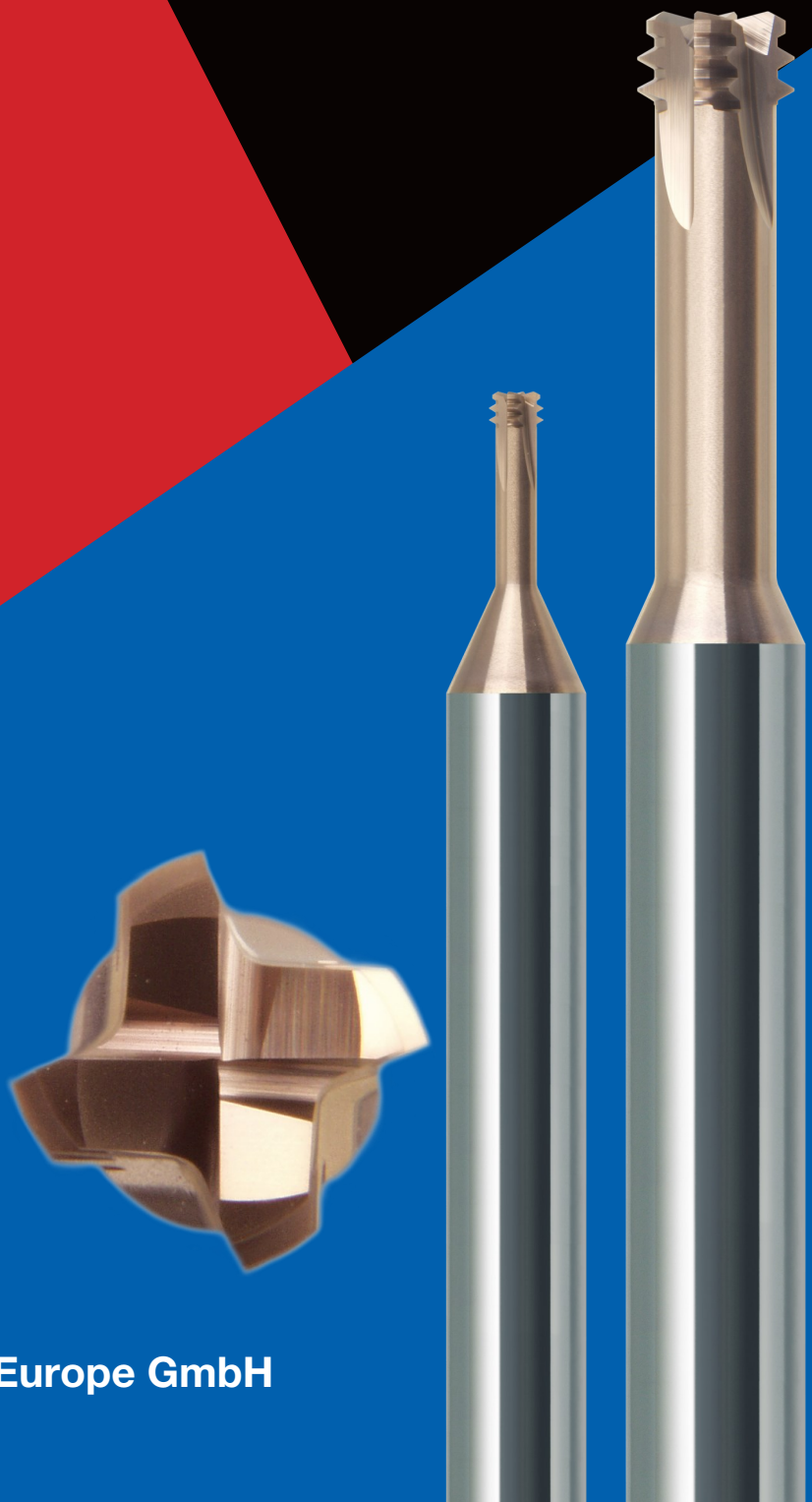
MOLDINO
The Edge To Innovation

Carbide Thread Mill series

EDT-ATH

Epoch Direct Thread ATH



MOLDINO Tool Engineering Europe GmbH

EDT-ATH | 2023-04 | Version 1.0 | PDF

Allowing thread milling in hardened steel. Supports NC automation of threading.

Features of EDT-ATH

01 Designed for simultaneous helical boring and threading

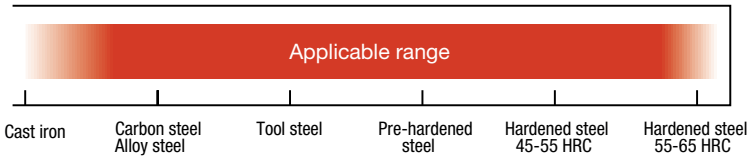
02 Geometry to maximize length of thread

03 Right hand, left-hand, fine thread milling and chamfering

Line-up: 38 items

Threads: M, G, PT, NPT

Recommended usage

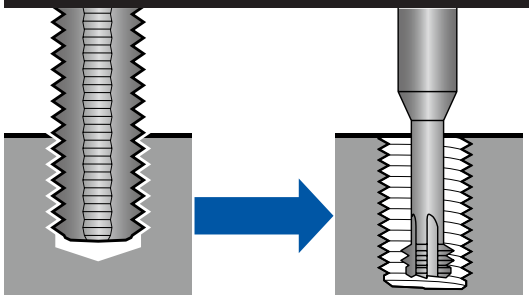


Application

Customer need and product benefit

Reliable and cost effective production of threads in hardened steels, with more flexibility and safety than tapping.

Tapping vs. Thread Milling



Challenge

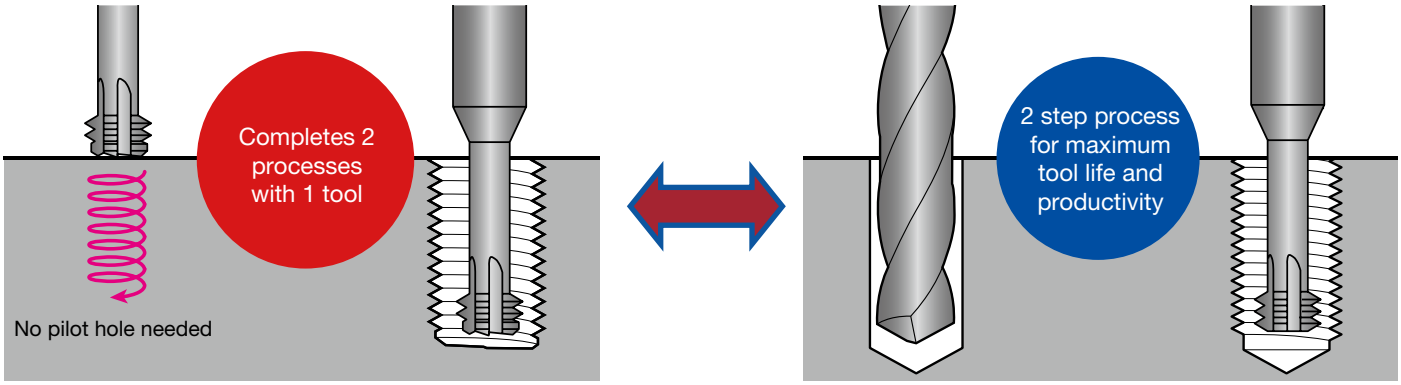
Breaking of taps and large number of tools and processes.
General difficulties of tapping hardened steels.

Solution

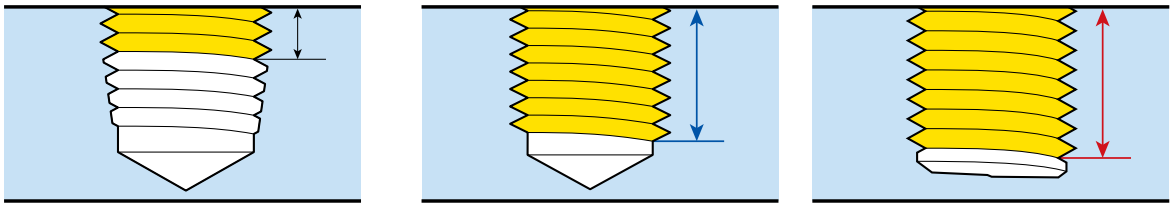
EDT-ATH offers reliable and fast thread milling with or without pilot holes.

EDT-ATH	2023-04	Version 1.0	PDF

Feature 01 Simultaneous helical boring and threading



Feature 02 Geometry to maximize length of thread



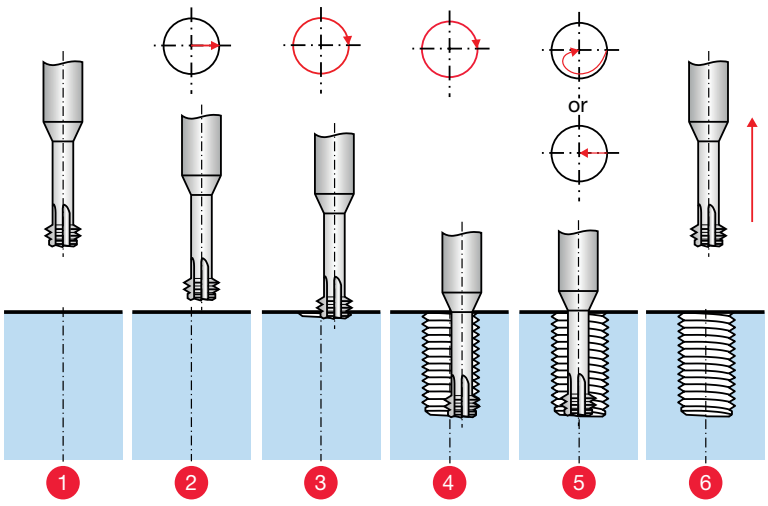
Conventional tap

EDT with pilot hole
(no incomplete thread)

EDT without pilot hole
(1 incomplete thread)

Ideal for machining when pilot hole depth allows no margins.

Feature 03 Right-hand, left-hand, fine thread milling and chamfering



Please use the predefined cycle of your machine control, or define the tool path as described in the graphic:

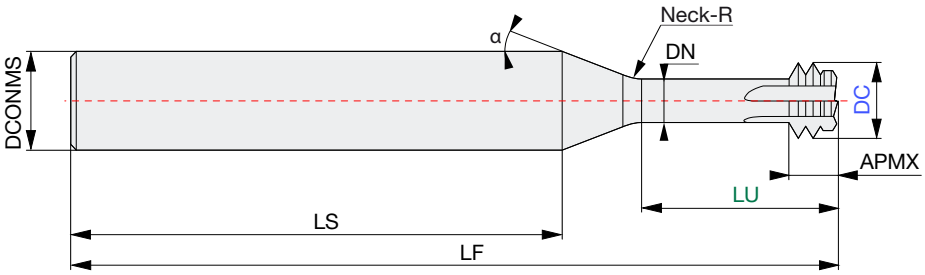
1. Start position, center of the hole
2. Approach to start position for helical milling
3. Approach with helical rotation
4. Thread cutting with helical rotation
5. After completing the thread, return the milling cutter to the center of the hole with spiral rotation.
6. Move the milling cutter back to the start position.

Left-hand, fine thread milling and chamfering can be performed by adapting the NC program.

EDT-ATH Lineup Metric Type

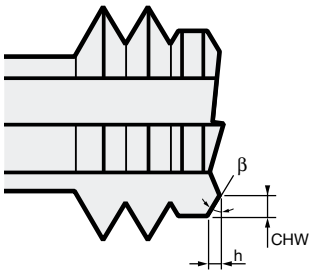
Counter Clockwise (left rotation) | NOF 4 | h5 | Carbide | ATH coated | 65 HRC

P M K
N S H



No inner coolant

With inner coolant



Info for chamfering

LU 2.5 x Regular Thread

ID Code	Item Code	Regular Thread	Size (mm)													Inner Coolant
			DC	Pitch	LU	APMX	DN	LS	LF	DCONMS	Neck-R	α	h	CHW	β	
EP1595	EDT-0.4-5-TH	M2	1.4	0.4	5	1.2	0.91	38.8	50	6	1	25	0.062	0.117	28	No
EP1596	EDT-0.45-6.25-TH	M2.5	1.8	0.45	6.25	1.35	1.24	37.95	50	6	1	25	0.089	0.168	28	No
EP1597	EDT-0.5-7.5-TH	M3	2.4	0.5	7.5	1.5	1.78	37.25	50	6	1	25	0.133	0.25	28	No
EP1598	EDT-0.7-10-TH	M4	3.1	0.7	10	2.1	2.24	34.75	50	6	1	25	0.163	0.306	28	No
EP1600	EDT-0.8-12.5-TH	M5	3.8	0.8	12.5	2.4	2.8	32.85	50	6	1	25	0.209	0.394	28	No
EP1601	EDT-1.0-15-TH	M6	4.6	1	15	3	3.36	30.95	50	6	1	25	0.247	0.465	28	No
EP1603	EDT-1.25-20-TH	M8	6.2	1.25	20	3.75	4.64	42.81	70	10	2	25	0.347	0.652	28	No
EP1599	EDT-0.75-20-TH	*	6.2	0.75	20	2.25	5.13	43.3	70	10	2	25	0.222	0.417	28	No
EP1604	EDT-1.5-25-TH	M10	7.5	1.5	25	4.5	5.61	38.85	70	10	2	25	0.422	0.794	28	Yes
EP1602	EDT-1.0-25-TH	*	7.5	1	25	3	6.11	39.4	70	10	2	25	0.314	0.59	28	Yes
EP1605	EDT-1.75-30-TH	M12	9	1.75	30	5.25	6.78	45.1	80	10	2	25	0.514	0.967	28	Yes
EP1606	EDT-2-40-TH	M16	11.5	2	40	6	8.87	55.2	100	12	2	25	0.691	1.299	28	Yes
EP1810	EDT-2.5-50-TH	M20	15	2.5	50	7.5	11.71	78.1	135	16	-	20	0.917	1.724	28	Yes

* is only for fine pitch type thread

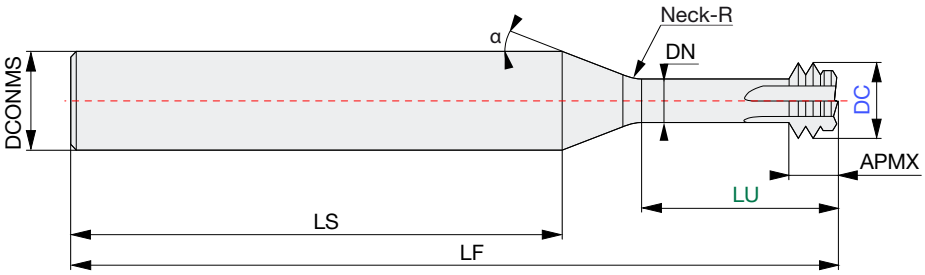
LU 5 x Regular Thread

ID Code	Item Code	Regular Thread	Size (mm)													Inner Coolant
			DC	Pitch	LU	APMX	DN	LS	LF	DCONMS	Neck-R	α	h	CHW	β	
EP1803	EDT-0.5-15-TH	M3 long	2.4	0.5	15	1.5	1.78	39.75	60	6	1	25	0.133	0.25	28	No
EP1804	EDT-0.7-20-TH	M4 long	3.1	0.7	20	2.1	2.24	34.75	60	6	1	25	0.163	0.306	28	No
EP1805	EDT-0.8-25-TH	M5 long	3.8	0.8	25	2.4	2.8	40.35	70	6	1	25	0.209	0.394	28	No
EP1806	EDT-1.0-30-TH	M6 long	4.6	1	30	3	3.36	35.95	70	6	1	25	0.247	0.465	28	No
EP1807	EDT-1.25-40-TH	M8 long	6.2	1.25	40	3.75	4.64	52.81	100	10	2	25	0.347	0.652	28	No
EP1808	EDT-1.5-50-TH	M10 long	7.5	1.5	50	4.5	5.61	43.85	100	10	2	25	0.422	0.794	28	Yes
EP1809	EDT-1.75-60-TH	M12 long	9	1.75	60	5.25	6.78	45.1	110	10	2	25	0.514	0.967	28	Yes

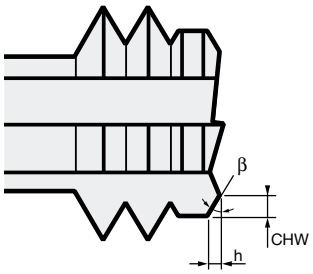
All items on EU-stock

EDT-ATH Lineup G-Type

Counter Clockwise (left rotation) | NOF 4 | h5 | Carbide | ATH coated | 65 HRC



P M K
N S H



Info for chamfering

No
inner coolant

G-Type (ISO 228-1)

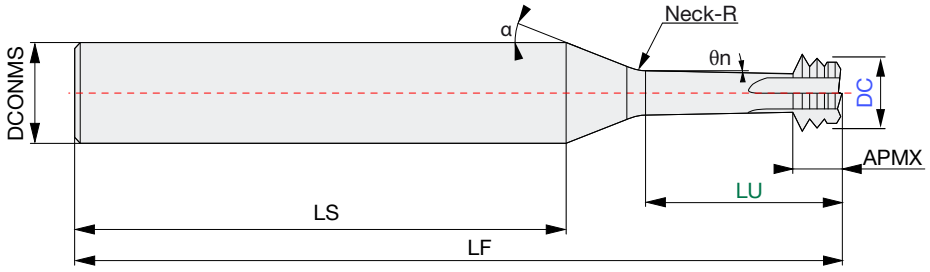
ID Code	Item Code	Regular Thread	Size (mm)													Inner Coolant
			DC	Pitch	LU	APMX	DN	LS	LF	DCONMS	Neck-R	α	h	CHW	β	
EP1811	EDT-G1/16-18-ATH	G1/16	5.8	0.9071	18	2.721	4.3	49.49	70	6	1	20	0.277	0.58	25.5	No
EP1812	EDT-G1/8-19-ATH	G1/8	7.3	0.9071	19	2.721	5.81	54.89	80	10	2	20	0.272	0.57	25.5	No
EP1813	EDT-G1/4-28-ATH	G1/4	9.8	1.3368	28	4.011	7.57	48.31	80	10	2	20	0.391	0.82	25.5	No
EP1814	EDT-G3/8-28-ATH	G3/8	11.8	1.3368	28	4.011	9.6	78.35	110	12	2	20	0.384	0.805	25.5	No
EP1815	EDT-G1/2-35-ATH	G1/2	15.7	1.8143	35	5.443	12.73	95.51	135	16	-	20	0.513	1.075	25.5	No
EP1816	EDT-G1-45-ATH	G1	15.8	2.3091	45	6.927	12.04	84.56	135	16	-	20	0.637	1.335	25.5	No

All items on EU-stock

EDT-ATH Lineup PT and NPT-Type

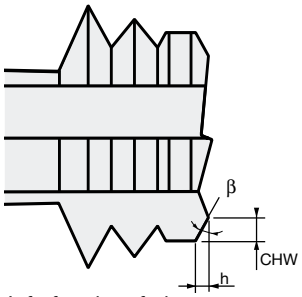
Counter Clockwise (left rotation) | NOF 4 | h5 | Carbide | ATH coated | 65 HRC

P M K N S H



Neck angle α = 20°
Taper angle θn = 1.7°
θn of EDT-(N)PT1-45-ATH is 0° (straight neck).

No
inner coolant



Info for chamfering

PT-Type

ID Code	Item Code	Thread Dia. D1		Size (mm)											
		No pilot needed	Pilot needed**	DC (Ref. Dia.)	Pitch	LU	APMX	LS	LF	DCONMS	D2 Dia. Com-pensation	Neck-R	h	CHW	β
EP2619	EDT-PT1/16-18-ATH	PT1/16-28 7.723	PT1/8-28 9.728 (D4)	4.8	0.9071	18	2.721	49.43	70	6	0.029	1	0.274	0.575	25.5
EP2620	EDT-PT1/8-19-ATH	PT1/8-28 9.728	-	5.7	0.9071	19	2.721	49.72	70	6	0.029	1	0.274	0.575	25.5
EP2621	EDT-PT1/4-28-ATH	PT1/4-19 13.157	PT3/8-19 16.662 (D6)	7.9	1.3368	28	4.011	47.82	80	10	0.043	2	0.384	0.805	25.5
EP2622	EDT-PT3/8-28-ATH	PT3/8-19 16.662	-	9.6	1.3368	28	4.011	50.16	80	10	0.043	2	0.384	0.805	25.5
EP2623	EDT-PT1/2-35-ATH	PT1/2-14 20.955	PT3/4-14 26.441 (D8)	11.5	1.8143	35	5.443	72.57	110	12	0.058	2	0.508	1.065	25.5
EP2624	EDT-PT1-45-ATH	-	PT1-11 33.249 (D10)	15.4	2.3091	45	6.927	84.53	135	16	0.074	-	0.634	1.33	25.5

NPT-Type

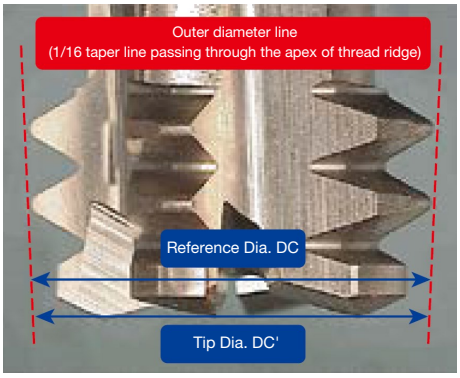
ID Code	Item Code	Thread Dia. D1		Size (mm)											
		No pilot needed	Pilot needed*	DC (Ref. Dia.)	Pitch	LU	APMX	LS	LF	DCONMS	D2 Dia. Com-pensation	Neck-R	h	CHW	β
EP2613	EDT-NPT1/16-18-ATH	NPT1/16-27 7.895	NPT1/8-27 10.242 (D4)	4.8	0.9407	18	2.822	49.02	70	6	0.03	1	0.284	0.535	28
EP2614	EDT-NPT1/8-19-ATH	NPT1/8-27 10.242	-	5.7	0.9407	19	2.822	49.32	70	6	0.03	1	0.284	0.535	28
EP2615	EDT-NPT1/4-28-ATH	NPT1/4-18 13.616	NPT3/8-18 17.055 (D6)	7.9	1.4111	28	4.234	47.14	80	10	0.045	2	0.407	0.765	28
EP2616	EDT-NPT3/8-28-ATH	NPT3/8-18 17.055	-	9.6	1.4111	28	4.234	49.48	80	10	0.045	2	0.407	0.765	28
EP2617	EDT-NPT1/2-35-ATH	NPT1/2-14 21.224	NPT3/4-14 26.569 (D8)	11.5	1.8143	35	5.443	71.85	110	12	0.058	2	0.51	0.96	28
EP2618	EDT-NPT1-45-ATH	-	NPT1-11.5 33.228 (D10)	15.4	2.2087	45	6.626	83.79	135	16	0.071	-	0.611	1.15	28

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

All items on EU-stock

PT/NPT Usage instruction

Cautions when creating NC program for PT, NPT threads



Since the reference diameter DC and the tool tip diameter DC' are different, it is necessary to correct the thread diameter D1 and program. The thread diameter D1 corresponds to the reference diameter of the groove of the internal thread (reference diameter of the tap).

Example of PT1/4 thread milling with EDT-PT1/4-28-ATH:

Thread dia. D1	+ Compensation value D2	=	Setup thread diameter
13.157	+ 0.043	=	13.2 (mm)

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

Reference diameter position adjustment procedure for PT, NPT threads

For the machining of tapered internal threads using a thread mill, in contrast to conventional taps, the reference diameter position is adjusted by adjusting the internal thread diameter with tool diameter correction.

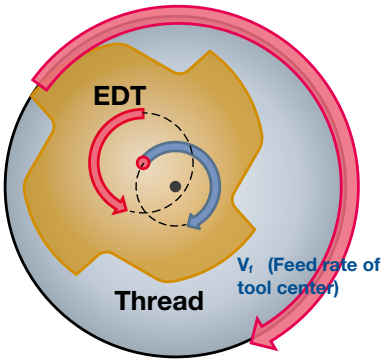
Example of PT1/4 thread milling with EDT-PT1/4-28-ATH:

(Ref. Dc	±	adjustment amount	x	1/16)	÷ 2	=	Corrected tool radius
(7.9	-	2	x	1/16)	÷ 2	=	3.8875 (mm)

Note:
1/16 (thread taper angle in arc dimension) is valid for all PT/NPT threads!

EDT-ATH General usage instruction

About tool feed rate



$$vf = fz \times z \times n \times \frac{D1 - DC}{D1}$$

vf	: Feed rate	(mm/min)
fz	: Feed per tooth	(mm/t)
z	: No. of flutes	
n	: Rotation	(min^{-1})
$D1$	: Thread diameter	(mm)
Dc	: Tool diameter	(mm)

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 left.

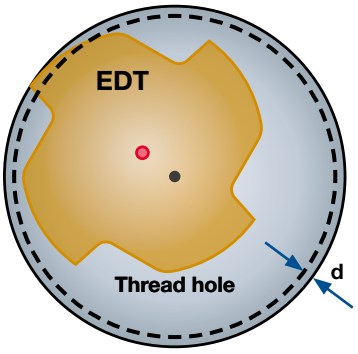
The standard cutting conditions for PT and NPT threads are calculated based on the thread diameter D1' at the machin-able maximum depth (neck length) .

PT-thread milling example with EDT-PT1/8-19-ATH:

D1' = D1 - (underneck length * thread taper) = 9.728 - (19 * 1/16) = 8.5405 (mm)

Note:
1/16 (thread taper angle in arc dimension) is valid for all PT/NPT threads!

About the correction of tool dimension (cylindrical threads)

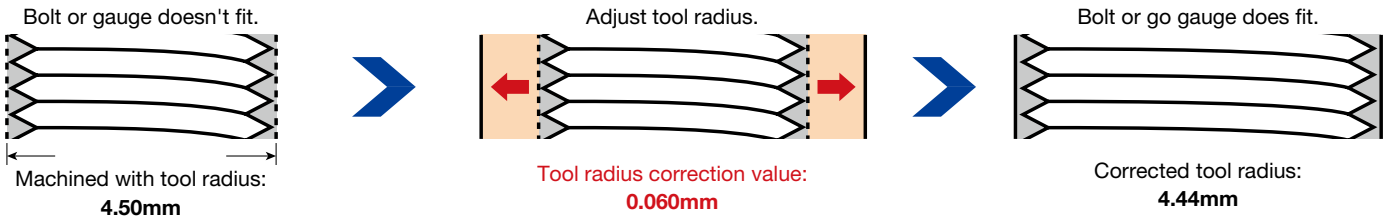


Possible situation

The machined thread diameter may need to be adjusted if reduced by wear and/or deflection of tool. Tool diameter correction or repeated zero-cut could be helpful to reach the requested thread size.

Correction example: Machining an M12 × 1.75 thread with EDT-1.75-30-TH (DC 9mm)

Corrected tool radius = DC/2- d = 9.0 / 2 - 0.060 = 4.44 (mm)

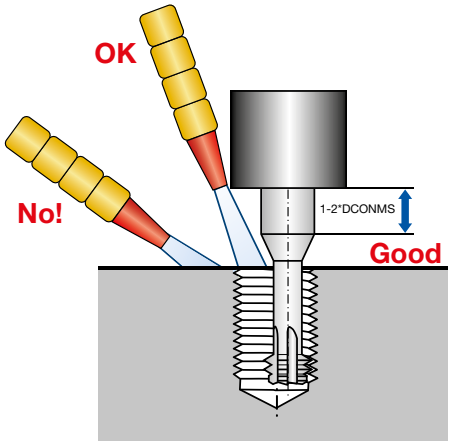


EDT-ATH General usage instruction

About coolant

Work material	EDT	
	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	×	◎

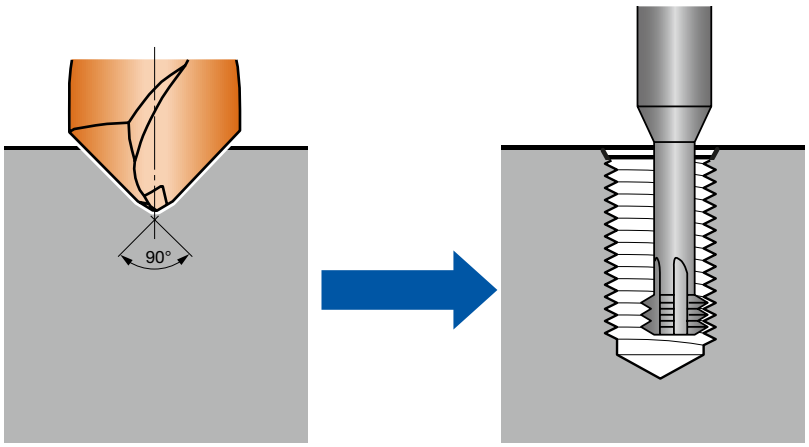
◎: First recommended
○: Second recommended
△: Tendency to decrease tool life
X : Not recommended



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.

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.

Chamfering for improved thread quality



Centering EDT threadmill

Centering before using EDT-ATH allows chamfer without deformed thread profiles.

EDT-ATH Trouble shooting

Regarding thread diameter expansion / contraction

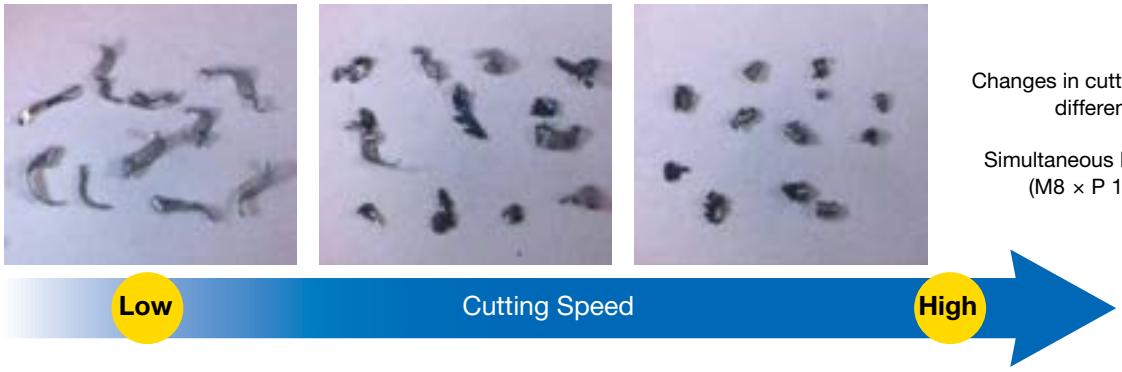
Suitable tool diameter correction should be performed according to the work material and tool wear condition. Also, please be careful not to forget to input the tool diameter correction value into the machine.

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 (at same V_f), 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 × P 1.25) of carbon steel.

Regarding upper limit on machinable thread diameters

Please note that since EDT 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 when using EDT with pilot hole.

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 EDT-2-40-PN (designed for M16×2)

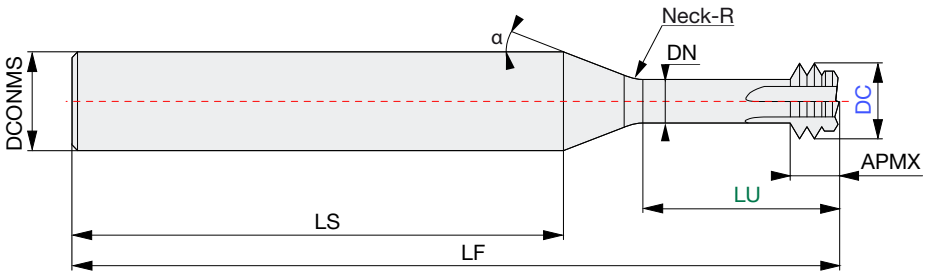
EDT-ATH General technical information

ISO 513 Symbol	Description	Examples
P	Non-alloy steel, low alloy steel, high alloy steel, ferritic/martensitic stainless steel, tool steel	1.2343 / X38CrMoV5-1; 1.2738 / 40CrMnNiMo8; 1.0503 / C45; 1.0570 / ST52-3; 1.1730 / C45W; 1.7131 / 16MnCr5; 1.7225 / 42CrMo4; 1.3343 / HS6-5-2; 1.0511 / C40; 1.2312 / 40CrMnMoS8-6; 1.2311 / 40CrMnMo7; 1.2344 / X40CrMoV5-1; 1.2767 / X45NiCrMo4; 1.2083 / X42Cr13; 1.2085 / X33CrS16; 1.2714 / 55NiCrMoV7; 1.2842 / 90MnCrV8;
M	Austenitic stainless steel	1.4301 / X5CrNi18-9; 1.4401 / X5CrNiMo17-12-2; 1.4404 / X2CrNiMo17-13-2; 1.4828 / X15CrNiSi20 12
K	Grey cast iron (GG), nodular cast iron (GGG), malleable cast iron	0.6025 / GG-25; GGG-40.3; 0.8155 / GTS-55-04
N	Aluminum wrought all, copper alloy, aluminum-cast, alloyed, non-metallic	2.0060 / E-Cu57; 2.0321 / CuZn37; 3.0255 / Al99.5; 3.5103 / MgSE3Zn27r1
S	High temperature alloys, titanium and Ti alloys	1.4864 / X12NiCrSi36 16; 2.4856 / NiCr22Mo9Nb; 1.4977 / X40CoCrNi20 20; 2.4669 / NiCr15Fe7TiAl
H	Hardened steel, chilled cast iron, cast iron	

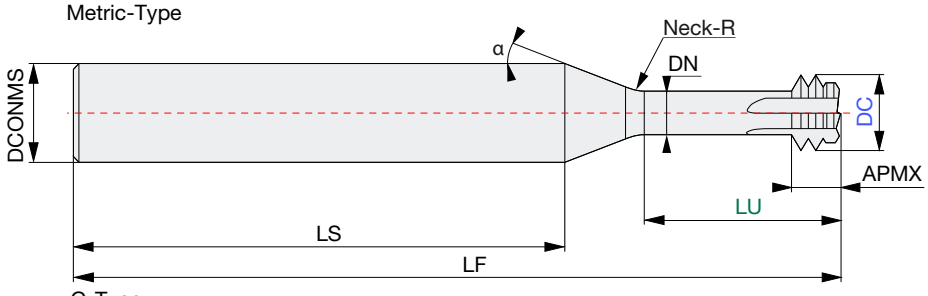
Recommended: P M K N S H

Suitable: P M K N S H

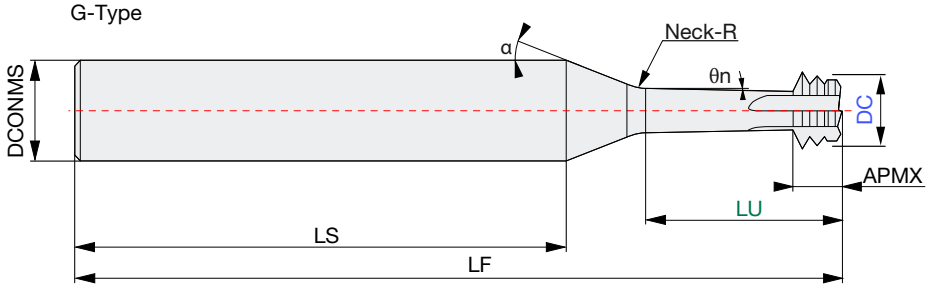
NOT recommended: P M K N S H



Metric-Type



G-Type



PT/NPT-Type

Drawing nomenclature	
DC	Diameter Cutting
DCONMS	Connection Diameter Machine Side
DN	Diameter Neck
LU	Length Usage
LS	Length Shank
LF	Length Function
APMX	Cutting Edge Length

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⚠ Attentions on Safety

1. Cautions regarding handling

(1) When removing the tool from its case (packaging), be careful that the tool does not pop out or is dropped. Be particularly careful regarding contact with the tool flutes.

(2) When handling tools with sharp cutting flutes, be careful not to touch the cutting flutes directly with your bare hands.

2. Cautions regarding mounting

(1) Before use, check the outside appearance of the tool for scratches, cracks, etc. and that it is firmly mounted in the collet chuck, etc.

(2) When preparing for use, be sure that the inserts are firmly mounted in place and that they are firmly mounted on the arbor, etc.

(3) If abnormal chattering, etc. occurs during use, stop the machine immediately and remove the cause of the chattering.

3. Cautions during use

(1) Before use, confirm the dimensions and direction of rotation of the tool and milling work material.

(2) The numerical values in the standard cutting conditions table should be used as criteria when starting new work. The cutting conditions should be adjusted as appropriate when the cutting depth is large, the rigidity of the machine being used is low, or according to the conditions of the work material.

(3) Cutting tools are made of a hard material. During use, they may break and fly off. In addition, cutting chips may also fly off. Since there is a danger of injury to workers, fire, or eye damage from such flying pieces, a safety cover should be attached when work is performed and safety equipment such as safety goggles should be worn to create a safe environment for work.

(4) There is a risk of fire or inflammation due to sparks, heat due to breakage, and cutting chips. Do not use where there is a risk of fire or explosion. Please caution of fire while using oil base coolant, fire prevention is necessary.

(5) Do not use the tool for any purpose other than that for which it is intended.

4. Cautions regarding regrinding

(1) If regrinding is not performed at the proper time, there is a risk of the tool breaking. Replace the tool with one in good condition, or perform regrinding.

(2) Grinding dust will be created when regrinding a tool. When regrinding, be sure to attach a safety cover over the work area and wear safety clothes such as safety goggles, etc.

(3) This product contains the specified chemical substance cobalt and its inorganic compounds. When performing regrinding or similar processing, be sure to handle the processing in accordance with the local laws and regulations regarding prevention of hazards due to specified chemical substances.

Specifications for the products listed in this catalog are subject to change without notice due to replacement or modification.

The diagrams and table data are examples of test results and are not guaranteed values.

For more details please check our digital tool database

P50QF PRODUCTION50 QuickFinder

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