DIA EDGE

MV1000 SERIES

COATED CARBIDE
GRADE FOR MILLING

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

ABOUT OUR BRAND

Your manufacturing success is our success.

It's simple. We want to provide high-quality cutting tool products that help deliver unparalleled performance and control for you to manufacture precisely perfect products every day.

Our long heritage of building partnerships through cutting tool solutions to metal working manufacturers, like yours, has given Mitsubishi Materials USA a solid reputation as an industry leader. We understand the importance of getting it right the first time by delivering high-quality cutting tool product brands to help overcome machining challenges to improve machining processes.

Your success is our success and is the driving force behind our innovative products. Our product brands, DIAEDGE and MOLDINO, are trusted globally in the metal manufacturing and die & mold industries for delivering expertly-designed manufactured tools of the trade for highly specialized industries like yours.

With the acquisition of MOLDINO Tool Engineering, Ltd, our traditional Mitsubishi Materials USA cutting tool product line is now sold under the DIAEDGE product brand name.

Brands you can trust:

MITSUBISHI MATERIALS U.S.A.

TRUSTED PRODUCT BRANDS

DIAEDGE MOLDINO

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.

*Graphical Representation.

Excellent welding resistance
Smooth surface

Outstanding wear resistance
Newly developed Al-Rich coating

Excellent chipping resistance for stable machining
Newly developed bonding layer

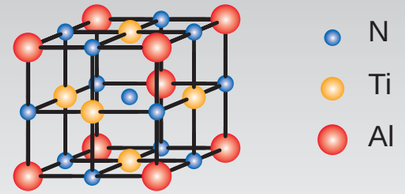
Fracture resistance for the ultimate stability
Exclusive cemented carbide substrate

Complete Coating Technology that Topples Current Tool Life Standards

Due to

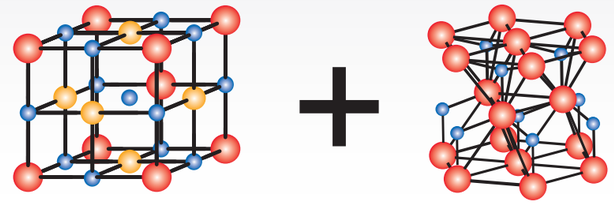
the Newly Developed Al-Rich Coating

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.



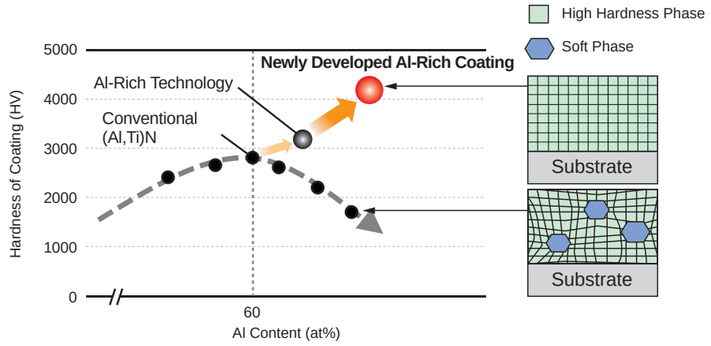
The combination of atoms with different sizes creates an exceptionally hard crystal structure.

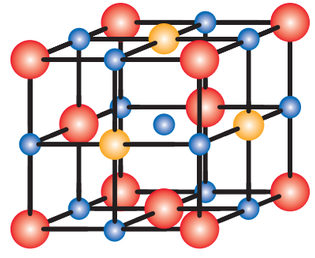
The hardness of (Al,Ti)N increases as the Al content ratio increases, but with conventional technology, when the Al content ratio exceeds 60%, the crystal structure changes and the hardness of (Al,Ti)N decreases.



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

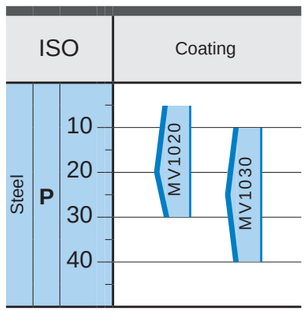
MV1020

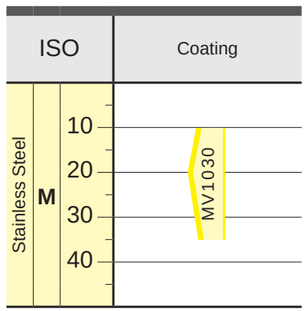
This grade has advanced wear and thermal shock resistance and also achieves stable cutting at unprecedented cutting speeds especially when machining steel and ductile cast iron, thus greatly reducing work time.

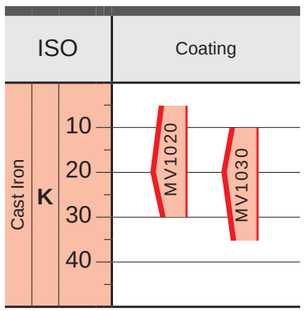
Coated Carbide Grade for Milling

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.

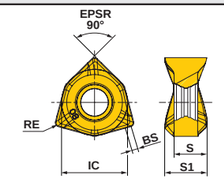
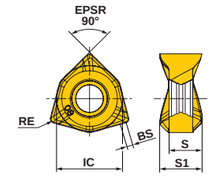
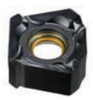
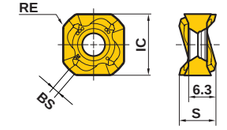
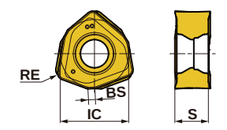
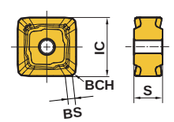
Inserts

(inch)

Workpiece Material			MV1020	MV1030
P	Steel		◆	◆
M	Stainless Steel		◇	◇
K	Cast Iron		◆	◆

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the Recommended Cutting Conditions.

Edge Preparation : E : Round

Shape	Application	Order Number	Class	Edge Preparation	Coated MV1020 (NEW)	Coated MV1030 (NEW)	IC	S	S1	BS	RE/ BCH	Geometry
WWX200 	General Purpose Cutting	**6NMU0906040PNER-M**	M	E	●		.354	.209	.240	.063	.016	
	General Purpose Cutting	**6NMU0906080PNER-M**	M	E	●		.354	.209	.240	.047	.031	
	Cutting Edge Strength	**6NMU0906080PNER-R**	M	E	●		.354	.209	.240	.047	.031	
WWX400 	Low Cutting Resistance	**6NGU1409040PNER-L**	G	E	●	●	.551	.276	.354	.067	.016	
	Low Cutting Resistance	**6NGU1409080PNER-L**	G	E	●	●	.551	.276	.354	.051	.031	
	General Purpose Cutting	**6NGU1409040PNER-M**	G	E	●	●	.551	.276	.354	.067	.016	
	General Purpose Cutting	**6NGU1409080PNER-M**	G	E	●	●	.551	.276	.354	.051	.031	
	General Purpose Cutting	**6NMU1409040PNER-M**	M	E	●	●	.551	.276	.354	.067	.016	
	General Purpose Cutting	**6NMU1409080PNER-M**	M	E	●	●	.551	.276	.354	.051	.031	
	General Purpose Cutting	**6NMU1409160PNER-M**	M	E	●	●	.551	.276	.354	.020	.063	
	General Purpose Cutting	**6NMU1409200PNER-M**	M	E	●	●	.551	.276	.354	.020	.079	
	Cutting Edge Strength	**6NMU1409080PNER-R**	M	E	●	●	.551	.276	.354	.051	.031	
	Cutting Edge Strength	**6NMU1409160PNER-R**	M	E	●	●	.551	.276	.354	.020	.063	
	Cutting Edge Strength	**6NMU1409200PNER-R**	M	E	●	●	.551	.276	.354	.020	.079	
WSX445 	Low Cutting Resistance	**SNGU140812ANER-L**	G	E	●	●	.551	.331	–	.059	.047	
	General Purpose Cutting	**SNGU140812ANER-M**	G	E	●	●	.551	.331	–	.059	.047	
	General Purpose Cutting	**SNMU140812ANER-M**	M	E	●	●	.551	.331	–	.059	.047	
	Cutting Edge Strength	**SNMU140812ANER-R**	M	E	●	●	.551	.331	–	.059	.047	
	Cutting Edge Strength	**SNMU140812ANER-H**	M	E	●	●	.551	.331	–	.059	.047	
WJX 	Low Cutting Resistance	**JOMU090512ZZER-L**	M	E	●	●	.375	.186	–	.035	.047	
	Low Cutting Resistance	**JOMU140715ZZER-L**	M	E	●	●	.551	.259	–	.051	.059	
	General Purpose Cutting	**JOMU090512ZZER-M**	M	E	●	●	.375	.187	–	.035	.047	
	General Purpose Cutting	**JOMU140715ZZER-M**	M	E	●	●	.551	.261	–	.051	.059	
	Cutting Edge Strength	**JOMU090512ZZER-R**	M	E	●	●	.375	.190	–	.035	.047	
	Cutting Edge Strength	**JOMU140715ZZER-R**	M	E	●	●	.551	.266	–	.051	.059	
WSF406W 	Cast Iron Milling	**SNMU1206C05ZNER-M**	M	E	★	★	.500	.244	–	.063	.020	

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

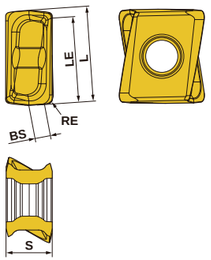
(inch)

Workpiece Material		
P	Steel	◆ ◆
M	Stainless Steel	◇
K	Cast Iron	◆ ◆

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the Recommended Cutting Conditions.

Edge Preparation : E : Round

Shape	Application	Order Number	Class	Edge Preparation	Coated NEW MV1020	Coated NEW MV1030	L	RE	LE	S	RE	Geometry
VPX200	Low Cutting Resistance	**LOGU0904020PNER-L**	G	E	●	●	.343	.169	.299	.067	.008	
		LOGU0904040PNER-L	G	E	●	●	.343	.169	.299	.059	.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	.031	.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	
		LOGU1207300PNER-L	G	E	●	●	.488	.276	.445	.024	.118	
		LOGU1207320PNER-L	G	E	●	●	.488	.276	.445	.016	.126	
	General Purpose Cutting	**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)

(inch)

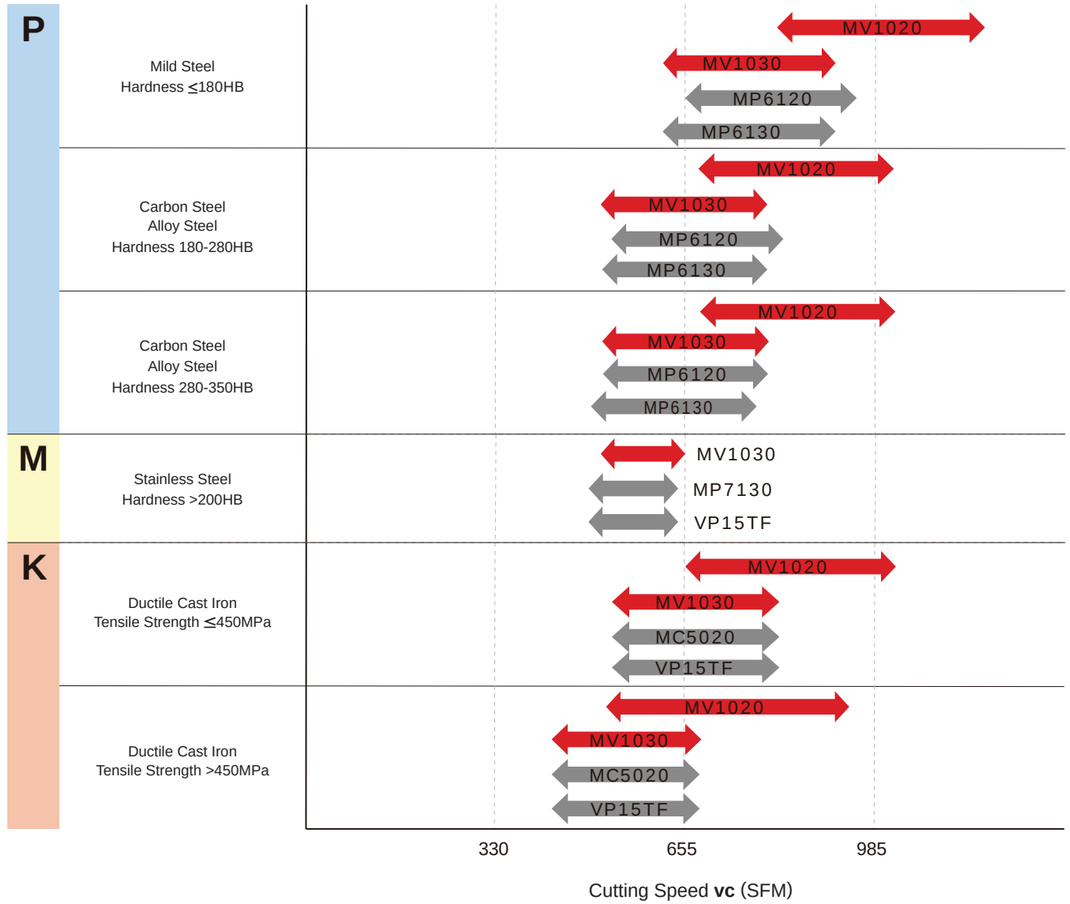
Workpiece Material		
P	Steel	◆ ◆
M	Stainless Steel	◇
K	Cast Iron	◆ ◆

Please note that the cutting conditions differ depending on multiple factors, for more details refer to the Recommended Cutting Conditions.

Edge Preparation : E : Round **S :** Chamfer + Hone

Shape	Application	Order Number	Class	Edge Preparation	Coated NEW MV1020	Coated NEW MV1030	IC	S	S1	BS	RE	Geometry
AHX440/475	Low Cutting Resistance	**NNMU130508ZER-L**	M	E	●	●	.528	.227	–	.039	.031	
	General Purpose Cutting	**NNMU130508ZEN-M**	M	E	●	●	.528	.219	–	.039	.031	
	General Purpose Cutting	**NNMU130532ZEN-M**	M	E	●	●	.528	.219	–	–	.126	
	Cutting Edge Strength	**NNMU130532ZEN-R**	M	E	●	●	.528	.215	–	–	.126	
ASX445	Finish-Light Cutting	**SEET13T3AGEN-JL**	E	E	●	●	.528	.156	–	.075	.059	
	Light-Rough Cutting	**SEMT13T3AGSN-JM**	M	S	●	●	.528	.156	–	.075	.059	
	Medium-Heavy Cutting	**SEMT13T3AGSN-JH**	M	S	●	●	.528	.156	–	.075	.059	
	Cast Iron Milling	**SEMT13T3AGSN-FT**	M	S	●	●	.528	.156	–	.075	.059	
ASX400	Finish-Light Cutting	**SOET12T308PEER-JL**	E	E	●	●	.500	.156	–	.055	.031	
	Light-Rough Cutting	**SOMT12T308PEER-JM**	M	E	●	●	.500	.156	–	.055	.031	
	Medium-Heavy Cutting	**SOMT12T308PEER-JH**	M	E	●	●	.500	.156	–	.055	.031	
	Heavy Interrupted Cutting	**SOMT12T320PEER-FT**	M	E	●	●	.500	.156	–	.020	.079	

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



Recommended Cutting Conditions

■ WWX200/400 Cutting Speed
Dry Cutting

(inch)

Workpiece Material		Properties	Cutting Conditions	MV1020 Width of Cut ae 0.5DC≥ Cutting Speed vc (SFM)	MV1020 Width of Cut ae 0.8DC≥ Cutting Speed vc (SFM)	MV1020 Width of Cut ae DC(Slot) Cutting Speed vc (SFM)	MV1030 Width of Cut ae 0.5DC≥ Cutting Speed vc (SFM)	MV1030 Width of Cut ae 0.8DC≥ Cutting Speed vc (SFM)	MV1030 Width of Cut ae DC(Slot) 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)

Workpiece Material		Properties	Cutting Conditions	MV1020 Width of Cut ae 0.5DC≥ Cutting Speed vc (SFM)	MV1020 Width of Cut ae 0.8DC≥ Cutting Speed vc (SFM)	MV1020 Width of Cut ae DC(Slot) Cutting Speed vc (SFM)	MV1030 Width of Cut ae 0.5DC≥ Cutting Speed vc (SFM)	MV1030 Width of Cut ae 0.8DC≥ Cutting Speed vc (SFM)	MV1030 Width of Cut ae DC(Slot) 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.

Recommended Cutting Conditions

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

(inch)

	Workpiece Material	Properties	Cutting Conditions	Width of Cut **ae** 0.5DC≥ Breaker	0.5DC≥ Depth of Cut **ap**	0.5DC≥ Feed **fz** (IPT)	0.8DC≥ Breaker	0.8DC≥ Depth of Cut **ap**	0.8DC≥ Feed **fz** (IPT)	DC(Slot) Breaker	DC(Slot) Depth of Cut **ap**	DC(Slot) 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)

	Workpiece Material	Properties	Cutting Conditions	Width of Cut **ae** 0.5DC≥ Breaker	0.5DC≥ Depth of Cut **ap**	0.5DC≥ Feed **fz** (IPT)	0.8DC≥ Breaker	0.8DC≥ Depth of Cut **ap**	0.8DC≥ Feed **fz** (IPT)	DC(Slot) Breaker	DC(Slot) Depth of Cut **ap**	DC(Slot) 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.

■ WSX445 Cutting Speed
Dry and Wet Cutting

(inch)

	Workpiece Material	Properties	MV1020 Cutting Speed **vc** (SFM) Dry Cutting	MV1020 Cutting Speed **vc** (SFM) Wet Cutting	MV1030 Cutting Speed **vc** (SFM) Dry Cutting	MV1030 Cutting Speed **vc** (SFM) 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)

	Workpiece Material	Properties	Finish-Light Cutting **fz** (IPT)	Finish-Light Cutting **ap**	Light Cutting **fz** (IPT)	Light Cutting **ap**	Medium Cutting **fz** (IPT)	Medium Cutting **ap**	Rough Cutting **fz** (mm/t.)	Rough Cutting **ap**	Heavy Cutting **fz** (IPT)	Heavy Cutting **ap**
P			L Breaker		L,M Breaker		M Breaker		M,R Breaker		R,H Breaker	
	Mild Steel	Hardness ≤180HB	.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			L Breaker		L,M Breaker		M Breaker		M,R Breaker		R,H Breaker	
	Stainless Steel	–	.006 (.004–.008)	≤.039	.006 (.004–.008)	≤.079	.008 (.006–.010)	≤.118	–	–	–	–
K			L Breaker		L,M Breaker		M Breaker		M,R Breaker		R,H Breaker	
	Ductile Cast Iron	Tensile Strength ≤450MPa	.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

Recommended Cutting Conditions

Chip Breaker Selection Table

■ WJX09 (inch)

	Workpiece Material	Properties	L Breaker		M Breaker		R Breaker	
			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
P	Carbon Steel Alloy Steel	Hardness 180—350HB	● ◕	≤.039	● ◕	≤.059	◕ ✲	≤.059
M	Stainless Steel	—	○ ◔	≤.039	○ ◔	≤.039	—	—
K	Ductile Cast Iron	Tensile Strength ≤450MPa	● ◕	≤.039	● ◕	≤.059	◕ ✲	≤.059
K	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◕	≤.039	● ◕	≤.039	◕ ✲	≤.039

■ WJX14 (inch)

	Workpiece Material	Properties	L Breaker		M Breaker		R Breaker	
			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
P	Carbon Steel Alloy Steel	Hardness 180—350HB	● ◕	≤.079	● ◕	≤.118	◕ ✲	≤.118
M	Stainless Steel	—	○ ◔	≤.059	○ ◔	≤.059	—	—
K	Ductile Cast Iron	Tensile Strength ≤450MPa	● ◕	≤.079	● ◕	≤.118	—	—
K	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◕	≤.079	● ◕	≤.079	—	—

Cutting Conditions (Guide) :
● : Stable Cutting ◕ : General Cutting ✲ : Unstable Cutting

■ WJX09 Cutting Speed
Dry Cutting (inch)

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

■ WJX09 Depth of Cut / Feed per Tooth
Dry Cutting (inch)

	Workpiece Material	Properties	Breaker	Depth of Cut **ap**	Cutting Dia. Max. DCX=1.000", 1.125", 25mm, 28mm (Z=2) Feed **fz** (IPT)	Cutting Dia. Max. DCX=1.000", 1.125", 25mm, 28mm (Z=3) Feed **fz** (IPT)	Cutting Dia. Max. DCX≥1.250", 32 mm Feed **fz** (IPT)
P	Mild Steel	Hardness ≤180HB	M, R	≤.020	.051(.016—.079)	.051(.016—.079)	.059(.020—.079)
				≤.039	.039(.012—.051)	.031(.012—.039)	.047(.016—.059)
				≤.059	.024(.012—.039)	—	.031(.016—.047)
			L	≤.020	.047(.016—.063)	.047(.016—.063)	.047(.016—.063)
				≤.039	.031(.012—.047)	.031(.012—.039)	.039(.016—.098)
	Carbon Steel Alloy Steel	Hardness 180—350HB	M, R	≤.020	.051(.016—.067)	.051(.016—.067)	.059(.016—.079)
				≤.039	.031(.012—.039)	.028(.012—.035)	.039(.012—.051)
				≤.059	.020(.012—.028)	—	.028(.012—.039)
			L	≤.020	.047(.012—.059)	.047(.012—.059)	.047(.012—.059)
				≤.039	.028(.008—.039)	.028(.008—.035)	.028(.008—.039)
M	Stainless Steel	—	L	≤.020	.031(.012—.039)	.031(.012—.039)	.031(.012—.039)
				≤.039	.039(.016—.047)	.039(.016—.047)	.039(.016—.047)
			M	≤.020	.024(.008—.031)	.024(.008—.031)	.024(.008—.031)
				≤.039	.031(.012—.039)	.031(.012—.039)	.031(.012—.039)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	M, R	≤.020	.051(.016—.067)	.051(.016—.067)	.059(.016—.079)
				≤.039	.031(.012—.039)	.028(.012—.035)	.039(.012—.051)
				≤.059	.020(.012—.028)	—	.028(.012—.039)
			L	≤.020	.039(.012—.051)	.039(.012—.051)	.039(.012—.051)
				≤.039	.031(.008—.039)	.028(.008—.035)	.031(.008—.047)
		Tensile Strength ≤800MPa	M, R	≤.020	.039(.008—.059)	.039(.008—.059)	.051(.012—.067)
				≤.039	.031(.008—.039)	.024(.008—.031)	.039(.012—.047)
			L	≤.020	.031(.012—.047)	.031(.012—.047)	.031(.012—.047)
				≤.039	.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 Cutting Speed
Dry Cutting

(inch)

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

■ WJX14 Depth of Cut / Feed per Tooth
Dry Cutting

(inch)

	Workpiece Material	Properties	Breaker	Depth of Cut **ap**	Cutting Dia. Max. DCX=2.000", 50 mm, 52 mm Feed **fz** (IPT)	Cutting Dia. Max. DCX≥2.500", 63 mm 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%.

Recommended Cutting Conditions

■ VPX200/300 Cutting Speed
Dry Cutting

(inch)

	Workpiece Material	Properties	Cutting Conditions	Recommended 1st	Recommended 2nd	Width of Cut ae ≤0.25DC MV1020	≤0.25DC MV1030	0.25-0.5DC MV1020	0.25-0.5DC MV1030	0.5-0.75DC MV1020	0.5-0.75DC MV1030	DC(Slot) MV1020	DC(Slot) 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)
P	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)
P	Carbon Steel Alloy Steel	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)
M	Stainless Steel	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	655 (490–920)	490 (330–655)	620 (460–885)	460 (295–620)	560 (425–785)	410 (260–560)	560 (425–785)	330 (260–395)
K	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	M	L	590 (460–820)	490 (330–655)	560 (425–785)	460 (295–620)	490 (395–690)	410 (260–560)	490 (395–690)	490 (395–690)

Cutting Mode : Wet Cutting

(inch)

	Workpiece Material	Properties	Cutting Conditions	Recommended 1st	Recommended 2nd	Width of Cut ae ≤0.25DC MV1020	≤0.25DC MV1030	0.25-0.5DC MV1020	0.25-0.5DC MV1030	0.5-0.75DC MV1020	0.5-0.75DC MV1030	DC(Slot) MV1020	DC(Slot) MV1030
P	Mild Steel	Hardness ≤180HB	● ◐	L	M	690 (490–950)	460 (330–620)	655 (460–885)	425 (295–590)	490 (360–590)	330 (230–395)	490 (360–590)	330 (230–395)
P	Carbon Steel Alloy Steel	Hardness 180–280HB	● ◐	L	M	590 (460–690)	395 (295–460)	560 (395–655)	360 (260–425)	490 (360–590)	330 (230–395)	490 (360–590)	330 (230–395)
P	Carbon Steel Alloy Steel	Hardness 280–350HB	● ◐	L	M	460 (360–525)	395 (295–460)	425 (295–490)	360 (260–425)	395 (260–460)	330 (230–395)	395 (260–460)	395 (260–460)
K	Ductile Cast Iron	Tensile Strength ≤450MPa	● ◐	M	L	590 (490–785)	425 (260–590)	560 (460–755)	395 (230–560)	490 (425–655)	345 (195–490)	490 (425–655)	345 (195–490)
K	Ductile Cast Iron	Tensile Strength ≤800MPa	● ◐	M	L	525 (425–690)	425 (260–590)	490 (395–655)	395 (230–560)	425 (360–560)	345 (195–490)	425 (360–560)	345 (195–490)

Cutting Conditions (Guide) :
● : Stable Cutting ◐ : General Cutting ❖ : Unstable Cutting

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

(inch)

	Workpiece Material	Properties	Width of Cut ae	Cutting Conditions	DC ø.625–ø.750(ø16mm–18mm) Depth of Cut ap	DC ø.625–ø.750(ø16mm–18mm) Feed fz (IPT)	DC ø.875–ø1.000(ø20mm–25mm) Depth of Cut ap	DC ø.875–ø1.000(ø20mm–25mm) Feed fz (IPT)	DC ø1.125–ø2.500(ø28mm–63mm) Depth of Cut ap	DC ø1.125–ø2.500(ø28mm–63mm) 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
P	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
P	Carbon Steel Alloy Steel	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)

	Workpiece Material	Properties	Width of Cut ae	Cutting Conditions	DC ø1.000(ø25mm) Depth of Cut ap	DC ø1.000(ø25mm) Feed fz (IPT)	DC ø1.125–ø3.000(ø28mm–80mm) Depth of Cut ap	DC ø1.125–ø3.000(ø28mm–80mm) 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
P	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
P	Carbon Steel Alloy Steel	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.

Recommended Cutting Conditions

■ AHX440S
Dry Cutting

(inch)

	Workpiece Material	Properties	Cutting Speed **vc** (SFM) MV1020	Cutting Speed **vc** (SFM) MV1030	Feed **fz** (IPT)	Depth of Cut **ap**	Width of Cut **ae**
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)

	Workpiece Material	Properties	Breaker	Cutting Speed **vc** (SFM) MV1020	Cutting Speed **vc** (SFM) MV1030	Feed **fz** (IPT)	Depth of Cut **ap**	Width of Cut **ae**
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
			M	655(490—820)	460(260—655)	.039	≤.063	0.8DC<ae≤DC
		Tensile Strength ≤800MPa	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%.

Cutting Conditions (Guide) :
●: Stable Cutting ◕: General Cutting ✥: Unstable Cutting

■ WSF406W
Dry Cutting

(inch)

	Workpiece Material	Properties	Cutting Conditions	Depth of Cut **ap**	Cutting Speed **vc** (SFM) MV1020	Cutting Speed **vc** (SFM) MV1030	Feed **fz** (IPT)	Width of Cut **ae**
K	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—655)	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

Recommended Cutting Conditions

■ ASX445
Dry and Wet Cutting

(inch)

Workpiece Material		Properties	Cutting Speed **vc** (m/min)		Finish-Light Cutting		Light-Rough Cutting		Medium-Heavy Cutting	
			MV1020	**MV1030**	Feed **fz** (IPT)	Breaker	Feed **fz** (IPT)	Breaker	Feed **fz** (IPT)	Breaker
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

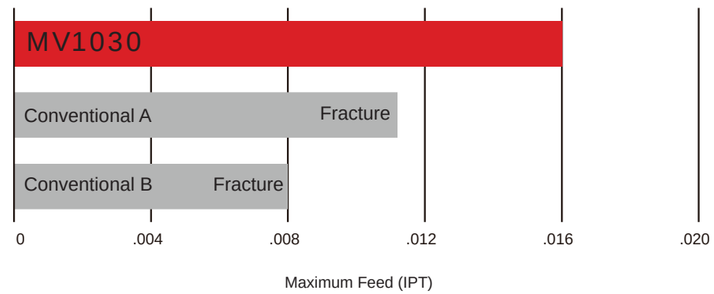
(inch)

Workpiece Material		Properties	Cutting Speed **vc** (m/min)		Finish-Light Cutting		Light-Rough Cutting		Medium-Heavy Cutting	
			MV1020	**MV1030**	Feed **fz** (IPT)	Breaker	Feed **fz** (IPT)	Breaker	Feed **fz** (IPT)	Breaker
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

Cutting Performance

Comparison of fracture resistance for intermittent cutting of 4140 alloy steel

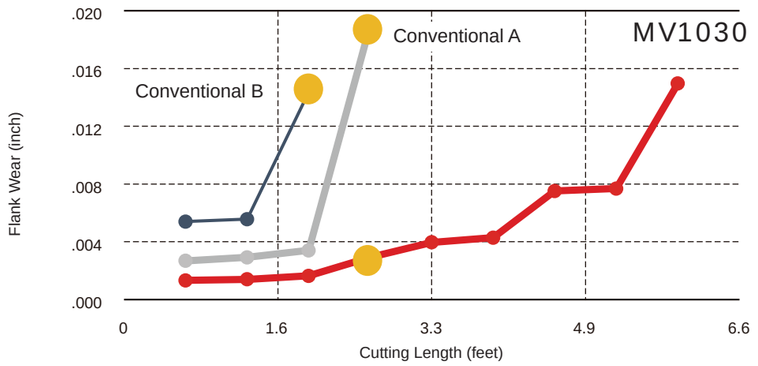
MV1030 is capable of high feed machining due to its excellent fracture resistance even during interrupted cutting.



<Cutting Conditions>
Workpiece
Material : AISI 4140
Tool : ASX445
Inserts : SEMT13T3AGSN-JM
Cutting Speed : vc=655 SFM
Depth of Cut : ap=.118 inch
Width of Cut : ae=3.937 inch
Cutting Mode : Dry Cutting

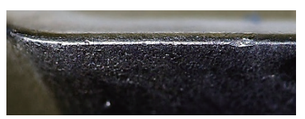
Comparison of wear resistance when machining stainless steel 304

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

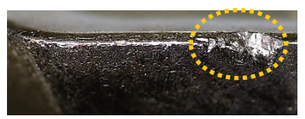


<Cutting Conditions>
Workpiece
Material : AISI 304
Tool : ASX445
Inserts : SEMT13T3AGSN-JM
Cutting Speed : vc=590 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.079 inch
Width of Cut : ae=3.937 inch
Cutting Mode : Dry Cutting
Single Insert

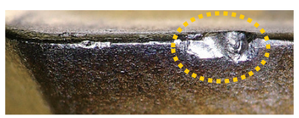
●Photographed after Machining



MV1030 After Machining 2.6 feet



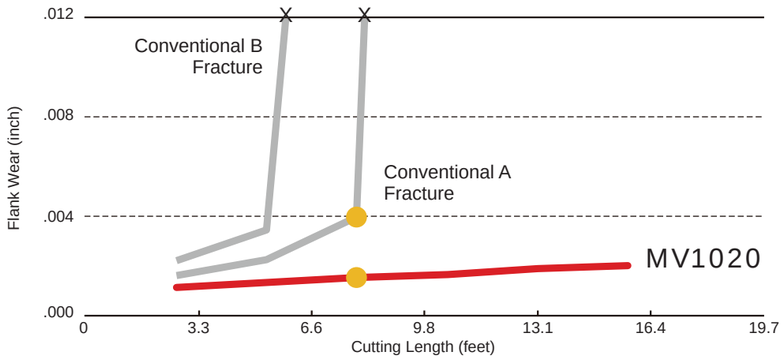
Conventional A After Machining 2.6 feet



Conventional B After Machining 2.0 feet

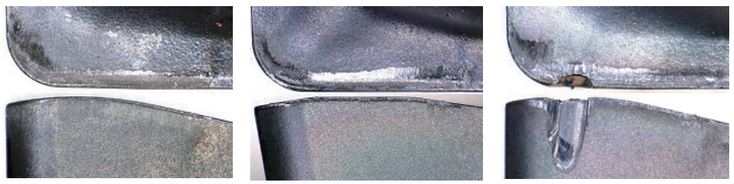
Cutting Performance

Comparison of wear resistance when machining alloy steel 4140



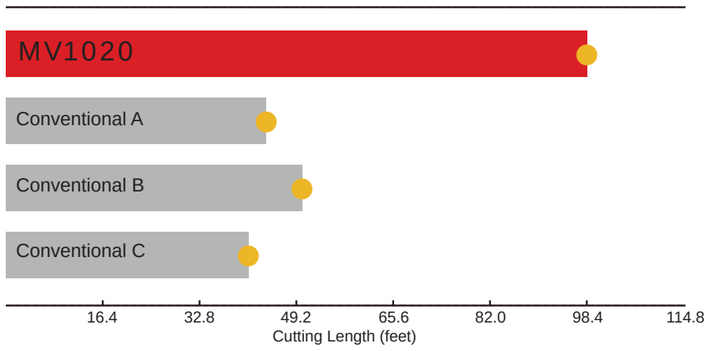
<Cutting Conditions>
Workpiece
Material : AISI 4140
Tool : WWX400
Inserts : 6NMU1409080PNER-M
Cutting Speed : vc=985 SFM
Feed per Tooth : fz=.006 IPT
Depth of Cut : ap=.118 inch
Width of Cut : ae=2.047 inch
Cutting Mode : Dry Cutting
Single Insert

* Taken after cutting length of 7.9 feet

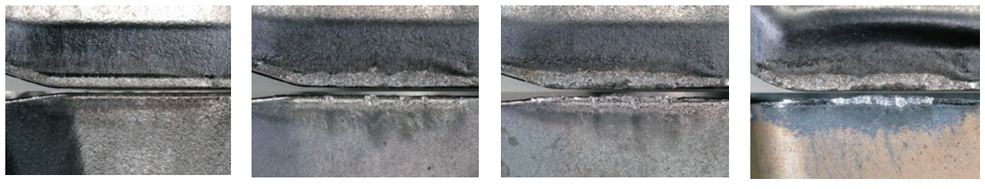


MV1020 Conventional A Conventional B

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

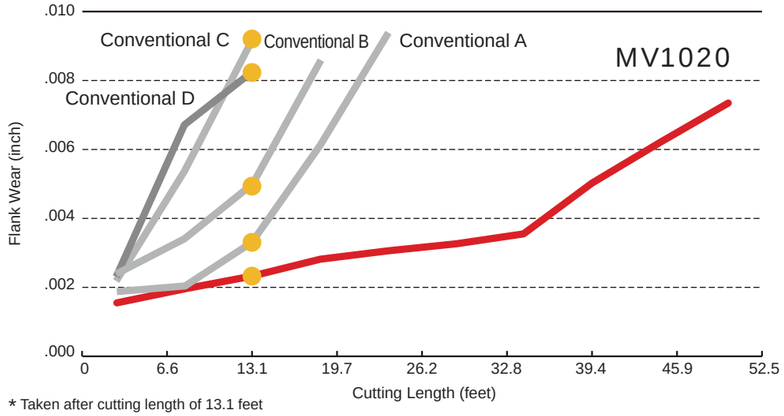


<Cutting Conditions>
Workpiece
Material : ASTM 100-70-03
Tool : WJX14
Inserts : JOMU140715ZZER-M
Cutting Speed : vc=720 SFM
Feed per Tooth : fz=.039 IPT
Depth of Cut : ap=.039 inch
Width of Cut : ae=1.772 inch
Cutting Mode : Dry Cutting
Single Insert



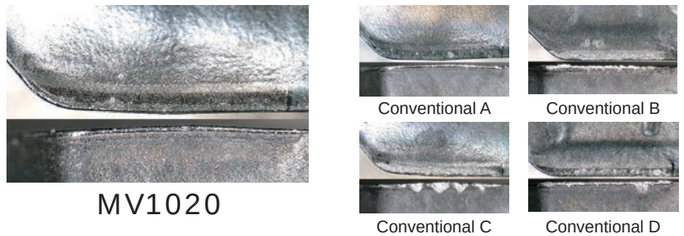
MV1020 (99.7 feet) Conventional A (44.6 feet) Conventional B (49.9 feet) Conventional C (42.0 feet)

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



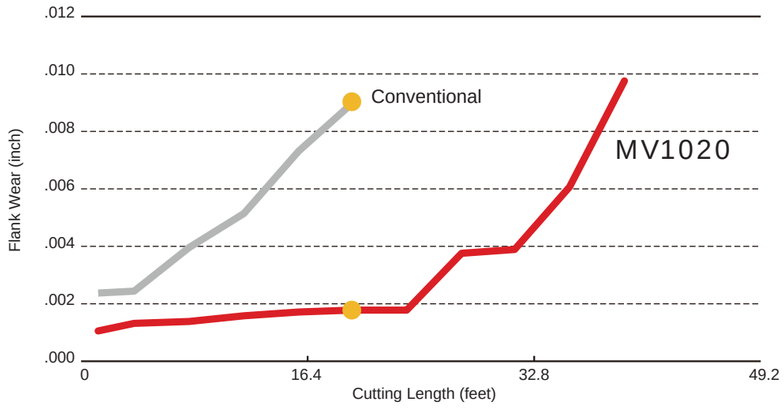
<Cutting Conditions>
Workpiece
Material : ASTM 100-70-03
Tool : AHX440
Inserts : NNMU130508ZEN-M
Cutting Speed : vc=985 SFM
Feed per Tooth : fz=.004 IPT
Depth of Cut : ap=.079 inch
Width of Cut : ae=2.047 inch
Cutting Mode : Dry Cutting
Single Insert

* Taken after cutting length of 13.1 feet

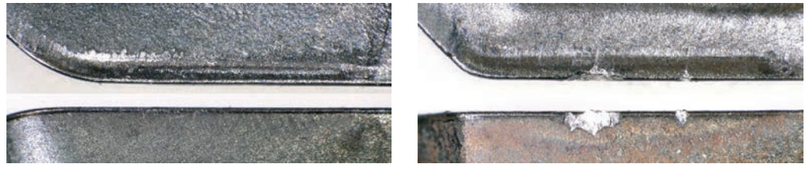


MV1020 Conventional A Conventional B Conventional C Conventional D

Comparison of wear resistance when machining alloy steel 4140



<Cutting Conditions>
Workpiece
Material : AISI 4140
Tool : WSX445
Inserts : SNMU140812ANER-M
Cutting Speed : vc=985 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.079 inch
Width of Cut : ae=3.937 inch
Cutting Mode : Dry Cutting

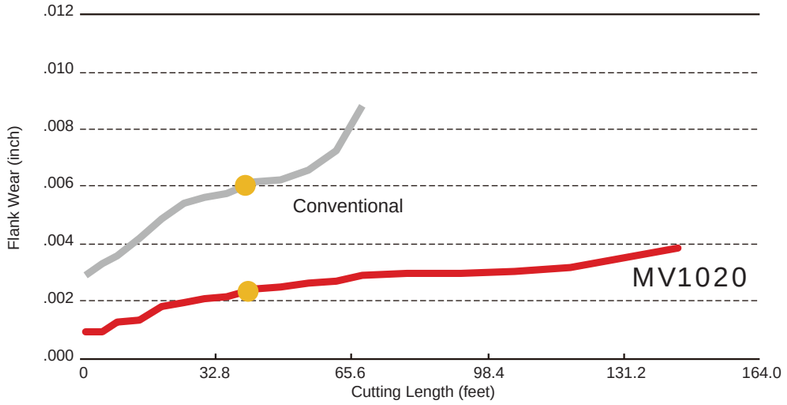


39.4 feet cutting length achieved MV1020 Chipping occurs at cutting length of 19.7 feet Conventional

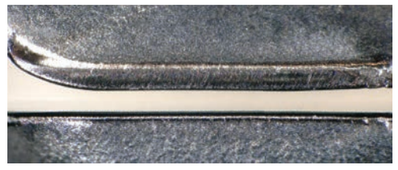
* Taken after cutting length of 19.7 feet

Cutting Performance

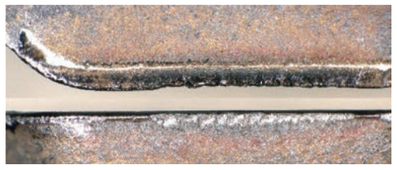
Comparison of wear resistance for rolled steel JIS SS400



<Cutting Conditions>
Workpiece
Material : JIS SS400
Tool : ASX445
Inserts : SEMT13T3AGSN-JM
Cutting Speed : vc=985 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.079 inch
Width of Cut : ae=3.937 inch
Cutting Mode : Dry Cutting



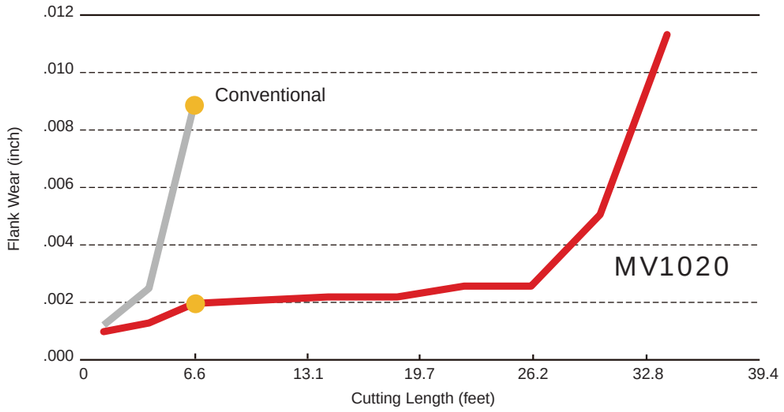
131.2 feet cutting length achieved
MV1020



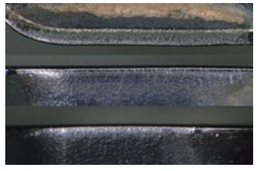
Wear progressed and the substrate was exposed
Conventional

* Taken after cutting length of 42.0 feet

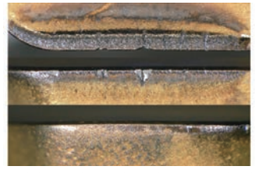
Comparison of wear resistance when machining carbon steel 1055



<Cutting Conditions>
Workpiece
Material : AISI 1055
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



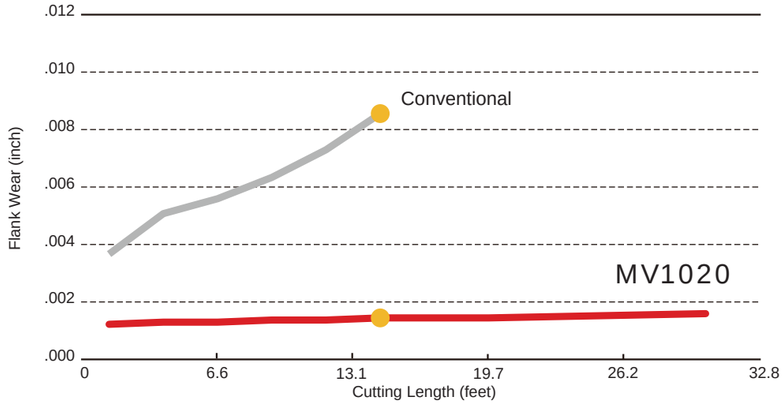
32.8 feet cutting length achieved
MV1020



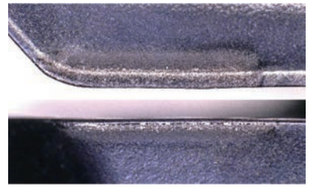
Chipping occurred due to thermal cracks at a cutting length of 6.6 feet
Conventional

* Taken after cutting length of 6.6 feet

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



<Cutting Conditions>
Workpiece
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



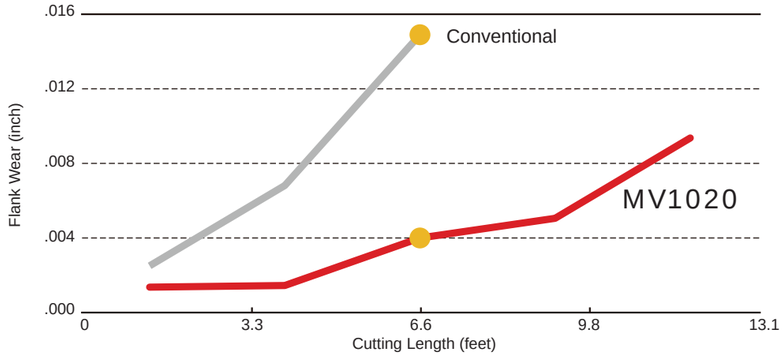
Achieves a cutting length of 29.5 feet or more
MV1020

Unable to continue machining after a cut length of 14.4 feet
Conventional

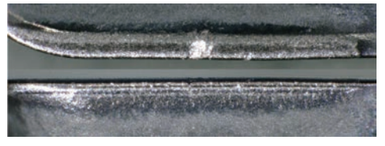
* Taken after cutting length of 14.4 feet

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

Wet Cutting



<Cutting Conditions>
Workpiece
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

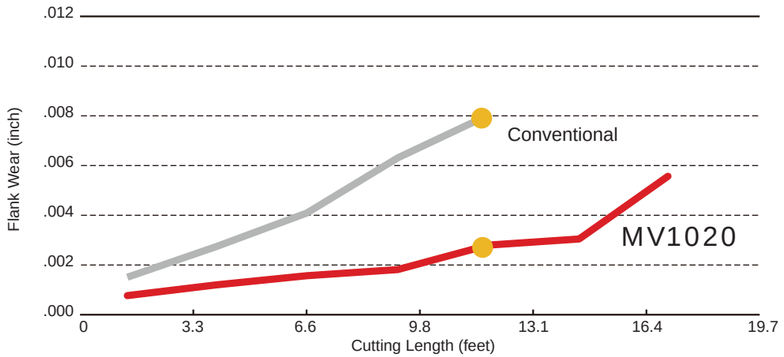
Unable to continue processing with a cut length of 6.6 feet
Conventional

* Taken after cutting length of 6.6 feet

Cutting Performance

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

Dry Cutting



<Cutting Conditions>
Workpiece
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

Chipping occurred due to peeling of the coating
Conventional

* Taken after cutting length of 11.8 feet

Memo

MTEC MACHINING TECHNOLOGY & EDUCATION CENTER

Welcome to our new world-class Machining Technology and Education Center (MTEC) in Mooresville, NC providing year round support and services to North America.

ABOUT MTEC

TOOLING PROPOSALS & EVALUATION

We will review your current processes or outline a new process. From this review, we will improve productivity, analyze programming methods and output a solution with programming, tooling and time savings.

MACHINING SIMULATION

Using the latest CAD/CAM software and our cutting tool experience, we will outline a new process using proper machining techniques to maximize tool life and productivity.

TECHNICAL SUPPORT

Dedicated local professionals to answer any of your order, product or technical questions.

TRAINING

We are excited to offer several levels of training with goals to reach our highest level--Craftsman Machining Technology. At MTEC NC, we will train using a combination of classroom and hands-on machine time to develop skills and real-world understanding of materials, tools and applications. In addition to multi-day courses, we will have Machining Technology skills seminars, as well as seminars from our partners to complement our apprentice level courses, our journeyman courses, and up to our craftsman level courses.

PROCESS IMPROVEMENTS

Review of the complete part processing and recommend changes of speed, feed, new tooling, reduction of passes, modifying programming and other solutions to reduce cycle time, save money and be proactive.

ONLINE TRAINING

Our FREE e-learning program offers 11 courses in drilling, milling, turning, threading, tool grades and workpiece materials. Once each course is completed, you will be given the opportunity to print a certificate.

- Basic Drilling
- 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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MITSUBISHI MATERIALS U.S.A. CORPORATION

California Office (Headquarters)

3535 Hyland Avenue, Suite 200
Costa Mesa, CA 92626
Customer Service: 800.523.0800
Technical Service: 800.486.2341

North Carolina-MTEC (Marketing & Technical Center)

105 Corporate Center Drive, Suite A
Mooresville, NC 28117
Main: 980.312.3100
Fax: 704.746.9292

Chicago Office (Engineering)

300 N. Martingale Road, Suite 500
Schaumburg, IL 60173
Main: 847.252.6300
Fax: 847.519.1732

Toronto Office (Canada Branch)

600 Matheson Blvd. Unit 5 (Office)
Mississauga, ON L5R 4C1
Main: 905.814.0240
Fax: 905.814.0245

MMC Metal de Mexico, S.A. DE C.V.

Av. La Cañada No.16,
Parque Industrial Bernardo
Quintana, El Marques,
Queretaro C.P. 76246 MEXICO
Main: +52.442.221.61.36
Fax: +52.442.221.61.34

Detroit Office (Moldino CS)

41700 Gardenbrook Road, Suite 120
Novi, MI 48375
Main: 248.308.2620
Fax: 248.308.2627

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.

MITSUBISHI MATERIALS U.S.A.

Product Brands Crafted by Mitsubishi Materials U.S.A.

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Tools specifications subject to change without notice.

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