

## Long Thread

Cutting a long thread requires the same general considerations as cutting any other thread - proper spindle speed, cutting depths, infeed, coolant, etc. However, because of the thread length and its pitch, there is another consideration - the thread accuracy over its length. Consider the drawing - it requires a 60 inches long thread with 12 threads per inch. The feedrate is always the lead of the thread, which is the same as pitch for this thread:

$$12 \text{ TPI} = 1/12 = 0.08333333$$

The threading cycle G76 could be programmed using these settings:

```
G76 P021060 Q004 R0.002
G76 X1.8978 Z-60.0 P0511 Q0120 F0.0833
```

Now, consider the results.

➡ Using the common method:

As the thread is 60 inches long, and there are 12 threads per inch, the total number of threads can be calculated:

$$60 \times 12 \text{ TPI} = 720$$

Programmed feedrate is *F0.0833*, which will be used to double check the calculation:

$$60 / 0.0833 = 720.28811525$$

... which amounts to a significant error. The actual number of threads is *more* than required. Why? Because of the rounding:

$$\begin{aligned} 0.0833 \times 720 &= 59.976 \\ 60 - 59.976 &= 0.024000 \text{ error} \end{aligned}$$

The problem is with the rounding of 0.0833333333 to four decimal places.

➡ Using the special method:

Fanuc offers a more accurate method of programming threads similar to this example. It allows the feedrate to be rounded to *six* decimal places, rather than the normal four. Compare with the previous calculations:

Programmed feedrate is *F0.083333*, which will be used to double check the calculation:

$$60 / 0.083333 = 720.00288001$$

... which still amounts to an error, but much smaller:

$$\begin{aligned} 0.083333 \times 720 &= 59.99976 \\ 60 - 59.99976 &= 0.000240 \text{ error} \end{aligned}$$

➡ The solution:

```
G76 P021060 Q004 R0.002
G76 X1.8978 Z-60.0 P0511 Q0120 F0.083333 (only the feedrate is different)
```

*Note* - Six decimal places accuracy is not required for threads whose pitch divides equally to four or fewer decimal places. For example,  $8 \text{ TPI} = 1/8 = 0.1250$ . Trailing zeros may be omitted, for example, *F0.125*.