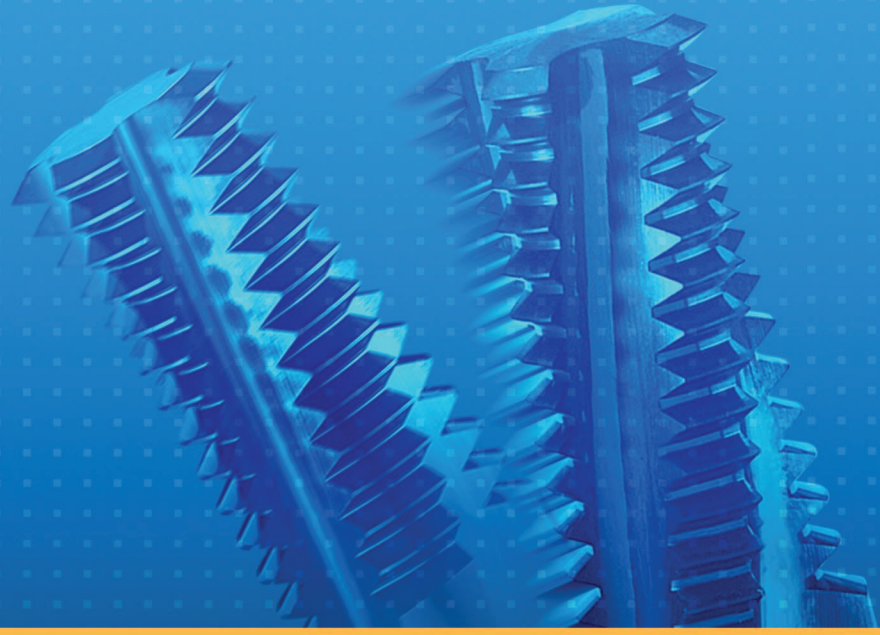
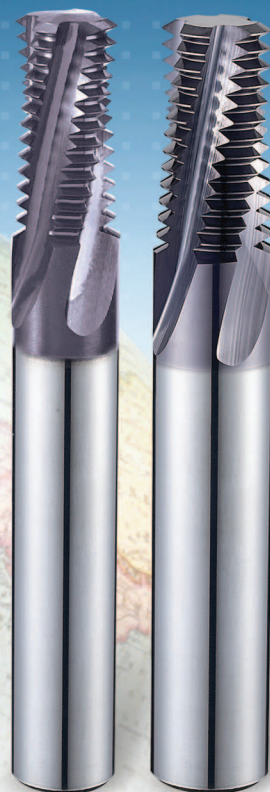


YU-TM13



THREAD MILLS

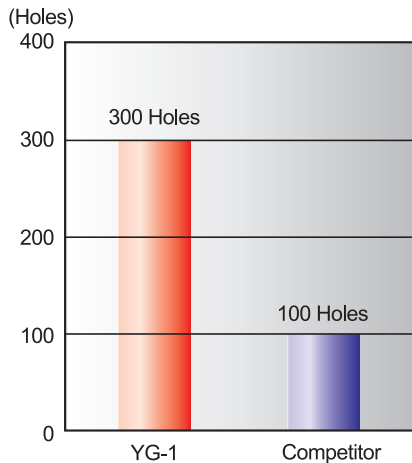
- Higher cutting speeds and feeds than tapping.
- One tool for blind holes and through holes.



YG-1 CO., LTD.

Thread Mill - Test Report

TEST REPORT-1 : M8x1.25



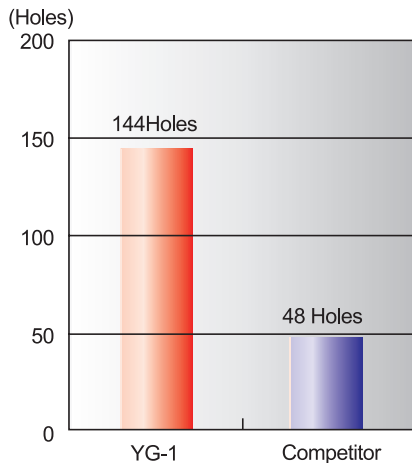
YG-1
Competitor

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**

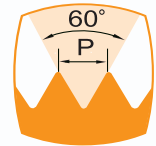
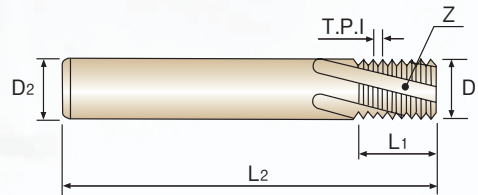
Fd = feed in center of mill (inch/min) **3.4**

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°

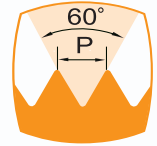
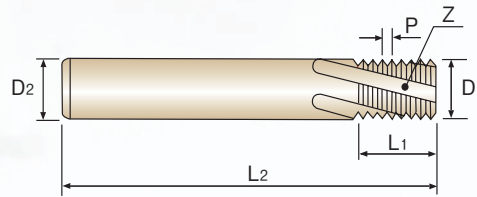
unit : inch

EDP No.	Size	Pitch	Cutter Diameter	Shank Diameter	Thread Length	Overall Length	No. of Flute
TiAlN		T.P.I	D ₁	D ₂	L ₁	L ₂	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



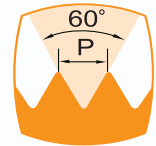
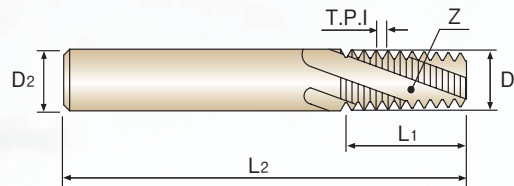
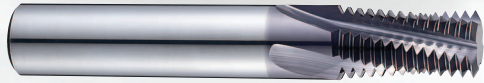
- ▶ **Material** : Solid Carbide
- ▶ **Shank** : Plain Straight
- ▶ **Spiral Angle** : 15°

unit : inch

EDP No.	Size	Pitch (mm)	Cutter Diameter	Shank Diameter	Thread Length	Overall Length	No. of Flute
TiAlN		P	D ₁	D ₂	L ₁	L ₂	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 ₁	D ₂	L ₁	L ₂	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

F₁ : Feed at Cutting Edge

F₂ : 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

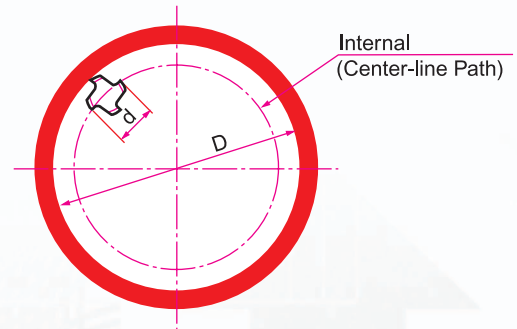
G Codes for Thread Milling

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

CNC Internal Thread Milling

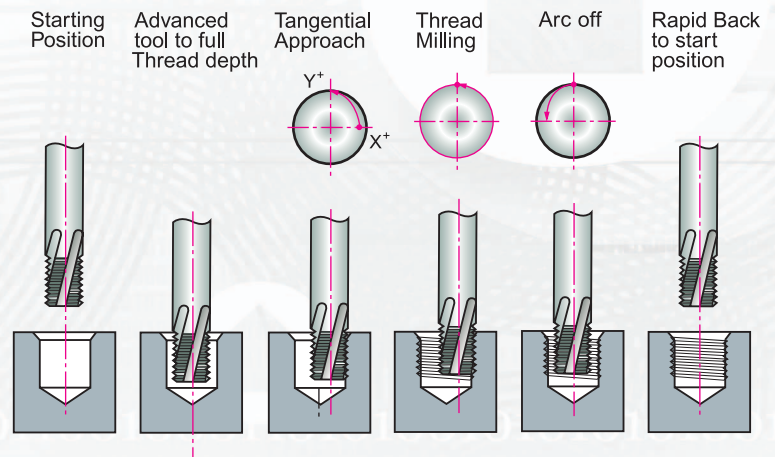
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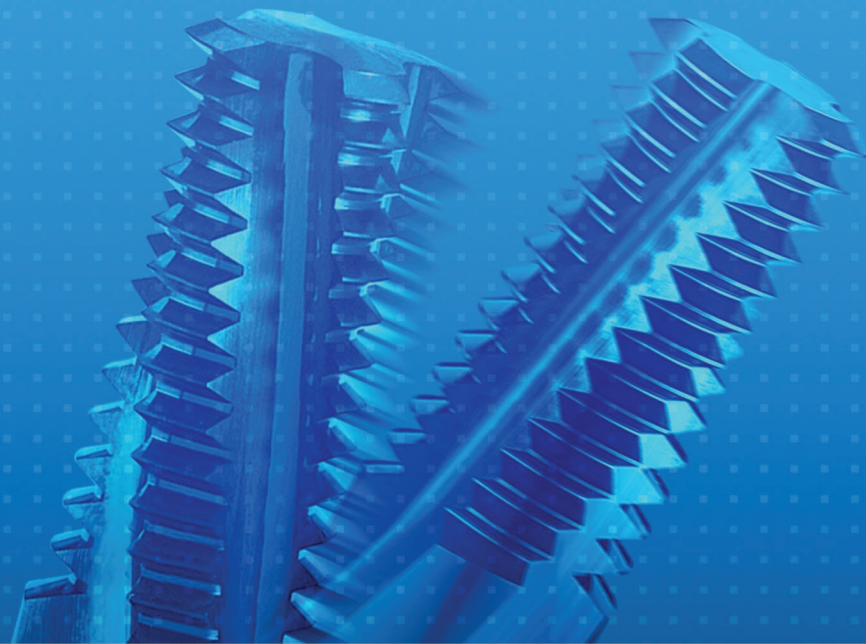
N10    G54    G90    G00    X...    Y...
N20    G43    H10    Z0.250  M0.3    S...
N30    G91    G00    Z...(A3+0.250)
N40    G41    G01    D26    X...(A6)  Y...(A5)  F...
N50    G03    X...(A6)  Y...(A6)  Z...(A4)  I...(A6)  J0
N60    G03    X0      Y0      Z...(A2)  I0      J...(A1)
N70    G03    X...(A6)  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