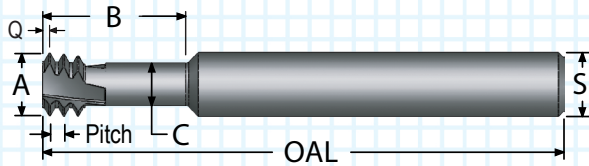


UN THREAD MILLS

LONG REACH (TMLR) - SOLID CARBIDE

FULL PROFILE



- Small thread milling is made easy with TMLR tools
- Economical cost per hole
- Minimal cutting pressure
- ALTiN+ coating for higher Surface Feet per Minute

MIN ID THREAD /PITCH*	"A" TOOL DIA.	"B" LENGTH OF CUT	"C" NECK DIA.	"Q" LENGTH	"S" SHANK DIA.	OAL	FLUTES	ORDER #		EDP #	
								UNCOATED	ALTiN+	UNCOATED	ALTiN+
								<i>INTERNAL THREADS ONLY</i>			
2-56	0.065	0.170	0.039	0.009	0.250	2.50	3	TMLR065-56	TMLR065-56A	110501	110603
2-56	0.065	0.210	0.039	0.009	0.250	2.50	3	TMLR065-56EL	TMLR065-56ELA	110504	110606
2-56	0.065	0.290	0.039	0.009	0.250	2.50	3	TMLR065-56XL	TMLR065-56XLA	110505	110607
4-40	0.082	0.225	0.046	0.013	0.250	2.50	3	TMLR082-40	TMLR082-40A	110507	110609
4-40	0.082	0.300	0.046	0.013	0.250	2.50	3	TMLR082-40EL	TMLR082-40ELA	110510	110612
6-32	0.100	0.260	0.056	0.016	0.250	2.50	3	TMLR100-32	TMLR100-32A	110513	110615
6-32	0.100	0.400	0.056	0.016	0.250	2.50	3	TMLR100-32EL	TMLR100-32ELA	110516	110618
6-40	0.100	0.260	0.065	0.013	0.250	2.50	3	TMLR100-40	TMLR100-40A	110519	110621
6-40	0.100	0.400	0.065	0.013	0.250	2.50	3	TMLR100-40EL	TMLR100-40ELA	110522	110624
8-32	0.126	0.300	0.080	0.016	0.250	2.50	3	TMLR126-32	TMLR126-32A	110525	110627
8-32	0.126	0.500	0.080	0.016	0.250	2.50	3	TMLR126-32EL	TMLR126-32ELA	110528	110630
8-36	0.126	0.300	0.085	0.014	0.250	2.50	3	TMLR126-36	TMLR126-36A	110531	110633
8-36	0.126	0.500	0.085	0.014	0.250	2.50	3	TMLR126-36EL	TMLR126-36ELA	110534	110636
10-24	0.139	0.400	0.080	0.021	0.250	2.50	3	TMLR139-24	TMLR139-24A	110537	110639
10-24	0.139	0.600	0.080	0.021	0.250	2.50	3	TMLR139-24EL	TMLR139-24ELA	110540	110642
10-32	0.139	0.400	0.093	0.016	0.250	2.50	3	TMLR139-32	TMLR139-32A	110543	110645
10-32	0.139	0.600	0.093	0.016	0.250	2.50	3	TMLR139-32EL	TMLR139-32ELA	110546	110648
10-48	0.139	0.400	0.106	0.010	0.250	2.50	3	TMLR139-48	TMLR139-48A	110549	110651
10-48	0.139	0.600	0.106	0.010	0.250	2.50	3	TMLR139-48EL	TMLR139-48ELA	110552	110654
1/4-20	0.186	0.500	0.112	0.025	0.250	2.50	3	TMLR186-20	TMLR186-20A	110555	110657
1/4-20	0.186	0.700	0.112	0.025	0.250	2.50	3	TMLR186-20EL	TMLR186-20ELA	110558	110660
1/4-28	0.186	0.500	0.130	0.018	0.250	2.50	3	TMLR186-28	TMLR186-28A	110561	110663
1/4-28	0.186	0.700	0.130	0.018	0.250	2.50	3	TMLR186-28EL	TMLR186-28ELA	110564	110666
1/4-32	0.186	0.500	0.140	0.016	0.250	2.50	3	TMLR186-32	TMLR186-32A	110567	110669
1/4-32	0.186	0.700	0.140	0.016	0.250	2.50	3	TMLR186-32EL	TMLR186-32ELA	110570	110672
5/16-18	0.234	0.600	0.156	0.028	0.250	2.50	3	TMLR234-18	TMLR234-18A	110573	110675
5/16-18	0.234	0.850	0.156	0.028	0.250	2.50	3	TMLR234-18EL	TMLR234-18ELA	110576	110678
5/16-24	0.234	0.600	0.176	0.021	0.250	2.50	3	TMLR234-24	TMLR234-24A	110579	110681
5/16-24	0.234	0.850	0.176	0.021	0.250	2.50	3	TMLR234-24EL	TMLR234-24ELA	110582	110684
5/16-28	0.234	0.600	0.180	0.018	0.250	2.50	3	TMLR234-28	TMLR234-28A	110585	110687
5/16-28	0.234	0.850	0.180	0.018	0.250	2.50	3	TMLR234-28EL	TMLR234-28ELA	110588	110690
5/16-32	0.234	0.600	0.188	0.016	0.250	2.50	3	TMLR234-32	TMLR234-32A	110591	110693
5/16-32	0.234	0.850	0.188	0.016	0.250	2.50	3	TMLR234-32EL	TMLR234-32ELA	110594	110696
5/16-40	0.234	0.600	0.194	0.013	0.250	2.50	3	TMLR234-40	TMLR234-40A	110597	110699
5/16-40	0.234	0.850	0.194	0.013	0.250	2.50	3	TMLR234-40EL	TMLR234-40ELA	110600	110702

*Single profile thread mills can cut any larger size internal thread within the recommended TPI

THREAD MILLS UN

SINGLE POINT

INDEXABLE TOOLS

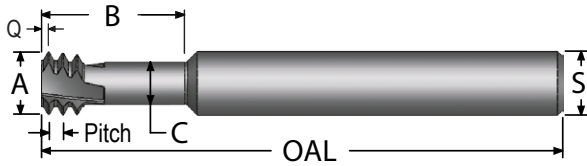
PORT - CAVITY

SPECIALTY

UN THREAD MILLS

LONG REACH (TMLR) - SOLID CARBIDE

FULL PROFILE



- Cuts UNC, UNF, UNEF, and UNS threads
- Cuts UNJ threads (internal only)
- Excels in difficult-to-thread materials
- ALTiN+ coating extends tool life

MIN ID THREAD /PITCH *	"A" TOOL DIA.	"B" LENGTH OF CUT	"C" NECK DIA.	"Q" LENGTH	"S" SHANK DIA.	OAL	FLUTES	ORDER #		EDP #	
								UNCOATED	AITiN	UNCOATED	ALTiN+
								<i>INTERNAL THREADS ONLY</i>			
3/8-16	0.285	0.750	0.191	0.031	0.375	3.50	3	TMLR285-16	TMLR285-16A	110705	110771
3/8-16	0.285	1.000	0.191	0.031	0.375	3.50	3	TMLR285-16EL	TMLR285-16ELA	110708	110774
3/8-24	0.285	0.750	0.222	0.021	0.375	3.50	3	TMLR285-24	TMLR285-24A	110711	110777
3/8-24	0.285	1.000	0.222	0.021	0.375	3.50	3	TMLR285-24EL	TMLR285-24ELA	110714	110780
3/8-32	0.285	0.750	0.235	0.016	0.375	3.50	3	TMLR285-32	TMLR285-32A	110717	110783
3/8-32	0.285	1.000	0.235	0.016	0.375	3.50	3	TMLR285-32EL	TMLR285-32ELA	110720	110786
7/16-14	0.340	0.800	0.235	0.036	0.375	3.50	3	TMLR340-14	TMLR340-14A	110723	110789
7/16-14	0.340	1.200	0.235	0.036	0.375	3.50	3	TMLR340-14EL	TMLR340-14ELA	110726	110792
7/16-18	0.340	0.800	0.258	0.028	0.375	3.50	3	TMLR340-18	TMLR340-18A	110729	110795
7/16-18	0.340	1.200	0.258	0.028	0.375	3.50	3	TMLR340-18EL	TMLR340-18ELA	110732	110798
7/16-20	0.340	0.800	0.265	0.025	0.375	3.50	3	TMLR340-20	TMLR340-20A	110735	110801
7/16-20	0.340	1.200	0.265	0.025	0.375	3.50	3	TMLR340-20EL	TMLR340-20ELA	110738	110804
1/2-12	0.370	0.800	0.245	0.042	0.375	3.50	3	TMLR370-12	TMLR370-12A	110741	110807
1/2-12	0.370	1.200	0.245	0.042	0.375	3.50	3	TMLR370-12EL	TMLR370-12ELA	110744	110810
1/2-13	0.370	0.800	0.255	0.038	0.375	3.50	3	TMLR370-13	TMLR370-13A	110747	110813
1/2-13	0.370	1.200	0.255	0.038	0.375	3.50	3	TMLR370-13EL	TMLR370-13ELA	110750	110816
1/2-18	0.370	0.800	0.287	0.028	0.375	3.50	3	TMLR370-18	TMLR370-18A	110753	110819
1/2-18	0.370	1.200	0.287	0.028	0.375	3.50	3	TMLR370-18EL	TMLR370-18ELA	110756	110822
1/2-20	0.370	0.800	0.295	0.025	0.375	3.50	3	TMLR370-20	TMLR370-20A	110759	110825
1/2-20	0.370	1.200	0.295	0.025	0.375	3.50	3	TMLR370-20EL	TMLR370-20ELA	110762	110828
1/2-32	0.370	0.800	0.315	0.016	0.375	3.50	3	TMLR370-32	TMLR370-32A	110765	110831
1/2-32	0.370	1.200	0.315	0.016	0.375	3.50	3	TMLR370-32EL	TMLR370-32ELA	110768	110834
5/8-11	0.470	1.200	0.335	0.045	0.500	4.00	4	TMLR470-11	TMLR470-11A	110837	110861
5/8-11	0.470	1.750	0.335	0.045	0.500	4.00	4	TMLR470-11EL	TMLR470-11ELA	110840	110864
3/4-10	0.495	1.200	0.345	0.050	0.500	4.00	4	TMLR495-10	TMLR495-10A	110843	110867
3/4-10	0.495	1.750	0.345	0.050	0.500	4.00	4	TMLR495-10EL	TMLR495-10ELA	110846	110870
3/4-12	0.495	1.200	0.370	0.042	0.500	4.00	4	TMLR495-12	TMLR495-12A	110849	110873
3/4-12	0.495	1.750	0.370	0.042	0.500	4.00	4	TMLR495-12EL	TMLR495-12ELA	110852	110876
3/4-16	0.495	1.200	0.395	0.031	0.500	4.00	4	TMLR495-16	TMLR495-16A	110855	110879
3/4-16	0.495	1.750	0.395	0.031	0.500	4.00	4	TMLR495-16EL	TMLR495-16ELA	110858	110882

***Single profile thread mills can cut any larger size internal thread within the recommended TPI**

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-.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-.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 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 is 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: **$(150 \times 3.82) / 0.290$** , 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: **$1975 \times 0.001 \times 4 = 7.9$ 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 **$AFR = NAFR \times (D-d) \div D$**

In this example: **$AFR = 7.9 \times (0.375 - 0.290) \div 0.375$**

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.