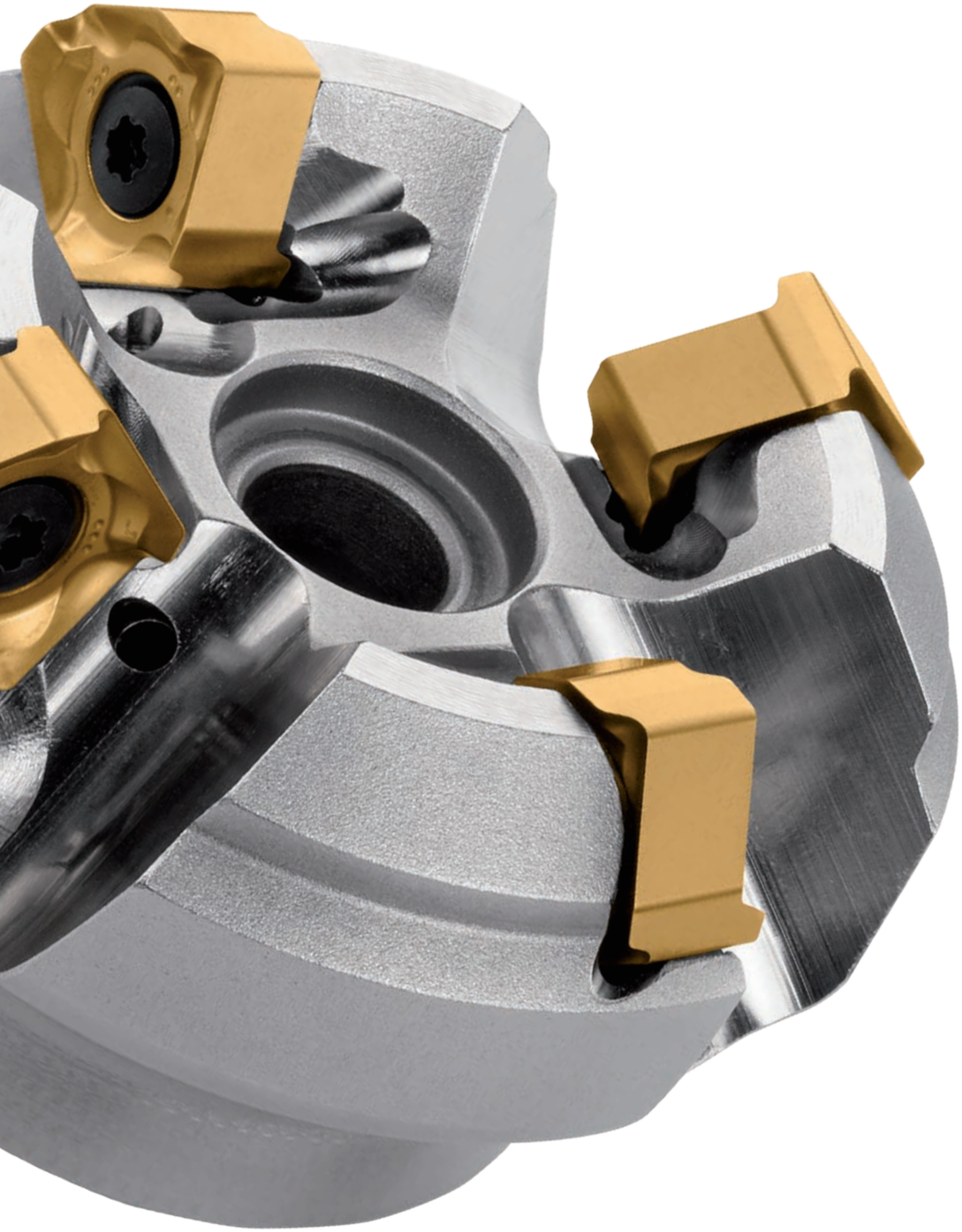
2017.09

WSX445

LOW CUTTING RESISTANCE
NEXT GENERATION FACE MILLING CUTTER
DOUBLE SIDED INSERTS

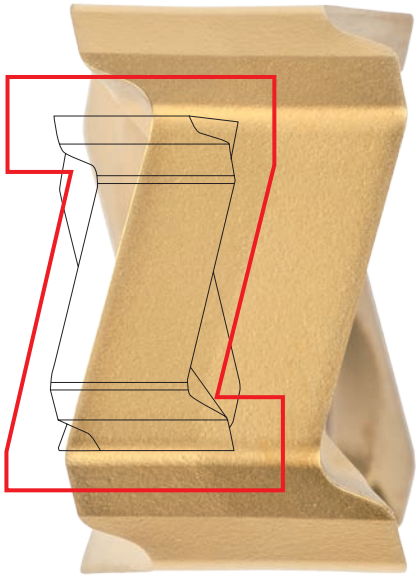


DIAEDGE

MITSUBISHI MATERIALS

DOUBLE-Z GEOMETRY

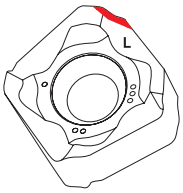
1. LOW CUTTING RESISTANCE
2. SUITABLE FOR ALL MACHINES
3. EXCELLENT CHIP DISCHARGE
4. NO ABRASIVE DAMAGE FROM CHIPS



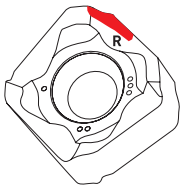
New double sided Z geometry inserts feature sharp cutting edges for low cutting resistance by combining features of conventional positive and negative rake inserts.

CHIPBREAKER
Series for varied depth of cut and feeds.

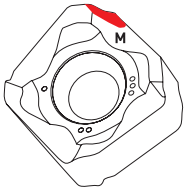
L CHIPBREAKER
- Boosts performance with high rake angle.
- Positive land retains strength and provides low cutting resistance.



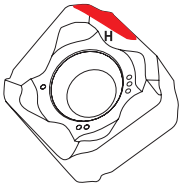
R CHIPBREAKER
- For unstable applications.
- Enhanced cutting edge strength but retains sharpness with negative land and positive rake angle.



M CHIPBREAKER
- Recommended for general applications.
- Balance of cutting edge strength and sharpness with optimized positive land and rake angle.



H CHIPBREAKER
- For demanding applications
- A stronger land and reduced positive rake angle provides maximum edge strength.



INSERT GRADES

HIGH PERFORMANCE GRADES
TO COVER A WIDE APPLICATION AREA
AND FOR SPECIFIC MATERIALS

INSERT GRADES

MP6120
for general milling of steel

MP6130
for interrupted milling of steel

MP7130
for stable milling of stainless steel

MP7140
for unstable milling of stainless steel

MC5020
for general milling of cast iron

MP9120
for general milling of HRSA and titanium alloy

MP9130
for interrupted general milling of HRSA and titanium alloy

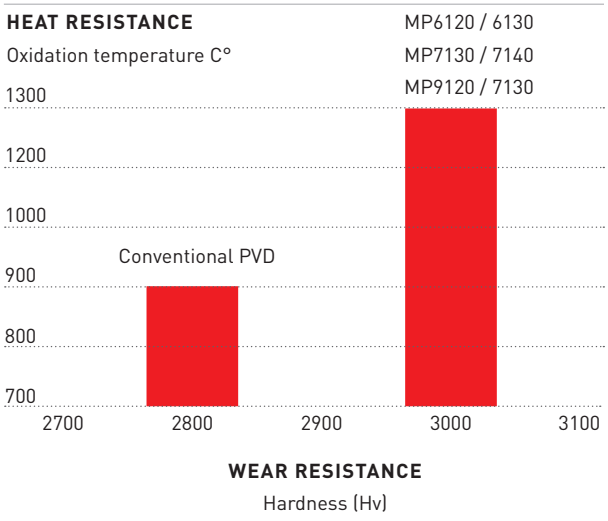
MX3030
for finishing

TF15
for general milling of aluminium

COEFFICIENT OF FRICTION

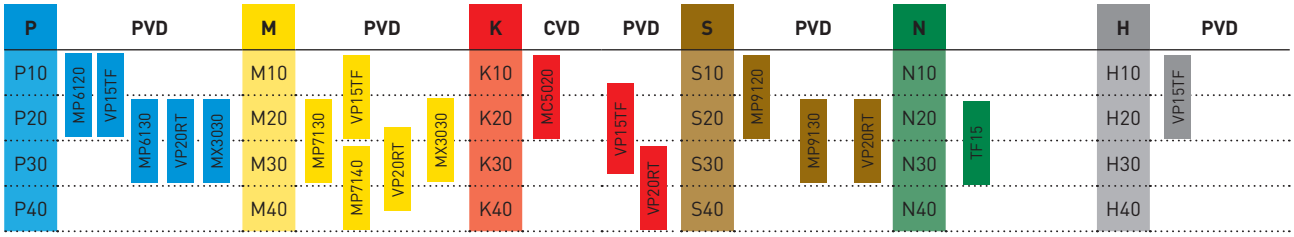
	Work Material	Grade	Coefficient of friction (Measured at 600 degrees)		
			C55	X10CrNi18-9	Ti6Al4V
P	Carbon Steel, Alloy Steel	MP6100	0.4		
M	Stainless Steel	MP7100		0.5	
S	Titanium Alloy, Heat Resistant Alloy	MP9100		0.7	0.3
	Conventional		0.7		0.7

TOUGH-Σ



INSERT GRADES FOR A WIDE RANGE OF MATERIALS

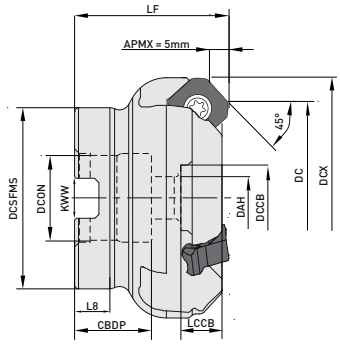
APPLICATION RANGE



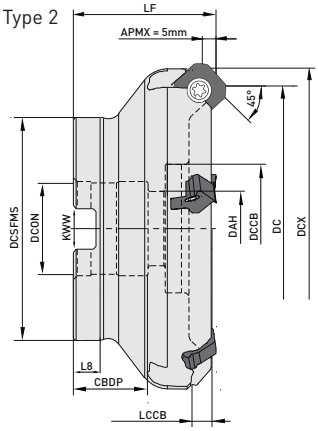
WSX445

NEXT GENERATION FACE MILLING CUTTER

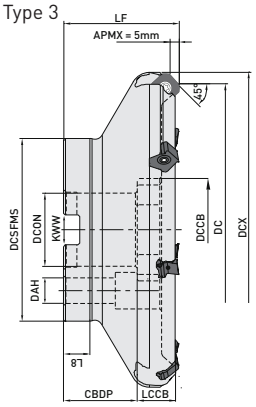
Type 1



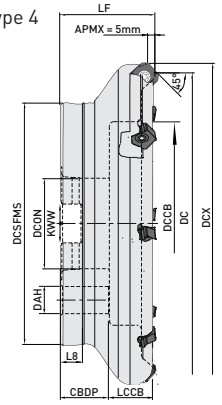
Type 2



Type 3



Type 4



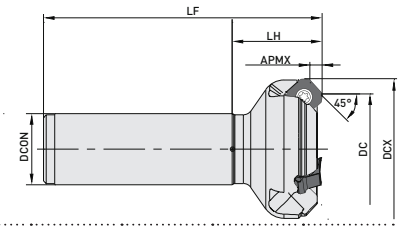
C H: 45°
A.R: +17° T: - 7° – - 2°
R.R: - 6° – + 1° I : + 16° – + 19°

ARBOR TYPE

Order Number	Stock		Coolant hole	Teeth	DC	DCX	LF	DCON	CBDP	DAH	DCSFMS	KWW	L8	DCCB	LCCB	WT (kg)	Fig.
NORMAL PITCH	R	L															
WSX445-040A03AR	●		○	3	40	52.8	40	16	18	9	37	8.4	5.6	14	25	0.3	1
WSX445-050A03AR	●		○	3	50	62.9	40	22	20	11	47	10.4	6.3	17	27	0.5	1
WSX445-063A04AR	●		○	4	63	75.9	40	22	20	11	50	10.4	6.3	17	27	0.6	1
WSX445-080A04AR/L	●	★	○	4	80	92.9	50	27	23	13	56	12.4	7	20	34	1.3	1
WSX445-100B05AR/L	●	★	○	5	100	112.9	50	32	26	26	78	14.4	8	45	32	1.8	2
WSX445-125B06AR/L	●	★	○	6	125	137.9	63	40	28	30	89	16.4	9	56	40	3.2	2
WSX445-160C07NR/L	●	★	—	7	160	172.9	63	40	40	56	100	16.4	9	—	—	4.9	3
WSX445-200C08NR	●		—	8	200	212.9	63	60	32	135	160	25.7	14.22	—	—	8.7	4
FINE PITCH																	
WSX445-040A04AR	●		○	4	40	52.8	40	16	18	9	37	8.4	5.6	14	25	0.3	1
WSX445-050A04AR	●		○	4	50	62.9	40	22	20	11	47	10.4	6.3	17	27	0.4	1
WSX445-063A05AR	●		○	5	63	75.9	40	22	20	11	50	10.4	6.3	17	27	0.6	1
WSX445-080A06AR	●		○	6	80	92.9	50	27	23	13	56	12.4	7	20	34	1.2	1
WSX445-100B07AR	●		○	7	100	112.9	50	32	26	26	78	14.4	8	45	32	1.7	2
WSX445-125B08AR	●		○	8	125	137.9	63	40	28	30	89	16.4	9	56	40	3.1	2
WSX445-160C10NR	●		—	10	160	172.9	63	40	40	56	100	16.4	9	—	—	4.8	3
WSX445-200C12NR	●		—	12	200	212.9	63	60	32	135	160	25.7	14.22	—	—	8.6	4
EXTRA FINE PITCH																	
WSX445-050A05AR	●		○	5	50	62.9	40	22	20	11	47	10.4	6.3	17	27	0.4	1
WSX445-063A06AR	●		○	6	63	75.9	40	22	20	11	50	10.4	6.3	17	27	0.6	1
WSX445-080A08AR	●		○	8	80	92.9	50	27	23	13	56	12.4	7	20	34	1.1	1
WSX445-100B10AR	●		○	10	100	112.9	50	32	26	26	78	14.4	8	45	32	1.6	2
WSX445-125B12AR	●		○	12	125	137.9	63	40	28	30	89	16.4	9	56	40	3.0	2
WSX445-160C16NR	●		—	16	160	172.8	63	40	40	56	100	16.4	9	—	—	4.6	3
WSX445-200C20NR	●		—	20	200	212.8	63	60	32	135	160	25.7	14.22	—	—	8.4	4

● Stock Standard ○ With through coolant holes ★ Stock Standard in Japan

SHANK TYPE



Order Number	Stock	Coolant hole	Teeth	DC	DCX	LF	DCON	LH	WT (kg)	APMX
NORMAL PITCH										
WSX445R-4003SA32M	★	○	3	40	52.8	125	32	40	0.8	≤ 5
WSX445R-5003SA32M	★	○	3	50	62.9	125	32	40	1.0	≤ 5
WSX445R-6304SA32M	★	○	4	63	75.9	125	32	40	1.2	≤ 5
WSX445R-8004SA32M	★	○	4	80	92.9	125	32	40	1.6	≤ 5
FINE PITCH										
WSX445R-4004SA32M	★	○	4	40	52.8	125	32	40	0.8	≤ 5
WSX445R-5004SA32M	★	○	4	50	62.9	125	32	40	1.0	≤ 5
WSX445R-6305SA32M	★	○	5	63	75.9	125	32	40	1.2	≤ 5
WSX445R-8006SA32M	★	○	6	80	92.9	125	32	40	1.5	≤ 5

*1 Right hand tool holder only.

SPARE PARTS

WSX445	Clamp Screw		Wrench (Insert)	
Arbor Type		TPS4R		TIP15W
Shank Type				

* Clamp Torque (N • m) : TPS4R = 3.5

OPTIONAL PARTS LIST

Order Number	Order Number set bolt: ☐☐☐ with coolant hole	Order Number set bolt: ☐☐☐ without coolant hole	Fig.	MPCA	MPCB	MPCC	MPCD	MPCE	MPCF	MPCG
ARBOR TYPE										
WSX445-040A☐☐☐AR	HSC08025H	HSC08040	1	13	M8×1.25	33	8	5	—	—
WSX445-050A☐☐☐AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	—	—
WSX445-063A☐☐☐AR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	—	—
WSX445-080A☐☐☐AR/L	HSC12035H	HSC12035 HSC12045	1	18	M12×1.75	37	12	10	—	—
WSX445-200C☐☐☐NR	◊	—	1	24	M16×2	43	16	14	6	23
WSX445-100B☐☐☐AR/L	MBA16033H	—	2	40	M16×2	43	10	14	6	23
WSX445-125B☐☐☐AR/L	MBA10030H	—	2	50	M20×2.5	54	14	17	6	27
WSX445-160C☐☐☐NR/L	◊	—	2	50	M20×2.5	54	14	17	6	27

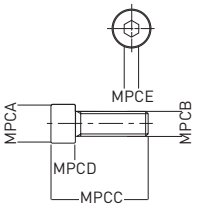


Fig. 1

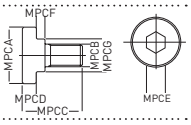


Fig. 2

◊ no coolant hole

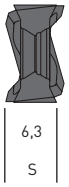
INSERTS

DOUBLE SIDED Z-GEOMETRY

8 CUTTING EDGES

Shape

Geometry



	Order Number	Class	Honing	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	MX3030	VP20RT	TF15	IC	S	BS	RE
	SNMU140812ANEL-M	M	E	★	★	★		●			★	★			14	8.4	1.5	1.2
	SNGU140812ANEL-M	G	E	★	★	★					★	★			14	8.4	1.5	1.2
NEW	SNGU140812ANFL-L	G	F	★	★	★					★			★	14	8.4	1.5	1.2
NEW	SNGU140812ANEL-L	G	E	★	★	★					★			★	14	8.4	1.5	1.2
	SNGU140812ANFR-L	G	F											●	14	8.4	1.5	1.2
	SNGU140812ANER-L	G	E	●	●	●	●	●	●	●	★	●	★		14	8.4	1.5	1.2
	SNGU140812ANER-M	G	E	●	●	●	●	●	●	●	★	●	★		14	8.4	1.5	1.2
	SNMU140812ANER-M	M	E	●	●	●	●		●	●	★	●	★		14	8.4	1.5	1.2
	SNMU140812ANER-R	M	E	●	●	●					★		★		14	8.4	1.5	1.2
	SNMU140812ANEL-R	M	E	★	★	★					★				14	8.4	1.5	1.2
	SNMU140812ANER-H	M	E	●	●	●					★		★		14	8.4	1.5	1.2

GRADE APPLICATION

P	Steel				◐	✣					◐	●	◐					
M	Stainless Steel						◐	✣			◐	●	◐					
K	Cast Iron			◐							◐		◐					
S	Heat resistant Alloys, Titanium								◐	◐	◐		◐					
N	Aluminium													◐				
H	Hardened Steel										◐							

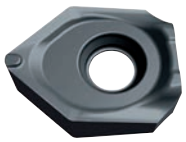
● Stable Cutting
◐ General Cutting
✣ Unstable Cutting

Honing:
E: Round
F: Sharp Edge

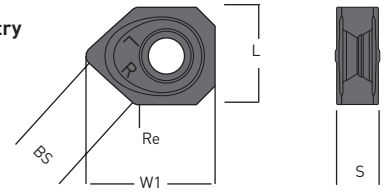
■ : MIRACLE SIGMA ● Stock Standard (10 Inserts per Packing Unit) ★ Stock Standard in Japan

WIPER INSERTS

Shape



Geometry



Order Number	Class	Honing	MP6120	VP15TF	MC5020	L	W1	S	BS	RE
WNGU1406ANEN8C-M	G	E	●	●	●	14	18.1	6	8	1.0

GRADE APPLICATION

P	Steel	◐	◐		●
M	Stainless Steel		◐		●
K	Cast Iron		◐	◐	
S	Heat resistant Alloys, Titanium		◐		
N	Aluminium				
H	Hardened Steel		◐		

● Stable Cutting
◐ General Cutting
✠ Unstable Cutting

INSTRUCTIONS FOR USE OF WIPER INSERTS

Fig. 1

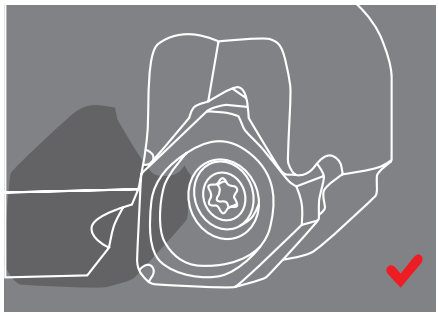


Fig. 2

- Wiper inserts for WSX445 are two-cornered. Please set as shown in Fig.1.
- Excellent finished surfaces can be achieved with one wiper.
- Set more than 2 wiper inserts, equally spaced, when the feed is larger than 8 mm / rev.

RECOMMENDED CUTTING CONDITIONS

WSX445 – FOR DRY CUTTING

	Work Material	Hardness	Grades	Vc (m/min)	Finish – Light		Light –Medium		Medium – Rough	
					fz (mm/t.)	ap (mm)	fz (mm/t.)	ap (mm)	fz (mm/t.)	ap (mm)
P	Mild Steel	≤180HB	MP6120 VP15TF	250 (200 – 300)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MP6130 VP20RT	240 (190 – 290)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MX3030	180 (130-230)	0.15 (0.1-0.2)	< 1.0	0.15 (0.1-0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0
	Carbon Steel Alloy Steel	180 – 350HB	MP6120 VP15TF	220 (170 – 270)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MP6130 VP20RT	200 (150 – 250)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MX3030	150 (120-180)	0.15 (0.1 – 0.2)	< 1.0	0.15 (0.1-0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0
	Alloy Steel Pre-Hardened Steel	≤350HB	MP6120 VP15TF	140 (100 – 180)	0.15 (0.1 – 0.2)	< 2.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MP6130 VP20RT	120 (90 – 150)	0.15 (0.1 – 0.2)	< 2.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MX3030	150 (120-180)	0.15 (0.1 – 0.2)	< 1.0	0.15 (0.1-0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0
M	Austenitic, Ferritic and martensitic Stainless Steel	—	MP7130 MP7140 VP15TF VP20RT	200 (150 – 250)	0.15 (0.1 – 0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0	—	—
			MX3030	130 (100-180)	0.15 (0.1 – 0.2)	< 1.0	0.15 (0.1-0.2)	< 2.0	—	—
	Austenitic Stainless Steel	≥200HB	MP7130 MP7140 VP15TF VP20RT	170 (120 – 220)	0.15 (0.1 – 0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0	—	—
	Two-phase Stainless Steel	≤280MPa	MP7130 MP7140 VP15TF VP20RT	160 (110 – 210)	0.15 (0.1 – 0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0	—	—
	Hardened Stainless Steel	≤450HB	MP7130 MP7140 VP15TF VP20RT	150 (100 – 200)	0.15 (0.1 – 0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0	—	—
K	Gray Cast Iron	≤350MPa	MC5020	220 (200 – 270)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			VP15TF VP20RT	180 (130 – 250)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			MX3030	150 (120 – 180)	0.15 (0.1 – 0.2)	< 1.0	0.15 (0.1-0.2)	< 2.0	0.2 (0.15 – 0.25)	< 3.0
	Ductile Cast Iron	≤800MPa	MC5020	200 (180 – 250)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
			VP15TF VP20RT	160 (110 – 240)	0.15 (0.1 – 0.2)	< 3.0	0.2 (0.15 – 0.25)	< 4.0	0.25 (0.2 – 0.3)	< 5.0
H	Hardened Steel	40 – 55HRC	VP15TF	50 (30 – 70)	0.05 (0.05 – 0.1)	< 1.5	0.1 (0.05 – 0.15)	< 2.0	—	—

1. Please set the cutting conditions according to the system requirements referring to the above table.
2. Wet cutting is recommended for better surface finishes.
   (Tool life is shorter when compared to dry cutting.)

WSX445 – FOR WET CUTTING

	Work Material	Hardness	Grades	Vc (m/min)	Finish – Light		Light –Medium		Medium – Rough	
					fz (mm/t.)	ap (mm)	fz (mm/t.)	ap (mm)	fz (mm/t.)	ap (mm)
P	Mild Steel	<180HB	MP6120 VP15TF	150 (100–200)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
			MP6130 VP20RT	150 (100–200)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
	Carbon Steel Alloy Steel	180–350HB	MP6120 VP15TF	120 (80–160)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
			MP6130 VP20RT	120 (80–160)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
	Alloy Steel Pre-Hardened Steel	35–45HRC	MP6120 VP15TF	100 (80–120)	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
			MP6130 VP20RT	100 (80–120)	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
M	Austenitic, Ferritic and martensitic Stainless Steel	—	MP7130 MP7140 VP15TF VP20RT	130 (80–180)	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤2.0	—	—
	Austenitic Stainless Steel	>200HB	MP7130 MP7140 VP15TF VP20RT	100 (80–150)	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	—	—
	Two-phase Stainless Steel	≤280MPa	MP7130 MP7140 VP15TF VP20RT	100 (80–150)	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	—	—
	Hardened Stainless Steel	<450HB	MP7130 MP7140 VP15TF VP20RT	90 (50–140)	0.15 (0.1–0.2)	≤2.0	0.2 (0.15–0.25)	≤3.0	—	—
K	Gray Cast Iron	Tensile Strength <350MPa	MC5020	180 (160–200)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
			VP15TF VP20RT	130 (100–160)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
	Ductile Cast Iron	Tensile Strength <800MPa	MC5020	180 (160–200)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
			VP15TF VP20RT	110 (80–140)	0.15 (0.1–0.2)	≤3.0	0.2 (0.15–0.25)	≤4.0	0.25 (0.2–0.3)	≤5.0
N	Aluminium Alloy	—	TF15	500 (200-1000)	0.2 (0.1–0.3)	≤5.0	—	—	—	—
S	Titanium Alloy	—	MP9120 MP9130 VP15TF VP20RT	50 (40–60)	0.05 (0.05–0.1)	≤1.5	0.1 (0.05–0.15)	≤2.0	—	—
	Heat Resistant Alloy	—	MP9120 MP9130 VP15TF VP20RT	40 (20–50)	0.05 (0.05–0.1)	≤1.5	0.1 (0.05–0.15)	≤2.0		
H	Hardened Steel	40–55HRC	VP15TF	50 (30–70)	0.05 (0.05–0.1)	≤1.5	0.1 (0.05–0.15)	≤2.0	—	—

NOTES

NOTES

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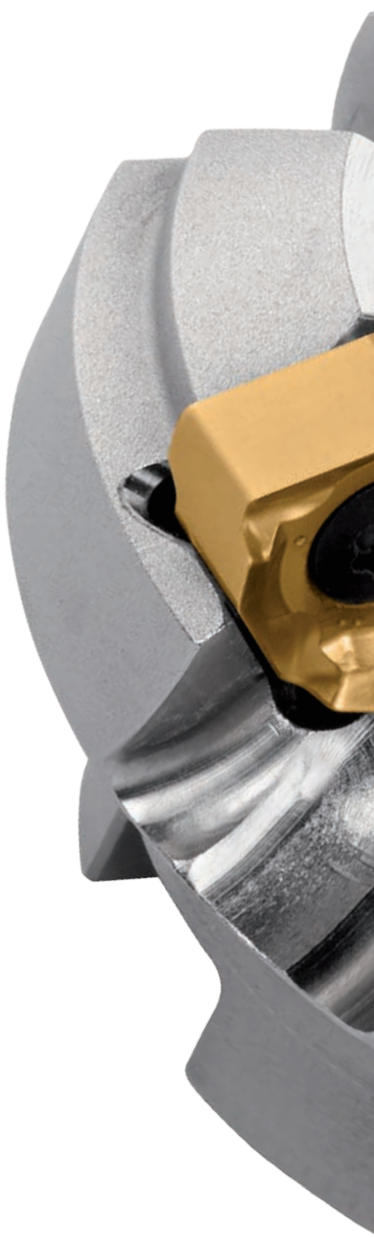

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