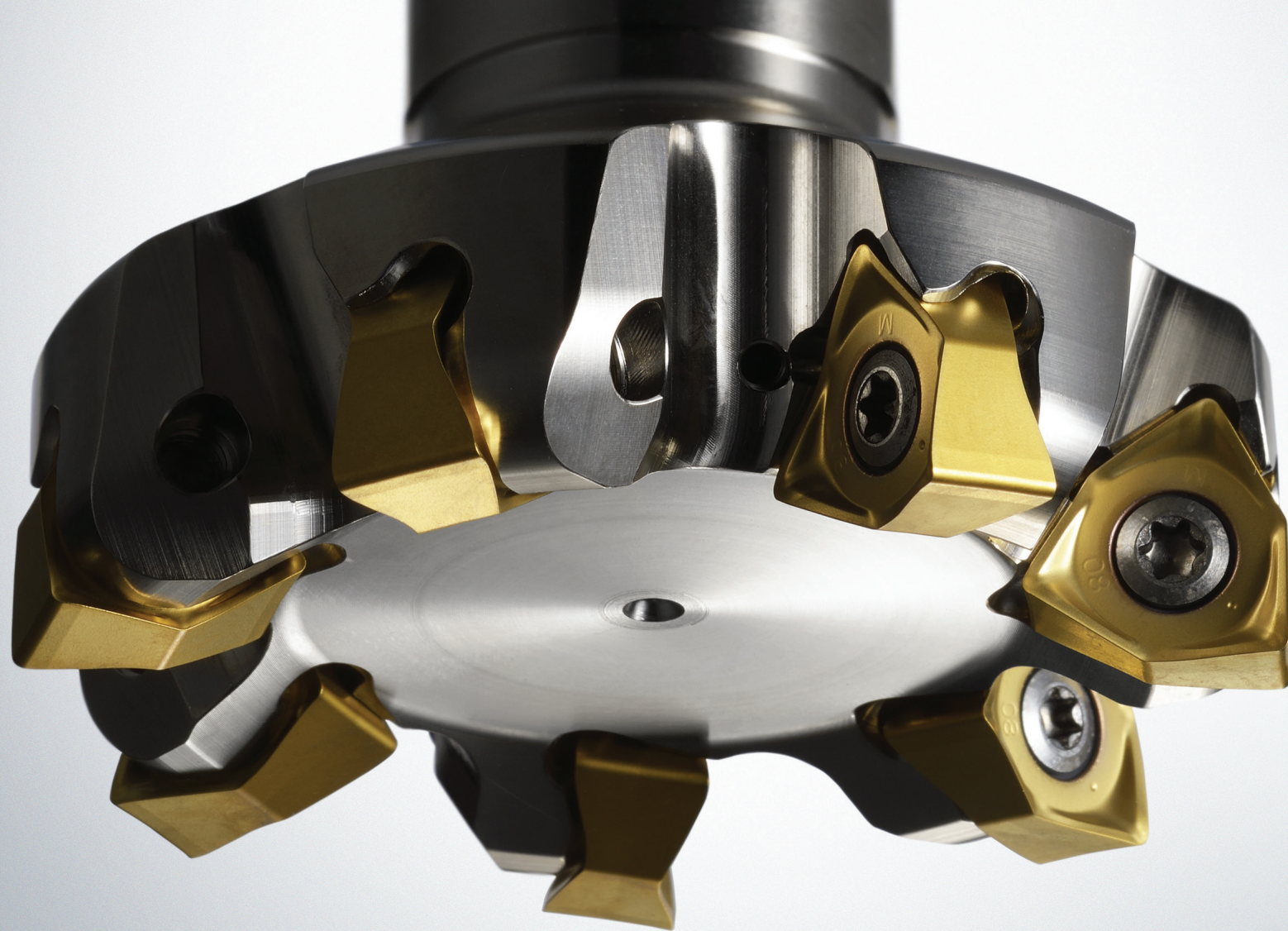


WWX Series

DOUBLE-SIDED INSERT
TYPE SHOULDER MILL

Strong  Geometry





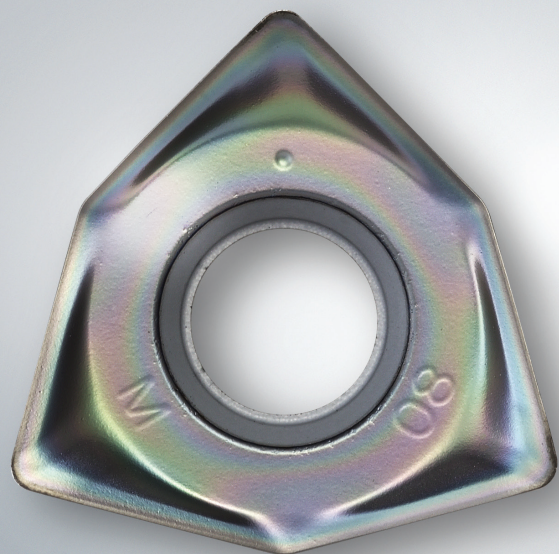
Stable and Reliable

The optimized “X-type” insert enables stable, high quality machining.

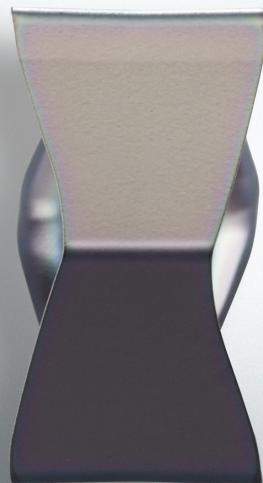
Strong  Geometry

Double-Sided Insert Type Shoulder Mill

WWX Series



Economical double-sided insert with 6 corners.



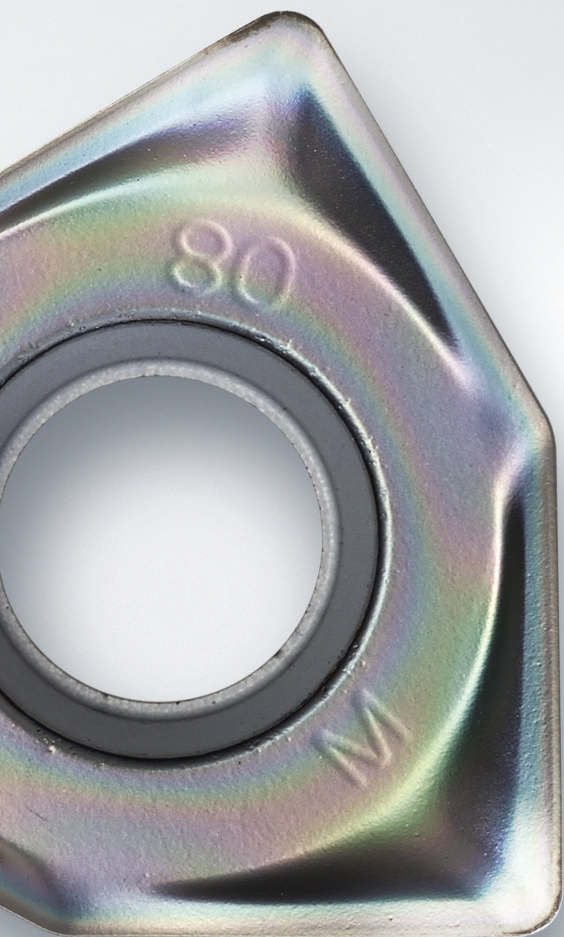
The insert thickness was greatly increased to markedly improve the fracture resistance (MMC comparison).



Tool body damage is negated due to the radial geometry behind the insert.



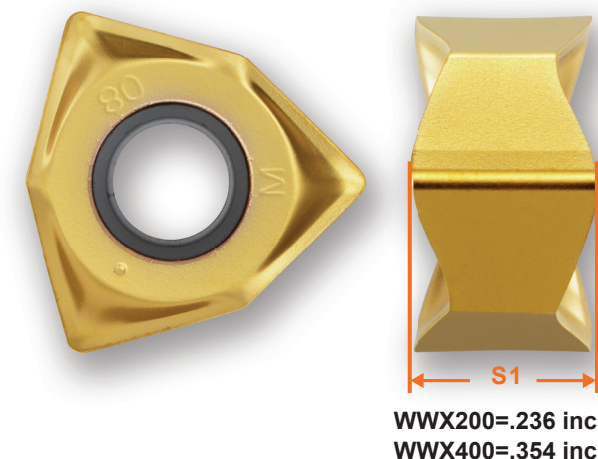
Are available to machine a vast range of materials.



The optimized “X-type” insert meets the demand for greater strength.

■ The generous thickness of the insert provides high rigidity.

The new WWX200 insert is 1.5 times thicker than a conventional ASX400 insert, and the WWX400 is 2.2 times thicker. This extra thickness provides higher rigidity and fracture resistance. Additionally, the extra rigidity eliminates the need for a shim. Therefore direct clamping of the insert to the body provides extra stability.

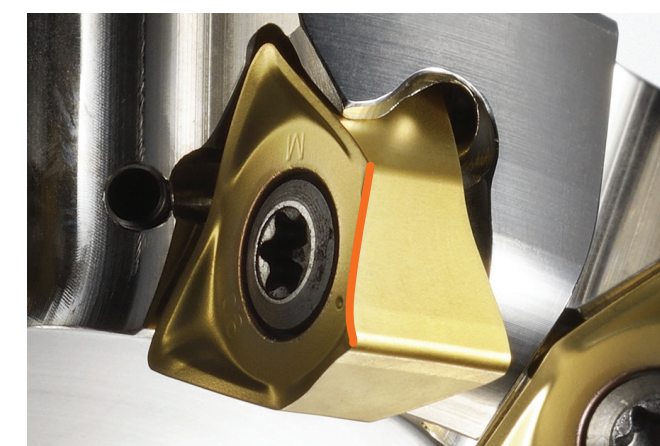


Strong  Geometry

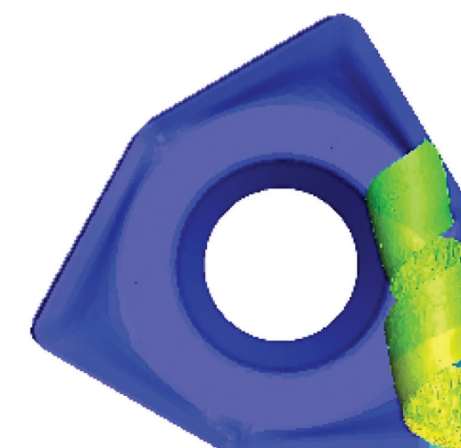
■ Excellent control and chip abrasion prevention.

CAE* analysis was used for the main cutting edge design. This resulted in changing from a straight to a curved cutting edge. Additionally, the rake angle shape of the optimized cutting edge greatly suppresses the scattering of chips on the finished surface. This enables good surface finishes and markedly improved efficiency.

*CAE : Computer Aided Engineering



Curved cutting edge shape designed with an optimum rake face.



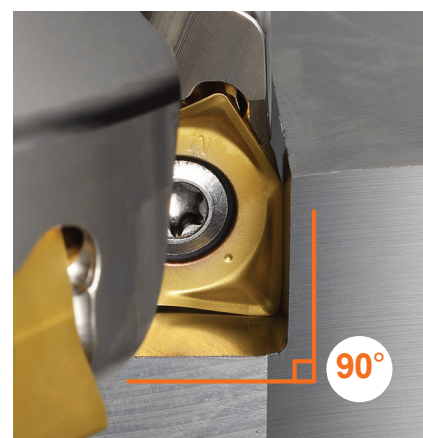
Chips are created in a helical shape for efficient dispersal.

Comments from The Developer

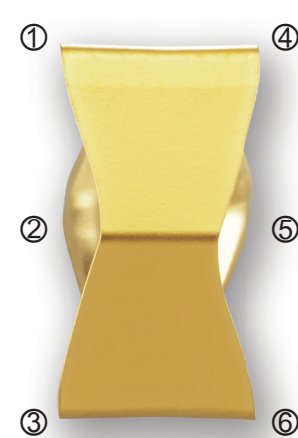
The WWX Series was developed under the concept of “Stable and Worry-free” using an optimized insert shape with a maximum thickness of WWX200=.234", WWX400=.354" in response to recent trends of unmanned operations and the demand for increased efficiency. The main attributes improved were rigidity and fracture resistance. Attention was also given to the cutting edge shape to achieve improved finished surface quality and good chip discharge. Be sure to experience the proprietary “X-type” insert developed by Mitsubishi Materials.

■ The “X-Type” insert shape provides economic efficiency as well as maintaining high quality surface finishes.

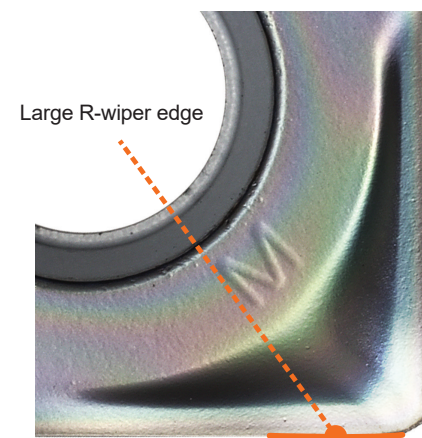
A 90° wall surface is produced and the large R-wiper edge achieves good surface finishes. In addition the optimized X-type insert with 6 corners contributes to lower tooling costs.



High-quality wall surface machining is possible.



Economical double-sided 6 corners.



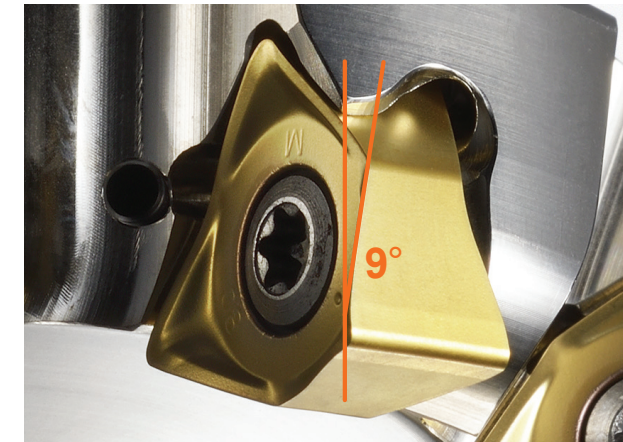
Large R-wiper edge achieves a good surface finish.



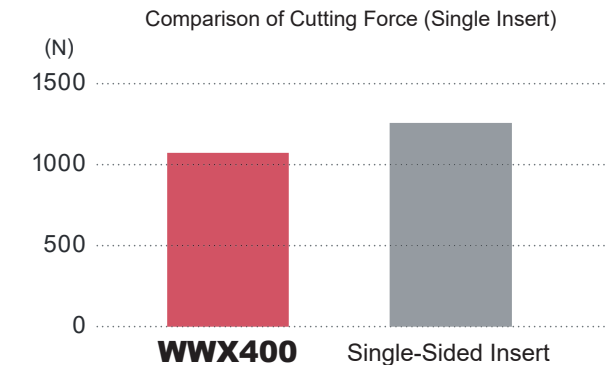
Extreme clamping stability and high-quality machining.

Low cutting resistance suppresses chatter vibration even for thin workpieces.

Although a double-sided insert type with an axial rake angle of 9° (close to that of a single-sided insert type) is used, the WWX Series insert achieves lower cutting resistance than a single-sided insert (in-house comparison) and suppresses chatter vibration when machining thin workpieces.



Axial Rake Angle of 9°



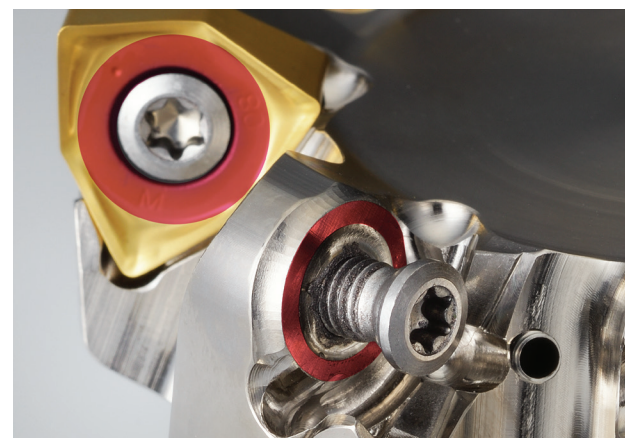
<Cutting Conditions>
 Material : AISI 4140
 Cutter Dia. : DC=3.000"
 Cutting Speed : vc=525 SFM
 Feed per Tooth : fz=.008 IPT
 Depth of Cut : ap=.079"
 Width of Cut : ae=2.520"
 Cutting Mode : Dry Cutting

Optimized support under the insert and high clamping rigidity improves stability.

The conical shaped seating surface widely supports the insert seating surface while the radial geometry of the tool body behind the insert provides necessary clearance to suppress body damage from scratches and chip abrasion. Additionally, the strong clamping force of the screws provides robust clamping.



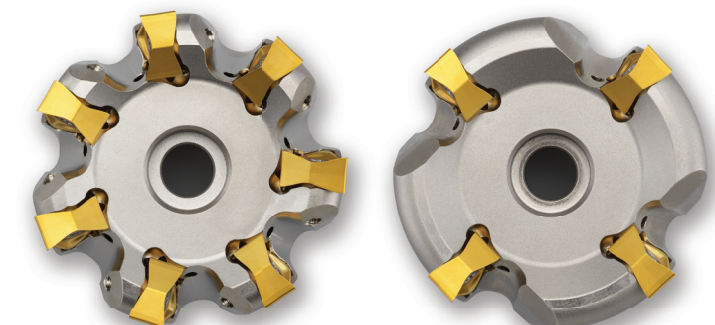
Radius geometry of the tool body behind the insert.



The conical shim surface and the M5 screw for WWX400, and the M3 screw for WWX200 provide a high clamping force.

Variety of cutter types, diameters & pitches.

Increasing the insert thickness, while achieving a shim-less clamping face made it possible to incorporate a large number of teeth while maintaining large chip pockets to provide a variety of cutter options. A standard inventory is maintained consisting of 3 pitch types of both arbor and shank type cutters of the same diameter. Fine pitch types in particular allow a high table feed and greatly improve efficiency.



DC=ø3.000"
Fine Pitch Type

DC=ø3.000"
Coarse Pitch Type

Comments from The Developer

The pursuit of "trouble free machining" is also reflected in the cutter body. The highly rigid radial insert support achieves a stable insert seating face by using a conical shaped shim and M5 screws. This design allows for long use and is the answer to the dissatisfied customers who have experienced "when damage to the insert has also made the cutter body unusable."

WWX Series Classification

Arbor Type

The table feed is calculated from the recommended conditions of a M chipbreaker for mild steel, during dry, stable cutting and with a cutting width of .5DC. APMX is the maximum depth of cut which differs from the recommended cutting conditions.

DC		WWX200 APMX= .197 inch						WWX400 APMX= .323 inch					
(inch)	(mm)	No.T	Table Feed (IPM)	No.T	Table Feed (IPM)	No.T	Table Feed (IPM)	No.T	Table Feed (IPM)	No.T	Table Feed (IPM)	No.T	Table Feed (IPM)
1.500	40	3	29.3	4	39.1	—	—	—	—	—	—	—	—
2.000	50	4	31.3	5	39.1	6	46.9	3	23.5	4	31.3	—	—
2.500	63	5	31.1	6	37.2	7	43.5	3	18.6	4	24.8	5	31.1
3.000	80	5	24.4	7	34.2	9	44.0	4	19.6	5	24.4	7	34.2
4.000	100	6	23.5	8	31.3	11	43.0	5	19.6	7	27.4	9	35.2
5.000	125	7	21.9	11	34.4	14	43.8	6	18.8	8	25.0	12	37.6
6.000	160	9	22.0	12	29.3	16	39.1	8	19.6	10	24.4	14	34.2
8.000	200	—	—	—	—	—	—	10	19.6	12	23.5	16	31.3
10.000	250	—	—	—	—	—	—	12	18.8	14	21.9	18	28.1

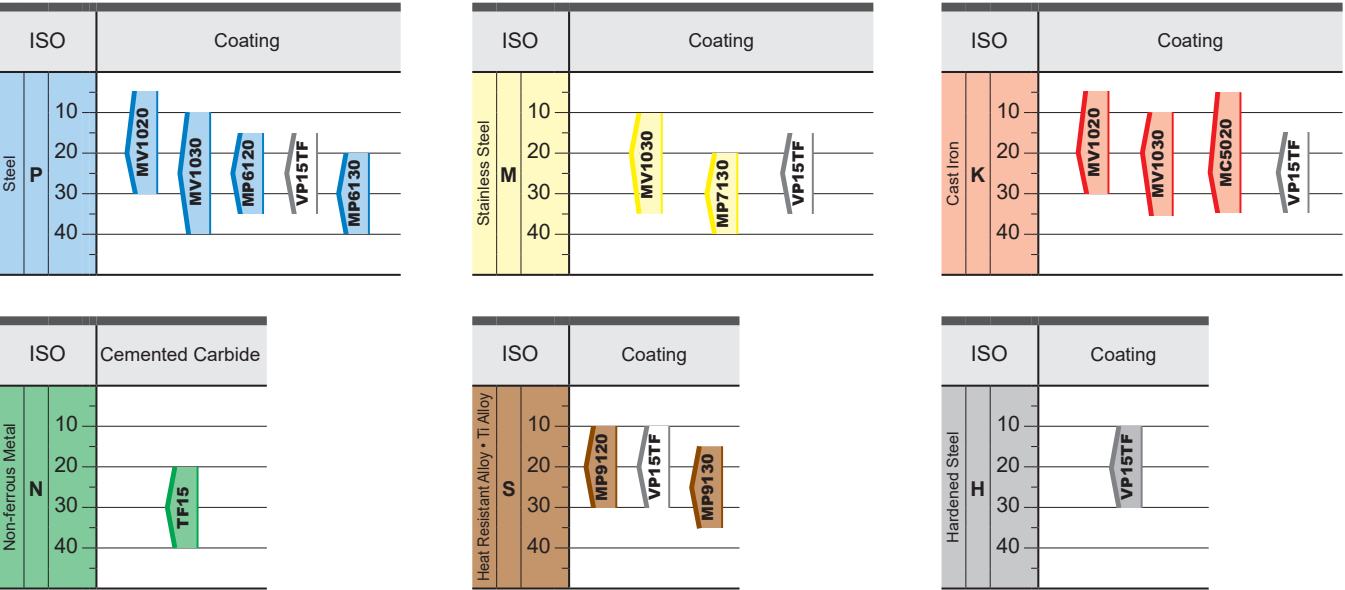
★ Number of Teeth

Shank Type

DC		WWX200 APMX= .197 inch					WWX400 APMX= .323 inch				
(inch)	DCONMS	Functional Length LF		Number of Teeth			DCONMS	Functional Length LF	Number of Teeth		
1.000	1.000	4.750	8.500	2	—	—	—	—	—	—	—
1.125	1.000	8.500	—	2	—	—	—	—	—	—	—
1.250	1.000	5.125	—	2	3	—	—	—	—	—	—
	1.000	9.000	—	3	—	—	—	—	—	—	—
	1.250	5.125	—	2	3	—	—	—	—	—	—
	1.250	9.000	—	3	—	—	—	—	—	—	—
1.500	1.250	5.125	—	3	4	—	—	—	—	—	—
	1.250	9.000	—	4	—	—	—	—	—	—	—
2.000	—	—	—	—	—	—	1.250	4.750	3	4	—
2.500	—	—	—	—	—	—	1.250	4.750	3	4	5
3.000	—	—	—	—	—	—	1.250	4.750	4	5	7

DC		WWX200 APMX 5.0 mm					WWX400 APMX 8.2 mm				
(mm)	DCONMS	Functional Length LF		Number of Teeth			DCONMS	Functional Length LF	Number of Teeth		
25	20	115	—	2	—	—	—	—	—	—	—
	25	115	170	2	—	—	—	—	—	—	—
28	25	115	170	2	—	—	—	—	—	—	—
30	25	125	—	2	—	—	—	—	—	—	—
32	32	125	—	2	3	—	—	—	—	—	—
	32	190	—	3	—	—	—	—	—	—	—
35	32	190	—	3	—	—	—	—	—	—	—
40	32	125	—	3	4	—	—	—	—	—	—
50	32	125	—	4	5	6	32	125	3	4	—
63	—	—	—	—	—	—	32	125	3	4	5
80	—	—	—	—	—	—	32	125	4	5	7

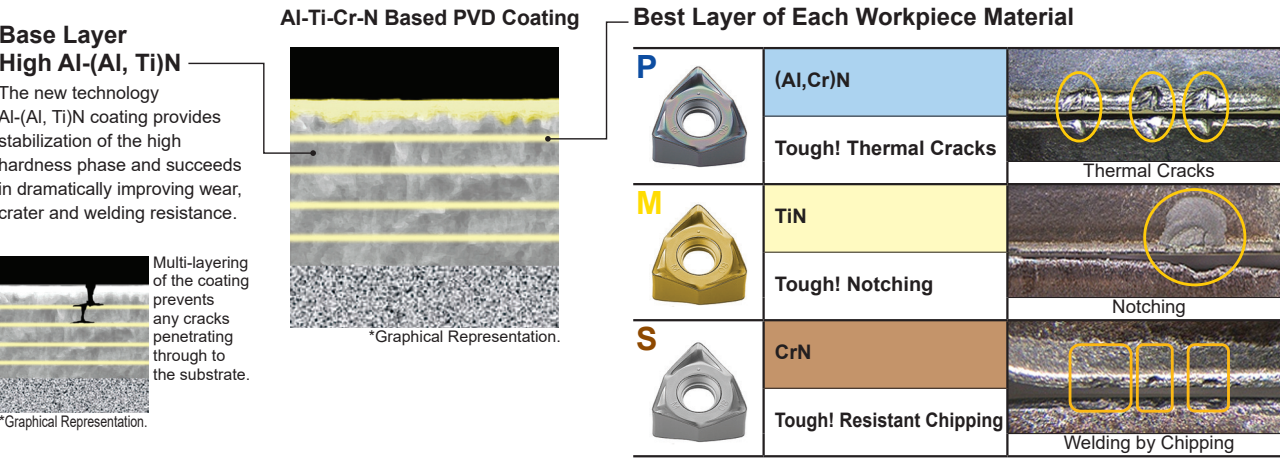
Inserts Grades for a Wide Range of Materials



MP6100/MP7100/MP9100 Series

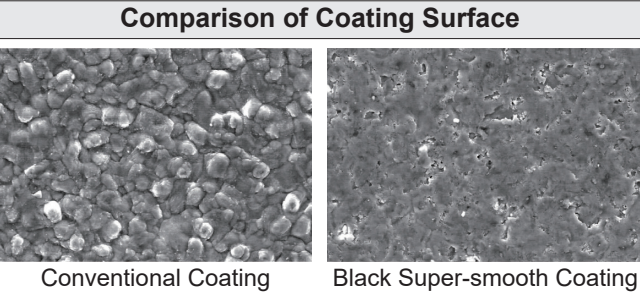
TOUGH-Σ Technology

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



CVD Coating MC5020

First recommendation for cast iron milling. MC5020 has excellent wear resistance and also controls thermal cracking and chipping that are common when machining ductile cast iron.



Black Super-smooth Coating

Black super-smooth coating prevents abnormal damage such as weld chipping.

Double-Sided Insert Type Shoulder Mill

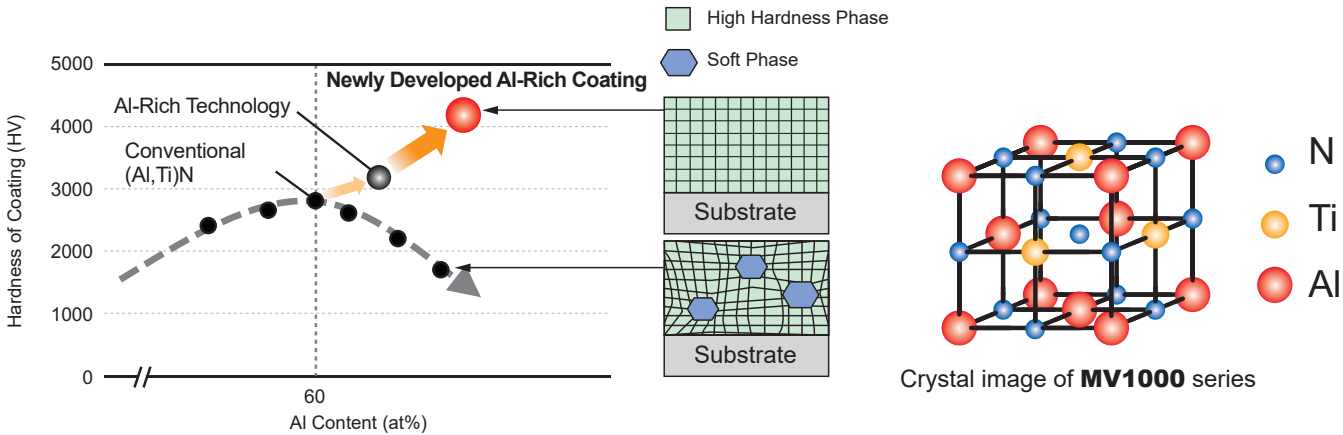
Coated Carbide Grade for Milling

MV1020/MV1030

Newly Developed Al-Rich Coating

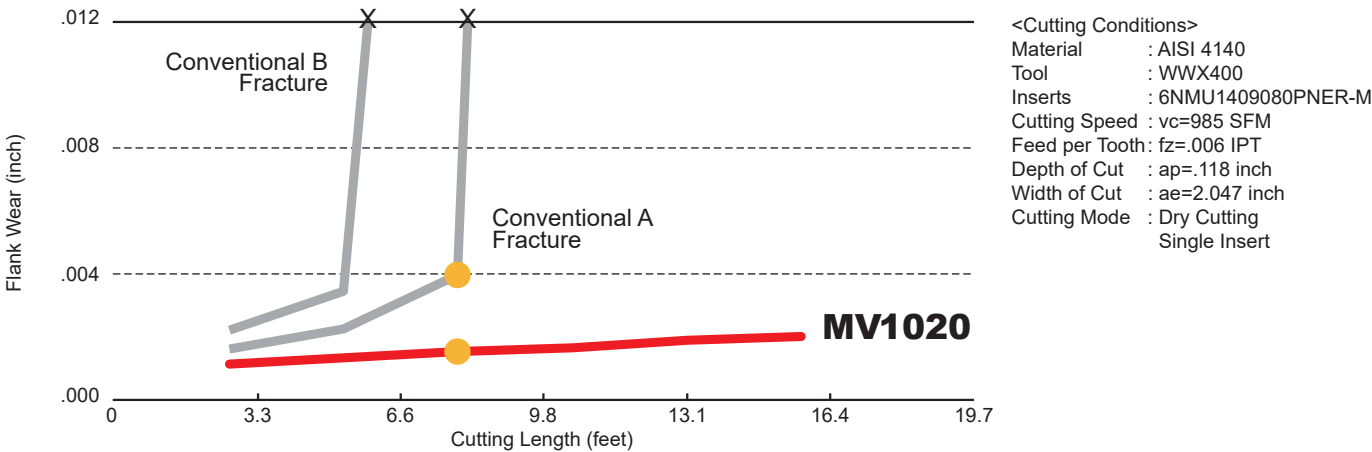
Advanced Wear and Thermal Shock Resistance

By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance. The extreme heat resistance of this new series achieves amazing stability not only during dry cutting, but also when wet cutting where inserts are usually prone to thermal cracking. MV1020 offers overwhelmingly superior performance in high-speed cutting, and MV1030 achieves stable performance during interrupted and stainless steel machining.

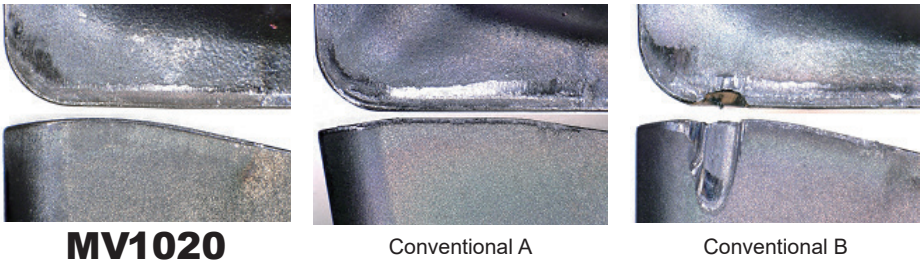


Cutting Performance

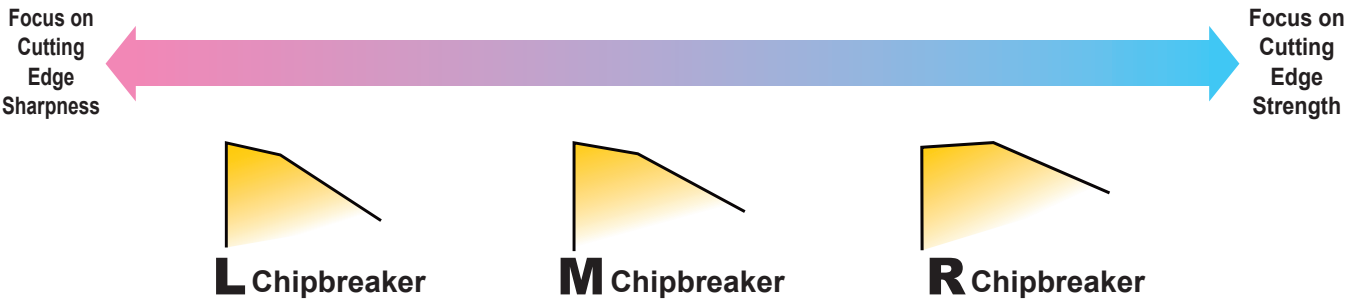
Comparison of wear resistance when machining alloy steel 4140



Taken after cutting length of 7.9 feet



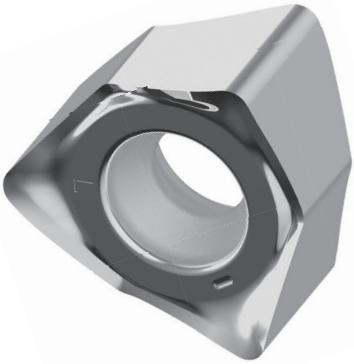
Chipbreaker System



Material	Cutting Conditions		
	Stable Cutting	General Cutting	Unstable Cutting
P	L	M	R
M	L	M	
K	L	M	R
N	L	L	
S	L	M	R
H	L	M	R

L chipbreaker ideal for machining aluminum alloys and non-ferrous metals

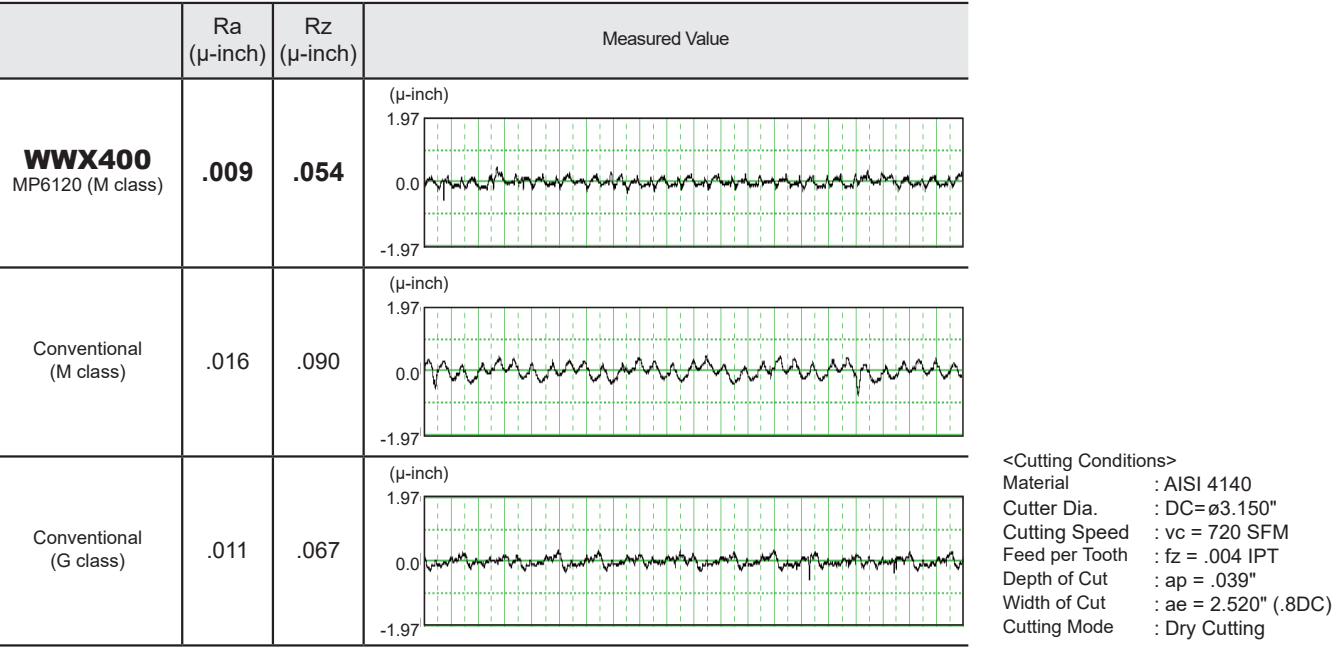
Cost advantage of using 6 corners. Precision grade provides high adhesion resistance and excellent machined surface quality. Low cutting force and good chip control.



Cutting Performance

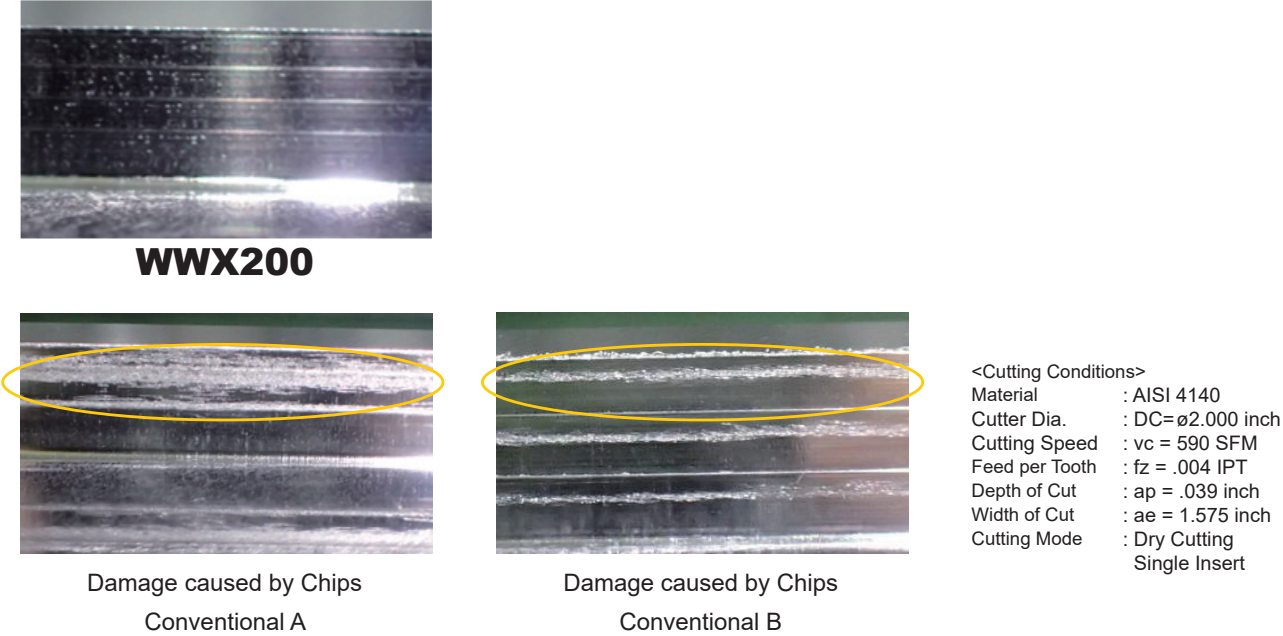
Finished Surface Comparison after Single Insert Machining of 4140

WWX400 M class inserts achieve excellent surface finishes, better than conventional G class products.



Comparison of Wall after Shoulder Milling Alloy Steel 4140

Excels in chip control and achieves excellent, scratch-free wall surfaces.

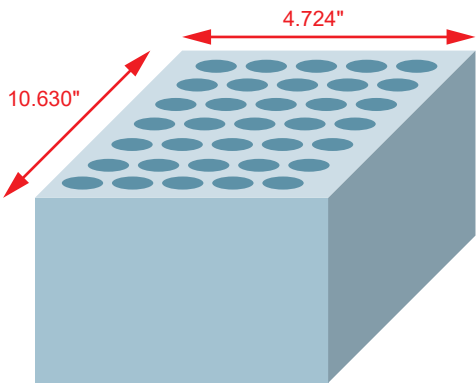


Fracture Resistance Comparison when Machining 4140

High stability is achieved without fracturing even at a feed of fz=.014 IPT.

fz (IPT)	.008	.010	.012	.014
Item				
WWX400 MP6120 (Grade M)	✓	✓	✓	✓
Conventional Single-sided Insert	✗			

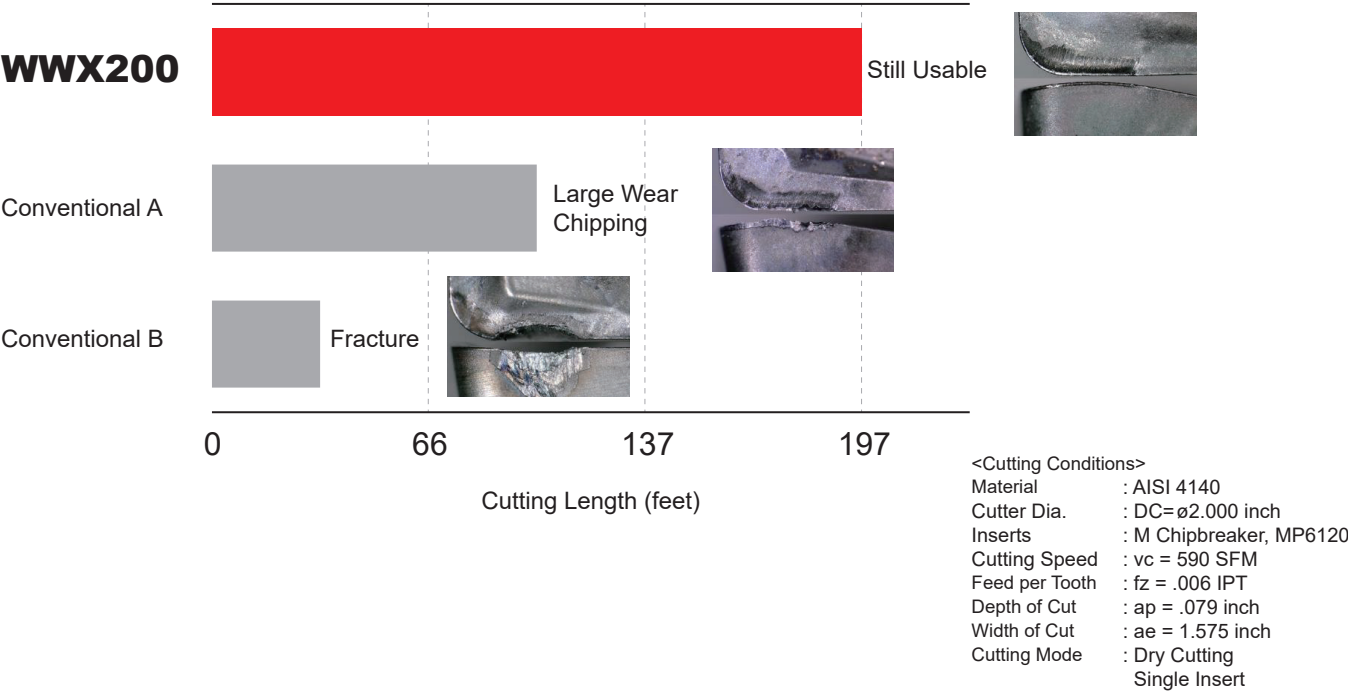
✓ : Cutting Length 5.32 Feet Possible
✗ : Fracture



2.66 feet x 2 = 5.32 feet

Comparison of Overall Cutting Length when Machining Alloy Steel 4140

Displays excellent wear and fracture resistance, and contributes to the extension of cutting length.



Double-Sided Insert Type Shoulder Mill

SHOULDER MILLING
<GENERAL CUTTING>

WWX200

- P
- M
- K
- N
- S
- H



Fig.1
ø1.500"
ø2.000"

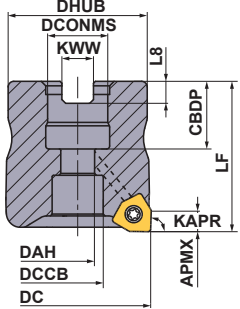
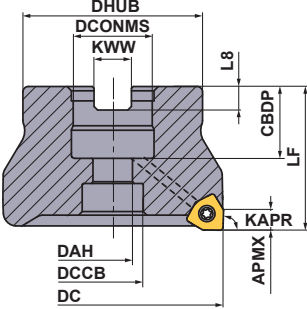


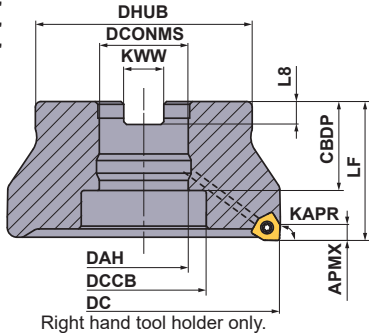
Fig.2
ø2.500"
ø3.000"



Right hand tool holder only.

Fig.3

ø4.000"
ø5.000"
ø6.000"



DC	Set Bolt	Geometry	
1.500	HSCU25011H	①	
2.000	HSCU37513H		
2.500	HSCU50014H		
3.000	HSCU50014H		
4.000	MBAU75016H	②	
5.000	MBAU75016H		
6.000	MBAU75016H		

Arbor Type

DCONMS=inch size

DC	Order Number	Stock	*1	*2	LF	DCONMS	WT (lbs)	APMX	RPMX (min ⁻¹)	Fig.
		R	Coolant Thru	No. T						
1.500	WWX200UR1.5003SA	●	Y	3	1.750	.500	.6	.197	21600	1
1.500	WWX200UR1.5004SA	●	Y	4	1.750	.500	.5	.197	21600	1
2.000	WWX200UR2.0004AA	●	Y	4	1.750	.750	.9	.197	18600	1
2.000	WWX200UR2.0005AA	●	Y	5	1.750	.750	.9	.197	18600	1
2.000	WWX200UR2.0006AA	●	Y	6	1.750	.750	.9	.197	18600	1
2.500	WWX200UR2.5005CA	●	Y	5	2.000	1.000	1.7	.197	16000	2
2.500	WWX200UR2.5006CA	●	Y	6	2.000	1.000	1.6	.197	16000	2
2.500	WWX200UR2.5007CA	●	Y	7	2.000	1.000	1.6	.197	16000	2
3.000	WWX200UR3.0005CA	●	Y	5	2.000	1.000	2.2	.197	13600	2
3.000	WWX200UR3.0007CA	●	Y	7	2.000	1.000	2.2	.197	13600	2
3.000	WWX200UR3.0009CA	●	Y	9	2.000	1.000	2.1	.197	13600	2
4.000	WWX200UR4.0006EA	●	Y	6	2.500	1.500	5.1	.197	11700	3
4.000	WWX200UR4.0008EA	●	Y	8	2.500	1.500	5.0	.197	11700	3
4.000	WWX200UR4.0011EA	●	Y	11	2.500	1.500	4.9	.197	11700	3
5.000	WWX200UR5.0007EA	●	Y	7	2.500	1.500	7.8	.197	10100	3
5.000	WWX200UR5.0011EA	●	Y	11	2.500	1.500	7.6	.197	10100	3
5.000	WWX200UR5.0014EA	●	Y	14	2.500	1.500	7.6	.197	10100	3
6.000	WWX200UR6.0009EA	●	N	9	2.500	1.500	10.0	.197	8600	3
6.000	WWX200UR6.0012EA	●	N	12	2.500	1.500	9.8	.197	8600	3
6.000	WWX200UR6.0016EA	●	N	16	2.500	1.500	9.8	.197	8600	3

*1 Y=Yes, N=No
*2 Number of Teeth

Mounting Dimensions

(inch)

DC	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
1.500	WWX200UR1.5003SA	.500	.630	.276	.433	1.438	.250	.156	1
1.500	WWX200UR1.5004SA	.500	.630	.276	.433	1.438	.250	.156	1
2.000	WWX200UR2.0004AA	.750	.748	.413	.630	1.750	.313	.187	1
2.000	WWX200UR2.0005AA	.750	.748	.413	.630	1.750	.313	.187	1
2.000	WWX200UR2.0006AA	.750	.748	.413	.630	1.750	.313	.187	1
2.500	WWX200UR2.5005CA	1.000	.945	.539	.787	2.188	.375	.219	2
2.500	WWX200UR2.5006CA	1.000	.945	.539	.787	2.188	.375	.219	2
2.500	WWX200UR2.5007CA	1.000	.945	.539	.787	2.188	.375	.219	2
3.000	WWX200UR3.0005CA	1.000	.945	.539	.787	2.188	.375	.219	2
3.000	WWX200UR3.0007CA	1.000	.945	.539	.787	2.188	.375	.219	2
3.000	WWX200UR3.0009CA	1.000	.945	.539	.787	2.188	.375	.219	2
4.000	WWX200UR4.0006EA	1.500	1.654	1.500	2.205	3.500	.625	.375	3
4.000	WWX200UR4.0008EA	1.500	1.654	1.500	2.205	3.500	.625	.375	3
4.000	WWX200UR4.0011EA	1.500	1.654	1.500	2.205	3.500	.625	.375	3
5.000	WWX200UR5.0007EA	1.500	1.654	1.500	2.205	3.813	.625	.375	3
5.000	WWX200UR5.0011EA	1.500	1.654	1.500	2.205	3.813	.625	.375	3
5.000	WWX200UR5.0014EA	1.500	1.654	1.500	2.205	3.813	.625	.375	3
6.000	WWX200UR6.0009EA	1.500	1.654	1.500	2.205	3.813	.625	.375	3
6.000	WWX200UR6.0012EA	1.500	1.654	1.500	2.205	3.813	.625	.375	3
6.000	WWX200UR6.0016EA	1.500	1.654	1.500	2.205	3.813	.625	.375	3

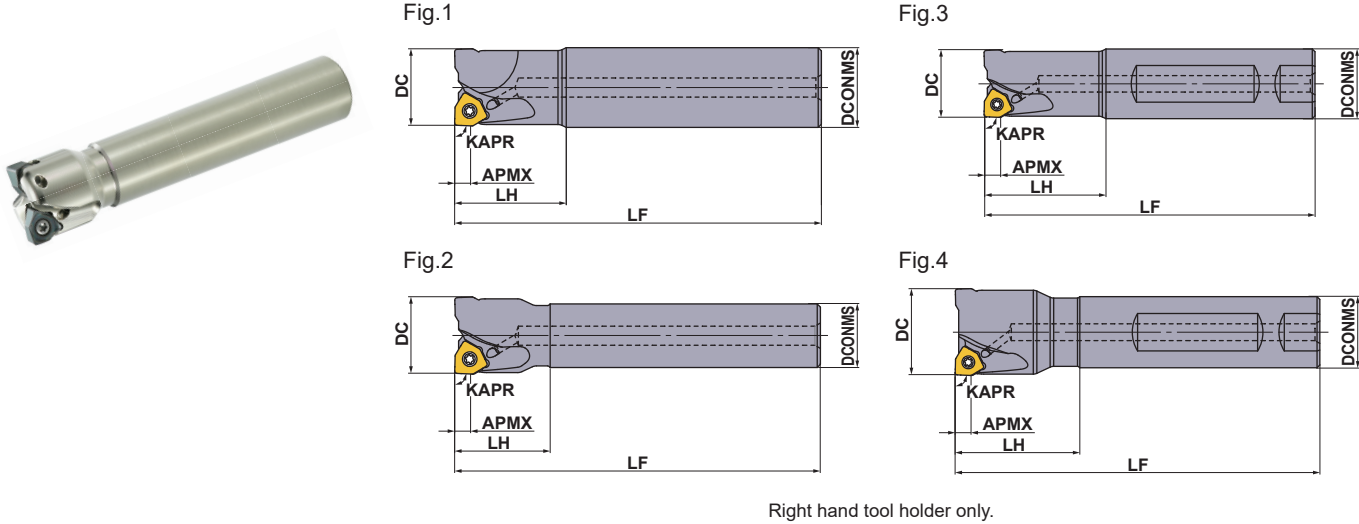
Spare Parts

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX200	TPS3R	TIP10D	MK1KS

* Clamp Torque (lbf-in) : TPS3R = 17.7

● : USA Stock

WWX200



Shank Type

With Air / Coolant through

DC	Order Number	Stock	*No.T	LF	DCONMS	LH	WT (lbs)	APMX	RPMX (min ⁻¹)	Fig.
		R								
1.000	WWX200UR1602FA16S	●	2	4.750	1.000	1.750	.9	.197	29600	3
1.000	WWX200UR1602SA16L	●	2	8.500	1.000	2.500	1.7	.197	29600	1
1.125	WWX200UR1802SA16L	●	2	8.500	1.000	1.750	1.8	.197	27400	2
1.250	WWX200UR2002FA16S	●	2	5.125	1.000	1.750	1.1	.197	25100	4
1.250	WWX200UR2003FA16S	●	3	5.125	1.000	1.750	1.1	.197	25100	4
1.250	WWX200UR2003SA16L	●	3	9.000	1.000	1.750	1.9	.197	25100	2
1.250	WWX200UR2002FA20S	●	2	5.125	1.250	2.000	1.5	.197	25100	3
1.250	WWX200UR2003FA20S	●	3	5.125	1.250	2.000	1.5	.197	25100	3
1.250	WWX200UR2003SA20L	●	3	9.000	1.250	3.000	2.8	.197	25100	1
1.500	WWX200UR2403FA20S	●	3	5.125	1.250	2.000	1.7	.197	21600	4
1.500	WWX200UR2404FA20S	●	4	5.125	1.250	2.000	1.7	.197	21600	4
1.500	WWX200UR2404SA20L	●	4	9.000	1.250	2.000	3.0	.197	21600	2

* Number of Teeth

Spare Parts

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX200	TPS3R	TIP10D	MK1KS

* Clamp Torque (lbf-in) : TPS3R = 17.7

● : USA Stock ★ : Stocked in Japan

SHOULDER MILLING
<GENERAL CUTTING>

WWX200

P M K N S H



Metric Standard

Arbor Type

DCONMS = inch size

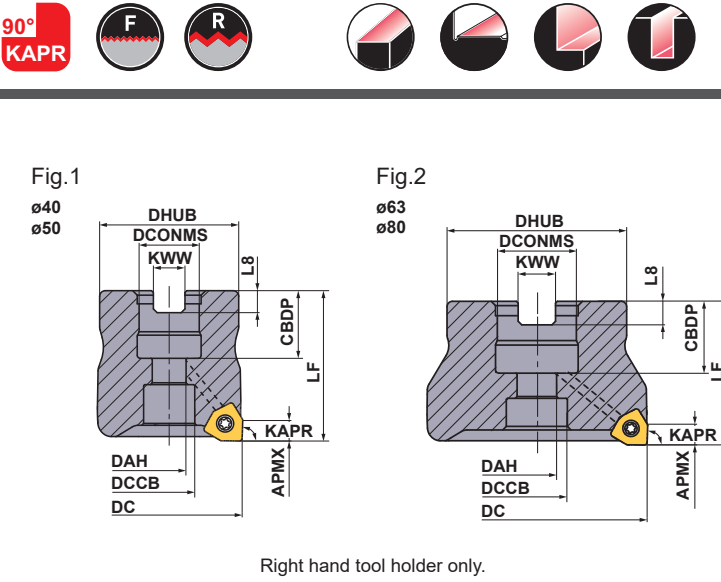
DC	Order Number	Stock	*1Coolant Thru	*2No.T	LF	DCONMS	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.
		R								
80	WWX200R08005CA	★	Y	5	50	25.4	1.1	5.0	13600	2
80	WWX200R08007CA	★	Y	7	50	25.4	1.1	5.0	13600	2
80	WWX200R08009CA	★	Y	9	50	25.4	1.0	5.0	13600	2
100	WWX200R10006DA	★	Y	6	50	31.75	1.6	5.0	11700	3
100	WWX200R10008DA	★	Y	8	50	31.75	1.5	5.0	11700	3
100	WWX200R10011DA	★	Y	11	50	31.75	1.5	5.0	11700	3
125	WWX200R12507EA	★	Y	7	63	38.1	2.8	5.0	10100	3
125	WWX200R12511EA	★	Y	11	63	38.1	2.8	5.0	10100	3
125	WWX200R12514EA	★	Y	14	63	38.1	2.8	5.0	10100	3
160	WWX200R16009FA	★	Y	9	63	50.8	4.6	5.0	8600	3
160	WWX200R16012FA	★	Y	12	63	50.8	4.5	5.0	8600	3
160	WWX200R16016FA	★	Y	16	63	50.8	4.5	5.0	8600	3

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 19, when ordering.

Note2) Please use a set bolt of the FMA type on the cutter body from 80 to 160 in diameter(DC).



Right hand tool holder only.

WWX200

Fig.3
ø100
ø125
ø160

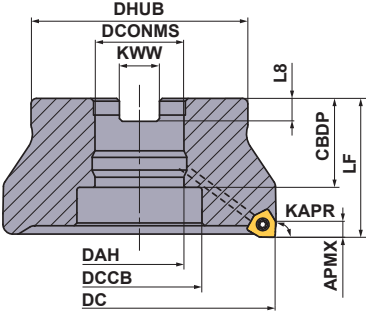
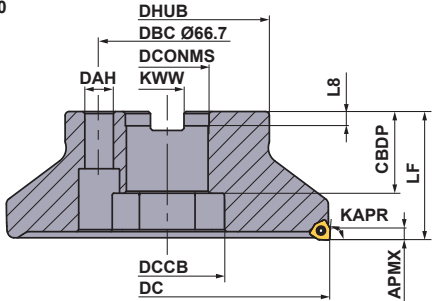


Fig.4
ø160



Right hand tool holder only.

Metric Standard

Arbor Type

DCONMS = mm size

DC	Order Number	Stock	*1	*2	LF	DCONMS	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.
		R	Coolant Thru	No. T						
40	WWX200-040A03AR	★	Y	3	40	16	0.2	5.0	21600	1
40	WWX200-040A04AR	★	Y	4	40	16	0.2	5.0	21600	1
50	WWX200-050A04AR	★	Y	4	40	22	0.4	5.0	18600	1
50	WWX200-050A05AR	★	Y	5	40	22	0.4	5.0	18600	1
50	WWX200-050A06AR	★	Y	6	40	22	0.3	5.0	18600	1
63	WWX200-063A05AR	★	Y	5	40	22	0.5	5.0	16000	2
63	WWX200-063A06AR	★	Y	6	40	22	0.5	5.0	16000	2
63	WWX200-063A07AR	★	Y	7	40	22	0.5	5.0	16000	2
80	WWX200-080A05AR	★	Y	5	50	27	1.1	5.0	13600	2
80	WWX200-080A07AR	★	Y	7	50	27	1.0	5.0	13600	2
80	WWX200-080A09AR	★	Y	9	50	27	1.0	5.0	13600	2
100	WWX200-100B06AR	★	Y	6	50	32	1.7	5.0	11700	3
100	WWX200-100B08AR	★	Y	8	50	32	1.7	5.0	11700	3
100	WWX200-100B11AR	★	Y	11	50	32	1.7	5.0	11700	3
125	WWX200-125B07AR	★	Y	7	63	40	3.1	5.0	10100	3
125	WWX200-125B11AR	★	Y	11	63	40	3.0	5.0	10100	3
125	WWX200-125B14AR	★	Y	14	63	40	3.0	5.0	10100	3
160	WWX200-160C09NR	★	N	9	63	40	4.6	5.0	8600	4
160	WWX200-160C12NR	★	N	12	63	40	4.6	5.0	8600	4
160	WWX200-160C16NR	★	N	16	63	40	4.6	5.0	8600	4

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 19, when ordering.

Note2) Please use a set bolt of the FMC type on the cutter body from 40 to 100 in diameter(DC).

Note3) Please use a set bolt of the FMA type on the cutter body from 125 to 160 in diameter(DC).

Spare Parts

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX200	TPS3R	TIP10D	MK1KS

* Clamp Torque (N • m) : TPS3R = 2.0

★ : Stocked in Japan

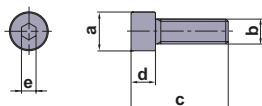
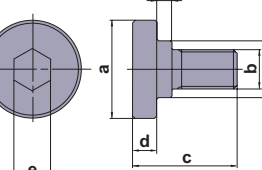
Mounting Dimensions

(mm)

DC	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
40	WWX200-040A03AR	16	18	9	13.6	37	8.4	5.6	1
40	WWX200-040A04AR	16	18	9	13.6	37	8.4	5.6	1
50	WWX200-050A04AR	22	20	11	17	47	10.4	6.3	1
50	WWX200-050A05AR	22	20	11	17	47	10.4	6.3	1
50	WWX200-050A06AR	22	20	11	17	47	10.4	6.3	1
63	WWX200-063A05AR	22	20	11	17	50	10.4	6.3	2
63	WWX200-063A06AR	22	20	11	17	50	10.4	6.3	2
63	WWX200-063A07AR	22	20	11	17	50	10.4	6.3	2
80	WWX200R08005CA	25.4	26	13	20	56	9.5	6	2
80	WWX200R08007CA	25.4	26	13	20	56	9.5	6	2
80	WWX200R08009CA	25.4	26	13	20	56	9.5	6	2
80	WWX200-080A05AR	27	23	13	20	56	12.4	7	2
80	WWX200-080A07AR	27	23	13	20	56	12.4	7	2
80	WWX200-080A09AR	27	23	13	20	56	12.4	7	2
100	WWX200R10006DA	31.75	37	31.75	45	70	12.7	8	3
100	WWX200R10008DA	31.75	37	31.75	45	70	12.7	8	3
100	WWX200R10011DA	31.75	37	31.75	45	70	12.7	8	3
100	WWX200-100B06AR	32	26	32	45	78	14.4	8	3
100	WWX200-100B08AR	32	26	32	45	78	14.4	8	3
100	WWX200-100B11AR	32	26	32	45	78	14.4	8	3
125	WWX200R12507EA	38.1	42	38.1	56	80	15.9	10	3
125	WWX200R12511EA	38.1	42	38.1	56	80	15.9	10	3
125	WWX200R12514EA	38.1	42	38.1	56	80	15.9	10	3
125	WWX200-125B07AR	40	35	42	56	89	16.4	9	3
125	WWX200-125B11AR	40	35	42	56	89	16.4	9	3
125	WWX200-125B14AR	40	35	42	56	89	16.4	9	3
160	WWX200-160C09NR	40	40	—	56	100	16.4	9	4
160	WWX200-160C12NR	40	40	—	56	100	16.4	9	4
160	WWX200-160C16NR	40	40	—	56	100	16.4	9	4
160	WWX200R16009FA	50.8	45	50.8	72	100	19.1	11	3
160	WWX200R16012FA	50.8	45	50.8	72	100	19.1	11	3
160	WWX200R16016FA	50.8	45	50.8	72	100	19.1	11	3

Parts Sold Separately
Set Bolt

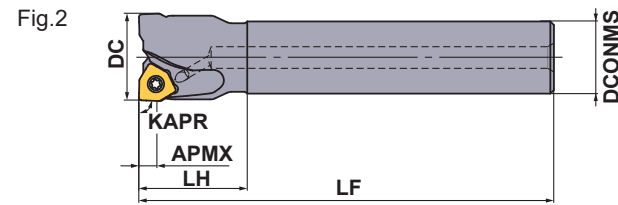
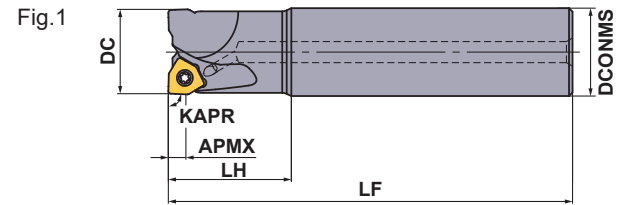
(mm)

Tool Holder Type	Set Bolt		Fig.	Reference Dimensions								Geometry
	With Coolant Thru	Without Coolant Thru										
	Order Number	Order Number		a	b	c	d	e	f	g		
WWX200R080CA	HSC12035H	HSC12035	1	18	M12x1.75	47	12	10	—	—		
WWX200R100DA	MBA16033H	—	2	40	M16x2	43	10	14	6	23		
WWX200R125EA	MBA20040H	—	2	50	M20x2.5	54	14	17	6	27		
WWX200R160FA	MBA24045H	—	2	65	M24x3	59	14	17	10	37		
WWX200-040AAR	HSC08025H	—	1	13	M8x1.25	33	8	5	—	—		
WWX200-050AAR	HSC10030H	HSC10035	1	16	M10x1.5	40(45)	10	6	—	—		
WWX200-063AAR	HSC10030H	HSC10035	1	16	M10x1.5	40(45)	10	6	—	—		
WWX200-080AAR	HSC12035H	HSC12035	1	18	M12x1.75	47	12	10	—	—		
WWX200-100BAR	MBA16033H	—	2	40	M16x2	43	10	14	6	23		
WWX200-125BAR	MBA20040H	—	2	50	M20x2.5	54	14	17	6	27		
WWX200-160CNR	No Coolant Thru	—	2	50	M20x2.5	54	14	17	6	27		

Note 1) Please purchase the appropriate set bolt after confirming the reference dimensions. The items with an order number listed under the Set Bolt columns are also sold by MITSUBISHI MATERIALS.

Note 2) Internal coolant through is necessary with the set bolt.

WWX200



Metric Standard

With Air / Coolant through										(mm)
DC	Order Number	Stock	*	LF	DCONMS	LH	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.
		R	No.T							
25	WWX200R2502SA20S	★	2	115	20	30	0.3	5	29600	2
25	WWX200R2502SA25S	★	2	115	25	35	0.4	5	29600	1
25	WWX200R2502SA25L	★	2	170	25	70	0.6	5	29600	1
28	WWX200R2802SA25S	★	2	115	25	35	0.4	5	27400	2
28	WWX200R2802SA25L	★	2	170	25	35	0.6	5	27400	2
30	WWX200R3002SA25S	★	2	125	25	35	0.5	5	26200	2
32	WWX200R3202SA32S	★	2	125	32	45	0.7	5	26200	1
32	WWX200R3203SA32S	★	3	125	32	45	0.7	5	26200	1
32	WWX200R3203SA32L	★	3	190	32	90	1.0	5	26200	1
35	WWX200R3503SA32L	★	3	190	32	45	1.1	5	25100	2
40	WWX200R4003SA32S	★	3	125	32	45	0.8	5	21600	2
40	WWX200R4004SA32S	★	4	125	32	45	0.8	5	21600	2
50	WWX200R5004SA32S	★	4	125	32	45	0.9	5	18600	2
50	WWX200R5005SA32S	★	5	125	32	45	0.9	5	18600	2
50	WWX200R5006SA32S	★	6	125	32	45	0.9	5	18600	2

Tool Holder Type	 *		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX200	TPS3R	TIP10D	MK1KS

[illegible]

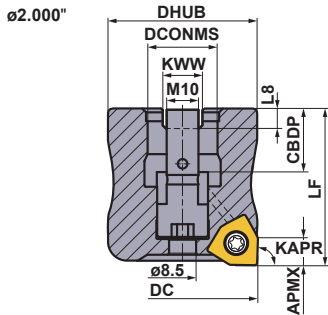
● = NEW

Double-Sided Insert Type Shoulder Mill

SHOULDER MILLING
<GENERAL CUTTING>

WWX400 2.000"

- P
- M
- K
- N
- S
- H



Right hand tool holder only.
The set bolt is built in.
Allen wrench (1/4 inch Hex Key size) is used to tighten the set bolt.

Arbor Type

DCONMS=inch size

DC	Order Number	Stock	*1	*2	LF	DCONMS	WT (lbs)	APMX	RMPX	RPMX (min ⁻¹)
		R	Coolant Thru	No.T						
2.000	WWX400UR2.0003AA	●	Y	3	2.125	.750	1.1	.323	.4°	5000
2.000	WWX400UR2.0004AA	●	Y	4	2.125	.750	1.1	.323	.4°	5000

*1 Y=Yes, N=No
*2 Number of Teeth
Note 1) The maximum spindle speeds **RPMX** are set to ensure tool and insert stability.
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.
Note 3) The milling cutter has a built-in set bolt. The set bolt cannot be replaced.
Therefore, absolutely do not disassemble the milling cutter.

Mounting Dimensions

DC	Order Number	DCONMS	CBDP	DHUB	KWW	L8
2.000	WWX400UR2.0003AA	.750	.858	1.750	.313	.187
2.000	WWX400UR2.0004AA	.750	.858	1.750	.313	.187

Spare Parts

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

* Clamp Torque (lbf-in) : TS5R = 44

● : USA Stock

SHOULDER MILLING
<GENERAL CUTTING>

WWX400

- P
- M
- K
- N
- S
- H



Fig.1
ø2.500"

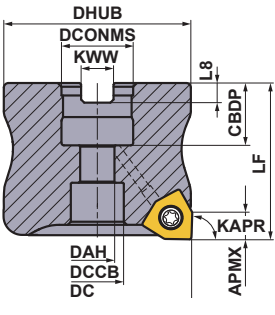
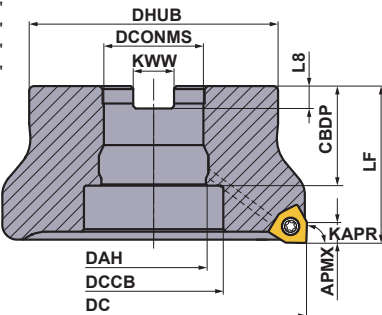


Fig.2
ø3.000"
ø4.000"
ø5.000"
ø6.000"



Right hand tool holder only.

Arbor Type

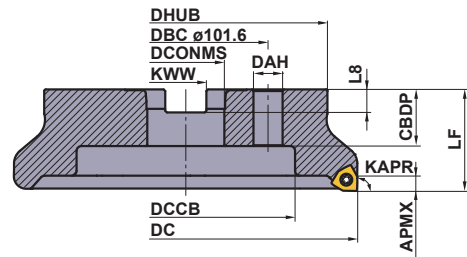
DCONMS=inch size

DC	Order Number	Stock	*1	*2	LF	DCONMS	WT (lbs)	APMX	RMPX	RPMX (min ⁻¹)	Fig.
		R	Coolant thru	No.T							
2.500	WWX400UR2.5003CA	●	Y	3	2.000	1.000	1.6	.323	.26°	14000	1
2.500	WWX400UR2.5004CA	●	Y	4	2.000	1.000	1.5	.323	.26°	14000	1
2.500	WWX400UR2.5005CA	●	Y	5	2.000	1.000	1.5	.323	.26°	14000	1
3.000	WWX400UR3.0004CA	●	Y	4	2.000	1.000	2.1	.323	.16°	12600	2
3.000	WWX400UR3.0005CA	●	Y	5	2.000	1.000	2.1	.323	.16°	12600	2
3.000	WWX400UR3.0007CA	●	Y	7	2.000	1.000	1.9	.323	.16°	12600	2
4.000	WWX400UR4.0005EA	●	Y	5	2.500	1.500	4.9	.323	—	10700	2
4.000	WWX400UR4.0007EA	●	Y	7	2.500	1.500	4.8	.323	—	10700	2
4.000	WWX400UR4.0009EA	●	Y	9	2.500	1.500	4.7	.323	—	10700	2
5.000	WWX400UR5.0006EA	●	Y	6	2.500	1.500	7.6	.323	—	9400	2
5.000	WWX400UR5.0008EA	●	Y	8	2.500	1.500	7.5	.323	—	9400	2
5.000	WWX400UR5.0012EA	●	Y	12	2.500	1.500	7.3	.323	—	9400	2
6.000	WWX400UR6.0008EA	●	Y	8	2.500	1.500	9.9	.323	—	8500	2
6.000	WWX400UR6.0010EA	●	Y	10	2.500	1.500	9.8	.323	—	8500	2
6.000	WWX400UR6.0014EA	●	Y	14	2.500	1.500	9.7	.323	—	8500	2
8.000	WWX400UR8.0010MN	●	N	10	2.500	2.500	17.3	.323	—	7200	3
8.000	WWX400UR8.0012MN	●	N	12	2.500	2.500	17.2	.323	—	7200	3
8.000	WWX400UR8.0016MN	●	N	16	2.500	2.500	17	.323	—	7200	3
10.000	WWX400UR10.0012MN	●	N	12	2.500	2.500	29.3	.323	—	6400	3
10.000	WWX400UR10.0014MN	●	N	14	2.500	2.500	29.3	.323	—	6400	3
10.000	WWX400UR10.0018MN	●	N	18	2.500	2.500	29	.323	—	6400	3

*1 Y=Yes, N=No
*2 Number of Teeth

WWX400

Fig.3
ø8.000"
ø10.000"



Right hand tool holder only.

DC	Set Bolt	Geometry	
2.500	HSCU50014H	①	
3.000	HSCU50014H		
4.000	MBAU75016H	②	
5.000	MBAU75016H		
6.000	MBAU75016H	—	
8.000	—		
10.000	—		

Mounting Dimensions

(inch)

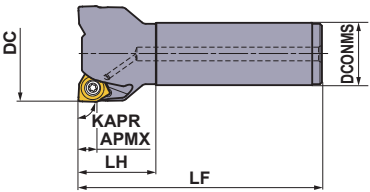
DC	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
2.500	WWX400UR2.5003CA	1.000	.945	.539	.787	2.190	.375	.219	1
2.500	WWX400UR2.5004CA	1.000	.945	.539	.787	2.190	.375	.219	1
2.500	WWX400UR2.5005CA	1.000	.945	.539	.787	2.190	.375	.219	1
3.000	WWX400UR3.0004CA	1.000	.945	.539	.787	2.190	.375	.219	2
3.000	WWX400UR3.0005CA	1.000	.945	.539	.787	2.190	.375	.219	2
3.000	WWX400UR3.0007CA	1.000	.945	.539	.787	2.190	.375	.219	2
4.000	WWX400UR4.0005EA	1.500	1.654	1.500	2.205	3.500	.625	.375	2
4.000	WWX400UR4.0007EA	1.500	1.654	1.500	2.205	3.500	.625	.375	2
4.000	WWX400UR4.0009EA	1.500	1.654	1.500	2.205	3.500	.625	.375	2
5.000	WWX400UR5.0006EA	1.500	1.654	1.500	2.205	3.813	.625	.375	2
5.000	WWX400UR5.0008EA	1.500	1.654	1.500	2.205	3.813	.625	.375	2
5.000	WWX400UR5.0012EA	1.500	1.654	1.500	2.205	3.813	.625	.375	2
6.000	WWX400UR6.0008EA	1.500	1.654	1.500	2.205	3.813	.625	.375	2
6.000	WWX400UR6.0010EA	1.500	1.654	1.500	2.205	3.813	.625	.375	2
6.000	WWX400UR6.0014EA	1.500	1.654	1.500	2.205	3.813	.625	.375	2
8.000	WWX400UR8.0010MN	2.500	1.378	.709	5.512	6.890	1.000	.560	3
8.000	WWX400UR8.0012MN	2.500	1.378	.709	5.512	6.890	1.000	.560	3
8.000	WWX400UR8.0016MN	2.500	1.378	.709	5.512	6.890	1.000	.560	3
10.000	WWX400UR10.0012MN	2.500	1.378	.709	7.087	8.661	1.000	.560	3
10.000	WWX400UR10.0014MN	2.500	1.378	.709	7.087	8.661	1.000	.560	3
10.000	WWX400UR10.0018MN	2.500	1.378	.709	7.087	8.661	1.000	.560	3

Spare Parts

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

★ Clamp Torque (lbf-in) : TS5R = 44

● : USA Stock



Right hand tool holder only.

Shank Type

With Air / Coolant through

(inch)

DC	Order Number	Stock R	* No.T	LF	DCONMS	LH	WT (lbs)	APMX	RMPX	RPMX (min ⁻¹)
2.000	WWX400UR3203FA20M	●	3	4.750	1.250	1.500	1.7	.323	.4°	15800
2.000	WWX400UR3204FA20M	●	4	4.750	1.250	1.500	1.7	.323	.4°	15800
2.500	WWX400UR4003FA20M	●	3	4.750	1.250	1.500	2.1	.323	.26°	14000
2.500	WWX400UR4004FA20M	●	4	4.750	1.250	1.500	2	.323	.26°	14000
2.500	WWX400UR4005FA20M	●	5	4.750	1.250	1.500	2	.323	.26°	14000
3.000	WWX400UR4804FA20M	●	4	4.750	1.250	1.500	2.5	.323	.16°	12600
3.000	WWX400UR4805FA20M	●	5	4.750	1.250	1.500	2.4	.323	.16°	12600
3.000	WWX400UR4807FA20M	●	7	4.750	1.250	1.500	2.3	.323	.16°	12600

★ Number of Teeth

Spare Parts

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

★ Clamp Torque (lbf-in) : TS5R = 44

Double-Sided Insert Type Shoulder Mill

SHOULDER MILLING<GENERAL CUTTING>

WWX400

P M K N S H

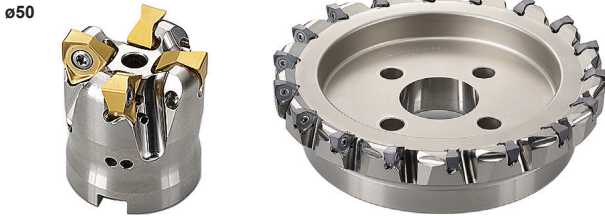


Fig.1

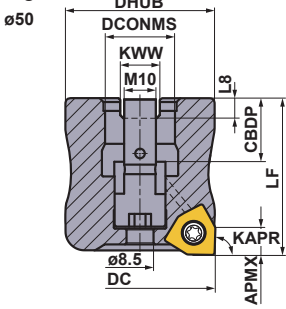
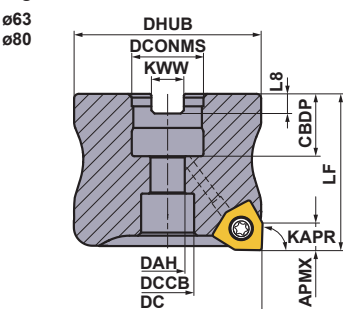


Fig.2



Right hand tool holder only.

Metric Standard

Arbor Type

DCONMS=inch size

DC	Order Number	Stock	*1	*2	LF	DCONMS	WT (kg)	APMX	RMPX	RPMX (min ⁻¹)	Fig.
		R	Coolant Thru	No.T							
80	WWX400R08004CA	★	Y	4	50	25.4	1.0	8.2	0.16°	12200	2
80	WWX400R08005CA	★	Y	5	50	25.4	1.0	8.2	0.16°	12200	2
80	WWX400R08007CA	★	Y	7	50	25.4	0.9	8.2	0.16°	12200	2
100	WWX400R10005DA	★	Y	5	50	31.75	1.4	8.2	—	10700	3
100	WWX400R10007DA	★	Y	7	50	31.75	1.4	8.2	—	10700	3
100	WWX400R10009DA	★	Y	9	50	31.75	1.3	8.2	—	10700	3
125	WWX400R12506EA	★	Y	6	63	38.1	2.8	8.2	—	9500	3
125	WWX400R12508EA	★	Y	8	63	38.1	2.8	8.2	—	9500	3
125	WWX400R12512EA	★	Y	12	63	38.1	2.7	8.2	—	9500	3
160	WWX400R16008FA	★	Y	8	63	50.8	4.5	8.2	—	8300	3
160	WWX400R16010FA	★	Y	10	63	50.8	4.4	8.2	—	8300	3
160	WWX400R16014FA	★	Y	14	63	50.8	4.3	8.2	—	8300	3
200	WWX400R20010KN	★	N	10	63	47.625	8.1	8.2	—	7300	5
200	WWX400R20012KN	★	N	12	63	47.625	8.1	8.2	—	7300	5
200	WWX400R20016KN	★	N	16	63	47.625	8.0	8.2	—	7300	5
250	WWX400R25012KN	★	N	12	63	47.625	12.1	8.2	—	6400	5
250	WWX400R25014KN	★	N	14	63	47.625	12.1	8.2	—	6400	5
250	WWX400R25018KN	★	N	18	63	47.625	12.0	8.2	—	6400	5

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 28, when ordering.

Note2) Please use a set bolt of the FMA type on the cutter body from 80 to 250 in diameter(DC).

★ : Stocked in Japan

Fig.3

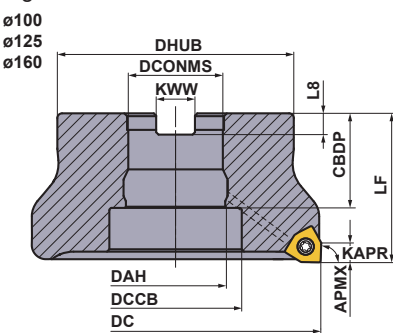
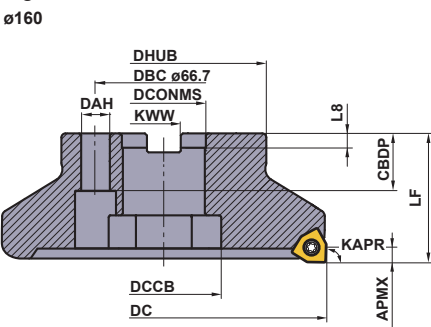
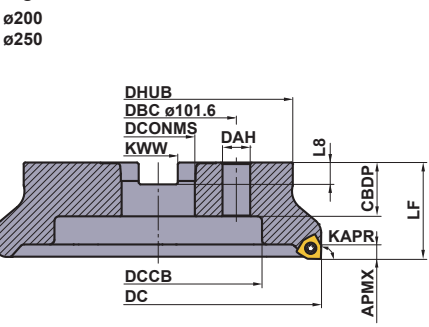


Fig.4



Right hand tool holder only.

Fig.5



Metric Standard

Arbor Type

DCONMS=mm size

(mm)

DC	Order Number	Stock	*1	*2	LF	DCONMS	WT (kg)	APMX	RMPX	RPMX (min ⁻¹)	Fig.
		R	Coolant Thru	No.T							
50	WWX400-050A03AR	★	Y	3	55	22	0.5	8.2	0.4°	5000	1
50	WWX400-050A04AR	★	Y	4	55	22	0.5	8.2	0.4°	5000	1
63	WWX400-063A03AR	★	Y	3	40	22	0.5	8.2	0.26°	14100	2
63	WWX400-063A04AR	★	Y	4	40	22	0.5	8.2	0.26°	14100	2
63	WWX400-063A05AR	★	Y	5	40	22	0.5	8.2	0.26°	14100	2
80	WWX400-080A04AR	★	Y	4	50	27	1.0	8.2	0.16°	12200	2
80	WWX400-080A05AR	★	Y	5	50	27	1.0	8.2	0.16°	12200	2
80	WWX400-080A07AR	★	Y	7	50	27	0.9	8.2	0.16°	12200	2
100	WWX400-100B05AR	★	Y	5	50	32	1.6	8.2	—	10700	3
100	WWX400-100B07AR	★	Y	7	50	32	1.5	8.2	—	10700	3
100	WWX400-100B09AR	★	Y	9	50	32	1.5	8.2	—	10700	3
125	WWX400-125B06AR	★	Y	6	63	40	3.0	8.2	—	9500	3
125	WWX400-125B08AR	★	Y	8	63	40	3.0	8.2	—	9500	3
125	WWX400-125B12AR	★	Y	12	63	40	2.9	8.2	—	9500	3
160	WWX400-160C08NR	★	N	8	63	40	4.5	8.2	—	8300	4
160	WWX400-160C10NR	★	N	10	63	40	4.4	8.2	—	8300	4
160	WWX400-160C14NR	★	N	14	63	40	4.4	8.2	—	8300	4
200	WWX400-200C10NR	★	N	10	63	60	6.7	8.2	—	7300	5
200	WWX400-200C12NR	★	N	12	63	60	6.7	8.2	—	7300	5
200	WWX400-200C16NR	★	N	16	63	60	6.6	8.2	—	7300	5
250	WWX400-250C12NR	★	N	12	63	60	11.5	8.2	—	6400	5
250	WWX400-250C14NR	★	N	14	63	60	11.5	8.2	—	6400	5
250	WWX400-250C18NR	★	N	18	63	60	11.4	8.2	—	6400	5

*1 Y=Yes, N=No

*2 Number of Teeth

Note1) A set bolt to the arbor is not supplied with the body. Please refer to page 28, when ordering.

Note2) The milling cutter with cutting diameter DC=50 mm has a built-in set bolt. The set bolt cannot be replaced.

Therefore, do not disassemble the milling cutter.

Note3) Please use a set bolt of the FMC type on the cutter body from 63 to 100 in diameter(DC).

Note4) Please use a set bolt of the FMA type on the cutter body from 125 to 250 in diameter(DC).

Spare Parts

Tool Holder Type	★		
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

★ Clamp Torque (N • m) : TS5R = 5.0

Double-Sided Insert Type Shoulder Mill

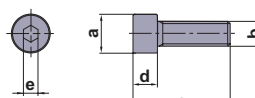
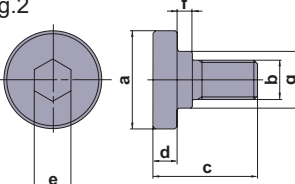
Mounting Dimensions

(mm)

DC	Order Number	DCONMS	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
50	WWX400-050A03AR	22	20	—	—	47	10.4	6.3	1
50	WWX400-050A04AR	22	20	—	—	47	10.4	6.3	1
63	WWX400-063A03AR	22	20	11	17	50	10.4	6.3	2
63	WWX400-063A04AR	22	20	11	17	50	10.4	6.3	2
63	WWX400-063A05AR	22	20	11	17	50	10.4	6.3	2
80	WWX400R08004CA	25.4	26	13	20	56	9.5	6	2
80	WWX400R08005CA	25.4	26	13	20	56	9.5	6	2
80	WWX400R08007CA	25.4	26	13	20	56	9.5	6	2
80	WWX400-080A04AR	27	23	13	20	56	12.4	7	2
80	WWX400-080A05AR	27	23	13	20	56	12.4	7	2
80	WWX400-080A07AR	27	23	13	20	56	12.4	7	2
100	WWX400R10005DA	31.75	37	31.75	45	70	12.7	8	3
100	WWX400R10007DA	31.75	37	31.75	45	70	12.7	8	3
100	WWX400R10009DA	31.75	37	31.75	45	70	12.7	8	3
100	WWX400-100B05AR	32	32	32	45	78	14.4	8	3
100	WWX400-100B07AR	32	32	32	45	78	14.4	8	3
100	WWX400-100B09AR	32	32	32	45	78	14.4	8	3
125	WWX400R12506EA	38.1	42	38.1	56	80	15.9	10	3
125	WWX400R12508EA	38.1	42	38.1	56	80	15.9	10	3
125	WWX400R12512EA	38.1	42	38.1	56	80	15.9	10	3
125	WWX400-125B06AR	40	40	40	56	89	16.4	9	3
125	WWX400-125B08AR	40	40	40	56	89	16.4	9	3
125	WWX400-125B12AR	40	40	40	56	89	16.4	9	3
160	WWX400-160C08NR	40	40	14	56	100	16.4	9	4
160	WWX400-160C10NR	40	40	14	56	100	16.4	9	4
160	WWX400-160C14NR	40	40	14	56	100	16.4	9	4
160	WWX400R16008FA	50.8	45	50.8	72	100	19.1	11	3
160	WWX400R16010FA	50.8	45	50.8	72	100	19.1	11	3
160	WWX400R16014FA	50.8	45	50.8	72	100	19.1	11	3
200	WWX400R20010KN	47.625	35	18	135	175	25.4	14.22	5
200	WWX400R20012KN	47.625	35	18	135	175	25.4	14.22	5
200	WWX400R20016KN	47.625	35	18	135	175	25.4	14.22	5
200	WWX400-200C10NR	60	32	18	135	160	25.7	14.22	5
200	WWX400-200C12NR	60	32	18	135	160	25.7	14.22	5
200	WWX400-200C16NR	60	32	18	135	160	25.7	14.22	5
250	WWX400R25012KN	47.625	35	18	180	210	25.4	14.22	5
250	WWX400R25014KN	47.625	35	18	180	210	25.4	14.22	5
250	WWX400R25018KN	47.625	35	18	180	210	25.4	14.22	5
250	WWX400-250C12NR	60	32	18	180	210	25.7	14.22	5
250	WWX400-250C14NR	60	32	18	180	210	25.7	14.22	5
250	WWX400-250C18NR	60	32	18	180	210	25.7	14.22	5

Parts Sold Separately
Set Bolt

(mm)

Tool Holder Type	Set Bolt		Fig.	Reference Dimensions								Geometry
	With Coolant Thru	Without Coolant Thru										
	Order Number	Order Number		a	b	c	d	e	f	g		
WWX400R080CA	HSC12035H	HSC12035	1	18	M12×1.75	47	12	10	—	—	Fig.1 	
WWX400R100DA	MBA16033H	—	2	40	M16×2	43	10	14	6	23		
WWX400R125EA	MBA20040H	—	2	50	M20×2.5	54	14	17	6	27		
WWX400R160FA	MBA24045H	—	2	65	M24×3	59	14	17	10	37		
WWX400R200KN	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		
WWX400R250KN	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—	Fig.2 	
WWX400-063AAR	HSC10030H	HSC10035	1	16	M10×1.5	40	10	6	—	—		
WWX400-080AAR	HSC12035H	HSC12035	1	18	M12×1.75	47	12	10	—	—		
WWX400-100BAR	MBA16033H	—	2	40	M16×2	43	10	14	6	23		
WWX400-125BAR	MBA20040H	—	2	50	M20×2.5	54	14	17	6	27		
WWX400-160CNR	No Coolant Thru	—	2	50	M20×2.5	54	14	17	6	27		
WWX400-200CNR	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		
WWX400-250CNR	No Coolant Thru	—	1	24	M16×2	43	16	14	—	—		

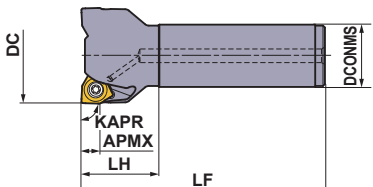
Note 1) Please purchase the appropriate set bolt after confirming the reference dimensions.

The items with an order number listed under the Set Bolt columns are also sold by MITSUBISHI MATERIALS.

Note 2) Internal coolant is necessary with the set bolt.

Note 3) The milling cutter with cutting diameter DC=50 mm has a built-in set bolt. Please use a 7 mm Allen wrench to tighten/loosen the set bolt.

WWX400



Right hand tool holder only.

Metric Standard

Shank Type

With Air / Coolant through

(mm)

DC	Order Number	Stock R	* No.T	LF	DCONMS	LH	WT (kg)	APMX	RMPX	RPMX (min ⁻¹)
50	WWX400R5003SA32M	★	3	125	32	40	0.8	8.2	0.4°	16000
50	WWX400R5004SA32M	★	4	125	32	40	0.8	8.2	0.4°	16000
63	WWX400R6303SA32M	★	3	125	32	40	1.0	8.2	0.26°	14100
63	WWX400R6304SA32M	★	4	125	32	40	1.0	8.2	0.26°	14100
63	WWX400R6305SA32M	★	5	125	32	40	1.0	8.2	0.26°	14100
80	WWX400R8004SA32M	★	4	125	32	40	1.3	8.2	0.16°	12200
80	WWX400R8005SA32M	★	5	125	32	40	1.3	8.2	0.16°	12200
80	WWX400R8007SA32M	★	7	125	32	40	1.2	8.2	0.16°	12200

* Number of Teeth

Spare Parts

Tool Holder Type		* 	
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WWX400	TS5R	TKY20T	MK1KS

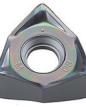
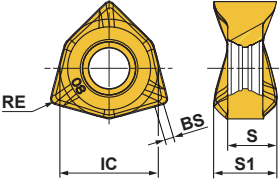
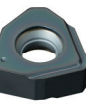
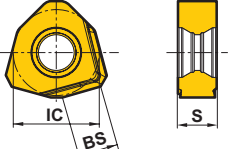
* Clamp Torque (N • m) : TS5R = 5.0

★ : Stocked in Japan

Double-Sided Insert Type Shoulder Mill

Inserts

(inch)

Material	P	Steel	MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF	TF15	IC	S	S1	BS	RE	Geometry
	M	Stainless Steel																
Material	K	Cast Iron	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	This is the selection guideline for WWX400. Please note that the cutting conditions differ depending on multiple factors, for more details refer to the Recommended Cutting Conditions. Edge Preparation : E : Round F : Sharp
	N	Non-ferrous Metals	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	S	Heat Resistant Alloys, Titanium Alloys	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
	H	Hardened Steel	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	
Shape	Order Number	Class	Edge Preparation	Coated								Carbide	IC	S	S1	BS	RE	Geometry
				MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP9120	MP9130	VP15TF						
	6NGU1409040PNER-L	G	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.067	.016	
	6NGU1409080PNER-L	G	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.051	.031	
	6NGU1409040PNFR-L	G	F	●	●	●	●	●	●	●	●	●	.551	.276	.354	.067	.016	
	6NGU1409080PNFR-L	G	F	●	●	●	●	●	●	●	●	●	.551	.276	.354	.051	.031	
	6NGU1409040PNER-M	G	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.067	.016	
	6NGU1409080PNER-M	G	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.051	.031	
	6NMU1409040PNER-M	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.067	.016	
	6NMU1409080PNER-M	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.051	.031	
	6NMU1409160PNER-M	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.002	.063	
	6NMU1409200PNER-M	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.002	.079	
	6NMU1409080PNER-R	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.051	.031	
	6NMU1409160PNER-R	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.002	.063	
	6NMU1409200PNER-R	M	E	●	●	●	●	●	●	●	●	●	.551	.276	.354	.002	.079	
	2NGU1406ZNER6C-M	G	E	●	●	●	●	●	●	●	●	●	.551	.248	—	.256	—	

Instructions for Use of Wiper Inserts

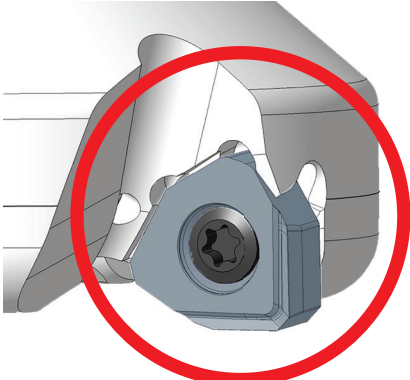


Fig.1

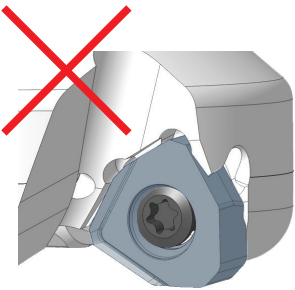


Fig.2

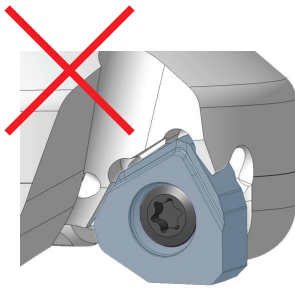


Fig.3

Wiper inserts for WWX400 are two-cornered. Please set as shown in Fig.1.
Excellent surface finish can be achieved with one wiper.
Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than .256 IPR.
When choosing a wiper insert select a general grade that is similar to the ideal cutting conditions.

● : USA Stock (10 inserts in one case)

WWX200/400

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

Recommended Cutting Conditions

Dry Cutting
Cutting Speed

(inch)

Material	Properties	Cutting Conditions	Grade	Width of Cut ae		
				.5DC≥	.8DC≥	DC(Slot)
				Cutting Speed vc (SFM)		
P	Mild Steel	Hardness ≤180HB	MV1020	985(820—1150)	920(755—1080)	820(655—985)
			MP6120	785(655—920)	720(590—850)	655(525—785)
			MV1030	755(620—885)	690(560—820)	620(490—755)
			MV1020	950(785—1115)	850(690—1050)	785(620—950)
			MV1030,MP6130	755(620—885)	690(560—820)	620(490—755)
			MP6130,VP15TF	690(560—820)	620(490—755)	560(425—690)
	Carbon Steel Alloy Steel	Hardness 180—280HB	MV1020	850(690—1015)	785(620—920)	690(525—850)
			MP6120	690(560—820)	620(490—755)	560(425—690)
			MV1030	655(525—785)	590(460—720)	525(395—655)
			MV1020	820(655—985)	755(590—885)	655(490—820)
			MV1030,MP6130	655(525—785)	590(460—720)	525(395—655)
			MP6130,VP15TF	590(460—720)	525(395—655)	460(330—590)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB (Annealing)	MV1020	850(690—1015)	785(620—920)	690(525—850)
			MP6120	655(525—785)	590(460—720)	525(395—655)
			MV1030	655(525—785)	590(460—720)	525(395—655)
			MV1020	820(655—985)	755(590—885)	655(490—820)
			MV1030,MP6130	620(490—755)	560(425—690)	490(360—620)
			MP6130,VP15TF	560(425—690)	490(360—620)	425(295—560)
	Pre-Hardened Steel	Hardness 35—45HRC	MP6120	460(395—525)	—	—
			MP6130	395(330—460)	—	—
			MP6130,VP15TF	360(295—425)	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	MV1030,MP7130	590(525—655)	525(460—590)	—
			MV1030,MP7130,VP15TF	560(490—620)	490(425—560)	—
	Austenitic Stainless Steel	Hardness >200HB	MP7130,VP15TF	490(425—560)	425(360—490)	—
			MV1030,MP7130	560(490—620)	490(425—560)	—
	Austenitic Stainless Steel	Hardness >200HB	MV1030,MP7130,VP15TF	525(460—590)	460(395—525)	—
			MP7130,VP15TF	460(395—525)	395(330—460)	—
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	MV1030,MP7130	590(525—655)	525(460—590)	—
			MV1030,MP7130,VP15TF	560(490—620)	490(425—560)	—
	Duplex Stainless Steel	Hardness ≤280HB	MP7130	525(460—590)	460(395—525)	—
			MP7130,VP15TF	490(425—560)	425(360—490)	—
	Precipitation Hardening Stainless Steel	Hardness <450HB	MP7130,VP15TF	425(360—490)	360(295—425)	—
			MP7130	460(395—525)	—	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	MC5020	820(690—950)	755(620—885)	690(560—820)
			MC5020	785(655—920)	720(590—850)	655(525—785)
			VP15TF	785(655—920)	720(590—850)	—
	Ductile Cast Iron	Tensile Strength ≤450MPa	MC5020,VP15TF	720(590—850)	655(525—785)	590(460—720)
			MV1020	785(655—1015)	720(560—920)	655(490—850)
			MC5020	720(590—850)	655(525—785)	590(460—720)
			MV1030	690(560—820)	620(490—755)	560(425—690)
			MV1020	755(620—985)	690(525—885)	620(460—820)
			MV1030,MC5020	690(560—820)	620(490—755)	560(425—690)
	Ductile Cast Iron	Tensile Strength ≤800MPa	VP15TF	690(560—820)	620(490—755)	—
			MC5020,VP15TF	620(490—755)	560(425—690)	490(360—620)
			MV1020	690(525—920)	620(460—820)	525(395—690)
			MC5020	590(460—720)	525(395—655)	460(330—590)
			MV1030	560(425—690)	490(360—620)	425(295—560)
			MV1020	655(490—885)	590(425—785)	490(360—690)
H	Hardened Steel	Hardness 40—55HRC	MV1030,MC5020	560(425—690)	490(360—620)	425(295—560)
			VP15TF	560(425—690)	490(360—620)	—
			MC5020,VP15TF	490(360—620)	425(295—560)	360(230—490)
	Hardened Steel	Hardness 40—55HRC	VP15TF	165(100—230)	—	—
			MP6120	130(100—230)	—	—

Note 1) The recommended cutting speed has been calculated for a depth of cut .079 inch. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

WWX200/400

Recommended Cutting Conditions

Wet Cutting
Cutting Speed

(inch)

	Material	Properties	Cutting Conditions	Grade	Width of Cut ae		
					.5DC≥	.8DC≥	DC(Slot)
					Cutting Speed vc (SFM)		
P	Mild Steel	Hardness ≤180HB	●	MV1020	720(690—755)	620(590—690)	590(525—620)
			●	MP6120	490(460—525)	425(395—460)	395(360—425)
			●	MV1030	460(425—490)	395(360—425)	360(330—395)
			●	MV1020	690(655—720)	590(560—655)	560(490—590)
			●	MV1030,MP6130	460(425—490)	395(360—425)	360(330—395)
			✱	MP6130,VP15TF	395(360—425)	330(295—360)	295(260—330)
	Carbon Steel Alloy Steel	Hardness 180—280HB	●	MV1020	655(620—690)	560(525—620)	525(490—560)
			●	MP6120	490(460—525)	425(395—460)	395(360—425)
			●	MV1030	460(425—490)	395(360—425)	360(330—395)
			●	MV1020	620(590—655)	525(490—590)	490(460—525)
			●	MV1030,MP6130	460(425—490)	395(360—425)	360(330—395)
			✱	MP6130,VP15TF	395(360—425)	330(295—360)	295(260—330)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	●	MV1020	655(620—690)	560(525—620)	525(490—560)
			●	MP6120, MV1030	460(425—490)	395(360—425)	360(330—395)
			●	MV1020	620(590—655)	525(490—590)	490(460—525)
			●	MV1030	460(425—490)	395(360—425)	360(330—395)
			●	MP6130	425(395—460)	360(330—395)	330(295—360)
			✱	MP6130,VP15TF	360(330—395)	295(260—330)	260(230—295)
	Pre-Hardened Steel	Hardness 35—45HRC	●	MP6120	360(330—395)	—	—
			●	MP6130	330(295—360)	—	—
			✱	MP6130,VP15TF	260(230—295)	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	●	MP7130	425(395—460)	360(330—395)	—
			●	MP7130,VP15TF	395(360—425)	330(295—360)	—
			✱	MP7130,VP15TF	330(295—360)	260(230—295)	—
	Austenitic Stainless Steel	Hardness >200HB	●	MP7130	425(395—460)	360(330—395)	—
			●	MP7130,VP15TF	395(360—425)	330(295—360)	—
			✱	MP7130,VP15TF	330(295—360)	260(230—295)	—
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	●	MP7130	425(395—460)	360(330—395)	—
			●	MP7130,VP15TF	395(360—425)	330(295—360)	—
			✱	MP7130,VP15TF	330(295—360)	260(230—295)	—
	Duplex Stainless Steel	Hardness ≤280HB	●	MP7130	395(360—425)	330(295—360)	—
			●	MP7130,VP15TF	360(330—395)	295(260—330)	—
			✱	MP7130,VP15TF	295(260—330)	230(195—260)	—
	Precipitation Hardening Stainless Steel	Hardness <450HB	●	MP7130	395(360—425)	—	—
			●	MP7130,VP15TF	360(330—395)	—	—
			✱	MP7130,VP15TF	295(260—330)	—	—

Note 1) The recommended cutting speed has been calculated for a depth of cut .079 inch. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

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

(inch)

	Material	Properties	Cutting Conditions	Grade	Width of Cut ae		
					.5DC≥	.8DC≥	DC(Slot)
					Cutting Speed vc (SFM)		
K	Gray Cast Iron	Tensile Strength ≤350MPa	●	MC5020	560(490—620)	490(425—560)	425(360—490)
			●	MC5020	525(460—590)	460(395—525)	395(330—460)
			●	VP15TF	525(460—590)	460(395—525)	—
			✱	MC5020,VP15TF	460(395—525)	395(330—460)	330(260—395)
	Ductile Cast Iron	Tensile Strength ≤450MPa	●	MV1020	655(590—785)	590(490—720)	490(425—655)
			●	MC5020	560(490—620)	490(425—560)	425(360—490)
			●	MV1030	525(460—590)	460(395—525)	395(330—460)
			●	MV1020	620(560—755)	560(460—690)	460(395—620)
			●	MV1030,MC5020	525(460—590)	460(395—525)	395(330—460)
			●	VP15TF	525(460—590)	460(395—525)	—
			✱	MC5020,VP15TF	460(395—525)	395(330—460)	330(260—395)
	Ductile Cast Iron	Tensile Strength ≤800MPa	●	MV1020	590(560—690)	525(490—620)	460(395—525)
			●	MC5020	525(490—560)	460(425—490)	395(360—425)
			●	MV1030	490(460—525)	425(395—460)	360(330—395)
			●	MV1020	560(525—655)	490(460—590)	395(360—490)
			●	MV1030,MC5020	490(460—525)	425(395—460)	360(330—395)
			●	VP15TF	490(460—525)	425(395—460)	—
			✱	MC5020,VP15TF	425(395—460)	360(330—395)	295(260—330)
N	Aliminum Alloys	Content Si<5%	●	TF15	1640(985—2950)	1640(985—2950)	1640(985—2950)
			●	TF15	1640(985—2950)	1640(985—2950)	1640(985—2950)
			✱	TF15	1310(655—2625)	1310(655—2625)	1310(655—2625)
S	Titanium Alloys	—	●	MP9120	260(195—330)	—	—
			●	MP9120	230(165—295)	—	—
			✱	MP9130	195(130—260)	—	—
	Heat Resistant Alloys	—	●	MP9120	195(165—230)	—	—
			●	MP9120	165(100—195)	—	—
H	Hardened Steel	Hardness 40—55HRC	●	VP15TF	165(100—230)	—	—
			●	MP6120	130(100—230)	—	—

Note 1) The recommended cutting speed has been calculated for a depth of cut .079 inch. Please reduce the cutting speed by an appropriate amount corresponding to the increase in cutting depth.

WWX200

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

Recommended Cutting Conditions

Depth of Cut / Feed per Tooth (inch)

Material	Properties	Cutting Conditions	Cutting Mode	Grade	ae				ae			ae			
					0.5DC≥				0.8DC≥			DC(Slot)			
					Chipbreaker	ap	fz (IPT)		Chipbreaker	ap	fz (IPT)	Chipbreaker	ap	fz (IPT)	
P	Mild Steel	Hardness ≤180HB		Dry, Wet	MV1020,MV1030,MP6120	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet	MV1020,MV1030,MP6130	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet		M, R	≤.118	.006(.004—.008)		M, R	≤.118	.006(.004—.008)	—	—	—
				Dry, Wet	MP6130,VP15TF	M, R	≤.118	.005(.004—.006)		M, R	≤.118	.005(.004—.006)	M	≤.079	.005(.004—.006)
	Carbon Steel Alloy Steel	Hardness 180—280HB		Dry, Wet	MV1020,MV1030,MP6120	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet	MV1020,MV1030,MP6130	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet		M, R	≤.118	.006(.004—.008)		M, R	≤.118	.006(.004—.008)	—	—	—
				Dry, Wet	MP6130,VP15TF	M, R	≤.118	.005(.004—.006)		M, R	≤.118	.005(.004—.006)	M	≤.079	.005(.004—.006)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)		Dry, Wet	MV1020,MV1030,MP6120	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet	MV1020,MV1030,MP6130	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet		M, R	≤.118	.006(.004—.008)		M, R	≤.118	.006(.004—.008)	—	—	—
				Dry, Wet	MP6130,VP15TF	M, R	≤.118	.005(.004—.006)		M, R	≤.118	.005(.004—.006)	M	≤.079	.005(.004—.006)
	Pre-hardened Steel	Hardness 35—45HRC		Dry, Wet	MP6120	M	≤.079	.005(.004—.006)		—	—	—	—	—	—
				Dry, Wet	MP6130	M	≤.079	.005(.004—.006)		—	—	—	—	—	—
				Dry, Wet		R	≤.079	.006(.004—.008)		—	—	—	—	—	—
				Dry, Wet	MP6130,VP15TF	R	≤.079	.005(.004—.006)		—	—	—	—	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	 	Dry, Wet	MP7130	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	—	—	—
			 	Dry, Wet	MV1030	L, M	≤.079	.005(.004—.006)		L, M	≤.079	.005(.004—.006)	—	—	—
				Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
				Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Austenitic Stainless Steel	Hardness >200HB	 	Dry	MP7130	L, M	≤.079	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	—	—	—
			 	Wet		L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	—	—	—
				Dry	MV1030	L, M	≤.079	.005(.004—.006)		L, M	≤.079	.005(.004—.006)	—	—	—
				Dry, Wet	VP15TF	M	≤.079	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
				Dry	MP7130,VP15TF	M	≤.079	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
				Wet		M	≤.118	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	 	Dry, Wet	MP7130	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	—	—	—
			 	Dry	MV1030	L, M	≤.079	.005(.004—.006)		L, M	≤.079	.005(.004—.006)	—	—	—
				Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
				Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Duplex Stainless Steel	Hardness ≤280HB	 	Dry	MP7130	L, M	≤.079	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	—	—	—
			 	Wet		L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	—	—	—
			Dry	VP15TF	M	≤.079	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—	
			Wet	MP7130,VP15TF	M	≤.118	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—	
			Dry		M	≤.079	.005(.004—.006)		M	≤.118	.006(.004—.008)	—	—	—	
			Wet	M	≤.118	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—		
Precipitation Hardening Stainless Steel	Hardness <450HB	 	Dry, Wet	MP7130	L, M	≤.079	.005(.004—.006)		—	—	—	—	—	—	
			Dry, Wet	VP15TF	M	≤.079	.006(.004—.008)		—	—	—	—	—	—	
			Dry, Wet	MP7130,VP15TF	M	≤.079	.005(.004—.006)		—	—	—	—	—	—	
K	Gray Cast Iron	Tensile Strength ≤350MPa	 	Dry, Wet	MC5020	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
				Dry, Wet	VP15TF	M, R	≤.118	.006(.004—.008)		M, R	≤.118	.006(.004—.008)	—	—	—
				Dry, Wet	MC5020,VP15TF	M, R	≤.118	.005(.004—.006)		M, R	≤.118	.005(.004—.006)	M, R	≤.079	.005(.004—.006)
	Ductile Cast Iron	Tensile Strength ≤800MPa	 	Dry, Wet	MV1020,MV1030,MC5020	L, M	≤.118	.005(.004—.006)		L, M	≤.118	.005(.004—.006)	L, M	≤.079	.005(.004—.006)
			Dry, Wet	MV1020,MV1030,VP15TF	M, R	≤.118	.006(.004—.008)		M, R	≤.118	.006(.004—.008)	—	—	—	
	Dry, Wet	MC5020,VP15TF	M, R	≤.118	.005(.004—.006)		M, R	≤.118	.005(.004—.006)	M, R	≤.079	.005(.004—.006)			
N	Aluminum Alloys	Content Si<5%	  	Wet	TF15	L	≤.118	.005(.004—.006)		L	≤.118	.005(.004—.006)	L	≤.079	.005(.004—.006)
S	Titanium Alloys	—	 	Wet	MP9120	L, M	≤.079	.004(.002—.005)		—	—	—	—	—	—
				Wet	MP9130	L, M	≤.079	.004(.002—.005)		—	—	—	—	—	—
	Heat Resistant Alloys	—	 	Wet	MP9120	L, M	≤.079	.004(.002—.005)		—	—	—	—	—	—
				Wet	MP9130	L, M	≤.079	.004(.002—.005)		—	—	—	—	—	—
H	Hardened Steel	Hardness 40—55HRC		Dry, Wet	VP15TF	M	≤.079	.002(.002—.004)		—	—	—	—	—	—
				Dry, Wet	VP15TF,MP6120	M, R	≤.079	.002(.002—.004)		—	—	—	—	—	—

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

WWX400

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

Recommended Cutting Conditions

Depth of Cut / Feed per Tooth (inch)

Material	Properties	Cutting Conditions	Cutting Mode	Grade	ae				ae			ae			
					.5DC≥				.8DC≥			DC(Slot)			
					Chipbreaker	ap	fz (IPT)		Chipbreaker	ap	fz (IPT)	Chipbreaker	ap	fz (IPT)	
P	Mild Steel	Hardness ≤180HB	●	Dry, Wet	MV1020,MV1030,MP6120	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.005(.004—.006)
			●	Dry, Wet	MV1020,MV1030,MP6130	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.005(.004—.006)
			●	Dry, Wet		M,R	≤.157	.006(.004—.008)		M,R	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MP6130,VP15TF	M,R	≤.157	.005(.004—.006)		M,R	≤.118	.005(.004—.006)	M	≤.079	.005(.004—.006)
	Carbon Steel Alloy Steel	Hardness 180—280HB	●	Dry, Wet	MV1020,MV1030,MP6120	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.005(.004—.006)
			●	Dry, Wet	MV1020,MV1030,MP6130	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.005(.004—.006)
			●	Dry, Wet		M,R	≤.157	.006(.004—.008)		M,R	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MP6130,VP15TF	M,R	≤.157	.005(.004—.006)		M,R	≤.118	.005(.004—.006)	M	≤.079	.005(.004—.006)
	Carbon Steel Alloy Steel Alloy Tool Steel	Hardness 280—350HB ≤350HB (Annealing)	●	Dry, Wet	MV1020,MV1030,MP6120	L,M	≤.118	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.005(.004—.006)
			●	Dry, Wet	MV1020,MV1030,MP6130	L,M	≤.118	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.005(.004—.006)
			●	Dry, Wet		M,R	≤.118	.006(.004—.008)		M,R	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MP6130,VP15TF	M,R	≤.118	.005(.004—.006)		M,R	≤.118	.005(.004—.006)	M	≤.079	.005(.004—.006)
	Pre-Hardened Steel	Hardness 35—45HRC	●	Dry, Wet	MP6120	L,M	≤.079	.005(.004—.006)		—	—	—	—	—	—
			●	Dry, Wet	MP6130	L,M	≤.079	.005(.004—.006)		—	—	—	—	—	—
			●	Dry, Wet		M,R	≤.079	.006(.004—.008)		—	—	—	—	—	—
			✱	Dry, Wet	MP6130,VP15TF	M,R	≤.079	.005(.004—.006)		—	—	—	—	—	—
M	Austenitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	—	—	—
			● ●	Dry	MV1030	L,M	≤.079	.005(.004—.006)		L,M	≤.079	.005(.004—.006)	—	—	—
			●	Dry, Wet	VP15TF	M	≤.157	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MP7130,VP15TF	M	≤.157	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Austenitic Stainless Steel	Hardness >200HB	●	Dry, Wet	MP7130	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	—	—	—
			●	Dry	MV1030	L,M	≤.079	.005(.004—.006)		L,M	≤.079	.005(.004—.006)	—	—	—
			●	Dry, Wet	MP7130	L,M	≤.118	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	—	—	—
			●	Dry	MV1030	L,M	≤.079	.005(.004—.006)		L,M	≤.079	.005(.004—.006)	—	—	—
			●	Dry, Wet	VP15TF	M	≤.118	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Ferritic and Martensitic Stainless Steel	Hardness ≤200HB	● ●	Dry, Wet	MP7130	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	—	—	—
			● ●	Dry	MV1030	L,M	≤.079	.005(.004—.006)		L,M	≤.079	.005(.004—.006)	—	—	—
			●	Dry, Wet	VP15TF	M	≤.157	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MP7130,VP15TF	M	≤.118	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Duplex Stainless Steel	Hardness ≤280HB	● ●	Dry	MP7130	L,M	≤.118	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	—	—	—
			● ●	Wet	MP7130	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	—	—	—
			●	Dry	VP15TF	M	≤.118	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
			●	Wet	VP15TF	M	≤.157	.006(.004—.008)		M	≤.118	.006(.004—.008)	—	—	—
			✱	Dry	MP7130,VP15TF	M	≤.118	.005(.004—.006)		M	≤.118	.006(.004—.008)	—	—	—
			✱	Wet	MP7130,VP15TF	M	≤.157	.005(.004—.006)		M	≤.118	.005(.004—.006)	—	—	—
	Precipitation Hardening Stainless Steel	Hardness <450HB	●	Dry, Wet	MP7130	L,M	≤.079	.005(.004—.006)		—	—	—	—	—	—
			●	Dry, Wet	MP7130	L,M	≤.079	.005(.004—.006)		—	—	—	—	—	—
			●	Dry, Wet	VP15TF	M	≤.079	.006(.004—.008)		—	—	—	—	—	—
			✱	Dry, Wet	MP7130,VP15TF	M	≤.079	.005(.004—.006)		—	—	—	—	—	—
K	Gray Cast Iron	Tensile Strength ≤350MPa	● ●	Dry, Wet	MC5020	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.130(.100—.150)
			●	Dry, Wet	VP15TF	M,R	≤.157	.006(.004—.008)		M,R	≤.118	.006(.004—.008)	—	—	—
			✱	Dry, Wet	MC5020,VP15TF	M,R	≤.157	.005(.004—.006)		M,R	≤.118	.005(.004—.006)	M,R	≤.079	.130(.100—.150)
	Ductile Cast Iron	Tensile Strength ≤800MPa	● ●	Dry, Wet	MV1020,MV1030,MC5020	L,M	≤.157	.005(.004—.006)		L,M	≤.118	.005(.004—.006)	L,M	≤.079	.130(.100—.150)
●			Dry, Wet	MV1020,MV1030,VP15TF	M,R	≤.157	.006(.004—.008)		M,R	≤.118	.006(.004—.008)	—	—	—	
		✱	Dry, Wet	MC5020,VP15TF	M,R	≤.157	.005(.004—.006)		M,R	≤.118	.005(.004—.006)	M,R	≤.079	.130(.100—.150)	
N	Aluminum Alloys	Content Si<5%	● ● ✱	Wet	TF15	L	≤.157	.005(.004—.006)		L	≤.118	.005(.004—.006)	L	≤.079	.130(.100—.150)
S	Titanium Alloys	—	● ●	Wet	MP9120	L,M	≤.079	.004(.002—.005)		—	—	—	—	—	—
			✱	Wet	MP9130	L,M	≤.079	.004(.002—.005)		—	—	—	—	—	—
	Heat Resistant Alloys	—	● ●	Wet	MP9120	L,M	≤.079	.004(.002—.005)		—	—	—	—	—	—
			✱	Wet	MP9130	L,M	≤.079	.004(.002—.005)		—	—	—	—	—	—
H	Hardened Steel	Hardness 40—55HRC	●	Dry, Wet	VP15TF	M	≤.079	.002(.002—.004)		—	—	—	—	—	—
			●	Dry, Wet	VP15TF	M,R	≤.079	.002(.002—.004)		—	—	—	—	—	—

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

WWX400

- **Ramping**



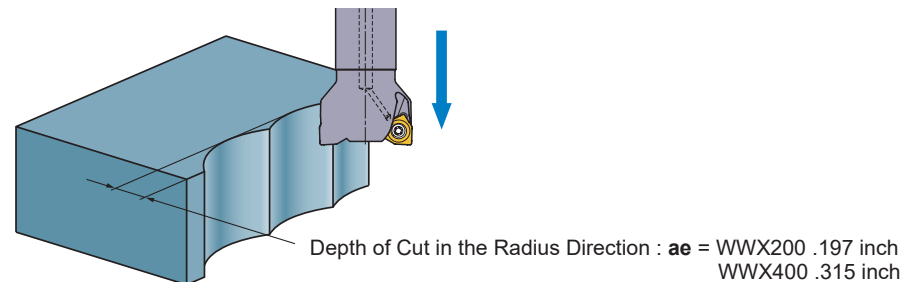
DC		RE	APMX	Ramping		Helical Milling (Blind Hole, Flat Bottom)				Helical Milling (Through Hole)	
				Maximum Ramping Angle	Minimum Distance [*]	Maximum Hole Diameter	Maximum Pitch	Minimum Hole Diameter	Maximum Pitch	Minimum Hole Diameter	Maximum Pitch
inch	mm			RMPX	L	DH max.	P max.	DH min.	P max.	DH min.	P max.
1.969	50			.016	.315	.40°	46.260	3.878	.042	3.748	.039
1.969	50	.031	.315	.40°	46.260	3.846	.041	3.748	.039	3.248	.028
2.000	—	.016	.315	.40°	46.260	3.929	.042	3.811	.040	3.295	.028
2.000	—	.031	.315	.40°	46.260	3.898	.042	3.811	.040	3.295	.028
2.480	63	.016	.315	.26°	71.142	4.902	.035	4.772	.033	4.276	.024
2.480	63	.031	.315	.26°	71.142	4.870	.034	4.772	.033	4.276	.024
2.500	—	.016	.315	.26°	71.142	4.929	.035	4.811	.033	4.299	.026
2.500	—	.031	.315	.26°	71.142	4.898	.034	4.811	.033	4.299	.026
3.000	—	.016	.315	.16°	115.591	5.929	.026	5.811	.025	5.299	.020
3.000	—	.031	.315	.16°	115.591	5.898	.026	5.811	.025	5.299	.020
3.150	80	.016	.315	.16°	115.591	6.240	.027	6.110	.026	5.614	.020
3.150	80	.031	.315	.16°	115.591	6.209	.027	6.114	.026	5.614	.020

Note 3) WWX200 cannot be used for ramping or helical machining.

To obtain a flat bottom surface when helical milling, it requires to remove “the uncut part” in the center of the workpiece material at a final pass. When helical milling, make sure that the depth of cut per helical pass doesn't exceed the maximum depth of cut (**APMX**).

WWX200/400

● Plunging



Memo



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FOR YOUR SAFETY

- Don't handle inserts and chips without gloves.
- Please machine within the recommended application range and exchange expired tools with new ones in advance of breakage.
- Please use safety covers and wear safety glasses.
- When using compounded cutting oils, please take fire precautions.
- When attaching inserts or spare parts, please use only the correct wrench or driver.
- When using rotating tools, please make a trial run to check run-out, vibration and abnormal sounds etc.

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Tools specifications subject to change without notice.

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