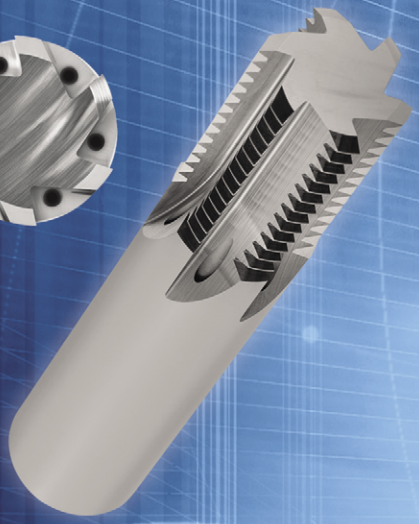
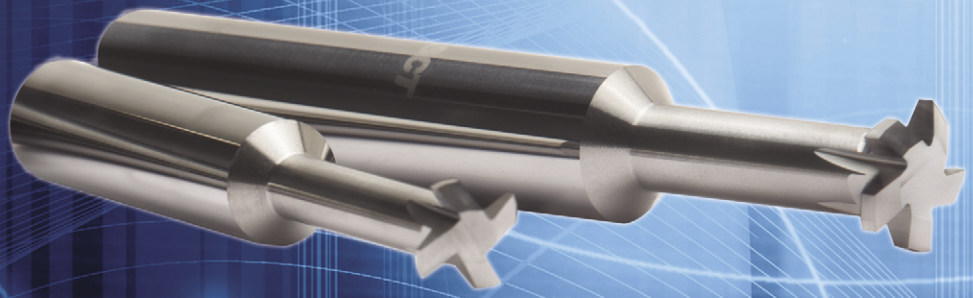
SCT

THREAD MILLS



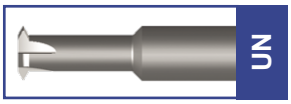


Helical Flute
Acme/Stub Acme
Single Profile (SPTM)
Long Reach (TMLR)

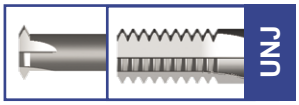
NPTF/ NPT
Staggered Tooth
Coolant Through
Metric

THREAD MILLS PRODUCT OVERVIEW

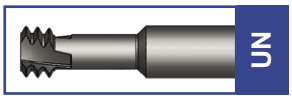
Thread mills cut a thread using helical interpolation. Helical interpolation involves moving three axes simultaneously. The X and Y axes move in a circular motion while the Z axis moves in a linear motion. This allows the same thread mill to cut both right and left-hand threads and to produce a variety of thread sizes of the same pitch. All thread mills are made from premium submicron carbide and are stocked with and without an ALTiN+ coating. They are ground on state-of-the-art CNC tool-and-cutter grinders and have been engineered for high performance. Programming assistance is available. Technical information available on pages 31-32.



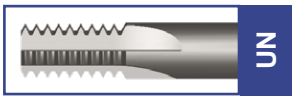
SPTM (p.7-8)
Single profile thread mills cut internal and external threads in a range of thread sizes with minimum side cutting pressure.



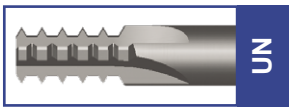
EXTERNAL (p. 9)
The straight flute EXJ and SPTM EXJ have the root radius that is required for the external "UNJ" thread.



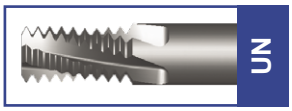
TMLR (p.10-11)
Long reach thread mills have three teeth and a helical flute that excel in internal deep threads and hard-to-cut materials.



STRAIGHT FLUTE (p.12-15)
Straight flute thread mills come in a large variety of sizes and are crest cutting for internal threads only.

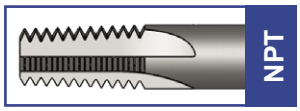


STAGGERED TOOTH (p.16)
Staggered tooth thread mills cut internal and external threads. Every other tooth is removed in a staggered pattern for reduced side cutting pressure.

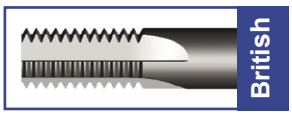


15° HELICAL FLUTE (p.17)
15° helical flute thread mills are non-crest cutting and for internal threads only. The helical flutes distribute the side cutting pressure.

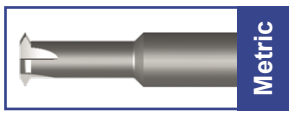
30° HELICAL FLUTE (p.18)
The 30° helical flute thread mills cut internal and external threads. The helical flutes distribute the side cutting pressure.



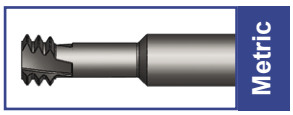
NPT / NPTF (p.19-21)
NPT thread mills come in straight, helical and staggered tooth design. They cut both internal and external threads. NPTF are for dryseal applications.



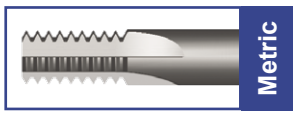
BSPP / BSPT (p.22)
These straight flute thread mills have a 55° thread profile and cut the British Standard Pipe Parallel (BSPP) and the British Standard Pipe Taper (BSPT).



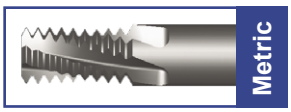
SPTM METRIC (p.23-24)
Single profile thread mills cut internal and external threads in a range of thread sizes with minimum side cutting pressure.



TMLR METRIC (p.25)
Long reach thread mills have three teeth and a helical flute that excel in internal deep threads and hard to cut materials.

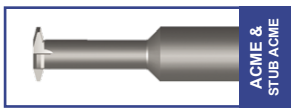


STRAIGHT FLUTE (p.26-27)
Straight flute thread mills come in a large variety of sizes and are crest cutting for internal threads only.



15° HELICAL FLUTE (p.28)
15° helical flute thread mills are non-crest cutting for internal threads only. The helical flute distributes the side cutting pressure.

30° HELICAL FLUTE (p.28)
30° helical flute thread mills cut internal and external threads. The helical flute distributes side cutting pressure.



ACME / STUB ACME (p.29-30)
Acme thread mills come in both acme and stub acme configurations. Different tools are available to cut the internal and external threads.

FREE THREAD MILL CODE GENERATOR FOR SCT THREAD MILLS

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THREAD MILL LOCATOR CHART ONLINE

THREAD MILL TECH INFORMATION PAGES 31-32

Scientific Cutting Tools, Inc.
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(805) 584-9495 Fax: (805) 584-9629
(800) 383-2244 Fax: (888) 728-3295

THREAD MILL FEED AND SPEED CHART

MATERIAL	HB/Rc	SPEED SFM* UNCOATED	SPEED SFM ALTiN+	FEED (INCHES PER TOOTH)					
				TOOL DIAMETER					
				.032 - .056	.059 - .090	.100 - .190	.200 - .350	.370 - .595	.600+
CAST IRON	160 HB	100-220	200-425	.0004-.001	.0004-.0008	.0004-.0014	.0004-.002	.0004-.0035	.0004-.006
CARBON STEEL	18 Rc	100-200	190-425	.0003-.001	.0003-.0008	.0003-.0014	.0003-.002	.0003-.005	.0003-.006
ALLOY STEEL	20 Rc	80-200	200-375	.0003-.001 2 Passes	.0003-.0008 3 Passes	.0003-.0014	.0003-.0024	.0003-.005	.0003-.006
TOOL STEEL	20 Rc	80-175	175-250	.0003-.0004 2 Passes	.0003-0.0005 3 Passes	.0003-.0005	.0003-.0009	.0003-.0026	.0003-.004
300 STAINLESS STEEL	150 HB	90-120	120-255	.0003-.0005 2 Passes	.0003-0.0006 3 Passes	.0003-.0007	.0003-.002	.0003-.0035	.0003-.0045
400 STAINLESS STEEL	195 HB	90-150	140-375	.0003-.0005 2 Passes	.0003-.0006 3 Passes	.0003-.0007	.0003-.002	.0003-.0026	.0003-.0045
HIGH TEMP ALLOY (Ni & Co BASE)	20 Rc	50-125	100-125	.0003-.0004 3 Passes	.0003-.00045 3 Passes	.0003-.0005 2 Passes	.0003-.0009	.0003-.0026	.0003-.004
TITANIUM	25 Rc	50-130	100-170	.0003-.0004 3 Passes	.0003-.00045 3 Passes	.0003-.001 2 Passes	.0003-.0009	.0003-.0015	.0003-.003
HEAT TREATED ALLOYS (38-45Rc)	40 Rc	50-90	90-150	.0003-.0004 3 Passes	.0003-.00045 3 Passes	.0003-.0005 2 Passes	.0003-.0008	.0003-.001	.0003-.0025
ALUMINUM	100 HB	100-800	100-1200	.0005-.0015	.0005-.002	.0005-.0025	.0005-.003	.0005-.006	.0005-.009
BRASS, ZINC	80 HB	200-350	200-750	.0005-.0015	.0005-.002	.0005-.0025	.0005-.003	.0005-.006	.0005-.009

*SFM = Surface Feet per Minute

**Parameters are a starting point based on machinability rating at hardness listed.
Check machinability rating of the material to be machined and adjust accordingly.**

**Looking for the Thread Mill Locator Chart? It is now online.
Visit www.sct-usa.com and click on resources.**

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THREAD MILL FEED AND SPEED APPLICATION

It may be necessary to use more radial depth passes than shown on the chart (p.31) when cutting an unfavorable length-to-diameter ratio, coarse pitches, or hard materials. When cutting a thread with two passes, cut approximately **65% of the thread on the first pass and 35 percent on the finish pass.** For three passes, use a **50/30/20** ratio. For four passes, use a **40/27/20/13** ratio. The idea is to equalize the side cutting pressure.

Thread mills can sometimes be used to cut multiple start threads. Call engineering for assistance.
Thread mills can be cut off for shorter thread depths or necked back for deeper thread depths. Call for price and delivery.

In order to apply the Feed and Speed chart appropriately, it is necessary to understand that machining centers will apply the feed rate at the centerline of the spindle. It is correct to use a normal calculation and the following Feed & Speed Chart when cutting in a straight line; however, it is incorrect when cutting an internal thread. Therefore, the feed rate must be recalculated.

The following is an example of how to apply the feed rate correctly:
The tool is a TM290-24A cutting a 3/8-24 thread in stainless steel.
The outside diameter of the tool is 0.290.
The surface foot per minute (SFM) is 150.
The chip per tooth ia 0.001. The tool has four flutes.
The revolutions per minute (RPM) equal the SFM x 3.82 divided by the outside diameter of the tool.

In this example: **(150 x 3.82) / 0.290**, which equals 1975 RPM.
The RPM x feed (chip per tooth) x the number of flutes equals the Non-Adjusted Feed Rate or NAFR.
In this example: **1975 x 0.001 x 4 = 7.9 NAFR**
The major diameter of the thread is 0.375. We will call this D.
The outside diameter of the tool is 0.290. We will call this d.
We will call the Adjusted Feed Rate the AFR.
The formula for the AFR for internal interpolation is **AFR = NAFR x (D-d) ÷ D**

In this example: **AFR = 7.9 x (0.375 - 0.290) ÷ 0.375**

Therefore, the Adjusted Feed Rate equals 1.79. This is the feed rate that will equal 0.001 chip per tooth in the above example. This is the feed rate that must be used in the CNC program.

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