (09, 12 size)

Depth of cut of JL chipbreaker is up to .035 inch. (08 size)

(inch)

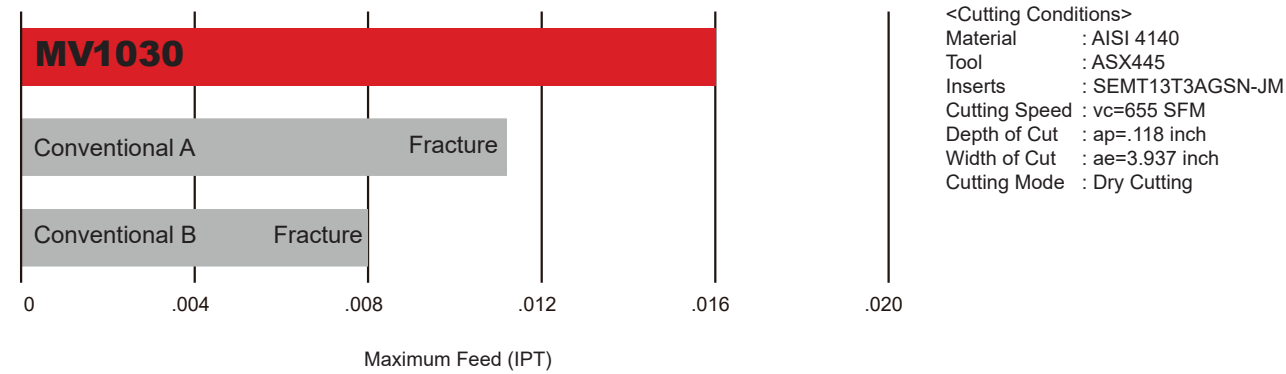
Material	Properties	DCX=2.000", 2.500" (50mm, 63mm, 66 mm) Arbor Type			DCX=3.000", 4.000", 4.921", 6.299" (80 mm, 100 mm, 125 mm, 160 mm) Arbor Type			DCX=3.000", 4.000" (80 mm, 100 mm) Arbor Type			
		AJXU09 Type(2.000") AJXU12 Type(2.500")			AJXU14 Type AJX14 Type			AJXU12 Type			
		4 (Number of Teeth)			4 - 8 (Number of Teeth)			6 or 7 (Number of Teeth)			
		Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	Over-hang	Axial Depth of Cut	Feed per Tooth (IPT)	
P	Mild Steel	Hardness ≤180HB	6.0	.053	.051	7.0	.059	.059	7.0	.053	.051
			10.0	.046	.043	12.0	.051	.051	12.0	.046	.043
			14.0	.039	.035	18.0	.039	.039	18.0	.035	.031
	Carbon Steel Alloy Steel	Hardness 180–280HB	6.0	.053	.051	7.0	.059	.059	7.0	.053	.051
			10.0	.046	.043	12.0	.051	.051	12.0	.046	.043
			14.0	.039	.035	18.0	.039	.039	18.0	.035	.031
	Carbon Steel Alloy Steel	Hardness 280–350HB	6.0	.046	.051	7.0	.051	.059	7.0	.046	.051
			10.0	.039	.043	12.0	.043	.051	12.0	.039	.043
			14.0	.032	.035	18.0	.031	.039	18.0	.028	.031
Alloy Tool Steel	Hardness ≤350HB (Annealing)	6.0	.046	.051	7.0	.051	.059	7.0	.046	.051	
		10.0	.039	.043	12.0	.043	.051	12.0	.039	.043	
		14.0	.032	.035	18.0	.031	.039	18.0	.028	.031	
M	Stainless Steel	Hardness ≤200HB	6.0	.053	.043	7.0	.059	.051	7.0	.053	.043
			10.0	.046	.035	12.0	.051	.043	12.0	.046	.035
			14.0	.039	.028	18.0	.039	.031	18.0	.035	.024
K	Ductile Cast Iron	Tensile Strength ≤800MPa	6.0	.046	.051	7.0	.051	.059	7.0	.046	.051
			10.0	.039	.043	12.0	.043	.051	12.0	.039	.043
			14.0	.032	.035	18.0	.031	.039	18.0	.028	.031

Depth of cut of JL chipbreaker is up to .047 inch. (09, 12 size)

Cutting Performance

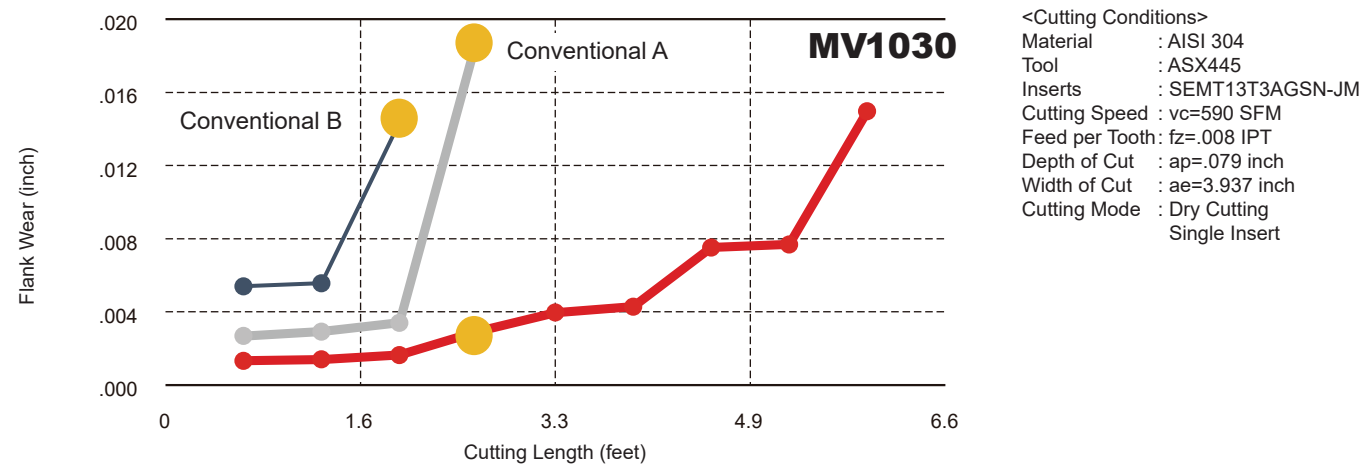
Comparison of fracture resistance for intermittent cutting of 4140 alloy steel

MV1030 is capable of high feed machining due to its excellent fracture resistance even during interrupted cutting.



Comparison of wear resistance when machining stainless steel 304

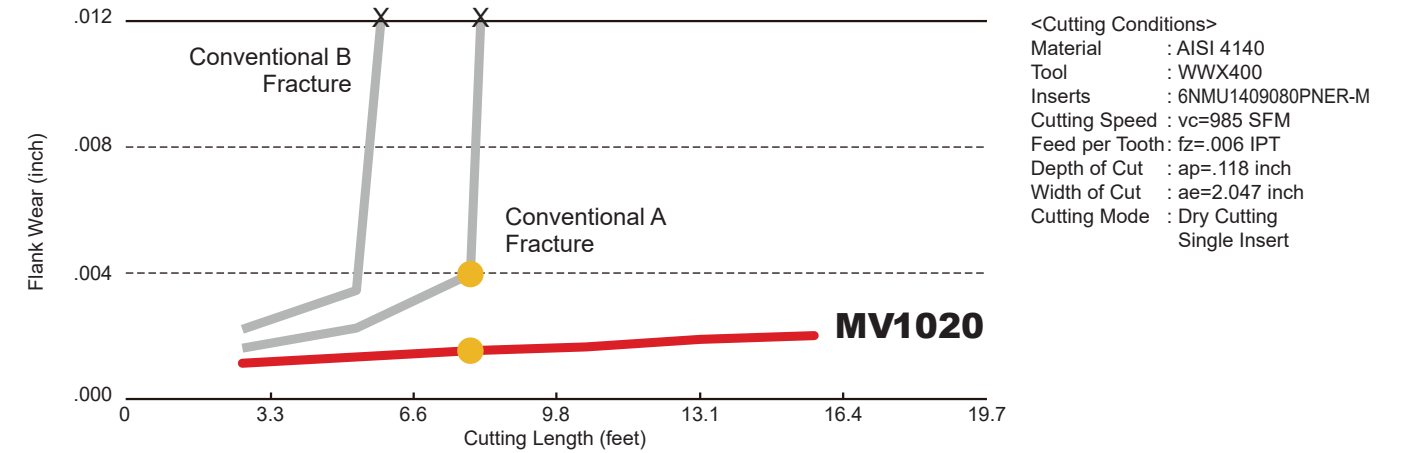
MV1030 suppresses damage at the cut border and can be expected to significantly improve tool life.



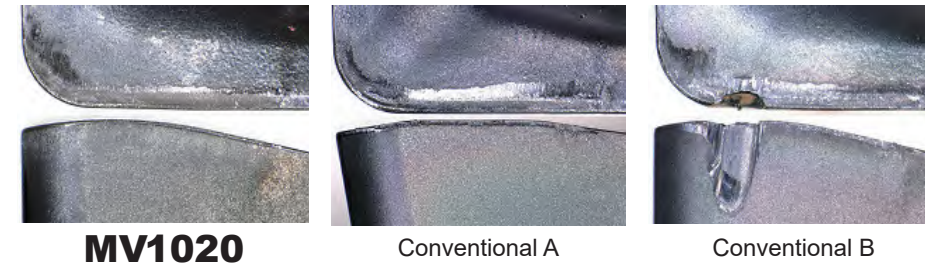
● Photographed after Machining



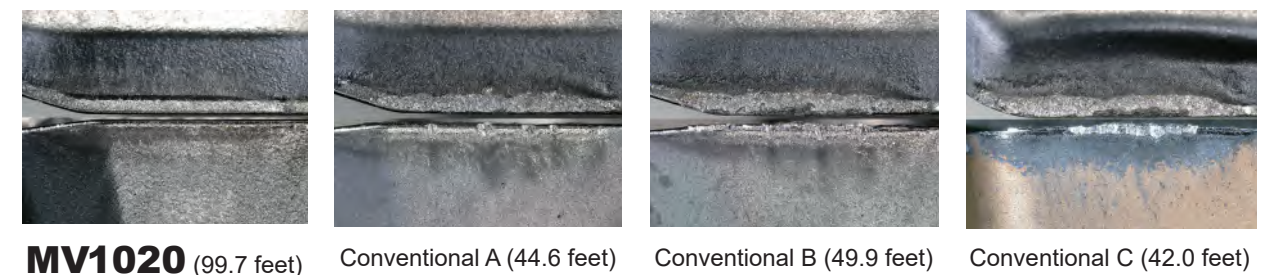
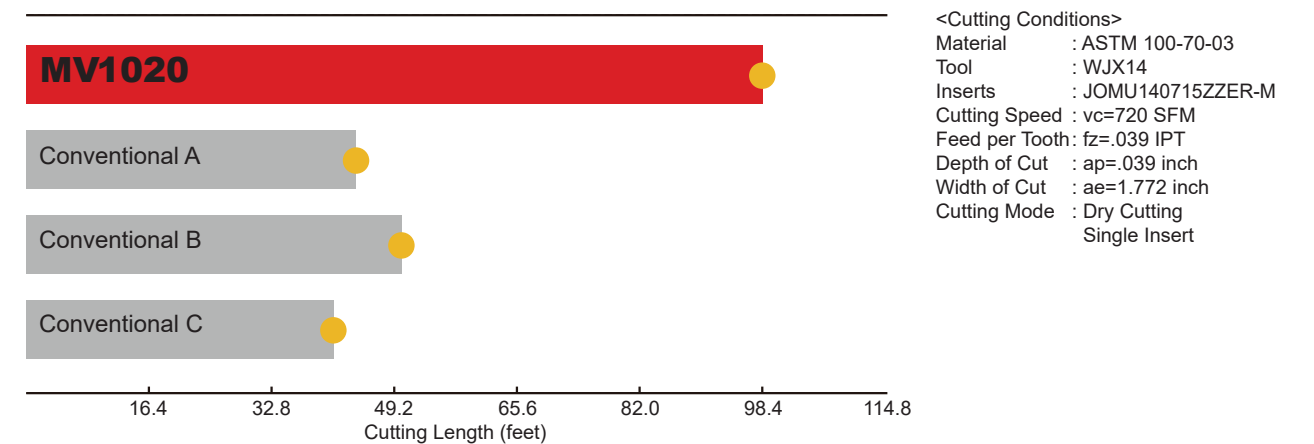
Comparison of wear resistance when machining alloy steel 4140



* Taken after cutting length of 7.9 feet

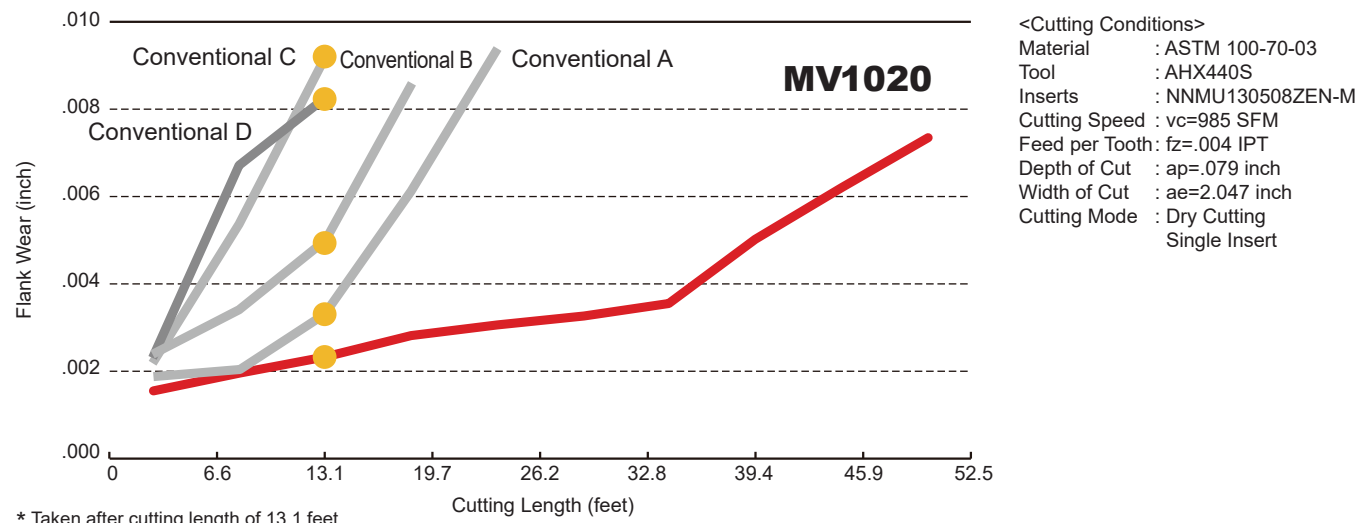


Comparison of wear resistance when machining ductile cast Iron 100-70-03

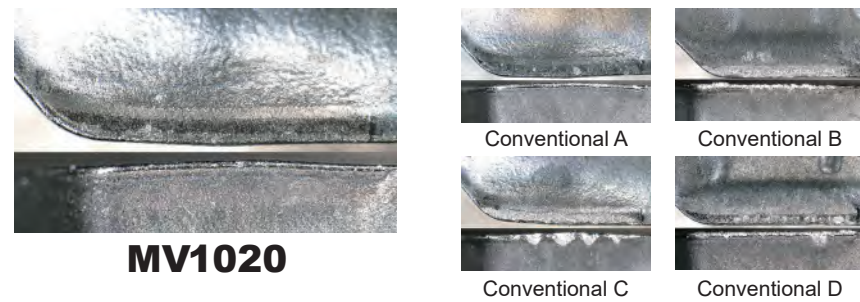


Cutting Performance

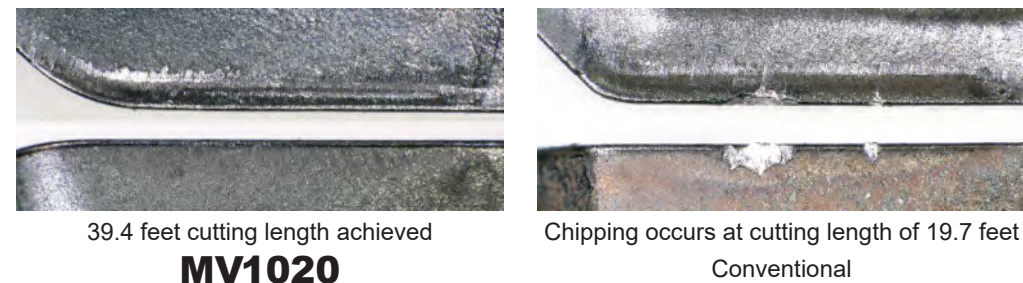
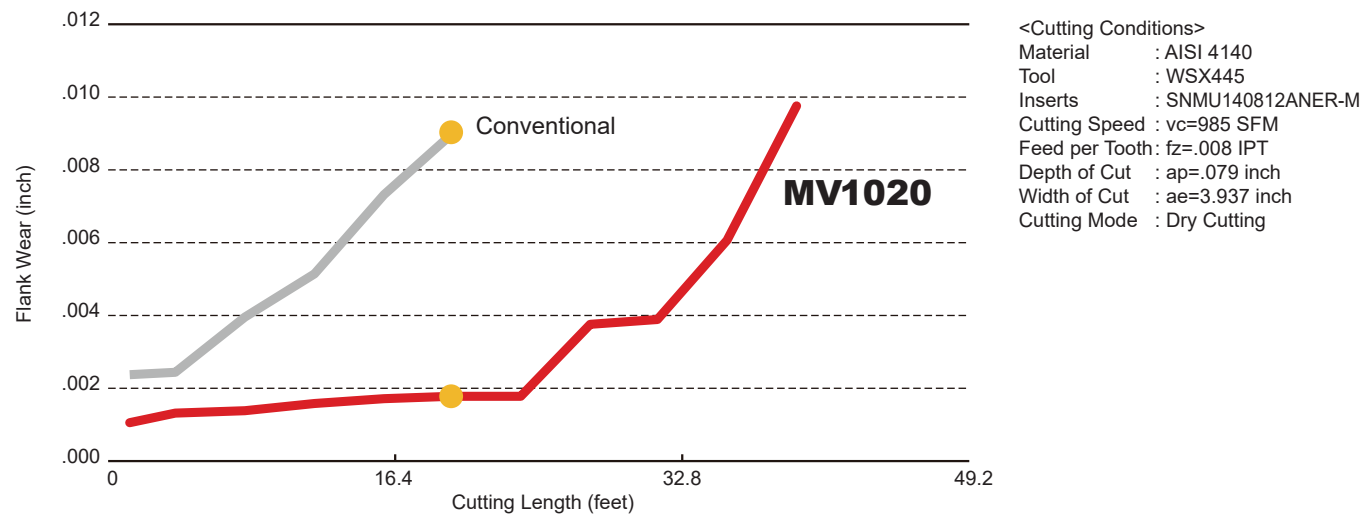
Comparison of wear resistance when machining ductile cast iron 100-70-03



* Taken after cutting length of 13.1 feet

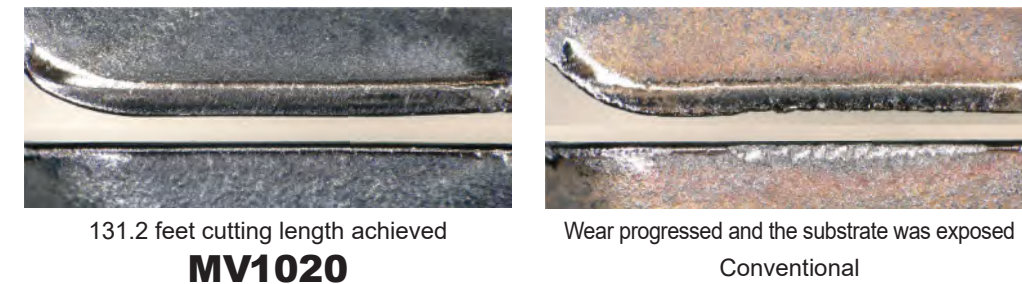
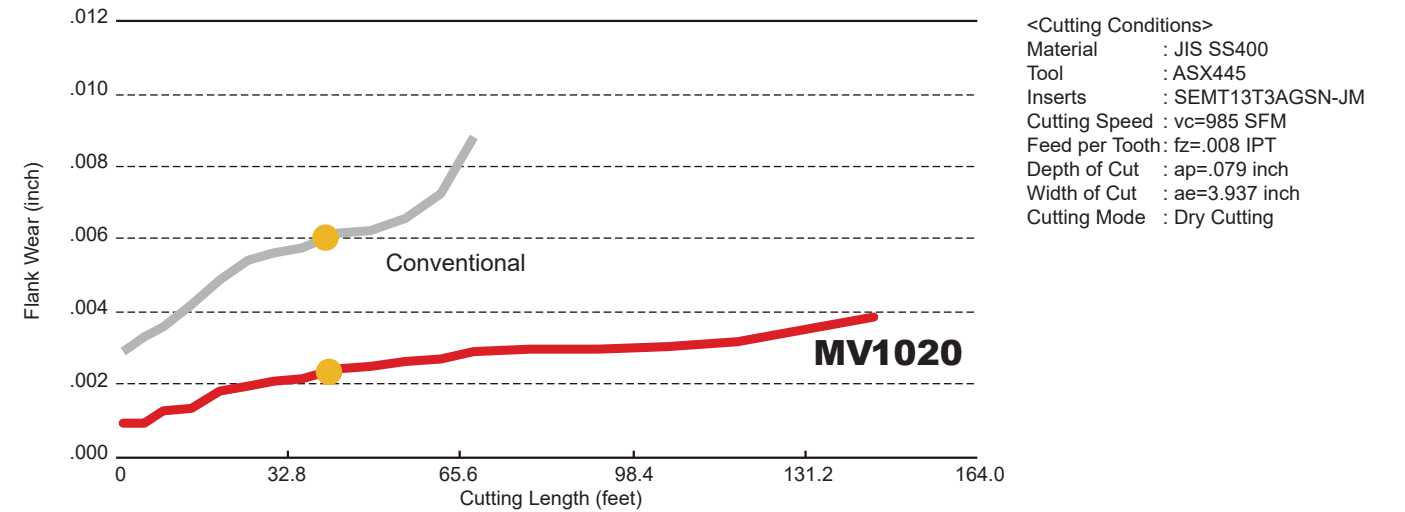


Comparison of wear resistance when machining alloy steel 4140



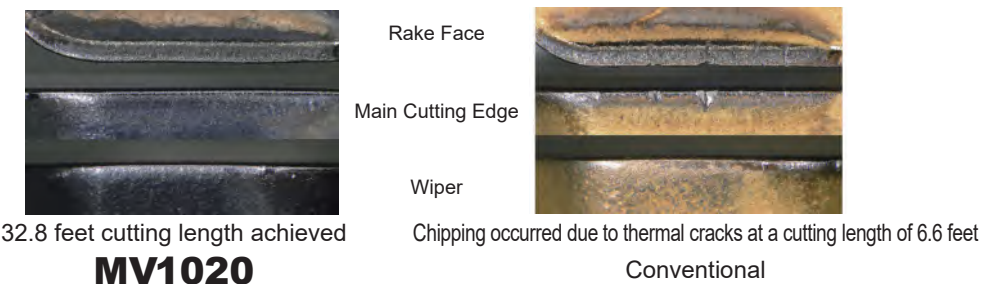
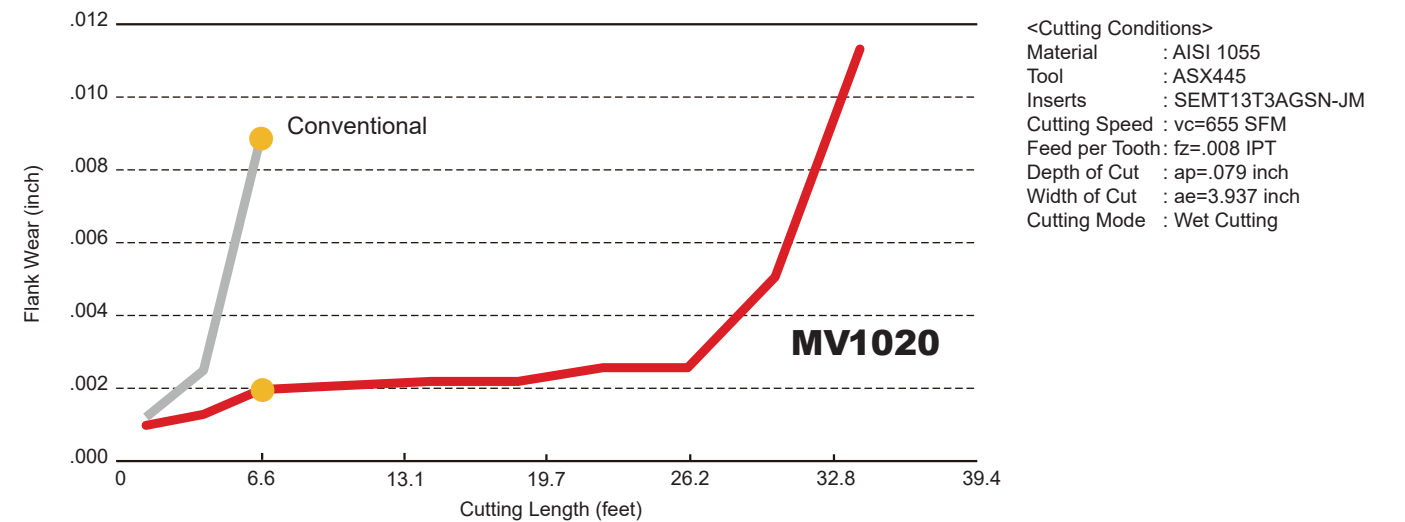
* Taken after cutting length of 19.7 feet

Comparison of wear resistance for rolled steel JIS SS400



* Taken after cutting length of 42.0 feet

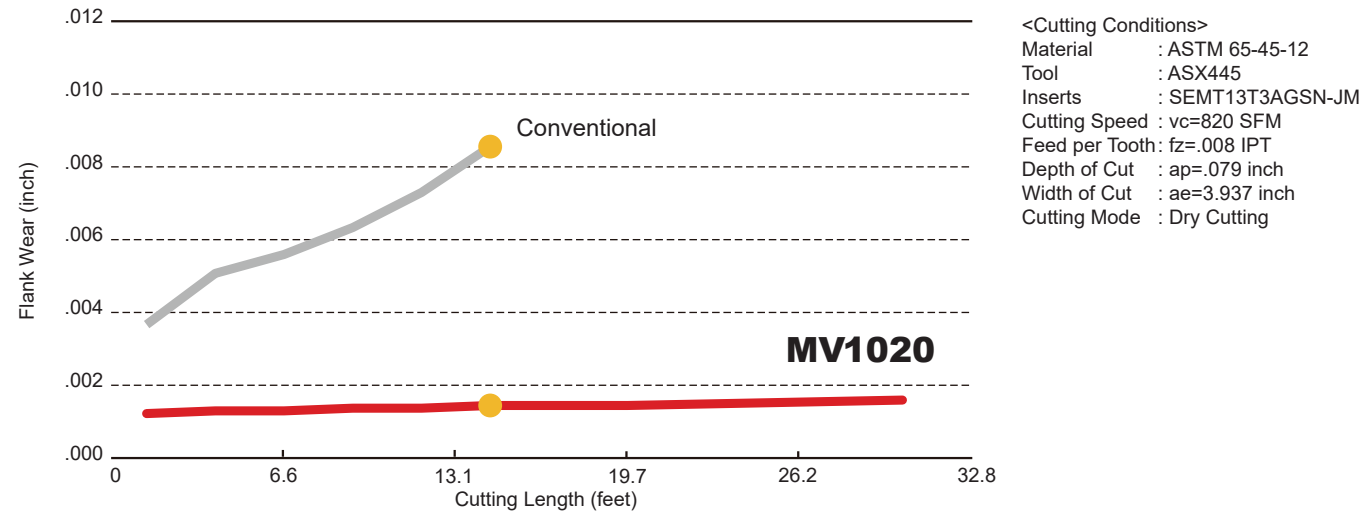
Comparison of wear resistance when machining carbon steel 1055



* Taken after cutting length of 6.6 feet

Cutting Performance

Comparison of wear resistance when machining ductile cast Iron 65-45-12



<Cutting Conditions>
 Material : ASTM 65-45-12
 Tool : ASX445
 Inserts : SEMT13T3AGSN-JM
 Cutting Speed : vc=820 SFM
 Feed per Tooth: fz=.008 IPT
 Depth of Cut : ap=.079 inch
 Width of Cut : ae=3.937 inch
 Cutting Mode : Dry Cutting



Achieves a cutting length of 29.5 feet or more

MV1020

* Taken after cutting length of 14.4 feet

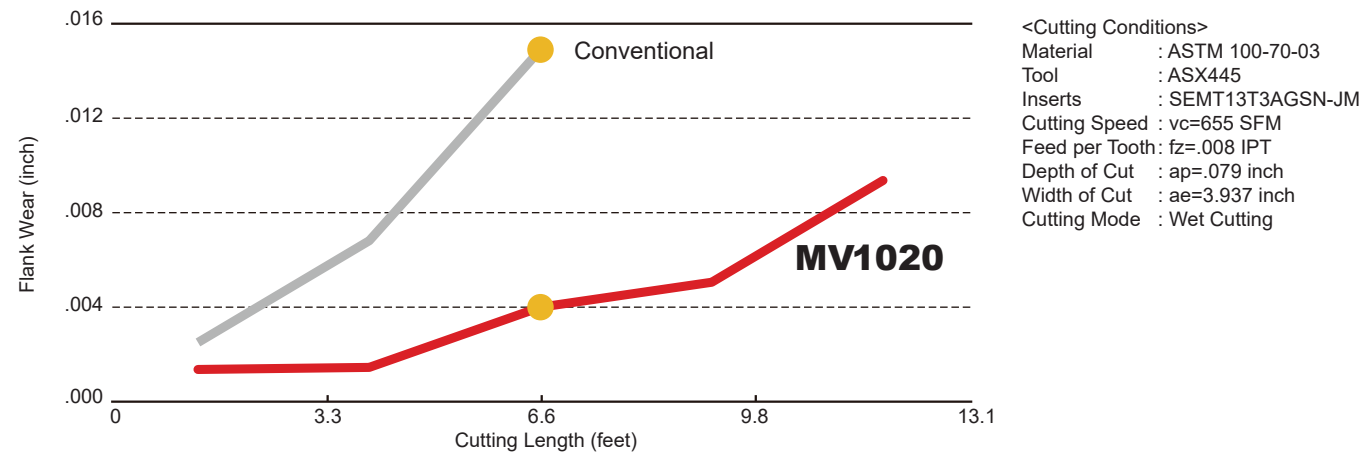


Unable to continue machining after a cut length of 14.4 feet

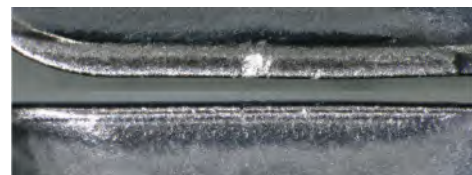
Conventional

Comparison of wear resistance when machining ductile cast Iron 100-70-03

Wet Cutting



<Cutting Conditions>
 Material : ASTM 100-70-03
 Tool : ASX445
 Inserts : SEMT13T3AGSN-JM
 Cutting Speed : vc=655 SFM
 Feed per Tooth: fz=.008 IPT
 Depth of Cut : ap=.079 inch
 Width of Cut : ae=3.937 inch
 Cutting Mode : Wet Cutting



11.5 feet cutting length achieved

MV1020

* Taken after cutting length of 6.6 feet

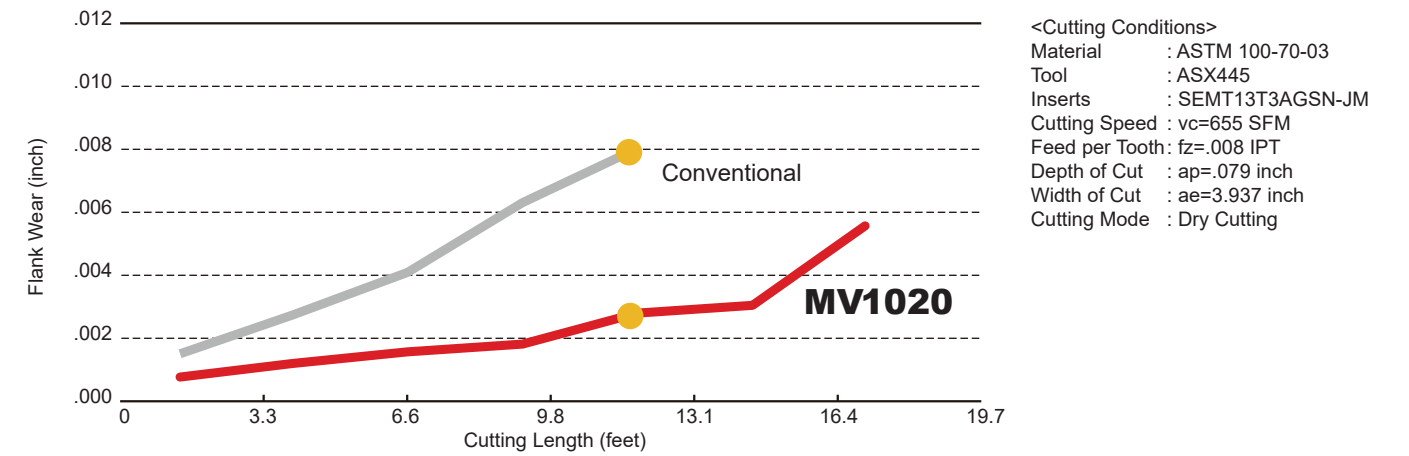


Unable to continue processing with a cut length of 6.6 feet

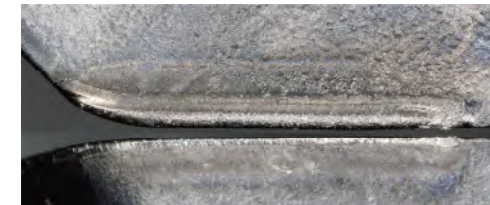
Conventional

Comparison of wear resistance when machining ductile cast Iron 100-70-03

Dry Cutting



<Cutting Conditions>
 Material : ASTM 100-70-03
 Tool : ASX445
 Inserts : SEMT13T3AGSN-JM
 Cutting Speed : vc=655 SFM
 Feed per Tooth: fz=.008 IPT
 Depth of Cut : ap=.079 inch
 Width of Cut : ae=3.937 inch
 Cutting Mode : Dry Cutting



16.4 feet cutting length achieved

MV1020

* Taken after cutting length of 11.8 feet



Chipping occurred due to peeling of the coating

Conventional



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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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