NEW

MOLDINO
The Edge To Innovation

ASPV mini

Polish Mill V type ASPV mini

ASPV

Polish Mill V type ASPV

Expanded lineup with a focus on large-diameter bodies, precision bodies and insert grades.

MOLDINO Tool Engineering, Ltd.

New Product News | No.2601E-1 | 2026-4

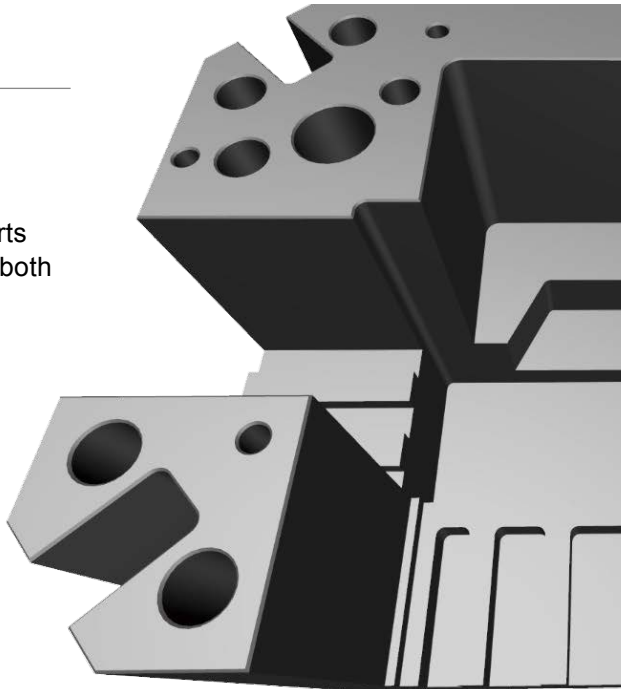
Addresses challenges posed by structural component finishing

Issue 01

We want to reduce cycle times, but increasing cutting conditions reduces accuracy.

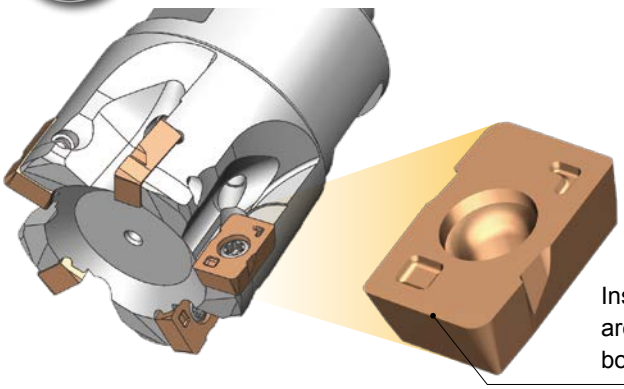
Proposed solutions

High precision × fine pitch concept



Point!

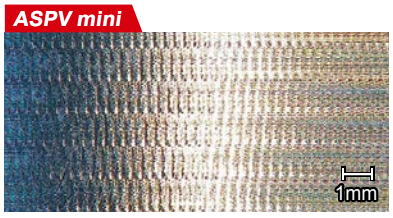
Combines high precision ground inserts with fine-pitch body design to ensure both accuracy and productivity.



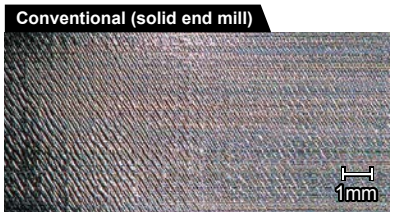
Inserts with wiper edges are also available for bottom face finishing.

Point!

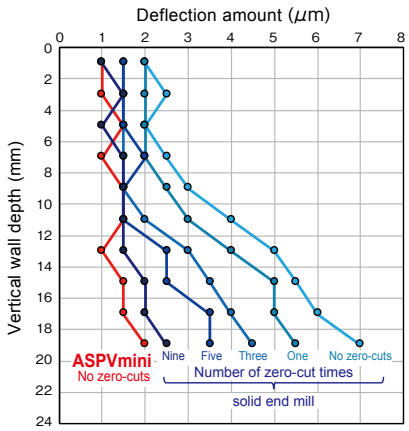
Reduces rework operations and significantly reduces finishing time.



Shiny surface



Worn / Cloudy surface



ASPVmini

Equipped with small inserts featuring a free-cutting chipbreaker
Enables replacement of solid end mills.

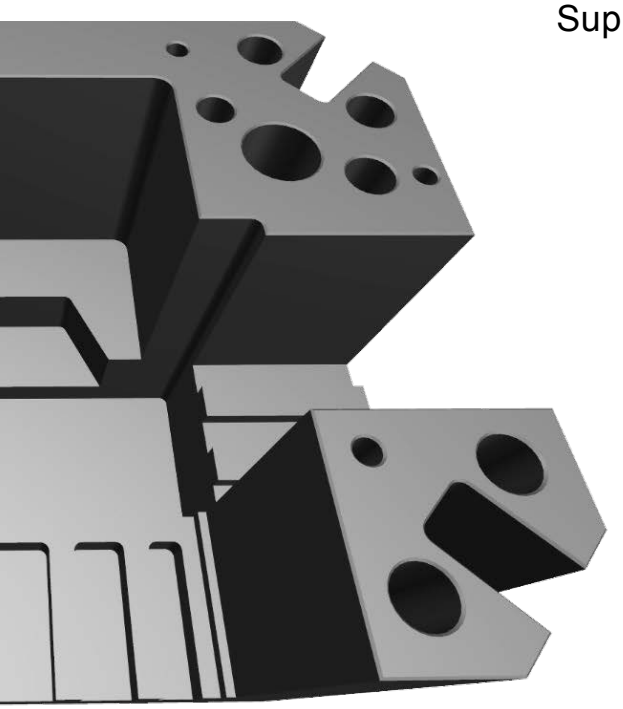
Tool diameters ϕ10 - ϕ33 mm
For more information, see pages 4 - 11 in this catalog.

Issue
02

Different tools are required for various machining locations and depths.
Typically, this calls for a large number of tools.

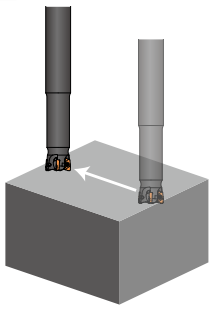
Proposed solutions

Supports a wide range of machining requirements.

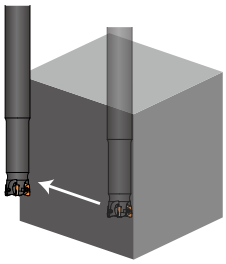


Point!

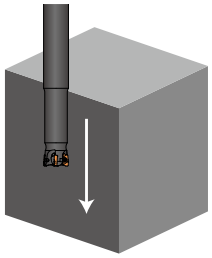
High flexibility in machining methods makes it possible to machine a wide range of locations.



Face milling



Contour machining

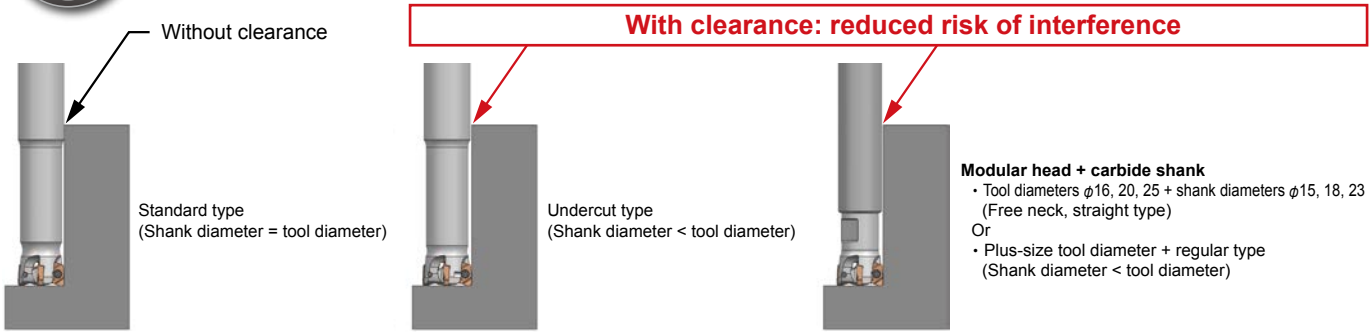


Vertical cutting

Interference avoidance variations

Point!

Extensive lineup reduces risk of interference with wall sections.



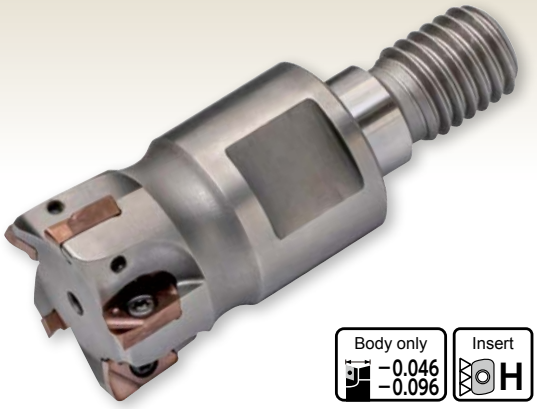
ASPV

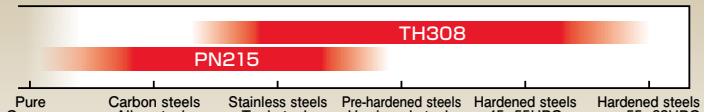
Large-diameter bodies and extensive insert lineup
Can be used with a wide range of materials from steel to aluminum and graphite.

Tool diameters ϕ12 - ϕ125 mm
For more information, see pages 12 - 25 in this catalog.

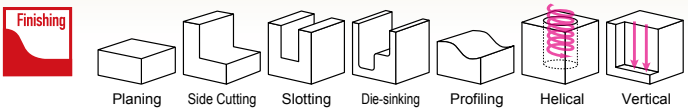
ASPVmini Features and Machining Examples

ASPV mini





Applications



Features

Free-cutting chipbreaker

Achieves high-cutting surface grades, even for work materials whose cut surface tends to be cloudy, like carbon steel. Maintains high dimensional accuracy when cutting, even for tools with long overhangs.

Peripheral cutting edge

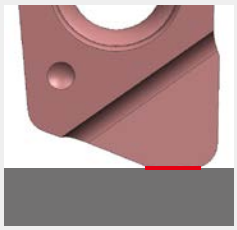
Functions as peripheral cutting edge when side cutting.

Front cutting edge

This edge is used for bottom surface finishing.
Various shapes with wiper edges are lined up for each R size.
Makes it possible to boost feed rates when finishing bottom surfaces.

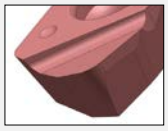
● Without wiper edge

●With wiper edge

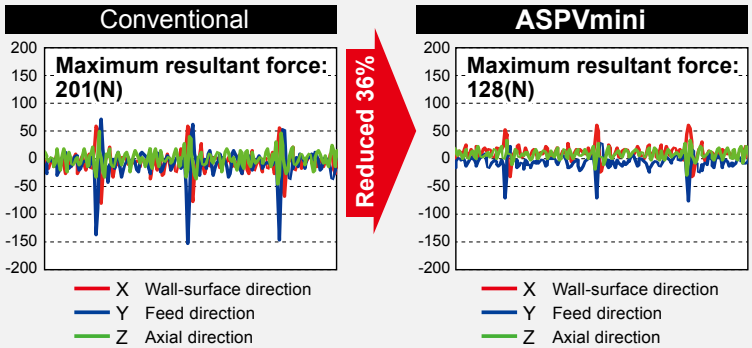


Point! Ground chipbreaker

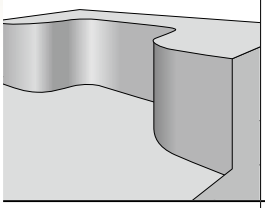
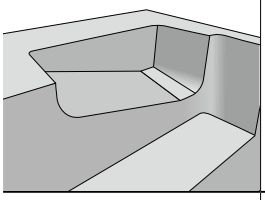
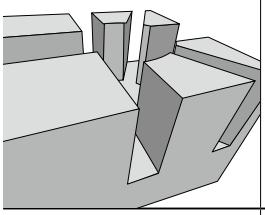
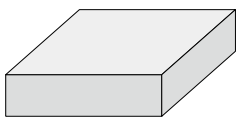
The ground chipbreaker suppresses cutting forces.



Work material : S50C(220HB)
Cutter : Diameter ϕ20
Insert : MPHT040205ZEL-0.5(TH308)
Cutting speed : v_c = 300m/min
Feed rate : f_z=0.1mm/t
Axial depth of cut : a_p=1.0mm
Radial depth of cut : a_e=0.2mm

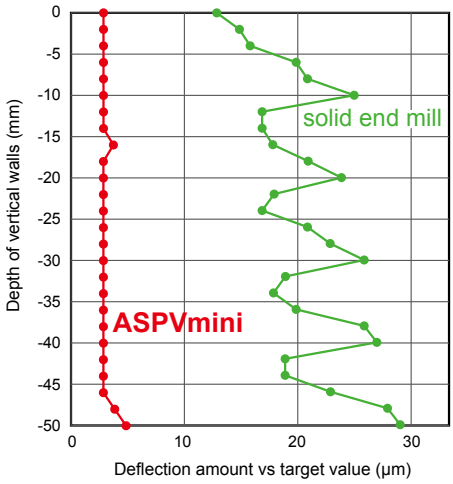


Field Data

Cutting examples	Cutting conditions		Result
Plastic mold Finishing mold base 	Tool : ASPVM1016R-4-M8、ASC16-8.5-160-95Z Work material : SCM440（32HRC） Insert : MPHT040202ZEL（Equivalent to TH308） Overhang : 120mm（L/D=7.5） Machine : Vertical type (HSK63)		Produces reference surfaces with a single cut and without zero cuts, reducing the time required for modification and additional cutting.
	■ side wall Cutting speed : *Vc*=300m/min Revolution : *n*=6,000min^{-1} Feed speed : *Vf*=2,150mm/min Feed rate : *fz*=0.09mm/t Cutting depth : *a*p=0.8mm Radial depth of cut : *a*e=0.05mm Coolant : Air-blow	**■ Bottom surface** Cutting speed : *Vc*=200m/min Revolution : *n*=4,000min^{-1} Feed speed : *Vf*=1,600mm/min Feed rate : *fz*=0.1mm/t Cutting depth : *a*p=0.05mm Radial depth of cut : *a*e=8.0mm Coolant : Air-blow	
Die-casting mold Finishing design sections 	Tool : ASPVM1012R-3-M6、ASC12-6.5-74-24Z Work material : SKD61（46HRC） Insert : MPHT040210ZEL-0.5（Equivalent to TH308） Overhang : 50mm（L/D=4.2） Machine : Vertical type (HSK63)		Maintains high surface grade and dimensional accuracy throughout the cutting process. Can be used as an integrated tool for both design and structural sections.
	■ side wall Cutting speed : *Vc*=260m/min Revolution : *n*=7,000min^{-1} Feed speed : *Vf*=2,000mm/min Feed rate : *fz*=0.1mm/t Cutting depth : *a*p=0.1mm Radial depth of cut : *a*e=0.1mm Coolant : Air-blow	**■ Bottom surface** Cutting speed : *Vc*=110m/min Revolution : *n*=2,900min^{-1} Feed speed : *Vf*=870mm/min Feed rate : *fz*=0.1mm/t Cutting depth : *a*p=0.1mm Radial depth of cut : *a*e=7.0mm Coolant : Air-blow	
Mold components Finishing reference surfaces 	Tool : ASPVM1016R-4-M8、ASC16-8.5-160-95Z Work material : SCM440（32HRC） Insert : MPHT040205ZEL（Equivalent to TH308） Overhang : 125mm（L/D=7.8） Machine : Vertical type (HSK63)		Allows reference surface finishing at twice the feed rate of conventional tools. Achieves good dimensional accuracy without need for reworking, reducing cutting times to half or less compared to conventional tools.
	■ side wall Cutting speed : *Vc*=300m/min Revolution : *n*=6,000min^{-1} Feed speed : *Vf*=2,400mm/min Feed rate : *fz*=0.1mm/t Cutting depth : *a*p=0.4mm Radial depth of cut : *a*e=0.05mm Coolant : Air-blow		
Plate finishing 	Tool : ASPVM1012R-3-M6、ASC12-6.5-74-24Z Work material : S50C（220HB） Insert : MPHT040205ZEL（Equivalent to TH308） Overhang : 50mm（L/D=4.2） Machine : Vertical type（BT50）		Produces equivalent cutting surface grades at more than twice the feed rate of conventional cermet. Longer tool life for higher efficiency and lower tool costs.
	■ Bottom surface Cutting speed : *Vc*=300m/min Revolution : *n*=7,958min^{-1} Feed speed : *Vf*=1,194mm/min Feed rate : *fz*=0.05mm/t Cutting depth : *a*p=0.03mm Radial depth of cut : *a*e=9.6mm Coolant : Emulsion oil		

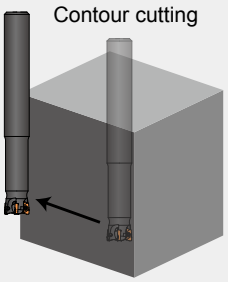
ASPVmini Cutting Data and Lineup

- Insert shapes with enhanced free-cutting capabilities enable to precisely finish deep vertical walls with extended overhangs.
- ASPVmini decreases wall deflection, reducing the time spent on reworking, additional work and modification issues during the finishing process.

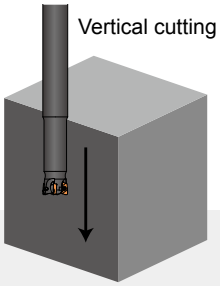


〈Cutting conditions〉
Work material : S50C(220HB)
Machine : Vertical type (BT40)

solid end mill	ASPVmini
Tool dia. : ϕ20mm	Tool dia. : ϕ20mm
	Insert : MPHT040205ZEL-0.5 (TH308)
Revolution : 1,432min^{-1}	Revolution : 4,775min^{-1}
Feed rate : 572mm/min	Feed rate : 2,387mm/min
Depth of cut : ap=8.0mm	Depth of cut : ap=1.0mm
Cutting width : ae=0.2mm	Cutting width : ae=0.2mm
Overhang : OH=100mm (L/D=5)	Overhang : OH=100mm (L/D=5)

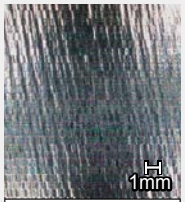


- Vertical cutting improves vertical wall accuracy, even when it's difficult to cut the wall at constant depth due to extremely long overhangs.

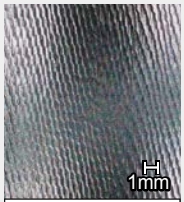


〈Cutting conditions〉
Work material : P21(40HRC)
Machine : Vertical type (HSK100)

Depth constant cutting	Vertical cutting
Tool dia. : ϕ11mm	Tool dia. : ϕ11mm
Insert : MPHT040205ZEL-0.5 (TH308)	Insert : MPHT040205ZEL-0.5 (TH308)
Revolution : 2,893min^{-1}	Revolution : 2,893min^{-1}
Feed rate : 463mm/min	Feed rate : 463mm/min
Depth of cut : ap=0.5mm	Pick feed : pf=0.2mm
Cutting width : ae=0.1mm	Cutting width : ae=0.1mm
Overhang : OH=90mm (L/D=8.2)	Overhang : OH=90mm (L/D=8.2)
Air-blow	Air-blow



Deflection amount: 21.7μm



Deflection amount: 8.7μm

※Use only in pushing-down direction.

Steel shank Type

ASPV10○○R-○

Numeric figure in a circle ○.

Fig-1
(Standard type)

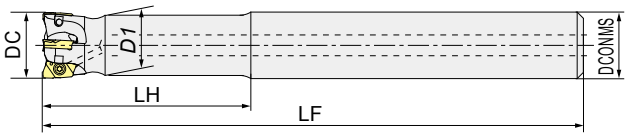
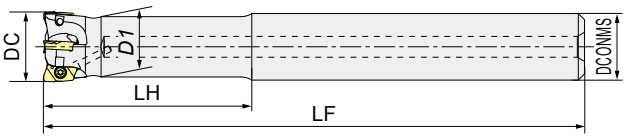


Fig-2
(Undercut type)
※DC > DCONMS

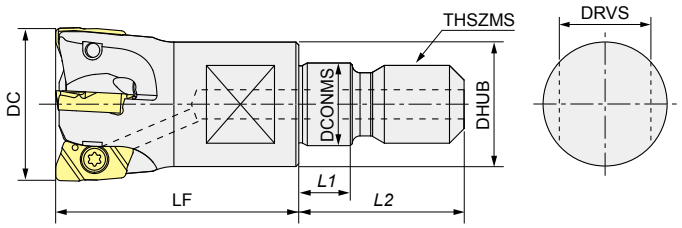


Item code	Stock	No.of flutes	Size (mm)					Shape	Recommended insert
			DC	LF	LH	*D1*	DCONMS		
ASPV1010R-2	●	2	10	100	30	9.4	10	Fig-1 Standard type	MPHT0402○○ ZEL(-○○)
ASPV1011R-2	●	2	11	100	30	9.4	10	Fig-2 Undercut type	
ASPV1012R-3	●	3	12	100	40	11.2	12	Fig-1 Standard type	
ASPV1013R-3	●	3	13	100	40	11.2	12	Fig-2 Undercut type	
ASPV1016R-4	●	4	16	130	50	14.5	16	Fig-1 Standard type	
ASPV1017R-4	●	4	17	130	50	14.5	16	Fig-2 Undercut type	
ASPV1020R-5	●	5	20	160	60	18	20	Fig-1 Standard type	
ASPV1021R-5	●	5	21	160	60	18	20	Fig-2 Undercut type	
ASPV1025R-6	●	6	25	180	75	23	25	Fig-1 Standard type	
ASPV1026R-6	●	6	26	180	75	23	25	Fig-2 Undercut type	
ASPV1032R-8	●	8	32	200	100	30	32	Fig-1 Standard type	

Modular Type

ASPVM10○○R-○-M○○

Numeric figure in a circle ○.



Item code	Stock	No.of flutes	Size (mm)								Recommended insert
			DC	LF	DCONMS	THSZMS	DHUB	*L1*	*L2*	DRVS	
ASPVM1010R-2-M6	●	2	10	20	6.5	M6	9.4	5.5	14.5	7	MPHT0402○○ ZEL(-○○)
※ASPVM1011R-2-M6	●	2	11	20	6.5	M6	9.8	5.5	14.5	7	
ASPVM1012R-3-M6	●	3	12	20	6.5	M6	9.8	5.5	14.5	7	
※ASPVM1013R-3-M6	●	3	13	20	6.5	M6	9.8	5.5	14.5	7	
ASPVM1016R-4-M8	●	4	16	25	8.5	M8	12.8	5.5	17	10	
※ASPVM1017R-4-M8	●	4	17	25	8.5	M8	12.8	5.5	17	10	
ASPVM1020R-5-M10	●	5	20	30	10.5	M10	17.8	5.5	19	15	
※ASPVM1021R-5-M10	●	5	21	30	10.5	M10	17.8	5.5	19	15	
ASPVM1025R-6-M12	●	6	25	30	12.5	M12	20.8	5.5	22	17	
※ASPVM1026R-6-M12	●	6	26	30	12.5	M12	20.8	5.5	22	17	
ASPVM1030R-6-M16	★	6	30	30	17	M16	28.8	6	23	22	
ASPVM1032R-8-M16	●	8	32	30	17	M16	28.8	6	23	22	
※ASPVM1033R-8-M16	★	8	33	30	17	M16	28.8	6	23	22	

【Note】 When ※ and carbide shank are used together as a set, there is no interference.
Do not apply lubricants to the threaded section or end surface sections in contact with the dedicated shank/arbor for modular mills.

★ : Stocked Items of New products. ● : Stocked items.

ASPVmini Lineup and Cutting Conditions

Inserts

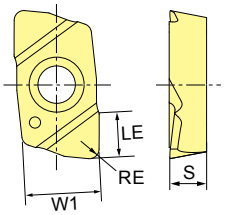


Fig.1

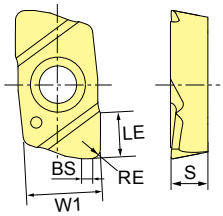


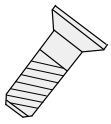
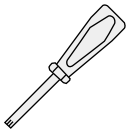
Fig.2

P	Carbon Steels	⌐	■
M	SUS, etc.	■	⌐
K	Cast irons FC・FCD	■	⌐
S	Titanium alloys	■	⌐
H	Hardened steels	■	⌐

■ : General cutting, First recommendation
⌐ : General cutting, Second recommendation

Item code	Tolerance class	Grade		Size (mm)					Shape
		TH308	PN215	W1	BS	S	LE	RE	
MPHT040202ZEL	H	●	★	4.3	0	2	2.3	0.2	Fig. 1
MPHT040202ZEL-0.5		●	★		0.5				Fig. 2
MPHT040205ZEL		●	★		0			0.5	Fig. 1
MPHT040205ZEL-0.5		●	★		0.5				Fig. 2
MPHT040205ZEL-1.0		★	★		1				
MPHT040210ZEL		●	★		0			1.0	Fig. 1
MPHT040210ZEL-0.5		●	★		0.5				Fig. 2

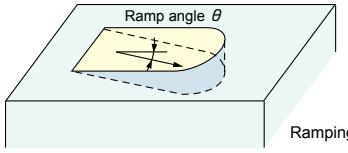
Parts

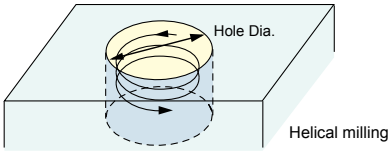
Parts	Clamp screw		Screw Driver	Screw anti-seizure agent
Shape / Cutter body		Fastening torque (N·m)		
ASPV10○○R-○ ASPVM10○○R-○-M○	T06-1804A	0.5	104-T6	P-37

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.

Ramp Angle / Hole Dia.

Regarding ramping and helical milling diameter.





Tool Dia. (mm)	10	11	12	13	16	17	20	21	25	26	30	32	33
Maximum Ramping angle θ	0.5 ° or less												
Hole Dia. (mm)	13 ~ 19	15 ~ 21	17 ~ 23	19 ~ 25	25 ~ 31	27 ~ 33	33 ~ 39	35 ~ 41	43 ~ 59	45 ~ 51	53 ~ 59	57 ~ 63	59 ~ 65

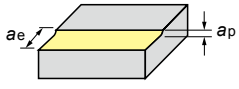
★ : Stocked Items of New products. ● : Stocked items.

※ Red indicates primary recommended grade.

Bottom finishing

Work material	Recommended grade	DC Tool dia. (mm)	ϕ 10			ϕ 12			ϕ 16			ϕ 20			ϕ 25			ϕ 32		
		Flutes	2 Flutes			3 Flutes			4 Flutes			5 Flutes			6 Flutes			8 Flutes		
		Overhang	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
Carbon steels Alloy steels (30HRC or less)	PN215 TH308	n (min-1)	6,366	5,411	4,456	5,305	4,509	3,714	3,979	3,382	2,785	3,183	2,706	2,228	2,546	2,165	1,783	1,989	1,691	1,393
		Vc(m/min)	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140
		Vf(mm/min)	1,910	1,299	891	2,387	1,623	1,114	2,387	1,623	1,114	2,387	1,623	1,114	2,292	1,558	1,070	2,387	1,623	1,114
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Alloy steels (Quenched and tempered steels) (35HRC or less)	PN215 TH308	n (min-1)	5,730	4,775	3,501	4,775	3,979	2,918	3,581	2,984	2,188	2,865	2,387	1,751	2,292	1,910	1,401	1,790	1,492	1,094
		Vc(m/min)	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110
		Vf(mm/min)	1,375	955	700	1,719	1,194	875	1,719	1,194	875	1,719	1,194	875	1,650	1,146	840	1,719	1,194	875
		fz(mm/t)	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Pre-hardened steels Alloy steels (Quenched and tempered steels) (45HRC or less)	TH308 PN215	n (min-1)	5,093	4,138	3,183	4,244	3,448	2,653	3,183	2,586	1,989	2,546	2,069	1,592	2,037	1,655	1,273	1,592	1,293	995
		Vc(m/min)	160	130	100	160	130	100	160	130	100	160	130	100	160	130	100	160	130	100
		Vf(mm/min)	1,019	828	637	1,273	1,035	796	1,273	1,035	796	1,273	1,035	796	1,222	993	764	1,273	1,035	796
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Hardened steels (55HRC or less)	TH308	n (min-1)	3,183	2,546	2,546	2,653	2,122	2,122	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019	995	796	796
		Vc(m/min)	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
		Vf(mm/min)	637	509	509	796	637	637	796	637	637	796	637	637	764	611	611	796	637	637
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Hardened steels (62HRC or less)	TH308	n (min-1)	2,228	1,592	1,592	1,857	1,326	1,326	1,393	995	995	1,114	796	796	891	637	637	696	497	497
		Vc(m/min)	70	50	50	70	50	50	70	50	50	70	50	50	70	50	50	70	50	50
		Vf(mm/min)	446	318	255	557	398	318	557	398	318	557	398	318	535	382	306	557	398	318
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Stainless steels SUS	TH308 PN215	n (min-1)	5,730	4,775	3,501	4,775	3,979	2,918	3,581	2,984	2,188	2,865	2,387	1,751	2,292	1,910	1,401	1,790	1,492	1,094
		Vc(m/min)	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110
		Vf(mm/min)	1,146	955	700	1,432	1,194	875	1,432	1,194	875	1,432	1,194	875	1,375	1,146	840	1,432	1,194	875
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Cast irons FC FCD	TH308 PN215	n (min-1)	6,366	5,411	4,456	5,305	4,509	3,714	3,979	3,382	2,785	3,183	2,706	2,228	2,546	2,165	1,783	1,989	1,691	1,393
		Vc(m/min)	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140
		Vf(mm/min)	1,910	1,299	891	2,387	1,623	1,114	2,387	1,623	1,114	2,387	1,623	1,114	2,292	1,558	1,070	2,387	1,623	1,114
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Heat resistant alloys Super heat resistant alloys	TH308 PN215	n (min-1)	1,592	1,273	955	1,326	1,061	796	995	796	597	796	637	477	637	509	382	497	398	298
		Vc(m/min)	50	40	30	50	40	30	50	40	30	50	40	30	50	40	30	50	40	30
		Vf(mm/min)	318	255	191	398	318	239	398	318	239	398	318	239	382	306	229	398	318	239
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Titanium alloys	TH308 PN215	n (min-1)	1,910	1,592	955	1,592	1,326	796	1,194	995	597	955	796	477	764	637	382	597	497	298
		Vc(m/min)	60	50	30	60	50	30	60	50	30	60	50	30	60	50	30	60	50	30
		Vf(mm/min)	382	318	191	477	398	239	477	398	239	477	398	239	458	382	229	477	398	239
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	7	7	5	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③ For slotting or ramping, feed rate should be set to 70% as general criteria.
④ Ensure to index the insert at the correct time to ensure safety of the tool-body.
⑤ The evacuation of swarf can cause burns, cuts or damage to the eyes please ensue the correct safety cover is fitted around the machine, and necessary personal protection equipment is worn by the machine operator.
⑥ Due to fire risks do not use neat cutting oil as a coolant.



Finishing

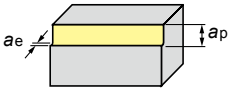
Recommended cutting conditions of ASPVmini

※ Red indicates primary recommended grade.

Side finishing

Work material	Recommended grade	DC Tool dia. (mm)	φ 10			φ 12			φ 16			φ 20			φ 25			φ 32		
		Flutes	2 Flutes			3 Flutes			4 Flutes			5 Flutes			6 Flutes			8 Flutes		
		Overhang	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
Carbon steels Alloy steels (30HRC or less)	PN215 TH308	*n* (min-1)	12,732	9,549	9,549	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	3,820	2,292	1,910	4,775	2,865	2,387	4,775	2,865	2,387	4,775	2,865	2,387	4,584	2,750	2,292	4,775	2,865	2,387
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alloy steels (Quenched and tempered steels) (35HRC or less)	PN215 TH308	*n* (min-1)	9,549	7,958	7,958	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	2,292	1,592	1,592	2,865	1,989	1,989	2,865	1,989	1,989	2,865	1,989	1,989	2,750	1,910	1,910	2,865	1,989	1,989
		fz(mm/t)	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pre-hardened steels Alloy steels (Quenched and tempered steels) (45HRC or less)	TH308 PN215	*n* (min-1)	7,958	6,366	6,366	6,631	5,305	5,305	4,974	3,979	3,979	3,979	3,183	3,183	3,183	2,546	2,546	2,487	1,989	1,989
		Vc(m/min)	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200
		Vf(mm/min)	1,592	1,273	1,273	1,989	1,592	1,592	1,989	1,592	1,592	1,989	1,592	1,592	1,910	1,528	1,528	1,989	1,592	1,592
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (55HRC or less)	TH308	*n* (min-1)	6,366	4,775	4,775	5,305	3,979	3,979	3,979	2,984	2,984	3,183	2,387	2,387	2,546	1,910	1,910	1,989	1,492	1,492
		Vc(m/min)	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150
		Vf(mm/min)	1,273	955	955	1,592	1,194	1,194	1,592	1,194	1,194	1,592	1,194	1,194	1,528	1,146	1,146	1,592	1,194	1,194
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (62HRC or less)	TH308	*n* (min-1)	4,775	3,183	3,183	3,979	2,653	2,653	2,984	1,989	1,989	2,387	1,592	1,592	1,910	1,273	1,273	1,492	995	995
		Vc(m/min)	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100
		Vf(mm/min)	955	637	637	1,194	796	796	1,194	796	796	1,194	796	796	1,146	764	764	1,194	796	796
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Stainless steels SUS	TH308 PN215	*n* (min-1)	9,549	7,958	7,958	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	1,910	1,592	1,592	2,387	1,989	1,989	2,387	1,989	1,989	2,387	1,989	1,989	2,292	1,910	1,910	2,387	1,989	1,989
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cast irons FC FCD	TH308 PN215	*n* (min-1)	12,732	9,549	9,549	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	3,820	2,292	1,910	4,775	2,865	2,387	4,775	2,865	2,387	4,775	2,865	2,387	4,584	2,750	2,292	4,775	2,865	2,387
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat resistant alloys Super heat resistant alloys	TH308 PN215	*n* (min-1)	1,910	1,273	1,273	1,592	1,061	1,061	1,194	796	796	955	637	637	764	509	509	597	398	398
		Vc(m/min)	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40
		Vf(mm/min)	382	255	255	477	318	318	477	318	318	477	318	318	458	306	306	477	318	318
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Titanium alloys	TH308 PN215	*n* (min-1)	3,183	2,546	2,546	2,653	2,122	2,122	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019	995	796	796
		Vc(m/min)	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
		Vf(mm/min)	637	509	509	796	637	637	796	637	637	796	637	637	764	611	611	796	637	637
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

【Note】
① Use the appropriate coolant for the work material and machining shape.
② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③ For slotting or ramping, feed rate should be set to 70% as general criteria.
④ Ensure to index the insert at the correct time to ensure safety of the tool-body.
⑤ The evacuation of swarf can cause burns, cuts or damage to the eyes please ensue the correct safety cover is fitted around the machine, and necessary personal protection equipment is worn by the machine operator.
⑥ Due to fire risks do not use neat cutting oil as a coolant.

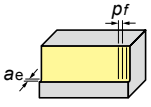


Finishing

Vertical side finishing (※ Use only in pushing-down direction.)

Work material	Recommended grade	DC Tool dia. (mm)	ϕ 10			ϕ 12			ϕ 16			ϕ 20			ϕ 25			ϕ 32		
		Flutes	2 Flutes			3 Flutes			4 Flutes			5 Flutes			6 Flutes			8 Flutes		
		Overhang	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
Carbon steels Alloy steels (30HRC or less)	PN215 TH308	*n* (min-1)	12,732	9,549	9,549	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	3,820	2,292	1,910	4,775	2,865	2,387	4,775	2,865	2,387	4,775	2,865	2,387	4,584	2,750	2,292	4,775	2,865	2,387
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alloy steels (Quenched and tempered steels) (35HRC or less)	PN215 TH308	*n* (min-1)	9,549	7,958	7,958	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	2,292	1,592	1,592	2,865	1,989	1,989	2,865	1,989	1,989	2,865	1,989	1,989	2,750	1,910	1,910	2,865	1,989	1,989
		fz(mm/t)	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pre-hardened steels Alloy steels (Quenched and tempered steels) (45HRC or less)	TH308 PN215	*n* (min-1)	7,958	6,366	6,366	6,631	5,305	5,305	4,974	3,979	3,979	3,979	3,183	3,183	3,183	2,546	2,546	2,487	1,989	1,989
		Vc(m/min)	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200
		Vf(mm/min)	1,592	1,273	1,273	1,989	1,592	1,592	1,989	1,592	1,592	1,989	1,592	1,592	1,910	1,528	1,528	1,989	1,592	1,592
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (55HRC or less)	TH308	*n* (min-1)	6,366	4,775	4,775	5,305	3,979	3,979	3,979	2,984	2,984	3,183	2,387	2,387	2,546	1,910	1,910	1,989	1,492	1,492
		Vc(m/min)	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150
		Vf(mm/min)	1,273	955	955	1,592	1,194	1,194	1,592	1,194	1,194	1,592	1,194	1,194	1,528	1,146	1,146	1,592	1,194	1,194
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (62HRC or less)	TH308	*n* (min-1)	4,775	3,183	3,183	3,979	2,653	2,653	2,984	1,989	1,989	2,387	1,592	1,592	1,910	1,273	1,273	1,492	995	995
		Vc(m/min)	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100
		Vf(mm/min)	955	637	637	1,194	796	796	1,194	796	796	1,194	796	796	1,146	764	764	1,194	796	796
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Stainless steels SUS	TH308 PN215	*n* (min-1)	9,549	7,958	7,958	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	1,910	1,592	1,592	2,387	1,989	1,989	2,387	1,989	1,989	2,387	1,989	1,989	2,292	1,910	1,910	2,387	1,989	1,989
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cast irons FC FCD	TH308 PN215	*n* (min-1)	12,732	9,549	9,549	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	3,820	2,292	1,910	4,775	2,865	2,387	4,775	2,865	2,387	4,775	2,865	2,387	4,584	2,750	2,292	4,775	2,865	2,387
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat resistant alloys Super heat resistant alloys	TH308 PN215	*n* (min-1)	1,910	1,273	1,273	1,592	1,061	1,061	1,194	796	796	955	637	637	764	509	509	597	398	398
		Vc(m/min)	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40
		Vf(mm/min)	382	255	255	477	318	318	477	318	318	477	318	318	458	306	306	477	318	318
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Titanium alloys	TH308 PN215	*n* (min-1)	3,183	2,546	2,546	2,653	2,122	2,122	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019	995	796	796
		Vc(m/min)	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
		Vf(mm/min)	637	509	509	796	637	637	796	637	637	796	637	637	764	611	611	796	637	637
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		pf(mm)	0.4	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

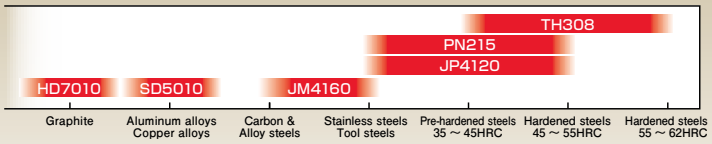
【Note】
① Use the appropriate coolant for the work material and machining shape.
② These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
③ Ensure to index the insert at the correct time to ensure safety of the tool-body.
④ The evacuation of swarf can cause burns, cuts or damage to the eyes please ensue the correct safety cover is fitted around the machine, and necessary personal protection equipment is worn by the machine operator.
⑤ Due to fire risks do not use neat cutting oil as a coolant.

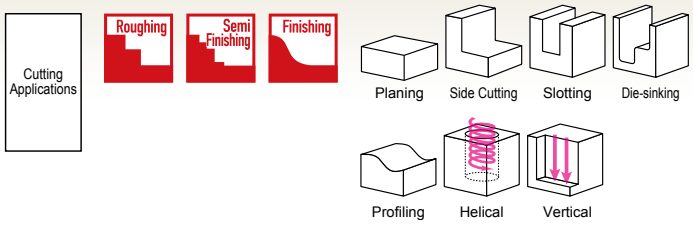


Finishing

ASPV Features and Machining Examples

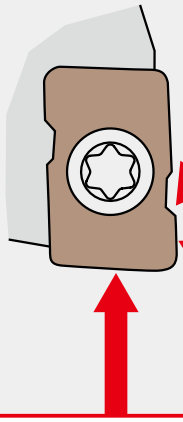
ASPV





Body only −0.03 −0.1 | Precision body only ±0.02 | Insert N | Insert H

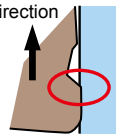
Features The inserts feature three cutting edges.



1 Cutting edge for reciprocating machining

This is used as the cutting edge in pulling-up direction during reciprocating machining.

The MPHW0603○○ZFL-N lacks a reciprocating machining cutting edge. Use only in pushing-down direction.

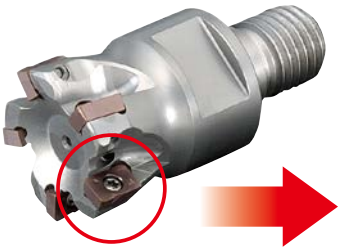


2 Peripheral cutting edge

This is used as the peripheral cutting edge during side machining.

3 Face cutting edge

This is used during bottom surface finishing.



Insert with wiper edge

MPHW0603○○ZEL-0.5
MPHW0603○○ZEL-1.5
MPHW0603○○ZEL-1.5F

The wiper edge allows use at higher feed rates.

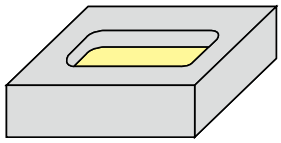
Insert without wiper edge

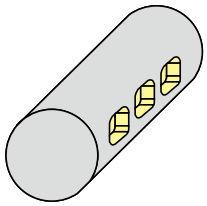
MPHW0603○○ZEL
MPNW0603○○ZEL
MPHW0603○○ZFL
MPHW0603○○ZFL-N

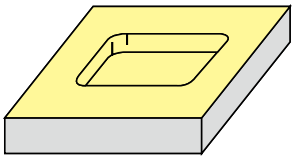
Ideal for bottom machining with long overhang (L/D = 5 or more) and conditions with low rigidity in the spindle direction

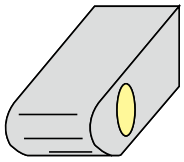
※ Inserts without a wiper edge are recommended for vertical machining.

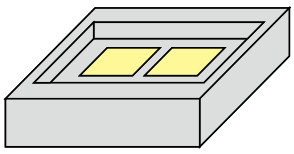
Field Data

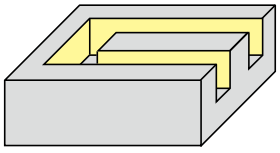
Tools: ASPVS2020R-3	Cutting Conditions	Result
	Work Material : S55C (220HB) Tools : ASPVS2020R-3 Arbor : Commercial milling chuck Insert : MPHW060302ZEL-0.5 (MZ1000) Overhang : OH=50mm Machine used : Vertical type (BT50) Rotation speed : n=3,180min^{-1} Cutting speed : Vc=200m/min Feed rate : Vf=670mm/min Feed rate per flute : 0.07mm/t Depth of cut : ap×ae=0.1×10mm	The feed rate is 1.5 times faster and the cutting accuracy is more consistent than previous indexable tools, more than doubling tool life.

Tools: ASPVM2016R-2	Cutting Conditions	Result
	Work Material : SCM (30HRC) Tools : ASPVM2016R-2 Arbor : ASC16-8.5-95-30 Insert : MPHW060302ZEL (MZ1000) Overhang : OH=55mm Machine used : Multi-tasking machine (BT40) Rotation speed : n=4,050min^{-1} Cutting speed : Vc=203m/min Feed rate : Vf=800mm/min Feed rate per flute : 0.1mm/t Depth of cut : ap×ae=0.5×0.4mm	HSS end mills were used previously, but using ASPVM together with a carbide shank improves inclination accuracy and enables consistent use of indexable tools.

Tools: ASPVS2016R-2	Cutting Conditions	Result
	Work Material : SUS420 Tools : ASPVS2016R-2 Arbor : Commercial milling chuck Insert : MPHW060304ZEL-0.5 (Equivalent to JP4120) Overhang : OH=40mm Machine used : Vertical type (BT40) Rotation speed : n=4,000min^{-1} Cutting speed : Vc=200m/min Feed rate : Vf=1,000mm/min Feed rate per flute : 0.125mm/t Depth of cut : ap×ae=0.1×8mm	Before, conventional shoulder type indexable tools tended to result in chattering marks as machining progressed, but ASPV achieves a consistent cutting surface with no chattering marks. Inserts showed satisfactory constant wear after approximately one hour of cutting.

Tools: ASPVM2032R-5	Cutting Conditions	Result
	Work Material : FCD550 Tools : ASPVM2032R-5 Arbor : ASC32-17-210-110 Insert : MPHW060308ZEL (ATH08M) Overhang : OH=160mm Machine used : Vertical type (BT50) Rotation speed : n=1,800min^{-1} Cutting speed : Vc=180m/min Feed rate : Vf=2,500mm/min Feed rate per flute : 0.28mm/t Depth of cut : ap×ae=1×0.2mm	Previously, the HSS end mills with long flute lengths were typically used, which led to inconsistent cutting accuracy. Using ASPVM and a carbide shank ensures consistent cutting accuracy.

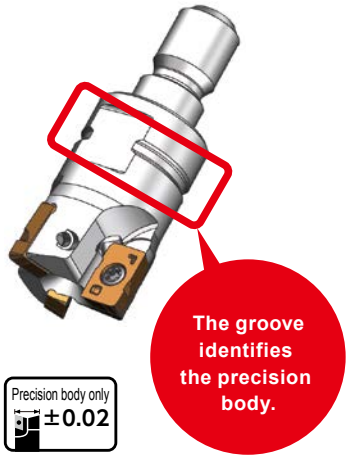
Tools: ASPVB2050R-7	Cutting Conditions	Result
	Work Material : FC250 Tools : ASPVB2050R-7 Arbor : BT50-22.225-200-50 Insert : MPHW060308ZEL-1.5 (ATH08M) Overhang : OH=250mm Machine used : Vertical type (BT50) Rotation speed : n=1,270min^{-1} Cutting speed : Vc=200m/min Feed rate : Vf=1,510mm/min Feed rate per flute : 0.17mm/t Depth of cut : ap×ae=0.1×30mm	Compared to previous indexable tools, the feed marks on the cutting surface are consistent and satisfactory.

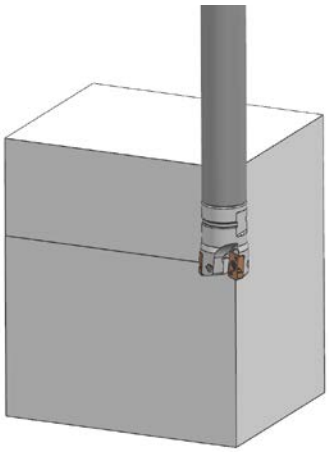
Tools: ASPVM2032R-5	Cutting Conditions	Result
	Work Material : SKD61 (HB≦229) Tools : ASPVM2032R-5 Arbor : Commercial Modular arbor Insert : MPHW060308ZEL (Equivalent to JP4120) Overhang : OH=220mm Machine used : Vertical type (BT50) Rotation speed : n=5,000min^{-1} Cutting speed : Vc=500m/min Feed rate : Vf=4000mm/min Feed rate per flute : 0.16mm/t Depth of cut : ap×ae=1.0×0.2mm	Solid end mills led to inconsistent cutting accuracy. In contrast, ASPVM ensures consistent cutting accuracy and improved machining efficiency.

ASPV Machining Examples

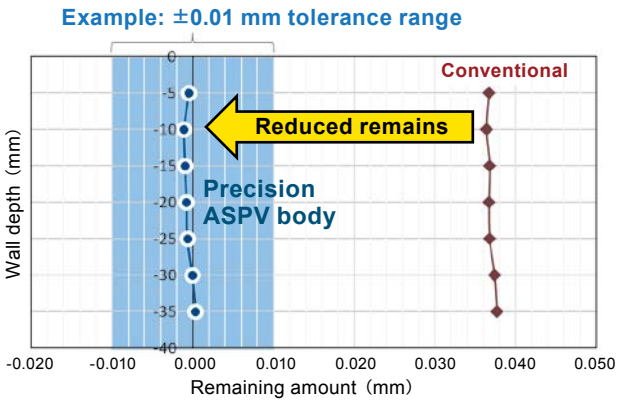
New precision body

Improved cutting diameter accuracy closer to the nominal diameter reduces remains.





Model No. : ASPVM-P-20○○R-○-M○○
Tool dia. : ϕ16 ~ 42

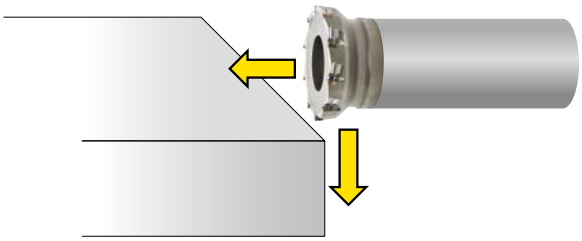


Machine : 5-axis machining center (HSK100 spindle)
Work material : S50C (220HB)
Tool : ϕ20 modular head (single-insert) + carbide shank
MPHW060308ZEL
Cutting conditions : *Vc*=300m/min, *fz*=0.1mm,
*a*p=1.0mm, *a*e=0.1mm, Water-based cutting fluid

※Depending on the insert combination, the cutting diameter may exceed the nominal diameter. Measure the actual diameter before use.

Expanded range of bore type sizes

Large diameter ϕ80, 100, and 125mm products added to range



Customer feedback

Convenient: Makes it possible to machine the sides without repositioning of large workpieces

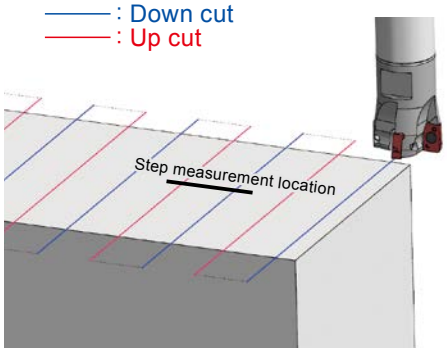
Work material : FCD500
Tool dia. : ϕ125mm
Insert : MPHW060308ZEL (JP4120)
Cutting conditions :
Vc=200m/min
fz=0.1mm/t
*p*f=2mm
*a*e=0.1mm
OH=470mm
Air-blow

Replacing an adjustable cutter resulted in trouble-free use and excellent accuracy.

Work material : FC250
Tool dia. : ϕ125mm
Insert : MPHW060308ZEL (JP4120)
Cutting conditions :
Vc=250m/min
fz=0.1mm/t
*a*p=0.2mm
*a*e=50mm
OH=420mm
Air-blow

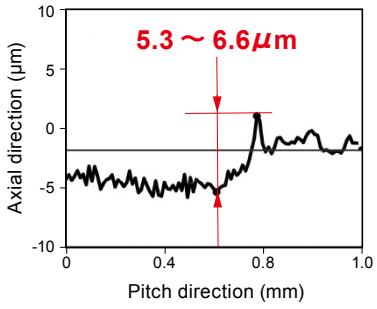
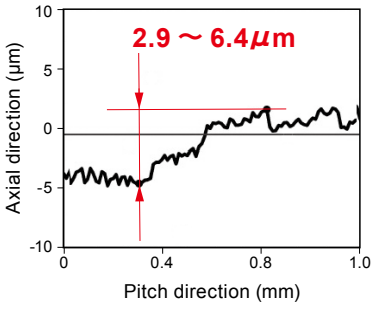
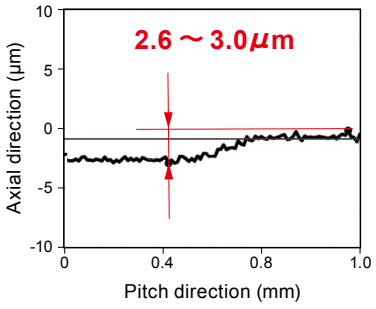
Optimized face cutting edge clearance angle reduces step height between machining passes.

Reduces step height between machining passes and improves surface quality.



Model No. : MPHW060308ZEL-1.5F
Grade : TH308、PN215、JP4120、MZ1000

Work material : DIEVAR（46.5HRC）
Tool dia. : ϕ25mm（Single-insert）
Cutting conditions :
Vc=275m/min
fz=0.057mm/t
ap=0.04mm
ae=20mm
OH=175mm (L/D=7)
Water-based cutting fluid

	Conventional ①	Conventional ②	MPHW060308ZEL-1.5F (TH308)
Step height/profile	Large step with protrusions	Large step with protrusions	**Small step with smooth profile**
			

Customer feedback

Die casting manufacturer

Step between passes reduced to 2 μm

Work material : DIEVAR（45HRC）
Cutting method : Reciprocating bottom finishing
Tool dia. : ϕ18mm
Cutting conditions :
Vc=196m/min
fz=0.065mm/t
ap=0.03mm
ae=12mm
OH=40mm
Wet

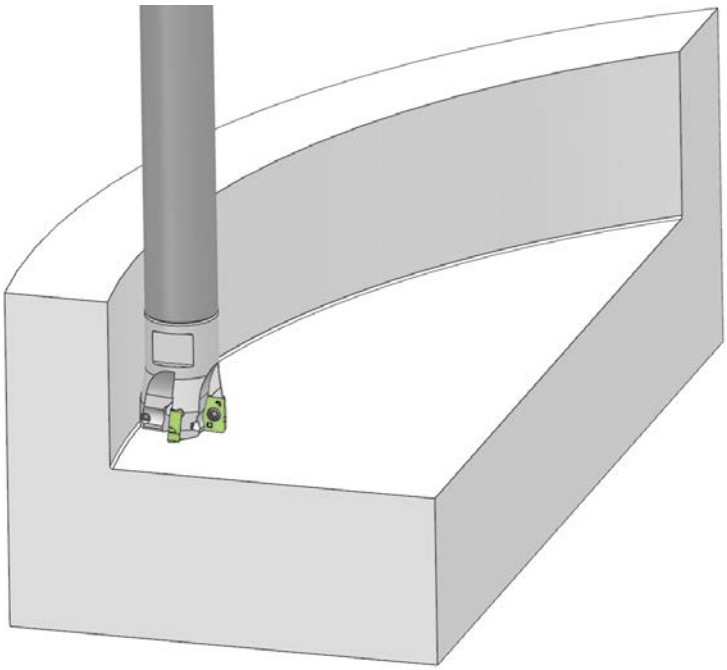
Plastic mold manufacturer

Reduces step between passes
and improves surface appearance.

Work material : S50C（220HB）
Cutting method : Reciprocating bottom finishing
Tool dia. : ϕ25mm
Cutting conditions :
Vc=236m/min
fz=0.058mm/t
ap=0.1mm
ae=16mm
OH=100mm
Wet

ASPV Cutting Data and Lineup

01 Finishing machining example on aluminum part using SD5010



Cutting conditions

Work material : Aluminum (Equivalent to A1050)

Tool : ϕ25 mm modular head (4 flutes) + carbide shank

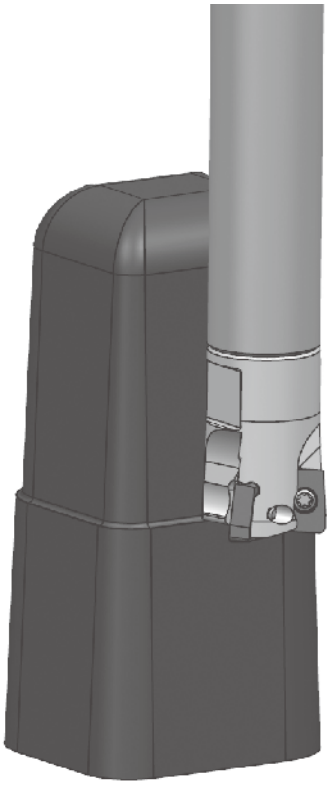
Insert : MPHW060308ZFL (SD5010)

Cutting speed *Vc* (m/min)	668
Revolution *n* (rpm)	8500
Feed rate *fz* (mm/t)	0.118
Feed speed *Vf* = (mm/min)	4000
Axial depth of cut *ap* (mm)	0.5
Radial depth of cut *ae* (mm)	10
Overhang (mm)	110 (L/D=4.4)
Coolant	Water-based cutting fluid

Customer feedback

- Allows consistent machining with zero chattering and high quality finished machined face.

02 Example of roughing/finishing machining with graphite electrode using HD7010



Tool appearance after use

Cutting conditions

Work material : Graphite

Tool : ϕ20 mm modular head (3 flutes) + carbide shank

Insert : MPHW060310ZFL-N (HD7010)

	Roughing	Finishing
Cutting speed *Vc* (m/min)	503	534
Revolution *n* (rpm)	8000	8500
Feed rate *fz* (mm/t)	0.208	0.353
Feed speed *Vf* = (mm/min)	5000	9000
Axial depth of cut *ap* (mm)	0.75	0.15
Radial depth of cut *ae* (mm)	1	1
Overhang (mm)	160 (L/D=8)	160 (L/D=8)
Coolant	Air-blow	Air-blow

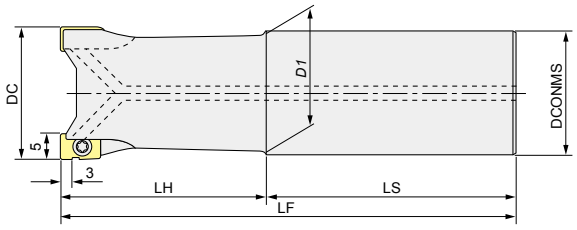
Customer feedback

- The tool was still usable even after 750 minutes of roughing and finishing.
- Wear is low and the machine face quality is excellent.

Straight Shank Type

ASPVS2○○○R-○

Numeric figure in a circle ○.



Item code	Stock	No.of flutes	Size (mm)						Recommended insert
			DC	LF	LH	LS	*D1*	DCONMS	
ASPVS2016R-2	●	2	16	100	30	70	14.5	16	
ASPVS2017R-2	★	2	17	100	30	70	14.5	16	
ASPVS2020R-3	●	3	20	110	30	80	18	20	MPHW0603○○ZEL
ASPVS2021R-3	★	3	21	110	30	80	18	20	MPHW0603○○ZEL-○○
ASPVS2025R-4	●	4	25	120	40	80	23	25	MPHW0603○○ZEL-1.5F
ASPVS2026R-4	★	4	26	120	40	80	23	25	MPHW0603○○ZFL
ASPVS2030R-4	●	5	30	150	50	100	28	32	MPHW0603○○ZFL-N
ASPVS2032R-5	●	5	32	150	50	100	30	32	MPNW0603○○ZEL
ASPVS2035R-5	●	5	35	150	50	100	31	32	
ASPVS2040R-6	●	6	40	170	50	120	31	32	

Modular Type

ASPVM20○○R-○

Numeric figure in a circle ○.

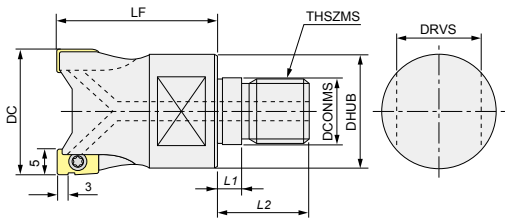


Fig.1

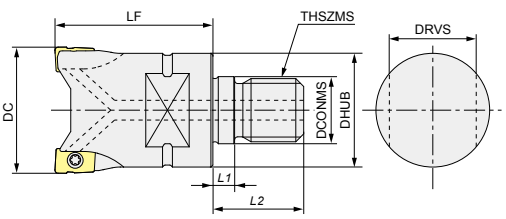


Fig.2

Item code	Stock	No.of flutes	Size (mm)								Shape	Recommended insert
			DC	LF	DCONMS	THSZMS	DHUB	*L1*	*L2*	DRVS		
ASPVM2012R-1	★	1	12	22	6.5	M6	9.8	5.5	14.5	7	Fig-1	MPHW0603○○ZEL MPHW0603○○ZEL-○○ MPHW0603○○ZEL-1.5F MPHW0603○○ZFL MPHW0603○○ZFL-N MPNW0603○○ZEL
ASPVM2016R-2	●	2	16	25	8.5	M8	12.8	5.5	17	10		
※1 ASPVM2017R-2	★	2	17	25	8.5	M8	12.8	5.5	17	10		
※1 ASPVM2018R-2	●	2	18	25	8.5	M8	14.5	5.5	17	10		
ASPVM2020R-2	●	2	20	30	10.5	M10	17.8	5.5	19	15		
ASPVM2020R-3	●	3	20	30	10.5	M10	17.8	5.5	19	15		
※1 ASPVM2021R-3	★	3	21	30	10.5	M10	17.8	5.5	19	15		
※1 ASPVM2022R-3	●	3	22	30	10.5	M10	17.8	5.5	19	15		
ASPVM2025R-4	●	4	25	35	12.5	M12	20.8	5.5	22	17		
※1 ASPVM2026R-4	★	4	26	35	12.5	M12	20.8	5.5	22	17		
※1 ASPVM2028R-4	●	4	28	35	12.5	M12	23	5.5	22	17		
ASPVM2030R-4	●	4	30	40	17	M16	28.8	6	23	22		
ASPVM2032R-3	●	3	32	40	17	M16	28.8	6	23	22		
ASPVM2032R-5	●	5	32	40	17	M16	28.8	6	23	22		
※1 ASPVM2033R-5	★	5	33	40	17	M16	28.8	6	23	22		
※1 ASPVM2035R-5	●	5	35	40	17	M16	28.8	6	23	22		
※1 ASPVM2040R-6	●	6	40	40	17	M16	28.8	6	23	22		
High precision ※2 ASPVM-P-2016R-2-M8	★	2	16	25	8.5	M8	12.8	5.5	17	10	Fig-2	
High precision ※2 ASPVM-P-2020R-3-M10	★	3	20	30	10.5	M10	17.8	5.5	19	15		
High precision ※2 ASPVM-P-2025R-4-M12	★	4	25	35	12.5	M12	20.8	5.5	22	17		
High precision ※2 ASPVM-P-2032R-5-M16	★	5	32	40	17	M16	28.8	6	23	22		
High precision ※1,2 ASPVM-P-2035R-5-M16	★	5	35	40	17	M16	28.8	6	23	22		
High precision ※1,2 ASPVM-P-2042R-6-M16	★	6	42	40	17	M16	28.8	6	23	22		

【Note】 When ※1 and carbide shank are used together as a set, there is no interference.
※2 Depending on the insert combination, the cutting diameter may exceed the nominal diameter. Measure the actual diameter before use.
Do not apply lubricants such as grease, etc. to the “contact faces” and “modular screws” of the “modular mill”, “dedicated shanks” and “dedicated arbor”.

★ : Stocked Items of New products. ● : Stocked items.

ASPV Lineup

Bore Type

ASPVB2○○○R(M)-○

Numeric figure in a circle ○.

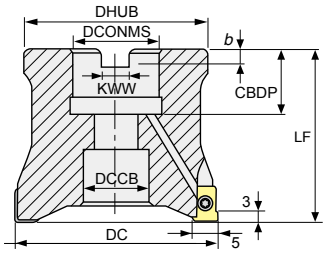


Fig.1

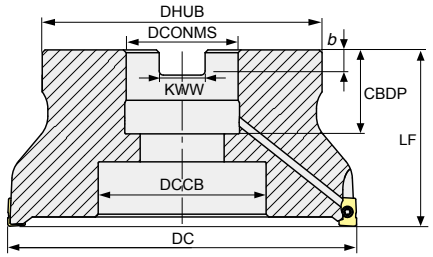


Fig.2

	Item code	Stock	No.of flutes	Size (mm) DC	DHUB	LF	CBDP	KWW	b	DCONMS	DCCB	Shape	Recommended insert
Inch pilot	ASPVB2050R-7	●	7	50	47	50	19	8.4	5	22.225	17	Fig-1	MPHW0603○○ZEL MPHW0603○○ZEL-○○ MPHW0603○○ZEL-1.5F MPHW0603○○ZFL MPHW0603○○ZFL-N MPNW0603○○ZEL
	ASPVB2063R-8	●	8	63	60	50	19	8.4	5	22.225	17		
	ASPVB2080R-8	★	8	80	76	63	32	12.7	8	31.75	26		
	ASPVB2100R-10	★	10	100	96	63	32	12.7	8	31.75	26		
	※ ASPVB2125R-10	★	10	125	100	63	36	15.9	10	38.1	60	Fig-2	
Metric pilot	ASPVB2042RM-6	★	6	42	35	40	18	8.4	5.6	16	13.5	Fig-1	
	ASPVB2050RM-7	●	7	50	47	50	20	10.4	6.3	22	17		
	ASPVB2063RM-8	●	8	63	60	50	20	10.4	6.3	22	17		
	ASPVB2080RM-8	★	8	80	76	63	22	12.4	7	27	20		
	ASPVB2100RM-10	★	10	100	96	63	26	14.4	8	32	26		
	※ ASPVB2125RM-10	★	10	125	100	63	30	16.4	9	40	60	Fig-2	

【Note】 Arbor screw is not included.
※ Before using a hollow-center configuration, deploy an arbor with a coolant supply port on the end face of the arbor-side connection.

Inserts

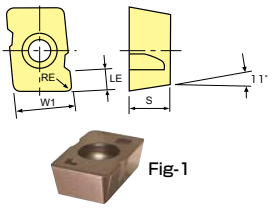


Fig-1

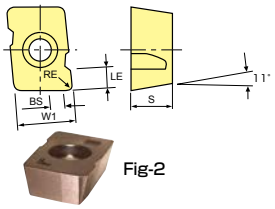


Fig-2

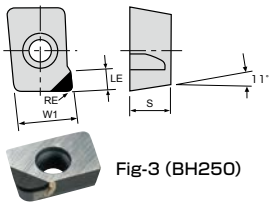


Fig-3 (BH250)

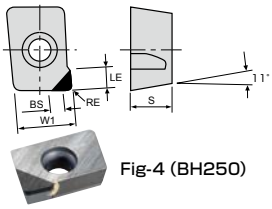


Fig-4 (BH250)

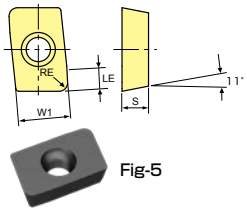


Fig-5

		TH308	PN215	JP4105	ATH08M	JP4120	JM4160	JS4060	MZ1000	BH250	SD5010	HD7010
P	Carbon Steels	■	□			□			■	■		
M	SUS, etc.	■	□				■					
K	Cast irons FC・FCD	■								■		
	Graphite											■
N	Aluminum alloys										■	
S	Titanium alloys	■	□			□	□					
H	Hardened steels	■	□			□						

■ : General cutting, First recommendation
□ : General cutting, Second recommendation

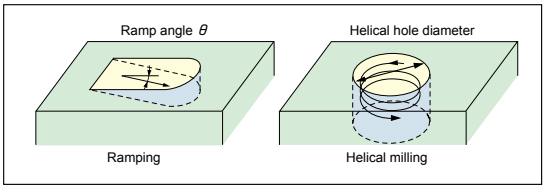
Item code	Tolerance class	Grade TH308	PN215	JP4105	ATH08M	JP4120	JM4160	JS4060	MZ1000	BH250	SD5010	HD7010	Size (mm) W1	BS	S	LE	RE	Shape
MPHW060302ZEL	H	★	★						●				6.35	–	3.18	3	0.2	Fig-1
MPHW060302ZEL-0.5		★	★						●					0.5				Fig-2
MPHW060304ZEL		★	★	●	●				●					–			0.4	Fig-1
MPHW060304ZEL-0.5		★	★	●	●				●					0.5				Fig-2
MPHW060308ZEL		★	★	●	●	●			●					–			0.8	Fig-1
MPHW060308ZEL-1.5				●	●	●			●	●				1.5				Fig-2,4
MPHW060308ZEL-1.5F		★	★			★			★					1.5				Fig-2
MPHW060320ZEL		★	★	●	●				●	●				–			2.0	Fig-1,3
MPHW060304ZFL											●			–			0.4	Fig-1
MPHW060308ZFL											●			–			0.8	Fig-1
MPHW060305ZFL-N												★		–			0.5	Fig-5
MPHW060310ZFL-N												★		–			1.0	Fig-5
MPHW060320ZFL-N												★		–			2.0	Fig-5
MPNW060308ZEL	N					●	●	●						–			0.8	Fig-1
MPNW060320ZEL						●	●	●						–			2.0	Fig-1

【Note】 Please note that the JS Coating and HD Coating do not cause a reaction in conductive touch sensors.

★ : Stocked Items of New products. ● : Stocked items. No Mark : Manufactured request only.

Also allows direct milling without pilot hole

The absence of a cutting edge at the center constrains the ramping angle and hole diameter, but, as shown below, direct milling without a pilot hole is possible using ramping or helical milling.



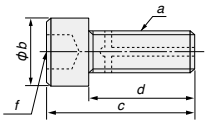
【Note】① Set the ramp angle θ within the range given above. Use with ramp angles not exceeding 0.5° is recommended.
② For hole diameters outside the range given above, drill a pilot hole before milling.

Tool Dia. (mm)	12	16	17	18	20	21	22	25	26	28	30
Maximum Ramping angle θ	2.5°	2.5°	2.5°	2.5°	2.5°	2.5°	2.5°	2.1°	2°	1.8°	1.7°
Hole Dia. (mm)	14 ~ 22	22 ~ 30	24 ~ 32	26 ~ 34	30 ~ 38	32 ~ 40	34 ~ 42	40 ~ 48	42 ~ 50	46 ~ 54	50 ~ 58

Tool Dia. (mm)	32	33	35	40	42	50	63	80	100	125
Maximum Ramping angle θ	1.6°	1.5°	1.4°	1.2°	1°	1°	0.5°	0.4°	0.3°	0.2°
Hole Dia. (mm)	54 ~ 62	56 ~ 64	60 ~ 68	70 ~ 78	74 ~ 82	90 ~ 98	116 ~ 124	150 ~ 158	190 ~ 198	240 ~ 248

Parts

Numeric figure in a circle ◌.

Type		Parts (Shape / Cutter body)	Clamp screw		Arbor screw (With Air hole)						Screw driver	Screw anti-seizure agent
												
				Fastening torque (N・m)	Model No.	a	ϕb	c	d	f		
Modular		ASPVM20◌◌R-◌ ASPVM-P-20◌◌R-◌-M◌◌	250-141	1.1	-	-	-	-	-	-	104-T8	P-37
Shank		ASPVS20◌◌R-◌			-	-	-	-	-	-		
Bore	Inch size	ASPVB2050R-7			100-178	M10 × 1.5	16	35	25	8		
		ASPVB2063R-8										
		ASPVB2080R-8			100-180	M16 × 2.0	24	51	35	14		
		ASPVB2100R-10										
		※ASPVB2125R-10			-	-	-	-	-	-		
	mm size	ASPVB2042RM-6			100-183	M8 × 1.25	13	33	25	6		
		ASPVB2050RM-7			100-178	M10 × 1.5	16	35	25	8		
		ASPVB2063RM-8										
		ASPVB2080RM-8			100-179	M12 × 1.75	18	42	30	10		
		ASPVB2100RM-10			100-180	M16 × 2.0	24	51	35	14		
		※ASPVB2125RM-10			-	-	-	-	-	-		

【Note】Use the arbor screw above when supplying air and cutting fluid to each cutting edge. 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.
※ When using a hollow-center configuration, deploy an arbor with a coolant supply port on the end face of the arbor-side connection.

Recommended cutting conditions of ASPV

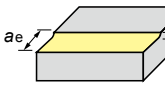
※ Red indicates primary recommended grade.

Bottom finishing

Work material	Recommended grade	DC Tool dia. (mm)	φ12			φ16			φ20			φ25			φ32		
		Flutes	1 Flutes			2 Flutes			3 Flutes			4 Flutes			5 Flutes		
		Overhang	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
Carbon steels Alloy steels (30HRC or less)	MZ1000 PN215 JP4120	n (min-1)	5,305	4,509	3,714	3,979	3,382	2,785	3,183	2,706	2,228	2,546	2,165	1,783	1,989	1,691	1,393
		Vc(m/min)	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140
		Vf(mm/min)	796	541	371	1,194	812	557	1,432	974	668	1,528	1,039	713	1,492	1,015	696
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
	BH250	n (min-1)	13,263	10,610	10,610	9,947	7,958	7,958	7,958	6,366	6,366	6,366	5,093	5,093	4,974	3,979	3,979
		Vc(m/min)	500	400	400	500	400	400	500	400	400	500	400	400	500	400	400
		Vf(mm/min)	1,326	1,061	849	1,989	1,592	1,273	2,387	1,910	1,528	2,546	2,037	1,630	2,487	1,989	1,592
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Alloy steels (Quenched and tempered steels) (35HRC or less)	MZ1000 PN215 JP4120	n (min-1)	4,775	3,979	2,918	3,581	2,984	2,188	2,865	2,387	1,751	2,292	1,910	1,401	1,790	1,492	1,094
		Vc(m/min)	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110
		Vf(mm/min)	573	398	292	859	597	438	1,031	716	525	1,100	764	560	1,074	746	547
		fz(mm/t)	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Pre-hardened steels, Alloy steels (Quenched and tempered steels) (45HRC or less)	TH308 PN215 JP4120	n (min-1)	4,244	3,448	2,653	3,183	2,586	1,989	2,546	2,069	1,592	2,037	1,655	1,273	1,592	1,293	995
		Vc(m/min)	160	130	100	160	130	100	160	130	100	160	130	100	160	130	100
		Vf(mm/min)	424	345	265	637	517	398	764	621	477	815	662	509	796	647	497
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Hardened steels (55HRC or less)	TH308 JP4120	n (min-1)	2,653	2,122	2,122	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019	995	796	796
		Vc(m/min)	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
		Vf(mm/min)	265	212	212	398	318	318	477	382	382	509	407	407	497	398	398
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Hardened steels (62HRC or less)	TH308	n (min-1)	1,857	1,326	1,326	1,393	995	995	1,114	796	796	891	637	637	696	497	497
		Vc(m/min)	70	50	50	70	50	50	70	50	50	70	50	50	70	50	50
		Vf(mm/min)	186	133	106	279	199	159	334	239	191	357	255	204	348	249	199
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Stainless steels SUS	JP4120 JM4160	n (min-1)	4,775	3,979	2,918	3,581	2,984	2,188	2,865	2,387	1,751	2,292	1,910	1,401	1,790	1,492	1,094
		Vc(m/min)	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110
		Vf(mm/min)	477	398	292	716	597	438	859	716	525	917	764	560	895	746	547
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Cast irons FC FCD	TH308 JP4120	n (min-1)	5,305	4,509	3,714	3,979	3,382	2,785	3,183	2,706	2,228	2,546	2,165	1,783	1,989	1,691	1,393
		Vc(m/min)	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140
		Vf(mm/min)	796	541	371	1,194	812	557	1,432	974	668	1,528	1,039	713	1,492	1,015	696
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
	BH250	n (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,273	3,183	2,387	1,910	3,820	2,865	2,292	4,074	3,056	2,445	3,979	2,984	2,387
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Aluminum alloys Copper alloys	SD5010 PN215	n (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,592	3,183	2,387	2,387	3,820	2,865	2,865	4,074	3,056	3,056	3,979	2,984	2,984
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Graphite CFRP	HD7010	n (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,061	796	796	1,592	1,194	1,194	1,910	1,432	1,432	2,037	1,528	1,528	1,989	1,492	1,492
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Heat resistant alloys Super heat resistant alloys	TH308 JP4120	n (min-1)	1,326	1,061	796	995	796	597	796	637	477	637	509	382	497	398	298
		Vc(m/min)	50	40	30	50	40	30	50	40	30	50	40	30	50	40	30
		Vf(mm/min)	133	106	80	199	159	119	239	191	143	255	204	153	249	199	149
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16
Titanium alloys	TH308 JP4120	n (min-1)	1,592	1,326	796	1,194	995	597	955	796	477	764	637	382	597	497	298
		Vc(m/min)	60	50	30	60	50	30	60	50	30	60	50	30	60	50	30
		Vf(mm/min)	159	133	80	239	199	119	286	239	143	306	255	153	298	249	149
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ae(mm)	8	8	6	11	11	8	14	14	10	18	18	13	22	22	16

【Note】
① These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
② To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
③ The evacuation of swarf can cause burns, cuts or damage to the eyes please ensue the correct safety cover is fitted around the machine, and necessary personal protection equipment is worn by the machine operator.
④ Please note that the JS Coating and HD Coating do not cause a reaction in conductive touch sensors.
⑤ Ensure to index the insert at the correct time to ensure safety of the tool-body.
⑥ Make settings so that the cutting depth and per-flute feed rate do not exceed the maximum values.
⑦ MZ1000 and BH250 are not suitable for wet cutting. Use them for dry cutting (air blow).
⑧ Due to fire risks do not use neat cutting oil as a coolant.
⑨ When using the BT30 arbor for modular mills, determine the cutting conditions using the standard cutting conditions table as a general guide. If vibrations are a concern due to the cutting conditions, adjust conditions by 1.reducing cutting depth (ap) or 2.reducing per-flute feed rate (fz).

ϕ 40			ϕ 50			ϕ 63			ϕ 80			ϕ 100			ϕ 125		
6 Flutes			7 Flutes			8 Flutes			8 Flutes			10 Flutes			10 Flutes		
<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
1,592	1,353	1,114	1,273	1,082	891	1,011	859	707	796	676	557	637	541	446	509	433	357
200	170	140	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140
1,432	974	668	1,337	909	624	1,213	825	566	955	649	446	955	649	446	764	519	357
0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
3,979	3,183	3,183	3,183	2,546	2,546	2,526	2,021	2,021	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019
500	400	400	500	400	400	500	400	400	500	400	400	500	400	400	500	400	400
2,387	1,910	1,528	2,228	1,783	1,426	2,021	1,617	1,293	1,592	1,273	1,019	1,592	1,273	1,019	1,273	1,019	815
0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
1,432	1,194	875	1,146	955	700	909	758	556	716	597	438	573	477	350	458	382	280
180	150	110	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110
1,031	716	525	963	668	490	873	606	445	688	477	350	688	477	350	550	382	280
0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
1,273	1,035	796	1,019	828	637	808	657	505	637	517	398	509	414	318	407	331	255
160	130	100	160	130	100	160	130	100	160	130	100	160	130	100	160	130	100
764	621	477	713	579	446	647	525	404	509	414	318	509	414	318	407	331	255
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
796	637	637	637	509	509	505	404	404	398	318	318	318	255	255	255	204	204
100	80	80	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
477	382	382	446	357	357	404	323	323	318	255	255	318	255	255	255	204	204
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
557	398	398	446	318	318	354	253	253	279	199	199	223	159	159	178	127	127
70	50	50	70	50	50	70	50	50	70	50	50	70	50	50	70	50	50
334	239	191	312	223	178	283	202	162	223	159	127	223	159	127	178	127	102
0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
1,432	1,194	875	1,146	955	700	909	758	556	716	597	438	573	477	350	458	382	280
180	150	110	180	150	110	180	150	110	180	150	110	180	150	110	180	150	110
859	716	525	802	668	490	728	606	445	573	477	350	573	477	350	458	382	280
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
1,592	1,353	1,114	1,273	1,082	891	1,011	859	707	796	676	557	637	541	446	509	433	357
200	170	140	200	170	140	200	170	140	200	170	140	200	170	140	200	170	140
1,432	974	668	1,337	909	624	1,213	825	566	955	649	446	955	649	446	764	519	357
0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,292	3,565	2,674	2,139	3,234	2,425	1,940	2,546	1,910	1,528	2,546	1,910	1,528	2,037	1,528	1,222
0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,865	3,565	2,674	2,674	3,234	2,425	2,425	2,546	1,910	1,910	2,546	1,910	1,910	2,037	1,528	1,528
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
1,910	1,432	1,432	1,783	1,337	1,337	1,617	1,213	1,213	1,273	955	955	1,273	955	955	1,019	764	764
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
398	318	239	318	255	191	253	202	152	199	159	119	159	127	95	127	102	76
50	40	30	50	40	30	50	40	30	50	40	30	50	40	30	50	40	30
239	191	143	223	178	134	202	162	121	159	127	95	159	127	95	127	102	76
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63
477	398	239	382	318	191	303	253	152	239	199	119	191	159	95	153	127	76
60	50	30	60	50	30	60	50	30	60	50	30	60	50	30	60	50	30
286	239	143	267	223	134	243	202	121	191	159	95	191	159	95	153	127	76
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
28	28	20	35	35	25	44	44	32	56	56	40	70	70	50	88	88	63



Finishing

Recommended cutting conditions of ASPV

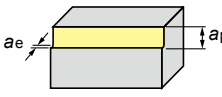
※ Red indicates primary recommended grade.

Side finishing

Work material	Recommended grade	DC Tool dia. (mm)	φ12			φ16			φ20			φ25			φ32		
		Flutes	1 Flutes			2 Flutes			3 Flutes			4 Flutes			5 Flutes		
		Overhang	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
Carbon steels Alloy steels (30HRC or less)	MZ1000 PN215 JP4120	*n* (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,592	955	796	2,387	1,432	1,194	2,865	1,719	1,432	3,056	1,833	1,528	2,984	1,790	1,492
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	BH250	*n* (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,273	3,183	2,387	1,910	3,820	2,865	2,292	4,074	3,056	2,445	3,979	2,984	2,387
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alloy steels (Quenched and tempered steels) (35HRC or less)	MZ1000 PN215 JP4120	*n* (min-1)	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	955	663	663	1,432	995	995	1,719	1,194	1,194	1,833	1,273	1,273	1,790	1,243	1,243
		fz(mm/t)	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pre-hardened steels, Alloy steels (Quenched and tempered steels) (45HRC or less)	TH308 PN215 JP4120	*n* (min-1)	6,631	5,305	5,305	4,974	3,979	3,979	3,979	3,183	3,183	3,183	2,546	2,546	2,487	1,989	1,989
		Vc(m/min)	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200
		Vf(mm/min)	663	531	531	995	796	796	1,194	955	955	1,273	1,019	1,019	1,243	995	995
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (55HRC or less)	TH308 JP4120	*n* (min-1)	5,305	3,979	3,979	3,979	2,984	2,984	3,183	2,387	2,387	2,546	1,910	1,910	1,989	1,492	1,492
		Vc(m/min)	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150
		Vf(mm/min)	531	398	398	796	597	597	955	716	716	1,019	764	764	995	746	746
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (62HRC or less)	TH308	*n* (min-1)	3,979	2,653	2,653	2,984	1,989	1,989	2,387	1,592	1,592	1,910	1,273	1,273	1,492	995	995
		Vc(m/min)	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100
		Vf(mm/min)	398	265	265	597	398	398	716	477	477	764	509	509	746	497	497
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Stainless steels SUS	JP4120 JM4160	*n* (min-1)	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	796	663	663	1,194	995	995	1,432	1,194	1,194	1,528	1,273	1,273	1,492	1,243	1,243
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cast irons FC FCD	TH308 JP4120	*n* (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,592	955	796	2,387	1,432	1,194	2,865	1,719	1,432	3,056	1,833	1,528	2,984	1,790	1,492
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	BH250	*n* (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,273	3,183	2,387	1,910	3,820	2,865	2,292	4,074	3,056	2,445	3,979	2,984	2,387
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aluminum alloys Copper alloys	SD5010 PN215	*n* (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,592	3,183	2,387	2,387	3,820	2,865	2,865	4,074	3,056	3,056	3,979	2,984	2,984
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Graphite CFRP	HD7010	*n* (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,061	796	796	1,592	1,194	1,194	1,910	1,432	1,432	2,037	1,528	1,528	1,989	1,492	1,492
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat resistant alloys Super heat resistant alloys	TH308 JP4120	*n* (min-1)	1,592	1,061	1,061	1,194	796	796	955	637	637	764	509	509	597	398	398
		Vc(m/min)	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40
		Vf(mm/min)	159	106	106	239	159	159	286	191	191	306	204	204	298	199	199
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Titanium alloys	TH308 JP4120	*n* (min-1)	2,653	2,122	2,122	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019	995	796	796
		Vc(m/min)	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
		Vf(mm/min)	265	212	212	398	318	318	477	382	382	509	407	407	497	398	398
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

【Note】
① These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
② To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
③ The evacuation of swarf can cause burns, cuts or damage to the eyes please ensue the correct safety cover is fitted around the machine, and necessary personal protection equipment is worn by the machine operator.
④ Please note that the JS Coating and HD Coating do not cause a reaction in conductive touch sensors.
⑤ Ensure to index the insert at the correct time to ensure safety of the tool-body.
⑥ Make settings so that the cutting depth and per-flute feed rate do not exceed the maximum values.
⑦ MZ1000 and BH250 are not suitable for wet cutting. Use them for dry cutting (air blow).
⑧ Due to fire risks do not use neat cutting oil as a coolant.
⑨ When using the BT30 arbor for modular mills, determine the cutting conditions using the standard cutting conditions table as a general guide. If vibrations are a concern due to the cutting conditions, adjust conditions by 1.reducing cutting depth (*ap*) or 2.reducing per-flute feed rate (*fz*).

ϕ 40			ϕ 50			ϕ 63			ϕ 80			ϕ 100			ϕ 125		
6 Flutes			7 Flutes			8 Flutes			8 Flutes			10 Flutes			10 Flutes		
<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
2,865	1,719	1,432	2,674	1,604	1,337	2,425	1,455	1,213	1,910	1,146	955	1,910	1,146	955	1,528	917	764
0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,292	3,565	2,674	2,139	3,234	2,425	1,940	2,546	1,910	1,528	2,546	1,910	1,528	2,037	1,528	1,222
0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2,387	1,989	1,989	1,910	1,592	1,592	1,516	1,263	1,263	1,194	995	995	955	796	796	764	637	637
300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
1,719	1,194	1,194	1,604	1,114	1,114	1,455	1,011	1,011	1,146	796	796	1,146	796	796	917	637	637
0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,989	1,592	1,592	1,592	1,273	1,273	1,263	1,011	1,011	995	796	796	796	637	637	637	509	509
250	200	200	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200
1,194	955	955	1,114	891	891	1,011	808	808	796	637	637	796	637	637	637	509	509
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,592	1,194	1,194	1,273	955	955	1,011	758	758	796	597	597	637	477	477	509	382	382
200	150	150	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150
955	716	716	891	668	668	808	606	606	637	477	477	637	477	477	509	382	382
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,194	796	796	955	637	637	758	505	505	597	398	398	477	318	318	382	255	255
150	100	100	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100
716	477	477	668	446	446	606	404	404	477	318	318	477	318	318	382	255	255
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2,387	1,989	1,989	1,910	1,592	1,592	1,516	1,263	1,263	1,194	995	995	955	796	796	764	637	637
300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
1,432	1,194	1,194	1,337	1,114	1,114	1,213	1,011	1,011	955	796	796	955	796	796	764	637	637
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
2,865	1,719	1,432	2,674	1,604	1,337	2,425	1,455	1,213	1,910	1,146	955	1,910	1,146	955	1,528	917	764
0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,292	3,565	2,674	2,139	3,234	2,425	1,940	2,546	1,910	1,528	2,546	1,910	1,528	2,037	1,528	1,222
0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,865	3,565	2,674	2,674	3,234	2,425	2,425	2,546	1,910	1,910	2,546	1,910	1,910	2,037	1,528	1,528
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
1,910	1,432	1,432	1,783	1,337	1,337	1,617	1,213	1,213	1,273	955	955	1,273	955	955	1,019	764	764
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
477	318	318	382	255	255	303	202	202	239	159	159	191	127	127	153	102	102
60	40	40	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40
286	191	191	267	178	178	243	162	162	191	127	127	191	127	127	153	102	102
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
796	637	637	637	509	509	505	404	404	398	318	318	318	255	255	255	204	204
100	80	80	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
477	382	382	446	357	357	404	323	323	318	255	255	318	255	255	255	204	204
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5	1.2	0.8	0.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1



Recommended cutting conditions of ASPV

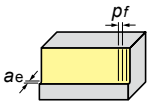
※ Red indicates primary recommended grade.

Vertical side finishing

Work material	Recommended grade	DC Tool dia. (mm)	φ12			φ16			φ20			φ25			φ32		
		Flutes	1 Flutes			2 Flutes			3 Flutes			4 Flutes			5 Flutes		
		Overhang	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
Carbon steels Alloy steels (30HRC or less)	MZ1000 PN215 JP4120	n (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,592	955	796	2,387	1,432	1,194	2,865	1,719	1,432	3,056	1,833	1,528	2,984	1,790	1,492
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	BH250	n (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	1,485	1,114	796	2,228	1,671	1,194	2,674	2,005	1,432	2,852	2,139	1,528	2,785	2,089	1,492
		fz(mm/t)	0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Alloy steels (Quenched and tempered steels) (35HRC or less)	MZ1000 PN215 JP4120	n (min-1)	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	955	663	663	1,432	995	995	1,719	1,194	1,194	1,833	1,273	1,273	1,790	1,243	1,243
		fz(mm/t)	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Pre-hardened steels, Alloy steels (Quenched and tempered steels) (45HRC or less)	TH308 PN215 JP4120	n (min-1)	6,631	5,305	5,305	4,974	3,979	3,979	3,979	3,183	3,183	3,183	2,546	2,546	2,487	1,989	1,989
		Vc(m/min)	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200
		Vf(mm/min)	663	531	531	995	796	796	1,194	955	955	1,273	1,019	1,019	1,243	995	995
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (55HRC or less)	TH308 JP4120	n (min-1)	5,305	3,979	3,979	3,979	2,984	2,984	3,183	2,387	2,387	2,546	1,910	1,910	1,989	1,492	1,492
		Vc(m/min)	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150
		Vf(mm/min)	531	398	398	796	597	597	955	716	716	1,019	764	764	995	746	746
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Hardened steels (62HRC or less)	TH308	n (min-1)	3,979	2,653	2,653	2,984	1,989	1,989	2,387	1,592	1,592	1,910	1,273	1,273	1,492	995	995
		Vc(m/min)	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100
		Vf(mm/min)	398	265	265	597	398	398	716	477	477	764	509	509	746	497	497
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Stainless steels SUS	JP4120 JM4160	n (min-1)	7,958	6,631	6,631	5,968	4,974	4,974	4,775	3,979	3,979	3,820	3,183	3,183	2,984	2,487	2,487
		Vc(m/min)	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
		Vf(mm/min)	796	663	663	1,194	995	995	1,432	1,194	1,194	1,528	1,273	1,273	1,492	1,243	1,243
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Cast irons FC FCD	TH308 JP4120	n (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,592	955	796	2,387	1,432	1,194	2,865	1,719	1,432	3,056	1,833	1,528	2,984	1,790	1,492
		fz(mm/t)	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
	BH250	n (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,273	3,183	2,387	1,910	3,820	2,865	2,292	4,074	3,056	2,445	3,979	2,984	2,387
		fz(mm/t)	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Aluminum alloys Copper alloys	SD5010 PN215	n (min-1)	21,221	15,915	15,915	15,915	11,937	11,937	12,732	9,549	9,549	10,186	7,639	7,639	7,958	5,968	5,968
		Vc(m/min)	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
		Vf(mm/min)	2,122	1,592	1,592	3,183	2,387	2,387	3,820	2,865	2,865	4,074	3,056	3,056	3,979	2,984	2,984
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Graphite CFRP	HD7010	n (min-1)	10,610	7,958	7,958	7,958	5,968	5,968	6,366	4,775	4,775	5,093	3,820	3,820	3,979	2,984	2,984
		Vc(m/min)	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
		Vf(mm/min)	1,061	796	796	1,592	1,194	1,194	1,910	1,432	1,432	2,037	1,528	1,528	1,989	1,492	1,492
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Heat resistant alloys Super heat resistant alloys	TH308 JP4120	n (min-1)	1,592	1,061	1,061	1,194	796	796	955	637	637	764	509	509	597	398	398
		Vc(m/min)	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40
		Vf(mm/min)	159	106	106	239	159	159	286	191	191	306	204	204	298	199	199
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Titanium alloys	TH308 JP4120	n (min-1)	2,653	2,122	2,122	1,989	1,592	1,592	1,592	1,273	1,273	1,273	1,019	1,019	995	796	796
		Vc(m/min)	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
		Vf(mm/min)	265	212	212	398	318	318	477	382	382	509	407	407	497	398	398
		fz(mm/t)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
		ap(mm)	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8
		ae(mm)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

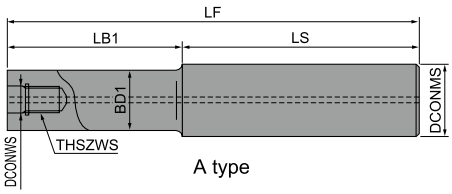
【Note】
① These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine and work-piece conditions.
② To prevent tool breakage due to chips clogging tool flutes, always be sure to use an air blower, etc. to remove chips.
③ The evacuation of swarf can cause burns, cuts or damage to the eyes please ensue the correct safety cover is fitted around the machine, and necessary personal protection equipment is worn by the machine operator.
④ Please note that the JS Coating and HD Coating do not cause a reaction in conductive touch sensors.
⑤ Ensure to index the insert at the correct time to ensure safety of the tool-body.
⑥ Make settings so that the cutting depth and per-flute feed rate do not exceed the maximum values.
⑦ MZ1000 and BH250 are not suitable for wet cutting. Use them for dry cutting (air blow).
⑧ Due to fire risks do not use neat cutting oil as a coolant.
⑨ When using the BT30 arbor for modular mills, determine the cutting conditions using the standard cutting conditions table as a general guide. If vibrations are a concern due to the cutting conditions, adjust conditions by 1.reducing cutting depth (ap) or 2.reducing per-flute feed rate (fz).
⑩ The MPHW0603 ○○ ZFL-N is not equipped with a reciprocating machining cutting edge. Use only in pushing-down direction.

ϕ 40			ϕ 50			ϕ 63			ϕ 80			ϕ 100			ϕ 125		
6 Flutes			7 Flutes			8 Flutes			8 Flutes			10 Flutes			10 Flutes		
<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC	<5DC	5DC -7DC	>7DC
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
2,865	1,719	1,432	2,674	1,604	1,337	2,425	1,455	1,213	1,910	1,146	955	1,910	1,146	955	1,528	917	764
0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
2,674	2,005	1,432	2,496	1,872	1,337	2,264	1,698	1,213	1,783	1,337	955	1,783	1,337	955	1,426	1,070	764
0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05	0.07	0.07	0.05
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2,387	1,989	1,989	1,910	1,592	1,592	1,516	1,263	1,263	1,194	995	995	955	796	796	764	637	637
300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
1,719	1,194	1,194	1,604	1,114	1,114	1,455	1,011	1,011	1,146	796	796	1,146	796	796	917	637	637
0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1	0.12	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,989	1,592	1,592	1,592	1,273	1,273	1,263	1,011	1,011	995	796	796	796	637	637	637	509	509
250	200	200	250	200	200	250	200	200	250	200	200	250	200	200	250	200	200
1,194	955	955	1,114	891	891	1,011	808	808	796	637	637	796	637	637	637	509	509
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,592	1,194	1,194	1,273	955	955	1,011	758	758	796	597	597	637	477	477	509	382	382
200	150	150	200	150	150	200	150	150	200	150	150	200	150	150	200	150	150
955	716	716	891	668	668	808	606	606	637	477	477	637	477	477	509	382	382
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
1,194	796	796	955	637	637	758	505	505	597	398	398	477	318	318	382	255	255
150	100	100	150	100	100	150	100	100	150	100	100	150	100	100	150	100	100
716	477	477	668	446	446	606	404	404	477	318	318	477	318	318	382	255	255
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
2,387	1,989	1,989	1,910	1,592	1,592	1,516	1,263	1,263	1,194	995	995	955	796	796	764	637	637
300	250	250	300	250	250	300	250	250	300	250	250	300	250	250	300	250	250
1,432	1,194	1,194	1,337	1,114	1,114	1,213	1,011	1,011	955	796	796	955	796	796	764	637	637
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
2,865	1,719	1,432	2,674	1,604	1,337	2,425	1,455	1,213	1,910	1,146	955	1,910	1,146	955	1,528	917	764
0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1	0.15	0.12	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,292	3,565	2,674	2,139	3,234	2,425	1,940	2,546	1,910	1,528	2,546	1,910	1,528	2,037	1,528	1,222
0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.08
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
6,366	4,775	4,775	5,093	3,820	3,820	4,042	3,032	3,032	3,183	2,387	2,387	2,546	1,910	1,910	2,037	1,528	1,528
800	600	600	800	600	600	800	600	600	800	600	600	800	600	600	800	600	600
3,820	2,865	2,865	3,565	2,674	2,674	3,234	2,425	2,425	2,546	1,910	1,910	2,546	1,910	1,910	2,037	1,528	1,528
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
3,183	2,387	2,387	2,546	1,910	1,910	2,021	1,516	1,516	1,592	1,194	1,194	1,273	955	955	1,019	764	764
400	300	300	400	300	300	400	300	300	400	300	300	400	300	300	400	300	300
1,910	1,432	1,432	1,783	1,337	1,337	1,617	1,213	1,213	1,273	955	955	1,273	955	955	1,019	764	764
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
477	318	318	382	255	255	303	202	202	239	159	159	191	127	127	153	102	102
60	40	40	60	40	40	60	40	40	60	40	40	60	40	40	60	40	40
286	191	191	267	178	178	243	162	162	191	127	127	191	127	127	153	102	102
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
796	637	637	637	509	509	505	404	404	398	318	318	318	255	255	255	204	204
100	80	80	100	80	80	100	80	80	100	80	80	100	80	80	100	80	80
477	382	382	446	357	357	404	323	323	318	255	255	318	255	255	255	204	204
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
0.9	0.9	0.9	1	1	1	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	1.5	1.5	1.5
0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1

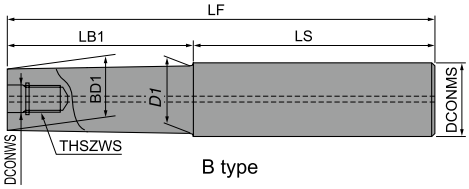


Finishing

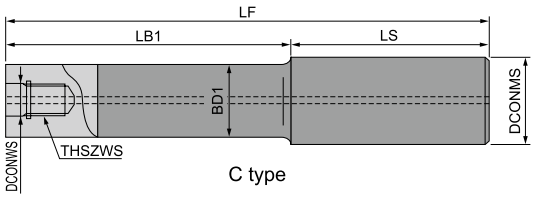
Carbide shank regular type



A type



B type



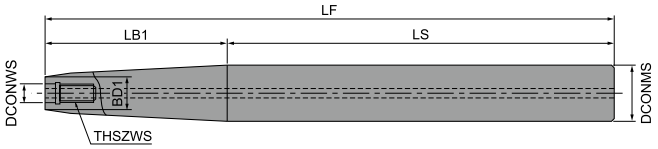
C type

Item code	Stock	Size (mm)								Shape	Cutter body	With/without air hole
		DCONWS	THSZWS	LF	LB1	LS	BD1	DCONMS	*D1*			
ASC10-6.5-74-24Z	●	6.5	M6	74	24	50	9.3	10	-	A	φ8※1 φ10 φ11※2 φ12※2 φ13※2	○
ASC10-6.5-84-34Z	●			84	34	50				A		○
ASC10-6.5-114-49Z	●			114	49	65				A		○
ASC10-6.5-114-24Z	●				24	90				A		○
ASC12-6.5-74-24Z	●	6.5	M6	74	24	50	11	12	11.5	B	φ8※1 φ10※1 φ11※1 φ12 φ13※2	○
ASC12-6.5-94-44Z	●			94	44	50				B		○
ASC12-6.5-129-64Z	●			129	64	65				B		○
ASC12-6.5-129-24Z	●				24	105				B		○
ASC16-8.5-95-30Z	●	8.5	M8	95	30	65	14.5	16	15.5	B	φ16 φ17※2 φ18※2 AHUM 1020R-2-M8※2	○
ASC16-8.5-120-55Z	●			120	55	65						
ASC16-8.5-140-75Z	●			140	75	65						
ASC16-8.5-160-95Z	●			160	95	65						
ASC16-8.5-160-30Z	●			160	30	130						
ASC20-10.5-120-50Z	●	10.5	M10	120	50	70	18.5	20	19.5	B	φ20 φ21※2 φ22※2 AHUM 1025R-2-M10※2 GF1G 2025M-4-M10※2	○
ASC20-10.5-170-90Z	●			170	90	80						
ASC20-10.5-220-120Z	●			220	120	100						
ASC20-10.5-270-150Z	●			270	150	120						
ASC20-10.5-220-50Z	●	10.5	M10	220	50	170	18.5	20	19.5	B		○
ASC20-10.5-270-50Z	●			270		220						
ASC25-12.5-145-65	●	12.5	M12	145	65	80	23	25	-	C	φ25 φ26※2 φ28※2 AHUM 1030R-2-M12※2 AHUM 1530R-2-M12※2	○
ASC25-12.5-215-115	●			215	115	100						
ASC25-12.5-265-145	●			265	145	120						
ASC25-12.5-315-195	●			315	195	120						
ASC25-12.5-265-65	●	12.5	M12	265	65	200	23	25	-	C		○
ASC25-12.5-315-65	●			315		250						
ASC32-17-160-80	●	17	M16	160	80	80	28	32	-	C	φ30 φ32 φ33※2 φ35※2 〈φ40〉※2 〈φ42〉※2	○
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						
ASC32-17-260-80	●	17	M16	260	80	180	28	32	-	C		○
ASC32-17-310-80	●			310		230						
ASC32-17-360-80	●			360		280						

Compatible with commercially-available milling chucks and shrink-fit holders.
For ※1, Interference will occur because the cutter diameter is less than the shank neck diameter (BD1, *D1*).
For ※2, The cutter diameter is larger than the shank diameter (DCONMS), eliminating shank interference.
Under normal conditions, the ⌀40 dimension should be used with overhang lengths up to 200 mm.

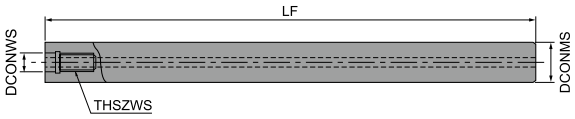
★ : Stocked Items of New products. ● : Stocked items.

Carbide shank tapered type



Item code	Stock	Size(mm) DCONWS	THSZWS	LF	LB1	LS	BD1	DCONMS	Compatible wall angle	Cutter body	With/without air hole
ASC12T-6.5-200-60Z-09	★	6.5	M6	200	60	140	9.3	12	≧0.9°	Φ10 Φ11	○
ASC16T-6.5-200-115Z-14	★				115	85		16	≧1.4°		
ASC16T-6.5-200-50Z-29	★				50	150			≧2.9°		
ASC16T-6.5-200-120Z-09※1	★				120	80	11	16	≧0.9°	Φ12 Φ13	○
ASC16T-6.5-200-75Z-14※1	★				75	125			≧1.4°		
ASC20T-6.5-200-70Z-29※1	★				70	130		20	≧2.9°		
ASC20T-8.5-250-120Z-09	★	8.5	M8	250	120	130	14.5	20	≧0.9°	Φ16 Φ17 Φ18	○
ASC20T-8.5-250-75Z-14	★				75	175			≧1.4°		
ASC25T-8.5-250-80Z-29	★				80	170		25	≧2.9°		
ASC25T-10.5-300-150Z-09	★	10.5	M10	300	150	150	18.5	25	≧0.9°	Φ20 Φ21 Φ22	○
ASC25T-10.5-300-95Z-14	★				95	205			≧1.4°		
ASC32T-10.5-300-105Z-29	★				105	195		32	≧2.9°		

Carbide shank straight type



Item code	Stock	Size(mm) DCONWS	THSZWS	LF	DCONMS	Cutter body	With/without air hole
ASC10-6.5-80-0Z	★	6.5	M6	80	10	Φ10 Φ11※2	○
ASC10-6.5-130-0Z	★			130			
ASC12-6.5-100-0Z※1	★			100	12	Φ12 Φ13※2	○
ASC12-6.5-150-0Z※1	★			150			
ASC15-8.5-210-0Z	★	8.5	M8	210	15	Φ16※2 Φ17※2 Φ18※2	○
ASC16-8.5-130-0Z	★	8.5	M8	130	16	Φ16 Φ17※2 Φ18※2	○
ASC16-8.5-210-0Z	★			210			
ASC18-10.5-240-0Z	★	10.5	M10	240	18	Φ20※2 Φ21※2 Φ22※2	○
ASC20-10.5-150-0Z	★	10.5	M10	150	20	Φ20 Φ21※2 Φ22※2	○
ASC20-10.5-250-0Z	★			250			
ASC23-12.5-300-0Z	★	12.5	M12	300	23	Φ25※2 Φ26※2 Φ28※2	○
ASC25-12.5-175-0Z	★	12.5	M12	175	25	Φ25 Φ26※2 Φ28※2	○
ASC25-12.5-300-0Z	★			300			

【注意】① Compatible with commercially-available milling chucks and shrink-fit holders.
② ※1 When tools with diameters of Φ10 and Φ11 are combined, interference should be occurred.
③ ※2 Since the cutter diameter is larger than the shank diameter (DCONMS), there is no interference at the shank.

Lineup of MOLDINO tools for structural component finishing

Type	Feature Tolerance class	Efficiency	Economical	Body Tool dia.	Flutes	Insert Corner R	No. of corners	Tool description
ARPF 	◎			φ6~32	2	R0.3~3.0	1	High-precision radius finishing tools featuring unique clamping mechanism and helical cutting edge
ASPVmini 	○	◎	◎	φ10~33	2~8	R0.2~1.0	2	Compact tools offering free cutting with ground chip breaker and high efficiency based on fine-pitch specification
ASPV 	○	○	◎	φ12~125	2~10	R0.2~2.0	2	Multi-function, fine-pitch tools ideal for structural component finishing

MOLDINO

The Edge To Innovation

The diagrams and table data are examples of test results, and are not guaranteed values.
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⚠ 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.

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