

FETOLA

Solid Carbide Threadmills





FETO GA

FENN TOOL LTD

Solid Carbide Threadmills

HAIMER

Spindle Tooling

Balanced Tool Holders and
Shrink Fit Equipment



Dümmel

INDEXABLE GROOVING SYSTEMS

Grooving & Threading Tools

Hahnreiter

H.S.C.O Taps



MILLSTAR®

INDEXABLE MOULD & DIE CUTTERS

Indexable Carbide Tools



MAYKESTAG

COBALT MILLING CUTTERS

H.S.C.O Drills, Reamers, Countersinks etc

SPHINX

H.S.C.O & Carbide Micro Tools



ZOLLER

measure fascination

Pre-setters and measuring machines

ULTRATOOL®

Carbide products

FETO GA

Solid Carbide Milling Cutters, Drills, Reamers, Countersinks



Fenn Tool Ltd
44 Springwood Drive
Springwood Industrial Estate
Braintree, Essex CM7 2YN
Tel: 01376 347566
Fax: 01376 550827



Kildare Tooling Services
Main Street, Kill
County Kildare
Republic of Ireland
Tel: 045 877740
Fax: 045 877728



Solid Carbide Threadmills

Index

	M	Metric Spiral Flute Threadmills	4
	MF	Metric Fine Spiral Flute Threadmills	5
	UNC	Unified Coarse Pitch Spiral Flute Threadmills	6
	UNF	Unified Fine Pitch Spiral Flute Threadmills	7
	BSP(G)	British Standard Pipe Thread (Gas) Spiral Flute Threadmills	8
	NPT	NPT American Pipe Thread Spiral Flute Threadmills	9
	NPTF	NPTF American Pipe Thread (Dryseal) Straight Flute Threadmills	9
	BSW	British Standard Whitworth Spiral Flute Threadmills	10
	BSF	British Standard Fine Spiral Flute Threadmills	11
		Technical Data	12 - 15



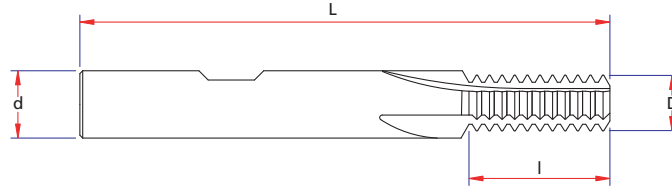
**FENN
TOOL LTD**

Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

ISO Metric



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
0.7	M4	3.0	6	8.4	58	3	12	HMX0.7(6)
0.75	M4.5	3.3	6	8.6	58	3	11	HMX0.75(6)
0.8	M5	3.8	6	9.2	58	3	11	HMX0.8(6)
1.0	M6, M7	4.5	6	10.5	58	3	10	HMX1.0(6)
1.25	M8, M9	5.9	6	13.8	58	3	11	HMX1.25(6)
1.5	M10, M11	7.8	8	16.5	64	4	11	HMX1.5(8)
1.75	M12	9.5	10	21.0	73	3	12	HMX1.75(10)
2.0	M14	9.9	10	26.0	73	3	14	HMX2.0(10)
2.0	M14	11.0	12	26.0	84	3	14	HMX2.0(12)
2.0	M16	11.9	12	29.0	84	4	13	HMX2.01(12)
2.5	M18, M20 M22	13.9	14	32.0	84	3	13	HMX2.5(14)
2.5	M20, M22	15.9	16	35.0	100	4	14	HMX2.5(16)
3.0	M24	15.9	16	39.0	100	4	13	HMX3.0(16)
3.0	M24, M27	17.9	18	42.0	100	4	14	HMX3.0(18)
3.0	M24, M27	19.0	20	45.0	120	4	15	HMX3.0(20)
3.5	M30, M33	19.9	20	52.5	120	4	15	HMX3.5(20)
3.5	M33	24.9	25	52.5	125	4	15	HMX3.5(25)
4.0	M36, M39	19.9	20	52.5	125	4	13	HMX4.0(20)
4.0	M36, M39	24.9	25	60.0	125	4	15	HMX4.0(25)

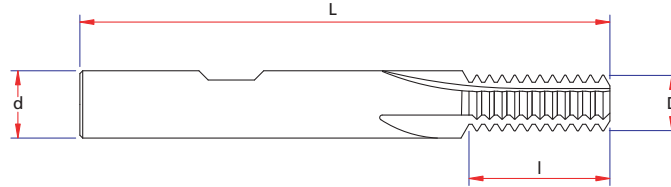


Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

**ISO Metric
Fine**



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
0.75	M6	4.5	6	11.2	58	3	15	HMFx0.75(6)
0.75	M7	5.5	6	12.0	58	3	16	HMFx0.751(6)
1.0	M8	5.9	6	21.0	58	3	21	HMFx1.0(6)
1.0	M10	7.9	8	26.0	64	4	26	HMFx1.0(8)
1.0	M12	9.9	10	26.0	73	4	26	HMFx1.0(10)
1.0	M14	11.9	12	33.0	84	4	33	HMFx1.0(12)
1.25	M10, M12	7.9	8	26.0	64	4	20	HMFx1.25(8)
1.5	M12, M14 M16, M18	9.9	10	27.0	73	4	18	HMFx1.5(10)
1.5	M16, M18	11.9	12	33.0	84	4	22	HMFx1.5(12)
1.5	M20, M22	15.9	16	43.5	100	4	29	HMFx1.5(16)
2.0	M24, M27 M30, M33	15.9	16	48.0	100	4	24	HMFx2.0(16)



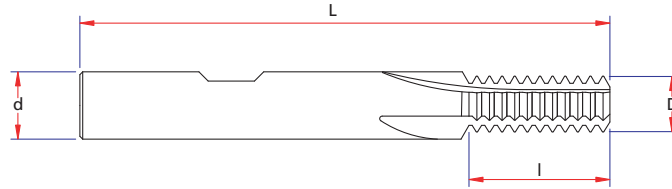
**FENN
TOOL LTD**

Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

U.N.C.



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
32	No. 8	3.0	6	8.0	58	3	10	HUNCX32(6)
20	1/4	4.5	6	10.8	58	3	8	HUNCX20(6)
18	5/16	5.3	6	12.7	58	3	9	HUNCX18(6)
16	3/8	6.5	8	14.8	64	3	9	HUNCX16(8)
14	7/16	7.9	8	18.1	64	3	10	HUNCX14(8)
13	1/2	9.0	10	21.4	73	3	11	HUNCX13(10)
12	9/16	9.9	10	23.3	73	3	11	HUNCX12(10)
11	5/8	11.9	12	29.0	84	3	12	HUNCX11(12)
10	3/4	11.9	12	33.0	84	4	13	HUNCX10(12)
10	3/4	14.4	16	33.0	100	4	13	HUNCX10(16)
9	7/8	15.9	16	36.7	100	4	13	HUNCX9(16)
8	1"	19.9	20	39.7	120	5	12	HUNCX8(20)
7	1-1/8, 1-1/4	19.9	20	43.5	120	4	12	HUNCX7(20)
6	1-1/2	19.9	25	52.5	120	4	12	HUNCX6(25)

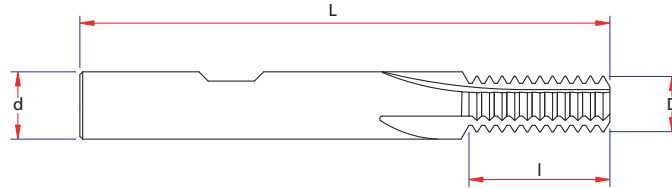


Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

U.N.F.



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
36	No. 8	3.0	6	6.4	58	3	9	HUNFX36(6)
32	No. 10	3.8	6	12.0	58	3	14	HUNFX32(6)
28	No. 12	4.0	6	9.0	58	3	9	HUNFX28(6)
28	1/4	4.8	6	12.2	58	3	13	HUNFX281(6)
24	5/16 - 3/8	5.8	6	14.8	58	3	14	HUNFX24(6)
20	7/16 - 1/2	7.9	8	22.9	64	3	18	HUNFX20(8)
20	7/16 - 1/2	8.5	10	22.9	73	3	18	HUNFX20(10)
18	9/16 - 5/8	9.9	10	25.4	73	3	18	HUNFX18(10)
18	9/16 - 5/8	11.3	12	25.4	84	4	18	HUNFX18(12)
16	3/4	11.9	12	32.0	84	4	20	HUNFX16(12)
16	3/4	15.6	16	36.5	100	4	23	HUNFX16(16)
14	7/8	15.9	16	39.9	100	4	22	HUNFX14(16)
12	1", 1-1/2	11.9	12	32.0	84	4	15	HUNFX12(12)
12	1", 1-1/2	15.9	16	38.1	100	4	18	HUNFX12(16)



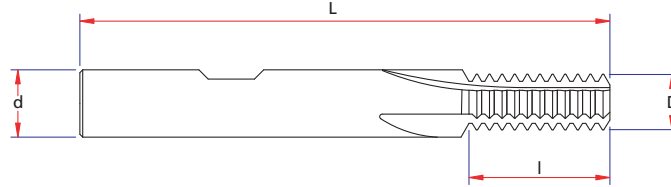
**FENN
TOOL LTD**

Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

B.S.P.(G)



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
28	G1/16-1/8	5.9	6	9.1	58	3	10	HGX28(6)
28	G1/8	7.9	8	15.9	64	3	17	HGX28(8)
19	G1/4 - 3/8	7.9	8	13.4	64	3	10	HGX19(8)
19	G1/4 - 3/8	9.9	10	21.4	73	4	16	HGX19(10)
14	G1/2 - 7/8	11.9	12	18.1	84	3	10	HGX14(12)
14	G1/2 - 7/8	15.9	16	39.0	100	4	21	HGX14(16)
11	G1" - 3"	15.9	16	36.9	100	4	16	HGX11(16)
11	G1" - 4"	19.9	20	41.6	120	4	14	HGX11(20)

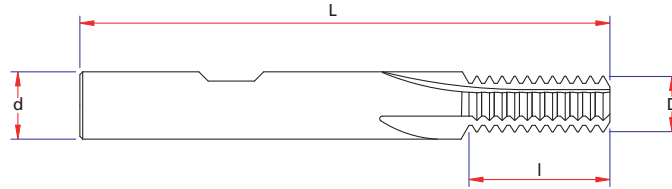


**Spiral Fluted Threadmills &
Straight Fluted Threadmills**

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

N.P.T.



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
27	1/16, 1/8	5.3	6	9.4	58	3	10	HNPTX27(6)
18	1/4, 3/8	9.0	10	14.2	73	4	10	HNPTX18(10)
18	1/4, 3/8	8.8	10	17.0	73	4	13	HNPTX181(10)
14	1/2, 3/4	10.5	12	22.0	84	4	12	HNPTX14(12)
14	1/2, 3/4	14.5	16	22.0	100	5	12	HNPTX14(16)
11.5	1", 2"	14.0	16	28.9	100	4	13	HNPTX11.5(16)
11.5	1", 2"	18.0	20	31.0	120	5	14	HNPTX11.5(20)



N.P.T.F

Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
27	1/16, 1/8	5.3	6	9.4	58	3	10	SNPTFX27(6)
27	1/8	7.0	8	9.4	64	4	10	SNPTFX27(8)
18	1/4, 3/8	7.0	8	14.1	64	4	10	SNPTFX18(8)
18	1/4, 3/8	9.0	10	14.1	73	4	10	SNPTFX18(10)
14	1/2, 3/4	10.7	12	20.0	84	4	11	SNPTFX14(12)
14	1/2, 3/4	14.7	16	20.0	100	4	11	SNPTFX14(16)
11.5	1", 2"	14.2	16	26.5	100	4	12	SNPTFX11.5(16)



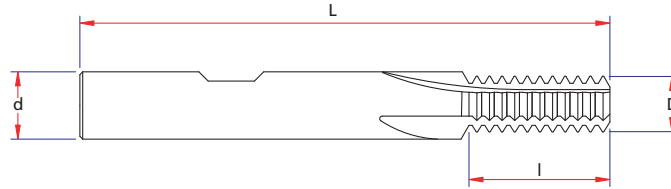
**FENN
TOOL LTD**

Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

B.S.W.



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
20	1/4	4.5	6	11.4	58	3	9	HBSWX20(6)
18	5/16	5.5	6	14.1	58	3	10	HBSWX18(6)
16	3/8	7.0	8	15.9	64	3	10	HBSWX16(8)
14	7/16	7.9	8	18.1	64	3	10	HBSWX14(8)
12	1/2	9.5	10	23.3	73	3	11	HBSWX12(10)
11	5/8	11.9	12	28.8	84	3	12	HBSWX11(12)
10	3/4	11.9	12	33.0	84	4	13	HBSWX10(12)
10	3/4	13.9	16	33.0	100	4	13	HBSWX10(16)
9	7/8	15.9	16	36.7	100	4	13	HBSWX9(16)
8	1"	19.9	20	41.3	120	4	13	HBSWX8(20)
7	1-1/8, 1-1/4	19.9	20	50.8	120	4	14	HBSWX7(20)
6	1-1/2	19.9	20	59.3	120	4	14	HBSWX6(20)
5	1-3/4	19.9	20	71.1	120	4	14	HBSWX5(20)

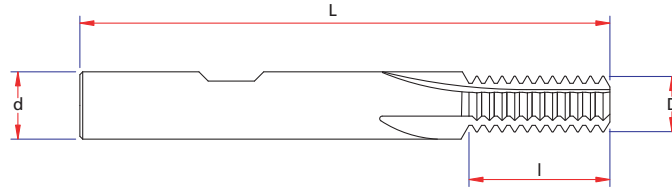


Spiral Fluted Threadmills

Specifications

Weldon Shank DIN 6535HB
Stygian Coated

B.S.F.



Pitch	Range	Dia (D)	Shank Dia (d)	Flute (l)	Overall (L)	No. of Teeth	No. of Threads	Code
22	5/16	5.9	6	13.9	58	3	12	HBSFX22(6)
20	3/8	7.5	8	16.5	64	3	13	HBSFX20(8)
18	7/16	7.9	8	19.0	64	3	13	HBSFX18(8)
16	1/2, 9/16	9.9	10	22.2	73	3	14	HBSFX16(10)
14	5/8, 11/16	11.9	12	29.0	84	3	15	HBSFX14(12)
12	3/4, 13/16	15.0	16	33.9	100	4	16	HBSFX12(16)
11	7/8	15.9	16	36.8	100	4	16	HBSFX11(16)
10	1"	15.9	16	40.6	100	4	16	HBSFX10(16)



**FENN
TOOL LTD**

Solid Carbide Threadmills

TECHNICAL INFORMATION

Thread Milling requires the use of a machining centre capable of helical interpolation. This means that the machine must be capable of three axis simultaneous movement. Two of the axis perform circular interpolation, while the third axis moves perpendicular to the circular plane. On most CNC controls this is achieved with a GO2, or a GO3 code. There are other factors to consider when using a Thread Mill, the most important being fixturing, and tool length extension.

Due to the cutting action of a Thread Mill the forces acting on the part differ greatly than those when tapping.

The speeds and feeds are maximized when vibration of the part and fixture is minimised. The next factor of the utmost importance is the tool, and tool holder. The speed and feed are reduced depending on the distance a tool is held from the spindle face.

**A weldon or side lock holder is only recommended.
Never use a collet style holder for a Thread Mill.**

If you consider the rigidity of your fixture, and the distance of the tool from gauge line, you should not have a problem with any thread milling operation.

FEED RATE CALCULATION

Due to the circular motion of the cutter as it forms a thread the actual feed rate at the cutting edge will be different from that which is programmed at the centre of the tool. For an internal thread the feed rate at the edge increases as the cutter diameter increases. For an external thread the feed rate at the edge decreases as the cutter diameter increases. This can be shown as a direct relation between the size of the circle the cutter moves around, and the size of circle cut.

$$\text{Internal Thread:} \quad F1 = \frac{F2X (Dw-Dc)}{Dw}$$

$$\text{External Thread:} \quad F1 = \frac{F2X (Dw+Dc)}{Dw}$$

Where

- F1 = Programmed feed rate at the tool centre (mm/min)
- F2 = Actual Feed rate at the cutting edge.
- Dw = Diameter of the work piece, or thread diameter.
- Dc = Cutting diameter.

The actual feed rate is calculated using the standard formula:
 $F = (\text{RPM}) \times (\text{Chip load}) \times (\text{No of teeth}).$



Solid Carbide Threadmills

FEED AND SPEED CHARTS ARE NEVER CORRECT!

They can only be used as a guide, as there are too many factors to be taken into account.

1. The cutting speeds are totally dependent on the strength, hardness and abrasiveness of the material.

Generally, the softer the material, the higher the surface speed. However, some materials of relatively low strength and hardness contain very abrasive elements which require a considerable reduction in surface speed.

2. Cutting conditions are dependent on rigidity, concentricity and sufficient supply of a suitable coolant.

3. The extent that tool life needs to be sacrificed to achieve faster machining times.

We would therefore recommend setting and maintaining a constant surface speed (RPM) and adjusting the feed to achieve the optimum performance.

The speed and feed charts are of necessity for guidance only.

Material	Speed Metres/ Min	Feed mm / Per Tooth							
		6 Ø	8 Ø	10 Ø	12 Ø	14 Ø	16 Ø	20 Ø	25 Ø
Steel to 500 N/mm ²	90-130	.02	.025	.025	.03	.03	.035	.04	.045
Steel 500-800 N/mm ²	70-100	.015	.02	.02	.025	.025	.03	.035	.04
Steel 800-1000 N/mm ² Cast Iron < 180 HB	60-90	.01	.015	.015	.02	.04	.025	.03	.035
Steel 1000-1500 N/mm ² Cast Iron > 180HB Chrome Molybdenum Cast Iron > 180HB	30-70	.01	.01	.015	.015	.03	.02	.02	.025
Alloyed Steels Cr, Ni, Stainless Steels Heat resistance steels. Titanium Alloys	30-60	.01	.015	.015	.02	.02	.02	.025	.03
High Alloyed Steel, Nickel alloys Inconel Nimonic	20-45	.05	.05	.05	.01	.01	.015	.03	.035
Copper Brass and Bronze	100-200	.015	.02	.03	.03	.035	.04	.04	.025
Aluminium < 10% Silicon	300-800	.025	.035	.05	.06	.075	.08	.10	.12
Aluminium > 10% Silicon	100-300	.015	.02	.02	.03	.03	.04	.05	.06
Duroplastics	100-150	.035	.04	.045	.05	.06	.075	.08	.09

Too high a feed rate will cause poor surface finish, tool deflection and possible tool breakage.

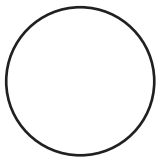
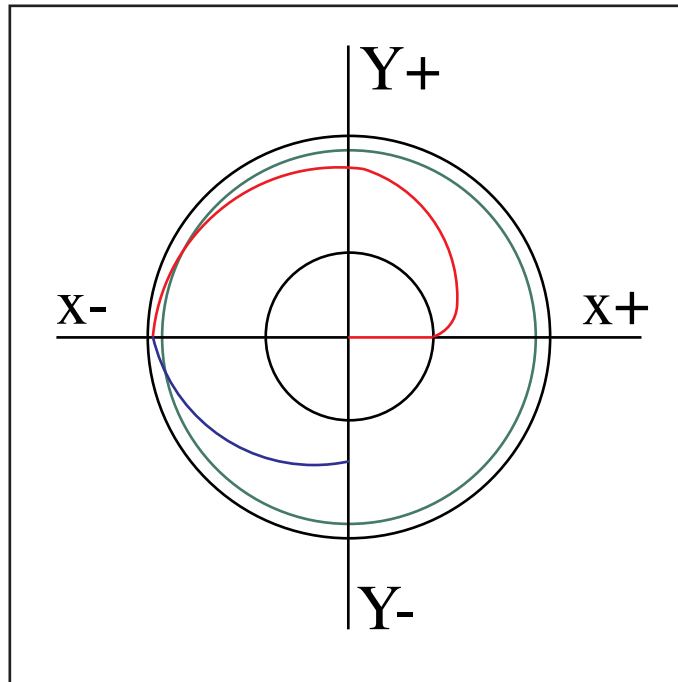
Too low a feed rate will cause vibration, thread thinning and poor tool life.

For internal threads, the interpolated feed must be reduced. For external threads the interpolated feed must be increased.



Solid Carbide Threadmills

APPLICATION GUIDE



Thread Milling Cutter \emptyset
Cutter starts at (X0, Y0), then rapids Z - to thread depth required.



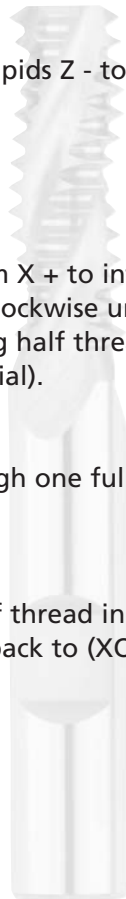
Feed thread milling cutter 0.5mm X + to introduce cutter compensation (G41).
Feed tool in a helical path anti clockwise until full thread depth is obtained.
Finishing at 9 o'clock and moving half thread pitch in Z Axis
(45° to 180° depending on material).



Feed thread milling cutter through one full circle in an anti-clockwise direction and one full pitch of thread in Z Axis.

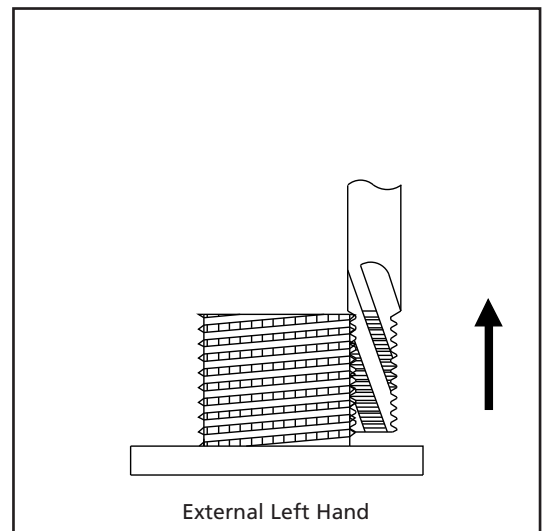
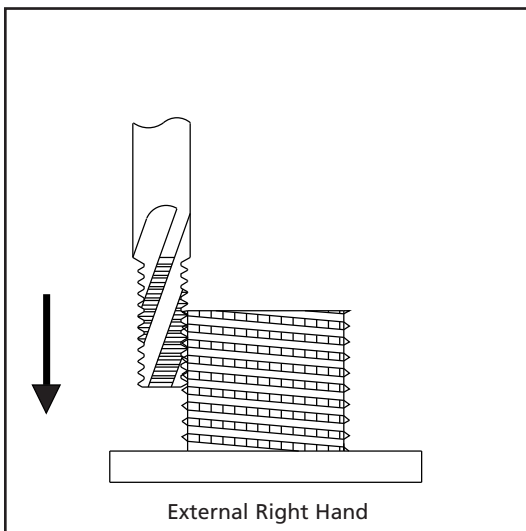
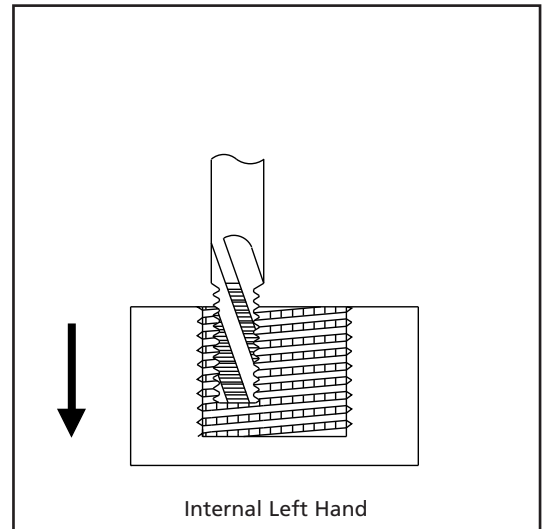
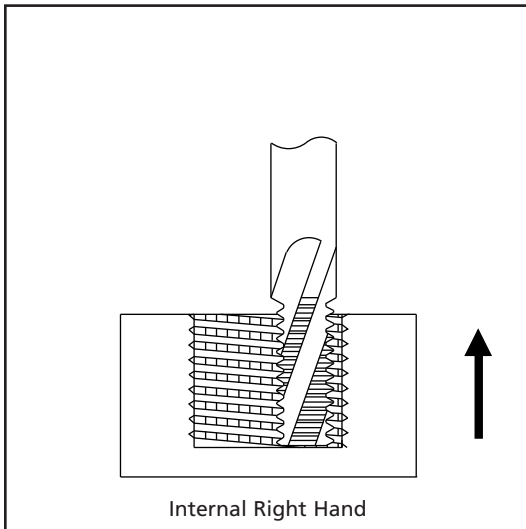


Feed thread milling cutter out of thread in a helical movement anti-clockwise, moving half pitch of thread in Z Axis. Rapid back to (X0, Y0) then Z out of hole. (G40) cutter compensation off.



Solid Carbide Threadmills

DIRECTIONAL PATH



As with the majority of Carbide applications, it is usually better to climb mill, but this is dependent on the applications.

Our graphics show the best directional path, but due to other factors, i.e. Swarf in the bottom of an internal hole for example, it is sometimes better to change the direction of the circular interpolation path to achieve the correct hand thread.

Tool Holding. Only Weldon/Side Lock Holders should be used.
Collet Chucks are not suitable as a pivoting action may occur, resulting in tapered threads.

****Please note all tools will be supplied for internal threads. Please state if you wish to machine external threads****



FENN TOOL LIMITED

44 Springwood Drive
 Springwood Industrial Estate,
 Braintree, Essex CM7 2YN

Tel: +44 (0)1376 347566 Fax: +44 (0)1376 550827
 Email: enquiries@fenntool.co.uk
www.fenntool.com

KILDARE TOOLING SERVICES

Main Street,
 Kill, County Kildare
 Republic of Ireland.

Tel: +353 (0)45 877740 Fax: +353 (0)45 877728
 Email: sales@kildaretooling.ie
www.kildaretooling.com