

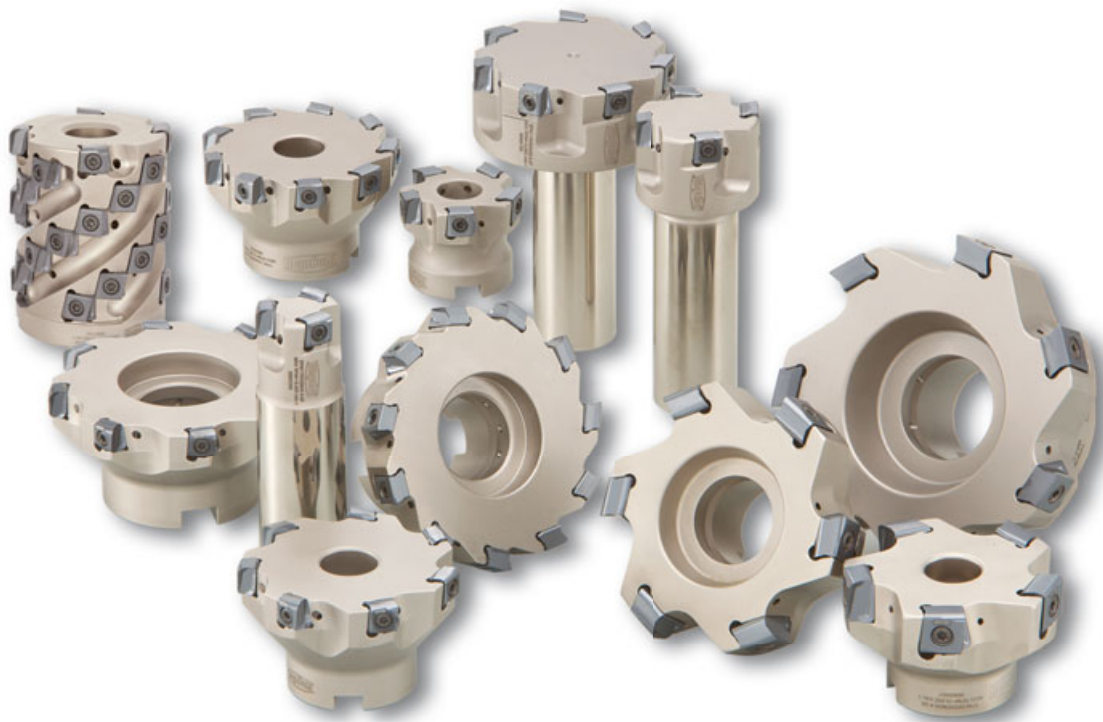
Unprecedented stability in roughing / finishing due to highly reliable tangential insert



INDUSTRY 4.0
FEED the SPEED!



ACCELERATED MACHINING



High productivity and stable cutting with large depth of cut in shouldering and finishing

Tangential insert with **high stability** guarantees **exceptional reliability** in rough shouldering and finishing

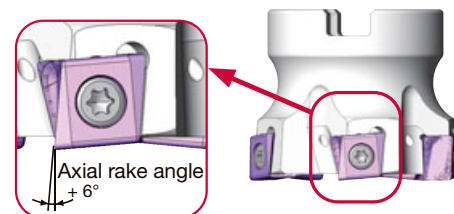
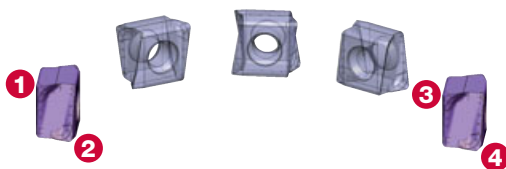
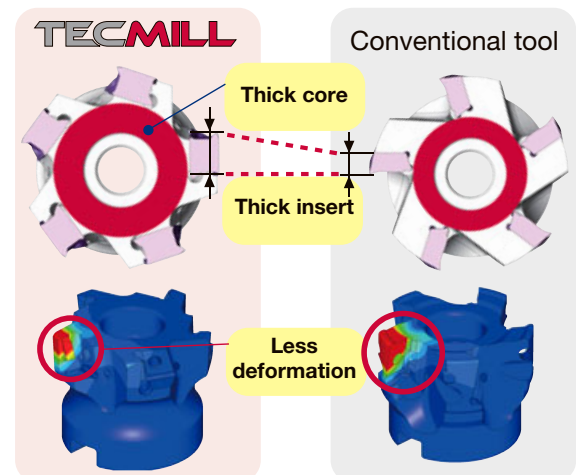
Reliable operation

Delivers high productivity with large depth of cut

- Highly rigid cutter with thicker core
- Tangentially mounted insert with thicker cross section and tough cutting edges

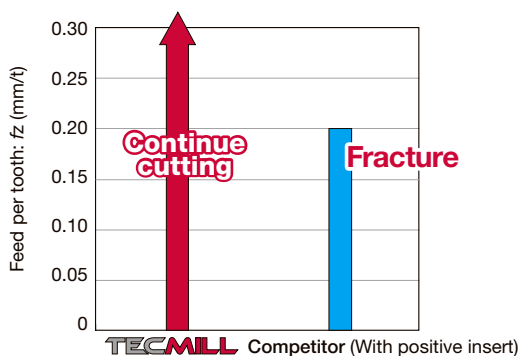
4-cornered insert

- Economical double sided insert
- Large rake and inclination angles reduce cutting forces and provide stable, smooth cutting



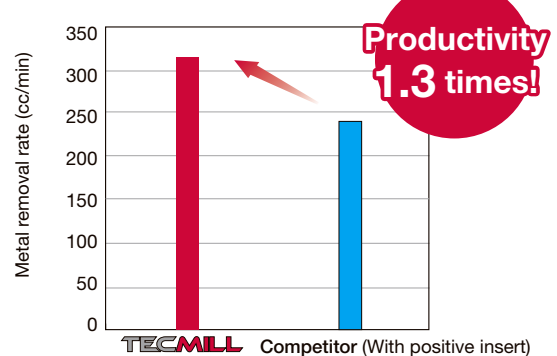
CUTTING PERFORMANCE

■ Comparison of cutting edge toughness



Workpiece : S55C / C55 (200HB)
 Tool ϕ : $\phi 50$ mm
 Cutting speed : $V_c = 250$ m/min
 Depth of cut : $a_p = 3$ mm
 Width of cut : $a_e = 12.5$ mm

■ Comparison of metal removal rate



Workpiece : S55C / C55 (200HB) Depth of cut : $a_p = 10$ mm
 Tool ϕ : $\phi 63$ mm Width of cut : $a_e = 35$ mm
 Cutting speed : $V_c = 150$ m/min Cutting fluids : Dry
 Feed per tooth
 TECMILL : $f_z = 0.2$ mm/t ($z = 6$)
 Competitor : $f_z = 0.15$ mm/t ($z = 6$)

Rich grade lineup for every kind of material

A total of four grades, including two new CVD grades

New

AH3135

P

M

Steel Stainless

- PVD grade with high chipping resistance
- Suitable for machining steel and stainless steel in general cutting conditions

New

T1215

K

Cast iron

- CVD grade with outstanding wear and chipping resistance
- Best for cast iron at high-speed machining

New

T3225

P

M

Steel Stainless

- CVD grade with outstanding wear and chipping resistance
- Most suited for steel and stainless steel at high-speed machining

AH725

P

S

H

Steel Superalloys Hard materials

- PVD grade with high wear resistance
- Suitable for difficult-to-cut materials and high-hardened steel

AH120

P

K

Steel Cast iron

- PVD grade with a well-balanced wear and fracture resistance
- Ideal for general machining of steel and stainless steel

AH140

P

M

Steel Stainless

- PVD grade with high chipping resistance
- Suitable for workpieces required interrupted cutting and stainless steel

T3225 / T1215

Special Surface Technology PREMIUMTEC

Enhanced coating resistance to chipping and peeling

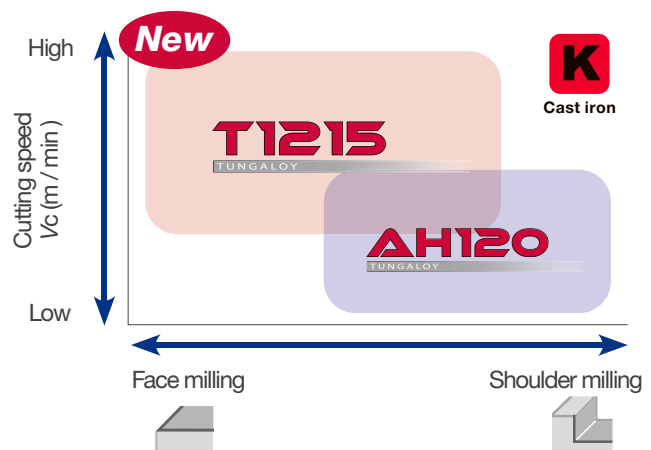
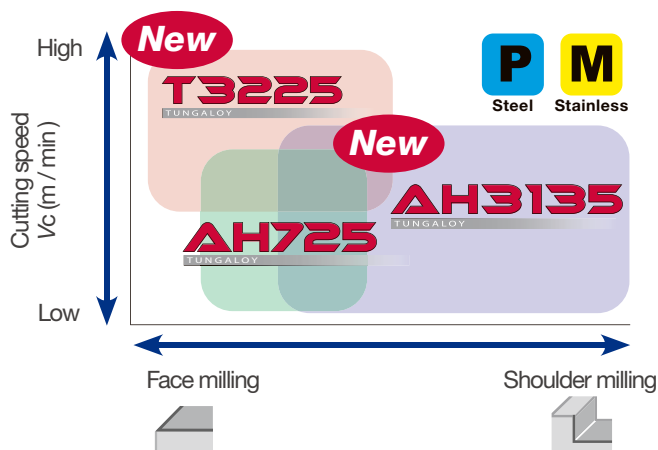
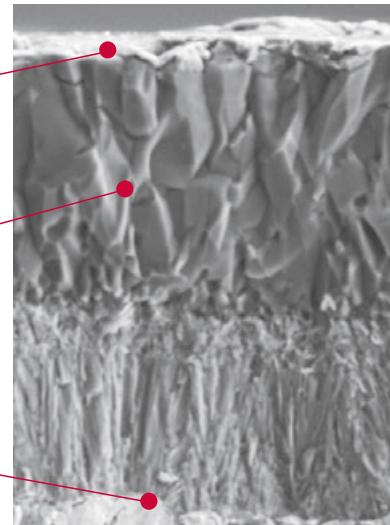
- Special surface post-treatment technology improves surface smoothness

Superior wear resistance in high speed cutting

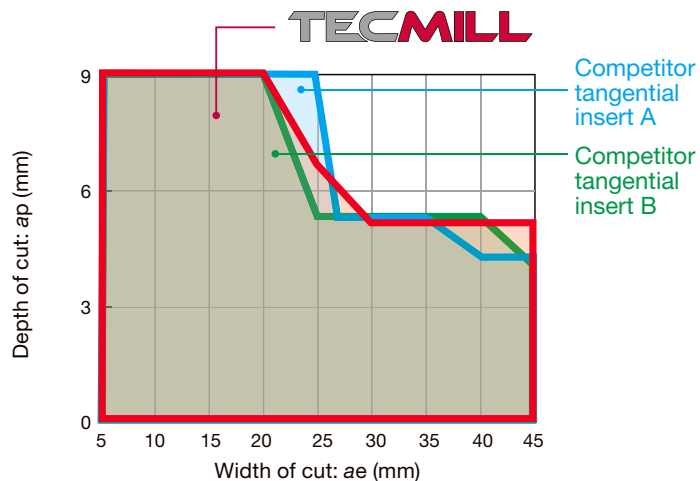
- A thick alumina (Al₂O₃) layer improves insert life in a high cutting temperature generated during high speed machining

Enhanced coating resistance to peeling

- Strong adhesion between the carbide substrate and the coating layer improves coating resistance to peeling



APPLICATION RANGE

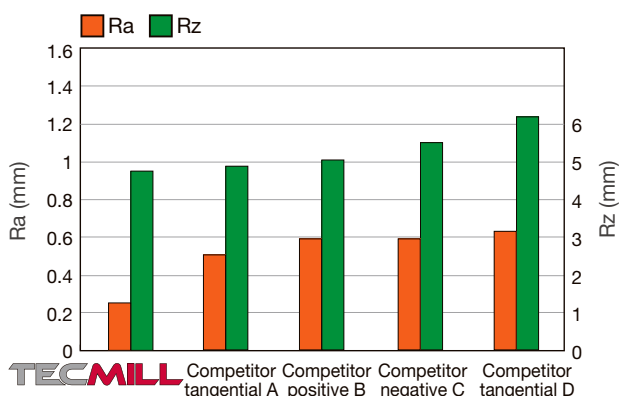


Cutter	: TPM11R050M22.0E05
	($\phi D_c = 50$ mm, $z = 5$)
Insert	: LMMU110708PNER-MJ AH3135
Workpiece material	: S55C / C55
Cutting speed	: $V_c = 180$ m/min
Feed per tooth	: $f_z = 0.2$ mm/t
Feed speed	: $V_f = 1146$ mm/min
Number of revolutions	: $n = 1146$ min ⁻¹
Coolant	: Dry
Machine	: Vertical M/C, BT50

TecMill maximizes the application area of tangential inserts.

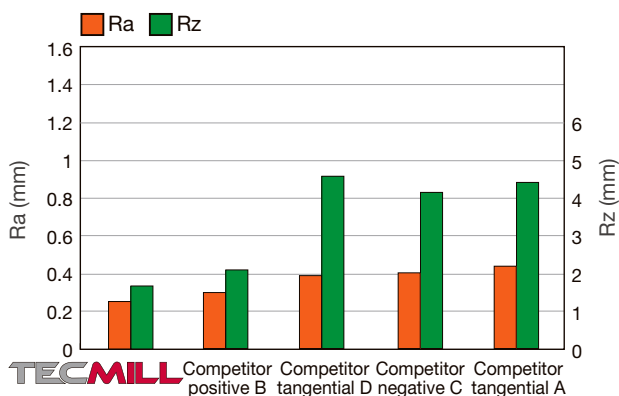
CUTTING PERFORMANCE

Surface finish: Carbon steel



P	Cutter	: TPM11R050M22.0E05
		($\phi D_c = 50$ mm, $z = 5$)
	Insert	: LMMU110708PNER-MJ AH3135
	Workpiece material	: S55C / C55
	Cutting speed	: $V_c = 250$ m/min
	Feed per tooth	: $f_z = 0.1$ mm/t
	Feed speed	: $V_f = 636.6$ mm/min
	Number of revolutions	: $n = 1591$ min ⁻¹
	Depth of cut	: $a_p = 1.5$ mm
	Cutting width	: $a_e = 40$ mm
	Coolant	: Dry
	Machine	: Vertical M/C, BT50

Surface finish: Stainless steel



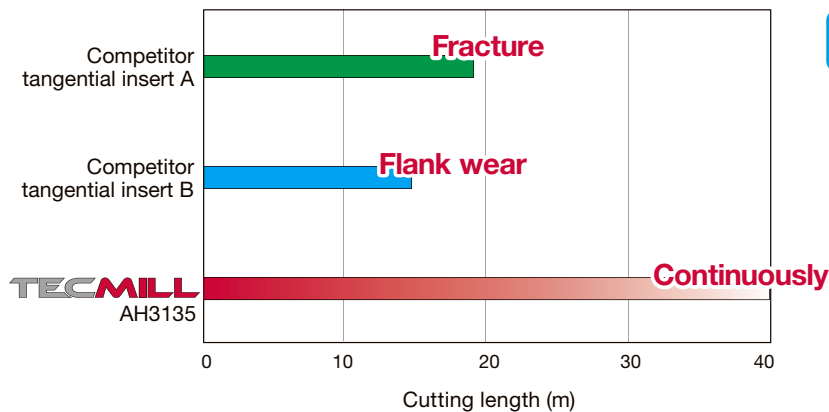
M	Cutter	: TPM11R050M22.0E05
		($\phi D_c = 50$ mm, $z = 5$)
	Insert	: LMMU110708PNER-MJ AH3135
	Workpiece material	: SUS304 / X5CrNi18-9
	Cutting speed	: $V_c = 150$ m/min
	Feed per tooth	: $f_z = 0.1$ mm/t
	Feed speed	: $V_f = 477$ mm/min
	Number of revolutions	: $n = 955$ min ⁻¹
	Depth of cut	: $a_p = 2$ mm
	Cutting width	: $a_e = 40$ mm
	Coolant	: Wet
	Machine	: Vertical M/C, BT50

Surface roughness:

Highly reliable insert and body provide excellent surface roughness compared to the competitors including positive inserts and tangential inserts.

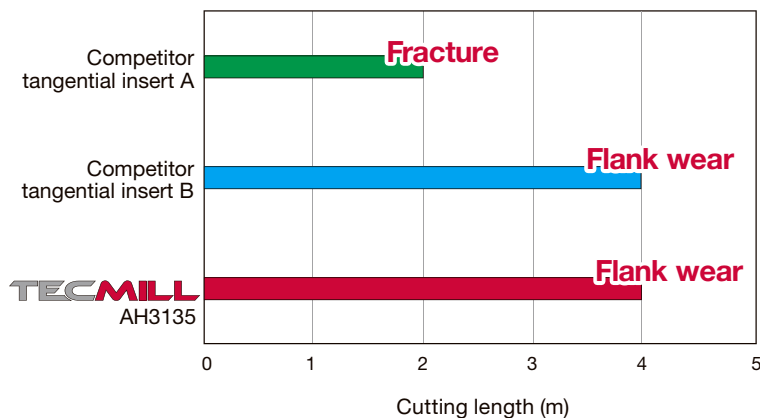
CUTTING PERFORMANCE

Tool life: Carbon steel

**P**

Cutter : TPM11R050M22.0E05
 (øDc = 50 mm, z = 5)
 Insert : LMMU110708PNER-MJ AH3135
 Workpiece material : S55C / C55
 Cutting speed : $V_c = 180$ m/min
 Feed per tooth : $f_z = 0.2$ mm/t
 Feed speed : $V_f = 229$ mm/min
 Number of revolutions : $n = 1146$ min⁻¹
 Depth of cut : $a_p = 5$ mm
 Cutting width : $a_e = 30$ mm
 Coolant : Dry
 Machine : Vertical M/C, BT50

Tool life: Cast iron

**K**

Cutter : TPM11R050M22.0E05
 (øDc = 50 mm, z = 5)
 Insert : LMMU110708PNER-MJ T1215
 Workpiece material : FC250 /GG25 / 250
 Cutting speed : $V_c = 250$ m/min
 Feed per tooth : $f_z = 0.2$ mm/t
 Feed speed : $V_f = 318$ mm/min
 Number of revolutions : $n = 1592$ min⁻¹
 Depth of cut : $a_p = 5$ mm
 Cutting width : $a_e = 20$ mm
 Coolant : Dry
 Machine : Vertical M/C, BT50

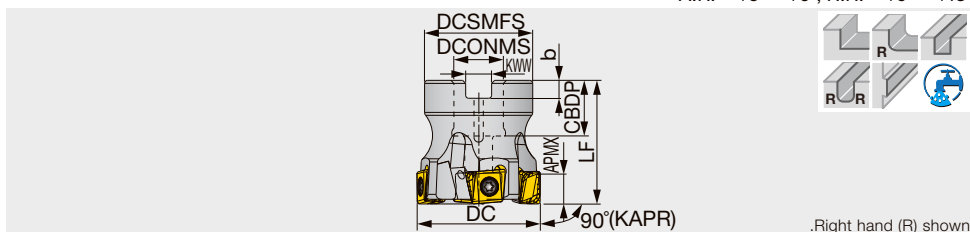
Tool life:

Due to tough cutting edges and a new grade, tool life is increased to 200% at the maximum.

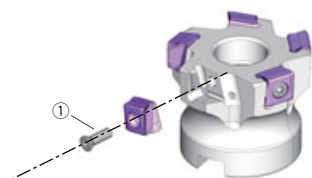
TPM11,16

Square shoulder mills with LMMU type tangential clamped insert with 4 edges

A.R. = +5° ~ +6°, R.R. = +9° ~ +13°



Designation	APMX	DC	CICT	DCSMFS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TPM11R050M22.0-05	9.7	50	5	41	40	22	20	10	6	0.3	with	LMMU1107...
TPM11R050M22.0E05	9.7	50	5	41	40	22	20	10.4	6.3	0.3	with	LMMU1107...
TPM11R063M22.0-06	9.7	63	6	41	40	22	20	10	6	0.5	with	LMMU1107...
TPM11R063M22.0E06	9.7	63	6	41	40	22	20	10.4	6.3	0.5	with	LMMU1107...
TPM11R080M25.4-07	9.7	80	7	46	50	25.4	26	9.5	6	0.9	with	LMMU1107...
TPM11R080M25.4-09	9.7	80	9	46	50	25.4	26	9.5	6	1	with	LMMU1107...
TPM11R100M31.7-08	9.7	100	8	60	50	31.75	32	12.7	8	1.4	with	LMMU1107...
TPM11R100M31.7-11	9.7	100	11	60	50	31.75	32	12.7	8	1.5	with	LMMU1107...
TPM16R080M25.4-05	15.1	80	5	46	50	25.4	26	9.5	6	1	with	LMMU1609...
TPM16R100M31.7-06	15.1	100	6	60	50	31.75	32	12.7	8	1.6	with	LMMU1609...
TPM16R125M38.1-07	15.1	125	7	80	63	38.1	38	15.9	10	3	with	LMMU1609...



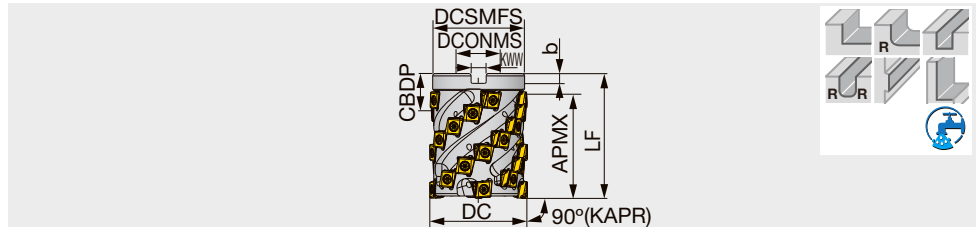
SPARE PARTS

Designation	① Clamping screw	Grip	Center bolt	Center bolt 1	Torx bit	Wrench
TPM11R050, 063...	SM35-114-H0	-	-	CM10X30H	-	T-15DF
TPM11R080M...	SM35-114-H0	-	-	CM12X30H	-	T-15DF
TPM11R100M...	SM35-114-H0	-	TMBA-M16H	-	-	T-15DF
TPM16R080M25.4-05	CSTB-5L159	H-TB	-	CM12X30H	BT20S	-
TPM16R100M31.7-06	CSTB-5L159	H-TB	TMBA-M16H	-	BT20S	-
TPM16R125M38.1-07	CSTB-5L159	H-TB	TMBA-M20H	-	BT20S	-

TLM11

Square shoulder mills for roughing with LMMU type tangential clamped insert with 4 edges

A.R. = +5° ~ +6°, R.R. = +9° ~ +13°



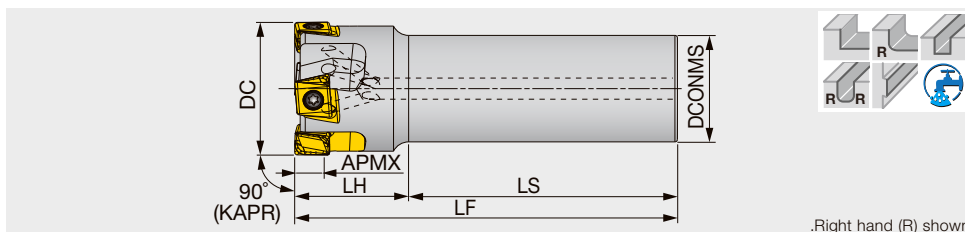
Designation	APMX	DC	ZEFP	CICT	DCSMFS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TLM11R050M22.0E03	58.5	50	3	21	47	70	22	20	10.4	6.3	0.8	with	LMMU1107...
TLM11R063M25.4-04	66.9	63	4	32	59	80	25.4	26	9.5	6	1.4	with	LMMU1107...

SPARE PARTS

Designation	Clamping screw	Center bolt	Wrench
TLM11R050M22.0E03	SM35-114-H0	SD06-A3	T-15DF
TLM11R063M25.4-04	SM35-114-H0	SD08-98	T-15DF

EPM11

Square shoulder endmills with LMMU type tangential clamped insert with 4 edges



Designation	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(kg)	Air hole	Insert
EPM11R032M32.0-03	9.7	32	3	32	80	35	115	0.6	with	LMMU1107...
EPM11R040M32.0-04	9.7	40	4	32	80	35	115	0.7	with	LMMU1107...
EPM11R050M32.0-04	9.7	50	4	32	80	40	120	0.9	with	LMMU1107...
EPM11R063M32.0-06	9.7	63	6	32	80	40	120	1.2	with	LMMU1107...
EPM11R080M32.0-07	9.7	80	7	32	80	40	120	1.6	with	LMMU1107...

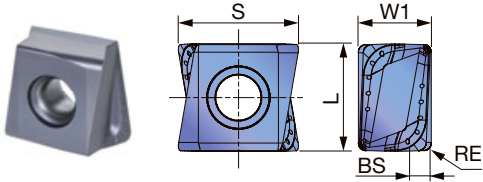
SPARE PARTS



Designation	Clamping screw	Wrench
EPM11...	SM35-114-H0	T-15DF

INSERTS

LMMU11/16-MJ



P Steel	★	☆			☆	
M Stainless	★			☆		
K Cast iron			★		☆	
N Non-ferrous						
S Superalloys	☆	★	☆			
H Hard materials		★				

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated						S	L	W1	BS
			AH3135	AH725	AH120	AH140	T1215	T3225				
LMMU110708PNER-MJ	0.8	9.7	●	●	●	●	●	●	11.7	10.5	7.1	2
LMMU110716PNER-MJ	1.6	9.7	●	●	●	●	●	●	11.5	10.5	7.1	1.2
LMMU110724PNER-MJ	2.4	9.7		●	●	●			11.3	10.5	7.1	0.4
LMMU110732PNER-MJ	3.2	9.7		●	●	●			11.1	10.5	7.1	-
LMMU160908PNER-MJ	0.8	15.1	●	●	●	●	●	●	17.3	16	9.5	2.4
LMMU160916PNER-MJ	1.6	15.1	●	●	●	●			17.1	16	9.5	1.6
LMMU160924PNER-MJ	2.4	15.1		●	●	●			16.9	16	9.5	0.8
LMMU160932PNER-MJ	3.2	15.1		●	●	●			16.8	16	9.5	-

● : New product
● : Line up

STANDARD CUTTING CONDITIONS

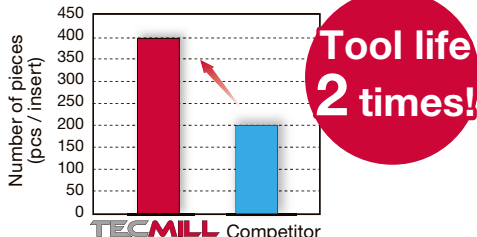
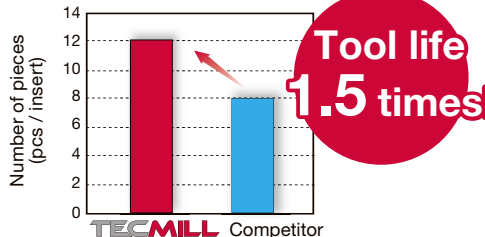
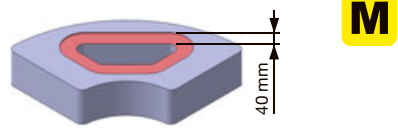
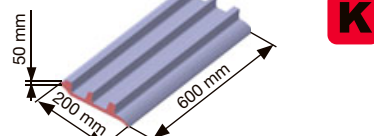
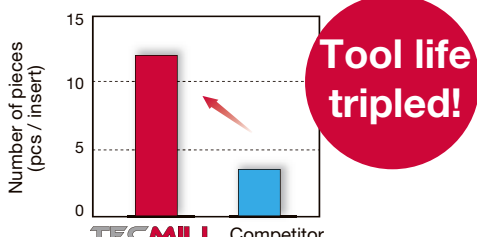
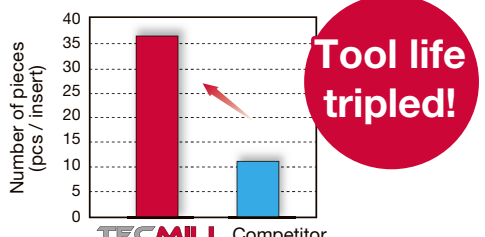
Bore, shank type

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed V _c (m/min)	Feed per tooth f _z (mm/t)
P	Low carbon steel (S15C / C15E4, SS400 / E275A, etc.)	- 200 HB	First choice	AH3135	100 - 250	0.12 - 0.3
		- 200 HB	Priority on wear resistance	T3225	150 - 350	0.08 - 0.2
	Carbon steel and alloy steel (S55C / C55, SCM440 / 42CrMo4, etc.)	- 300 HB	First choice	AH3135	100 - 230	0.1 - 0.25
		- 300 HB	Priority on wear resistance	T3225	150 - 350	0.08 - 0.2
	Prehardend steel (NAK80, PX5, etc.)	30 - 40 HRC	First choice	AH3135	100 - 230	0.1 - 0.25
		30 - 40 HRC	Priority on wear resistance	T3225	120 - 350	0.08 - 0.2
M	Stainless steel (SUS304 / X5CrNi18-9, etc.)	-	First choice	AH3135	90 - 180	0.1 - 0.25
K	Grey cast iron (FC250 / 250, etc.)	150 - 250 HB	First choice	AH120	140 - 250	0.12 - 0.3
		150 - 250 HB	Priority on wear resistance	T1215	120 - 350	0.08 - 0.2
	Ductile cast iron (FCD400, FCD600 / 600-3, etc.)	150 - 250 HB	First choice	AH120	110 - 200	0.12 - 0.3
		150 - 250 HB	Priority on wear resistance	T1215	120 - 350	0.08 - 0.2
S	Titanium alloys (Ti-6Al-4V, etc.)	-	First choice	AH725	30 - 60	0.08 - 0.2
	Superalloys (Inconel718, etc.)	-	First choice	AH725	20 - 50	0.06 - 0.1
H	Hardened steel	(SKD61 / X40CrMoV5-1, etc.) 40 - 50 HRC	First choice	AH725	45 - 70	0.08 - 0.15
		(SKD11 / X153CrMoV12, etc.) 50 - 60 HRC	First choice	AH725	40 - 65	0.06 - 0.1

Roughing type

ISO	Workpiece materials	Hardness	Priority	Grades	Cutting speed V _c (m/min)	Feed per tooth f _z (mm/t)
P	Low carbon steel (S15C / C15E4, SS400 / E275A, etc.)	- 200 HB	First choice	AH3135	100 - 250	0.1 - 0.25
		- 300 HB	Priority on wear resistance	T3225	150 - 350	0.1 - 0.2
	Carbon steel and alloy steel (S55C / C55, SCM440 / 42CrMo4, etc.)	- 300 HB	First choice	AH3135	100 - 200	0.1 - 0.2
		- 300 HB	Priority on wear resistance	T3225	150 - 300	0.1 - 0.2
	Prehardend steel (NAK80, PX5, etc.)	30 - 40 HRC	First choice	AH3135	100 - 200	0.1 - 0.2
		30 - 40 HRC	Priority on wear resistance	T3225	120 - 300	0.1 - 0.2
M	Stainless steel (SUS304 / X5CrNi18-9, etc.)	-	First choice	AH3135	90 - 150	0.1 - 0.25
K	Grey cast iron (FC250 / 250, etc.)	150 - 250 HB	First choice	AH120	100 - 250	0.1 - 0.25
		150 - 250 HB	Priority on wear resistance	T1215	120 - 350	0.1 - 0.25
	Ductile cast iron (FCD400, FCD600 / 600-3, etc.)	150 - 250 HB	First choice	AH120	100 - 200	0.1 - 0.25
		150 - 250 HB	Priority on wear resistance	T1215	120 - 350	0.1 - 0.25
S	Titanium alloys (Ti-6Al-4V, etc.)	-	First choice	AH725	20 - 50	0.06 - 0.15
	Superalloys (Inconel718, etc.)	-	First choice	AH725	20 - 40	0.06 - 0.1
H	Hardened steel	(SKD61 / X40CrMoV5-1, etc.) 40 - 50 HRC	First choice	AH725	30 - 60	0.08 - 0.15
		(SKD11 / X153CrMoV12, etc.) 50 - 60 HRC	First choice	AH725	25 - 55	0.06 - 0.1

PRACTICAL EXAMPLE

Workpiece type		Planetary carrier	Gear case housing
Cutter		Special ($\phi 78$ mm, $z = 2$)	TPM11R200U0075A05 ($\phi 50.8$ mm, $z = 5$)
Insert		LMMU160932PNER-MJ	LMMU110708PNER-MJ
Grade		AH3135	T1215
		S35C	FCD450 / GGG45 / 450-10S
Workpiece material			
Cutting conditions	Cutting speed: V_c (m/min)	250	175
	Feed per tooth: f_z (mm/t)	0.1	0.15
	Feed speed: V_f (m/min)	200	840
	Depth of cut: a_p (mm)	40	4
	Width of cut: a_e (mm)	30	20
	Machining	Plunging	Shoulder milling
	Coolant	Dry	Dry
Machine		Vertical M/C, BT50	Vertical M/C, BT50
Results		 Tool life was doubled with AH3135, the combination of the substrate for high fracture resistance and the coating for high wear resistance.	 Tool life was extended by 1.5 times due to T1215 with high wear resistance.
Workpiece type		Case	Shoe
Cutter		TPM16R100M31.7-06 ($\phi 100$, $z = 6$)	TLM11R050M22.0E03 ($\phi 50$, $z = 3$)
Insert		LMMU160908PNER-MJ	LMMU110708PNER-MJ
Grade		AH725	AH140
		Stainless steel	Forged steel
Workpiece material			
Cutting conditions	Cutting speed: V_c (m/min)	100	100
	Feed per tooth: f_z (mm/t)	0.3	0.1
	Feed speed: V_f (m/min)	-	191
	Depth of cut: a_p (mm)	10	43
	Width of cut: a_e (mm)	40	12
	Machining	Shoulder milling	Shoulder milling
	Coolant	Dry	Dry
Machine		Vertical M/C, BT50	Vertical M/C, BT50
Results		 Chipping on cutting edge is significantly reduced, and the machining cost is cut due to increased number of corners.	 Chipping on cutting edge is reduced in interrupted cutting, and tool life is 3 times longer than the competitor.

ACCELERATED MACHINING

tungaloy

EPM11R032M32.0-03
MAX RPM=19,900 min-1
96800010

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