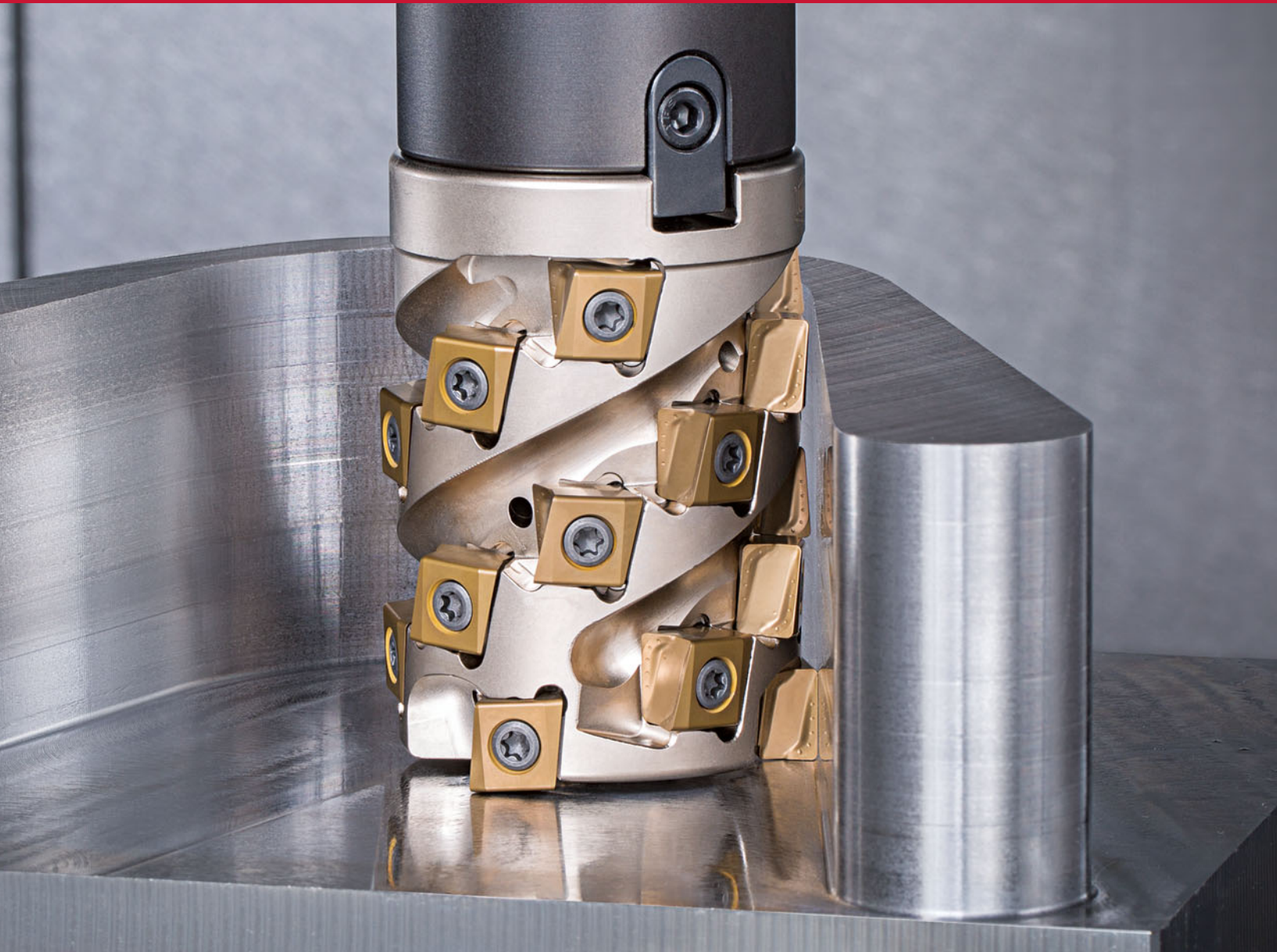
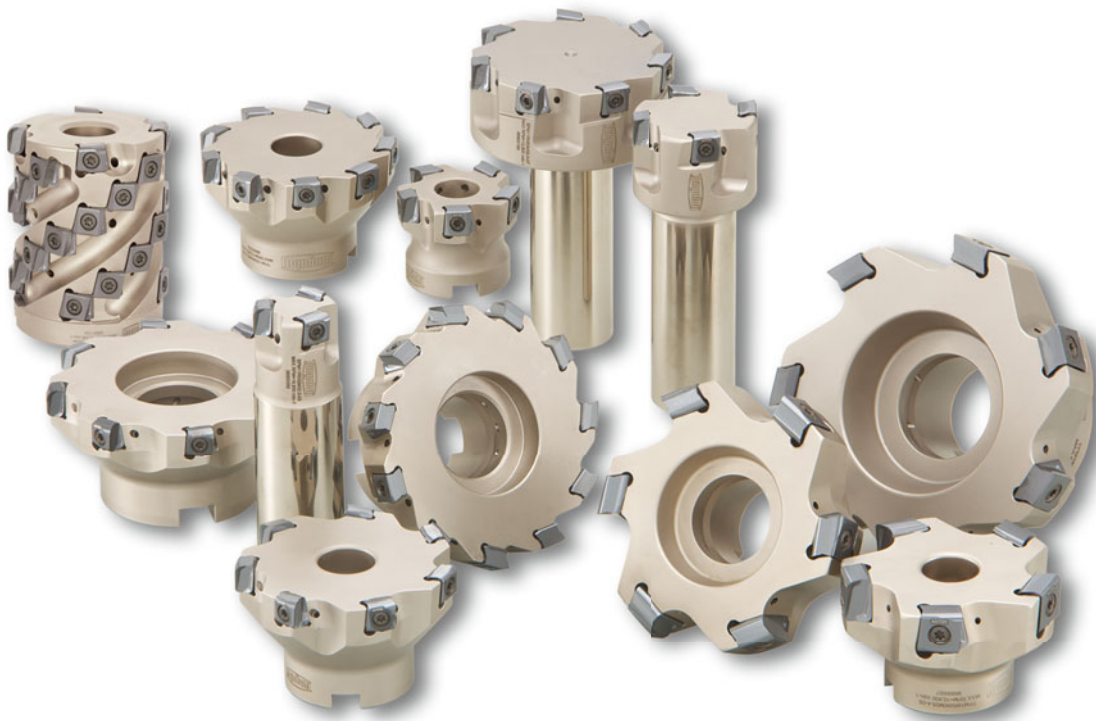


Groundbreaking stability in roughing / finishing due to highly reliable tangential insert





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**

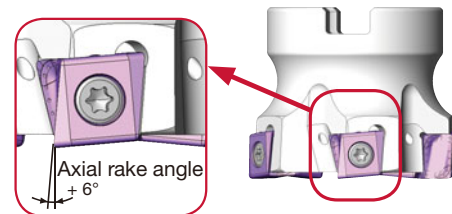
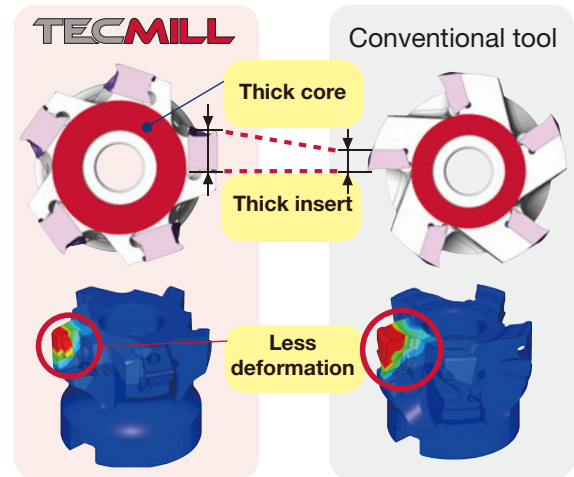
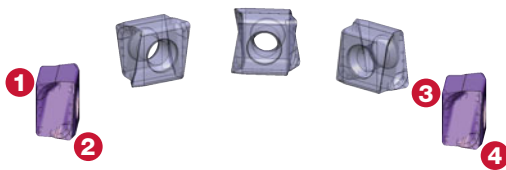
Reliable operation

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

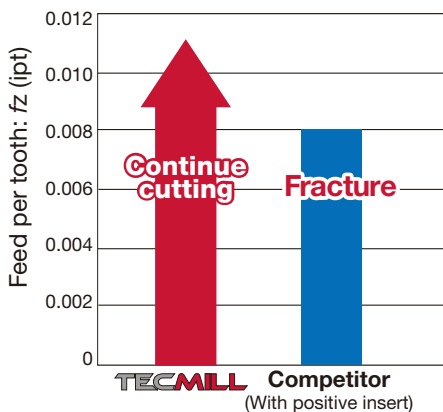
4-cornered insert

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



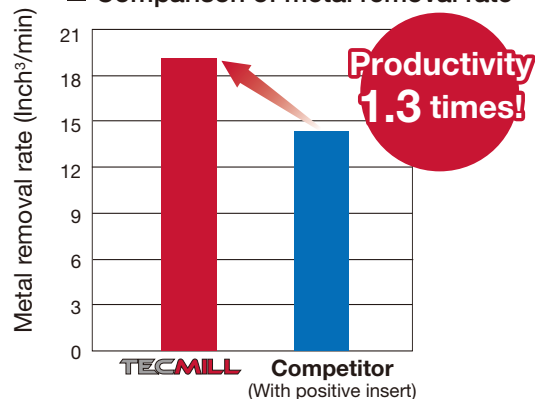
CUTTING PERFORMANCE

■ Comparison of cutting edge toughness



Work material : 1055 (200HB)
Tool ϕ : $\phi 2.000''$
Cutting speed : $V_c = 820$ sfm
Depth of cut : $a_p = 0.118''$
Width of cut : $a_e = 0.500''$

■ Comparison of metal removal rate



Workpiece : 1055 (200HB)
Tool ϕ : $\phi 2.500''$
Cutting speed : $V_c = 500$ sfm
Feed per tooth :
TECMILL : $f_z = .008$ ipt ($z = 6$)
Competitor : $f_z = .006$ ipt ($z = 6$)
Depth of cut : $a_p = 0.400''$
Width of cut : $a_e = 1.400''$
Cutting fluids : Dry

Rich grade lineup for every type 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

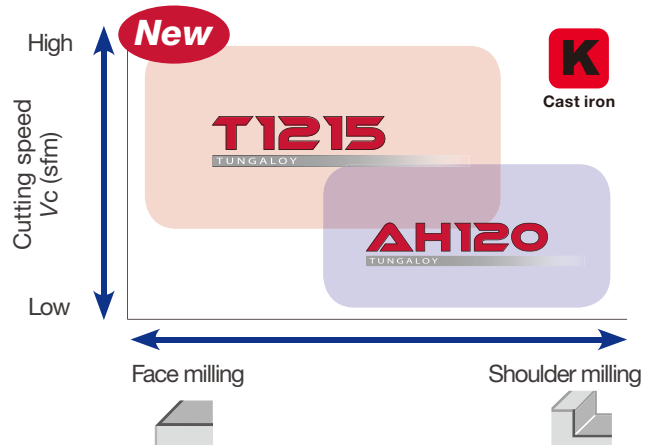
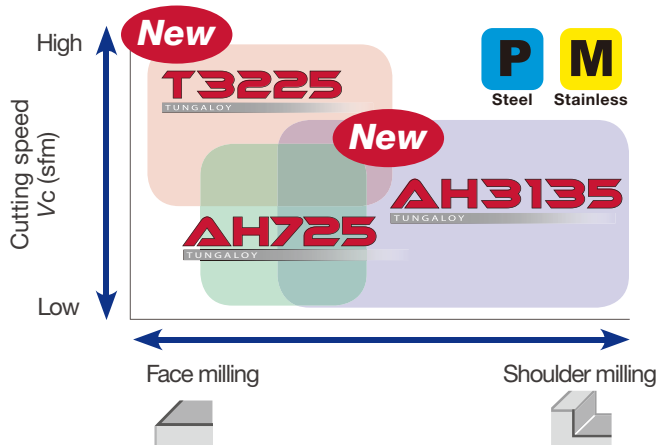
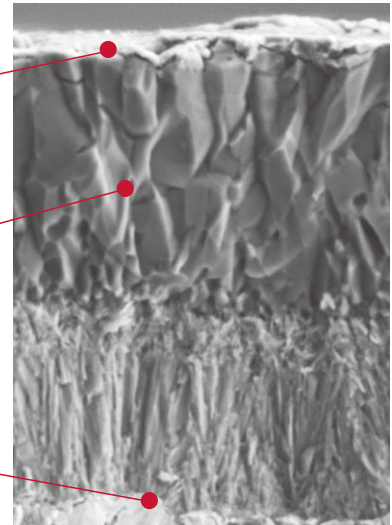
- Special surface post-treatment technology improves surface smoothness

Superior wear resistance in high speed cutting

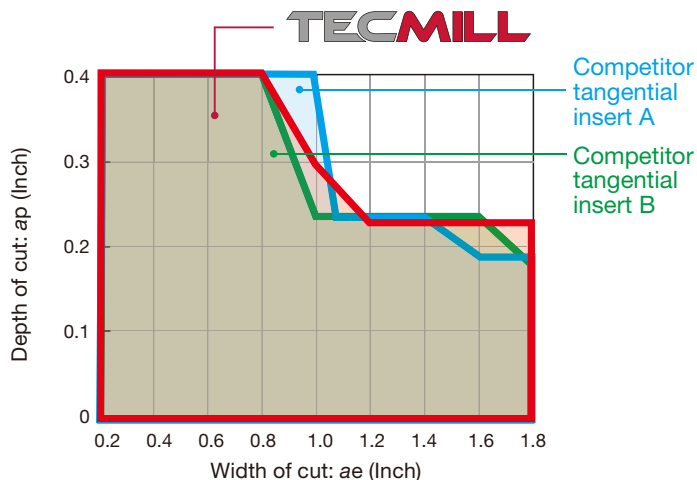
- A thick alumina (Al_2O_3) layer improves insert life in high cutting temperatures generated during high speed machining

Enhanced coating resistant to peeling

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



APPLICATION RANGE

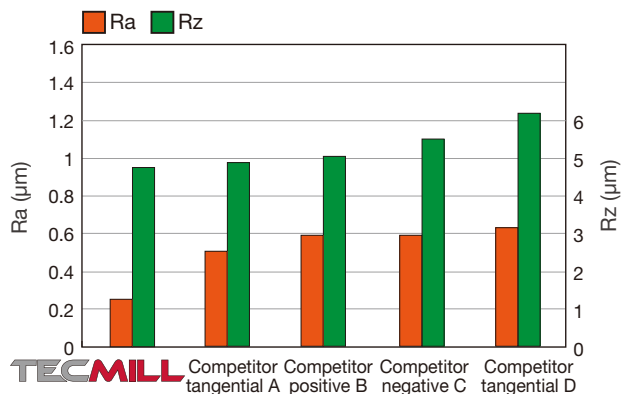


Cutter : TPM11R200U0075A05
($\phi 2.0"$, $z = 5$)
Insert : LMMU110708PNER-MJ AH3135
Workpiece material : 1055
Cutting speed : $V_c = 600$ sfm
Feed per tooth : $f_z = 0.008$ ipt
Number of revolutions : $n = 1146$ min⁻¹
Coolant : Dry
Machine : Vertical M/C, CAT50

TecMill maximizes the application area of tangential inserts.

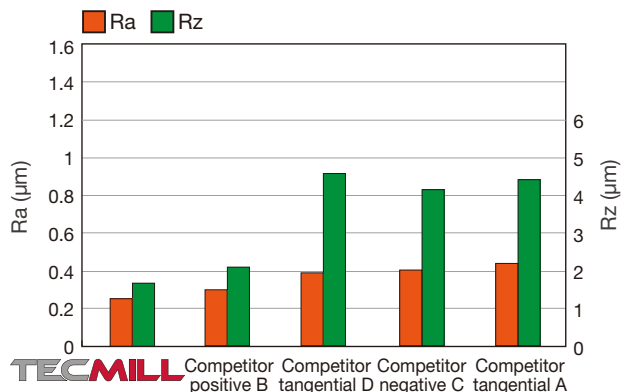
CUTTING PERFORMANCE

Surface finish: Carbon steel



P Cutter : TPM11R200U0075A05
($\phi 20"$, $z = 5$)
Insert : LMMU110708PNER-MJ AH3135
Workpiece material : (SAE) 1055
Cutting speed : $V_c = 820$ sfm
Feed per tooth : $f_z = 0.004$ ipt
Number of revolutions : $n = 1591$ min⁻¹
Depth of cut : $a_p = 0.06"$
Cutting width : $a_e = 1.57"$
Coolant : Dry
Machine : Vertical M/C, CAT50

Surface finish: Stainless steel

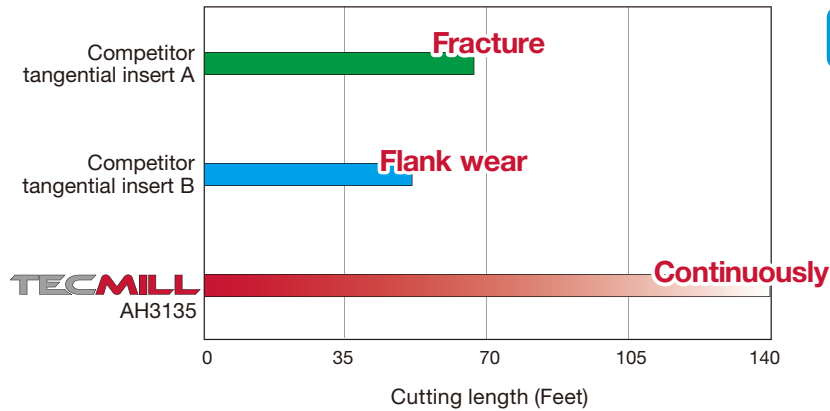


M Cutter : TPM11R200U0075A5
($\phi 20"$, $z = 5$)
Insert : LMMU110708PNER-MJ AH3135
Workpiece material : 304
Cutting Speed : $V_c = 492$ sfm
Feed per tooth : $f_z = 0.1$ ipt
Number of revolutions : $n = 955$ min⁻¹
Depth of cut : $a_p = 0.08"$
Cutting width : $a_e = 1.57"$
Coolant : Wet
Machine : Vertical M/C, CAT50

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

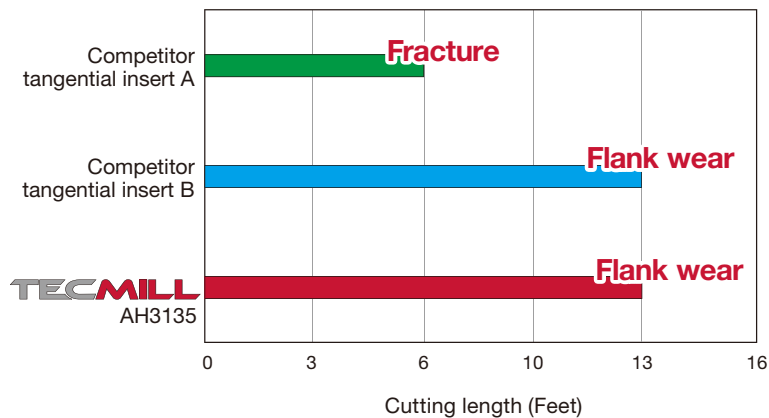
CUTTING PERFORMANCE

Tool life: Carbon steel

**P**

Cutter : TPM11R200U0075A05
 (ø20", z = 5)
 Insert : LMMU110708PNER-MJ AH3135
 Workpiece material : (SAE) 1055
 Cutting speed : $V_c = 600$ sfm
 Feed per tooth : $f_z = 0.008$ ipt
 Number of revolutions : $n = 1146$ min⁻¹
 Depth of cut : $a_p = 0.20$ "
 Cutting width : $a_e = 1.20$ "
 Coolant : Dry
 Machine : Vertical M/C, CAT50

Tool life: Cast iron

**K**

Cutter : TPM11R200U0075A05
 (ø20", z = 5)
 Insert : LMMU110708PNER-MJ T1215
 Workpiece material : No.250B
 Cutting speed : $V_c = 820$ sfm
 Feed per tooth : $f_z = 0.008$ ipt
 Number of revolutions : $n = 1592$ min⁻¹
 Depth of cut : $a_p = 0.20$ "
 Cutting width : $a_e = 0.79$ "
 Coolant : Dry
 Machine : Vertical M/C, CAT50

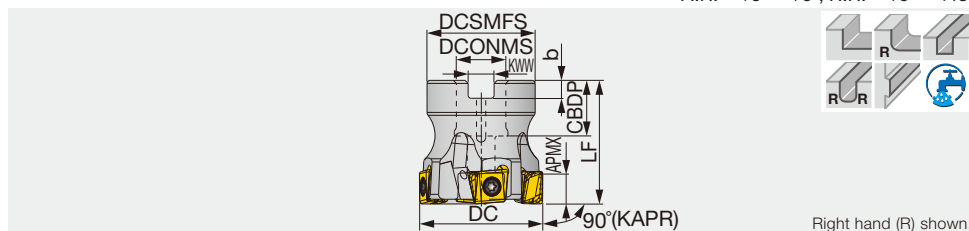
Tool life:

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

TPM11,16

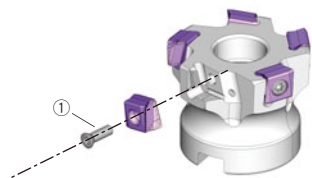
Square shoulder mills with LMMU type tangential clamped insert with 4 edges

A.R. = +5° ~ +6°, R.R. = +9° ~ +13°



Right hand (R) shown.

Inch	APMX	DC	CICT	DCSMFS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TPM11R200U0075A05	0.380	2.000	5	1.770	1.575	0.750	0.750	0.315	0.197	0.660	with	LMMU110708PNER-MJ
TPM11R250U0075A06	0.380	2.500	6	1.770	1.575	0.750	0.750	0.315	0.197	1.100	with	LMMU110708PNER-MJ
TPM11R300U0100A06	0.380	3.000	6	2.165	1.969	1.000	0.750	0.394	0.236	1.980	with	LMMU110708PNER-MJ
TPM11R300U0100A08	0.380	3.000	8	2.165	1.969	1.000	0.750	0.394	0.236	1.980	with	LMMU110708PNER-MJ
TPM11R400U0150A08	0.380	4.000	8	3.070	1.969	1.500	1.060	0.630	0.354	3.300	with	LMMU110708PNER-MJ
TPM11R400U0150A11	0.380	4.000	11	3.070	1.969	1.500	1.060	0.630	0.354	3.300	with	LMMU110708PNER-MJ
TPM16R300U0100A05	0.590	3.000	5	2.165	1.969	1.000	0.750	0.394	0.236	1.980	with	LMMU160908PNER-MJ
TPM16R400U0150A06	0.590	4.000	6	3.071	1.969	1.500	1.060	0.630	0.354	3.080	with	LMMU160908PNER-MJ
TPM16R500U0150A07	0.590	5.000	7	3.071	2.480	1.500	1.060	0.630	0.354	5.950	with	LMMU160908PNER-MJ



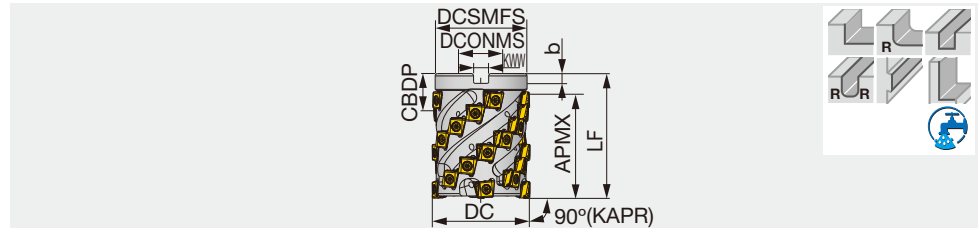
SPARE PARTS

Designation	Clamping screw	Grip	Center bolt 1	Torx bit	Wrench
TPM11R2**U0075A...	CSTB-3.5L110	H-TB	C0.375X1.125H	BT15S	-
TPM11R300U0100A...	CSTB-3.5L110	H-TB	C0.500X1.375H	BT15S	-
TPM11R400U0150A...	CSTB-3.5L110	H-TB	TMBA-0.750H	BT15S	-
TPM16R300U0100A05	CSTB-5L159	H-TB	C0.500X1.375H	BT20S	-
TPM16R400U0150A06	CSTB-5L159	H-TB	TMBA-0.750H	BT20S	-
TPM16R500U0150A07	CSTB-5L159	H-TB	TMBA-0.750H	BT20S	T-20T

TLM11

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

A.R. = +5° ~ +6°, R.R. = +9° ~ +13°



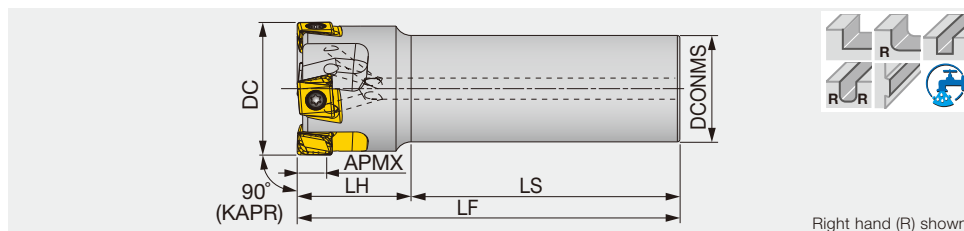
Inch	APMX	DC	ZEFP	CICT	DCSMFS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TLM11R200U0075A03	2.303	2.000	3	21	1.850	2.750	0.750	0.750	0.315	0.157	1.780	with	LMMU1107...
TLM11R250U0100A04	2.634	2.500	4	32	2.323	3.250	1.000	0.750	0.374	0.197	3.330	with	LMMU1107...

SPARE PARTS

Designation	Clamping screw	Grip	Torx bit
TLM11R200U0075A03	SM35-114-H0	H-TB	BT15S
TLM11R250U0100A04	SM35-114-H0	H-TB	BT15S

EPM11

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



Right hand (R) shown.

Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EPM11R125U0125W03	0.381	1.250	3	1.250	2.250	1.750	4.000	1.150	with	LMMU1107...
EPM11R150U0125W04	0.381	1.500	4	1.250	2.250	1.750	4.000	1.320	with	LMMU1107...

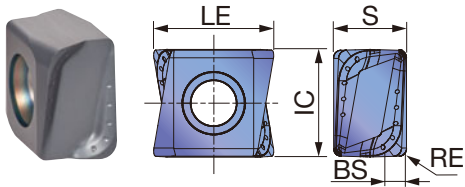
SPARE PARTS



Designation	Clamping screw	Wrench
EPM11...	CSTB-3.5L110	T-15DB

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						LE	IC	S	BS
			AH3135	AH725	AH120	AH140	T1215	T3225				
LMMU110708PNER-MJ	0.0314	0.382	●	●	●	●	●	●	0.461	0.413	0.280	0
LMMU110716PNER-MJ	0.0629	0.382	●	●	●	●	●	●	0.453	0.413	0.280	0
LMMU110724PNER-MJ	0.0944	0.382		●	●	●			0.445	0.413	0.280	0
LMMU110732PNER-MJ	0.1259	0.382		●	●	●			0.437	0.413	0.280	0
LMMU160908PNER-MJ	0.0314	0.594	●	●	●	●	●	●	0.681	0.630	0.374	0
LMMU160916PNER-MJ	0.0629	0.594	●	●	●	●	●		0.673	0.630	0.374	0
LMMU160924PNER-MJ	0.0944	0.594		●	●	●			0.665	0.630	0.374	0
LMMU160932PNER-MJ	0.1259	0.594		●	●	●			0.661	0.630	0.374	0

●: New product
●: Line up

STANDARD CUTTING CONDITIONS


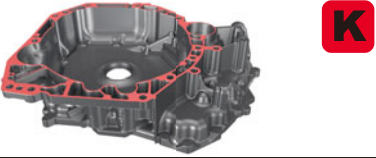
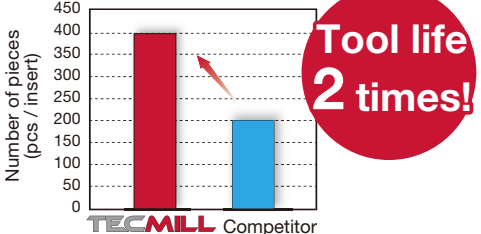
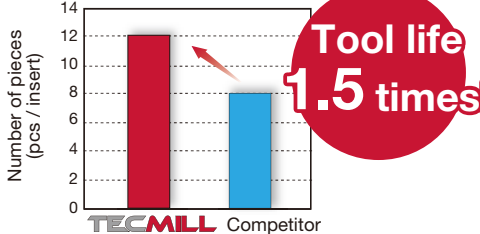
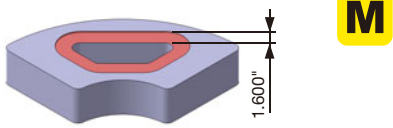
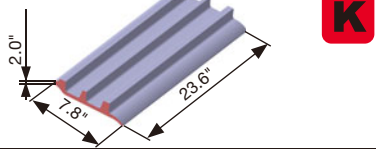

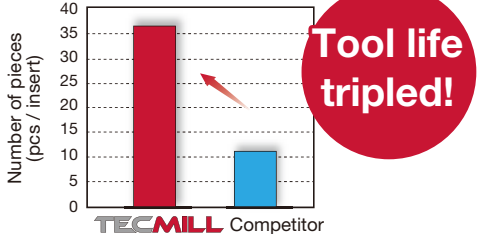
Bore, shank type

ISO	Workpiece materials		Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel (1010, 1015, etc.)		- 200 HB	First choice	AH3135	330 - 820	0.005 - 0.012
			- 200 HB	Priority on wear resistance	T3225	490 - 1150	0.003 - 0.008
	Carbon steel and alloy steel (1055, 4140, etc.)		- 300 HB	First choice	AH3135	330 - 760	0.004 - 0.010
			- 300 HB	Priority on wear resistance	T3225	490 - 1150	0.003 - 0.008
	Prehardend steel (NAK80, PX5, etc.)		30 - 40 HRC	First choice	AH3135	330 - 760	0.004 - 0.010
			30 - 40 HRC	Priority on wear resistance	T3225	400 - 1150	0.003 - 0.008
M	Stainless steel (304, etc.)		-	First choice	AH3135	300 - 590	0.004 - 0.010
K	Grey cast iron (No.250B, etc.)		150 - 250 HB	First choice	AH120	460 - 820	0.005 - 0.012
			150 - 250 HB	Priority on wear resistance	T1215	400 - 1150	0.003 - 0.008
	Ductile cast iron (65-45-12, 80-55-06, etc.)		150 - 250 HB	First choice	AH120	360 - 660	0.005 - 0.012
			150 - 250 HB	Priority on wear resistance	T1215	400 - 1150	0.003 - 0.008
S	Titanium alloys (Ti-6Al-4V, etc.)		-	First choice	AH725	100 - 200	0.003 - 0.008
	Superalloys (Inconel718, etc.)		-	First choice	AH725	66 - 165	0.002 - 0.004
H	Hardened steel	(H13, etc.)	40 - 50 HRC	First choice	AH725	150 - 230	0.003 - 0.006
		(D2, etc.)	50 - 60 HRC	First choice	AH725	130 - 215	0.002 - 0.004

Roughing type

ISO	Workpiece materials		Hardness	Priority	Grades	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Low carbon steel (1010, 1015, etc.)		- 200 HB	First choice	AH3135	330 - 820	0.004 - 0.010
			- 300 HB	Priority on wear resistance	T3225	490 - 1150	0.004 - 0.008
	Carbon steel and alloy steel (1055, 4140, etc.)		- 300 HB	First choice	AH3135	330 - 660	0.004 - 0.008
			- 300 HB	Priority on wear resistance	T3225	490 - 985	0.004 - 0.008
	Prehardend steel (NAK80, PX5, etc.)		30 - 40 HRC	First choice	AH3135	330 - 660	0.004 - 0.008
			30 - 40 HRC	Priority on wear resistance	T3225	400 - 985	0.004 - 0.008
M	Stainless steel (304, etc.)		-	First choice	AH3135	300 - 490	0.004 - 0.010
K	Grey cast iron (No.250B, etc.)		150 - 250 HB	First choice	AH120	330 - 820	0.004 - 0.010
			150 - 250 HB	Priority on wear resistance	T1215	400 - 1150	0.004 - 0.010
	Ductile cast iron (65-45-12, 80-55-06, etc.)		150 - 250 HB	First choice	AH120	330 - 660	0.004 - 0.010
			150 - 250 HB	Priority on wear resistance	T1215	400 - 1150	0.004 - 0.010
S	Titanium alloys (Ti-6Al-4V, etc.)		-	First choice	AH725	66 - 165	0.002 - 0.006
	Superalloys (Inconel718, etc.)		-	First choice	AH725	66 - 130	0.002 - 0.004
H	Hardened steel	(H13, etc.)	40 - 50 HRC	First choice	AH725	100 - 200	0.003 - 0.006
		(D2, etc.)	50 - 60 HRC	First choice	AH725	80 - 180	0.002 - 0.004

PRACTICAL EXAMPLE

Workpiece type		Planetary carrier	Gear case housing
Cutter		Special ($\phi 3.07"$, $z = 2$)	TPM11R200U0075A05 ($\phi 2.0"$, $z = 5$)
Insert		LMMU160932PNER-MJ	LMMU110708PNER-MJ
Grade		AH3135	T1215
Workpiece material		1035	65-45-12
			
Cutting conditions	Cutting speed: V_c (sfm)	820	574
	Feed per tooth: f_z (ipt)	0.004	0.006
	Feed speed: V_f (ipm)	7.9	33.1
	Depth of cut: a_p (Inch)	1.57	0.16
	Width of cut: a_e (Inch)	1.18	0.79
	Machining	Plunging	Shoulder milling
	Coolant	Dry	Dry
	Machine	Vertical M/C, CAT50	Vertical M/C, CAT50
Results		 <p>Tool life was doubled with AH3135 due to the combination of the substrate for high fracture resistance and the coating for high wear resistance.</p>	 <p>Tool life was extended by 1.5 times due to T1215 with high wear resistance.</p>
Workpiece type		Case	Shoe
Cutter		TPM16R100M31.7-06 ($\phi 4"$, $z = 6$)	TLM11R050M22.0E03 ($\phi 2"$, $z = 3$)
Insert		LMMU160908PNER-MJ	LMMU110708PNER-MJ
Grade		AH725	AH140
Workpiece material		Stainless steel	Forged steel
			
Cutting conditions	Cutting speed: V_c (sfm)	330	330
	Feed per tooth: f_z (ipt)	0.012	0.004
	Feed speed: V_f (ipm)	-	7.5
	Depth of cut: a_p (Inch)	0.400	1.69
	Width of cut: a_e (Inch)	1.600	0.47
	Machining	Shoulder milling	Shoulder milling
	Coolant	Dry	Dry
	Machine	Vertical M/C, CAT50	Vertical M/C, CAT50
Results		 <p>Chipping on cutting edge is significantly reduced, and the machining cost is cut due to increased number of corners.</p>	 <p>Chipping on cutting edge is reduced in interrupted cutting and tool life is 3 times longer than the competitor.</p>

100



Tungaloy

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

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