MITSUBISHI MATERIALS

MP1200
Series

PVD COATED CARBIDE GRADE FOR MILLING





TOOL NEWS **B272A**

PVD Coated Carbide Grade for Milling

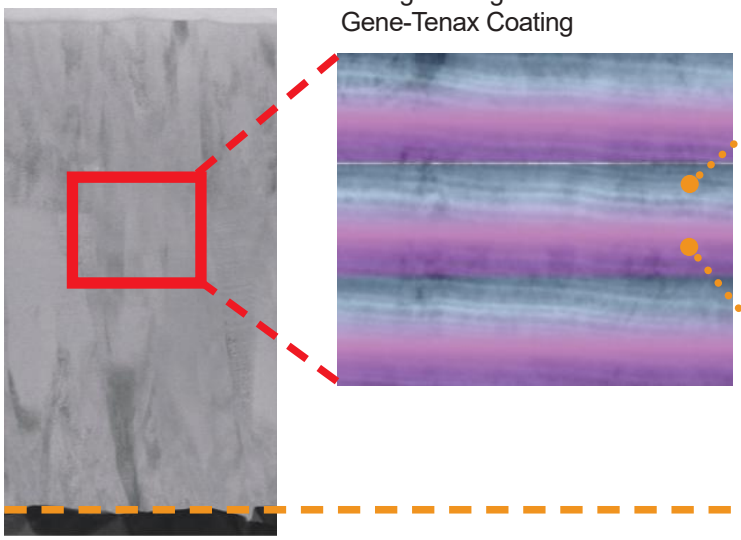
NEW

MP1200 Series MP1220, MP1230, MP1240

New Multilayer PVD Coating for Milling

Gene-Tenax Coating

A newly developed multilayer technology precisely controls the coating structure at the nano level. This simultaneously enhances wear, heat and adhesion resistance.
In addition, the high bonding strength with the carbide substrate ensures stable cutting performance across a wide range of workpiece materials.



Al-Rich Technology AlTiN-Based

Improved wear and heat resistance.

Original AlTiN Composite Functional Layer

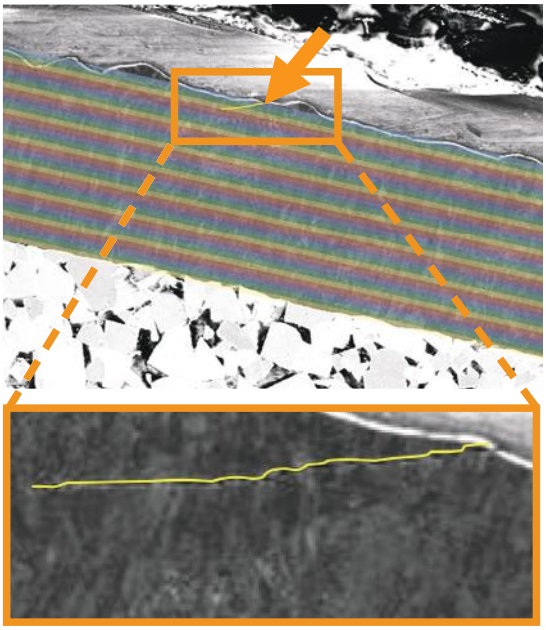
Increasingly resistant to oxidation and welding.

Technology to improve adhesion strength

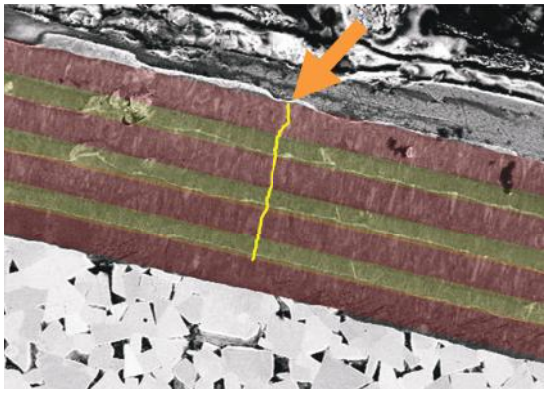
New Multilayer Technology

By adopting a new multilayer technology that laminates multiple coating layers, crack propagation is suppressed, resulting in a dramatic improvement in fracture resistance compared with conventional technologies.

New Multilayer Technology



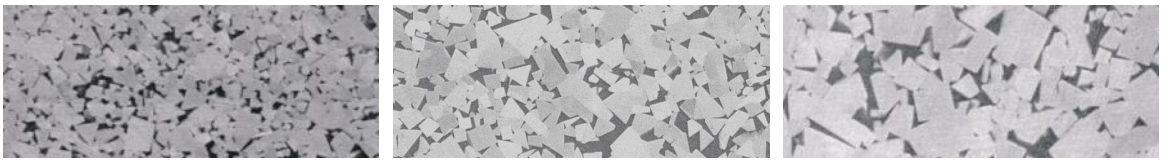
Conventional Layer Technology



Multi-Grade System

Using simulation technology, precise analysis of the cutting edge load and temperature when machining different workpiece materials was carried out. This led to the substrates of three different grades. That deliver optimal performance for each workpiece material.
Ensuring the best performance on a wide range of applications.

MP1220 **MP1230** **MP1240**



Selection Guidelines

Steel, Cast Iron — **Stainless Steel** — **Titanium Alloys, Heat Resistant Alloys**

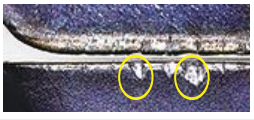
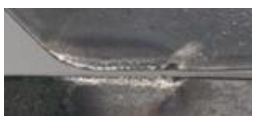
Hard Grade
Stable cutting
Emphasis on wear resistance and mechanical properties.

Tough grade
Unstable cutting
Emphasis on fracture resistance and thermal properties

	MP1220	MP1230	MP1240
Steel Ductile Cast Iron	1st recommendation	Interrupted Cutting Fracture Resistance	Heavy Interrupted Cutting
Cast Iron	1st recommendation	Interrupted Cutting Fracture Resistance	Alternative Grade Fracture Resistance
Stainless Steel	Recommended for Ferritic and Martensitic Stainless Steel	1st recommendation	Interrupted Cutting Fracture Resistance
Titanium Alloys Heat Resistant Alloys	Recommended for Stable Cutting of Heat-Resistant Alloys	Recommended for Stable Cutting of Titanium Alloys	1st recommendation

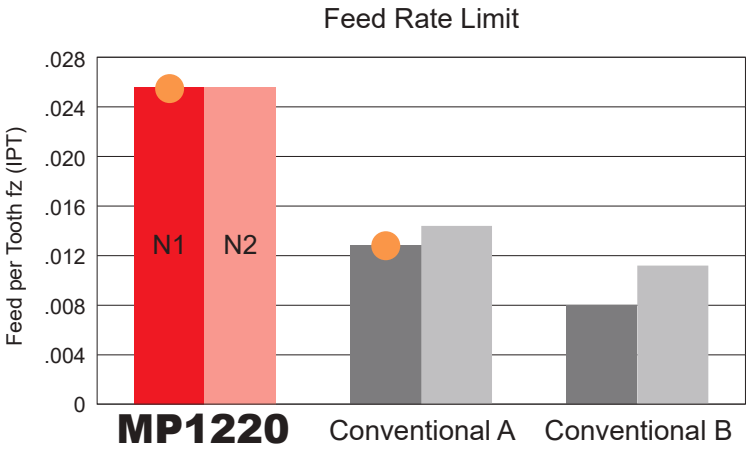
* Selection may vary depending on the tool and cutting conditions.
Please refer to the recommended cutting conditions.

Effectiveness in Suppressing Major Damage for Each Different Materials

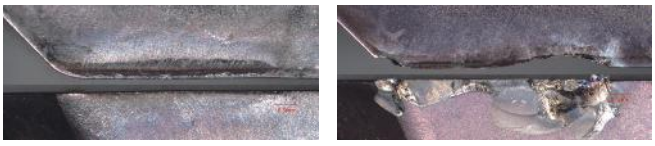
	Steel	Cast Iron Ductile Cast Iron	Stainless Steel	Titanium Alloys Heat Resistant Alloys
Main Damage Factors	Abrasion Wear Thermal Cracks	Crater Wear Adhesion	Notching Chipping	Notching Abrasion Wear Adhesion
Conventional PVD				
MP1200 Series				

4140 Alloy steel: Fracture resistance comparison

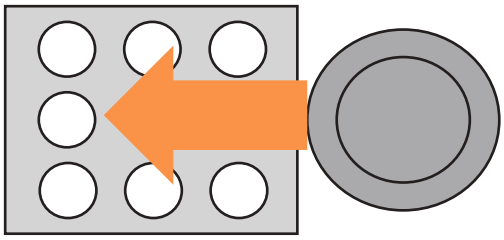
It suppresses breakage during high-load machining and exhibits more than twice the breakage resistance of conventional product A.



: Feed per tooth at capture



MP1220 Conventional A

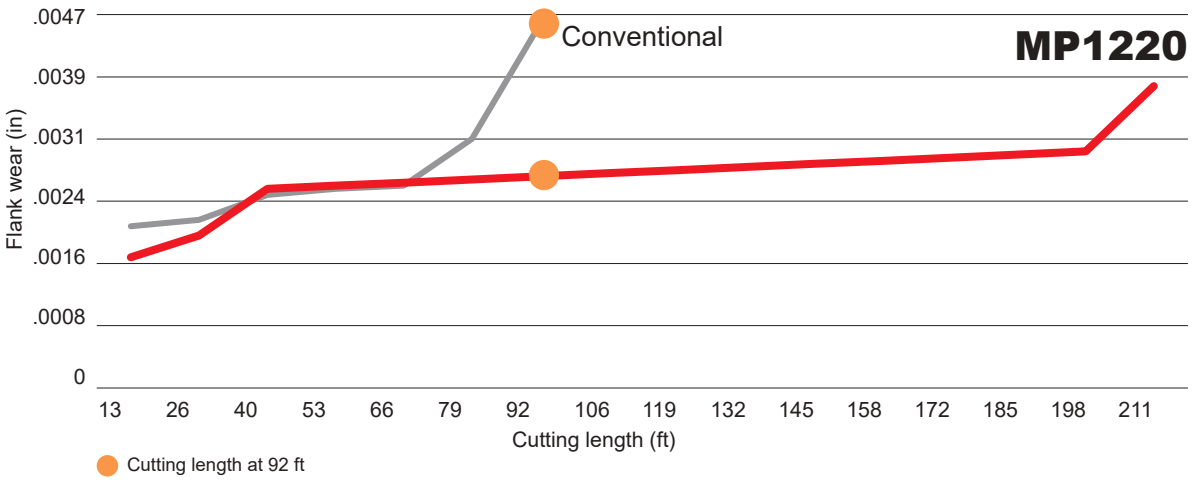


Machining Image

<Cutting Conditions>
Material : AISI 4140 Alloy Steel
Cutter Dia. : ASX445 DC = 4.921 in
Insert : MP1220 JM
Cutting Speed : vc=655 SFM
Depth of Cut : ap= .118 in
Width of Cut : ae= 3.937 in
Cutting Mode : Dry Cutting
Single Insert
Center Cut

4140 Alloy steel: Wear resistance comparison

Suppresses rake face wear and the occurrence of thermal cracking, enabling stable machining.



Cutting length at 92 ft

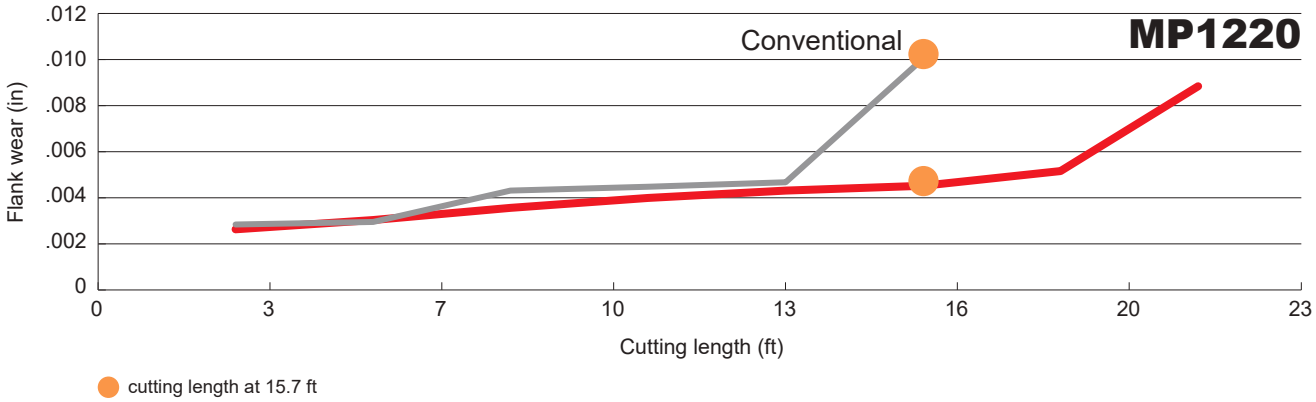


MP1220 Conventional

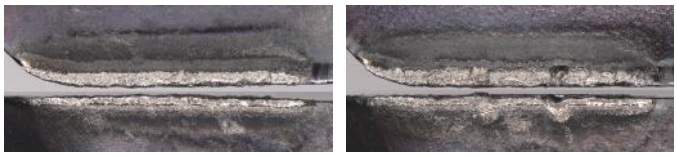
<Cutting conditions>
Material : AISI 4140 Alloy Steel
Cutter Dia. : VPX300 DC = 1.259 in
Insert : MP1220 M
Cutting speed : vc=655 SFM
Feed per Tooth : fz= .006 IPT
Depth of cut : ap= .157 in
Width of Cut : ae= .630 in
Cutting mode : Dry Cutting
Single Insert
Center Cut

A536 Ductile cast iron: Wear resistance comparison

Reduces wear and chipping during cast iron machining, delivering significantly improved performance compared with conventional products.



cutting length at 15.7 ft



MP1220 Conventional

<Cutting Conditions>
Material : ASTM A536 Ductile Cast Iron
Cutter Dia. : ASX445 DC = 4.921 in
Insert : MP1220 JM
Cutting Speed : vc = 490 SFM
Feed per Tooth : fz= .008 IPT
Depth of Cut : ap= .079 in
Width of Cut : ae= 3.937 in
Cutting Mode : Dry Cutting
Single Insert
Center Cut

304 Stainless steel: Fracture resistance comparison

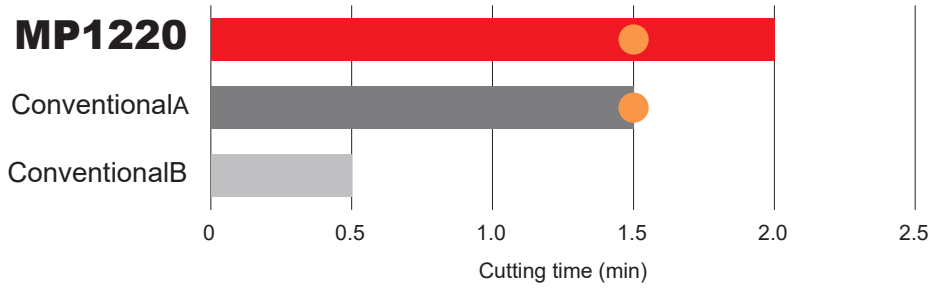
Reduces notching during stainless steel machining, delivering a significant performance improvement.

	MP1230	Conventional
After 1.3 ft of machining		
After 3.9 ft of machining		

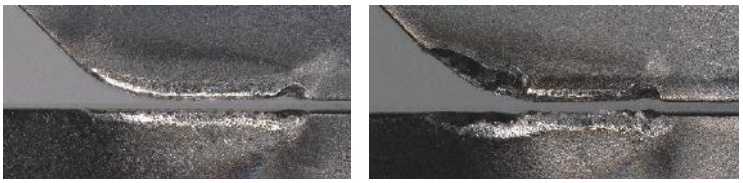
<Cutting Conditions>
Material : AISI 304 Stainless Steel
Tool : ASX445
Insert : MP1230 JM
Cutting Speed : vc=590 SFM
Feed per Tooth : fz= .008 IPT
Depth of Cut : ap= .079 in
Width of Cut : ae= 3.937 in
Cutting Mode : Dry Cutting
Single Insert
Center Cut

Inconel718: Wear resistance comparison

Reduces wear and chipping during heat resistant alloy machining, delivering improved performance.



Cutting time at 1.5 min

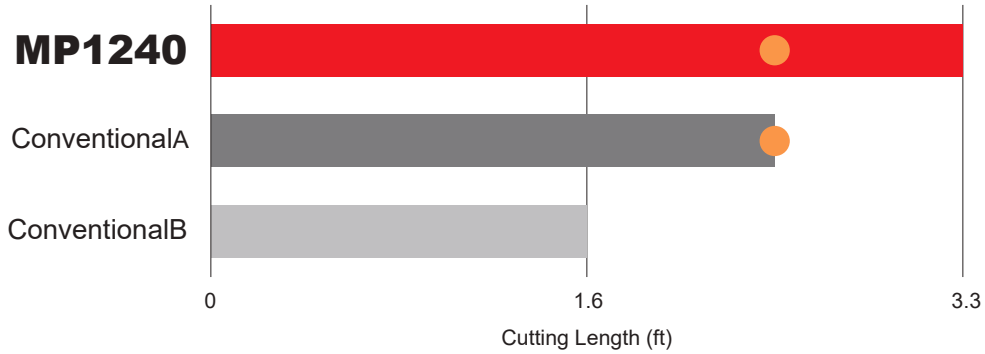


MP1220 Conventional A

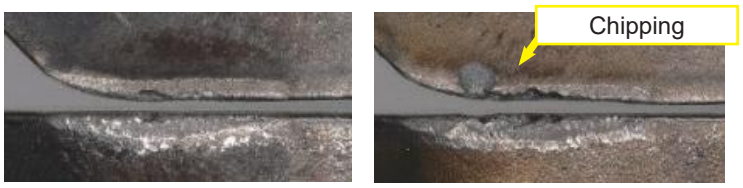
<Cutting Conditions>
Material : Inconel718
Tool : ASX445
Insert : MP1220 JM
Cutting Speed : vc=195 SFM
Feed per Tooth : fz= .008 IPT
Depth of Cut : ap= .039 in
Width of Cut : ae= 3.937 in
Cutting Mode : Wet Cutting
Single Insert
Center Cut

Ti-6Al-4V Titanium alloy: Cutting performance comparison

Greatly reduces adhesion-related chipping damage during titanium alloy machining, delivering improved performance.



Cutting length at 2.5 ft



MP1240 Conventional A

<Cutting Conditions>
Material : Ti-6Al-4V Titanium Alloy
Tool : ASX445
Insert : MP1240 JM
Cutting Speed : vc= 260 SFM
Feed per Tooth : fz= .004 IPT
Depth of Cut : ap= .039 in
Width of Cut : ae= 3.937 in
Cutting Mode : Wet Cutting
Single Insert
Center Cut

Inserts

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Face Milling	WSX445		SNGU140812ANER-L	●	●	●	G	Low resistance	Light cutting
			SNGU140812ANEL-L	●	●		G	Low resistance	Light cutting
			SNGU140812ANER-M	●	●	●	G	1st recommendation	General cutting
			SNGU140812ANEL-M	●	●		G	1st recommendation	General cutting
			SNMU140812ANER-M	●	●	●	M	1st recommendation	General cutting
			SNMU140812ANEL-M	●	●		M	1st recommendation	General cutting
			SNMU140812ANER-R	●	●	●	M	Strong cutting edge	Rough cutting
			SNMU140812ANEL-R	●	●		M	Strong cutting edge	Rough cutting
			SNMU140812ANER-H	●	●	●	M	Strong cutting edge	Heavy cutting
			WNGU1406ANEN8C-M	●			G	Wiper	Finish cutting
	AHX440S		NNMU130508ZER-L	●	●	●	M	Low resistance	General cutting
			NNMU130508ZEN-M	●	●	●	M	1st recommendation	General cutting
			WNEU1305ZEN4C-M	●			E	Wiper	Finish cutting
	AHX475S		NNMU130532ZEN-M	●	●	●	M	1st recommendation	High feed cutting
			NNMU130532ZEN-R	●	●	●	M	Strong cutting edge	High feed cutting
	AHX640S		NNMU200608ZEN-MK	●			M	1st recommendation	General cutting
			NNMU200608ZEN-HK	●			M	Strong cutting edge	General cutting
			NNMU200712ZER-L	●	●	●	M	Low resistance	General cutting
			NNMU200708ZEN-M	●	●	●	M	1st recommendation	General cutting
			WNEU2007ZEN7C-M	●			E	Wiper	Finish cutting
	ASX445		SEET13T3AGEN-JL	●	●	●	E	Low resistance	Finish—Light cutting
			SEMT13T3AGSN-JM	●	●	●	M	1st recommendation	Light—Rough cutting
			SEMT13T3AGSN-JH	●	●	●	M	Strong cutting edge	Medium—Heavy cutting

● = NEW

● : USA Stock ★ : Stocked in Japan

10 inserts in one case.

PVD Coated Carbide Grade for Milling

Inserts

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Shoulder Milling	ASX300		SOMT083304PEER-L	●	●	●	M	Low resistance, RE .016	Stable cutting
			SOMT083308PEER-L	●	●	●	M	Low resistance, RE .031	Stable cutting
			SOMT083308PEER-M	●	●	●	M	RE .031	General cutting
			SOMT083312PEER-M	●	●	●	M	RE .047	General cutting
			SOMT083316PEER-M	●	●	●	M	RE .063	General cutting
			SOMT083308PEER-R	●	●	●	M	Strong cutting edge, RE .031	Unstable cutting
			SOMT083312PEER-R	●	●	●	M	Strong cutting edge, RE .047	Unstable cutting
			SOMT083316PEER-R	●	●	●	M	Strong cutting edge, RE .063	Unstable cutting
	ASX400		SOET12T308PEER-JL	●	●	●	E	Low resistance	Finish—Light cutting
			SOMT12T308PEER-JM	●	●	●	M	1st recommendation	Light—Rough cutting
			SOMT12T308PEER-JH	●	●	●	M	Strong cutting edge	Medium—Heavy cutting
			SOMT12T320PEER-FT	●	●	●	M	Strong cutting edge	Heavy and interrupted cutting
	VOX400		SONX1206PER	●			N	Right-hand	Cast iron rough cutting
			WOEX1206PER5C	●			E	Wiper	Finish cutting
	WWX200		6NGU0906040PNER-L	●	●	●	G	Low resistance, RE .016	Stable cutting
			6NGU0906080PNER-L	●	●	●	G	Low resistance, RE .031	Stable cutting
			6NMU0906040PNER-M	●	●	●	M	RE .016	General cutting
			6NMU0906080PNER-M	●	●	●	M	RE .031	General cutting
			6NMU0906080PNER-R	●	●	●	M	Strong cutting edge, RE .031	Unstable cutting
	WWX400		6NGU1409040PNER-L	●	●	●	G	Low resistance, RE .016	Stable cutting
			6NGU1409080PNER-L	●	●	●	G	Low resistance, RE .031	Stable cutting
			6NGU1409040PNER-M	●	●	●	G	RE .016	General cutting
			6NGU1409080PNER-M	●	●	●	G	RE .031	General cutting
			6NMU1409040PNER-M	●	●	●	M	RE .016	General cutting
			6NMU1409080PNER-M	●	●	●	M	RE .031	General cutting
			6NMU1409160PNER-M	●	●	●	M	RE .063	General cutting
			6NMU1409200PNER-M	●	●	●	M	RE .079	General cutting
			6NMU1409080PNER-R	●	●	●	M	RE .031	Unstable cutting
			6NMU1409160PNER-R	●	●	●	M	RE .063	Unstable cutting
			6NMU1409200PNER-R	●	●	●	M	RE .079	Unstable cutting
			2NGU1406ZNER6C-M	●			G	Wiper	Finish cutting

● = NEW

● : USA Stock ★ : Stocked in Japan

10 inserts in one case.

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Side Cutter	VAS400		LNGU130804PNER-M	●			G	Low resistance, RE1 .016	Right-hand
			LNGU130804PNEL-M	●			G	Low resistance, RE1 .016	Left-hand
			LNGU130808PNER-M	●			G	Low resistance, RE1 .032	Right-hand
			LNGU130808PNEL-M	●			G	Low resistance, RE1 .032	Left-hand
			LNGU130812PNER-M	●			G	Low resistance, RE1 .047	Right-hand
			LNGU130812PNEL-M	●			G	Low resistance, RE1 .047	Left-hand
			LNGU130816PNER-M	●			G	Low resistance, RE1 .063	Right-hand
			LNGU130816PNEL-M	●			G	Low resistance, RE1 .063	Left-hand
			LNGU130820PNER-M	●			G	Low resistance, RE1 .079	Right-hand
			LNGU130820PNEL-M	●			G	Low resistance, RE1 .079	Left-hand
			LNGU130824PNER-M	●			G	Low resistance, RE1 .095	Right-hand
			LNGU130824PNEL-M	●			G	Low resistance, RE1 .095	Left-hand
			LNGU130830PNER-M	●			G	Low resistance, RE1 .118	Right-hand
			LNGU130830PNEL-M	●			G	Low resistance, RE1 .118	Left-hand
			LNGU130840PNER-M	●			G	Low resistance, RE1 .158	Right-hand
			LNGU130840PNEL-M	●			G	Low resistance, RE1 .158	Left-hand
			LNGU130850PNER-M	●			G	Low resistance, RE1 .197	Right-hand
			LNGU130850PNEL-M	●			G	Low resistance, RE1 .197	Left-hand
			LNGU130804PNER-R	●			G	Strong cutting edge, RE1 .016	Right-hand
			LNGU130804PNEL-R	●			G	Strong cutting edge, RE1 .016	Left-hand
			LNGU130808PNER-R	●			G	Strong cutting edge, RE1 .032	Right-hand
			LNGU130808PNEL-R	●			G	Strong cutting edge, RE1 .032	Left-hand
			LNGU130812PNER-R	●			G	Strong cutting edge, RE1 .047	Right-hand
			LNGU130812PNEL-R	●			G	Strong cutting edge, RE1 .047	Left-hand
			LNGU130816PNER-R	●			G	Strong cutting edge, RE1 .063	Right-hand
			LNGU130816PNEL-R	●			G	Strong cutting edge, RE1 .063	Left-hand
			LNGU130820PNER-R	●			G	Strong cutting edge, RE1 .079	Right-hand
			LNGU130820PNEL-R	●			G	Strong cutting edge, RE1 .079	Left-hand
			LNGU130824PNER-R	●			G	Strong cutting edge, RE1 .095	Right-hand
			LNGU130824PNEL-R	●			G	Strong cutting edge, RE1 .095	Left-hand
			LNGU130830PNER-R	●			G	Strong cutting edge, RE1 .118	Right-hand
			LNGU130830PNEL-R	●			G	Strong cutting edge, RE1 .118	Left-hand
			LNGU130840PNER-R	●			G	Strong cutting edge, RE1 .158	Right-hand
			LNGU130840PNEL-R	●			G	Strong cutting edge, RE1 .158	Left-hand
			LNGU130850PNER-R	●			G	Strong cutting edge, RE1 .197	Right-hand
			LNGU130850PNEL-R	●			G	Strong cutting edge, RE1 .197	Left-hand
	ASX400		SOMT12T308PEEL-JM	●	●	●	M	Left-hand	Light—Rough cutting
	VOS400		SONX1206PEL	●			N	Left-hand	Cast iron rough cutting

● = NEW

PVD Coated Carbide Grade for Milling

Inserts

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Multi-Functional Milling	AJX		JOMW06T215ZZSR-FT	●	●	●	M	IC .250	1st recommendation
			JOMW080320ZZSR-FT	●	●	●	M	IC .315	1st recommendation
			JDMW09T320ZDSR-FT	●	●	●	M	IC .375	1st recommendation
			JDMW120420ZDSR-FT	●	●	●	M	IC .472	1st recommendation
			JDMW140520ZDSR-FT	●	●	●	M	IC .551	1st recommendation
			JDMT120420ZDSR-ST	●	●		M	IC .473, Strong cutting edge	Interrupted cutting
			JDMT140520ZDSR-ST	●	●		M	IC .551, Strong cutting edge	Interrupted cutting
			JOMT06T216ZZER-JL	●	●	●	M	IC .250	Difficult-to-cut materials
			JOMT080322ZZER-JL	●	●	●	M	IC .315	Difficult-to-cut materials
			JDMT09T323ZDER-JL	●	●	●	M	IC .375	Difficult-to-cut materials
			JDMT120423ZDER-JL	●	●	●	M	IC .472	Difficult-to-cut materials
			JDMT140523ZDER-JL	●	●	●	M	IC .551	Difficult-to-cut materials
			JOMT06T215ZZSR-JM	●	●	●	M	IC .250, Low resistance	General cutting
			JOMT080320ZZSR-JM	●	●	●	M	IC .315, Low resistance	General cutting
			JDMT09T320ZDSR-JM	●	●	●	M	IC .375, Low resistance	General cutting
			JDMT120420ZDSR-JM	●	●	●	M	IC .473, Low resistance	General cutting
			JDMT140520ZDSR-JM	●	●	●	M	IC .551, Low resistance	General cutting
	AQX		QOGT0830R-G1	●			G	*APMX .291, Low resistance	General cutting
			QOGT0934R-G1	●			G	*APMX .344, Low resistance	General cutting
			QOGT1035R-G1	●			G	*APMX .362, Low resistance	General cutting
			QOGT1342R-G1	●			G	*APMX .453, Low resistance	General cutting
			QOGT1443R-G1	●			G	*APMX .469, Low resistance	General cutting
			QOGT1651R-G1	●			G	*APMX .571, Low resistance	General cutting
			QOGT1856R-G1	●			G	*APMX .630, Low resistance	General cutting
			QOGT1959R-G1	●			G	*APMX .688, Low resistance	General cutting
			QOGT2062R-G1	●			G	*APMX .709, Low resistance	General cutting
			QOGT2576R-G1	●			G	*APMX .906, Low resistance	General cutting
			QOMT0830R-M2	●	●	●	M	*APMX .291	General cutting
			QOMT0934R-M2	●	●	●	M	*APMX .344	General cutting
			QOMT1035R-M2	●	●	●	M	*APMX .362	General cutting
			QOMT1342R-M2	●	●	●	M	*APMX .453	General cutting
			QOMT1443R-M2	●	●	●	M	*APMX .469	General cutting
			QOMT1651R-M2	●	●	●	M	*APMX .571	General cutting
			QOMT1856R-M2	●	●	●	M	*APMX .630	General cutting
			QOMT1959R-M2	●	●	●	M	*APMX .688	General cutting
			QOMT2062R-M2	●	●	●	M	*APMX .709	General cutting
			QOMT2576R-M2	●	●	●	M	*APMX .906	General cutting
	AXD4000 AXD4000A		XDGX175004PDER-GM	●			G	Strong cutting edge, RE.016	High speed cutting
			XDGX175008PDER-GM	●			G	Strong cutting edge, RE.032	High speed cutting
			XDGX175012PDER-GM	●			G	Strong cutting edge, RE.047	High speed cutting
			XDGX175016PDER-GM	●			G	Strong cutting edge, RE.063	High speed cutting
			XDGX175020PDER-GM	●			G	Strong cutting edge, RE.079	High speed cutting
			XDGX175024PDER-GM	●			G	Strong cutting edge, RE.095	High speed cutting
			XDGX175030PDER-GM	●			G	Strong cutting edge, RE.118	High speed cutting
			XDGX175032PDER-GM	●			G	Strong cutting edge, RE.126	High speed cutting
			XDGX175040PDER-GM	●			G	Strong cutting edge, RE.158	High speed cutting
			XDGX175050PDER-GM	●			G	Strong cutting edge, RE.197	High speed cutting

● = NEW

*** This is the short edge type APMX.**

● : USA Stock ★ : Stocked in Japan

10 inserts in one case.

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Multi-Functional Milling	AXD7000		XDGX227008PDER-GLA	●			G	Low resistance, RE.032	Dimensions after machining will be RE
			XDGX227016PDER-GLA	●			G	Low resistance, RE.063	Dimensions after machining will be RE
	ARP		RPHT1040M0E4-L	●	●	●	H	IC .394, Low resistance, High precision	Titanium alloys, Stainless steel
			RPMT1040M0E8-L1	●	●	●	M	IC .394, General 8 corner	Titanium alloys, Stainless steel
			RPMT1040M0E4-L2	●	●	●	M	IC .394, Low resistance, High rigidity	Titanium alloys, Stainless steel
			RPHT1040M0E4-M	●	●	●	H	IC .394, General, High precision	General cutting
			RPMT1040M0E8-M1	●	●	●	M	IC .394, General 8 corner	General cutting
			RPMT1040M0E4-M2	●	●	●	M	IC .394, General, High rigidity	General cutting
			RPHT1040M0E4-R	●	●	●	H	IC .394, Strong cutting edge, High precision	Interrupted cutting
			RPMT1040M0E8-R1	●	●	●	M	IC .394, General 8 corner	Interrupted cutting
			RPMT1040M0E4-R2	●	●	●	M	IC .394, Strong cutting edge	Interrupted cutting
			RPHT1248M0E4-L	●	●	●	H	IC .472, Low resistance, High precision	Titanium alloys, Stainless steel
			RPMT1248M0E8-L1	●	●	●	M	IC .472, General 8 corner	Titanium alloys, Stainless steel
			RPMT1248M0E4-L2	●	●	●	M	IC .472, Low resistance, High rigidity	Titanium alloys, Stainless steel
			RPHT1248M0E4-M	●	●	●	H	IC .472, General, High precision	General cutting
			RPMT1248M0E8-M1	●	●	●	M	IC .472, General 8 corner	General cutting
			RPMT1248M0E4-M2	●	●	●	M	IC .472, General, High rigidity	General cutting
			RPHT1248M0E4-R	●	●	●	H	IC .472, Strong cutting edge, High precision	Interrupted cutting
			RPMT1248M0E8-R1	●	●	●	M	IC .472, General 8 corner	Interrupted cutting
			RPMT1248M0E4-R2	●	●	●	M	IC .472, Strong cutting edge	Interrupted cutting
	BRP		RPMT08T2M0E-JS	●			M	IC .315, Low resistance	High feed cutting
			RPMT10T3M0E-JS	●			M	IC .394, Low resistance	High feed cutting
			RPMT1204M0E-JS	●			M	IC .472, Low resistance	High feed cutting
			RPMT1606M0E-JS	●			M	IC .630, Low resistance	High feed cutting
			RPMW10T3M0E	●			M	IC .394	General cutting
			RPMW1204M0E	●			M	IC .472	General cutting
			RPMW1606M0E	●			M	IC .630	General cutting
	BXD4000		XDGT1550PDER-G04	●	●		G	RE.016	General cutting
			XDGT1550PDER-G08	●	●		G	RE.032	General cutting
			XDGT1550PDER-G12	●	●		G	RE.047	General cutting
			XDGT1550PDER-G16	●	●		G	RE.063	General cutting
			XDGT1550PDER-G20	●	●		G	RE.079	General cutting
			XDGT1550PDER-G30	●	●		G	RE.118	General cutting
			XDGT1550PDER-G32	●	●		G	RE.126	General cutting
			XDGT1550PDER-G40	●	●		G	RE.158	General cutting
			XDGT1550PDER-G50	●	●		G	RE.197	General cutting

● = NEW

Inserts

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Multi-Functional Milling	VPX200		LOGU0904020PNER-L	●	●	●	G	Low resistance, RE.008	Stable—General cutting
			LOGU0904040PNER-L	●	●	●	G	Low resistance, RE.016	Stable—General cutting
			LOGU0904080PNER-L	●	●	●	G	Low resistance, RE.032	Stable—General cutting
			LOGU0904100PNER-L	●	●	●	G	Low resistance, RE.039	Stable—General cutting
			LOGU0904120PNER-L	●	●	●	G	Low resistance, RE.047	Stable—General cutting
			LOGU0904160PNER-L	●	●	●	G	Low resistance, RE.063	Stable—General cutting
			LOGU0904020PNER-M	●	●	●	G	RE.008	General—Unstable cutting
			LOGU0904040PNER-M	●	●	●	G	RE.016	General—Unstable cutting
			LOGU0904080PNER-M	●	●	●	G	RE.032	General—Unstable cutting
			LOGU0904100PNER-M	●	●	●	G	RE.039	General—Unstable cutting
			LOGU0904120PNER-M	●	●	●	G	RE.047	General—Unstable cutting
			LOGU0904160PNER-M	●	●	●	G	RE.063	General—Unstable cutting
	VPX300		LOGU1207020PNER-L	●	●	●	G	Low resistance, RE.008	Stable—General cutting
			LOGU1207040PNER-L	●	●	●	G	Low resistance, RE.016	Stable—General cutting
			LOGU1207080PNER-L	●	●	●	G	Low resistance, RE.031	Stable—General cutting
			LOGU1207100PNER-L	●	●	●	G	Low resistance, RE.039	Stable—General cutting
			LOGU1207120PNER-L	●	●	●	G	Low resistance, RE.047	Stable—General cutting
			LOGU1207160PNER-L	●	●	●	G	Low resistance, RE.063	Stable—General cutting
			LOGU1207200PNER-L	●	●	●	G	Low resistance, RE.079	Stable—General cutting
			LOGU1207240PNER-L	●	●	●	G	Low resistance, RE.094	Stable—General cutting
			LOGU1207300PNER-L	●	●	●	G	Low resistance, RE.118	Stable—General cutting
			LOGU1207320PNER-L	●	●	●	G	Low resistance, RE.126	Stable—General cutting
			LOGU1207020PNER-M	●	●	●	G	RE.008	General—Unstable cutting
			LOGU1207040PNER-M	●	●	●	G	RE.016	General—Unstable cutting
			LOGU1207080PNER-M	●	●	●	G	RE.031	General—Unstable cutting
			LOGU1207100PNER-M	●	●	●	G	RE.039	General—Unstable cutting
			LOGU1207120PNER-M	●	●	●	G	RE.047	General—Unstable cutting
			LOGU1207160PNER-M	●	●	●	G	RE.063	General—Unstable cutting
			LOGU1207200PNER-M	●	●	●	G	RE.079	General—Unstable cutting
			LOGU1207240PNER-M	●	●	●	G	RE.094	General—Unstable cutting
			LOGU1207300PNER-M	●	●	●	G	RE.118	General—Unstable cutting
			LOGU1207320PNER-M	●	●	●	G	RE.126	General—Unstable cutting

● = NEW

● : USA Stock ★ : Stocked in Japan

10 inserts in one case.

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Multi-Functional Milling	RS01		RS0112M020ER-M	●	●	●	M	RE .008	General cutting
			RS0112M040ER-M	●	●	●	M	RE .016	General cutting
			RS0112M080ER-M	●	●	●	M	RE .031	General cutting
			RS0112M100ER-M	●	●	●	M	RE .039	General cutting
			RS0112M120ER-M	●	●	●	M	RE .047	General cutting
			RS0112M160ER-M	●	●	●	M	RE .063	General cutting
			RS0112M200ER-M	●	●	●	M	RE .079	General cutting
			RS0112M240ER-M	●	●	●	M	RE .094	General cutting
			RS0112M300ER-M	●	●	●	M	RE .118	General cutting
			RS0112M320ER-M	●	●	●	M	RE .126	General cutting
			RS0112M020ER-R	●	●	●	M	Strong cutting edge, RE .008	Interrupted cutting
			RS0112M040ER-R	●	●	●	M	Strong cutting edge, RE .016	Interrupted cutting
			RS0112M080ER-R	●	●	●	M	Strong cutting edge, RE .031	Interrupted cutting
			RS0112M100ER-R	●	●	●	M	Strong cutting edge, RE .039	Interrupted cutting
			RS0112M120ER-R	●	●	●	M	Strong cutting edge, RE .047	Interrupted cutting
			RS0112M160ER-R	●	●	●	M	Strong cutting edge, RE .063	Interrupted cutting
			RS0112M200ER-R	●	●	●	M	Strong cutting edge, RE .079	Interrupted cutting
			RS0112M240ER-R	●	●	●	M	Strong cutting edge, RE .094	Interrupted cutting
			RS0112M300ER-R	●	●	●	M	Strong cutting edge, RE .118	Interrupted cutting
			RS0112M320ER-R	●	●	●	M	Strong cutting edge, RE .126	Interrupted cutting
			RS0112M080ER-H	●	●	●	M	Strong cutting edge, RE .031	Heavy interrupted cutting
	WJX09		JOMU090512ZZER-L	●	●	●	M	Low resistance	Stable cutting, Titanium alloys
			JOMU090512ZZER-M	●	●	●	M	General	General cutting
			JOMU090512ZZER-R	●	●	●	M	Strong cutting edge	Unstable cutting
	WJX14		JOMU140715ZZER-L	●	●	●	M	Low resistance	Stable cutting, Titanium alloys
			JOMU140715ZZER-M	●	●	●	M	General	General cutting
			JOMU140715ZZER-R	●	●	●	M	Strong cutting edge	Unstable cutting
Deep Shoulder Milling	SPX		JPMX140412-JM	●	●		M	Straight cutting edge	Bottom cutting edge
			JPMX190412-JM	●	●		M	Straight cutting edge	Bottom cutting edge
			JPMX140412-WH	●	●		M	Wavy cutting edge	Bottom cutting edge
			JPMX190412-WH	●	●		M	Wavy cutting edge	Bottom cutting edge
			MPMX120412-JM	●	●		M	Straight cutting edge	Bottom cutting edge
			MPMX120412-WH	●	●		M	Wavy cutting edge	Bottom cutting edge
			SPMX120408-JM	●	●		M	Straight cutting edge	Peripheral cutting edge
			SPMX120408-WH	●	●		M	Wavy cutting edge	Peripheral cutting edge

● = NEW

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Copying	SRM2		SRG16C	●			G	Reinforced edge, CEMR .315	Inner
			SRG16E	●			G	Reinforced edge, CEMR .315	Outer
			SRG20C	●			G	Reinforced edge, CEMR .394	Inner
			SRG20E	●			G	Reinforced edge, CEMR .394	Outer
			SRG25C	●			G	Reinforced edge, CEMR .492	Inner
			SRG25E	●			G	Reinforced edge, CEMR .492	Outer
			SRG30C	●			G	Reinforced edge, CEMR .591	Inner
			SRG30E	●			G	Reinforced edge, CEMR .591	Outer
			SRG32C	●			G	Reinforced edge, CEMR .630	Inner
			SRG32E	●			G	Reinforced edge, CEMR .630	Outer
			SRM212C	●			M	Strong edge, CEMR .375	Inner
			SRM212E	●			M	Strong edge, CEMR .375	Outer
			SRM216C	●			M	Strong edge, CEMR .500	Inner
			SRM216E	●			M	Strong edge, CEMR .500	Outer
			SRM220C	●			M	Strong edge, CEMR .625	Inner
			SRM220E	●			M	Strong edge, CEMR .625	Outer
			SRM210C-M	●			M	Low resistance, CEMR .313	Inner
			SRM210E-M	●			M	Low resistance, CEMR .313	Outer
			SRM16C-M	●			M	Low resistance, CEMR .315	Inner
			SRM16E-M	●			M	Low resistance, CEMR .315	Outer
			SRM212C-M	●			M	Low resistance, CEMR .375	Inner
			SRM212E-M	●			M	Low resistance, CEMR .375	Outer
			SRM20C-M	●			M	Low resistance, CEMR .394	Inner
			SRM20E-M	●			M	Low resistance, CEMR .394	Outer
			SRM25C-M	●			M	Low resistance, CEMR .492	Inner
			SRM25E-M	●			M	Low resistance, CEMR .492	Outer
			SRM216C-M	●			M	Low resistance, CEMR .500	Inner
			SRM216E-M	●			M	Low resistance, CEMR .500	Outer
			SRM30C-M	●			M	Low resistance, CEMR .591	Inner
			SRM30E-M	●			M	Low resistance, CEMR .591	Outer
			SRM220C-M	●			M	Low resistance, CEMR .625	Inner
			SRM220E-M	●			M	Low resistance, CEMR .625	Outer
			SRM32C-M	●			M	Low resistance, CEMR .630	Inner
			SRM32E-M	●			M	Low resistance, CEMR .630	Outer
Spot Milling	CBJP		JPMT060204-E	●			M	Parallelogram	General cutting
	CBMP		MPMT090308	●			M	Rhombic geometry	General cutting

● = NEW

(in)

Application	Cutter	Shape	Order Number	NEW MP1220	NEW MP1230	NEW MP1240	Class	Specifications	Note
Vertical Feed Milling	**PMF**		**TPEW1303ZPER2**	●			E	IC .313	General cutting
	PMR		**CPMT1205ZPEN-M2**	●			M	IC .500	General cutting
			CPMT1205ZPEN-M3	●			M	IC .500	General cutting

● = NEW

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Face Milling	**WSX445**	P	Mild Steel	≤180HB	—	Dry	● ● ●	820 (655–985)	785 (625–950)	755 (590–920)
						Wet	● ● ●	490 (330–655)	490 (330–655)	490 (330–655)
			Carbon Steel Alloy Steel	180–350HB	—	Dry	● ● ●	720 (560–885)	655 (490–820)	590 (425–755)
						Wet	● ● ●	395 (260–525)	395 (260–525)	395 (260–525)
			Alloy Tool Steel	≤350HB Annealed	—	Dry	● ● ●	720 (560–885)	655 (490–820)	590 (425–755)
						Wet	● ● ●	395 (260–525)	395 (260–525)	395 (260–525)
			Pre-hardened Steel	35–45HRC	—	Dry	● ● ●	460 (330–590)	395 (295–490)	330 (230–425)
						Wet	● ● ●	330 (260–395)	330 (260–395)	330 (260–395)
		M	Austenitic Stainless Steel	≤200HB	—	Dry	● ● ●	—	655 (490–820)	655 (490–820)
						Wet	● ● ●	—	425 (260–590)	425 (260–590)
				>200HB	—	Dry	● ● ●	—	560 (395–720)	560 (395–720)
						Wet	● ● ●	—	330 (260–490)	330 (260–490)
			Duplex Stainless Steel	≤280HB	—	Dry	● ● ●	—	525 (360–690)	525 (360–690)
						Wet	● ● ●	—	330 (260–490)	330 (260–490)
			Precipitation Hardening Stainless Steel	<450HB	—	Dry	● ● ●	—	490 (330–655)	490 (330–655)
						Wet	● ● ●	—	295 (165–460)	295 (165–460)
		K	Gray Cast Iron	≤350MPa	—	Dry	● ● ●	590 (425–820)	560 (395–785)	—
						Wet	● ● ●	425 (330–525)	425 (330–525)	—
			Ductile Cast Iron	≤450MPa	—	Dry	● ● ●	525 (360–785)	525 (360–690)	—
						Wet	● ● ●	425 (330–525)	425 (330–525)	—
				≤800MPa	—	Dry	● ● ●	525 (360–785)	490 (330–655)	—
						Wet	● ● ●	360 (260–460)	360 (260–460)	—
		S	Titanium Alloys	—	—	Wet	● ● ●	165 (130–195)	165 (130–195)	165 (130–195)
			Heat Resistant Alloys	—	—	Wet	● ● ●	130 (65–165)	130 (65–165)	130 (65–165)
	ASX445	P	Mild Steel	≤180HB	—	Dry/Wet	● ● ●	820 (655–985)	785 (625–950)	755 (590–920)
			Carbon Steel Alloy Steel	180–280HB	—	Dry/Wet	● ● ●	720 (560–885)	655 (490–755)	490 (395–590)
				280–350HB		Dry/Wet	● ● ●	460 (330–590)	395 (295–490)	330 (260–525)
		M	Stainless Steel	≤270HB	—	Dry/Wet	● ● ●	—	720 (560–885)	655 (490–820)
		K	Gray Cast Iron Ductile Cast Iron	≤450MPa	—	Dry/Wet	● ● ●	590 (425–820)	560 (395–720)	—
				≥450MPa		Dry/Wet	● ● ●	360 (260–490)	330 (260–425)	—
		S	Titanium Alloys	—	—	Wet	● ● ●	165 (130–195)	150 (100–180)	150 (100–180)
			Heat Resistant Alloys	—	—	Wet	● ● ●	130 (65–165)	115 (50–150)	115 (50–150)
	AHX440S	P	Mild Steel	≤180HB	—	Dry	● ● ●	820 (655–985)	785 (625–950)	755 (590–920)
			Carbon Steel, Alloy Steel	180–280HB	—	Dry	● ● ●	720 (560–885)	655 (490–820)	590 (425–690)
				280–350HB		Dry	● ● ●	460 (330–590)	395 (295–490)	330 (230–425)
			Alloy Tool Steel	≤350HB Annealed	—	Dry	● ● ●	460 (330–590)	395 (295–490)	330 (230–425)
			Pre-hardened Steel	35–45HRC	—	Dry	● ● ●	460 (330–590)	395 (295–490)	330 (230–425)
		M	Austenitic Stainless Steel	≤200HB	—	Dry	● ● ●	—	655 (490–820)	590 (395–755)
						Wet	● ● ●	—	410 (330–490)	330 (260–460)
				>200HB	—	Dry	● ● ●	—	490 (330–655)	425 (260–590)
						Wet	● ● ●	—	330 (245–410)	260 (180–345)
			Ferritic and Martensitic Stainless Steel	≤200HB	—	Dry	● ● ●	655 (490–820)	655 (490–820)	590 (395–755)
						Wet	● ● ●	410 (330–490)	410 (330–490)	330 (260–460)
				>200HB	—	Dry	● ● ●	490 (330–655)	490 (330–655)	425 (260–590)
						Wet	● ● ●	330 (245–410)	330 (245–410)	260 (180–345)
			Duplex Stainless Steel	≤280HB	—	Dry	● ● ●	—	460 (330–590)	395 (260–525)
						Wet	● ● ●	—	260 (195–330)	195 (130–260)
			Precipitation Hardening Stainless Steel	<450HB	—	Dry	● ● ●	—	425 (330–525)	360 (260–460)
						Wet	● ● ●	—	230 (165–295)	165 (100–230)
		K	Gray Cast Iron	≤350MPa	—	Dry	● ● ●	590 (425–755)	590 (425–755)	—
			Ductile Cast Iron	≤450MPa	—	Dry	● ● ●	560 (395–720)	560 (395–720)	—
				≤800MPa		Dry	● ● ●	460 (330–590)	460 (330–590)	—

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Face Milling	**AHX440S**	P	Mild Steel	≤180HB	–	Wiper	● ◐	820 (655–985)	–	–
			Carbon Steel Alloy Steel	180–280HB	–	Wiper	● ◐	720 (560–885)	–	–
				280–350HB	–	Wiper	● ◐	460 (330–590)	–	–
			Alloy Tool Steel	≤350HB Annealed	–	Wiper	● ◐	460 (330–590)	–	–
			Pre-hardened Steel	35–45HRC	–	Wiper	● ◐	460 (330–590)	–	–
		M	Austenitic Stainless Steel	≤200HB	–	Wiper	○ ◐	410 (330–490)	–	–
				>200HB	–	Wiper	○ ◐	330 (245–410)	–	–
			Ferritic and Martensitic Stainless Steel	≤200HB	–	Wiper	○ ◐	410 (330–490)	–	–
				>200HB	–	Wiper	○ ◐	330 (245–410)	–	–
			Duplex Stainless Steel	≤280HB	–	Wiper	○ ◐	260 (195–330)	–	–
			Precipitation Hardening Stainless Steel	<450HB	–	Wiper	○ ◐	230 (165–295)	–	–
		K	Gray Cast Iron	≤350MPa	–	Wiper	● ◐	720 (490–985)	–	–
			Ductile Cast Iron	≤450MPa	–	Wiper	● ◐	655 (490–820)	–	–
				≤800MPa	–	Wiper	● ◐	560 (490–655)	–	–
	AHX475S	P	Mild Steel	≤180HB	–	Dry	● ◐ ✠	490 (330–655)	425 (260–590)	360 (195–525)
			Carbon Steel Alloy Steel	180–280HB	–	Dry	● ◐ ✠	425 (260–590)	360 (195–525)	295 (130–460)
				280–350HB	–	Dry	● ◐ ✠	330 (165–490)	260 (100–395)	260 (100–395)
			Alloy Tool Steel	≤350HB Annealed	–	Dry	● ◐ ✠	330 (165–490)	260 (100–395)	260 (100–395)
			Pre-hardened Steel	35–45HRC	–	Dry	● ◐ ✠	330 (230–425)	260 (165–360)	260 (165–360)
		K	Gray Cast Iron	≤350MPa	–	Dry	● ◐ ✠	395 (260–525)	395 (260–525)	–
			Ductile Cast Iron	≤800MPa	–	Dry	● ◐ ✠	395 (260–525)	395 (260–525)	–
	AHX640S	P	Mild Steel	≤180HB	–	Dry	● ◐ ✠	820 (655–985)	720 (560–885)	625 (460–785)
			Carbon Steel Alloy Steel	180–280HB	–	Dry	● ◐ ✠	720 (560–885)	625 (460–785)	525 (360–690)
				280–350HB	–	Dry	● ◐ ✠	460 (330–590)	360 (230–490)	360 (230–490)
			Alloy Tool Steel	≤350HB Annealed	–	Dry	● ◐ ✠	460 (330–590)	360 (230–490)	360 (230–490)
			Pre-hardened Steel	35–45HRC	–	Dry	● ◐ ✠	460 (330–590)	360 (230–490)	360 (230–490)
		M	Austenitic Stainless Steel	≤200HB	–	Dry	○ ◐ ✠	–	655 (490–820)	590 (395–755)
						Wet	○ ◐ ✠	–	410 (330–490)	330 (260–460)
				>200HB	–	Dry	○ ◐ ✠	–	490 (330–655)	425 (260–590)
						Wet	○ ◐ ✠	–	330 (245–410)	260 (180–345)
			Ferritic and Martensitic Stainless Steel	≤200HB	–	Dry	○ ◐ ✠	655 (490–820)	655 (490–820)	590 (395–755)
						Wet	○ ◐ ✠	410 (330–490)	410 (330–490)	330 (260–460)
				>200HB	–	Dry	○ ◐ ✠	490 (330–655)	490 (330–655)	425 (260–590)
						Wet	○ ◐ ✠	330 (245–410)	330 (245–410)	260 (180–345)
			Duplex Stainless Steel	≤280HB	–	Dry	○ ◐ ✠	–	460 (330–590)	395 (260–525)
						Wet	○ ◐ ✠	–	260 (195–330)	195 (130–260)
			Precipitation Hardening Stainless Steel	<450HB	–	Dry	○ ◐ ✠	–	425 (330–525)	360 (260–460)
						Wet	○ ◐ ✠	–	230 (165–295)	165 (100–230)
		K	Gray Cast Iron	≤350MPa	–	Dry	● ◐ ✠	590 (425–755)	590 (425–755)	–
			Ductile Cast Iron	≤450MPa	–	Dry	● ◐ ✠	560 (395–720)	560 (395–720)	–
				≤800MPa	–	Dry	● ◐ ✠	460 (330–590)	460 (330–590)	–
		S	Titanium Alloys	–	–	Wet	● ◐ ✠	195 (165–230)	130 (65–165)	130 (65–165)
			Heat Resistant Alloys	–	–	Wet	● ◐ ✠	195 (165–230)	130 (65–165)	130 (65–165)
		P	Mild Steel	≤180HB	–	Wiper	●	820 (655–985)	–	–
			Carbon Steel Alloy Steel	180–280HB	–	Wiper	●	720 (560–885)	–	–
				280–350HB	–	Wiper	●	460 (330–590)	–	–
		K	Gray Cast Iron	≤350MPa	–	Wiper	●	720 (490–985)	–	–
			Ductile Cast Iron	≤450MPa	–	Wiper	●	655 (490–820)	–	–
				≤800MPa	–	Wiper	●	560 (490–655)	–	–
		S	Heat Resistant Alloys	–	–	Wiper	●	130 (65–165)	–	–
	AHX640W	K	Gray Cast Iron	≤350MPa	–	Dry/Wet	● ◐ ✠	590 (425–755)	590 (425–755)	–
			Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◐ ✠	560 (395–720)	560 (395–720)	–
				≤800MPa	–	Dry/Wet	● ◐ ✠	460 (330–590)	460 (330–590)	–

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Shoulder Milling	**WWX200**	P	Mild Steel	≤180HB	0.5DC≥	Dry	●	785 (655–920)	–	–
						Dry	◐	–	755 (625–885)	–
						Dry	✲	–	690 (560–820)	655 (525–785)
						Wet	●	490 (460–525)	–	–
						Wet	◐	–	460 (425–490)	–
						Wet	✲	–	395 (360–425)	360 (330–395)
					0.8DC≥	Dry	●	720 (590–855)	–	–
						Dry	◐	–	690 (560–820)	–
						Dry	✲	–	625 (490–755)	590 (460–720)
						Wet	●	425 (395–460)	–	–
						Wet	◐	–	395 (360–425)	–
						Wet	✲	–	330 (295–360)	295 (260–330)
					DC	Dry	●	655 (525–785)	–	–
						Dry	◐	–	625 (490–755)	–
						Dry	✲	–	560 (425–690)	525 (395–655)
						Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
			Carbon Steel Alloy Steel	180–280HB	0.5DC≥	Dry	●	690 (560–820)	–	–
						Dry	◐	–	655 (525–785)	–
						Dry	✲	–	590 (460–720)	560 (425–690)
						Wet	●	490 (460–525)	–	–
						Wet	◐	–	460 (425–490)	–
						Wet	✲	–	395 (360–425)	360 (330–395)
					0.8DC≥	Dry	●	625 (490–755)	–	–
						Dry	◐	–	590 (460–720)	–
						Dry	✲	–	525 (395–655)	490 (360–625)
						Wet	●	425 (395–460)	–	–
						Wet	◐	–	395 (360–425)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
					DC	Dry	●	560 (425–690)	–	–
						Dry	◐	–	525 (395–655)	–
						Dry	✲	–	460 (330–590)	425 (295–560)
						Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	260 (230–295)	230 (195–260)
				280–350HB	0.5DC≥	Dry	●	655 (525–785)	–	–
						Dry	◐	–	625 (490–755)	–
						Dry	✲	–	560 (425–690)	525 (395–655)
						Wet	●	460 (425–490)	–	–
						Wet	◐	–	425 (395–460)	–
						Wet	✲	–	360 (330–395)	330 (295–360)
					0.8DC≥	Dry	●	590 (460–720)	–	–
						Dry	◐	–	560 (425–690)	–
						Dry	✲	–	490 (360–625)	460 (330–590)
						Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
					DC	Dry	●	560 (425–690)	–	–
						Dry	◐	–	490 (360–625)	–
						Dry	✲	–	425 (295–560)	395 (260–525)
						Wet	●	360 (330–395)	–	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	260 (230–295)	230 (195–260)
			Alloy Tool Steel	≤350HB Annealed	0.5DC≥	Dry	●	655 (525–785)	–	–
						Dry	◐	–	625 (490–755)	–
						Dry	✲	–	560 (425–690)	525 (395–655)
						Wet	●	460 (425–490)	–	–
						Wet	◐	–	425 (395–460)	–
						Wet	✲	–	360 (330–395)	330 (295–360)
					0.8DC≥	Dry	●	590 (460–720)	–	–
						Dry	◐	–	560 (425–690)	–
						Dry	✲	–	490 (360–625)	460 (330–590)

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Shoulder Milling	**WWX200**	P	Alloy Tool Steel	≤350HB Annealed	0.8DC≥	Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
					DC	Dry	●	560 (425–690)	–	–
						Dry	◐	–	490 (360–625)	–
						Dry	✲	–	425 (295–560)	395 (260–525)
						Wet	●	360 (330–395)	–	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	260 (230–295)	230 (195–260)
			Pre-hardened Steel	35–45HRC	0.5DC≥	Dry	●	460 (395–525)	–	–
						Dry	◐	–	395 (330–460)	–
						Dry	✲	–	360 (295–425)	330 (260–395)
						Wet	●	360 (330–395)	–	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	260 (230–295)	230 (195–260)
		M	Austenitic Stainless Steel	≤200HB	0.5DC≥	Dry	●	–	590 (525–655)	–
						Dry	◐	–	560 (490–625)	–
						Dry	✲	–	–	490 (425–560)
						Wet	●	–	425 (395–460)	–
						Wet	◐	–	395 (360–425)	–
						Wet	✲	–	–	330 (295–360)
					0.8DC≥	Dry	●	–	525 (460–590)	–
						Dry	◐	–	490 (425–560)	–
						Dry	✲	–	–	425 (360–490)
						Wet	●	–	360 (330–395)	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	–	260 (230–295)
				>200HB	0.5DC≥	Dry	●	–	560 (490–625)	–
						Dry	◐	–	525 (460–590)	–
						Dry	✲	–	–	460 (395–525)
						Wet	●	–	425 (395–460)	–
						Wet	◐	–	395 (360–425)	–
						Wet	✲	–	–	330 (295–360)
					0.8DC≥	Dry	●	–	490 (425–560)	–
						Dry	◐	–	460 (395–525)	–
						Dry	✲	–	–	395 (330–460)
						Wet	●	–	360 (330–395)	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	–	260 (230–295)
			Ferritic and Martensitic Stainless Steel	≤200HB	0.5DC≥	Dry	●	590 (525–655)	590 (525–655)	–
						Dry	◐	–	560 (490–625)	–
						Dry	✲	–	–	490 (425–560)
						Wet	●	425 (395–460)	425 (395–460)	–
						Wet	◐	–	395 (360–425)	–
						Wet	✲	–	–	330 (295–360)
					0.8DC≥	Dry	●	525 (460–590)	525 (460–590)	–
						Dry	◐	–	490 (425–560)	–
						Dry	✲	–	–	425 (360–490)
						Wet	●	360 (330–395)	360 (330–395)	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	–	260 (230–295)
			Duplex Stainless Steel	≤280HB	0.5DC≥	Dry	●	–	525 (460–590)	–
						Dry	◐	–	490 (425–560)	–
						Dry	✲	–	–	425 (360–490)
						Wet	●	–	395 (360–425)	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	–	295 (260–330)
					0.8DC≥	Dry	●	–	460 (395–525)	–
						Dry	◐	–	425 (360–490)	–
						Dry	✲	–	–	360 (295–425)
						Wet	●	–	330 (295–360)	–
						Wet	◐	–	295 (260–330)	–
						Wet	✲	–	–	230 (195–260)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut ap	Cutting Mode	Cutting Conditions	Cutting Speed vc(SFM) MP1220	MP1230	MP1240
Shoulder Milling	WWX200	M	Precipitation Hardening Stainless Steel	<450HB	0.5DC≥	Dry		–	460 (395–525)	–
						Dry		–	425 (360–490)	–
						Dry		–	–	360 (295–425)
						Wet		–	395 (360–425)	–
						Wet		–	360 (330–395)	–
						Wet		–	–	295 (260–330)
		K	Gray Cast Iron	≤350MPa	0.5DC≥	Dry		785 (655–920)	785 (655–920)	–
						Dry		720 (590–855)	720 (590–855)	–
						Wet		525 (460–590)	525 (460–590)	–
						Wet		460 (395–525)	460 (395–525)	–
					0.8DC≥	Dry		720 (590–855)	720 (590–855)	–
						Dry		655 (525–785)	655 (525–785)	–
						Wet		460 (395–525)	460 (395–525)	–
						Wet		395 (330–460)	395 (330–460)	–
					DC	Dry		655 (525–785)	655 (525–785)	–
						Dry		590 (460–720)	590 (460–720)	–
						Wet		395 (330–460)	395 (330–460)	–
						Wet		330 (260–395)	330 (260–395)	–
			Ductile Cast Iron	≤450MPa	0.5DC≥	Dry		690 (560–820)	690 (560–820)	–
						Dry		625 (490–755)	625 (490–755)	–
						Wet		525 (460–590)	525 (460–590)	–
						Wet		460 (395–525)	460 (395–525)	–
					0.8DC≥	Dry		625 (490–755)	625 (490–755)	–
						Dry		560 (425–690)	560 (425–690)	–
						Wet		460 (395–525)	460 (395–525)	–
						Wet		395 (330–460)	395 (330–460)	–
					DC	Dry		560 (425–690)	560 (425–690)	–
						Dry		490 (360–625)	490 (360–625)	–
						Wet		395 (330–460)	395 (330–460)	–
						Wet		330 (260–395)	330 (260–395)	–
				≤800MPa	0.5DC≥	Dry		560 (425–690)	560 (425–690)	–
						Dry		490 (360–625)	490 (360–625)	–
						Wet		490 (460–525)	490 (460–525)	–
						Wet		425 (395–460)	425 (395–460)	–
					0.8DC≥	Dry		490 (360–625)	490 (360–625)	–
						Dry		425 (295–560)	425 (295–560)	–
						Wet		425 (395–460)	425 (395–460)	–
						Wet		360 (330–395)	360 (330–395)	–
					DC	Dry		425 (295–560)	425 (295–560)	–
						Dry		360 (230–490)	360 (230–490)	–
						Wet		360 (330–395)	360 (330–395)	–
						Wet		295 (260–330)	295 (260–330)	–
		S	Titanium Alloys	–	0.5DC≥	Wet		260 (195–330)	–	–
						Wet		–	230 (165–295)	–
						Wet		–	–	195 (130–260)
			Heat Resistant Alloys	–	0.5DC≥	Wet		195 (165–230)	–	–
						Wet		–	165 (100–195)	–
						Wet		–	–	130 (65–130)
	WWX400	P	Mild Steel	≤180HB	0.5DC≥	Dry		785 (655–920)	–	–
						Dry		–	755 (625–885)	–
						Dry		–	690 (560–820)	655 (525–785)
						Wet		490 (460–525)	–	–
						Wet		–	460 (425–490)	–
						Wet		–	395 (360–425)	360 (330–395)
					0.8DC≥	Dry		720 (590–855)	–	–
						Dry		–	690 (560–820)	–
						Dry		–	625 (490–755)	590 (460–720)
						Wet		425 (395–460)	–	–
						Wet		–	395 (360–425)	–
						Wet		–	330 (295–360)	295 (260–330)
					DC	Dry		655 (525–785)	–	–
						Dry		–	625 (490–755)	–
						Dry		–	560 (425–690)	525 (395–655)

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Shoulder Milling	**WWX400**	**P**	Mild Steel	≤180HB	DC	Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
			Carbon Steel Alloy Steel	180–280HB	0.5DC≥	Dry	●	690 (560–820)	–	–
						Dry	◐	–	655 (525–785)	–
						Dry	✲	–	590 (460–720)	560 (425–690)
						Wet	●	490 (460–525)	–	–
						Wet	◐	–	460 (425–490)	–
						Wet	✲	–	395 (360–425)	360 (330–395)
					0.8DC≥	Dry	●	625 (490–755)	–	–
						Dry	◐	–	590 (460–720)	–
						Dry	✲	–	525 (395–655)	490 (360–625)
						Wet	●	425 (395–460)	–	–
						Wet	◐	–	395 (360–425)	–
						Wet	✲	–	330 (295–360)	295 (260–330)
					DC	Dry	●	560 (425–690)	–	–
						Dry	◐	–	525 (395–655)	–
						Dry	✲	–	460 (330–590)	425 (295–560)
						Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
				280–350HB	0.5DC≥	Dry	●	655 (525–785)	–	–
						Dry	◐	–	625 (490–755)	–
						Dry	✲	–	560 (425–690)	525 (395–655)
						Wet	●	460 (425–490)	–	–
						Wet	◐	–	425 (395–460)	–
						Wet	✲	–	360 (330–395)	330 (295–360)
					0.8DC≥	Dry	●	590 (460–720)	–	–
						Dry	◐	–	560 (425–690)	–
						Dry	✲	–	490 (360–625)	460 (330–590)
						Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
					DC	Dry	●	525 (395–655)	–	–
						Dry	◐	–	490 (360–625)	–
						Dry	✲	–	425 (295–560)	395 (260–525)
						Wet	●	360 (330–395)	–	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	260 (230–295)	230 (195–260)
			Alloy Tool Steel	≤350HB Annealed	0.5DC≥	Dry	●	655 (525–785)	–	–
						Dry	◐	–	625 (490–755)	–
						Dry	✲	–	560 (425–690)	525 (395–655)
						Wet	●	460 (425–490)	–	–
						Wet	◐	–	425 (395–460)	–
						Wet	✲	–	360 (330–395)	330 (295–360)
					0.8DC≥	Dry	●	590 (460–720)	–	–
						Dry	◐	–	560 (425–690)	–
						Dry	✲	–	490 (360–625)	460 (330–590)
						Wet	●	395 (360–425)	–	–
						Wet	◐	–	360 (330–395)	–
						Wet	✲	–	295 (260–330)	260 (230–295)
					DC	Dry	●	525 (395–655)	–	–
						Dry	◐	–	490 (360–625)	–
						Dry	✲	–	425 (295–560)	395 (260–525)
						Wet	●	360 (330–395)	–	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	260 (230–295)	230 (195–260)
			Pre-hardened Steel	35–45HRC	0.5DC≥	Dry	●	460 (395–525)	–	–
						Dry	◐	–	395 (330–460)	–
						Dry	✲	–	360 (295–425)	330 (260–395)
						Wet	●	360 (330–395)	–	–
						Wet	◐	–	330 (295–360)	–
						Wet	✲	–	260 (230–295)	230 (195–260)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Shoulder Milling	**WWX400**	M	Austenitic Stainless Steel	≤200HB	0.5DC≥	Dry	●	–	590 (525–655)	–
						Dry	◔	–	560 (490–625)	–
						Dry	✱	–	–	490 (425–560)
						Wet	●	–	425 (395–460)	–
						Wet	◔	–	395 (360–425)	–
						Wet	✱	–	–	330 (295–360)
					0.8DC≥	Dry	●	–	525 (460–590)	–
						Dry	◔	–	490 (425–560)	–
						Dry	✱	–	–	425 (360–490)
						Wet	●	–	360 (330–395)	–
						Wet	◔	–	330 (295–360)	–
						Wet	✱	–	–	260 (230–295)
				>200HB	0.5DC≥	Dry	●	–	560 (490–625)	–
						Dry	◔	–	525 (460–590)	–
						Dry	✱	–	–	460 (395–525)
						Wet	●	–	425 (395–460)	–
						Wet	◔	–	395 (360–425)	–
						Wet	✱	–	–	330 (295–360)
					0.8DC≥	Dry	●	–	490 (425–560)	–
						Dry	◔	–	460 (395–525)	–
						Dry	✱	–	–	395 (330–460)
						Wet	●	–	360 (330–395)	–
						Wet	◔	–	330 (295–360)	–
						Wet	✱	–	–	260 (230–295)
			Ferritic and Martensitic Stainless Steel	≤200HB	0.5DC≥	Dry	●	590 (525–655)	590 (525–655)	–
						Dry	◔	–	560 (490–625)	–
						Dry	✱	–	–	490 (425–560)
						Wet	●	425 (395–460)	425 (395–460)	–
						Wet	◔	–	395 (360–425)	–
						Wet	✱	–	–	330 (295–360)
					0.8DC≥	Dry	●	460 (525–590)	460 (525–590)	–
						Dry	◔	–	490 (425–560)	–
						Dry	✱	–	–	425 (360–490)
						Wet	●	360 (330–395)	360 (330–395)	–
						Wet	◔	–	330 (295–360)	–
						Wet	✱	–	–	260 (230–295)
			Duplex Stainless Steel	≤280HB	0.5DC≥	Dry	●	–	525 (460–590)	–
						Dry	◔	–	490 (425–560)	–
						Dry	✱	–	–	425 (360–490)
						Wet	●	–	395 (360–425)	–
						Wet	◔	–	360 (330–395)	–
						Wet	✱	–	–	295 (260–330)
					0.8DC≥	Dry	●	–	460 (395–525)	–
						Dry	◔	–	425 (360–490)	–
						Dry	✱	–	–	360 (295–425)
						Wet	●	–	330 (295–360)	–
						Wet	◔	–	295 (260–330)	–
						Wet	✱	–	–	230 (195–260)
			Precipitation Hardening Stainless Steel	<450HB	0.5DC≥	Dry	●	–	460 (395–525)	–
						Dry	◔	–	425 (360–490)	–
						Dry	✱	–	–	360 (295–425)
						Wet	●	–	395 (360–425)	–
						Wet	◔	–	360 (330–395)	–
						Wet	✱	–	–	295 (260–330)
		K	Gray Cast Iron	≤350MPa	0.5DC≥	Dry	●	785 (655–920)	785 (655–920)	–
						Dry	✱	720 (590–855)	720 (590–855)	–
						Wet	●	525 (460–590)	525 (460–590)	–
						Wet	✱	460 (395–525)	460 (395–525)	–
					0.8DC≥	Dry	●	720 (590–855)	720 (590–855)	–
						Dry	✱	655 (525–785)	655 (525–785)	–
						Wet	●	460 (395–525)	460 (395–525)	–
						Wet	✱	395 (330–460)	395 (330–460)	–

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Shoulder Milling	**WWX400**	K	Gray Cast Iron	≤350MPa	DC	Dry	◐	655 (525–785)	655 (525–785)	–
						Dry	✲	590 (460–720)	590 (460–720)	–
						Wet	◐	395 (330–460)	395 (330–460)	–
						Wet	✲	330 (260–395)	330 (260–395)	–
			Ductile Cast Iron	≤450MPa	0.5DC≥	Dry	◐	690 (560–820)	690 (560–820)	–
						Dry	✲	625 (490–755)	625 (490–755)	–
						Wet	◐	525 (460–590)	525 (460–590)	–
						Wet	✲	460 (395–525)	460 (395–525)	–
					0.8DC≥	Dry	◐	625 (490–755)	625 (490–755)	–
						Dry	✲	560 (425–690)	560 (425–690)	–
						Wet	◐	460 (395–525)	460 (395–525)	–
						Wet	✲	395 (330–460)	395 (330–460)	–
					DC	Dry	◐	560 (425–690)	560 (425–690)	–
						Dry	✲	490 (360–625)	490 (360–625)	–
						Wet	◐	395 (330–460)	395 (330–460)	–
						Wet	✲	330 (260–395)	330 (260–395)	–
				≤800MPa	0.5DC≥	Dry	◐	560 (425–690)	560 (425–690)	–
						Dry	✲	490 (360–625)	490 (360–625)	–
						Wet	◐	490 (460–525)	490 (460–525)	–
						Wet	✲	425 (395–460)	425 (395–460)	–
					0.8DC≥	Dry	◐	490 (360–625)	490 (360–625)	–
						Dry	✲	425 (295–560)	425 (295–560)	–
						Wet	◐	425 (395–460)	425 (395–460)	–
						Wet	✲	360 (330–395)	360 (330–395)	–
					DC	Dry	◐	425 (295–560)	425 (295–560)	–
						Dry	✲	360 (230–490)	360 (230–490)	–
						Wet	◐	360 (330–395)	360 (330–395)	–
						Wet	✲	295 (260–330)	295 (260–330)	–
		S	Titanium Alloys	–	0.5DC≥	Wet	●	260 (195–330)	–	–
						Wet	◐	–	230 (165–295)	–
						Wet	✲	–	–	195 (130–260)
			Heat Resistant Alloys			Wet	●	195 (165–230)	–	–
						Wet	◐	–	165 (100–195)	–
						Wet	✲	–	–	130 (65–130)
	VOX400	K	Gray Cast Iron	≤200MPa	–	Dry/Wet	● ◐	820 (655–985)	–	–
				≤350MPa	–	Dry/Wet	● ◐	655 (490–985)	–	–
			Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◐	560 (490–655)	–	–
				≤800MPa	–	Dry/Wet	● ◐	490 (330–655)	–	–
	ASX300	P	Mild Steel	≤180HB	–	Dry/Wet	● ◐ ✲	820 (655–985)	785 (625–950)	755 (590–920)
			Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◐ ✲	720 (560–885)	590 (490–755)	490 (395–655)
				280–350HB	–	Dry/Wet	● ◐ ✲	460 (330–590)	395 (295–490)	330 (230–425)
		M	Stainless Steel	–	–	Dry/Wet	○ ◔ ✲	–	720 (560–885)	655 (490–820)
		K	Gray Cast Iron Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◐ ✲	590 (425–755)	560 (395–720)	–
				≥450MPa	–	Dry/Wet	● ◐ ✲	425 (330–525)	395 (295–490)	–
		S	Titanium Alloys	–	–	Wet	● ◐ ✲	165 (130–195)	150 (100–180)	150 (100–180)
			Heat Resistant Alloys	–	–	Wet	● ◐ ✲	130 (65–165)	100 (50–150)	100 (50–150)
	ASX400	P	Mild Steel	≤180HB	–	Dry/Wet	● ◐ ✲	820 (655–985)	785 (625–950)	755 (590–920)
			Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◐ ✲	720 (560–885)	590 (490–755)	490 (395–590)
				280–350HB	–	Dry/Wet	● ◐ ✲	460 (330–590)	395 (295–490)	330 (260–525)
		M	Stainless Steel	≤270HB	–	Dry/Wet	○ ◔ ✲	–	720 (560–885)	655 (490–820)
		K	Gray Cast Iron Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◐ ✲	590 (425–755)	560 (395–720)	–
				≥450MPa	–	Dry/Wet	● ◐ ✲	425 (330–525)	395 (295–490)	–
		S	Titanium Alloys	–	–	Wet	●	165 (130–195)	–	–
						Wet	◐ ✲	–	150 (100–180)	150 (100–180)
			Heat Resistant Alloys	–	–	Wet	●	130 (65–165)	–	–
						Wet	◐ ✲	–	115 (50–150)	115 (50–150)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Side Cutter	**VAS400**	P	Mild Steel	≤180HB	—	Dry, Shoulder	● ◐	490 (425–590)	—	—
						Dry, Center	● ◐	490 (425–590)	—	—
			Carbon Steel Alloy Steel	180–280HB	—	Dry, Shoulder	● ◐	490 (425–590)	—	—
						Dry, Center	● ◐	490 (425–590)	—	—
		K	Gray Cast Iron	≤350MPa	—	Dry, Shoulder	● ◐	490 (425–590)	—	—
						Dry, Center	● ◐	490 (425–590)	—	—
			Ductile Cast Iron	≤450MPa	—	Dry, Shoulder	● ◐	425 (360–525)	—	—
						Dry, Center	● ◐	490 (425–590)	—	—
				≥800MPa	—	Dry, Shoulder	● ◐	425 (360–525)	—	—
						Dry, Center	● ◐	425 (360–525)	—	—
Multi-Functional Milling	**VPX200**	P	Mild Steel	≤180HB	≤0.25DC	Dry	● ◐	755 (590–885)	—	—
						Dry	✲	—	655 (490–785)	625 (460–755)
						Wet	● ◐ ✲	460 (330–625)	460 (330–625)	425 (295–590)
					0.25–0.5DC	Dry	● ◐	720 (560–855)	—	—
						Dry	✲	—	625 (460–755)	590 (425–720)
						Wet	● ◐ ✲	425 (295–590)	425 (295–590)	395 (260–560)
					0.5–0.75DC	Dry	● ◐	590 (460–690)	—	—
						Dry	✲	—	490 (360–590)	460 (330–560)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	590 (460–690)	—	—
						Dry	✲	—	490 (360–590)	460 (330–560)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
			Carbon Steel Alloy Steel	180–280HB	≤0.25DC	Dry	● ◐	590 (460–690)	—	—
						Dry	✲	—	490 (360–590)	460 (330–560)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	—	—
						Dry	✲	—	460 (330–560)	425 (295–525)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	—	—
						Dry	✲	—	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	460 (360–525)	—	—
						Dry	✲	—	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
				280–350HB	≤0.25DC	Dry	● ◐	590 (460–690)	—	—
						Dry	✲	—	490 (360–590)	460 (330–560)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	—	—
						Dry	✲	—	460 (330–560)	425 (295–525)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	—	—
						Dry	✲	—	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	460 (360–525)	—	—
						Dry	✲	—	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
			Alloy Tool Steel	≤350HB Annealed	≤0.25DC	Dry	● ◐	590 (460–690)	—	—
						Dry	✲	—	490 (360–590)	460 (330–560)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	—	—
						Dry	✲	—	460 (330–560)	425 (295–525)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	—	—
						Dry	✲	—	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	460 (360–525)	—	—
						Dry	✲	—	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
			Pre-hardened Steel	35–45HRC	≤0.25DC	Dry	● ◐	395 (295–460)	—	—
						Dry	✲	—	330 (260–395)	295 (230–360)
						Wet	● ◐ ✲	330 (260–395)	330 (260–395)	295 (195–360)
					0.25–0.5DC	Dry	● ◐	360 (260–425)	—	—
						Dry	✲	—	295 (230–360)	260 (195–330)
						Wet	● ◐ ✲	295 (230–360)	295 (230–360)	260 (195–330)

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	**VPX200**	P	Pre-hardened Steel	35—45HRC	0.5–0.75DC	Dry	● ◔	330 (230–395)	—	—
						Dry	✲	—	260 (195–330)	230 (165–295)
						Wet	● ◔ ✲	260 (195–330)	260 (195–330)	230 (165–295)
					DC	Dry	● ◔	330 (230–395)	—	—
						Dry	✲	—	260 (195–330)	230 (165–295)
						Wet	● ◔ ✲	260 (195–330)	260 (195–330)	230 (165–295)
		M	Austenitic Stainless Steel	≤200HB	≤0.25DC	Dry	● ◔ ✲	—	590 (460–690)	590 (460–690)
						Wet	● ◔ ✲	—	395 (330–490)	395 (330–490)
					0.25–0.5DC	Dry	● ◔ ✲	—	560 (425–655)	560 (425–655)
						Wet	● ◔ ✲	—	360 (295–460)	360 (295–460)
					0.5–0.75DC	Dry	● ◔ ✲	—	460 (360–525)	460 (360–525)
						Wet	● ◔ ✲	—	295 (230–395)	295 (230–395)
					DC	Dry	● ◔ ✲	—	460 (360–525)	460 (360–525)
						Wet	● ◔ ✲	—	295 (230–395)	295 (230–395)
				>200HB	≤0.25DC	Dry	● ◔ ✲	—	490 (360–590)	490 (360–590)
						Wet	● ◔ ✲	—	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry	● ◔ ✲	—	460 (330–525)	460 (330–525)
						Wet	● ◔ ✲	—	295 (230–360)	295 (230–360)
					0.5–0.75DC	Dry	● ◔ ✲	—	360 (260–425)	360 (260–425)
						Wet	● ◔ ✲	—	230 (165–330)	230 (165–330)
					DC	Dry	● ◔ ✲	—	360 (260–425)	360 (260–425)
						Wet	● ◔ ✲	—	230 (165–330)	230 (165–330)
			Ferritic and Martensitic Stainless Steel	≤200HB	≤0.25DC	Dry	● ◔ ✲	590 (460–690)	590 (460–690)	—
						Wet	● ◔ ✲	395 (330–490)	395 (330–490)	—
					0.25–0.5DC	Dry	● ◔ ✲	560 (425–655)	560 (425–655)	—
						Wet	● ◔ ✲	360 (295–460)	360 (295–460)	—
					0.5–0.75DC	Dry	● ◔ ✲	460 (360–525)	460 (360–525)	—
						Wet	● ◔ ✲	295 (230–395)	295 (230–395)	—
					DC	Dry	● ◔ ✲	460 (360–525)	460 (360–525)	—
						Wet	● ◔ ✲	295 (230–395)	295 (230–395)	—
			Duplex Stainless Steel	≤280HB	≤0.25DC	Dry	● ◔ ✲	—	460 (360–560)	460 (360–560)
						Wet	● ◔ ✲	—	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry	● ◔ ✲	—	425 (295–490)	425 (295–490)
						Wet	● ◔ ✲	—	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry	● ◔ ✲	—	330 (230–395)	330 (230–395)
						Wet	● ◔ ✲	—	230 (165–330)	230 (165–330)
					DC	Dry	● ◔ ✲	—	330 (230–395)	330 (230–395)
						Wet	● ◔ ✲	—	230 (165–330)	230 (165–330)
			Precipitation Hardening Stainless Steel	<450HB	≤0.25DC	Dry	● ◔ ✲	—	425 (330–525)	425 (330–525)
						Wet	● ◔ ✲	—	295 (230–395)	295 (230–395)
					0.25–0.5DC	Dry	● ◔ ✲	—	395 (260–460)	395 (260–460)
						Wet	● ◔ ✲	—	260 (195–360)	260 (195–360)
					0.5–0.75DC	Dry	● ◔ ✲	—	295 (195–360)	295 (195–360)
						Wet	● ◔ ✲	—	195 (130–295)	195 (130–295)
					DC	Dry	● ◔ ✲	—	295 (195–360)	295 (195–360)
						Wet	● ◔ ✲	—	195 (130–295)	195 (130–295)
		K	Gray Cast Iron	≤350MPa	≤0.25DC	Dry	● ◔ ✲	655 (490–820)	655 (490–820)	—
						Wet	● ◔ ✲	425 (330–490)	425 (330–490)	—
					0.25–0.5DC	Dry	● ◔ ✲	625 (460–785)	625 (460–785)	—
						Wet	● ◔ ✲	395 (295–460)	395 (295–460)	—
					0.5–0.75DC	Dry	● ◔ ✲	525 (360–690)	525 (360–690)	—
						Wet	● ◔ ✲	330 (260–395)	330 (260–395)	—
					DC	Dry	● ◔ ✲	525 (360–690)	525 (360–690)	—
						Wet	● ◔ ✲	330 (260–395)	330 (260–395)	—
			Ductile Cast Iron	≤800MPa	≤0.25DC	Dry	● ◔ ✲	425 (330–490)	425 (330–490)	—
						Wet	● ◔ ✲	360 (260–460)	360 (260–460)	—
					0.25–0.5DC	Dry	● ◔ ✲	395 (295–460)	395 (295–460)	—
						Wet	● ◔ ✲	330 (230–425)	330 (230–425)	—
					0.5–0.75DC	Dry	● ◔ ✲	330 (260–395)	330 (260–395)	—
						Wet	● ◔ ✲	260 (195–395)	260 (195–395)	—
					DC	Dry	● ◔ ✲	330 (260–395)	330 (260–395)	—
						Wet	● ◔ ✲	260 (195–395)	260 (195–395)	—

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut ap	Cutting Mode	Cutting Conditions	Cutting Speed vc(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	VPX200	S	Titanium Alloys	Ti–6Al–4V,etc.	≤0.25DC	Wet	● ◐	165 (130–230)	165 (130–230)	–
						Wet	✣	–	130 (100–195)	130 (100–195)
					0.25–0.5DC	Wet	● ◐	165 (130–230)	165 (130–230)	–
						Wet	✣	–	130 (100–195)	130 (100–195)
					0.5–0.75DC	Wet	● ◐	165 (130–230)	165 (130–230)	–
						Wet	✣	–	130 (100–195)	130 (100–195)
					DC	Wet	● ◐	165 (130–230)	165 (130–230)	–
						Wet	✣	–	130 (100–195)	130 (100–195)
				Ti–5Al–5Mo–5V–3Cr,etc.	≤0.25DC	Wet	● ◐ ✣	–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet	● ◐ ✣	–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet	● ◐ ✣	–	100 (65–130)	100 (65–130)
					DC	Wet	● ◐ ✣	–	100 (65–130)	100 (65–130)
			Heat Resistant Alloys	–	≤0.25DC	Wet	● ◐	130 (100–195)	–	–
						Wet	✣	–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet	● ◐	130 (100–195)	–	–
						Wet	✣	–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet	● ◐	130 (100–195)	–	–
						Wet	✣	–	100 (65–130)	100 (65–130)
					DC	Wet	● ◐	130 (100–195)	–	–
						Wet	✣	–	100 (65–130)	100 (65–130)
	VPX300	P	Mild Steel	≤180HB	≤0.25DC	Dry	● ◐	755 (590–885)	–	–
						Dry	✣	–	655 (490–785)	625 (460–755)
						Wet	● ◐ ✣	460 (330–625)	460 (330–625)	425 (295–590)
					0.25–0.5DC	Dry	● ◐	720 (560–855)	–	–
						Dry	✣	–	625 (460–755)	590 (425–720)
						Wet	● ◐ ✣	425 (295–590)	425 (295–590)	395 (260–560)
					0.5–0.75DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✣	–	490 (360–590)	460 (330–560)
						Wet	● ◐ ✣	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✣	–	490 (360–590)	460 (330–560)
						Wet	● ◐ ✣	330 (230–395)	330 (230–395)	295 (195–360)
			Carbon Steel Alloy Steel	180–280HB	≤0.25DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✣	–	490 (360–590)	460 (330–560)
						Wet	● ◐ ✣	395 (295–460)	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	–	–
						Dry	✣	–	460 (330–560)	425 (295–525)
						Wet	● ◐ ✣	360 (260–425)	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✣	–	360 (260–425)	330 (230–395)
						Wet	● ◐ ✣	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✣	–	360 (260–425)	330 (230–395)
						Wet	● ◐ ✣	330 (230–395)	330 (230–395)	295 (195–360)
				280–350HB	≤0.25DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✣	–	490 (360–590)	460 (330–560)
						Wet	● ◐ ✣	395 (295–460)	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	–	–
						Dry	✣	–	460 (330–560)	425 (295–525)
						Wet	● ◐ ✣	360 (260–425)	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✣	–	360 (260–425)	330 (230–395)
						Wet	● ◐ ✣	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✣	–	360 (260–425)	330 (230–395)
						Wet	● ◐ ✣	330 (230–395)	330 (230–395)	295 (195–360)
			Alloy Tool Steel	≤350HB Annealed	≤0.25DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✣	–	490 (360–590)	460 (330–560)
						Wet	● ◐ ✣	395 (295–460)	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	–	–
						Dry	✣	–	460 (330–560)	425 (295–525)
						Wet	● ◐ ✣	360 (260–425)	360 (260–425)	330 (230–395)

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	**VPX300**	**P**	Alloy Tool Steel	≤350HB Annealed	0.5–0.75DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
					DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	330 (230–395)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	295 (195–360)
			Pre-hardened Steel	35–45HRC	≤0.25DC	Dry	● ◐	395 (295–460)	–	–
						Dry	✲	–	330 (260–395)	295 (230–360)
						Wet	● ◐ ✲	330 (260–395)	330 (260–395)	295 (195–360)
					0.25–0.5DC	Dry	● ◐	360 (260–425)	–	–
						Dry	✲	–	295 (230–360)	260 (195–330)
						Wet	● ◐ ✲	295 (230–360)	295 (230–360)	260 (195–330)
					0.5–0.75DC	Dry	● ◐	330 (230–395)	–	–
						Dry	✲	–	260 (195–330)	230 (165–295)
						Wet	● ◐ ✲	260 (195–330)	260 (195–330)	230 (165–295)
					DC	Dry	● ◐	330 (230–395)	–	–
						Dry	✲	–	260 (195–330)	230 (165–295)
						Wet	● ◐ ✲	260 (195–330)	260 (195–330)	230 (165–295)
		M	Austenitic Stainless Steel	≤200HB	≤0.25DC	Dry	○ ◐ ✲	–	590 (460–690)	590 (460–690)
						Wet	○ ◐ ✲	–	395 (330–490)	395 (330–490)
					0.25–0.5DC	Dry	○ ◐ ✲	–	560 (425–655)	560 (425–655)
						Wet	○ ◐ ✲	–	360 (295–460)	360 (295–460)
					0.5–0.75DC	Dry	○ ◐ ✲	–	460 (360–525)	460 (360–525)
						Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					DC	Dry	○ ◐ ✲	–	460 (360–525)	460 (360–525)
						Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
				>200HB	≤0.25DC	Dry	○ ◐ ✲	–	490 (360–590)	490 (360–590)
						Wet	○ ◐ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry	○ ◐ ✲	–	460 (330–525)	460 (330–525)
						Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry	○ ◐ ✲	–	360 (260–425)	360 (260–425)
						Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry	○ ◐ ✲	–	360 (260–425)	360 (260–425)
						Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
			Ferritic and Martensitic Stainless Steel	≤200HB	≤0.25DC	Dry	○ ◐ ✲	590 (460–690)	590 (460–690)	–
						Wet	○ ◐ ✲	395 (330–490)	395 (330–490)	–
					0.25–0.5DC	Dry	○ ◐ ✲	560 (425–655)	560 (425–655)	–
						Wet	○ ◐ ✲	360 (295–460)	360 (295–460)	–
					0.5–0.75DC	Dry	○ ◐ ✲	460 (360–525)	460 (360–525)	–
						Wet	○ ◐ ✲	295 (230–395)	295 (230–395)	–
					DC	Dry	○ ◐ ✲	460 (360–525)	460 (360–525)	–
						Wet	○ ◐ ✲	295 (230–395)	295 (230–395)	–
			Duplex Stainless Steel	≤280HB	≤0.25DC	Dry	○ ◐ ✲	–	460 (360–560)	460 (360–560)
						Wet	○ ◐ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry	○ ◐ ✲	–	425 (295–490)	425 (295–490)
						Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry	○ ◐ ✲	–	330 (230–395)	330 (230–395)
						Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry	○ ◐ ✲	–	330 (230–395)	330 (230–395)
						Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
			Precipitation Hardening Stainless Steel	<450HB	≤0.25DC	Dry	○ ◐ ✲	–	425 (330–525)	425 (330–525)
						Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					0.25–0.5DC	Dry	○ ◐ ✲	–	395 (260–460)	395 (260–460)
						Wet	○ ◐ ✲	–	260 (195–360)	260 (195–360)
					0.5–0.75DC	Dry	○ ◐ ✲	–	295 (195–360)	295 (195–360)
						Wet	○ ◐ ✲	–	195 (130–295)	195 (130–295)
					DC	Dry	○ ◐ ✲	–	295 (195–360)	295 (195–360)
						Wet	○ ◐ ✲	–	195 (130–295)	195 (130–295)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	**VPX300**	**K**	Gray Cast Iron	≤350MPa	≤0.25DC	Dry	● ● ●	655 (490–820)	655 (490–820)	–
						Wet	● ● ●	425 (330–490)	425 (330–490)	–
					0.25–0.5DC	Dry	● ● ●	625 (460–785)	625 (460–785)	–
						Wet	● ● ●	395 (295–460)	395 (295–460)	–
					0.5–0.75DC	Dry	● ● ●	525 (360–690)	525 (360–690)	–
						Wet	● ● ●	330 (260–395)	330 (260–395)	–
					DC	Dry	● ● ●	525 (360–690)	525 (360–690)	–
						Wet	● ● ●	330 (260–395)	330 (260–395)	–
			Ductile Cast Iron	≤800MPa	≤0.25DC	Dry	● ● ●	425 (330–490)	425 (330–490)	–
						Wet	● ● ●	360 (260–460)	360 (260–460)	–
					0.25–0.5DC	Dry	● ● ●	395 (295–460)	395 (295–460)	–
						Wet	● ● ●	330 (230–425)	330 (230–425)	–
					0.5–0.75DC	Dry	● ● ●	330 (260–395)	330 (260–395)	–
						Wet	● ● ●	260 (195–395)	260 (195–395)	–
					DC	Dry	● ● ●	330 (260–395)	330 (260–395)	–
						Wet	● ● ●	260 (195–395)	260 (195–395)	–
		S	Titanium Alloys	Ti–6Al–4V,etc.	≤0.25DC	Wet	● ●	165 (130–230)	165 (130–230)	–
						Wet	●	–	130 (100–195)	130 (100–195)
					0.25–0.5DC	Wet	● ●	165 (130–230)	165 (130–230)	–
						Wet	●	–	130 (100–195)	130 (100–195)
					0.5–0.75DC	Wet	● ●	165 (130–230)	165 (130–230)	–
						Wet	●	–	130 (100–195)	130 (100–195)
					DC	Wet	● ●	165 (130–230)	165 (130–230)	–
						Wet	●	–	130 (100–195)	130 (100–195)
				Ti–5Al–5Mo–5V–3Cr,etc.	≤0.25DC	Wet	● ● ●	–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet	● ● ●	–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet	● ● ●	–	100 (65–130)	100 (65–130)
					DC	Wet	● ● ●	–	100 (65–130)	100 (65–130)
			Heat Resistant Alloys	–	≤0.25DC	Wet	● ●	130 (100–195)	–	–
						Wet	●	–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet	● ●	130 (100–195)	–	–
						Wet	●	–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet	● ●	130 (100–195)	–	–
						Wet	●	–	100 (65–130)	100 (65–130)
					DC	Wet	● ●	130 (100–195)	–	–
						Wet	●	–	100 (65–130)	100 (65–130)

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	**RS0112**	P	Mild Steel	≤180HB	≤0.25DC	Dry	● ◐	755 (590–885)	–	–
						Dry	✲	–	655 (490–785)	655 (490–785)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	395 (295–460)
					0.25–0.5DC	Dry	● ◐	720 (560–855)	–	–
						Dry	✲	–	625 (460–755)	625 (460–755)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	360 (260–425)
					0.5–0.75DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✲	–	490 (360–590)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
					DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✲	–	490 (360–590)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
			Carbon Steel Alloy Steel	180–280HB	≤0.25DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✲	–	490 (360–590)	655 (490–785)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	395 (295–460)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	–	–
						Dry	✲	–	460 (330–560)	625 (460–755)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	360 (260–425)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
					DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
				280–350HB	≤0.25DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✲	–	490 (360–590)	655 (490–785)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	395 (295–460)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	–	–
						Dry	✲	–	460 (330–560)	625 (460–755)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	360 (260–425)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
					DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
			Alloy Tool Steel	≤350HB Annealed	≤0.25DC	Dry	● ◐	590 (460–690)	–	–
						Dry	✲	–	490 (360–590)	655 (490–785)
						Wet	● ◐ ✲	395 (295–460)	395 (295–460)	395 (295–460)
					0.25–0.5DC	Dry	● ◐	560 (425–655)	–	–
						Dry	✲	–	460 (330–560)	625 (460–755)
						Wet	● ◐ ✲	360 (260–425)	360 (260–425)	360 (260–425)
					0.5–0.75DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
					DC	Dry	● ◐	460 (360–525)	–	–
						Dry	✲	–	360 (260–425)	490 (360–590)
						Wet	● ◐ ✲	330 (230–395)	330 (230–395)	330 (230–395)
		M	Austenitic Stainless Steel	≤200HB	≤0.25DC	Dry	○ ◔ ✲	–	590 (460–690)	590 (460–690)
						Wet	○ ◔ ✲	–	395 (330–490)	395 (330–490)
					0.25–0.5DC	Dry	○ ◔ ✲	–	560 (425–655)	560 (425–655)
						Wet	○ ◔ ✲	–	360 (295–460)	360 (295–460)
					0.5–0.75DC	Dry	○ ◔ ✲	–	460 (360–525)	460 (360–525)
						Wet	○ ◔ ✲	–	295 (230–395)	295 (230–395)
					DC	Dry	○ ◔ ✲	–	460 (360–525)	460 (360–525)
						Wet	○ ◔ ✲	–	295 (230–395)	295 (230–395)
				>200HB	≤0.25DC	Dry	○ ◔ ✲	–	490 (360–590)	490 (360–590)
						Wet	○ ◔ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry	○ ◔ ✲	–	460 (330–525)	460 (330–525)
						Wet	○ ◔ ✲	–	295 (230–360)	295 (230–360)
					0.5–0.75DC	Dry	○ ◔ ✲	–	360 (260–425)	360 (260–425)
						Wet	○ ◔ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry	○ ◔ ✲	–	360 (260–425)	360 (260–425)
						Wet	○ ◔ ✲	–	230 (165–330)	230 (165–330)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	RS0112	M	Ferritic and Martensitic Stainless Steel	≤200HB	≤0.25DC	Dry		590 (460–690)	590 (460–690)	–
						Wet		395 (330–490)	395 (330–490)	–
					0.25–0.5DC	Dry		560 (425–655)	560 (425–655)	–
						Wet		360 (295–460)	360 (295–460)	–
					0.5–0.75DC	Dry		460 (360–525)	460 (360–525)	–
						Wet		295 (230–395)	295 (230–395)	–
					DC	Dry		460 (360–525)	460 (360–525)	–
						Wet		295 (230–395)	295 (230–395)	–
			Precipitation Hardening Stainless Steel	<450HB	≤0.25DC	Dry		–	425 (330–525)	425 (330–525)
						Wet		–	295 (230–395)	295 (230–395)
					0.25–0.5DC	Dry		–	395 (260–460)	395 (260–460)
						Wet		–	260 (195–360)	260 (195–360)
					0.5–0.75DC	Dry		–	295 (195–360)	295 (195–360)
						Wet		–	195 (130–295)	195 (130–295)
					DC	Dry		–	295 (195–360)	295 (195–360)
						Wet		–	195 (130–295)	195 (130–295)
		K	Gray Cast Iron	≤350MPa	≤0.25DC	Dry		655 (490–820)	655 (490–820)	–
						Wet		425 (330–490)	425 (330–490)	–
					0.25–0.5DC	Dry		625 (460–785)	625 (460–785)	–
						Wet		395 (295–460)	395 (295–460)	–
					0.5–0.75DC	Dry		525 (360–690)	525 (360–690)	–
						Wet		330 (260–395)	330 (260–395)	–
					DC	Dry		525 (360–690)	525 (360–690)	–
						Wet		330 (260–395)	330 (260–395)	–
			Ductile Cast Iron	≤800MPa	≤0.25DC	Dry		425 (330–490)	425 (330–490)	–
						Wet		360 (260–460)	360 (260–460)	–
					0.25–0.5DC	Dry		395 (295–460)	395 (295–460)	–
						Wet		330 (230–425)	330 (230–425)	–
					0.5–0.75DC	Dry		330 (260–395)	330 (260–395)	–
						Wet		260 (195–395)	260 (195–395)	–
					DC	Dry		330 (260–395)	330 (260–395)	–
						Wet		260 (195–395)	260 (195–395)	–
		S	Titanium Alloys	Ti–6Al–4V,etc.	≤0.25DC	Wet		165 (130–230)	165 (130–230)	–
						Wet		–	130 (100–195)	130 (100–195)
					0.25–0.5DC	Wet		165 (130–230)	165 (130–230)	–
						Wet		–	130 (100–195)	130 (100–195)
					0.5–0.75DC	Wet		165 (130–230)	165 (130–230)	–
						Wet		–	130 (100–195)	130 (100–195)
					DC	Wet		165 (130–230)	165 (130–230)	–
						Wet		–	130 (100–195)	130 (100–195)
				Ti–5Al–5Mo–5V–3Cr,etc.	≤0.25DC	Wet		–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet		–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet		–	100 (65–130)	100 (65–130)
					DC	Wet		–	100 (65–130)	100 (65–130)
			Heat Resistant Alloys	–	≤0.25DC	Wet		130 (100–195)	–	–
						Wet		–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet		130 (100–195)	–	–
						Wet		–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet		130 (100–195)	–	–
						Wet		–	100 (65–130)	100 (65–130)
					DC	Wet		130 (100–195)	–	–
						Wet		–	100 (65–130)	100 (65–130)
		H	Hardened Steel	40–55HRC	≤0.25DC	Dry		295 (230–330)	–	–
						Wet		295 (230–330)	–	–
					0.25–0.5DC	Dry		280 (195–330)	–	–
						Wet		280 (195–330)	–	–
					0.5–0.75DC	Dry		230 (165–260)	–	–
						Wet		230 (165–260)	–	–
					DC	Dry		230 (165–260)	–	–
						Wet		230 (165–260)	–	–

Cutting Conditions (Guide) :
● : Stable Cutting ◔ : General Cutting ✣ : Unstable Cutting

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	**AXD4000**	P	Mild Steel	≤180HB	–	Dry/Wet	●	655 (490–720)	–	–
			Carbon Steel, Alloy Steel	180–280HB	–	Dry/Wet	●	655 (490–720)	–	–
		N	Aluminum Alloys	Si<5%	–	Dry/Wet	●	3280 (655–9840)	–	–
				Si>5%		Dry/Wet	●	3280 (655–9840)	–	–
	AXD4000A	N	Aluminum Alloys	Si<5%	–	Dry/Wet	●	13125 (6560–16405)	–	–
	AXD7000	P	Mild Steel	≤180HB	–	Dry/Wet	●	655 (490–720)	–	–
			Carbon Steel, Alloy Steel	180–280HB	–	Dry/Wet	●	655 (490–720)	–	–
		S	Titanium Alloys	–	–	Wet	●	130 (100–195)	–	–
	BXD4000	P	Mild Steel	≤180HB	–	Dry/Wet	●	590 (490–655)	–	–
			Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	●	490 (395–655)	–	–
				280–350HB		Dry/Wet	●	460 (395–525)	–	–
		M	Stainless Steel	≤270HB	–	Dry/Wet	●	460 (395–525)	–	–
		S	Titanium Alloys	–	–	Wet	●	130 (100–195)	–	–
			Heat Resistant Alloys	–	–	Wet	●	100 (65–130)	–	–
	AQX	P	Mild Steel	≤180HB	–	Dry/Wet	● ◔ ✣	655 (560–785)	525 (425–655)	460 (360–590)
			Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◔ ✣	590 (460–720)	460 (330–590)	395 (260–525)
				280–350HB		Dry/Wet	● ◔ ✣	590 (460–720)	460 (330–590)	395 (260–525)
		M	Austenitic Stainless Steel	≤200HB	–	Dry/Wet	● ◔ ✣	–	560 (395–655)	525 (330–590)
				>200HB		Dry/Wet	● ◔ ✣	–	560 (395–655)	525 (330–590)
			Ferritic and Martensitic Stainless Steel	≤200HB	–	Dry/Wet	● ◔ ✣	560 (395–655)	560 (395–655)	525 (330–590)
				>200HB		Dry/Wet	● ◔ ✣	560 (395–655)	560 (395–655)	525 (330–590)
		K	Gray Cast Iron	≤350MPa	–	Dry/Wet	● ◔ ✣	590 (490–720)	525 (425–655)	–
			Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◔ ✣	590 (490–720)	525 (425–655)	–
		S	Titanium Alloys	–	–	Wet	● ◔ ✣	165 (100–230)	165 (100–230)	165 (100–230)
	AJX	P	Mild Steel	≤180HB	–	Dry	● ◔ ✣	490 (330–655)	425 (260–590)	360 (195–525)
			Carbon Steel Alloy Steel	180–280HB		Dry/Wet	● ◔ ✣	425 (260–590)	360 (195–525)	295 (130–460)
				280–350HB	–	Dry/Wet	● ◔ ✣	330 (165–490)	260 (100–425)	230 (100–395)
			Alloy Tool Steel	≤350HB Annealed	–	Dry/Wet	● ◔ ✣	330 (165–490)	260 (100–395)	230 (100–395)
			Pre-hardened Steel	35–45HRC	–	Dry/Wet	● ◔ ✣	330 (230–425)	260 (165–360)	230 (100–395)
		M	Stainless Steel	≤270HB	–	Dry/Wet	● ◔ ✣	–	460 (330–590)	395 (260–525)
		K	Gray Cast Iron	≤350MPa	–	Dry/Wet	● ◔ ✣	490 (330–655)	460 (330–590)	–
			Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◔ ✣	490 (330–655)	460 (330–590)	–
				≤800MPa		Dry/Wet	● ◔ ✣	395 (260–525)	360 (260–460)	–
		S	Titanium Alloys	–	–	Wet	● ◔ ✣	165 (130–195)	150 (100–180)	130 (100–165)
			Heat Resistant Alloys	–	–	Wet	● ◔ ✣	100 (65–130)	80 (65–115)	65 (50–100)
	WJX09	P	Mild Steel	≤180HB	–	Dry	● ◔ ✣	560 (395–720)	525 (360–655)	490 (330–655)
			Carbon Steel Alloy Steel	180–280HB	–	Dry	● ◔ ✣	525 (330–720)	460 (295–655)	425 (260–625)
				280–350HB		Dry	● ◔ ✣	525 (330–720)	460 (295–655)	425 (260–625)
			Alloy Tool Steel	≤350HB Annealed	–	Dry	● ◔ ✣	525 (330–720)	460 (295–655)	425 (260–625)
			Pre-hardened Steel	35–45HRC	–	Dry	● ◔ ✣	395 (260–525)	330 (195–460)	295 (165–425)
		M	Austenitic Stainless Steel	≤200HB	–	Dry	● ◔ ✣	–	525 (425–655)	490 (395–590)
				>200HB		Dry	● ◔ ✣	–	460 (330–655)	425 (260–590)
			Ferritic and Martensitic Stainless Steel	≤200HB	–	Dry	● ◔ ✣	490 (330–655)	490 (330–655)	425 (260–590)
			Duplex Stainless Steel	≤280HB	–	Dry	● ◔ ✣	–	425 (260–590)	360 (195–525)
			Precipitation Hardening Stainless Steel	<450HB	–	Dry	● ◔ ✣	–	360 (195–525)	295 (165–425)
		K	Gray Cast Iron	≤350MPa	–	Dry	● ◔ ✣	590 (460–720)	560 (460–655)	–
			Ductile Cast Iron	≤450MPa	–	Dry	● ◔ ✣	525 (395–690)	490 (395–590)	–
				≤800MPa		Dry	● ◔ ✣	425 (295–560)	395 (260–490)	–
		S	Titanium Alloys	–	–	Wet	● ◔ ✣	165 (100–215)	130 (100–195)	130 (100–195)
			Heat Resistant Alloys	–	–	Wet	● ◔ ✣	130 (65–165)	100 (65–130)	100 (65–130)
	WJX14	P	Mild Steel	≤180HB	–	Dry	● ◔ ✣	490 (330–655)	460 (295–590)	425 (260–625)
			Carbon Steel Alloy Steel	180–280HB	–	Dry	● ◔ ✣	460 (260–655)	395 (230–590)	360 (195–560)
				280–350HB		Dry	● ◔ ✣	460 (260–655)	395 (230–590)	360 (195–560)
			Alloy Tool Steel	≤350HB Annealed	–	Dry	● ◔ ✣	460 (260–655)	395 (230–590)	360 (195–560)
			Pre-hardened Steel	35–45HRC	–	Dry	● ◔ ✣	360 (230–490)	295 (165–425)	260 (130–395)
		M	Austenitic Stainless Steel	≤200HB	–	Dry	● ◔ ✣	–	525 (425–655)	490 (395–590)
				>200HB		Dry	● ◔ ✣	–	460 (330–655)	425 (260–590)
			Ferritic and Martensitic Stainless Steel	≤200HB	–	Dry	● ◔ ✣	490 (330–655)	490 (330–655)	425 (260–590)
			Duplex Stainless Steel	≤280HB	–	Dry	● ◔ ✣	–	425 (260–590)	360 (195–525)
			Precipitation Hardening Stainless Steel	<450HB	–	Dry	● ◔ ✣	–	360 (195–525)	295 (165–425)
		K	Gray Cast Iron	≤350MPa	–	Dry/Wet	● ◔ ✣	525 (395–655)	490 (330–655)	–
			Ductile Cast Iron	≤450MPa	–	Dry/Wet	● ◔ ✣	490 (330–655)	460 (330–590)	–
				≤800MPa		Dry/Wet	● ◔ ✣	395 (260–525)	360 (260–460)	–
		S	Titanium Alloys	–	–	Wet	● ◔ ✣	165 (100–215)	130 (100–195)	130 (100–195)
			Heat Resistant Alloys	–	–	Wet	● ◔ ✣	130 (65–165)	100 (65–130)	100 (65–130)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut ap	Cutting Mode	Cutting Conditions	Cutting Speed vc(SFM) MP1220	MP1230	MP1240
Multi-Functional Milling	ARP	M	Austenitic Stainless Steel	≤200HB	—	Dry		—	655 (490–820)	590 (425–755)
				>200HB		Dry		—	560 (395–720)	490 (330–655)
			Ferritic and Martensitic Stainless Steel	—	—	Dry		655 (490–820)	655 (490–820)	590 (425–755)
			Duplex Stainless Steel	≤280HB	—	Dry		—	525 (360–690)	460 (295–625)
			Precipitation Hardening Stainless Steel	<450HB	—	Dry		—	490 (330–655)	425 (260–590)
			Austenitic Stainless Steel	≤200HB	—	Wet		—	425 (260–590)	360 (195–525)
				>200HB		Wet		—	330 (260–490)	260 (195–425)
			Ferritic and Martensitic Stainless Steel	—	—	Wet		425 (260–590)	425 (260–590)	360 (195–525)
			Duplex Stainless Steel	≤280HB	—	Wet		—	330 (260–490)	260 (195–425)
			Precipitation Hardening Stainless Steel	<450HB	—	Wet		—	295 (165–460)	230 (100–395)
		S	Titanium Alloys	—	—	Wet		165 (115–195)	150 (100–180)	130 (100–165)
			Heat Resistant Alloys	—	—	Wet		130 (65–165)	115 (50–150)	100 (50–130)
	BRP	P	Mild Steel	≤180HB	—	Dry/Wet		820 (655–985)	—	—
			Carbon Steel Alloy Steel	180–280HB	—	Dry/Wet		590 (425–720)	—	—
				280–350HB		Dry/Wet		525 (360–625)	—	—
			Pre-hardened Steel	35–45HRC	—	Dry/Wet		395 (260–460)	—	—
		M	Stainless Steel	≤270HB	—	Dry/Wet		590 (425–720)	—	—
		K	Gray Cast Iron	≤350MPa	—	Dry/Wet		560 (425–720)	—	—
			Ductile Cast Iron	≤450MPa	—	Dry/Wet		460 (330–590)	—	—
				≤800MPa		Dry/Wet		360 (260–460)	—	—
Deep Shoulder Milling	VPX200-L	P	Mild Steel	≤180HB	≤0.25DC	Dry/Wet		460 (330–625)	—	—
						Dry/Wet		—	460 (330–625)	425 (295–590)
					0.25–0.5DC	Dry/Wet		425 (295–590)	—	—
						Dry/Wet		—	425 (295–590)	395 (260–560)
					0.5–0.75DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
					DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
			Carbon Steel Alloy Steel	180–280HB	≤0.25DC	Dry/Wet		395 (295–460)	—	—
						Dry/Wet		—	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry/Wet		360 (260–425)	—	—
						Dry/Wet		—	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
					DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
				280–350HB	≤0.25DC	Dry/Wet		395 (295–460)	—	—
						Dry/Wet		—	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry/Wet		360 (260–425)	—	—
						Dry/Wet		—	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
					DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
			Alloy Tool Steel	≤350HB Annealed	≤0.25DC	Dry/Wet		395 (295–460)	—	—
						Dry/Wet		—	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry/Wet		360 (260–425)	—	—
						Dry/Wet		—	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
					DC	Dry/Wet		330 (230–395)	—	—
						Dry/Wet		—	330 (230–395)	295 (195–360)
			Pre-hardened Steel	35–45HRC	≤0.25DC	Dry/Wet		330 (260–395)	—	—
						Dry/Wet		—	330 (260–395)	295 (195–360)
					0.25–0.5DC	Dry/Wet		295 (230–360)	—	—
						Dry/Wet		—	295 (230–360)	260 (195–330)
					0.5–0.75DC	Dry/Wet		260 (195–330)	—	—
						Dry/Wet		—	260 (195–330)	230 (165–295)
					DC	Dry/Wet		260 (195–330)	—	—
						Dry/Wet		—	260 (195–330)	230 (165–295)

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Deep Shoulder Milling	**VPX200-L**	M	Austenitic Stainless Steel	≤200HB	≤0.25DC	Dry/Wet	● ◐ ✲	–	395 (330–490)	395 (330–490)
					0.25–0.5DC	Dry/Wet	● ◐ ✲	–	360 (295–460)	360 (295–460)
					0.5–0.75DC	Dry/Wet	● ◐ ✲	–	295 (230–395)	295 (230–395)
					DC	Dry/Wet	● ◐ ✲	–	295 (230–395)	295 (230–395)
				>200HB	≤0.25DC	Dry/Wet	● ◐ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry/Wet	● ◐ ✲	–	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry/Wet	● ◐ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry/Wet	● ◐ ✲	–	230 (165–330)	230 (165–330)
			Ferritic and Martensitic Stainless Steel	–	≤0.25DC	Dry/Wet	● ◐ ✲	395 (330–490)	395 (330–490)	–
					0.25–0.5DC	Dry/Wet	● ◐ ✲	360 (295–460)	360 (295–460)	–
					0.5–0.75DC	Dry/Wet	● ◐ ✲	295 (230–395)	295 (230–395)	–
					DC	Dry/Wet	● ◐ ✲	295 (230–395)	295 (230–395)	–
			Duplex Stainless Steel	≤280HB	≤0.25DC	Dry/Wet	● ◐ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry/Wet	● ◐ ✲	–	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry/Wet	● ◐ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry/Wet	● ◐ ✲	–	230 (165–330)	230 (165–330)
			Precipitation Hardening Stainless Steel	<450HB	≤0.25DC	Dry/Wet	● ◐ ✲	–	295 (230–395)	295 (230–395)
					0.25–0.5DC	Dry/Wet	● ◐ ✲	–	260 (195–360)	260 (195–360)
					0.5–0.75DC	Dry/Wet	● ◐ ✲	–	195 (130–295)	195 (130–295)
					DC	Dry/Wet	● ◐ ✲	–	195 (130–295)	195 (130–295)
		K	Gray Cast Iron	≤350MPa	≤0.25DC	Dry/Wet	◐ ✲	425 (330–490)	425 (330–490)	–
					0.25–0.5DC	Dry/Wet	◐ ✲	395 (295–460)	395 (295–460)	–
					0.5–0.75DC	Dry/Wet	◐ ✲	330 (260–395)	330 (260–395)	–
					DC	Dry/Wet	◐ ✲	330 (260–395)	330 (260–395)	–
			Ductile Cast Iron	≤800MPa	≤0.25DC	Dry/Wet	◐ ✲	360 (260–460)	360 (260–460)	–
					0.25–0.5DC	Dry/Wet	◐ ✲	330 (230–425)	330 (230–425)	–
					0.5–0.75DC	Dry/Wet	◐ ✲	260 (195–395)	260 (195–395)	–
					DC	Dry/Wet	◐ ✲	260 (195–395)	260 (195–395)	–
		S	Titanium Alloys	Ti–6Al–4V,etc.	≤0.25DC	Wet	● ◐	165 (130–230)	100 (65–130)	–
						Wet	✲	–	165 (130–230)	165 (130–230)
					0.25–0.5DC	Wet	● ◐	165 (130–230)	100 (65–130)	–
						Wet	✲	–	165 (130–230)	165 (130–230)
					0.5–0.75DC	Wet	● ◐	165 (130–230)	100 (65–130)	–
						Wet	✲	–	165 (130–230)	165 (130–230)
					DC	Wet	● ◐	165 (130–230)	100 (65–130)	–
						Wet	✲	–	165 (130–230)	165 (130–230)
				Ti–5Al–5Mo–5V–3Cr,etc.	≤0.25DC	Wet	● ◐	100 (65–130)	100 (65–130)	–
						Wet	✲	–	100 (65–130)	100 (65–130)
					0.25–0.5DC	Wet	● ◐	100 (65–130)	100 (65–130)	–
						Wet	✲	–	100 (65–130)	100 (65–130)
					0.5–0.75DC	Wet	● ◐	100 (65–130)	100 (65–130)	–
						Wet	✲	–	100 (65–130)	100 (65–130)
					DC	Wet	● ◐	100 (65–130)	100 (65–130)	–
						Wet	✲	–	100 (65–130)	100 (65–130)
			Heat Resistant Alloys	–	≤0.25DC	Wet	●	130 (100–195)	–	–
						Wet	◐ ✲	–	130 (100–195)	130 (100–195)
					0.25–0.5DC	Wet	●	130 (100–195)	–	–
						Wet	◐ ✲	–	130 (100–195)	130 (100–195)
					0.5–0.75DC	Wet	●	130 (100–195)	–	–
						Wet	◐ ✲	–	130 (100–195)	130 (100–195)
					DC	Wet	●	130 (100–195)	–	–
						Wet	◐ ✲	–	130 (100–195)	130 (100–195)
	VPX300-L	P	Mild Steel	≤180HB	≤0.25DC	Dry/Wet	● ◐	460 (330–625)	–	–
						Dry/Wet	✲	–	460 (330–625)	425 (295–590)
					0.25–0.5DC	Dry/Wet	● ◐	425 (295–590)	–	–
						Dry/Wet	✲	–	425 (295–590)	395 (260–560)
					0.5–0.75DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
					DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut ap	Cutting Mode	Cutting Conditions	Cutting Speed vc(SFM) MP1220	MP1230	MP1240
Deep Shoulder Milling	VPX300-L	P	Carbon Steel Alloy Steel	180–280HB	≤0.25DC	Dry/Wet	● ◐	395 (295–460)	–	–
						Dry/Wet	✲	–	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry/Wet	● ◐	360 (260–425)	–	–
						Dry/Wet	✲	–	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
					DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
				280–350HB	≤0.25DC	Dry/Wet	● ◐	395 (295–460)	–	–
						Dry/Wet	✲	–	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry/Wet	● ◐	360 (260–425)	–	–
						Dry/Wet	✲	–	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
					DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
			Alloy Tool Steel	≤350HB Annealed	≤0.25DC	Dry/Wet	● ◐	395 (295–460)	–	–
						Dry/Wet	✲	–	395 (295–460)	360 (260–425)
					0.25–0.5DC	Dry/Wet	● ◐	360 (260–425)	–	–
						Dry/Wet	✲	–	360 (260–425)	330 (230–395)
					0.5–0.75DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
					DC	Dry/Wet	● ◐	330 (230–395)	–	–
						Dry/Wet	✲	–	330 (230–395)	295 (195–360)
			Pre-hardened Steel	35–45HRC	≤0.25DC	Dry/Wet	● ◐	330 (260–395)	–	–
						Dry/Wet	✲	–	330 (260–395)	295 (230–360)
					0.25–0.5DC	Dry/Wet	● ◐	295 (230–360)	–	–
						Dry/Wet	✲	–	295 (230–360)	260 (195–330)
					0.5–0.75DC	Dry/Wet	● ◐	260 (195–330)	–	–
						Dry/Wet	✲	–	260 (195–330)	230 (165–295)
					DC	Dry/Wet	● ◐	260 (195–330)	–	–
						Dry/Wet	✲	–	260 (195–330)	230 (165–295)
		M	Austenitic Stainless Steel	≤200HB	≤0.25DC	Dry/Wet	○ ◐ ✲	–	395 (330–490)	395 (330–490)
					0.25–0.5DC	Dry/Wet	○ ◐ ✲	–	360 (295–460)	360 (295–460)
					0.5–0.75DC	Dry/Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					DC	Dry/Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
				>200HB	≤0.25DC	Dry/Wet	○ ◐ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry/Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry/Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry/Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
			Ferritic and Martensitic Stainless Steel	–	≤0.25DC	Dry/Wet	○ ◐ ✲	395 (330–490)	395 (330–490)	–
					0.25–0.5DC	Dry/Wet	○ ◐ ✲	360 (295–460)	360 (295–460)	–
					0.5–0.75DC	Dry/Wet	○ ◐ ✲	295 (230–395)	295 (230–395)	–
					DC	Dry/Wet	○ ◐ ✲	295 (230–395)	295 (230–395)	–
			Duplex Stainless Steel	≤280HB	≤0.25DC	Dry/Wet	○ ◐ ✲	–	330 (260–425)	330 (260–425)
					0.25–0.5DC	Dry/Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					0.5–0.75DC	Dry/Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
					DC	Dry/Wet	○ ◐ ✲	–	230 (165–330)	230 (165–330)
			Precipitation Hardening Stainless Steel	<450HB	≤0.25DC	Dry/Wet	○ ◐ ✲	–	295 (230–395)	295 (230–395)
					0.25–0.5DC	Dry/Wet	○ ◐ ✲	–	260 (195–360)	260 (195–360)
					0.5–0.75DC	Dry/Wet	○ ◐ ✲	–	195 (130–295)	195 (130–295)
					DC	Dry/Wet	○ ◐ ✲	–	195 (130–295)	195 (130–295)
		K	Gray Cast Iron	≤350MPa	≤0.25DC	Dry/Wet	◐ ✲	425 (330–490)	425 (330–490)	–
					0.25–0.5DC	Dry/Wet	◐ ✲	395 (295–460)	395 (295–460)	–
					0.5–0.75DC	Dry/Wet	◐ ✲	330 (260–395)	330 (260–395)	–
					DC	Dry/Wet	◐ ✲	330 (260–395)	330 (260–395)	–
			Ductile Cast Iron	≤800MPa	≤0.25DC	Dry/Wet	◐ ✲	360 (260–460)	360 (260–460)	–
					0.25–0.5DC	Dry/Wet	◐ ✲	330 (230–425)	330 (230–425)	–
					0.5–0.75DC	Dry/Wet	◐ ✲	260 (195–395)	260 (195–395)	–
					DC	Dry/Wet	◐ ✲	260 (195–395)	260 (195–395)	–

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

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut **ap**	Cutting Mode	Cutting Conditions	Cutting Speed **vc**(SFM) MP1220	MP1230	MP1240
Deep Shoulder Milling	**VPX300-L**	S	Titanium Alloys	Ti–6Al–4V,etc.	≤0.75DC	Wet	● ◕	165 (130–230)	165 (130–230)	–
						Wet	✲	–	165 (130–230)	165 (130–230)
					DC	Wet	● ◕	165 (130–230)	165 (130–230)	–
						Wet	✲	–	165 (130–230)	165 (130–230)
				Ti–5Al–5Mo–5V–3Cr,etc.	≤0.75DC	Wet	● ◕	100 (65–130)	100 (65–130)	–
						Wet	✲	–	100 (65–130)	100 (65–130)
					DC	Wet	● ◕	100 (65–130)	100 (65–130)	–
						Wet	✲	–	100 (65–130)	100 (65–130)
			Heat Resistant Alloys	–	≤0.75DC	Wet	● ◕	130 (100–195)	–	–
						Wet	✲	–	130 (100–195)	130 (100–195)
					DC	Wet	● ◕	130 (100–195)	–	–
						Wet	✲	–	130 (100–195)	130 (100–195)
	SPX Shank	P	Mild Steel	≤180HB	Shoulder Milling	Dry/Wet	● ◕	395 (330–460)	–	–
					DC	Dry/Wet	● ◕	195 (165–395)	–	–
			Carbon Steel Alloy Steel	180–280HB	Shoulder Milling	Dry/Wet	● ◕	260 (230–395)	–	–
					DC	Dry/Wet	● ◕	195 (165–330)	–	–
				280–350HB	Shoulder Milling	Dry/Wet	● ◕	260 (230–395)	–	–
					DC	Dry/Wet	● ◕	195 (165–330)	–	–
			Alloy Tool Steel	≤350HB Annealed	Shoulder Milling	Dry/Wet	● ◕	260 (195–330)	–	–
					DC	Dry/Wet	● ◕	165 (130–260)	–	–
		M	Stainless Steel	≤270HB	Shoulder Milling	Dry/Wet	○ ◔	–	260 (195–330)	–
					DC	Dry/Wet	○ ◔	–	130 (115–260)	–
		K	Gray Cast Iron	≤350MPa	Shoulder Milling	Dry/Wet	● ◕	330 (260–395)	–	–
					DC	Dry/Wet	● ◕	165 (130–260)	–	–
			Ductile Cast Iron	≤800MPa	Shoulder Milling	Dry/Wet	● ◕	260 (195–330)	–	–
					DC	Dry/Wet	● ◕	130 (115–260)	–	–
		S	Titanium Alloys	–	Shoulder Milling	Wet	● ◕	–	130 (115–165)	–
					DC	Wet	● ◕	–	115 (100–165)	–
	SPX Shell (Shoulder milling)	P	Mild Steel	≤180HB	≤0.5DC	Dry/Wet	● ◕	395 (330–460)	–	–
					>0.5DC	Dry/Wet	● ◕	395 (330–460)	–	–
					DC	Dry/Wet	● ◕	395 (330–460)	–	–
			Carbon Steel Alloy Steel	180–280HB	≤0.5DC	Dry/Wet	● ◕	395 (260–425)	–	–
					>0.5DC	Dry/Wet	● ◕	330 (260–395)	–	–
					DC	Dry/Wet	● ◕	330 (260–395)	–	–
				280–350HB	≤0.5DC	Dry/Wet	● ◕	395 (260–425)	–	–
					>0.5DC	Dry/Wet	● ◕	330 (260–395)	–	–
					DC	Dry/Wet	● ◕	330 (260–395)	–	–
			Alloy Tool Steel	≤350HB Annealed	≤0.5DC	Dry/Wet	● ◕	330 (195–360)	–	–
					>0.5DC	Dry/Wet	● ◕	260 (195–330)	–	–
					DC	Dry/Wet	● ◕	260 (195–330)	–	–
		M	Stainless Steel	≤270HB	≤0.5DC	Dry/Wet	○ ◔	–	460 (330–490)	–
					>0.5DC	Dry/Wet	○ ◔	–	395 (330–460)	–
					DC	Dry/Wet	○ ◔	–	330 (260–460)	–
		K	Gray Cast Iron	≤350MPa	ap≤0.5DC	Dry/Wet	● ◕	395 (260–425)	–	–
					ap>0.5DC	Dry/Wet	● ◕	330 (260–395)	–	–
					DC, ap≤0.25DC	Dry/Wet	● ◕	260 (195–395)	–	–
					DC, ap≤0.6DC	Dry/Wet	● ◕	195 (165–330)	–	–
			Ductile Cast Iron	≤800MPa	ap≤0.5DC	Dry/Wet	● ◕	330 (195–360)	–	–
					ap>0.5DC	Dry/Wet	● ◕	260 (195–360)	–	–
					DC, ap≤0.25DC	Dry/Wet	● ◕	260 (195–395)	–	–
					DC, ap≤0.6DC	Dry/Wet	● ◕	195 (165–330)	–	–
		S	Titanium Alloys	–	≤0.5DC	Wet	● ◕	–	150 (115–165)	–
					>0.5DC	Wet	● ◕	–	130 (115–165)	–
					DC	Wet	● ◕	–	130 (115–165)	–

Cutting Conditions (Guide) :
● : Stable Cutting ◔ : General Cutting ✠ : Unstable Cutting

Recommended Cutting Conditions

(in)

Application	Tool	ISO	Material	Properties	Depth of Cut ap	Cutting Mode	Cutting Conditions	Cutting Speed vc(SFM) MP1220	MP1230	MP1240
Copying	SRM2	P	Carbon Steel Alloy Steel	180–280HB	DC	Dry/Wet	● ◔	525 (395–655)	–	–
					Small	Dry/Wet	● ◔	655 (525–820)	–	–
					Large	Dry/Wet	● ◔	655 (525–820)	–	–
				280–350HB	DC	Dry/Wet	● ◔	460 (395–525)	–	–
					Small	Dry/Wet	● ◔	525 (395–655)	–	–
					Large	Dry/Wet	● ◔	525 (395–655)	–	–
			Alloy Tool Steel	≤350HB Annealed	DC	Dry/Wet	● ◔	460 (395–525)	–	–
					Small	Dry/Wet	● ◔	525 (395–655)	–	–
					Large	Dry/Wet	● ◔	525 (395–655)	–	–
			Pre-hardened Steel	35–45HRC	DC	Dry/Wet	● ◔	395 (330–525)	–	–
					Small	Dry/Wet	● ◔	525 (395–655)	–	–
					Large	Dry/Wet	● ◔	525 (395–655)	–	–
		M	Stainless Steel	≤270HB	DC	Dry/Wet	○ ◔	655 (330–820)	–	–
					Small	Dry/Wet	○ ◔	655 (330–820)	–	–
					Large	Dry/Wet	○ ◔	655 (330–820)	–	–
		K	Gray Cast Iron	≤350MPa	Small	Dry/Wet	● ◔	655 (490–985)	–	–
					Large	Dry/Wet	● ◔	655 (490–985)	–	–
			Ductile Cast Iron	≤500MPa	Small	Dry/Wet	● ◔	655 (490–920)	–	–
					Large	Dry/Wet	● ◔	655 (490–920)	–	–
				≤800MPa	Small	Dry/Wet	● ◔	590 (490–820)	–	–
					Large	Dry/Wet	● ◔	590 (490–820)	–	–
		S	Titanium Alloys	–	DC	Wet	● ◔	165 (100–195)	–	–
					Small	Wet	● ◔	165 (100–195)	–	–
					Large	Wet	● ◔	165 (100–195)	–	–
			Heat Resistant Alloys	–	DC	Wet	● ◔	130 (100–195)	–	–
					Small	Wet	● ◔	130 (100–195)	–	–
					Large	Wet	● ◔	130 (100–195)	–	–
Spot Milling	CBJP	P	Mild Steel	≤180HB	–	Dry/Wet	● ◔	590 (330–655)	–	–
			Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◔	590 (330–655)	–	–
				280–350HB	–	Dry/Wet	● ◔	395 (260–525)	–	–
		M	Austenitic Stainless Steel	≤200HB	–	Dry/Wet	○ ◔	490 (330–655)	–	–
		K	Cast Iron	≤450MPa	–	Dry/Wet	● ◔	525 (330–720)	–	–
	CBMP	P	Mild Steel	≤180HB	–	Dry/Wet	● ◔	590 (330–655)	–	–
			Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◔	590 (330–655)	–	–
				280–350HB	–	Dry/Wet	● ◔	395 (260–525)	–	–
		M	Austenitic Stainless Steel	≤200HB	–	Dry/Wet	○ ◔	490 (330–655)	–	–
		K	Cast Iron	≤450MPa	–	Dry/Wet	● ◔	525 (330–720)	–	–
Vertical Feed Milling	PMF	P	Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◔	820 (490–1150)	–	–
				280–350HB	–	Dry/Wet	● ◔	655 (330–985)	–	–
		K	Gray Cast Iron	≤350MPa	–	Dry/Wet	● ◔	1150 (655–1640)	–	–
			Ductile Cast Iron	≤500MPa	–	Dry/Wet	● ◔	820 (490–1150)	–	–
				≤800MPa	–	Dry/Wet	● ◔	655 (330–985)	–	–
	PMR	P	Carbon Steel Alloy Steel	180–280HB	–	Dry/Wet	● ◔	590 (490–655)	–	–
				280–350HB	–	Dry/Wet	● ◔	590 (490–655)	–	–
		K	Gray Cast Iron	≤350MPa	–	Dry/Wet	● ◔	590 (490–655)	–	–
			Ductile Cast Iron	≤500MPa	–	Dry/Wet	● ◔	490 (395–560)	–	–
				≤800MPa	–	Dry/Wet	● ◔	395 (330–490)	–	–

Memo

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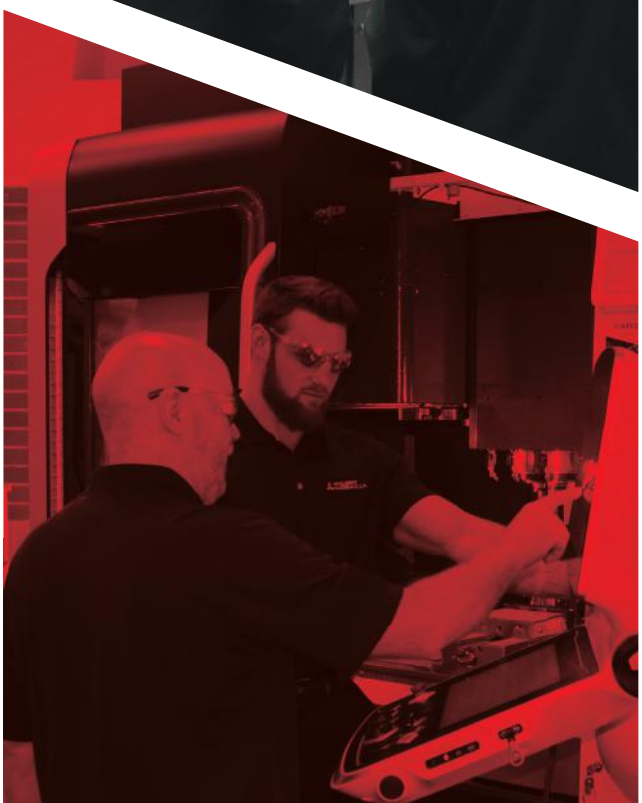
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- Don't handle inserts and chips without gloves.
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