

MillLine

TUNG^{RI}TSHRED

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Tungaloy Report No. 505-G

SM[★]TOOLS[®]

Powerful and Efficient Rough Shoulder Milling with **New CVD Grades**

Member IMC Group
Tungaloy



INDUSTRY 4.0
FEED the SPEED!



ACCELERATED MACHINING

MillLine

TUNG T^{RI} SHRED
TUNGALOY

TUNG *FORCE* **MILL**
ACCELERATED MACHINING



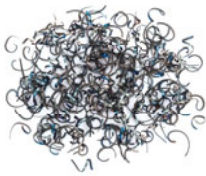
High performance cutter with chip splitters
for improved chatter stability and efficiency in
rough milling with long overhang

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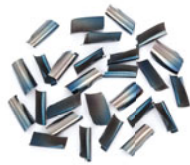
Long-edge roughing cutter with effective chip splitting and chatter stability

Anti-Chatter Design

- Serrated cutting edge creates smaller chips reducing chatter.



TUNGTRI SHRED

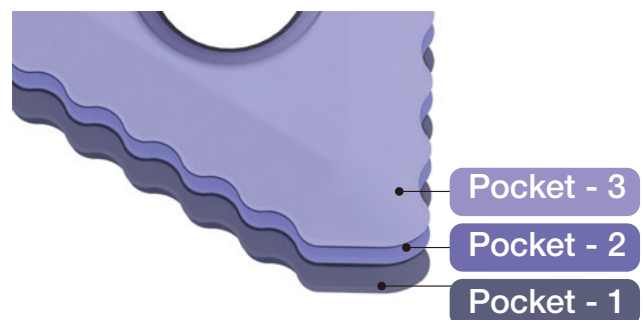


Conventional

- Insert's triangular shape ensures rigid clamping during heavy machining.

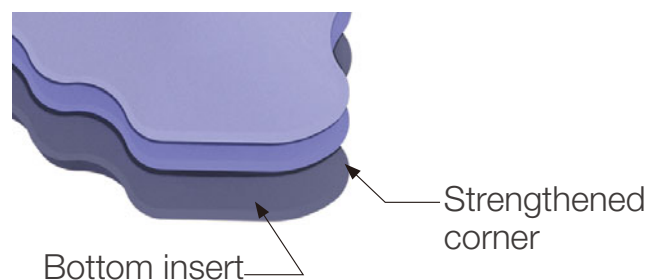
Intelligent and User friendly design

- Each flute (adjacent pockets in radial direction) in the cutter body is offset in the Z direction. This positioning ensures that the insert in the adjacent flute removes the material left by the previous insert. Thus, the machined wall surface is close to flat.



- No specific insert positioning is required as positioning is done on the cutter.
- All cutting edges of the inserts are identical.

- Insert corner is strengthened to resist corner fracture for the bottom most insert. (the bottom most insert is a single effective corner and withstands the feed equal to feed/rev)



Insert Varieties

2 types of inserts fit on the same cutter body providing options for roughing as well as finishing.



TCMT-NMJ

For roughing operation with serrated edges
 - Low cutting force

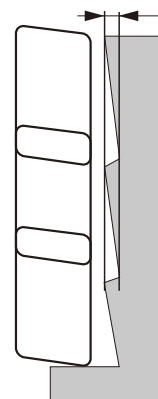
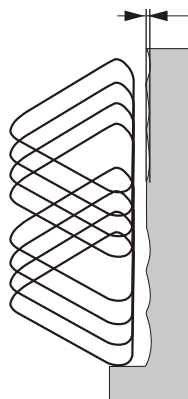


TCGT-MJ

Suitable for finishing operation or general square shoulder milling.
 - Low cutting force with large rake angle
 - Precision-ground periphery insert and unique offset positioning of the pockets ensure minimal step on the machined wall.

Small step

Large step

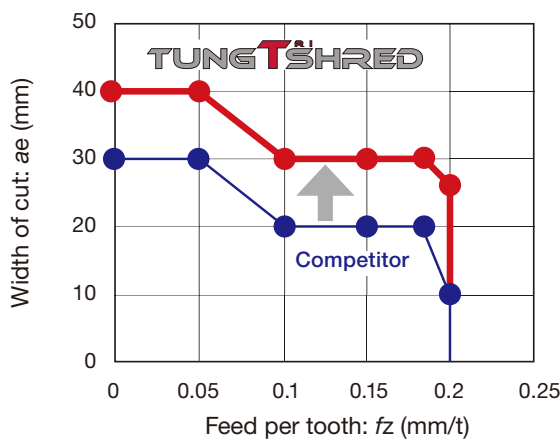


TUNGTRI-SHRED

Conventional, Competitor

CUTTING PERFORMANCE

Comparison of application range



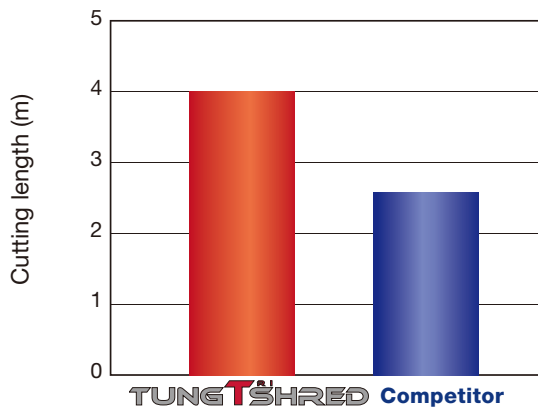
Cutter : LPTC16M080B32.0L076R04 ($\phi D_c = 80$ mm, $z = 4$)
 Insert : TCMT160620PDER-NMJ
 Workpiece material : 42CrMo4 / SCM440H (270HB)
 Cutting speed : $V_c = 100$ m/min
 Depth of cut : $a_p = 70$ mm
 Machine : Vertical M/C (BT50, 37 kw)

TungTri-Shred can be applied in broader application area.

CUTTING PERFORMANCE

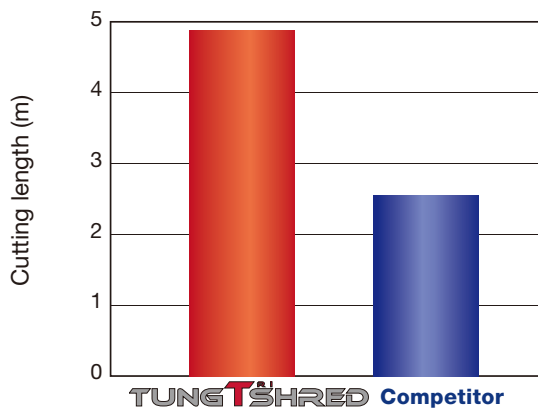
Tool life

P Carbon steel with NMJ inserts



Cutter : LPTC16M080B32.0L076R04 ($\phi D_c = 80$ mm, $z = 4$)
 Insert : TCMT160620PDER-NMJ AH3135
 Workpiece material : S55C / C55 (200HB)
 Cutting speed : $V_c = 150$ m/min
 Feed per tooth : $f_z = 0.18$ mm/t
 Depth of cut : $a_p = 10$ mm
 Width of cut : $a_e = 40$ mm
 Coolant : Dry
 Machine : Vertical M/C, BT50, 30kW
 Machining : Heavy interrupted
 Tool life criteria : Chipping on edge

P Alloy steel with MJ inserts



Cutter : LPTC16M080B32.0L076R04 ($\phi D_c = 80$ mm, $z = 4$)
 Insert : TCGT160608PDER-MJ AH3135
 Workpiece material : SCM440 / 42CrMo4 (270HB)
 Cutting speed : $V_c = 150$ m/min
 Feed per tooth : $f_z = 0.15$ mm/t
 Depth of cut : $a_p = 10$ mm
 Width of cut : $a_e = 40$ mm
 Coolant : Dry
 Machine : Vertical M/C, BT50, 30kW
 Machining : Heavy interrupted
 Tool life criteria : Chipping on edge

Rich grade lineup for various materials

- A total of four grades, including two new CVD grades

PREMIUMTEC

TUNGALOY

AH3135



- PVD grade for high fracture resistance
- Most suitable for steel and stainless steel in general cutting parameters

AH120



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

New

T1215



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

New

T3225

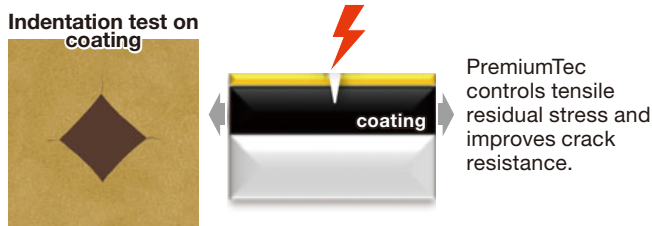


- CVD grade with excellent chipping and fracture resistance
- Most suited for steel and stainless steel at high-speed machining

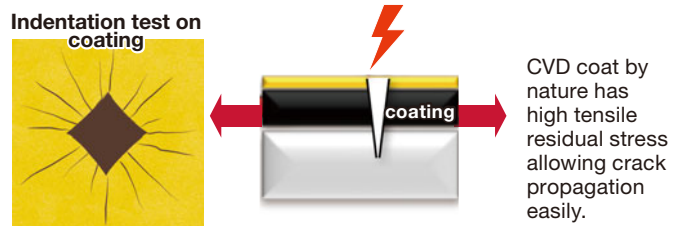
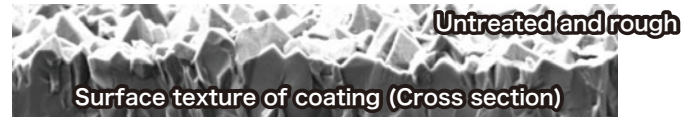
Special Surface Technology

PREMIUMTEC

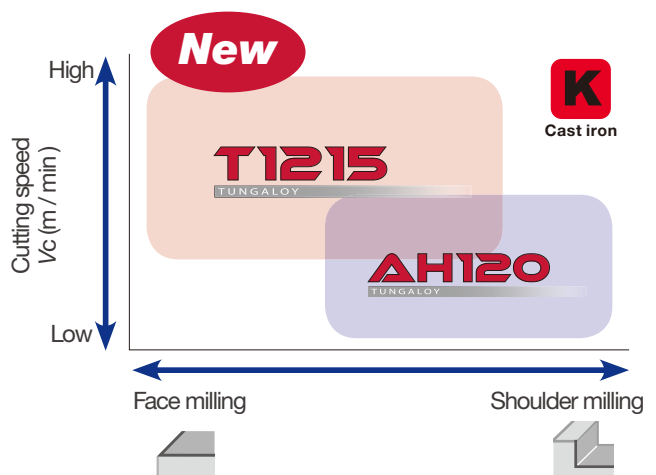
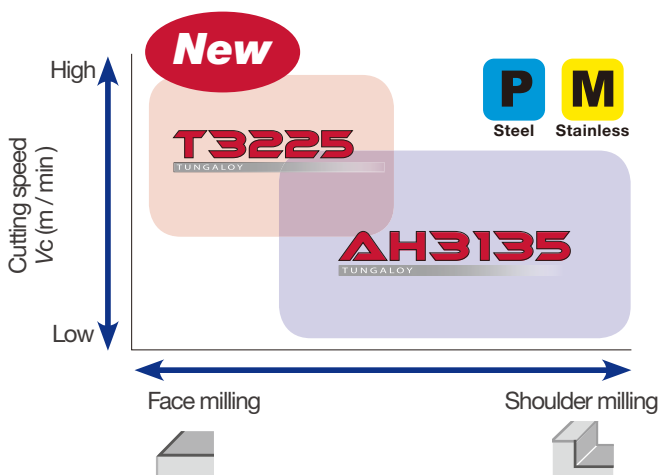
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Conventional item



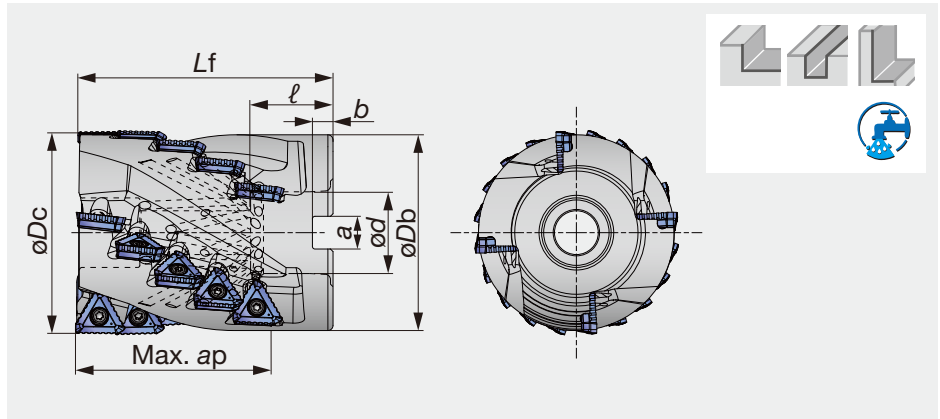
PremiumTec technology enhances both smoothness and toughness on coating surface, improving resistance to chipping, build-up edge, and fracture.



Square shoulder milling cutters for roughing with shred insert

CUTTER - FOR ROUGHING - BORE TYPE

TungTri-Shred LPTC16



Designation	Max. ap	øDc	Z eff	z	øDb	Lf	ød	l	a	b	Kg	C.bolt	Insert
LPTC16J063B25.4L061R03	61.0	63.00	3	12	59	85.0	25.400	26.00	9.50	6.00	1.25	CAP-CM12X1.75X50	TC*T16
LPTC16M063B27.0L061R03	61.0	63.00	3	12	59	85.0	27.000	22.00	12.40	7.00	1.24	CAP-CM12X1.75X50	TC*T16
LPTC16J080B31.7L076R04	76.0	80.00	4	20	76	100.0	31.750	32.00	12.70	8.00	2.44	CM16X75	TC*T16
LPTC16M080B32.0L076R04	76.0	80.00	4	20	76	100.0	32.000	25.00	14.40	8.00	2.46	CM16X75	TC*T16

Note: Coolant cannot be supplied through the arbor center (through the clamping screw). Supply coolant through the flange of the arbor pilot.

SPARE PARTS



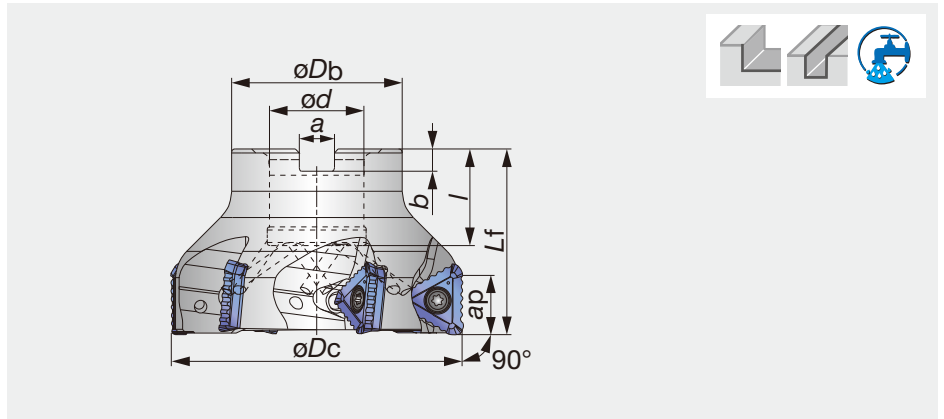
Clamping screw	Wrench	
	Torx Bit	Grip
TS 40B100I	BT15S	H-TB2W

Note: recommended tightening torque for screw (TS 40B100I) : 3.5 N · m

Square shoulder milling cutters with shred insert

CUTTER - BORE TYPE

TungTri-Shred TPTC16



Designation	Max. ap	$\varnothing D_c$	z	$\varnothing D_b$	L_f	$\varnothing d$	ℓ	a	b	Kg	C.bolt	Insert
TPTC16M050B22.0R04	16.0	50.00	4	41	40.0	22.000	20.00	10.40	6.30	0.29	FSHM10-40H	TC*T16
TPTC16M063B22.0R05	16.0	63.00	5	41	40.0	22.000	20.00	10.40	6.30	0.44	CM10X30H	TC*T16
TPTC16J080B25.4R06	16.0	80.00	6	46	50.0	25.400	26.00	9.50	6.00	0.88	CM12X30H	TC*T16
TPTC16M080B27.0R06	16.0	80.00	6	50	50.0	27.000	22.00	12.40	7.00	0.90	CM12X30H	TC*T16
TPTC16J100B31.7R07	16.0	100.00	7	60	50.0	31.750	32.00	12.70	8.00	1.38	TMBA-M16H	TC*T16
TPTC16M100B32.0R07	16.0	100.00	7	60	50.0	32.000	28.50	14.40	8.00	1.35	TMBA-M16H	TC*T16

SPARE PARTS



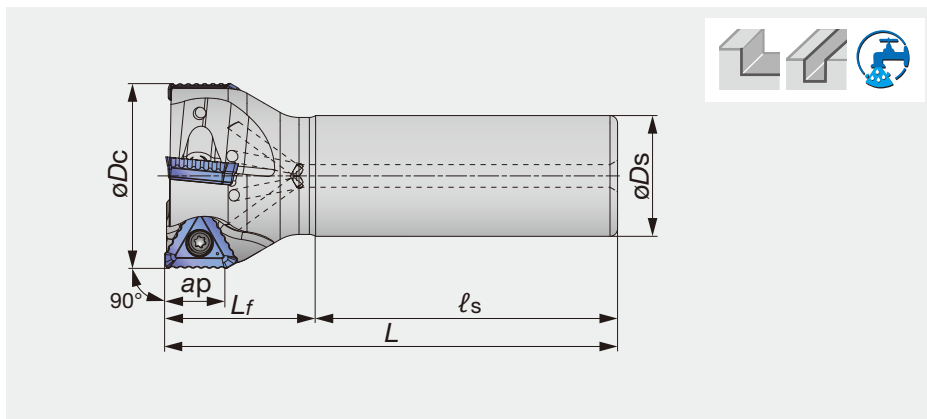
Clamping screw	Wrench	
	Torx Bit	Grip
TS 40B100I	BT15S	H-TB2W

Note: recommended tightening torque for screw (TS 40B100I) : 3.5 N · m

Square shoulder milling cutters with shred insert

CUTTER - SHANK TYPE

TungTri-Shred EPTC16



Designation	Max. ap	ϕD_c	z	ϕD_s	l_s	L_f	L	Kg	Insert
EPTC16M050C32.0R04	16.0	50.00	4	32.0	80.0	40.0	120.0	0.80	TC*T16
EPTC16M050C42.0R02L	16.0	50.00	2	42.0	310.0	50.0	360.0	3.80	TC*T16

SPARE PARTS



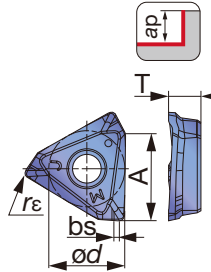
Clamping screw	Torx Bit	Wrench
TS 40B100I	BT15S	Grip H-TB2W

Note: recommended tightening torque for screw (TS 40B100I): 3.5 N · m

INSERTS

TCGT-MJ

TCMT-NMJ



Designation	Max. ap	A	ød	T	rε	bs	AH3135	AH120	New T3225	New T1215
TCGT160608PDER-MJ	16	16	13.7	5.8	0.8	1	● ● ● ●	○ ● ● ●	● ● ● ●	● ● ● ●
TCMT160620PDER-NMJ	16	16	13.3	5.8	2	2	● ● ● ●	○ ● ● ●	● ○ ● ●	● ● ● ●
							P M K S	P M K S	P M K S	P M K S

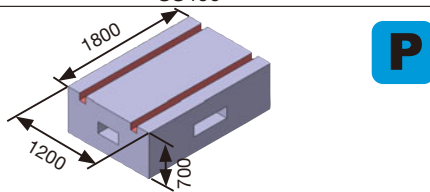
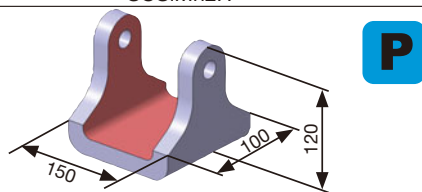
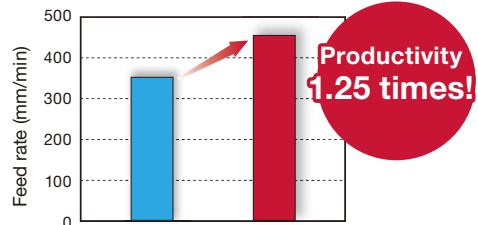
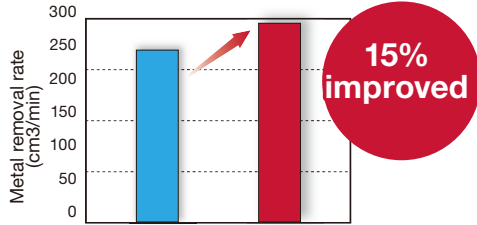
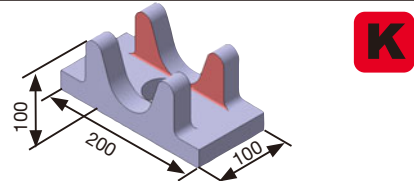
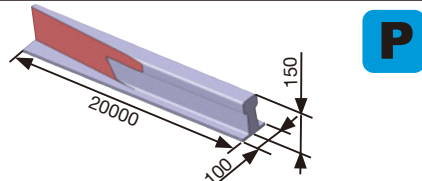
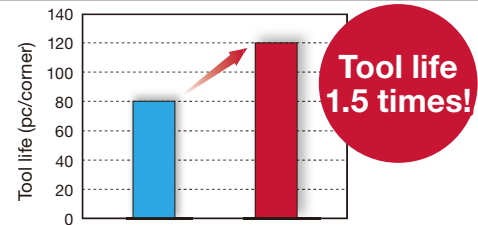
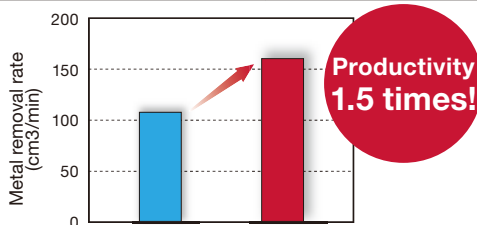
● First choice

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel (C15, C20, etc.)	- 300 HB	First choice	AH3135	NMJ*	100 - 250	0.08 - 0.15
		- 300 HB	For wear resistance	T3225	NMJ*	100 - 300	0.08 - 0.15
		- 300 HB	For finishing	AH3135	MJ	100 - 250	0.08 - 0.20
	Carbon steel and alloy steel (S55C / C55, SCM440 / 42CrMo4, etc.)	- 300 HB	First choice	AH3135	NMJ*	100 - 230	0.08 - 0.15
		- 300 HB	For wear resistance	T3225	NMJ*	100 - 280	0.08 - 0.15
		- 300 HB	For finishing	AH3135	MJ	100 - 230	0.08 - 0.20
	Prehardened steel (NAK80, PX5, etc.)	30 - 40 HRC	First choice	AH3135	NMJ*	100 - 180	0.08 - 0.15
		30 - 40 HRC	For wear resistance	T3225	NMJ*	100 - 200	0.08 - 0.15
		30 - 40 HRC	For finishing	AH3135	MJ	100 - 180	0.08 - 0.20
M	Stainless steel (SUS304 / X5CrNi18-9, SUS316 / X5CrNiMo17-12-3, etc.)	-	First choice	AH3135	NMJ*	90 - 200	0.08 - 0.15
		-	For wear resistance	T3225	NMJ*	90 - 250	0.08 - 0.15
		-	For finishing	AH3135	MJ	90 - 200	0.08 - 0.20
K	Grey cast iron (FC250 / 250, FC300 / 300, etc.)	150 - 250 HB	First choice	AH120	NMJ*	140 - 250	0.08 - 0.15
		150 - 250 HB	For wear resistance	T1215	NMJ*	150 - 300	0.08 - 0.15
		150 - 250 HB	For finishing	AH120	MJ	140 - 250	0.08 - 0.25
	Ductile cast iron (400-15, FCD600 / 600-3, etc.)	150 - 250 HB	First choice	AH120	NMJ*	140 - 250	0.08 - 0.15
		150 - 250 HB	For wear resistance	T1215	NMJ*	150 - 300	0.08 - 0.15
		150 - 250 HB	For finishing	AH120	MJ	140 - 250	0.08 - 0.25
S	Titanium alloys (Ti-6Al-4V, etc.)	-	First choice	AH120	NMJ*	20 - 60	0.08 - 0.15
		-	For finishing	AH120	MJ	20 - 60	0.08 - 0.18
	Heat-resistant alloys (Inconel718, etc.)	-	First choice	AH120	NMJ*	20 - 40	0.08 - 0.13
		-	For finishing	AH120	MJ	20 - 40	0.08 - 0.15

* When using the -NMJ chipbreaker, do not feed higher than 0.15 mm/t.

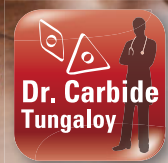
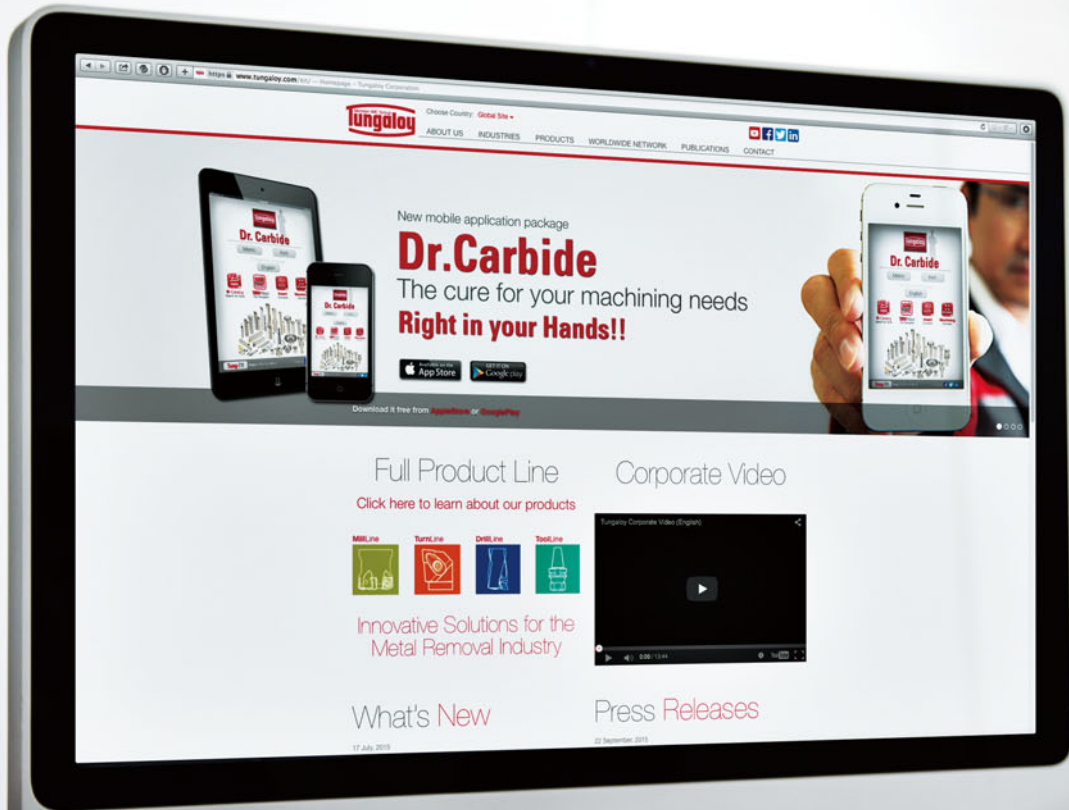
PRACTICAL EXAMPLES

Workpiece type	Machine parts	Bracket	
Holder	LPTC16J063B25.4L061R03 (ø63, z = 3)	LPTC16M080B32.0L076R04 (ø80, z = 4)	
Insert	TCMT160620PDER-NMJ	TCMT160620PDER-NMJ	
Grade	AH3135 SS400	AH3135 SCSiMn2H	
Workpiece material			
Cutting conditions	Cutting speed: Vc (m/min)	150 (Competitor: Vc = 105)	135 (Competitor: Vc = 126)
	Feed per tooth: fz (mm/t)	0.2	0.33 (Competitor: fz = 0.3)
	Feed speed: Vf (m/min)	455	709
	Depth of cut: ap (mm)	50	75
	Width of cut: ae (mm)	10	5
	Method of machining	Shoulder milling	Shoulder milling
	Coolant	Air	Air
Machine	Tower M/C, BT50	Vertical M/C, BT40	
Results	 <p>Thanks to its high chatter stability, TungTriShred increased the feed rate by 25%.</p>	 <p>Thanks to its low cutting force, TungTriShred improved MRR by 15%, significantly reducing the machining costs.</p>	
Workpiece type	Flange	Rail	
Holder	TPTC16M050B22.0R04 (ø50, z = 4)	LPTC16M080B32.0L076R04 (ø80, z = 4)	
Insert	TCMT160620PDER-NMJ	TCGT160608PDER-MJ	
Grade	AH120 FC300 / GG30	AH120 E1101	
Workpiece material			
Cutting conditions	Cutting speed: Vc (m/min)	150	125 (Competitor: Vc = 57)
	Feed per tooth: fz (mm/t)	0.18	0.15
	Feed speed: Vf (m/min)	700	240
	Depth of cut: ap (mm)	2	45
	Width of cut: ae (mm)	10	15
	Method of machining	Shoulder milling	Shoulder milling
	Coolant	Wet	Air
Machine	Horizontal M/C, BT40	Tower M/C, BT50	
Results	 <p>Smaller chips and reduced cutting forces improves tool life by 1.5 times.</p>	 <p>TungTriShred's high chatter stability allowed high speed machining, improving MRR. The -MJ geometry improved surface finish.</p>	

MEMO

A large grid of graph paper, consisting of 20 columns and 30 rows of small squares, intended for writing a memo.

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