

MILLLINE Shoulder milling cutter

TECMILL

TPM / EPM / TLM type

**Extended version
with roughing type**

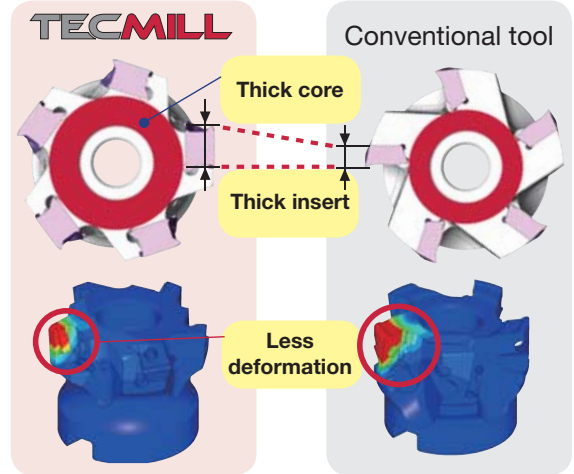
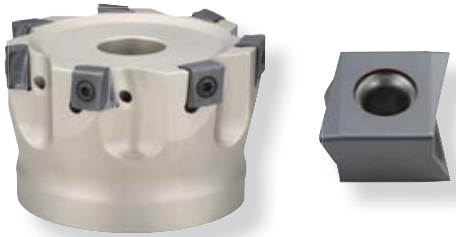
**Highly rigid cutters for roughing on medium
to large size machines**



Features

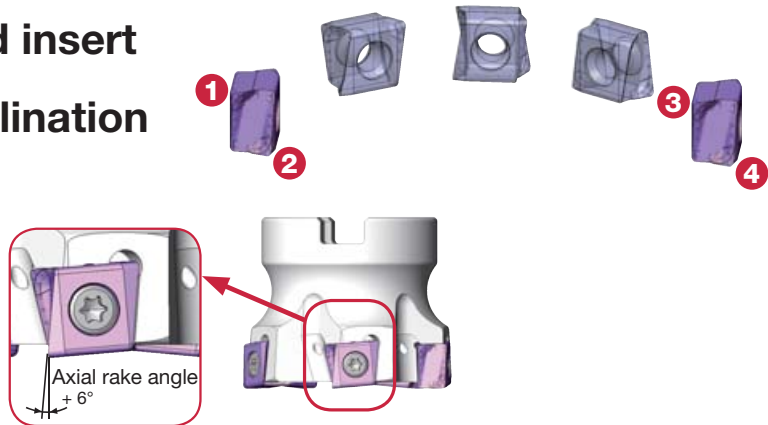
● Excellent reliability

- Highly rigid cutter with large web thickness
 - Tangential insert with tough cutting edges
- Delivers high productivity with large depth of cut



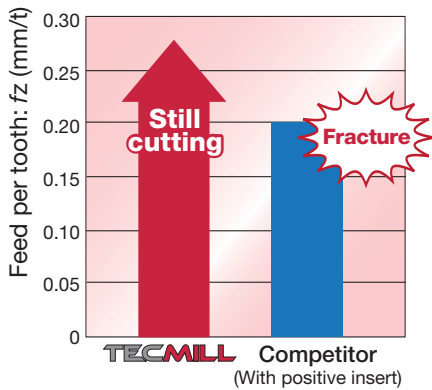
● Economical 4 corner insert

- Economical double sided insert
- Large rake angle and inclination reduce cutting forces



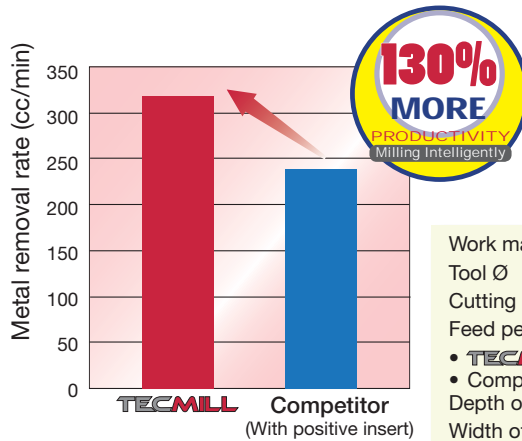
Cutting performance

Comparison of cutting edge toughness



Work material : S55C / C55 (200HB)
 Tool Ø : ø50 mm
 Cutting speed : Vc = 250 m/min
 Depth of cut : ap = 3 mm
 Width of cut : ae = 12.5 mm

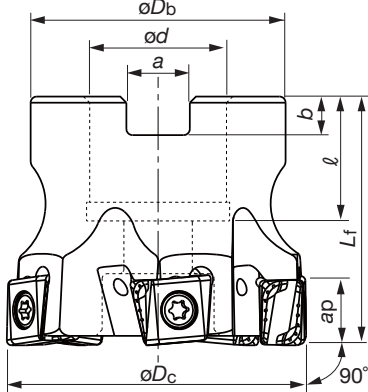
Comparison of metal removal rate



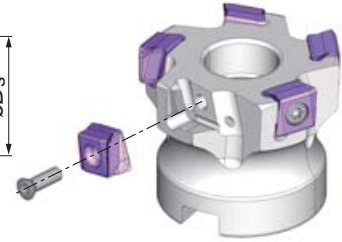
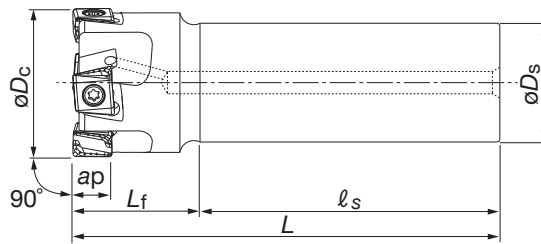
Work material : S55C / C55 (200HB)
 Tool Ø : ø63 mm
 Cutting speed : Vc = 150 m/min
 Feed per tooth : fz = 0.2 mm/t (z = 6)
 • **TECMILL**
 • Competitor : fz = 0.15 mm/t (z = 6)
 Depth of cut : ap = 10 mm
 Width of cut : ae = 35 mm
 Cutting fluids : Dry

Milling cutter

Bore type



Shank type



LMMU11 type : Max. $ap = 9.7$ mm
LMMU16 type : Max. $ap = 15.1$ mm

Bore type: Replacement parts

Description		Cat. No.	
Applicable cutter	TPM11R...	TPM16R...	
Clamping screw	CSTB-3.5L110	CSTB-5L159	
Wrench	Torx bit	BT15S	BT20S
	Grip	H-TB	H-TB
Mono block type substitution wrench		T-15T	T-20T

Bore type

JIS

Pitch	Cat. No.	Stock	No. of Inserts	Dimensions (mm)							Weight (kg)	Air hole	Center bolt	Inserts
				ϕDc	ϕDb	ϕd	ℓ	L_f	b	a				
Coarse	TPM11R050M22.0-05	●	5	50	41	22	20	40	6	10	0.3	with	CM10x30H	LMMU1107**PNER-MJ
	TPM11R063M22.0-06	●	6	63	41	22	20	40	6	10	0.5	with	CM10x30H	
	TPM11R080M25.4-07	●	7	80	46	25.4	26	50	6	9.5	0.9	with	CM12x30H	
	TPM11R100M31.7-08	●	8	100	60	31.75	32	50	8	12.7	1.4	with	TMBA-M16H	
	TPM16R080M25.4-05	●	5	80	46	25.4	26	50	6	9.5	1.0	with	CM12x30H	
	TPM16R100M31.7-06	●	6	100	60	31.75	32	50	8	12.7	1.6	with	TMBA-M16H	
Close	TPM16R125M38.1-07	●	7	125	80	38.1	38	63	10	15.9	3.0	with	TMBA-M20H	LMMU1609**PNER-MJ
	TPM11R080M25.4-09	●	9	80	46	25.4	26	50	6	9.5	1.0	with	CM12x30H	
	TPM11R100M31.7-11	●	11	100	60	31.75	32	50	8	12.7	1.5	with	TMBA-M16H	LMMU1107**PNER-MJ

ISO

Pitch	Cat. No.	Stock	No. of Inserts	Dimensions (mm)							Weight (kg)	Air hole	Center bolt	Inserts
				ϕDc	ϕDb	ϕd	ℓ	L_f	b	a				
Coarse	TPM11R050M22.0E05	●	5	50	41	22	20	40	6.3	10.4	0.3	with	CM10x30H	LMMU1107**PNER-MJ
	TPM11R063M22.0E06	●	6	63	41	22	20	40	6.3	10.4	0.5	with	CM10x30H	
	TPM11R080M27.0E07	●	7	80	50	27	22	50	7	12.4	1.0	with	CM12x30H	
	TPM11R100M32.0E08	●	8	100	60	32	28.5	50	8	14.4	1.4	with	TMBA-M16H	
	TPM16R080M27.0E05	●	5	80	50	27	22	50	7	12.4	1.0	with	CM12x30H	
	TPM16R100M32.0E06	●	6	100	60	32	28.5	50	8	14.4	1.5	with	TMBA-M16H	
	TPM16R125M40.0E07	●	7	125	71	40	32	63	9	16.4	2.7	with	TMBA-M20H	
Close	TPM11R080M27.0E09	●	9	80	50	27	22	50	7	12.4	1.0	with	CM12x30H	LMMU1107**PNER-MJ
	TPM11R100M32.0E11	●	11	100	60	32	28.5	50	8	14.4	1.5	with	TMBA-M16H	

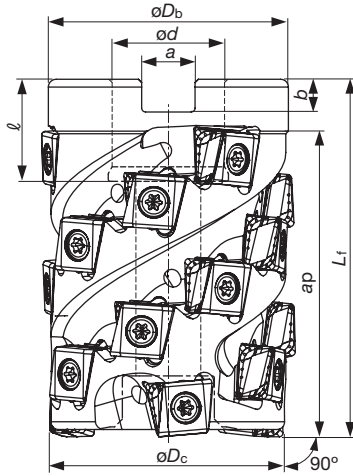
Shank type

Cat. No.	Stock	No. of Inserts	Dimensions (mm)					Weight (kg)	Air hole	Inserts	Parts	
			ϕDc	ϕDs	ℓ_s	L_f	L				Clamping screw	Wrench (Substitution)
EPM11R032M32.0-03	●	3	32	32	80	35	115	0.6	with	LMMU1107**PNER-MJ	CSTB-3.5L110	T-15DB (T-15D)
EPM11R040M32.0-04	●	4	40	32	80	35	115	0.7	with			
EPM11R050M32.0-04	●	4	50	32	80	40	120	0.9	with			
EPM11R063M32.0-06	●	6	63	32	80	40	120	1.2	with			
EPM11R080M32.0-07	●	7	80	32	80	40	120	1.6	with			

● : Stocked items

Roughing type

NEW



Roughing type: Replacement parts

Description		Cat. No.	
Applicable cutter	TLM11R050...	TLM11R063...	
Clamping screw	CSTB-3.5L110		
Wrench	Torx bit	BT15S	
	Grip	H-TB	
Mono block type substitution wrench		T-15T	
Center bolt	SD06-A3	SD08-52	

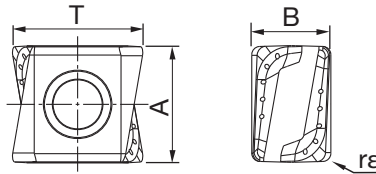
JIS

Cat. No.	Stock	No. of eff. edge lines / inserts	Dimensions (mm)								Weight (kg)	Air hole	Inserts
			øDc	øDb	ød	l	Lf	b	a	ap			
NEW TLM11R050M22.0E03	●	3/21	50	47	22	20	70	6.3	10.4	58.5	0.8	with	LMMU1107**PNER-MJ
NEW TLM11R063M25.4-04	●	4/32	63	59	25.4	26	80	6	9.5	66.9	1.4	with	

ISO

Cat. No.	Stock	No. of eff. edge lines / inserts	Dimensions (mm)								Weight (kg)	Air hole	Inserts
			øDc	øDb	ød	l	Lf	b	a	ap			
NEW TLM11R050M22.0E03	●	3/21	50	47	22	20	70	6.3	10.4	58.5	0.8	with	LMMU1107**PNER-MJ
NEW TLM11R063M27.0E04	●	4/32	63	59	27	22	80	7	12.4	66.9	1.4	with	

Inserts



Cat. No.	Accuracy	Honing	Stock					Dimensions (mm)				Cutter
			Coated grades					A	B	T	rε	
			AH725	T3130	AH140	AH120	T1115					
LMMU110708PNER-MJ	M	with	●	●	●	●	●	10.5	7.1	11.7	0.8	EPM11... TPM11... TLM11...
LMMU110716PNER-MJ	M	with	●	●	●	●	●	10.5	7.1	11.5	1.6	
LMMU110724PNER-MJ	M	with	●	●	●	●	●	10.5	7.1	11.3	2.4	
LMMU110732PNER-MJ	M	with	●	●	●	●	●	10.5	7.1	11.1	3.2	
LMMU160908PNER-MJ	M	with	●	●	●	●	●	16.0	9.5	17.3	0.8	TPM16...
LMMU160916PNER-MJ	M	with	●	●	●	●	●	16.0	9.5	17.1	1.6	
LMMU160924PNER-MJ	M	with	●	●	●	●	●	16.0	9.5	16.9	2.4	
LMMU160932PNER-MJ	M	with	●	●	●	●	●	16.0	9.5	16.8	3.2	

● : Stocked items

Standard cutting conditions

● Bore, shank type

Work material	Brinell hardness HB	Priority	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
Low carbon steels (S15C / C15E4 etc.)	~ 200	First choice	AH725	100 - 250	0.12 - 0.3
		For impact resistance	AH140	80 - 180	
		For wear resistance	T3130	120 - 250	
High carbon steels (S45C / C45 etc.)	200 ~ 300	First choice	AH725	100 - 230	0.12 - 0.25
		For impact resistance	AH140	80 - 180	
		For wear resistance	T3130	120 - 250	
Alloyed steels (SCM440 / 42CrMo4 etc.)	150 ~ 300	First choice	AH725	100 - 230	0.12 - 0.25
		For impact resistance	AH140	80 - 150	
		For wear resistance	T3130	120 - 250	
Tool steels (SKD61 / X40CrMoV5-1 etc.)	~ 300	First choice	AH725	100 - 180	0.12 - 0.25
		For impact resistance	AH140	80 - 120	
		For wear resistance	T3130	100 - 180	
Stainless steels (SUS304 / X5CrNi18-9 etc.)	-	First choice	AH140	90 - 180	0.12 - 0.3
Grey cast irons (FC250 / GG25 / 250 etc.)	150 ~ 250	First choice	AH120	140 - 250	0.12 - 0.3
For wear resistance		T1115			
Ductile cast irons (FCD450 / GGG45 / 450-10S etc.)		First choice	AH120	110 - 200	0.12 - 0.3
		For wear resistance	T1115		
Heat-resisting alloy (Inconel 718, Ti-6Al-4V etc.)	-	First choice	AH725	20 - 50	0.1 - 0.2

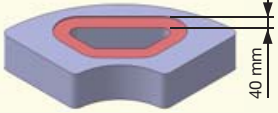
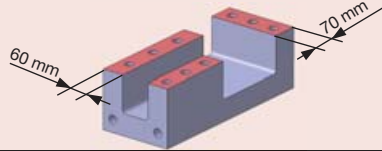
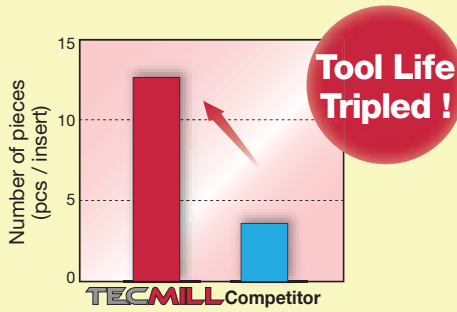
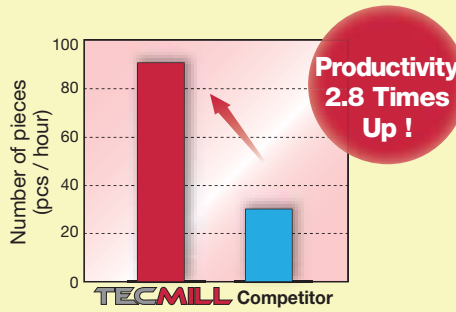
- To remove excessive chip accumulation use an air blast.
- When cutting an interrupted surface or a casting skin, the feed (fz) should be reduced to the lower recommended value shown in the above table.

- 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.

● Roughing type

Work material	Brinell hardness HB	Priority	Grade	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
Low carbon steels (S15C / C15E4 etc.)	~ 200	First choice	AH725	100 - 250	0.10 - 0.23
		Priority for impact resistance	AH140	80 - 180	
		Priority for wear resistance	T3130	100 - 250	
High carbon steels (S45C / C45 etc.)	200 ~ 300	First choice	AH725	100 - 200	0.08 - 0.21
		Priority for impact resistance	AH140	80 - 150	
		Priority for wear resistance	T3130	100 - 200	
Alloyed steels (SCM440 / 42CrMo4 etc.)	150 ~ 300	First choice	AH725	100 - 200	0.08 - 0.21
		Priority for impact resistance	AH140	80 - 150	
		Priority for wear resistance	T3130	100 - 200	
Tool steels (SKD61 / X40CrMoV5-1 etc.)	~ 300	First choice	AH725	100 - 150	0.08 - 0.21
		Priority for impact resistance	AH140	80 - 120	
		Priority for wear resistance	T3130	100 - 150	
Stainless steels (SUS304 / X5CrNi18-9 etc.)	-	First choice	AH140	90 - 150	0.08 - 0.21
Grey cast irons (FC250 / GG25 / 250 etc.)	150 ~ 250	First choice	AH120	100 - 250	0.10 - 0.25
Priority for wear resistance		T1115			
Ductile cast irons (FCD450 / GGG45 / 450-10S etc.)		First choice	AH120	100 - 250	0.10 - 0.25
		Priority for wear resistance	T1115		
Heat-resisting alloy (Inconel 718, Ti-6Al-4V etc.)	-	First choice	AH725	20 - 50	0.06 - 0.15

Practical examples

Work piece type		Case	Machine parts
Cutter		TPM16R100M31.7-06 (ø100, z = 6)	TPM11R100M31.7-11 (ø100, z = 11)
Insert		LMMU160908PNER-MJ	LMMU110708PNER-MJ
Grade		AH725	AH120
Work material		Stainless steel	FC300 / GG30 / 300
			
Cutting conditions	Cutting speed: V_c (m/min)	100	150
	Feed per tooth: f_z (mm/t)	0.3	0.2
	Depth of cut: ap (mm)	10	7
	Cutting width: ae (mm)	40	60 ~ 70
	Method of machining	Shoulder milling	Face milling
	Coolant	Dry	Wet
Machine		Vertical M/C, BT50	Vertical M/C, BT50
Results			
		Chipping on edges are significantly reduced. Increased number of corners enables customer to cut machining cost.	Tangential inserts can double the D.O.C and the close pitch cutter increases feed speed by 40%.



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