

Square shoulder milling cutter

**DOF<sup>ORCE</sup>TRI**

Tungaloy Report No. 501-US

High productive and cost-effective  
shoulder milling cutter - **Now available  
with new AH3225 grade**

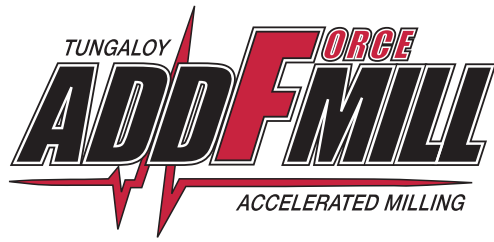






**INDUSTRY 4.0**  
*FEED the SPEED!*





DO F TRI



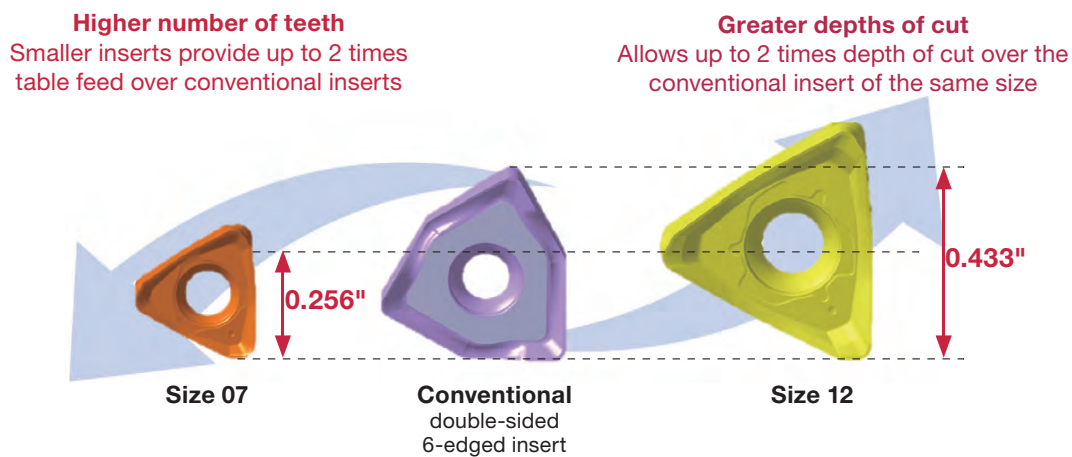
New AH3225 grade offers extended tool life for  
maximum economical benefits

# Economical shoulder mill with an innovative 6-edged geometry offers **maximum performance** in various applications

## ■ Innovative insert design for improved productivity

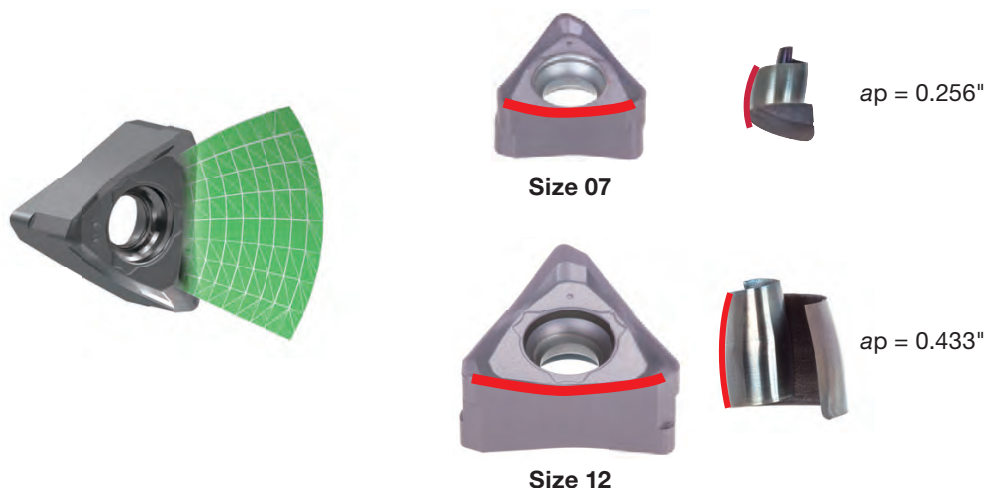
### ● High efficiency

Inserts are available in 2 sizes for high cutter density and cutting depths over conventional double-sided 6-edged inserts.



### ● High machining flexibility

The cutting edge is configured with a large curve with an optimal inclination, providing not only effective chip evacuation during heavy stock removal but also low cutting force in light depth of cut.



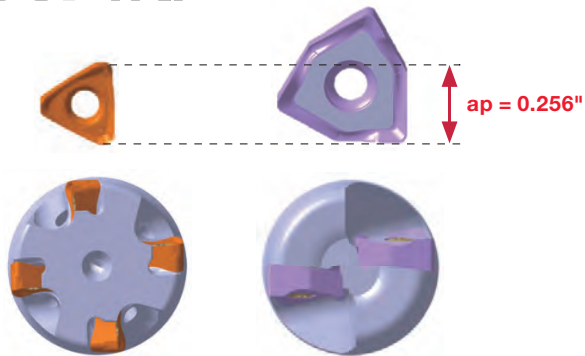
## Size 07

### ● High insert density for efficiency

DoForce-Tri offers insert density of up to 2 times as high as competitors' shoulder cutters of the same depth of cut, ensuring maximum efficiency thanks to its curved cutting edge with optimal inclination.

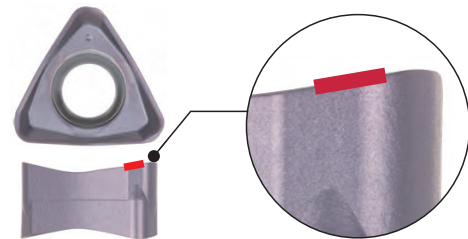
**DOF<sup>ORCE</sup>TRI**

Conventional



### ● Superior surface finishing

Every cutting edge is built with a wiper, thanks to the innovative flank design.



**Optimized cutting edge ensures smooth entry and good surface finish**

## Size 12

### ● Insert lineup for various applications



**TNMU-MJ**

with built-in wipers

**1st choice**

**Versatile geometry with good surface finish**



**TNGU-MJ**

with built-in wipers

**For close tolerance**



**TNMU-R-MJ**

Radius insert

**Strong cutting edge design with large corner radius**



**TNMU-NMJ**

Serrated insert\*

**Ensures free cutting and good chip control during heavy milling**

\*Please see page 10 for instruction for use

### ● Lineup of each insert size

Size	Max. depth of cut (in)	Corner radius (in)	Workpiece material	Tool diameter (in) Number of inserts	
07	0.256"	0.0157" / 0.0314"	<b>P M</b> <b>K S</b>	<div>ø0.750" 2</div> <div>ø1.000" 2, 3</div> <div>ø1.000" 3, 4</div> <div>ø1.250" 4, 5</div> <div>ø2.500" 6</div> <div>ø3.000" 8</div>	
12	0.433"	0.0314" / 0.0629" / 0.0787"	<b>P M</b> <b>K S</b>	<div>ø1.250" 2, 3</div> <div>ø1.500" 3, 4</div> <div>ø2.000" 4, 5</div> <div>ø2.500" 5, 6</div> <div>ø3.000" 6, 8</div> <div>ø4.000" 7, 10</div> <div>ø5.000" 8, 12</div> <div>ø6.000" 10</div>	

## GRADES

Enriched grade lineup covers various materials and machining applications

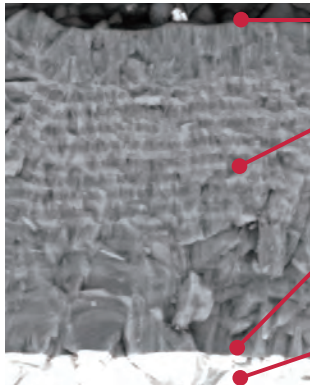
Offers three PVD and two CVD grades

New

### AH3225

**P M**

- Nano multi-layer coating technology with three major properties for optimal cutting edge integrity
- Increased resistance to wear, fracture, oxidation, built-up edge, and delamination



#### Resistance to built-up edge

The coating surface prevents built-up edge

#### Resistance to wear, oxidation, and fracture

Multi-layered coating is designed to resist wear and oxidation, while preventing micro-cracks from propagating in the coating layer for improved resistance to edge chipping

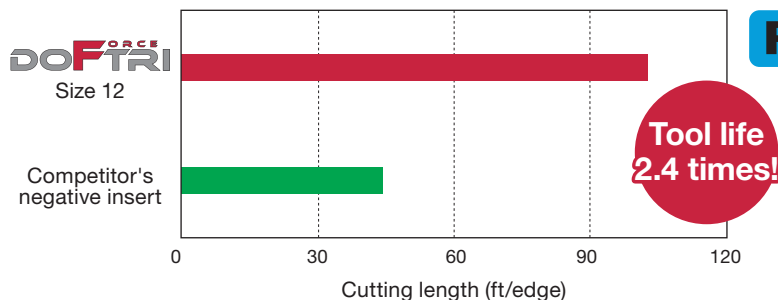
#### Strong coating / substrate adhesion

Coating is optimized for strong adhesion property with substrate to maintain strong cutting edge integrity

#### Carbide substrate

High resistance to fracture

## Long tool life



**P**

Cutter : TPTN12U2.00B0.75R05  
( $\phi 1.969"$ ,  $z = 5$ )  
Insert : TNMU120708PER-MJ AH3225  
Workpiece material : 1055  
Cutting speed :  $V_c = 656$  sfm  
Feed per tooth :  $f_z = 0.006$  ipt  
Depth of cut :  $a_p = 0.118"$   
Width of cut :  $a_e = 1.181"$   
Coolant : Dry  
Machine : Vertical M/C, CAT40

## PREMIUMTEC

### AH3135 **P M**

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

### AH120 **P K**

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

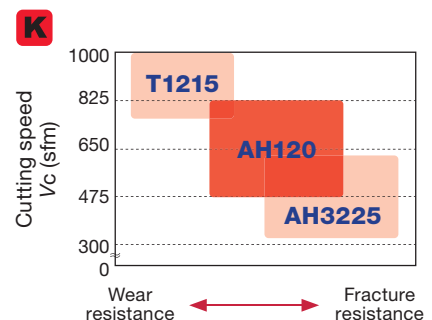
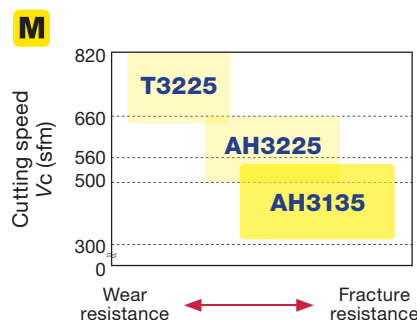
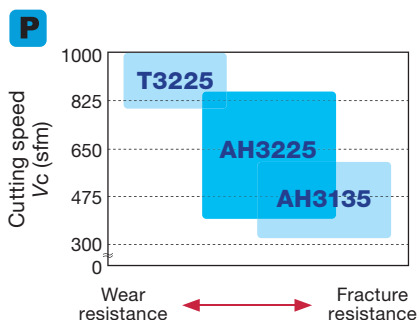
### T1215 **K**

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

### T3225 **P M**

- CVD grade with high chipping and fracture resistance

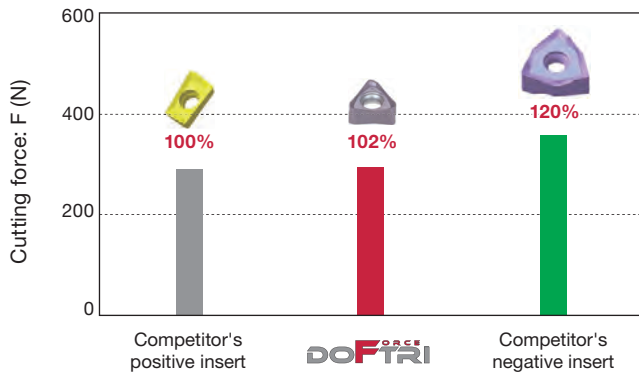
## APPLICATION AREAS



## CUTTING PERFORMANCE

### Low cutting forces

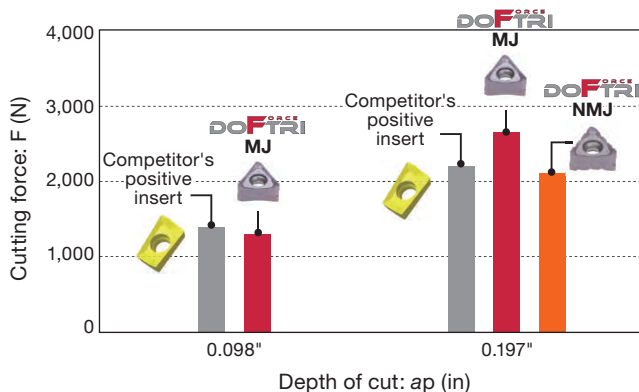
#### Size 07



Cutter : EPTN07U1.00C1.00R04 ( $\phi 1.000"$ ,  $z = 4$ )  
 Insert : TNMU070308PER-MJ AH3135  
 Workpiece material : 1055 (180 HB)  
 Cutting speed :  $V_c = 656$  sfm  
 Feed per tooth :  $f_z = 0.004$  ipt  
 Depth of cut :  $a_p = 0.059"$   
 Width of cut :  $a_e = 0.591"$   
 Number of insert : 1  
 Coolant : Dry  
 Machine : Vertical M/C, CAT50

**Unique cutting edge configuration can reduce cutting force to the same level produced by positive insert when  $a_p \leq 0.059"$ .**

#### Size 12

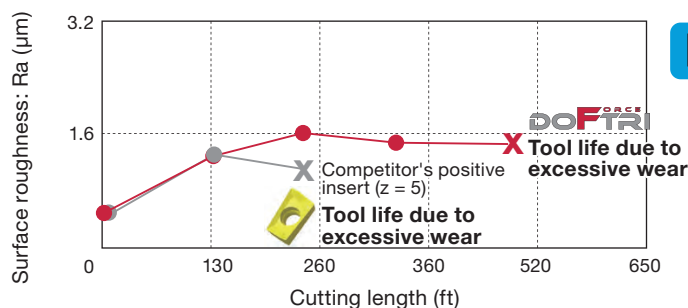


Cutter : TPTN12U2.00B0.75R05 ( $\phi 1.000"$ ,  $z = 4$ )  
 Insert : TNMU120708PER-MJ AH3135  
 TNMU120708PER-NMJ AH3135  
 Workpiece material : 1055 (180 HB)  
 Cutting speed :  $V_c = 492$  sfm  
 Feed per tooth :  $f_z = 0.006$  ipt  
 Depth of cut :  $a_p = 0.098"$ ,  $0.197"$   
 Width of cut :  $a_e = 1.181"$   
 Number of inserts : 2  
 Coolant : Dry  
 Machine : Vertical M/C, CAT50

**The MJ style insert ensures freer cutting than positive insert at light depths of cut. While the NMJ insert provides lower cutting force at greater depths of cut.**

### High surface quality

#### Size 07



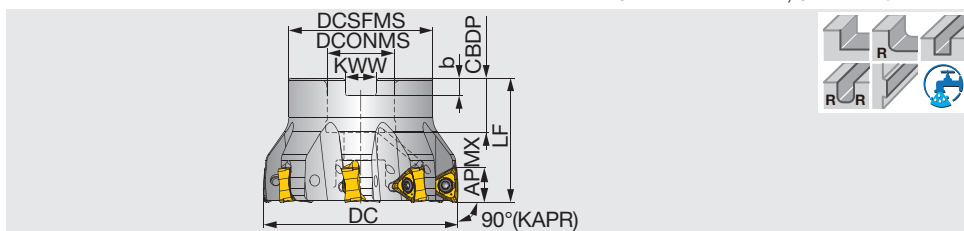
Cutter : EPTN07U1.00C1.00R04 ( $\phi 1.000"$ ,  $z = 4$ , Competitor:  $z = 5$ )  
 Insert : TNMU070308PER-MJ AH3135  
 Workpiece material : 1055 (180 HB)  
 Cutting speed :  $V_c = 656$  sfm  
 Feed per tooth :  $f_z = 0.004$  ipt  
 Depth of cut :  $a_p = 0.118"$   
 Width of cut :  $a_e = 0.591"$   
 Coolant : Dry  
 Machine : Horizontal M/C, CAT40

**Built-in wiper provides quality surface finishing, while also prolonging insert life.**

## TPTN07

Square shoulder mill, with screw clamp system, for double sided triangular inserts

GAMP = +4.2°~ +4.7°, GAMF = -15.4°~ -11.2°



Inch	APMX	DC	CICT	DCSFMS	LF <sup>(1)</sup>	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TPTN07U2.00B0.75R08	0.256	2.000	8	1.850	1.575	0.750	0.750	0.315	0.197	0.930	With	TN MU0703...

(1) The value is true with R0.8 insert. For R0.4, please refer to page 10.

### SPARE PARTS

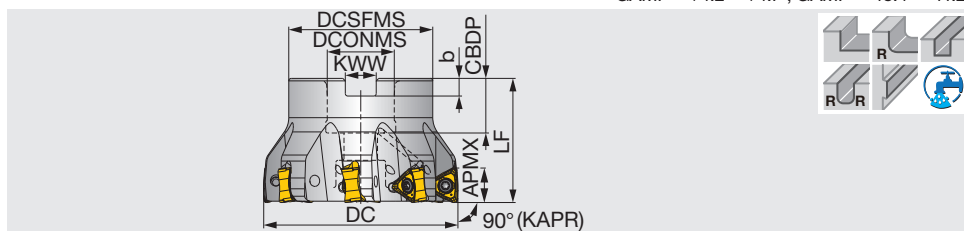
Designation	Clamping screw	Wrench	Lubricant
TPTN07U2.00B0.75R08	CSPB-2.5SH	IP-7D	M-1000

\* Torque (lb·ft): CSPB-2.5SH = 0.81

## TPTN12

Square shoulder mill, with screw clamp system, for double sided triangular inserts

GAMP = +4.2°~ +4.7°, GAMF = -15.4°~ -11.2°



Inch	APMX	DC	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(lb)	Air hole	Insert
TPTN12U2.00B0.75R05	0.433	2.000	5	1.850	1.575	0.750	0.750	0.315	0.197	0.890	With	TN*U1207...
TPTN12U2.50B0.75R06	0.433	2.500	6	1.850	1.575	0.750	0.750	0.315	0.197	1.330	With	TN*U1207...
TPTN12U3.00B1.00R08	0.433	3.000	8	2.835	1.969	1.000	1.024	0.374	0.236	2.440	With	TN*U1207...
TPTN12U4.00B1.50R10	0.433	4.000	10	3.150	1.969	1.500	1.181	0.626	0.394	3.110	With	TN*U1207...
TPTN12U5.00B1.50R12	0.433	5.000	12	3.150	2.480	1.500	1.181	0.626	0.394	5.330	With	TN*U1207...
TPTN12U6.00B2.00R12N	0.433	6.000	12	3.858	2.48	2.000	1.496	0.748	0.433	4	Without	TN*U1207...

### SPARE PARTS

Designation	Clamping screw	Grip	Torx bit	Lubricant
TPTN12U**R...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000

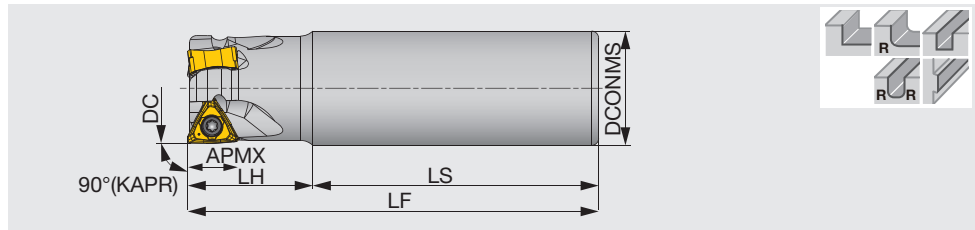
\* Torque (lb·ft): CSPB-3.5 = 2.58



## EPTN07

Square shoulder endmill, with screw clamp system, for double sided triangular inserts

GAMP = +4.2° ~ +4.7°, GAMF = -15.4° ~ -11.2°



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF <sup>(1)</sup>	WT(lb)	Air hole	Insert
EPTN07U0.75C0.75R02	0.256	0.750	2	0.750	2.500	1.000	3.500	0.370	With	TN MU0703..
EPTN07U0.75C0.75R02L	0.256	0.750	2	0.750	4.750	1.670	6.420	0.710	With	TN MU0703..
EPTN07U1.00C1.00R03	0.256	1.000	3	1.000	3.000	1.500	4.500	0.880	With	TN MU0703..
EPTN07U1.00C1.00R03L	0.256	1.000	3	1.000	5.700	3.000	8.700	1.720	With	TN MU0703..
EPTN07U1.00C1.00R04	0.256	1.000	4	1.000	3.000	1.500	4.500	0.880	With	TN MU0703..
EPTN07U1.25C1.25R04	0.256	1.250	4	1.250	3.000	1.500	4.500	1.390	With	TN MU0703..
EPTN07U1.25C1.25R05	0.256	1.250	5	1.250	3.000	1.500	4.500	1.390	With	TN MU0703..
EPTN07U1.50C1.25R06	0.256	1.500	6	1.250	2.250	2.250	4.500	1.460	With	TN MU0703..

(1) The value is true with R0.8 insert. For R0.4, please refer to page 10.

### SPARE PARTS



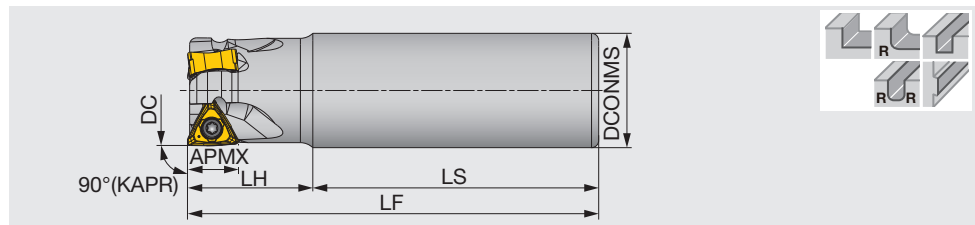
Designation	Clamping screw	Wrench
EPTN07...	CSPB-2.5SH	IP-7D

\* Torque (lb·ft): CSPB-2.5SH = 0.81

## EPTN12

Square shoulder endmill, with screw clamp system, for double sided triangular inserts

GAMP = +4.2° ~ +4.7°, GAMF = -15.4° ~ -11.2°



Inch	APMX	DC	CICT	DCONMS	LS	LH	LF	WT(lb)	Air hole	Insert
EPTN12U1.25C1.25R03N	0.433	1.250	3	1.250	3.000	1.500	4.500	1.560	Without	TN*U1207...
EPTN12U1.50C1.25R04N	0.433	1.500	4	1.250	3.000	1.500	4.500	1.780	Without	TN*U1207...

### SPARE PARTS

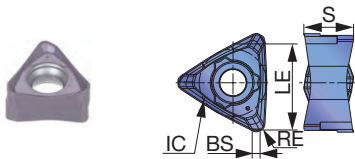


Designation	Clamping screw	Grip	Torx bit	Lubricant
EPTN12...	CSPB-3.5	H-TB2W	BLDIP15/S7	M-1000

\* Torque (lb·ft): CSPB-3.5 = 2.58

## INSERT

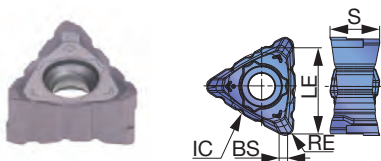
### TNMU07-MJ



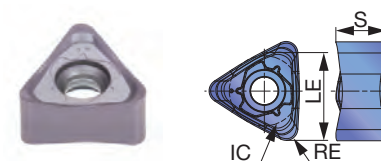
### TNGU12-MJ/TNMU12-MJ



### TNMU12-NMJ



### TNMU12-R-MJ



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

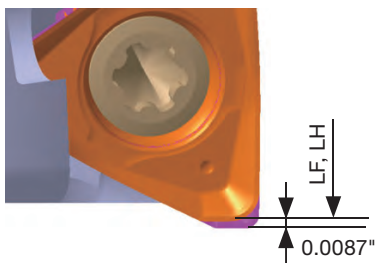
★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated					LE	IC	S	BS
			AH120	AH3225	AH3135	T1215	T3225				
TNMU070304PER-MJ	0.016	0.256	●	●	●			0.256	0.224	0.161	0.024
TNMU070308PER-MJ	0.031	0.256	●	●	●			0.256	0.224	0.161	0.024
TNGU120708PER-MJ	0.031	0.433	●	●	●	●		0.472	0.375	0.277	0.046
TNMU120708PER-MJ	0.031	0.433	●	●	●	●	●	0.472	0.375	0.28	0.046
TNMU120708PER-NMJ	0.031	0.433	●	●	●			0.472	0.375	0.28	0.046
TNMU1207R16PER-MJ	0.063	0.433	●	●	●			0.472	0.375	0.271	-
TNMU1207R20PER-MJ	0.079	0.433	●	●	●	●		0.472	0.375	0.265	-

● : New product  
● : Line up

## Notes

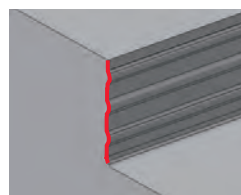
### ■ LF and LH dimensions for R0.4, size 07 insert



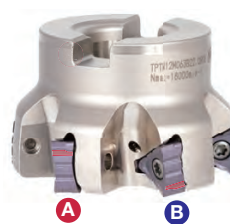
Add 0.0087" to LH and LF measurements when R0.4 insert is used.

### ■ Serrated size 12 insert (NMJ)

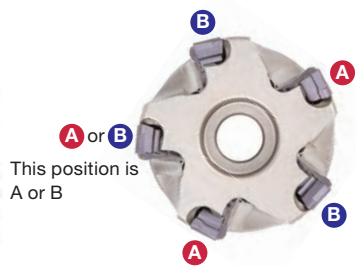
To obtain good wall accuracy, the serrated inserts must be arranged in alternative orders on the cutter so that the same serrated edge will not cut the same surface twice, generating steps on the wall. One of the serration grooves (marked in red) on the cutting edge has a irregular shape, and this must be placed alternatively as shown below by A and B.



Check the insert orientations if steps are produced on the wall surface.



The groove in red is asymmetric for easy identification



This position is A or B

Insert orientation for odd number of teeth

## STANDARD CUTTING CONDITIONS

### Size 07 inserts

ISO	Workpiece material	Hardness	Priority	Grade	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Carbon steel 1018, 1026, etc.	- 200 HB	First choice	AH3225	328 - 820	0.003 - 0.008
		- 200 HB	For fracture resistance	AH3135	328 - 820	0.003 - 0.008
	High Carbon steel, Alloy steel 1045, 4140, etc.	- 300 HB	First choice	AH3225	328 - 755	0.003 - 0.006
		- 300 HB	For fracture resistance	AH3135	328 - 755	0.003 - 0.006
	Prehardened steel H-13, P-20, etc.	30 - 40 HRC	First choice	AH3225	328 - 591	0.003 - 0.006
		30 - 40 HRC	For fracture resistance	AH3135	328 - 591	0.003 - 0.006
M	Stainless steel 304, 316, etc.	-	First choice	AH3135	295 - 656	0.003 - 0.006
		-	For wear resistance	AH3225	295 - 656	0.003 - 0.006
K	Gray cast iron Class 25, Class 30, etc.	150 - 250 HB	First choice	AH120	459 - 820	0.003 - 0.008
		150 - 250 HB	For fracture resistance	AH3225	459 - 820	0.003 - 0.008
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	361 - 656	0.003 - 0.006
		150 - 250 HB	For fracture resistance	AH3225	361 - 656	0.003 - 0.006
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH3135	66 - 197	0.003 - 0.006
	Heat-resistant alloys Inconel 718, etc.	-	First choice	AH120	66 - 131	0.003 - 0.004



## STANDARD CUTTING CONDITIONS


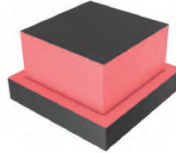
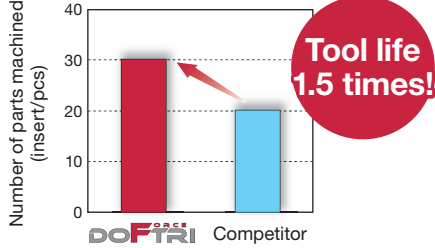
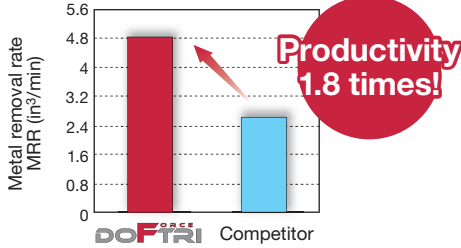

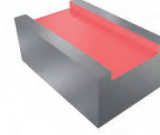
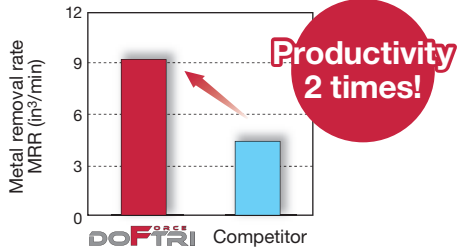
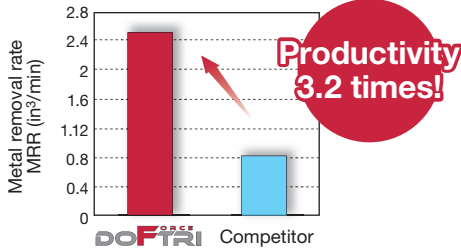
Size 12 inserts

ISO	Workpiece material	Hardness	Priority	Grade	Chipbreaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
P	Carbon steel 1018, 1026, etc.	- 200 HB	First choice	AH3225	MJ	328 - 820	0.003 - 0.012
		- 200 HB	For fracture resistance	AH3135	MJ	328 - 820	0.003 - 0.012
		- 200 HB	For wear resistance	T3225	MJ	328 - 984	0.003 - 0.012
		- 200 HB	Low cutting force	AH3225	NMJ	328 - 820	0.003 - 0.006
	High Carbon steel, Alloy steel 1045, 4140, etc.	- 300 HB	First choice	AH3225	MJ	328 - 755	0.003 - 0.012
		- 300 HB	For fracture resistance	AH3135	MJ	328 - 755	0.003 - 0.012
		- 300 HB	For wear resistance	T3225	MJ	328 - 919	0.003 - 0.012
		- 300 HB	Low cutting force	AH3225	NMJ	328 - 755	0.003 - 0.006
	Prehardened steel H-13, P-20, etc.	30 - 40 HRC	First choice	AH3225	MJ	328 - 591	0.003 - 0.010
		30 - 40 HRC	For fracture resistance	AH3135	MJ	328 - 591	0.003 - 0.010
		30 - 40 HRC	For wear resistance	T3225	MJ	328 - 656	0.003 - 0.010
		30 - 40 HRC	Low cutting force	AH3225	NMJ	328 - 591	0.003 - 0.006
M	Stainless steel 304, 316, etc.	-	First choice	AH3135	MJ	295 - 656	0.003 - 0.010
		-	For wear resistance	T3225	MJ	295 - 820	0.003 - 0.010
		-	Low cutting force	AH3135	NMJ	295 - 656	0.003 - 0.006
K	Gray cast iron Class 25, Class 30, etc.	150 - 250 HB	First choice	AH120	MJ	459 - 820	0.003 - 0.012
		150 - 250 HB	For fracture resistance	AH3225	MJ	459 - 820	0.003 - 0.012
		150 - 250 HB	For wear resistance	T1215	MJ	459 - 984	0.003 - 0.012
		150 - 250 HB	Low cutting force	AH120	NMJ	459 - 820	0.003 - 0.006
	Ductile cast iron 60-40-18, 80-55-06, etc.	150 - 250 HB	First choice	AH120	MJ	361 - 656	0.003 - 0.010
		150 - 250 HB	For fracture resistance	AH3225	MJ	361 - 656	0.003 - 0.010
		150 - 250 HB	For wear resistance	T1215	MJ	361 - 820	0.003 - 0.010
		150 - 250 HB	Low cutting force	AH120	NMJ	361 - 656	0.003 - 0.006
S	Titanium alloys Ti-6Al-4V, etc.	-	First choice	AH3135	MJ	66 - 197	0.003 - 0.008
		-	Low cutting force	AH3135	NMJ	66 - 197	0.003 - 0.006
	Heat-resistant alloys Inconel 718, etc.	-	First choice	AH120	MJ	66 - 131	0.003 - 0.007
		-	Low cutting force	AH120	NMJ	66 - 131	0.003 - 0.006



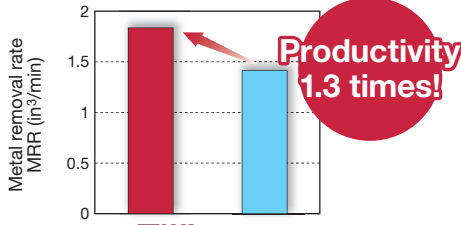
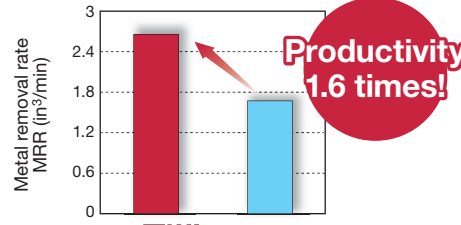
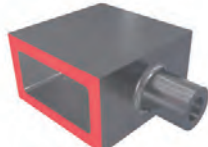
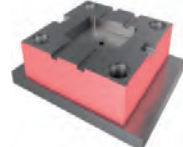
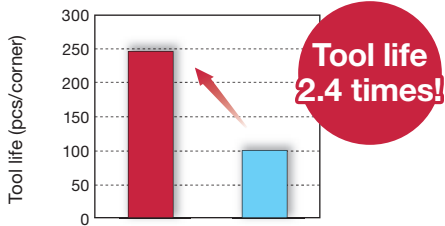
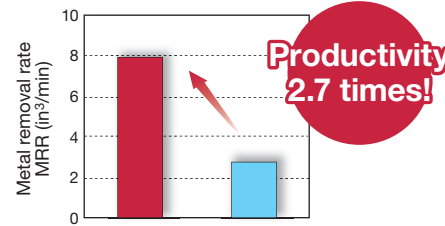
Note: For NMJ chipbreaker, use a feed rate that satisfies the following theoretical chip thickness:

Designation	Chip thickness (in)
TNMMU120708PER-NMJ	< 0.008"

## PRACTICAL EXAMPLES

Workpiece type		Bracket	Machine part
Cutter		TPTN12U2.00B0.75R05 ( $\phi 2.000"$ , $z = 5$ )	EPTN12M040C32.0R04N ( $\phi 40$ mm, $z = 4$ )
Insert		TNMT120708PER-MJ	TNMT120708PER-NMJ
Grade		AH3225	AH3135
Workpiece material		Low carbon steel	S45C / C45
		 <b>P</b>	 <b>P</b>
Cutting conditions	Cutting speed : $V_c$ (sfm)	460	840
	Feed per tooth: $f_z$ (ipt)	0.005	0.006
	Feed speed : $V_f$ (ipm)	21.063	44
	Depth of cut : $a_p$ (in)	0.008	0.157
	Width of cut : $a_e$ (in)	1.417	1.060
	Machining	Shoulder milling	Shoulder milling
	Coolant	Wet	None
Machine		Vertical M/C, CAT40	Horizontal M/C, CAT40
Results		 <p><b>Tool life 1.5 times!</b></p> <p>The combination of special insert geometry and grade for inserts in DoForce-Tri series helps extend tool life compared to the competitor.</p>	 <p><b>Productivity 1.8 times!</b></p> <p>DoForce-Tri's NMJ chipbreaker with serrations reduced cutting force eliminating chatter. MRR has been improved to double the depth of cut with long and stable tool life.</p>
		<p>Number of parts machined (insert/pcs)</p> <p>DOFTRI Competitor</p>	<p>Metal removal rate MRR (in³/min)</p> <p>DOFTRI Competitor</p>
Workpiece type		Crankshaft	Machine part
Cutter		TPTN12M160B40.0R10N ( $\phi 6.299"$ , $z = 10$ )	EPTN07U1.00C1.00R04 ( $\phi 1.000"$ , $z = 4$ )
Insert		TNMT120708PER-MJ	TNMT070308PER-MJ
Grade		AH3135	AH3135
Workpiece material		1055	304
		 <b>P</b>	 <b>M</b>
Cutting conditions	Cutting speed : $V_c$ (sfm)	443	660
	Feed per tooth: $f_z$ (ipt)	0.006	0.005
	Feed speed : $V_f$ (ipm)	16.535	51.1
	Depth of cut : $a_p$ (in)	0.118	0.08
	Width of cut : $a_e$ (in)	4.921	1
	Machining	Shoulder milling	Slotting
	Coolant	Air blast	Air blast
Machine		Horizontal boring M/C, CAT50	Horizontal M/C, CAT40
Results		 <p><b>Productivity 2 times!</b></p> <p>The competitor's shoulder mill chattered at high cutting parameters. DoForce-Tri's helical cutting edges produced stable machining at 1.7 times number of teeth and 1.2 times depth of cut.</p>	 <p><b>Productivity 3.2 times!</b></p> <p>MRR has been improved by 3.2 times over the competitor's positive inserts thanks to higher number of teeth on the cutter increasing feed per tooth. No sacrifice for surface quality.</p>
		<p>Metal removal rate MRR (in³/min)</p> <p>DOFTRI Competitor</p>	<p>Metal removal rate MRR (in³/min)</p> <p>DOFTRI Competitor</p>

## PRACTICAL EXAMPLES

Workpiece type		Bearing housing	Bracket
Cutter		EPTN07U1.25C1.25R05 ( $\phi 1.500"$ , $z = 5$ )	EPTN07U1.00C1.00R04 ( $\phi 1.000"$ , $z = 4$ )
Insert		TNMU070308PER-MJ	TNMU070308PER-MJ
Grade		AH3135	AH120
Workpiece material		No.250B	100-70-03
		 <b>K</b>	 <b>K</b>
Cutting conditions	Cutting speed : Vc (sfm)	1050	590
	Feed per tooth: fz (ipt)	0.002	0.003
	Feed speed : Vf (ipm)	37.795	27.165
	Depth of cut : ap (in)	0.080	0.157
	Width of cut : ae (in)	0.945	0.866
	Machining	Grooving	Face milling
	Coolant	Air blast	Air blast
	Machine	Horizontal M/C, CAT40	Vertical M/C, CAT40
Results		 <p><b>Productivity 1.3 times!</b></p> <p>MRR has been improved by 1.3 times over the competitor's positive inserts thanks to higher number of teeth and increased feed per tooth.</p>	 <p><b>Productivity 1.6 times!</b></p> <p>Inserts free cutting action eliminated chatter despite higher number of cutting edges, improving MRR by 1.6 times.</p>
Workpiece type		Carrier	Mold base
Cutter		TPTN12U2.50B0.75R06 ( $\phi 2.5"$ , $z = 6$ )	TPTN12J080B25.4R06 ( $\phi 80$ mm, $z = 6$ )
Insert		TNGU120708PER-MJ	TNMU120708PER-MJ
Grade		AH120	AH120
Workpiece material		Pearlitic cast iron (250 HB)	FCD600 / GGG60 / 600-3
		 <b>K</b>	 <b>K</b>
Cutting conditions	Cutting speed : Vc (sfm)	500	660
	Feed per tooth: fz (ipt)	0.008	0.008
	Feed speed : Vf (ipm)	37.400	38.00
	Depth of cut : ap (in)	0.236	0.197
	Width of cut : ae (in)	0.800	1.570
	Machining	Face milling	Shoulder milling
	Coolant	Wet	Wet
	Machine	Horizontal M/C, CAT50	Horizontal M/C, CAT50
Results		 <p><b>Tool life 2.4 times!</b></p> <p>The combination of special insert geometry and grade for inserts in DoForce-Tri series helps extend tool life compared to the competitor.</p>	 <p><b>Productivity 2.7 times!</b></p> <p>The competitor's shoulder mill chattered at high cutting parameters. DoForce-Tri's helical cutting edges produced high wall accuracy at double cutting speed and 1.7 times greater depth of cut.</p>



# FIXED TORQUE WRENCH

Achieves high cutting edge precision thanks to uniform clamping force

## Easy setting

### Handle

Multi-component handle optimally designed for the hand enables ideal power transmission.



### Mechanism

Driver clicks to alert the operator when the preset torque is attained. IDs printed on the handle end allow easy identification of the driver specs. Driver has unlimited loosening torque. Driver mechanism is industrial-lubricant-resistant.

## High repeatability & robustness

### Robustness / Fitting

Wiha ChromTop® finish on tip for a perfect fit every time. Durability thanks to high quality chrome-vanadium-molybdenum steel, through hardened, chrome-plated.

### Versatility

Extra slim blade geometry is particularly suitable for applications with confined narrow access.

Dark green: TORX

Light green: TORX PLUS



### Handle

Ex) **TW - D - 0.6NM**

1 Torque Wrench 2 Driver type 3 Torque

Designation	Stock	Torque (lbf-ft)	Accuracy (%)	øD	L
TW-D-0.6NM	●	0.44	10	1.339"	5.118"
TW-D-0.9NM	●	0.66	10	1.339"	5.118"
TW-D-1.1NM	●	0.81	10	1.339"	5.118"
TW-D-1.4NM	●	1.03	10	1.339"	5.118"
TW-D-2.5NM	●	1.84	10	1.339"	5.118"
TW-D-3.0NM	●	2.21	10	1.339"	5.118"
TW-D-3.5NM	●	2.58	10	1.339"	5.118"

1 piece per package



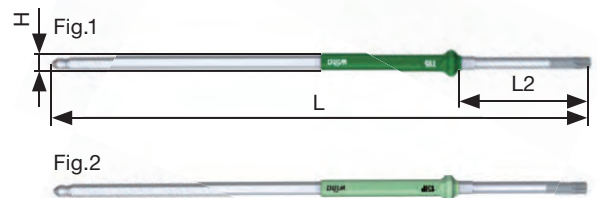
### Blade

Ex) **TW - B - T6**

1 Torque Wrench 2 Blade 3 TORX geom.

Designation	Stock	TORX geom.	H	L	L2	Fig.
TW-B-T6	●	T6	0.157"	6.890"	1.654"	1
TW-B-T7	●	T7	0.157"	6.890"	1.654"	1
TW-B-T8	●	T8	0.157"	6.890"	1.654"	1
TW-B-T9	●	T9	0.157"	6.890"	1.654"	1
TW-B-T10	●	T10	0.157"	6.890"	1.654"	1
TW-B-T15	●	T15	0.157"	6.890"	1.654"	1
TW-B-6IP	●	6IP	0.157"	6.890"	1.654"	2
TW-B-7IP	●	7IP	0.157"	6.890"	1.654"	2
TW-B-8IP	●	8IP	0.157"	6.890"	1.654"	2
TW-B-10IP	●	10IP	0.157"	6.890"	1.654"	2
TW-B-15IP	●	15IP	0.157"	6.890"	1.654"	2

1 piece per package



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Feb. 2022 (TJ)