

# Why are my Pens NOT Round?

**A Tutorial by:**

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I hate to even use that term out-of-round. That means oval to me, and I doubt very seriously that any one without an eccentric chuck is turning oval barrels. The correct term is out of concentric. Your barrel is round, but not turning true with the tube, or axis of the lathe. Wood grain density on opposite sides of the blank can affect the roundness when sanding, but that is another topic. There have been many discussions on this in the past, and I hope maybe this will put those ideas and suggestions into one place.

Many of those thoughts are:

1. Over tightening the brass nut.
2. Pushing with the tail stock too hard.
3. Bent mandrels.
4. Unsquare blanks.
5. Unsquare bushings.
6. Sloppy bushings.
7. Dead center run out.
8. Spindle run out.
9. Bad live center.
10. And more.....

I'll start with the brass nut. This also will cover the usquare blank/bushing issues. Plus a few others. I do not believe that the over tightening the brass nut in itself causes the issue. I look at it like tightening a string, the more you pull, the straighter it gets. It can contribute to some of the other issues though. One of them being unsquare blanks or bushings. If the ends of the blanks/bushings are not truly 90 degrees, then that will 'cock' things a bit. Compound that by having loose fitting bushings on the mandrel, and you will have concentricity problems as that will push the bushing/blank to a 'high' side on one end or ends of the blank. Unsquare blanks can be caused by your pen mill, if not sharpened truly at 90 degrees, or mill a blank with too small a pilot. If you use a disc sander, make sure your fixture is perpendicular to the disc. The Bushing hitting on the wood first, or only, especially is there is soft wood, or grain differences on the end, will cause things to mis-align.

Pushing too hard with the tail stock. I tighten the tail stock up as I rotate the center by hand back and forth until it is tight enough that the spindle starts moving with the center and start there. Sometimes it needs a bit more, but rarely. Bent mandrels. Well, I think this one is self explanatory. Mandrels can be straightened. Use a dial indicator on the mandrel and rotate by hand. Give a light tap on the high side until it runs true. If you don't have an indicator, you can use a marker to mark the mandrel with the lathe running on low. Tap on the marked side until you get a full line around. Not perfect, but usually very close.

I touched on sloppy bushings a bit above, but if the hole in the bushing is a loose fit on the mandrel, the blanks most likely will run a bit out of concentric. The best way I can give you a picture of this is to put a large id tube on the mandrel with mandrel in your hand, and move it in a circle so the tube rotates around it. That is out of concentric diameters. They run on the same axis, but....make sense? My guess is that this is one of the bigger causes of issues than we think, because any other issue compounds this one, and vice-versa.

Spindle/Dead center run out. This is caused either by there being dirt in the taper of the spindle, or possibly the spindle itself not running true. Make sure the pocket and the center are CLEAN before putting it in. You can check the taper pocket with a dial test indicator. I have had one of the cheaper dead centers not run true as well. I popped the center out and rotated it 45 degrees and put it back in and checked it. Did that a couple times and got it to within 0.001. If it is the spindle, it can either be a bearing problem, or from the factory. If the inside and the outside of the spindle run out the same, then bearings are most likely. If not, then there is a possibility that it was machined that way.

Bad live center. Most live center problems seem to come from using the factory live center/point that came with the lathe. Most of these are not 60 degrees. You can buy a 60 degree center for a reasonable price online, or from some of our vendors in the group. You can use the factory center (I have and still do) by filling the tip off a bit. The problem with it is that it sticks into the bottom of the center drilled spot in the end of the mandrel, and does not 'seat' in the tapered part of the center hole itself. Without the tip, it will seat in the small diameter of the center drilled hole, but still not on the whole taper, but it will work. If you have run out and are using between center bushings and everything else checks out ok, then I would look at the bushings and make sure that the center drilled hole is cleaned out. There have been many ways discussed about getting away from the problem by turning between centers, using short mandrels that will only hold one blank at a time, etc. Probably as many preferences as there are for finishing. I have done both the above with great results, but for the most part I still turn with a regular mandrel set up with little or no problems with concentricity myself. I like to do both halves of the pen at the same time.