

Berea Hardwoods Co., Inc. Pen Instructions July 2008

Elegant American Ball Point Pen (Berea # 0302A/B-xxx -1)



Needed: Mandrel-A OR Mandrel-B
Bushings 15A OR 17B
Drill "O"
Wood size: 5/8" x 5/8"

Note: This pen can be made on a Mandrel 'A' by using the 15A bushing set or on the Mandrel 'B' using the 17B bushing set. For the purpose of this set of instructions we will use a B Mandrel and the 17B bushing set.

Preparing the Material Blanks

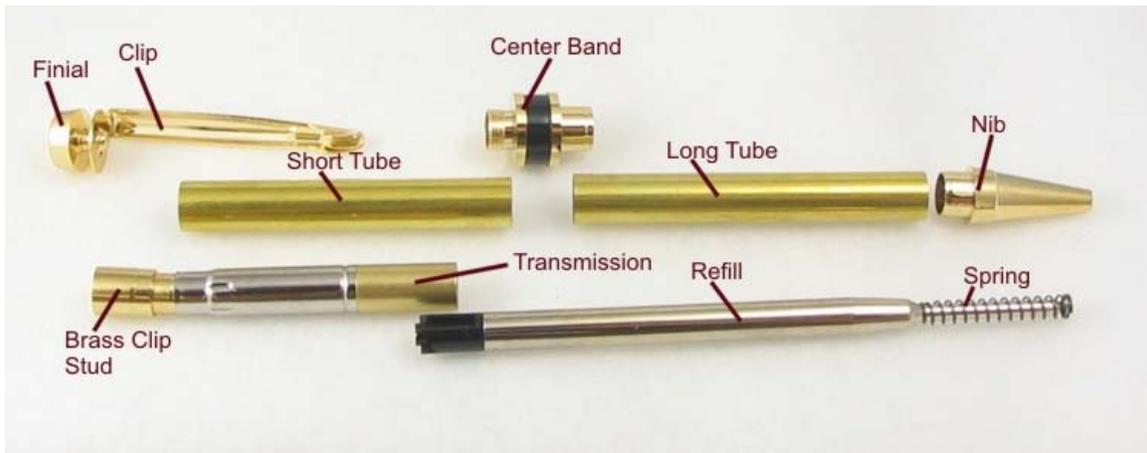
1. Cut the material blanks a little longer, approximately 1/4", than the pen tubes. Drill each blank through the center, lengthwise, with an "O" bit.
2. Polish the brass tubes with 60 grit sandpaper. This can be done by hand or on a power machine such as a belt sander. The purpose of the sanding is to clean off any oxidation and to roughen the tube so that the glue will have a better adhesion surface.
3. Plug the ends of the tubes with the material of your choice. Some use base plate wax, a dental product, or Play Dough, or even a slice of potato. Just push the ends of the tubes into a thin section of the material. This will form a plug to keep glue from getting into the tube.
4. Clean the tube, after plugging, with acetone or alcohol on a rag to remove any oils.
5. Prepare your glue. We recommend two part epoxy glue that is available in all hardware stores. Use a fast drying type, one hour or less. Be sure to mix it thoroughly. A Post-it Note Pad makes an excellent mixing place. When you are finished just tear it off and throw it away. Polyurethanes and thick flexible CA's can be used, but they each have their own drawbacks.
6. Place some epoxy into the blank using a small piece of dowel or other small stick.
7. Roll the appropriate tube in the epoxy.
8. Insert the tube with a twisting motion until it is almost in the material blank. Then use a dowel or a pen tube insertion tool to push it in until the end is flush with the blank. Use the stick to rake off the excess glue at the ends of the the blank.
9. Push the brass tube through the blank until the other end is flush with the blank. Then rake the glue flush with that end. Now push the tube back into the blank until the tube is an equal distance from both ends of the blank.

10. Set the blanks aside for 60 minutes until the epoxy has had time to reach its maximum strength.
11. If you are using CA glue, the wait is only about 60 seconds. When using polyurethane the wait will be about 24 hours.
12. When the glue has cured use a hobby knife to remove the plugs from the ends. It is also a good idea to clean the tubes with a brass gun cleaning brush to remove any glue or debris that may have gotten into the tubes.
13. Not removing all the glue from inside the tubes is the Number 1 cause of pen failure. Be certain that all dried glue is removed from inside the tubes before proceeding.
14. Using a barrel trimmer of the proper size, face off the ends of the blanks until you can just see the bright brass end of the tube. STOP facing at this point. Your pen's proper operation is dependent on having the proper length tubes. This facing operation can also be done with the proper jig and a disk or belt sander.
15. Not having the proper tube length is the #2 cause of pen failure. Sanding, on a disk sander, using a jig to hold the tube square with the disk, is a more sure way of getting the proper length. It should be tried if you have any doubt as to your abilities to square the material using a barrel trimmer.
16. Another good method of squaring the ends of the blank is to turn the blank until it is just round. Using a miter gauge to maintain the blank perpendicular to the sanding disk, just touch the ends to the disk. Once the blanks are square and you can see the ends of the tubes brighten, then return the blanks to the mandrel and finish the turning process until the desired contour is accomplished.

Turning the Blanks



1. Assemble the blanks on the mandrel using the 17B bushings. There are 3 bushings in this set. The largest bushing is for the center band and it is placed in the middle between the 2 blanks. The smallest bushing is used for the nib end of the longest blank and the other bushing is used for the clip end of the shortest blank.
2. Tighten the tailstock before tightening the blanks on the mandrel. This will center the mandrel first. Then tighten the nut that holds the blanks.
3. Turn the blanks to the desired contour making sure that the area next to the bushing is turned to the size of the adjacent bushing. This pen is intended to be a tapered pen.
4. After turning the blank, sand the surface in progressive steps until you get to 400 or 500 grit.
5. If a higher polish finish is desired continue sanding with Micro Mesh through 12000 grit.
6. Apply the finish of your choice and polish.
7. Remove the blanks from the mandrel. If using friction polish do not handle the blanks for at least 24 hours.



Parts Diagram

Assembling the Pen

Please refer to the Pen Parts diagram shown above.

The third most common error resulting in a non-functional or damaged pen is the misalignment of the parts when pressing them in place. The use of a properly adjusted pen press or small arbor press is recommended, but it can be accomplished with a good “C” clamp and much care. When pressing in the various parts, by any means, be sure that the parts are straight and in line with the blanks. If the part is cocked or otherwise misaligned, at the very least, a poor fitting pen will result. At the worst, you may have a pen that is not usable. Exercise caution here!

One other word about pen parts: Occasionally you will encounter parts that are a little loose fitting. This can easily be corrected by using a SMALL spot of glue, usually CA glue, on these parts before pressing them home.

1. Press the **NIB** into smallest end of the **longest** blank. One word of caution here: The small ends of the tapered blanks are very similar in size. Make sure you press the **nib** into the small end of the **longest** blank.
2. Press the **CENTER BAND** into the other end of the **longest** blank inserting the unthreaded end into the blank first. It is wise to use a block with a hole drilled in it so that the downward pressure is not applied directly onto the threads of the center band but onto the shoulder of the center band.
3. Press the **BRASS CLIP STUD** into the silver end (the unthreaded end) of the **TWIST MECHANISM**. Look at the parts diagram above for proper positioning.
4. Now press the **brass clip stud and twist mechanism assembly** into the **smallest** end of the **shortest** blank, inserting the brass collar (the threaded end) of the **twist mechanism** into the blank first. We recommend using a press block with a 5/16” hole to support this assembly which will allow the twist mechanism to extend beyond the brass tube. See next step.
5. When properly seated the brass collar of the **twist mechanism** should extend the thickness of a piece of paper **past** the brass tube (.003”). This .003” dimension will produce a very tiny gap between the upper pen blank and centerband which will allow the upper barrel to rotate and operate the twist mechanism without any binding.
6. Place the **CLIP** on the end containing the **brass clip stud** and install the **FINIAL**. A tiny drop of **Lock Tite** thread sealant can be applied to the threads of the finial.
7. Place the **REFILL** into the long blank with the spring in place, spring end first. Now place the **upper barrel**, containing the **twist mechanism assembly**, over the refill and carefully screw it onto the exposed threads of the **center band**.