

# Obtaining Perfect Tube Length

By

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This tutorial was downloaded from

<http://www.penturners.org>

The International Association of Penturners



## Introduction

Certain pen kits call for a specific barrel length to ensure that the refill extends the proper amount. In this tutorial I will show how to ensure the lower barrel of a “Cigar” kit pen is the proper length, and cover a techniques to compensate if the barrel is slightly too long or too short. These techniques can also be applied to other kits.

You will need a set of calipers to do this procedure. The techniques used to make length adjustments require a collet chuck.

## Determining proper barrel length

The best way to eliminate problems with refill extension is to ensure the tube is the proper length. Pen kit components are subject to variations in dimension, and variation between manufacturers. Usually there is no problem, but let’s do a quick check, just to be sure (especially if we are mixing components from different manufacturers). We want to determine the desired length of the barrel to match the components we are using to we can trim the barrel length with confidence.

Before we start, let’s consider the refill we are using. I have noticed quite a bit of variability in the length of refills included in kits. I have made pens with good refill extension, only to discover that the pen did not look right with an upgraded refill. I recommend that you always use a brand of refill that has consistent length, and has a length consistent with the Parker brand of refills. This ensures that your customer can easily replace the refills without extension length issues. I use the Private Reserve brand. Even if you choose to use the kit refill, I recommend that you size the pen using a parker, private reserve, or some other standard length refill.

The first step is to create a gauge tube to use for reference. The bottom tube is the gauge tube. It needs to be slightly fatter than the kit tube. In this case it is a Sierra tube cut to the same length as the lower cigar tube (ends are squared.)



Mark the length of the gauge tube. The actual length of the tube is not critical, but you need to know its exact length. The length of the lower cigar tube is reported as 2.09 in the IAP tube and bushing reference.



Test assemble the kit components. They fit loosely onto the gauge tube.



Reassemble with the refill inserted and the transmission in the extended position. Hold the parts together by hand to see how far out the refill tip will extend.



Now I can decide if the barrel length should be slightly longer or shorter than the gauge tube length. In this example I see that the refill tip barely extends an acceptable amount. I prefer a little more extension. My gauge tube is 2.095". I will target my barrel to be slightly shorter in length.

If you desire, you can also make a set of shim washers of known thickness, then add washers in your trial assembly until you get the length you want. I simply eye-ball it. If you use the shims, you will want your gauge tube to be slightly shorter than nominal.

## Increasing Refill Extension

If the refill does not extend far enough, the obvious thing to do is to use a pen mill to shorten the barrel. But, if the pen is assembled and your fit & finish is good, you may not want to risk changing the barrel. If the adjustment needed is small (less than  $1/32''$ ) you can shorten the transmission instead.

Chuck the transmission using a 5/16 collet and turn off the desired amount from the threaded side of the transmission. Be sure that the transmission is held in the chuck by threaded portion (usually brass) and not the part that twists.





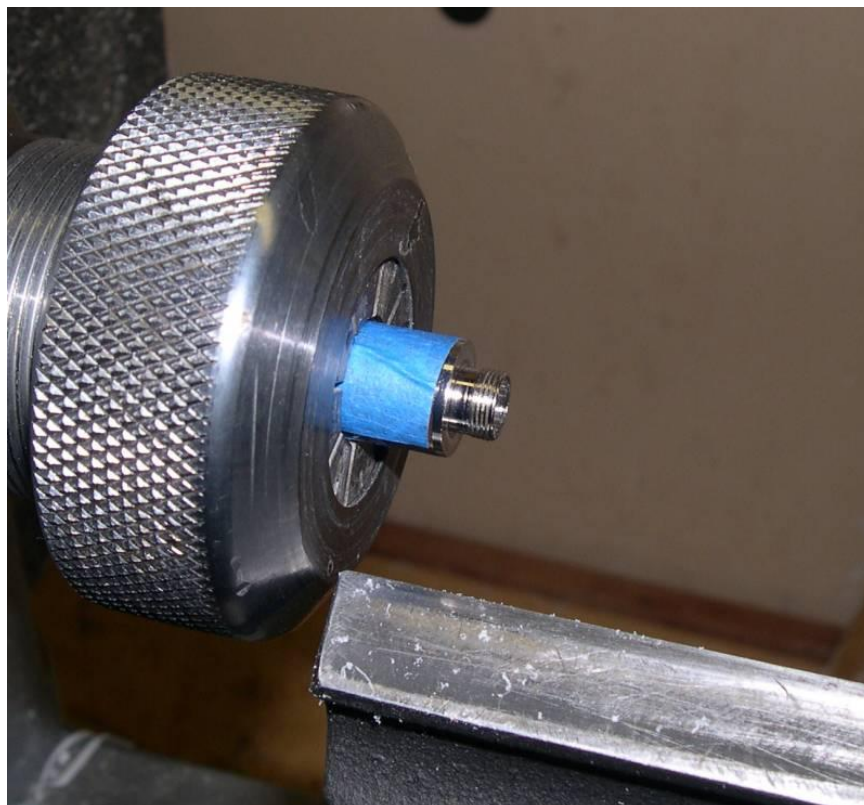
A quick touch with the tool on the inside and outside corners removes the burrs.



Depending on how much material you remove, the transmission may no longer seat all the way onto the coupler, as depicted below.



If this happens you can wrap the lower barrel of the pen in blue painter's tape, chuck it in the lathe, and remove enough of the coupler threads so that the transmission seats properly. Note that this picture is not a cigar pen, as I did how have one available to photograph. It is a Jr. Gent ballpoint.



## Decreasing Refill Extension

If the refill extends too far, then the length of the barrel needs to be increased. Typically this would be done by adding an “oops band”, or simply re-turning the barrel. However, if you only need  $\frac{1}{32}$ ” or less, there is another way. The black band in the nib can be made slightly fatter. The color can also be changed to add a more custom look to your pen.

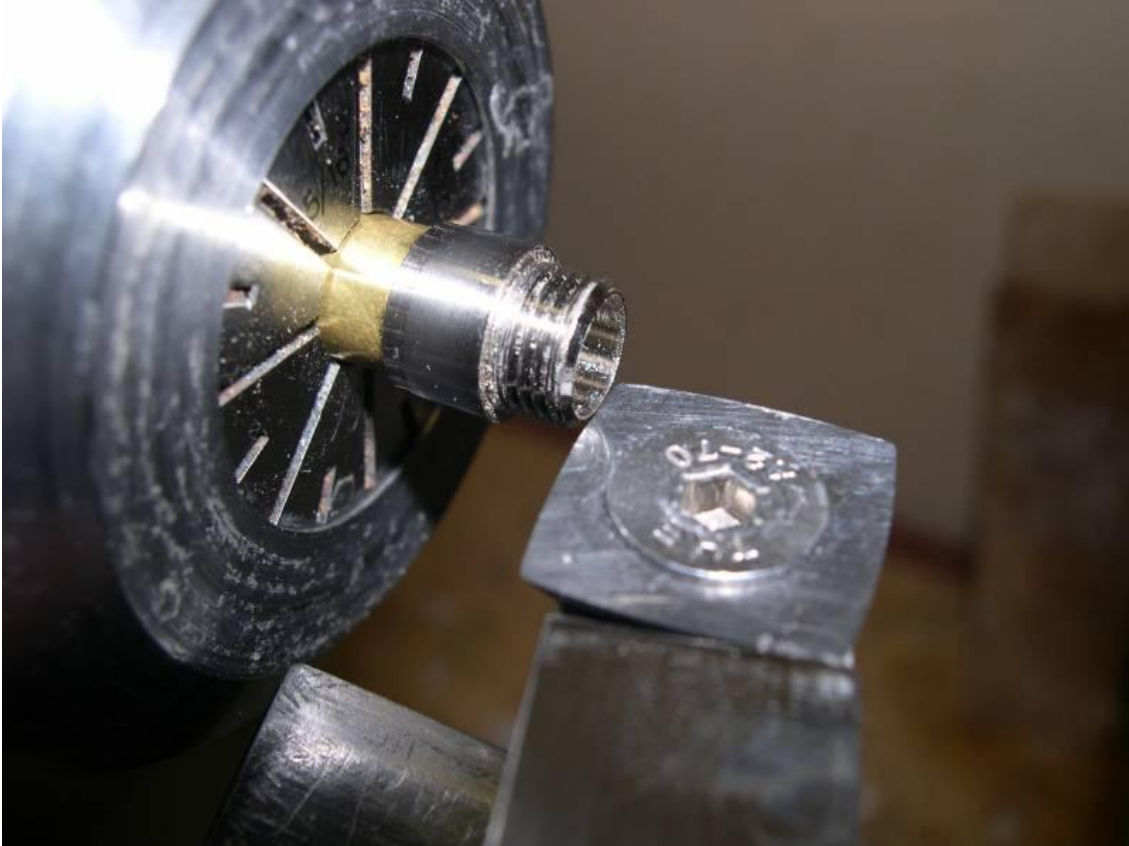
The following picture shows the black band un-screwed about  $\frac{1}{32}$ ”, both with and without the nose cone.





Let's turn a replacement band  $1/32''$  fatter than the original. First thing we will need is a mandrel to hold the small piece as we turn it. We can make a dedicated mandrel, or what I do us use the activator tube from the kit.

Chuck the activator tube using a  $5/16$  collet. I shorten the threaded area so that it is the same as my target thickness of the new band. This gets the metal out of the way, and gives a visual reference while I am turning the band. A slight shortening of the threads will not hurt final assembly (I use thread locker for final assembly of the finial.)

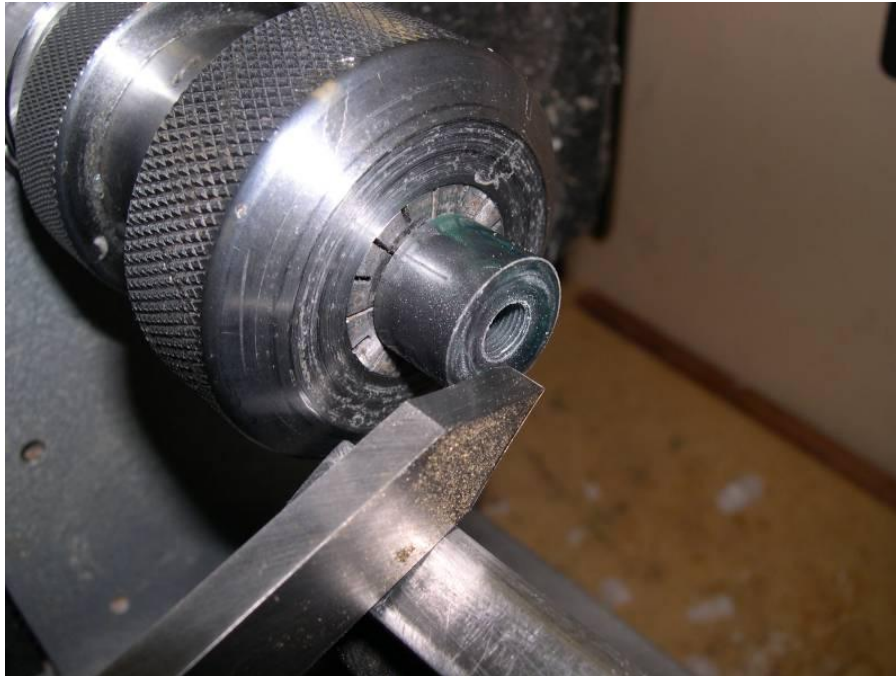


Select the material to use for the band. Some materials are easier than others to tap and turn small. I choose Alumilite, which I recommend for your first try.

Drill and tap your selected material. The tap needed for the cigar nib is M8 x .75, which is typically \$5 - \$10 at a discount tool supply.



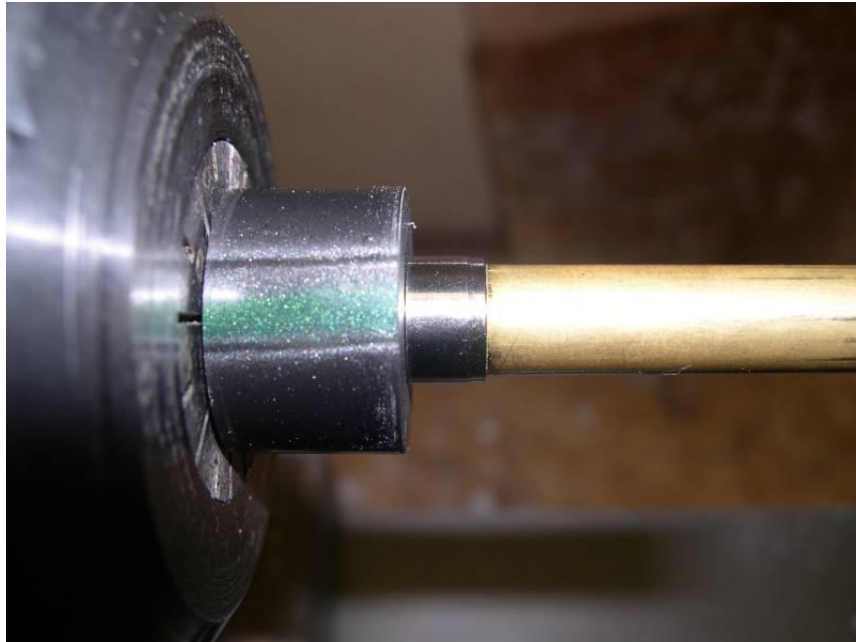
Clean up and square the end.



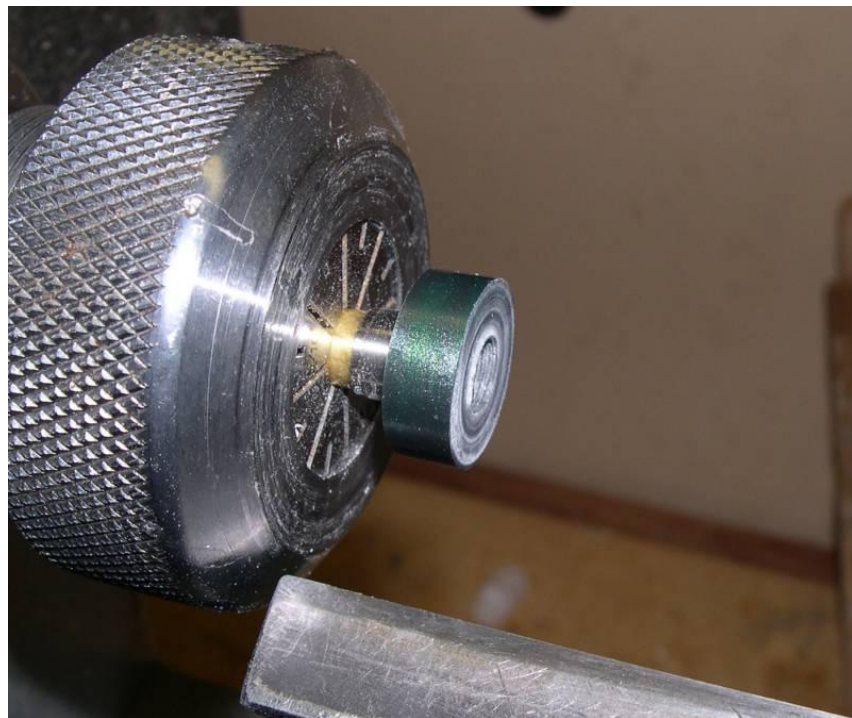
Test fit the "Mandrel". You will see that it will not screw in all the way. There needs to be relief for the un-threaded portion.



After using a 5/16" bit to drill out relief, the "Mandrel" goes in all the way.



Part-off a portion fatter than your target thickness. Screw it onto your "Mandrel" (squared side first) and chuck it in a 5/16 collet.





Turn and finish to final size. Use calipers to measure your old band and be careful not to over-turn the new band. New and old bands are shown for size comparison.



If you are making a band out of a neutral color (like black) you can part off and save several pieces for future use if you ever need to do this again. Be sure to mark which side of the parted off pieces have been properly squared.