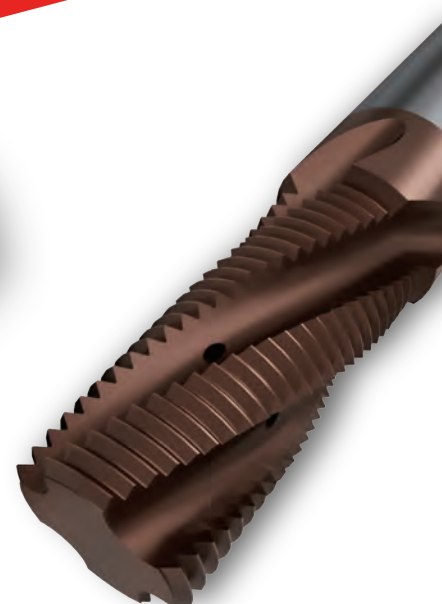




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NICHE
TM03SM2P0.4-d1.54-D4-L50



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TM Carbide Thread Mill

TM	01	S	M10	P1.0	d7.9	D8	L65	C
1	2	3	4	5	6	7	8	9

1- Series

Carbide Thread Mill

3- Teeth

S - 1 Tooth

T - 3 Teeth

F - Full Teeth

2- Grade

01 - For general thread milling

02 - For hardened materials

03 - For Titanium-alloys/heat-resistant alloys

04 - For non-ferrous metals without coating

05 - For non-ferrous metals with DLC coating

4 - Thread Standard

60 - Partial Profile 60°	BSF - Whitworth Fine
ISO - ISO Metric	BSPT - BSPT
UN - American UN	NPT - NPT
UNC - UN Coarse	ANPT - ANPT
UNF - UN Fine	NPTF - NPTF
UNEF - UN Extra Fine	NPS - NPS
UNJ - UNJ	PG - PG
MJ - MJ	TP60 - Taper 60°
BSW - Whitworth Coarse	TP55 - Taper 55°
BSP - BSP	TR - Trapezoidal

5 - Pitch

Full Profile - Pitch Range

mm	TPI
0.25-6.0	80 - 4.5

Partial Profile - Pitch Range

mm	TPI
0.5-0.8	32-56
0.5-1.0	24-56
1.0-1.50	16-24
1.0-1.75	14-24
0.5-1.25	20-48

6 - Cutter Diameter

7 - Shank Diameter

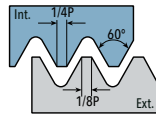
8 - Total Length

9 - Cooling

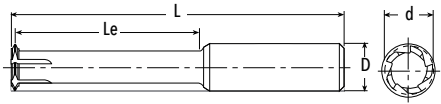
-: External
C: Internal



ISO Metric



Defined by: R262 (DIN 13)
Tolerance class: 6H



Unit: mm

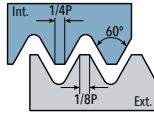
Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**SM0.8P0.2-d0.55-D4-L50	M0.8*0.2	0.20	0.55	4	2	50	3	0.6
TM**SM0.9P0.225-d0.6-D4-L50	M0.9*0.225	0.23	0.6	4	2	50	3	0.675
TM**SM1P0.25-d0.73-D4-L50	M1*0.25	0.25	0.73	4	2.3	50	3	0.75
TM**SM1.2P0.25-d0.92-D4-L50	M1.2*0.25	0.25	0.92	4	2.8	50	3	0.95
TM**SM1.4P0.3-d1.05-D4-L50	M1.4*0.3	0.30	1.05	4	3.2	50	3	1.1
TM**SM1.6P0.35-d1.21-D4-L50	M1.6*0.35	0.35	1.21	4	3.5	50	3	1.25
TM**SM2P0.4-d1.54-D4-L50	M2*0.4	0.40	1.54	4	4.5	50	3	1.6
TM**SM2.5P0.45-d1.96-D4-L50	M2.5*0.45	0.45	1.96	4	5.5	50	3	2.05
TM**SM3P0.5-d2.4-D4-L50	M3*0.5	0.50	2.4	4	7	50	3	2.5
TM**SM4P0.7-d3.15-D4-L50	M4*0.7	0.70	3.15	4	10	50	4	3.3
TM**SM5P0.8-d4-D4-L50	M5*0.8	0.80	4.0	4	12	50	4	4.2
TM**SM5P0.8-d4-D6-L50	M5*0.8	0.80	4.0	6	13	50	4	4.2
TM**SM6P1.0-d4.75-D6-L50	M6*1.0	1.00	4.75	6	15	50	4	5
TM**SM8P1.25-d5.95-D6-L60	M8*1.25	1.25	5.95	6	20	60	4	6.75
TM**SM10P1.5-d7.9-D8-L60	M10*1.5	1.50	7.9	8	25	60	6	8.5
TM**SM12P1.75-d9.9-D10-L75	M12*1.75	1.75	9.9	10	30	75	6	10.25
TM**SM14P2.0-d9.9-D10-L75	M14*2.0	2.00	9.9	10	30	75	6	12
TM**SM16P2.0-d11.9-D12-L75	M16*2.0	2.00	11.9	12	35	75	6	14
TM**SM18P2.5-d14-D14-L100	M18*2.5	2.50	14	14	40	100	5	15.5
TM**SM24P3.0-d16-D16-L100	M24*3.0	3.00	16	16	45	100	5	21
TM**SM30P6.0-d20-D20-L100	M30*6.0	6.00	20	20	50	100	6	24



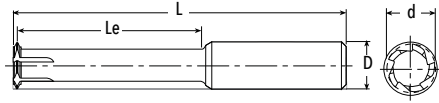
1-tooth Thread Mill

ISO Metric

Extra length



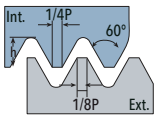
Defined by: R262 (DIN 13)
Tolerance class: 6H



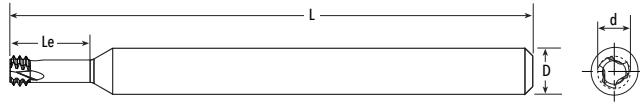
Unit: mm

Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**SM1.6P0.35-d1.21-D4-L75	M1.6*0.35	0.35	1.21	4	3.5	75	3	1.25
TM**SM2P0.4-d1.54-D4-L75	M2*0.4	0.40	1.54	4	6	75	3	1.6
TM**SM2P0.4-d1.54-D4-L100	M2*0.4	0.40	1.54	4	6	100	3	1.6
TM**SM2.5P0.45-d1.96-D4-L75	M2.5*0.45	0.45	1.96	4	7.5	75	3	2.05
TM**SM2.5P0.45-d1.96-D4-L100	M2.5*0.45	0.45	1.96	4	7.5	100	3	2.05
TM**SM3P0.5-d2.4-D4-L75	M3*0.5	0.50	2.4	4	9	75	3	2.5
TM**SM3P0.5-d2.4-D4-L100	M3*0.5	0.50	2.4	4	9	100	3	2.5
TM**SM4P0.7-d3.15-D4-L75	M4*0.7	0.70	3.15	4	12	75	3	3.3
TM**SM4P0.7-d3.15-D4-L100	M4*0.7	0.70	3.15	4	12	100	3	3.3
TM**SM5P0.8-d4-D6-L75	M5*0.8	0.80	4.0	6	15	75	4	4.2
TM**SM5P0.8-d4-D6-L100	M5*0.8	0.80	4.0	6	13	100	4	4.2
TM**SM6P1.0-d4.75-D6-L75	M6*1.0	1.00	4.75	6	18	75	4	5
TM**SM6P1.0-d4.75-D6-L100	M6*1.0	1.00	4.75	6	18	100	4	5
TM**SM8P1.25-d5.9-D6-L75	M8*1.25	1.25	5.9	6	20	75	4	6.75
TM**SM8P1.25-d5.9-D6-L100	M8*1.25	1.25	5.9	6	25	100	4	6.75
TM**SM10P1.5-d7.9-D8-L75	M10*1.5	1.50	7.9	8	30	75	6	8.5
TM**SM10P1.5-d7.9-D8-L100	M10*1.5	1.50	7.9	8	30	100	6	8.5
TM**SM12P1.75-d9.9-D10-L100	M12*1.75	1.75	9.9	10	35	100	6	10.25
TM**SM16P2.0-d12-D12-L100	M16*2.0	2.00	12	12	35	100	6	14

ISO Metric



Defined by: R262 (DIN 13)
Tolerance class: 6H



Unit: mm

Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**TM1.6P0.25-d0.73-D4-L50	M1*0.25	0.25	0.73	4	2.3	50	3	0.75
TM**TM1.2P0.25-d0.92-D4-L50	M1.2*0.25	0.25	0.92	4	3.3	50	3	0.95
TM**TM1.4P0.3-d1.05-D4-L50	M1.4*0.3	0.30	1.05	4	3.2	50	3	1.1
TM**TM1.6P0.35-d1.21-D4-L50	M1.6*0.35	0.35	1.21	4	3.5	50	3	1.25
TM**TM1.8P0.35-d1.4-D4-L50	M1.8*0.35	0.35	1.4	4	4	50	3	1.45
TM**TM2P0.4-d1.54-D4-L50	M2*0.4	0.4	1.54	4	4.5	50	3	1.6
TM**TM2.2P0.45-d1.65-D4-L50	M2.2*0.45	0.45	1.65	4	5	50	3	1.75
TM**TM2.5P0.45-d1.96-D4-L50	M2.5*0.45	0.45	1.96	4	5.5	50	3	2.05
TM**TM3P0.5-d2.42-D4-L50	M3*0.5	0.5	2.42	4	7	50	3	2.5
TM**TM3.5P0.6-d2.75-D4-L50	M3.5*0.6	0.6	2.75	4	9	50	3	2.9
TM**TM4P0.5-d3.4-D4-L50	M4*0.5	0.5	3.4	4	8	50	3	3.5
TM**TM4P0.7-d3.15-D4-L50	M4*0.7	0.7	3.15	4	10	50	3	3.3
TM**TM4.5P0.75-d3.5-D4-L50	M4.5*0.75	0.75	3.5	4	11	50	3	3.75
TM**TM5P0.5-d3.9-D4-L50	M5*0.5	0.5	3.9	4	8	50	3	4.5
TM**TM5P0.75-d3.9-D4-L50	M5*0.75	0.42	3.9	4	8	50	3	4.25
TM**TM5P0.8-d4-D6-L50	M5*0.8	0.8	4.0	6	12	50	3	4.2
TM**TM5P0.8-d3.95-D4-L50	M5*0.8	0.8	3.95	4	12	50	3	4.2
TM**TM6P0.5-d4.8-D6-L50	M6*0.5	0.5	4.8	6	13	50	3	5.5
TM**TM6P0.75-d5-D6-L50	M6*0.75	0.75	5.0	6	13	50	3	5.25
TM**TM6P1.0-d4.75-D6-L50	M6*1.0	1	4.75	6	13	50	3	5

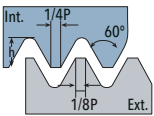
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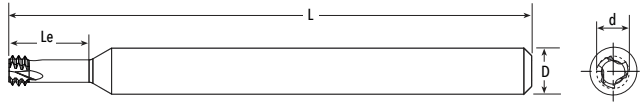


3-teeth Thread Mill

ISO Metric



Defined by: R262 (DIN 13)
Tolerance class: 6H

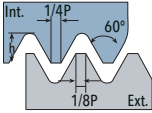


Unit: mm

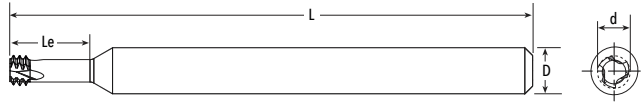
Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**TM8P0.75-d5.95-D6-L50	M8*0.75	0.75	5.95	6	20	50	3	7.25
TM**TM8P1.0-d5.9-D6-L60	M8*1.0	1	5.9	6	20	60	3	7
TM**TM8P0.5-d5.95-D6-L50	M8*0.5	0.5	5.95	6	16	50	4	7.5
TM**TM8P1.25-d5.95-D6-L60	M8*1.25	1.25	5.95	6	17.5	60	3	6.75
TM**TM10P1.0-d7.9-D8-L65	M10*1.0	1	7.9	8	21	65	4	9
TM**TM10P1.25-d7.95-D8-L65	M10*1.25	1.25	7.95	8	21	65	4	8.75
TM**TM10P1.5-d7.9-D8-L60	M10*1.5	1.5	7.9	8	22	60	4	8.5
TM**TM12P1.0-d9.9-D10-L75	M12*1.0	1	9.9	10	30	75	4	11
TM**TM12P1.5-d9.9-D10-L75	M12*1.5	1.5	9.9	10	30	75	4	10.5
TM**TM12P1.25-d9.9-D10-L75	M12*1.25	1.25	9.9	10	30	75	4	10.75
TM**TM12P1.75-d9.9-D10-L75	M12*1.75	1.75	9.9	10	28	75	4	10.25
TM**TM14P2.0-d9.9-D10-L75	M14*2.0	2	9.9	10	28	75	4	12
TM**TM16P1.5-d11.9-D12-L75	M16*1.5	1.5	11.9	12	35	75	4	14.5
TM**TM16P2.0-d11.9-D12-L75	M16*2.0	2	11.9	12	35	75	4	14
TM**TM18P2.5-d13.9-D14-L83	M18*2.5	2.5	13.9	14	40	83	5	15.5
TM**TM20P2.5-d15.9-D16-L100	M20*2.5	2.5	15.9	16	50	100	6	17.5
TM**TM24P3.0-d15.9-D16-L100	M24*3.0	3	15.9	16	50	100	6	21
TM**TM30P3.5-d15.9-D16-L100	M30*3.5	3.5	15.9	16	50	100	6	26.5

ISO Metric

Extra length



Defined by: R262 (DIN 13)
Tolerance class: 6H



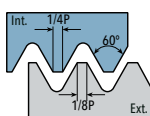
Unit: mm

Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**TM1.6P0.35-d1.21-D4-L100	M1.6*0.35	0.35	1.21	4	5	100	3	1.25
TM**TM2P0.4-d1.54-D4-L75	M2*0.4	0.4	1.54	4	6	75	3	1.6
TM**TM2P0.4-d1.54-D4-L100	M2*0.4	0.4	1.54	4	6	100	3	1.6
TM**TM2.5P0.45-d1.96-D4-L75	M2.5*0.45	0.45	1.96	4	7.5	75	3	2.05
TM**TM2.5P0.45-d1.96-D4-L100	M2.5*0.45	0.45	1.96	4	7.5	100	3	2.05
TM**TM3P0.5-d2.4-D4-L75	M3*0.5	0.5	2.4	4	9	75	3	2.5
TM**TM3P0.5-d2.4-D4-L100	M3*0.5	0.5	2.4	4	9	100	3	2.5
TM**TM4P0.7-d3.15-D4-L75	M4*0.7	0.7	3.15	4	12	75	3	3.3
TM**TM4P0.7-d3.15-D4-L100	M4*0.7	0.7	3.15	4	12	100	3	3.3
TM**TM5P0.8-d4.0-D6-L75	M5*0.8	0.8	4.0	6	15	75	4	4.2
TM**TM5P0.8-d4.0-D6-L100	M5*0.8	0.8	4.0	6	15	100	4	4.2
TM**TM6P1.0-d4.75-D6-L75	M6*1.0	1	4.75	6	18	75	4	5
TM**TM6P1.0-d4.75-D6-L100	M6*1.0	1	4.75	6	18	100	4	5
TM**TM8P1.25-d5.9-D6-L75	M8*1.25	1.25	5.9	6	20	75	3	6.75
TM**TM8P1.25-d5.9-D6-L100	M8*1.25	1.25	5.9	6	25	100	3	6.75
TM**TM10P1.5-d7.9-D8-L75	M10*1.5	1.5	7.9	8	30	75	4	8.5
TM**TM10P1.5-d7.9-D8-L100	M10*1.5	1.5	7.9	8	30	100	5	8.5
TM**TM12P1.75-d9.9-D10-L100	M12*1.75	1.75	9.9	10	35	100	5	10.25
TM**TM16P2.0-d11.9-D12-L100	M16*2.0	2	11.9	12	35	100	5	14

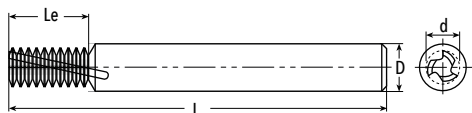


Full-teeth Thread Mill

ISO Metric



Defined by: R262 (DIN 13)
Tolerance class: 6H



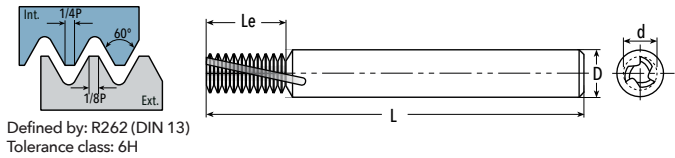
Unit: mm

Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**FM1.6P0.35-d1.2-D4-L50	M1.6*0.35	0.35	1.2	4	3.5	50	3	1.25
TM**FM2P0.4-d1.54-D4-L50	M2*0.4	0.4	1.54	4	5	50	3	1.6
TM**FM2.5P0.45-d1.96-D4-L50	M2.5*0.45	0.45	1.96	4	6	50	3	2.05
TM**FM3P0.5-d2.4-D4-L50	M3*0.5	0.5	2.4	4	7.5	50	3	2.5
TM**FM3.5P0.6-d2.75-D4-L50	M3.5*0.6	0.6	2.75	4	8.5	50	3	2.9
TM**FM4P0.5-d3-D4-L50	M4*0.5	0.5	3	4	8	50	3	3.5
TM**FM4P0.7-d3.15-D4-L50	M4*0.7	0.7	3.15	4	10	50	3	3.3
TM**FM4.5P0.75-d3.4-D4-L50	M4.5*0.75	0.75	3.4	4	9	50	3	3.75
TM**FM5P0.5-d3.9-D4-L50	M5*0.5	0.5	3.9	4	12	50	3	4.5
TM**FM5P0.8-d3.95-D4-L50	M5*0.8	0.8	3.95	4	12	50	3	4.2
TM**FM5P0.8-d3.9-D6-L50	M5*0.8	0.8	3.9	6	13	50	3	4.2
TM**FM6P0.5-d4.8-D6-L50	M6*0.5	0.5	4.8	6	13	50	3	5.5
TM**FM6P0.75-d3.9-D4-L50	M6*0.75	0.75	3.9	4	12	50	3	5.25
TM**FM6P0.75-d5.0-D6-L60	M6*0.75	0.75	5	6	17	60	3	5.25
TM**FM6P1.0-d3.95-D4-L50	M6*1.0	1.0	3.95	4	12	50	3	5
TM**FM6P1.0-d4.75-D6-L50	M6*1.0	1.0	4.75	6	13	50	3	5
TM**FM8P0.5-d5.9-D6-L60	M8*0.5	0.5	5.9	6	16	60	3	7.5
TM**FM8P0.75-d5.95-D6-L60	M8*0.75	0.75	5.95	6	18	60	3	7.25
TM**FM8P1.0-d5.95-D6-L60	M8*1.0	1.0	5.95	6	15	60	3	7
TM**FM8P1.25-d5.9-D6-L60	M8*1.25	1.25	5.9	6	20	60	3	6.75
TM**FM10P0.5-d7.9-D8-L65	M10*0.5	0.5	7.9	8	20	65	4	9.5
TM**FM10P0.75-d7.9-D8-L65	M10*0.75	0.75	7.9	8	22	65	4	9.25
TM**FM10P1.0-d7.95-D8-L65	M10*1.0	1.0	7.95	8	22	65	4	9
TM**FM10P1.25-d7.9-D8-L65	M10*1.25	1.25	7.9	8	20	65	3	8.75
TM**FM10P1.5-d7.7-D8-L65	M10*1.5	1.5	7.7	8	22	65	4	8.5
TM**FM12P0.5-d9.95-D10-L75	M12*0.5	0.5	9.95	10	20	75	3	11.5

See next page



ISO Metric



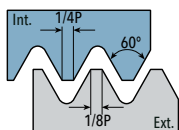
Unit: mm

Specification	Thread	Pitch	Dimensions					Bore
			d	D	Le	L		
TM**FM12P0.75-d9.95-D10-L75	M12*0.75	0.75	9.95	10	20	75	4	11.25
TM**FM12P1.0-d9.9-D10-L65	M12*1.0	1.0	9.9	10	20	65	4	11
TM**FM12P1.0-d9.9-D10-L75	M12*1.0	1.0	9.9	10	28	75	4	11
TM**FM12P1.25-d9.9-D10-L75	M12*1.25	1.25	9.9	10	25	75	4	10.75
TM**FM12P1.5-d9.4-D10-L75	M12*1.5	1.5	9.4	10	24	75	4	10.5
TM**FM12P1.5-d9.9-D10-L65	M12*1.5	1.5	9.9	10	20	65	4	10.5
TM**FM12P1.75-d9.5-D10-L75	M12*1.75	1.75	9.5	10	25	75	4	10.25
TM**FM14P1.0-d11.9-D12-L75	M14*1.0	1.0	11.9	12	30	75	4	13
TM**FM14P1.5-d9.9-D10-L75	M14*1.5	1.5	9.9	10	25	75	4	12.5
TM**FM14P1.5*d11.2-D12-L75	M14*1.5	1.5	11.2	12	30	75	4	12.5
TM**FM14P2.0-d9.9-D10-L75	M14*2.0	2.0	9.9	10	30	75	4	12
TM**FM16P1.5-d12-D12-L75	M16*1.5	1.5	12	12	30	75	4	14.5
TM**FM16P1.5-d11.9-D12-L83	M16*1.5	1.5	11.9	12	36	83	4	14.5
TM**FM16P2.0-d11.9-D12-L75	M16*2.0	2.0	11.9	12	30	75	4	14
TM**FM16P2.0-d12-D12-L83	M16*2.0	2.0	12	12	35	83	4	14
TM**FM16P1.5-d13.9-D14-L83	M16*1.5	1.5	13.9	14	33	83	4	14.5
TM**FM16P1.0-d11.9-D14-L83	M16*1.0	1.0	11.9	14	33	100	4	15
TM**FM18P2.0-d13.9-D14-L100	M18*2.0	2.0	13.9	14	33	100	5	16
TM**FM18P2.5-d13.9-D14-L100	M18*2.5	2.5	13.9	14	33	100	5	15.5
TM**FM20P1.5-d15.95-D16-L100	M20*1.5	1.5	15.95	16	40	100	4	18.5
TM**FM22P1.0-d16-D16-L100	M22*1.0	1.0	16	16	40	100	5	21
TM**FM20P2.0-d15.95-D16-L100	M20*2.0	2.0	15.95	16	40	100	5	20
TM**FM20P2.5-d15.9-D16-L100	M20*2.5	2.5	15.9	16	40	100	5	19.5
TM**FM24P3.0-d15.9-D16-L100	M24*3.0	3.0	15.9	16	40	100	4	21
TM**FM20P2.0-d20-D20-L100	M20*2.0	2.0	20	20	40	100	5	18
TM**FM20P4.0-d20-D20-L100	M20*4.0	4.0	20	20	40	100	5	16
TM**FM30P3.5-d15.9-D16-L100	M30*3.5	3.5	15.9	16	40	100	5	26.5

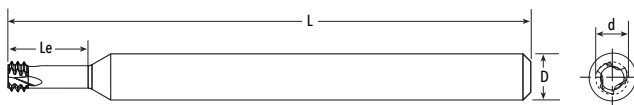


3-teeth Thread Mill

American UN



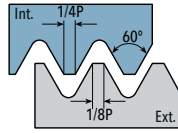
Defined by: ANSI B1.1.74
Tolerance class: 2B



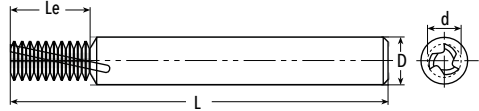
Unit: mm

Specification	Thread	TPI	Dimensions				
			d	D	Le	L	
TM**TUN64-d1.4-D4-L50	UNC1#-64	64	1.4	4	4	50	3
TM**TUN72-d1.44-D4-L50	UNF1#-72	72	1.44	4	3.8	50	3
TM**TUN80-d1.18-D4-L50	UNF0#-80	80	1.18	4	3.5	50	3
TM**TUN48-d1.9-D4-L50	UNC3#-48	48	1.9	4	5	50	3
TM**TUN36-d3.31-D4-L50	UNF8#-36	36	3.31	4	11	50	3
TM**TUN24-d3.58-D4-L50	UNC10#-24	24	3.58	4	11	50	3
TM**TUN32-d3.8-D4-L50	UNF10#-32	32	3.8	4	12	50	3
TM**TUN56-d1.65-D4-L50	UNC2#-56	56	1.65	4	5	50	3
TM**TUN32-d2.56-D4-L50	UNC6#-32	32	2.56	4	7.5	50	3
TM**TUN40-d2.13-D4-L50	UNC4#-40	40	2.13	4	6	50	3
TM**TUN32-d3.2-D4-L50	UNC8#-32	32	3.2	4	11	50	3
TM**TUN40-d2.46-D4-L50	UNC5#-40	40	2.46	4	8	50	3
TM**TUN28-d5-D6-L50	UNF1/4"-28	28	5	6	15	50	3
TM**TUN20-d4.87-D6-L50	UNC1/4"-20	20	4.87	6	14	50	3
TM**TUN18-d5.95-D6-L50	UNC5/16"-18	18	5.95	6	18	50	3
TM**TUN24-d5.95-D6-L60	UNC5/16"-24	24	5.95	6	18	60	3
TM**TUN16-d7.65-D8-L60	UNC3/8"-16	16	7.65	8	20	60	3
TM**TUN24-d7.4-D8-L65	UNF3/8"-24	24	7.4	8	20	65	4
TM**TUN13-d9.9-D10-L75	UNC1/2"-13	13	9.9	10	25	75	4
TM**TUN20-d9.5-D10-L75	UNF7/16"-20	20	9.5	10	28	75	4
TM**TUN14-d9-D10-L75	UNC7/16"-14	14	9	10	28	75	4
TM**TUN18-d11.9-D12-L75	UNC9/16"-18	18	11.9	12	30	75	4
TM**TUN24-d11.9-D12-L75	UNF9/16"-24	24	11.9	12	29	75	4

American UN



Defined by: ANSI B1.1.74
Tolerance class: 2B



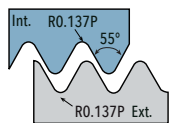
Unit: mm

Specification	Thread	TPI	Dimensions				
			d	D	Le	L	
TM**FUN32-d3.2-D4-L50	UNC8#-32	32	3.2	4	11	50	3
TM**FUN24-d3.6-D4-L50	UNC10#-24	24	3.6	4	11	50	3
TM**FUN32-d3.8-D4-L50	UNC10#-32	32	3.8	4	10	50	3
TM**FUN20-d4.9-D6-L50	UNC1/4"-20	20	4.9	6	13	50	3
TM**FUN18-d6-D6-L60	UNC5/16"-18	18	6	6	17	60	3
TM**FUN28-d4.6-D6-L50	UNF1/4"-28	28	4.6	6	15	50	3
TM**FUN24-d5.9-D6-L60	UNF5/16"-24	24	5.9	6	17	60	3
TM**FUN24-d7.4-D8-L65	UNF3/8"-24	24	7.4	8	20	65	3
TM**FUN16-d7.65-D8-L65	UNC3/8"-16	16	7.65	8	20	65	3
TM**FUN20-d8.5-D10-L75	UNC7/16"-20	20	8.5	10	23	75	4
TM**FUN13-d9.5-D10-L75	UNC1/2"-13	13	9.5	10	25	75	4
TM**FUN20-d9.9-D10-L75	UNC1/2"-20	20	9.9	10	25	75	4
TM**FUN20-d9.95-D10-L75	UNF3/4"-20	20	9.95	10	23	75	4
TM**FUN18-d10-D10-L75	UNF9/16"-18	18	10	10	30	75	4
TM**FUN12-d11.8-D12-L75	UNC9/16"-12	12	11.8	12	28.6	75	4
TM**FUN11-d11.95-D12-L83	UNC5/8"-11	11	11.95	12	35	83	4
TM**FUN18-d11.95-D12-L83	UNC9/16"-18	18	11.95	12	30	83	4
TM**FUN16-d12-D12-L75	UNF3/4"-16	16	12	12	25	75	4
TM**FUN14-d12-D12-L75	UNF7/8"-14	14	12	12	30	75	4
TM**FUN10-d14.5-D16-L100	UNC3/4"-10	10	14.5	16	40	100	5
TM**FUN16-d15.9-D16-L100	UNF3/4"-16	16	15.9	16	40	100	5
TM**FUN9-d15.95-D16-L100	UNC7/8"-9	9	15.95	16	45	100	5

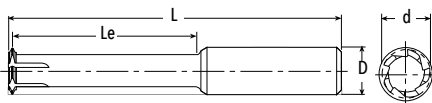


1-tooth/Full-teeth Thread Mill

BSP (G)



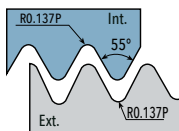
Defined by: B.S.84:1956,
Tolerance class: Medium class



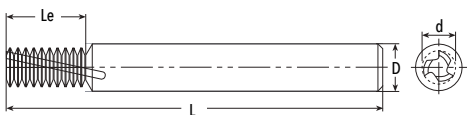
Unit: mm

Specification	Thread	Pitch	Dimensions				
			d	D	Le	L	
TM**SG55-d3-D4-L50	d3.0*G55	0.5-1.0	3	4	9	50	3
TM**SG55-d4-D4-L50	d4.0*G55	0.5-1.0	4	4	12	50	4
TM**SG55-d4.6-D6-L50	d4.6*G55	0.5-1.25	4.6	6	16	50	3
TM**SG55-d5-D6-L50	d5.0*G55	0.5-1.25	5	6	16	50	4
TM**SG55-d6-D6-L50	d6.0*G55	0.5-1.25	6	6	16	50	4
TM**SG55-d8-D8-L60	d8.0*G55	1.0-2.0	8	8	25	60	4
TM**SG55-d8-D8-L75	d8.0*G55	1.0-2.0	8	8	20	75	4
TM**SG55-d10-D10-L75	d10*G55	1.0-2.5	10	10	30	75	5
TM**SG55-d12-D12-L75	d12*G55	2.0-2.5	12	12	35	75	5

BSP



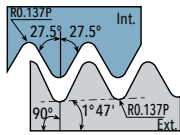
Defined by: B.S.2779:1956
Tolerance class: Medium class



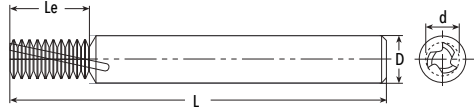
Unit: mm

Specification	Thread	TPI	Dimensions					Bore
			d	D	Le	L		
TM**FBSP28-d5.8-D6-L60	BSP 1/16"-28	28	5.8	6	17	60	3	6.7
TM**FBSP28-d7.7-D8-L60	BSP 1/8"-28	28	7.7	8	20	60	3	8.7
TM**FBSP19-d9.9-D10-L75	BSP 1/4"-19	19	9.9	10	27	75	4	11.8
TM**FBSP19-d11.9-D12-L75	BSP 3/8"-19	19	11.9	12	26.7	75	4	11.8
TM**FBSP14-d11.9-D12-L83	BSP 1/2"-14	14	11.9	12	35	83	4	19.0
TM**FBSP14-d11.9-D12-L75	BSP 1/2"-14	14	11.9	12	30	75	4	19.0
TM**FBSP14-d15.7-D16-L100	BSP 1/2"-14	14	15.7	16	40	100	5	19.0
TM**FBSP11-d16-D16-L100	BSP 1"-11	11	16	16	42	100	5	30.7
TM**FBSP11-d19.9-D20-L100	BSP 1"-11	11	19.9	20	42	100	5	30.7

BSPT



Defined by: B.S.21:1985
Tolerance class: Standard BSPT



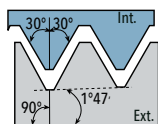
Unit: mm

Specification	Thread	TPI	Dimensions					Bore
			d	D	Le	L		
TM**FBSP28-d5.8-D6-L60	BSPT 1/16"-28	28	5.8	6	12	60	3	6.7
TM**FBSP28-d7.9-D8-L65	BSPT 1/8"-28	28	7.9	8	20	65	3	8.7
TM**FBSP28-d7.95-D8-L60	BSPT 1/8"-28	28	7.95	8	15	60	4	8.7
TM**FBSP19-d9.9-D10-L75	BSPT 1/4"-19	19	9.9	10	26.7	75	4	11.8
TM**FBSP19-d9.95-D10-L75	BSPT 1/4"-19	19	9.95	10	20	75	4	11.8
TM**FBSP19-d11.9-D12-L75	BSPT 3/8"-19	19	11.9	12	20	75	4	15.2
TM**FBSP14-d11.9-D12-L75	BSPT 1/2"-14	14	11.9	12	25	75	4	19.0
TM**FBSP14-d15.9-D16-L100	BSPT 1/2"-14	14	15.9	16	30	100	5	19.0
TM**FBSP11-d15.9-D16-L100	BSPT 1"-11	11	15.9	16	30	100	5	30.7
TM**FBSP11-d19.9-D20-L100	BSPT 1"-11	11	19.9	20	35	100	5	30.7

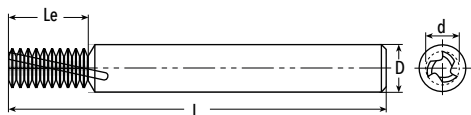


Full-teeth Thread Mill

NPT



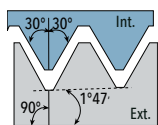
Defined by: USAS B2.1:1968
Tolerance class: Standard NPT



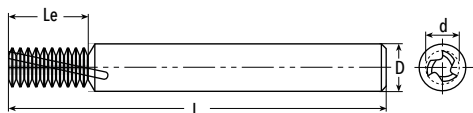
Unit: mm

Specification	Thread	TPI	Dimensions					Bore
			d	D	Le	L		
TM**FNPT27-d5.3-D6-L60	NPT1/16"-27	27	5.3	6	10	60	3	6.3
TM**FNPT27-d7.95-D8-L65	NPT1/8"-27	27	7.95	8	15	65	3	8.5
TM**FNPT18-d9.9-D10-L75	NPT1/4"-18	18	9.9	10	15.5	75	4	11.1
TM**FNPT18-d11.9-D12-L75	NPT3/8"-18	18	11.9	12	16	75	4	14.5
TM**FNPT14-d11.9-D12-L83	NPT1/2"-14	14	11.9	12	25	83	4	14.5
TM**FNPT14-d15.95-D16-L100	NPT1/2"-14	14	15.95	16	30	100	5	17.7
TM**FNPT11.5-d19.9-D20-L100	NPT1"-11.5	11.5	19.9	20	33	100	5	29.0
TM**FNPT11.5-d15.9-D16-L100	NPT1"-11.5	11.5	15.9	16	33	100	5	17.7

NPTF



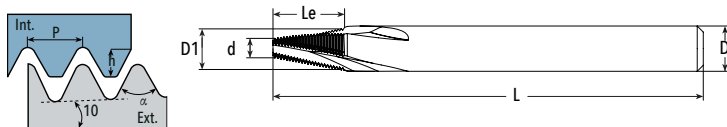
Defined by: ANSI 1.20.3-1976
Tolerance class: Standard NPTF



Unit: mm

Specification	Thread	TPI	Dimensions					Bore
			d	D	Le	L		
TM**FNPTF27-d5.9-D6-L50	NPTF1/16"-27	27	5.9	6	10	50	3	6.3
TM**FNPTF27-d7.95-D8-L60	NPTF1/8"-27	27	7.95	8	15	60	3	8.4
TM**FNPTF18-d9.9-D10-L75	NPTF1/4"-18	18	9.9	10	14.8	75	4	11.1
TM**FNPTF18-d11.15-D12-L75	NPTF3/8"-18	18	11.15	12	14.8	75	4	14.7
TM**FNPTF14-d15.95-D16-L100	NPTF1/2"-14	14	15.95	16	25	100	5	17.9
TM**FNPTF11.5-d19.6-D20-L100	NPTF1"-11.5	11.5	19.6	20	23	100	5	29.0

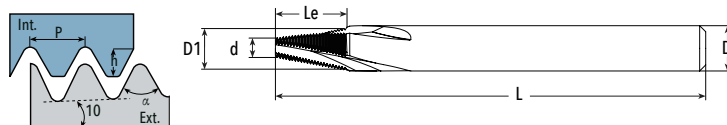
Tap 60°



Unit: mm

Specification	Pitch	Taper	Angle	Profile Height	Dimensions				
			α	h	d	D	D1	Le	L
TM**FTP60P0.4d3.2D6L60	0.4	20°	60°	0.20	3.2	6	5.9	8.0	60
TM**FTP60P0.5d2.9D6L60	0.5	20°	60°	0.25	2.9	6	5.9	9.0	60

Tap 55°



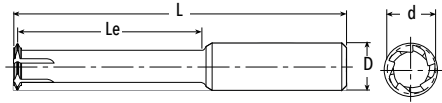
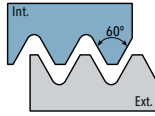
Unit: mm

Specification	Pitch	Taper	Angle	Profile Height	Dimensions				
			α	h	d	D	D1	Le	L
TM**FTP55P0.3d1.5D3L50	0.3	20°	55°	0.18	1.5	3	2.8	3.9	50
TM**FTP55P0.35d1.8D4L50	0.35	20°	55°	0.20	1.8	4	3.9	6.3	50
TM**FTP55P0.4d2.5D6L60	0.4	20°	55°	0.29	2.5	6	5.9	10.0	60
TM**FTP55P0.5d2.9D3L60	0.5	20°	55°	0.33	2.9	6	5.9	9.0	60
TM**FTP55P0.6d3.8D3L60	0.6	20°	55°	0.47	3.8	6	5.9	6.6	60



1-tooth Thread Mill

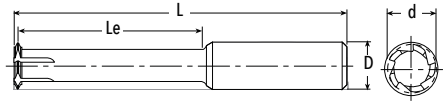
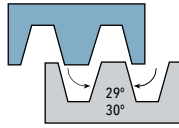
AG60



Unit: mm

Specification	Thread	Pitch	Dimensions				
			d	D	Le	L	
TM**SA60-d1.5-D4-L50	d1.5*A60	0.2-0.35	1.5	4	5	50	3
TM**SA60-d2-D4-L50	d2.0*A60	0.3-0.5	2	4	6	50	3
TM**SA60-d2.35-D4-L50	d2.35*A60	0.3-0.5	2.35	4	8	50	3
TM**SA60-d3-D4-L50	d3.0*A60	0.5-0.8	3	4	12	50	3
TM**SA60-d3.3-D4-L50	d3.3*A60	0.5-0.8	3.3	4	12	50	3
TM**SA60-d3.9-D4-L75	d3.9*A60	0.5-1.0	3.9	4	13	75	4
TM**SA60-d3.9-D4-L100	d3.9*A60	0.5-1.0	3.9	4	13	100	4
TM**SA60-d4-D4-L50	d4.0*A60	0.5-1.0	4.0	4	12	50	4
TM**SA60-d4.6-D6-L50	d4.6*A60	0.5-1.25	4.6	6	16	50	4
TM**SA60-d4.8-D6-L50	d4.8*A60	0.5-1.25	4.8	6	16	50	4
TM**SA60-d5-D6-L50	d5.0*A60	0.5-1.25	5	6	16	50	4
TM**SA60-d6-D6-L50	d6.0*A60	0.5-1.25	6	6	16	50	4
TM**SA60-d8-D8-L60	d8.0*A60	0.8-1.5	8	8	25	60	4
TM**SA60-d8-D8-L75	d8.0*A60	0.8-1.5	8	8	25	75	4
TM**SA60-d9.4-D10-L75	d9.4*A60	1.25-2.0	9.4	10	28	75	5
TM**SA60-d10-D10-L75	d10*A60	1.25-2.0	10	10	30	75	5
TM**SA60-d12-D12-L75	d12*A60	1.0-3.0	12	12	35	75	5
TM**SA60-d14-D14-L100	d14*A60	2.0-3.0	14	14	40	100	6
TM**SA60-d16-D16-L100	d16*A60	2.0-4.0	16	16	45	100	5
TM**SA60-d20-D20-L100	d20*A60	2.0-6.0	20	20	50	100	6

Tr30°



Unit: mm

Specification	Thread	Pitch	Dimensions				Angle
			d	D	Le	L	
TM**STR8P1.5-d5.95-D6-L50	TR8*1.5	1.5	5.95	6	20	50	30°
TM**STR9*1.5-d5.95-D6-L50	TR9*1.5	1.5	5.95	6	20	50	30°
TM**STR9*2-d6.45-D8-L60	TR9*2	2	6.45	8	20	60	30°
TM**STR10*2-d6.45-D8-L60	TR10*2	2	6.45	8	20	60	30°
TM**STR11*2-d6.45-D8-L60	TR11*2	2	6.45	8	20	60	30°
TM**STR12*2-d9.4-D10-L75	TR12*2	2	9.4	10	35	75	30°
TM**STR14*2-d9.4-D10-L75	TR14*2	2	9.4	10	35	75	30°
TM**STR16*2-d9.4-D10-L75	TR16*2	2	9.4	10	35	75	30°
TM**STR18*2-d9.4-D10-L75	TR18*2	2	9.4	10	35	75	30°
TM**STR20*2-d9.4-D10-L75	TR20*2	2	9.4	10	35	75	30°
TM**STR11*3-d7.4-D8-L60	TR11*3	3	7.4	8	25	60	30°
TM**STR12*3-d7.4-D8-L60	TR12*3	3	7.4	8	25	60	30°
TM**STR14*3-d7.4-D8-L60	TR14*3	3	7.4	8	25	60	30°
TM**STR14*3-d10-D10-L75	TR14*3	3	10	10	35	75	30°
TM**STR22*3-d10-D10-L75	TR22*3	3	10	10	35	75	30°
TM**STR24*3-d10-D10-L75	TR24*3	3	10	10	35	75	30°
TM**STR26*3-d10-D10-L75	TR26*3	3	10	10	35	75	30°
TM**STR28*3-d10-D10-L75	TR28*3	3	10	10	35	75	30°
TM**STR30*3-d10-D10-L75	TR30*3	3	10	10	35	75	30°
TM**STR16*4-d11-D12-L75	TR16*4	4	11	12	35	75	30°
TM**STR18*4-d11-D12-L75	TR18*4	4	11	12	35	75	30°
TM**STR20*4-d11-D12-L75	TR20*4	4	11	12	35	75	30°
TM**STR22*5-d14-D14-L100	TR22*5	5	14	14	50	100	30°
TM**STR24*5-d14-D14-L100	TR24*5	5	14	14	50	100	30°
TM**STR26*5-d14-D14-L100	TR26*5	5	14	14	50	100	30°
TM**STR28*5-d14-D14-L100	TR28*5	5	14	14	50	100	30°



Technical Information

Material Group	Vagus No.	Material		HB	Vc[m/min]		Feed [mm/tooth]		
					3 / Full Teeth	1 Tooth	Full Teeth	1 Tooth	3 Teeth
P Steel	1	Unalloyed Steel	Low Carbon (C=0.1-0.25%)	125	80-250	60-120	0.03-0.08	0.10-0.35	0.02-0.16
	2		Medium Carbon (C=0.25-0.55%)	150	80-230	60-120	0.03-0.08	0.08-0.30	0.02-0.16
	3		High Carbon (C=0.55-0.85%)	170	80-200	60-90	0.03-0.08	0.08-0.30	0.02-0.16
	4	Low Alloy Steel (alloying elements ≤ 5%)	Non Hardened	180	60-180	60-90	0.03-0.08	0.08-0.30	0.02-0.16
	5		Hardened	275	60-170	50-80	0.03-0.07	0.08-0.30	0.02-0.07
	6		Hardened	350	60-160	50-80	0.02-0.05	0.05-0.15	0.02-0.03
	7	High Alloy Steel (alloying elements > 5%)	Annealed	200	40-100	50-80	0.03-0.07	0.10-0.24	0.02-0.09
	8		Hardened	325	30-80	50-80	0.02-0.04	0.05-0.15	0.02-0.03
	9	Cast Steel	Low Alloy (alloying elements < 5%)	200	80-250	70-90	0.03-0.08	0.08-0.30	0.02-0.16
	10		High Alloy (alloying elements > 5%)	225	60-170	60-80	0.03-0.05	0.05-0.15	0.02-0.03
M Stainless Steel	11	Stainless Steel Ferritic	Non Hardened	200	60-150	60-90	0.04-0.07	0.11-0.35	0.02-0.16
	12		Hardened	330	60-120	50-80	0.02-0.06	0.05-0.24	0.02-0.03
	13	Stainless Steel Austenitic	Austenitic	180	60-140	60-90	0.03-0.08	0.11-0.35	0.02-0.16
	14		Super Austenitic	200	60-130	50-80	0.03-0.08	0.11-0.35	0.02-0.16
	15	Stainless Steel Cast Ferritic	Non Hardened	200	60-160	60-90	0.03-0.08	0.11-0.35	0.02-0.16
	16		Hardened	330	60-110	50-80	0.02-0.05	0.10-0.24	0.02-0.03
	17	Stainless Steel Cast Austenitic	Austenitic	200	60-150	60-90	0.03-0.08	0.11-0.35	0.02-0.16
	18		Hardened	330	60-100	50-80	0.02-0.05	0.10-0.24	0.02-0.03
K Cast Iron	28	Malleable Cast Iron	Ferritic (short chips)	130	60-70	50-80	0.03-0.08	0.05-0.15	0.02-0.03
	29		Pearlitic (long chips)	230	60-150	60-90	0.03-0.08	0.10-0.24	0.02-0.12
	30	Grey Cast Iron	Low Tensile Strength	180	70-160	70-100	0.03-0.08	0.09-0.25	0.02-0.16
	31		High Tensile Strength	260	40-120	60-90	0.02-0.06	0.10-0.24	0.02-0.12
	32	Nodular Sg Iron	Ferritic	160	40-110	70-100	0.03-0.08	0.09-0.25	0.02-0.16
	33		Pearlitic	260	40-100	60-90	0.02-0.06	0.10-0.24	0.02-0.12
N Non-Ferrous Metals	34	Aluminium Alloys Wrought	Non Aging	60	200-300	60-250	0.05-0.12	0.12-0.40	0.03-0.15
	35		Aged	100	150-250	60-150	0.05-0.12	0.10-0.32	0.03-0.16
	36	Aluminium Alloys	Cast	75	100-200	60-250	0.05-0.12	0.10-0.32	0.03-0.16
	37		Cast & Aged	90	120-220	60-150	0.05-0.12	0.10-0.30	0.02-0.16
	38	Aluminium Alloys	Cast Si 13-22%	130	200-300	250	0.05-0.12	0.10-0.32	0.03-0.15
	39	Copper and Copper Alloys	Brass	90	200-300	60-250	0.06-0.13	0.12-0.40	0.03-0.16
	40		Bronze And Non Lead Copper	100	150-250	60-150	0.05-0.12	0.10-0.32	0.03-0.15

See next page 

Material Group	Vargus No.	Material		HB	Vc [m/min]		Feed [mm/tooth]		
					3/ Full Teeth	1 Tooth	Full Teeth	Single Flute	3 Teeth
S Heat Resistant Material	19	High Temperature	Annealed (iron based)	200	30 - 60	60	0.03 - 0.07	0.11 - 0.35	0.02 - 0.16
	20		Aged (iron based)	280	20 - 50	50	0.02 - 0.04	0.05 - 0.15	0.02 - 0.03
	21	Alloys	Annealed (nickel or cobalt based)	250	15 - 35	35	0.02 - 0.04	0.05 - 0.15	0.02 - 0.03
	22		Aged (nickel or cobalt based)	350	15 - 30	30	0.02 - 0.04	0.05 - 0.15	0.02 - 0.03
	23	Titanium Alloys	Pure 99.5 Ti	400Rm	40 - 80	30 - 50	0.02 - 0.04	0.10 - 0.24	0.02 - 0.07
	24		$\alpha + \beta$ Alloys	1050Rm	20 - 50	25 - 35	0.02 - 0.04	0.10 - 0.24	0.02 - 0.07
H Hardened Material	25	Extra Hard Steel	Hardened & Tempered	45-50HRc	15 - 45	45	0.02 - 0.03	0.03 - 0.06	-
	26			51-55HRc	15 - 40	30	0.02 - 0.03	0.03 - 0.06	-

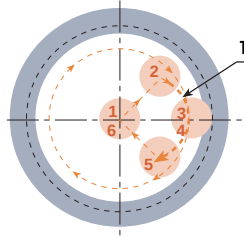
Recommendation:

At tool entry, set the Feed f [mm/tooth] to 70% lower than the threading Feed.

Example:

Threading Feed: 0.3[mm/tooth]

Tool entry Feed: 0.09[mm/tooth]



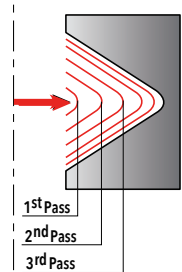
Tool entry along tangential arc

Efficient Multi-passes Machining Method

Due to the high volume of chips, thinner chips are required. This is achieved by radial multi-pass machining, which reduces the accumulation of chips, and thereby enables higher speeds and feed rates.

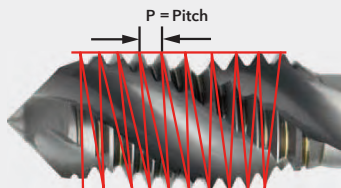
Recommended No. of Passes According to Pitch

Pitch TPI	48	32	24	20	16	14	12	10	8
Pitch mm	0.50	0.75	1.00	1.25	1.50	1.75	2.00	2.50	3.00
No. of Passes	2-3	2-3	3-4	4-5	5-6	5-6	6-7	7-8	7-9



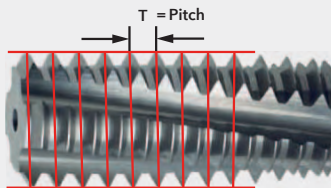
Difference between taps/fluteless taps and thread milling cutters

Taps/Fluteless taps



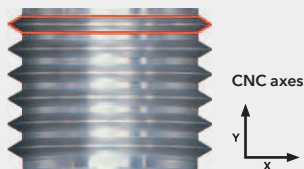
The red lines show the pitch angle of the thread that is ground into the tool. This means the pitch is cut into the workpiece by the tool.

Thread milling cutters

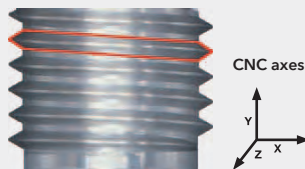


The red lines show that the tool does not possess a pitch angle. The pitch is produced by the Z-axis of a CNC machine.

Creation of the thread with thread milling



Thread profile without axial feed (Z-axis) of the machine. A groove profile is created without pitch. A functioning thread is not created.



Through the additional programming of the Z-axis the necessary pitch is produced.

Note

Due to diagonal milling in the pitch angle (Z-axis) the thread profile of the tool is transferred onto the component distorted. The more the milling cutter diameter (80% of nom. Ø) approaches the nominal thread diameter and the higher the thread pitch the more pronounced the profile distortion is.

Distinction between two milling processes

Reverse rotation milling clockwise, with G02



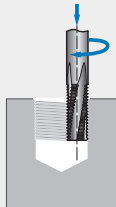
Reverse rotation milling is preferentially applied for the machining of harder materials or to remedy taper threads.

Synchronous milling anticlockwise, with G03



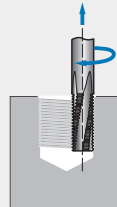
Synchronous milling is applied with thread depths smaller than $1.5 \times D$. Advantage: A better surface finish is achieved.

Thread production with one tool
Right-hand thread reverse rotation milling



Tool rotates clockwise from top to bottom.

Thread production with one tool
Left-hand thread reverse rotation milling



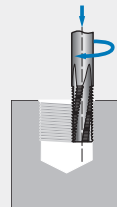
Tool rotates clockwise from bottom to top.

Thread production with one tool
Right-hand thread synchronous milling



Tool rotates clockwise from bottom to top.

Thread production with one tool
Left-hand thread synchronous milling



Tool rotates clockwise from top to bottom.



Taping size holes for thread milling cutters

Std. ISO metric threads DIN 13					
Nom. Ø	Pitch	size	min.	max.	
M 1	0.25	0.75	0.729	0.785	
M 1.1	0.25	0.85	0.829	0.885	
M 1.2	0.25	0.95	0.929	0.985	
M 1.4	0.30	1.10	1.075	1.142	
M 1.6	0.35	1.25	1.221	1.321	
M 1.8	0.35	1.45	1.421	1.521	
M 2	0.40	1.60	1.567	1.679	
M 2.2	0.45	1.75	1.713	1.838	
M 2.5	0.45	2.05	2.013	2.138	
M 3	0.50	2.50	2.459	2.599	
M 3.5	0.60	2.90	2.850	3.010	
M 4	0.70	3.30	3.242	3.422	
M 4.5	0.75	3.70	3.688	3.878	
M 5	0.80	4.20	4.134	4.334	
M 6	1.00	5.00	4.917	5.153	
M 7	1.00	6.00	5.917	6.153	
M 8	1.25	6.80	6.647	6.912	
M 9	1.25	7.80	7.647	7.912	
M 10	1.50	8.50	8.376	8.676	
M 11	1.50	9.50	9.376	9.676	
M 12	1.75	10.20	10.106	10.441	
M 14	2.00	12.00	11.835	12.210	
M 16	2.00	14.00	13.835	14.210	
M 18	2.50	15.50	15.294	15.744	
M 20	2.50	17.50	17.294	17.744	
M 22	2.50	19.50	19.294	19.744	
M 24	3.00	21.00	20.752	21.252	
M 27	3.00	24.00	23.752	24.252	
M 30	3.50	26.50	26.211	26.771	
M 33	3.50	29.50	29.211	29.771	
M 36	4.00	32.00	31.670	32.270	

ISO metric fine threads DIN 13							
Nom. x Pitch	size	min.	max.	Nom. x Pitch	size	min.	max.
M 2.5 * 0.35	2.15	2.121	2.221	M 22 x 1.50	20.50	20.376	20.676
M 3.0 * 0.35	2.65	2.621	2.721	M 22 x 2.00	20.00	19.835	20.210
M 3.5 * 0.35	3.15	3.121	3.221	M 24 x 1.00	23.00	22.917	23.153
M 4.0 * 0.50	3.50	3.459	3.599	M 24 x 1.50	22.50	22.376	22.676
M 4.5 * 0.50	4.00	3.959	4.099	M 24 x 2.00	22.00	21.835	22.210
M 5.0 * 0.50	4.50	4.459	4.599	M 25 x 1.00	24.00	23.917	24.153
M 5.5 * 0.50	5.00	4.959	5.099	M 25 x 1.50	23.50	23.376	23.676
M 6.0 * 0.75	5.20	5.188	5.378	M 25 x 2.00	23.00	22.835	23.210
M 7.0 * 0.75	6.20	6.188	6.378	M 27 x 1.00	26.00	25.917	26.153
M 8.0 * 0.50	7.50	7.459	7.599	M 27 x 1.50	25.50	25.376	25.676
M 8.0 * 0.75	7.20	7.188	7.378	M 27 x 2.00	25.00	24.835	25.210
M 8.0 * 1.00	7.00	6.917	7.153	M 28 x 1.00	27.00	26.917	27.153
M 9.0 * 0.75	8.20	8.188	8.378	M 28 x 1.50	26.50	26.376	26.676
M 9.0 * 1.00	8.00	7.917	8.153	M 28 x 2.00	26.00	25.835	26.210
M 10 * 0.75	9.20	9.188	9.378	M 30 x 1.00	29.00	28.917	29.153
M 10 * 1.00	9.00	8.917	9.153	M 30 x 1.50	28.50	28.376	28.676
M 10 * 1.25	8.80	8.647	8.912	M 30 x 2.00	28.00	27.835	28.210
M 11 * 0.75	10.20	10.188	10.378	M 30 x 3.00	27.00	26.752	27.252
M 11 * 1.00	10.00	9.917	10.153	M 32 x 1.50	30.50	30.376	30.676
M 12 * 1.00	11.00	10.917	11.153	M 32 x 2.00	30.00	29.835	30.210
M 12 * 1.25	10.80	10.647	10.912	M 33 x 1.50	31.50	31.376	31.676
M 12 * 1.50	10.50	10.376	10.676	M 33 x 2.00	31.00	30.835	31.210
M 14 * 1.00	13.00	12.917	13.153	M 33 x 3.00	30.00	29.752	30.252
M 14 * 1.25	12.80	12.647	12.912	M 35 x 1.50	33.50	33.376	33.676
M 14 * 1.50	12.50	12.376	12.676	M 36 x 1.50	34.50	34.376	34.676
M 15 * 1.00	14.00	13.917	14.153				
M 15 * 1.50	13.50	13.376	13.676				
M 16 * 1.00	15.00	14.917	15.153				
M 16 * 1.25	14.80	14.647	14.912				
M 16 * 1.50	14.50	14.376	14.676				
M 17 * 1.00	16.00	15.917	16.153				



Taping size holes for thread milling cutters

Std. ISO metric threads DIN 13				
Nom. Ø	Pitch	size	min.	max.
M 39	4.00	35.00	34.670	35.270
M 42	4.50	37.50	37.129	37.799
M 45	4.50	40.50	40.129	40.799
M 48	5.00	43.00	42.587	43.297
M 52	5.00	47.00	46.587	47.297
M 56	5.50	50.50	50.046	50.796

MJ threads DIN ISO 5855				
Nom. * Pitch	size	min.	max.	
MJ 3 * 0.50	2.60	2.513	2.653	
MJ 4 * 0.70	3.40	3.318	3.498	
MJ 5 * 0.80	4.30	4.221	4.421	
MJ 6 * 0.50	5.55	5.513	5.625	
MJ 6 * 0.75	5.35	5.269	5.419	
MJ 6 * 1.00	5.10	5.026	5.216	
MJ 8 * 0.50	7.55	7.513	7.625	
MJ 8 * 0.75	7.35	7.269	7.419	
MJ 8 * 1.00	7.10	7.026	7.216	
MJ 8 * 1.25	6.90	6.782	6.994	
MJ 10 * 1.00	9.10	9.026	9.216	
MJ 10 * 1.25	8.90	8.782	8.994	
MJ 10 * 1.50	8.60	8.539	8.775	
MJ 12 * 1.75	10.40	10.295	10.560	
MJ 16 * 2.00	14.20	14.051	14.351	

UNJC threads ISO 3161				
Nom. Ø	Threads	size	min.	max.
7/16	- 20	10.00	9.876	10.084
1/2	- 20	11.60	11.463	11.661
9/16	- 18	13.00	12.913	13.122
5/8	- 18	14.60	14.501	14.702

ISO metric fine threads DIN 13				
Nom. * Pitch	size	min.	max.	
M 17 x 1.50	15.50	15.376	15.676	
M 18 x 1.00	17.00	16.917	17.153	
M 18 x 1.50	16.50	16.376	16.676	
M 20 x 1.00	19.00	18.917	19.153	
M 20 x 1.50	18.50	18.376	18.676	
M 20 x 2.00	18.00	17.835	18.210	
M 22 x 1.00	21.00	20.917	21.153	

UNJC threads ISO 3161				
Nom. Ø	Threads	size	min.	max.
No. 6 - 32		2.85	2.733	2.939
No. 8 - 32		3.55	3.393	3.599
No. 10 - 24		4.00	3.795	4.064
No. 12 - 24		4.60	4.455	4.704
1/4 - 20		5.30	5.113	5.387
5/16 - 18		6.75	6.563	6.833
3/8 - 16		8.20	7.978	8.255
7/16 - 14		9.60	9.346	9.639
1/2 - 13		11.00	10.798	11.095
9/16 - 12		12.40	12.228	12.482
5/8 - 11		13.80	13.627	13.904

UNJC threads ISO 3161				
Nom. Ø	Threads	size	min.	max.
No. 6 - 40		3.00	2.888	3.053
No. 8 - 36		3.60	3.480	3.663
No. 10 - 32		4.20	4.054	4.255
No. 12 - 28		4.75	4.602	4.816
1/4 - 28		5.60	5.466	5.662
5/16 - 24		7.00	6.906	7.109
3/8 - 24		8.60	8.494	8.679

UNC threads ASME B1.1				
Nom. Ø Pitch	size	min.	max.	
No. 1 - 64	1.55	1.425	1.580	
No. 2 - 56	1.85	1.694	1.872	
No. 3 - 48	2.10	1.941	2.146	
No. 4 - 40	2.35	2.157	2.385	
No. 5 - 40	2.65	2.487	2.698	
No. 6 - 32	2.85	2.642	2.896	
No. 8 - 32	3.50	3.302	3.531	
No. 10 - 24	3.90	3.683	3.937	
No. 12 - 24	4.50	4.343	4.597	
1/4 - 20	5.10	4.978	5.258	
5/16 - 18	6.60	6.401	6.731	
3/8 - 16	8.00	7.798	8.153	
7/16 - 14	9.40	9.144	9.550	
1/2 - 13	10.80	10.592	11.024	
9/16 - 12	12.20	11.989	12.446	
5/8 - 11	13.50	13.386	13.868	
3/4 - 10	16.50	16.307	16.840	
7/8 - 9	19.50	19.177	19.761	
1 - 8	22.25	21.971	22.606	
1 1/8 - 7	25.00	24.638	25.349	
1 1/4 - 7	28.00	27.813	28.524	
1 3/8 - 6	30.75	30.353	31.115	
1 1/2 - 6	34.00	33.528	34.290	
1 3/4 - 5	39.50	38.938	39.802	
2 - 4.5	45.00	44.679	45.593	



Taping size holes for thread milling cutters

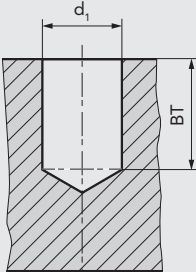
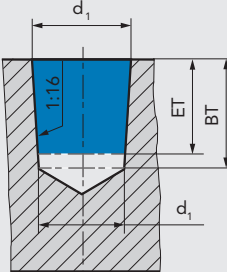
UNF threads ASME B1.1			
Nom. Threads	size	min.	max.
No. 1 - 72	1.55	1.473	1.610
No. 2 - 64	1.85	1.755	1.910
No. 3 - 56	2.15	2.024	2.197
No. 4 - 48	2.40	2.271	2.459
No. 5 - 44	2.70	2.550	2.741
No. 6 - 40	2.95	2.819	3.023
No. 8 - 36	3.50	3.404	3.607
No. 10 - 32	4.10	3.962	4.16
No. 12 - 28	4.60	4.496	4.724
1/4 - 28	5.50	5.359	5.588
5/16 - 24	6.90	6.782	7.036
3/8 - 24	8.50	8.382	8.636
7/16 - 20	9.90	9.728	10.033
1/2 - 20	11.50	11.328	11.608
9/16 - 18	12.90	12.751	13.081
5/8 - 18	14.50	14.351	14.681
3/4 - 16	17.50	17.323	17.678
7/8 - 14	20.40	20.269	20.650
1 - 12	23.25	23.114	23.571
1 1/8 - 12	26.50	26.289	26.746
1 1/4 - 12	29.50	29.464	29.921
1 3/8 - 12	32.75	32.639	33.096
1 1/2 - 12	36.00	35.814	36.271

BSW (Whitworth) threads BS84			
Nom. Threads	size	min.	max.
W 1/1 - 60	1.20	1.045	1.230
W 3/32 - 48	1.80	1.704	1.912
W 1/8 - 40	2.50	2.362	2.591
W 5/32 - 32	3.20	2.952	3.214
W 3/16 - 24	3.60	3.407	3.745
W 7/32 - 24	4.50	4.201	4.539
W 1/4 - 20	5.10	4.724	5.156
W 5/16 - 18	6.50	6.130	6.590
W 3/8 - 16	7.90	7.492	7.987
W 7/16 - 14	9.20	8.789	9.330
W 1/2 - 12	10.50	9.989	10.591
W 9/16 - 12	12.00	11.577	12.179
W 5/8 - 11	13.50	12.918	13.558
W 3/4 - 10	16.25	15.797	16.483
W 7/8 - 9	19.25	18.611	19.353
W 1 - 8	22.00	21.334	22.147
W 1 1/8 - 7	24.50	23.928	24.832
W 1 1/4 - 7	27.75	27.103	28.007
W 1 3/8 - 6	30.50	29.504	30.528
W 1 1/2 - 6	33.50	32.679	33.703
W 1 5/8 - 5	35.50	34.769	35.963
W 1 3/4 - 5	39.00	37.944	39.138
W 2 - 4.5	44.50	43.571	44.877

BSW (Whitworth) threads BS84			
Nom. Threads	size	min.	max.
G 1/16 - 28	6.80	6.561	6.843
G 1/8 - 28	8.80	8.566	8.848
G 1/4 - 19	11.80	11.445	11.890
G 3/8 - 19	15.25	14.950	15.395
G 1/2 - 14	19.00	18.631	19.172
G 5/8 - 14	21.00	20.587	21.128
G 3/4 - 14	24.50	24.117	24.658
G 7/8 - 14	28.25	27.877	28.418
G 1 - 11	30.75	30.291	30.931
G 1 1/8 - 11	35.50	34.939	35.579
G 1 1/4 - 11	39.50	38.952	39.592
G 1 1/2 - 11	45.25	44.845	45.485
G 1 3/4 - 11	51.00	50.788	51.428
G 2 - 11	57.00	56.656	57.296

BSW (Whitworth) threads BS84			
Nom. Threads	size	min.	max.
Pg 7 - 20	11.40	11.280	11.430
Pg 9 - 18	14.00	13.860	14.010
Pg 11 - 18	17.30	17.260	17.410
Pg 13.5 - 18	19.00	19.060	19.210
Pg 16 - 18	21.30	21.160	21.310
Pg 21 - 16	26.90	26.780	27.030
Pg 29 - 16	35.50	35.480	35.730
Pg 36 - 16	45.50	45.480	45.730
Pg 42 - 16	52.50	52.480	52.730
Pg 48 - 16	57.80	57.780	58.030

Taping size holes for thread milling cutters

NPT ANSI B 2.1 American tapered pipe thread 1:16					
	Nom. Threads	d ₁	Tapp.	ET	BT
	1/16 - 27	6.15	6.39	9.29	10.7
	1/8 - 27	8.40	8.74	9.32	10.8
	1/4 - 18	11.10	11.36	13.52	15.6
	3/8 - 18	14.30	14.80	13.83	16.0
	1/2 - 14	17.90	18.32	18.07	20.8
	3/4 - 14	23.30	23.67	18.55	21.3
	1 - 11.5	29.00	29.69	22.29	25.6
	1 1/4 - 11.5	37.70	38.45	22.80	26.1
	1 1/2 - 11.5	43.70	44.52	22.80	26.1
	2 - 11.5	55.60	56.56	23.20	26.5
	2 1/2 - 8	66.30	67.62	31.75	36.3
	3 - 8	82.30	83.52	33.74	38.5

(avoid if possible)

Version B

BSW (Whitworth) threads BS84				
Nom. Threads	size	min.	max.	
EG M 4 0.70	4.20	4.152	4.292	
EG M 5 0.80	5.25	5.174	5.334	
EG M 6 1.00	6.30	6.217	6.407	
EG M 8 1.25	8.40	8.271	8.483	
EG M10 1.50	10.50	10.324	10.560	
EG M12 1.75	12.50	12.379	12.644	
EG M14 x 1.25	14.40	14.271	14.483	
EG M16 2.00	16.50	16.433	16.733	

BSW (Whitworth) threads BS84				
Nom. Threads	size	min.	max.	
EG No. 6 - 32	3.80	3.678	3.879	
EG No. 8 - 32	4.40	4.338	4.524	
EG No. 10 - 24	5.20	5.055	5.283	
EG No. 12 - 24	5.80	5.715	5.944	
EG 1/4 - 20	6.70	6.624	6.868	
EG 5/16 - 18	8.40	8.242	8.489	
EG 3/8 - 16	10.00	9.868	10.127	
EG 7/16 - 14	11.60	11.506	11.783	
EG 1/2 - 13	13.30	13.122	13.393	
EG 9/16 - 12	14.90	14.747	15.032	
EG 5/8 - 11	16.50	16.375	16.673	

BSW (Whitworth) threads BS84				
Nom. Threads	size	min.	max.	
EG No. 6 - 40	3.70	3.644	3.818	
EG No. 8 - 36	4.40	4.321	4.498	
EG No. 10 - 32	5.10	4.999	5.184	
EG No. 12 - 28	5.70	5.682	5.809	
EG 1/4 - 28	6.60	6.546	6.721	
EG 5/16 - 24	8.25	8.166	8.352	
EG 3/8 - 24	9.80	9.754	9.931	
EG 7/16 - 20	11.50	11.389	11.585	
EG 1/2 - 20	13.10	12.974	13.172	
EG 9/16 - 18	14.70	14.592	14.798	
EG 5/8 - 18	16.25	16.180	16.386	

Practical application of thread milling cutters

1.Tool clamping

good concentricity is important, therefore clamping as short and rigid as possible.

2.Enter tool data in machine memory

D. Tool length from the front face, take drill/thread milling cutters (DTMC) from point.

E. Measure tool radius with tool pre-setting equipment. General rule:
measured radius – 0.022 x pitch provides the input value in machine memory.

3.Input of CNC program in control

(preferably integrated as sub-program at corresponding positions)

D. Call-up of a self-controlling cycle (procedures should be known)

E. Integration of data file from our threadmill-software (DIN or Haidenhain)

4.Trial run over workpiece

D. Tool length dimension in memory extending by an approximate value dependent on contact length (eg. 30 mm) or offset zero point.

E. Run program in single set, visual check of travel path.

F. Allow program to run in automatic mode.

Attention

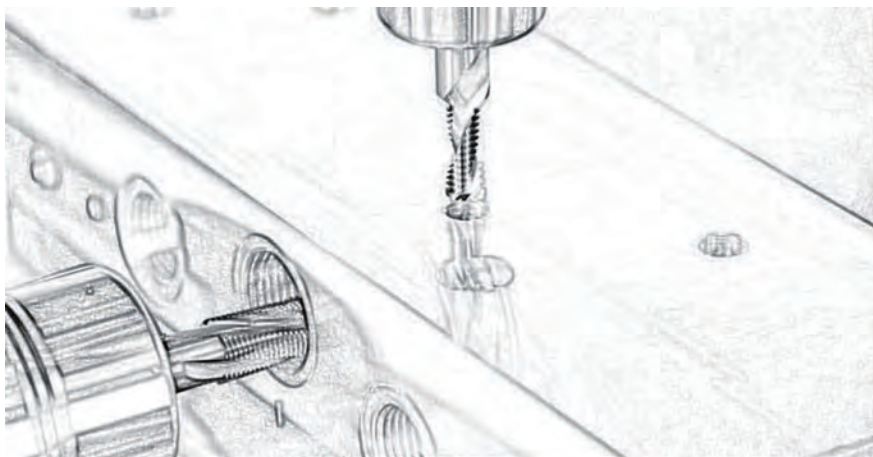
With controls where it is not definitely clear what milling path is assigned it must be clarified if the feed is positioned on the external path v_f or at the centre path v_m . As a rule we specify the milling centre point path v_m .

5.Application in workpiece

Re-set the tool extension or the zero point. Then allow the program to run in the workpiece the feed regulation must be 100% selected. Should the thread not be true to gauge, the tool radius requires correction in the tool memory:

Example:

- Thread too tight: Radius correction – input
- Thread too large: Radius correction + input



Thread milling programming

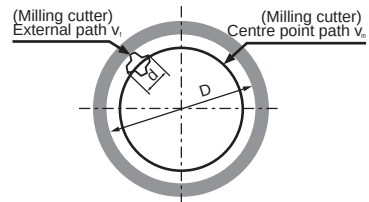
Program specifications

Thread milling functions

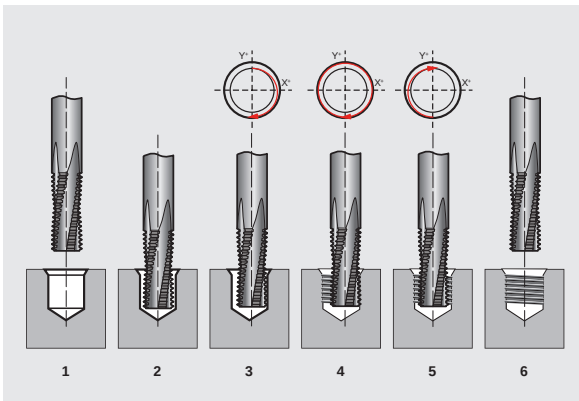
G00 Rapid movement	G90 Absolute dimension
G01 Feed	G91 Incremental dimension
G02 Circular interpolation (clockwise)	M03 Spindle on (clockwise rotation)
G03 Circular interpolation (anti-clockwise)	M05 Spindle stop
G17 Layer selection x-y axis	M08 Coolant on
G18 Layer selection z-x axis	X Axis
G19 Layer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

CNC internal thread milling

1. Moving to start position
2. Moving to thread depth in bore
3. 180° descending loop to contour
4. 360° full circular movement of thread milling cutter
5. 180° exit loop to centre of bore
6. Rapid movement from bore to start position



Entry cycle 180°
(always half feed rate)



Formula of calculation

$$v_c = \frac{d \cdot \pi \cdot n}{1000}$$

$$n = \frac{v_c \cdot 1000}{d \cdot \pi}$$

$$v_f = n \cdot z \cdot f_z$$

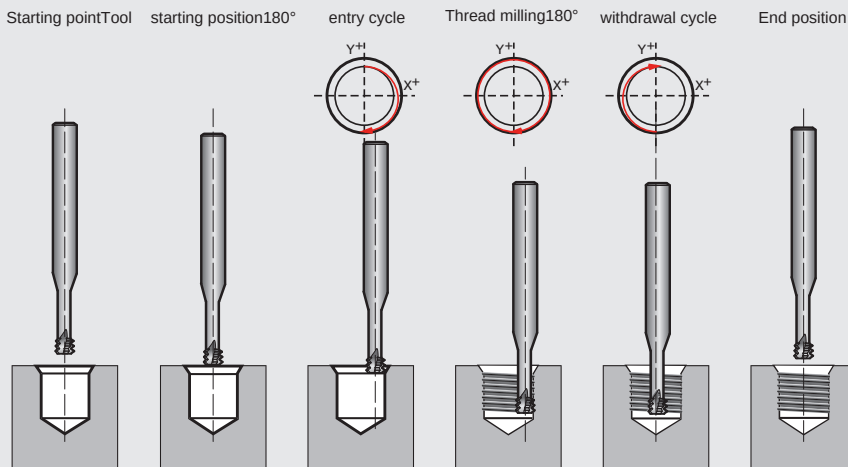
$$v_m = \frac{v_f \cdot (D - d)}{D}$$

$$v_b = n \cdot f_b$$

- v_c = Cutting speed
- v_f = Contour feed
- v_m = Centre point path feed
- n = Revolutions
- z = Number of teeth
- f_z = Feed per tooth
- f_b = Feed per drill per revolution*
- v_b = Drill feed rate*
- D = Ø nom. of thread [mm]
- d = Milling cutter nom. Ø [mm]
- * for drill/thread milling

Thread milling programming

Programming process for micro thread milling (right-hand thread in reverse rotation)



Possibilities to reduce radial forces

To reduce radial forces cut distribution can be undertaken:

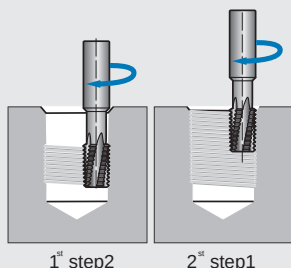
Advantages

- for larger thread depths
- counteracts taper threads
- for unstable clamping conditions

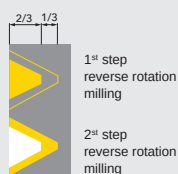
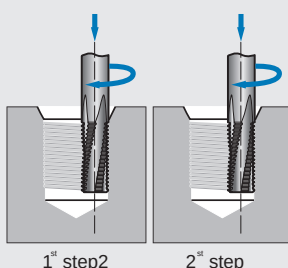
Disadvantages

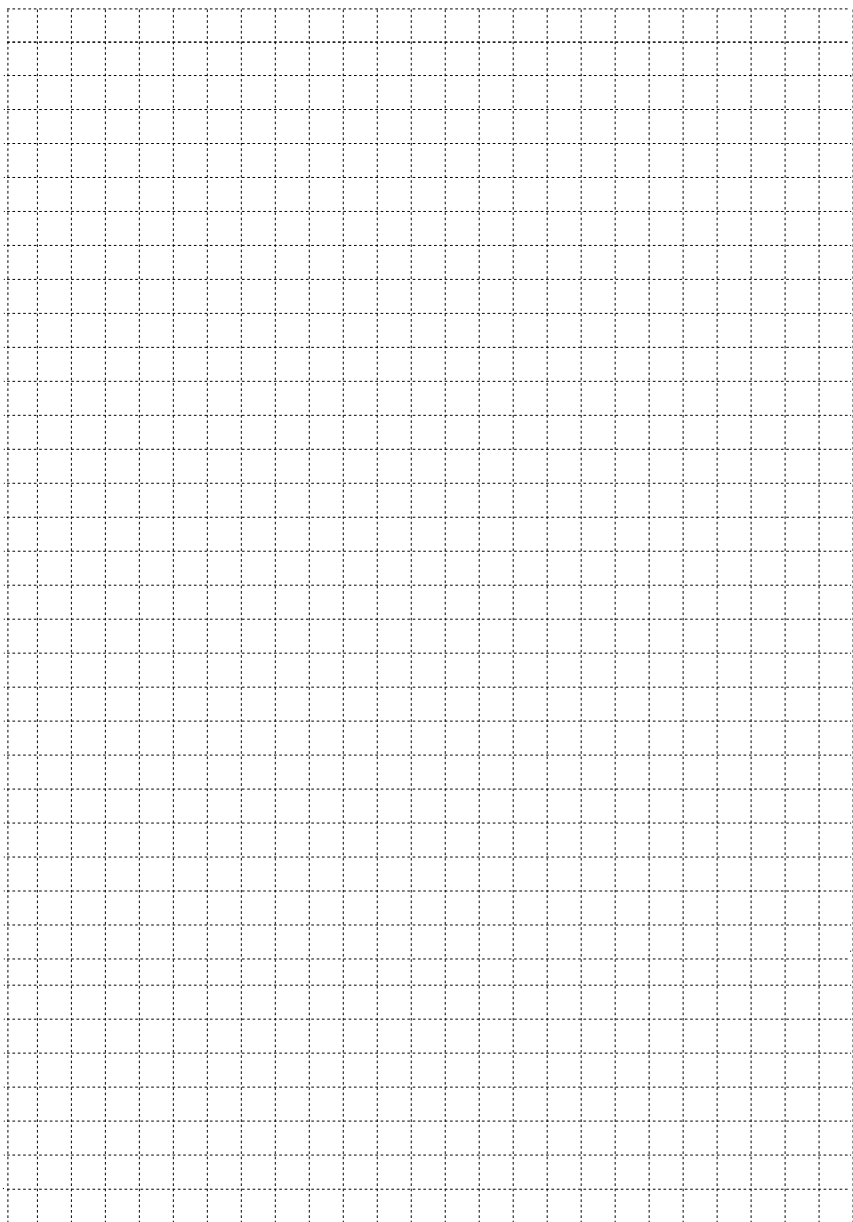
- increased tool wear
- longer production time

Axial distribution of cut



Radial distribution of cut







ADDRESS

ROOM 1601, NO. 399 MINHE ROAD, ZHENHAI,
NINGBO CHINA, 315202

GET IN TOUCH

PHONE: **+86 574 8659 2189**

FAX: **+86 574 8659 3892**

NTOOLS2017@GMAIL.COM

WWW.NICHE-TOOL.COM