

Double-Sided Insert Type, High Feed Radius Milling Cutter

WJX Series

Series
Expansion

Sharpness with Stability for High Efficiency Machining

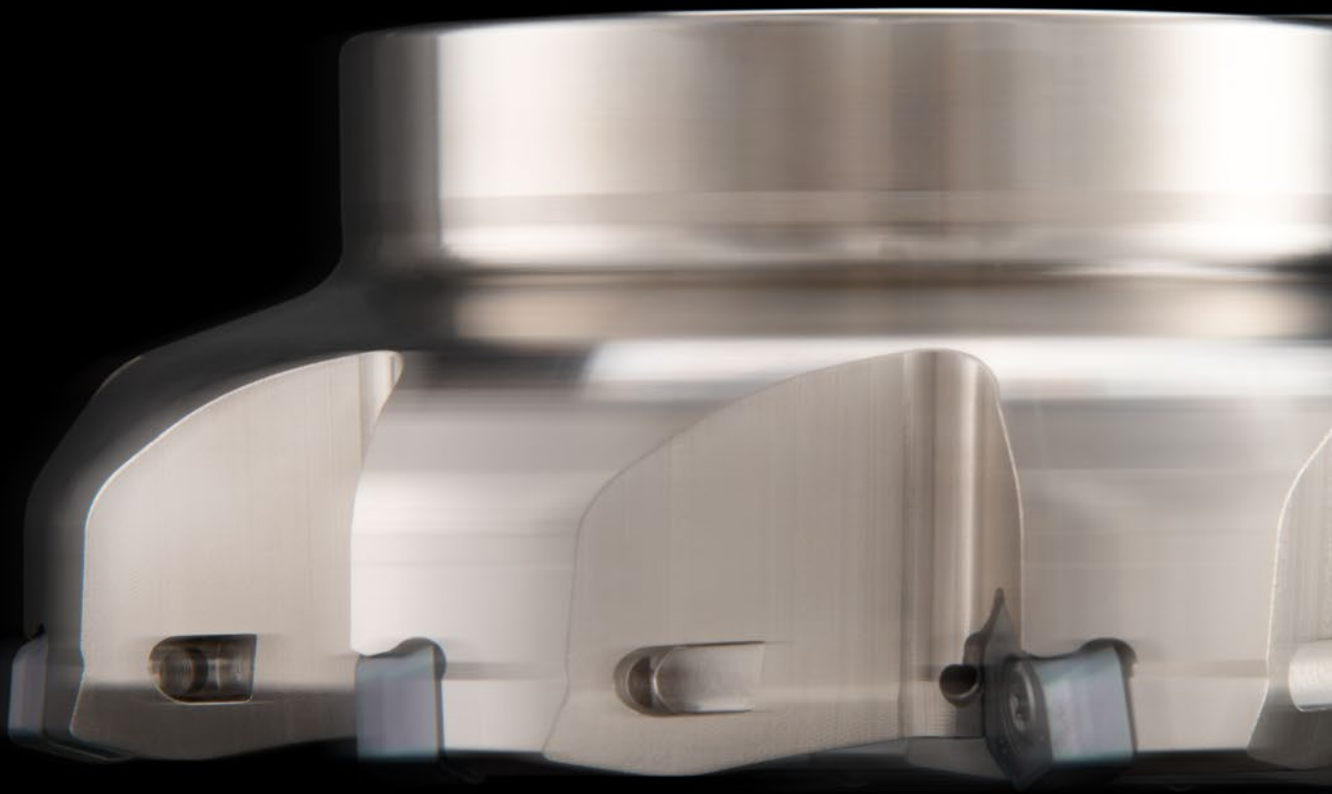
Now available with the new WJX09 smaller insert type



Fast Sha

WJX Series

High feed radius milling cutter with strong double-sided type inserts. Displays low cutting resistance on entry to the workpiece and maintains stable machining even during interrupted and large depth of cut machining.



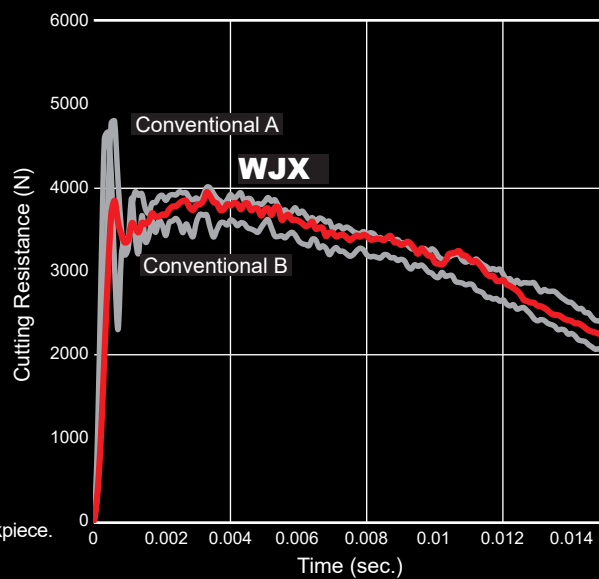
rp Strong

強く

<Cutting Conditions>

Workpiece Material : JIS SCM440
Cutter Dia. : DCX=φ63mm
Cutting Speed : $v_c=150\text{m/min}$
Feed per Tooth : $f_z=1.5\text{mm/t.}$
Depth of Cut : $a_p=1.5\text{mm}$
Width of Cut : $a_e=31.5\text{mm}$
Cutting Mode : Single Insert

WJX produces low cutting resistance when entering the workpiece.



Reliability Even in High Efficiency Cutting Conditions

Provides excellent sharpness and tool life as well as reducing cutting noise. The WJX series was developed for reliability and economy even during high efficiency machining.



Unconventional Cutting Edge Design for Stable Milling



Wiper Cutting Edge

The wiper edge enables surface finishes that are more than sufficient for rough machining.

Straight Cutting Edge

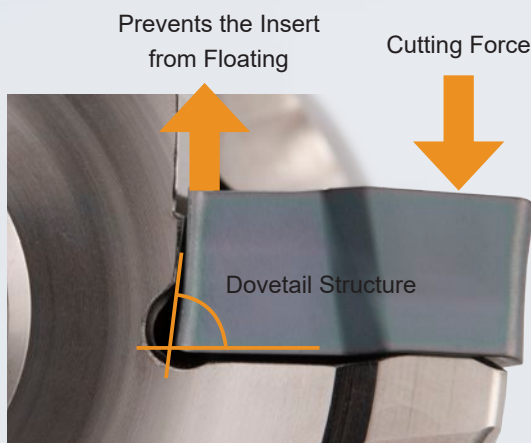
The straight cutting edge extending to the maximum depth of cut (APMX) allows for high feed machining even at large depths of cut.

Minor Cutting Edge

Stable chip formation, even at high ramping angles, is made possible with the straight cutting edge.

Highly-reliable Clamping System

The dovetail pocket geometry prevents the insert from lifting and provides stable clamping without the use of a clamp bridge.



Complex Shape Flank Face Suitable for Ramping

The flank shape combines the strength and economy of negative inserts, with the sharpness and multi-functionality of positive inserts.



Single-Sided : Positive Insert
Ramping Performance
Sharpness



Double-Sided : Negative Insert
Cost Efficiency
Insert Strength
Fracture Resistance



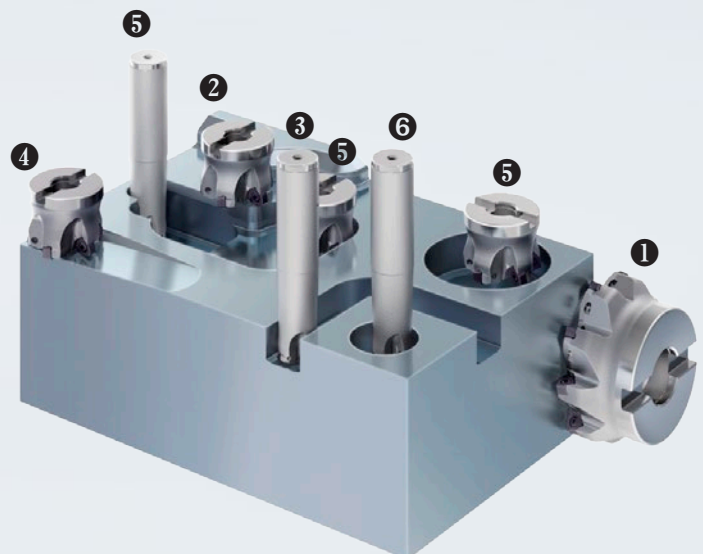
YouTube

Multi-functional Application Range

- ① Face Milling
- ② Shoulder Milling
- ③ Flute Milling
- ④ Ramping
- ⑤ Pocket Milling
- ⑥ Helical Milling



YouTube



Increased Insert Thickness Provides Higher Strength

Increased thickness prevents the inserts from fracturing and makes the cutter body resistant to breakage.



WJX



Conventional



Cutting Length 4.8m



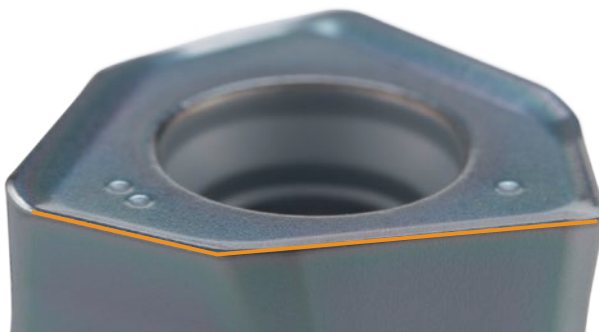
Cutting Length 3.6m

<Cutting Conditions>

Workpiece Material : JIS SCM440
 Cutter Dia. : DCX=ø63mm
 Cutting Speed : vc=150 m/min
 Feed per Tooth : fz=2.0mm/t.
 Depth of Cut : ap=2mm
 Width of Cut : ae=45mm
 Cutting Mode : Dry Cutting
 Single Insert

Good Chip Formation

The cutting edge forms short chips that prevents chip jamming and tangling, as well as facilitating easy removal of the chips after machining.



YouTube



WJX



Conventional

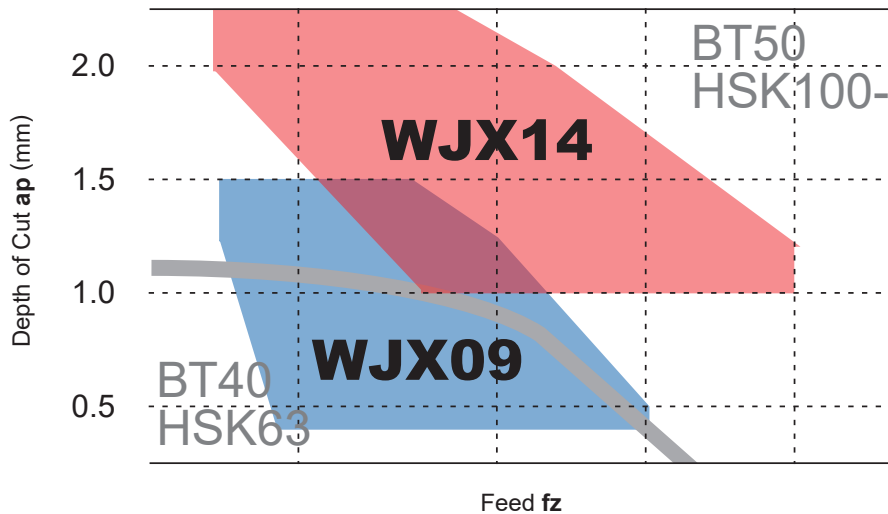
<Cutting Conditions>

Workpiece Material : JIS SCM440
 Cutter Dia. : DCX=ø63mm
 Cutting Speed : vc=150 m/min
 Feed per Tooth : fz=2.0mm/t.
 Depth of Cut : ap=2mm
 Width of Cut : ae=45mm
 Cutting Mode : Dry Cutting
 Single Insert

Using the WJX

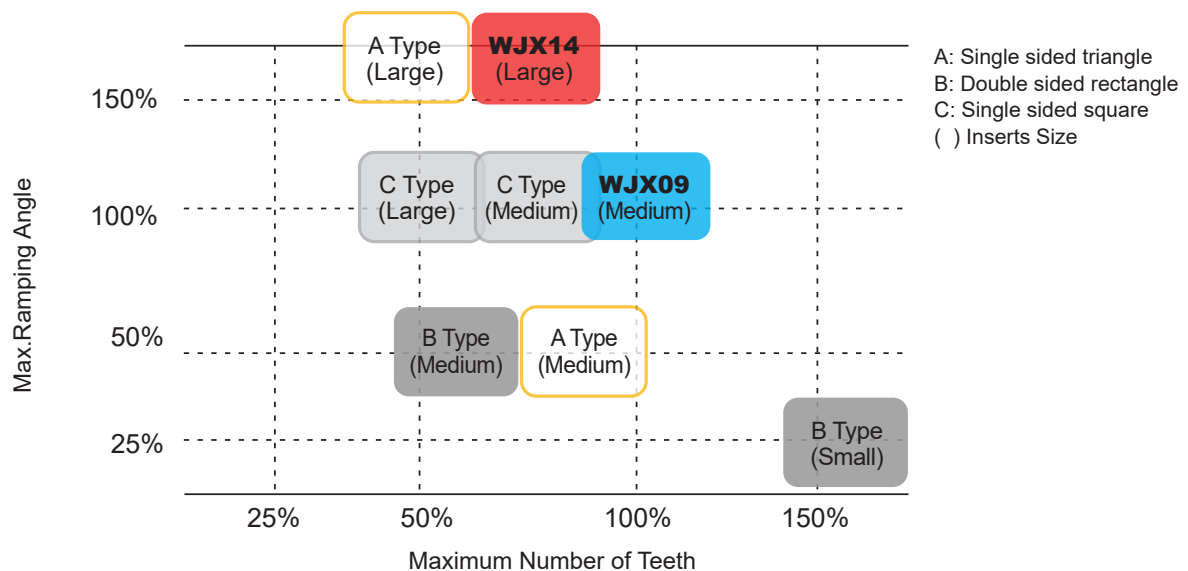
Machine tools to be used

The conditions for cutting at high feed will depend on the rigidity and output of the machine tools to be used. Please adjust the cutting conditions accordingly (refer to the table of recommended cutting conditions). Select a WJX series according to the figure below.



Multiple Cutting Edges and Multi-functionality

The WJX has achieved an excellent balance between cutting edge count and maximum ramping angle, making multi-functionality and high-efficiency cutting possible.



* Performance of the WJX09 is treated as standard (100%).

Memo

A series of horizontal dashed lines for writing, spanning the width of the page.

PVD Coated Grade for Milling

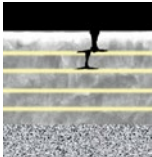
MP6100/MP7100/MP9100 Series

TOUGH-Σ Technology

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

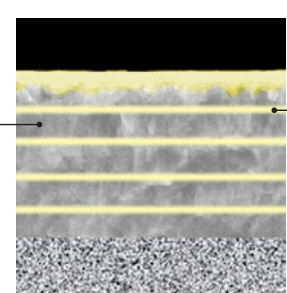
Base Layer High Al-(Al, Ti)N

The new technology Al-(Al, Ti)N coating provides stabilisation of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.



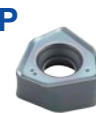
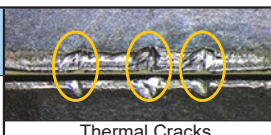



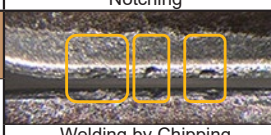
*Graphical Representation.

Al-Ti-Cr-N Based PVD Coating



*Graphical Representation.

Best Layer of Each Workpiece Material

P 	(Al,Cr)N Tough! Thermal Cracks	 Thermal Cracks
M 	TiN Tough! Notching	 Notching
S 	CrN Tough! Resistant Chipping	 Welding by Chipping

VP15TF

Stable machining properties are enabled when the coating is combined with a high wear and fracture resistant carbide substrate.

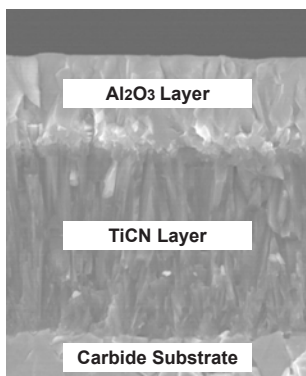
VP30RT

Ideal for heavy interrupted cutting of stainless and general steels because of the excellent fracture resistance properties.

CVD Coated Grade for Milling of Steels and Stainless Steels

MC7020

MC7020 suppresses crater wear that can occur during high speed cutting and also achieves stability when high efficiency machining.



Structure of **MC7020**

Improved Wear Resistance

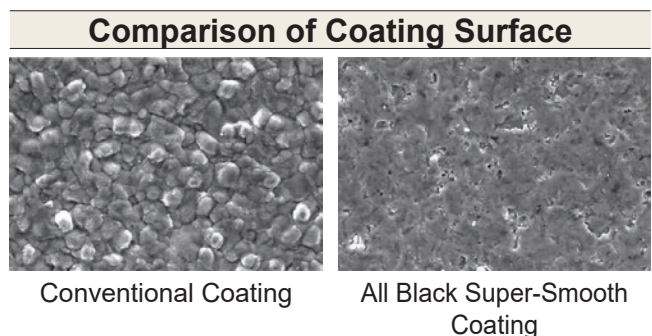
The micro-grain wear resistant Al₂O₃ and fibrous TiCN layers deliver excellent wear resistance in high speed cutting.

Improved Fracture Resistance

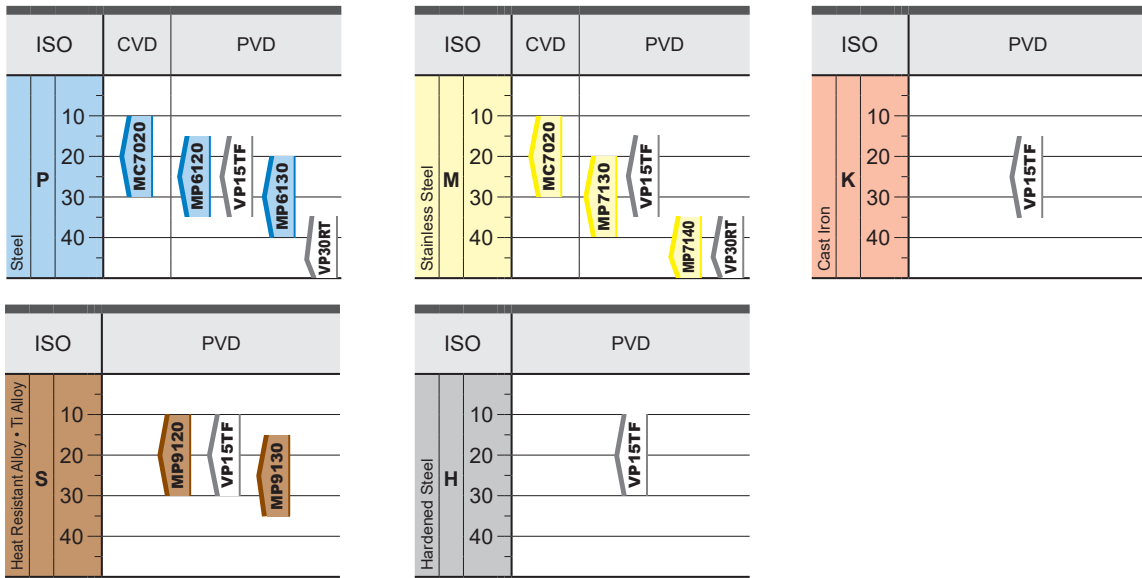
Use of a specially developed cemented carbide that provides superior resistance to fracture and thermal cracking prevents the cutting edge from sudden fracturing.

Reduced Abnormal Damage

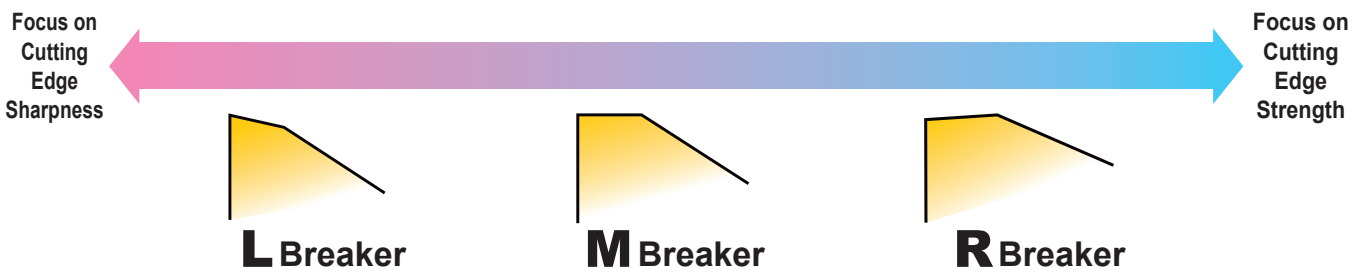
An extremely smooth black super-smooth coating prevents abnormal damage such as chip welding.



Insert Grades for a Wide Range of Workpiece Materials



Chip Breaker System



Workpiece Material	Cutting Conditions		
	Stable Cutting	General Cutting	Unstable Cutting
P Steel	L	M	R
M Stainless Steel	L	M	
K Cast Iron	L	M	R
S Titanium Alloys	L		
S Heat Resistant Alloys	L	M	R
H Hardened Steel	M		R

MULTI-FUNCTIONAL MILLING



WJX09

NEW

P M K N S H



Fig.1
ø40

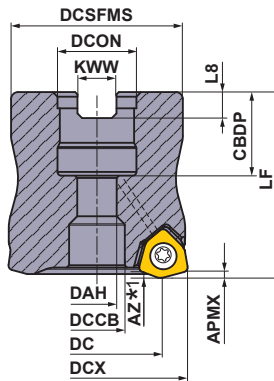
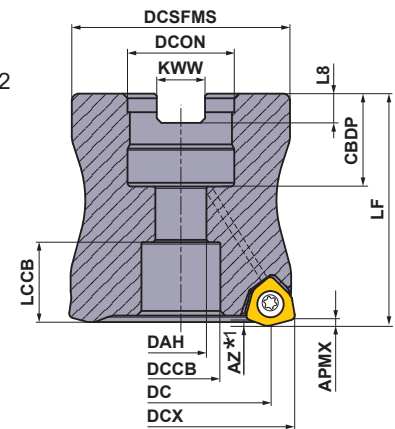


Fig.2
ø50
ø52
ø63
ø66



Right hand tool holder only.

(mm)

DCON		Set Bolt	Geometry	
inch size	mm size		①	②
	φ16	HFF08033H	①	
φ22.225	φ22	HSC10030H	②	
	φ27	HSC12035H		

Arbor Type

GAMP: -6° GAMF: -11° ~ -10°

With Coolant Hole

DCON=inch size

(mm)

DCX	Order Number	Stock	*2	DC	LF	DCON	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.	Insert Type
		R	No.T								
50	WJX09R05004BA	●	4	38.8	50	22.225	0.4	1.2	20000	2	JOMU0905
50	WJX09R05006BA	●	6	38.8	50	22.225	0.4	1.2	20000	2	JOMU0905
63	WJX09R06305BA	●	5	51.8	50	22.225	0.8	1.2	17300	2	JOMU0905
63	WJX09R06307BA	●	7	51.8	50	22.225	0.8	1.2	17300	2	JOMU0905

DCON=mm size

(mm)

DCX	Order Number	Stock	*2	DC	LF	DCON	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.	Insert Type
		R	No.T								
40	WJX09-040A04AR	●	4	28.8	40	16	0.2	1.2	23200	1	JOMU0905
40	WJX09-040A05AR	●	5	28.8	40	16	0.2	1.2	23200	1	JOMU0905
50	WJX09-050A04AR	●	4	38.8	50	22	0.4	1.2	20000	2	JOMU0905
50	WJX09-050A06AR	●	6	38.8	50	22	0.4	1.2	20000	2	JOMU0905
52	WJX09-052A06AR	●	6	40.8	50	22	0.5	1.2	19500	2	JOMU0905
63	WJX09-063A05AR	●	5	51.8	50	22	0.8	1.2	17300	2	JOMU0905
63	WJX09-063A07AR	●	7	51.8	50	22	0.8	1.2	17300	2	JOMU0905
63	WJX09-063X07AR	●	7	51.8	50	27	0.7	1.2	17300	2	JOMU0905
66	WJX09-066X07AR	●	7	54.8	50	27	0.8	1.2	16800	2	JOMU0905

*1 Refer to page 22, for the maximum drilling depth (AZ).

*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.

CUTTING CONDITIONS > P19 - P22

● : Inventory maintained in Japan.

Double-Sided Insert Type, High Feed Radius Milling Cutter




Mounting Dimensions

(mm)

DCX	Order Number	DCON	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
40	WJX09-040A04AR	16	18	8.5	12	—	37	8.4	5.6	1
40	WJX09-040A05AR	16	18	8.5	12	—	37	8.4	5.6	1
50	WJX09-050A04AR	22	20	11	17	17.2	47	10.4	6.3	2
50	WJX09-050A06AR	22	20	11	17	17.2	47	10.4	6.3	2
50	WJX09R05004BA	22.225	19	11	17	18.2	47	8.4	5	2
50	WJX09R05006BA	22.225	19	11	17	18.2	47	8.4	5	2
52	WJX09-052A06AR	22	20	11	17	17.2	47	10.4	6.3	2
63	WJX09-063A05AR	22	20	11	17	17.2	60	10.4	6.3	2
63	WJX09-063A07AR	22	20	11	17	17.2	60	10.4	6.3	2
63	WJX09R06305BA	22.225	19	11	17	18.2	60	8.4	5	2
63	WJX09R06307BA	22.225	19	11	17	18.2	60	8.4	5	2
63	WJX09-063X07AR	27	23	13	20	16.2	60	12.4	7	2
66	WJX09-066X07AR	27	23	13	20	16.2	60	12.4	7	2

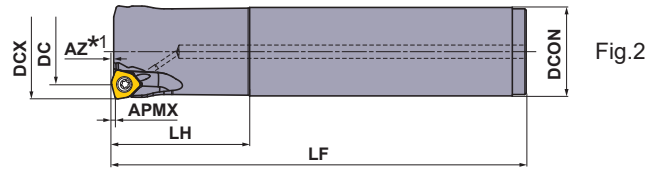
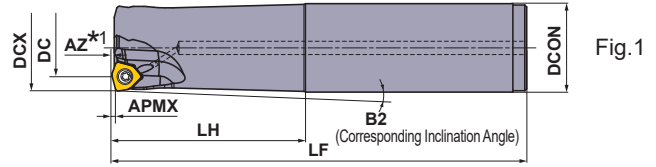
Spare Parts

(mm)

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WJX09	TPS3R	TIP10D	MK1KS

* Clamp Torque (N · m) : TPS3R = 2.0

● : Inventory maintained in Japan.



Right hand tool holder only.

Shank Type

With Coolant Hole

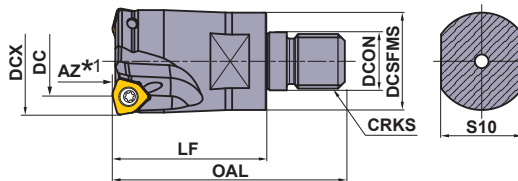
(mm)

DCX	Order Number	Stock	*2 No.T	DC	LF	LH	DCON	B2	APMX	RPMX (min ⁻¹)	Fig.	Insert Type
		R										
25	WJX09R2502SA25S	●	2	14	140	60	25	1.09°	1.2	33500	1	JOMU0905
25	WJX09R2503SA25S	●	3	14	140	60	25	1.09°	1.2	33500	1	JOMU0905
25	WJX09R2502SA25L	●	2	14	200	120	25	0.54°	1.2	33500	1	JOMU0905
25	WJX09R2503SA25L	●	3	14	200	120	25	0.54°	1.2	33500	1	JOMU0905
25	WJX09R2502SA25EL	●	2	14	300	180	25	0.35°	1.2	33500	1	JOMU0905
28	WJX09R2802SA25S	●	2	16.9	140	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2803SA25S	●	3	16.9	140	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2802SA25L	●	2	16.9	200	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2803SA25L	●	3	16.9	200	40	25	—	1.2	30300	2	JOMU0905
28	WJX09R2802SA25EL	●	2	16.9	300	40	25	—	1.2	30300	2	JOMU0905
32	WJX09R3202SA32S	●	2	20.9	150	70	32	0.93°	1.2	27300	1	JOMU0905
32	WJX09R3203SA32S	●	3	20.9	150	70	32	0.93°	1.2	27300	1	JOMU0905
32	WJX09R3202SA32L	●	2	20.9	200	120	32	0.54°	1.2	27300	1	JOMU0905
32	WJX09R3203SA32L	●	3	20.9	200	120	32	0.54°	1.2	27300	1	JOMU0905
32	WJX09R3202SA32EL	●	2	20.9	300	180	32	0.35°	1.2	27300	1	JOMU0905
35	WJX09R3503SA32S	●	3	23.8	150	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3504SA32S	●	4	23.8	150	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3503SA32L	●	3	23.8	200	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3504SA32L	●	4	23.8	200	50	32	—	1.2	25500	2	JOMU0905
35	WJX09R3502SA32EL	●	2	23.8	300	50	32	—	1.2	25500	2	JOMU0905
40	WJX09R4003SA32S	●	3	28.8	150	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4004SA32S	●	4	28.8	150	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4003SA32L	●	3	28.8	250	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4004SA32L	●	4	28.8	250	50	32	—	1.2	23200	2	JOMU0905
40	WJX09R4003SA32EL	●	3	28.8	300	50	32	—	1.2	23200	2	JOMU0905

*1 Refer to page 22, for the maximum drilling depth (AZ).

*2 Number of Teeth

CUTTING CONDITIONS > P19 - P22



Screw-in Type

With Coolant Hole

Right hand tool holder only.

(mm)

DCX	Order Number	Stock	*2 No.T	DC	LF	OAL	DCON	DCSFMS	S10	CRKS	WT (kg)	APMX	RPMX (min ⁻¹)	Insert Type
		R												
25	WJX09R2502AM1235	●	2	14	35	57	12.5	23.5	19	M12	0.1	1.2	33500	JOMU0905
25	WJX09R2503AM1235	●	3	14	35	57	12.5	23.5	19	M12	0.1	1.2	33500	JOMU0905
28	WJX09R2802AM1235	●	2	16.9	35	57	12.5	23.5	19	M12	0.1	1.2	30300	JOMU0905
28	WJX09R2803AM1235	●	3	16.9	35	57	12.5	23.5	19	M12	0.1	1.2	30300	JOMU0905
32	WJX09R3202AM1645	●	2	20.9	45	68	17.0	28.5	24	M16	0.2	1.2	27300	JOMU0905
32	WJX09R3203AM1645	●	3	20.9	45	68	17.0	28.5	24	M16	0.2	1.2	27300	JOMU0905
35	WJX09R3502AM1645	●	2	23.8	45	68	17.0	28.5	24	M16	0.3	1.2	25500	JOMU0905
35	WJX09R3503AM1645	●	3	23.8	45	68	17.0	28.5	24	M16	0.2	1.2	25500	JOMU0905
35	WJX09R3504AM1645	●	4	23.8	35	68	17.0	28.5	24	M16	0.2	1.2	25500	JOMU0905
40	WJX09R4003AM1645	●	3	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905
40	WJX09R4004AM1645	●	4	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905
40	WJX09R4005AM1645	●	5	28.8	45	68	17.0	28.5	24	M16	0.3	1.2	23200	JOMU0905

*1 Refer to page 22, for the maximum drilling depth (AZ).

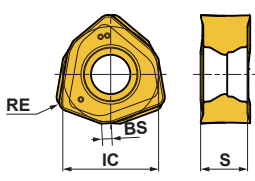
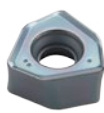
*2 Number of Teeth

CUTTING CONDITIONS > P19 - P22

Double-Sided Insert Type, High Feed Radius Milling Cutter

Inserts

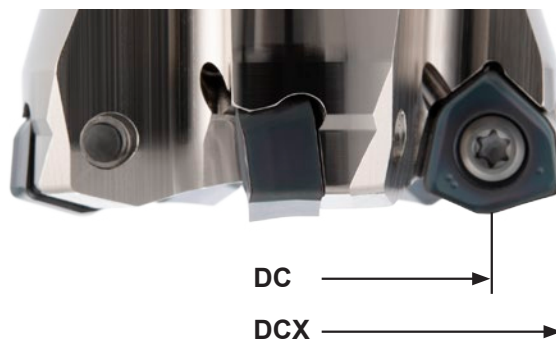
(mm)

Workpiece Material	P	Steels	●	●	●										Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✦ : Unstable Cutting Edge Preparation (Honing) : E : Round
	M	Stainless Steels	●												
Shape	K	Cast Irons													 Right hand insert only.
	S	Heat Resistant Alloys, Titanium Alloys													
	H	Hardened Steels													
Order Number	Class	Edge Preparation	Coated								IC	S	BS	RE	
			MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP30RT				
	NEW JOMU090512ZZER-L	M	E	●	●	●	●	●	●	●	●	9.525	4.73	0.88	1.2
	NEW JOMU090512ZZER-M	M	E	●	●	●	●	●	●	●	●	9.525	4.75	0.88	1.2
	NEW JOMU090512ZZER-R	M	E	●	●					●	●	9.525	4.83	0.88	1.2

● = NEW

Cutter Diameter and Flat Surface Milling

The maximum cutting diameter (DCX) shown in the WJX items table is not the same as the possible dimensions for face milling. The possible dimensions for face milling are given as the cutting axle DC value. Please note that this is smaller than the DCX value.



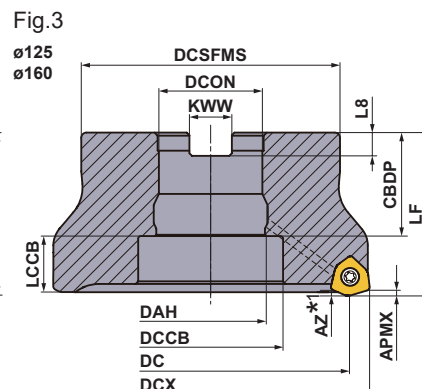
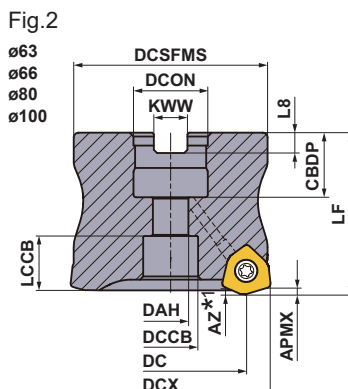
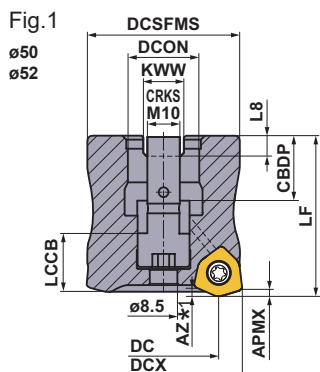
YouTube

● : Inventory maintained in Japan.
(10 inserts in one case)

MULTI-FUNCTIONAL MILLING



WJX14



Right hand tool holder only.

DCON		Set Bolt	Geometry
inch size	mm size		
φ22.225	φ22	HSC10030H	
φ31.75	φ27	HSC12035H	
φ38.1	φ32	HSC16040H	
φ50.8	φ40	MBA20040H	
		MBA24045H	

Arbor Type

GAMP: -7°, -10° GAMF: -10°

With Coolant Hole

DCON=inch size

Note 1) The milling cutter with cutting diameter maximum DCX = 50mm and 52mm has a built in set bolt.
Please use 7mm Allen wrench to tighten/loosen the set bolt.

DCX	Order Number	Stock	*2	DC	LF	DCON	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.	Insert Type
		R	No.T								
50	WJX14R05003BA	●	3	34.5	50	22.225	0.4	2	5000	1	JOMU1407
50	WJX14R05004BA	●	4	34.5	50	22.225	0.4	2	5000	1	JOMU1407
63	WJX14R06304BA	●	4	47.5	50	22.225	0.7	2	18200	2	JOMU1407
63	WJX14R06305BA	●	5	47.5	50	22.225	0.7	2	18200	2	JOMU1407
80	WJX14R08005DA	●	5	64.4	63	31.75	1.4	2	15600	2	JOMU1407
80	WJX14R08006DA	●	6	64.4	63	31.75	1.4	2	15600	2	JOMU1407
100	WJX14R10006DA	●	6	84.4	63	31.75	2.5	2	13500	2	JOMU1407
100	WJX14R10007DA	●	7	84.4	63	31.75	2.5	2	13500	2	JOMU1407
125	WJX14R12507EA	●	7	109.4	63	38.1	3.2	2	11600	3	JOMU1407
125	WJX14R12509EA	●	9	109.4	63	38.1	3.1	2	11600	3	JOMU1407
160	WJX14R16009FA	●	9	144.4	63	50.8	4.5	2	9900	3	JOMU1407

DCON=mm size

DCX	Order Number	Stock	*2	DC	LF	DCON	WT (kg)	APMX	RPMX (min ⁻¹)	Fig.	Insert Type
		R	No.T								
50	WJX14-050A03AR	●	3	34.5	50	22	0.4	2	5000	1	JOMU1407
50	WJX14-050A04AR	●	4	34.5	50	22	0.4	2	5000	1	JOMU1407
52	WJX14-052A04AR	●	4	36.5	50	22	0.4	2	5000	1	JOMU1407
63	WJX14-063A04AR	●	4	47.5	50	22	0.7	2	18200	2	JOMU1407
63	WJX14-063A05AR	●	5	47.5	50	22	0.7	2	18200	2	JOMU1407
63	WJX14-063X05AR	●	5	47.5	50	27	0.6	2	18200	2	JOMU1407
66	WJX14-066X05AR	●	5	50.4	50	27	0.7	2	17700	2	JOMU1407
80	WJX14-080A05AR	●	5	64.4	50	27	1.2	2	15600	2	JOMU1407
80	WJX14-080A06AR	●	6	64.4	50	27	1.2	2	15600	2	JOMU1407
100	WJX14-100A06AR	●	6	84.4	63	32	2.5	2	13500	2	JOMU1407
100	WJX14-100A07AR	●	7	84.4	63	32	2.5	2	13500	2	JOMU1407
125	WJX14-125B07AR	●	7	109.4	63	40	3.2	2	11600	3	JOMU1407
125	WJX14-125B09AR	●	9	109.4	63	40	3.1	2	11600	3	JOMU1407
160	WJX14-160B09AR	●	9	144.4	63	40	4.9	2	9900	3	JOMU1407

*1 Refer to page 26, for the maximum drilling depth (AZ).

*2 Number of Teeth

Note 1) The maximum spindle speeds RPMX are set to ensure tool and insert stability.

CUTTING CONDITIONS > P23-P26

Double-Sided Insert Type, High Feed Radius Milling Cutter

Mounting Dimensions

(mm)

DCX	Order Number	DCON	CBDP	DAH	DCCB	LCCB	DCSFMS	KWW	L8	Fig.
50	WJX14-050A03AR	22	20	—	—	18.3	47	10.4	6.3	1
50	WJX14-050A04AR	22	20	—	—	18.3	47	10.4	6.3	1
50	WJX14R05003BA	22.225	20	—	—	18.3	47	8.4	5	1
50	WJX14R05004BA	22.225	20	—	—	18.3	47	8.4	5	1
52	WJX14-052A04AR	22	20	—	—	18.3	47	10.4	6.3	1
63	WJX14-063A04AR	22	20	11	17	16.7	60	10.4	6.3	2
63	WJX14-063A05AR	22	20	11	17	16.7	60	10.4	6.3	2
63	WJX14R06304BA	22.225	19	11	17	17.7	60	8.4	5	2
63	WJX14R06305BA	22.225	19	11	17	17.7	60	8.4	5	2
63	WJX14-063X05AR	27	23	13	20	15.7	60	12.4	7	2
66	WJX14-066X05AR	27	23	13	20	15.7	60	12.4	7	2
80	WJX14-080A05AR	27	23	13	20	15.7	76	12.4	7	2
80	WJX14-080A06AR	27	23	13	20	15.7	76	12.4	7	2
80	WJX14R08005DA	31.75	32	17	26	19.7	76	12.7	8	2
80	WJX14R08006DA	31.75	32	17	26	19.7	76	12.7	8	2
100	WJX14R10006DA	31.75	32	17	26	19.7	96	12.7	8	2
100	WJX14R10007DA	31.75	32	17	26	19.7	96	12.7	8	2
100	WJX14-100A06AR	32	26	17	26	25.7	96	14.4	8	2
100	WJX14-100A07AR	32	26	17	26	25.7	96	14.4	8	2
125	WJX14R12507EA	38.1	40	40	56	21.7	100	15.9	10	3
125	WJX14R12509EA	38.1	40	40	56	21.7	100	15.9	10	3
125	WJX14-125B07AR	40	40	42	56	21.7	100	16.4	9	3
125	WJX14-125B09AR	40	40	42	56	21.7	100	16.4	9	3
160	WJX14-160B09AR	40	40	42	56	21.7	100	16.4	9	3
160	WJX14R16009FA	50.8	43	53	72	18.7	100	19.1	11	3

*1 Refer to page 26, for the maximum drilling depth (AZ).

*2 Number of Teeth




Note 1) The milling cutter with cutting diameter DC = 50 mm and 52 mm has a built-in set bolt cannot be replaced.

Therefore, absolutely do not disassemble the milling cutter.

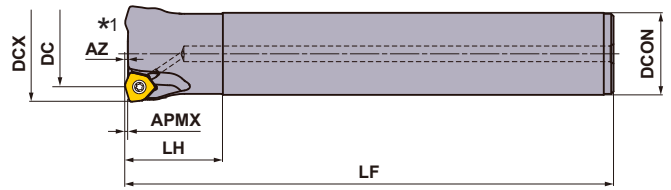
Note 2) When using the tool at high spindle speeds, ensure that the tool and arbor are correctly balanced.

Spare Parts

(mm)

Tool Holder Type			
	Clamp Screw	Wrench (Insert)	Anti-seize Lubricant
WJX14	TS5R	TKY20T	MK1KS

* Clamp Torque (N • m) : TS5R = 5.0



Right hand tool holder only.

Shank Type

With Coolant Hole

(mm)

DCX	Order Number	Stock	*2 No.T	DC	LF	LH	DCON	APMX	RPMX (min ⁻¹)	Insert Type
		R								
50	WJX14R5003SA42S	●	3	34.5	150	50	42	2	21200	JOMU1407
50	WJX14R5003SA42L	●	3	34.5	250	50	42	2	21200	JOMU1407

*1 Refer to page 26, for the maximum drilling depth (AZ).

*2 Number of Teeth

CUTTING CONDITIONS > P23-P26

Spare Parts

Tool Holder Type			
	WJX14	TS5R	TKY20D

* Clamp Torque (N · m) : TS5R = 5.0

Inserts

(mm)

Workpiece Material	P	Steels	●	●	●	●	●	●	●	●	Cutting Conditions (Guide) : ● : Stable Cutting ● : General Cutting ✖ : Unstable Cutting Edge Preparation (Honing) : E : Round						
	M	Stainless Steels	●	●	●	●	●	●	●	●							
K	Cast Irons	●	●	●	●	●	●	●	●								
S	Heat Resistant Alloys, Titanium Alloys	●	●	●	●	●	●	●	●								
H	Hardened Steels	●	●	●	●	●	●	●	●								
Shape	Order Number	Class	Edge Preparation	Coated								IC	S	BS	RE	Geometry	
				MC7020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF						VP30RT
	JOMU140715ZZER-L	M	E	●	●	●	●	●	●	●	●	●	14	6.58	1.3	1.5	
	JOMU140715ZZER-M	M	E	●	●	●	●	●	●	●	●	●	14	6.63	1.3	1.5	
	JOMU140715ZZER-R	M	E	●	●	●	●	●	●	●	●	●	14	6.75	1.3	1.5	

Right hand insert only.

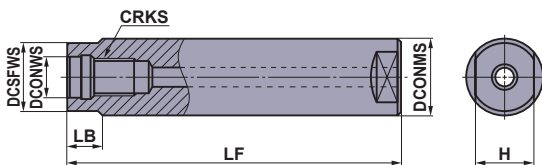
● = NEW

ARBORS

Arbors for Screw-in Tools

■ Straight Shank Arbor

(mm)



Type	Order Number	Stock	DCONWS	DCONMS	DCSFWS	LF	LB	H	CRKS
Steel Shank Type	SC16M08S100S	●	8.5	16	14.5	100	10	10	M8
	SC16M08S200L	●	8.5	16	14.5	200	10	10	M8
	SC20M10S120S	●	10.5	20	18.5	120	10	14	M10
	SC20M10S220L	●	10.5	20	18.5	220	10	14	M10
	SC25M12S125S	●	12.5	25	23.5	125	10	19	M12
	SC25M12S245L	●	12.5	25	23.5	245	10	19	M12
	SC32M16S140S	●	17.0	32	28.5	140	15	24	M16
	SC32M16S280L	●	17.0	32	28.5	280	15	24	M16
Carbide Shank Type	SC16M08S100SW	●	8.5	16	14.5	100	10	10	M8
	SC16M08S200LW	●	8.5	16	14.5	200	10	10	M8
	SC20M10S120SW	●	10.5	20	18.5	120	10	14	M10
	SC20M10S220LW	●	10.5	20	18.5	220	10	14	M10
	SC25M12S125SW	●	12.5	25	23.5	125	10	19	M12
	SC25M12S245LW	●	12.5	25	23.5	245	10	19	M12
	SC32M16S140SW	●	17.0	32	28.5	140	15	24	M16
	SC32M16S280LW	●	17.0	32	28.5	280	15	24	M16

How to Install the Screw-in Head

- ① Thoroughly clean the clamp section of the head and the arbor with an air blower or brush before installation.
- ② Tighten the head at the recommended torque and ensure that there is no gap between the head and arbor.

(mm)

Screw Size	Recommended Torque (N · m)	Wrench Size
M8	23	10
M10	46	14
M12	80	19
M16	90	24

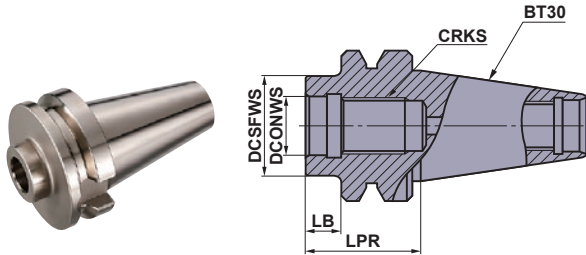


- Cutting tools become extremely hot during cutting. Never touch them with bare hands after operation as this may produce risk of injuries or burns.
- Do not handle the cutting tools with bare hands as this may cause injuries.

● : Inventory maintained in Japan.

■ BT30 Shank Arbor

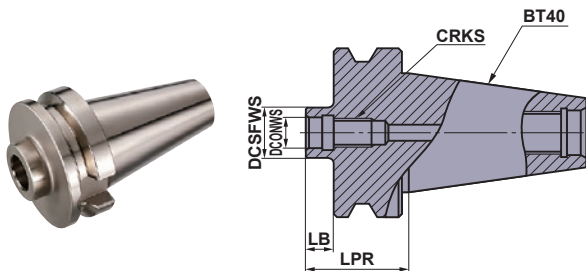
(mm)



Order Number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS
SC16M08S10-BT30	●	8.5	14.5	32	10	M8
SC20M10S10-BT30	●	10.5	18.5	32	10	M10
SC25M12S10-BT30	●	12.5	23.5	32	10	M12
SC32M16S10-BT30	●	17.0	28.5	32	10	M16

■ BT40 Shank Arbor

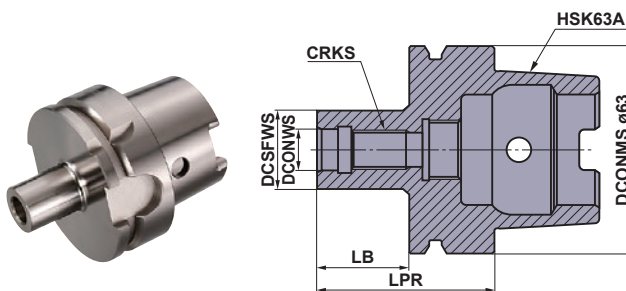
(mm)



Order Number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS
SC16M08S10-BT40	●	8.5	14.5	37	10	M8
SC20M10S10-BT40	●	10.5	18.5	37	10	M10
SC25M12S10-BT40	●	12.5	23.5	37	10	M12
SC32M16S10-BT40	●	17.0	28.5	37	10	M16

■ HSK63A Shank Arbor

(mm)



Order Number	Stock	DCONWS	DCSFWS	LPR	LB	CRKS
SC16M08S22-HSK63A	●	8.5	14.5	48	22	M8
SC20M10S24-HSK63A	●	10.5	18.5	50	24	M10
SC25M12S27-HSK63A	●	12.5	23.5	53	27	M12
SC32M16S28-HSK63A	●	17.0	28.5	54	28	M16

The coolant tube has been already set.

Double-Sided Insert Type, High Feed Radius Milling Cutter

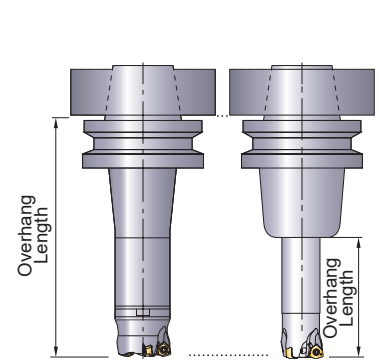
WJX09

Recommended Cutting Conditions

Correction Value According to Overhang Length

Multiply the recommended cutting conditions by the corrections factor x overhang length.

Type	Cutting Dia. Max. DCX	Overhang Length	Correction Value According		
			Cutting Speed vc (m/min)	Depth of Cut ap	Feed fz(mm/t.)
Shank Type Screw-in Type	25-40	< 2.5×DCON	100%	100%	100%
		3.0×DCON	90%	100%	90%
		4.0×DCON	85%	90%	85%
		5.0×DCON	80%	85%	80%
		7.5×DCON	70%	75%	75%
Arbor Type	40-66	< 2.5×DCX	100%	100%	100%
		3.0×DCX	85%	100%	90%
		4.0×DCX	80%	80%	80%
		5.0×DCX	75%	75%	60%
		6.0×DCX	70%	70%	40%



DCON=Connection Dia.

Cutting Speed (Dry Cutting)

Workpiece Material	Properties	Cutting Speed vc (m/min)				
		MP6130	MP6120	VP15TF	MC7020	VP30RT
P		MP6130	MP6120	VP15TF	MC7020	VP30RT
Mild Steels	≤180HB	160 (110-200)	170 (120-220)	170 (120-220)	230 (180-280)	140 (100-180)
Carbon Steels Alloy Steels	180-280HB	140 (90-200)	160 (100-220)	160 (100-220)	220 (170-270)	120 (80-170)
Carbon Steels Alloy Steels	280-350HB	140 (90-200)	160 (100-220)	160 (100-220)	220 (170-270)	120 (80-170)
Alloy Tool Steels	≤350HB (Annealing)	140 (90-200)	160 (100-220)	160 (100-220)	220 (170-270)	120 (80-170)
Pre-hardened Steels	35-45HRC	100 (60-140)	120 (80-160)	120 (80-160)	-	90 (50-130)
M		MP7130	MP7140	MC7020	VP30RT	
Austenitic Stainless Steels	≤200HB	160 (130-200)	150 (120-180)	220 (170-270)	150 (120-180)	
Austenitic Stainless Steels	>200HB	140 (100-200)	130 (80-180)	190 (140-240)	130 (80-180)	
Ferritic and Martensitic Stainless Steels	≤200HB	150 (100-200)	130 (80-180)	220 (170-270)	130 (80-180)	
Duplex Stainless Steels	≤280HB	130 (80-180)	110 (60-160)	180 (130-230)	110 (60-160)	
Precipitation Hardening Stainless Steels	<450HB	110 (60-160)	90 (50-130)	170 (120-220)	90 (50-130)	
K		VP15TF				
Gray Cast Irons	≤350MPa	180 (140-220)				
Ductile Cast Irons	≤450MPa	160 (120-210)				
Ductile Cast Irons	≤800MPa	130 (90-170)				
S		MP9130	MP9120	VP15TF		
Titanium Alloys	-	40 (30-60)	50 (30-65)	50 (30-65)		
Heat Resistant Alloys	-	30 (20-40)	40 (20-50)	40 (20-50)		
H		VP15TF				
Hardened Steels	40-55HRC	70 (40-100)				

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

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

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

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

Depth of Cut / Feed per Tooth

(mm)

Workpiece Material	Properties	Depth of Cut ap	Breaker	Cutting Dia. Max. DCX=25,28(Z=2)	Cutting Dia. Max. DCX=25,28(Z=3)	Cutting Dia. Max. DCX=32-	Cutting Mode	
				Feed fz(mm/t.)	Feed fz(mm/t.)	Feed fz(mm/t.)		
P	Mild Steels	≤0.5	M,R	1.3(0.4-2.0)	1.3(0.4-2.0)	1.5(0.5-2.0)	Dry	
			L	1.2(0.4-1.6)	1.2(0.4-1.6)	1.2(0.4-1.6)		
		≤1.0	M,R	1.0(0.3-1.3)	0.8(0.3-1.0)	1.2(0.4-1.5)		
			L	0.8(0.3-1.2)	0.8(0.3-1.0)	0.8(0.3-1.2)		
	Carbon Steels Alloy Steels	Hardness 180-280HB	≤0.5	M,R	1.3(0.4-1.7)	1.3(0.4-1.7)	1.5(0.4-2.0)	Dry
				L	1.2(0.3-1.5)	1.2(0.3-1.5)	1.2(0.3-1.5)	
			≤1.0	M,R	0.8(0.3-1.0)	0.7(0.3-0.9)	1.0(0.3-1.3)	
	L	0.7(0.2-1.0)		0.7(0.2-0.9)	0.7(0.2-1.0)			
	Carbon Steels Alloy Steels Alloy Tool Steels	Hardness 280-350HB ≤350HB (Annealing)	≤0.5	M,R	1.3(0.4-1.7)	1.3(0.4-1.7)	1.5(0.4-2.0)	Dry
				L	1.2(0.3-1.5)	1.2(0.3-1.5)	1.2(0.3-1.5)	
			≤1.0	M,R	0.8(0.3-1.0)	0.7(0.3-0.9)	1.0(0.3-1.3)	
	L	0.7(0.2-1.0)		0.7(0.2-0.9)	0.7(0.2-1.0)			
Pre-hardened Steels	Hardness 35-45HRC	≤0.5	M,R	1.0(0.3-1.3)	1.0(0.3-1.3)	1.2(0.3-1.5)	Dry	
			L	0.8(0.3-1.2)	0.8(0.3-1.2)	0.8(0.3-1.2)		
		≤1.0	M,R	0.6(0.2-0.8)	0.6(0.2-0.8)	0.8(0.2-1.0)		
L	0.5(0.2-0.8)		0.5(0.2-0.8)	0.5(0.2-0.8)				
M	Austenitic Stainless Steels	≤0.5	L	0.8(0.3-1.0)	0.8(0.3-1.0)	0.8(0.3-1.0)	Dry	
			M	1.0(0.4-1.2)	1.0(0.4-1.2)	1.0(0.4-1.2)		
		≤1.0	L	0.6(0.2-0.8)	0.6(0.2-0.8)	0.6(0.2-0.8)		
			M	0.8(0.3-1.0)	0.8(0.3-1.0)	0.8(0.3-1.0)		
	Ferritic and Martensitic Stainless Steels	Hardness ≤200HB	≤0.5	L	0.8(0.3-1.0)	0.8(0.3-1.0)	0.8(0.3-1.0)	Dry
				M	1.0(0.4-1.2)	1.0(0.4-1.2)	1.0(0.4-1.2)	
			≤1.0	L	0.6(0.2-0.8)	0.6(0.2-0.8)	0.6(0.2-0.8)	
				M	0.8(0.3-1.0)	0.8(0.3-1.0)	0.8(0.3-1.0)	
	Duplex Stainless Steels	Hardness ≤280HB	≤0.5	L	0.6(0.3-0.8)	0.6(0.3-0.8)	0.6(0.3-0.8)	Dry
				M	0.7(0.3-1.0)	0.7(0.3-1.0)	0.7(0.3-1.0)	
			≤1.0	L	0.5(0.2-0.7)	0.5(0.2-0.7)	0.5(0.2-0.7)	
				M	0.6(0.3-0.7)	0.6(0.3-0.7)	0.6(0.3-0.7)	
Precipitation Hardening Stainless Steels	Hardness <450HB	≤0.5	L	0.6(0.3-0.8)	0.6(0.3-0.8)	0.6(0.3-0.8)	Dry	
			M	0.7(0.3-1.0)	0.7(0.3-1.0)	0.7(0.3-1.0)		
		≤1.0	L	0.5(0.2-0.7)	0.5(0.2-0.7)	0.5(0.2-0.7)		
			M	0.6(0.3-0.7)	0.6(0.3-0.7)	0.6(0.3-0.7)		
K	Gray Cast Irons	≤0.5	M,R	1.3(0.4-2.0)	1.3(0.4-2.0)	1.5(0.5-2.0)	Dry	
			L	1.2(0.4-1.6)	1.2(0.4-1.6)	1.2(0.4-1.6)		
		≤1.0	M,R	1.0(0.3-1.3)	0.8(0.3-1.0)	1.2(0.4-1.5)		
			L	1.0(0.3-1.3)	0.8(0.3-1.0)	1.0(0.3-1.3)		
	Ductile Cast Irons	Tensile Strength ≤450MPa	≤0.5	M,R	1.3(0.4-1.7)	1.3(0.4-1.7)	1.5(0.4-2.0)	Dry
				L	1.0(0.3-1.3)	1.0(0.3-1.3)	1.0(0.3-1.3)	
			≤1.0	M,R	0.8(0.3-1.0)	0.7(0.3-0.9)	1.0(0.3-1.3)	
	L	0.8(0.2-1.0)		0.7(0.2-0.9)	0.8(0.2-1.2)			
	Ductile Cast Irons	Tensile Strength ≤800MPa	≤0.5	M,R	1.0(0.2-1.5)	1.0(0.2-1.5)	1.3(0.3-1.7)	Dry
				L	0.8(0.3-1.2)	0.8(0.3-1.2)	0.8(0.3-1.2)	
			≤1.0	M,R	0.8(0.2-1.0)	0.6(0.2-0.8)	1.0(0.3-1.2)	
	L	0.5(0.2-0.8)		0.5(0.2-0.8)	0.5(0.2-0.8)			
S	Titanium Alloys	≤0.5	L	0.3(0.2-0.6)	0.3(0.2-0.6)	0.3(0.2-0.6)	Wet	
		≤1.0	L	0.3(0.2-0.4)	0.3(0.2-0.4)	0.3(0.2-0.4)		
	Heat Resistant Alloys	≤0.5	L,M,R	0.8(0.3-1.2)	0.8(0.3-1.2)	0.8(0.3-1.2)	Wet	
		≤1.0	L,M,R	0.7(0.3-1.0)	0.7(0.3-1.0)	0.7(0.3-1.0)		
H	Hardened Steels	≤0.5	R,M	0.6(0.3-1.0)	0.6(0.3-1.0)	0.6(0.3-1.0)	Dry	
		≤1.0	R,M	0.5(0.3-0.8)	0.4(0.3-0.6)	0.5(0.3-0.8)		

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

Note 2) When large vibration occurs, reduce the cutting conditions.

Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

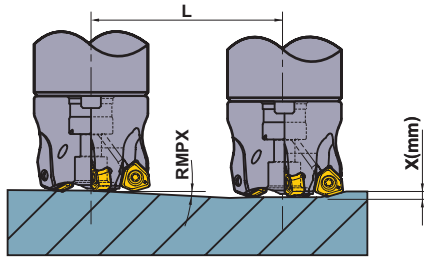
Note 4) If ap is set at 2mm or more, avoid machining on the walls or ramping.

Memo

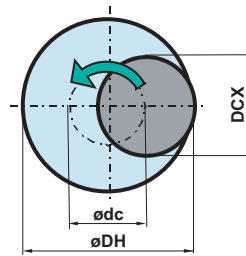
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Maximum Capacities by Mode

■ Ramping



■ Helical Milling



- How to derive a locus of the center of the tool.

$$\text{odc} = \text{DH} - \text{DCX}$$

odc = Locus of the Center of the Tool
 DH = Desired Hole Diameter
 DCX = Cutting Diameter Maximum

(mm)

Tool Holder Type	DCX	DC	APMX	Ramping		Helical Milling (Blind Hole, Flat Bottom)		Helical Milling (Through Hole)		AZ
				RMPX	L (mm) Required Distance for X mm Depth	DH		DH	P max.	
					x = 1	Min.	Max.	Min.		
WJX09R25	25	14.0	1.2	4.7°	12.2	38	47	34	1.2	0.8
WJX09R28	28	16.9	1.2	5.6°	10.2	44	53	38	1.2	1.2
WJX09R32	32	20.9	1.2	4.2°	13.7	52	61	46	1.2	1.2
WJX09R35	35	23.8	1.2	3.6°	15.9	58	67	52	1.2	1.2
WJX09R40	40	28.8	1.2	2.9°	19.8	68	77	61	1.2	1.2
WJX09-040	40	28.8	1.2	2.9°	19.8	68	77	61	1.2	1.2
WJX09-050	50	38.8	1.2	2.0°	28.7	88	97	81	1.2	1.2
WJX09R050	50	38.8	1.2	2.0°	28.7	88	97	81	1.2	1.2
WJX09-052	52	40.8	1.2	1.9°	30.2	92	101	85	1.2	1.2
WJX09-063	63	51.8	1.2	1.4°	41.0	114	123	107	1.2	1.2
WJX09R063	63	51.8	1.2	1.4°	41.0	114	123	107	1.2	1.2
WJX09-066	66	54.8	1.2	1.4°	41.0	120	129	113	1.2	1.2

DCX = Cutting Dia. Max.
APMX = Depth of Cut Max.

DC = Cutting Dia.
RMPX = Ramping Angle Max.

DH = Desired Hole Dia.
AZ = Plunge Depth Max.

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.

Note 2) When ramping, helical milling and drilling, long continuous chips may be scattered so please be careful.

<Helical Milling>

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).

<Drilling>

When drilling, set the axial feed per revolution at 0.2mm/rev or less.

Double-Sided Insert Type, High Feed Radius Milling Cutter

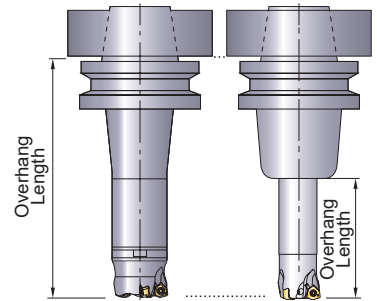
WJX14

Recommended Cutting Conditions

Correction Value According to Overhang Length

Multiply the recommended cutting conditions by the corrections factor x overhang length.

Type	Cutting Dia. Max. DCX	Overhang Length	Correction Value According		
			Cutting Speed vc (m/min)	Depth of Cut ap	Feed fz (mm/t.)
Shank Type	50	< 2.5 × DCON	100%	100%	100%
		3.0 × DCON	90%	100%	90%
		4.0 × DCON	80%	80%	90%
Arbor Type	50-80	< 2.5 × DCX	100%	100%	100%
		3.0 × DCX	85%	100%	90%
		4.0 × DCX	80%	80%	80%
		5.0 × DCX	75%	75%	60%
		6.0 × DCX	70%	70%	40%
		200	100%	100%	100%
	≥ 100	300	85%	100%	90%
		400	80%	80%	80%



DCON=Connection Dia.

Cutting Speed (Dry Cutting)

Workpiece Material	Properties	Cutting Speed vc (m/min)				
		MP6130	MP6120	MC7020	VP15TF	VP30RT
P		MP6130	MP6120	MC7020	VP15TF	VP30RT
Mild Steels	≤ 180HB	140 (90-180)	150 (100-200)	220 (170-270)	150 (100-200)	120 (80-160)
Carbon Steels Alloy Steels	180-280HB	120 (70-180)	140 (80-200)	200 (150-250)	140 (80-200)	100 (60-150)
Carbon Steels Alloy Steels	280-350HB	120 (70-180)	140 (80-200)	200 (150-250)	140 (80-200)	100 (60-150)
Alloy Tool Steels	≤ 350HB (Annealing)	120 (70-180)	140 (80-200)	200 (150-250)	140 (80-200)	100 (60-150)
Pre-hardened Steels	35-45HRC	90 (50-130)	110 (70-150)	-	110 (70-150)	80 (40-120)
M		MP7130	MP7140	MC7020	VP30RT	
Austenitic Stainless Steels	≤ 200HB	160 (130-200)	150 (120-180)	220 (170-270)	150 (120-180)	
Austenitic Stainless Steels	> 200HB	140 (100-200)	130 (80-180)	190 (140-240)	130 (80-180)	
Ferritic and Martensitic Stainless Steels	≤ 200HB	150 (100-200)	130 (80-180)	220 (170-270)	130 (80-180)	
Duplex Stainless Steels	≤ 280HB	130 (80-180)	110 (60-160)	180 (130-230)	110 (60-160)	
Precipitation Hardening Stainless Steels	< 450HB	110 (60-160)	90 (50-130)	170 (120-220)	90 (50-130)	
K		VP15TF				
Gray Cast Irons	≤ 350MPa	160 (120-200)				
Ductile Cast Irons	≤ 450MPa	150 (100-200)				
Ductile Cast Irons	≤ 800MPa	120 (80-160)				
S		MP9130	MP9120	VP15TF		
Titanium Alloys	-	40 (30-60)	50 (30-65)	50 (30-65)		
Heat Resistant Alloys	-	30 (20-40)	40 (20-50)	40 (20-50)		
H		VP15TF				
Hardened Steels	40-55HRC	70 (40-100)				

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

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

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

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

Depth of Cut / Feed per Tooth

(mm)

Workpiece Material	Properties	Depth of Cut ap	Breaker	Cutting Dia. Max. DCX=50, 52	Cutting Dia. Max. DCX≥63	Cutting Mode	
				Feed fz(mm/t.)	Feed fz(mm/t.)		
P	Mild Steels	≤1.0	M,R	1.5(0.6–2.5)	1.7(0.6–2.8)	Dry	
			L	1.2(0.4–2.0)	1.2(0.4–2.0)		
		≤1.5	M,R	1.3(0.6–2.0)	1.5(0.6–2.5)		
			L	1.0(0.4–1.8)	1.0(0.4–1.8)		
		≤2.0	M,R	1.2(0.6–2.0)	1.3(0.6–2.5)		
			L	0.8(0.4–1.7)	0.8(0.4–1.7)		
	≤2.5	M,R	0.8(0.3–1.5)	1.0(0.3–1.6)			
	≤3.0	M,R	0.4(0.2–1.0)	0.5(0.2–1.2)			
	Carbon Steels Alloy Steels	Hardness 180–280HB	≤1.0	M,R	1.5(0.5–2.0)	1.7(0.5–2.5)	Dry
				L	1.0(0.3–1.7)	1.0(0.3–1.7)	
			≤1.5	M,R	1.2(0.5–1.7)	1.3(0.5–2.5)	
				L	0.8(0.3–1.5)	0.8(0.3–1.5)	
			≤2.0	M,R	1.0(0.5–1.5)	1.2(0.5–2.0)	
				L	0.7(0.3–1.2)	0.7(0.3–1.2)	
	≤2.5	M,R	0.7(0.3–1.2)	0.9(0.3–1.5)			
	≤3.0	M,R	0.3(0.2–0.8)	0.4(0.2–1.0)			
	Carbon Steels Alloy Steels Alloy Tool Steels	Hardness 280–350HB ≤350HB (Annealing)	≤1.0	M,R	1.5(0.5–2.0)	1.7(0.5–2.5)	Dry
				L	1.0(0.3–1.7)	1.0(0.3–1.7)	
			≤1.5	M,R	1.2(0.5–1.7)	1.3(0.5–2.2)	
				L	0.8(0.3–1.5)	0.8(0.3–1.5)	
≤2.0			M,R	1.0(0.5–1.5)	1.2(0.5–2.0)		
			L	0.7(0.3–1.2)	0.7(0.3–1.2)		
≤2.5	M,R	0.7(0.3–1.2)	0.9(0.3–1.5)				
≤3.0	M,R	0.3(0.2–0.8)	0.4(0.2–1.0)				
Pre-hardened Steels	Hardness 35–45HRC	≤1.0	M,R	1.3(0.4–1.7)	1.5(0.4–2.0)	Dry	
			L	0.7(0.3–1.2)	0.7(0.3–1.2)		
		≤1.5	M,R	1.0(0.4–1.5)	1.2(0.4–1.5)		
			L	0.6(0.3–1.0)	0.6(0.3–1.0)		
		≤2.0	M,R	0.8(0.4–1.2)	1.0(0.4–1.3)		
			L	0.5(0.3–0.8)	0.5(0.3–0.8)		
M	Austenitic Stainless Steels	≤1.0	L	0.8(0.3–1.2)	0.8(0.3–1.2)	Dry	
			M	1.0(0.5–1.2)	1.0(0.5–1.2)		
		≤1.5	L	0.8(0.3–1.0)	0.8(0.3–1.0)		
			M	1.0(0.5–1.0)	1.0(0.5–1.0)		
	Ferritic and Martensitic Stainless Steels	Hardness ≤200HB	≤1.0	L	0.8(0.3–1.2)	0.8(0.3–1.2)	Dry
				M	1.0(0.5–1.2)	1.0(0.5–1.2)	
			≤1.5	L	0.8(0.3–1.0)	0.8(0.3–1.0)	
				M	1.0(0.5–1.0)	1.0(0.5–1.0)	
	Duplex Stainless Steels	Hardness ≤280HB	≤1.0	L	0.6(0.3–1.0)	0.6(0.3–1.0)	Dry
				M	0.8(0.4–1.0)	0.8(0.4–1.0)	
			≤1.5	L	0.6(0.3–0.8)	0.6(0.3–0.8)	
				M	0.8(0.4–0.8)	0.8(0.4–0.8)	
Precipitation Hardening Stainless Steels	Hardness <450HB	≤1	L	0.6(0.3–1.0)	0.6(0.3–1.0)	Dry	
			M	0.8(0.4–1.0)	0.8(0.4–1.0)		
		≤1.5	L	0.6(0.3–0.8)	0.6(0.3–0.8)		
			M	0.8(0.4–0.8)	0.8(0.4–0.8)		
K	Gray Cast Irons	≤1	M,R	1.7(0.6–2.5)	1.8(0.6–2.8)	Dry	
			L	1.3(0.4–2.0)	1.3(0.4–2.0)		
		≤1.5	M,R	1.5(0.6–2.0)	1.7(0.6–2.5)		
			L	1.2(0.4–1.8)	1.2(0.4–1.8)		
		≤2	M,R	1.3(0.6–2.0)	1.5(0.6–2.5)		
			L	1.0(0.4–1.5)	1.0(0.4–1.5)		
	≤2.5	M,R	0.8(0.3–1.5)	1.0(0.3–1.6)			
	≤3	M,R	0.4(0.2–1.0)	0.5(0.2–1.2)			
	Ductile Cast Irons	Tensile Strength ≤450MPa	≤1	M,R	1.5(0.5–2.0)	1.7(0.5–2.5)	Dry
				L	1.2(0.3–2.0)	1.2(0.3–2.0)	
			≤1.5	M,R	1.3(0.5–1.8)	1.5(0.5–2.0)	
				L	1.0(0.3–1.7)	1.0(0.3–1.7)	
			≤2	M,R	1.2(0.5–1.8)	1.3(0.5–2.0)	
				L	0.8(0.3–1.5)	0.8(0.3–1.5)	
	≤2.5	M,R	0.7(0.3–1.2)	0.9(0.3–1.5)			
	≤3	M,R	0.3(0.2–0.8)	0.4(0.2–1.0)			
	Ductile Cast Irons	Tensile Strength ≤800MPa	≤1	M,R	1.3(0.4–1.8)	1.5(0.4–2.0)	Dry
				L	1.0(0.3–1.7)	1.0(0.3–1.7)	
≤1.5			M,R	1.2(0.4–1.5)	1.3(0.4–1.8)		
			L	0.8(0.3–1.5)	0.8(0.3–1.5)		
≤2			M,R	1.0(0.4–1.5)	1.2(0.4–1.8)		
			L	0.7(0.3–1.2)	0.7(0.3–1.2)		
S	Titanium Alloys	≤1	L	0.3(0.2–0.6)	0.3(0.2–0.6)	Wet	
		≤1.5	L	0.3(0.2–0.5)	0.3(0.2–0.5)		
		≤2	L	0.3(0.2–0.4)	0.3(0.2–0.4)		
	Heat Resistant Alloys	≤1	L,M,R	1.0(0.3–1.3)	1.0(0.3–1.3)	Wet	
		≤1.5	L,M,R	0.8(0.3–1.2)	0.8(0.3–1.2)		
		≤2	L,M,R	0.7(0.3–1.2)	0.7(0.3–1.2)		
H	Hardened Steels	≤1	R,M	0.8(0.3–1.2)	0.8(0.3–1.2)	Dry	
		≤1.5	R,M	0.6(0.3–1.0)	0.6(0.3–1.0)		
		≤2	R,M	0.5(0.3–0.8)	0.5(0.3–0.8)		

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

Note 2) When large vibration occurs, reduce the cutting conditions.

Note 3) For interrupted cutting, reduce the cutting speed and feed rate by 20%.

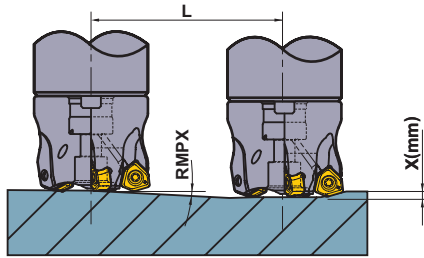
Note 4) If ap is set at 2mm or more, avoid machining on the walls or ramping.

Memo

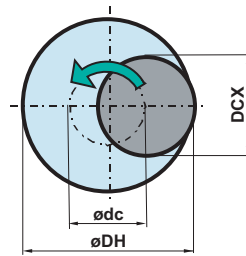
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Maximum Capacities by Mode

■ Ramping



■ Helical Milling



● How to derive a locus of the center of the tool.

$$\text{ødc} = \text{øDH} - \text{DCX}$$

Locus of the Center of the Tool Desired Hole Diameter Cutting Diameter Maximum

(mm)

Tool Holder Type	DCX	DC	APMX	Ramping			Helical Milling (Blind Hole, Flat Bottom)		Helical Milling (Through Hole)	AZ
				RMPX	L (mm) Required Distance for X mm Depth		DH		DH	
					x=1	x=2	Min.	Max.	Min.	
WJX14R50	50	34.5	2	4.4°	13.0	26.0	82	97	73	2.1
WJX14-050	50	34.5	2	4.4°	13.0	26.0	82	97	73	2.1
WJX14R050	50	34.5	2	4.4°	13.0	26.0	82	97	73	2.1
WJX14-052	52	36.5	2	4.1°	14.0	28.0	86	101	77	2.1
WJX14-063	63	47.5	2	3.0°	19.1	38.2	108	123	99	2.1
WJX14R063	63	47.5	2	3.0°	19.1	38.2	108	123	99	2.1
WJX14-066	66	50.4	2	2.8°	20.5	40.9	114	129	105	2.1
WJX14-080	80	64.4	2	2.1°	27.3	54.6	142	157	133	2.1
WJX14R080	80	64.4	2	2.1°	27.3	54.6	142	157	133	2.1
WJX14-100	100	84.4	2	1.5°	38.2	76.4	182	197	173	2.1
WJX14R100	100	84.4	2	1.5°	38.2	76.4	182	197	173	2.1
WJX14-125	125	109.4	2	1.2°	47.8	95.5	232	247	223	2.1
WJX14R125	125	109.4	2	1.2°	47.8	95.5	232	247	223	2.1
WJX14-160	160	144.4	2	0.8°	71.7	143.3	302	317	293	2.1
WJX14R160	160	144.4	2	0.8°	71.7	143.3	302	317	293	2.1

DCX = Cutting Dia. Max.

DC = Cutting Dia.

DH = Desired Hole Dia.

APMX = Depth of Cut Max.

RMPX = Ramping Angle Max.

AZ = Plunge Depth Max.

Note 1) When ramping and helical milling, it is recommended to reduce the feed per tooth.

Note 2) When ramping, helical milling and drilling, long continuous chips may be scattered so please be careful.

<Helical Milling>

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).

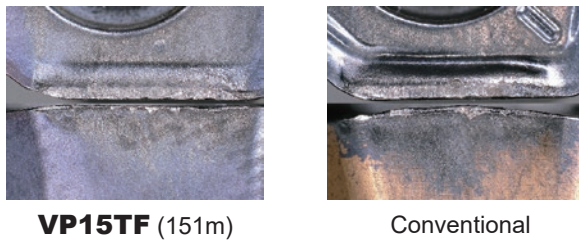
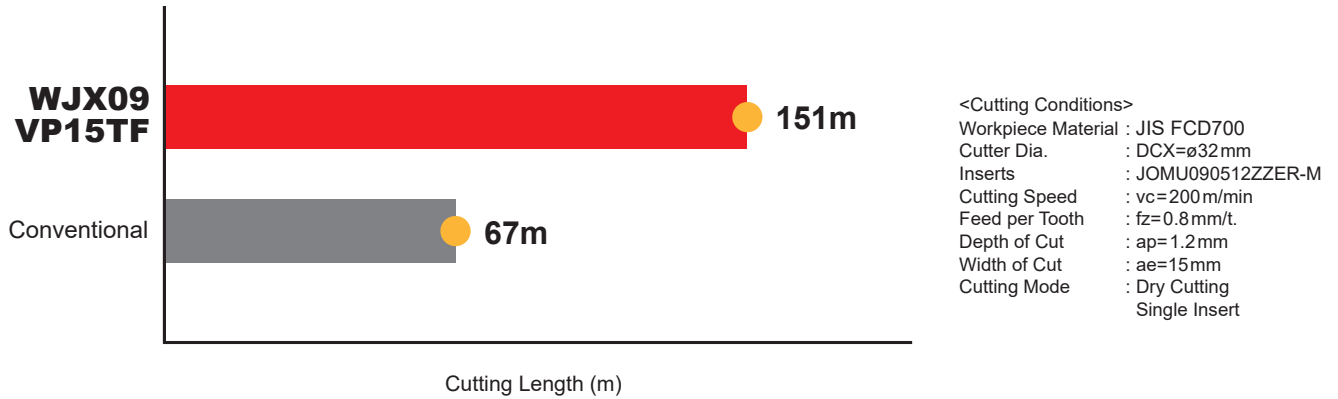
<Drilling>

When drilling, set the axial feed per revolution at 0.2mm/rev or less.

Cutting Performance

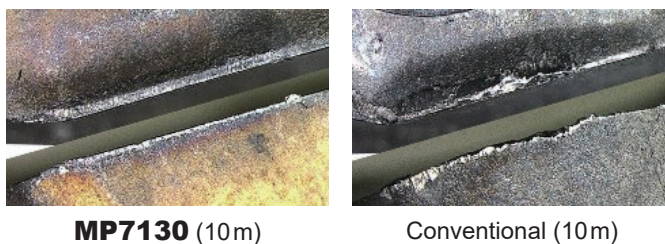
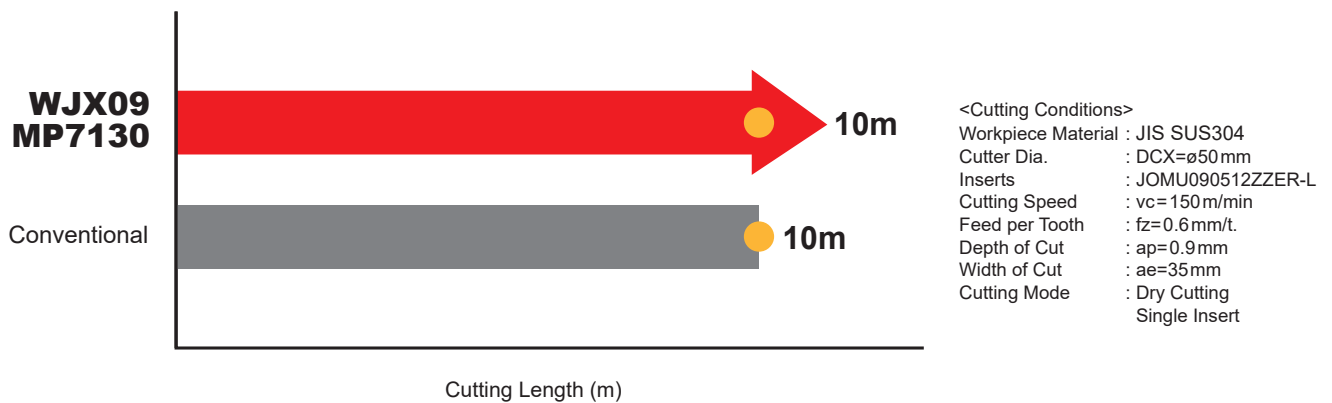
FCD700 Wear Resistance Comparison

The excellent wear resistance can extend tool life significantly.



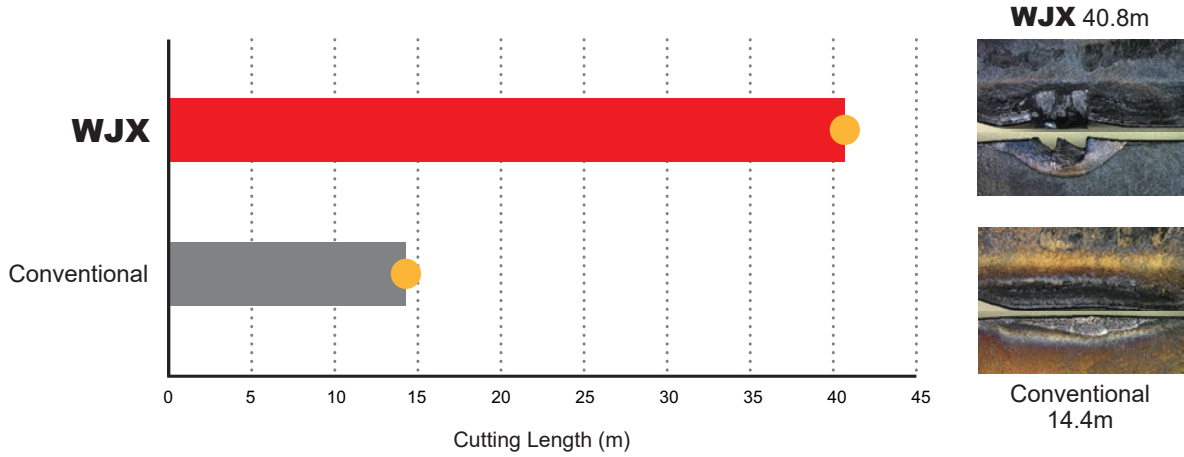
SUS304 Wear Resistance Comparison

Suppresses notch wear and therefore provides a stable tool life.



SCM440 Wear Resistance Comparison

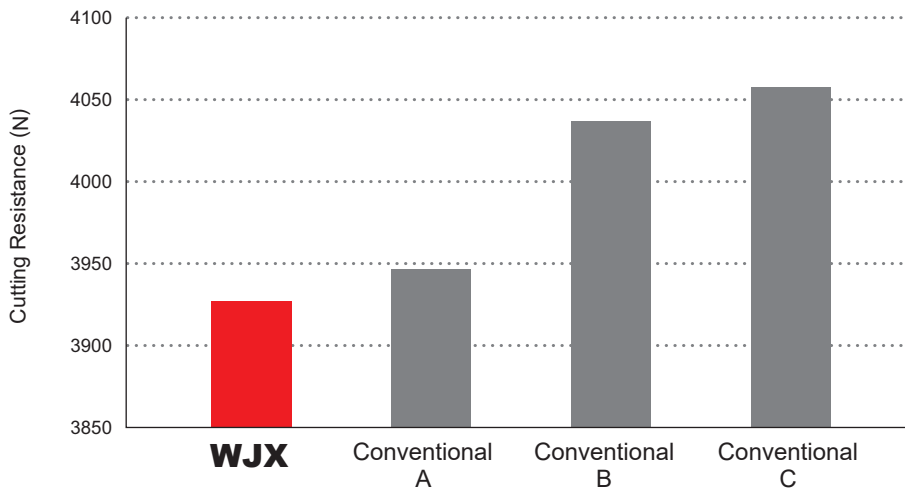
MC7020 has excellent crater wear resistance in high speed cutting.



<Cutting Conditions>
 Workpiece Material : JIS SCM440
 Cutter Dia. : DCX=ø63mm
 Inserts : JOMU140715ZZER-M
 Grade : MC7020
 Cutting Speed : vc=230m/min
 Feed per Tooth : fz=1.5mm/t.
 Depth of Cut : ap=1.5mm
 Width of Cut : ae=45mm
 Cutting Mode : Dry Cutting
 Single Insert

SCM440 Cutting Resistance Comparison

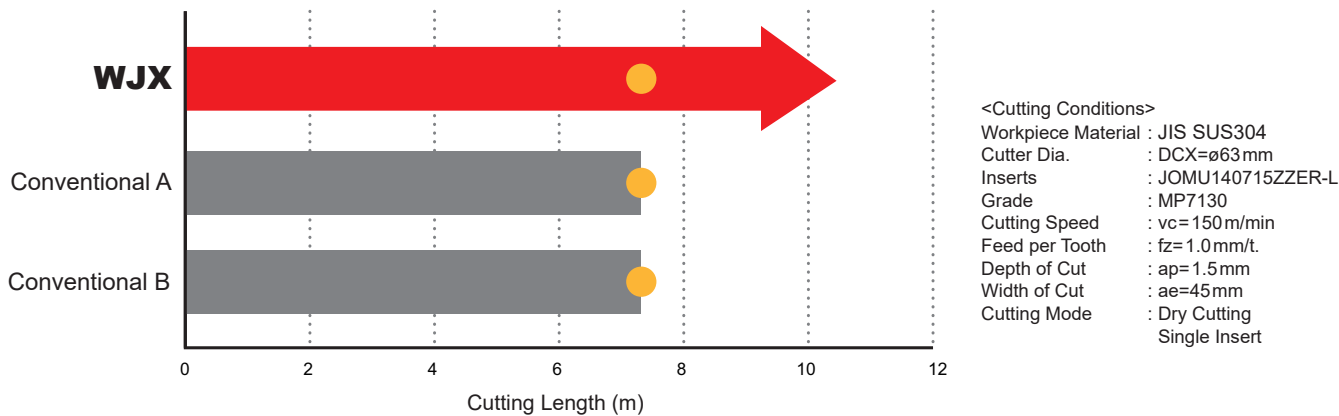
WJX reduces the spindle load for low cutting resistance.



<Cutting Conditions>
 Workpiece Material : JIS SCM440
 Cutter Dia. : DCX=ø63mm
 Inserts : JOMU140715ZZER-M
 Grade : VP15TF
 Cutting Speed : vc=150m/min
 Feed per Tooth : fz=1.0mm/t.
 Depth of Cut : ap=2.0mm
 Width of Cut : ae=45mm
 Cutting Mode : Dry Cutting
 Single Insert

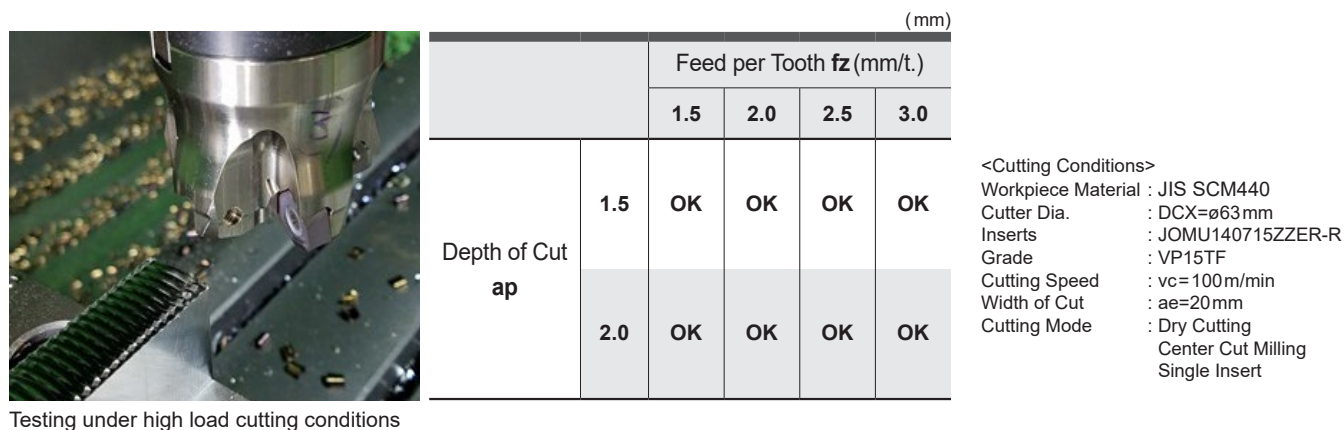
SUS304 Wear Resistance Comparison

Excellent result in welding and wear resistance.



AISI 4140 Fracture Resistance Comparison

Suitable for strong interrupted cutting due to high edge strength.



Operational Guidance

■ Depth of Cut

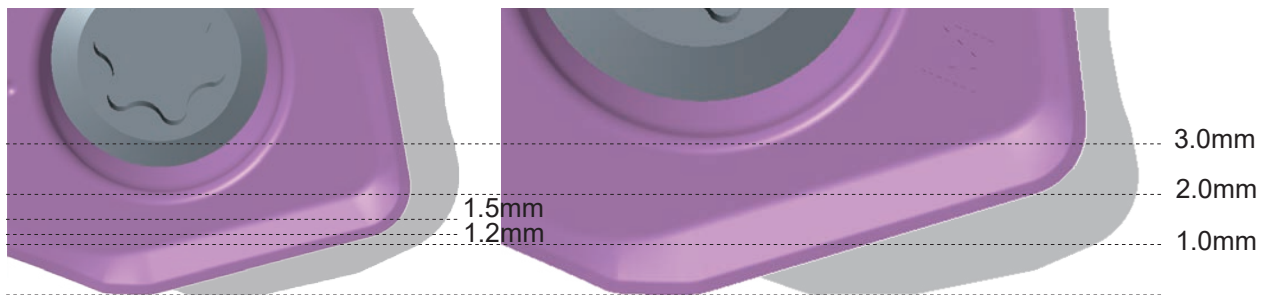
Refer to the following table for the maximum depth of cut of the WJX.

The straight cutting edge extending to the maximum depth of cut (APMX) allows for stable machining even at high depths of cut.

For face milling, lowering the feed rate will allow to exceed the APMX, up to depths of cut shown in the following table (when using the corner R).

For details on the feed rate, refer to the recommended cutting conditions on p.20 and 24.

	WJX09	WJX14
High feed and multi-function machining (APMX)	ap=1.2mm	ap=2.0mm
Low feed and Face machining	ap=1.5mm	ap=3.0mm



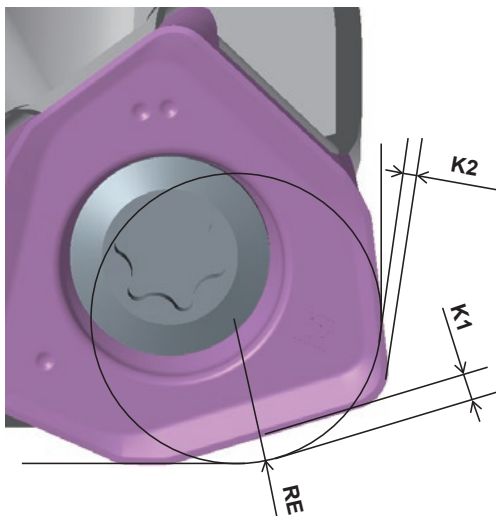
WJX09 Conventional Size 09

WJX14 Conventional Size 14

■ Remaining Stock

For CAM, use CAD data (from online catalogs), or use a definition as a radius milling cutter with reference to the following table.

The approximate radius RE, remaining stock K1, and over cutting amount K2 are as shown in the following table.



WJX09

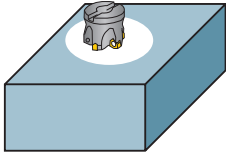
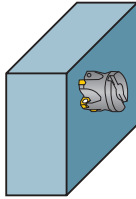
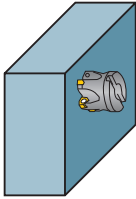
RE	Remaining Stock K1	Cutting Amount K2
R2.0 (Recommendation)	0.93	0.00
R2.3	0.86	0.00
R3.0	0.70	0.13

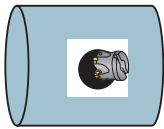
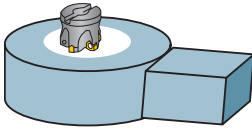
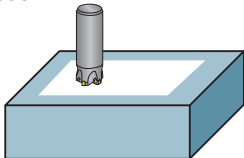
WJX14

RE	Remaining Stock K1	Cutting Amount K2
R3.0 (Recommendation)	1.41	0.00
R3.2	1.37	0.00
R4.0	1.17	0.10
R5.0	0.92	0.39

Depth of Cut ap	Remaining Stock H (mm)	
	WJX09	WJX14
0.5	0.02	-
1.0	0.07	0.05
1.5	-	0.08
2.0	-	0.12

Application Examples

Holder	WJX14-063A05AR	WJX14-063A05AR	WJX14-063A04AR
Insert (Grade)	JOMU140715ZZER-M(VP15TF)	JOMU140715ZZER-M(MP6120)	JOMU140715ZZER-M(VP15TF)
Workpiece	Welded Structural Steel 	Tool Steel 	JIS SKD61 Mild Steel 
Component	Machined Parts	Machined Parts	Mold
Cutting Conditions	Cutting Speed vc (m/min)	180	180
	Feed per Tooth fz (mm/t.)	1.0	1.6
	Depth of Cut (mm)	$ap = 1.0, ae = 38$	$ap = 1.0, ae = 40$
Cutting Mode	Wet Cutting, Helical Milling	Dry Cutting, Copy Milling	Dry Cutting, Contouring Milling
Results	Spindle load reduced by 10%. Good chip shape enables easy removal.	Reduced vibration meant treble tool life and enabled an increased table feed.	Using WJX meant a 30% reduction of spindle load and doubled cutting efficiency.

Holder	WJX14-063A05AR	WJX09-050A06AR	WJX09R2502SA25L
Insert (Grade)	JOMU140715ZZER-L(MP6130)	JOMU090512ZZER-M(MP6130)	JOMU090512ZZER-M(VP15TF)
Workpiece	Alloy Steel 	Tool Steel 	JIS S50C 
Component	Machined Parts	Machined Parts	Mold
Cutting Conditions	Cutting Speed vc (m/min)	190	196
	Feed per Tooth fz (mm/t.)	1.4	0.36
	Depth of Cut (mm)	$ap = 1.0$	$ap = 1.0, ae = 30$
Cutting Mode	Wet Cutting, Helical Milling	Dry Cutting, Helical Milling	Dry Cutting, Pocket Milling
Results	WJX machined double the number of holes and also displayed less tool wear compared to a conventional cutter.	WJX lowered the level of machining noise and increased efficiency by 50% with a higher feed rate and depth of cut.	Less vibration in the pocket corners reduced spindle load and improved tool life.

The above application examples are customer's applications, so it can be different from the recommended conditions.

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.)