

MillLine

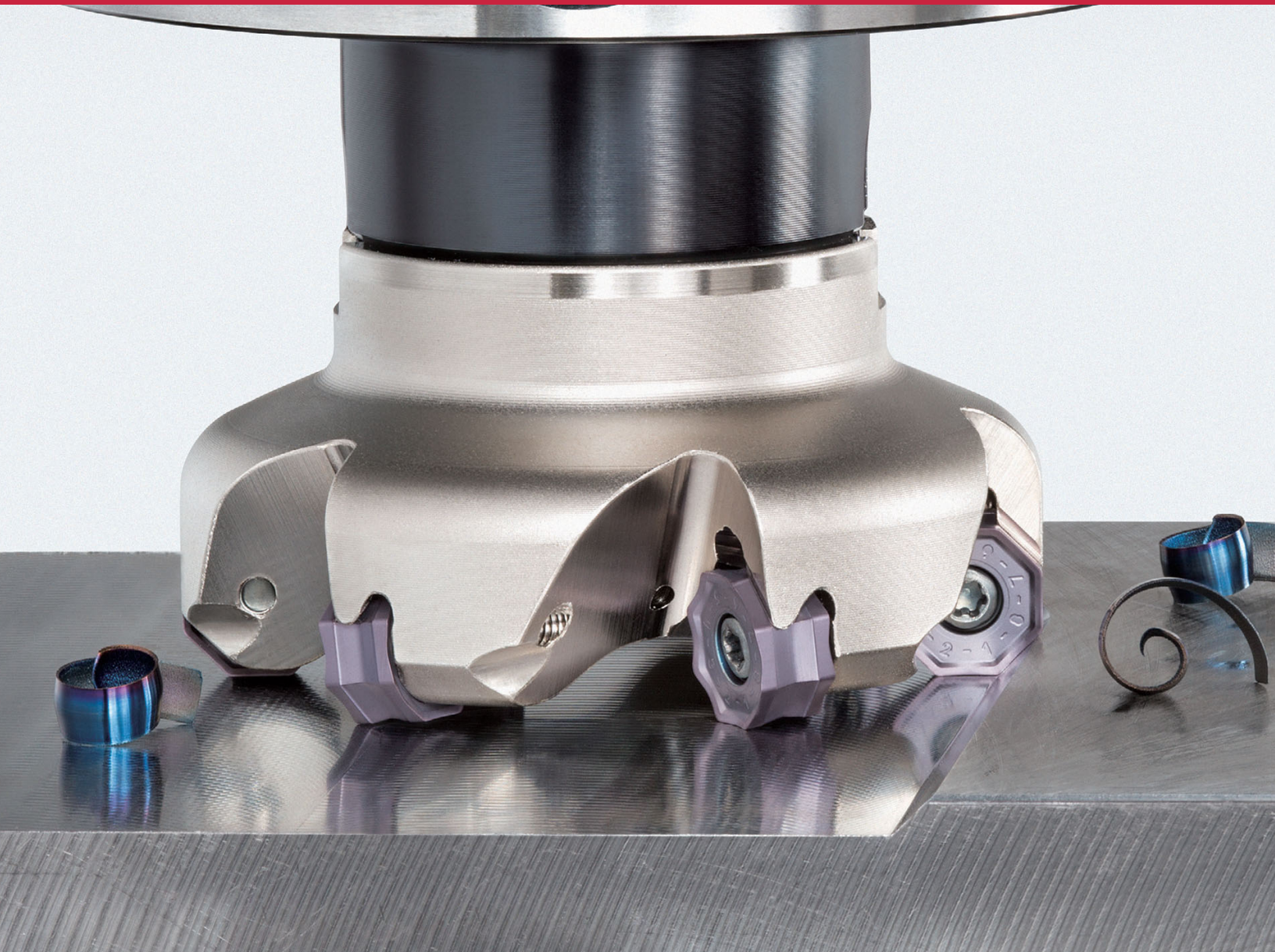
**DOT<sup>TRIPLE</sup>MILL**

tungaloy.com/us

Tungaloy Report No. 503-US

DOTRIPLE-MILL

**Three times the selection,**  
more than a triple advantage



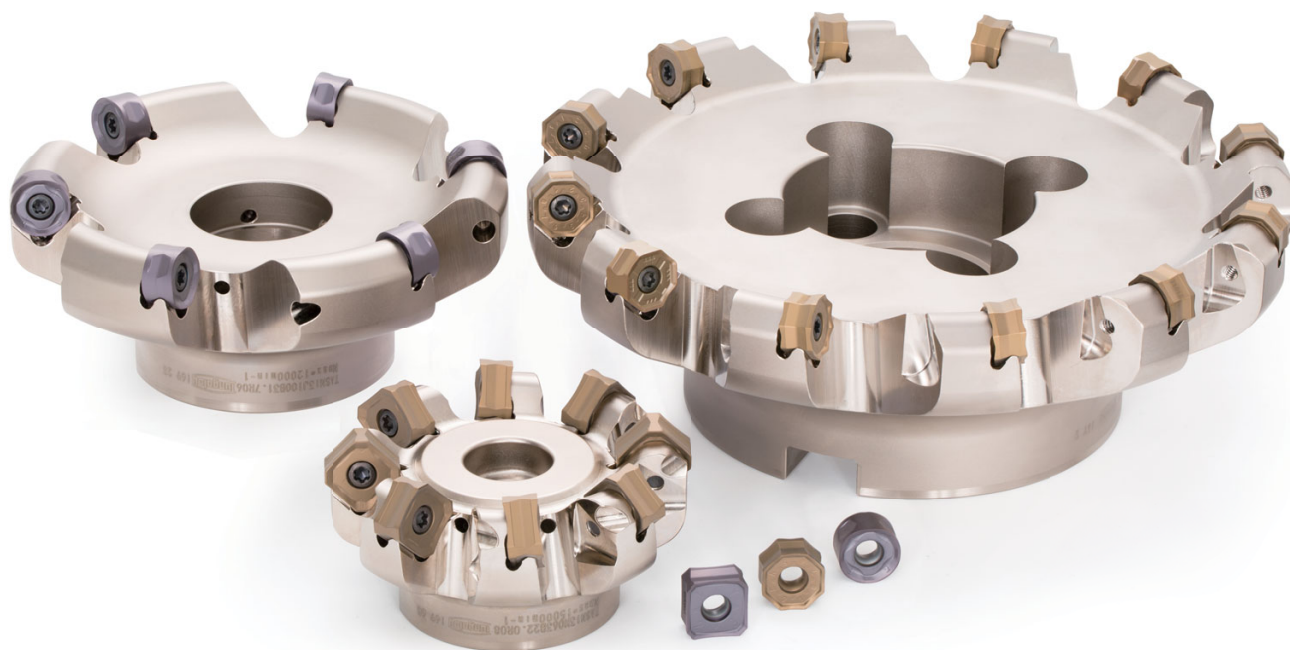
Member IMC Group  
**Tungaloy**





ACCELERATED MACHINING



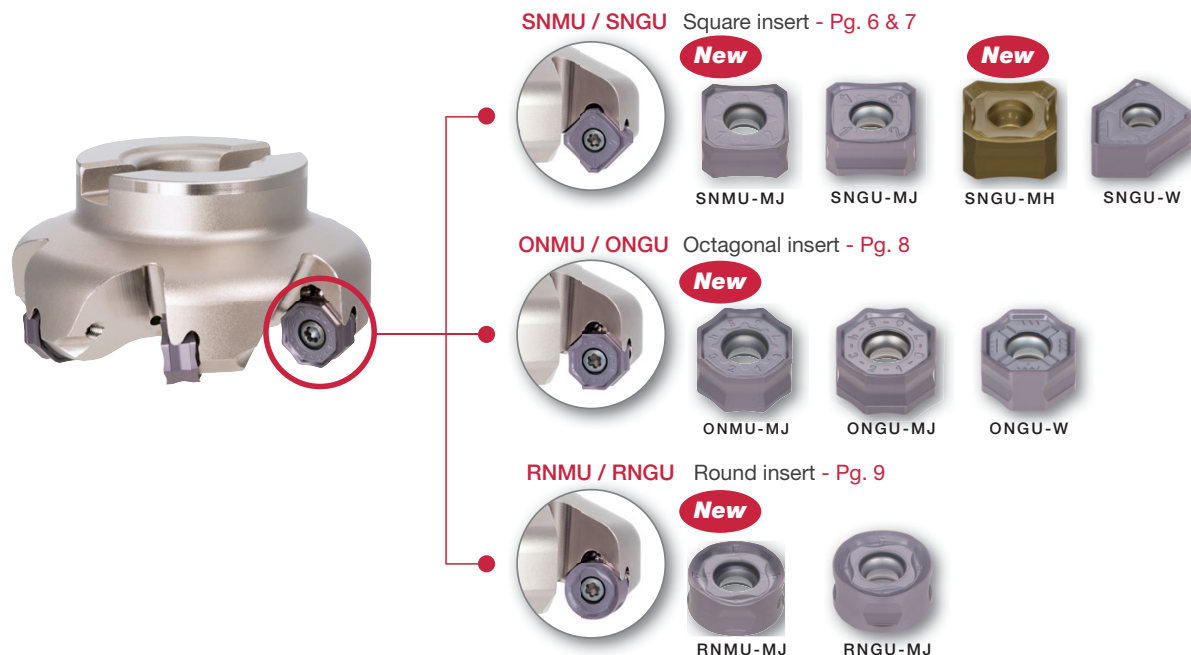


DoTriple-Mill features an improved dovetail clamping structure and offers **triple advantage of using square, octagonal, and round inserts** in the same pocket.

**Brings a top performance in every operation:**  
from high feed milling, scale removing,  
finish milling ... to stainless steel milling

## Versatility

3 types of double sided inserts fit in the same pocket



- Three different pitches are available: standard, close, and extra-close pitches



Standard pitch



Close pitch

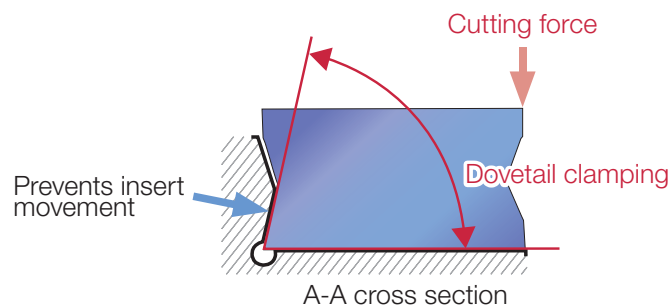
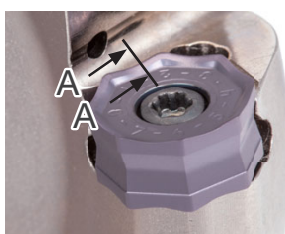


Extra-close pitch

## Rigid clamping

**Dovetail structure provides high clamping rigidity with only one screw**

- Improved performance especially in machining high-temperature materials
- Extended tool life



## Rich grade lineup for every kind of material

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

### AH3135



Steel

Stainless

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

### AH120



Steel

Cast Iron

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

**New**

### T1215



Cast Iron

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

**New**

### T3225



Steel

Stainless

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

## PREMIUMTEC

### Special Surface Technology

#### Enhanced coating resistance to chipping and peeling

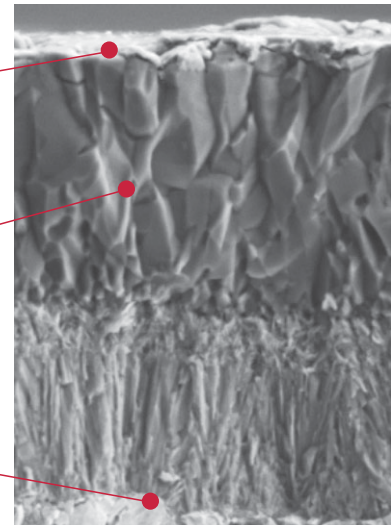
- Special surface post-treatment technology improves surface smoothness

#### Superior wear resistance in high speed cutting

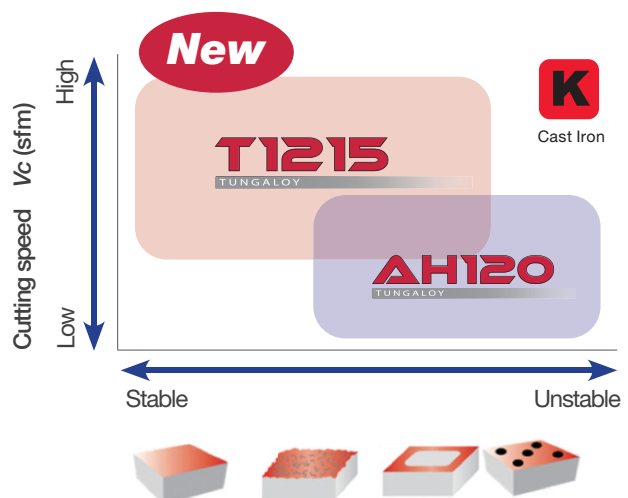
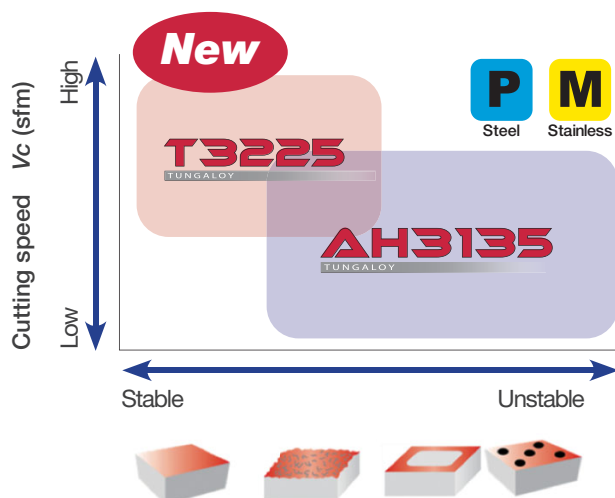
- A thick alumina ( $Al_2O_3$ ) layer improves insert life in a high cutting temperature generated during high speed machining

#### Enhanced coating resistance to peeling

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



## Application Area

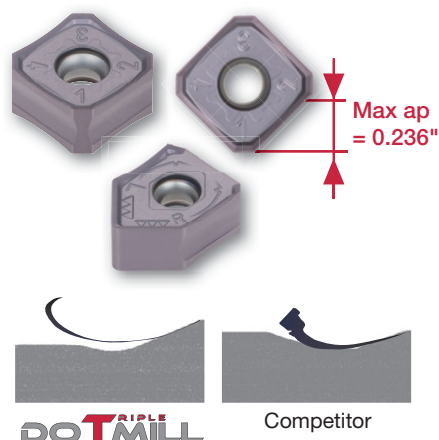


## Features of SNMU and SNGU inserts

Double-sided, square inserts with eight cutting edges

- Most suitable for a large depth of cut
- Free cutting inserts with excellent chip control

The optimized cutting edge height allows smooth chips flow in cutting smearing materials like stainless steel. Due to a large rake angle, less cutting force is produced, making the insert optimal for use even on a less rigid spindle like CAT40.



### Chip formation in stainless steel milling

DOTRIPLE



Chips are formed in optimal large curls for smooth evacuation.

Competitor A

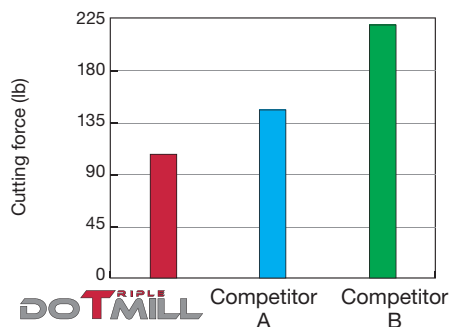


Small curls are formed, causing heavy load on the insert

**M**  
Stainless

Cutter : TASN13U3.00B1.00R08 ( $\phi D_c = 3"$ ,  $z = 8$ )  
 Insert : SNMU1307ANEN-MJ AH3135  
 Workpiece material : 304  
 Cutting speed :  $V_c = 492$  sfm  
 Feed per tooth :  $f_z = 0.012$  ipt  
 Depth of cut :  $a_p = 0.118"$   
 Width of cut :  $a_e = 2.008"$   
 Coolant : Dry

### Cutting force



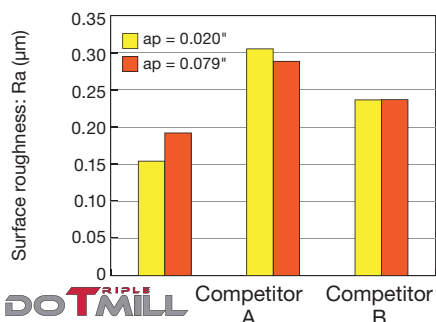
**P**  
Steel

Cutter : TASN13U4.00B1.50R08 ( $\phi D_c = 4"$ ,  $z = 8$ )  
 Insert : SNGU1307ANEN-MJ  
 Workpiece material : 1055  
 Cutting speed :  $V_c = 656$  sfm  
 Feed per tooth :  $f_z = 0.008$  ipt  
 Depth of cut :  $a_p = 0.079"$   
 Width of cut :  $a_e = 2.953"$   
 Coolant : Dry

### - Superior surface finish quality

The insert incorporates built-in wipers of for improved surface quality.

### Surface roughness



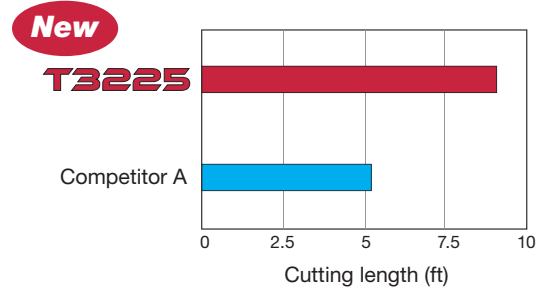
**P**  
Steel

Cutter : TASN13U4.00B1.50R08 ( $\phi D_c = 4"$ ,  $z = 8$ )  
 Insert : SNMU1307ANEN-MJ AH3135  $\times 7$   
 / SNGU1307ANEN-W AH3135  $\times 1$   
 Workpiece material : 1055  
 Cutting speed :  $V_c = 820$  sfm  
 Feed per tooth :  $f_z = 0.004$  ipt  
 Depth of cut :  $a_p = 0.020"$  /  $0.079"$   
 Width of cut :  $a_e = 2.953"$   
 Coolant : Dry

## - Stable tool life

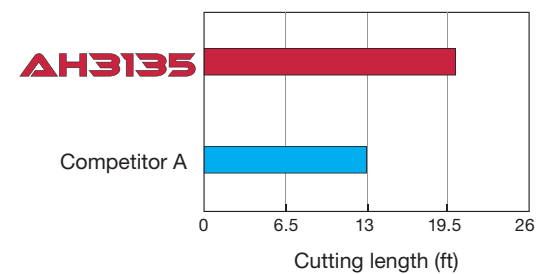
The MJ chipbreaker is most suitable for steel and stainless steel milling. The MH chipbreaker with an enhanced cutting edge delivers long, predictable insert life in removing scales from cast stainless steel.

Tool life comparison in alloy steel milling



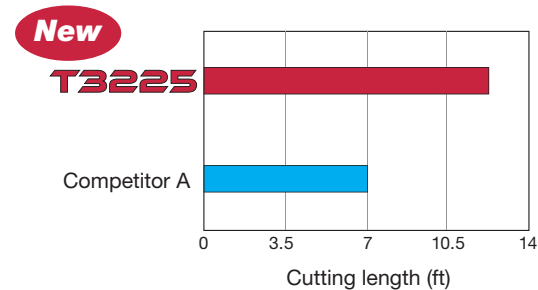
<b>P</b> Steel	Cutter	: TASN13U5.00B1.50R10 ( $\phi D_c = 5"$ , $z = 10$ )
	Insert	: SNMU1307ANEN-MJ T3225
	Workpiece material	: 4140
	Cutting speed	: $V_c = 984$ sfm
	Feed per tooth	: $f_z = 0.008$ ipt
	Depth of cut	: $a_p = 0.118"$
	Width of cut	: $a_e = 2.953"$
	Coolant	: Dry

Tool life comparison in stainless steel milling



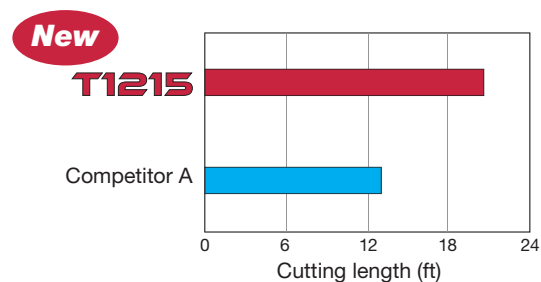
<b>M</b> Stainless	Cutter	: TASN13U4.00B1.50R08 ( $\phi D_c = 4"$ , $z = 8$ )
	Insert	: SNMU1307ANEN-MJ
	Workpiece material	: 304
	Cutting speed	: $V_c = 492$ sfm
	Feed per tooth	: $f_z = 0.006$ ipt
	Depth of cut	: $a_p = 0.118"$
	Width of cut	: $a_e = 2.953"$
	Coolant	: Dry

Tool life comparison in stainless steel milling



<b>M</b> Stainless	Cutter	: TASN13U2.50B0.75R08 ( $\phi D_c = 2.5"$ , $z = 8$ )
	Insert	: SNGU1307ANEN-MH T3225
	Workpiece material	: 304
	Cutting speed	: $V_c = 295$ sfm
	Feed per tooth	: $f_z = 0.011$ ipt
	Depth of cut	: $a_p = 0.098"$
	Width of cut	: $a_e = 0.984"$
	Coolant	: Dry

Tool life comparison in ductile cast iron milling



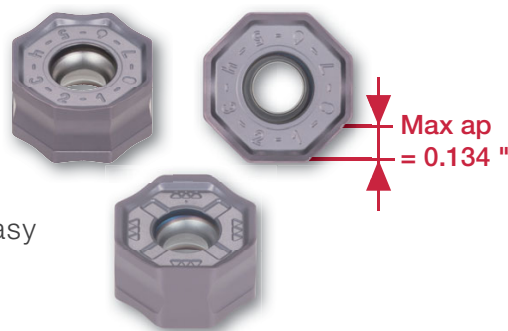
<b>K</b> Cast Iron	Cutter	: TASN13U5.00B1.50R10 ( $\phi D_c = 5"$ , $z = 10$ )
	Insert	: SNMU1307ANEN-MJ T1215
	Workpiece material	: 80-55-06
	Cutting speed	: $V_c = 656$ sfm
	Feed per tooth	: $f_z = 0.014$ ipt
	Depth of cut	: $a_p = 0.118"$
	Width of cut	: $a_e = 2.953"$
	Coolant	: Wet

## Features of ONMU and ONGU inserts

**Double-sided, octagonal insert with 16 cutting edges - high economy inserts**

### - Light cutting force due to excellent chip control

The optimized cutting edge creates barrel-formed chips for easy removal, allowing an operation at higher feed rate.



Chip are formed in optimal curls for smooth evacuation, leading to superior surface quality.

Competitor A



Chips are formed tightly curled, causing chip re-cutting.

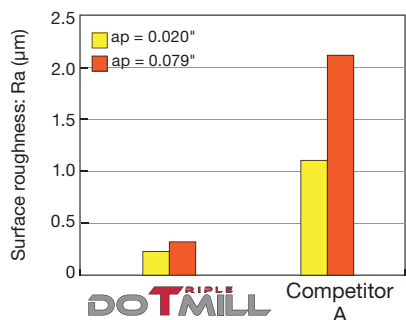


Stainless

Cutter : TASN13U3.00B1.00R08 ( $\phi D_c = 3"$ ,  $z = 8$ )  
 Insert : ONMU0507ANEN-MJ AH3135  
 Workpiece material : 304  
 Cutting speed :  $V_c = 492$  sfm  
 Feed per tooth :  $f_z = 0.012$  ipt  
 Depth of cut :  $ap = 0.118"$   
 Width of cut :  $ae = 2.008"$   
 Coolant : Dry

### - Superior surface finish

The wiper insert with eight cutting edges assures a superior finish on the machined surface

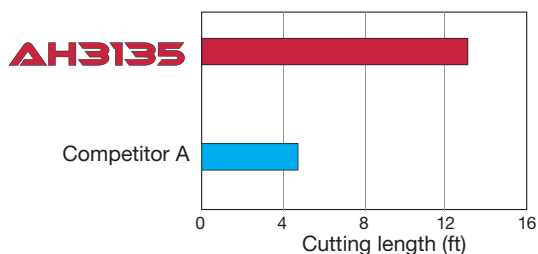


Steel

Cutter : TASN13U2.50B0.75R06 ( $\phi D_c = 2.5"$ ,  $z = 6$ )  
 Insert : ONMU0507ANEN-MJ AH3135 x5 / ONGU0507ANEN-W AH3135 x1  
 Workpiece material : 1055  
 Cutting speed :  $V_c = 820$  sfm  
 Feed per tooth :  $f_z = 0.008$  ipt  
 Depth of cut :  $ap = 0.020"$  /  $0.039"$   
 Width of cut :  $ae = 1.969"$   
 Coolant : Dry

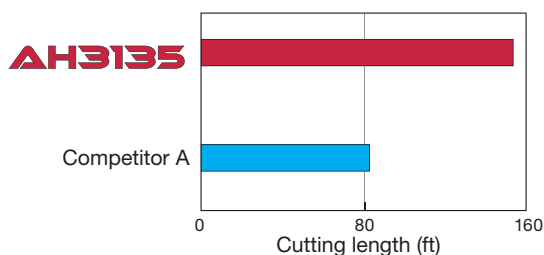
### - Stability in insert life

Ensures tool life stability in milling stainless steel



Stainless

Cutter : TASN13U4.00B1.50R08 ( $\phi D_c = 4"$ ,  $z = 1$ )  
 Insert : ONMU0507ANEN-MJ AH3135 ( $\phi D_c = 4"$ ,  $z = 1$ )  
 Workpiece material : 304  
 Cutting speed :  $V_c = 492$  sfm  
 Feed per tooth :  $f_z = 0.006$  ipt  
 Depth of cut :  $ap = 0.079"$   
 Width of cut :  $ae = 2.953"$   
 Coolant : Dry



Steel

Cutter : TASN13U4.00B1.50R08 ( $\phi D_c = 4"$ ,  $z = 1$ )  
 Insert : ONMU0507ANEN-MJ AH3135  
 Workpiece material : 1055  
 Cutting speed :  $V_c = 656$  sfm  
 Feed per tooth :  $f_z = 0.008$  ipt  
 Depth of cut :  $ap = 0.079"$   
 Width of cut :  $ae = 2.953"$   
 Coolant : Dry



## Features of RNMU and RNGU inserts

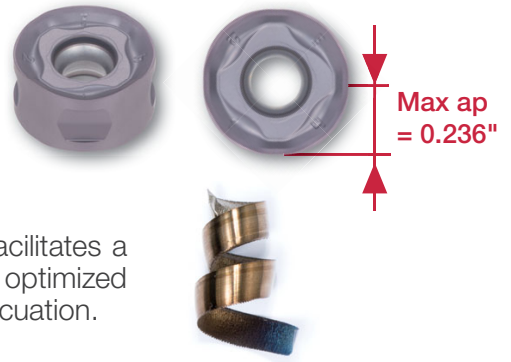
Double-sided, round inserts with eight cutting edges - an ideal insert for a roughing operation

- Can be used either in a high feed milling or in an operation with a large depth of cut

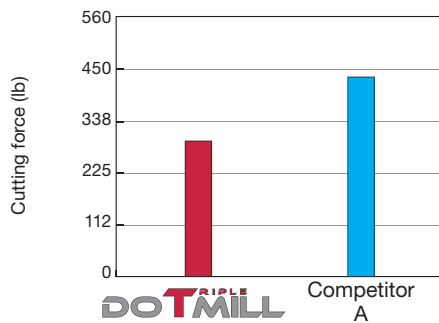
The robust cutting edge design of the RNMU and RNGU inserts facilitates a reliable rough milling even on an unstable surface. The chipbreaker is optimized for a high feed rate assists to form large-curl chips for easy chip evacuation.

- Lower cutting force

The helical cutting edge on the insert lowers the cutting load. Thermal damage to the cutting edge is thus reduced, leading to longer insert life.

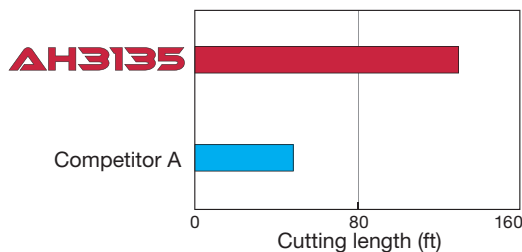


Cutting force



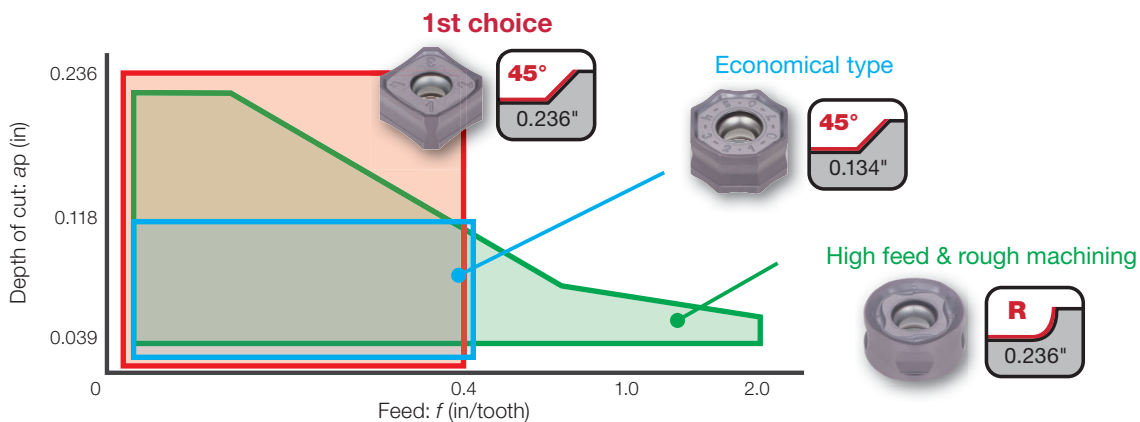
Cutter : TASN13U4.00B1.50R08 ( $\phi D_c = 4''$ ,  $z = 1$ )  
 Insert : RNMU1307ANEN-MJ AH3135  
 Workpiece material : 1055  
 Cutting speed :  $V_c = 656$  sfm  
 Feed per tooth :  $f_z = 0.008$  ipt  
 Depth of cut :  $a_p = 0.079''$   
 Width of cut :  $a_e = 2.953''$   
 Coolant : Dry

Tool life comparison in steel milling



Cutter : TASN13U4.00B1.50R08 ( $\phi D_c = 4''$ ,  $z = 1$ )  
 Insert : RNMU1307ANEN-MJ AH3135  
 Workpiece material : 4140  
 Cutting speed :  $V_c = 525$  sfm  
 Feed per tooth :  $f_z = 0.008$  ipt  
 Depth of cut :  $a_p = 0.079''$   
 Width of cut :  $a_e = 4.134''$   
 Coolant : Dry

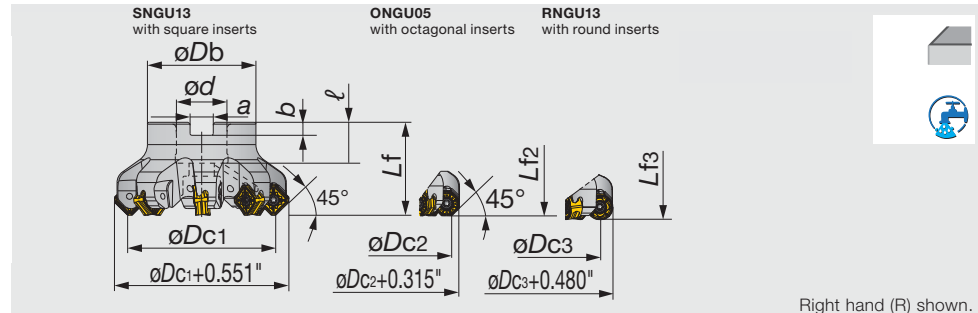
## APPLICATION AREA



## TASN13

45° face milling cutter to seat double sided square, octagonal, round insert

A.R.=+6.0°, R.R.=-6.8°~-6.3°



Right hand (R) shown.

Inch	øDc1	øDc2	øDc3	z	øDb	Lf1	Lf2	Lf3	ød	ℓ	a	b	lb	Air hole
TASN13U2.00B0.75R05	2.000	2.118	1.949	5	1.850	1.575	1.516	1.517	0.750	0.750	0.315	0.197	0.900	with
TASN13U2.50B0.75R06	2.500	2.618	2.449	6	1.850	1.575	1.516	1.517	0.750	0.750	0.315	0.197	1.320	with
TASN13U2.50B0.75R08	2.500	2.618	2.449	8	1.850	1.575	1.516	1.517	0.750	0.750	0.315	0.197	1.540	with
TASN13U3.00B1.00R08	3.000	3.118	2.949	8	1.969	1.969	1.909	1.911	1.000	1.024	0.374	0.236	1.980	with
TASN13U3.00B1.00R10	3.000	3.118	2.949	10	1.969	1.969	1.909	1.911	1.000	1.024	0.374	0.236	2.200	with
TASN13U4.00B1.50R08 *	4.000	4.118	3.949	8	3.150	1.969	1.909	1.911	1.500	1.276	0.626	0.394	3.750	without
TASN13U4.00B1.50R12 *	4.000	4.118	3.949	12	3.150	1.969	1.909	1.911	1.500	1.276	0.626	0.394	3.750	without
<b>New</b> TASN13U4.00B1.50R08LF2.5	4.000	4.118	3.949	8	3.150	2.480	2.421	2.422	1.500	1.496	0.626	0.394	4.410	without
<b>New</b> TASN13U4.00B1.50R12LF2.5	4.000	4.118	3.949	12	3.150	2.480	2.421	2.422	1.500	1.496	0.626	0.394	4.630	without
TASN13U5.00B1.50R10	5.000	5.118	4.949	10	3.150	2.480	2.421	2.422	1.500	1.378	0.626	0.394	5.950	without
TASN13U5.00B1.50R14	5.000	5.118	4.949	14	3.150	2.480	2.421	2.422	1.500	1.378	0.626	0.394	6.720	without
TASN13U6.00B2.00R12	6.000	6.118	5.949	12	3.937	2.480	2.421	2.422	2.000	1.496	0.748	0.433	8.600	without

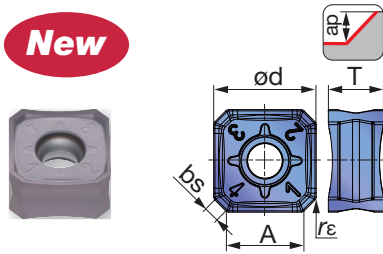
\* Discontinued items

### SPARE PARTS

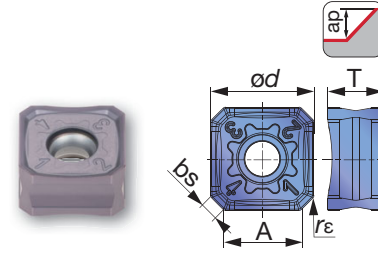
Designation	Clamping screw	Grip	Lubricant	Center bolt (Optional parts)	Center bolt 1 (Optional parts)	Torx bit
TASN13... (øDc1 ≤ 3.0")	CSPB-4	H-TB2W	M-1000	-	(C0.375X1.125H)	BLDIP15/S7
TASN13... (øDc1 = 3.0")	CSPB-4	H-TB2W	M-1000	-	(C0.500X1.375H)	BLDIP15/S7
TASN13... (øDc1 = 4.0")	CSPB-4	H-TB2W	M-1000	(TMBA-0.750S.375H)	-	BLDIP15/S7
TASN13... (øDc1 = 5.0")	CSPB-4	H-TB2W	M-1000	(TMBA-0.750S.375H)	-	BLDIP15/M7
TASN13... (øDc1 = 6.0")	CSPB-4	H-TB2W	M-1000	-	-	BLDIP15/M7

## INSERT

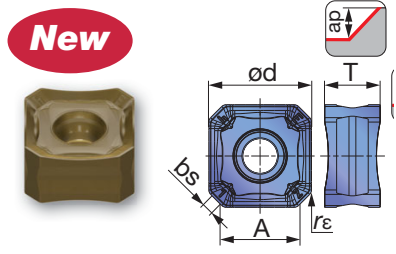
SNMU-MJ



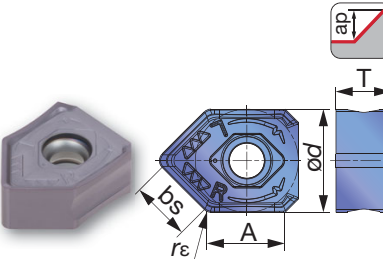
SNGU-MJ



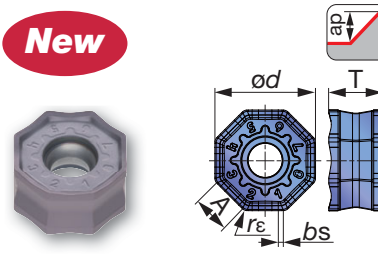
SNGU-MH



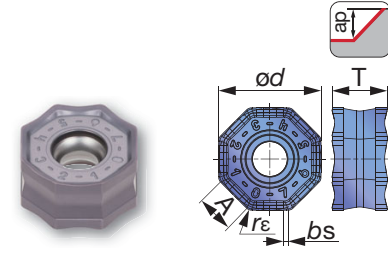
SNGU-W



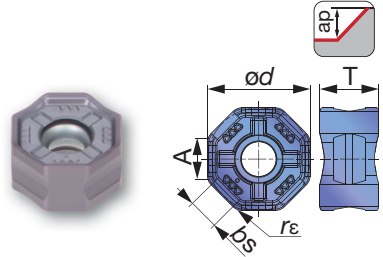
ONMU-MJ



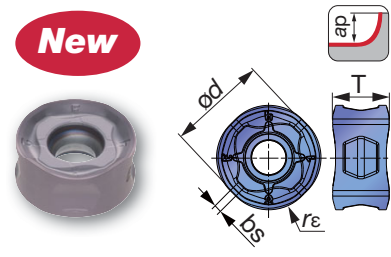
ONGU-MJ



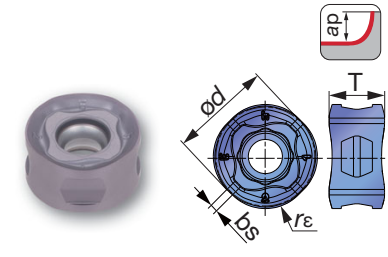
ONGU-W



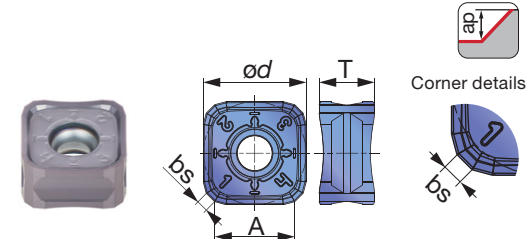
RNMU-MJ



RNGU-MJ



SNGU#C-MJ



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

Corner details

★ : First choice  
☆ : Second choice

Designation	rε	Max. ap	Coated				A	ød	T	bs
			AH120	AH3135	T3225	T1215				
SNMU1307ANEN-MJ	0.020	0.236	●	●	●	●	0.370	0.512	0.276	0.079
SNGU1307ANEN-MJ	0.020	0.236	●	●	●		0.370	0.512	0.276	0.079
SNGU1307ANEN-MH	0.031	0.236			●		0.354	0.512	0.276	0.079
SNGU1307ANEN-W	0.047	0.236	●	●			0.378	0.512	0.276	0.295
ONMU0507ANEN-MJ	0.031	0.134	●	●	●	●	0.193	0.512	0.276	0.028
ONGU0507ANEN-MJ	0.031	0.134	●	●	●		0.193	0.512	0.276	0.028
ONGU0507ANEN-W	0.063	0.134	●	●			0.197	0.512	0.293	0.154
RNMU1307ZNER-MJ	0.236	0.236	●	●	●	●	-	0.512	0.280	0.039
RNGU1307ZNER-MJ	0.236	0.236	●	●			-	0.512	0.280	0.039
SNGU1307C14ANEN-MJ	-	0.236	●	●			0.343	0.512	0.276	0.055

● : New product  
● : Line up



## STANDARD CUTTING CONDITIONS

### SNMU / SNGU / ONMU / ONGU

ISO	Workpiece materials	Hardness	Priority	Grades	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel (1015, 1020, etc.)	200 - 300HB	First choice	AH3135	MJ	330 - 820	0.004 - 0.020
			For wear resistance	T3225	MJ	660 - 1150	0.004 - 0.016
	High carbon and alloy steel (1055, 4140, etc.)	150 - 300HB	First choice	AH3135	MJ	330 - 820	0.004 - 0.016
			For wear resistance	T3225	MJ	590 - 980	0.004 - 0.016
	Prehardened steel (NAK80, PX5, etc.)	30 - 40HRC	First choice	AH3135	MJ	330 - 660	0.004 - 0.016
			For wear resistance	T3225	MJ	490 - 820	0.004 - 0.016
<b>M</b>	Stainless steel (304SS, 316SS, etc.)	- 200HB	First choice	AH3135	MJ	330 - 660	0.004 - 0.014
			For wear resistance	T3225	MJ	330 - 820	0.004 - 0.012
	Stainless cast steel (1.4849, etc.)	-	First choice	T3225	MH	200 - 390	0.004 - 0.012
			For low cutting force	AH3135	MJ	200 - 390	0.004 - 0.012
<b>K</b>	Gray cast iron (Class 25, Class 30, etc.)	150 - 250 HB	First choice	T1215	MJ	330 - 980	0.004 - 0.016
				AH120	MJ	330 - 820	0.004 - 0.020
	Ductile cast iron (60-40-18, 80-55-06, etc.)	150 - 250 HB	First choice	T1215	MJ	330 - 980	0.004 - 0.016
				AH120	MJ	260 - 660	0.004 - 0.020
<b>S</b>	Titanium alloys (Ti-6Al-4V, etc.)	- 40HRC	First choice	AH3135	MJ	100 - 200	0.004 - 0.012
	Heat-resistant alloys (Inconel718, etc.)	- 40HRC	First choice	AH120	MJ	30 - 130	0.002 - 0.006
<b>H</b>	Hardened steel	(H13, etc.)	First choice	AH3135	MJ	260 - 430	0.004 - 0.008
		(D2, etc.)	First choice	AH120	MJ	160 - 230	0.001 - 0.004




















### RNMU / RNGU




ISO	Workpiece materials	Hardness	Priority	Grades	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel (1015, 1020, etc.)	200 - 300 HB	First choice	AH3135	MJ	330 - 820	※ap = 0.236": 0.004 - 0.012 ※ap = 0.078": 0.016 - 0.031 ※ap = 0.039": 0.031 - 0.059
			For wear resistance	T3225	MJ	660 - 1150	
	High carbon and alloy steel (1055, 4140, etc.)	150 - 300 HB	First choice	AH3135	MJ	330 - 820	
			For wear resistance	T3225	MJ	590 - 980	
	Prehardened steel (NAK80, PX5, etc.)	30 - 40 HRC	First choice	AH3135	MJ	330 - 660	
			For wear resistance	T3225	MJ	490 - 820	
<b>M</b>	Stainless steel (304SS, 316SS, etc.)	- 200 HB	First choice	AH3135	MJ	330 - 660	※ap = 0.236": 0.004 - 0.010 ※ap = 0.078": 0.012 - 0.027 ※ap = 0.039": 0.024 - 0.051
			For wear resistance	T3225	MJ	330 - 820	
	Stainless cast steel (1.4849, etc.)	-	First choice	T3225	MJ	200 - 390	
			For fracture resistance	AH3135	MJ	200 - 390	
<b>K</b>	Gray cast iron (Class 25, Class 30, etc.)	150 - 250 HB	First choice	AH120	MJ	330 - 980	※ap = 0.236": 0.004 - 0.012 ※ap = 0.078": 0.016 - 0.031 ※ap = 0.039": 0.031 - 0.059
				T1215	MJ	330 - 820	
	Ductile cast iron (60-40-18, 80-55-06, etc.)	150 - 250 HB	First choice	AH120	MJ	330 - 980	
				T1215	MJ	260 - 660	
<b>S</b>	Titanium alloys (Ti-6Al-4V, etc.)	- 40 HRC	First choice	AH3135	MJ	100 - 200	ap = 0.039": 0.006 - 0.031
	Heat-resistant alloys (Inconel718, etc.)	- 40 HRC	First choice	AH120	MJ	30 - 130	ap = 0.039": 0.002 - 0.012
<b>H</b>	Hardened steel	(H13, etc.)	First choice	AH3135	MJ	260 - 430	ap = 0.039": 0.004 - 0.010
		(D2, etc.)	First choice	AH120	MJ	160 - 230	ap = 0.020": 0.001 - 0.004

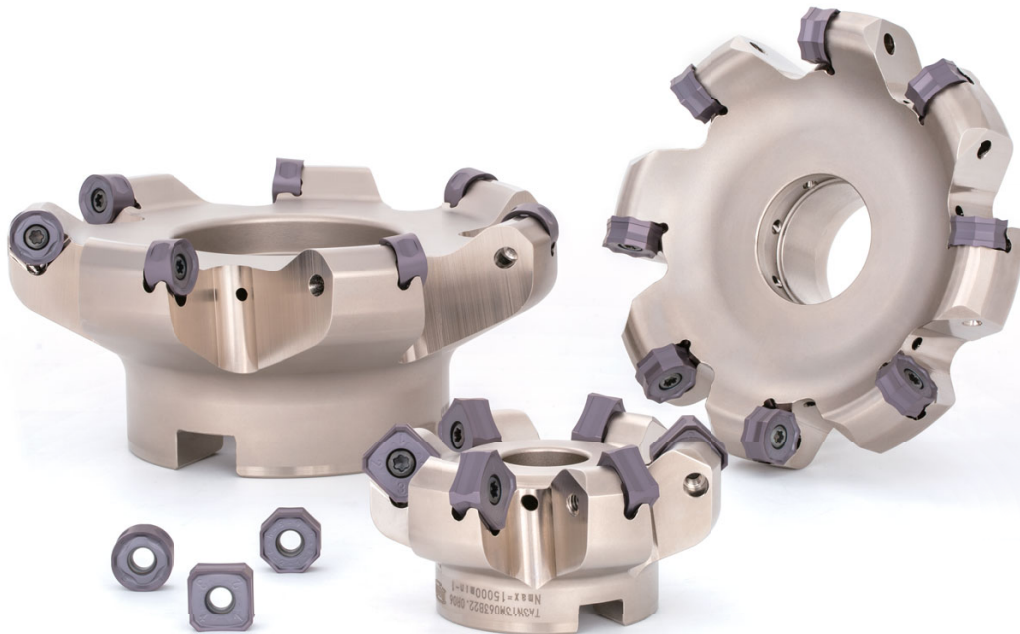
※When using T3225 or T1215, decrease the feed per tooth (fz) to 80% of the abovementioned value.

## Selection guide for face milling cutters

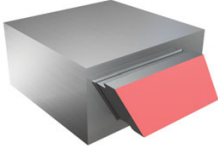

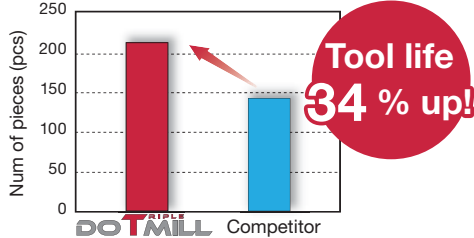
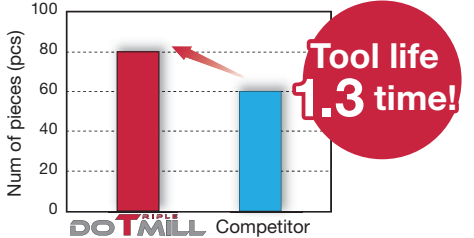

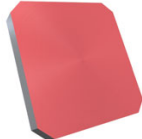
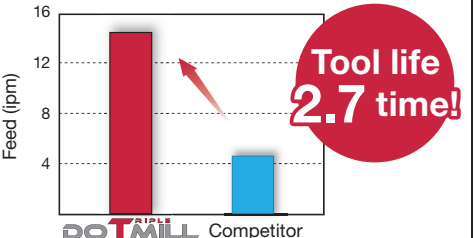
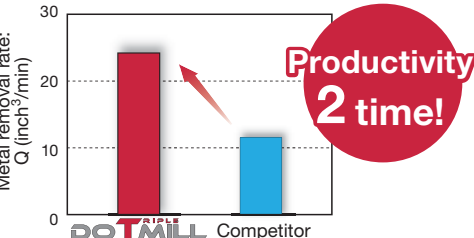
For workpiece configuration and spindle power

Spindle power			Light interrupted cuts	Edging of thin sections	Thin plates / hollow structure	Heavy interrupted cuts / scale or unstable surface
CAT40 (≥15kW)	CAT50 (≥22kW)	CAT50/ CAT60 (≥30kW)				
<b>DOPENT</b> 						
<b>DO<sup>TRIPLE</sup>MILL</b> 						
<b>DOOCTO DOQUAD</b> 						

 : First choice  
 : Second choice  
 : Not applicable


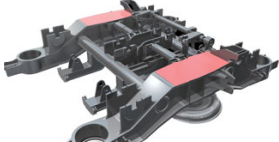
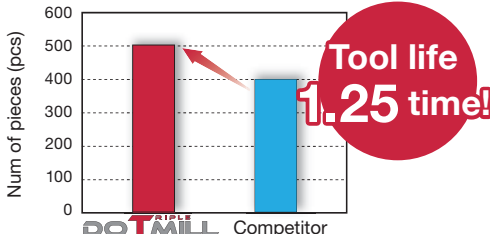
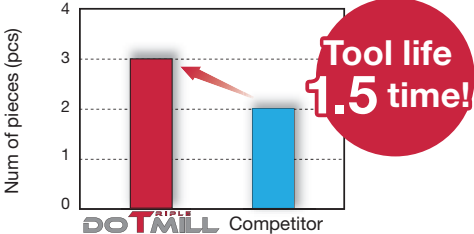
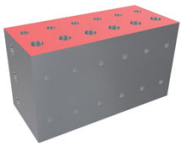

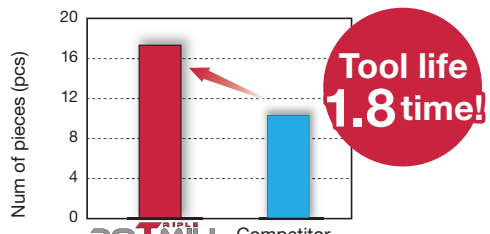
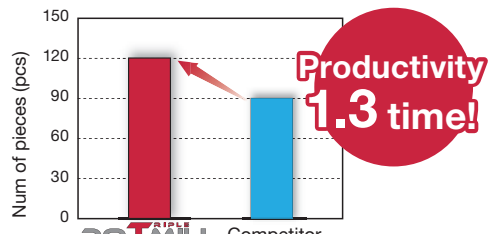


## PRACTICAL EXAMPLES

Workpiece type		Turbine blade	Turbine housing
Cutter		TASN13U3.00B1.00R08 ( $\phi 3"$ , $z = 8$ )	TASN13U3.00B1.00R08 ( $\phi 3"$ , $z = 8$ )
Insert		ONGU0507ANEN-MJ	SNGU1307ANEN-MJ
Grade		AH3135	AH3135
Workpiece material		Stainless steel	Stainless steel (cast)
		 <b>M</b>	 <b>M</b>
Cutting conditions	Cutting speed: $V_c$ (sfm)	260	308
	Feed per tooth: $f_z$ (ipt)	0.004	0.007
	Feed speed: $V_f$ (ipm)	7.92	16.06
	Depth of cut: $a_p$ (inch)	0.080	0.138
	Width of cut: $a_e$ (inch)	-	3.150
	Machining	Face milling (Roughing)	Face milling
	Coolant	External	External
Machine		Horizontal M/C, CAT50	Vertical M/C
Results		 <p>With DoTripleMill, the tool life is increased by 34% compared to the competitor.</p>	 <p>DoTripleMill extends tool life by 1.3 times compared with the competitor.</p>
Workpiece type		Turbine housing	Pallette
Cutter		TASN13U5.00B1.50R10 ( $\phi 5"$ , $z = 10$ )	TASN13U4.00B1.50R08 ( $\phi 4"$ , $z = 8$ )
Insert		SNGU1307ANEN-MJ	RNGU1307ZNER-MJ
Grade		AH3135	AH120
Workpiece material		Ductile cast iron (High Si)	No.300B
		 <b>K</b>	 <b>K</b>
Cutting conditions	Cutting speed: $V_c$ (sfm)	643	656
	Feed per tooth: $f_z$ (ipt)	0.003	0.012
	Feed speed: $V_f$ (ipm)	15.8	37.6
	Depth of cut: $a_p$ (inch)	0.051	0.200
	Width of cut: $a_e$ (inch)	4.00	3.307
	Machining	Face milling (Roughing)	Face milling (Roughing)
	Coolant	External	Dry
Machine		Vertical M/C, CAT50	Horizontal M/C, CAT50
Results		 <p>Due to DoTripleMill's low cutting force, the feed rate is maximized despite the weak fixture setting of the component.</p>	 <p>Tough RNGU insert offers stable and highly efficient machining even on the cast surface.</p>



## PRACTICAL EXAMPLES

Workpiece type		Flange yoke	Bogie truck
Cutter		TASN13U3.00B1.00R08 ( $\phi 3"$ , $z = 8$ )	TASN13J160B50.8R08 ( $\phi 160$ mm, $z = 8$ )
Insert		SNMU1307ANEN-MJ	SNMU1307ANEN-MJ
Grade		T3225	T3225
Workpiece material		1045	Low carbon steel
		 <b>P</b>	 <b>P</b>
Cutting conditions	Cutting speed: $V_c$ (sfm)	656	656
	Feed per tooth: $f_z$ (ipt)	0.004	0.012
	Feed speed: $V_f$ (ipm)	25.079	37.598
	Depth of cut: $a_p$ (inch)	0.079	0.118
	Width of cut: $a_e$ (inch)	-	-
	Machining	Face milling (Roughing)	Face milling (Roughing)
	Coolant	External coolant	External coolant
Machine		Horizontal M/C, BT40	Vertical M/C, BT50
Results		 <p>Criteria of tool life was burr. T3225 was long tool life due to less chipping and fracture on the cutting edge.</p>	 <p>DoTriple-Mill had high productivity and long tool life due to tougher chipbreaker than that of competitor.</p>
Workpiece type		Bulb body	Pump housing
Cutter		TASN13U5.00B1.50R10 ( $\phi 5"$ , $z = 10$ )	TASN13J125B38.1R07 ( $\phi 125$ mm, $z = 7$ )
Insert		SNMU1307ANEN-MJ	SNMU1307ANEN-MJ
Grade		T1215	T1215
Workpiece material		Vermicular cast iron	80-55-06
		 <b>K</b>	 <b>K</b>
Cutting conditions	Cutting speed: $V_c$ (sfm)	591	643
	Feed per tooth: $f_z$ (ipt)	0.005	0.016
	Feed speed: $V_f$ (ipm)	21.654	55.039
	Depth of cut: $a_p$ (inch)	0.106	0.217
	Width of cut: $a_e$ (inch)	-	2.559
	Machining	Face milling (Roughing)	Face milling (Roughing)
	Coolant	Air	Air
Machine		Horizontal M/C, BT50	Horizontal M/C, BT50
Results		 <p>Criteria of tool life was burr. T1215 showed stable tool life in machining vermicular cast iron because T1215 had good chipping resistance.</p>	 <p>T1215 showed longer tool life in spite of bigger depth of cut than competitor. T1215 has both good wear resistance and toughness.</p>

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