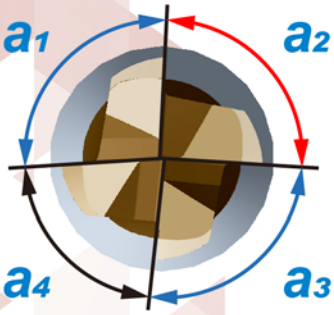
ZUQ®

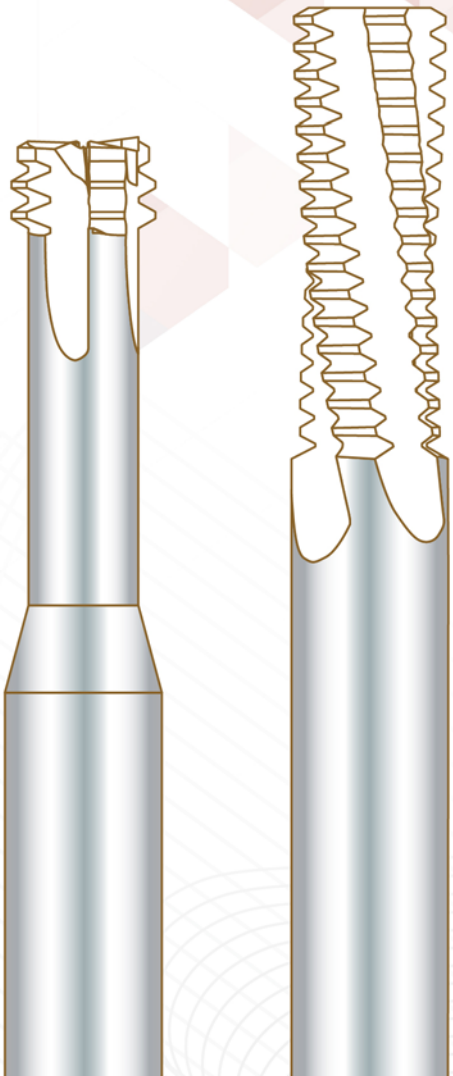
Solid Carbide Thread Mills

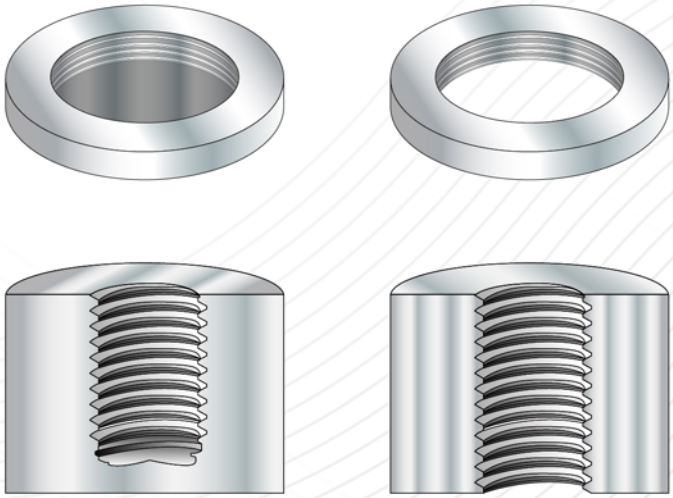
Anti-Vibration



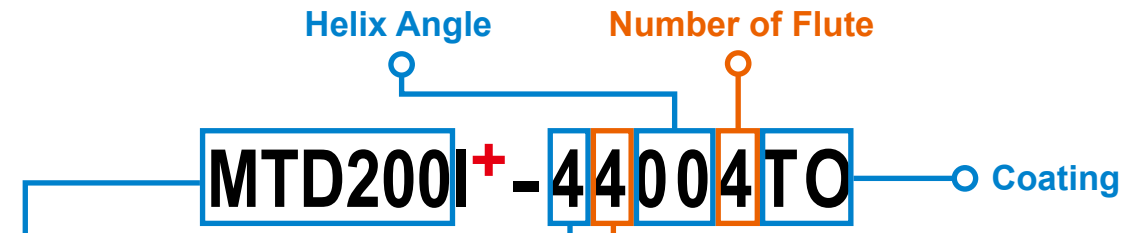
Best Seller IE Series

Hardness HRC>65





Coding Principle



Series

AC = Aluminum Series
CS = Stainless Steel Series
TI = Titanium Series
RF = Roughing Series
DR = Drill Series
CF = Chamfering Series
IR = Corner Radius Series
MT = Thread Mill
MTD = Thread Mill

Type

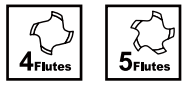
1 = Square
2 = Corner Radius
4 = Drill / Thread Mill
5 = Reammer
8 = Ball nose

Flue type

1 = Standard Flute
2 = Long Flute
3 = Long shank
4 = Stub Flute

Icon Guide

Type of Uneven Flute



Helix angle

Types & Operation

IE = Uneven Flute,Variable Helix Angle

Left / Right-Hand Cutting

Icon Guide

Type of Coating

TA TN TB TO Z3 DLC TS

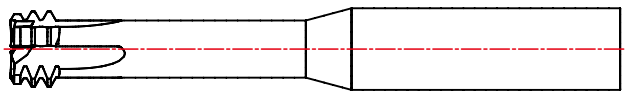
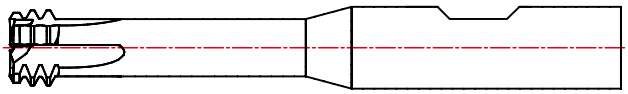
Code	Name	Oxidation Temperature	Surface Hardness(Hv)	Coefficient of Friction	Coating Thickness(μm)
TA	AlTiCrN	900℃	3200	0.5	0.1~0.4
TN	TiAlN	800℃	2600	0.4	0.1~0.4
TB	AlTiSiN-B	1100℃	3500	0.45	0.1~0.4
TO	AlTiSiN	1000℃	3200	0.45	0.1~0.4
Z3	AlTiSiZrN	1000℃	3000	0.4	0.1~0.4
DLC	Diamod	550℃	2500	0.1	0.8
TS	TA-C	1100℃	5500	0.1	0.1~1

※ **Actual coating color may have slight difference due to coating temperature.**

Solid Carbide Material

icon	Grade	Grain size	Cobalt	Hardness
UFMG	**Ultrafine Micro Grain Carbide**	0.2um~0.3um	8.2%	HRA93.7
UMG	**Ultra Micro Grain Carbide**	0.4um~0.5um	12%	HRA92.7
SMG	**Super Micro Grain Carbide**	0.6um~0.8um	10%	HRA92.3
HSS	**High Speed Steel**	---	8%	HRC66~68

Optional Weldon Shank HB Design

Form HA, plain	
Form HB, with drive flat	

Thread Mills

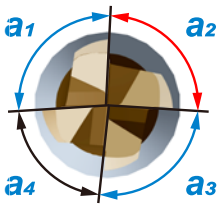
MTD200I - 44004TO-LH 2xD, 2.5xD

Helical Drill Thread Milling on material up to HRC65

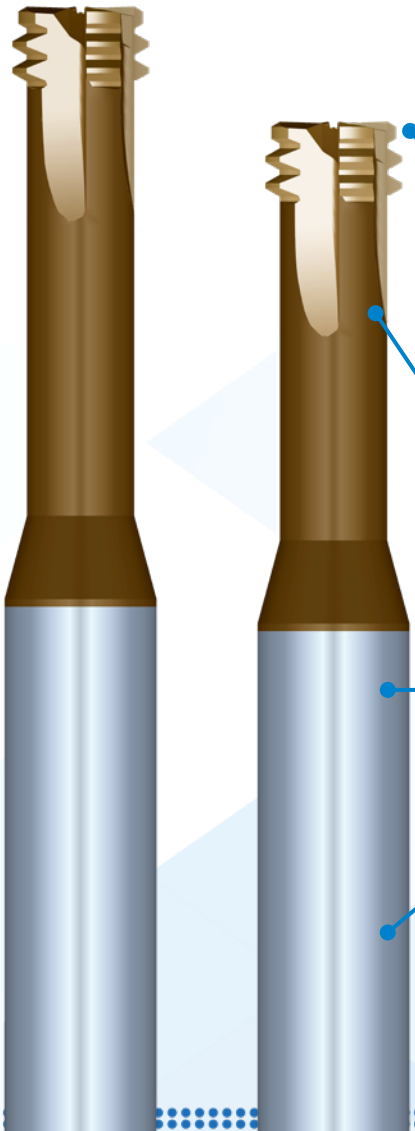
End-Cut Helical Milling and Chamfering

Uneven Flute

Smooth cutting and anti-vibration



$a_1 \neq a_2 \neq a_3 \neq a_4$



Left-Hand Cutting Geometry for Right-Hand Thread

TO Coating

High heat resistance AlTiCrSin multi-layer coating, able to cut material up to HRC65

Solid Carbide Material

HRC 65

UFMG

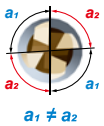
Super Ultrafine Micro Grain Carbide applicable to cut hardened material

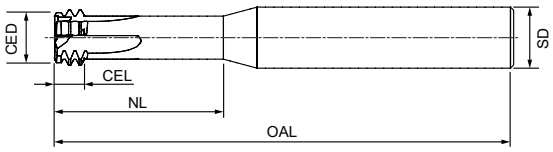
HB

Optional HB Weldon flat

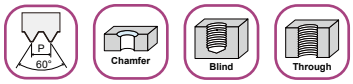
MTD200I- 44004TO-LH

- Helical Drill Thread Mills 4-Flute x 2D
- Left Hand Cutting / Righ-Hand Thread





ISO Metric Thread



(unit : mm)

Code No.	Thread Dia.	Pitch	CED	CEL	NL	SD	OAL	Flute
	Ø Dm	mm						
MTD200I-44004TO-LH	M3	0.5	2.4	1.5	7	6	50	4
	M4	0.7	3.1	2.1	9.5	6	50	4
	M5	0.8	4	2.4	12	6	50	4
	M6	1	4.6	3	14.5	6	50	4
	M8	1.25	6.2	3.75	19	8	65	4
	M10	1.5	7.5	4.5	23	8	65	4
	M12	1.75	9	5.25	28	10	75	4
	M16	2	11.7	6	36	12	80	4
	M20	2.5	15.7	7.5	45	16	100	4

※ Customized sizes, Coating, Internal Coolant are available on request!

Thread Milling

Work Material		Mild Steel Low Carbon Steel ~C0.25%			Alloyed Steel 25~35HRC			Hardened Steel 35~45HRC		
Suggested Coolant		Water-Soluble			Water-Soluble			Air Blow		
Cutting Speed (m/min)		60 ~ 120			35 ~ 55			35 ~ 75		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M3 x 0.5	2.4	8,000	64	0.005~0.01	6,000	48	0.005~0.01	6,000	48	0.005~0.01
M4 x 0.7	3.1	6,160	83	0.006~0.015	4,600	62	0.006~0.015	4,600	62	0.006~0.015
M5 x 0.8	4	4,770	65	0.008~0.017	3,580	49	0.008~0.017	3,580	49	0.008~0.017
M6 x 1	4.6	4,150	78	0.01~0.02	3,110	58	0.01~0.02	3,110	58	0.01~0.02
M8 x 1.25	6.2	3,080	83	0.015~0.03	2,310	62	0.015~0.03	2,310	62	0.015~0.03
M10 x 1.5	7.5	2,550	89	0.017~0.035	1,900	67	0.017~0.035	1,900	67	0.017~0.035
M12 x 1.75	9	2,120	95	0.02~0.045	1,600	72	0.02~0.045	1,600	72	0.02~0.045
M16 x 2	11.7	1,630	96	0.03~0.055	1,220	72	0.03~0.055	1,220	72	0.03~0.055
M20 x 2.5	15.7	1,220	68	0.04~0.065	910	51	0.04~0.065	910	51	0.04~0.065

Work Material		Hardened Steel 45~55HRC			Hardened Steel 55~65HRC			Stainless Steel, Tool Steel		
Suggested Coolant		Air Blow			Air Blow			Water-Soluble		
Cutting Speed (m/min)		35 ~ 65			35 ~ 55			35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M3 x 0.5	2.4	6,000	48	0.005~0.01	6,000	48	0.005~0.01	6,000	48	0.005~0.01
M4 x 0.7	3.1	4,600	62	0.006~0.015	4,600	62	0.006~0.015	4,600	62	0.006~0.015
M5 x 0.8	4	3,580	49	0.008~0.017	3,580	49	0.008~0.017	3,580	49	0.008~0.017
M6 x 1	4.6	3,110	58	0.01~0.02	3,110	58	0.01~0.02	3,110	58	0.01~0.02
M8 x 1.25	6.2	2,310	62	0.015~0.03	2,310	62	0.015~0.03	2,310	62	0.015~0.03
M10 x 1.5	7.5	1,900	67	0.017~0.035	1,900	67	0.017~0.035	1,900	67	0.017~0.035
M12 x 1.75	9	1,600	72	0.02~0.045	1,600	72	0.02~0.045	1,600	72	0.02~0.045
M16 x 2	11.7	1,220	72	0.03~0.055	1,220	72	0.03~0.055	1,220	72	0.03~0.055
M20 x 2.5	15.7	910	51	0.04~0.065	910	51	0.04~0.065	910	51	0.04~0.065

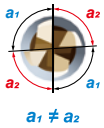
Work Material		Cast Steel, Cast Iron		
Suggested Coolant		Air Blow		
Cutting Speed (m/min)		35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M3 x 0.5	2.4	8,000	64	0.005~0.01
M4 x 0.7	3.1	6,160	83	0.006~0.015
M5 x 0.8	4	4,770	65	0.008~0.017
M6 x 1	4.6	4,150	78	0.01~0.02
M8 x 1.25	6.2	3,080	83	0.015~0.03
M10 x 1.5	7.5	2,550	89	0.017~0.035
M12 x 1.75	9	2,120	95	0.02~0.045
M16 x 2	11.7	1,630	96	0.03~0.055
M20 x 2.5	15.7	1,220	68	0.04~0.065

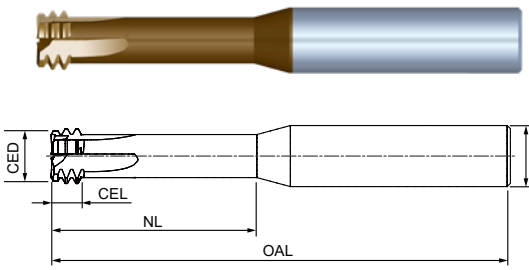
Work Material

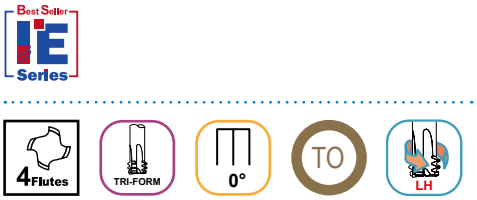
P	●	G1
	●	G2
	●	G3
M	○	G4
K	○	G5
H	●	G14
	●	G15
	○	G16

MTD200I- 44004TO-LH

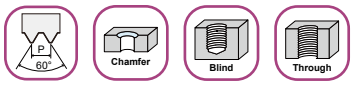
- Helical Drill Thread Mills 4-Flute x 2.5D
- Left Hand Cutting / Righ-Hand Thread







ISO Metric Thread



h5 (unit : mm)

Code No.	Thread Dia. Ø Dm	Pitch mm	CED	CEL	NL	SD	OAL	Flute
MTD200I-44004TO-LH	M3	0.5	2.4	1.5	8.5	6	50	4
	M4	0.7	3.1	2.1	11.5	6	50	4
	M5	0.8	4	2.4	14.5	6	50	4
	M6	1	4.6	3	17	6	50	4
	M8	1.25	6.2	3.75	22.5	8	65	4
	M10	1.5	7.5	4.5	28	8	65	4
	M12	1.75	9	5.25	34	10	75	4
	M16	2	11.7	6	44	12	100	4
	M20	2.5	15.7	7.5	55	16	110	4

※ Customized sizes, Coating, Internal Coolant are available on request!

Thread Milling

Work Material		Mild Steel Low Carbon Steel ~C0.25%			Alloyed Steel 25~35HRC			Hardened Steel 35~45HRC		
Suggested Coolant		Water-Soluble			Water-Soluble			Air Blow		
Cutting Speed (m/min)		60 ~ 120			35 ~ 55			35 ~ 75		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M3 x 0.5	2.4	8,000	64	0.005~0.01	6,000	48	0.005~0.01	6,000	48	0.005~0.01
M4 x 0.7	3.1	6,160	83	0.006~0.015	4,600	62	0.006~0.015	4,600	62	0.006~0.015
M5 x 0.8	4	4,770	65	0.008~0.017	3,580	49	0.008~0.017	3,580	49	0.008~0.017
M6 x 1	4.6	4,150	78	0.01~0.02	3,110	58	0.01~0.02	3,110	58	0.01~0.02
M8 x 1.25	6.2	3,080	83	0.015~0.03	2,310	62	0.015~0.03	2,310	62	0.015~0.03
M10 x 1.5	7.5	2,550	89	0.017~0.035	1,900	67	0.017~0.035	1,900	67	0.017~0.035
M12 x 1.75	9	2,120	95	0.02~0.045	1,600	72	0.02~0.045	1,600	72	0.02~0.045
M16 x 2	11.7	1,630	96	0.03~0.055	1,220	72	0.03~0.055	1,220	72	0.03~0.055
M20 x 2.5	15.7	1,220	68	0.04~0.065	910	51	0.04~0.065	910	51	0.04~0.065

Work Material		Hardened Steel 45~55HRC			Hardened Steel 55~65HRC			Stainless Steel, Tool Steel		
Suggested Coolant		Air Blow			Air Blow			Water-Soluble		
Cutting Speed (m/min)		35 ~ 65			35 ~ 55			35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M3 x 0.5	2.4	6,000	48	0.005~0.01	6,000	48	0.005~0.01	6,000	48	0.005~0.01
M4 x 0.7	3.1	4,600	62	0.006~0.015	4,600	62	0.006~0.015	4,600	62	0.006~0.015
M5 x 0.8	4	3,580	49	0.008~0.017	3,580	49	0.008~0.017	3,580	49	0.008~0.017
M6 x 1	4.6	3,110	58	0.01~0.02	3,110	58	0.01~0.02	3,110	58	0.01~0.02
M8 x 1.25	6.2	2,310	62	0.015~0.03	2,310	62	0.015~0.03	2,310	62	0.015~0.03
M10 x 1.5	7.5	1,900	67	0.017~0.035	1,900	67	0.017~0.035	1,900	67	0.017~0.035
M12 x 1.75	9	1,600	72	0.02~0.045	1,600	72	0.02~0.045	1,600	72	0.02~0.045
M16 x 2	11.7	1,220	72	0.03~0.055	1,220	72	0.03~0.055	1,220	72	0.03~0.055
M20 x 2.5	15.7	910	51	0.04~0.065	910	51	0.04~0.065	910	51	0.04~0.065

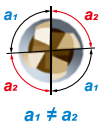
Work Material		Cast Steel, Cast Iron		
Suggested Coolant		Air Blow		
Cutting Speed (m/min)		35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M3 x 0.5	2.4	8,000	64	0.005~0.01
M4 x 0.7	3.1	6,160	83	0.006~0.015
M5 x 0.8	4	4,770	65	0.008~0.017
M6 x 1	4.6	4,150	78	0.01~0.02
M8 x 1.25	6.2	3,080	83	0.015~0.03
M10 x 1.5	7.5	2,550	89	0.017~0.035
M12 x 1.75	9	2,120	95	0.02~0.045
M16 x 2	11.7	1,630	96	0.03~0.055
M20 x 2.5	15.7	1,220	68	0.04~0.065

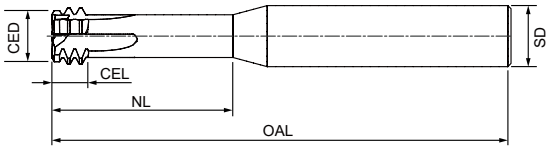
Work Material

P	●	G1
	●	G2
	●	G3
M	○	G4
K	○	G5
H	●	G14
	●	G15
	○	G16

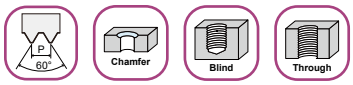
MTD200I- 44004TO-LH

- Helical Drill Thread Mills 4-Flute x 2D
- Left Hand Cutting / Righ-Hand Thread





UN Thread



h5 (unit : mm)

Code No.	Thread Dia. Ø Dm	TPI	Pitch mm	CED	CEL	NL	SD	OAL	Flute
MTD200I-44004TO-LH	No.8 UNC	32	0.794	3.1	2.38	10.5	6	50	4
	No.10 UNC	24	1.06	3.7	3.18	12.5	6	50	4
	1/4 UNC	20	1.27	4.55	3.81	15.5	6	50	4
	1/4 UNF	28	0.91	4.55	2.72	15	6	50	4
	5/16 UNC	18	1.41	5.7	4.23	19	8	65	4
	3/8 UNC	16	1.59	6.7	4.76	22	8	65	4
	7/16 UNC	14	1.81	7.7	5.44	26.5	8	65	4
	1/2 UNC	13	1.95	9.2	5.86	30	10	75	4

※ Customized sizes, Coating, Internal Coolant are available on request!

Thread Milling

Work Material		Mild Steel Low Carbon Steel ~C0.25%			Alloyed Steel 25~35HRC			Hardened Steel 35~45HRC		
Suggested Coolant		Water-Soluble			Water-Soluble			Air Blow		
Cutting Speed (m/min)		60 ~ 120			35 ~ 55			35 ~ 75		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
No.8 32UNC	3.1	6,160	63	0.005~0.01	4,620	47	0.005~0.01	4,620	47	0.005~0.01
No.10 24UNC	3.7	5,160	72	0.007~0.014	3,870	54	0.007~0.014	3,870	54	0.007~0.014
1/4 20UNC	4.55	4,200	119	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
1/4 28UNF	4.55	4,200	119	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
5/16 18UNC	5.7	3,350	113	0.015~0.03	2,510	85	0.015~0.03	2,510	85	0.015~0.03
3/8 16UNC	6.7	2,850	118	0.02~0.035	2,140	89	0.02~0.035	2,140	89	0.02~0.035
7/16 14UNC	7.7	2,480	122	0.025~0.04	1,860	91	0.025~0.04	1,860	91	0.025~0.04
1/2 13UNC	9.2	2,080	103	0.03~0.045	1,560	77	0.03~0.045	1,560	77	0.03~0.045

Work Material		Hardened Steel 45~55HRC			Hardened Steel 55~65HRC			Stainless Steel, Tool Steel		
Suggested Coolant		Air Blow			Air Blow			Water-Soluble		
Cutting Speed (m/min)		35 ~ 65			35 ~ 55			35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
No.8 32UNC	3.1	4,620	47	0.005~0.01	4,620	47	0.005~0.01	4,620	47	0.005~0.01
No.10 24UNC	3.7	3,870	54	0.007~0.014	3,870	54	0.007~0.014	3,870	54	0.007~0.014
1/4 20UNC	4.55	3,150	89	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
1/4 28UNF	4.55	3,150	89	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
5/16 18UNC	5.7	2,510	85	0.015~0.03	2,510	85	0.015~0.03	2,510	85	0.015~0.03
3/8 16UNC	6.7	2,140	89	0.02~0.035	2,140	89	0.02~0.035	2,140	89	0.02~0.035
7/16 14UNC	7.7	1,860	91	0.025~0.04	1,860	91	0.025~0.04	1,860	91	0.025~0.04
1/2 13UNC	9.2	1,560	77	0.03~0.045	1,560	77	0.03~0.045	1,560	77	0.03~0.045

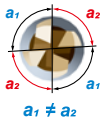
Work Material		Cast Steel, Cast Iron		
Suggested Coolant		Air Blow		
Cutting Speed (m/min)		35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
No.8 32UNC	3.1	6,160	63	0.005~0.01
No.10 24UNC	3.7	5,160	72	0.007~0.014
1/4 20UNC	4.55	4,200	119	0.012~0.025
1/4 28UNF	4.55	4,200	119	0.012~0.025
5/16 18UNC	5.7	3,350	113	0.015~0.03
3/8 16UNC	6.7	2,850	118	0.02~0.035
7/16 14UNC	7.7	2,480	122	0.025~0.04
1/2 13UNC	9.2	2,080	103	0.03~0.045

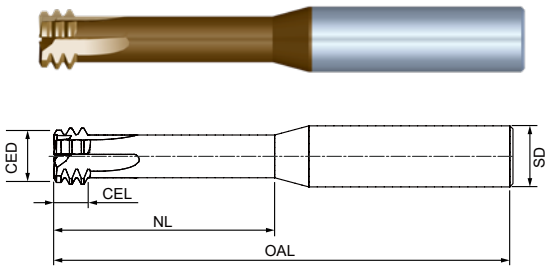
Work Material

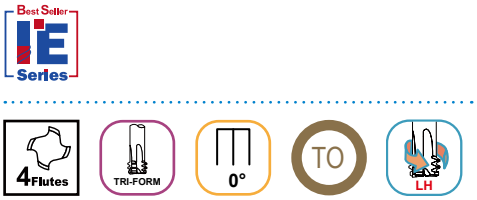
P	●	G1
	●	G2
	●	G3
M	○	G4
K	○	G5
H	●	G14
	●	G15
	○	G16

MTD200I- 44004TO-LH

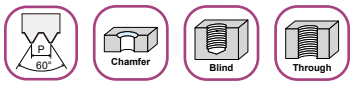
- Helical Drill Thread Mills 4-Flute x 2.5D
- Left Hand Cutting / Righ-Hand Thread







UN Thread



(unit : mm)

Code No.	Thread Dia. Ø Dm	TPI	Pitch mm	CED	CEL	NL	SD	OAL	Flute
MTD200I-44004TO-LH	No.8 UNC	32	0.794	3.1	2.38	12.5	6	50	4
	No.10 UNC	24	1.06	3.7	3.18	15	6	50	4
	1/4 UNC	20	1.27	4.55	3.81	19	6	65	4
	1/4 UNF	28	0.91	4.55	2.72	18	6	65	4
	5/16 UNC	18	1.41	5.7	4.23	23.5	8	65	4
	3/8 UNC	16	1.59	6.7	4.76	27.5	8	65	4
	7/16 UNC	14	1.81	7.7	5.44	32	8	65	4
	1/2 UNC	13	1.95	9.2	5.86	36.5	10	75	4

※ Customized sizes, Coating, Internal Coolant are available on request!

Thread Milling

Work Material		Mild Steel Low Carbon Steel ~C0.25%			Alloyed Steel 25~35HRC			Hardened Steel 35~45HRC		
Suggested Coolant		Water-Soluble			Water-Soluble			Air Blow		
Cutting Speed (m/min)		60 ~ 120			35 ~ 55			35 ~ 75		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
No.8 32UNC	3.1	6,160	63	0.005~0.01	4,620	47	0.005~0.01	4,620	47	0.005~0.01
No.10 24UNC	3.7	5,160	72	0.007~0.014	3,870	54	0.007~0.014	3,870	54	0.007~0.014
1/4 20UNC	4.55	4,200	119	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
1/4 28UNF	4.55	4,200	119	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
5/16 18UNC	5.7	3,350	113	0.015~0.03	2,510	85	0.015~0.03	2,510	85	0.015~0.03
3/8 16UNC	6.7	2,850	118	0.02~0.035	2,140	89	0.02~0.035	2,140	89	0.02~0.035
7/16 14UNC	7.7	2,480	122	0.025~0.04	1,860	91	0.025~0.04	1,860	91	0.025~0.04
1/2 13UNC	9.2	2,080	103	0.03~0.045	1,560	77	0.03~0.045	1,560	77	0.03~0.045

Work Material		Hardened Steel 45~55HRC			Hardened Steel 55~65HRC			Stainless Steel, Tool Steel		
Suggested Coolant		Air Blow			Air Blow			Water-Soluble		
Cutting Speed (m/min)		35 ~ 65			35 ~ 55			35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
No.8 32UNC	3.1	4,620	47	0.005~0.01	4,620	47	0.005~0.01	4,620	47	0.005~0.01
No.10 24UNC	3.7	3,870	54	0.007~0.014	3,870	54	0.007~0.014	3,870	54	0.007~0.014
1/4 20UNC	4.55	3,150	89	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
1/4 28UNF	4.55	3,150	89	0.012~0.025	3,150	89	0.012~0.025	3,150	89	0.012~0.025
5/16 18UNC	5.7	2,510	85	0.015~0.03	2,510	85	0.015~0.03	2,510	85	0.015~0.03
3/8 16UNC	6.7	2,140	89	0.02~0.035	2,140	89	0.02~0.035	2,140	89	0.02~0.035
7/16 14UNC	7.7	1,860	91	0.025~0.04	1,860	91	0.025~0.04	1,860	91	0.025~0.04
1/2 13UNC	9.2	1,560	77	0.03~0.045	1,560	77	0.03~0.045	1,560	77	0.03~0.045

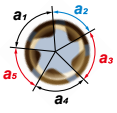
Work Material		Cast Steel, Cast Iron		
Suggested Coolant		Air Blow		
Cutting Speed (m/min)		35 ~ 100		
Thread Dia.Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
No.8 32UNC	3.1	6,160	63	0.005~0.01
No.10 24UNC	3.7	5,160	72	0.007~0.014
1/4 20UNC	4.55	4,200	119	0.012~0.025
1/4 28UNF	4.55	4,200	119	0.012~0.025
5/16 18UNC	5.7	3,350	113	0.015~0.03
3/8 16UNC	6.7	2,850	118	0.02~0.035
7/16 14UNC	7.7	2,480	122	0.025~0.04
1/2 13UNC	9.2	2,080	103	0.03~0.045

Work Material

P	●	G1
	●	G2
	●	G3
M	○	G4
K	○	G5
H	●	G14
	●	G15
	○	G16

MT205IE- 41094TO-RH / 41095TO-RH

- Anti-Vibration Thread Mills 4-Flute / 5-Flute x 2D
- Uneven Flute / Variable Helix 9~13°
- Right Hand Cutting / Righ-Hand Thread



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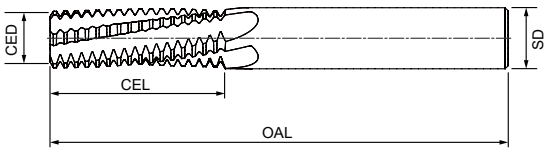
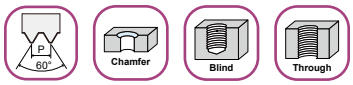


ISO Metric Thread



(unit : mm)

Code No.	Thread Dia.	Pitch	CED	CEL	NL	SD	OAL	Flute
	Ø Dm	mm						
MTD205IE-41094TO-RH	M6	0.75	4.5	13.5	16	6	65	4
		1	4.5	14	16	6	65	
	M8	1	5.7	18	-	6	65	
		1.25	5.7	18.75	-	6	65	
	M10	1.25	7.7	22.5	-	8	70	
		1.5	7.7	24	-	8	70	
MTD205IE-41095TO-RH	M12	1.5	9.7	27	-	10	75	5
		1.75	9.7	28	-	10	75	
	M14	1.5	10.7	31.5	34.5	12	80	
		2	9.7	32		10	75	
	M16	1.5	13.7	36	39	16	100	
		2	11.7	36	-	12	80	
	M20	1.5	15.7	43.5	-	16	100	
		2.5	13.7	45	50	16	100	

※ Customized sizes, Coating, Internal Coolant are available on request!

Thread Milling

Work Material		Mild Steel Low Carbon Steel ~C0.25%			Alloyed Steel 25~35HRC			Hardened Steel 35~45HRC		
Suggested Coolant		Water-Soluble			Water-Soluble			Air Blow		
Cutting Speed (m/min)		70 ~ 140			50 ~ 100			70 ~ 180		
Thread Size Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M6 x 0.75	4.5	4,850	85	0.001~0.02	4,150	73	0.005~0.02	3,460	61	0.005~0.02
M6 x 1										
M8 x 1	5.7	3,600	93	0.015~0.03	3,080	80	0.007~0.03	2,570	67	0.007~0.03
M8 x 1.25										
M10 x 1.25	7.7	3,000	100	0.02~0.035	2,550	85	0.009~0.035	2,120	71	0.009~0.035
M10 x 1.5										
M12 x 1.5	9.7	2,500	108	0.025~0.045	2,120	92	0.01~0.045	1,770	77	0.01~0.045
M12 x 1.75										
M14 x 1.5	10.7	2,500	118	0.025~0.045	2,120	100	0.01~0.045	1,770	83	0.01~0.045
M14 x 2	9.7	2,500	108	0.025~0.045	2,120	92	0.01~0.045	1,770	76	0.01~0.045
M16 x 1.5	13.7	1,900	108	0.03~0.055	1,630	93	0.015~0.055	1,360	78	0.015~0.055
M16 x 2	11.7	2,200	107	0.03~0.055	1,870	91	0.015~0.055	1,560	77	0.015~0.055
M20 x 1.5	15.7	1,430	90	0.04~0.065	1,220	77	0.016~0.065	1,020	64	0.016~0.065
M20 x 2.5	13.7	1,900	108	0.03~0.055	1,630	93	0.015~0.055	1,360	78	0.015~0.055

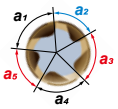
Work Material		Stainless Steel, Tool Steel			Cast Steel, Cast Iron		
Suggested Coolant		Water-Soluble			Air Blow		
Cutting Speed (m/min)		50 ~ 100			70 ~ 150		
Thread Size Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
M6 x 0.75	4.5	3,460	58	0.005~0.02	4,150	73	0.005~0.02
M6 x 1							
M8 x 1	5.7	2,570	62	0.007~0.03	3,080	80	0.007~0.03
M8 x 1.25							
M10 x 1.25	7.7	2,120	67	0.009~0.035	2,550	85	0.009~0.035
M10 x 1.5							
M12 x 1.5	9.7	1,770	72	0.01~0.045	2,120	92	0.01~0.045
M12 x 1.75							
M14 x 1.5	10.7	1,770	83	0.01~0.045	2,120	100	0.01~0.045
M14 x 2	9.7	1,770	76	0.01~0.045	2,120	92	0.01~0.045
M16 x 1.5	13.7	1,360	78	0.015~0.055	1,630	93	0.015~0.055
M16 x 2	11.7	1,560	77	0.015~0.055	1,870	91	0.015~0.055
M20 x 1.5	15.7	1,020	64	0.016~0.065	1,220	77	0.016~0.065
M20 x 2.5	13.7	1,360	78	0.015~0.055	1,630	93	0.015~0.055

Work Material

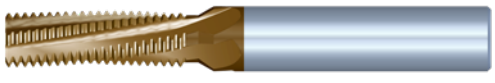
P	●	G1
	●	G2
	●	G3
M	○	G4
K	○	G5
H	●	G14
	●	G15
	○	G16

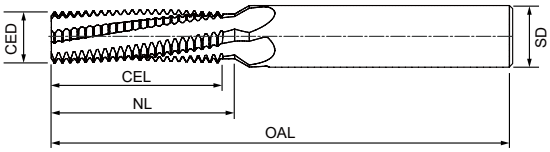
MT205IE- 41094TO-RH / 41095TO-RH

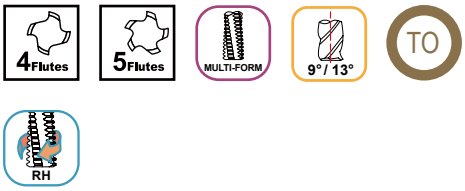
- Anti-Vibration Thread Mills 4-Flute / 5-Flute x 2D
- Uneven Flute / Variable Helix 9~13°
- Right Hand Cutting / Righ-Hand Thread



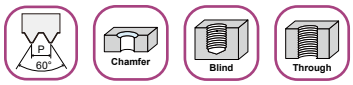
$a_1 \neq a_2 \neq a_3 \neq a_4 \neq a_5$







UN Thread



h5 (unit : mm)

Code No.	Thread Dia. Ø Dm	TPI	Pitch mm	CED	CEL	NL	SD	OAL	Flute
MTD205IE-41094TO-RH	1/4	20	1.27	4.55	15.24	17.7	6	65	4
		28	0.91	4.55	15.42	17.2	6	65	
	5/16	18	1.41	5.7	19.75	-	6	65	
		24	1.06	5.7	19.05	-	6	65	
	3/8	16	1.59	6.7	22.23	25.4	8	70	
		24	1.06	6.7	22.22	24.3	8	70	
	7/16	14	1.81	7.7	27.21	-	8	70	
		20	1.27	7.7	25.4	-	8	70	
MTD205IE-41095TO-RH	1/2	13	1.95	8.7	29.31	33.2	10	75	5
		20	1.27	8.7	27.94	30.4	10	75	
	9/16	12	2.12	9.7	33.87	-	10	75	
		18	1.41	9.7	32.45	-	10	75	
	5/8	11	2.31	10.7	36.94	41.5	12	80	
		18	1.41	10.7	35.28	38.1	12	80	
	3/4	10	2.54	11.7	43.18	-	12	80	
		16	1.59	11.7	41.28	-	12	80	
	7/8	9	2.82	13.7	50.8	56.4	16	100	
		14	1.81	13.7	48.98	52.6	16	100	

※ Customized Thread types, Sizes, Coating, Internal Coolant Shank are available on request!

Thread Milling

Work Material		Mild Steel Low Carbon Steel ~C0.25%			Alloyed Steel 25~35HRC			Hardened Steel 35~45HRC		
Suggested Coolant		Water-Soluble			Water-Soluble			Air Blow		
Cutting Speed (m/min)		70 ~ 140			50 ~ 100			70 ~ 180		
Thread Size Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
1/4 20UNC 1/4 28UNF	4.55	4,900	85	0.01~0.02	4,200	73	0.01~0.02	3,500	61	0.01~0.02
5/16 18UNC 5/16 24UNF	5.7	3,900	93	0.012~0.24	3,350	80	0.012~0.24	2,800	67	0.012~0.24
3/8 16UNC 3/8 24UNF	6.7	3,330	98	0.015~0.029	2,850	85	0.015~0.029	2,380	71	0.015~0.029
7/16 14UNC 7/16 20UNF	7.7	2,900	99	0.018~0.032	2,480	87	0.018~0.032	2,070	73	0.018~0.032
1/2 13UNC 1/2 20UNF	8.7	2,420	107	0.022~0.044	2,080	92	0.022~0.044	1,730	77	0.022~0.044
9/16 12UNC 9/16 18UNF	9.7	2,300	106	0.025~0.045	1,970	93	0.025~0.045	1,640	79	0.025~0.045
5/8 11UNC 5/8 18UNF	10.7	2,080	105	0.028~0.05	1,890	96	0.028~0.05	1,490	75	0.028~0.05
3/4 10UNC 3/4 16UNF	11.7	1,900	103	0.03~0.054	1,630	93	0.03~0.054	1,360	75	0.03~0.054
7/8 9UNC 7/8 14UNF	13.7	1,630	100	0.035~0.06	1,400	85	0.035~0.06	1,160	70	0.035~0.06

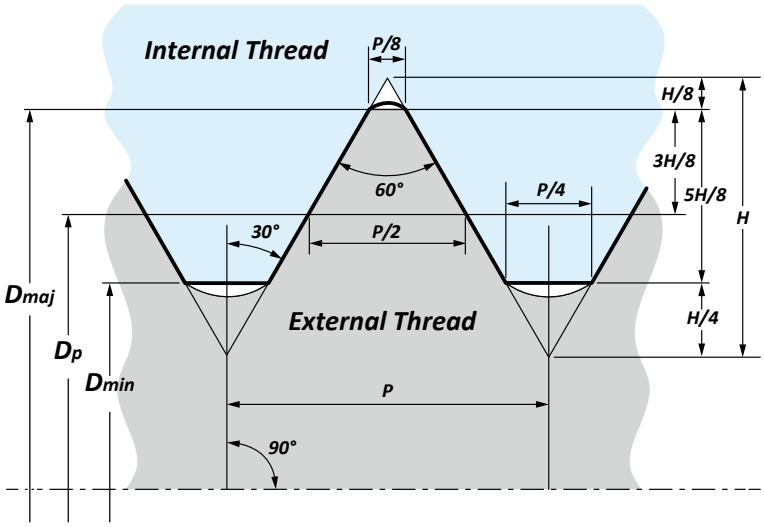
Work Material		Stainless Steel, Tool Steel			Cast Steel, Cast Iron		
Suggested Coolant		Water-Soluble			Air Blow		
Cutting Speed (m/min)		50 ~ 100			70 ~ 150		
Thread Size Ø	CED	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)	Speed (min-1)	Feed mm/min	Feed/tooth fz (mm)
1/4 20UNC 1/4 28UNF	4.55	3,500	61	0.01~0.02	4,200	73	0.01~0.02
5/16 18UNC 5/16 24UNF	5.7	2,800	67	0.012~0.24	3,350	80	0.012~0.24
3/8 16UNC 3/8 24UNF	6.7	2,380	71	0.015~0.029	2,850	85	0.015~0.029
7/16 14UNC 7/16 20UNF	7.7	2,070	73	0.018~0.032	2,480	87	0.018~0.032
1/2 13UNC 1/2 20UNF	8.7	1,730	77	0.022~0.044	2,080	92	0.022~0.044
9/16 12UNC 9/16 18UNF	9.7	1,640	79	0.025~0.045	1,970	93	0.025~0.045
5/8 11UNC 5/8 18UNF	10.7	1,490	75	0.028~0.05	1,890	96	0.028~0.05
3/4 10UNC 3/4 16UNF	11.7	1,360	75	0.03~0.054	1,630	93	0.03~0.054
7/8 9UNC 7/8 14UNF	13.7	1,160	70	0.035~0.06	1,400	85	0.035~0.06

Work Material

P	●	G1
	●	G2
	●	G3
M	○	G4
K	○	G5
H	●	G14
	●	G15
	○	G16

Technichal Data

ISO Metric Screw Thread / Unified Thread Standard (UTS)



$H \approx 0.8660 * P$

$P \approx 1.1547 * H$

$D_{min} \approx D_{maj} - 1.082532 * P$

$D_p \approx D_{maj} - 0.649519 * P$

※ ISO Metric Screw Thread

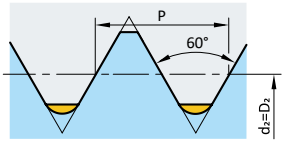
Thread Size D Ø (mm)	Coarse Pitch (mm)	Fine Pitch (mm)
M1	0.25	0.2
M1.2	0.25	0.2
M1.4	0.3	0.2
M1.6	0.35	0.2
M1.8	0.35	0.2
M2	0.4	0.25
M2.5	0.45	0.35
M3	0.5	0.35
M3 .5	0.6	0.35
M4	0.7	0.5
M5	0.8	0.5
M6	1	0.75
M7	1	0.75
M8	1.25	1
M10	1.5	1.25
M12	1.75	1.5
M14	2	1.5
M16	2	1.5
M20	2.5	2 or 1.5
M22	2.5	2 or 1.5
M24	3	2 or 1.5
M27	3	2
M30	3.5	2

※ Unified Thread Standard (UTS)

Thread Size D Ø (mm)	Coarse (mm)		Fine (mm)	
	TPI	Pitch	TPI	Pitch
No.1	64	0.397	72	0.353
No.2	56	0.453	64	0.397
No.3	48	0.529	56	0.454
No.4	40	0.635	48	0.529
No.5	40	0.635	44	0.577
No.6	32	0.794	40	0.635
No.8	32	0.794	36	0.706
No.10	24	1.058	32	0.794
No.12	24	1.058	28	0.907
1/4	20	1.270	28	0.907
5/16	18	1.411	24	1.058
3/8	16	1.588	24	1.058
7/16	14	1.814	20	1.270
1/2	13	1.954	20	1.270
9/16	12	2.117	18	1.411
5/8	11	2.309	18	1.411
3/4	10	2.540	16	1.588
7/8	9	2.822	14	1.814
1	8	3.175	12	2.117

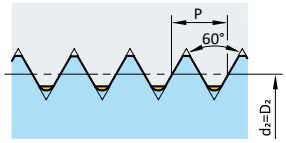
The characteristics of different thread types

M ISO-metric thread
General standard thread



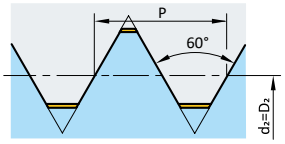
DIN13-1

M ISO-metric thread
General fine thread



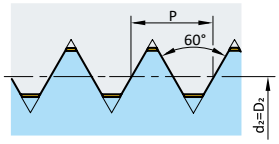
DIN13-2 ~
DIN 13-11

UNC Unified National Coarse thread
General UN standard thread



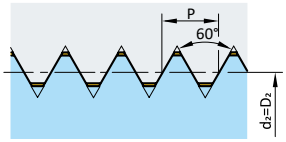
ASME B1.1

UNF Unified National Fine thread
General UN fine thread



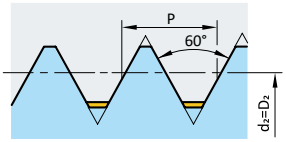
ASME B1.1、
ISO-metric
trapezoidal thread

UNEF Unified National Extra Fine thread
General UN Extra Fine thread



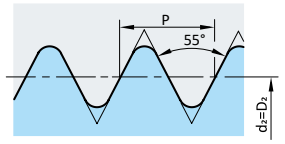
ASME B1.1

UNS Unified Special thread
General UN Special thread



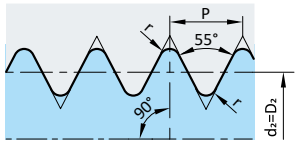
ASME B1.1

G Cylindrical Pipe thread without thread aealing connections
Threads for pipes,pipe connections and fittings



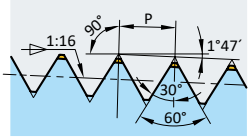
DIN EN ISO 228-1

Rp Whitworth pipe thread aylindrical internal thread
Internal thread for pipe threads and fittings (for in the thread sealing connections)



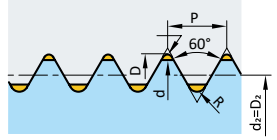
DIN EN 10226-1
(based on ISO 7-1)
Replacement for
DIN 2999-1

NPT American Standard Pipe Threads tapered for sealing
For pipe threads and fittings



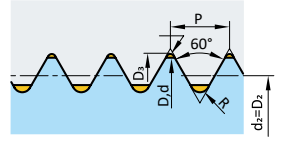
ANSI/ASME
B1.20.1

UNJ inch thread
For the aero space industry



ISO 3161

MJ thread metric thread
For the aero space industry



DIN ISO 5855-1

External thread

Internal thread

Play

Technichal Data

Calculation Formula for Internal Thread Milling

$$V_c = \frac{CED \times \pi \times n}{1000}$$

$$V_{fm} = n \times fz \times Z$$

$$V_f = \frac{Vfm \times (Dm-CED)}{D_m}$$

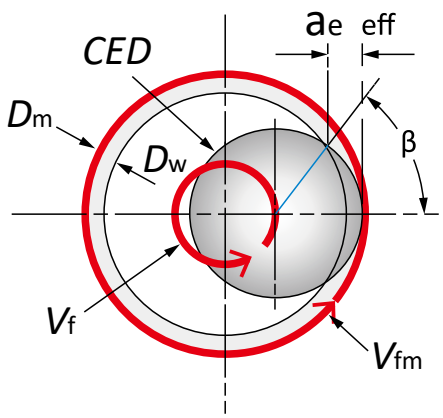
$$a_{e\ eff} = \frac{Dm^2 - Dw^2}{4(Dm-CED)}$$

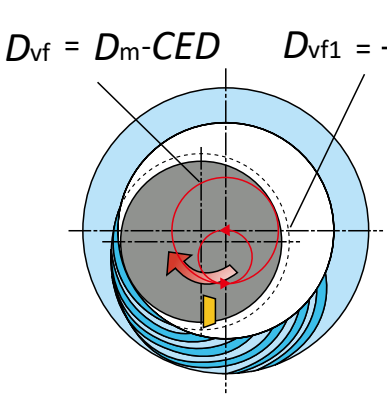
$$f_z = \frac{hex \times 1000}{\sqrt{1-\cos^2 \beta}} = \frac{h_{ex}}{Sin\ \beta}$$

$$\beta = \arccos\left(1 - \frac{2 \times a_{e\ eff}}{CED}\right)$$

V_c	=	cutting speed (m/min)
V_{fm}	=	contour feed (mm/min)
V_f	=	Tool center feed
n	=	Spindle Speed (rpm.)
z	=	number of flute
$a_{e\ eff}$	=	Radial depth of cut
f_z	=	feed per tooth
D_m	=	Ø Thread Dia.
π	=	3.14
CED	=	Thread Mill Cutting Dia.

Thread Milling





Thread Milling with a roll into cut tool path, D_{vf1}

Thread milling programming

Program specifications

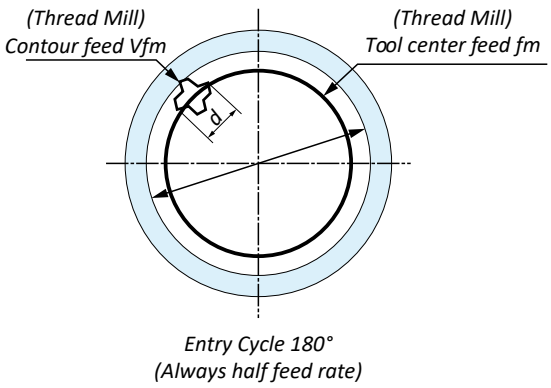
Thread milling functions

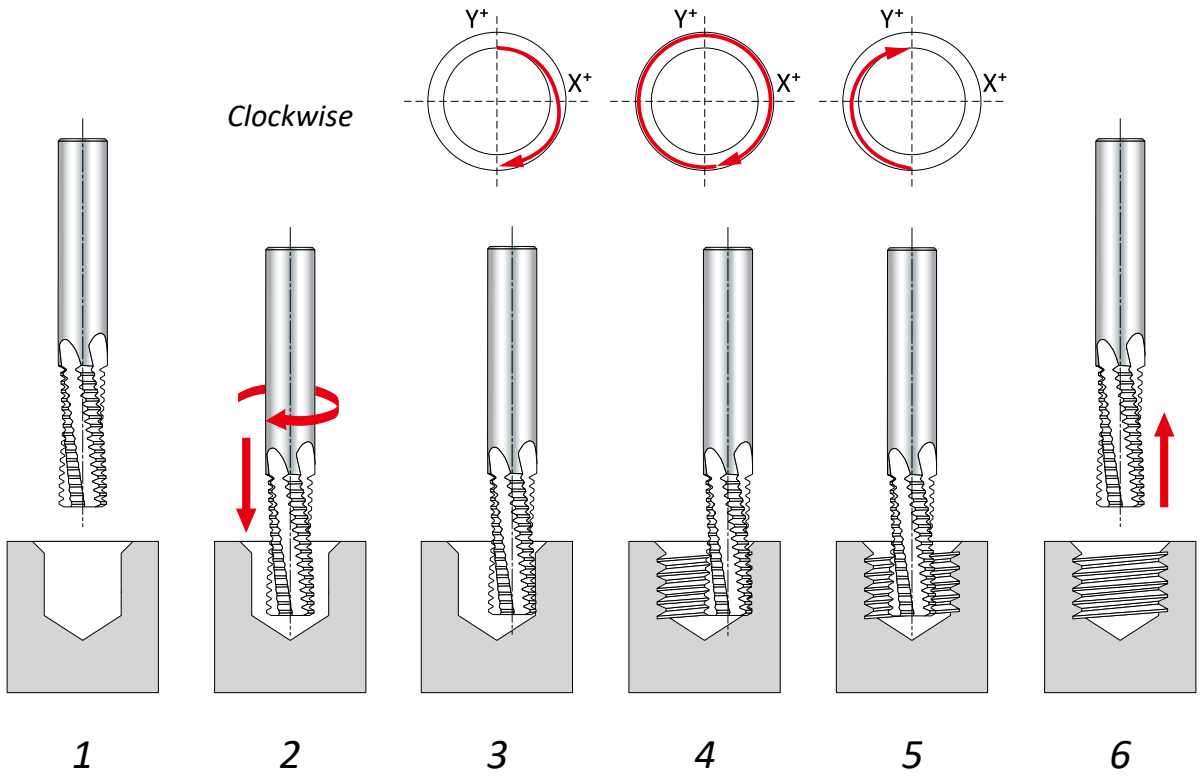
G00	*Rapid movement*
G01	*Feed*
G02	*Circular interpolation (clockwise)*
G03	*Circular interpolation (anti-clockwise)*
G17	*Layer selection x-y axis*
G18	*Layer selection z-x axis*
G19	*Layer selection y-z axis*
G40	*Cancel tool correction*
G41	*Tool path correction (left of contour)*
G42	*Tool path correction (right of contour)*
G43	*Tool length compensation (call-up)*
G49	*Tool length compensation (deselect)*
G54	*Work offset*
G90	*Absolute dimension*
G91	*Incremental dimension*
M03	*Spindle on (clockwise rotation)*
M05	*Spindle stop*
M08	*Coolant on*
X	*Axis*
Y	*Axis*
Z	*Axis*
I	*Thread pitch parallel to X-axis*
J	*Thread pitch parallel to Y-axis*
S	*Spindle speed*
F	*Feed*

Technichal Data

CNC Internal thread milling

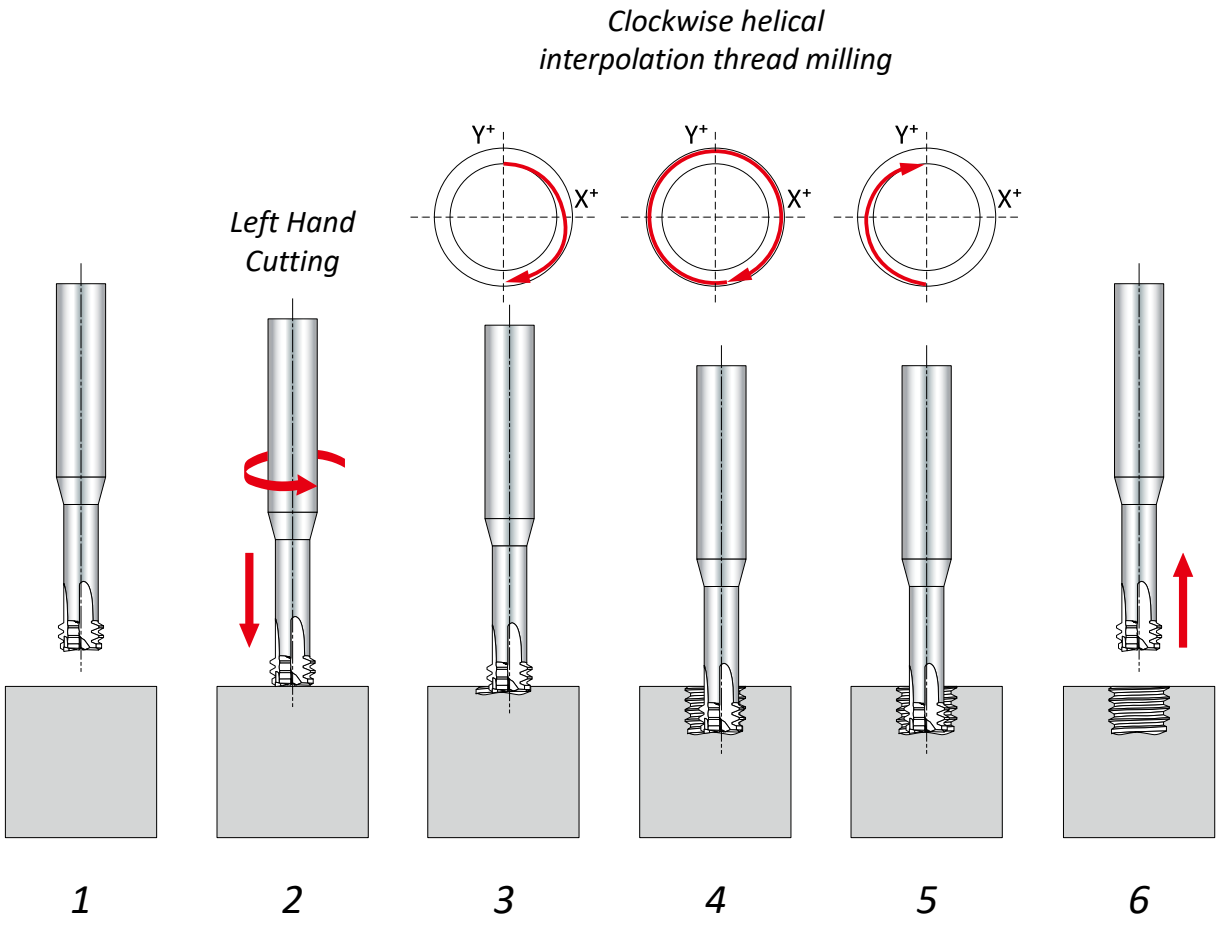
1 *Moving to starting position*
2 *Moving to thread depth in hole*
3 *180° descending loop to contour*
4 *360° full circular movement of thread milling cutter*
5 *180° exit loop to hole*
6 *Rapid movement from hole to starting position*





CNC Internal thread milling

1 *Starting point*
2 *Moving to starting position*
3 *180° entry to cycle (Clockwise helical interpolation thread milling*
4 *360° full circular thread milling*
5 *180° withdrawal cycle*
6 *Move to End position*



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