

# **ASRT** *type*

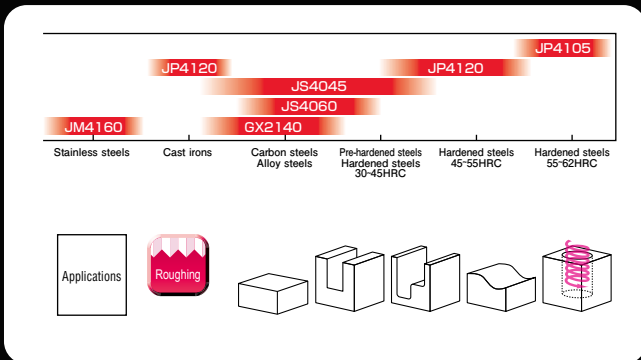
Radius Mill 3 Corners ASRT



**MOLDINO Tool Engineering, Ltd.**

New Product News | No.1205E-15 | 2022-11

# A wide range of different inserts for high-efficiency machining



## ASRT Breaker series



### Standard breaker

WDNT□□□□20

#### Features

- Standard breaker shape for use with a wide variety of steels



#### Ideal application

- Cases requiring less cutting force than the standard shape

Reduced cutting force during stable machining

### B breaker

WDNT□□□□20-B

#### Features

- Sharp breaker shape with high rake angle



#### Ideal application

- Materials tend to cause welding such as stainless steel or less rigidity of the workpiece easily cause vibration

For general structural steels / mild steels

Improved welding resistance for difficult-to-cut materials

### Standard shape

WDNW□□□□20

### Z breaker

WDNW□□□□20Z

#### Features

- High strength convex shape
- Minimizes chipping and breakage



#### Ideal application

- Heavy interrupted cutting or cases generating chip biting

Increased chipping resistance during unstable machining

### ZH breaker

WDNT□□□□20ZH

#### Features

- Breaker shape offering excellent balance between rigidity and sharpness



#### Ideal application

- Light interrupted cutting or cases requiring lower cutting force than the Z breaker

## AJ Coating series

JP4120 JP4105 JM4160

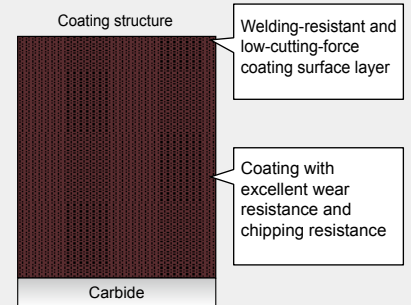
### Features of AJ Coating series

- Employs an AlTiN layer with a new composition created by increasing the Al content of conventional layers.
- Excellent wear resistance, chipping resistance, and heat resistance!

### New technology!!

- The new layer with high Al content employs a new composition and optimizes the structure to improve wear resistance and chipping resistance!
- Employs a low-friction-effect coating with excellent welding resistance as the top-most surface layer. This reduces welding to the work and decreases cutting force!

### Layer structure AJ Coating



### PVD Technology

## Grade for machining pre-hardened or hardened materials JP4120

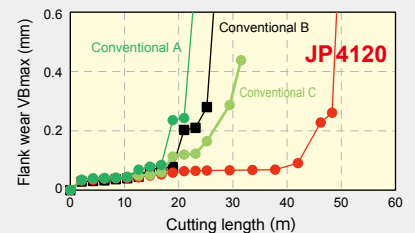
### Features

- Employs a fine carbide substrate with an excellent balance between wear resistance and toughness and the new "AJ Coating" to provide improved wear resistance and chipping resistance.
- Highly versatile with excellent wear resistance and chipping resistance when machining steel materials with hardnesses of 30 to 50 HRC.

### Strong fields

- Exhibits excellent cutting performance when machining pre-hardened or hardened steels with hardnesses of 30 to 50 HRC.
- Exhibits excellent wear resistance even on difficult-to-cut diecast tool steels or precipitation-hardened stainless steels, or for finishing.

Figure Cutting performance



Work material : P21 (40HRC)  
 Tool : ASRT5063R-4  
 Insert : WDNW140520  
 Cutting conditions :  
 $V_c=90\text{m/min}$   $f_z=0.8\text{mm/t}$   $a_p \times a_e=1 \times 44\text{mm}$   
 Dry ※Single-flute cutting

### PVD Technology

## Grade for machining stainless-steel materials JM4160

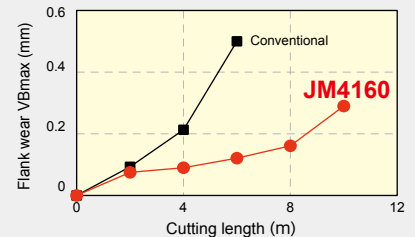
### Features

- Employs a carbide substrate with high toughness and the new "AJ Coating" to improve wear resistance and chipping resistance when machining stainless-steel materials.
- Employs AJ Coating with excellent welding resistance to reduce the welding to work material that occurs when machining stainless steel materials.

### Strong fields

- Provides long tool life for general processing of stainless-steel materials.

Figure Cutting performance



Work material : SUS304  
 Tool : ASRS2032R-5  
 Insert : EPMT0603EN-8LF  
 Cutting conditions :  
 $V_c=180\text{m/min}$   $f_z=0.5\text{mm/t}$   $a_p \times a_e=0.8 \times 21\text{mm}$   
 Wet ※Single-flute cutting

### PVD Technology

## Grade for machining high-hardness materials JP4105

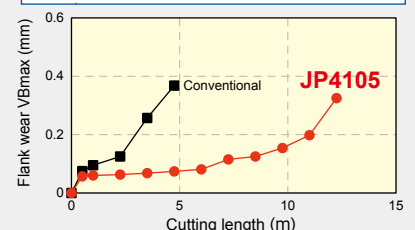
### Features

- Employs an ultra-fine cemented carbide substrate and the new "AJ Coating" to improve wear resistance.
- Excellent wear resistance when machining high hardness materials of 50HRC or higher.

### Strong fields

- Hardened steels (50 to 60 HRC): SKD11, SKD61, SKH, SUS420, etc.

Figure Cutting performance



Work material : SKD11 (61HRC) Tool : ASRS2032-5  
 Insert : EPNW0603TN-8  
 Cutting conditions :  
 $V_c=80\text{m/min}$   $f_z=0.2\text{mm/t}$   $a_p \times a_e=0.5 \times 21\text{mm}$   
 Dry ※Single-flute cutting

# Line Up

## Shank type

### ASRT□○○○○R-○

Numeric figure in a circle ○ and Alphabetical character comes in a square □.

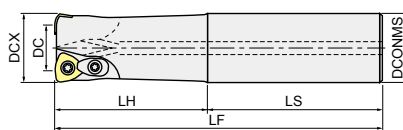


Fig.1 (Standard type)

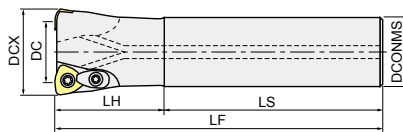


Fig.2 (Undercut type)

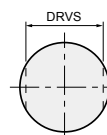
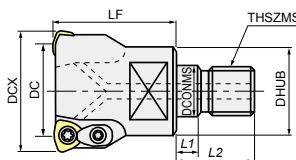
With air hole

Shank type	Item code	Stock	No. of flutes	Size (mm)						Shape	Inserts
				DCX	DC	LF	DCONMS	LH	LS		
Regular	ASRTS3025R-2	●	2	25	14	140	25	60	80	Fig1	WDNW09T320
	ASRTS3028R-2	●	2	28	17	140	25	40	100	Fig2	WDNT09T320 (-B/ZH)
	ASRTS4032R-2	●	2	32	20	150	32	70	80	Fig1	WDNW120420(Z) WDNT120420(-B/ZH)
	ASRTS4035R-2	●	2	35	23	150	32	50	100	Fig2	
	ASRTS4040R-3	●	3	40	28	150	32	50	100	Fig2	
	ASRTL3025R-2	●	2	25	14	200	25	120	80	Fig1	WDNW09T320
	ASRTL3028R-2	●	2	28	17	200	25	40	160	Fig2	WDNT09T320(-B/ZH)
	ASRTL4032R-2	●	2	32	20	200	32	120	80	Fig1	WDNW120420(Z) WDNT120420(-B/ZH)
ASRTL4035R-2	●	2	35	23	200	32	50	150	Fig2		
ASRTL4040R-3	●	3	40	28	250	32	50	200	Fig2		

## Modular type

### ASRTM30○○R-○

Numeric figure comes in a circle ○.



With air hole

Item code	Stock	No. of flutes	Size (mm)									Inserts
			DCX	DC	LF	DCONMS	THSZMS	DHUB	L1	L2	DRVS	
ASRTM3025R-2	●	2	25	14	35	12.5	M12	20.8	5.5	22	17	WDNW09T320 WDNT09T320 WDNT09T320-B WDNT09T320ZH
※1 ASRTM3028R-2	●	2	28	17	35	12.5	M12	23	5.5	22	17	
ASRTM3030R-2	●	2	30	19	40	17	M16	28.8	6	23	22	
ASRTM3030R-3	●	3	30	19	40	17	M16	28.8	6	23	22	
ASRTM3032R-2	●	2	32	21	40	17	M16	28.8	6	23	22	
ASRTM3032R-3	●	3	32	21	40	17	M16	28.8	6	23	22	
※1 ASRTM3035R-2	●	2	35	24	40	17	M16	28.8	6	23	22	
※1 ASRTM3035R-3	●	3	35	24	40	17	M16	28.8	6	23	22	
※1 ASRTM3040R-3	●	3	40	29	40	17	M16	28.8	6	23	22	
※1 ASRTM3040R-4	●	4	40	29	40	17	M16	28.8	6	23	22	

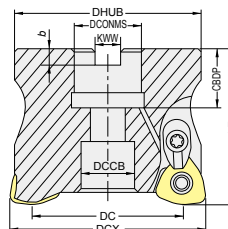
[Note] When ※ 1 and carbide shank are used together as a set, there is no interference.

Do not apply lubricants such as grease, etc. to the "contact faces" and "modular screws" of the "modular mill", "dedicated shanks" and "dedicated arbor".

## Bore type

### ASRT○○○○R(M)-○

Numeric figure comes in a circle ○.



With air hole

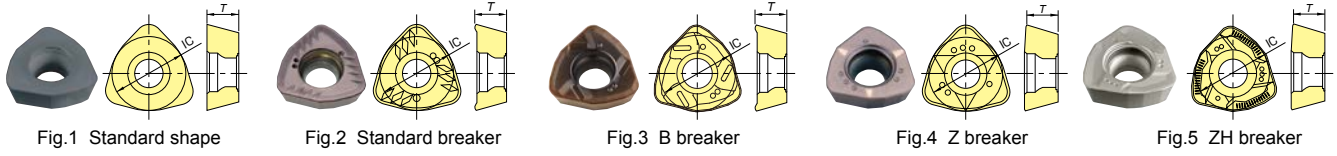
Item code	Stock	No. of flutes	Size (mm)									Inserts	
			DCX	DC	DHUB	LF	CBDP	KWW	b	DCONMS	DCCB		
Internal diameter inch size	ASRT4050R-3	●	3	50	38	47	50	19	8.4	5	22.225	16.5	WDNW120420(Z) WDNT120420(-B/ZH)
	ASRT4050R-4	●	4	50	38	47	50	19	8.4	5	22.225	16.5	
	ASRT5063R-4	●	4	63	50	60	50	19	8.4	5	22.225	17	WDNW140520(Z) WDNT140520(-B/ZH)
	ASRT5080R-5	●	5	80	67	76	63	32	12.7	8	31.75	26	
	ASRT5100R-6	●	6	100	87	96	63	32	12.7	8	31.75	26	
	ASRT4050RM-3	●	3	50	38	47	50	20	10.4	6.3	22	16.5	
ASRT4050RM-4	●	4	50	38	47	50	20	10.4	6.3	22	16.5		
Internal diameter mm size	ASRT5063RM-4	●	4	63	50	60	50	20	10.4	6.3	22	17	WDNW140520(Z) WDNT140520(-B/ZH)
	ASRT5080RM-5	●	5	80	67	76	63	22	12.4	7	27	20	
	ASRT5100RM-5	●	5	80	67	76	63	22	12.4	7	27	20	
	ASRT5100RM-6	●	6	100	87	96	63	25.5	14.4	8	32	26	

[Note] Arbor screw is not included.

● : Stocked Items. No Mark : Manufactured upon request only.

# Inserts

Numeric figure in a circle ○



Item code	Tolerance class	AJ Coating			GX Coating	JS Coating		Size (mm)		Shape	Cutter body
		JP4105	JP4120	JM4160	GX2140	JS4045	JS4060	IC	T		
WDNW09T320	N	●	●	●	●	●	●	9.525	3.97	Fig.1	ASRT M/S/L30○R-○
WDNW120420		●	●	●	●	●	●	12	4.76		ASRT S/L40○R(M)-○
WDNW140520		●	●	●	●	●	●	14	5.56		ASRT 5○R(M)-○
WDNT09T320					●	●	●	9.525	3.97	Fig.2	ASRT M/S/L30○R-○
WDNT120420					●	●	●	12	4.76		ASRT S/L40○R(M)-○
WDNT140520					●	●	●	14	5.56		ASRT 5○R(M)-○
WDNT09T320-B			●	●	●	●	●	9.525	3.97	Fig.3	ASRT M/S/L30○R-○
WDNT120420-B			●	●	●	●	●	12	4.76		ASRT S/L40○R(M)-○
WDNT140520-B			●	●	●	●	●	14	5.56		ASRT 5○R(M)-○
WDNW120420Z			●	●	●	●	●	12	4.76	Fig.4	ASRT S/L40○R(M)-○
WDNW140520Z			●	●	●	●	●	14	5.56		ASRT 5○R(M)-○
WDNT09T320ZH				●	●	●	●	9.525	3.97	Fig.5	ASRT M/S/L30○R-○
WDNT120420ZH				●	●	●	●	12	4.76		ASRT S/L40○R(M)-○
WDNT140520ZH				●	●	●	●	14	5.56		ASRT 5○R(M)-○

[Note] Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.

# Parts

Numeric figure in a circle ○

Parts	Clamp screw		Clamp piece set	Screw driver / Wrench		Screw anti-seizure agent
Shape		Fastening torque (N·m)				
Cutter body						
ASRT M/S/L30○R-○	242-141	2.9	CM3.5-141	104-T15	A	P-37
ASRT S/L40○R(M)-○	262-142	2.9	CM4-141	105-T15	B	
ASRT5○R(M)-○	555-141	4.9	CM5-147	105-T20	B	

[Note] The clamp screw is a consumable part. Since replacement life depends on the use environment, it is recommended that it be replaced at an early stage. One spare clamp screw is provided.

# High-feed tools lineup

Type	Feature				Holder	Insert			Programming R (mm)	APMX (mm)
	Economical (No. of corners)	High accuracy (Less uncut remnants)	Supports for high-hardened steel	Efficiency (No. of Flutes)	Tool dia. (mm)	No. of corners	Shape	Inscribed circle code		
TD4N	○	○	○ ~62HRC	○ High Efficiency multiflutes	φ16~40	4		06	2.0	1.0
ASR Multi-Flutes		○	○ ~62HRC	○ High Efficiency multiflutes	φ16~66	2		06	2.0	1.5
ASRF-mini	○		○ ~62HRC	○ General	φ20~63	4		07	2.0	1.2
ASR		○	○ ~60HRC	○ General	φ20~100	2		08~15	3.0	2.0
ASRT	○	○	○ ~62HRC	○ General	φ25~100	3		09~14		
ASRF	○		○ ~60HRC	○ General	φ32~100	4		12		
TD6N	○	○	○ ~50HRC	○ General	φ50~125	6		14	3.0	1.5
								14		3.0
								12		1.2
								15		2.0
TR4F	○		○ ~60HRC	○ General	φ32~125	4				

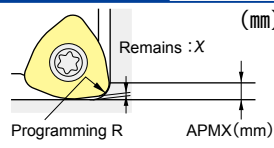
※ Various other tools for roughing are also available.

※ For more information on tool specifications, please refer to our general catalog or visit our website. (<http://www.moldino.com>)

# Line Up

## Flute tip shape definition method in program

Item code	Programming R	Remains : X	Maximum cut depth
WDN W/T09T320	3	0.47	2
WDN W/T120420(Z)	3	0.63	2
WDN W/T140520(Z)	3	0.64	2



When creating the CAM program, create the program as if a corner R3 radius cutter was being used.

## Cutting by direct milling is also possible

Since the cutting flute do not extend to the center, there are limitations on the ramp angle and hole diameter, but as shown below, cutting by direct milling without a pilot hole is possible for ramping and helical milling.



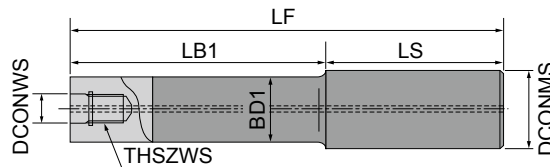
Inserts	Modular type/Shank type										Bore type		
	WDN W/T09T320					WDN W/T120420(Z)					WDN W/T140520(Z)		
Tool dia. DCX	φ25	φ28	φ30	φ32	φ35	φ40	φ32	φ35	φ40	φ50	φ63	φ80	φ100
Maximum ramp angle θn	4°	3°	2.5°	2.5°	2°	1.5°	4°	3.5°	3°	2°	2.5°	1.5°	1°
Hole dia.	33~46	39~52	43~56	47~60	53~66	63~76	41~60	47~66	57~76	77~96	98~122	132~156	172~196

[Note] ① The ramp angle  $\theta$  should be set within the ranges listed above. Use at ramp angles of 1° or less is recommended.

② For hole diameters outside the ranges listed above, a pilot hole should be drilled before milling.

## Modular Mill Shank

### Carbide Shank



Item code	Stock	Size (mm)							Cutter body	With/without air hole
		DCONWS	THSZWS	LF	LB1	LS	BD1	DCONMS		
ASC25-12.5-145-65	●	12.5	M 12	145	65	80	23	25	φ25 <sup>※3</sup> φ28	○
ASC25-12.5-215-115	●			215	115	100				
ASC25-12.5-265-145	●			265	145	120				
ASC25-12.5-315-195	●			315	195	120				
※2 ASC25-12.5-265-65	●	12.5	M 12	265	65	200	23	25	○	
※2 ASC25-12.5-315-65	●			315	250					
ASC32-17-160-80	●	17	M 16	160	80	80	28	32	φ30 <sup>※3</sup> φ32 <sup>※3</sup> φ35 (φ40)	○
ASC32-17-210-110	●			210	110	100				
ASC32-17-260-140	●			260	140	120				
ASC32-17-310-190	●			310	190	120				
ASC32-17-360-240	●			360	240	120				
※2 ASC32-17-260-80	●	17	M 16	260	80	180	28	32	○	
※2 ASC32-17-310-80	●			310	230					
※2 ASC32-17-360-80	●			360	280					

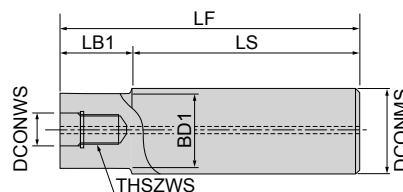
[Note] ① When ※ 2 and ※ 1 (p4) are used together as a set, there is no interference.

② Commercial milling chucks can be used.

③ For the φ40 size, it is recommended that the protrusion length be 200mm or less.

④ For ※ 3, since the cutter diameter is smaller than the shank diameter, interference occurs at the shank.

### Steel Shank

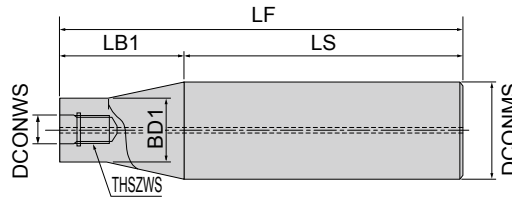


Item code	Stock	Size (mm)							Cutter body	With/without air hole
		DCONWS	THSZWS	LF	LB1	LS	BD1	DCONMS		
AS25-12.5-115-35	●	12.5	M 12	115	35	80	23	25	φ25 <sup>※3</sup> , φ28	○
AS32-17-110-30	●	17	M 16	110	30	80	28	32	φ30 <sup>※3</sup> , φ32 <sup>※3</sup> , φ35, φ40	○

[Note] ① Commercial milling chucks can be used. ② For ※ 3, since the cutter diameter is smaller than the shank diameter, interference occurs at the shank.

● : Stocked Items. No Mark : Manufactured upon request only.

## Steel Shank

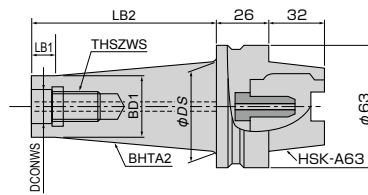


Item code	Stock	Size (mm)							Cutter body	With/without air hole
		DCONWS	THSZWS	LF	LB1	LS	BD1	DCONMS		
AS42-17-360-90	●	17	M 16	360	90	270	28	42	φ 30, φ 32, φ 35, φ 40	○

[Note] ① Commercial milling chucks can be used.

## Modular Mill HSK Arbor

### HSK-A63

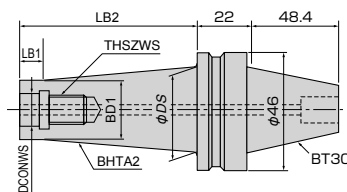


Item code	Stock	Size (mm)							With/without air hole
		DCONWS	THSZWS	BD1	φDS	LB2	LB1	BHTA2	
HSK-A63-12.5-35-21	●	12.5	M12	21	24.3	35	-	3°	○
HSK-A63-12.5-65-21	●				27.5	65	10	3°	
HSK-A63-12.5-65-21S					48	65	10	12°	
HSK-A63-12.5-115-21	●				32.7	115	10	3°	
HSK-A63-17-40-28	●	17	M16	28	31.8	40	-	3°	
HSK-A63-17-60-28	●				33.9	60	10	3°	
HSK-A63-17-60-28S					48	60	10	9.5°	
HSK-A63-17-110-28	●				39.2	110	10	3°	

[Note] Coolant Pipe is attached.

## Modular Mill BT Arbor

### BT30



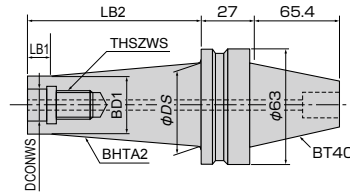
※For neck section, additional machining to user specifications is possible.

Item code	Stock	Size (mm)							Note
		DCONWS	THSZWS	BD1	φDS	LB2	LB1	BHTA2	
BT30-12.5-15-21		12.5	12	21	40	15	5	32.3°	With Air hole
BT30-12.5-40-21						40	10	17.6°	
BT30-12.5-65-21						65	10	9.8°	
BT30-12.5-85-21						85	10	7.2°	
BT30-17-10-28		17	16	28	40	10	5	31°	With Air hole
BT30-17-35-28						35	10	13.5°	
BT30-17-60-28						60	10	6.8°	

[Note] When using the BT30 arbor for modular mills, determine the processing conditions using the standard cutting conditions table as a general guide. If vibrations are a concern due to the processing conditions, adjust conditions by 1. reducing cutting depth (ap) or 2. reducing per-flute feed rate (fz).

# Line Up

## BT40

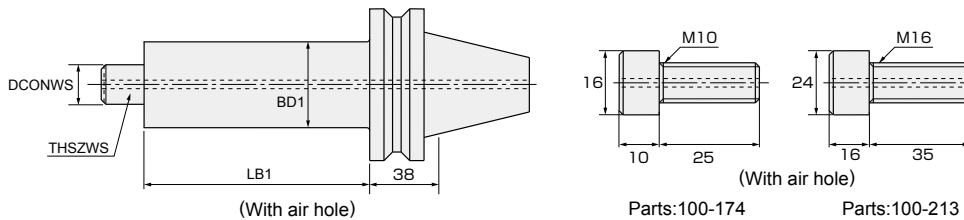


※For neck section, additional machining to user specifications is possible.

Item code	Stock	Size (mm)							Note
		DCONWS	THSZWS	BD1	$\phi DS$	LB2	LB1	BHTA2	
BT40-12.5-15-21		12.5	12	21	40	15	5	32.3°	With Air hole
BT40-12.5-40-21	40					10	17.6°		
BT40-12.5-65-21	65					10	9.8°		
BT40-12.5-115-21	115	10	5.2°						
BT40-17-10-28		17	16	28	48	10	5	45°	With Air hole
BT40-17-35-28	35					10	21.8°		
BT40-17-60-28	60					10	11.3°		
BT40-17-110-28	110					10	5.7°		

## Arbor

### BT50



Item code	Stock	Size (mm)				Weight (kgf)	Arbor screw included with arbor	Cutter body
		DCONWS	THSZWS	LB1	BD1			
BT50-22.225- 50-50	●	22.225	M10	50	47	4.3	100-174	ASRT4050R-○
BT50-22.225-100-50	●			100		5.0		
BT50-22.225-150-50	●			150		5.7		
BT50-22.225-200-50	●			200		6.4		
BT50-22.225-250-50	●			250		7.1		
BT50-22.225- 50-63	●	22.225	M10	50	60	4.8	100-174	ASRT5063R-○
BT50-22.225-100-63	●			100		5.9		
BT50-22.225-150-63	●			150		7.0		
BT50-22.225-200-63	●			200		8.1		
BT50-22.225-250-63	●			250		9.3		
BT50-22.225-350-63	●			350		11.5		
BT50-31.75- 7-80	●	31.75	M16	7	76	4.2	100-213	ASRT5080R-○
BT50-31.75- 80-80	●			80		6.8		
BT50-31.75-130-80	●			130		8.5		
BT50-31.75-180-80	●			180		10.2		
BT50-31.75-260-80	●			260		12.9		
BT50-31.75-330-80	●			330		15.4		
BT50-31.75- 7-100	●	31.75	M16	7	96	4.2	100-213	ASRT5100R-○
BT50-31.75- 80-100	●			80		8.3		
BT50-31.75-130-100	●			130		11.1		
BT50-31.75-180-100	●			180		13.9		
BT50-31.75-260-100	●			260		18.4		
BT50-31.75-330-100	●			330		22.4		

## Parts for arbor screws (Bore included with main body)

When supplying air or cutting oil to each cutting flute, please use the arbor screw shown below.

Arbor screw	Cutter body	Arbor screw	Cutter body	Arbor screw	Cutter body
	ASRT4050R(M)-○ ASRT5063R(M)-○		ASRT5080RM-○		ASRT5080R-○ ASRT5100R(M)-○
	100-178		100-179		100-180

[Note] Even with the screws included with the arbor, the arbor can be used as it is for center through.





# Recommended Cutting Conditions

※Red indicates primary recommended grade.

Work material	Recommended grade	Tool dia. DCX	Straight shank type						Modular carbide shank Type								
			φ25 (2 flutes)		φ32 (2 flutes)		φ40 (3 flutes)		φ25 (2 flutes)			φ32 (3 flutes)			φ40 (4 flutes)		
			Overhang		<3DCX		<3DCX		<3DCX		3DCX 5DCX >7DCX	5DCX 7DCX >7DCX	>7DCX	3DCX 5DCX >7DCX	5DCX 7DCX >7DCX	>7DCX	3DCX 5DCX >7DCX
General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing	General purpose	High speed processing
Mild steels (200HB or less)	※ GX2140 JS4060 JS4045	n (min <sup>-1</sup> )	1,910	2,550	1,500	1,990	1,200	1,600	1,910	1,660	1,150	1,500	1,300	900	1,200	1,040	720
		vc (m/min)	150	200	150	200	150	200	150	130	90	150	130	90	150	130	90
		vf (mm/min)	3,820	6,120	3,000	5,970	3,600	7,200	4,590	3,320	1,840	5,400	3,900	2,160	5,760	4,160	2,310
		fz (mm/t)	1.0	1.2	1.0	1.5	1.0	1.5	1.2	1.0	0.8	1.2	1.0	0.8	1.2	1.0	0.8
		ap (mm)	1.0	0.8	1.2	1.0	1.2	1.0	0.8	0.5	0.3	0.8	0.5	0.3	0.8	0.5	0.3
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	76	98	90	149	138	230	66	30	10	108	49	16	147	67	22
Carbon steels Alloy steels (35HRC or less)	GX2140 JS4060 JS4045	n (min <sup>-1</sup> )	1,910	2,550	1,500	1,990	1,200	1,600	1,910	1,660	1,150	1,500	1,300	900	1,200	1,040	720
		vc (m/min)	150	200	150	200	150	200	150	130	90	150	130	90	150	130	90
		vf (mm/min)	3,820	6,120	3,000	5,970	3,600	7,200	4,590	3,320	1,840	5,400	3,900	2,160	5,760	4,160	2,310
		fz (mm/t)	1.0	1.2	1.0	1.5	1.0	1.5	1.2	1.0	0.8	1.2	1.0	0.8	1.2	1.0	0.8
		ap (mm)	1.0	0.8	1.2	1.0	1.2	1.0	0.8	0.5	0.3	0.8	0.5	0.3	0.8	0.5	0.3
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	76	98	90	149	138	230	66	30	10	108	49	16	147	67	22
Carbon steels Alloy steels (35~45HRC)	JP4120 JS4045 JS4060	n (min <sup>-1</sup> )	1,280	1,910	1,000	1,500	800	1,200	1,280	1,150	1,150	1,000	900	900	800	720	720
		vc (m/min)	100	150	100	150	100	150	100	90	90	100	90	90	100	90	90
		vf (mm/min)	2,050	3,060	1,600	2,400	1,920	2,880	2,050	1,380	1,150	2,400	1,620	1,350	2,560	1,730	1,440
		fz (mm/t)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.6	0.5	0.8	0.6	0.5	0.8	0.6	0.5
		ap (mm)	1.0	0.8	1.2	1.0	1.2	1.0	0.8	0.5	0.3	0.8	0.5	0.3	0.8	0.5	0.3
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	41	49	48	60	74	92	30	12	6	48	20	10	66	28	14
Stainless steels SUS	JM4160	n (min <sup>-1</sup> )	1,280	2,550	1,000	1,990	800	1,600	1,280	1,280	1,150	1,000	1,000	900	800	800	720
		vc (m/min)	100	200	100	200	100	200	100	100	90	100	100	90	100	100	90
		vf (mm/min)	2,050	4,080	1,600	3,190	1,920	3,840	2,050	2,050	1,380	2,400	2,400	1,620	2,560	2,560	1,730
		fz (mm/t)	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.6	0.8	0.8	0.6	0.8	0.8	0.6
		ap (mm)	1.0	0.8	1.2	1.0	1.2	1.0	0.8	0.5	0.3	0.8	0.5	0.3	0.8	0.5	0.3
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	41	65	48	80	74	123	30	18	7	48	30	12	66	41	17
Cast irons FC, FCD	GX2140 JS4045 JP4120	n (min <sup>-1</sup> )	1,910	2,550	1,500	1,990	1,200	1,600	1,910	1,660	1,150	1,500	1,300	900	1,200	1,040	720
		vc (m/min)	150	200	150	200	150	200	150	130	90	150	130	90	150	130	90
		vf (mm/min)	5,730	7,650	4,500	5,970	5,400	7,200	5,350	3,990	2,300	6,300	4,680	2,700	6,720	5,000	2,880
		fz (mm/t)	1.5	1.5	1.5	1.5	1.5	1.5	1.4	1.2	1.0	1.4	1.2	1.0	1.4	1.2	1.0
		ap (mm)	1.0	0.8	1.2	1.0	1.2	1.0	1.0	0.8	0.6	1.0	0.8	0.6	1.0	0.8	0.6
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	115	122	135	149	207	230	96	57	25	158	94	41	215	128	55
Hardened steels Pre-Hardened steels (45~55HRC)	JP4120	n (min <sup>-1</sup> )	1,020	1,530	800	1,200	640	960	1,020	1,020	1,020	800	800	800	640	640	640
		vc (m/min)	80	120	80	120	80	120	80	80	80	80	80	80	80	80	80
		vf (mm/min)	410	620	320	480	390	580	410	410	410	480	480	480	520	520	520
		fz (mm/t)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
		ap (mm)	1.0	0.8	1.2	1.0	1.2	1.0	0.8	0.5	0.3	0.8	0.5	0.3	0.8	0.5	0.3
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	8	10	10	12	15	19	6	4	2	10	6	4	13	8	5
Hardened steels (55~62HRC)	JP4105	n (min <sup>-1</sup> )	770	1,280	600	1,000	480	800	770	770	770	600	600	600	480	480	480
		vc (m/min)	60	100	60	100	60	100	60	60	60	60	60	60	60	60	60
		vf (mm/min)	80	130	60	100	80	120	80	80	80	90	90	90	100	100	100
		fz (mm/t)	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
		ap (mm)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.5	0.5	0.3	0.5	0.5	0.3
		ae (mm)	20	20	25	25	32	32	18	18	18	25	25	25	32	32	32
		Q (cm <sup>3</sup> /min)	1	1	1	1	1	2	1	1	0	1	1	1	2	2	1

[Note] ① This table shows the general conditions for shoulder milling. The conditions should be adjusted according to the machine rigidity, tooling, condition of object to be milled, etc. In particular, when performing shoulder milling in combination with slotting or machining of cutting widths close to slots, etc., chattering vibrations may occur, which can lead to trouble. Therefore, please consider the following when adjusting the conditions:

② Use inserts equipped with breakers. ③ Reduce rotation speed and table feed rate by 50 to 70%. ④ Reduce cutting depth ap by 50 to 70%.

⑤ Please note that the GX Coating and JS Coating do not cause a reaction in conductive touch sensors.

⑥ JP4105 is a special high-hardness steels, and is not suitable for Non-heat-treated steels material.

⑦ For strongly interrupted cutting, when unsupported length is long, or for wet cutting, JM4160 is recommended.

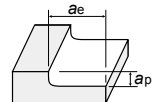
⑧ As a measure to prevent tool damage due to chip jamming, always use an air blower, etc. to remove chips.

⑨ Since there is a danger of the removed chips flying out and causing injury to workers, fire, or damage to eyes, during use be sure to cover the work area with a safety cover and have workers wear protective equipment such as glasses, etc. to make the work area safe.

⑩ Perform insert replacement at an early stage to prevent chipping due to excessive use.

⑪ The following equation expresses the chip removal amount per unit time:

$$Q(\text{cm}^3/\text{min}) = a_p(\text{mm}) \times a_e(\text{mm}) \times v_f(\text{mm}/\text{min}) / 1000$$







The diagrams and table data are examples of test results, and are not guaranteed values.  
 "MOLDINO" is a registered trademark of MOLDINO Tool Engineering, Ltd.



## Attentions on Safety

### 1. Attentions regarding handling

- (1) When removing the tool from the case (package), be careful not to drop it on your foot or drop it onto the tips of your bare fingers.
- (2) When actually setting the inserts, be careful not to touch the cutting flute directly with your bare hands.

### 2. Attentions regarding mounting

- (1) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.
- (2) If abnormal chattering occurs during use, stop the machine immediately and remove the cause of the chattering.

### 3. Attentions during use

- (1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.
- (2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.
- (3) The inserts are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be installed and safety equipment such as safety glasses should be worn to create a safe environment for work.
  - Do not use where there is a risk of fire or explosion.
  - Do not use non-water-soluble cutting oils. Such oils may result in fire.
- (4) Do not use the tool for any purpose other than that for which it is intended, and do not modify it.

## MOLDINO Tool Engineering, Ltd.

Head Office  
 Hulic Ryogoku Bldg. 8F, 4-31-11, Ryogoku, Sumida-ku, Tokyo, Japan 130-0026  
 International Sales Dept. : TEL +81-3-6890-5103 FAX +81-3-6890-5128

Official Web Site

<http://www.moldino.com/en/>

Database for selection Cutting Tool Products [TOOL SEARCH]



Europe

#### MOLDINO Tool Engineering Europe GmbH

Itterpark 12, 40724 Hilden, Germany  
 Tel +49-(0)2103-24820 Fax +49-(0)2103-248230

China

#### MOLDINO Tool Engineering (Shanghai), Ltd.

Room 2804-2805, Metro Plaza, 555 Loushanguan Road, Changning District, Shanghai, 200051, China  
 Tel +86-(0)21-3366-3058 Fax +86-(0)21-3366-3050

America

#### MITSUBISHI MATERIALS U.S.A. CORPORATION

DETROIT OFFICE Customer service  
 41700 Gardenbrook Road, Suite 120, Novi, MI 48375-1320 U.S.A.  
 Tel +1(248) 308-2620 Fax +1(248) 308-2627

Mexico

#### MMC METAL DE MEXICO, S.A. DE C.V.

Av. La Cañada No.16, Parque Industrial Bernardo Quintana, El Marques, Querétaro, CP 76246, México  
 Tel +52-442-1926800

Brazil

#### MMC METAL DO BRASIL LTDA.

Rua Cincinato Braga, 340 13° andar, Bela Vista – CEP 01333-010 São Paulo – SP., Brasil  
 Tel +55(11)3506-5600 Fax +55(11)3506-5677

Thailand

#### MMC Hardmetal (Thailand) Co.,Ltd. MOLDINO Division

622 Emporium Tower, Floor 22/1-4, Sukhumvit Road, Klong Tan, Klong Toei,  
 Bangkok 10110, Thailand  
 Tel +66-(0)2-661-8175 Fax +66-(0)2-661-8176

India

#### MMC Hardmetal India Pvt Ltd.

H.O.: Prasad Enclave, #118/119, 1st Floor, 2nd Stage, 5th main, BBMP Ward #11, (New #38),  
 Industrial Suburb, Yeshwanthpura, Bengaluru, 560 022, Karnataka, India.  
 Tel +91-80-2204-3600

DISTRIBUTED BY: