

Turning between centres: Our guide to getting started

Many pen turners start with a traditional pen mandrel—and for good reason. It's simple, affordable and works well for most projects.

But if you're looking for greater precision and consistently better-fitting pens, turning between centres (often called TBC) is a technique worth learning.

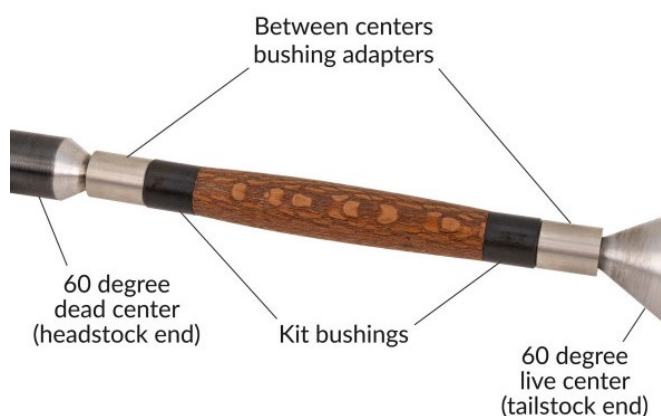
Instead of supporting your pen blank on a long mandrel shaft, turning between centres holds the blank directly between two 60° centres on your lathe. This eliminates one of the biggest causes of poorly fitting pens: mandrel flex. The result is straighter, more accurate pen barrels that line up cleanly with your pen components.

What is turning between centres?

Turning between centres replaces the traditional pen mandrel with two small bushing adapters. The adapters fit into your existing 7 mm pen bushings and are supported by:

- A 60° dead centre in the headstock
- A 60° live centre in the tailstock

Your pen blank and bushings are held directly between these two centres while you turn. The best part? You can continue using the kit-specific bushings you already own.



Why switch to turning between centres?

The biggest advantage is accuracy. A traditional pen mandrel uses a long steel shaft. If that shaft bends even slightly—especially toward the outer end—it can cause the blank to turn out of round. That can lead to:

- Pen barrels that aren't perfectly round
- One side of the barrel being thicker than the other
- Small ridges where the barrel meets the pen hardware
- Components that don't line up evenly after assembly

Because turning between centres eliminates the mandrel shaft entirely, there is no opportunity for mandrel flex. The finished barrel remains symmetrical from every angle, allowing the pen parts to fit much more accurately.

What you'll need

Before getting started, you'll need:

- ✓ 60° dead centre (headstock)
- ✓ 60° live centre (tailstock)
- ✓ Turning between centres bushing adapters
- ✓ Your existing kit-specific 7 mm pen bushings

Advantages and disadvantages of turning between centres

Like any technique, there are a few trade-offs, but for many pen turners, the improved accuracy easily outweighs these minor inconveniences. Ultimately, it's a matter of preference.

Pros	Cons
Eliminates mandrel bend.	Double-barrel pens must be turned one barrel at a time
Produces more consistent, round barrels.	Initial setup requires a 60° live centre, a 60° dead centre and TBC adapters.
Better alignment between barrel and pen parts.	It takes a little practice to apply the correct tailstock pressure.
Uses your existing 7 mm pen bushings.	Overtightening can expand the brass tube and crack the blank.

How to set up your lathe

Step 1 — Install the centres

Install the 60° dead centre in the headstock and the 60° live centre in the tailstock. A dead centre has no moving parts. A live centre contains bearings that allow it to rotate with the workpiece.

Step 2 — Assemble the blank

Mount the blank onto the kit bushings exactly as you normally would. Insert one TBC adapter into each bushing. Each adapter has a precision-machined 60° recess that mates perfectly with the points of the live and dead centres.



Step 3 — Position the assembly

Place one adapter against the dead centre. Bring the tailstock forward until the opposite adapter contacts the live centre. Apply only enough pressure to securely hold the blank. Do not overtighten.

Turning the blank

Turn the lathe on and check that everything is running true. Turn the blank just as you normally would, using the bushings as your diameter guide. If you're making a two-barrel pen (such as a Slimline or Cigar pen), simply repeat the process for the second barrel.

Sanding tips

Many pen turners stop cutting just before reaching the bushings. Instead of risking cutting into the bushings with a chisel, use 120-grit sandpaper to bring the ends perfectly flush, then continue sanding through your normal grit progression. This makes it easier to achieve perfectly flush ends without accidentally removing too much material.

Avoid metal transfer

One small downside of leaving the bushings in place during sanding is metal transfer. Fine metal particles from the bushings can sometimes discolor lighter-coloured woods. To avoid this:

- Remove the bushing assembly after rough shaping.
- Finish sanding with only the 60° centres supporting the blank.

This helps keep pale woods looking clean and bright.

Finishing your pen

You can complete the entire finishing process while the blank remains between centres. If you're using a friction polish, apply a small amount of wax to the live and dead centre points first. This helps prevent finish from building up on the centres.

Another option is to switch back to your traditional pen mandrel using plastic finishing bushings if your preferred finish is CA glue.



Important safety tip

Never overtighten the tailstock. The tapered 60° centres can expand the brass tube inside the blank. Too much pressure can split or crack the wood before you even begin turning. The blank only needs enough pressure to prevent slipping.