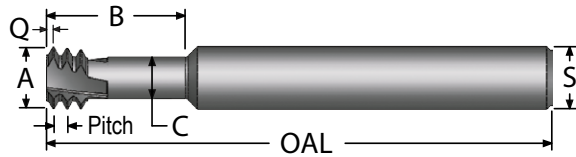


# METRIC THREAD MILLS

## LONG REACH (TMLR) - SOLID CARBIDE

### FULL PROFILE



- Small thread milling is made easy with TMLR tools
- Minimal cutting pressure
- Thread sizes starting from M1.4-.3mm

| MIN ID<br>THREAD<br>/PITCH* | "A"<br>TOOL<br>DIA. | "B"<br>LENGTH<br>OF CUT | "C"<br>NECK<br>DIA. | "Q"<br>LENGTH | "S"<br>SHANK<br>DIA. | OAL  | FLUTES | ORDER #               |                  | EDP #    |        |
|-----------------------------|---------------------|-------------------------|---------------------|---------------|----------------------|------|--------|-----------------------|------------------|----------|--------|
|                             |                     |                         |                     |               |                      |      |        | UNCOATED              | ALTiN+           | UNCOATED | ALTiN+ |
|                             |                     |                         |                     |               |                      |      |        | INTERNAL THREADS ONLY |                  |          |        |
| M1.4-.3                     | 0.039               | 0.115                   | 0.021               | 0.006         | 0.125                | 1.50 | 3      | TMLR1.4-.3MM          | TMLR1.4-.3MMA    | 110001   | 110019 |
| M1.4-.3                     | 0.039               | 0.150                   | 0.021               | 0.006         | 0.125                | 1.50 | 3      | TMLR1.4-.3MMEL        | TMLR1.4-.3MMELA  | 110004   | 110022 |
| M1.6-.35                    | 0.045               | 0.135                   | 0.023               | 0.007         | 0.125                | 1.50 | 3      | TMLR1.6-.35MM         | TMLR1.6-.35MMA   | 110007   | 110025 |
| M1.6-.35                    | 0.045               | 0.180                   | 0.023               | 0.007         | 0.125                | 1.50 | 3      | TMLR1.6-.35MMEL       | TMLR1.6-.35MMELA | 110010   | 110028 |
| M2-.4                       | 0.056               | 0.150                   | 0.030               | 0.008         | 0.125                | 1.50 | 3      | TMLR2-.4MM            | TMLR2-.4MMA      | 110013   | 110031 |
| M2-.4                       | 0.056               | 0.200                   | 0.030               | 0.008         | 0.125                | 1.50 | 3      | TMLR2-.4MMEL          | TMLR2-.4MMELA    | 110016   | 110034 |
| M2-.4                       | 0.056               | 0.150                   | 0.030               | 0.008         | 0.250                | 2.50 | 3      | TMLR2-.4MM            | TMLR2-.4MMA      | 110037   | 110097 |
| M2-.4                       | 0.056               | 0.200                   | 0.030               | 0.008         | 0.250                | 2.50 | 3      | TMLR2-.4MMEL          | TMLR2-.4MMELA    | 110040   | 110100 |
| M2.5-.45                    | 0.073               | 0.190                   | 0.046               | 0.009         | 0.250                | 2.50 | 3      | TMLR2.5-.45MM         | TMLR2.5-.45MMA   | 110043   | 110103 |
| M2.5-.45                    | 0.073               | 0.250                   | 0.046               | 0.009         | 0.250                | 2.50 | 3      | TMLR2.5-.45MMEL       | TMLR2.5-.45MMELA | 110046   | 110106 |
| M3-.5                       | 0.090               | 0.225                   | 0.059               | 0.010         | 0.250                | 2.50 | 3      | TMLR3-.5MM            | TMLR3-.5MMA      | 110049   | 110109 |
| M3-.5                       | 0.090               | 0.300                   | 0.059               | 0.010         | 0.250                | 2.50 | 3      | TMLR3-.5MMEL          | TMLR3-.5MMELA    | 110052   | 110112 |
| M4-.5                       | 0.120               | 0.300                   | 0.089               | 0.010         | 0.250                | 2.50 | 3      | TMLR4-.5MM            | TMLR4-.5MMA      | 110055   | 110115 |
| M4-.5                       | 0.120               | 0.500                   | 0.089               | 0.010         | 0.250                | 2.50 | 3      | TMLR4-.5MMEL          | TMLR4-.5MMELA    | 110058   | 110118 |
| M4-.7                       | 0.120               | 0.300                   | 0.079               | 0.014         | 0.250                | 2.50 | 3      | TMLR4-.7MM            | TMLR4-.7MMA      | 110061   | 110121 |
| M4-.7                       | 0.120               | 0.500                   | 0.079               | 0.014         | 0.250                | 2.50 | 3      | TMLR4-.7MMEL          | TMLR4-.7MMELA    | 110064   | 110124 |
| M5-.8                       | 0.150               | 0.400                   | 0.103               | 0.016         | 0.250                | 2.50 | 3      | TMLR5-.8MM            | TMLR5-.8MMA      | 110067   | 110127 |
| M5-.8                       | 0.150               | 0.600                   | 0.103               | 0.016         | 0.250                | 2.50 | 3      | TMLR5-.8MMEL          | TMLR5-.8MMELA    | 110070   | 110130 |
| M6-1                        | 0.180               | 0.500                   | 0.120               | 0.020         | 0.250                | 2.50 | 3      | TMLR6-1MM             | TMLR6-1MMA       | 110073   | 110133 |
| M6-1                        | 0.180               | 0.700                   | 0.120               | 0.020         | 0.250                | 2.50 | 3      | TMLR6-1MMEL           | TMLR6-1MMELA     | 110076   | 110136 |
| M8-.75                      | 0.234               | 0.600                   | 0.190               | 0.015         | 0.250                | 2.50 | 3      | TMLR8-.75MM           | TMLR8-.75MMA     | 110079   | 110139 |
| M8-.75                      | 0.234               | 0.850                   | 0.190               | 0.015         | 0.250                | 2.50 | 3      | TMLR8-.75MMEL         | TMLR8-.75MMELA   | 110082   | 110142 |
| M8-1                        | 0.234               | 0.600                   | 0.175               | 0.020         | 0.250                | 2.50 | 3      | TMLR8-1MM             | TMLR8-1MMA       | 110091   | 110151 |
| M8-1                        | 0.234               | 0.850                   | 0.175               | 0.020         | 0.250                | 2.50 | 3      | TMLR8-1MMEL           | TMLR8-1MMELA     | 110094   | 110154 |
| M8-1.25                     | 0.234               | 0.600                   | 0.162               | 0.025         | 0.250                | 2.50 | 3      | TMLR8-1.25MM          | TMLR8-1.25MMA    | 110085   | 110145 |
| M8-1.25                     | 0.234               | 0.850                   | 0.162               | 0.025         | 0.250                | 2.50 | 3      | TMLR8-1.25MMEL        | TMLR8-1.25MMELA  | 110088   | 110148 |
| M10-1                       | 0.310               | 0.750                   | 0.250               | 0.020         | 0.375                | 3.50 | 3      | TMLR10-1MM            | TMLR10-1MMA      | 110163   | 110187 |
| M10-1                       | 0.310               | 1.000                   | 0.250               | 0.020         | 0.375                | 3.50 | 3      | TMLR10-1MMEL          | TMLR10-1MMELA    | 110166   | 110190 |
| M10-1.5                     | 0.310               | 0.750                   | 0.223               | 0.030         | 0.375                | 3.50 | 3      | TMLR10-1.5MM          | TMLR10-1.5MMA    | 110157   | 110181 |
| M10-1.5                     | 0.310               | 1.000                   | 0.223               | 0.030         | 0.375                | 3.50 | 3      | TMLR10-1.5MMEL        | TMLR10-1.5MMELA  | 110160   | 110184 |
| M12-1                       | 0.370               | 0.800                   | 0.310               | 0.020         | 0.375                | 3.50 | 3      | TMLR12-1MM            | TMLR12-1MMA      | 110175   | 110199 |
| M12-1                       | 0.370               | 1.200                   | 0.310               | 0.020         | 0.375                | 3.50 | 3      | TMLR12-1MMEL          | TMLR12-1MMELA    | 110178   | 110202 |
| M12-1.25                    | 0.370               | 0.800                   | 0.295               | 0.025         | 0.375                | 3.50 | 3      | TMLR12-1.25MM         | TMLR12-1.25MMA   | 110169   | 110193 |
| M12-1.25                    | 0.370               | 1.200                   | 0.295               | 0.025         | 0.375                | 3.50 | 3      | TMLR12-1.25MMEL       | TMLR12-1.25MMELA | 110172   | 110196 |
| M14-1.5                     | 0.450               | 1.200                   | 0.360               | 0.030         | 0.500                | 4.00 | 4      | TMLR14-1.5MM          | TMLR14-1.5MMA    | 110205   | 110217 |
| M14-1.5                     | 0.450               | 1.650                   | 0.360               | 0.030         | 0.500                | 4.00 | 4      | TMLR14-1.5MMEL        | TMLR14-1.5MMELA  | 110208   | 110220 |
| M14-2                       | 0.450               | 1.200                   | 0.330               | 0.039         | 0.500                | 4.00 | 4      | TMLR14-2MM            | TMLR14-2MMA      | 110211   | 110223 |
| M14-2                       | 0.450               | 1.650                   | 0.330               | 0.039         | 0.500                | 4.00 | 4      | TMLR14-2MMEL          | TMLR14-2MMELA    | 110214   | 110226 |

\*Thread mills can cut any larger size internal thread of the same pitch

# THREAD MILL FEED AND SPEED CHART

| MATERIAL                            | HB/Rc  | SPEED<br>SFM*<br>UNCOATED | SPEED<br>SFM<br>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<br>2 Passes   | .0003-.0008<br>3 Passes  | .0003-.0014             | .0003-.0024 | .0003-.005  | .0003-.006  |
| TOOL STEEL                          | 20 Rc  | 80-175                    | 175-250                | .0003-.0004<br>2 Passes  | .0003-.0005<br>3 Passes  | .0003-.0005             | .0003-.0009 | .0003-.0026 | .0003-.004  |
| 300 STAINLESS<br>STEEL              | 150 HB | 90-120                    | 120-255                | .0003-.0005<br>2 Passes  | .0003-.0006<br>3 Passes  | .0003-.0007             | .0003-.002  | .0003-.0035 | .0003-.0045 |
| 400 STAINLESS<br>STEEL              | 195 HB | 90-150                    | 140-375                | .0003-.0005<br>2 Passes  | .0003-.0006<br>3 Passes  | .0003-.0007             | .0003-.002  | .0003-.0026 | .0003-.0045 |
| HIGH TEMP ALLOY<br>(Ni & Co BASE)   | 20 Rc  | 50-125                    | 100-125                | .0003-.0004<br>3 Passes  | .0003-.00045<br>3 Passes | .0003-.0005<br>2 Passes | .0003-.0009 | .0003-.0026 | .0003-.004  |
| TITANIUM                            | 25 Rc  | 50-130                    | 100-170                | .0003-.0004<br>3 Passes  | .0003-.00045<br>3 Passes | .0003-.001<br>2 Passes  | .0003-.0009 | .0003-.0015 | .0003-.003  |
| HEAT TREATED<br>ALLOYS<br>(38-45Rc) | 40 Rc  | 50-90                     | 90-150                 | .0003-.0004<br>3 Passes  | .0003-.00045<br>3 Passes | .0003-.0005<br>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.