

MillLine



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Tungaloy Report No. 531-G

Economical 8 edged inserts with light cutting face milling cutter



INDUSTRY 4.0
FEED the SPEED!



9216539

ACCELERATED MACHINING

MillLine

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TUNGALOY

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ACCELERATED MACHINING



Low cutting force cutters ensure effective machining of low rigidity workpieces

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 rake 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



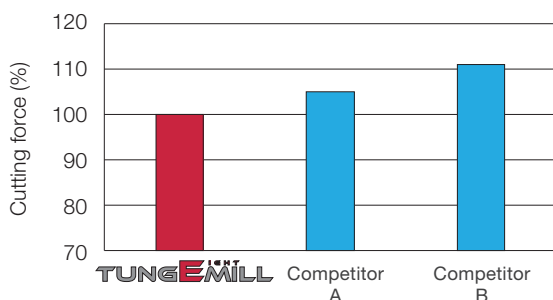
MM geometry, H class
8 cutting edges



Wiper insert
4 cutting edges

■ Cutting force comparison (calculated)

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



P Cutter	: TAOW05M100B32.0R08 (ø100 mm, z = 8)
Insert	: OWHT05T3C07AFER-MM AH3135
Workpiece material	: S55C / C55 (200HB)
Cutting speed	: Vc = 200 m/min
Feed per tooth	: fz = 0.3 mm/t
Depth of cut	: ap = 2 mm
Width of cut	: ae = 80 mm
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.

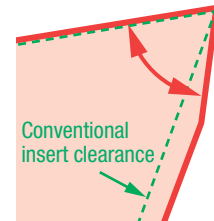
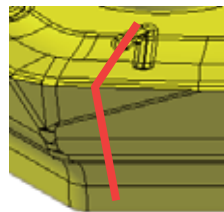


Chips in stainless steel

M	Cutter	: TAOW05M100B32.0R08 ($\phi 100$ mm, z = 8)
	Insert	: OWMT05T3AFER-MM AH3135
	Workpiece material	: SUS304 / X5CrNi18-9 (160HB)
	Cutting speed	: $V_c = 200$ m/min
	Feed per tooth	: $f_z = 0.25$ mm/t
	Depth of cut	: $a_p = 3$ mm
	Width of cut	: $a_e = 75$ mm
	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 7.6 m



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After machining 1.2 m



Competitor

M	Cutter	: TAOW05M100B32.0R08 ($\phi 100$ mm, z = 8)
	Insert	: OWHT05T3C07AFER-MM AH3135
	Workpiece material	: SUS304 / X5CrNi18-9 (160HB)
	Cutting speed	: $V_c = 200$ m/min
	Feed per tooth	: $f_z = 0.3$ mm/t
	Depth of cut	: $a_p = 2$ mm
	Width of cut	: $a_e = 60$ mm
	Coolant	: Dry
Number of inserts	: z = 1	

Minimum interference design

Allows milling close to the walls and fixtures.



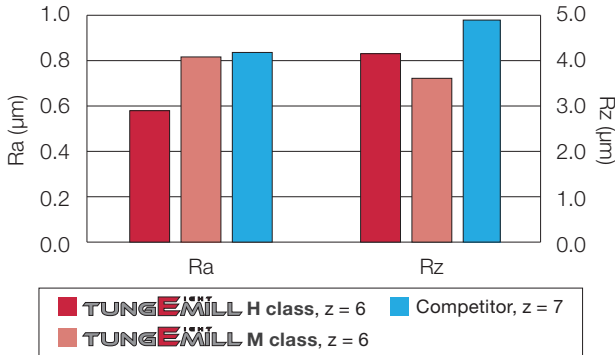
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Conventional tool

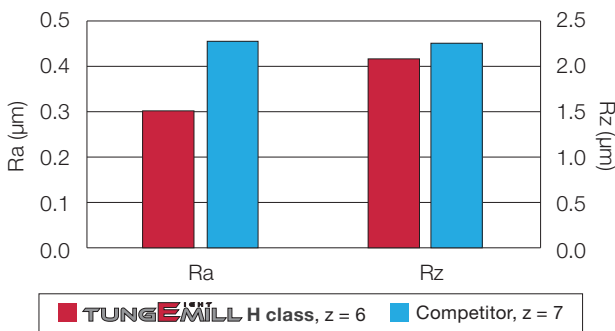
Excellent surface finish

Surface quality in carbon steel



P	Cutter	: TAOW05J100B31.7R06 (ø100 mm, z = 6)
	Insert	: OWMT05T3AFER-MM AH3135 / OWHT05T3C07AFER-MM AH3135
	Workpiece material	: S55C / C55 (200HB)
	Cutting speed	: Vc = 200 m/min
	Feed per tooth	: fz = 0.15 mm/t
	Depth of cut	: ap = 0.5 mm
	Width of cut	: ae = 60 mm
	Coolant	: Dry

Surface quality in stainless steel



M	Cutter	: TAOW05J100B31.7R06 (ø100 mm, z = 6)
	Insert	: OWHT05T3C07AFER-MM AH3135
	Workpiece material	: SUS304 / X5CrNi18-9 (160HB)
	Cutting speed	: Vc = 150 m/min
	Feed per tooth	: fz = 0.1 mm/t
	Depth of cut	: ap = 0.5 mm
	Width of cut	: ae = 60 mm
	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

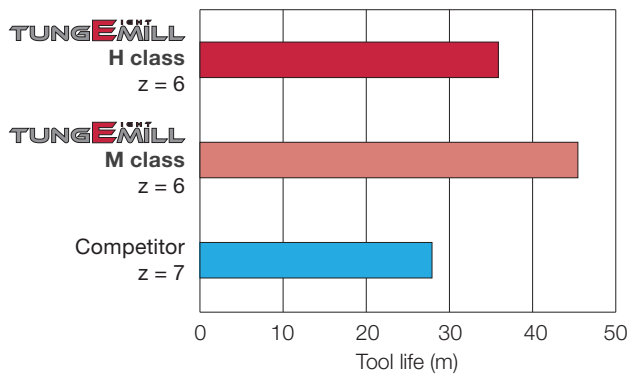
AH120



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

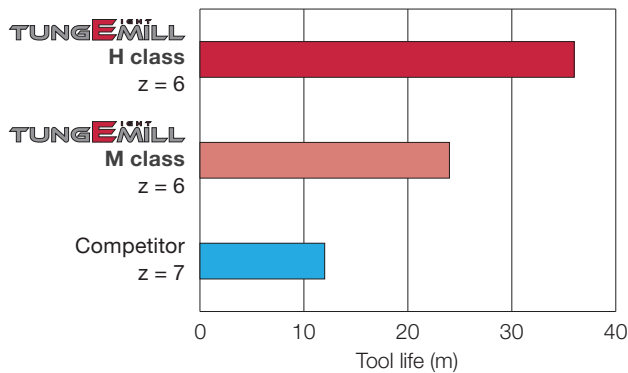
TOOL LIFE

Carbon steel



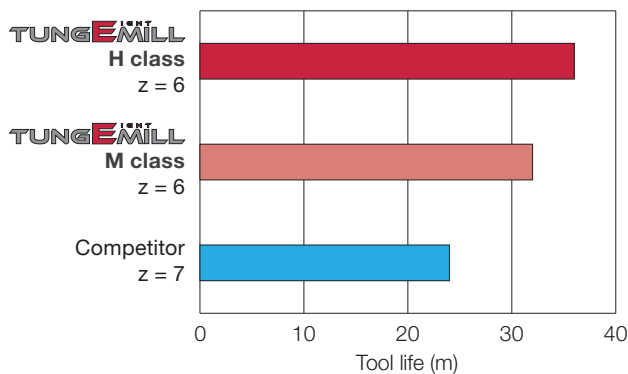
P Cutter : TAOW05J100B31.7R06 (ø100 mm, z = 6)
 Insert : OWMT05T3AFER-MM AH3135 / OWHT05T3C07AFER-MM AH3135
 Workpiece material : S55C / C55 (200HB)
 Cutting speed : Vc = 200 m/min
 Feed per tooth : fz = 0.3 mm/t
 Depth of cut : ap = 2 mm
 Width of cut : ae = 60 mm
 Coolant : Dry

Stainless steel



M Cutter : TAOW05J100B31.7R06 (ø100 mm, z = 6)
 Insert : OWMT05T3AFER-MM AH3135 / OWHT05T3C07AFER-MM AH3135
 Workpiece material : SUS304 / X5CrNi18-9 (160HB)
 Cutting speed : Vc = 150 m/min
 Feed per tooth : fz = 0.2 mm/t
 Depth of cut : ap = 2 mm
 Width of cut : ae = 60 mm
 Coolant : Dry

Ductile cast iron

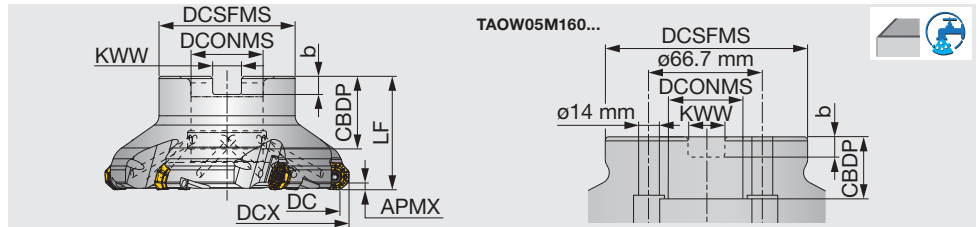


K Cutter : TAOW05J100B31.7R06 (ø100 mm, z = 6)
 Insert : OWMT05T3AFER-MM AH120 / OWHT05T3C07AFER-MM AH120
 Workpiece material : FCD600 / 600-3 / GGG60 (240HB)
 Cutting speed : Vc = 200 m/min
 Feed per tooth : fz = 0.2 mm/t
 Depth of cut : ap = 2 mm
 Width of cut : ae = 80 mm
 Coolant : Dry

TAOW05

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

GAMP = +23°, GAMF = -5°



Designation	APMX	DC	DCX	CICT	DCSFMS	LF	DCONMS	CBDP	KWW	b	WT(kg)	Air hole	Insert
TAOW05M050B22.0R04	3	50	57.8	4	41	40	22	20	10.4	6.3	0.35	With	OW*T05...
TAOW05M063B22.0R05	3	63	70.7	5	47	40	22	20	10.4	6.3	0.54	With	OW*T05...
TAOW05M080B27.0R07	3	80	87.7	7	58	50	27	22	12.4	7	1.07	With	OW*T05...
TAOW05J080B25.4R05	3	80	87.7	5	58	50	25.4	26	9.5	6	1.12	With	OW*T05...
TAOW05M100B32.0R08	3	100	107.6	8	60	50	32	28.5	14.4	8	1.20	With	OW*T05...
TAOW05J100B31.7R06	3	100	107.6	6	60	50	31.75	32	12.7	8	1.27	With	OW*T05...
TAOW05M125B40.0R10	3	125	132.6	10	71	63	40	32	16.4	9	2.41	With	OW*T05...
TAOW05J125B38.1R07	3	125	132.6	7	80	63	38.1	38	15.9	10	2.72	With	OW*T05...
TAOW05M160B40.0R12	3	160	167.6	12	100	63	40	29	16.4	9	4.39	Without	OW*T05...
TAOW05J160B50.8R08	3	160	167.6	8	100	63	50.8	46	19	11	4.22	Without	OW*T05...

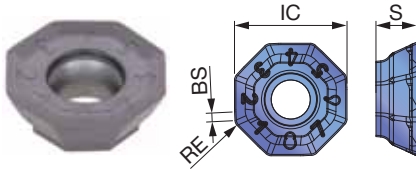
SPARE PARTS

Designation	Clamping screw	Grip	Torx bit	Shell locking bolt
TAOW05**050...	CSPB-4S	SW6-SD	BLDIP15/S7	CM10X30H
TAOW05**063...	CSPB-4S	SW6-SD	BLDIP15/S7	CM10X30H
TAOW05**080...	CSPB-4S	SW6-SD	BLDIP15/S7	CM12X30H
TAOW05**100...	CSPB-4S	SW6-SD	BLDIP15/S7	TMBA-M16H
TAOW05**125...	CSPB-4S	SW6-SD	BLDIP15/S7	TMBA-M20H
TAOW05**160...	CSPB-4S	SW6-SD	BLDIP15/S7	-

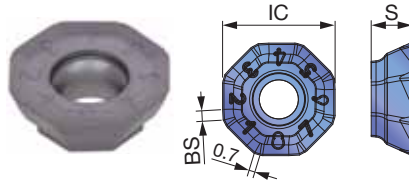
*Recommended clamping torque (N·m): CSPB-4S=3.5

INSERT

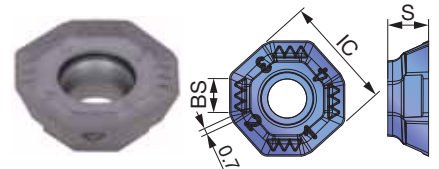
OWMT05T3AFER-MM



OWHT05T3C07AFER-MM



OWHT05T3C07AFER-MW



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

★ : First choice
☆ : Second choice

Designation	RE	APMX	Coated		IC	S	BS
			AH120	AH3135			
OWMT05T3AFER-MM	0.8	3	●	●	12.42	4.5	1
OWHT05T3C07AFER-MM	-	3	●	●	12.4	4.5	1.15
OWHT05T3C07AFER-MW	-	3	●	●	12.4	4.5	3.7

● : Line up

STANDARD CUTTING CONDITIONS

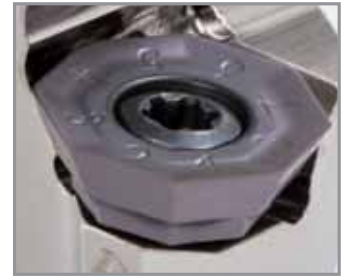
ISO	Workpiece material	Hardness	Priority	Grade	Chip-breaker	Cutting speed Vc (m/min)	Feed per tooth fz (mm/t)
P	Low carbon steel (C15, etc.)	- 200 HB	First choice	AH3135	MM	100 - 300	0.05 - 0.35
			Wear resistance	AH120	MM	100 - 300	0.05 - 0.35
	High carbon and alloy steel (S55C / C55, SCM440 / 42CrMo4, etc.)	- 300 HB	First choice	AH3135	MM	100 - 250	0.05 - 0.3
			Wear resistance	AH120	MM	100 - 250	0.05 - 0.3
M	Austenitic stainless steel (SUS304 / 1.4301, SUS316 / 1.4401, etc.)	- 200 HB	First choice	AH3135	MM	100 - 200	0.05 - 0.35
			Wear resistance	AH120	MM	100 - 200	0.05 - 0.35
	Martensitic stainless steel (X20Cr13, etc.)	- 220 HB	First choice	AH3135	MM	100 - 300	0.05 - 0.3
			Wear resistance	AH120	MM	100 - 300	0.05 - 0.3
K	Gray cast iron (FC250 / 250, etc.)	150 - 250 HB	First choice	AH120	MM	100 - 300	0.05 - 0.35
			Fracture resistance	AH3135	MM	100 - 300	0.05 - 0.35
	Ductile cast iron (FCD400 / 400-15, FCD600 / 600-3, etc.)	150 - 250 HB	First choice	AH120	MM	80 - 250	0.05 - 0.3
			Fracture resistance	AH3135	MM	80 - 250	0.05 - 0.3
S	Titanium alloys (Ti-6Al-4V, etc.)	-	First choice	AH3135	MM	30 - 60	0.05 - 0.2
			Wear resistance	AH120	MM	30 - 60	0.05 - 0.2
	Heat-resistant alloys (Inconel718, etc.)	-	First choice	AH120	MM	20 - 50	0.05 - 0.15
			Fracture resistance	AH3135	MM	20 - 50	0.05 - 0.15
H	Hardened steel (SKD61 / X40CrMoV51, etc.)	40 - 50 HRC	First choice	AH3135	MM	70 - 130	0.05 - 0.15
			Wear resistance	AH120	MM	70 - 130	0.05 - 0.15

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.



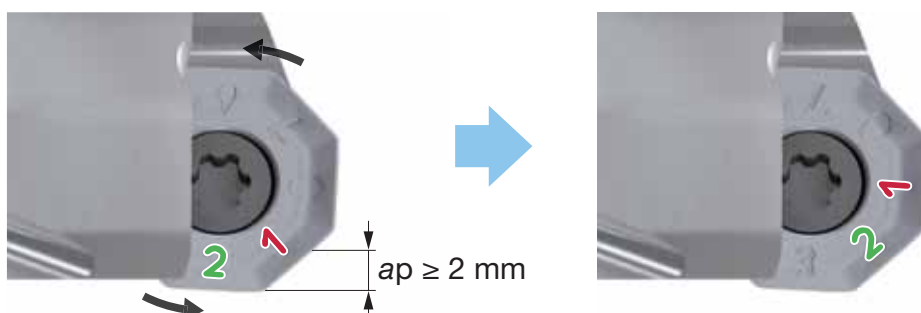
■ Installing MW (wiper) inserts

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.



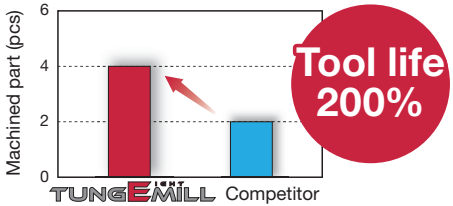
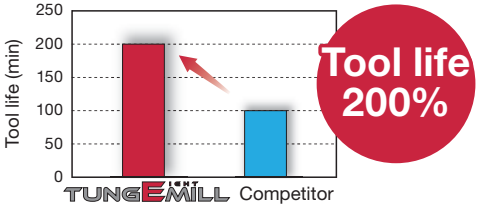


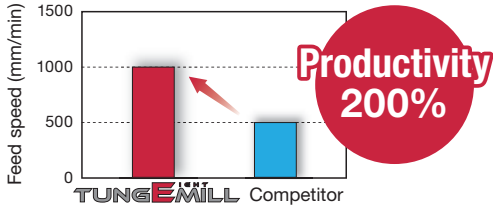
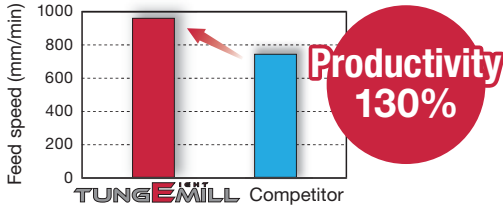


■ When indexing MM insert

When MM insert is used at a cutting depth of 2 mm 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		TAOW05M063B22.0R05	TAOW05J100B31.7R06	
Insert		OWHT05T3C07AFER-MM	OWHT05T3C07AFER-MM	
Grade		AH3135 EN 1.4301	AH3135 ISO E275A	
Workpiece material		 M	 P	
Cutting conditions	Cutting speed : V_c (m/min)	160	220	
	Feed per tooth: f_z (mm/t)	0.2	0.2	
	Feed speed : V_f (mm/min)	808	840	
	Depth of cut : a_p (mm)	1.6	2	
	Width of cut : a_e (mm)	19	100	
	Machining	Face Milling	Face Milling	
	Coolant	External coolant	External coolant	
Machine		Vertical M/C (BT40)	Vertical M/C	
Results	 <p>Tool life 200%</p> <p>Tool life has doubled thanks to TungEight-Mill's robust insert.</p>		 <p>Tool life 200%</p> <p>Tool life has doubled due to reduced burr generation. MRR has also increased by 130%.</p>	
	<p>Thanks to TungEight-Mill's 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		TAOW05M063B22.0R05	TAOW05M063B22.0R05	
Insert		OWMT05T3AFER-MM	OWMT05T3AFER-MM	
Grade		AH3135 EN 1.7225	AH120 GGG40.3	
Workpiece material		 P	 K	
Cutting conditions	Cutting speed : V_c (m/min)	150	190	
	Feed per tooth: f_z (mm/t)	0.26	0.2	
	Feed speed : V_f (mm/min)	1000	960	
	Depth of cut : a_p (mm)	2.6	0.5	
	Width of cut : a_e (mm)	18	60	
	Machining	Face Milling	Face Milling	
	Coolant	Internal coolant	External coolant	
Machine		Vertical M/C (BT40)	Horizontal M/C (SK40)	
Results	 <p>Productivity 200%</p> <p>Thanks to TungEight-Mill's light cutting geometry of TungEight-Mill, higher cutting parameters were possible, doubling the table feed.</p>		 <p>Productivity 130%</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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