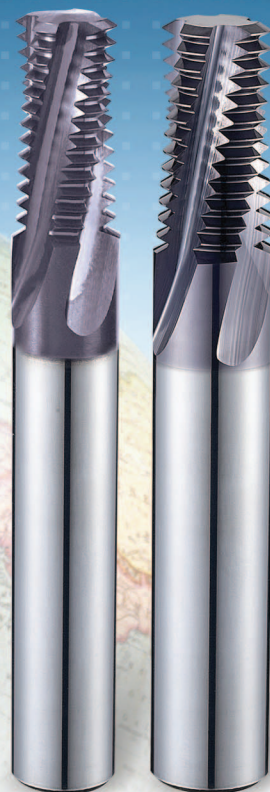


**YU-TM13**



# THREAD MILLS

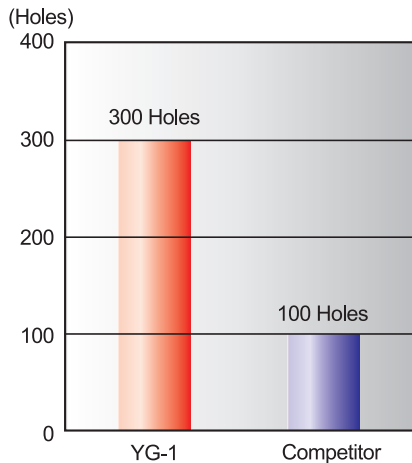
- Higher cutting speeds and feeds than tapping.
- One tool for blind holes and through holes.



**YG-1 CO., LTD.**

# Thread Mill - Test Report

## TEST REPORT-1 : M8x1.25



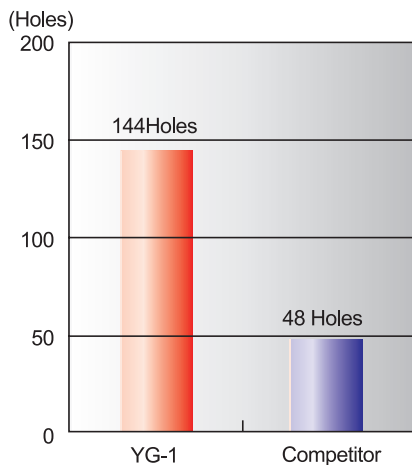
YG-1  
Competitor

### CUTTING CONDITION

SIZE : M8 × 1.25, .235 × .250 × .625 × 2.5  
 Work Material : 1045 (S45C)  
 Cutting Speed : 328 feet/min  
 Threading Feed : 0.0012 inch/tooth  
 Cutting Depth : 0.472 inch  
 Coolant : Wet Cut

- ▶ YG-1 : More Cutting is possible
- ▶ Competitor : Large chipping on thread

## TEST REPORT-2 : 3/4-10UNC



YG-1  
Competitor

### CUTTING CONDITION

SIZE : 3/4-10UNC, .495 × .500 × 1.25 × 3.5  
 Work Material : 1045 (S45C)  
 Cutting Speed : 328 feet/min  
 Threading Feed : 0.0020 inch/tooth  
 Cutting Depth : 1.10 inch  
 Coolant : Wet Cut

- ▶ YG-1 : More Cutting is possible
- ▶ Competitor : Large chipping on thread

## Application Program Available

### Programming of Thread Milling

Internal Thread Milling in Machining Center  
Fanuc

Thread Milling

UN - Unified

D = thread diameter (Inch) **0.375**

P = pitch (TPI) **16**

L = thread length (Inch) **0.750**

S = safety distance (Inch) **0.250**

Steel, High Alloy, < 1200 N/mm2

NC0285C0750 16TPI L121E480

Number of passes, axial **1**

Number of passes, radial (max 2) **1**

d = cutter diameter (Inch) **0.285**

l = length of cutting edge (Inch) **0.750**

z = number of flutes **4**

V = cutting speed (SFM) **262**

Fz = feed/tooth (inch/tooth) **0.0010**

Fdr = drilling feed (inch/rev.)

N = spindle speed (rpm) **3,511**

FD = feed at thread diameter (inch/min) **1.4**

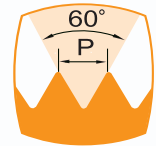
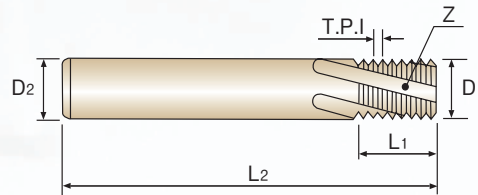
Fd = feed in center of mill (inch/min) **3.4**

T = time to mill the thread (seconds) **9**

CNC program for Fanuc

```
G90 G00 G57 X0. Y0.
G43 H10 Z0.250 M3 S3511
G91 G00 Z-1.0156
G41 D10 X0. Y-0.1563 F3.4
G03 X0.1906 Y0.1563 Z0.0156 R0.1594
G03 X0. Y0. Z0.0625 I-0.1906 J0.
G03 X-0.1906 Y0.1563 Z0.0156 R0.1594
G00 G40 X0. Y-0.1563
G00 Z0.9219
G90 G49 G00 Z8. M5
M30
```

# Solid Carbide Thread mill for Unified Internal Threads - ANSI B 1.1



- ▶ Material : Solid Carbide
- ▶ Shank : Plain Straight
- ▶ Spiral Angle : 15°

unit : inch

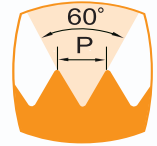
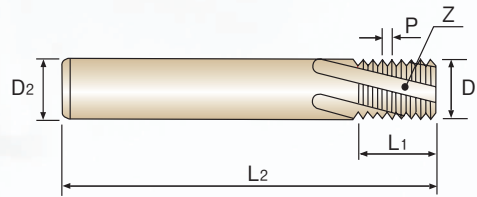
EDP No.	Size	Pitch	Cutter Diameter	Shank Diameter	Thread Length	Overall Length	No. of Flute
TiAlN		T.P.I	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	Z
TE080	#2	56	.065	.125	.125	2.000	3
TE120	#3	48	.075	.125	.167	2.000	3
TE220	#5	44	.095	.125	.228	2.000	3
TE160	#4	40	.085	.125	.175	2.000	3
TE300	#8	36	.115	.125	.250	2.000	3
TE240	#6	32	.100	.125	.218	2.000	3
TE280	#8	32	.115	.125	.250	2.000	3
TE340	#10	32	.120	.125	.312	2.000	3
TEF90	1/2	32	.370	.375	1.000	3.500	4
TEK90	#10	28	.120	.125	.312	2.000	3
TE420	1/4	28	.180	.187	.500	2.500	3
TE590	1/2	28	.370	.375	1.000	3.500	4
TE320	#10	24	.120	.125	.312	2.000	3
TE460	5/16	24	.235	.250	.625	2.500	3
TE500	3/8	24	.285	.312	.750	3.000	4
TE570	1/2	24	.370	.375	1.000	3.500	4
TE400	1/4	20	.180	.187	.500	2.500	3
TE540	7/16	20	.335	.375	.875	3.500	4
TE580	1/2	20	.370	.375	1.000	3.500	4
TE440	5/16	18	.235	.250	.625	2.500	3
TE620	9/16	18	.370	.375	.875	3.500	4
TE480	3/8	16	.285	.312	.750	3.000	4
TE720	3/4	16	.490	.500	1.250	3.500	4
TE520	7/16	14	.305	.312	.750	3.000	4
TE760	7/8	14	.490	.500	1.250	3.500	4
TE560	1/2	13	.350	.375	.875	3.500	4
TE600	9/16	12	.370	.375	.875	3.500	4
TE710	3/4	12	.495	.500	1.250	3.500	4
TE640	5/8	11	.470	.500	1.250	3.500	4
TE700	3/4	10	.495	.500	1.250	3.500	4
TE740	7/8	9	.620	.625	1.375	4.000	4
TE780	1	8	.620	.625	1.375	4.000	4
TE800	1	12	.745	.750	1.500	4.000	5
TE820	1-1/8 & 1-1/4	7	.745	.750	1.572	4.500	5

◎ : Excellent ○ : Good

Carbon Steels	Alloy Steels	Heat Treated Steels	Cast Iron	Stainless Steels	Titanium Alloy	Chrome-Nickel Alloy	Non Ferrous Materials
◎	◎	◎	◎	○	○	○	◎



# Solid Carbide Thread mill for Metric Internal Threads - DIN 13



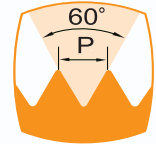
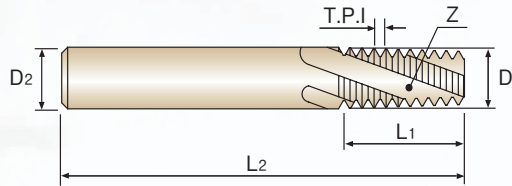
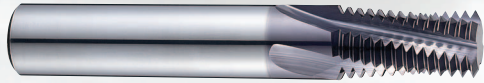
- ▶ **Material** : Solid Carbide
- ▶ **Shank** : Plain Straight
- ▶ **Spiral Angle** : 15°

unit : inch

EDP No.	Size	Pitch (mm)	Cutter Diameter	Shank Diameter	Thread Length	Overall Length	No. of Flute
TiAlN		P	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	Z
TD200	M3	0.50	.085	.125	.178	2.000	3
TD240	M4	0.70	.115	.125	.276	2.000	3
TD260	M4.5	0.75	.120	.125	.250	2.000	3
TD380	M8	0.75	.235	.250	.625	2.500	3
TD280	M5	0.80	.120	.125	.312	2.000	3
TD310	M6	1.00	.170	.187	.500	2.500	3
TD530	M12	1.00	.360	.375	.875	3.500	4
TD360	M8	1.25	.235	.250	.625	2.500	3
TD420	M10	1.50	.300	.312	.750	3.000	4
TD550	M14	1.50	.370	.375	.875	3.500	4
TD670	M18	1.50	.490	.500	1.250	3.500	4
TD500	M12	1.75	.360	.375	.875	3.500	4
TD600	M16	2.00	.470	.500	1.250	3.500	4
TD700	M20	2.50	.495	.500	1.250	3.500	4
TD780	M24	3.00	.620	.625	1.375	4.000	4

◎ : Excellent ○ : Good							
Carbon Steels	Alloy Steels	Heat Treated Steels	Cast Iron	Stainless Steels	Titanium Alloy	Chrome-Nickel Alloy	Non Ferrous Materials
◎	◎	◎	◎	○	○	○	◎

# Solid Carbide Thread mill for Taper Pipe Threads - ANSI B 1.20.1(NPT) / ANSI B1.20.3(NPTF)



- ▶ **Material** : Solid Carbide
- ▶ **Shank** : Plain Straight
- ▶ **Spiral Angle** : 15°

unit : inch

EDP No.	Size	Pitch	Large End Cutter Dia.	Shank Diameter	Thread Length	Overall Length	No. of Flute
TiAlN		T.P.I	D <sub>1</sub>	D <sub>2</sub>	L <sub>1</sub>	L <sub>2</sub>	Z
TF020	1/16 & 1/8 NPT	27	.245	.250	.437	2.500	3
TF400	1/4 & 3/8 NPT	18	.305	.312	.625	3.000	4
TF480	1/4 & 3/8 NPT	18	.363	.375	.680	3.500	4
TF560	1/2 & 3/4 NPT	14	.495	.500	.875	3.500	4
TF780	1" - 2" NPT	11.5	.620	.625	1.125	4.000	4
TFF40	2-1/2" - 6" NPT	8	.745	.750	1.500	5.000	4
TG020	1/16 & 1/8 NPTF	27	.245	.250	.437	2.500	3
TG400	1/4 & 3/8 NPTF	18	.305	.312	.625	3.000	4
TG560	1/2 & 3/4 NPTF	14	.495	.500	.875	3.500	4
TG780	1" - 2" NPTF	11.5	.620	.625	1.125	4.000	4
TGF40	2-1/2" - 6" NPTF	8	.745	.750	1.500	5.000	4

◎ : Excellent ○ : Good							
Carbon Steels	Alloy Steels	Heat Treated Steels	Cast Iron	Stainless Steels	Titanium Alloy	Chrome-Nickel Alloy	Non Ferrous Materials
◎	◎	◎	◎	○	○	○	◎

# RECOMMENDED CUTTING SPEED

Application Program Available

unit : inch

Material	Cutting Speed (SFM)	Feed per Tooth (fz)	
		Cutter Diameter $\leq 5/16$	Cutter Diameter $> 5/16$
Low Carbon Steels Medium Carbon Steels	250 - 400	0.0008 - 0.0016	0.0016 - 0.0040
High Carbon Steels	250 - 350	0.0008 - 0.0016	0.0016 - 0.0040
Alloy Steels	250 - 300	0.0008 - 0.0016	0.0016 - 0.0040
Heat Treated Steels	200 - 300	0.0008 - 0.0016	0.0016 - 0.0040
Stainless Steels	150 - 250	0.0004 - 0.0008	0.0008 - 0.0024
Cast Iron	200 - 350	0.0008 - 0.0016	0.0016 - 0.0040
Chrome-Nickel Alloys Titanium Alloys	70 - 200	0.0004 - 0.0008	0.0008 - 0.0024
Non Ferrous Material	350 - 1000	0.0012 - 0.0020	0.0020 - 0.0040

## TO CALCULATE SPEED & FEED RATES

### Calculate R.P.M of cutter

$$N = \frac{12 \times \text{SFM}}{d \times \pi}$$

N : R.P.M

SFM : Recommended Cutting Speed

d : Diameter of Cutter

fz : Recommended Feed per Tooth

Z : Number of Teeth

F<sub>1</sub> : Feed at Cutting Edge

F<sub>2</sub> : Feed at Center Line of Cutting

D : Major Diameter of Component

### Calculate Feed per Revolution

$$F_1 = fz \times Z \times N$$

### Finally Calculate Feed at Tool Center Line

$$F_2 = \frac{F_1 \times (D - d)}{D}$$

# PROGRAMMING OF THREAD MILLING

Application Program Available

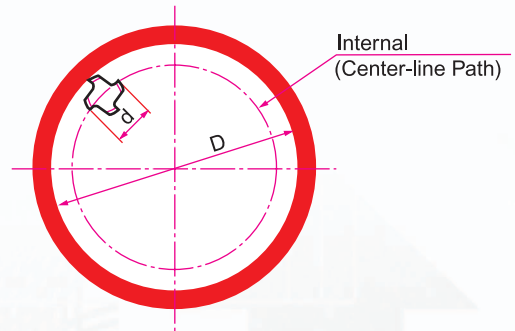
## Program Data

### G Codes for Thread Milling

<b>G00</b>	Fast Feed Linear	<b>G90</b>	Absolute Command
<b>G01</b>	Linear Movement	<b>G91</b>	Incremental Command
<b>G02</b>	Circular/Helical Interpolation C.W.	<b>M03</b>	Clockwise Rotation of Spindle
<b>G03</b>	Circular/Helical Interpolation A.C.W.	<b>M05</b>	Spindle Stop
<b>G17</b>	X, Y Plane (Vertical Machining)	<b>M08</b>	Coolant On
<b>G18</b>	Z, X Plane (Horizontal Machining)	<b>X</b>	Horizontal Co-ordinate
<b>G19</b>	Y, Z Plane (Using 90° Head)	<b>Y</b>	Horizontal Co-ordinate
<b>G40</b>	Cutter Radius Compensation Cancel	<b>Z</b>	Vertical Co-ordinate
<b>G41</b>	Cutter Radius Compensation Left	<b>I</b>	X Co-ordinate to Center of Arc Travel
<b>G42</b>	Cutter Radius Compensation Right	<b>J</b>	Y Co-ordinate to Center of Arc Travel
<b>G43</b>	Tool Length Compensation Plus	<b>S</b>	Spindle Speed R.P.M.
<b>G49</b>	Tool Length Compensation Cancel	<b>F</b>	Feed inch/min

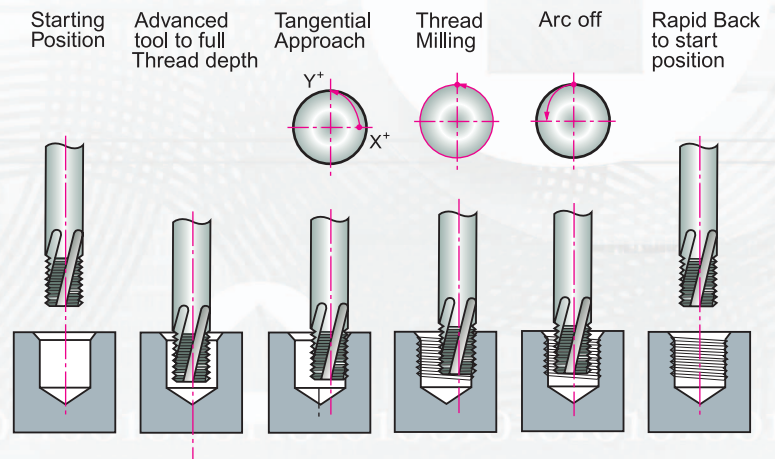
## CNC Internal Thread Milling

N10	G54	G90	G00	X...	Y...
N20	G43	H10	Z0.250	M0.3	S...
N30	G91	G00	Z...(A3+0.250)		
N40	G41	G01	D26	X...(A6)	Y...(A5) F...
N50	G03	X...(A6)	Y...(A6)	Z...(A4)	I...(A6) J0
N60	G03	X0	Y0	Z...(A2)	I0 J...(A1)
N70	G03	X...(A6)	Y...(A6)	Z...(A4)	I0 J...(A6)
N80	G00	G40	X...(A6)	Y...(A5)	
N90	G00	Z...(A7)			
N100	G90	G49	G00	Z8.0	M5
N110	M30				

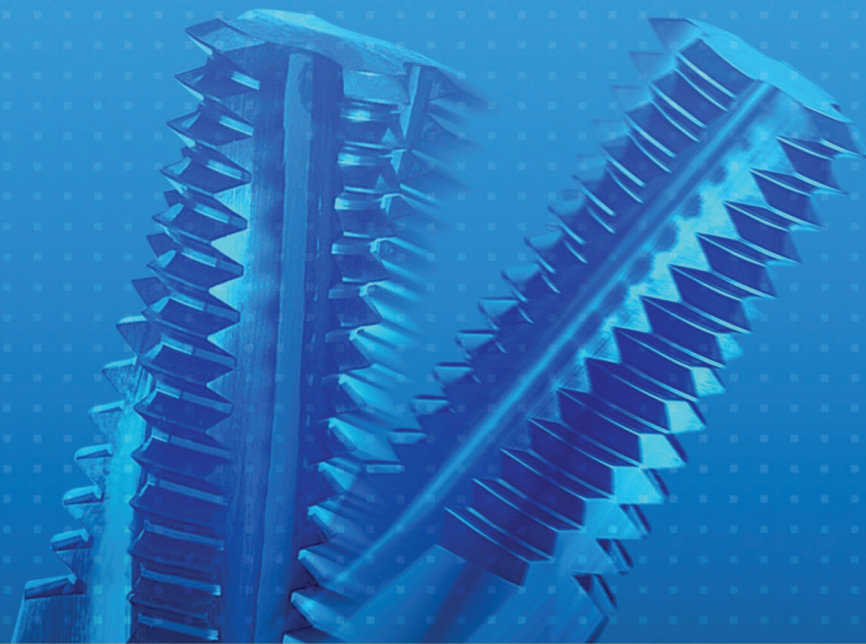


### <Explanation of Parameters>

- A1** : 1/2 Nominal Thread Diameter (D/2)
- A2** : Thread Pitch(P)
- A3** : Thread Depth
- A4** : P/4(for climb milling and right-hand thread)
- A5** : Beginning of Contour in Y (P/2)
- A6** : Arc Off (A1 - A5)
- A7** : A3 + 0.250 - P/2
- H10** : Tool length compensation number
- D26** : Tool radius compensation number







# THREAD MILLS

Higher cutting speeds and feeds than tapping.  
One tool for blind holes and through holes.

 **YG-1 CO., LTD.**

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Tool specifications are subject to change without notice.

YG1YETM120101003