MOLDINO
The Edge To Innovation

Carbide Threading tool

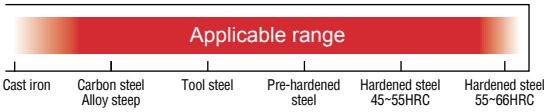
ET-PN
EDT-TH
EDT-(N)PT-ATH

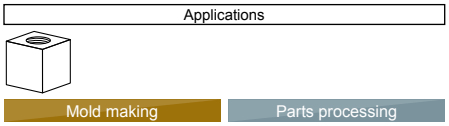
Carbide Thread Mill series

MOLDINO Tool Engineering, Ltd.

New Product News | No. H1803A-3 | 2021-5

Features





ET-PN
EDT-TH, EDT-(N)PT-ATH

ϕ1.4mm～ϕ15.8mm,
ϕ.055 inch～.622 inch [140 Sizes]

Features of Epoch Thread Mill

- Tough and strong edge design provides threading in hardened steels.
- Tip shape reduces cutting resistance suppresses tool bending.
- Drastically reduces tool breakage.
- PN Coating provides excellent adhesion and wear resistance.

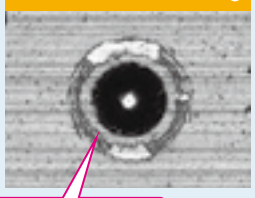
Reduces risk of breaking off inside!

New coating with excellent adhesion and wear resistance

Adhesion of PN coating

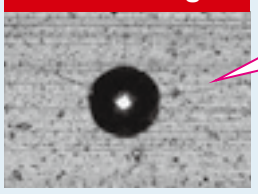
Substrate: Carbide alloy

Conventional coating



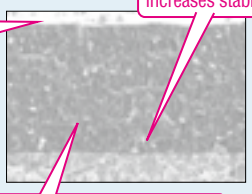
Coating is peeling.

PN coating



No peeling
↓
Superior adhesion

Cross-section photograph of PN coating layer structure



Layer surface with improved lubrication characteristics.

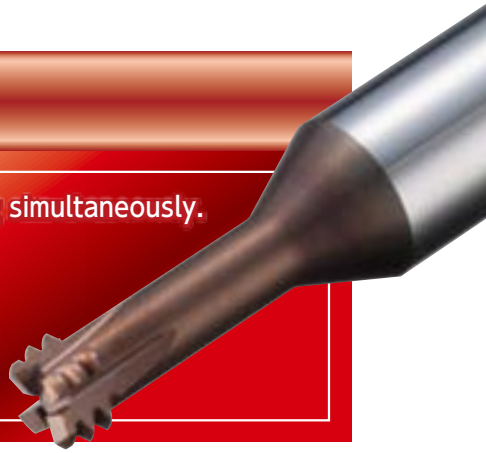
Improved adhesion increases stability!

Microstructure increases heat resistance!

Features of Epoch D Thread Mill

- No pilot hole needed. This single tool can perform both drilling and threading simultaneously.
- High-strength edge shape design suppresses edge tip breakage in severe machining environments including hardened steels.
- ATH Coating delivers improved hardness and oxidation resistance.

No pilot hole needed



ATH coating further improves the hardness and oxidation resistance of the previous TH coating.

New PVD Nano Technology

Epoch Super Coating ATH

- Hardness and oxidation resistance of TH coatings is further improved. Enables longer life and higher efficiency when cutting high-hardness materials.
  Hardness: 3800HV; Oxidation temperature: 1200℃
  (Si nano composite coating with finer crystal particles)
- Exhibits performance in ultra high-efficient cutting.

Reduces the risk of breaking off inside

By using a tool with a diameter smaller than the inside diameter of the thread, cutting chips are smaller and chip evacuation is improved.
The risk of the tool breaking off inside the hole is reduced as a result.

One tool - various types of thread milling

Right hand, left-hand and fine thread milling can be performed by just changing the NC program.
The thread diameters of the coarse threads and fine threads that can be processed with the same tool are different.
(Example: For ET-1.25-16-PN, coarse thread is M8 × 1.25 and fine thread is M10 × 1.25)

Cutting conditions can be freely set

Unlike when using taps, synchronizing the rotation and feed rates is not necessary, so these tools can be used in the same manner as end mills and cutting conditions can be set according to the processing environment.

Usable on a variety of machines

Since the load is smaller than when using taps, these tools can be used even on machines having low-powered spindle.
In addition, special tooling such as tapping holders are not necessary.

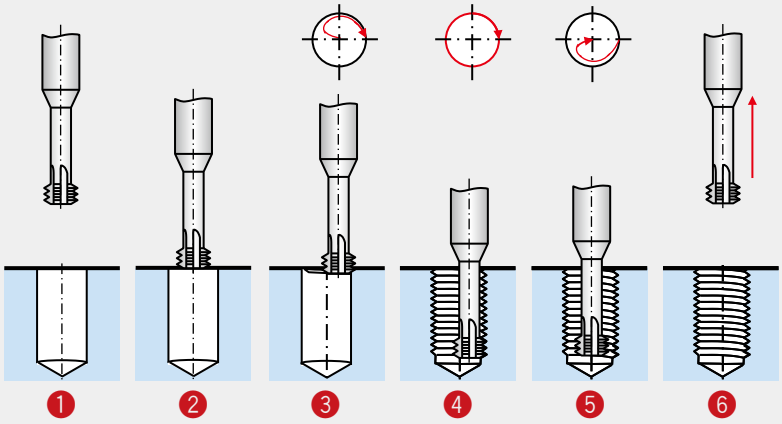
Provides good finished surfaces

Interrupted cutting suppresses gouging to provide good finished surfaces.

Thread milling can be performed to the bottom of the hole.

Epoch Thread Mills are designed with no incomplete threads and Epoch D Thread Mills have only one incomplete thread, making them ideal for when you want to perform thread milling to the bottom of shallow holes.

Machining process with Epoch Thread Mill



1. Startup
2. Positioning for starting point of machining
3. Entry (gradually cutting in)
4. Threading
5. Release (gradually detaching from cutting)
6. Ending

※Epoch D Thread Mill can perform boring simultaneously.

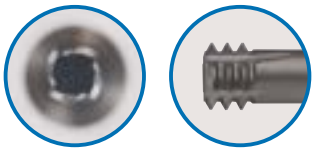
Easily Create NC Programs Online

You can create NC programs on our website!
http://www.moldino.com/en-US/

Left-hand cutting tool - Reverse spindle rotation should be used.

Line up

Epoch Thread Mill



4 flutes　　No incomplete thread

ET-(U)○○.○○-○○.○-PN

Unit　Metric Screw : mm, UN Screw Thread : inch

Carbide　PN

Order Number		Stock	Thread Dia. D_1		Thread Pitch TP	Cutting Dia. DC	Neck Length LU	Overall Length OAL	Connection Dia. DCONMS	Oil Hole
UN Screw Thread DC × 2	ET-U64-3.7-PN	★	No.1-64UNC	.073	64	.055	.146	1.969	.236	-
	ET-U56-4.4-PN	★	No.2-56UNC	.086	56	.065	.173	1.969	.236	-
	ET-U48-5-PN	★	No.3-48UNC	.099	48	.075	.197	1.969	.236	-
	ET-U40-5.7-PN	★	No.4-40UNC	.112	40	.083	.224	1.969	.236	-
	ET-U32-7-PN	★	No.6-32UNC	.138	32	.100	.276	1.969	.236	-
	ET-U36-8.3-PN	★	No.8-36UNF	.164	36	.130	.327	1.969	.236	-
	ET-U24-9.7-PN	★	No.10-24UNC	.190	24	.138	.382	2.756	.236	-
	ET-U20-12.7-PN	●	1/4-20UNC	1/4	20	.187	.500	2.756	.236	-
	ET-U28-12.7-PN	●	1/4-28UNF	1/4	28	.197	.500	2.756	.236	-
	ET-U18-15.9-PN	●	5/16-18UNC	5/16	18	.236	.626	3.150	.394	-
	ET-U16-19.1-PN	●	3/8-16UNC	3/8	16	.264	.752	3.150	.394	-
	ET-U14-22.2-PN	★	7/16-14UNC	7/16	14	.303	.874	3.150	.394	-
	ET-U13-25.4-PN	●	1/2-13UNC	1/2	13	.362	1.000	3.150	.394	-
	ET-U12-28.6-PN	★	9/16-12UNC	9/16	12	.413	1.126	3.937	.472	-
	ET-U11-31.8-PN	●	5/8-11UNC	5/8	11	.449	1.252	3.937	.472	-
UN Screw Thread DC × 2.5	ET-U64-4.6-PN	★	No.1-64UNC	.073	64	.055	.181	1.969	.236	-
	ET-U56-5.5-PN	★	No.2-56UNC	.086	56	.065	.217	1.969	.236	-
	ET-U48-6.3-PN	★	No.3-48UNC	.099	48	.075	.248	1.969	.236	-
	ET-U40-7.1-PN	★	No.4-40UNC	.112	40	.083	.280	1.969	.236	-
	ET-U32-8.8-PN	★	No.6-32UNC	.138	32	.100	.346	1.969	.236	-
	ET-U36-10.4-PN	★	No.8-36UNF	.164	36	.130	.409	1.969	.236	-
	ET-U24-12.1-PN	★	No.10-24UNC	.190	24	.138	.476	2.756	.236	-
	ET-U20-15.9-PN	●	1/4-20UNC	1/4	20	.187	.626	2.756	.236	-
	ET-U28-15.9-PN	●	1/4-28UNF	1/4	28	.197	.626	2.756	.236	-
	ET-U18-19.8-PN	●	5/16-18UNC	5/16	18	.236	.780	3.150	.394	-
	ET-U16-23.8-PN	●	3/8-16UNC	3/8	16	.264	.937	3.150	.394	-
	ET-U14-27.8-PN	★	7/16-14UNC	7/16	14	.303	1.094	3.150	.394	-
	ET-U13-31.8-PN	●	1/2-13UNC	1/2	13	.362	1.252	3.150	.394	-
	ET-U12-35.7-PN	★	9/16-12UNC	9/16	12	.413	1.406	3.937	.472	-
	ET-U11-39.7-PN	●	5/8-11UNC	5/8	11	.449	1.563	3.937	.472	-
Metric Screw DC × 2	ET-0.4-4-PN	★	M2		0.4	1.4	4	50	6	-
	ET-0.45-4.4-PN	★	M2.2		0.45	1.6	4.4	50	6	-
	ET-0.45-5-PN	★	M2.5		0.45	1.8	5	50	6	-
	ET-0.5-6-PN	●	M3		0.5	2.4	6	50	6	-
	ET-0.7-8-PN	●	M4		0.7	3.1	8	50	6	-
	ET-0.8-10-PN	●	M5		0.8	3.8	10	50	6	-
	ET-1.0-12-PN	●	M6		1	4.6	12	50	6	-
	ET-1.25-16-PN	●	M8		1.25	6.2	16	70	10	-
	ET-1.5-20-PN	●	M10		1.5	7.5	20	70	10	-
	ET-1.75-24-PN	●	M12		1.75	9	24	80	10	-
	ET-2-32-PN	★	M16		2	11.5	32	100	12	-
	ET-2.5-36-PN	★	M18		2.5	14	36	135	16	○
	ET-2.5-40-PN	★	M20		2.5	15	40	135	16	○
Metric Screw DC × 2.5	ET-0.4-5-PN	★	M2		0.4	1.4	5	50	6	-
	ET-0.45-5.5-PN	★	M2.2		0.45	1.6	5.5	50	6	-
	ET-0.45-6.25-PN	★	M2.5		0.45	1.8	6.25	50	6	-
	ET-0.5-7.5-PN	●	M3		0.5	2.4	7.5	50	6	-
	ET-0.7-10-PN	●	M4		0.7	3.1	10	50	6	-
	ET-0.8-12.5-PN	●	M5		0.8	3.8	12.5	50	6	-
	ET-1.0-15-PN	●	M6		1	4.6	15	50	6	-
	ET-1.25-20-PN	●	M8		1.25	6.2	20	70	10	-
	ET-1.5-25-PN	●	M10		1.5	7.5	25	70	10	-
	ET-1.75-30-PN	●	M12		1.75	9	30	80	10	-
	ET-2-40-PN	★	M16		2	11.5	40	100	12	-
	ET-2.5-45-PN	★	M18		2.5	14	45	135	16	○
	ET-2.5-50-PN	★	M20		2.5	15	50	135	16	○

● : Inventory maintained in US　★ : Inventory maintained in Japan

※For information about tool diameter correction, refer to the item in "Cautions on use" on p. 19.

Recommended Cutting Conditions

Epoch Thread Mill

UN Screw Thread

Work Material		Cast Iron, Carbon Steels 150～200HB		Stainless Steels 300 series		Tool Steels 25 ～ 35HRC		Pre-hardened Steels 35 ～ 45HRC	
v_c (SFM)		262 ～ **279** ～ 295				230 ～ **246** ～ 262		197 ～ **213** ～ 230	
Thread Dia. D_1	**DC** (inch)	RPM (min^{-1})	Feed Rate v_f (IPM)			RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)
No.1-64UNC	.055	19,300	6.690			17,100	5.280	14,800	4.570
No.2-56UNC	.065	16,400	6.930			14,500	6.140	12,500	4.800
No.3-48UNC	.075	14,200	7.130			12,600	5.830	10,900	4.610
No.4-40UNC	.083	12,900	7.990			11,400	6.570	9,900	5.310
No.6-32UNC	.100	10,600	8.190			9,400	6.850	8,100	5.550
No.8-36UNF	.130	8,200	6.690			7,200	5.670	6,300	4.530
No.10-24UNC	.138	7,700	8.980			6,800	7.360	5,900	5.870
¼-20UNC	.187	5,700	8.580			5,000	7.130	4,400	5.750
¼-28UNF	.197	5,400	7.240			4,800	6.100	4,100	4.800
5/16-18UNC	.236	4,500	8.310			4,000	6.930	3,400	5.470
⅜-16UNC	.264	4,000	10.080			3,600	8.430	3,100	6.810
7/16-14UNC	.303	3,500	10.510			3,100	8.700	2,700	7.050
½-13UNC	.362	2,900	9.330			2,600	7.800	2,200	6.100
9/16-12UNC	.413	2,600	8.700			2,300	7.200	2,000	5.830
⅝-11UNC	.449	2,400	9.250			2,100	7.560	1,800	6.060

Work Material		Hardened Steels 45 ～ 55HRC		Hardened Steels 55 ～ 62HRC		Hardened Steels 62 ～ 66HRC	
v_c (SFM)		164 ～ **180** ～ 197		131 ～ **148** ～ 164		98 ～ **115** ～ 131	
Thread Dia. D_1	**DC** (inch)	RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)
No.1-64UNC	.055	12,500	3.390	10,200	2.360	8,000	1.850
No.2-56UNC	.065	10,600	3.660	8,700	2.360	6,800	1.850
No.3-48UNC	.075	9,200	3.540	7,500	2.320	5,900	1.810
No.4-40UNC	.083	8,300	4.090	6,800	2.520	5,300	1.970
No.6-32UNC	.100	6,900	4.450	5,600	2.640	4,400	2.090
No.8-36UNF	.130	5,300	3.460	4,300	2.240	3,400	1.770
No.10-24UNC	.138	5,000	4.760	4,100	3.030	3,200	2.360
¼-20UNC	.187	3,700	4.570	3,000	2.870	2,300	2.200
¼-28UNF	.197	3,500	3.860	2,900	2.440	2,200	1.850
5/16-18UNC	.236	2,900	4.330	2,400	2.760	1,900	2.200
⅜-16UNC	.264	2,600	5.350	2,100	3.350	1,700	2.720
7/16-14UNC	.303	2,300	5.550	1,900	3.580	1,400	2.640
½-13UNC	.362	1,900	4.960	1,600	3.190	1,200	2.400
9/16-12UNC	.413	1,700	4.610	1,400	2.910	1,100	2.280
⅝-11UNC	.449	1,500	4.650	1,300	3.110	1,000	2.400

【Note】

①ET thread mills are only for threading the inside of holes.
②The above cutting conditions are for the thread diameters stated in the table. Cutting conditions for other thread diameters should be calculated taking into consideration the Cutting Considerations (page 19).
③The machinery should be a machining center equipped with NC (numerical control) equipment having a helical interpolation function.
④The feed rate stated in the above conditions table is the feed rate at the tool center during tapping. In addition, the per-tooth feed rate is the numerical value at the cutting point.
⑤Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to use the oil holes.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine conditions.

Recommended Cutting Conditions

Epoch Thread Mill

Metric Screw

Work Material			Cast Iron, Carbon Steels 150～200HB / Stainless Steels 300 series			Tool Steels 25 ～ 35HRC			Pre-hardened Steels 35 ～ 45HRC		
v_c (SFM)			262 ～ **279** ～ 295			230 ～ **246** ～ 262			197 ～ **213** ～ 230		
Thread Dia. D_1	**DC** (inch)	**DC** (mm)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)
M2	.055	1.4	19,300	8.189	208	17,100	6.457	164	14,800	5.591	142
M2.2	.063	1.6	16,900	7.992	203	14,900	6.417	163	12,900	5.551	141
M2.5	.071	1.8	15,000	7.953	202	13,300	6.457	164	11,500	5.591	142
M3	.094	2.4	11,300	6.063	154	9,900	5.000	127	8,600	4.055	103
M4	.122	3.1	8,700	7.402	188	7,700	5.984	152	6,700	5.000	127
M5	.150	3.8	7,100	7.795	198	6,300	6.417	163	5,400	5.118	130
M6	.181	4.6	5,900	8.031	204	5,200	6.693	170	4,500	5.276	134
M8	.244	6.2	4,400	7.795	198	3,900	6.496	165	3,300	5.039	128
M10	.295	7.5	3,600	8.504	216	3,200	7.047	179	2,800	5.827	148
M12	.354	9	3,000	8.504	216	2,700	7.244	184	2,300	5.709	145
M16	.453	11.5	2,400	9.252	235	2,100	7.638	194	1,800	6.063	154
M18	.551	14	1,900	6.732	171	1,700	5.669	144	1,500	4.606	117
M20	.591	15	1,800	7.244	184	1,600	6.063	154	1,400	4.921	125

Work Material			Hardened Steels 45 ～ 55HRC			Hardened Steels 55 ～ 62HRC			Hardened Steels 62 ～ 66HRC		
v_c (m/min)			164 ～ **180** ～ 197			131 ～ **148** ～ 164			98 ～ **115** ～ 131		
Thread Dia. D_1	**DC** (inch)	**DC** (mm)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)
M2	.055	1.4	12,500	4.134	105	10,200	2.874	73	8,000	2.283	58
M2.2	.063	1.6	10,900	4.213	107	9,000	2.717	69	7,000	2.087	53
M2.5	.071	1.8	9,700	4.291	109	8,000	2.835	72	6,200	2.205	56
M3	.094	2.4	7,300	3.228	82	6,000	2.087	53	4,600	1.575	40
M4	.122	3.1	5,600	3.780	96	4,600	2.441	62	3,600	1.929	49
M5	.150	3.8	4,600	4.016	102	3,800	2.598	66	2,900	1.969	50
M6	.181	4.6	3,800	4.173	106	3,100	2.638	67	2,400	2.047	52
M8	.244	6.2	2,800	3.976	101	2,300	2.520	64	1,800	1.969	50
M10	.295	7.5	2,300	4.449	113	1,900	2.835	72	1,500	2.244	57
M12	.354	9	1,900	4.409	112	1,600	2.835	72	1,200	2.126	54
M16	.453	11.5	1,500	4.724	120	1,200	2.913	74	1,000	2.441	62
M18	.551	14	1,300	3.740	95	1,000	2.205	56	800	1.772	45
M20	.591	15	1,200	3.937	100	1,000	2.520	64	700	1.772	45

【Note】

①ET thread mills are only for threading the inside of holes.
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③The machinery should be a machining center equipped with NC (numerical control) equipment having a helical interpolation function.
④The feed rate stated in the above conditions table is the feed rate at the tool center during tapping. In addition, the per-tooth feed rate is the numerical value at the cutting point.
⑤Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to use the oil holes.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine conditions.

Epoch D Thread Mill

4 flutes

1 incomplete thread and 2 complete threads

EDT-U○○-○○.○-TH

Unit inch

Carbide ATH

	Order Number		Stock	Thread Dia. D_1		Thread Pitch TP	Cutting Dia. DC	Neck Length LU	Overall Length OAL	Connection Dia. DCONMS	Oil Hole
UN Screw Thread DC × 2		EDT-U64-3.7-TH	★	No.1-64UNC	.073	64	.055	.146	1.969	.236	-
	NEW	EDT-U56-4.4-TH	●	No.2-56UNC	.086	56	.065	.173	1.969	.236	-
		EDT-U48-5-TH	★	No.3-48UNC	.099	48	.075	.197	1.969	.236	-
	NEW	EDT-U40-5.7-TH	●	No.4-40UNC	.112	40	.083	.224	1.969	.236	-
	NEW	EDT-U32-7-TH	●	No.6-32UNC	.138	32	.100	.276	1.969	.236	-
		EDT-U32-8.3-TH	●	No.8-32UNC	.164	32	.130	.327	2.362	.236	-
		EDT-U36-8.3-TH	★	No.8-36UNF	.164	36	.130	.327	1.969	.236	-
		EDT-U24-9.7-TH	★	No.10-24UNC	.190	24	.138	.382	2.362	.236	-
		EDT-U32-9.7-TH	●	NO.10-32UNF	.190	32	.138	.382	2.756	.236	-
		EDT-U20-12.7-TH	●	1/4-20UNC	1/4	20	.187	.500	2.756	.236	-
		EDT-U28-12.7-TH	●	1/4-28UNF	1/4	28	.197	.500	2.756	.236	-
		EDT-U18-15.9-TH	●	5/16-18UNC	5/16	18	.236	.626	3.150	.394	-
		EDT-U24-15.9-TH	●	5/16-24UNF	5/16	24	.236	.626	3.150	.394	-
		EDT-U16-19.1-TH	●	3/8-16UNC	3/8	16	.264	.752	3.150	.394	-
		EDT-U14-22.2-TH	★	7/16-14UNC	7/16	14	.303	.874	3.150	.394	○
		EDT-U13-25.4-TH	●	1/2-13UNC	1/2	13	.362	1.000	3.150	.394	○
		EDT-U20-25.4-TH	●	1/2-20UNF	1/2	20	.362	1.000	3.150	.394	○
		EDT-U12-28.6-TH	★	9/16-12UNC	9/16	12	.413	1.126	3.937	.472	○
		EDT-U11-31.8-TH	●	5/8-11UNC	5/8	11	.449	1.252	3.937	.472	○
		EDT-U18-31.8-TH	●	5/8-18UNF	5/8	18	.449	1.252	3.937	.472	○
		EDT-U10-3/4-38.1-TH	●	3/4-10UNC	3/4	10	.571	1.500	5.315	.630	○
		EDT-U9-7/8-44.5-TH	●	7/8-9UNC	7/8	9	.591	1.752	5.315	.630	○
		EDT-U8-1-50.8-TH	●	1-8UNC	1	8	.622	2.000	5.315	.630	○
UN Screw Thread DC × 2.5		EDT-U64-4.6-TH	★	No.1-64UNC	.073	64	.055	.181	1.969	.236	-
	NEW	EDT-U56-5.5-TH	●	No.2-56UNC	.086	56	.065	.217	1.969	.236	-
		EDT-U48-6.3-TH	★	No.3-48UNC	.099	48	.075	.248	1.969	.236	-
	NEW	EDT-U40-7.1-TH	●	No.4-40UNC	.112	40	.083	.280	1.969	.236	-
	NEW	EDT-U32-8.8-TH	●	No.6-32UNC	.138	32	.100	.346	1.969	.236	-
		EDT-U32-10.4-TH	●	No.8-32UNC	.164	32	.130	.409	2.362	.236	-
		EDT-U36-10.4-TH	★	No.8-36UNF	.164	36	.130	.409	1.969	.236	-
		EDT-U24-12.1-TH	★	No.10-24UNC	.190	24	.138	.476	2.756	.236	-
		EDT-U32-12.1-TH	●	No.10-32UNF	.190	32	.138	.476	2.362	.236	-
		EDT-U20-15.9-TH	●	1/4-20UNC	1/4	20	.187	.626	2.756	.236	-
		EDT-U28-15.9-TH	●	1/4-28UNF	1/4	28	.197	.626	2.756	.236	-
		EDT-U18-19.8-TH	●	5/16-18UNC	5/16	18	.236	.780	3.150	.394	-
		EDT-U24-19.8-TH	●	5/16-24UNF	5/16	24	.236	.780	3.150	.394	-
		EDT-U16-23.8-TH	●	3/8-16UNC	3/8	16	.264	.937	3.150	.394	-
		EDT-U14-27.8-TH	★	7/16-14UNC	7/16	14	.303	1.094	3.150	.394	○
		EDT-U13-31.8-TH	●	1/2-13UNC	1/2	13	.362	1.252	3.150	.394	○
		EDT-U20-31.8-TH	●	1/2-20UNF	1/2	20	.362	1.252	3.150	.394	○
		EDT-U12-35.7-TH	★	9/16-12UNC	9/16	12	.413	1.406	3.937	.472	○
		EDT-U11-39.7-TH	●	5/8-11UNC	5/8	11	.449	1.563	3.937	.472	○
		EDT-U18-39.7-TH	●	5/8-18UNF	5/8	18	.449	1.563	3.937	.472	○
		EDT-U10-3/4-47.6-TH	●	3/4-10UNC	3/4	10	.571	1.874	5.315	.630	○
		EDT-U9-7/8-55.6-TH	●	7/8-9UNC	7/8	9	.591	2.189	5.315	.630	○
		EDT-U8-1-63.5-TH	●	1-8UNC	1	8	.622	2.500	5.315	.630	○

● : Inventory maintained in US ★ : Inventory maintained in Japan

※For information about tool diameter correction, refer to the item in "Cautions on use" on p. 19.

Epoch D Thread Mill

4 flutes

1 incomplete thread and
2 complete threads

EDT○.○○-○○.○-TH

Unit mm

Order Number	Stock	Thread Dia. D_1	Thread Pitch **TP**	Cutting Dia. **DC**	Neck Length **LU**	Overall Length **OAL**	Connection Dia. **DCONMS**	Oil Hole
Metric Screw DC × 2								
NEW **EDT-0.4-4-TH**	●	**M2**	**0.4**	1.4	4	50	6	-
EDT-0.45-4.4-TH	★	**M2.2**	**0.45**	1.6	4.4	50	6	-
NEW **EDT-0.45-5-TH**	●	**M2.5**	**0.45**	1.8	5	50	6	-
EDT-0.5-6-TH	●	**M3**	**0.5**	2.4	6	50	6	-
EDT-0.7-8-TH	●	**M4**	**0.7**	3.1	8	50	6	-
EDT-0.8-10-TH	●	**M5**	**0.8**	3.8	10	50	6	-
EDT-1.0-12-TH	●	**M6**	**1**	4.6	12	50	6	-
EDT-1.25-16-TH	●	**M8**	**1.25**	6.2	16	70	10	-
EDT-1.5-20-TH	●	**M10**	**1.5**	7.5	20	70	10	○
EDT-1.75-24-TH	●	**M12**	**1.75**	9	24	80	10	○
NEW **EDT-2-32-TH**	●	**M16**	**2**	11.5	32	100	12	○
EDT-2.5-36-TH	★	**M18**	**2.5**	14	36	135	16	○
EDT-2.5-40-TH	★	**M20**	**2.5**	15	40	135	16	○
Metric Screw DC × 2.5								
NEW **EDT-0.4-5-TH**	●	**M2**	**0.4**	1.4	5	50	6	-
EDT-0.45-5.5-TH	★	**M2.2**	**0.45**	1.6	5.5	50	6	-
NEW **EDT-0.45-6.25-TH**	●	**M2.5**	**0.45**	1.8	6.25	50	6	-
EDT-0.5-7.5-TH	●	**M3**	**0.5**	2.4	7.5	50	6	-
EDT-0.7-10-TH	●	**M4**	**0.7**	3.1	10	50	6	-
EDT-0.8-12.5-TH	●	**M5**	**0.8**	3.8	12.5	50	6	-
EDT-1.0-15-TH	●	**M6**	**1**	4.6	15	50	6	-
EDT-1.25-20-TH	●	**M8**	**1.25**	6.2	20	70	10	-
EDT-1.5-25-TH	●	**M10**	**1.5**	7.5	25	70	10	○
EDT-1.75-30-TH	●	**M12**	**1.75**	9	30	80	10	○
NEW **EDT-2-40-TH**	●	**M16**	**2**	11.5	40	100	12	○
EDT-2.5-45-TH	★	**M18**	**2.5**	14	45	135	16	○
EDT-2.5-50-TH	★	**M20**	**2.5**	15	50	135	16	○

● : Inventory maintained in US ★ : Inventory maintained in Japan

※For information about tool diameter correction, refer to the item in "Cautions on use" on p. 19.

Recommended Cutting Conditions

Epoch D Thread Mill

UN Screw Thread

Work Material		Cast Iron, Carbon Steels 150～200HB		Tool Steels 25 ～ 35HRC		Pre-hardened Steels 35 ～ 45HRC	
Vc (SFM)		262 ～ **279** ～ 295		230 ～ **246** ～ 262		197 ～ **219** ～ 230	
Thread Dia. *D*1	**DC** (inch)	RPM (min^{-1})	Feed Rate *Vf* (IPM)	RPM (min^{-1})	Feed Rate *Vf* (IPM)	RPM (min^{-1})	Feed Rate *Vf* (IPM)
No.1-64UNC	.055	19,300	4.450	17,100	3.940	14,800	3.430
No.2-56UNC	.065	16,400	4.410	14,500	3.900	12,500	3.390
No.3-48UNC	.075	14,200	4.370	12,600	3.900	10,900	3.350
No.4-40UNC	.083	12,900	4.800	11,400	4.210	9,900	3.660
No.6-32UNC	.100	10,600	5.000	9,400	4.450	8,100	3.820
No.8-32UNC	.130	8,200	4.290	7,200	3.780	6,300	3.310
No.8-36UNF	.130	8,200	4.290	7,200	3.780	6,300	3.310
No.10-24UNC	.138	7,700	5.670	6,800	5.000	5,900	4.330
No.10-32UNF	.138	7,700	5.670	6,800	5.000	5,900	4.330
¼-20UNC	.187	5,700	5.430	5,000	4.760	4,400	4.170
¼-28UNF	.197	5,400	4.530	4,800	4.020	4,100	3.430
5/16-18UNC	.236	4,500	5.200	4,000	4.610	3,400	3.940
5/16-24UNF	.236	4,500	5.200	4,000	4.610	3,400	3.940
⅜-16UNC	.264	4,000	6.340	3,600	5.710	3,100	4.920
7/16-14UNC	.303	3,500	6.610	3,100	5.830	2,700	5.080
½-13UNC	.362	2,900	5.790	2,600	5.200	2,200	4.410
½-20UNF	.362	2,900	5.790	2,600	5.200	2,200	4.410
9/16-12UNC	.413	2,600	5.430	2,300	4.800	2,000	4.170
⅝-11UNC	.449	2,400	5.750	2,100	5.040	1,800	4.330
⅝-18UNF	.449	2,400	5.750	2,100	5.040	1,800	4.330
¾-10UNC	.571	1,900	4.450	1,600	3.740	1,400	3.270
⅞-9UNC	.591	1,800	5.910	1,600	5.240	1,400	4.610
1-8UNC	.622	1,700	6.770	1,500	5.980	1,300	5.200

Work Material		Hardened Steels 45 ～ 55HRC		Hardened Steels 55 ～ 62HRC		Hardened Steels 62 ～ 66HRC	Stainless Steels 300 series
Vc (SFM)		164 ～ **180** ～ 197		131 ～ **148** ～ 164		98 ～ **115** ～ 131	
Thread Dia. *D*1	**DC** (inch)	RPM (min^{-1})	Feed Rate *Vf* (IPM)	RPM (min^{-1})	Feed Rate *Vf* (IPM)	RPM (min^{-1})	Feed Rate *Vf* (IPM)
No.1-64UNC	.055	12,500	2.870	10,200	2.360	8,000	1.850
No.2-56UNC	.065	10,600	2.870	8,700	2.360	6,800	1.850
No.3-48UNC	.075	9,200	2.830	7,500	2.320	5,900	1.810
No.4-40UNC	.083	8,300	3.070	6,800	2.520	5,300	1.970
No.6-32UNC	.100	6,900	3.270	5,600	2.640	4,400	2.090
No.8-32UNC	.130	5,300	2.800	4,300	2.240	3,400	1.770
No.8-36UNF	.130	5,300	2.800	4,300	2.240	3,400	1.770
No.10-24UNC	.138	5,000	3.660	4,100	3.030	3,200	2.360
No.10-32UNF	.138	5,000	3.660	4,100	3.030	3,200	2.360
¼-20UNC	.187	3,700	3.500	3,000	2.870	2,300	2.200
¼-28UNF	.197	3,500	2.910	2,900	2.440	2,200	1.850
5/16-18UNC	.236	2,900	3.350	2,400	2.760	1,900	2.200
5/16-24UNF	.236	2,900	3.350	2,400	2.760	1,900	2.200
⅜-16UNC	.264	2,600	4.130	2,100	3.350	1,700	2.720
7/16-14UNC	.303	2,300	4.330	1,900	3.580	1,400	2.640
½-13UNC	.362	1,900	3.780	1,600	3.190	1,200	2.400
½-20UNF	.362	1,900	3.780	1,600	3.190	1,200	2.400
9/16-12UNC	.413	1,700	3.540	1,400	2.910	1,100	2.280
⅝-11UNC	.449	1,500	3.580	1,300	3.110	1,000	2.400
⅝-18UNF	.449	1,500	3.580	1,300	3.110	1,000	2.400
¾-10UNC	.571	1,200	2.800	1,000	2.320	800	1.850
⅞-9UNC	.591	1,200	3.940	1,000	3.270	700	2.280
1-8UNC	.622	1,100	4.370	900	3.580	700	2.800

【Note】
①EDT thread mills are capable of simultaneous boring and threading.
②The above cutting conditions are for the thread diameters stated in the table. Cutting conditions for other thread diameters should be calculated taking into consideration the Cutting Considerations (page 19).
③The machinery should be a machining center equipped with NC (numerical control) equipment having a helical interpolation function.
④The feed rate stated in the above conditions table is the feed rate at the tool center during tapping. In addition, the per-tooth feed rate is the numerical value at the cutting point.
⑤Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to use the oil holes.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine conditions.

Recommended Cutting Conditions

Epoch D Thread Mill

Metric Screw

Work Material			Cast Iron, Carbon Steels 150～200HB			Tool Steels 25 ～ 35HRC			Pre-hardened Steels 35 ～ 45HRC		
v_c (SFM)			262～**279**～295			230～**246**～262			197～**213**～230		
Thread Dia. D_1	**DC** (inch)	**DC** (mm)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)
M2	.055	1.4	19,300	5.472	139	17,100	4.843	123	14,800	4.213	107
M2.2	.063	1.6	16,900	5.079	129	14,900	4.488	114	12,900	3.898	99
M2.5	.071	1.8	15,000	5.276	134	13,300	4.685	119	11,500	4.055	103
M3	.094	2.4	11,300	3.898	99	9,900	3.425	87	8,600	2.992	76
M4	.122	3.1	8,700	4.606	117	7,700	4.094	104	6,700	3.543	90
M5	.150	3.8	7,100	4.843	123	6,300	4.291	109	5,400	3.661	93
M6	.181	4.6	5,900	5.000	127	5,200	4.409	112	4,500	3.819	97
M8	.244	6.2	4,400	4.843	123	3,900	4.291	109	3,300	3.622	92
M10	.295	7.5	3,600	5.394	137	3,200	4.803	122	2,800	4.173	106
M12	.354	9	3,000	5.315	135	2,700	4.803	122	2,300	4.094	104
M16	.453	11.5	2,400	5.866	149	2,100	5.118	130	1,800	4.370	111
M18	.551	14	1,900	4.173	106	1,700	3.740	95	1,500	3.307	84
M20	.591	15	1,800	4.528	115	1,600	4.016	102	1,400	3.543	90

Work Material			Hardened Steels 45 ～ 55HRC			Hardened Steels 55 ～ 62HRC			Hardened Steels 62 ～ 66HRC / Stainless Steels 300 series		
v_c (SFM)			164～**180**～197			131～**148**～164			98～**115**～131		
Thread Dia. D_1	**DC** (inch)	**DC** (mm)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)	RPM (min^{-1})	Feed Rate v_f (IPM)	Feed Rate v_f (mm/min)
M2	.055	1.4	12,500	3.543	90	10,200	2.874	73	8,000	2.283	58
M2.2	.063	1.6	10,900	3.268	83	9,000	2.717	69	7,000	2.087	53
M2.5	.071	1.8	9,700	3.425	87	8,000	2.835	72	6,200	2.205	56
M3	.094	2.4	7,300	2.520	64	6,000	2.087	53	4,600	1.575	40
M4	.122	3.1	5,600	2.992	76	4,600	2.441	62	3,600	1.929	49
M5	.150	3.8	4,600	3.110	79	3,800	2.598	66	2,900	1.969	50
M6	.181	4.6	3,800	3.228	82	3,100	2.638	67	2,400	2.047	52
M8	.244	6.2	2,800	3.071	78	2,300	2.520	64	1,800	1.969	50
M10	.295	7.5	2,300	3.425	87	1,900	2.835	72	1,500	2.244	57
M12	.354	9	1,900	3.386	86	1,600	2.835	72	1,200	2.126	54
M16	.453	11.5	1,500	3.661	93	1,200	2.913	74	1,000	2.441	62
M18	.551	14	1,300	2.874	73	1,000	2.205	56	800	1.772	45
M20	.591	15	1,200	3.031	77	1,000	2.520	64	700	1.772	45

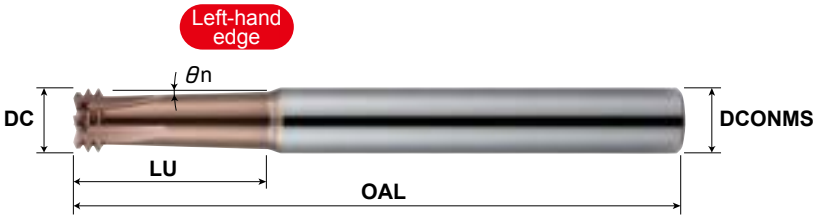
【Note】

①EDT thread mills are capable of simultaneous boring and threading.
②The above cutting conditions are for the thread diameters stated in the table. Cutting conditions for other thread diameters should be calculated taking into consideration the Cutting Considerations (page 19).
③The machinery should be a machining center equipped with NC (numerical control) equipment having a helical interpolation function.
④The feed rate stated in the above conditions table is the feed rate at the tool center during tapping. In addition, the per-tooth feed rate is the numerical value at the cutting point.
⑤Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to use the oil holes.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine conditions.

Epoch D Thread Mill for PT,NPT Threads

4 flutes

1 incomplete thread and 2 complete threads



θn : 1.7°
※The neck angle (θn) of EDT-PT1(NPT1)-45-ATH is 0° (straight neck).

EDT-NPT○○-○○-ATH

Unit : inch

NPT Thread Order Number	Stock	Thread Dia. D_1 No Pilot Hole	Thread Dia. D_1 Pilot Hole Requred (Pilot Hole Dia.)	Thread Pitch TP	Reference Dia. DC	Neck Length LU	Overall Length OAL	Connection Dia. DCONMS	Oil Hole	Compensation Value D_2
EDT-NPT1/16-18-ATH	●	NPT1/16-27 .311	NPT1/8-27(φ.1578 or larger) .403	27	.189	.709	2.756	.236	–	.0012
EDT-NPT1/8-19-ATH	●	NPT1/8-27 .403	–	27	.224	.748	2.756	.236	–	.0012
EDT-NPT1/4-28-ATH	●	NPT1/4-18 .536	NPT3/8-18(φ.2362 or larger) .672	18	.311	1.102	3.150	.394	–	.0018
EDT-NPT3/8-28-ATH	●	NPT3/8-18 .672	–	18	.378	1.102	3.150	.394	–	.0018
EDT-NPT1/2-35-ATH	●	NPT1/2-14 .836	NPT3/4-14(φ.3150 or larger) 1.046	14	.453	1.378	4.331	.472	–	.0023
EDT-NPT1-45-ATH	●	–	NPT1-11.5(φ.3937 or larger) 1.308	11.5	.606	1.772	5.315	.630	–	.0028

EDT-PT○○-○○-ATH

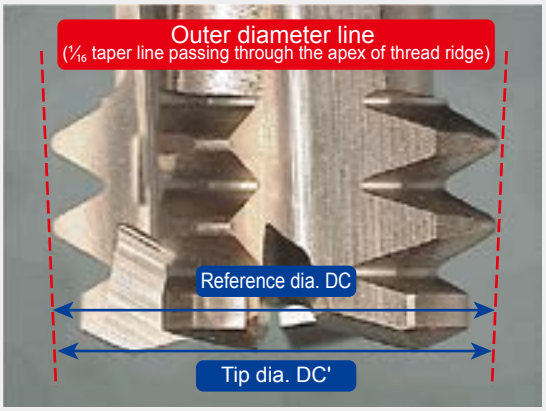
Unit : mm

PT (Rc) Thread Order Number	Stock	Thread Dia. D_1 No Pilot Hole	Thread Dia. D_1 Pilot Hole Requred (Pilot Hole Dia.)	Thread Pitch TP	Reference Dia. DC	Neck Length LU	Overall Length OAL	Connection Dia. DCONMS	Oil Hole	Compensation Value D_2
EDT-PT1/16-18-ATH	●	PT1/16-28 7.723	PT1/8-28(φ4 or large) 9.728	0.9071	4.8	18.0	70.0	6.0	–	0.029
EDT-PT1/8-19-ATH	●	PT1/8-28 9.728	–	0.9071	5.7	19.0	70.0	6.0	–	0.029
EDT-PT1/4-28-ATH	●	PT1/4-19 13.157	PT3/8-19(φ6 or large) 16.662	1.3368	7.9	28.0	80.0	10.0	–	0.043
EDT-PT3/8-28-ATH	●	PT3/8-19 16.662	–	1.3368	9.6	28.0	80.0	10.0	–	0.043
EDT-PT1/2-35-ATH	●	PT1/2-14 20.955	PT3/4-14(φ8 or large) 26.441	1.8143	11.5	35.0	110.0	12.0	–	0.058
EDT-PT1-45-ATH	●	–	PT1-11(φ10 or large) 33.249	2.3091	15.4	45.0	135.0	16.0	–	0.074

● : Inventory maintained in US

Thread diameter which requires pilot hole can not be used without larger pilot hole than the values shown in the table.

Cautions when using Epoch D Thread Mill for PT, NPT threads



Thread Dia. DC:
diameter at the virtual crest position of the first thread
Tip dia. DC': diameter at the tool tip position

Since the Reference cutting diameter DC and the tool tip diameter DC' are different, it is necessary to correct the Thread diameter TD and program. The thread diameter TD corresponds to the reference diameter of the groove of the internal thread (reference diameter of the tap).

Example

Thread milling PT¼ with EDT-PT1/4-28-ATH

Thread diameter D_1 + compensation value D_2
= setup thread diameter .5180 inch+ .0017 inch= .5197 inch

When adjusting the reference diameter position of the internal thread by tool diameter correction, the correction value is calculated using the following formula.
*In the case of radius indication in the NC program based on the tool center

(Reference tool dia. DC ± adjustment length x 1/16) ÷ 2 (Convert to radius)
(.311 inch -.079 inch x1/16) / 2 = .153 inch
Calculate with plus for shallowing and minus for deepening. Therefore in this case, it becomes .079 inch deeper.

Recommended Cutting Conditions

Epoch D Thread Mill for PT, NPT Threads

NPT Thread

Work Material		Cast Iron, Carbon Steels 150～200HB		Tool Steels 25 ～ 35HRC		Pre-hardened Steels 35 ～ 45HRC	
v_c (SFM)		262 ～ **279** ～ 295		230 ～ **246** ～ 262		197 ～ **219** ～ 230	
Thread Dia. D_1	**DC** (inch)	RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)
NPT1/16-27	.189	5,600	6.140	5,000	5.510	4,300	4.720
NPT1/8-27	.224	4,700	7.950	4,200	7.090	3,600	6.100
NPT1/4-18	.311	3,400	7.170	3,000	6.300	2,600	5.470
NPT3/8-18	.378	2,800	7.870	2,500	7.050	2,200	6.180
NPT1/2-14	.453	2,400	8.230	2,100	7.200	1,800	6.180
NPT3/4-14	.453	2,400	10.980	2,100	9.610	1,800	8.230
NPT1-11.5	.606	1,800	9.090	1,600	8.070	1,300	6.570

Work Material		Hardened Steels 45 ～ 55HRC		Hardened Steels 55 ～ 62HRC		Hardened Steels 62 ～ 66HRC	Stainless Steels 300 series
v_c (SFM)		164 ～ **180** ～ 197		131 ～ **148** ～ 164		98 ～ **115** ～ 131	
Thread Dia. D_1	**DC** (inch)	RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)	RPM (min^{-1})	Feed Rate v_f (IPM)
NPT1/16-27	.189	3,600	3.980	3,000	3.310	2,300	2.520
NPT1/8-27	.224	3,100	5.240	2,500	4.210	2,000	3.390
NPT1/4-18	.311	2,200	4.650	1,800	3.780	1,400	2.950
NPT3/8-18	.378	1,800	5.080	1,500	4.210	1,200	3.390
NPT1/2-14	.453	1,500	5.160	1,200	4.130	1,000	3.430
NPT3/4-14	.453	1,500	6.850	1,200	5.470	1,000	4.570
NPT1-11.5	.606	1,100	5.550	900	4.570	700	3.540

【Note】

①Epoch D Thread Mill is capable of simultaneous boring and threading.
②The above cutting conditions are for the thread diameters stated in the table. Cutting conditions for other thread diameters should be calculated taking into consideration the cautions on use (p.19).
③The machinery should be a machining center equipped with NC (numerical control) equipment having a helical interpolation function.
④The feed rate stated in the above conditions table is the feed rate at the tool center during tapping. In addition, the per-tooth feed rate is the numerical value at the cutting point.
⑤Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to perform processing using the oil holes.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine conditions.

PT (Rc) Thread

Work Material			Cast Iron, Carbon Steels 150～200HB			Tool Steels 25 ～ 35HRC			Pre-hardened Steels 35 ～ 45HRC		
vc (SFM)			262 ～ **279** ～ 295			230 ～ **246** ～ 262			197 ～ **213** ～ 230		
Thread Dia. *D1*	**DC** (inch)	**DC** (mm)	RPM (min^{-1})	Feed Rate *vf* (IPM)	Feed Rate *vf* (mm/min)	RPM (min^{-1})	Feed Rate *vf* (IPM)	Feed Rate *vf* (mm/min)	RPM (min^{-1})	Feed Rate *vf* (IPM)	Feed Rate *vf* (mm/min)
PT1/16-28	.189	4.8	5,600	5.748	146	5,000	5.157	131	4,300	4.409	112
PT1/8-28	.224	5.7	4,700	7.126	181	4,200	6.378	162	3,600	5.472	139
PT1/4-19	.311	7.9	3,400	6.575	167	3,000	5.827	148	2,600	5.039	128
PT3/8-19	.378	9.6	2,800	7.559	192	2,500	6.732	171	2,200	5.906	150
PT1/2-14	.453	11.5	2,400	8.031	204	2,100	7.047	179	1,800	6.024	153
PT3/4-14	.453	11.5	2,400	10.945	278	2,100	9.567	243	1,800	8.189	208
PT1-11	.606	15.4	1,800	9.094	231	1,600	8.110	206	1,300	6.575	167

Work Material			Hardened Steels 45 ～ 55HRC			Hardened Steels 55 ～ 62HRC			Hardened Steels 62 ～ 66HRC		Stainless Steels 300 series
vc (SFM)			164 ～ **180** ～ 197			131 ～ **148** ～ 164			98 ～ **115** ～ 131		
Thread Dia. *D1*	**DC** (inch)	**DC** (mm)	RPM (min^{-1})	Feed Rate *vf* (IPM)	Feed Rate *vf* (mm/min)	RPM (min^{-1})	Feed Rate *vf* (IPM)	Feed Rate *vf* (mm/min)	RPM (min^{-1})	Feed Rate *vf* (IPM)	Feed Rate *vf* (mm/min)
PT1/16-28	.189	4.8	3,600	3.701	94	3,000	3.071	78	2,300	2.362	60
PT1/8-28	.224	5.7	3,100	4.724	120	2,500	3.780	96	2,000	3.031	77
PT1/4-19	.311	7.9	2,200	4.252	108	1,800	3.504	89	1,400	2.717	69
PT3/8-19	.378	9.6	1,800	4.843	123	1,500	4.055	103	1,200	3.228	82
PT1/2-14	.453	11.5	1,500	5.039	128	1,200	4.016	102	1,000	3.346	85
PT3/4-14	.453	11.5	1,500	6.850	174	1,200	5.472	139	1,000	4.567	116
PT1-11	.606	15.4	1,100	5.551	141	900	4.567	116	700	3.543	90

【Note】

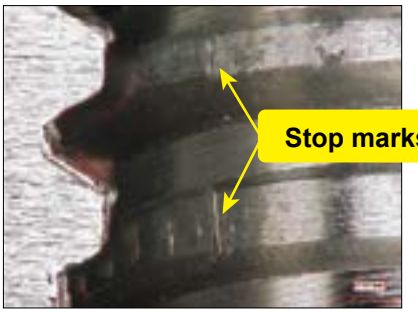
①Epoch D Thread Mill is capable of simultaneous boring and threading.
②The above cutting conditions are for the thread diameters stated in the table. Cutting conditions for other thread diameters should be calculated taking into consideration the cautions on use (p.19).
③The machinery should be a machining center equipped with NC (numerical control) equipment having a helical interpolation function.
④The feed rate stated in the above conditions table is the feed rate at the tool center during tapping. In addition, the per-tooth feed rate is the numerical value at the cutting point.
⑤Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to perform processing using the oil holes.
⑥Use the appropriate coolant for the work material and machining shape.
⑦These conditions are for general guidance; in actual machining conditions adjust the parameters according to your actual machine conditions.

Advantages of using Epoch D Thread Mill in pipe threading

Epoch D Thread Mill

Good finished surface without tear

General tap



Tears easily and stop marks occurred

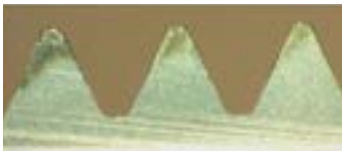
Effective for countermeasures against liquid leakage that is often caused by tapping.

Field data of Epoch Thread Mill

01 Threading of hardened steels (M4×0.7)

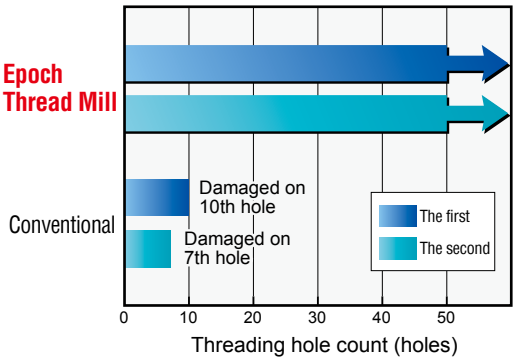
Cutting conditions

Work material：D2(60HRC) Tool：ET-0.7-8-PN
n=4,620min^{-1}(v_c=148 SFM) v_f=2.441 IPM
Threading depth：.315 inch Blind hole
Pilot hole dia.×Pilot hole depth：ϕ.134 x .472 inch Coolant：Air-blow



Epoch Thread Mill after threading 50 holes

Conventional after threading 10 holes.



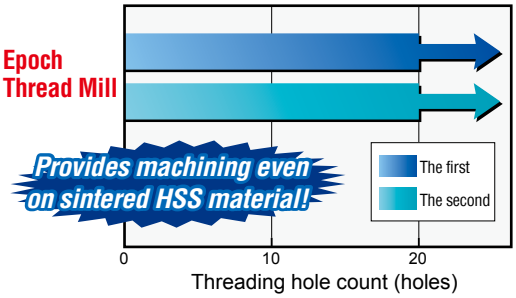
In the above example after 50 holes, the tool shows minimum wear.

02 Threading of sintered HSS material (M4×0.7)

Cutting conditions

Work material：High Speed Steel (64HRC) Tool：ET-0.7-8-PN
n=4,620min^{-1}(v_c=148 SFM) v_f=1.850 IPM
Threading depth：.276 inch Through hole
Pilot hole dia.×Pilot hole depth：ϕ134 x .276 inch Coolant：Water-base

In the above example after 20 holes, the tool shows minimum wear.



03 Threading of pre-hardened steel (M12×1.75)

Cutting conditions

Work material：P21 Modified(40HRC) Tool：ET-1.75-24-PN
n=3,537min^{-1}(v_c=328 SFM) v_f= 12.244 IPM
Threading depth：.866 inch Blind hole
Pilot hole dia.×Pilot hole depth：ϕ.413 x 1.102 inch Coolant：Water-base

In the above example after 300 holes, the tool shows minimum wear.

Epoch Thread Mill after threading 300 holes.

04 Threading of stainless steel (M8×1.25)

Cutting conditions

Work material：304 Stainless Steel Tool：ET-1.25-20-PN
n=5,130min^{-1}(v_c=328 SFM) v_f=10.906 IPM
Threading depth：.787 inch Blind hole
Pilot hole dia.×Pilot hole depth：ϕ.272 x .866 inch Coolant：Water-base

In the above example after 300 holes, the tool shows minimum wear.

Epoch Thread Mill after threading 300 holes.

05 Threading of superalloy (M6×1)

Cutting conditions

Work material：Inconel 718(40HRC) Tool：ET-1.0-12-PN
n=2,420min^{-1}(v_C=115 SFM)　v_f=2.205 IPM
Threading depth：.472 inch Blind hole
Pilot hole dia.×Pilot hole depth：ϕ.201 x .591 inch
Coolant：Water-base

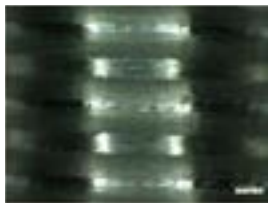
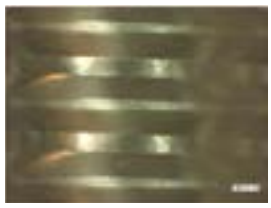
Epoch Thread Mill after threading 25 holes.

It is possible to thread superalloy which is difficult to tap.

06 Threading of non-ferrous (Aluminium alloy A7075, Acrylic resin) (M6×1)

Cutting conditions

Work material：Aluminium alloy A7075, Acrylic resin
Tool：ET-1.0-12-PN　n=14,500min^{-1}(v_C=689 SFM)　v_f=21.260 IPM
Threading depth：.472 inch Blind hole　Pilot hole dia.×Pilot hole depth：ϕ.197 x .591 inch

Work material	Aluminium alloy A7075		Acrylic resin	
Coolant	Water-base	Air-blow	Water-base	Air-blow
Surface				

High efficiency threading is possible even in dry condition.

※By using water-soluble cutting fluid, it is possible to obtain a glossy high-quality machined surface.
※By using water-soluble cutting fluid, Epoch D Thread Mill can be used with same cutting parameters.

Recommended pilot hole dia.

Metric threads

Order Number	Thread Dia. D_1	Pitch TPI (inch)	Pitch TPI (mm)	Recommended pilot hole dia. (inch)
ET-0.4-4-PN	M2	.016	0.4	.063
ET-0.45-4.4-PN	M2.2	.018	0.45	.069
ET-0.45-5-PN	M2.5	.018	0.45	.081
ET-0.5-6-PN	M3	.020	0.5	.098
ET-0.7-8-PN	M4	.028	0.7	.130
ET-0.8-10-PN	M5	.031	0.8	.165
ET-1.0-12-PN	M6	.039	1	.197
ET-1.25-16-PN	M8	.049	1.25	.266
ET-1.5-20-PN	M10	.059	1.5	.335
ET-1.75-24-PN	M12	.069	1.75	.404
ET-2-32-PN	M16	.079	2	.551
ET-2.5-36-PN	M18	.098	2.5	.610
ET-2.5-40-PN	M20	.098	2.5	.689

Order Number	Thread Dia. D_1	Pitch TPI (inch)	Pitch TPI (mm)	Recommended pilot hole dia. (inch)
ET-0.4-5-PN	M2	.016	0.4	.063
ET-0.45-5.5-PN	M2.2	.018	0.45	.069
ET-0.45-6.25-PN	M2.5	.018	0.45	.081
ET-0.5-7.5-PN	M3	.020	0.5	.098
ET-0.7-10-PN	M4	.028	0.7	.130
ET-0.8-12.5-PN	M5	.031	0.8	.165
ET-1.0-15-PN	M6	.039	1	.197
ET-1.25-20-PN	M8	.049	1.25	.266
ET-1.5-25-PN	M10	.059	1.5	.335
ET-1.75-30-PN	M12	.069	1.75	.404
ET-2-40-PN	M16	.079	2	.551
ET-2.5-45-PN	M18	.098	2.5	.610
ET-2.5-50-PN	M20	.098	2.5	.689

※Recommended pilot hole diameters are for internal threads regulated by former JIS class 2 and Unified class 2B.

Unified threads

Order Number	Thread Dia. D_1		Pitch TPI (inch)	Recommended pilot hole dia. (inch)
ET-U64-3.7-PN	No.1-64UNC	.073	64	.059
ET-U56-4.4-PN	No.2-56UNC	.086	56	.071
ET-U48-5-PN	No.3-48UNC	.099	48	.081
ET-U40-5.7-PN	No.4-40UNC	.112	40	.089
ET-U32-7-PN	No.6-32UNC	.138	32	.109
ET-U36-8.3-PN	No.8-36UNF	.164	36	.138
ET-U24-9.7-PN	No.10-24UNC	.190	24	.151
ET-U20-12.7-PN	¼-20UNC	1/4	20	.202
ET-U28-12.7-PN	¼-28UNF	1/4	28	.215
ET-U18-15.9-PN	5/16-18UNC	5/16	18	.259
ET-U16-19.1-PN	3/8-16UNC	3/8	16	.314
ET-U14-22.2-PN	7/16-14UNC	7/16	14	.368
ET-U13-25.4-PN	½-13UNC	1/2	13	.426
ET-U12-28.6-PN	9/16-12UNC	9/16	12	.480
ET-U11-31.8-PN	5/8-11UNC	5/8	11	.535

Order Number	Thread Dia. D_1		Pitch TPI (inch)	Recommended pilot hole dia. (inch)
ET-U64-4.6-PN	No.1-64UNC	.073	64	.059
ET-U56-5.5-PN	No.2-56UNC	.086	56	.071
ET-U48-6.3-PN	No.3-48UNC	.099	48	.081
ET-U40-7.1-PN	No.4-40UNC	.112	40	.089
ET-U32-8.8-PN	No.6-32UNC	.138	32	.109
ET-U36-10.4-PN	No.8-36UNF	.164	36	.138
ET-U24-12.1-PN	No.10-24UNC	.190	24	.151
ET-U20-15.9-PN	¼-20UNC	1/4	20	.202
ET-U28-15.9-PN	¼-28UNF	1/4	28	.215
ET-U18-19.8-PN	5/16-18UNC	5/16	18	.259
ET-U16-23.8-PN	3/8-16UNC	3/8	16	.314
ET-U14-27.8-PN	7/16-14UNC	7/16	14	.368
ET-U13-31.8-PN	½-13UNC	1/2	13	.426
ET-U12-35.7-PN	9/16-12UNC	9/16	12	.480
ET-U11-39.7-PN	5/8-11UNC	5/8	11	.535

Field data of Epoch D Thread Mill

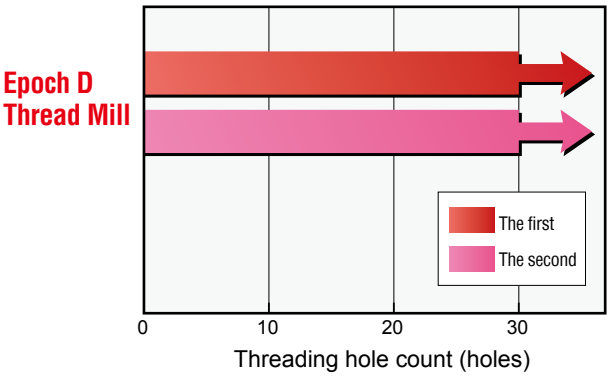
01 Simultaneous threading and drilling on hardened steels (M8×1.25)

Cutting conditions

Work material：D2(Improved)(62HRC)
Tool：EDT-1.25-16-TH
n=2,060min^{-1}(v_C=131 SFM)　v_f=1.850 IPM
Threading depth：.591 inch Blind hole
Coolant：Air-blow

Tool condition of Epoch D Thread Mill after machining 30 holes

Wear condition is good with no chipping or damage!



02 Simultaneous threading and drilling on hardened steels (M8×1.25)

Cutting conditions

Work material：H13(45HRC)
Tool：EDT-1.25-16-TH
n=2,820min^{-1}(v_C=180 SFM)
v_f=2.953 IPM
Threading depth：.623 inch Blind hole
Coolant：Air-blow

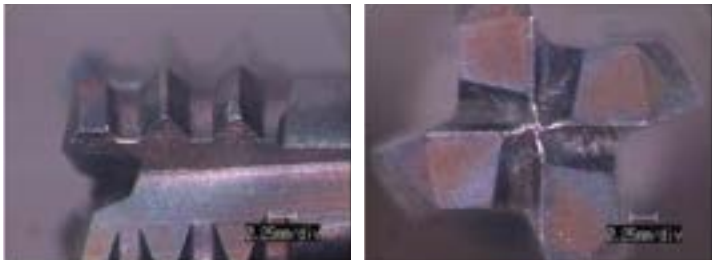
Epoch D Thread Mill after threading 150 holes.

In the above example after 150 holes, the tool shows minimum wear.

03 Simultaneous threading and drilling on pre-hardened steels (M4×0.7)

Cutting conditions

Work material：Pre-hardened steel(40HRC)
Tool：EDT-0.7-10-TH
n=5,650min^{-1}(v_C=180 SFM)
v_f=2.953 IPM
Threading depth：.394 inch Blind hole
Coolant：Air-blow



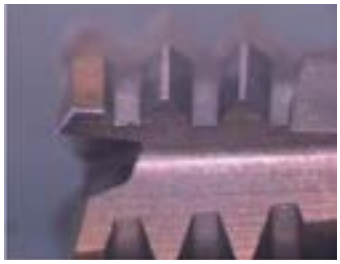
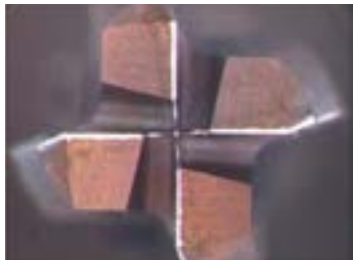
Epoch D Thread Mill after threading 400 holes.

In the above example after 400 holes, the tool shows minimum wear.

04 Simultaneous threading and drilling on stainless steels (M4×0.7)

Cutting conditions

Work material：304 Stainless Steel
Tool：EDT-0.7-10-TH
n=3,600min^{-1}(v_c=115 SFM)
v_f=1.929 IPM
Threading depth：.394 inch Blind hole
Coolant：Water-base

Epoch D Thread Mill after threading 600 holes.

In the above example after 600 holes, the tool shows minimum wear.

05 Simultaneous threading and drilling on titanium alloys (M4×0.7)

Cutting conditions

Work material：Ti-6Al-4V
Tool：EDT-0.7-10-TH
n=3,600min^{-1}(v_c=115 SFM)
v_f=1.929 IPM
Threading depth：.394 inch Blind hole
Coolant：Water-base


Epoch D Thread Mill after threading 64 holes.

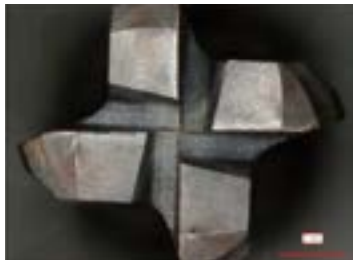
Threading titanium alloy which is difficult to tap, is possible without a pilot hole.

06 Simultaneous threading and drilling on hardened steel (PT$^1/_{16}$-28)

for PT,NPT Threads

Cutting conditions

Work material：STAVAX(52HRC)
Tool：EDT-PT1/16-18-ATH
n=3,600min^{-1}(v_c=180 SFM)
v_f=3.701 IPM
Threading depth：.630 inch
Coolant：Air-blow

Epoch D Thread Mill after threading 50 holes.

In the above example after 50 holes, the tool shows minimum wear.

Trouble shooting

Regarding thread diameter expansion/contraction

Suitable tool diameter correction should be performed according to the work material and tool wear condition. Also, please be careful not to forget to input the tool diameter compensation value into the machine.

Dimensional accuracy worsens when moving toward the bottom of the hole (deflection)

A characteristic of the thread milling method is that tool deflection increases as the tool progresses toward the bottom of the hole.
It may be necessary to perform zero cutting in order to perform high-accuracy thread milling with low deflection.

Regarding tool breakage

As a countermeasure against tool breakage, performing processing with a reduced feed rate is effective. In addition, when processing with tool extended or when large rough cutting chips are produced, breakage due to chip clogging should be considered. In such cases, if processing is performed with a higher cutting speed, the cutting chips will be broken into smaller bits which may improve conditions.

Changes in cutting chip conditions due to different cutting speeds;
Simultaneous boring and thread milling (M8 × 1.25) of carbon steel

If the NC program using MOLDINO's NC program creation software doesn't work properly.

There are differences in the programming code for the machine being used. Please contact the machine manufacturer for details.

Regarding upper limit on Machinable Thread Diameters

Please note that since the Epoch D Thread Mill performs boring simultaneously, it cannot perform thread milling for diameters of more than 1.68 times the tool diameter DC.
There are no particular similar limitations on using the Epoch Thread Mill.
Also, please be aware that if screws of a size smaller than the thread diameter described in the line-up table are processed, there is a possibility of malfunctioning the screw shape.
Example) Threading M14×2 with ET-2-40-PN (designed for M16×2)

Cautions on use

About tool feed rate

When performing thread milling by helical interpolation, the cutting point feed rate should be multiplied by a coefficient to determine the tool center feed rate.
The equation for calculating the tool center feed rate is shown at right.
The standard cutting conditions for PT and NPT threads are calculated based on the thread diameter D_1 at the machinable maximum depth (neck length).
Example) Thread milling PT⅛ with EDT-PT1/8-19-ATH
.383 inch (9.728mm) (D_1) - .748 inch (19mm) (under neck length)
x 1/16 (thread taper angle) = .336 inch (8.5405mm)

$$v_f = f_z \times CICT \times n \times \frac{D_1\text{-}DC}{D_1}$$

v_f	: Feed rate	(IPM) or (mm/min)
f_z	: Feed per tooth	(IPT) or (mm/t)
CICT	: No. of flutes	
n	: Rotation	(min^{-1})
D_1	: Thread Dia.	(inch) or (mm)
DC	: Cutting Dia.	(inch) or (mm)

* Above formula applies to both inch and metric.

About tool diameter correction

When performing thread milling by helical interpolation, it may be necessary to compensate for increased cutting resistance due to differences in work materials or tool wear condition.
In the NC programs created using MOLDINO's NC program creation software, tool diameter correction is in radius designation format.

Correction example **Threading of hardened material (60HRC) (M8×1.25)**

Work material：D2(60HRC) Tool：ET-1.25-20-PN(Tool dia. ϕ.244) Pilot hole dia.×Pilot hole depth：ϕ.268 x .984 inch
n=2,060min^{-1} (v_c=131 SFM) v_f=2.205 IPM Threading depth：.787 inch Blind hole

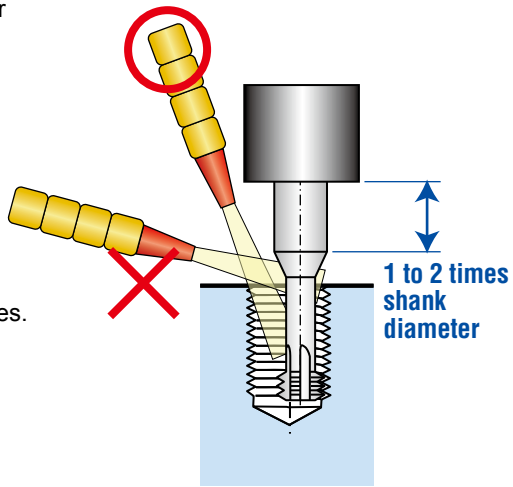
Threading hole count (holes)	10	20	30	40
Tool dia. correction value (mm)	.1217	.1213	.1205	.1197

Tool life has NOT been reached.

About coolant

- The first recommended coolant shown in the table tends to have the superior tool life. When priority is given to finished surface quality, water-soluble cutting fluids are effective. Oil-based cutting fluids are not suitable because they degrade chip removal characteristics.
- The holder should grip the tool shank so that the holder does not block the hole and the shank projection amount is 1 to 2 times the shank diameter. The coolant nozzle should then be positioned so that the coolant will reach the bottom of the hole. In addition, coolant pressure should be adjusted so that it removes cutting chips. If the setting is bad, cutting chip clogging may lead to flute tip damage or tool breakage.
- Since there is a risk of cutting chips getting inside the machine, when using tools equipped with oil holes, be sure to perform processing using the oil holes.

Work material	ET		EDT	
	Air-blow	Water-base	Air-blow	Water-base
Hardened steel, Pre-hardened steel Tool steel, Cast iron, Carbon steel	◎	○	◎	△
Stainless steel	×	◎	×	◎
Super heat resistant alloy, Titanium alloy	×	◎	×	◎
Aluminium alloy, Copper alloy, Resin	○	◎	×	◎



◎: First recommended
○: Second recommended
△: Tendency to decrease tool life
×: Not recommended

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