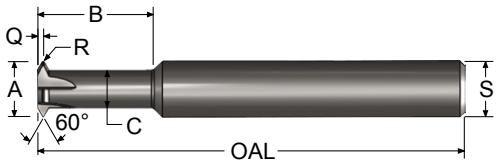
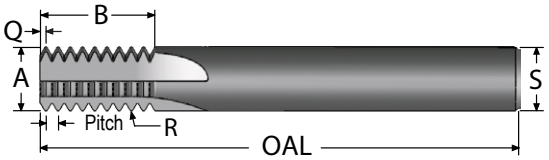
UN THREAD MILLS
SINGLE PROFILE (SPTM) - EXTERNAL UNJ - SOLID CARBIDE



- Non-crest cutting allows maximum flexibity for plated and non-standard threads
- Minimal side cutting pressure
- Conforms to aerospace standard AS8879

EXT. THREAD / PITCH	"A" TOOL DIA.	"B" LENGTH OF CUT	"C" NECK DIA.	"R" ROOT RADIUS	"Q" LENGTH	"S" SHANK DIA.	OAL	FLUTES	ORDER #		EDP #	
									UNCOATED	AlTiN+	UNCOATED	AlTiN+
									EXTERNAL ONLY			
UNJ-32	0.372	1.000	0.240	0.0051	0.043	0.375	3.00	4	SPTM372-32EXJ	SPTM372-32EXJ-A	120916	120934
UNJ-28	0.372	1.000	0.240	0.0059	0.043	0.375	3.00	4	SPTM372-28EXJ	SPTM372-28EXJ-A	120913	120931
UNJ-24	0.372	1.000	0.240	0.0069	0.044	0.375	3.00	4	SPTM372-24EXJ	SPTM372-24EXJ-A	120910	120928
UNJ-20	0.372	1.000	0.240	0.0082	0.044	0.375	3.00	4	SPTM372-20EXJ	SPTM372-20EXJ-A	120907	120925
UNJ-18	0.372	1.000	0.240	0.0091	0.045	0.375	3.00	4	SPTM372-18EXJ	SPTM372-18EXJ-A	120904	120922
UNJ-16	0.372	1.000	0.240	0.0103	0.046	0.375	3.00	4	SPTM372-16EXJ	SPTM372-16EXJ-A	120901	120919
UNJ-12	0.488	1.400	0.340	0.0137	0.052	0.500	3.50	5	SPTM488-12EXJ	SPTM488-12EXJ-A	120937	120940

THREAD MILLS - EXJ - SOLID CARBIDE
(EXTERNAL UNJ THREAD)
FULL PROFILE



- ALTiN+ coating extends tool life
- Precision ground for maximum concentricity
- Made with premium submicron carbide

EXT. THREAD / PITCH	"A" TOOL DIA.	"B" LENGTH OF CUT	"R" ROOT RADIUS	"Q" LENGTH	"S" SHANK DIA.	OAL	FLUTES	ORDER #		EDP #	
								UNCOATED	AlTiN+	UNCOATED	AlTiN+
								EXTERNAL THREADS ONLY			
UNJ-32	0.245	0.668	0.0051	0.016	0.250	2.50	4	TM245-32EXJ	TM245-32EXJ-A	104007	104025
UNJ-28	0.245	0.657	0.0059	0.018	0.250	2.50	4	TM245-28EXJ	TM245-28EXJ-A	104004	104022
UNJ-24	0.245	0.683	0.0069	0.020	0.250	2.50	4	TM245-24EXJ	TM245-24EXJ-A	104001	104019
UNJ-20	0.370	0.773	0.0082	0.024	0.375	3.50	5	TM370-20EXJ	TM370-20EXJ-A	104034	104052
UNJ-18	0.370	0.800	0.0091	0.026	0.375	3.50	5	TM370-18EXJ	TM370-18EXJ-A	104031	104049
UNJ-16	0.370	0.774	0.0103	0.029	0.375	3.50	5	TM370-16EXJ	TM370-16EXJ-A	104028	104046
UNJ-14	0.495	1.027	0.0118	0.033	0.500	3.50	6	TM495-14EXJ	TM495-14EXJ-A	104061	104085
UNJ-12	0.495	1.031	0.0137	0.038	0.500	3.50	6	TM495-12EXJ	TM495-12EXJ-A	104058	104082
UNJ-10	0.495	1.037	0.0165	0.046	0.500	3.50	6	TM495-10EXJ	TM495-10EXJ-A	104055	104079
UNJ-8	0.495	1.046	0.0207	0.057	0.500	3.50	6	TM495-8EXJ	TM495-8EXJ-A	104064	104088

Scientific Cutting Tools offers two external UNJ thread cutting options: the partial profile SPTM EXJ and the full profile EXJ Thread Mill. Both tools conform to aerospace standard AS8879.

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.**

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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