Member IMC Group Tungaloy INDUSTRY 4.0

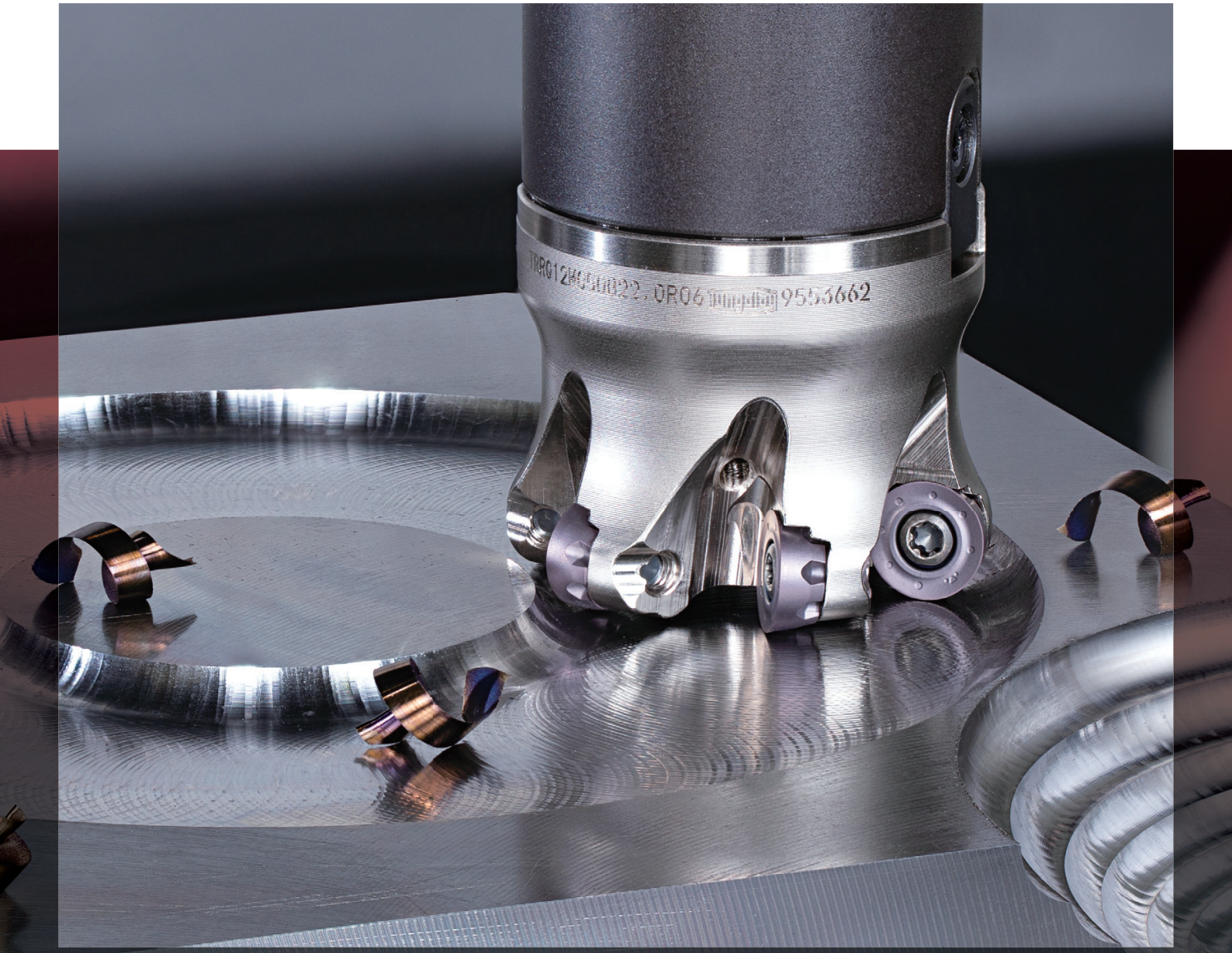
MillLine

Profile milling cutter

FIXRMILL

Tungaloy Report No. 418S1-US

Upgraded **FixRMill** round insert copy mill with **unique anti-rotation system**

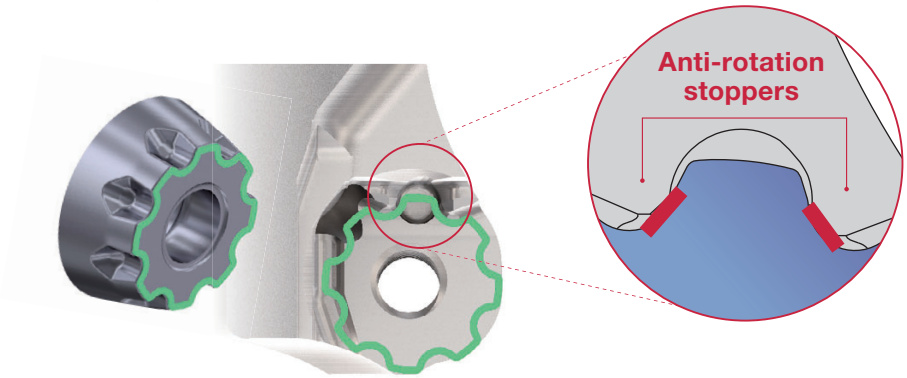


TUNGALOY ADDFORCE ACCELERATED LINES

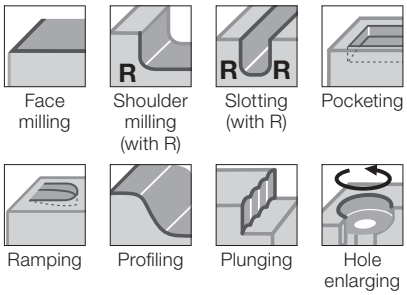
For more information

Accurate and secure clamping

- The anti-rotation system securely keeps the inserts locked in place and prevents them from moving in the pockets during machining, ensuring tool reliability and accurate indexing over various applications.



Applications capabilities



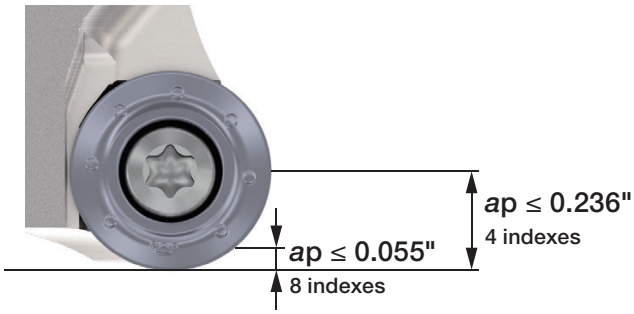
- High productive cutter with close pitch design

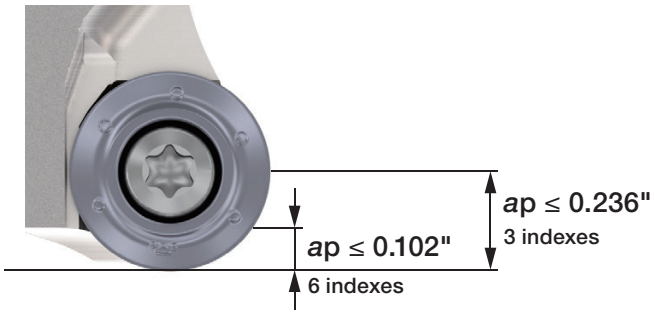
■ Inserts per diameter density comparisons: **FixRMill** vs conventional round insert cutter

Tool diameter DCX (mm)	FIXRMILL close pitched	Conventional round insert cutter
ø50	6	5
ø63	7	6

Two types of inserts

- Both inserts can be clamped in the same pocket
- Inserts can be selected based on the required depth of cut for best cost per edge





RQMT1204ENC8-MM

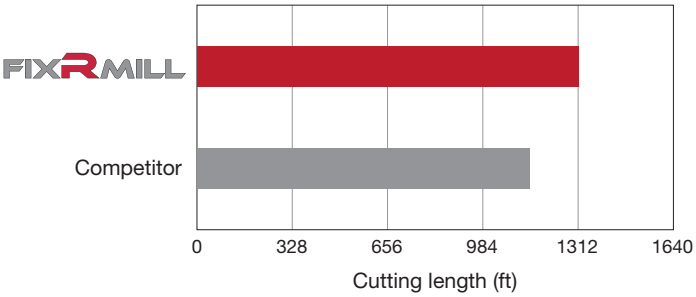
Allows up to 8 indexes for 0.055" or smaller D.O.C. and up to 4 indexes for up to 0.236" D.O.C.

RQMT1204ENC6-MM

Allows up to 6 indexes for 0.102" or smaller D.O.C. and up to 3 indexes for up to 0.236" D.O.C.

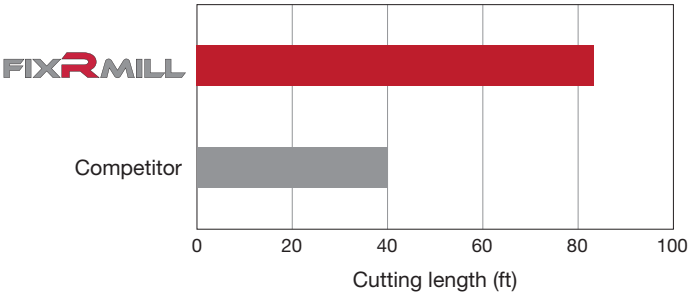
TOOL LIFE

P Carbon steel 1055 (200HB)



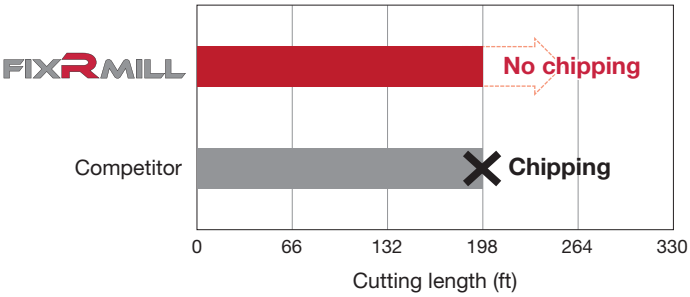
Cutter : TRRQ12M050B22.0R05
(DCX = 50 mm (1.969"), CICT = 5)
Insert : RQMT1204ENC6-MM AH3135
Cutting speed : *Vc* = 492 sfm
Feed per tooth : *fz* = 0.024 ipt
Depth of cut : *ap* = 0.059"
Width of cut : *ae* = 1.181"
Coolant : Dry
Overhang length: 3.937"
Machine : Horizontal M/C, BT40
Performed with only one insert on the cutter

P Plastic mold steel NAK80 (40HRC)



Cutter : TRRQ12M050B22.0R05
(DCX = 50 mm (1.969"), CICT = 5)
Insert : RQMT1204ENC6-MM AH3135
Cutting speed : *Vc* = 459 sfm
Feed per tooth : *fz* = 0.012 ipt
Depth of cut : *ap* = 0.059"
Width of cut : *ae* = 0.787"
Coolant : Dry
Overhang length: 5.906"
Machine : Horizontal M/C, BT40
Performed with only one insert on the cutter

M Austenitic stainless steel 304SS (160HB)



Cutter : TRRQ12M050B22.0R06
(DCX = 50 mm (1.969"), CICT = 6)
Insert : RQMT1204ENC8-MM AH3135
Cutting speed : *Vc* = 246 sfm
Feed per tooth : *fz* = 0.012 ipt
Depth of cut : *ap* = 0.039"
Width of cut : *ae* = 0.118"
Coolant : Dry
Overhang length: 5.906"
Machine : Vertical M/C, HSK100
Performed with all inserts on the cutter

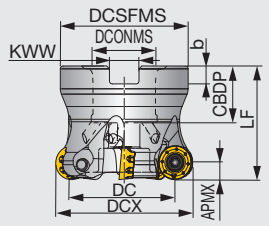
FIXRMILL

BORE TYPE

TRRQ12

Radius mill with anti-rotation system

GAMP = +5°, GAMF = -3°



Metric	APMX	DCX	CICT	DC	DCSFMS	DCONMS	LF	CBDP	KWW	b	WT(kg)	Air hole	Insert
TRRQ12M040B16.0R04 (1)	6	40	4	28	34	16	40	24	8.4	5.6	0.16	With	RQMT12...
TRRQ12M050B22.0R05	6	50	5	38	45	22	40	20	10.4	6.3	0.27	With	RQMT12...
TRRQ12M050B22.0R06	6	50	6	38	45	22	40	20	10.4	6.3	0.26	With	RQMT12...
TRRQ12M052B22.0R05	6	52	5	40	45	22	40	20	10.4	6.3	0.29	With	RQMT12...
TRRQ12M063B22.0R06	6	63	6	51	50	22	40	20	10.4	6.3	0.44	With	RQMT12...
TRRQ12M063B22.0R07	6	63	7	51	50	22	40	20	10.4	6.3	0.42	With	RQMT12...
TRRQ12M080B27.0R06	6	80	6	68	56	27	50	22	12.4	7	0.88	With	RQMT12...

(1) Always use the dedicated shell locking bolt # SRPS118-0416 when assembling the cutter on the arbor. See page 7 for the instruction for the cutter-arbor assembly.
Coolant needs to be supplied from the end of the arbor inlay. Coolant cannot be supplied from the shell locking bolt.

SPARE PARTS

Designation	Clamping screw	Torx bit	Grip	Shell locking bolt 1	Shell locking bolt 2
TRRQ12M040B16.0R04	CSPB-4S	BLDIP15/S7	H-TB2W	-	SRPS118-0416
TRRQ12M050 - 063...	CSPB-4S	BLDIP15/S7	H-TB2W	CM10X30H	-
TRRQ12M080B27.0R06	CSPB-4S	BLDIP15/S7	H-TB2W	CM12X30H	-

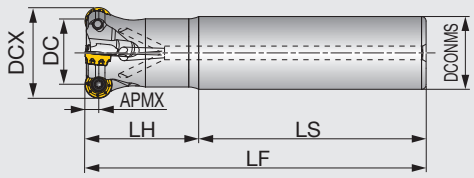
*Recommended clamping torque (N·m): CSPB-4S = 3.5

SHANK TYPE

ERRQ12

Radius endmill with anti-rotation system, shank type

GAMP = +5°, GAMF = -3°



Metric	APMX	DCX	CICT	DC	DCONMS	LF	LH	LS	WT(kg)	Air hole	Insert
ERRQ12M040C32.0R04	6	40	4	28	32	150	50	100	0.84	With	RQMT12...

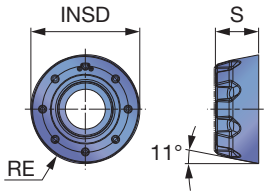
SPARE PARTS

Designation	Clamping screw	Torx bit	Grip
ERRQ12M040C32.0R04	CSPB-4S	BLDIP15/S7	H-TB2W

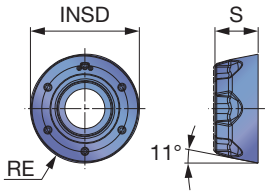
*Recommended clamping torque (N·m): CSPB-4S = 3.5

INSERTS

RQMT1204ENC8-MM



RQMT1204ENC6-MM



		Coated AH3135	Coated AH8015
P	Steel	★	
M	Stainless	★	
K	Cast iron		★
N	Non-ferrous		
S	Superalloy	★	★
H	Hard materials	☆	☆

★ : First choice
☆ : Second choice

Designation	RE (in)	APMX (in)	Coated AH3135	Coated AH8015	INSD (in)	S (in)
RQMT1204ENC8-MM	0.236	0.236	●	●	0.472	0.187
RQMT1204ENC6-MM	0.236	0.236	●	●	0.472	0.187

● : Line up

GRADES

AH3135 P M S H

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

AH8015 K S H

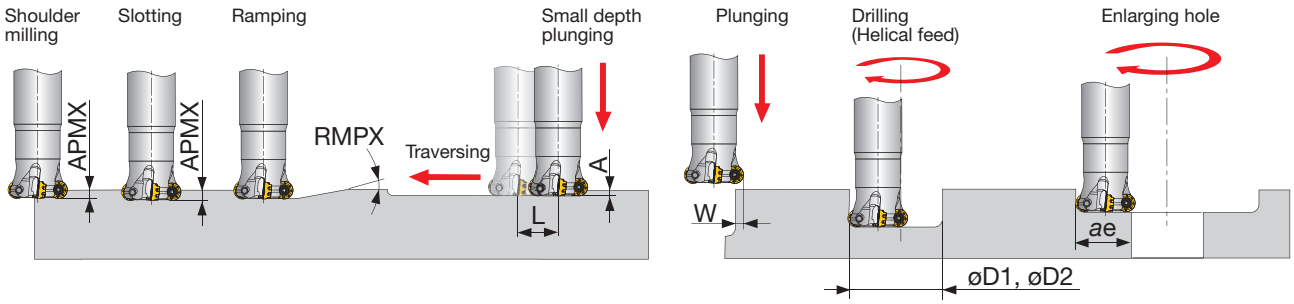
- Incorporates a hard coating layer and carbide substrate
- Strong resistance to wear, heat, and built-up edge. Ideal for machining cast iron, heat-resistant alloy, and hardened steel

STANDARD CUTTING CONDITIONS

ISO	Workpiece materials		Hardness	Priority	Grades	Chipbreaker	Cutting speed *Vc* (sfm)	Feed per tooth *fz* (ipt)
P	Low carbon steel 1015, etc.		- 200HB	First choice	AH3135	MM	328 - 984	ap = 0.236" : 0.004 - 0.012 ap = 0.079" : 0.006 - 0.024 ap = 0.039" : 0.008 - 0.031
	Carbon steel and alloy steel 1055, etc.		- 300HB	First choice	AH3135	MM	328 - 820	
	Prehardened steel NAK80, PX5, etc.		30 - 40HRC	First choice	AH3135	MM	328 - 656	
M	Austenitic stainless steel 304, 316, etc.		- 200HB	First choice	AH3135	MM	328 - 656	ap = 0.236" : 0.004 - 0.010 ap = 0.079" : 0.006 - 0.020 ap = 0.039" : 0.008 - 0.026
	Martensitic stainless steel 420, etc.		- 200HB	First choice	AH3135	MM	328 - 984	
K	Gray cast iron No.250B, etc.		150 - 250HB	First choice	AH8015	MM	328 - 984	ap = 0.236" : 0.004 - 0.012 ap = 0.079" : 0.006 - 0.024 ap = 0.039" : 0.008 - 0.031
	Ductile cast iron 60-40-18, 80-55-06, etc.		150 - 250HB	First choice	AH8015	MM	262 - 820	
S	Titanium alloys Ti-6Al-4V, etc.		-	First choice	AH3135	MM	98 - 197	ap = 0.236" : 0.003 - 0.008 ap = 0.079" : 0.005 - 0.016 ap = 0.039" : 0.006 - 0.024
	Heat-resistant alloys Inconel718, etc.		-	First choice	AH8015	MM	66 - 164	ap = 0.236" : 0.002 - 0.005 ap = 0.079" : 0.003 - 0.010 ap = 0.039" : 0.004 - 0.012
H	Hardened steel	H13, etc.	40 - 50HRC	First choice	AH3135	MM	164 - 492	ap = 0.236" : 0.002 - 0.005 ap = 0.079" : 0.003 - 0.010 ap = 0.039" : 0.004 - 0.012
		D2, etc.	50 - 60HRC	First choice	AH8015	MM	164 - 230	ap = 0.236" : 0.001 - 0.004 ap = 0.079" : 0.002 - 0.005 ap = 0.039" : 0.002 - 0.006

FIXRMILL

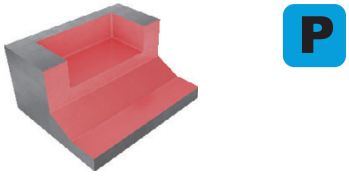
APPLICATION RANGE



Metric	DCX	Max. depth of cut APMX	Max. ramping angle RMPX	Max. plunging depth A	Max. cutting width in plunging W	Machining length for removing uncut portion L	Min. machining diameter øD1	Max. machining diameter øD2*	Max. cutting width engagement *ae*
T/ERRQ12M040…	40	6	5.1°	2.4	6	29	59	79	32
TRRQ12M050B22.0…	50	6	3.6°	2.4	6	39	79	99	42
TRRQ12M052B22.0R05	52	6	3.4°	2.4	6	41	83	103	44
TRRQ12M063B22.0…	63	6	3°	2.4	6	52	105	125	55
TRRQ12M080B27.0R06	80	6	2.1°	2.4	6	69	139	159	72

* For flat bottom hole

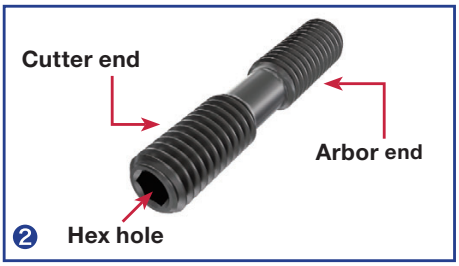
PRACTICAL EXAMPLES

Workpiece type		Mold	Generator part
Cutter		TRRQ12M050B22.0R05 (DCX = 1.969", CICT = 5)	TRRQ12M050B22.0R06 (DCX = 1.969", CICT = 6)
Insert		RQMT1204ENC8-MM	RQMT1204ENC8-MM
Grade		AH3135	AH3135
Workpiece material		1045  P	304  M
Cutting conditions	Cutting speed: *Vc* (sfm)	410	246
	Feed per tooth: *fz* (ipt)	0.049	0.012
	Depth of cut : *ap* (in)	0.020	0.039
	Width of cut : *ae* (in)	1.969	0.118
	Machining	Profiling	Profiling
	Coolant	Air	Air
	Machine	Vertical M/C, BT50	Vertical M/C, HSK100
Results		FIXRMILL  **No chipping** Competitor  **Chipping** The competitor's cutter resulted in edge chipping and could not complete the machining of one workpiece. **FixRMill** demonstrated no edge chipping and completed one workpiece thanks to its tough AH3135 grade inserts.	Due to a long overhang setup of 4xD and insecure anti-rotation feature, the competitor's cutter allowed the inserts to rotate during machining, yielding damage to the insert pockets and short cutter tool life. **FixRMill** prevented insert rotation thanks to its anti-rotation system, providing the cutter with security and long tool life.

How to Assemble on the Arbor (For Cutter # TRRQ12M040B16.0R04)

Before assembly

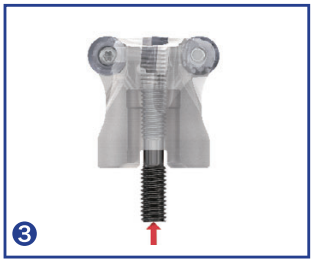
- Ensure before assembly that the milling cutter, dedicated shell locking bolt, and arbor are present and of the right sizes. (Fig.❶)
- The screw end with the hex hole should be inserted in the cutter body; the screw end with no hole goes in the arbor. (Fig.❷)

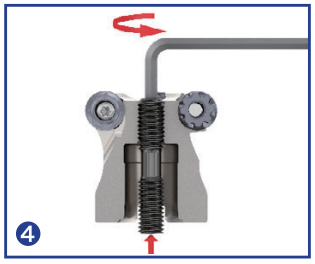


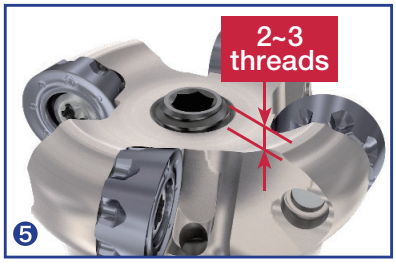
Assembling the screw in the cutter body

- Insert the screw end with the hex hole into the cutter body. (Fig.❸)
- Turn the screw counterclockwise (left) until it stops. (Fig.❹)
- Ensure that 2 to 3 threads are visible from the top of the cutter body. (Fig.❺)

NOTE: Always insert the shell locking bolt from the bottom of the cutter. NEVER insert the screw into the top of the cutter body; this will damage the screw threads.







Assembling the cutter and arbor

- Place the cutter body on the arbor so that the drive keys on the arbor engage the grooves on the cutter body. (Fig.❻)
- Tighten the screw clockwise (right) to lock the cutter body onto the arbor. While doing so, ensure that the drive keys stay in contact with the grooves at all times. (Fig.❼)
- Tighten the screw until the cutter body flange face is flush with the arbor face. (Fig.❽)
- Ensure the cutter body does not rotate on the arbor to finish the assembly.

NOTE: Recommended torque for the screw: 8 N·m (5.9 lbs·ft)

Tungaloy America, Inc.

3726 N Ventura Drive, Arlington Heights, IL 60004, U.S.A.
Inside Sales: +1-888-554-8394
Technical Support: +1-888-554-8391
Fax: +1-888-554-8392
www.tungaloy.com/us

Tungaloy Canada

432 Elgin St. Unit 3, Brantford, Ontario N3S 7P7, Canada
Phone: +1-519-758-5779 Fax: +1-519-758-5791
www.tungaloy.com/ca

Tungaloy de Mexico S.A.

C Los Arellano 113, Parque Industrial Siglo XXI
Aguascalientes, AGS, Mexico 20290
Phone:+52-449-929-5410 Fax:+52-449-929-5411
www.tungaloy.com/mx

Scan for instant web access

Member IMC Group Tungaloy INDUSTRY 4.0

www.tungaloy.com/us

follow us at:
facebook.com/tungaloyamerica
instagram.com/tungaloyamerica
linkedin.com/company/tungaloy-america

To see Tungaloy products in action visit:

YouTube

www.youtube.com/tungaloycorporation

Distributed by:

FIND US ON THE CLOUD!
machiningcloud.com

Explore the Tungaloy world!

Aug. 2022 (TJ)