

MillLine

**TUNG**<sup>IGHT</sup>**EMILL**

[www.tungaloy.com/us](http://www.tungaloy.com/us)

Tungaloy Report No. 531-US



# Economical 8 edged inserts

with light cutting face milling cutter



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

9216539

ACCELERATED MACHINING



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Low cutting force cutters ensure effective machining of low rigidity workpieces

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# Light cutting & optimal chip forming insert

featuring 8 cutting edges  
with high positive rake angle

## High positive rake face mill

### ■ Inserts with a high positive inclination provide light cutting actions

- Ensures smooth cutter entry to the work material as well as free chip evacuation.



- Three types of economical inserts are available, each equipped with a wiper and numbered for easy identification.



**MM geometry, M class**  
8 cutting edges



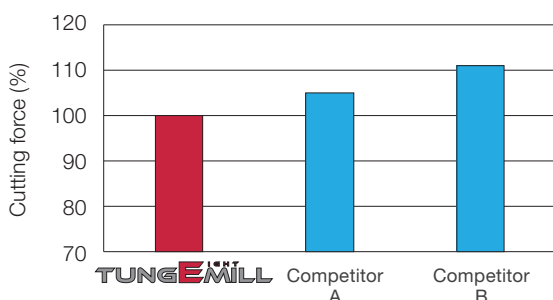
**MM geometry, H class**  
8 cutting edges



**Wiper insert**  
4 cutting edges

### ■ Cutting force comparison (calculated)

Cutting force is 5-10% lower than the competitors' inserts.



<b>P</b> Cutter	: TAOW05U4.00B1.50R08 (ø4", z = 8)
Insert	: OWHT05T3C07AFER-MM AH3135
Workpiece material	: 1055 (200HB)
Cutting speed	: Vc = 656 sfm
Feed per tooth	: fz = 0.012 ipt
Depth of cut	: ap = 0.08"
Width of cut	: ae = 3.15"
Coolant	: Dry
Number of inserts	: z = 1

## Designed to ensure machining stability

### Ideal chip forming

Provides an ideal chip shape in steel, stainless steel and other gummy materials. Chips can be cleaned out of the machine easily.

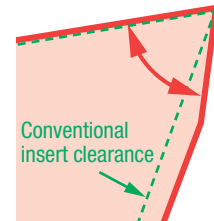
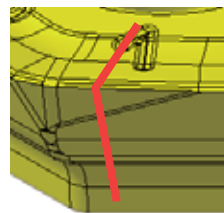


Chips in stainless steel

<b>M</b>	Cutter	: TAOW05U4.00B1.50R08 ( $\phi 4"$ , $z = 8$ )
	Insert	: OWMT05T3AFER-MM AH3135
	Workpiece material	: 304 (160HB)
	Cutting speed	: $V_c = 656$ sfm
	Feed per tooth	: $f_z = 0.010$ ipt
	Depth of cut	: $a_p = 0.12"$
	Width of cut	: $a_e = 2.95"$
	Coolant	: Dry
Number of inserts	: $z = 8$	

### Better insert reliability with double flank relief

The insert flank is constructed with two angles which provides greater cutting edge support.



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insert cross section

After machining 24.9 ft

After machining 3.9 ft



**TUNGEMILL**

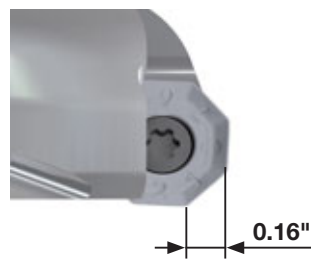


Competitor

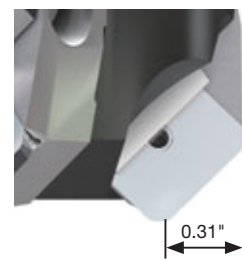
<b>M</b>	Cutter	: TAOW05U4.00B1.50R08 ( $\phi 4"$ , $z = 8$ )
	Insert	: OWHT05T3C07AFER-MM AH3135
	Workpiece material	: 304 (160HB)
	Cutting speed	: $V_c = 656$ sfm
	Feed per tooth	: $f_z = 0.012$ ipt
	Depth of cut	: $a_p = 0.08"$
	Width of cut	: $a_e = 2.36"$
	Coolant	: Dry
Number of inserts	: $z = 1$	

### Minimum interference design

Allows milling close to the walls and fixtures.



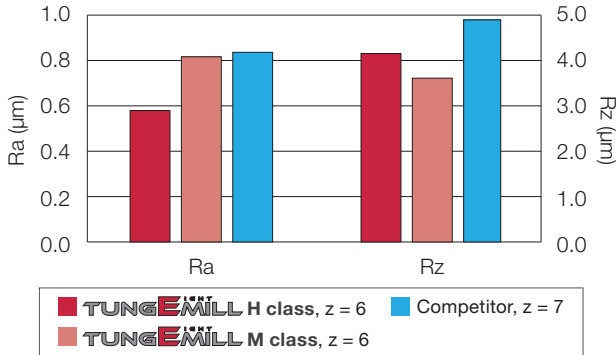
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Conventional tool

## Excellent surface finish

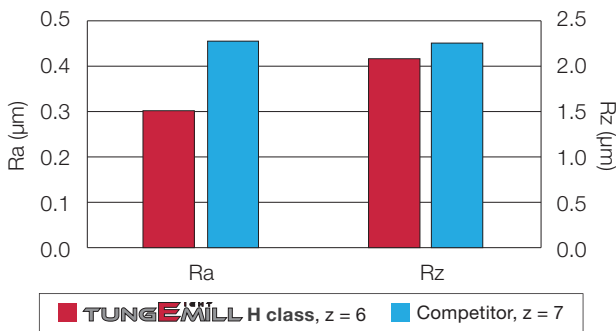
### Surface quality in carbon steel



**P**

Cutter : TAOW05J100B31.7R06  
 (ø3.94", z = 6)  
 Insert : OWMT05T3AFER-MM AH3135 /  
 OWHT05T3C07AFER-MM AH3135  
 Workpiece material : 1055 (200HB)  
 Cutting speed : Vc = 656 sfm  
 Feed per tooth : fz = 0.006 ipt  
 Depth of cut : ap = 0.02"  
 Width of cut : ae = 2.36"  
 Coolant : Dry

### Surface quality in stainless steel



**M**

Cutter : TAOW05J100B31.7R06  
 (ø3.94", z = 6)  
 Insert : OWHT05T3C07AFER-MM AH3135  
 Workpiece material : 304 (160HB)  
 Cutting speed : Vc = 492 sfm  
 Feed per tooth : fz = 0.004 ipt  
 Depth of cut : ap = 0.02"  
 Width of cut : ae = 2.36"  
 Coolant : Dry



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Competitor

OWHT05T3C07AFER-MM geometry is effective in minimizing burr formation.

**Burr**

## Improved usability

### Easy corner change without screw removal

Prevents dropping insert and screw when changing corner.



## Grade lineup for every kind of material

### AH3135



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

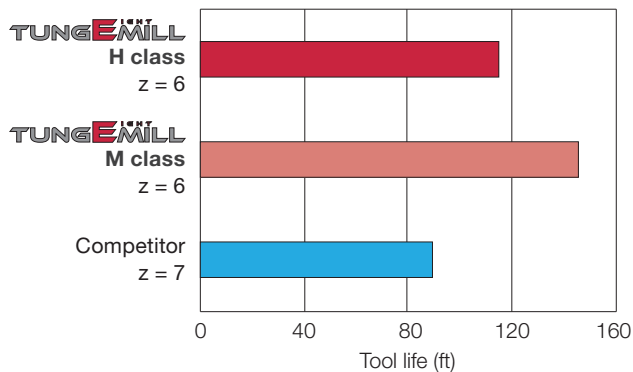
### AH120



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

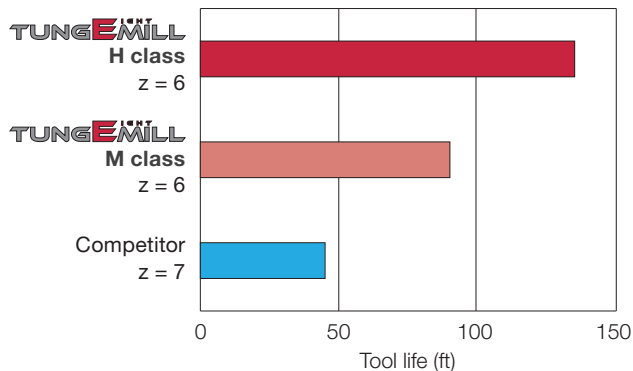
## TOOL LIFE

### Carbon steel



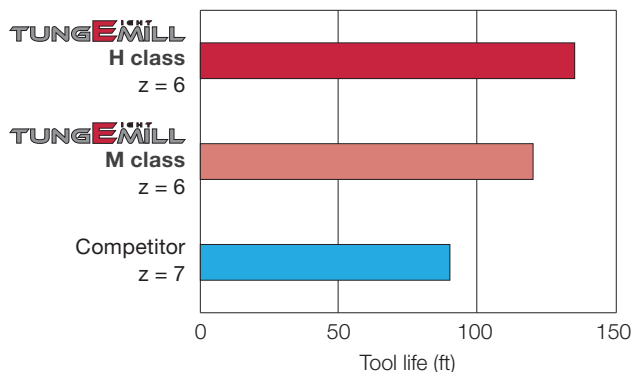
**P** Cutter : TAOW05J100B31.7R06  
( $\phi 3.94"$ , z = 6)  
Insert : OWMT05T3AFER-MM AH3135 / OWHT05T3C07AFER-MM AH3135  
Workpiece material : 1055 (200HB)  
Cutting speed :  $V_c = 656$  sfm  
Feed per tooth :  $f_z = 0.012$  ipt  
Depth of cut :  $a_p = 0.08"$   
Width of cut :  $a_e = 2.36"$   
Coolant : Dry

### Stainless steel



**M** Cutter : TAOW05J100B31.7R06  
( $\phi 3.94"$ , z = 6)  
Insert : OWMT05T3AFER-MM AH3135 / OWHT05T3C07AFER-MM AH3135  
Workpiece material : 304 (160HB)  
Cutting speed :  $V_c = 492$  sfm  
Feed per tooth :  $f_z = 0.008$  ipt  
Depth of cut :  $a_p = 0.08"$   
Width of cut :  $a_e = 2.36"$   
Coolant : Dry

### Ductile cast iron

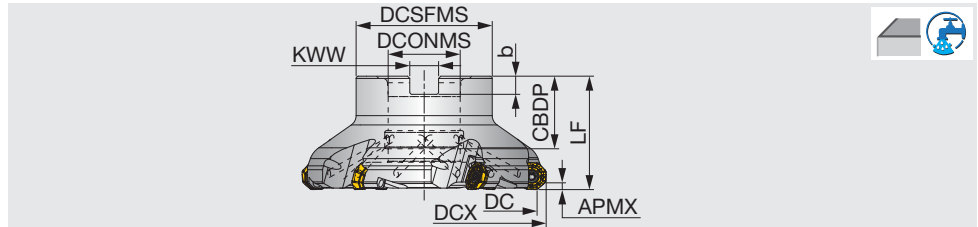


**K** Cutter : TAOW05J100B31.7R06  
( $\phi 3.94"$ , z = 6)  
Insert : OWMT05T3AFER-MM AH120 / OWHT05T3C07AFER-MM AH120  
Workpiece material : 80-55-06 (240HB)  
Cutting speed :  $V_c = 656$  sfm  
Feed per tooth :  $f_z = 0.008$  ipt  
Depth of cut :  $a_p = 0.08"$   
Width of cut :  $a_e = 3.15"$   
Coolant : Dry

## TAOW05

41° face mill, with screw clamp system, for single sided octagonal inserts

GAMP = +23°, GAMF = -5°



Inch	APMX	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDDP	KWW	b	WT(kg)	Air hole	Insert
TAOW05U2.00B0.75R04	0.118	2.000	2.310	4	1.850	1.575	0.750	0.750	0.315	0.197	0.970	With	OW*T05...
TAOW05U2.50B0.75R05	0.118	2.500	2.800	5	1.850	1.575	0.750	0.750	0.315	0.197	1.300	With	OW*T05...
TAOW05U3.00B1.00R07	0.118	3.000	3.300	7	1.969	1.969	1.000	1.020	0.374	0.236	1.960	With	OW*T05...
TAOW05U4.00B1.50R08	0.118	4.000	4.300	8	3.150	1.969	1.500	1.100	0.626	0.394	3.590	With	OW*T05...
TAOW05U5.00B1.50R10	0.118	5.000	5.300	10	3.150	2.480	1.500	1.300	0.626	0.394	6.190	With	OW*T05...
TAOW05U6.00B2.00R08	0.118	6.000	6.300	8	3.937	2.480	2.000	1.500	0.748	0.433	9.700	Without	OW*T05...

### SPARE PARTS



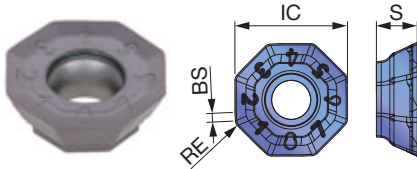
Designation	Clamping screw	Grip	Torx bit	Shell locking bolt (Not included)
TAOW05U2.00...	CSPB-4S	SW6-SD	BLDIP15/S7	(C0.375X1.125H)
TAOW05U2.50...	CSPB-4S	SW6-SD	BLDIP15/S7	(C0.375X1.125H)
TAOW05U3.00...	CSPB-4S	SW6-SD	BLDIP15/S7	(C0.500X1.375H)
TAOW05U4.00...	CSPB-4S	SW6-SD	BLDIP15/S7	(TMBA-0.750H)
TAOW05U5.00...	CSPB-4S	SW6-SD	BLDIP15/S7	(TMBA-0.750H)
TAOW05U6.00...	CSPB-4S	SW6-SD	BLDIP15/S7	-

\*Recommended clamping torque: CSPB-4S=2.58 lb-ft

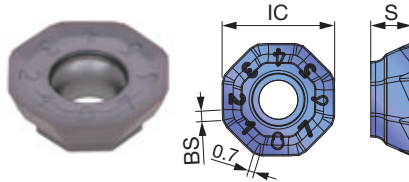


## INSERT

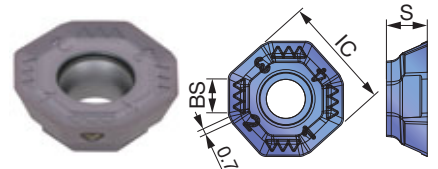
OWMT05T3AFER-MM



OWHT05T3C07AFER-MM



OWHT05T3C07AFER-MW



<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										

★ : First choice  
☆ : Second choice

Designation	RE	APMX	Coated		IC	S	BS
			AH120	AH3135			
OWMT05T3AFER-MM	0.031	0.12	●	●	0.489	0.18	0.039
OWHT05T3C07AFER-MM	-	0.12	●	●	0.488	0.18	0.045
OWHT05T3C07AFER-MW	-	0.12	●	●	0.488	0.18	0.146

● : Line up

## STANDARD CUTTING CONDITIONS

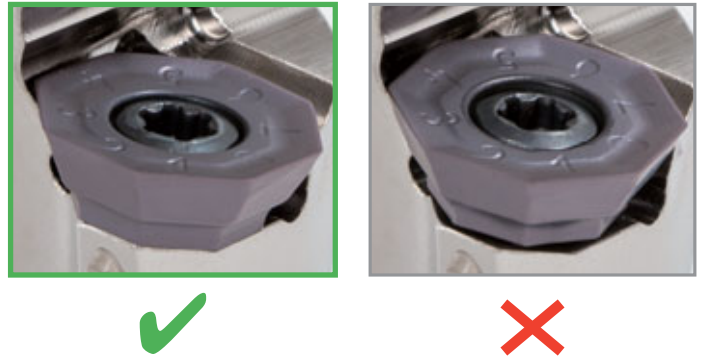
ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (sfm)	Feed per tooth fz (ipt)
<b>P</b>	Low carbon steel (1015, 1020, etc.)	- 200 HB	First choice	AH3135	MM	325 - 980	0.002 - 0.014
			Wear resistance	AH120	MM	325 - 980	0.002 - 0.014
	High carbon and alloy steel (1055, 4140, etc.)	- 300 HB	First choice	AH3135	MM	325 - 820	0.002 - 0.012
			Wear resistance	AH120	MM	325 - 820	0.002 - 0.012
<b>M</b>	Austenitic stainless steel (304, 316, etc.)	- 200 HB	First choice	AH3135	MM	325 - 655	0.002 - 0.014
			Wear resistance	AH120	MM	325 - 655	0.002 - 0.014
	Martensitic stainless steel (420, etc.)	- 220 HB	First choice	AH3135	MM	325 - 980	0.002 - 0.012
			Wear resistance	AH120	MM	325 - 980	0.002 - 0.012
<b>K</b>	Gray cast iron (No.250B, etc.)	150 - 250 HB	First choice	AH120	MM	325 - 980	0.002 - 0.014
			Fracture resistance	AH3135	MM	325 - 980	0.002 - 0.014
	Ductile cast iron (80-55-06, etc.)	150 - 250 HB	First choice	AH120	MM	260 - 820	0.002 - 0.012
			Fracture resistance	AH3135	MM	260 - 820	0.002 - 0.012
<b>S</b>	Titanium alloys (Ti-6Al-4V, etc.)	-	First choice	AH3135	MM	95 - 195	0.002 - 0.008
			Wear resistance	AH120	MM	95 - 195	0.002 - 0.008
	Heat-resistant alloys (Inconel718, etc.)	-	First choice	AH120	MM	65 - 160	0.002 - 0.006
			Fracture resistance	AH3135	MM	65 - 160	0.002 - 0.006
<b>H</b>	Hardened steel (H13, etc.)	40 - 50 HRC	First choice	AH3135	MM	225 - 425	0.002 - 0.006
			Wear resistance	AH120	MM	225 - 425	0.002 - 0.006

## IMPORTANT NOTES

### ■ Installing MM inserts

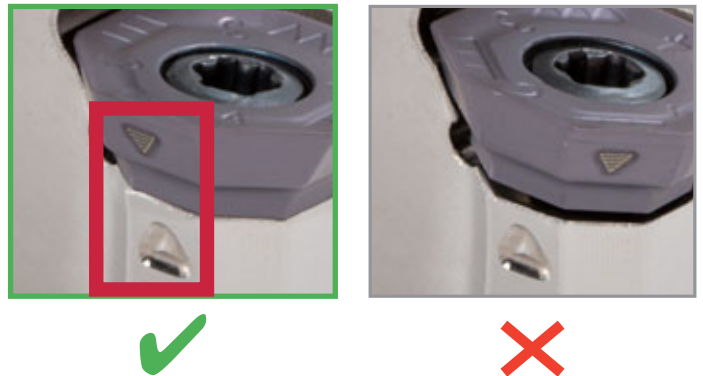
Before tightening the insert screw, make sure that the insert is correctly positioned in the pocket. If the screw is tightened with the insert not in place, the pocket may be damaged.

Do not use an excessive tightening torque as it may damage the pocket preventing proper positioning of the insert.



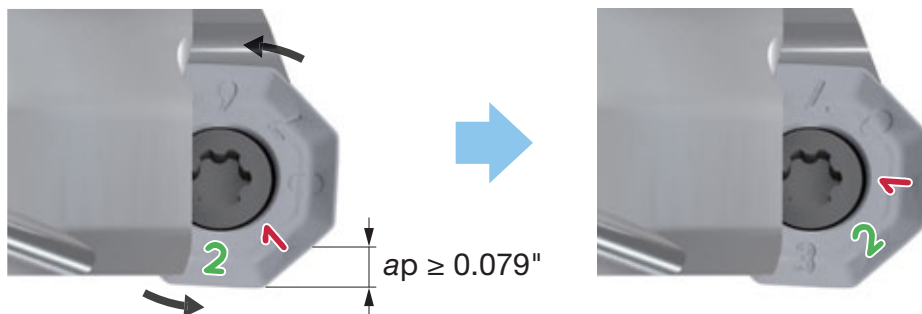
### ■ Installing MW (wiper) inserts

Wiper edge is identified with a ▼ inscribed on the insert flank. Make sure to match the ▼ mark to the ▲ mark on the cutter body when installing the wiper insert.


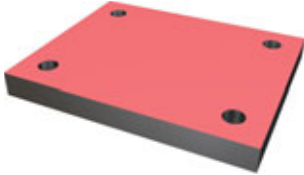
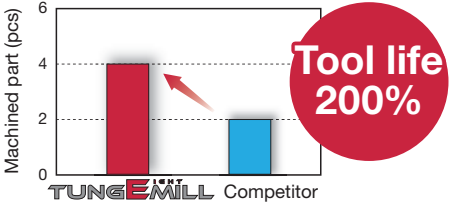
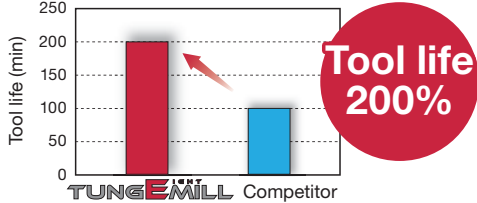


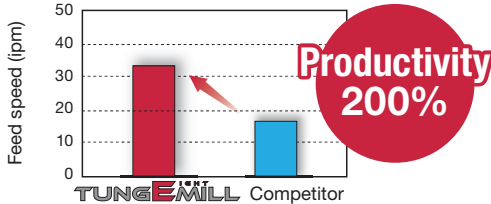
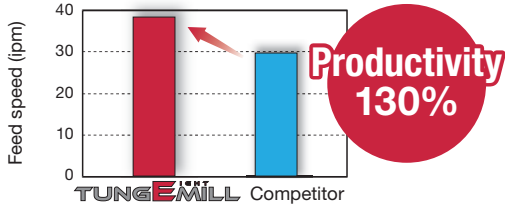


### ■ When indexing MM insert

When MM insert is used at a cutting depth of 0.079 inch or greater, the adjacent wiper is also engaged in the cut. Therefore, it is recommended that the insert is then rotated in the counter clockwise direction for indexing a new cutting edge.



## PRACTICAL EXAMPLES

Workpiece type		Part for semiconductor equipment	Base	
Cutter		TAOW05U2.50B0.75R05	TAOW05J100B31.7R06 (ø3.94", z = 6)	
Insert		OWHT05T3C07AFER-MM	OWHT05T3C07AFER-MM	
Grade		AH3135	AH3135	
Workpiece material		304  <b>M</b>	1015  <b>P</b>	
Cutting conditions	Cutting speed : Vc (sfm)	525	722	
	Feed per tooth: fz (ipt)	0.008	0.008	
	Feed speed : Vf (ipm)	31.6	33.1	
	Depth of cut : ap (inch)	0.06	0.08	
	Width of cut : ae (inch)	0.75	3.94	
	Machining	Face Milling	Face Milling	
	Coolant	External coolant	External coolant	
Machine		Vertical M/C (BT40)	Vertical M/C	
Results	 <p><b>Tool life 200%</b></p> <p>Tool life has doubled thanks to TungEight-Mill's robust insert.</p>		 <p><b>Tool life 200%</b></p> <p>Tool life has doubled due to reduced burr generation. MRR has also increased by 130%.</p>	
	<p>Thanks to the light cutting geometry of TungEight-Mill, higher cutting parameters were possible, doubling the table feed.</p>		<p>Thanks to TungEight-Mill's light-cutting, sharp-edged geometry, table feed was increased by 130% despite the deflecting structure of the workpiece.</p>	
Workpiece type		Machine part	Head of control block	
Cutter		TAOW05U2.50B0.75R05	TAOW05M063B22.0R05	
Insert		OWMT05T3AFER-MM	OWMT05T3AFER-MM	
Grade		AH3135	AH120	
Workpiece material		4140  <b>P</b>	60-40-18  <b>K</b>	
Cutting conditions	Cutting speed : Vc (sfm)	492	623	
	Feed per tooth: fz (ipt)	0.010	0.008	
	Feed speed : Vf (ipm)	38.5	37.5	
	Depth of cut : ap (inch)	0.10	0.02	
	Width of cut : ae (inch)	0.71	2.36	
	Machining	Face Milling	Face Milling	
	Coolant	Internal coolant	External coolant	
Machine		Vertical M/C (BT40)	Horizontal M/C (SK40)	
Results	 <p><b>Productivity 200%</b></p> <p>Thanks to the light cutting geometry of TungEight-Mill, higher cutting parameters were possible, doubling the table feed.</p>		 <p><b>Productivity 130%</b></p> <p>Thanks to TungEight-Mill's light-cutting, sharp-edged geometry, table feed was increased by 130% despite the deflecting structure of the workpiece.</p>	
	<p>Thanks to the light cutting geometry of TungEight-Mill, higher cutting parameters were possible, doubling the table feed.</p>		<p>Thanks to TungEight-Mill's light-cutting, sharp-edged geometry, table feed was increased by 130% despite the deflecting structure of the workpiece.</p>	

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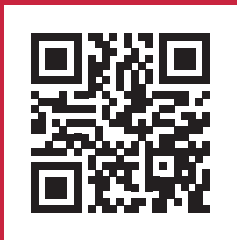
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