

Super Lightweight TAC MILL Series

**T/EFE12, DPD09, and
EDPD09 types**

Performs excellent ability even on a BT30- taper machining center !!





Allow High Efficiency Machining of Aluminum Alloy Parts !

Lightweight design allows these TAC mills to be used on a BT30-taper machining center !

Super lightweight general purpose TAC Mills

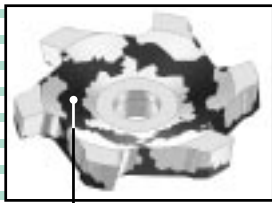
T/EFE12 type

Used for roughing to finishing of aluminum alloys.

By the use of dedicated inserts, the cutters can be also used for milling steels, cast irons and stainless steels.

Lightweight pocket

By simulating the stress applied on the cutter body, lightweight design was realized without sacrificing the rigidity.



Weight reduced portion

Reliability

Use of TORX PLUS screw has improved the clamping torque by 20 %.

Hole for center-through coolant supply

New insert grade KS05F

Use of high-hardness and high-strength micro-grain cemented carbide contributes to improved wear resistance and impact resistance.

Reduced body thickness and weight reduction

Realized 900g in weight and 35 mm in cutter height for 125 mm cutter. Required time to the set number of revolutions can be shortened.

A number of insert variations

Economical four corner design. A number of insert variations allows the cutter to be used for milling a wide range of work materials.

For aluminum and copper alloys

Cemented carbide

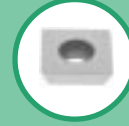


General purpose type



Low cutting force type (AJ)

For steels, cast irons and stainless steels



General purpose type

PCD (Polycrystalline diamond)



Regular insert



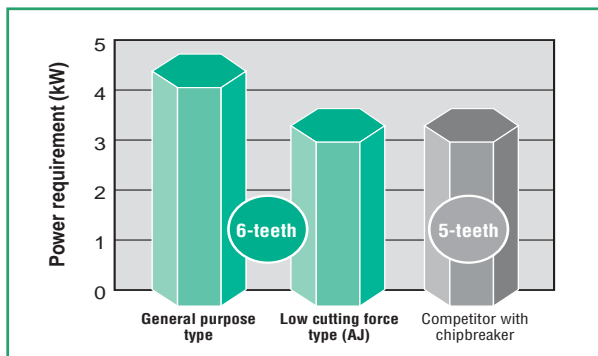
Wiper insert



Deburring wiper insert

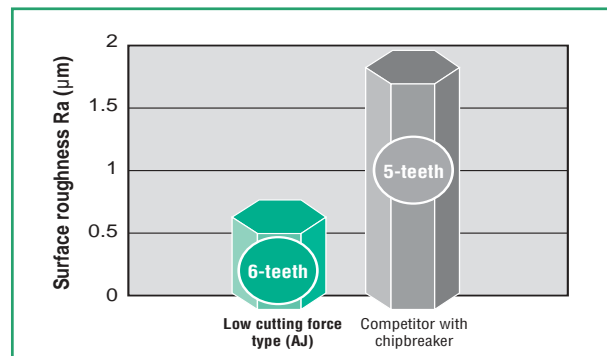
CUTTING PERFORMANCE

Comparison of power requirement



By the use of AJ-type inserts, 6-tooth cutter can reduce power requirement to the same level as the competitive 5-tooth cutter and allows high efficiency machining.

Comparison of surface roughness



By the use of AJ-type inserts, TFE type cutter produced better surface finish than the competitor's cutter with chipbreaker inserts.



Machinable at $V_c=4000$ m/min !

Together with dedicated inserts, allows improved surface finish and reduced burr occurrence !

Super lightweight all PCD-tipped TAC Mills

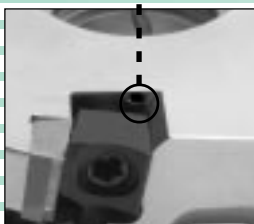
Used for roughing to finishing of aluminum alloys.

DPD09 and EDPD09type

Reduced body thickness and weight reduction

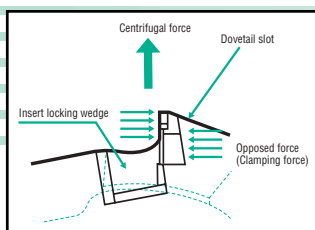
Realized 1700 g in weight and 35 mm in cutter height for $\phi 125$ mm cutter. Required time to the set number of revolutions can be shortened.

Hole for center-through coolant supply



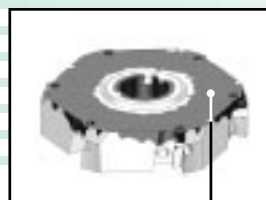
High-speed cutting

Anti-centrifugal force design balanced to a balancing quality of G16 allows high-speed machining up to $V_c=4000$ m/min.



Lightweight pocket

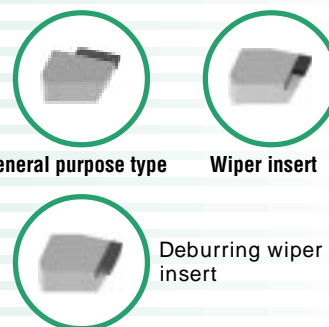
By simulating the stress applied on the cutter body, lightweight design was realized without sacrificing the rigidity.



Weight reduced portion

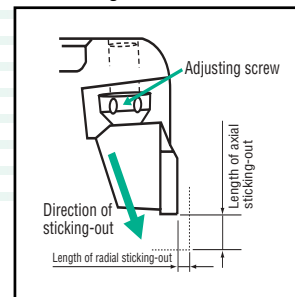
Insert variations

Variety of insert design



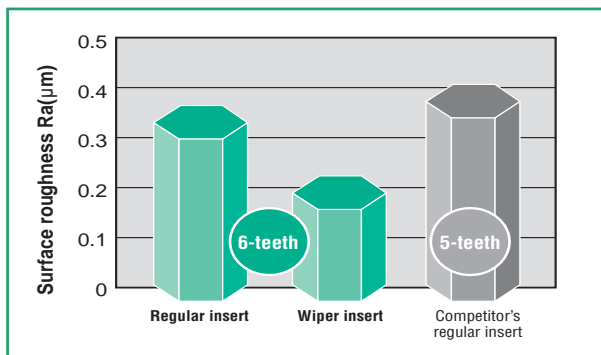
High precision

By the adjusting mechanism provided for all inserts, axial cutting edge runout can be adjusted within $5 \mu\text{m}$. Regrindable (0.1 mm X 8 times) constant cutter-diameter design.



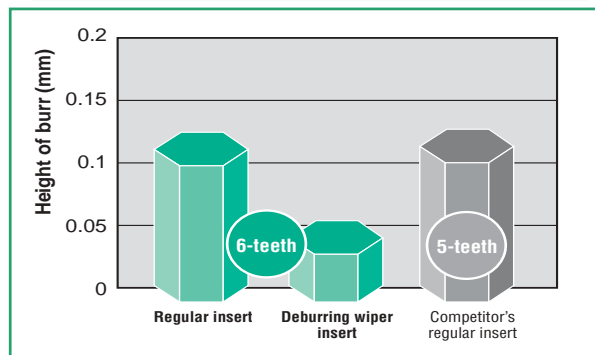
CUTTING PERFORMANCE

Comparison of surface roughness



Even when only regular inserts are used, the surface roughness was the same as those obtained with competitor's inserts. By mounting the wiper insert, the surface roughness was far better than the competitor.

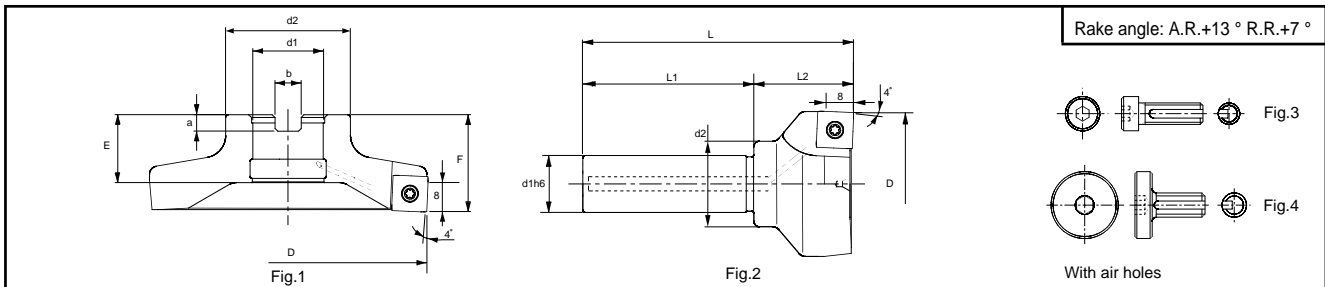
Comparison of burr occurrence



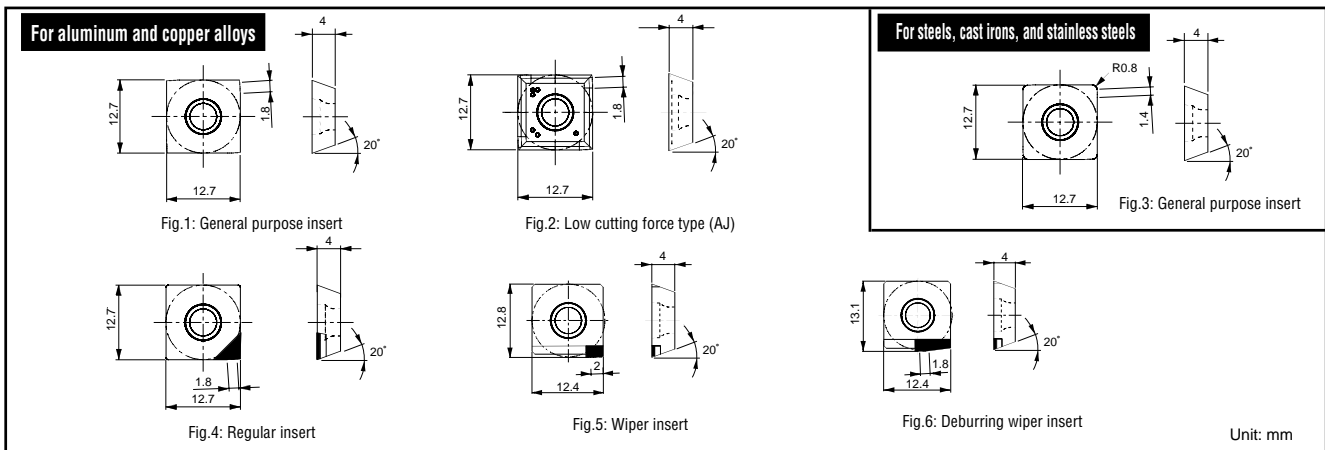
Even when only regular inserts are used, the surface roughness was the same as those obtained with competitor's inserts. By mounting the deburring wiper inserts, burr occurrence was far suppressed compared with competitor's inserts.

E/TFE 12

SPECIFICATIONS



Cutter body Cat. No.	Stock	No. of teeth	Shape	Dimensions (mm)									Weight (kg)	Clamping screw	Wrench	Center bolt		Recommended clamping torque N·m (kgf·cm)			
				D	d1	d2	E	F	a	b	L	L1				L2	Cat. No.		Shape		
EFE12050R		3	Fig.2	50	20	30	-	-	-	-	95	60	35	0.37	CSPB-4S	IP-15D	-	-	-		
TFE12063R				63	22	45	19	-	-	10	-	-	-	0.34			CM10X30H	Fig.3	40(408)		
TFE12080R		4	Fig.1	80	25.4	50	24.5	35	6	9.5	-	-	-	-			-	0.45	TMBA-M12H	Fig.4	70(714)
TFE12100R				100														0.59			
TFE12125R				125														0.90			



Insert cat. No.	Type	Shape	Honing	Stocked grades				
				KS05F	AH120	AH140	NS740	DX140
SEGW12X4ZEFR	General purpose	Fig.1	Without					
SEGT12X4ZEFR-AJ	Low cutting force	Fig.2						
SEGW12X4ZEPR	General purpose	Fig.3	With					
SEGW12X4ZEFR-D	Regular insert	Fig.4	Without					
SEGW12X4ZEFR-WD	Wiper insert	Fig.5						
SEGW12X4ZEFR-BD	Deburring wiper insert	Fig.6						

Note: PCD inserts listed above can not be reground.

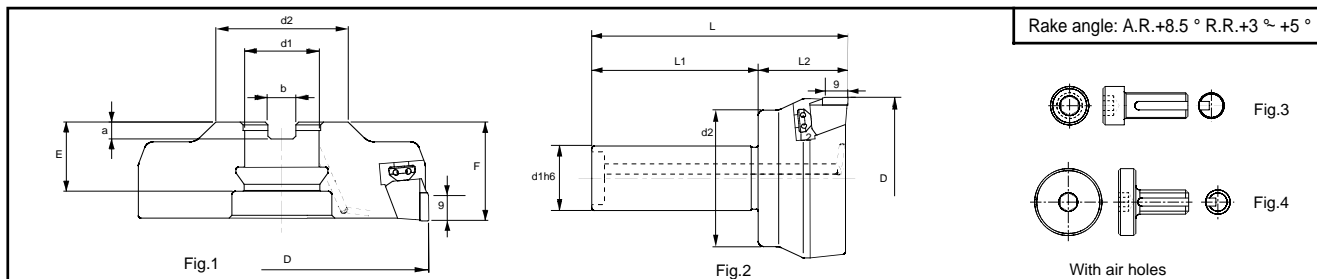
STANDARD CUTTING CONDITIONS

Work materials	Insert grade	Shape	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
Cast aluminum alloy / die-cast (Si < 13%)	KS05F	Fig.2	200~1500	0.05~0.2
	DX140	Fig.4		
Cast aluminum alloy / die-cast (Si > 13%)	KS05F	Fig.2	80~200	0.05~0.2
	DX140	Fig.4	200~500	
Aluminum alloys (JIS 1000, 3000, 5000, and 6000 types) Tensile strength < 350 N/mm ²	KS05F	Fig.2	200~1500	0.05~0.2
	DX140	Fig.4		
Aluminum alloys (JIS 2000, 4000, and 7000 types) Tensile strength > 350 N/mm ²	KS05F	Fig.1	200~1500	0.05~0.2
	DX140	Fig.4		
Copper alloys	KS05F	Fig.2	200~500	0.05~0.2
	DX140	Fig.4		
Carbon steels and alloy steels (< 300HB)	AH120	Fig.3	100~180	0.03~0.15
	NS740			
Stainless steels (< 250 HB)	AH140		80~180	0.03~0.15
Gray and ductile cast irons	AH120		100~200	0.03~0.15

Notes:

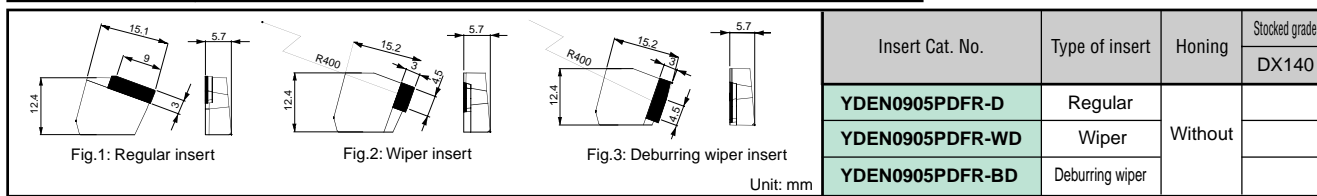
- In milling aluminum and copper alloys:
 - For improved surface finish, use together with wiper insert (Fig.5).
 - For reducing burr occurrence, use together with deburring insert (Fig.6).
- When milling aluminum and copper alloys, use of a water soluble cutting fluid is recommended. When milling steels, cast irons, and stainless steels, dry cutting is recommended.
- When the length-to-diameter overhang ratio of the tool (L/D) exceeds 3, reduce cutting speed and feed to 70 to 80 % of the values given in the table.

SPECIFICATIONS



Cutter body Cat. No.	Stock	No. of teeth	Shape	Dimensions (mm)									Weight (kg)	Center bolt		Recommended clamping torque N·m (kgf·cm)	
				D	d1	d2	E	F	a	b	L	L1		L2	Cat. No.		Shape
EDPD09063R		3	Fig.2	63	25	37	-	-	-	-	100	60	40	0.75	-	-	-
DPD09080R		4	Fig.1	80	25.4	50	23	41	6	9.5	-	-	-	0.80	CM12X30H	Fig.3	70(714)
DPD09100R		100		24.5			35	1.13						TMBA-M12H	Fig.4		
DPD09125R		125		1.70													

Cutter body Cat. No.	Wedge fastening screw	Insert locking wedge	Fine adjusting screw	Wrench for locking insert	Wrench for fine adjusting
EDPD09063R	FDS-8ST	FW-304R-T	AJM5	T-27T	T-7F
DPD09080R	FDS-8ST-18				
DPD09100R					
DPD09125R					



STANDARD CUTTING CONDITIONS

Work materials	Insert grade	Shape	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
Cast aluminum alloy / die-cast (Si < 13%)	DX140	Fig.1	500~4000	0.05~0.2
Cast aluminum alloy / die-cast (Si > 13%)			200~500	
Aluminum alloys			500~4000	
Copper alloys			200~500	

- Notes:
- (1) When requiring improved surface finish, use the wiper insert together with regular inserts (Fig.2).
 - (2) When requiring reduced burr occurrence, use the deburring inserts together with regular inserts (Fig.3).
 - (3) When using the cutter at speeds over 1500 m/min, use an arbor or toolholder well balanced to within G16.
 - (4) Wet cutting, using a water soluble cutting fluid, is recommended.
 - (5) When the length-to-diameter overhang ratio of the tool (L/D) exceeds 3, reduce cutting speed and feed to 70 to 80 % of the values given in the table.

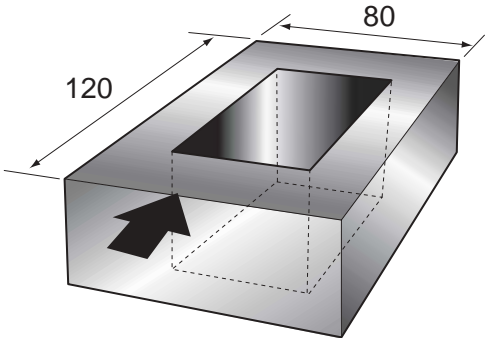

CONFIGURATION OF INSERTS

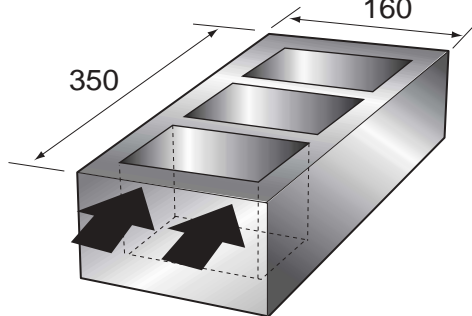

Insert type		General purpose	Priority on surface finish	Priority on reduced burr	
Insert	Regular insert	SEGW12X4ZEFR-D			
		YDEN0905PDFR-D			
	Wiper insert	SEGW12X4ZEFR-WD	-		
		YDEN0905PDFR-WD			
Deburring wiper insert	SEGW12X4ZEFR-BD	-			
	YDEN0905PDFR-BD				
Number of inserts to be mounted by type		Every inserts are regular type.	Replace one regular insert with one wiper insert.	Use deburring wiper inserts as many as regular inserts. (In the case of 3-tooth cutter, use one deburring insert)	
Positioning conditions of inserts		General purpose cutter 	All PCD tipped cutter 	General purpose cutter 	All PCD tipped cutter
Accuracy of finished surface (Roughness and waviness)					
Degree of burr occurrence left on finished surface					

Notes:

- When using the wiper insert or deburring wiper insert, set the table feed (Vf) as follows:
 $Vf = n \times f_z \times t$ n: Number of revolutions, fz: Feed per tooth, t: Number of regular inserts
- When using the wiper or deburring insert in T/EFE12 type cutters, the general purpose or low cutting force carbide inserts can be used as the regular inserts.

MACHINING EXAMPLES

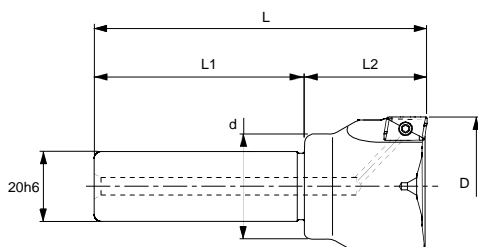
Shape of workpiece		Machine	BT30 Machining center	
	Work material	Housing (AC3A)		
	Cutter body	DPD09100R		
	Insert	YDEN0905PDFR-D (DX140)		
	Cutting conditions	Cutting speed	$V_c=1900$ m/min	
		Number of revolutions	$n=6048$ min ⁻¹	
		Feed per tooth	$f_z=0.04$ mm/t	
		Feed	$V_f=1452$ mm/min	
		Depth of cut	$a_p=1$ mm	
Cutting fluid	Dry			
		<p>Compared with the existing tool, required time to get up to the specified number of revolutions was shortened, resulting in reduced cycle time. Surface roughness was also improved.</p>		

Shape of workpiece		Machine	BT30 Machining center	
	Work material	Test piece (AC4B-T6)		
	Cutter body	TFE12125R		
	Insert	SEGT12X4ZEFR-AJ (KS05F)		
	Cutting conditions	Cutting speed	$V_c=1500$ m/min	
		Number of revolutions	$n=3820$ min ⁻¹	
		Feed per tooth	$f_z=0.2$ mm/t	
		Feed	$V_f=4584$ mm/min	
		Depth of cut	$a_p=2$ mm	
Cutting fluid	Wet			
		<p>When machining the surface in two passes, a bump formed in the boundary between passes was minute. Surface finish was also good.</p>		

EPS

Also for EPS11-type, New Specifications Have Been Added for Low Power Machines !!

SPECIFICATIONS



Note: With air holes

Body Cat. No.	Stock	No. of inserts	Dimensions (mm)			Applicable insert	Clamping screw	Wrench		
			D	d	L					
EPS11025RSS20		2	25	23	95	60	35	ASMT11T3 PDPR-	CSPB-2.5	IP-8D
EPS11030RSS20			30	28						
EPS11032RSS20			32							
EPS11040RSS20		3	40	30	95	60	35	ASMT11T3 PDPR-	CSPB-2.5	IP-8D
EPS11050RSS20			50							

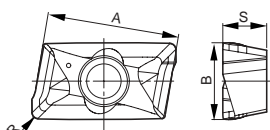


Fig.1

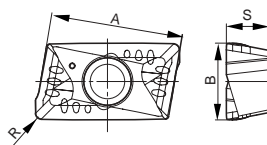
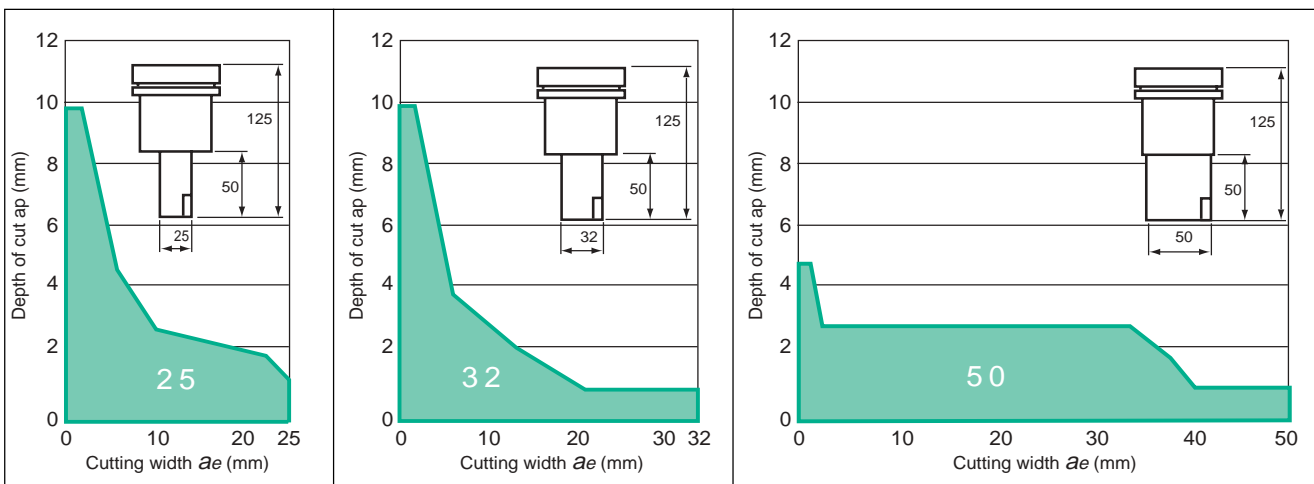


Fig.2

Insert Cat. No.	Corner R	Shape	Honing	Stocked grades					Dimensions (mm)		
				AH120	AH140	T3030	T1015	NS740	A	B	S
ASMT11T304PDPR-MJ	0.4	Fig.1	With						11.6	6.7	3.7
ASMT11T308PDPR-MJ	0.8										
ASMT11T316PDPR-MJ	1.6										
ASMT11T304PDPR-MS	0.4	Fig.2									

Note: For features of EPS-type, see Tungaloy Report No.340.

ALLOWABLE CUTTING CONDITION RANGES FOR EPS11 TYPE ON BT30- CLASS MACHINING CENTERS



Work material : Carbon steel (JIS S55C, 200HB)
 Machine : BT30 vertical machining center
 5.5 kW, max. 10000 min⁻¹
 Cutter body : EPS11 type
 Insert : ASMT11T304PDPR-MS (AH140)
 Cutting speed : $V_c=100$ m/min
 Feed per tooth : $f_z=0.1$ mm/t
 Cutting fluid : Dry cutting



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