Member IMC Group Tungaloy INDUSTRY 4.0

TurnLine

External turning tool

ADDMULTITURN

Tungaloy Report No. 550-G

6-corner inserts for high versatility, economy and productivity

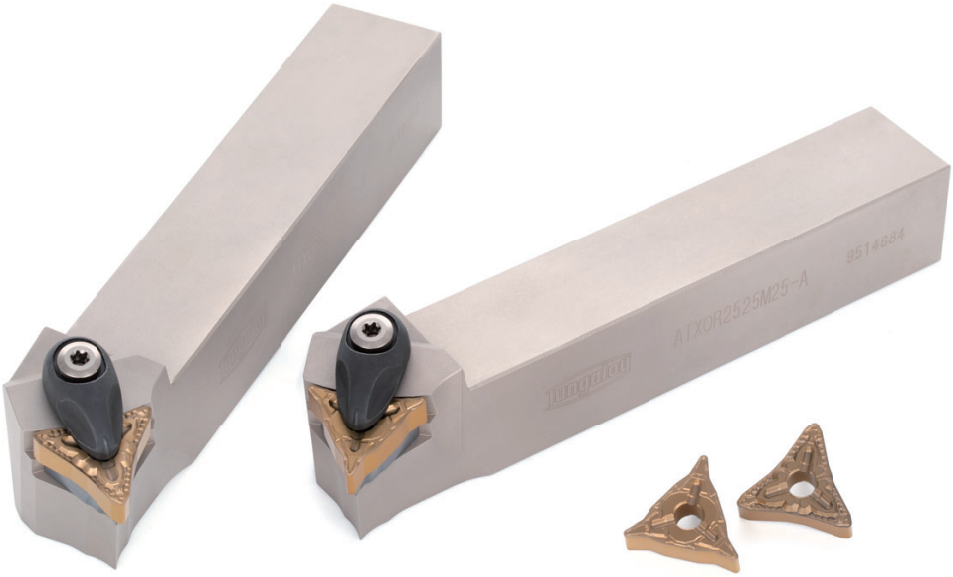
TUNGALOY ADDFORCE ACCELERATED LINES

INDUSTRY 4.0
FEED the SPEED!

TUNGALOY ADDFORCE TURN

ACCELERATED TURNING & THREADING

ADDMULTI TURN



Front Turning, Back Turning, Profiling,
and Face Turning with **ONE SINGLE TOOL**

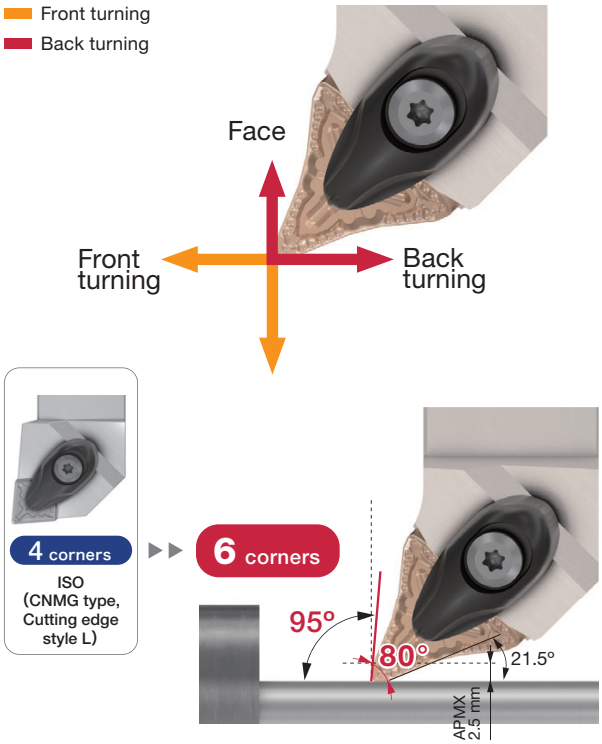
Innovative geometry for machining with high productivity and process security

Two types of corner and cutting edge angles for versatile applications

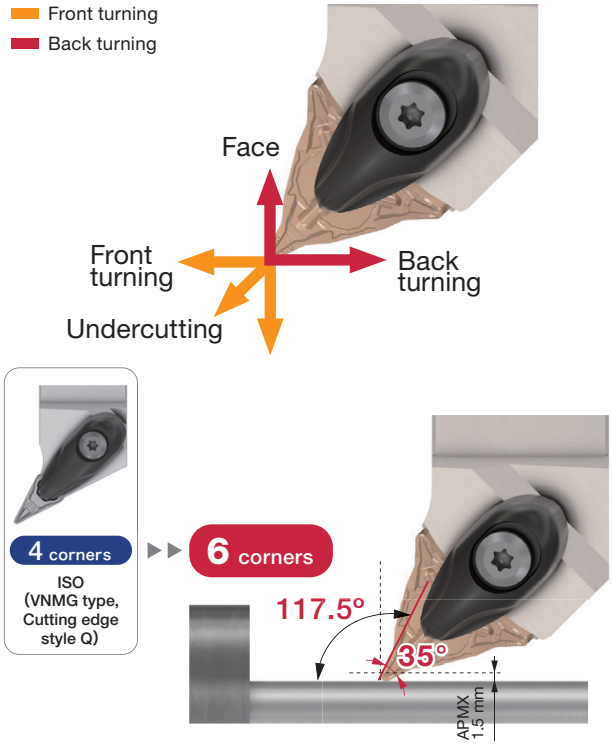
Double-sided 6-corner insert with 80° or 35° corner angle

- Back (pull) turning: High feed designed cutting edge improves productivity about 200% higher than existing ISO tools with no need for special programming.
- Front (push) turning: Same machining process is available using the same cutting edge angle as standard ISO tools.

6C-TOMG

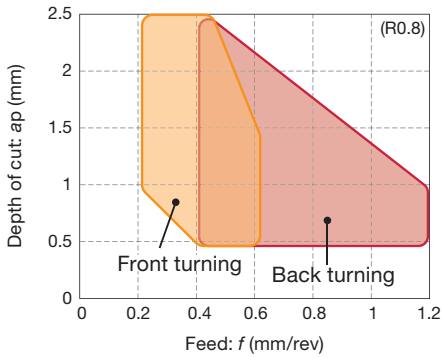


6V-TOMG

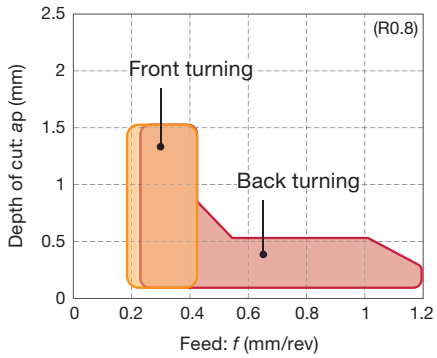


APPLICATION RANGE

Corner angle 80° + **TM** chipbreaker

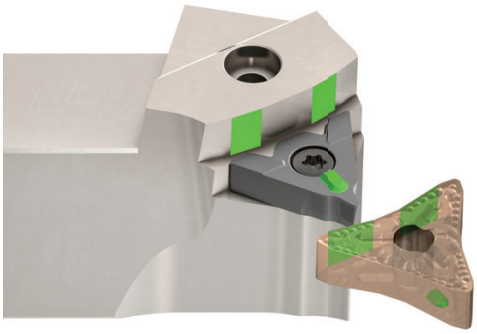


Corner angle 35° + **TSF** chipbreaker



*Under cutting
$f \leq 0.2$ mm/rev

Y-PRISM safe lock design has a rail on the shim and matching slot on the insert for tight interlocking and secure clamping.



Y-PRISM

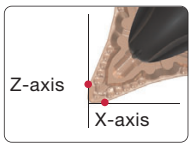
Prevents the cutting forces from affecting the tool position in any direction and ensures high stability

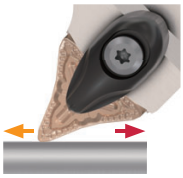
6C-TOMG**-TM 6V-TOMG**-TSF

Both inserts are interchangeable on the same toolholder

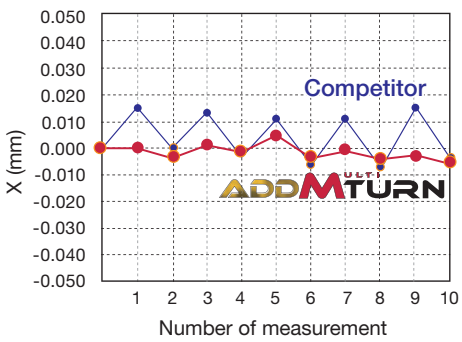
Clamp rigidity – cutting point displacements after machining (Back turning → Front turning)

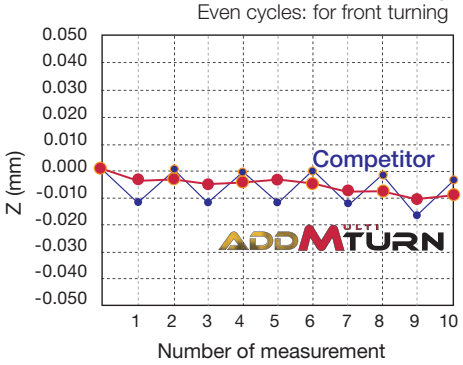
Y-PRISM achieved high accuracy cutting edge position compared with competitors' tools!!





Odd cycles: for back turning
Even cycles: for front turning





Insert : 6C-TOMG**-TM T9225
Workpiece material : S45C / C45
Cutting speed : *Vc* = 250 m/min

Back turning
Feed : *f* = 1 mm/rev
Depth of cut : *ap* = 1 mm

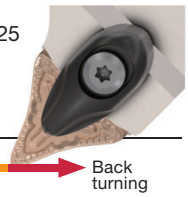
Front turning
Feed : *f* = 0.4 mm/rev
Depth of cut : *ap* = 1.5 mm

ADDMULTITURN

Chip control

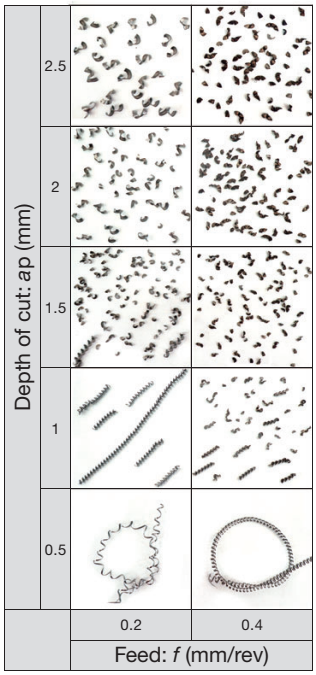
ADDMULTITURN 6C-TOMG**-TM

Insert : 6C-TOMG250608M-TM T9225
Workpiece material : S45C / C45
Cutting speed : *Vc* = 200 m/min
Coolant : Wet

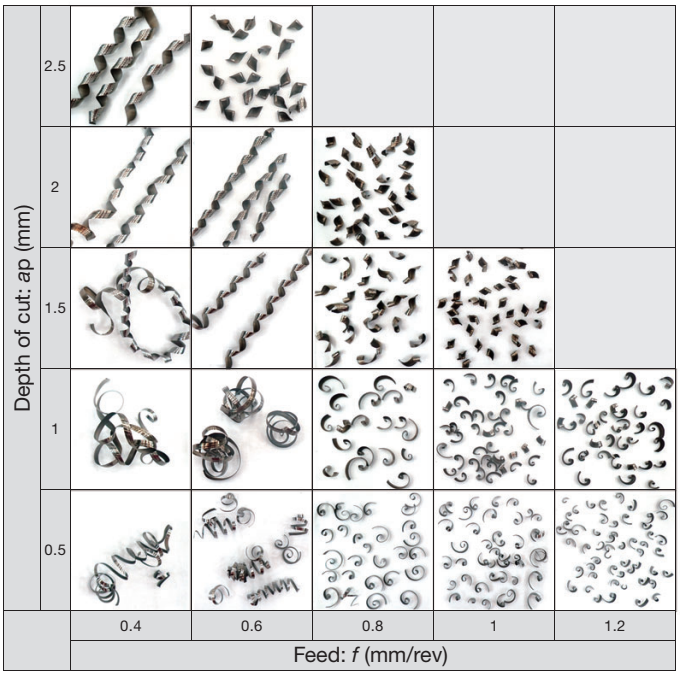


Front turning ← → Back turning

Front turning



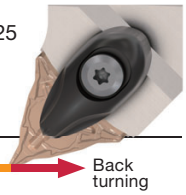
Back turning



Medium operation
- Front turning: Excellent chip control
- Back turning: Excellent chip control in high feed

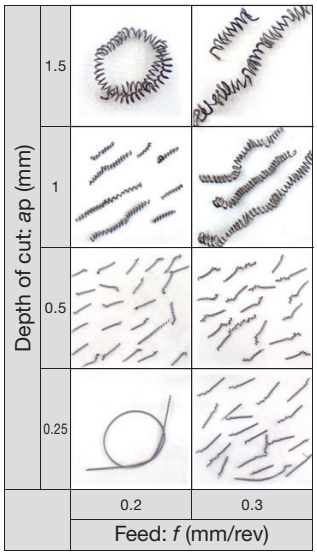
ADDMULTITURN 6V-TOMG**-TSF

Insert : 6V-TOMG250608F-TSF T9225
Workpiece material : S45C / C45
Cutting speed : *Vc* = 250 m/min
Coolant : Wet

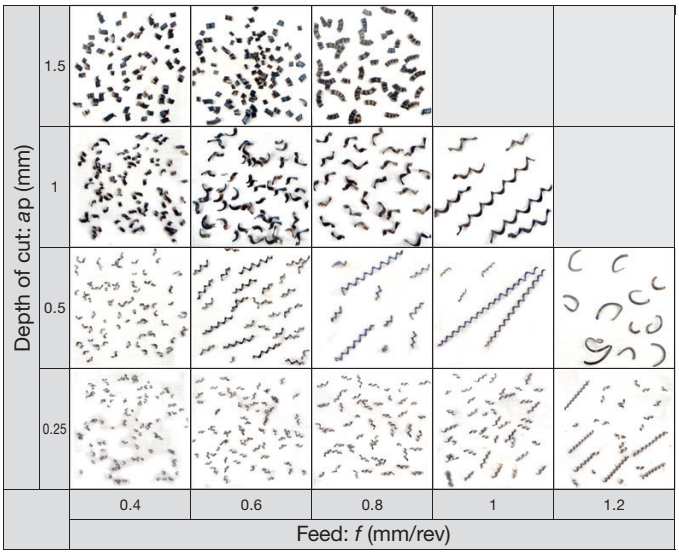


Front turning ← → Back turning

Front turning

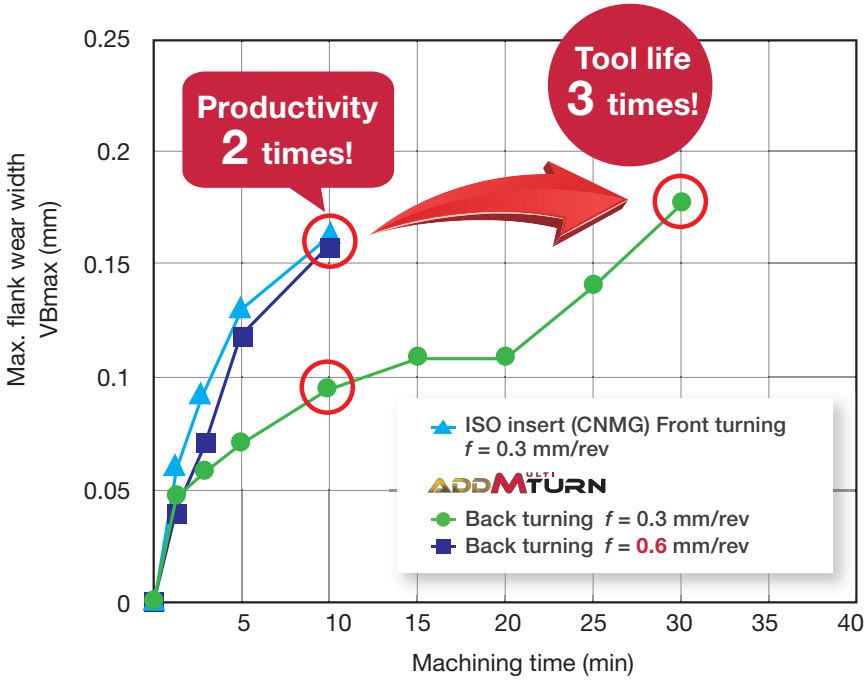


Back turning



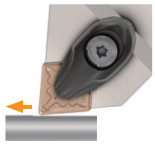
Finishing operation
- Front turning: Excellent chip control also in small D.O.C
- Back turning: Excellent chip control in high feed

Tool life



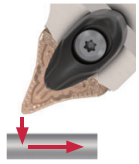
Insert	: 6C-TOMG**-TM T9225
Workpiece material	: S45C / C45
Cutting speed	: *Vc* = 250 m/min
Depth of cut	: *ap* = 1.5 mm
Coolant	: Wet

ISO insert (CNMG)
Front turning (10 minutes)



Feed: *f* = 0.3 mm/rev

ADDMULTITURN
Back turning (10 minutes)



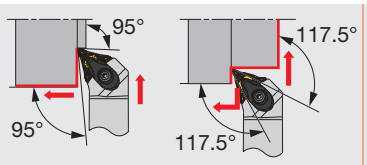
Feed: *f* = 0.3 mm/rev

Feed: *f* = 0.6 mm/rev

AddMultiTurn insert provided triple tool life when fed at the same feed rate as ISO insert.
Double the feed rate with AddMultiTurn compared with ISO insert without compromising tool life.

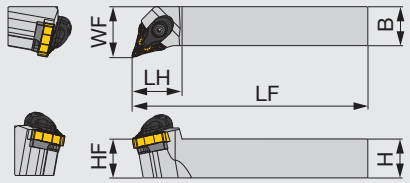
ATXOR/L

Double-clamp toolholder with 95° and 117.5° approach angle, for negative 80° and 35° triangular inserts



For 6C** inserts For 6V** inserts

Cutting edge style **X**



Right hand (R) shown.

Designation	H	B	LF	LH	HF	WF	RE**	Insert	Torque*
ATXOR/L2020K25-A	20	20	125	32	20	25	0.8	6C/6V-TOMG2506...	3
ATXOR/L2525M25-A	25	25	150	32	25	32	0.8	6C/6V-TOMG2506...	3
ATXOR/L3232P25-A	32	32	170	32	32	40	0.8	6C/6V-TOMG2506...	3

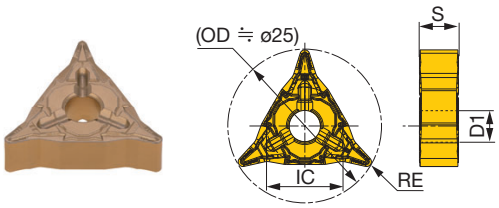
*Torque: Recommended clamping torque (N·m)
**RE: Standard corner radius

SPARE PARTS

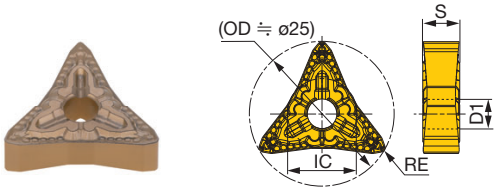
Designation	Clamp	Clamp screw	Spring	Spring pin	Shim	Shim screw	Wrench
ATXOR/L**25-A	ACP4S	ACS-5W	BP-7	SP-2.5	LST33 KS15F	CSTB-3.5	T-15F

INSERT

6V-TOMG**F-TSF



6C-TOMG**M-TM



		T9215	T9225	AH8015
P	Steel	★	★	
M	Stainless	☆		☆
K	Cast iron	☆		
N	Non-ferrous			
S	Superalloys			★
H	Hard materials			

★ : First choice
☆ : Second choice

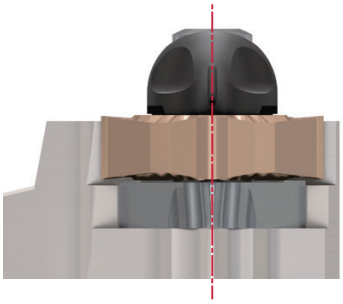
Designation	RE	Coated T9215	Coated T9225	Coated AH8015	IC	S	D1
6V-TOMG250604F-TSF	0.4	●	●	●	12.7	6.35	5.16
6V-TOMG250608F-TSF	0.8	●	●	●	12.7	6.35	5.16
6C-TOMG250608M-TM	0.8	●	●	●	12.1	6.35	5.16
6C-TOMG250612M-TM	1.2	●	●	●	12.1	6.35	5.16

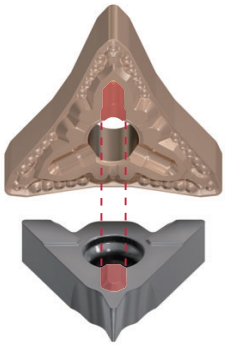
Please note that the insert may interfere with the work piece when machining outward (pulling) face turning when used with 6C** insert a work diameter of 30 mm or smaller and with 6V** insert a work diameter of 70 mm or smaller.

● : Line up

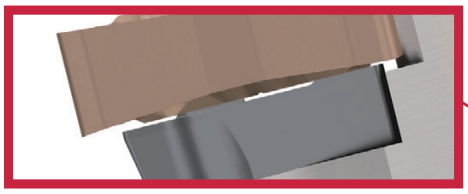
Cautions when mounting the insert on the holder

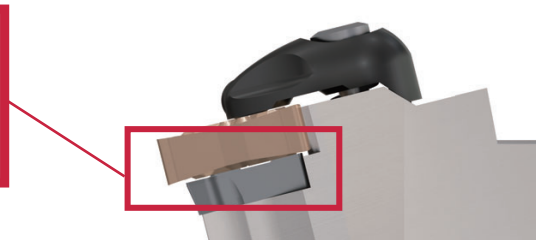
1 Ensure that the rail on the shim is positioned on the matching slot on the insert





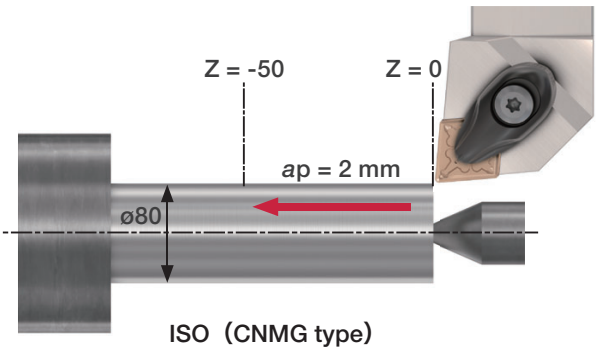
2 Ensure that the clamp is tightened on the shim and insert using the proper torque





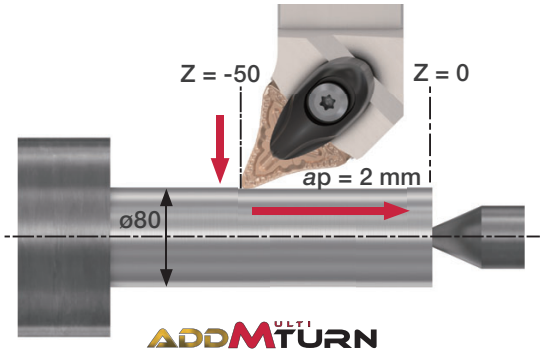
Clearance in the insert frontal area :
As the insert and shim are interlocked on the rail and slot, it is no problem to have this clearance.

3 Programming sample to change from front turning to back turning



ISO（CNMG type）

```
G90 G00  Z1.0
         X76.0
    G01  Z-50.0   F0.3
G91 X2.0 Z1.0
G90 G00  X120.0
```



ADDMULTITURN

```
G90 G00  Z-50.0
         X82.0
    G01  X76.0   F0.2
         Z1.0    F0.6
G90 X120.0
```

*When entering the cut, feed the tool at 0.2 mm/rev or use roll-in approach.
*When turning away from the main chuck, the cutting edge contact with the workpiece becomes larger, generating greater cutting load than when turning towards the chuck. Always use the tailstock support.

ADDMULTITURN

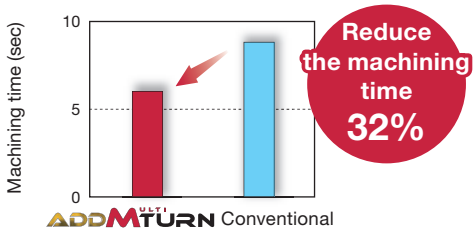
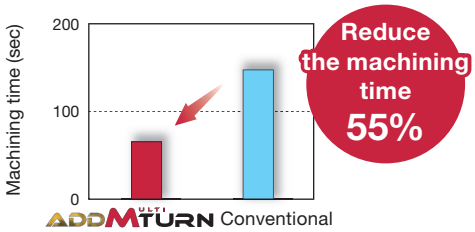
GRADES

Grade	Recommended workpiece material	Feature
PREMIUMTEC T9215	P M K	- Well-balanced between wear and chipping resistance - First choice for steel - High versatility for a wide range of applications
PREMIUMTEC T9225	P	- First choice for roughing to medium cutting - High fracture resistance
PREMIUMTEC AH8015	M S	- PVD coated grade with a balanced resistance to wear and fracture - First choice for stainless steel and heat-resistant superalloys

STANDARD CUTTING CONDITIONS

ISO	Operation	Chipbreaker	Grade	Depth of cut: *ap* (mm)		Feed: *f* (mm/rev)		Cutting speed
				Front turning	Back turning	Front turning	Back turning	*Vc* (m/min)
P	Finishing	TSF	T9215	0.2 - 1.5	0.2 - 1.5	0.08 - 0.4	0.2 - 1.2	150 - 400
		TSF	T9225	0.2 - 1.5	0.2 - 1.5	0.08 - 0.4	0.2 - 1.2	80 - 300
	Medium to heavy cutting	TM	T9215	0.5 - 2.5	0.5 - 2.5	0.2 - 0.6	0.4 - 1.2	150 - 400
		TM	T9225	0.5 - 2.5	0.5 - 2.5	0.2 - 0.6	0.4 - 1.2	80 - 300
M	Finishing	TSF	T9215	0.2 - 1.5	0.2 - 1.5	0.08 - 0.4	0.2 - 1.2	100 - 250
		TSF	AH8015	0.2 - 1.5	0.2 - 1.5	0.08 - 0.4	0.2 - 1.2	90 - 190
	Medium to heavy cutting	TM	T9215	0.5 - 2.5	0.5 - 2.5	0.2 - 0.6	0.4 - 1.2	100 - 250
		TM	AH8015	0.5 - 2.5	0.5 - 2.5	0.2 - 0.6	0.4 - 1.2	90 - 190
K	Finishing	TSF	T9215	0.2 - 1.5	0.2 - 1.5	0.08 - 0.4	0.2 - 1.2	140 - 500
	Medium to heavy cutting	TM	T9215	0.5 - 2.5	0.5 - 2.5	0.2 - 0.6	0.4 - 1.2	140 - 500
S	Finishing	TSF	AH8015	0.2 - 1.5	0.2 - 1.5	0.08 - 0.4	0.2 - 1.2	20 - 80
	Medium to heavy cutting	TM	AH8015	0.5 - 2.5	0.5 - 2.5	0.2 - 0.6	0.4 - 1.2	20 - 80

PRACTICAL EXAMPLES

Workpiece type		Turbine shaft	Gear part
Toolholder		ATXOL2525M25-A	ATXOR2525M25-A
Insert		6C-TOMG250608M-TM	6V-TOMG250604F-TSF
Grade		T9215	T9215
Workpiece material		SCr420 / 20Cr4	S25C / C25
Cutting conditions	Cutting speed : *Vc* (m/min)	147	200
	Feed : *f* (mm/rev)	Face turning: 0.35, External turning: 0.5	Roughing : 0.6 x 2 passes, Finishing : 0.1 x 1 pass
	Depth of cut : *ap* (mm)	Face turning: 1 - 2, External turning: 0.5	0.5 x 3 passes
	Machining	Face turning, External turning	External turning
	Coolant	Wet (External coolant)	Wet (External coolant)
Results		 **AddMultiTurn** reduced machining time by 32% and prevented burr formation thanks to high-feed back turning.	 **AddMultiTurn** reduced machining time by 55% thanks to high-feed back turning.

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