MITSUBISHI MATERIALS

WSX445

GENERAL PURPOSE DOUBLE-SIDED INSERT TYPE FACE MILL FEATURES LOW CUTTING RESISTANCE



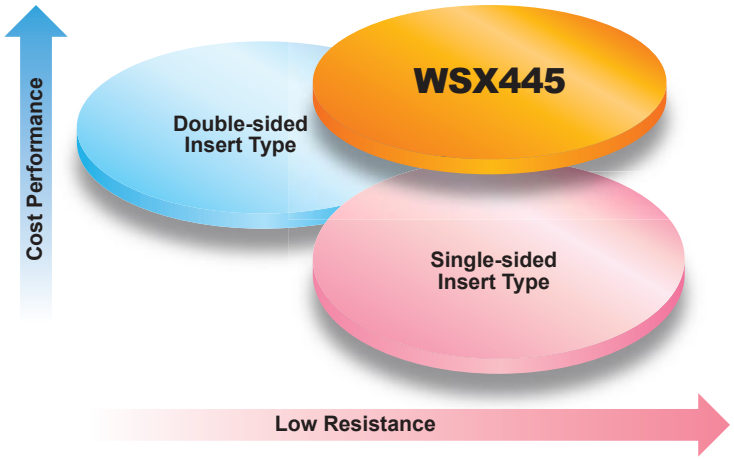


TOOL NEWS **B220A**

General Purpose Double-sided Insert Type Face Mill Features Low Cutting Resistance

WSX445

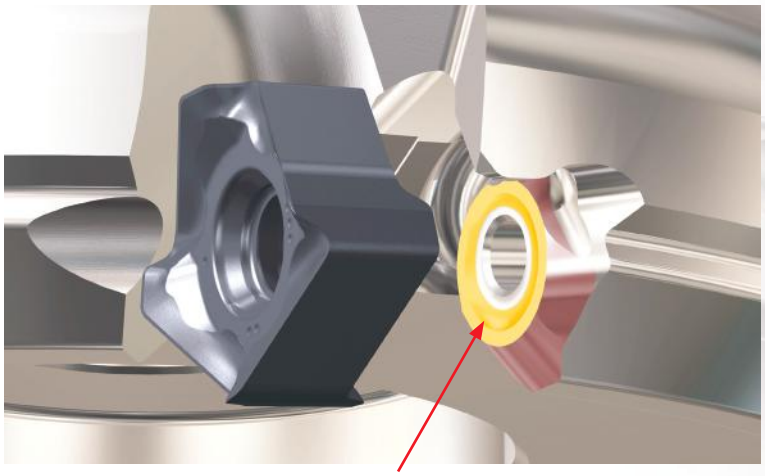
New double-sided insert type face milling cutter with innovative cutting edge!
Perfect balance between convenience and high efficiency!





Designed to control abnormal insert breakage and body damage

The unique conical insert pocket seating and Anti Fly Insert mechanism (A.F.I.) combine to securely hold the insert. Since the outer edge of the insert is not in contact with the cutter body damage from sudden fracturing is unlikely to cause damage to the cutter body.
Shims are not needed due to the high rigidity of the very thick insert.



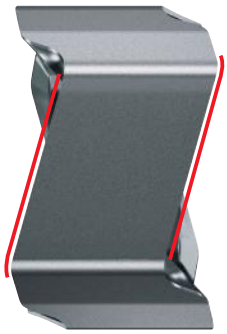
Anti Fly Insert Mechanism (A.F.I.)

Coolant Through

Improves chip discharge and prevents chip welding.

Unique Double Z Insert Geometry

Mitsubishi Materials' proprietary "Double-sided, Z Geometry" insert features sharp cutting edges with low cutting resistance by utilizing features of conventional positive and negative rake inserts.



Cutting Edge

Double-sided, Z Geometry

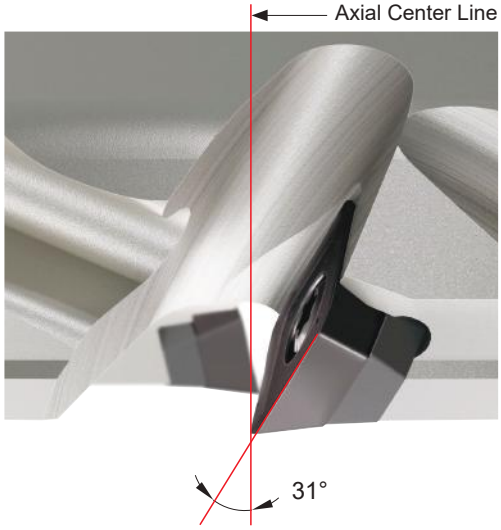


WSX445



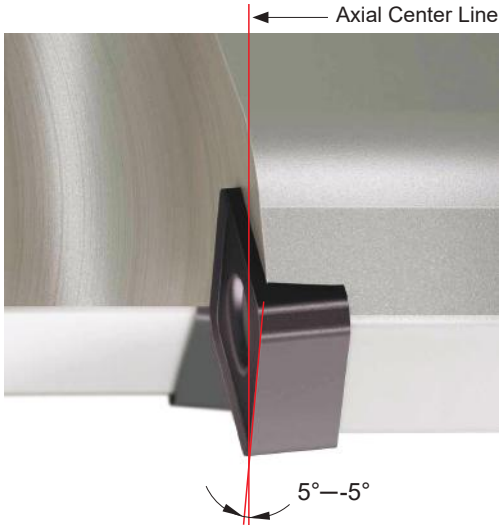
For Sharper Cutting Edge — **Double-sided Insert**

Conventional Positive Insert



For Sharper Cutting Edge — **Single-sided Insert**

Conventional Negative Insert

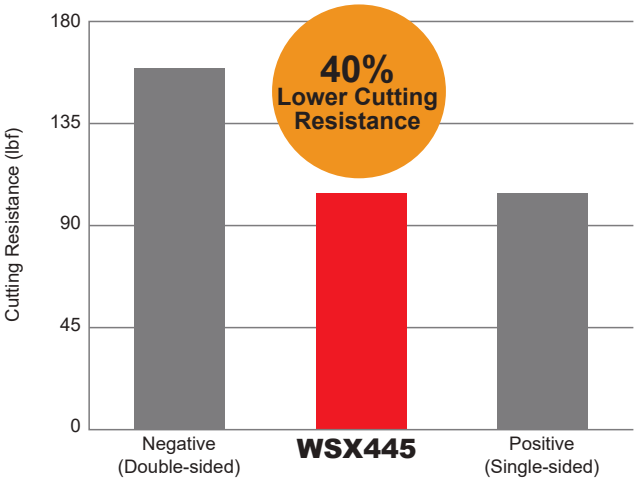


For Higher Edge Strength — **Double-sided Insert**

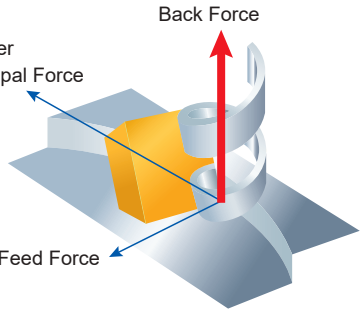
Cutting Resistance

WSX445's low cutting resistance equals that of single-sided insert cutters.
The low axial and radial forces reduce vibrations to a minimum.

[Comparison of the Back Force]



WSX445 M Chipbreaker
Conventional Insert



<Cutting Conditions>
Material : AISI 4140
Cutter Dia. : DC=5 inch
Cutting Speed : vc=655 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.157 inch
Width of Cut ae=4 inch
Cutting Mode : Dry Cutting
Single Insert

<Back Force>
Cutting force in the axial direction. Back force can cause inaccuracy and vibration, resulting in deflection of the workpiece material as well as cutting tools.

Chip Discharge Effect

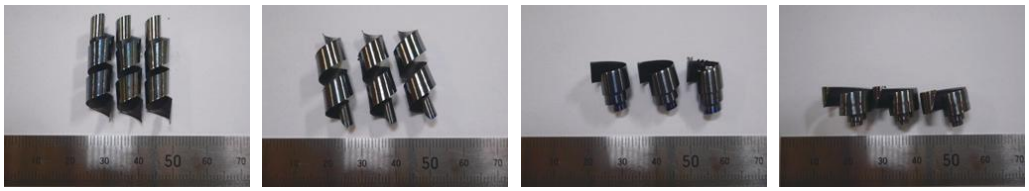
Chips are discharged outwardly because of the negative / positive edge design.
This helps prevent jamming of continuous chips and damage of coolant through.

Conventional Positive Insert

WSX445

Conventional Negative Insert A

Conventional Negative Insert B



Chips generated are cylindrical and are discharged away from the cutter.

Chips enter the inside of the cutter and cause machining problems.

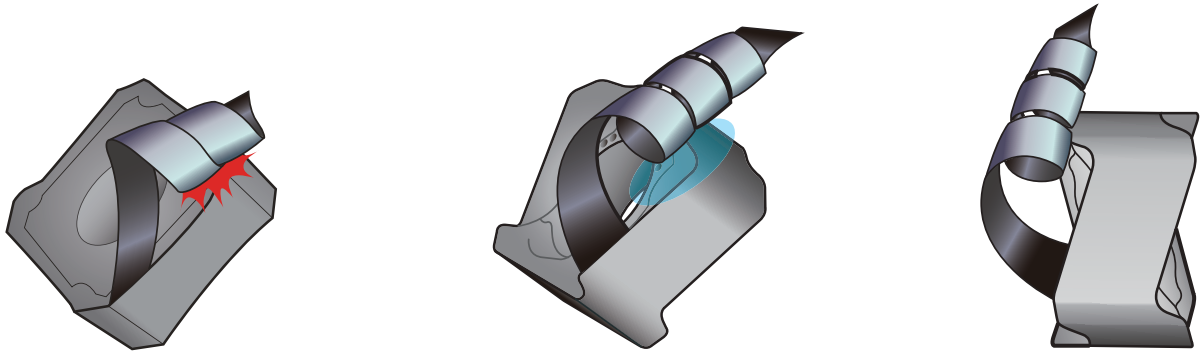
<Cutting Conditions>
Material : AISI 4140
Cutting Speed : vc=490 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.157 inch
Width of Cut ae=4 inch
Cutting Mode : Dry Cutting

Abrasive Damage from Chips

Depth of cut can be set without regard to the unused corner.

Conventional Double-sided Insert

WSX445

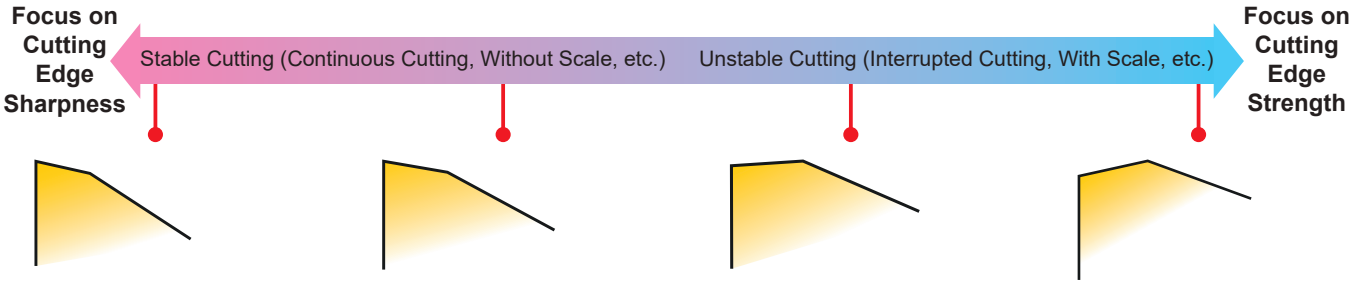


Chips can contact the unused corner.

The chips generated do not contact the unused corner.

Chipbreaker System

Chipbreaker series for varied cutting condition.



L Chipbreaker

The high rake angle boosts cutting performance. Positive land retains strength and provides low cutting resistance.

M Chipbreaker

First recommendation for general applications. A good balance of edge strength and sharpness is provided by the optimized positive land and rake angle.

R Chipbreaker

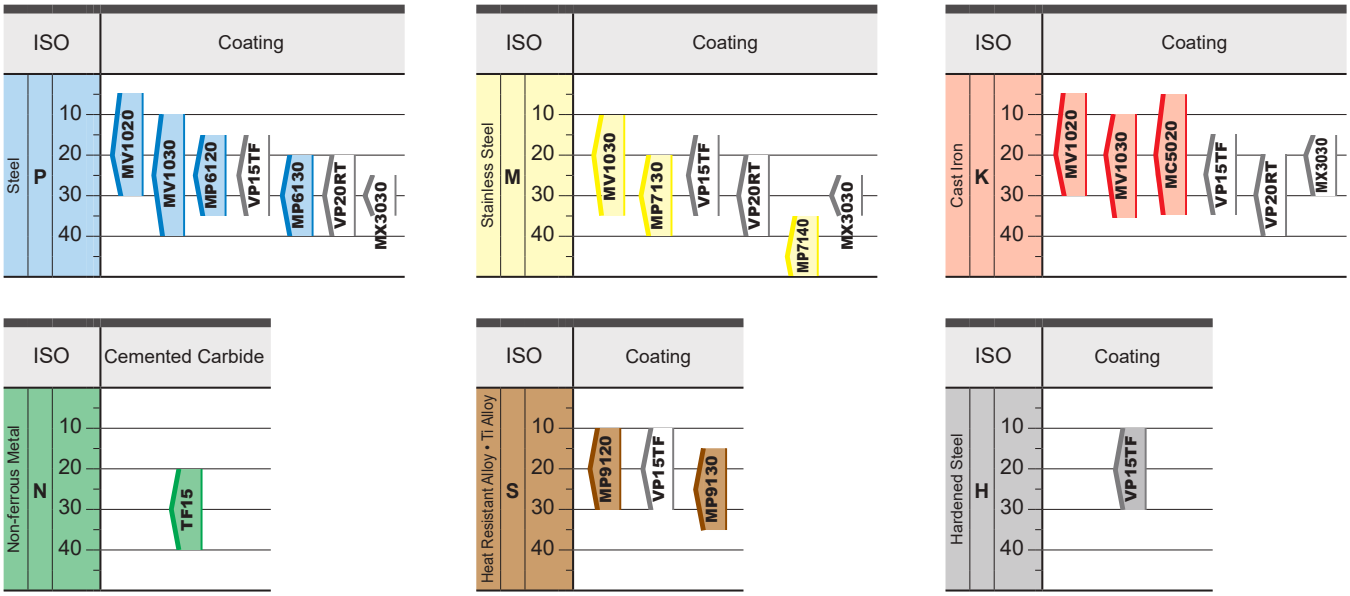
For unstable applications. Enhanced edge strength and retention of sharpness is provided by the negative land and positive rake angle respectively.

H Chipbreaker

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

Material	Cutting Conditions		
	Light	General	Heavy
P	L	M	R, H
M	L	M	
K	L	M	R, H
N	L		
S	L	M	
H	M	R	H

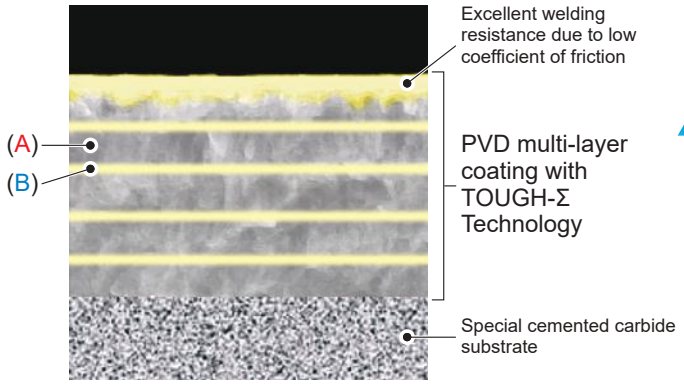
Inserts Grades for a Wide Range of Materials



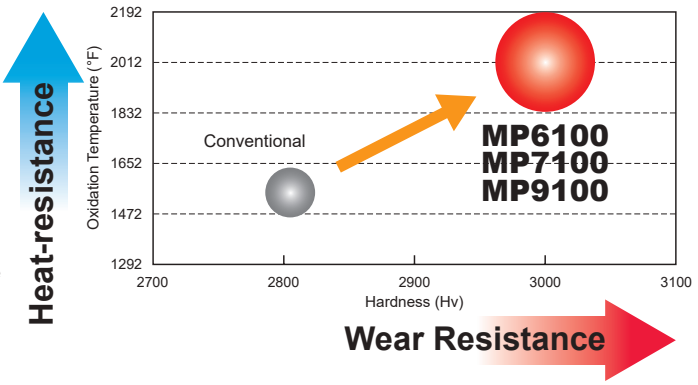
MP6100, MP7100, MP9100 - **With Accumulated Al-Ti-Cr-N Based PVD Coating**

TOUGH-Σ Technology

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



Dramatically Improving the Heat and Wear Resistance!



	Material	Grade	Coating		Coefficient of Friction		
			Base Layer (A)	Optimized Layer for Material (B)	Measured at 1112° F		
					AISI 1055	AISI 304	Ti-6Al-4V
P	Carbon Steel, Alloy Steel	**MP6100** 	**High Al-(Al, Ti)N** The new technology Al-(Al, Ti)N provides stability of the high hardness phase and succeeds in dramatically improving wear, crater and welding resistance.	(Al, Cr) N Based	.4		
				Tough! Resists Chipping			
M	Stainless Steel	**MP7100** 		TiN Based		.5	
				Tough! Resists Notching			
S	Titanium Alloys, Heat Resistant Alloys	**MP9100** 		CrN Based			.3
				Tough! Resists Thermal Cracking			
				Conventional	.7	.7	.7

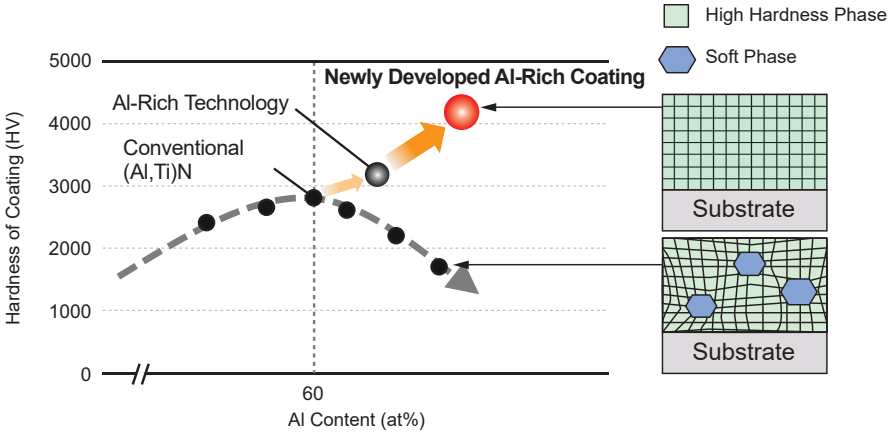
Coated Carbide Grade for Milling

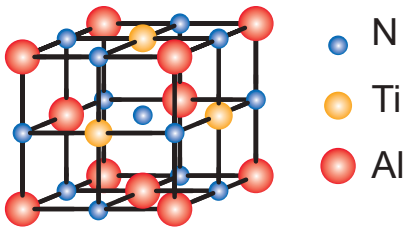
MV1020/MV1030

Newly Developed Al-Rich Coating

Advanced Wear and Thermal Shock Resistance

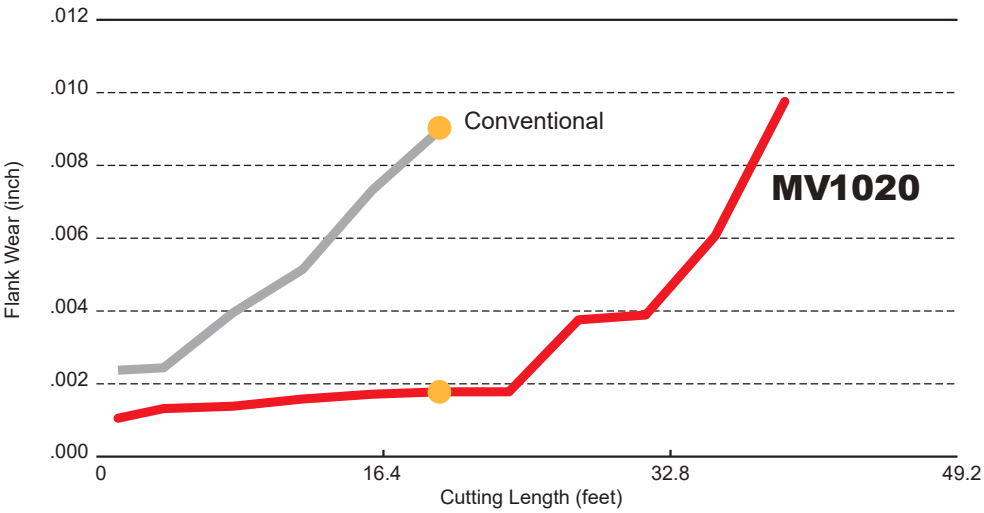
By adopting the newly developed Al-Rich coating technology, the (Al,Ti)N with a high Al content ratio displays a very high hardness. This greatly improves oxidation and wear resistance.
The extreme heat resistance of this new series achieves amazing stability not only during dry cutting, but also when 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.





Crystal image of **MV1000** series

Comparison of wear resistance when machining alloy steel 4140



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



39.4 feet cutting length achieved

MV1020



Chipping occurs at cutting length of 19.7 feet

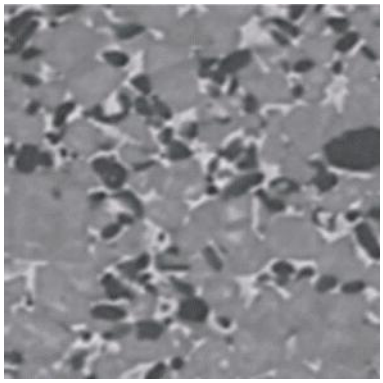
Conventional

* Taken after cutting length of 19.7 feet

The grade for finishing and light cutting is excellent for welding resistance and is suitable for machining that requires a shiny surface.

MX3020

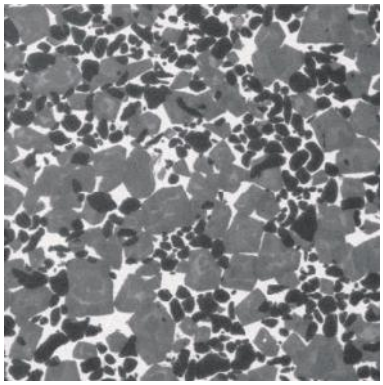
MX3020 is a cermet grade with excellent wear resistance for wiper inserts.



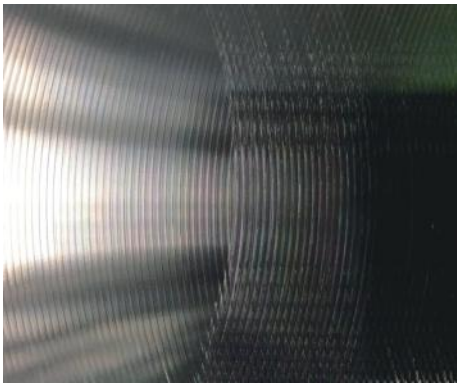
MX3020

MX3030

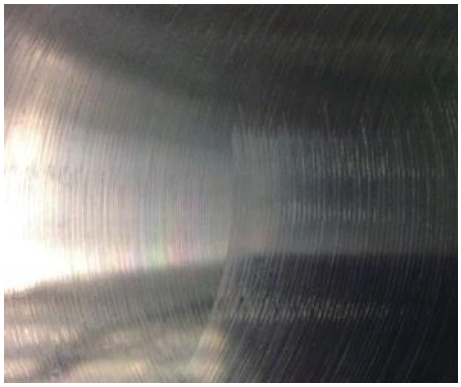
MX3030 is a cermet grade with excellent fracture resistance and is suitable for finish and light cutting.



MX3030



Conventional



MX3030

<Cutting Conditions>
Material : ASTM A36M
Cutter Dia. : DC=5 inch
Cutting Speed : vc=655 SFM
Feed per Tooth : fz=.004 IPT
Depth of Cut : ap=.079 inch
Width of Cut : ae=3.937 inch
Cutting Mode : Dry Cutting
8 Inserts
Center Cut
After 26 feet Cutting Work

FACE MILLING
<GENERAL CUTTING>

45° KAPR

WSX445

P M K N S H



- Double-sided Z Geometry.
- Smooth chip discharge.

Fig.1

ø1.5"
ø2"
ø2.5"
ø3"

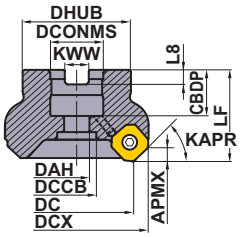
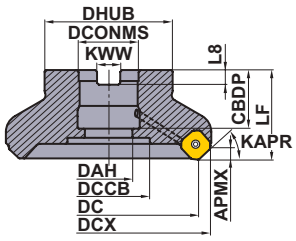


Fig.2

ø4"
ø5"
ø6"



Right hand tool holder only.

Arbor Type
Right Hand Tool Holder

DC=inch size, DCONMS=Inch size (inch)

DC	Order Number	Stock	*1 Coolant Thru	*2 No.T	Pitch	DCX	LF	DCONMS	WT(lbs)	APMX	Fig.
1.500	**WSX445UR1503SA**	●	Y	3	Coarse	2.005	1.750	.500	.8	.197	1
1.500	**WSX445UR1504SA**	●	Y	4	Fine	2.005	1.750	.500	.7	.197	1
2.000	**WSX445UR0203AA**	●	Y	3	Coarse	2.506	1.750	.750	1.2	.197	1
2.000	**WSX445UR0204AA**	●	Y	4	Fine	2.506	1.750	.750	1.1	.197	1
2.000	**WSX445UR0205AA**	●	Y	5	Extra Fine	2.506	1.750	.750	1.1	.197	1
2.500	**WSX445UR2504CA**	●	Y	4	Coarse	3.006	2.000	1.000	2.0	.197	1
2.500	**WSX445UR2505CA**	●	Y	5	Fine	3.006	2.000	1.000	2.0	.197	1
2.500	**WSX445UR2506CA**	●	Y	6	Extra Fine	3.006	2.000	1.000	1.9	.197	1
3.000	**WSX445UR0304CA**	●	Y	4	Coarse	3.506	2.000	1.000	2.6	.197	1
3.000	**WSX445UR0306CA**	●	Y	6	Fine	3.506	2.000	1.000	2.5	.197	1
3.000	**WSX445UR0308CA**	●	Y	8	Extra Fine	3.506	2.000	1.000	2.4	.197	1
4.000	**WSX445UR0405EA**	●	Y	5	Coarse	4.506	2.500	1.500	5.9	.197	2
4.000	**WSX445UR0407EA**	●	Y	7	Fine	4.506	2.500	1.500	5.8	.197	2
4.000	**WSX445UR0410EA**	●	Y	10	Extra Fine	4.506	2.500	1.500	5.6	.197	2
5.000	**WSX445UR0506EA**	●	Y	6	Coarse	5.506	2.500	1.500	8.5	.197	2
5.000	**WSX445UR0508EA**	●	Y	8	Fine	5.506	2.500	1.500	8.3	.197	2
5.000	**WSX445UR0512EA**	●	Y	12	Extra Fine	5.506	2.500	1.500	8.0	.197	2
6.000	**WSX445UR0607EA**	●	Y	7	Coarse	6.506	2.500	1.500	10.6	.197	2
6.000	**WSX445UR0610EA**	●	Y	10	Fine	6.506	2.500	1.500	10.4	.197	2
6.000	**WSX445UR0616EA**	●	Y	16	Extra Fine	6.506	2.500	1.500	9.9	.197	2
8.000	**WSX445UR0808MN**	●	N	8	Coarse	8.506	2.500	2.500	19.1	.197	3
8.000	**WSX445UR0812MN**	●	N	12	Fine	8.506	2.500	2.500	18.8	.197	3
8.000	**WSX445UR0820MN**	●	N	20	Extra Fine	8.506	2.500	2.500	18.3	.197	3
10.000	**WSX445UR1010MN**	●	N	10	Coarse	10.493	2.500	2.500	28.5	.197	3
10.000	**WSX445UR1014MN**	●	N	14	Fine	10.493	2.500	2.500	29.2	.197	3
12.000	**WSX445UR1214MN**	●	N	14	Coarse	12.493	2.500	2.500	48.1	.197	4

*1 Y=Yes, N=No
*2 Number of Teeth
(Note1) The cutter body includes a set bolt for an arbor.

● : **USA Stock**

Fig.3

ø8"
ø10"

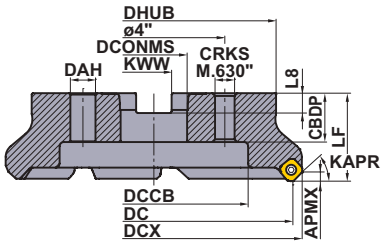
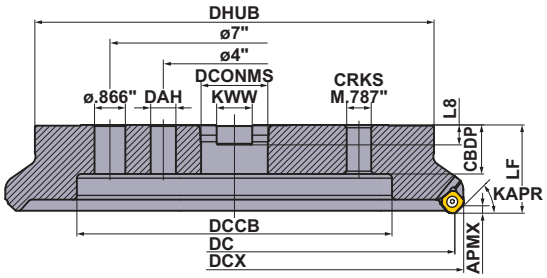


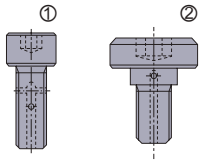
Fig.4

ø12"



Right hand tool holder only.

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	
8.000	—	—
10.000	—	
12.000	—	



Arbor Type Mounting Dimensions

(inch)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
.500	1.500	**WSX445UR1503SA**	.630	.276	.433	1.437	.250	.156	1
.500	1.500	**WSX445UR1504SA**	.630	.276	.433	1.437	.250	.156	1
.750	2.000	**WSX445UR0203AA**	.748	.413	.630	1.750	.313	.187	1
.750	2.000	**WSX445UR0204AA**	.748	.413	.630	1.750	.313	.187	1
.750	2.000	**WSX445UR0205AA**	.748	.413	.630	1.750	.313	.187	1
1.000	2.500	**WSX445UR2504CA**	.945	.539	.827	2.190	.375	.219	1
1.000	2.500	**WSX445UR2505CA**	.945	.539	.827	2.190	.375	.219	1
1.000	2.500	**WSX445UR2506CA**	.945	.539	.827	2.190	.375	.219	1
1.000	3.000	**WSX445UR0304CA**	.945	.539	.827	2.190	.375	.219	1
1.000	3.000	**WSX445UR0306CA**	.945	.539	.827	2.190	.375	.219	1
1.000	3.000	**WSX445UR0308CA**	.945	.539	.827	2.190	.375	.219	1
1.500	4.000	**WSX445UR0405EA**	1.417	1.181	2.205	3.500	.625	.375	2
1.500	4.000	**WSX445UR0407EA**	1.417	1.181	2.205	3.500	.625	.375	2
1.500	4.000	**WSX445UR0410EA**	1.417	1.181	2.205	3.500	.625	.375	2
1.500	5.000	**WSX445UR0506EA**	1.417	1.181	2.205	3.813	.625	.375	2
1.500	5.000	**WSX445UR0508EA**	1.417	1.181	2.205	3.813	.625	.375	2
1.500	5.000	**WSX445UR0512EA**	1.417	1.181	2.205	3.813	.625	.375	2
1.500	6.000	**WSX445UR0607EA**	1.417	1.181	2.205	3.813	.625	.375	2
1.500	6.000	**WSX445UR0610EA**	1.417	1.181	2.205	3.813	.625	.375	2
1.500	6.000	**WSX445UR0616EA**	1.417	1.181	2.205	3.813	.625	.375	2
2.500	8.000	**WSX445UR0808MN**	1.378	.709	5.512	6.890	1.000	.560	3
2.500	8.000	**WSX445UR0812MN**	1.378	.709	5.512	6.890	1.000	.560	3
2.500	8.000	**WSX445UR0820MN**	1.378	.709	5.512	6.890	1.000	.560	3
2.500	10.000	**WSX445UR1010MN**	1.378	.709	7.087	8.661	1.000	.560	3
2.500	10.000	**WSX445UR1014MN**	1.378	.709	7.087	8.661	1.000	.560	3
2.500	12.000	**WSX445UR1214MN**	1.575	.709	8.858	11.220	1.000	.560	4



Metric Standard

For inch arbors

Fig.1

ø80

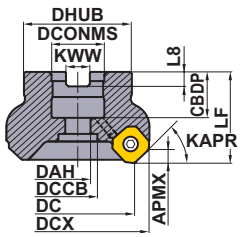
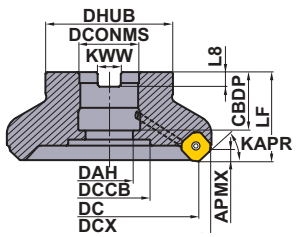


Fig.2

ø100
ø125
ø160



Right hand tool holder shown.

Arbor Type
Right Hand Tool Holder

DC = mm size, DCONMS = Inch size

(mm)

DC	Order Number	Stock	✶1 Coolant Thru	✶2 No.T	Pitch	DCX	LF	DCONMS	WT(kg)	APMX	Fig.
80	**WSX445R08004CA**	★	Y	4	Coarse	92.9	50	25.4 [1.00"]	1.3	5	1
80	**WSX445R08006CA**	★	Y	6	Fine	92.9	50	25.4 [1.00"]	1.2	5	1
80	**WSX445R08008CA**	★	Y	8	Extra Fine	92.9	50	25.4 [1.00"]	1.1	5	1
100	**WSX445R10005DA**	★	Y	5	Coarse	112.9	50	31.75 [1.25"]	1.8	5	2
100	**WSX445R10007DA**	★	Y	7	Fine	112.9	50	31.75 [1.25"]	1.7	5	2
100	**WSX445R10010DA**	★	Y	10	Extra Fine	112.9	50	31.75 [1.25"]	1.6	5	2
125	**WSX445R12506EA**	★	Y	6	Coarse	137.9	63	38.1 [1.50"]	3.2	5	2
125	**WSX445R12508EA**	★	Y	8	Fine	137.9	63	38.1 [1.50"]	3.1	5	2
125	**WSX445R12512EA**	★	Y	12	Extra Fine	137.9	63	38.1 [1.50"]	3.0	5	2
160	**WSX445R16007FA**	★	Y	7	Coarse	172.9	63	50.8 [2.00"]	4.9	5	2
160	**WSX445R16010FA**	★	Y	10	Fine	172.9	63	50.8 [2.00"]	4.8	5	2
160	**WSX445R16016FA**	★	Y	16	Extra Fine	172.8	63	50.8 [2.00"]	4.6	5	2
200	**WSX445R20008KN**	★	N	8	Coarse	212.9	63	47.625 [1.85"]	8.7	5	3
200	**WSX445R20012KN**	★	N	12	Fine	212.9	63	47.625 [1.85"]	8.6	5	3
200	**WSX445R20020KN**	★	N	20	Extra Fine	212.8	63	47.625 [1.85"]	8.4	5	3
250	**WSX445R25010KN**	★	N	10	Coarse	262.9	63	47.625 [1.85"]	13.1	5	3
250	**WSX445R25014KN**	★	N	14	Fine	262.9	63	47.625 [1.85"]	13.2	5	3
315	**WSX445R31514PN**	★	N	14	Coarse	327.9	63	47.625 [1.85"]	21.5	5	4

Arbor Type
Left Hand Tool Holder

DC = mm size, DCONMS = Inch size

(mm)

DC	Order Number	Stock	✶1 Coolant Thru	✶2 No.T	Pitch	DCX	LF	DCONMS	WT(kg)	APMX	Fig.
80	**WSX445L08004CA**	★	Y	4	Coarse	92.9	50	25.4 [1.00"]	1.3	5	1
100	**WSX445L10005DA**	★	Y	5	Coarse	112.9	50	31.75 [1.25"]	1.8	5	2
125	**WSX445L12506EA**	★	Y	6	Coarse	137.9	63	38.1 [1.50"]	3.2	5	2
160	**WSX445L16007FA**	★	Y	7	Coarse	172.9	63	50.8 [2.00"]	4.9	5	2
200	**WSX445L20008KN**	★	N	8	Coarse	212.9	63	47.625 [1.85"]	8.7	5	3
250	**WSX445L25010KN**	★	N	10	Coarse	262.9	63	47.625 [1.85"]	13.1	5	3

✶1 Y=Yes, N=No
✶2 Number of Teeth
(Note1) Set bolt not included.

★ : **Stocked in Japan**

Fig.3
ø200
ø250

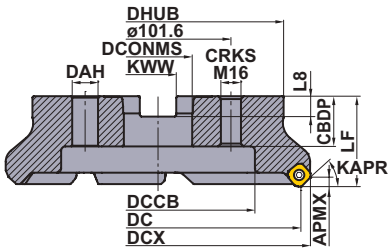
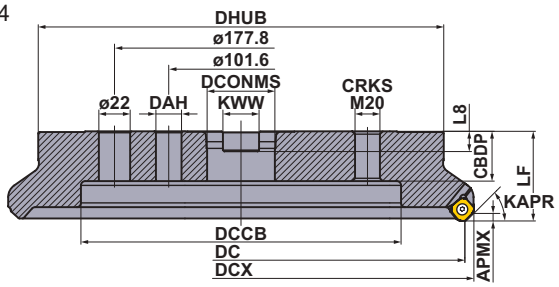
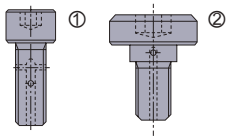


Fig.4
ø315



Right hand tool holder shown.

DC	Set Bolt	Geometry
ϕ80	HSC12035H	①
ϕ100	MBA16033H	②
ϕ125	MBA20040H	②
ϕ160	MBA24045H	②
ϕ200	—	—
ϕ250	—	—
ϕ315	—	—



Arbor Type Mounting Dimensions

(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
25.4	80	**WSX445R08004CA**	26	13	20	56	9.5	6	1
25.4	80	**WSX445R08006CA**	26	13	20	56	9.5	6	1
25.4	80	**WSX445R08008CA**	26	13	20	56	9.5	6	1
31.75	100	**WSX445R10005DA**	32	26	45	70	12.7	8	2
31.75	100	**WSX445R10007DA**	32	26	45	70	12.7	8	2
31.75	100	**WSX445R10010DA**	32	26	45	70	12.7	8	2
38.1	125	**WSX445R12506EA**	36	30	56	80	15.9	10	2
38.1	125	**WSX445R12508EA**	36	30	56	80	15.9	10	2
38.1	125	**WSX445R12512EA**	36	30	56	80	15.9	10	2
50.8	160	**WSX445R16007FA**	38	40	72	100	19.1	11	2
50.8	160	**WSX445R16010FA**	38	40	72	100	19.1	11	2
50.8	160	**WSX445R16016FA**	38	40	72	100	19.1	11	2
47.625	200	**WSX445R20008KN**	35	18	135	175	25.4	14.22	3
47.625	200	**WSX445R20012KN**	35	18	135	175	25.4	14.22	3
47.625	200	**WSX445R20020KN**	35	18	135	175	25.4	14.22	3
47.625	250	**WSX445R25010KN**	35	18	180	220	25.4	14.22	3
47.625	250	**WSX445R25014KN**	35	18	180	220	25.4	14.22	3
47.625	315	**WSX445R31514PN**	35	18	225	285	25.4	14.22	4

(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
25.4	80	**WSX445L08004CA**	26	13	20	56	9.5	6	1
31.75	100	**WSX445L10005DA**	32	26	45	70	12.7	8	2
38.1	125	**WSX445L12506EA**	36	30	56	80	15.9	10	2
50.8	160	**WSX445L16007FA**	38	40	72	100	19.1	11	2
47.625	200	**WSX445L20008KN**	35	18	135	175	25.4	14.22	3
47.625	250	**WSX445L25010KN**	35	18	180	220	25.4	14.22	3



Metric Standard

For metric arbors

Fig.1

ø40
ø50
ø63
ø80

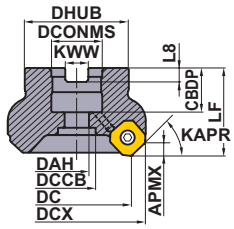
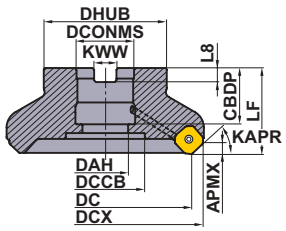


Fig.2

ø100
ø125



Right hand tool holder shown.

Arbor Type
Right Hand Tool Holder

DC=mm size, DCONMS=mm size (mm)

DC	Order Number	Stock	✶1 Coolant Thru	✶2 No.T	Pitch	DCX	LF	DCONMS	WT(kg)	APMX	Fig.
40	**WSX445-040A03AR**	★	Y	3	Coarse	52.8	40	16	0.3	5	1
40	**WSX445-040A04AR**	★	Y	4	Fine	52.8	40	16	0.3	5	1
50	**WSX445-050A03AR**	★	Y	3	Coarse	62.9	40	22	0.5	5	1
50	**WSX445-050A04AR**	★	Y	4	Fine	62.9	40	22	0.4	5	1
50	**WSX445-050A05AR**	★	Y	5	Extra Fine	62.9	40	22	0.4	5	1
63	**WSX445-063A04AR**	★	Y	4	Coarse	75.9	40	22	0.6	5	1
63	**WSX445-063A05AR**	★	Y	5	Fine	75.9	40	22	0.6	5	1
63	**WSX445-063A06AR**	★	Y	6	Extra Fine	75.9	40	22	0.6	5	1
80	**WSX445-080A04AR**	★	Y	4	Coarse	92.9	50	27	1.3	5	1
80	**WSX445-080A06AR**	★	Y	6	Fine	92.9	50	27	1.2	5	1
80	**WSX445-080A08AR**	★	Y	8	Extra Fine	92.9	50	27	1.1	5	1
100	**WSX445-100B05AR**	★	Y	5	Coarse	112.9	50	32	1.9	5	2
100	**WSX445-100B07AR**	★	Y	7	Fine	112.9	50	32	1.9	5	2
100	**WSX445-100B10AR**	★	Y	10	Extra Fine	112.9	50	32	1.8	5	2
125	**WSX445-125B06AR**	★	Y	6	Coarse	137.9	63	40	3.4	5	2
125	**WSX445-125B08AR**	★	Y	8	Fine	137.9	63	40	3.4	5	2
125	**WSX445-125B12AR**	★	Y	12	Extra Fine	137.9	63	40	3.2	5	2
160	**WSX445-160C07NR**	★	N	7	Coarse	172.9	63	40	4.9	5	3
160	**WSX445-160C10NR**	★	N	10	Fine	172.9	63	40	4.8	5	3
160	**WSX445-160C16NR**	★	N	16	Extra Fine	172.8	63	40	4.6	5	3
200	**WSX445-200C08NR**	★	N	8	Coarse	212.9	63	60	7.5	5	4
200	**WSX445-200C12NR**	★	N	12	Fine	212.9	63	60	7.4	5	4
200	**WSX445-200C20NR**	★	N	20	Extra Fine	212.8	63	60	7.2	5	4

Arbor Type
Left Hand Tool Holder

DC=mm size, DCONMS=mm size (mm)

DC	Order Number	Stock	✶1 Coolant Thru	✶2 No.T	Pitch	DCX	LF	DCONMS	WT(kg)	APMX	Fig.
80	**WSX445-080A04AL**	★	Y	4	Coarse	92.9	50	27	1.3	5	1
100	**WSX445-100B05AL**	★	Y	5	Coarse	112.9	50	32	1.9	5	2
125	**WSX445-125B06AL**	★	Y	6	Coarse	137.9	63	40	3.4	5	2
160	**WSX445-160C07NL**	★	N	7	Coarse	172.9	63	40	4.9	5	3

✶1 Y=Yes, N=No ✶2 Number of Teeth
(Note1) Set bolt not included.

★ : **Stocked in Japan**

Fig.3

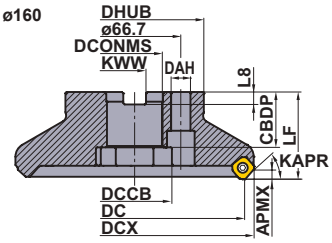
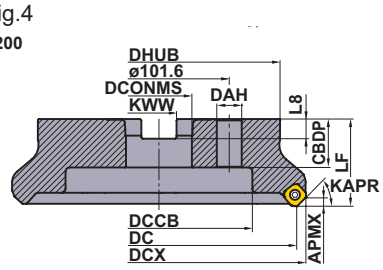
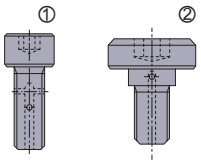


Fig.4



Right hand tool holder shown.

DC	Set Bolt	Geometry	
ϕ40	HSC08025H	①	
ϕ50	HSC10030H		
ϕ63	HSC10030H		
ϕ80	HSC12035H		
ϕ100	MBA16033H	②	
ϕ125	MBA20040H		
ϕ160	–	–	
ϕ200	–		

Arbor Type Mounting Dimensions

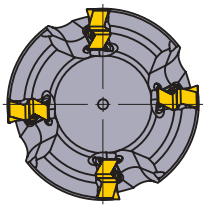
(mm)

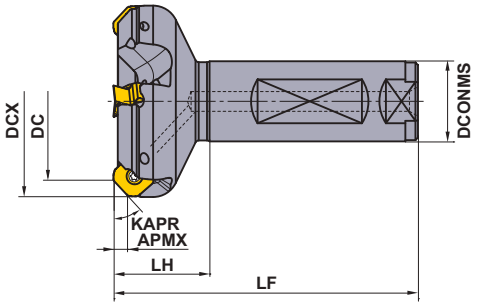
DCONMS	DC	Order Number	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
16	40	**WSX445-040A03AR**	18	9	14	37	8.4	5.6	1
16	40	**WSX445-040A04AR**	18	9	14	37	8.4	5.6	1
22	50	**WSX445-050A03AR**	20	11	17	47	10.4	6.3	1
22	50	**WSX445-050A04AR**	20	11	17	47	10.4	6.3	1
22	50	**WSX445-050A05AR**	20	11	17	47	10.4	6.3	1
22	63	**WSX445-063A04AR**	20	11	17	50	10.4	6.3	1
22	63	**WSX445-063A05AR**	20	11	17	50	10.4	6.3	1
22	63	**WSX445-063A06AR**	20	11	17	50	10.4	6.3	1
27	80	**WSX445-080A04AR**	23	13	20	56	12.4	7	1
27	80	**WSX445-080A06AR**	23	13	13	56	12.4	7	1
27	80	**WSX445-080A08AR**	23	13	20	56	12.4	7	1
32	100	**WSX445-100B05AR**	26	26	45	78	14.4	8	2
32	100	**WSX445-100B07AR**	26	26	45	78	14.4	8	2
32	100	**WSX445-100B10AR**	26	26	45	78	14.4	8	2
40	125	**WSX445-125B06AR**	28	30	56	89	16.4	9	2
40	125	**WSX445-125B08AR**	28	30	56	89	16.4	9	2
40	125	**WSX445-125B12AR**	28	30	56	89	16.4	9	2
40	160	**WSX445-160C07NR**	40	–	56	100	16.4	9	3
40	160	**WSX445-160C10NR**	40	–	56	100	16.4	9	3
40	160	**WSX445-160C16NR**	40	–	56	100	16.4	9	3
60	200	**WSX445-200C08NR**	32	–	135	160	25.7	14.22	4
60	200	**WSX445-200C12NR**	32	–	135	160	25.7	14.22	4
60	200	**WSX445-200C20NR**	32	–	135	160	25.7	14.22	4

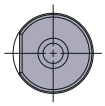
(mm)

DCONMS	DC	Order Number	CBDP	DAH	DCCB	DHUB	KWW	L8	Fig.
27	80	**WSX445-080A04AL**	23	13	20	56	12.4	7	1
32	100	**WSX445-100B05AL**	26	26	45	78	14.4	8	2
40	125	**WSX445-125B06AL**	28	30	56	89	16.4	9	2
40	160	**WSX445-160C07NL**	40	–	56	100	16.4	9	3









Right hand tool holder only.

Shank Type

(inch)

Type	Order Number	Stock R	*1 Coolant Thru	*2 No.T	DC	DCX	LF	DCONMS	LH	WT (lbs)	APMX
Coarse Pitch	**WSX445UR2403FA20M**	●	Y	3	1.500	2.005	4.750	1.250	1.500	1.698	.197
	WSX445UR3203FA20M	●	Y	3	2.000	2.506	4.750	1.250	1.500	2.050	.197
	WSX445UR4004FA20M	●	Y	4	2.500	3.006	4.750	1.250	1.500	2.469	.197
	WSX445UR4804FA20M	●	Y	4	3.000	3.506	4.750	1.250	1.500	2.976	.197
Fine Pitch	**WSX445UR2404FA20M**	●	Y	4	1.500	2.005	4.750	1.250	1.500	1.631	.197
	WSX445UR3204FA20M	●	Y	4	2.000	2.506	4.750	1.250	1.500	1.984	.197
	WSX445UR4005FA20M	●	Y	5	2.500	3.006	4.750	1.250	1.500	2.381	.197
	WSX445UR4806FA20M	●	Y	6	3.000	3.506	4.750	1.250	1.500	2.844	.197

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

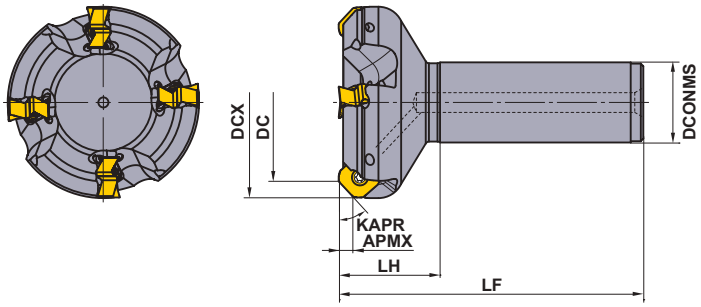
Spare Parts

Tool Holder Type	 * Clamp Screw	 Wrench (Insert)
WSX445	TPS4R	TIP15W

* Clamp Torque (lbf-in) : TPS4R=31

● : **USA Stock**





Right hand tool holder only.

Metric Standard

Straight Shank Type

(mm)

Type	Order Number	Stock R	★1 Coolant Thru	★2 No.T	DC	DCX	LF	DCONMS	LH	WT (kg)	APMX
Coarse Pitch	**WSX445R4003SA32M**	★	Y	3	40	52.8	125	32	40	0.84	5
	WSX445R5003SA32M	★	Y	3	50	62.9	125	32	40	0.98	5
	WSX445R6304SA32M	★	Y	4	63	75.9	125	32	40	1.18	5
	WSX445R8004SA32M	★	Y	4	80	92.9	125	32	40	1.51	5
Fine Pitch	**WSX445R4004SA32M**	★	Y	4	40	52.8	125	32	40	0.81	5
	WSX445R5004SA32M	★	Y	4	50	62.9	125	32	40	0.95	5
	WSX445R6305SA32M	★	Y	5	63	75.9	125	32	40	1.15	5
	WSX445R8006SA32M	★	Y	6	80	92.9	125	32	40	1.45	5

★1 Y=Yes, N=No
★2 Number of Teeth

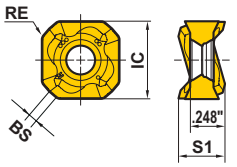
★ : Stocked in Japan

Inserts

(inch)

Material		
	P	Steel
	M	Stainless Steel
	K	Cast Iron
	N	Non-ferrous Metals
	S	Heat Resistant Alloys, Titanium Alloys
	H	Hardened Steel

This is the selection guideline for WSX445.
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

Shape	Order Number	Class	Hand	Edge Preparation	Coated										Cermet		Carbide		IC	S1	BS	RE	Geometry
					MV1020	MV1030	MC5020	MP6120	MP6130	MP7130	MP7140	MP9120	MP9130	VP15TF	VP20RT	MX3030		TF15					
	**SNGU140812ANFR-L**	G	R	F														●		.551	.331	.059	.047	
	SNGU140812ANER-L	G	R	E	●	●	●	●	●	●	●	●	●	●	●	●				.551	.331	.059	.047	
	SNGU140812ANER-M	G	R	E	●	●	●	●	●	●	●	●	●	●	●	●				.551	.331	.059	.047	
	SNMU140812ANER-M	M	R	E	●	●	●	●	●	●	●	●	●	●	●	●				.551	.331	.059	.047	
	SNMU140812ANER-R	M	R	E	●	●	●	●	●					●	●					.551	.331	.059	.047	
	SNMU140812ANER-H	M	R	E	●	●	●	●	●					●	●					.551	.331	.059	.047	
	SNGU140812ANFL-L	G	L	F														●		.551	.331	.059	.047	
	SNGU140812ANEL-L	G	L	E			●	●	●					●		●				.551	.331	.059	.047	
	SNGU140812ANEL-M	G	L	E			●	●	●					●		●				.551	.331	.059	.047	
	SNMU140812ANEL-M	M	L	E	●	●	●	●	●					●		●				.551	.331	.059	.047	
	SNMU140812ANEL-R	M	L	E			●	●	●					●						.551	.331	.059	.047	Right hand insert shown.

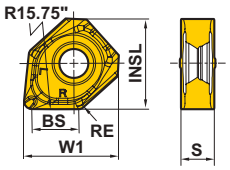
● : USA Stock
(10 inserts in one case)

■ Wiper Inserts

(inch)

Material			MC5020	MP6120	VP15TF	MX3020	
	P	Steel		◆	◆	◆	
	M	Stainless Steel			◇	◇	
	K	Cast Iron	◆		◆	◆	
	S	Heat Resistant Alloys, Titanium Alloys			◆		
	H	Hardened Steel			◇		

This is the selection guideline for WSX445.
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

Shape	Order Number	Class	Edge Preparation	Coated MC5020	Coated MP6120	Coated VP15TF	Cermet MX3020		INSL	W1	S	BS	RE	Geometry
	**WNGU1406ANEN8C-M**	G	E	●	●	●	●		.664	.664	.236	.315	.039	

Instructions for Use of Wiper Inserts



Fig.1



Fig.2

Wiper inserts for WSX445 are two-cornered. Please set as shown in Fig.1.
Excellent surface finish can be achieved with one wiper.
Set more than 2 wiper inserts, equally spaced, when the feed per revolution is larger than .315 IPR.

● : USA Stock
(10 inserts in one case)

Recommended Cutting Conditions

Cutting Speed

	Material	Properties	Grade		Dry Cutting	Wet Cutting
					vc (SFM)	**vc** (SFM)
P	Mild Steel	Hardness ≤180HB	MV1020	—	985 (655—1310)	720 (395—1050)
			MV1030	—	820 (655—985)	490 (330—655)
			MP6120	VP15TF	820 (655—985)	490 (330—655)
			MP6130	VP20RT	785 (620—950)	490 (330—655)
			MX3030	—	590 (425—755)	—
	Carbon Steel Alloy Steel	Hardness 180—350HB	MV1020	—	850 (560—1150)	655 (330—985)
			MV1030	—	720 (560—885)	395 (260—525)
			MP6120	VP15TF	720 (560—885)	395 (260—525)
			MP6130	VP20RT	655 (490—820)	395 (260—525)
			MX3030	—	490 (395—590)	—
	Alloy Tool Steel	Hardness ≤ 350HB (Annealing)	MV1020	—	590 (330—820)	490 (330—655)
			MV1030	—	590 (330—820)	395 (260—525)
			MP6120	VP15TF	720 (560—885)	395 (260—525)
			MP6130	VP20RT	655 (490—820)	395 (260—525)
			MX3030	—	490 (395—590)	—
	Pre-hardened Steel	Hardness 35—45HRC	MP6120	VP15TF	460 (330—590)	330 (260—395)
			MP6130	VP20RT	395 (295—490)	330 (260—395)
M	Austenitic Stainless Steel	Hardness ≤200HB	MV1030	—	655 (490—820)	—
			MP7130	VP15TF	655 (490—820)	425 (260—590)
			MP7140	VP20RT	655 (490—820)	425 (260—590)
			MX3030	—	425 (330—590)	—
	Austenitic Stainless Steel	Hardness >200HB	MV1030	—	655 (490—820)	—
			MP7130	VP15TF	560 (395—720)	330 (260—490)
			MP7140	VP20RT	560 (395—720)	330 (260—490)
	Duplex Stainless Steel	Hardness ≤ 280HB	MP7130	VP15TF	525 (360—690)	330 (260—490)
			MP7140	VP20RT	525 (360—690)	330 (260—490)
	Precipitation Hardening Stainless Steel	Hardness < 450HB	MP7130	VP15TF	490 (330—655)	295 (165—460)
			MP7140	VP20RT	490 (330—655)	295 (165—460)

Recommended Cutting Conditions

Cutting Speed

	Material	Properties	Grade		Dry Cutting	Wet Cutting
					vc (SFM)	**vc** (SFM)
K	Gray Cast Iron	Tensile Strength ≤350MPa	MC5020	—	720 (655—885)	590 (525—655)
			VP15TF	—	590 (425—820)	425 (330—525)
			VP20RT	—	560 (395—785)	425 (330—525)
			MX3030	—	490 (395—590)	—
	Ductile Cast Iron	Tensile Strength ≤450MPa	MV1020	—	785 (425—1150)	655 (425—820)
			MV1030	—	525 (360—785)	490 (330—655)
			MC5020	—	655 (590—820)	590 (525—655)
			VP15TF	VP20RT	525 (360—785)	425 (330—525)
	Ductile Cast Iron	Tensile Strength ≤800MPa	MV1020	—	720 (260—1150)	590 (260—755)
			MV1030	—	590 (360—820)	460 (260—655)
			MC5020	—	655 (590—820)	590 (525—655)
			VP15TF	—	525 (360—785)	360 (260—460)
			VP20RT	—	490 (330—655)	360 (260—460)
N	Aluminum Alloys	—	TF15	—	—	≥300
S	Titanium Alloys	—	MP9120	VP15TF	—	165 (130—195)
			MP9130	VP20RT	—	165 (130—195)
	Heat Resistant Alloys	—	MP9120	VP15TF	—	130 (65—165)
			MP9130	VP20RT	—	130 (65-165)
H	Hardened Steel	Hardness 40—55HRC	VP15TF	—	165 (100-230)	—
	Hardened Steel	Hardness 55—62HRC	VP15TF	—	130 (65-165)	—

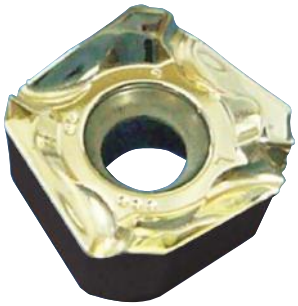
Depth of Cut / Feed per Tooth

	Material	Cutting Mode	Cutting Area	Chipbreaker	**fz** (IPT)	**ap** (inch)	NB
P	Mild Steel, Carbon Steel Alloy Steel, Pre-hardend Steel	Dry, Wet	Finish	L	.006 (.004—.008)	≤.039	
			Light	L,M	.006 (.004—.008)	≤.079	
			Medium	M	.008 (.006—.010)	≤.118	
			Rough	M,R	.008 (.006—.010)	≤.157	Excluding MX3030
			Heavy	R,H	.010 (.008—.012)	≤.197	Excluding MX3030
M	Austenitic Stainless Steel Duplex Stainless Steel Precipitation Hardening	Dry, Wet	Finish	L	.006 (.004—.008)	≤.039	
			Light	L,M	.006 (.004—.008)	≤.079	
			Medium	M	.008 (.006—.010)	≤.118	Excluding MX3030
K	Gray Cast Iron Ductile Cast Iron	Dry, Wet	Finish	L	.006 (.004—.008)	≤.039	
			Light	L,M	.006 (.004—.008)	≤.079	
			Medium	M	.008 (.006—.010)	≤.118	
			Rough	M,R	.008 (.006—.010)	≤.157	Excluding MX3030
			Heavy	R,H	.010 (.008—.012)	≤.197	Excluding MX3030
N	Aluminum Alloys	Wet	Finish	L	.006 (.004—.008)	≤.039	
			Light	L	.006 (.004—.008)	≤.079	
			Medium	L	.008 (.006—.010)	≤.118	
			Rough	L	.008 (.006—.010)	≤.157	
			Heavy	L	.010 (.008—.012)	≤.197	
S	Titanium Alloys Heat Resistant Alloys	Wet	Finish	L	.002 (.002—.004)	≤.039	
			Light	L,M	.002 (.002—.004)	≤.059	
			Medium	M	.004 (.002—.006)	≤.079	
H	Hardened Steel	Dry	Finish	M	.002 (.002—.004)	≤.039	
			Light	M,R	.002 (.002—.004)	≤.059	
			Medium	R,H	.002 (.002—.006)	≤.079	

Cutting Performance

Comparison of Finished Surface - Aluminum Alloy (AISI 6061)

Chipbreaker for Aluminum Alloy

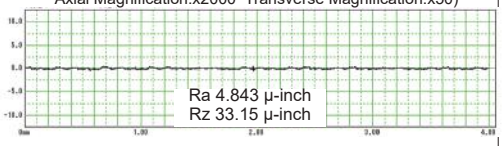
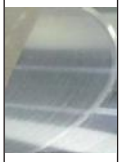
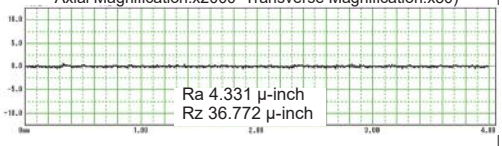
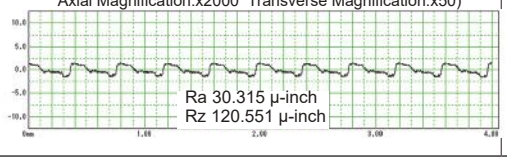


Polished Rake Face

→Improved Welding Resistance

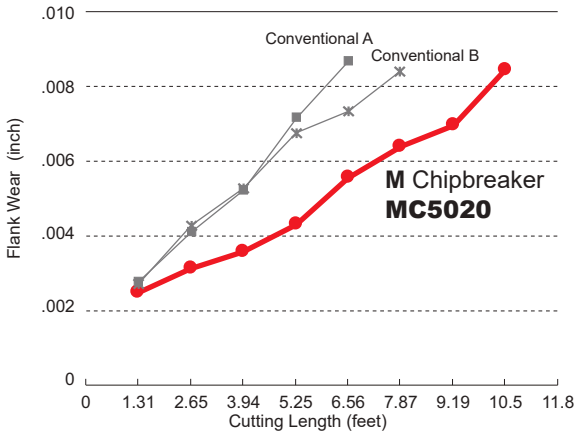
Sharp Edge

→Provides Smooth Cutting

Insert	Surface	Measured Value	Surface Roughness	Surface Quality
L Chipbreaker **TF15**		(μ-inch) Roughness Profile Axial Magnification:x2000 Transverse Magnification:x50)  Ra 4.843 μ-inch Rz 33.15 μ-inch	○	○
Conventional A		(μ-inch) Roughness Profile Axial Magnification:x2000 Transverse Magnification:x50)  Ra 4.331 μ-inch Rz 36.772 μ-inch	○	× Cloudiness
Conventional B		(μ-inch) Roughness Profile Axial Magnification:x2000 Transverse Magnification:x50)  Ra 30.315 μ-inch Rz 120.551 μ-inch	× Rough	○

<Cutting Conditions>
Cutter Dia. : DC=5 inch
Cutting Speed : vc=1640 SFM
Feed per Tooth : fz=.004 IPT
Depth of Cut : ap=.079 inch
Width of Cut ae=3.937 inch
Cutting Mode : Dry Cutting
4 inserts
Center Cut

Tool Life Comparison when Cutting Ductile Cast Iron



<Cutting Conditions>
Cutter Dia. : DC=5 inch
Cutting Speed : vc=655 SFM
Feed per Tooth : fz=.008 IPT
Depth of Cut : ap=.118 inch
Width of Cut : ae=3.937 inch
Cutting Mode : Dry Cutting
Single insert
Center Cut

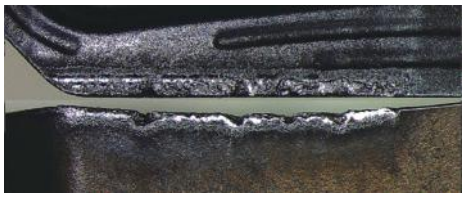
M Chipbreaker **MC5020**



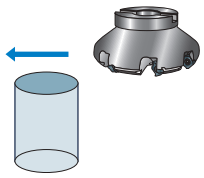
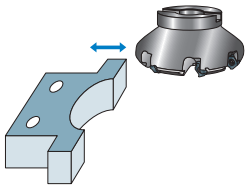
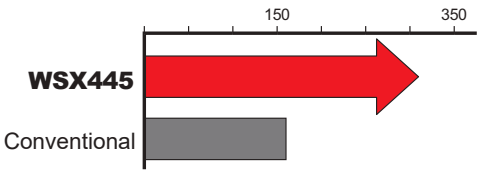
Conventional A

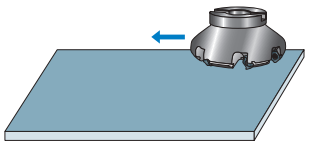
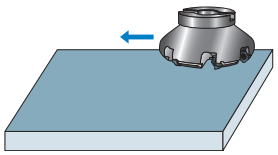
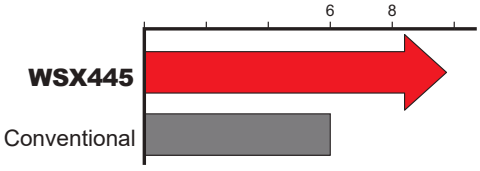


Conventional B



Application Examples

	Cutter Body	**WSX445-050A04AR**	**WSX445-080A08AR**
	Insert (Grade)	**SNMU140812ANER-R(MP6120)**	**SNGU140812ANER-M (MP6120)**
	Workpiece	Carbon Steel 	Ductile Cast Iron 
	Component	Round Bar	Automotive Component
Cutting Conditions	Cutting Speed **vc** (SFM)	620	655
Cutting Conditions	Feed per Tooth **fz** (IPT)	.008	.016
Cutting Conditions	Depth of Cut (inch)	ap=.079, ae=.984	ap=.079, ae=2.36
	Cutting Mode	Dry Cutting	Dry Cutting
	Results	The low cutting resistance enabled WSX445 double-sided inserts to be used with smaller BT30 arbors. Previously, only positive type single-sided inserts could be used, therefore doubling the number of cutting edges available.	Number of Workpieces (pcs. /corner)  WSX445 achieved double tool life compared to conventional product without insert fracturing in interrupted machining.

	Cutter Body	**WSX445R12508EA**	**WSX445R10007DA**
	Insert (Grade)	**SNGU140812ANER-M (MP6120)**	**SNGU140812ANER-L (MP9120)**
	Workpiece	Carbon Steel 	Precipitation Hardening Stainless Steel 
	Component	Thin Plate	Aerospace Component
Cutting Conditions	Cutting Speed **vc** (SFM)	710	150
Cutting Conditions	Feed per Tooth **fz** (IPT)	.012	.012
Cutting Conditions	Depth of Cut (inch)	ap=.059–.098, ae=4.72	ap=.079–.118, ae=3.15
	Cutting Mode	Dry Cutting	Wet Cutting
	Results	Spindle load could be reduced to 80% of conventional product, as WSX445 offers improved chip discharge performance resulting in smooth and silent machining.	Number of Workpieces (pass)  Number of workpieces increased by 1.5 times or more since WSX445 prevents thermal cracking.

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

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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.

B220A-US-2025.7