

Threadmill Nomenclature

1

TR

2

N

3

16

4

139

5

L40

6

2.5

7

ISO

8

C

1 - Line

- TR - Helical Flutes
- TS - Straight Flutes

2 - Tool Type

- E - External Thread
- N - Internal Thread

3 - Tool Shank Dia.

- 04 - 4.0 mm
- 06 - 6.0 mm
- 08 - 8.0 mm
- 10 - 10.0 mm
- 12 - 12.0 mm
- 14 - 14.0 mm
- 16 - 16.0 mm
- 18 - 18.0 mm
- 20 - 20.0 mm

4 - Cutting Dia.

- 139 - 13.9 mm

5 - Cutting Length

- L40 - 40.0 mm

6 - Thread Pitch/TPI

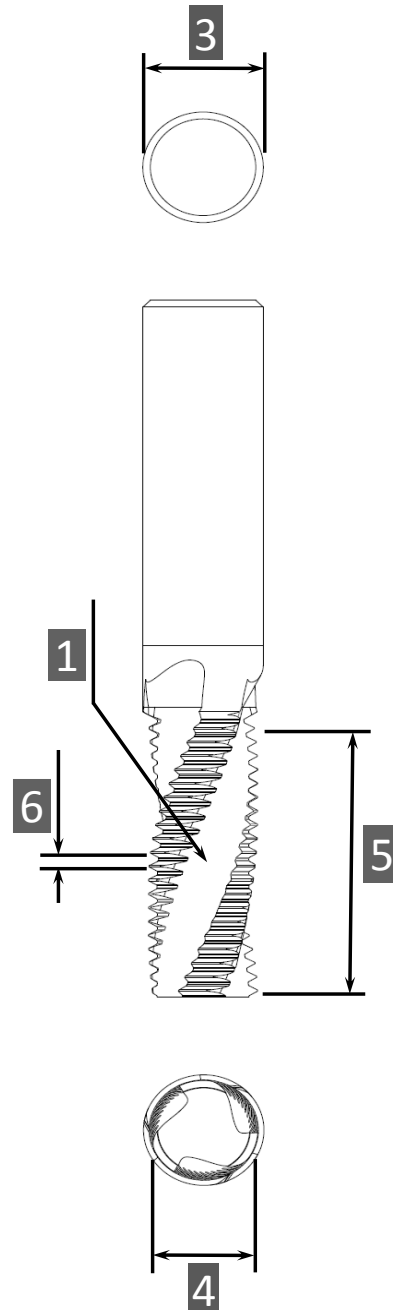
- 2.5 - 2.5 mm
- 10 - 10 TPI

7 - Thread Form

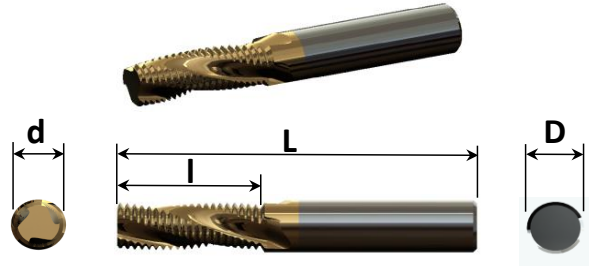
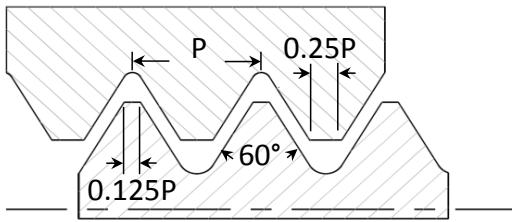
- ISO - ISO
- UNC - Unified Coarse
- UNF - Unified Fine
- UNEF - Unified Extra Fine
- BSW - British Standard Whitworth
- BSF - British Standard Fine
- BSP - British Standard Pipe
- BSPT - British Standard Pipe Taper
- NPT - National Pipe Thread
- NPTF - National Pipe Thread Fuel

8- Through Hole Coolant

- C - With Coolant



ISO Metric



HELICAL FLUTE

Thread	Pitch/TPI	Threadmill Dimensions in mm							
ISO	mm	Catalogue Number	d	l	D	L	Pitches	Flutes	
M3	0.50	TRN 04 022 L06 0.5ISO	2.20	6.0	4.0	45	12	3	
M4	0.70	TRN 04 028 L08 0.7ISO	2.80	8.4	4.0	45	12	3	
M4.5	0.75	TRN 04 039 L12 0.75ISO	3.90	12.0	4.0	45	16	3	
M5	0.80	TRN 04 035 L10 0.8ISO	3.50	10.4	4.0	45	13	3	
M6	1.00	TRN 04 039 L12 1.0ISO	3.90	12.0	4.0	45	12	3	
M8	1.25	TRN 06 058 L16 1.25ISO	5.80	16.3	6.0	57	13	3	
M10	1.50	TRN 08 077 L21 1.5ISO	7.70	21.0	8.0	63	14	3	
M12	1.75	TRN 10 087 L25 1.75ISO	8.70	24.5	10.0	73	14	4	
M14	2.00	TRN 10 099 L28 2.0ISO	9.90	28.0	10.0	73	14	4	
M16	2.00	TRN 12 119 L32 2.0ISO	11.90	32.0	12.0	83	16	4	
M18-M22	2.50	TRN 16 139 L40 2.5ISO	13.90	40.0	16.0	92	16	5	
M24	3.00	TRN 16 159 L42 3.0ISO	15.90	42.0	16.0	92	14	4	

HELICAL FLUTE

Thread	Pitch/TPI	Threadmill Dimensions in mm							
ISO Fine	mm	Catalogue Number	d	l	D	L	Pitches	Flutes	
M6	0.75	TRN 04 039 L12 0.75ISO	3.90	12.0	4.0	45	16	3	
M8	1.00	TRN 06 059 L16 1.0ISO	5.90	16.0	6.0	57	16	3	
M10	1.25	TRN 08 077 L20 1.25ISO	7.70	20.0	8.0	63	16	3	
M12	1.50	TRN 10 094 L24 1.5ISO	9.40	24.0	10.0	73	16	4	
M16	1.50	TRN 12 119 L33 1.5ISO	11.90	33.0	12.0	83	22	4	
M17-M80	2.00	TRN 12 119 L32 2.0ISO	11.90	32.0	12.0	83	16	4	

HELICAL FLUTE WITH THROUGH HOLE COOLANT

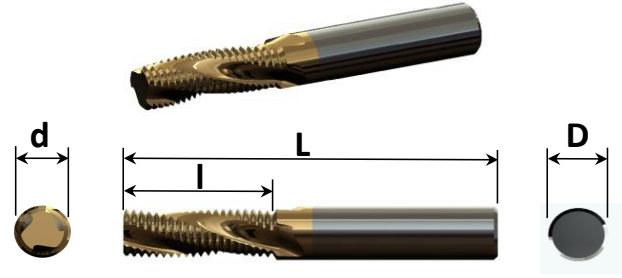
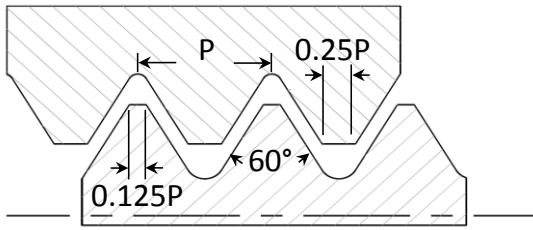
Thread	Pitch/TPI	Threadmill Dimensions in mm							
ISO	mm	Catalogue Number	d	l	D	L	Pitches	Flutes	
M3	0.50	TRN 04 024 L06 0.5ISO-C	2.40	6.0	4.0	45	12	3	
M4	0.70	TRN 04 031 L08 0.7ISO-C	3.15	8.4	4.0	45	12	3	
M4.5	0.75	TRN 06 050 L12 0.75ISO-C	5.00	12.0	6.0	57	16	3	
M5	0.80	TRN 04 039 L10 0.8ISO-C	3.90	10.4	4.0	45	13	3	
M6	1.00	TRN 06 048 L12 1.0ISO-C	4.80	12.0	6.0	57	12	3	
M8	1.25	TRN 08 065 L16 1.25ISO-C	6.50	16.3	8.0	61	13	3	
M10	1.50	TRN 10 082 L20 1.5ISO-C	8.20	19.5	10.0	73	13	3	
M12	1.75	TRN 10 099 L25 1.75ISO-C	9.90	24.5	10.0	73	14	4	
M14	2.00	TRN 12 116 L28 2.0ISO-C	11.60	28.0	12.0	80	14	4	
M16	2.00	TRN 14 136 L32 2.0ISO-C	13.60	32.0	14.0	92	16	4	
M18-M22	2.50	TRN 18 171 L40 2.5ISO-C	17.10	40.0	18.0	102	16	4	
M24	3.00	TRN 20 199 L48 3.0ISO-C	19.90	48.0	20.0	102	16	4	

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Threadmill Dimensions in mm							
ISO Fine	mm	Catalogue Number	d	l	D	L	Pitches	Flutes	
M6	0.75	TRN 06 050 L12 0.75ISO-C	5.00	12.0	6.0	57	16	3	
M8	1.00	TRN 08 067 L16 1.0ISO-C	6.70	16.0	8.0	61	16	3	
M10	1.25	TRN 10 085 L20 1.25ISO-C	8.50	20.0	10.0	73	16	3	
M12	1.50	TRN 10 099 L24 1.5ISO-C	9.90	24.0	10.0	73	16	4	
M16	1.50	TRN 14 139 L32 1.5ISO-C	13.90	31.5	14.0	92	21	4	
M17-M80	2.00	TRN 12 116 L28 2.0ISO-C	11.60	28.0	12.0	80	14	4	

All threadmills can be used to machine threads on larger diameter components.

UNIFIED



HELICAL FLUTE

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
UNC	TPI							
No.10	24	TRN 04 029 L11 24UNC	2.9	10.6	4.0	45	10	3
1/4"	20	TRN 04 039 L13 20UNC	3.9	12.7	4.0	45	10	3
5/16"	18	TRN 06 052 L17 18UNC	5.2	16.9	6.0	57	12	3
3/8"	16	TRN 08 067 L19 16UNC	6.7	19.1	8.0	63	12	3
7/16"	14	TRN 08 076 L24 14UNC	7.6	23.6	8.0	63	13	4
1/2"	13	TRN 10 089 L26 13UNC	8.9	25.4	10.0	73	13	4
9/16"	12	TRN 12 103 L30 12UNC	10.3	29.6	12.0	83	14	4
5/8"	11	TRN 12 110 L32 11UNC	11.0	32.3	12.0	83	14	4
3/4"	10	TRN 16 135 L38 10UNC	13.5	38.1	16.0	92	15	5
7/8"	9	TRN 16 152 L45 9UNC	15.2	45.2	16.0	92	16	4
1"	8	TRN 20 170 L51 8UNC	17.0	50.8	20.0	104	16	4

HELICAL FLUTE

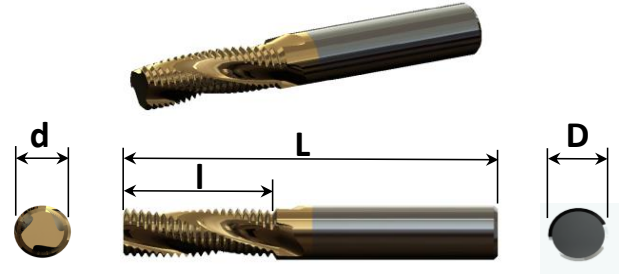
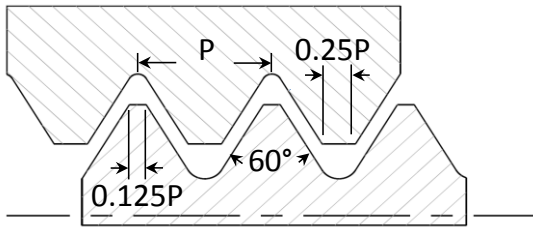
Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
UNF	TPI							
No.8	36	TRN 04 030 L09 36UNF	3.0	8.5	4.0	45	12	3
No.10	32	TRN 04 033 L11 32UNF	3.3	11.1	4.0	45	14	3
No.12 1/4"	28	TRN 04 038 L12 28UNF	3.8	11.8	4.0	45	13	3
1/4"	28	TRN 06 046 L13 28UNF	4.6	12.7	6.0	57	14	3
5/16" 3/8"	24	TRN 06 057 L16 24UNF	5.7	15.9	6.0	57	15	3
7/16" 1/2"	20	TRN 10 085 L23 20UNF	8.5	22.9	10.0	73	18	4
9/16" 5/8"	18	TRN 12 113 L30 18UNF	11.3	29.6	12.0	83	21	4
3/4"	16	TRN 16 159 L38 16UNF	15.9	38.1	16.0	92	24	4
7/8"	14	TRN 20 187 L44 14UNF	18.7	43.5	20.0	104	24	4
1/2"	12	TRN 20 199 L51 12UNF	19.9	50.8	20.0	104	24	5

HELICAL FLUTE

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
UNEF	TPI							
7/16" 1/2"	28	TRN 10 092 L23 28UNEF	9.2	22.7	10.0	73	25	4
9/16" 11/16"	24	TRN 12 119 L29 24UNEF	11.9	28.6	12.0	83	27	4
3/4" 1"	20	TRN 16 159 L38 20UNEF	15.9	38.1	16.0	92	30	5

All threadmills can be used to machine threads on larger diameter components.

UNIFIED



HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
UNC	TPI							
No.10	24	TRN 04 036 L10 24UNC-C	3.6	9.5	4.0	45	9	3
1/4"	20	TRN 06 048 L13 20UNC-C	4.8	12.7	6.0	57	10	3
5/16"	18	TRN 08 061 L16 18UNC-C	6.1	15.5	8.0	61	11	3
3/8"	16	TRN 08 076 L19 16UNC-C	7.6	19.1	8.0	61	12	3
7/16"	14	TRN 10 090 L22 14UNC-C	9.0	21.8	10.0	73	12	3
1/2"	13	TRN 12 104 L25 13UNC-C	10.4	25.4	12.0	80	13	4
9/16"	12	TRN 12 118 L28 12UNC-C	11.8	27.5	12.0	80	13	4
5/8"	11	TRN 14 131 L32 11UNC-C	13.1	32.3	14.0	92	14	4
3/4"	10	TRN 16 159 L38 10UNC-C	15.9	38.1	16.0	92	15	4
7/8"	9	TRN 20 190 L45 9UNC-C	19.0	45.2	20.0	102	16	4
1"	8	TRN 20 199 L51 8UNC-C	19.9	50.8	20.0	102	16	4

HELICAL FLUTE WITH THROUGH HOLE COOLANT

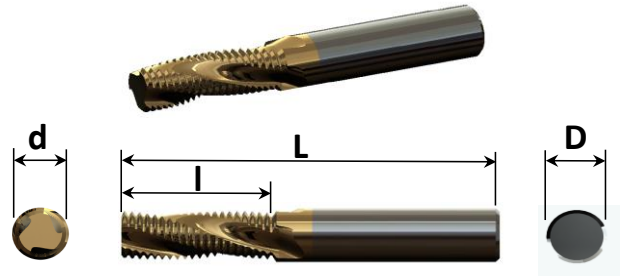
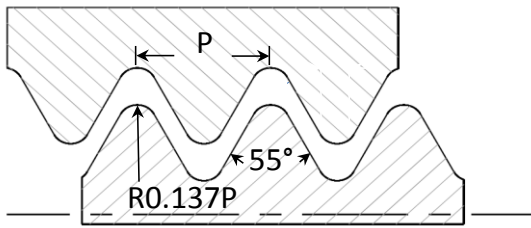
Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
UNF	TPI							
No.10	32	TRN 06 044 L11 32UNF-C	4.4	11.1	6.0	57	14	3
No.12 1/4"	28	TRN 06 043 L11 28UNF-C	4.3	10.9	6.0	57	12	3
1/4"	28	TRN 06 052 L13 28UNF-C	5.2	12.7	6.0	57	14	3
5/16" 3/8"	24	TRN 08 066 L16 24UNF-C	6.6	15.9	8.0	61	15	3
7/16" 1/2"	20	TRN 10 096 L22 20UNF-C	9.6	21.6	10.0	73	17	3
9/16" 5/8"	18	TRN 14 125 L28 18UNF-C	12.5	28.2	14.0	92	20	4
3/4"	16	TRN 18 170 L38 16UNF-C	17.0	38.1	18.0	102	24	4
7/8"	14	TRN 20 199 L44 14UNF-C	19.9	43.5	20.0	102	24	4
1/2"	12	TRN 20 199 L51 12UNF-C	19.9	50.8	20.0	102	24	4

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
UNEF	TPI							
7/16" 1/2"	28	TRN 10 099 L22 28UNEF-C	9.9	21.8	10.0	73	24	3
9/16" 11/16"	24	TRN 14 129 L29 24UNEF-C	12.9	28.6	14.0	92	27	4
3/4" 1"	20	TRN 18 174 L38 20UNEF-C	17.4	38.1	18.0	102	30	4

All threadmills can be used to machine threads on larger diameter components.

WHITWORTH



HELICAL FLUTE WITH THROUGH HOLE COOLANT

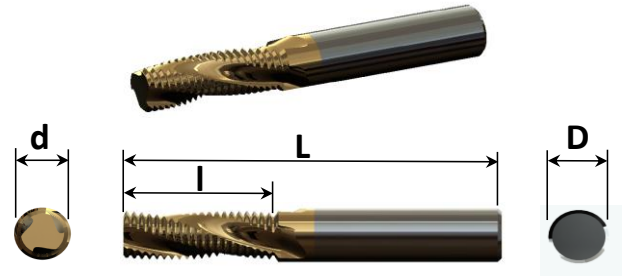
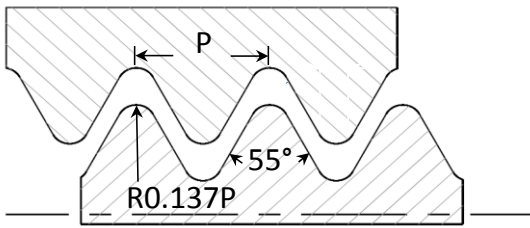
Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
Whitworth BSW	TPI							
1/4"	20	TRX 06 044 L13 20BSW-C	4.4	12.7	6.0	57	10	3
5/16"	18	TRX 06 058 L16 18BSW-C	5.8	15.5	6.0	57	11	3
3/8"	16	TRX 08 072 L19 16BSW-C	7.2	19.1	8.0	61	12	3
7/16"	14	TRX 10 085 L22 14BSW-C	8.5	21.8	10.0	73	12	3
1/2"	12	TRX 10 096 L25 12BSW-C	9.6	25.4	10.0	73	12	3
5/8"	11	TRX 14 126 L32 11BSW-C	12.6	32.3	14.0	92	14	4

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
Whitworth BSF	TPI							
5/16"	22	TRX 08 063 L16 22BSF-C	6.3	16.2	8.0	61	14	3
3/8"	20	TRX 08 076 L19 20BSF-C	7.6	19.1	8.0	61	15	3
7/16"	18	TRX 10 092 L23 18BSF-C	9.2	22.6	10.0	73	16	3
1/2" 9/16"	16	TRX 12 105 L25 16BSF-C	10.5	25.4	12.0	80	16	4
5/8" 11/16"	14	TRX 14 134 L31 14BSF-C	13.4	30.8	14.0	92	17	4
3/4"	12	TRX 18 162 L38 12BSF-C	16.2	38.1	18.0	102	18	4
7/8"	11	TRX 14 126 L33 11BSF-C	12.6	32.3	14.0	92	14	4

All threadmills can be used to machine threads on larger diameter components.

BSP



HELICAL FLUTE

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
Whitworth BSP	TPI							
1/16" 1/8"	28	TRX 06 058 L16 28BSP	5.8	16.3	6.0	57	18	3
1/8"	28	TRX 08 077 L20 28BSP	7.7	20.0	8.0	63	22	3
1/4" 3/8"	19	TRX 10 099 L27 19BSP	9.9	26.7	10.0	73	20	4
3/8"	19	TRX 16 134 L33 19BSP	13.4	33.4	16.0	92	25	4
1/2" 3/4"	14	TRX 16 157 L44 14BSP	15.7	43.5	16.0	92	24	5
1" 1 1/2" 2" 2 1/2"	11	TRX 20 199 L42 11BSP	19.9	41.6	20.0	104	18	5

STRAIGHT FLUTE

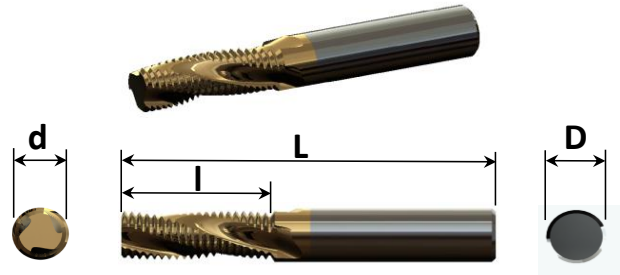
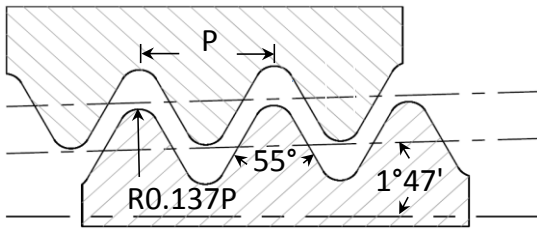
Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
Whitworth BSP	TPI							
1/16"	28	TSX 06 059 L15 28BSP	5.9	14.5	6.0	57	16	3
1/4"	19	TSX 08 079 L19 19BSP	7.9	18.7	8.0	63	14	5
1/2"	14	TSX 12 119 L29 14BSP	11.9	29.0	12.0	83	16	5
1"	11	TSX 16 159 L35 11BSP	15.9	34.6	16.0	92	15	5

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
Whitworth BSP	TPI							
1/16" 1/8"	28	TSX 08 064 L15 28BSP-C	6.4	15.4	8.0	61	17	3
1/8"	28	TSX 10 082 L19 28BSP-C	8.2	19.1	10.0	73	21	3
1/4" 3/8"	19	TSX 12 110 L27 19BSP-C	11.0	26.7	12.0	80	20	4
3/8"	19	TSX 16 145 L33 19BSP-C	14.5	33.4	16.0	92	25	4
1/2" 3/4"	14	TSX 18 179 L42 14BSP-C	17.9	41.7	18.0	102	23	4
1" 1 1/2" 2" 2 1/2"	11	TSX 20 199 L42 11BSP-C	19.9	41.6	20.0	102	18	4

All threadmills can be used to machine threads on larger diameter components.

BSPT



HELICAL FLUTE

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
BSPT	TPI							
1/16"	28	TRX 06 058 L16 28BSPT	5.8	16.3	6.0	57	18	3
1/8"	28	TRX 08 077 L20 28BSPT	7.7	20.0	8.0	63	22	3
1/4"	19	TRX 10 099 L27 19BSPT	9.9	26.7	10.0	73	20	4
3/8"	19	TRX 16 134 L33 19BSPT	13.4	33.4	16.0	92	25	4
1/2" 3/4"	14	TRX 16 157 L44 14BSPT	15.7	43.5	16.0	92	24	5
1" 1 1/2" 2" 2 1/2"	11	TRX 20 199 L42 11BSPT	19.9	41.6	20.0	104	18	5

STRAIGHT FLUTE

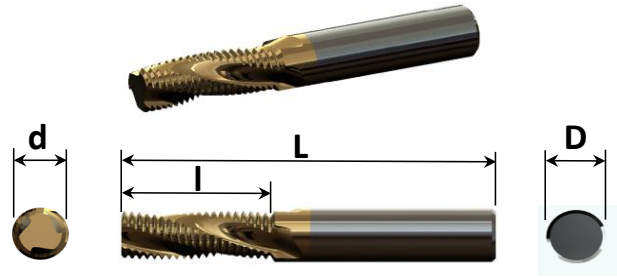
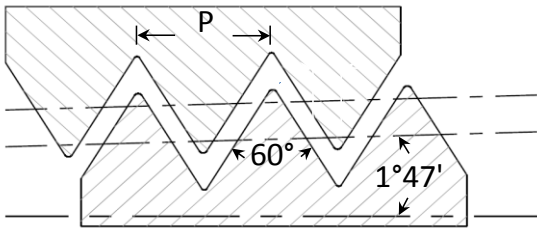
Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
BSPT	TPI							
1/16"	28	TSX 06 059 L10 28BSPT	5.9	10.0	6.0	57	11	3
1/4"	19	TSX 08 079 L15 19BSPT	7.9	14.7	8.0	63	11	5
1/2"	14	TSX 12 119 L20 14BSPT	11.9	20.0	12.0	83	11	5
1"	11	TSX 16 159 L39 11BSPT	15.9	39.3	16.0	92	17	5

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
BSPT	TPI							
1/16"	28	TRX 06 059 L10 28BSPT-C	5.9	10.0	6.0	57	11	3
1/8"	28	TRX 08 077 L10 28BSPT-C	7.7	10.0	8.0	61	11	3
1/4"	19	TRX 10 099 L15 19BSPT-C	9.9	14.7	10.0	73	11	3
3/8"	19	TRX 12 112 L15 19BSPT-C	11.2	14.7	12.0	73	11	4
1/2" 3/4"	14	TRX 16 143 L22 14BSPT-C	14.3	21.8	16.0	92	12	4
1" 1 1/2" 2" 2 1/2"	11	TRX 20 196 L28 11BSPT-C	19.6	27.7	20.0	102	12	4

All threadmills can be used to machine threads on larger diameter components.

NPT



HELICAL FLUTE

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
NPT	TPI							
1/16"	27	TRX 06 053 L09 27NPT	5.3	9.4	6.0	45	10	3
1/8"	27	TRX 08 075 L09 27NPT	7.5	9.4	8.0	45	10	4
1/4"	18	TRX 10 094 L14 18NPT	9.4	14.1	10.0	45	10	4
3/8"	18	TRX 12 119 L14 18NPT	11.9	14.1	12.0	57	10	4
1/2" 3/4"	14	TRX 16 155 L25 14NPT	15.5	25.4	16.0	63	14	5
1" 2"	11.5	TRX 20 199 L33 11.5NPT	19.9	33.1	20.0	63	15	5
2 1/2" 3"	8	TRX 20 199 L38 8NPT	19.9	38.1	20.0	73	12	4

STRAIGHT FLUTE

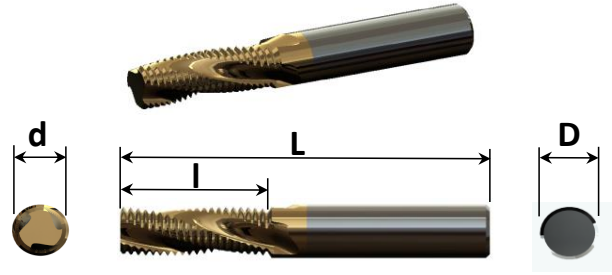
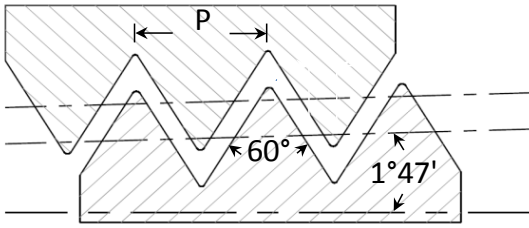
Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
NPT	TPI							
1/16"	27	TSX 06 059 L09 27NPT	5.9	9.4	6.0	57	10	3
1/4"	18	TSX 08 079 L14 18NPT	7.9	14.1	8.0	63	10	5
1/2"	14	TSX 12 119 L20 14NPT	11.9	20.0	12.0	83	11	5
1"	11.5	TSX 16 159 L27 11.5NPT	15.9	26.5	16.0	92	12	5
2 1/2"	8	TSX 16 159 L38 8NPT	15.9	38.1	16.0	92	12	5

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Catalogue Number	d	l	D	L	Pitches	Flutes
NPT	TPI							
1/16"	27	TRX 06 059 L09 27NPT-C	5.9	9.4	6.0	57	10	3
1/8"	27	TRX 08 077 L09 27NPT-C	7.7	9.4	8.0	61	10	3
1/4"	18	TRX 10 099 L14 18NPT-C	9.9	14.1	10.0	73	10	3
3/8"	18	TRX 12 112 L14 18NPT-C	11.2	14.1	12.0	73	10	4
1/2" 3/4"	14	TRX 16 142 L18 14NPT-C	14.2	18.1	16.0	92	10	4
1" 2"	11.5	TRX 20 196 L22 11.5NPT-C	19.6	22.1	20.0	102	10	4
2 1/2" 3"	8	TRX 20 196 L32 8NPT-C	19.6	31.8	20.0	102	10	4

All threadmills can be used to machine threads on larger diameter components.

NPTF



HELICAL FLUTE

Thread	Pitch/TPI	Threadmill Dimensions in mm							
NPTF	TPI	Catalogue Number	d	l	D	L	Pitches	Flutes	
1/16"	27	TRN 06 053 L09 27NPTF	5.3	9.4	6.0	45	10	3	
1/8"	27	TRN 08 075 L09 27NPTF	7.5	9.4	8.0	45	10	4	
1/4"	18	TRN 10 094 L14 18NPTF	9.4	14.1	10.0	45	10	4	
3/8"	18	TRN 12 119 L14 18NPTF	11.9	14.1	12.0	57	10	4	
1/2" 3/4"	14	TRN 16 155 L25 14NPTF	15.5	25.4	16.0	63	14	5	
1" 2"	11.5	TRN 20 199 L33 11.5NPTF	19.9	33.1	20.0	63	15	5	
2 1/2" 3"	8	TRN 20 199 L38 8NPTF	19.9	38.1	20.0	73	12	4	

STRAIGHT FLUTE

Thread	Pitch/TPI	Threadmill Dimensions in mm							
NPTF	TPI	Catalogue Number	d	l	D	L	Pitches	Flutes	
1/16"	27	TSX 06 059 L09 27NPTF	5.9	9.4	6.0	57	10	3	
1/4"	18	TSX 08 079 L14 18NPTF	7.9	14.1	8.0	63	10	5	
1/2"	14	TSX 12 119 L20 14NPTF	11.9	20.0	12.0	83	11	5	
1"	11.5	TSX 16 159 L27 11.5NPTF	15.9	26.5	16.0	92	12	5	
2 1/2"	8	TSX 16 159 L38 8NPTF	15.9	38.1	16.0	92	12	5	

HELICAL FLUTE WITH THROUGH HOLE COOLANT

Thread	Pitch/TPI	Threadmill Dimensions in mm							
NPTF	TPI	Catalogue Number	d	l	D	L	Pitches	Flutes	
1/16"	27	TRX 06 059 L09 27NPTF-C	5.9	9.4	6.0	57	10	3	
1/8"	27	TRX 08 077 L09 27NPTF-C	7.7	9.4	8.0	61	10	3	
1/4"	18	TRX 10 099 L14 18NPTF-C	9.9	14.1	10.0	73	10	3	
3/8"	18	TRX 12 112 L14 18NPTF-C	11.2	14.1	12.0	73	10	4	
1/2" 3/4"	14	TRX 16 142 L18 14NPTF-C	14.2	18.1	16.0	92	10	4	
1" 2"	11.5	TRX 20 196 L22 11.5NPTF-C	19.6	22.1	20.0	102	10	4	
2 1/2" 3"	8	TRX 20 196 L32 8NPTF-C	19.6	31.8	20.0	102	10	4	

All threadmills can be used to machine threads on larger diameter components.

Recommended Cutting Speeds and Feeds

Material	Metres/Min	Feed/Tooth fz	
		d ≤ 8.0 ∅	d > 8.0 ∅
Low/Med. Carbon Steel	250-180	0.03 - 0.07	0.05 - 0.15
High Carbon Steel	250-50	0.03 - 0.07	0.05 - 0.15
High Carbon Steel	180-50	0.02 - 0.05	0.05 - 0.12
Stainless Steel	200-80	0.03 - 0.07	0.05 - 0.15
Cast Iron	180-50	0.03 - 0.07	0.05 - 0.15
Non Ferrous 400	400-100	0.04 - 0.10	0.08 - 0.25
Nickel Chrome Alloys	80-20	0.02 - 0.05	0.04 - 0.10
Titanium Alloys	80-21	0.02 - 0.06	0.04 - 0.11
Iron Based Alloys	80-22	0.02 - 0.07	0.04 - 0.12
Cobalt Based Alloys	80-23	0.02 - 0.08	0.04 - 0.13

Recommended Cutting Speeds and Feeds

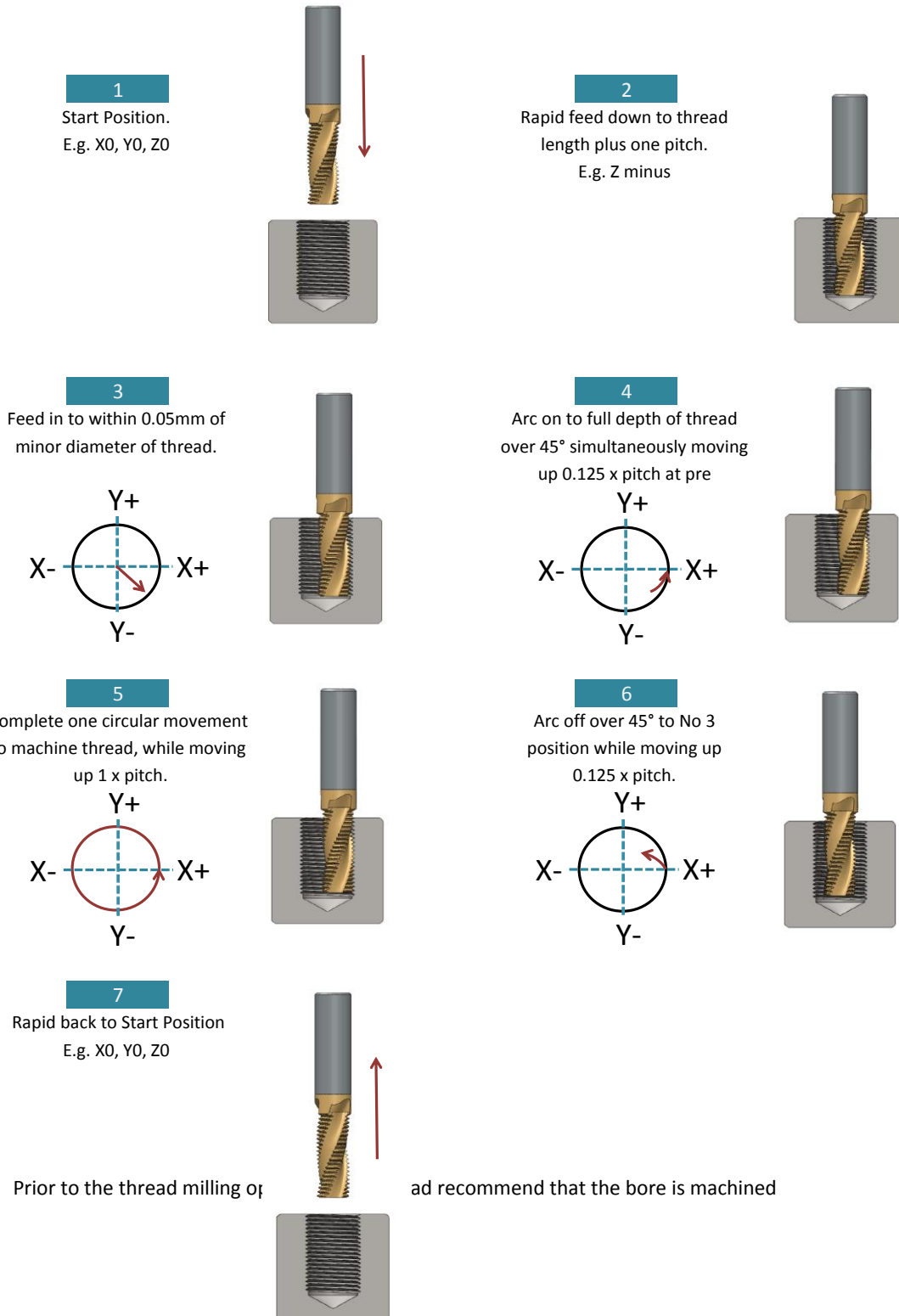
Material Groups	Cutting Speeds	Feed / Tooth fz		
		TRN	TSN	TRN - C
Material	Metres/Min			
Low/Med. Carbon Steel	80 - 230	0.030 - 0.070	0.010 - 0.050	0.050 - 0.150
High Carbon Steel	80 - 230	0.030 - 0.070	0.010 - 0.050	0.050 - 0.150
High Carbon Steel	60 - 170	0.020 - 0.050	0.010 - 0.035	0.050 - 0.120
Stainless Steel	60 - 170	0.030 - 0.070	0.010 - 0.050	0.050 - 0.150
Cast Iron	60 - 150	0.030 - 0.070	0.007 - 0.020	0.050 - 0.150
Non Ferrous 400	150 - 300	0.040 - 0.100	0.020 - 0.075	0.080 - 0.250
Nickel Chrome Alloys	20 - 180	0.020 - 0.050	0.015 - 0.035	0.040 - 0.100
Titanium Alloys	20 - 180	0.020 - 0.050	0.015 - 0.035	0.040 - 0.110
Iron Based Alloys	20 - 180	0.020 - 0.050	0.015 - 0.035	0.040 - 0.120
Cobalt Based Alloys	20 - 180	0.020 - 0.050	0.015 - 0.035	0.040 - 0.130

The Cutting speed and feed on the tool arc path to the start of the thread cut must be equal to the that of the threading cycle.

Machining Recommendations

Operation

The bore for internal threads, or the outside diameter for external threads, should be produced to the minor diameter for internal and major diameter for external threads, prior to the thread milling operation. For internal threads it is preferable to start the threading operation from the bottom of the hole and feed outwards, this reduces the possibility of damage by the swarf produced and 'climb milling' is recommended. When entering into the cut it is recommended that the tool is introduced to the cut on a radial path taking 45° to reach full depth of thread, simultaneously the tool should move 1/8 pitch of the thread in the z axis to prevent thread thinning.



To calculate Speed and Feed

(1) Calculate R.P.M. of cutter

$N = \text{R.P.M.}$

$V = \text{Recommended Cutting Speed}$

$d = \text{Diameter of cutter}$

$$N = \frac{1000 \times V}{d \times \pi} = \text{Required R.P.M.}$$

(2) Calculate Feed per revolution

$F1 = \text{Feed at cutting edge}$

$fz = \text{Recommended feed per tooth}$

$Z = \text{Number of teeth (flutes)}$

$N = \text{R.P.M.}$

$$F1 = fz \times Z \times N = \text{Feed in mm/min at cutting edge}$$

(3) Calculate feed at tool centre line Internal Threads

$F2 = \text{Feed at centre line of cutter}$

$F1 = \text{Feed at cutting edge}$

$D0 = \text{Major diameter of component}$

$d = \text{Cutter diameter}$

$$F2 = \frac{F1 \times (D0 - d)}{D0} = \text{Feed at cutter centre line mm/min.}$$

(4) Calculate feed at tool centre line External Threads

$$F2 = \frac{F1 \times (D0 + d)}{D0}$$

Program example (Fanuc)

Thread: M24x3 24.0 x 3.0 x 39.0

Tool: TRN 16 159 L42 3.0ISO

Material: Stainless Steel

T00 M06

G21 S1450 M03

G00 G90 X0.000 Y0.000 M08

G43 H00 Z0.000

G91

(Fast feed to depth)

G01 X0.000 Y0.000 Z-39.000 F902.2

(Feed to arc in start adding rad comp)

G01 X2.025 Y-2.025 Z0.000 F152 G41 D00

(Arc on)

G03 X2.025 Y2.025 I0.0000 J2.0250 Z0.678 F152

(Machine thread)

G03 X0.000 Y0.000 I-4.0500 J0.0000 Z3.000 F152

(Arc out)

G03 X-2.025 Y2.025 I-2.0250 J0.0000 Z0.678 F152

(Fast feed to centre removing rad comp)

G01 X-2.025 Y-2.025 Z0.000 F451.1 G40 D00

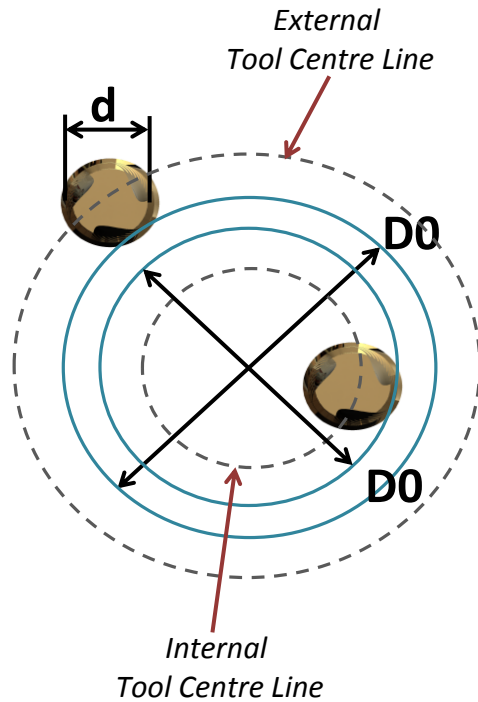
(Fast feed to start)

G00 X0.000 Y0.000 Z34.644 F0.0

M05

(Tool change)

Programs can vary with different CNC controls.



Machining Taper Threads

Prior to the thread milling operation Posithread recommend that the bore is machined to the finished taper minor diameter size. When thread milling taper threads in order to machine an accurately finished part, the tool path must be programmed to achieve this angle.

The angle for BSPT and NPT threads is 1:16 or 1° 47' 24". This angle is produced on the thread mill cutter, but in operation the tool moves in a vertical straight line in Z axis. In order to correct the error the use of quadrant move programming is required. Therefore the X and Y axis arc positions are compensated for every 90° movement of the tool. The amount moved in each quadrant is:

$$\frac{\text{Pitch} \times \tan 1^\circ 47' 24''}{4}$$

For a 14NPT thread the quadrant movement X and Y = 0.0142 mm

