A Quick Tutorial on How to Make Male and Female Threads for Kitless Pens

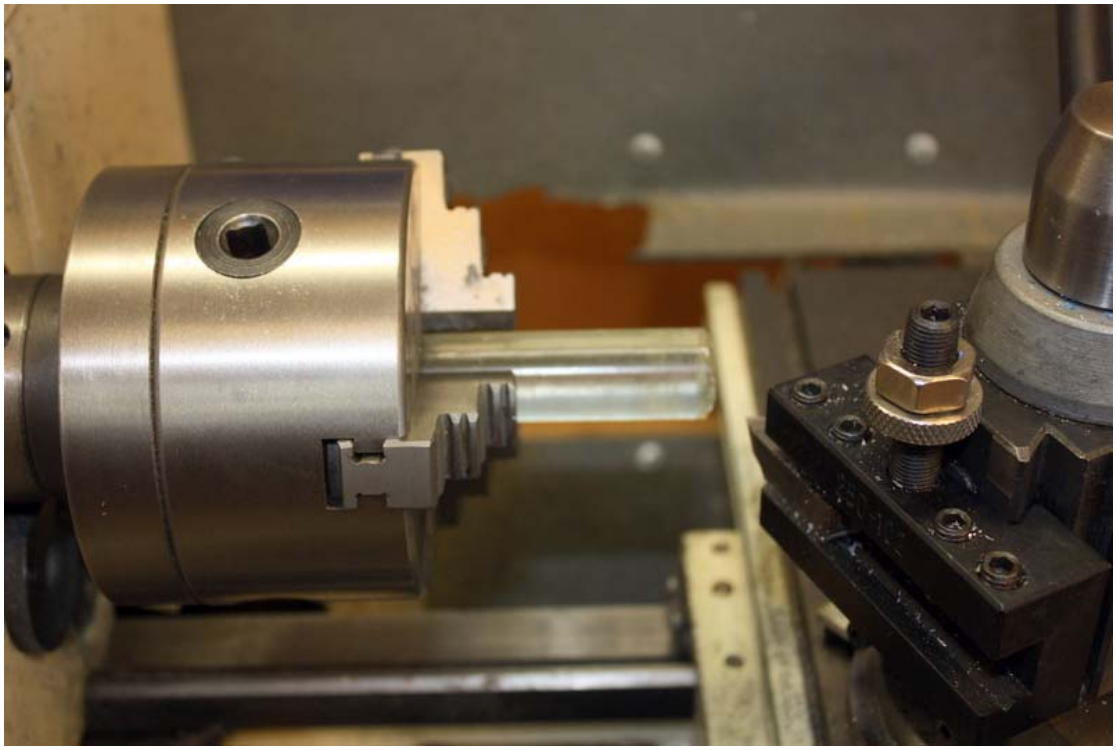
Author: Fred Brunings aka: Big Shed Dec., 2020

I was asked by another pen maker how I go about making male and female threads in resin blanks to be used for kitless pens.

I normally make a male/female set for each tap(s)/die combination I have so that I have these available for quick reference, eg to test a thread or to find whether a particular thread size fits.

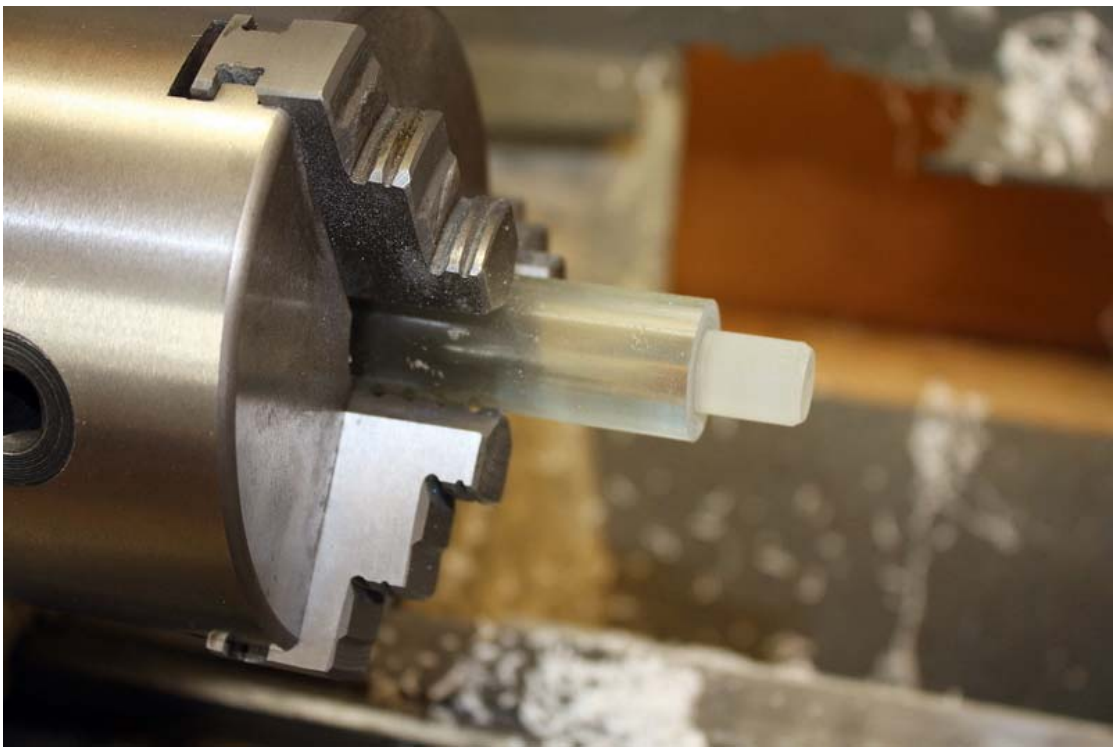
I keep a stock of clear 22mm PR blanks for this sort of work and have used one of these for this tutorial.

I start with mounting the PR blank in the 3 jaw chuck, I don't have a collet that handles 22mm.

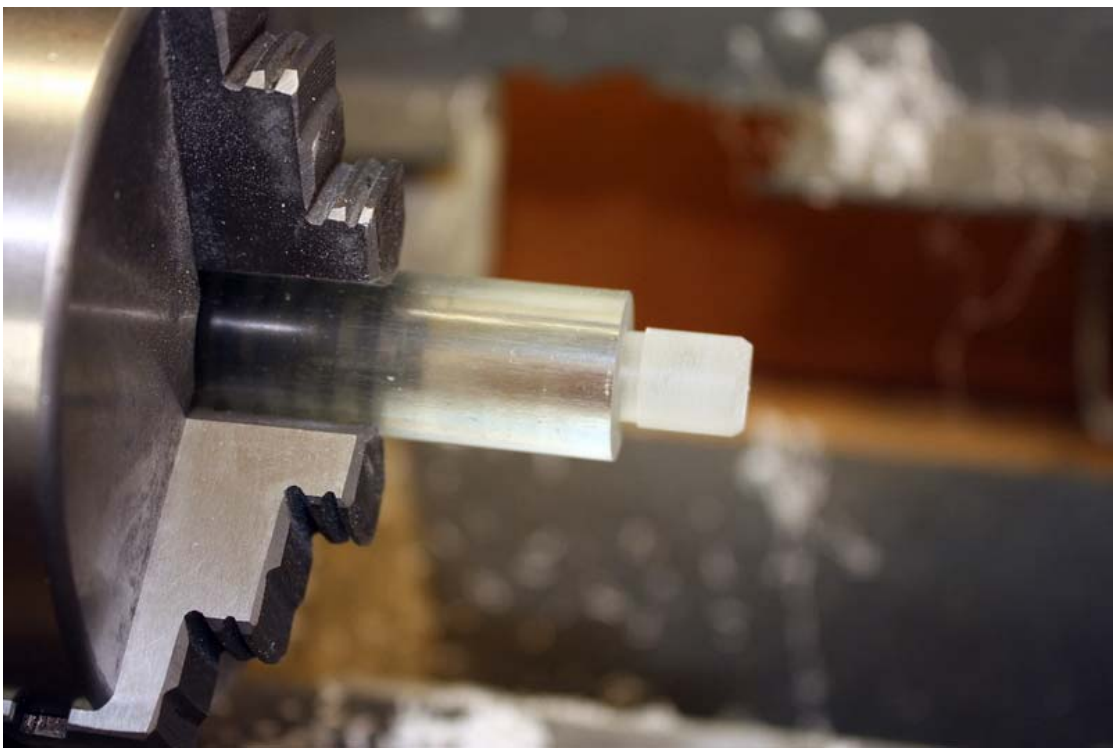


The end is then turned square.

Next a tenon is turned to take the thread. As this set will be for an M12x1.0 mm tap and die set, the tenon for the male 12mm thread needs to be turned to 12mm OD, I have made it 15mm long for this exercise.

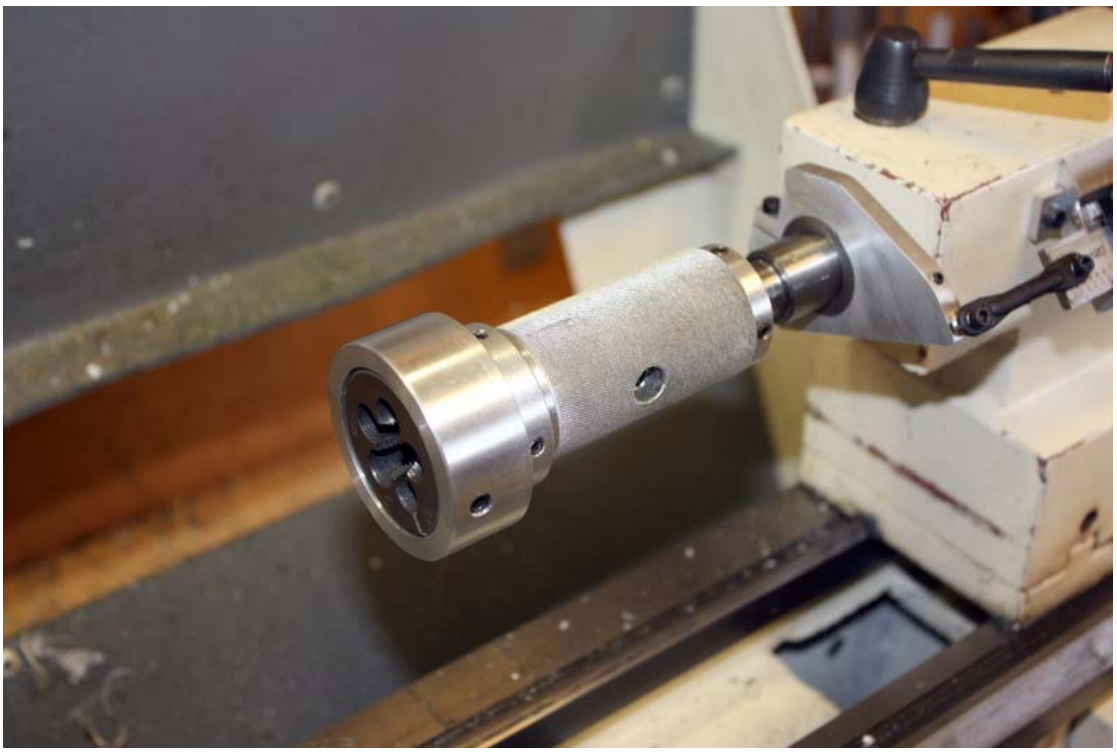


A recess is then turned at the end of the tenon to enable the die to run up to the shoulder and the female thread to sit flush against the shoulder.



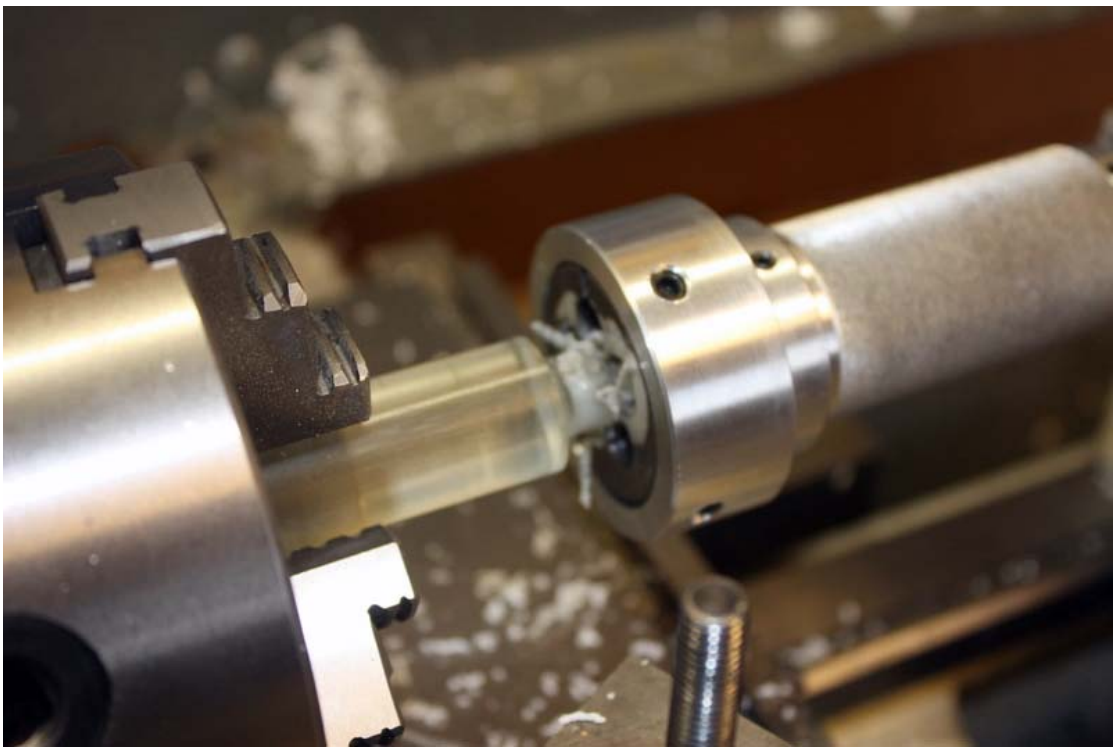
A parting tool is used for this, the depth should be slightly deeper than the minimum diameter for the thread being cut, I used a 1.2mm depth here.

Now we can start cutting the male thread using the M12 die, in this case it has an outside diameter of 1.5” so an adapter is used to take this size die. Put the die in the holder with the size data facing outwards and tighten the grub screws on the outside of the die holder to engage the dimples in the die.



When cutting threads in PR I use a canola oil cooking spray, both on the tenon and on the die or tap.

The die is now brought up to the tenon, the die holder slides on the adapter, which was purchased from Little Machine Shop. As it only takes up to 1” dies I made an adapter to accept the 1.5” dies.

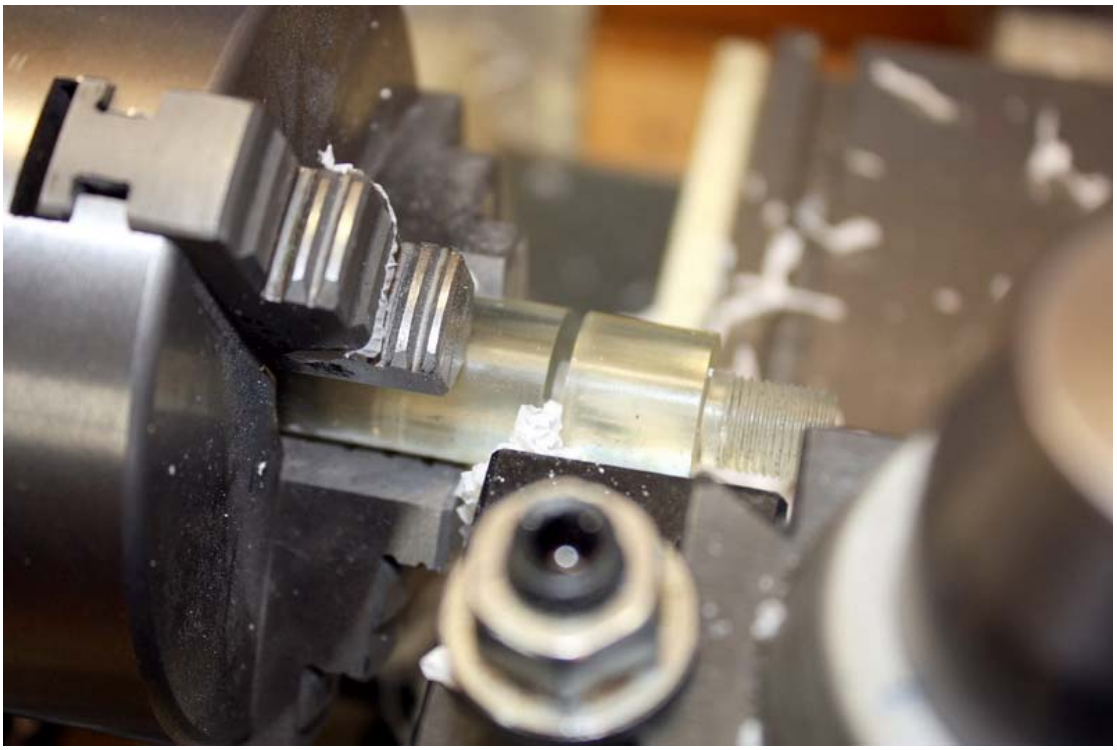


When cutting the thread only do short bits, no more than one full turn, and frequently reverse the die to clear any swarf.

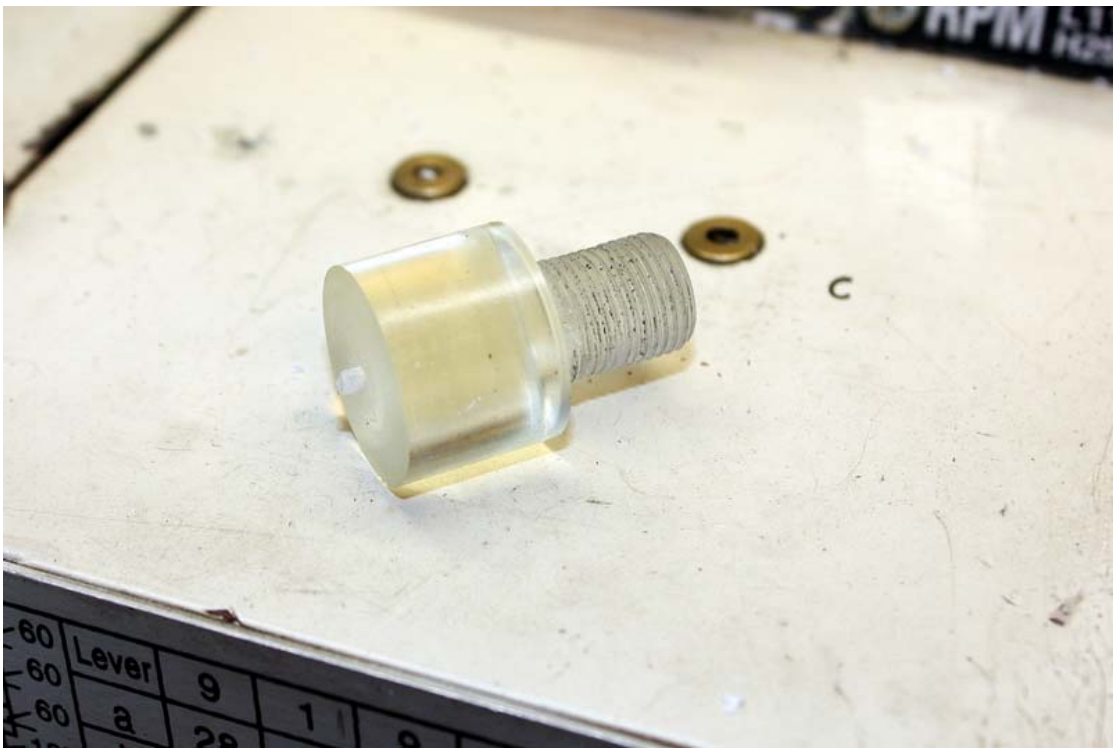
Please note the lathe should be switched OFF during this process, preferably at the power point.

Once the thread is cut right up to the shoulder I normally reverse the die in the holder and run it over the thread again.

Once the thread is cut, the part is parted off; I left another 15mm from the shoulder.



Here we have the male thread.

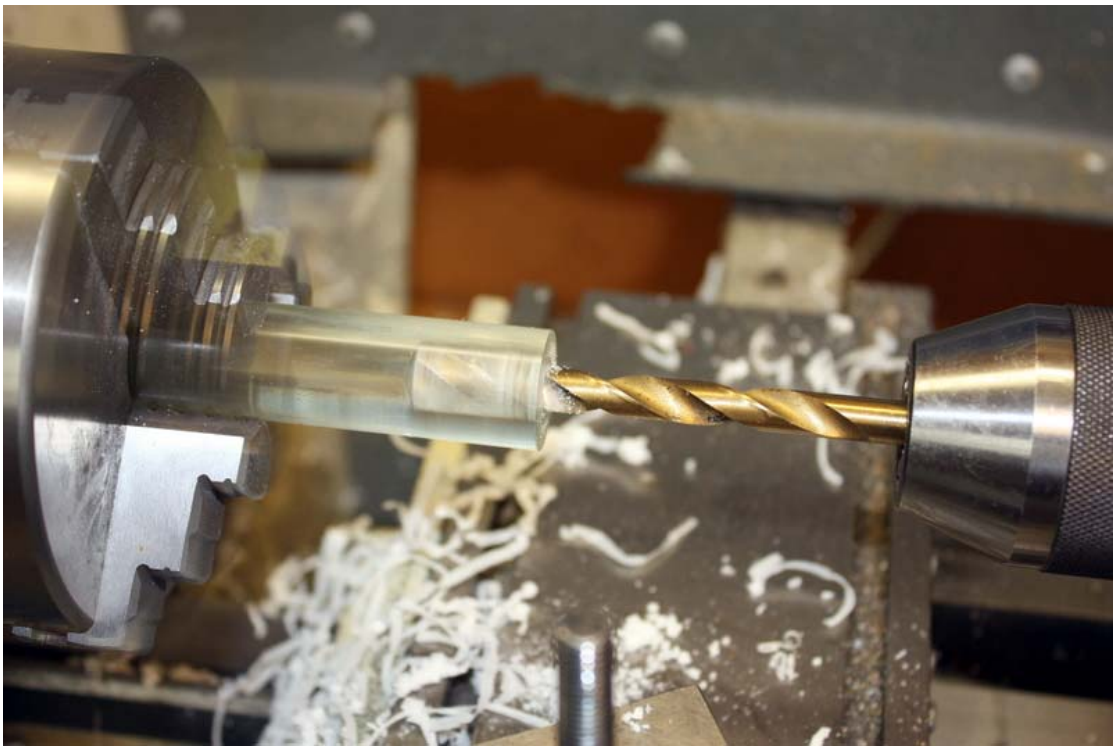


Now the end of the blank is squared off again and we start on the female thread, this would normally be the cap part.

After squaring off a centre drill is used to mark a starting point for our drilling.

As I am making an M12x1.0mm thread a 11.0mm hole is needed (12-1mm).

Use a smaller drill first, in this case I am using 7mm.



Then the 11mm drill is used to drill to final size for tapping.

Then the tap is mounted in a tap holder, which is supported on the tailstock to keep it centred.

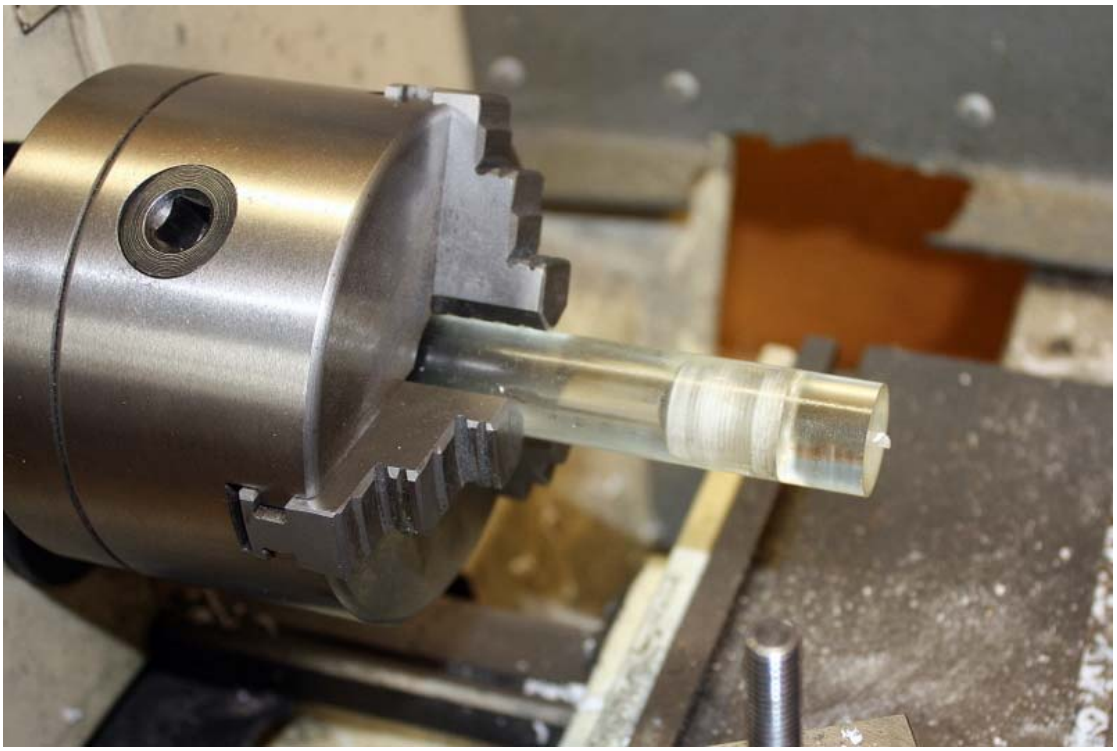
As I tap the thread I keep the tailstock and live centre up against the rear of the tap holder.

Once the thread is cut to full depth I use a countersink to countersink it slightly to make for easy entry of the male thread.

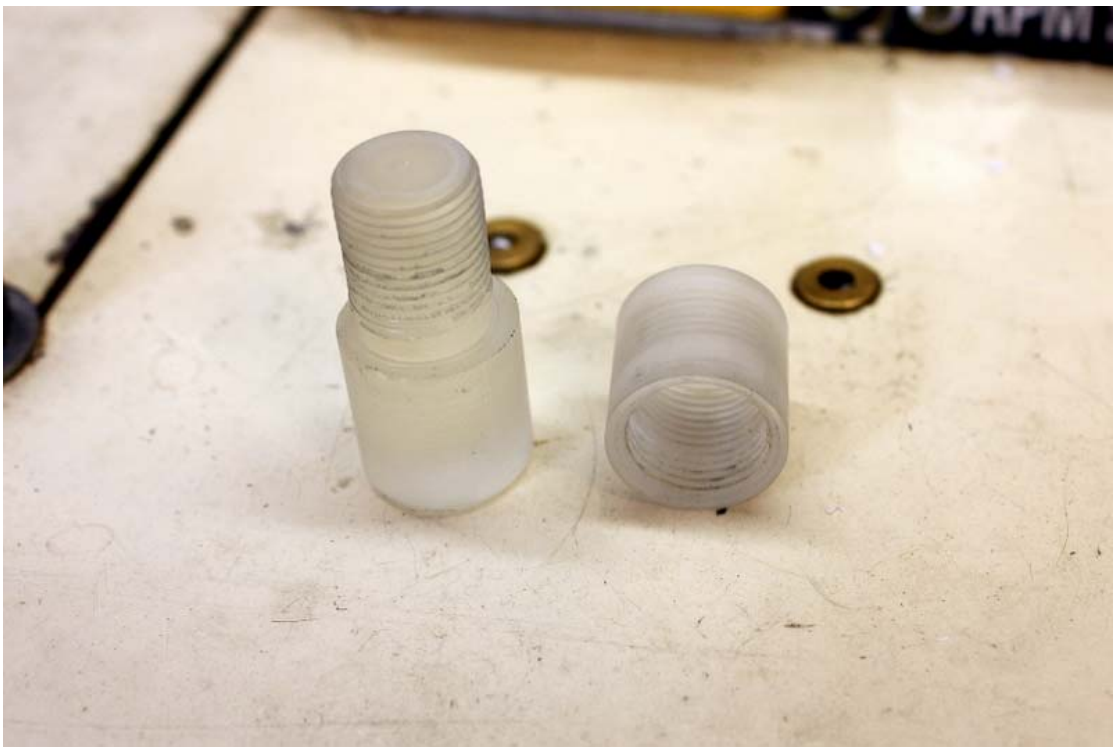
Here we have a blind hole, keep in mind you would normally be doing this on a cap so it would be much deeper and you wouldn't thread the whole depth of the cap, only enough to screw on to the barrel (male) thread.

The female thread is now ready for testing with the male part.

Voila, it fits!



Here we have both male and female parts parted off.



So this in a nutshell is how male and female threads are done using hand taps and dies on the lathe.

One could get fancier and use the screw cutting facilities on the lathe, but for this sort of work hand taps and dies are much easier.

To re-cap, the male thread you have seen me make would normally be the male thread on the end of the barrel that accepts the cap.

The female thread would be in the bottom of the cap and will screw on to the end of the barrel.

As I said at the beginning of this tutorial, I make a male/female set like this for every tap(s) and die combination I have, they are invaluable for testing threads for size and pitch, much more definitive than a thread/pitch gauge.

I also use the female part tp protect the external thread on the barrel when I drill the barrel for the internal diameter for pump and section. As there is little PR at the thread end of the barrel it is prone to cracking when drilling.