

EMC2 Thread Milling Program:

%

(MSG Thread Milling Program)

(TOOL #1 IS A 1/4" DIAMETER SINGLE TIP THREAD MILL)

(Z ZERO IS THE TOP OF THE HOLE AT X0, Y0. THE TOP OF THE STUD IS Z.5)

(WE ARE MILLING 1/2"-20 THREADS, ID AT X0, Y0 AND 1/2"-13 THREADS OD AT X0, Y-1.0)

(1.0" / 20 TPI = .050. THIS IS HOW MUCH THE Z AXIS WILL MOVE FOR EACH REVOLUTION)

(1.0" / 13 TPI = .0769. THIS IS HOW MUCH THE Z AXIS WILL MOVE FOR EACH REVOLUTION)

G17 G20 G40 G49 G80 G90 (FIRST LINE G17=X,Y AXIS, G20= INCH, G40 CANCELS ALL CUTTER COMP, G49 CANCELS ALL LENGTH COMP, G80 CANCELS ALL CAN CYCLES, G90 IS ABSOLUTE POSITIONING)

(THIS LINE OF CODE CANCELS EVERYTHING THAT MAY BE RETAINED SHOULD YOU STOP, AND RESTART THIS PROGRAM. THIS SETS EVERYTHING AT ZERO)

(Begin FEATURE THREAD MILL 1/2-20 HOLE .400 DEEP)

G90 G00 G80 G40 G49 X0.0 Y0.0 (CANCEL ALL AND MOVE TO CENTERLINE OF HOLE)

G43 H1 Z.1 (G43 INCORPORATES LENGTH COMPENSATION, H1 IS FOR TOOL #1, TOOL MOVES TO .100 ABOVE Z 0 SURFACE)

z0.0

(LINE EXPLANATION)

g91 g01 g42 d1 x-.250 f60

(FEED OUT FROM CL TO MAJOR DIA. OF THREAD USING G42 CUTTER COMP RIGHT AND CUTTER DIAMETER OFFSET D1)

g91g02 x0 y0 z-0.050 i0.25 j0.0 f6

(G91 = INCREMENTAL)

(G02 = CIRCULAR CUTTING IN THE CLOCKWISE DIRECTION)

(x0 AND y0 = ARC FINISH POINT)

(z = THE THREAD LEAD OR PITCH. A 20 TPI THREAD MOVES .050 FOR EACH FULL ROTATION)

(NOTE: IF YOU WANTED TO CUT A HALF CIRCLE, YOU WOULD CHANGE X0 TO X.5 AND Z-.050 TO Z-.025)

(i = THE INCREMENTAL DISTANCE AND DIRECTION FROM START POINT TO ARC CENTER IN THE X AXIS)

(J = THE INCREMENTAL DISTANCE AND DIRECTION FROM START POINT TO ARC CENTER IN THE y AXIS)

```
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6 (EACH LINE WILL CUT ONE THREAD)
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6
g91g02 x0 y0 z-0.050 i0.25 j0.0 f6
```

g91 g00 g40 x.250 (G40 CANCELS CUTTER COMP AS TOOL IS MOVING AWAY FROM THE MATERIAL)

```
g90 g00 z.600
```

(Begin FEATURE THREAD MILL O.D. 1/2-13 STUD .384 DEEP)

```
G90 G00 G80 G40 G49 X0.0 Y-1.0 (CENTER OF 1/2-13 STUD)
```

(MINOR DIAMETER OF A 1/2-13 THREAD IS $27/64$ " = .211 RADIUS)

(MOVE AWAY FROM CL OF STUD BY AN AMOUNT THAT IS GREATER THAN THE RADIUS OF THE STUD + CUTTER RADIUS + CLEARANCE)

```
G91 G00 X-.5
```

```
G90 G00 Z.500
```

(MOVE INTO THE MINOR DIAMETER OF THE THREAD. TAKE $.500 - .211 = .289$ USING G41 CUTTER COMP LEFT AND D1)

```
g91 g01 g41 d1 x.289f6
```

```
g91g02 x0 y0 z-0.0769 i0.211 j0.0 f6
```

```
g91g02 x0 y0 z-0.0769 i0.211 j0.0 f6
```

```
g91g02 x0 y0 z-0.0769 i0.211 j0.0 f6
```

```
g91g02 x0 y0 z-0.0769 i0.211 j0.0 f6
```

```
g91g02 x0 y0 z-0.0769 i0.211 j0.0 f6
```

g91 g00 g40 x-.289 (G40 CANCELS CUTTER COMP AS TOOL IS MOVING AWAY FROM THE MATERIAL)

```
g90 g00 z.6
```

```
G49 Z0 (G49 Z0 CANCELS LENGTH COMPENSATION)
```

```
G90 X1.0 Y1.0
```

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M2
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%
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Notes:

Depending on the desired finish and the material that you are cutting, you may want to do a rough and finish pass. You can accomplish this one of two ways.

1. Run the program twice. Add .002 or .003 to the diameter of the cutter on the “tool setup” page for the first run. This will offset the cutter leaving .001 to .0015 of material for a finish pass. Then change the tool diameter back to what it should be, and run the program again.

2. The second way is to program a rough and finish pass.

For the ID thread you would change the (I) value from i.250 to i.248 for the roughing pass.

Rough: g91g02 x0 y0 z-0.050 i0.248 j0.0 f6

Finish: g91g02 x0 y0 z-0.050 i0.25 j0.0 f6

For the OD thread you will have to change the G41 line in addition to the threading lines. If you want to leave .001 for a finish pass, you will reduce the (x) value on the G41 line by .001 and increase the (i) value on the threading lines by .001. X.289 is changed to X.288 and i0.211 is changed to i0.212 for the roughing pass.

Rough: g91 g01 g41 d1 x.288 f6

g91g02 x0 y0 z-0.0769 i0.212 j0.0 f6

Finish: g91 g01 g41 d1 x.289 f6

g91g02 x0 y0 z-0.0769 i0.211 j0.0 f6