

Tungaloy

Member IMC Group

Keeping the Customer First

Tungaloy Report No. 380-EE

MILLLINE Shoulder milling cutter

TUNGREC



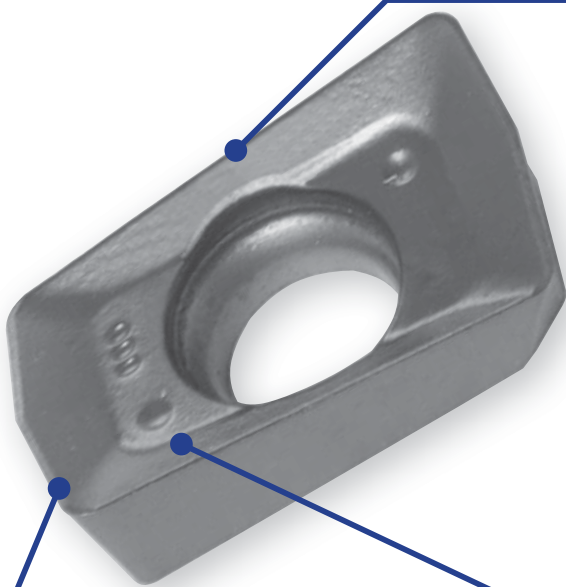
New multi purpose high precision cutter



Highly productive semi finish with high accuracy 90 degree Helical cutting edges and high axial rake

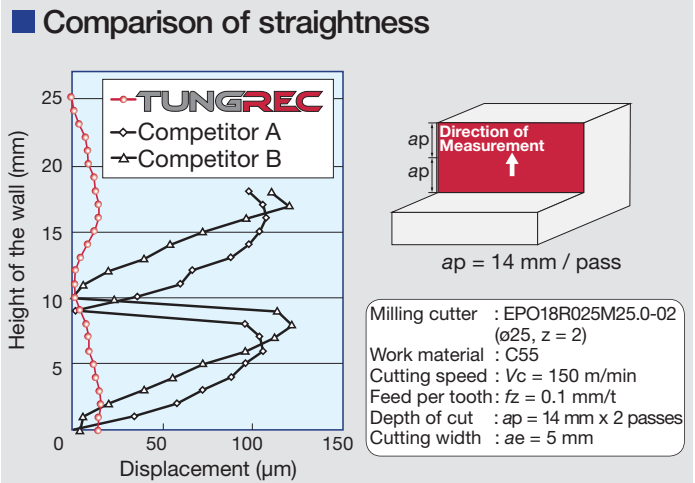
Features

High performance inserts



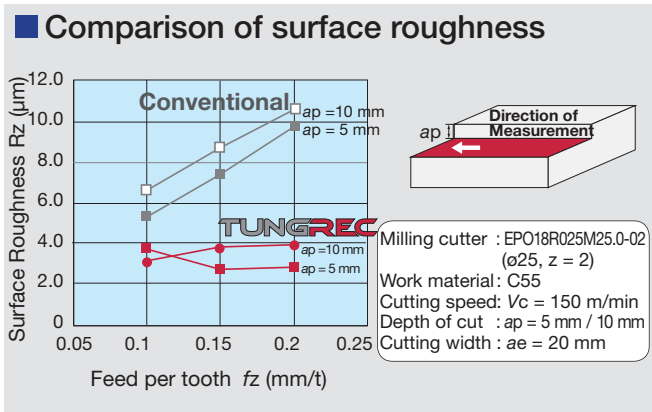
Helical cutting edges

Excellent wall straightness!



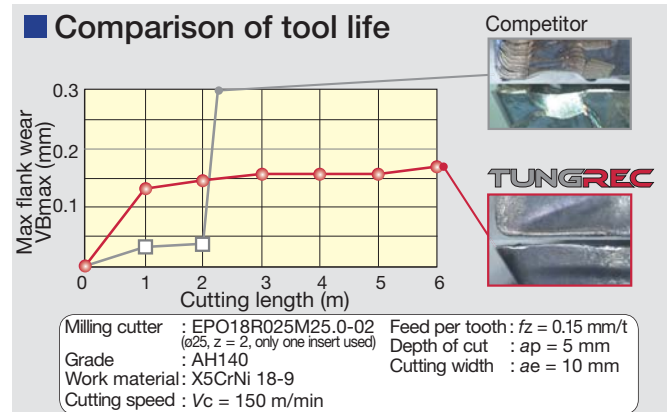
Wiper edges

Excellent surface finish!



Optimized rake angle

Provides sharpness and reliability!



High performance milling cutter free shoulders angles provide free cutting.

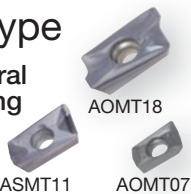


Chipbreakers

4 types of chipbreaker cater for a wide range of applications

MJ type

for general machining



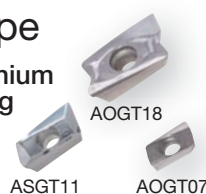
MS type

for stainless steel machining



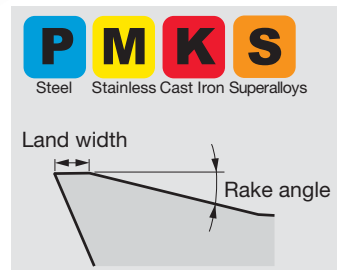
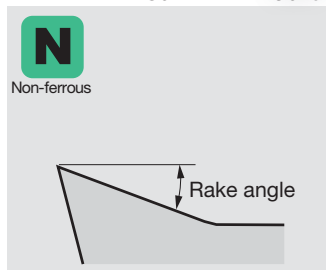
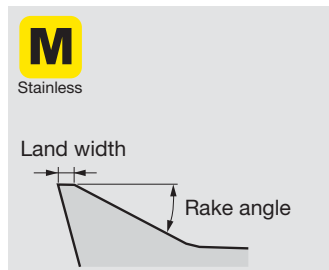
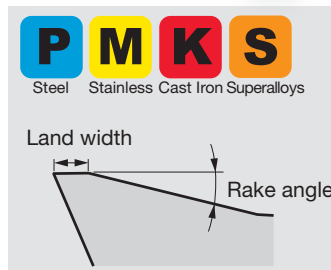
AJ type

for aluminium machining



HJ type

for high feed machining



High performance cutter bodies

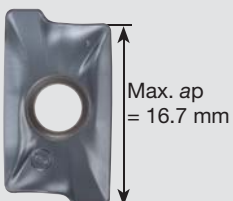
Air holes ➔ For improved chip evacuation!

Coarse pitch, close pitch and long shank cutters available!

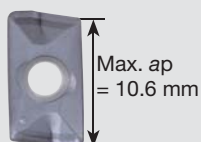
➔ Choose the optimum cutter body for your application!

■ Max. depth of cut: ap / with MJ chipbreaker

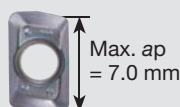
AOMT18



ASMT11



AOMT07



Coarse pitch

3 inserts



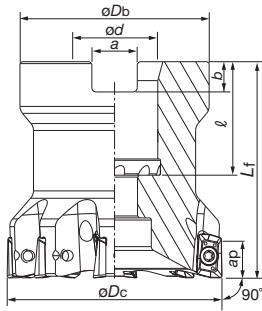
Close pitch

7 inserts

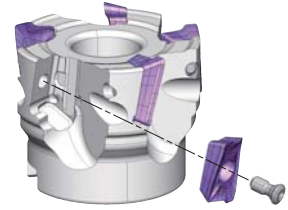
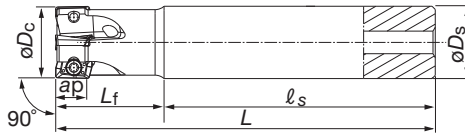


Milling cutter TPO07 / EPO07

Bore type



Shank type



MJ chipbreaker: Max. $ap = 7$ mm
 AJ chipbreaker: Max. $ap = 6.4$ mm
 HJ chipbreaker: Max. $ap = 0.8$ mm

Bore type

Description	Cat. No.
Wrench	T-7DB

Cat. No.	Stock	No. of inserts	Dimensions (mm)							Weight (kg)	Air hole	Centre bolt	Clamping screw	Inserts
			* ϕD_c	ϕD_b	ϕd	ℓ	** L_f	b	a					
TPO07R032M16.0E08	●	8	32	30	16	21	40	5.6	8.4	0.1	with	CM8x30H	CSTB-2.5L046	AOMT0702...
TPO07R040M16.0E10	●	10	40	35	16	21	40	5.6	8.4	0.2	with	CM8x30H		AOGT0702...
TPO07R050M22.0E12	●	12	50	41	22	22	40	6.3	10.4	0.3	with	CM10x30H		

Shank type

Type	Cat. No.	Stock	No. of inserts	Dimensions (mm)					Weight (kg)	Air hole	Clamping Screw	Inserts
				* ϕD_c	ϕD_s	ℓ_s	** L_f	** L				
Coarse pitch	EPO07R016M12.0-02	●	2	16	12	50	20	70	0.1	with	CSTB-2.5L046	AOMT0702... AOGT0702...
	EPO07R020M16.0-03	●	3	20	16	60	30	90	0.1	with		
	EPO07R025M20.0-03	●	3	25	20	60	35	95	0.3	with		
Close pitch	EPO07R012M12.0-02	●	2	12	12	50	18	68	0.1	with		
	EPO07R016M16.0-04	●	4	16	16	60	24	84	0.1	with		
	EPO07R018M16.0-04	●	4	18	16	60	24	84	0.1	with		
	EPO07R020M20.0-05	●	5	20	20	70	30	100	0.2	with		
	EPO07R022M20.0-05	●	5	22	20	70	30	100	0.2	with		
	EPO07R025M25.0-07	●	7	25	25	80	35	115	0.4	with		
Long shank	EPO07R028M25.0-07	●	7	28	25	80	35	115	0.4	with		
	EPO07R012M12.0-02L	●	2	12	12	95	30	125	0.1	with		
	EPO07R016M16.0-02L	●	2	16	16	105	40	145	0.2	with		
	EPO07R018M16.0-02L	●	2	18	16	105	40	145	0.2	with		
	EPO07R020M20.0-03L	●	3	20	20	135	50	185	0.4	with		
	EPO07R022M20.0-03L	●	3	22	20	135	50	185	0.4	with		
	EPO07R025M25.0-03L	●	3	25	25	150	70	220	0.7	with		
EPO07R028M25.0-03L	●	3	28	25	150	70	220	0.7	with			

* The ϕD_c in the above table shows the diameter when MJ and AJ chipbreakers are used. When HJ chipbreaker is used, the tool diameter is equal to the above shown $\phi D_c + 0.6$ mm.

** The L_f and L in the above table show the lengths when MJ chipbreaker is used. When AJ chipbreaker is used, the lengths are equal to $L_f, L + 0.1$ mm. When HJ chipbreaker is used, the lengths are equal to $L_f, L + 0.5$ mm.

Inserts TPO07 / EPO07

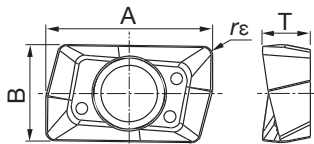


Fig. 1 MJ

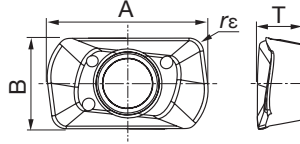


Fig. 2 HJ

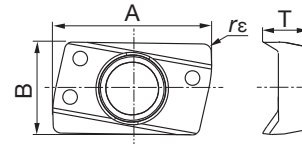


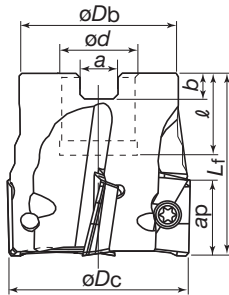
Fig. 3 AJ

Cat. No.	Accuracy	Honing	Grades			Dimensions (mm)				Shape	Cutter
			Coated		Carbide	A	B	T	r_ϵ		
			AH725	AH140							
AOMT070202PDPR-MJ	M	with	●	●		8.0	4.7	2.3	0.2	Fig. 1	EPO07R TPO07R
AOMT070204PDPR-MJ	M	with	●	●		8.0	4.7	2.3	0.4	Fig. 1	
AOMT070208PDPR-MJ	M	with	●	●		8.0	4.7	2.3	0.8	Fig. 1	
AOMT070216PDPR-MJ	M	with	●	●		8.0	4.7	2.3	1.6	Fig. 1	
AOMT070208PDPR-HJ	M	with	●	●		8.8	4.9	2.4	0.8	Fig. 2	
AOGT070204PDFR-AJ	G	without			●	8.1	4.7	2.3	0.4	Fig. 3	

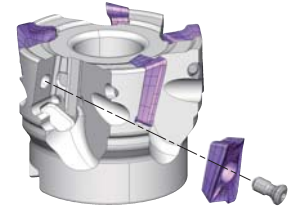
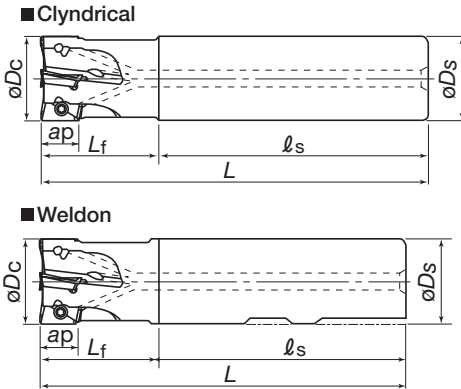
● : Stocked items

Milling cutter TPS11 / EPS11

Bore type



Shank type



Max. ap = 10.6 mm

Description	Cat. No.
Wrench	IP-8D

● Bore type

Cat. No.	Stock	No. of Inserts	Dimensions (mm)						Weight (kg)	Air hole	Centre bolt	Clamping screw	Inserts	
			$\varnothing D_c$	$\varnothing D_b$	$\varnothing d$	ℓ	L_f	b						a
TPS11040RB-E	●	6	40	35	16	19	40	5.6	8.4	0.2	without	CM8X30	CSPB-2.5	ASMT11T3... ASGT11T3...
TPS11050RB-E	●	7	50	41	22	20	40	6.3	10.4	0.4	without	CM10X30		
TPS11063RB-E	●	8	63	41	22	20	45	6.3	10.4	0.6	without	CM10X30		

● Shank type

Type	Cat. No.	Stock	No. of Inserts	Dimensions (mm)					Weight (kg)	Air hole	Clamping Screw	Inserts	
				$\varnothing D_c$	$\varnothing D_s$	ℓ_s	L_f	L					
Cylindrical	Coarse pitch	EPS11012RS	●	1	12	16	60	25	85	0.1	with	CSPB-2.5S	ASMT11T3... ASGT11T3...
		EPS11016RS	●	2	16					0.1	with		
		EPS11018RS	●	2	18					0.1	with		
	Close pitch	EPS11020RS	●	2	20	20	70	30	100	0.2	with	CSPB-2.5	
		EPS11025RS	●	3	25	25	80	35	115	0.4	with		
		EPS11032RS	●	3	32	32		40	120	0.7	with		
		EPS11020RSB	●	3	20	20	70	30	100	0.2	with	CSPB-2.5S	
		EPS11021RSB	●	3	21					0.2	with		
		EPS11025RSB	●	4	25	25	80	35	115	0.4	with	CSPB-2.5	
	EPS11026RSB	●	4	26	0.4					with			
	EPS11032RSB	●	5	32	0.7					with			
	Long shank	EPS11033RSB	●	5	33	32	40	120	0.7	with			
		EPS11012RL	●	1	12	16	95	30	125	0.2	with	CSPB-2.5S	
		EPS11016RL	●	2	16		105	40	145	0.2	with		
EPS11018RL		●	2	18	0.2		with						
EPS11020RL		●	2	20	20	135	50	185	0.4	with	CSPB-2.5S		
EPS11021RL		●	2	21					0.4	with			
EPS11025RL		●	2	25	25	150	70	220	0.8	with	CSPB-2.5		
EPS11026RL		●	2	26					0.8	with			
EPS11032RL	●	2	32	32	175	80	255	1.5	with				
EPS11033RL	●	2	33					1.5	with				
Weldon	Coarse pitch	EPS11012RS-E	●	1	12	16	55	25	80	0.1	with	CSPB-2.5S	
		EPS11016RS-E	●	2	16				85	0.1	with		
	Close pitch	EPS11020RSB-E	●	3	20	20	60	30	90	0.2	with	CSPB-2.5	
		EPS11025RSB-E	●	4	25	25	35	95	0.4	with			
		EPS11032RSB-E	●	5	32	32	70	40	110	0.7	with		

● : Stocked items

Inserts TPS11 / EPS11

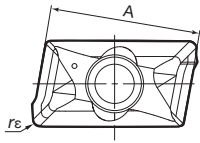


Fig. 4 MJ

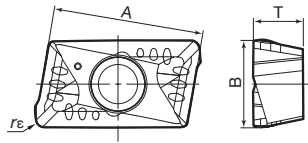


Fig. 5 MS

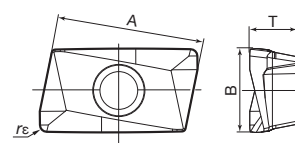
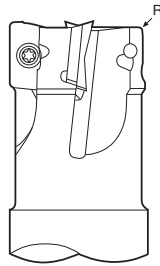


Fig. 6 AJ

Cat. No.	Accuracy	Honing	Grades							Dimensions (mm)				Shape	Cutter				
			Coated						DLC coated	Cermet	Uncoated	A	B			T	r _ε		
			AH725	AH120	AH130	AH140	T3130	T1115	DS1100	NS740	KS05F								
ASMT11T304PDPR-MJ	M	with	★	●	●		●	●		●		11.6	6.7	3.7	0.4	Fig. 4	EPS11R TPS11R		
ASMT11T308PDPR-MJ		with	★	●	●		●	●		●								0.8	Fig. 4
ASMT11T312PDPR-MJ		with	★	●	●		●											1.2	Fig. 4
ASMT11T316PDPR-MJ		with	★	●	●		●		●									1.6	Fig. 4
ASMT11T320PDPR-MJ		with		●	●													2.0	Fig. 4
ASMT11T330PDPR-MJ		with		●	●													3.0	Fig. 4
ASMT11T304PDPR-MS		with			●	●												0.4	Fig. 5
ASMT11T304PDPR-AJ		G	without						●		●								0.4
ASMT11T308PDPR-AJ	without							●		●		0.8	Fig. 6						

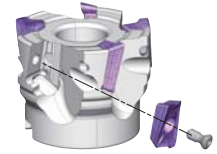
Cautionary point in modifying cutter bodies

When using inserts with corner radius $r_{\epsilon} \geq 2.0$ mm, standard cutter bodies have to be modified "R".

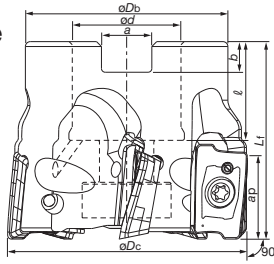


Corner radius r_{ϵ} (mm)	The dimension of modifying "R" (mm)
0.4 ~ 1.6	Unnecessary
2.0 ~ 3.2	2

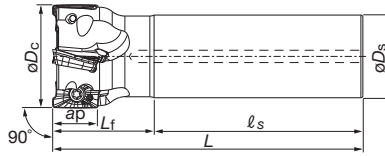
Milling cutter TPO18 / EPO18



Bore type



Shank type



Max. $a_p = 16.7$ mm

Description		Cat. No.	
Applicable cutter	TPO18R...	EPO18R...	
Wrench	Torx Bit	BT15M	-
	Grip	H-TBS	-
Mono block type wrench	-		T-15DB

● Bore type

Cat. No.	Stock	No. of Inserts	Dimensions (mm)							Weight (kg)	Air hole	Centre bolt	Clamping screw	Inserts
			* ϕD_c	ϕD_b	ϕd	l	L_f	b	a					
TPO18R040M16.0E04	●	4	40	35	16	18	40	5.6	8.4	0.2	with	FSHM8-30H	CSTB-4L093	AOMT1805... AOGT1805...
TPO18R050M22.0E05	●	5	50	41	22	20	40	6.3	10.4	0.3	with	CM10x30H		
TPO18R063M22.0E06	●	6	63	41	22	20	40	6.3	10.4	0.5	with	CM10x30H		
TPO18R080M27.0E07	●	7	80	50	27	22	50	7	12.4	1.0	with	CM12x30H		
TPO18R100M32.0E08	●	8	100	60	32	28.5	50	8	14.4	1.4	with	TMBA-M16H		
TPO18R125M40.0E09	●	9	125	71	40	32	63	9	16.4	2.8	with	TMBA-M20H		
TPO18R160M40.0E10	●	10	160	100	40	29	63	9	16.4	4.9	without	-		

● Shank type

Type	Cat. No.	Stock	No. of Inserts	Dimensions (mm)					Weight (kg)	Air hole	Clamping Screw	Inserts
				* ϕD_c	ϕD_s	l_s	L_f	L				
Coarse pitch	EPO18R025M25.0-02	●	2	25	25	80	35	115	0.4	with	CSTB-4L085	AOMT1805... AOGT1805...
	EPO18R028M25.0-02	●	2	28	25	80	35	115	0.4	with		
	EPO18R030M32.0-02	●	2	30	32	80	40	120	0.6	with		
	EPO18R032M32.0-02	●	2	32	32	80	40	120	0.7	with		
	EPO18R035M32.0-02	●	2	35	32	80	40	120	0.7	with		
Close pitch	EPO18R040M32.0-03	●	3	40	32	80	40	120	0.7	with	CSTB-4L093	
	EPO18R050M32.0-03	●	3	50	32	80	40	120	0.8	with		
	EPO18R030M32.0-03	●	3	30	32	80	40	120	0.6	with		
	EPO18R032M32.0-03	●	3	32	32	80	40	120	0.6	with		
	EPO18R035M32.0-03	●	3	35	32	80	40	120	0.7	with		
Long shank	EPO18R040M32.0-04	●	4	40	32	80	40	120	0.7	with	CSTB-4L093	
	EPO18R050M32.0-05	●	5	50	32	80	40	120	0.8	with		
	EPO18R025M25.0-02L	●	2	25	25	150	70	220	0.8	with		
	EPO18R028M25.0-02L	●	2	28	25	150	70	220	0.8	with		
	EPO18R030M32.0-02L	●	2	30	32	175	80	255	1.4	with		
	EPO18R032M32.0-02L	●	2	32	32	175	80	255	1.5	with		
EPO18R035M32.0-02L	●	2	35	32	175	80	255	1.5	with			
EPO18R040M32.0-02L	●	2	40	32	205	50	255	1.6	with			

* The ϕD_c in the above table shows the diameter when MJ chipbreaker is used. When AJ chipbreaker is used, the diameter is equal to the above shown $\phi D_c + 0.2$ mm.

Inserts TPO18 / EPO18

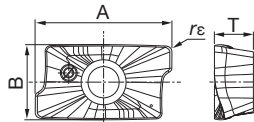


Fig. 7 MJ

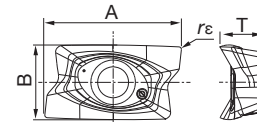
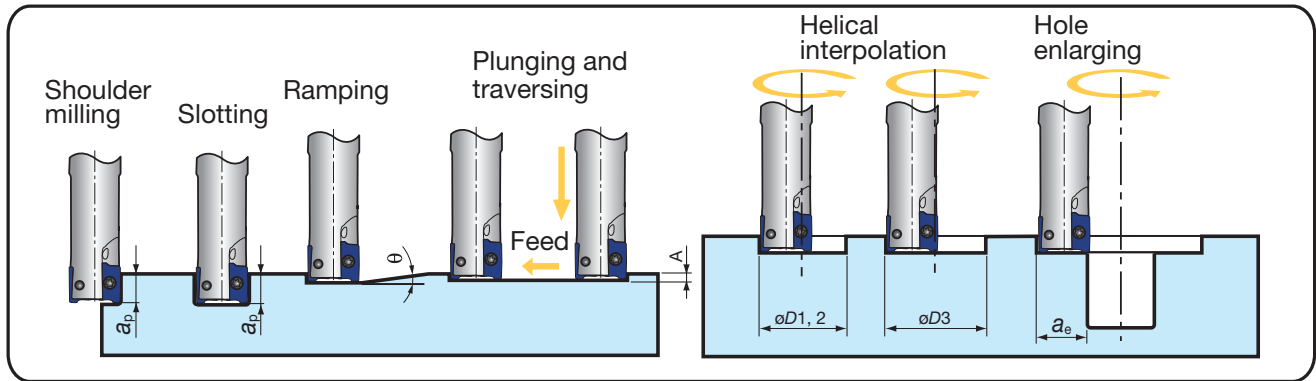


Fig. 8 AJ

Cat. No.	Accuracy	Honing	Grades			Dimensions (mm)				Shape	Cutter
			Coated		Carbide	A	B	T	r_e		
			AH725	AH140							
AOMT180508PDPR-MJ	M	with	●	●		19.5	10.7	5.6	0.8	Fig. 7	EPO18R TPO18R
AOMT180516PDPR-MJ	M	with	●	●		19.5	10.7	5.6	1.6	Fig. 7	
AOMT180524PDPR-MJ	M	with	●	●		19.5	10.7	5.6	2.4	Fig. 7	
AOMT180532PDPR-MJ	M	with	●	●		19.5	10.7	5.6	3.2	Fig. 7	
AOGT180504PDFR-AJ	G	without			●	19.8	10.8	6.1	0.4	Fig. 8	
AOGT180508PDFR-AJ	G	without			●	19.8	10.8	6.1	0.8	Fig. 8	

● : Stocked items

Machining applications



Cat. No.	Tool- ϕ ϕD_c (mm)	Max. depth of cut a_p (mm)	Max. ramping angle θ	Max. plunging A (mm)	Min. machining $\phi D1$ (mm)	Max. machining $\phi D2$ (mm)	*Max. machining $\phi D3$ (mm)	Max. cutting width in enlarging a_e (mm)
EPO07R012...	$\phi 12$	7	8°	0.5	16	23	20.5	11.5
EPO07R016...	$\phi 16$	7	5°	0.5	24	31	28.5	15.5
EPO07R018...	$\phi 18$	7	4°	0.5	28	35	32.5	17.5
EPO07R020...	$\phi 20$	7	3.5°	0.5	32	39	36.5	19.5
EPO07R022...	$\phi 22$	7	3°	0.5	36	43	40.5	21.5
EPO07R025...	$\phi 25$	7	2.5°	0.5	42	49	46.5	24.5
EPO07R028...	$\phi 28$	7	2°	0.5	48	55	52.5	27.5
TPO07R032M16.0E08	$\phi 32$	7	1.8°	0.5	56	63	60.5	31.5
TPO07R040M16.0E10	$\phi 40$	7	1.2°	0.5	72	79	76.5	39.5
TPO07R050M22.0E12	$\phi 50$	7	0.9°	0.5	92	99	96.5	49.5
EPS11012R...	$\phi 12$	10.6	6°	0.5	15	23	21	11.5
EPS11016R...	$\phi 16$	10.6	5°	0.5	20	31	29	15.5
EPS11018R...	$\phi 18$	10.6	4°	0.5	26	35	33	17.5
EPS11020R...	$\phi 20$	10.6	3°	0.5	28	39	37	19.5
EPS11021R...	$\phi 21$	10.6	3°	0.5	30	41	39	20.5
EPS11025R...	$\phi 25$	10.6	2°	0.5	38	49	47	24.5
EPS11026R...	$\phi 26$	10.6	2°	0.5	40	51	49	25.5
EPS11032R...	$\phi 32$	10.6	1.3°	0.5	52	63	61	31.5
EPS11033R...	$\phi 33$	10.6	1.3°	0.5	54	65	63	32.5
TPS11040RB-E	$\phi 40$	10.6	1°	0.5	68	79	77	39.5
TPS11050RB-E	$\phi 50$	10.6	0.42°	0.5	88	99	97	49.5
TPS11063RB-E	$\phi 63$	10.6	0.3°	0.5	114	125	123	62.5
EPO18R025...	$\phi 25$	16.7	6°	1	31.5	48	44	24
EPO18R028...	$\phi 28$	16.7	4.5°	1	37.5	54	50	27
EPO18R030...	$\phi 30$	16.7	4°	1	41.5	58	54	29
EPO18R032...	$\phi 32$	16.7	3.5°	1	45.5	62	58	31
EPO18R035...	$\phi 35$	16.7	3°	1	51.5	68	64	34
TPO/EPO18R040...	$\phi 40$	16.7	2.5°	1	61.5	78	74	39
TPO/EPO18R050...	$\phi 50$	16.7	1.9°	1	81.5	98	94	49
TPO/EPO18R063...	$\phi 63$	16.7	1.4°	1	107.5	124	120	62
TPO18R080M27.0E07	$\phi 80$	16.7	1°	1	141.5	158	154	79
TPO18R100M32.0E08	$\phi 100$	16.7	0.8°	1	181.5	198	194	99
TPO18R125M40.0E09	$\phi 125$	16.7	0.6°	1	231.5	248	244	124
TPO18R160M40.0E10	$\phi 160$	16.7	0.4°	1	301.5	318	314	159

*Flat bottom hole

Notes: Corner r_ϵ for dimensions of $\phi D1$, $\phi D2$, and $\phi D3$: $r_\epsilon = 0.4$ for EPO 07 / EPS 11 and $r_\epsilon = 0.8$ for EPO 18.

Standard cutting conditions

TPO 07 / EPO 07 type

Work material	Brinell hardness HB	Grades	Cutting Speed Vc (m/min)	Feed per tooth: fz (mm/t)		
				MJ	HJ	AJ
Low carbon steels (C15E etc.)	~ 200	AH725	150 (90 - 200)	0.08 (0.05 - 0.1)	0.6 (0.4 - 0.9)	-
High carbon steels (C45, C55 etc.)	200 ~ 300		120 (90 - 150)			
Alloyed steels (42CrMo4, 17Cr3 etc.)	150 ~ 300		100 (80 - 120)			
Tool steels (X155CrVMo 12 1 etc.)	~ 300		120 (90 - 150)			
Stainless steels (X5CrNi 18-9 etc.)	-	AH140	120 (90 - 150)	0.08 (0.05 - 0.1)	0.6 (0.4 - 0.9)	-
Grey cast irons (GG25, GG30 etc.)	150 ~ 250	AH725	150 (100 - 180)	0.08 (0.05 - 0.1)	0.6 (0.4 - 0.9)	-
Ductile cast irons (GGG40 etc.)						
Aluminium alloys (Si < 13%)	-	KS15F	650 (300 - 1000)	-	-	0.14 (0.08 - 0.2)
Aluminium alloys (Si ≥ 13%)			150 (100 - 200)			
Superalloys (Inconel 718, Ti-6Al-4V etc.)	-	AH725	30 (20 - 35)	0.06 (0.05 - 0.08)	0.4 (0.2 - 0.6)	-

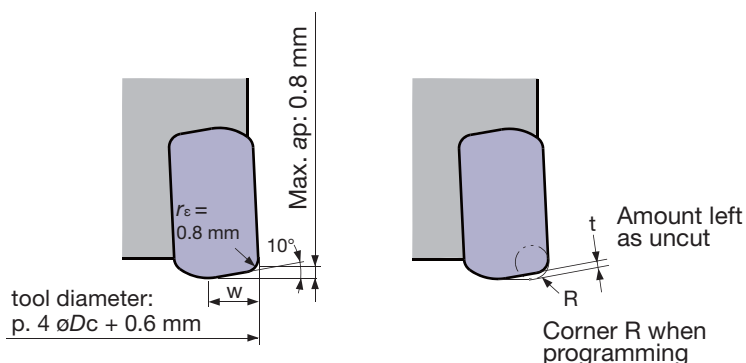
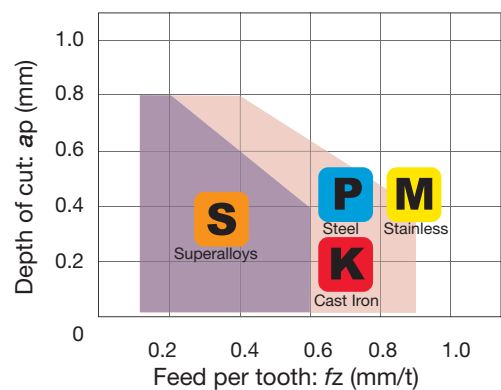
Cautionary points when using HJ inserts

HJ type inserts are designed for high feed machining.

Please note the following when using HJ inserts:

1. The shape of HJ insert differs from that of other inserts (MJ, AJ). However the same insert pocket can be used.
2. When using HJ inserts, all the inserts on the cutter body must be HJ type. Do not use other types of inserts (MJ and AJ types) with HJ inserts on the same cutter body.
3. When using CAD/CAM, please program it as a radius cutter. The table below shows the corner R when programming and the uncut area (t).
4. With HJ inserts, the tool diameter is equal to the diameters shown on p. 4 $\varnothing Dc + 0.6$ mm

TungRec 07 type HJ inserts Standard conditions



Max. depth of cut max ap (mm)	Main cutting edge length W (mm)	Amount left as uncut t (mm)	Corner R when programming
0.8	3.0	0.4	R 0.5
		0.3	R 1.0

TPS 11 / EPS 11 type

Work material	Brinell hardness HB	Grades	Cutting Speed Vc (m/min)	Feed per tooth: fz (mm/t)		
				MJ	MS	AJ
Mild steel, Low Carbon steels (C10, C15E4)	~ 180	NS740	100 (80 - 150)	0.08 (0.05 - 0.10)	-	-
		AH120	100 (80 - 150)			
Carbon steels, Alloy steels (C50E4, 42CrMo4)	~ 300	NS740	100 (80 - 120)			
		T3130	150 (80 - 200)			
Die steels (X40CrMoV5-1 etc.)	~ 300	T3130	100 (80 - 150)			
Stainless steels (X5CrNi 18-9 etc.)	-	AH130	150 (80 - 200)	-	0.10 (0.05 - 0.20)	-
		AH140				
Grey Cast irons, Ductile Cast irons etc. (GG25, GGG40 etc.)	150 ~ 250	T1115	150 (80 - 200)	0.08 (0.05 - 0.1)	-	-
Aluminium alloys (Si < 13%)	-	DS1100	500 (300 - 1000)	-	-	0.10 (0.05 - 0.2)
Aluminium alloys (Si ≥ 13%)		DS1100	150 (100 - 200)	-	-	
Copper alloys		-	KS05F	350 (200 - 500)	-	
Superalloys (Inconel 718, Ti-6Al-4V etc.)	-	AH725	30 (20 - 35)	0.08 (0.06 - 0.12)	-	-

TPO 18 / EPO 18 type

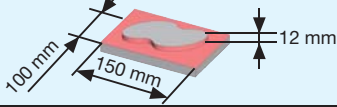
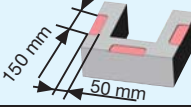
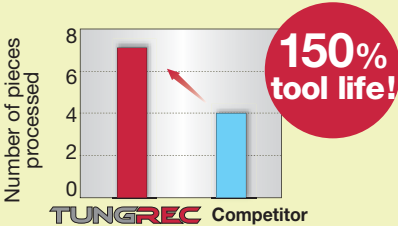
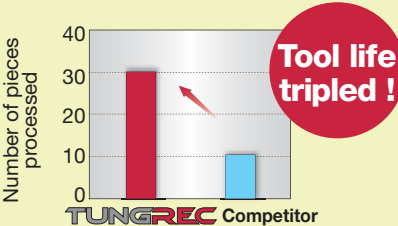
Work material	Brinell hardness HB	Grades	Cutting Speed Vc (m/min)	Feed per tooth: fz (mm/t)	
				MJ	AJ
Low carbon steels (C15E etc.)	~ 200	AH725	180 (100 - 250)	0.15 (0.08 - 0.2)	-
High carbon steels (C45, C55 etc.)	200 ~ 300		150 (100 - 230)	0.12 (0.08 - 0.15)	-
Alloyed steels (42CrMo4, 17Cr3 etc.)	150 ~ 300				
Tool steels (X155CrVMo 12 1 etc.)	~ 300		120 (100 - 180)		
Stainless steels (X5CrNi 18-9 etc.)	-	AH140	150 (90 - 180)	0.15 (0.08 - 0.2)	-
Grey cast irons (GG25, GG30 etc.)	150 ~ 250	AH725	180 (140 - 250)	0.15 (0.08 - 0.22)	-
Ductile cast irons (GGG40 etc.)					
Aluminium alloys (Si < 13%)	-	KS15F	650 (300 - 1000)	-	0.15 (0.05 - 0.25)
Aluminium alloys (Si ≥ 13%)			150 (100 - 200)		
Superalloys (Inconel 718, Ti-6Al-4V etc.)	-	AH725	30 (20 - 35)	0.1 (0.07 - 0.15)	-

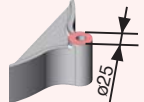
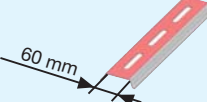
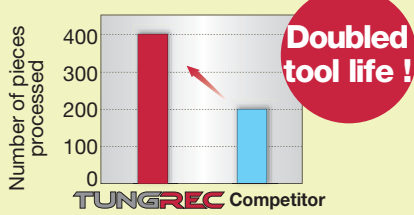
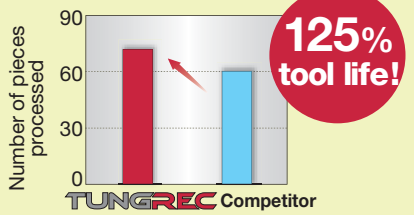
- To remove excessive chip accumulation, use an air blast.
- When chips stick to the cutting edges (aluminium machining), use a water-soluble coolant.
- When cutting an interrupted surface or a casted skin, the feed (fz) should be reduced to the lower recommended

value shown in the above table.

- Cutting conditions are limited by machine power, work piece rigidity, and spindle output. When the cutting width, depth, or overhang length is large, set Vc and fz to the lower recommended values and check the machine power and vibration.

Practical Examples

Work piece type		Machine parts	Compressor parts
Cutter		TPO07R040M16.0E10 ($\phi 40$, $z = 10$)	EPS11033RSB ($\phi 33$, $z = 5$)
Insert		AOMT070208PDPR-MJ	ASMT11T304PDPR-MJ
Grade		AH725	NS740
Work material		42CrMo4	Structural steel
			
Cutting conditions	Cutting speed: V_c (m/min)	130	150
	Feed per tooth: f_z (mm/t)	0.1	0.13
	Feed speed: V_f (mm/min)	1000	940
	Depth of cut: a_p (mm)	3.0	5
	Cutting width: a_e (mm)	~ 30	15
	Method of machining	Shoulder milling	Shoulder milling
	Coolant	Dry	Dry
	Machine	Vertical MC, BT40	Vertical MC, BT50
Results		 150% tool life! $V_f = 600 \rightarrow 1000$ mm/min Improves productivity and makes tool life very stable.	 Tool life tripled! Improves tool life and surface finish, drastically.

Work piece type		Machine parts	Transportation rail
Cutter		TPS11063RB-E ($\phi 63$, $z = 8$)	TPO18R050M22.0E05 ($\phi 50$, $z = 5$)
Insert		ASMT11T308PDPR-MJ	AOMT180516PDPR-MJ
Grade		AH120	AH725
Work material		GGG45	C22E
			
Cutting conditions	Cutting speed: V_c (m/min)	250	220
	Feed per tooth: f_z (mm/t)	0.15	0.16
	Feed speed: V_f (mm/min)	1500	1200
	Depth of cut: a_p (mm)	2	6
	Cutting width: a_e (mm)	26	20
	Method of machining	Face milling	Face milling
	Coolant	Dry	Dry
	Machine	Horizontal MC, BT40	Vertical MC, BT50
Results		 Doubled tool life! Reduces spindle load due to low cutting force and improves cutting noise.	 125% tool life! Reduces machining noise with low cutting forces



Tungaloy Corporation (Head office)

11-1 Yoshima-Kogyodanchi
Iwaki-city, Fukushima, 970-1144 Japan
Phone: +81-246-36-8501 Fax: +81-246-36-8542
<http://www.tungaloy.co.jp/>

Tungaloy America, Inc.

3726 N Ventura Drive, Arlington Heights, IL 60004, U.S.A.
Phone: +1-888-554-8394 Fax: +1-888-554-8392
<http://www.tungaloyamerica.com>

Tungaloy Canada

432 Elgin St. Unit 3, Brantford, Ontario N3S 7P7, Canada
Phone: +1-519-758-5779 Fax: +1-519-758-5791
<http://www.tungaloyamerica.com/>

Tungaloy de Mexico S.A.

C Los Arellano 113, Parque Industrial Siglo XXI
Aguascalientes, AGS, Mexico 20290
Phone: +52-449-929-5410 Fax: +52-449-929-5411
<http://www.tungaloyamerica.com/>

Tungaloy do Brasil Comércio de Ferramentas de Corte Ltda.

Rua dos Sabias N.104
13280-000 Vinhedo, São Paulo, Brazil
Phone: +55-19-38262757 Fax: +55-19-38262757
<http://www.tungaloy.co.jp/br/>

Tungaloy Germany GmbH

Elisabeth-Selbert-Str. 3
D-40764 Langenfeld, Germany
Phone: +49-2173-90420-0 Fax: +49-2173-90420-19
<http://www.tungaloy.de>

Tungaloy France S.A.S.

ZA Courtaboeuf - Le Rio, 1 rue de la Terre de feu
F-91952 Courtaboeuf Cedex, France
Phone: +33-1-6486-4300 Fax: +33-1-6907-7817
<http://www.tungaloy-eu.com>

Tungaloy Italia S.r.l.

Via E. Andolfato 10
I-20126 Milano, Italy
Phone: +39-02-252012-1 Fax: +39-02-252012-65
<http://www.tungaloy-eu.com/>

Tungaloy Czech s.r.o

Turanka 115
CZ-627 00 Brno, Czech Republic
Phone: +420-532 123 391 Fax: +420-532 123 392
<http://www.tungaloy.co.jp/cz/>

Tungaloy Ibérica S.L.

C/La Pau, nº46
E-08243 Manresa (BCN). SPAIN
Phone: +34 93 1131360 Fax: +34 93 1131361
<http://www.tungaloy.co.jp/es/>

Tungaloy Scandinavia AB

S:t Lars Väg 42A
SE-22270 Lund, Sweden
Phone: +46-462119200 Fax: +46-462119200
<http://www.tungaloy.co.jp/se/>

LLC Tungaloy Rus

Grazhdanskiy Prospectus, 29a
Belgorod, 308019, Russia
Phone: +7 4722 33 97 23 Fax: +7 4722 33 97 23
<http://www.tungaloy.co.jp/ru/>

Tungaloy Polska Sp. z o.o.

ul. Genewska 24
03-963 Warszawa, Poland
Phone: +48-22-617-0890 Fax: +48-22-617-0890
<http://www.tungaloy.co.jp/pl/>

Tungaloy U.K. Ltd

Woodgate Business Park, Bartley Green
Birmingham B32 3DE, UK
Phone: +44 121 244 3064 Fax: +44 121 270 9694
<http://www.tungaloy.co.jp/uk> salesinfo@tungaloyuk.co.uk

Tungaloy Cutting Tool (Shanghai) Co.,Ltd.

Rm No 401 No.88 Zhabei, Jiangchang No.3 Rd
Shanghai 200436, China
Phone: +86-21-3632-1880 Fax: +86-21-3621-1918
<http://www.tungaloy.co.jp/tcts/>

Tungaloy Cutting Tool (Thailand) Co.,Ltd.

11th Floor, Sorachai Bldg. 23/7, Soi Sukhumvit 63
Klongtonnue, Wattana, Bangkok 10110, Thailand
Phone: +66-2-714-3130 Fax: +66-2-714-3134
<http://www.tungaloy.co.th/>

Tungaloy Singapore (Pte.), Ltd.

50 Kallang Avenue #06-03 Noel Corporate Building
Singapore 339505
Phone: +65-6391-1833 Fax: +65-6299-4557
<http://www.tungaloy.co.jp/tspl/>

Tungaloy India Pvt. Ltd.

Unit#13, B wing, 8th Floor, Kamala Mills Compound
Trade World, Lower Parel (West), Mumbai - 4000 13. India
Phone: +91-22-6124-8804 Fax: +91-22-6124-8899
<http://www.tungaloy.co.jp/in/>

Tungaloy Korea Co., Ltd

#1312, Byucksan Digital Valley 5-cha
60-73 Gasan-dong, Geumcheon-gu
153-788 Seoul, Korea
Phone: +82-2-6393-8930 Fax: +82-2-6393-8952
<http://www.tungaloy.co.jp/kr/>

Tungaloy Malaysia Sdn Bhd

50 K-2, Kelana Mall, Jalan SS6/14, Kelana Jaya, 47301
Petaling Jaya, Selangor Darul Ehsan, Malaysia
Phone: +603-7805-3222 Fax: +603-7804-8563
<http://www.tungaloy.co.jp/my/>

Tungaloy Australia Pty Ltd

Unit 308/33 Lexington Drive
Bella Vista NSW 2153, Australia
Phone: +612-9672-6844 Fax: +612-9672-6866
<http://www.tungaloy.co.jp/au>

Distributed by:



ISO 9001 certified
QC00J0056
Tungaloy Corporation

18/10/1996

ISO 14001 certified
EC97J1123
Tungaloy Group
Japan site and Asian
production site
26/11/1997