Keeping the Customer First

Tungaloy Report No.348-E

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 !

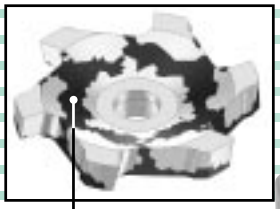
Super lightweight general purpose TAC Mills

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

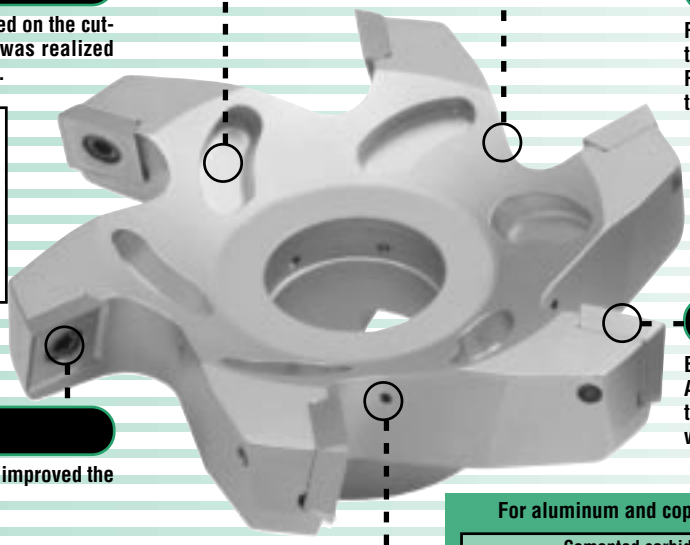
By simulating the stress applied on the cutter body, lightweight design was realized without sacrificing the rigidity.



Weight reduced portion

Reduced body thickness and weight reduction

Realized 900g in weight and 35 mm in cutter height for ϕ125 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.

Reliability

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

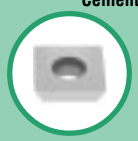
Hole for center-through coolant supply

New insert grade KS05F

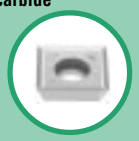
Use of high-hardness and high-strength micro-grain cemented carbide contributes to improved wear resistance and impact resistance.

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)

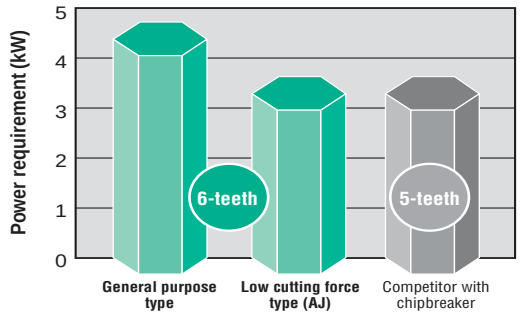
Regular insert

Wiper insert

Deburring wiper insert

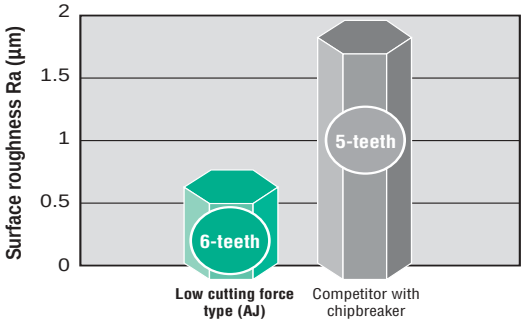
CUTTING PERFORMANCE

Comparison of power requirement



Results 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



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

● Work material: Cast aluminum alloy ● Tool: TFE12125R (6-teeth) ● Cutting conditions: Vc=1500 m/min, fz=0.2 mm/t, ap=2 mm, ae=60 mm, Wet cutting

Machinable at Vc=4000 m/min !

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

Super lightweight all PCD-tipped TAC Mills

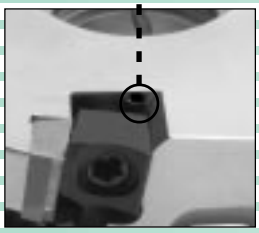
DPD09 and EDPD09type

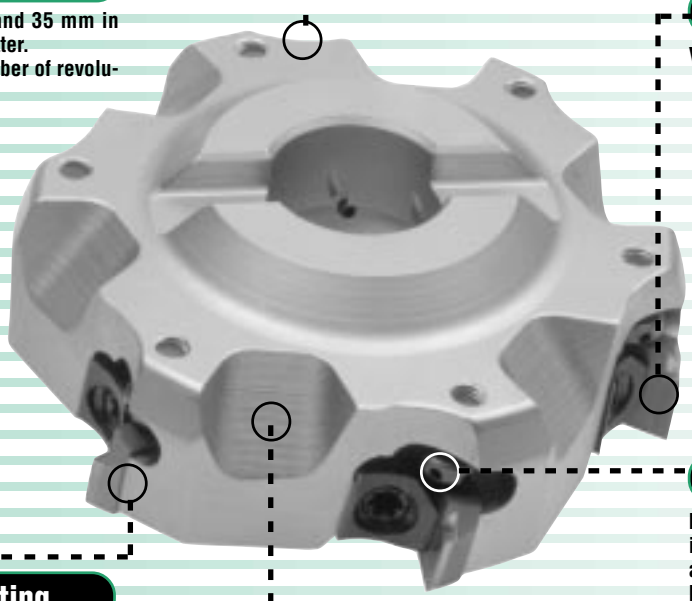
Used for roughing to finishing of aluminum alloys.

Reduced body thickness and weight reduction

Realized 1700 g in weight and 35 mm in cutter height for ø125 mm cutter.
Required time to the set number of revolutions can be shortened.

Hole for center-through coolant supply





Insert variations

Variety of insert design

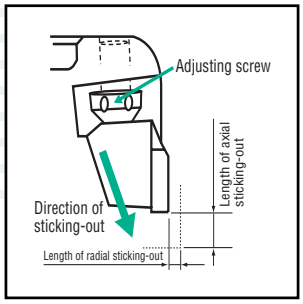
General purpose type

Wiper insert

Deburring wiper insert

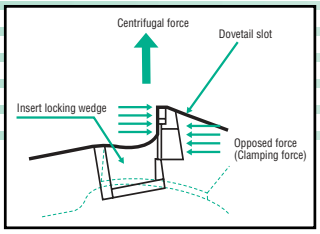
High precision

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



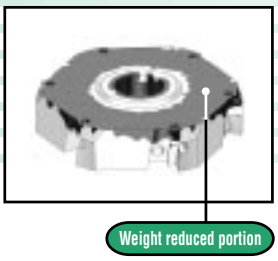
High-speed cutting

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



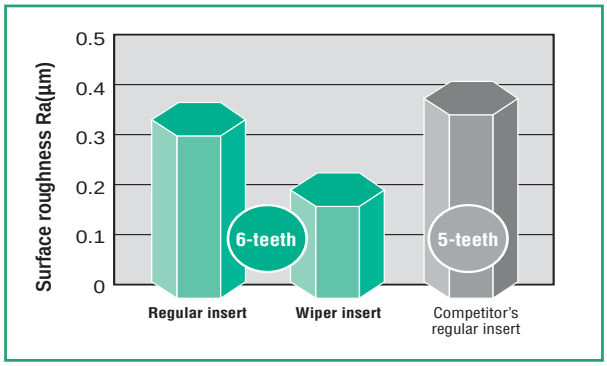
Lightweight pocket

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



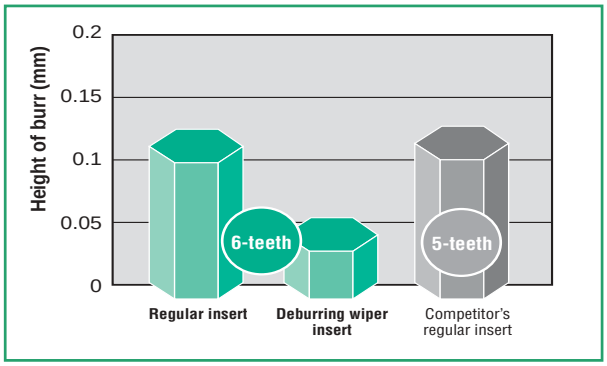
CUTTING PERFORMANCE

Comparison of surface roughness



Results 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



Results 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.

● Work material: Cast aluminum alloy ● Tool: DPD09125R (6-teeth) ● Cutting conditions: Vc=3000 m/min, fz=0.1 mm/t, ap=0.5 mm, ae=60 mm, Wet cutting

E/TFE 12

SPECIFICATIONS

Rake angle: A.R.+13 ° R.R.+7 °

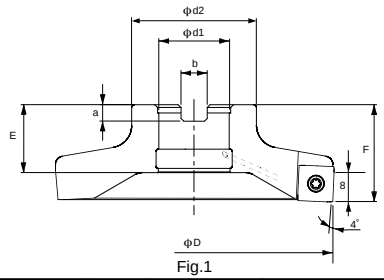


Fig.1

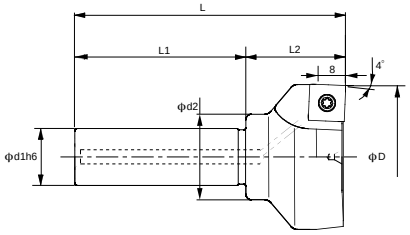


Fig.2

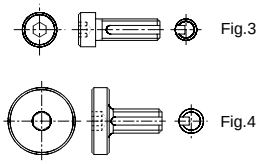


Fig.3

Fig.4

With air holes

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)
				φ D	φ d1	φ 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	●		Fig.1	63	22	45	19	35	6	10	-	-	-	0.34			CM10X30H	Fig.3	40(408)
TFE12080R	●	4		80	25.4	50	24.5			9.5				0.45			TMBA-M12H	Fig.4	70(714)
TFE12100R	●	6		100										0.59					
TFE12125R	●			125										0.90					

For aluminum and copper alloys

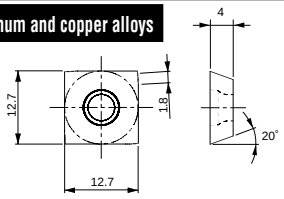


Fig.1: General purpose insert

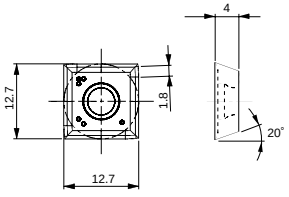


Fig.2: Low cutting force type (AJ)

For steels, cast irons, and stainless steels

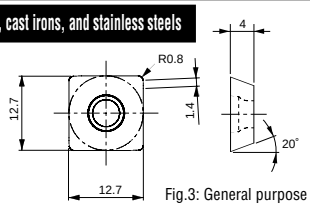


Fig.3: General purpose insert

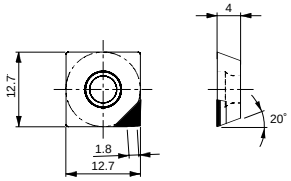


Fig.4: Regular insert

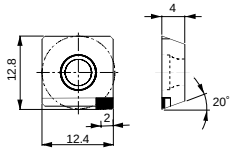


Fig.5: Wiper insert

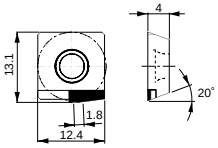


Fig.6: Deburring wiper insert

Unit: mm

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/mm²	KS05F	Fig.2	200~1500	0.05~0.2
	DX140	Fig.4		
Aluminum alloys (JIS 2000, 4000, and 7000 types) Tensile strength > 350 N/mm²	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:

(1) For improved surface finish, use together with wiper insert (Fig.5).

(2) 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.

DPD09 • EDPD 09

SPECIFICATIONS

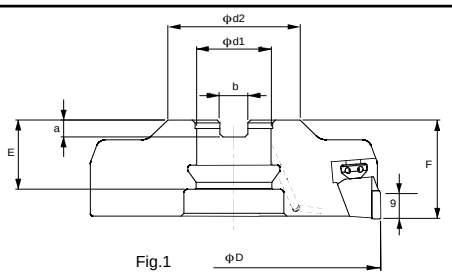


Fig.1

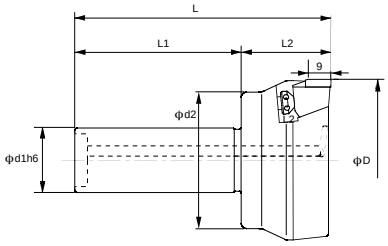


Fig.2

Rake angle: A.R.+8.5 ° R.R.+3 ~+5 °

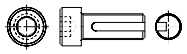


Fig.3

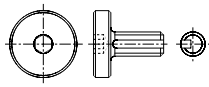


Fig.4

With air holes

Cutter body Cat. No.	Stock	No. of teeth	Shape	Dimensions (mm)										Weight (kg)	Center bolt		Recommended clamping torque N•m (kgf•cm)
				φ D	φ d1	φ 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	●	6		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					

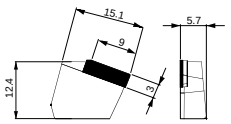


Fig.1: Regular insert

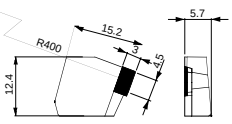


Fig.2: Wiper insert

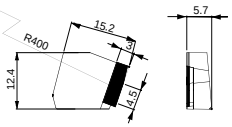


Fig.3: Deburring wiper insert

Unit: mm

Insert Cat. No.	Type of insert	Honing	Stocked grade DX140
YDEN0905PDFR-D	Regular	Without	●
YDEN0905PDFR-WD	Wiper		●
YDEN0905PDFR-BD	Deburring wiper		●

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	

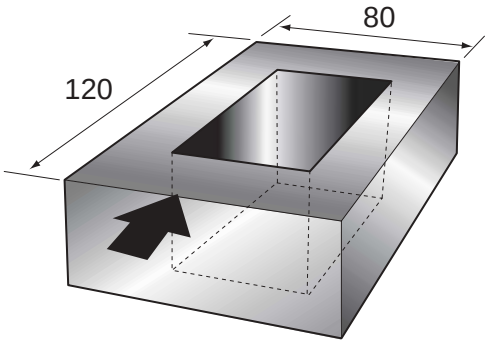
Notes:
(1) When requiring improved surface finish, use the wiper insert together with regular inserts (Fig.2).
(2) When requiring reduced burr occurrence, use the deburring inserts together with regular inserts (Fig.3).
(3) When using the cutter at speeds over 1500 m/min, use an arbor or toolholder well 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.

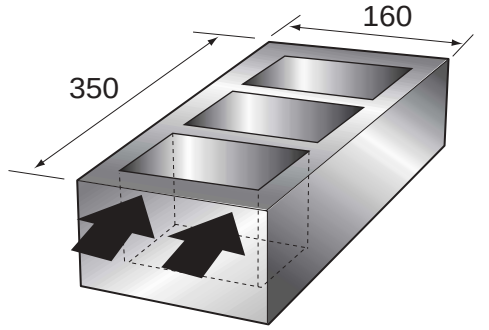
CONFIGURATION OF INSERTS

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	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 X fz X 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

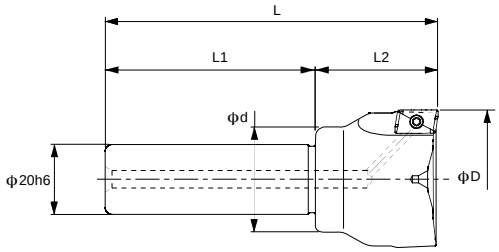
Shape of workpiece		
	Machine	BT30 Machining center
	Work material	Housing (AC3A)
	Cutter body	DPD09100R
	Insert	YDEN0905PDFR-D (DX140)
	Cutting conditions: Cutting speed	Vc=1900 m/min
	Cutting conditions: Number of revolutions	n=6048 min^{-1}
	Cutting conditions: Feed per tooth	fz=0.04 mm/t
	Cutting conditions: Feed	Vf=1452 mm/min
	Cutting conditions: Depth of cut	ap=1 mm
	Cutting conditions: Cutting fluid	Dry
	Results	**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.**

Shape of workpiece		
	Machine	BT30 Machining center
	Work material	Test piece (AC4B-T6)
	Cutter body	TFE12125R
	Insert	SEGT12X4ZEFR-AJ (KS05F)
	Cutting conditions: Cutting speed	Vc=1500 m/min
	Cutting conditions: Number of revolutions	n=3820 min^{-1}
	Cutting conditions: Feed per tooth	fz=0.2 mm/t
	Cutting conditions: Feed	Vf=4584 mm/min
	Cutting conditions: Depth of cut	ap=2 mm
	Cutting conditions: Cutting fluid	Wet
	Results	**When machining the surface in two passes, a bump formed in the boundary between passes was minute. Surface finish was also good.**

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
			φ D	φ d	L	L1	L2			
EPS11025RSS20	●	2	25	23	95	60	35	ASMT11T3 □□ PDPR- □□	CSPB-2.5	IP-8D
EPS11030RSS20	●		30	28						
EPS11032RSS20	●		32	30						
EPS11040RSS20	●	3	40							
EPS11050RSS20	●		50							

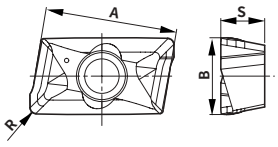


Fig.1

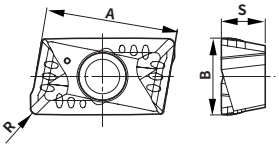
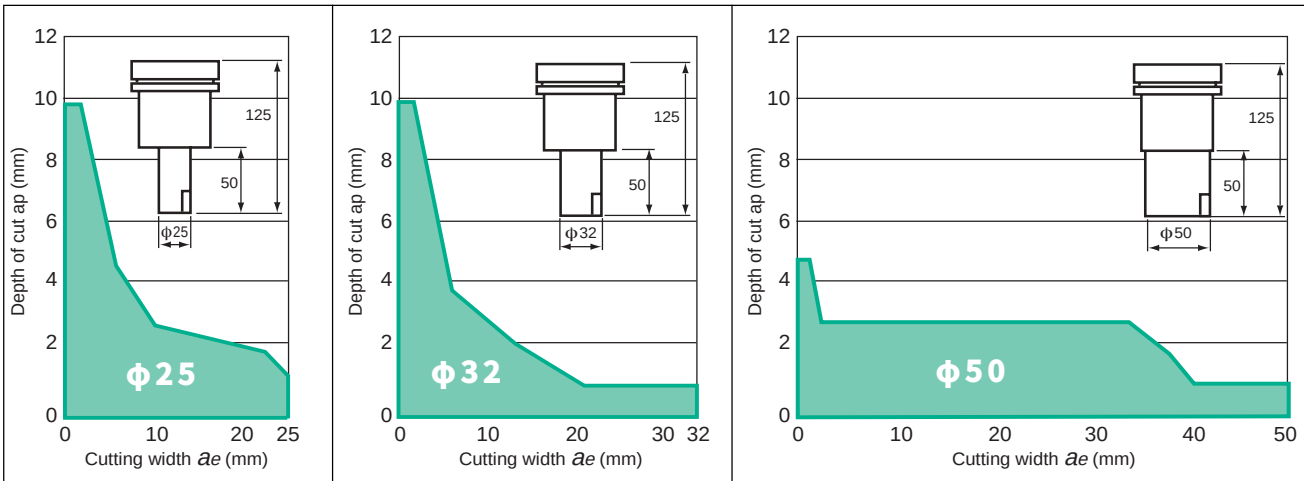


Fig.2

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 : Vc=100 m/min
Feed per tooth: fz=0.1 mm/t
Cutting fluid : Dry cutting

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