MITSUBISHI

TOOLS NEWS

B039G

Inclined cutting edge insert

BAP series

A highly rigid body and low cutting resistance inserts

Realize stable machining.

Due to a moulded breaker with a positive rake angle,

■Low cutting resistance and good chip disposal.

Because of thicker insert's backing metal than existing products,

■Highly rigid body.

With a wiper edge,

■An excellent surface finish.

MITSUBISHI CARBIDE

Inclined cutting edge insert

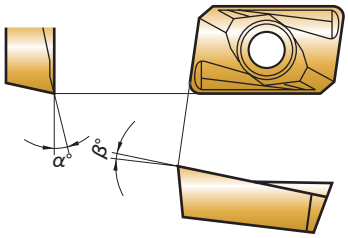
BAP series

Features

Low cutting resistance

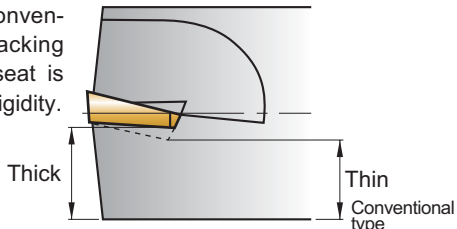
A positive rake angle and a molded chipbreaker gives low cutting resistance, good sharpness and excellent chip disposal.

Geometry	α°	β°
H breaker	12	5
M・G breaker	15 - 20	15



High rigidity

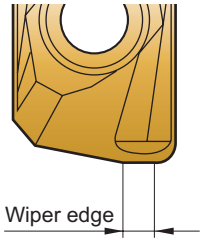
Compared to the conventional type, the backing metal of the insert seat is thicker for improved rigidity.



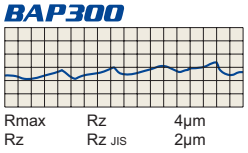
Backing metal comparison

High finishing accuracy

The use of a wiper edge produces an excellent surface finish.

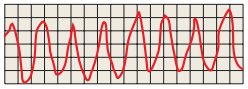


BAP300



Rmax Rz 4μm
Rz JIS 2μm

Conventional nose radius insert



Rmax Rz 15μm
Rz JIS 13μm

A variety of grades & geometries

Three chipbreakers available in coated carbide, cermet or cemented carbide allow for the machining of a wide range of workpiece materials.

H breaker

Coated carbide
Cermet
Carbide

M breaker

Coated carbide
Cermet

G breaker

Carbide

●Application guideline

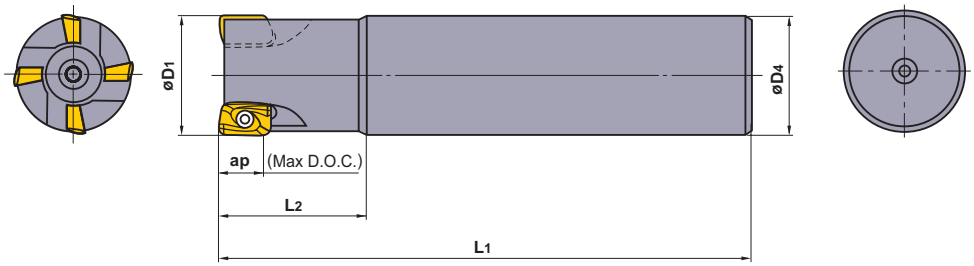
Workpiece	Finishing			Roughing		
	Stable cutting	General cutting	Unstable cutting	Stable cutting	General cutting	Unstable cutting
Mild steel Carbon steel Alloy steel	NX4545	F7030		F7030		
	M breaker		H breaker	M breaker		H breaker
Hardened steel	NX4545	VP15TF		VP15TF		
	M breaker			M breaker		
Stainless steel	NX4545	F7030		F7030		
	M breaker		H breaker	M breaker		H breaker
Cast iron Ductile cast iron	VP15TF			VP15TF		
	M breaker			M breaker		
Aluminium alloy	HTi10			HTi10		
	G breaker			G breaker		
Titanium alloy	HTi10			HTi10		
	G breaker			G breaker		
Heat resistant alloy	F7030			F7030		
	M breaker			M breaker		

1) The grades shown above are the main grades. For more details refer to insert standards (page4) and recommended cuttingconditions (page 5).

2) Stable cutting (low depth of cut, low feed rate, machining without scale, and machining with a high rigidity machine) Unstable cutting (large depth of cut, high feed rate, machining with scaling, interrupted cutting, and machining with a low rigidity machine.)

BAP series

Shank type



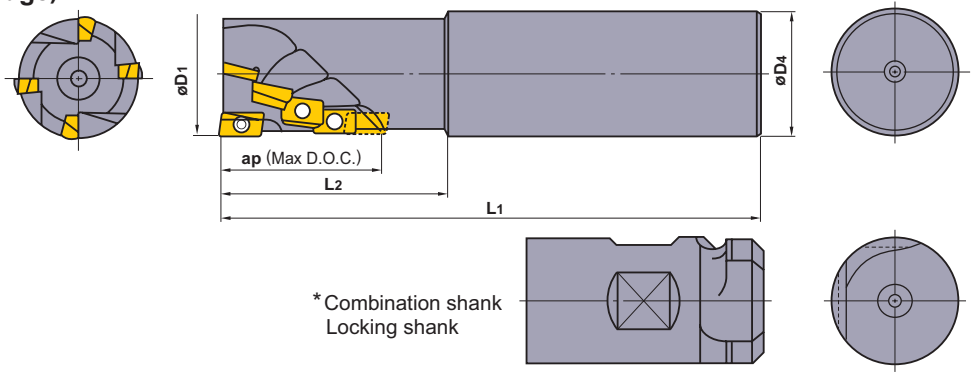
Right hand tool holder only.

Type	Order number	Stock	Number of teeth	Dimensions (mm)					Insert	Clamp screw	Wrench
		R		D_1	L_1	D_4	L_2	ap			
Standard type	**BAP300R101S16**	●	1	10	85	16	25	9	APG/MT1135 PDER-○○	TS25	TKY08F
	121S16	●	1	12	85	16	25	9		TS25	TKY08F
	141S16	●	1	14	85	16	25	9		TS25	TKY08F
	162S16	●	2	16	85	16	25	9		TS25	TKY08F
	182S16	●	2	18	85	16	25	9		TS25	TKY08F
	203S20	●	3	20	100	20	30	9		TS25	TKY08F
	223S20	●	3	22	100	20	30	9		TS25	TKY08F
	254S25	●	4	25	115	25	35	9		TS25	TKY08F
	284S25	●	4	28	115	25	35	9		TS25	TKY08F
	304S32	●	4	30	125	32	45	9		TS25	TKY08F
	325S32	●	5	32	125	32	45	9		TS25	TKY08F
	406S32	●	6	40	125	32	45	9		TS25	TKY08F
	507S32	●	7	50	125	32	45	9		TS25	TKY08F
	638S32	●	8	63	125	32	45	9		TS25	TKY08F
Long shank type	**BAP300R202LS20**	●	2	20	150	20	60	9	APG/MT1135 PDER-○○	TS25	TKY08F
	253LS25	●	3	25	170	25	70	9		TS25	TKY08F
	323LS32	●	3	32	190	32	90	9		TS25	TKY08F
	403LS32	●	3	40	190	32	90	9		TS25	TKY08F
Standard type	**BAP400R252S25**	●	2	25	115	25	35	14	APG/MT1604 PDER-○○	TS4	TKY15F
	323S32	●	3	32	125	32	45	14		TS43	TKY15F
	404S32	●	4	40	125	32	45	14		TS43	TKY15F
	505S32	●	5	50	125	32	45	14		TS43	TKY15F
	636S32	●	6	63	125	32	45	14		TS43	TKY15F

● : Inventory maintained.

BAP series

Shank type (long cutting edge)

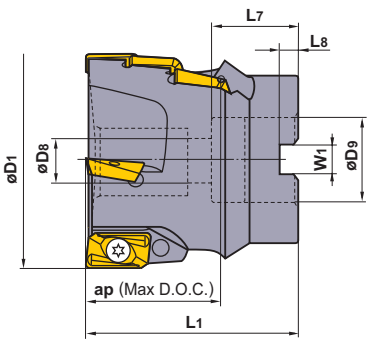


Right hand tool holder only.

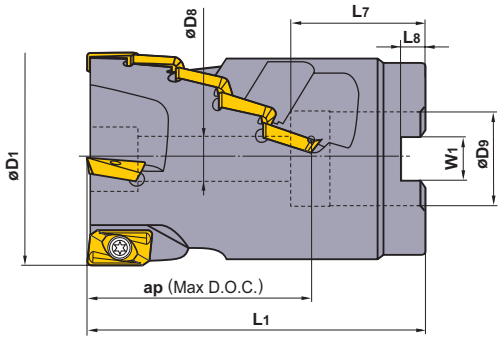
Order number	Stock	Number of teeth	Dimensions (mm)					Number of flutes	Insert	Clamp screw	Wrench
	R		D1	L1	D4	L2	ap				
BAP300R2004ES20	●	4	20	120	20	40	25	1	APG/MT1135 PDER-○1/○2	TS25	TKY08F
2508ES25	●	8	25	130	25	50	34	2		TS25	TKY08F
3212ES32	●	12	32	140	32	60	43	2		TS25	TKY08F
4014ES42	●	14	40	150	42	70	51	2		TS25	TKY08F
BAP400R4008ES42	●	8	40	150	42	70	53	2	APG/MT1604 PDER-○1/○2	TS43	TKY15F
5012ES58	●	12	50	175	50.8	90	66	2		TS43	TKY15F

Arbor type (long cutting edge)

Arbor type



Shell type



Right hand tool holder only.

Type	Order number	Stock	Number of teeth	Dimensions (mm)								Number of flutes	Insert	Clamp screw	Wrench
		R		D1	L1	D9	L7	D8	W1	L8	ap				
Arbor type	BAP400R06308C	●	8	63	63	25.4	26	13	9.5	6	40	2	APG/MT1604 PDER-○1/○2	TS43	TKY15F
	08012D	●	12	80	63	31.75	32	17	12.7	8	40	3		TS43	TKY15F
Shell type	BAP400R06312A27	□	12	63	100	27	40	13	12.4	7	66	2		TS43	TKY15F
	08018A27	□	18	80	100	27	40	13	12.4	7	66	3		TS43	TKY15F

Note : Only inserts with corner radius of 0.4mm or 0.8mm (H1,H2,M2) can be used for the shank type BRP400.

● : Inventory maintained. □ : Non stock, produced to order only. No mark : Not manufactured.

▲ : Inventory maintained. To be replaced by new products.

With coolant holes

Light Alloy	Cast Iron	General Steel	Stainless Steel	Hardened Steel

Fig. 1
BAP300
ø32
BAP400
ø40

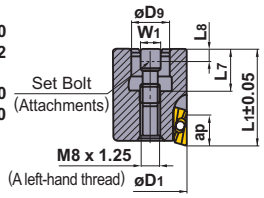


Fig. 2
BAP300
ø40
ø50
ø63
BAP400
ø50
ø63

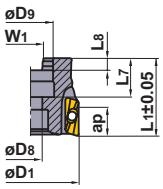


Fig. 3
BAP300
ø80
ø100
BAP400
ø80
ø100

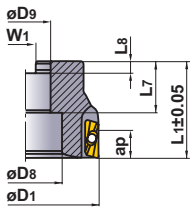
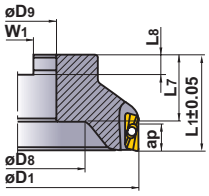


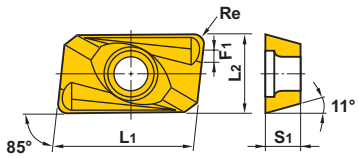
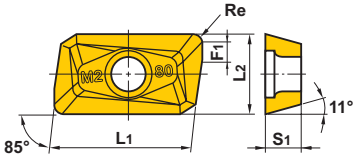
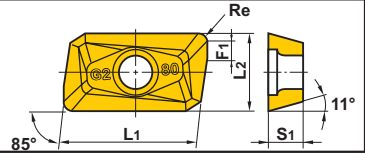
Fig. 4
BAP400
ø125
ø160



Right hand tool holder only. Tolerance when setting with master insert.

	Order number	Stock R	Number of teeth	Dimensions (mm) D1	L1	D9	L7	D8	W1	L8	Tool weight (kg)	Max. depth of cut ap	Clamp screw	Set Bolt	Wrench	Type
BAP300	BAP300-032A05R	●	5	32	40	16	18	—	8.4	5.6	0.2	9	TS25	※ LS24	①TKY08F	Fig. 1
	-040A06R	●	6	40	40	16	18	9	8.4	5.6	0.3	9	TS25	※ LS24	①TKY08F	Fig. 2
	-050A07R	●	7	50	40	22	20	11	10.4	6.3	0.4	9	TS25	※ LS24	①TKY08F	Fig. 2
	-063A08R	●	8	63	40	22	20	11	10.4	6.3	0.7	9	TS25	※ LS24	①TKY08F	Fig. 2
	R0309C	●	9	80	50	25.4	26	38	9.5	6.0	1.1	9	TS25	※ LS24	①TKY08F	Fig. 3
	R0411D	●	11	100	50	31.75	32	45	12.7	8.0	1.6	9	TS25	※ LS24	①TKY08F	Fig. 3
BAP400	BAP400-040A04R	●	4	40	40	16	18	—	8.4	5.6	0.3	14	TS43	※ LS24	①TKY15F	Fig. 1
	-050A05R	●	5	50	40	22	20	11	10.4	6.3	0.4	14	TS43	※ LS24	①TKY15F	Fig. 2
	-063A06R	●	6	63	40	22	20	11	10.4	6.3	0.6	14	TS43	※ LS24	①TKY15F	Fig. 2
	R0307C	●	7	80	50	25.4	26	38	9.5	6.0	1.0	14	TS43	※ LS24	①TKY15F	Fig. 3
	R0408D	●	8	100	50	31.75	32	45	12.7	8.0	1.6	14	TS43	※ LS24	①TKY15F	Fig. 3
	R0509E	●	9	125	50	38.1	35	68	15.9	10	2.3	14	TS43	—	②TKY15D	Fig. 4
	R0610E	●	10	160	50	38.1	35	72	15.9	10	4.0	14	TS43	—	②TKY15D	Fig. 4

Insert

Shape	Cutter Type	Order number	Class	Coated F7030	Coated F620	Coated VP15TF	Coated UP20M	Cermet NX2525	Cermet NX4545	Carbide UTI20T	Carbide HTI10	Geometry	Dimensions (mm) L1	L2	S1	F1	Re
	BAP300	APMT1135PDER-H1	M	●	▲	●	●	●	●	●	●		11	6.35	3.5	1.5	0.4
		1135PDER-H2	M	●	▲	●	●	●	●	●	●		11	6.35	3.5	1.2	0.8
		1135PDER-H3	M	●	▲		●			●			11	6.35	3.5	0.8	1.2
		1135PDER-H4	M	●	▲		●			●			11	6.35	3.5	0.4	1.6
		1135PDER-H6	M	●	▲		●			●			11	6.35	3.5	0.4	2.4
	BAP400	APMT1604PDER-H1	M	●	▲		●			●			16.5	9.525	4.76	1.7	0.4
		1604PDER-H2	M	●	▲	●	●	●	●	●	●		16.5	9.525	4.76	1.4	0.8
		1604PDER-H4	M	●	▲					●			16.5	9.525	4.76	0.4	1.6
		1604PDER-H6	M	●	▲					□			16.5	9.525	4.76	0.4	2.4
		1604PDER-H8	M	●	▲					●			16.5	9.525	4.76	0.4	3.2
	BAP300	APMT1135PDER-M0	M	●									11	6.35	3.5	1.8	0.2
		1135PDER-M1	M	●									11	6.35	3.5	1.5	0.4
		1135PDER-M2	M	●	▲	●			●				11	6.35	3.5	1.2	0.8
	BAP400	APMT1604PDER-M2	M	●	▲	●			●				16.5	9.525	4.76	1.4	0.8
	BAP300	APGT1135PDFR-G2	G								●		11	6.35	3.5	1.2	0.8
	BAP400	APGT1604PDFR-G2	G								●		16.5	9.525	4.76	1.4	0.8

BAP series

Recommended cutting conditions

●Standard type

	Workpiece	Hardness	Grade	Breaker	Cutting mode	Cutting speed (m/min)	Feed per tooth (mm/tooth)
P	Mild steel (JIS SS400, S10C etc.)	≦180HB	**NX4545**	H	Finishing	160 (120－180)	0.1 (0.05－0.15)
			F7030	M	General	180 (150－200)	0.15 (0.1－0.2)
	Carbon steel Alloy steel (JIS S45C, JIS SCM440 etc.)	180－280HB	**NX4545**	H	Finishing	120 (100－160)	0.08 (0.05－0.1)
			F7030	M	General	150 (120－200)	0.15 (0.1－0.2)
			UTi20T・UP20M	H	General	120 (100－160)	0.2 (0.1－0.25)
			F7030	H	Unstable	120 (100－160)	0.15 (0.1－0.2)
		280－350HB	**NX4545**	H	Finishing	100 (80－120)	0.08 (0.05－0.1)
			F7030	M	General	140 (120－160)	0.15 (0.1－0.2)
			F7030	H	Unstable	100 (80－120)	0.2 (0.1－0.25)
M	Stainless steel (JIS SUS304 etc.)	≦200HB	**F7030**	M	General	140 (120－160)	0.15 (0.1－0.2)
			UTi20T・UP20M	H	General	120 (80－140)	0.1 (0.05－0.15)
			F7030	H	Unstable	120 (80－140)	0.2 (0.1－0.25)
K	Cast iron (JIS FC250 etc.)	Tensile strength ≦350N/mm²	**VP15TF**	M	General	140 (120－160)	0.15 (0.1－0.2)
			HTi10・UTi20T	H	General	120 (100－140)	0.2 (0.1－0.25)
	Ductile cast iron (JIS FCD450 etc.)	Tensile strength ≦450N/mm²	**VP15TF**	M	General	120 (100－140)	0.15 (0.1－0.2)
			HTi10・UTi20T	H	General	100 (80－120)	0.2 (0.1－0.25)
	Ductile cast iron (JIS FCD500 etc.)	Tensile strength 500－800N/mm²	**VP15TF**	M	General	100 (80－120)	0.1 (0.05－0.15)
			HTi10・UTi20T	H	General	80 (60－100)	0.15 (0.1－0.2)
H	Quenched steel	≧40HRC	**VP15TF**	M	General	70 (50－100)	0.1 (0.05－0.15)
S	Titanium alloy	≧350HB	**HTi10**	G	General	40 (30－60)	0.2 (0.1－0.3)
	Heat resistant alloy	–	**F7030**	M	General	30 (20－40)	0.15 (0.1－0.2)
N	Aluminium alloy	–	**HTi10**	G	General	500 (200－1000)	0.2 (0.1－0.3)

●Long cutting edge type

	Workpiece	Hardness	Grade	Breaker	Cutting mode	Cutting speed (m/min)	Feed per tooth (mm/tooth)
P	Mild steel (JIS SS400, S10C etc.)	≦180HB	**F7030**	M	General	180 (150－200)	0.15 (0.08－0.2)
	Carbon steel Alloy steel (JIS S45C, JIS SCM440 etc.)	180－280HB	**F7030**	M	General	150 (120－280)	0.15 (0.08－0.2)
			UTi20T・UP20M	H	General	120 (100－160)	0.15 (0.08－0.2)
			F7030	H	Unstable	120 (100－160)	0.2 (0.1－0.25)
		280－350HB	**F7030**	M	General	140 (120－160)	0.1 (0.05－0.15)
			F7030	H	Unstable	100 (80－120)	0.15 (0.08－0.2)
M	Stainless steel (JIS SUS304 etc.)	≦200HB	**F7030**	M	General	140 (120－160)	0.1 (0.08－0.15)
			UTi20T・UP20M	H	General	120 (80－140)	0.1 (0.08－0.15)
			F7030	H	Unstable	120 (80－140)	0.15 (0.08－0.2)
K	Cast iron (JIS FC250 etc.)	Tensile strength ≦350N/mm²	**VP15TF**	M	General	140 (120－160)	0.15 (0.08－0.2)
			HTi10・UTi20T	H	General	120 (100－140)	0.1 (0.05－0.15)
	Ductile cast iron (JIS FCD450 etc.)	Tensile strength ≦450N/mm²	**VP15TF**	M	General	120 (100－140)	0.1 (0.05－0.15)
			HTi10・UTi20T	H	General	100 (80－120)	0.15 (0.08－0.2)
	Ductile cast iron (JIS FCD450 etc.)	Tensile strength 500－800N/mm²	**VP15TF**	M	General	100 (80－120)	0.08 (0.05－0.1)
			HTi10・UTi20T	H	General	80 (60－100)	0.1 (0.05－0.15)
H	Quenched steel	≧40HRC	**VP15TF**	M	General	70 (50－100)	0.08 (0.05－0.1)
S	Titanium alloy	≧350HB	**HTi10**	G	General	40 (30－60)	0.15 (0.05－0.25)
	Heat resistant alloy	–	**F7030**	M	General	30 (20－40)	0.1 (0.05－0.15)
N	Aluminium alloy	–	**HTi10**	G	General	500 (200－1000)	0.15 (0.05－0.25)

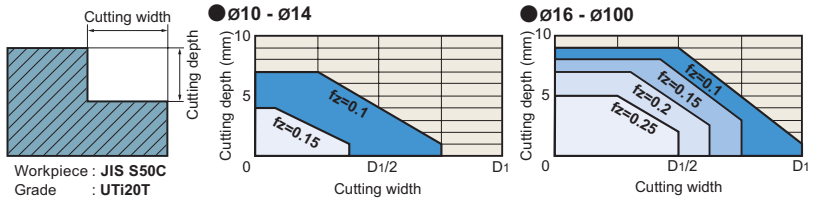
●Revolution (min^{-1}) = (1000 x Cutting Speed) x (3.14 x ØD$_1$)
●Table Feed (mm/min) = Feed per Tooth x Number of Teeth x Cutter Revolution

Cutting performance

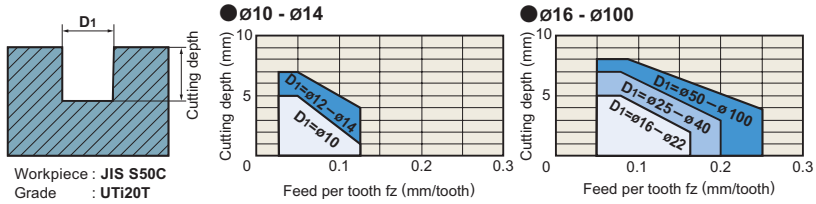
BAP300

Cemented carbide, coated carbide

Shoulder milling

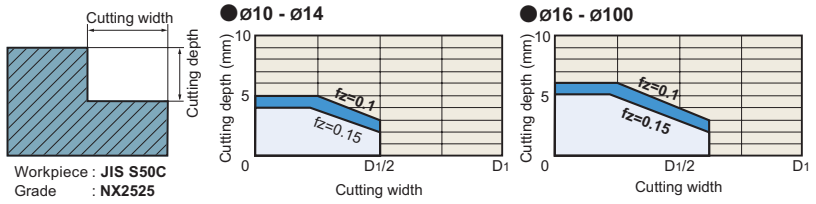


Slot milling



Cermet

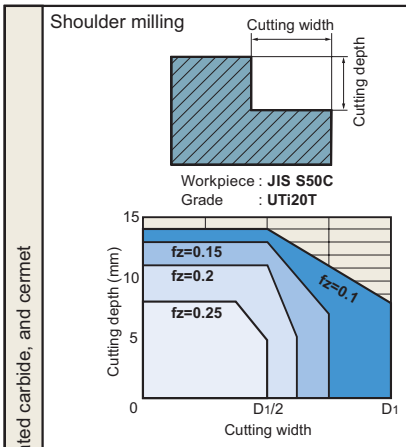
Shoulder milling



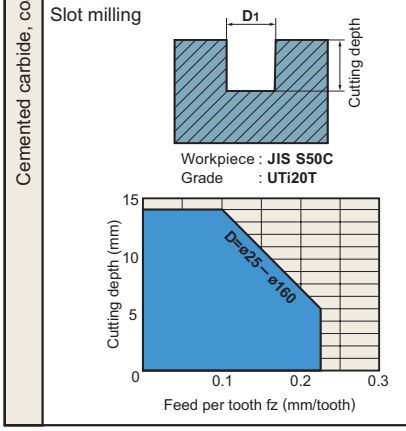
BAP400

Cemented carbide, coated carbide, and cermet

Shoulder milling



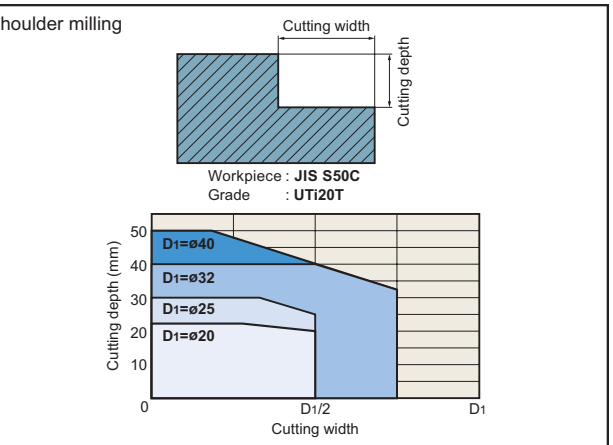
Slot milling



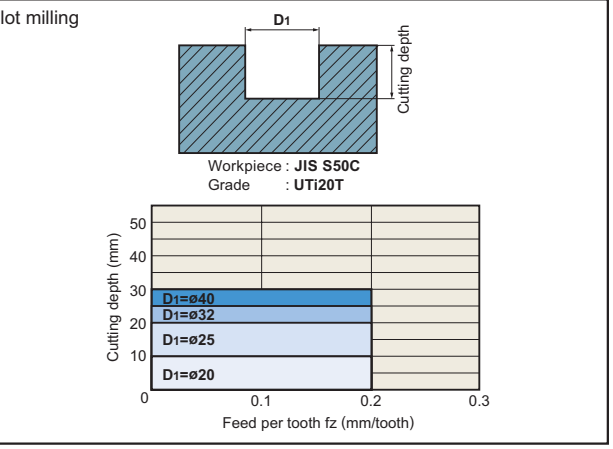
BAP300 (Long cutting edge type)

Cemented carbide, coated carbide

Shoulder milling



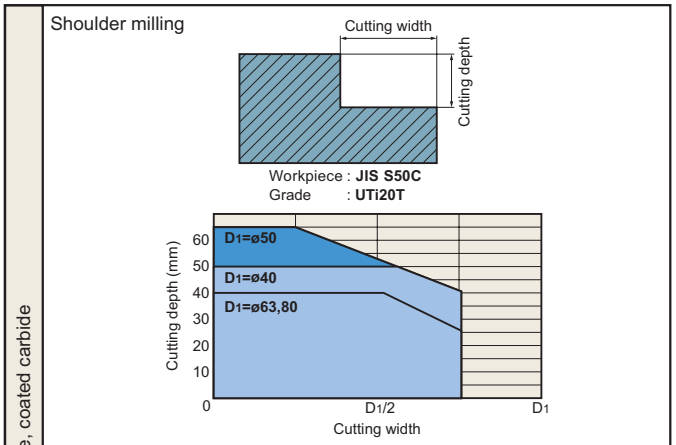
Slot milling



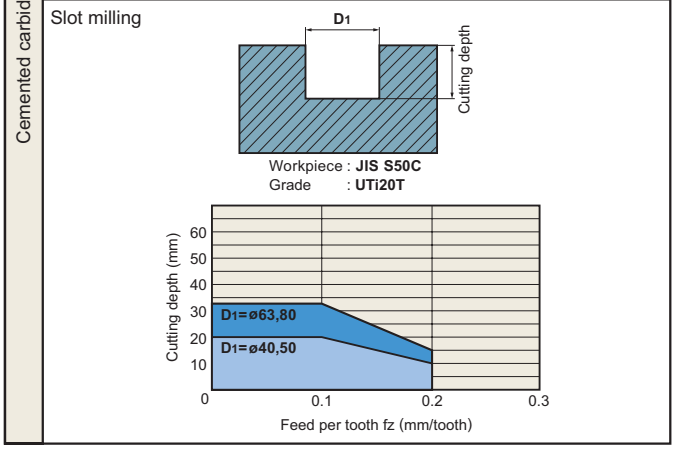
BAP400 (Long cutting edge type)

Cemented carbide, coated carbide

Shoulder milling



Slot milling



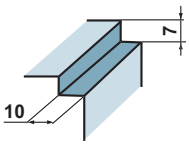
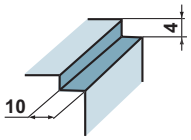
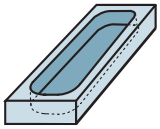
NOTE : 1) The above data was conducted on carbon steel (JIS S50C). For use with alloy steels reduce the conditions by 20 - 30%.
2) When slot milling, the use of an airblower is recommended.
3) The dimension (D_1) represents the dimension at the tools peripheral cutting edge.

Inclined cutting edge insert

MITSUBISHI

BAP series

Application examples

Tool		BAP300R254S25	BAP300R203S20	BAP400R252S25
Insert		APMT1135PDER-H1	APMT1135PDER-M2	APGT1604PDFR-G2
Grade		VP15TF	F7030	HTi10
Workpiece		JIS SKD61 (40HRC) 	JIS SCM440 (200HB) 	Aluminium alloy (A7075) 
Component		Machine parts	Machine parts	Machine parts
Cutting conditions	Cutting speed (m/min)	122	150	238
	Feed (mm/tooth)	0.1	0.1	0.15
	Depth of cut (mm)	ap = 7 ae = 10	ap = 4 ae = 10	ap = 6.5 ae = 3
Coolant		Airblow	Dry cutting	Dry cutting
Results		●Tool life No. of pieces/corner 0 10 20 30 40 BAP300 Competitor	●Tool life Cutting time (min) 0 25 50 75 100 BAP300 Competitor Fracture	●Tool life No. of pieces/corner 0 20 40 60 BAP400 Competitor

For Your Safety
●Don't touch breakers and chips without gloves. ●Please machine within recommended application range, and exchange expired tools with new parts in advance. ●Please use safety cover and wear safety glasses. ●When using compounded cutting oils, please take fire prevention. ●When attaching chips or spare parts, please use the attached wrench or spanner. ●When using tools in revolution machining, please make a trial run to check run-out, vibration, abnormal sounds etc.

MITSUBISHI MATERIALS CORPORATION

Tsukuba Plant ISO 9001-2000 Registration No. JSAQ 080 Gifu Plant ISO 9001-2000 Registration No. JSAQ 094

Tsukuba Plant ISO 14001-1996 Registration No. JSAE 036

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(Tools specifications subject to change without notice.)

2003.6.E(-)