

Berea Hardwoods Co., Inc.
Pen Instructions

Berea Hardwoods Flashlight Pen (Berea #WL-516-xxx)



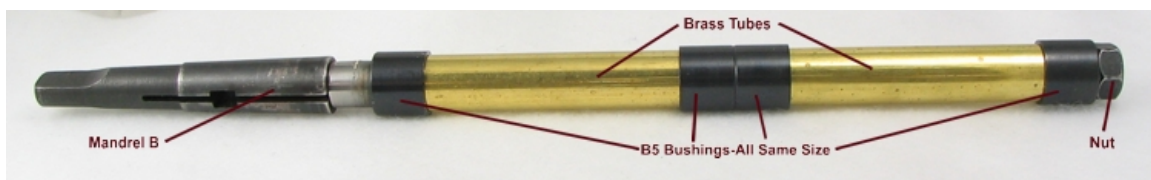
Needed: Mandrel B
Bushings 5B
Drill 31/64"
Wood Size 5/8" x 5/8"

Preparing the Material Blanks

1. Cut the blanks to the size of each tube.
2. Drill each blank with a 31/64" drill bit.
3. Square the top end of the upper blank.
4. Measure exactly 1 3/8" from this squared end and drill a 3/16" hole, some use a 1/4" hole, to intersect with the tube hole.
5. Polish the brass tubes with 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 the oxidation and roughen the tube so that the glue will have a better adhesion surface.
6. Plug the ends of the tubes with the material of your choice. Some use base wax 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 the glue from getting into the tube.
7. Clean the tube, after plugging, with acetone or alcohol on a rag.
8. 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 drawbacks.
9. Place some of the epoxy into the blank using a small piece of dowel or other small stick.
10. Roll the appropriate tube in the epoxy.

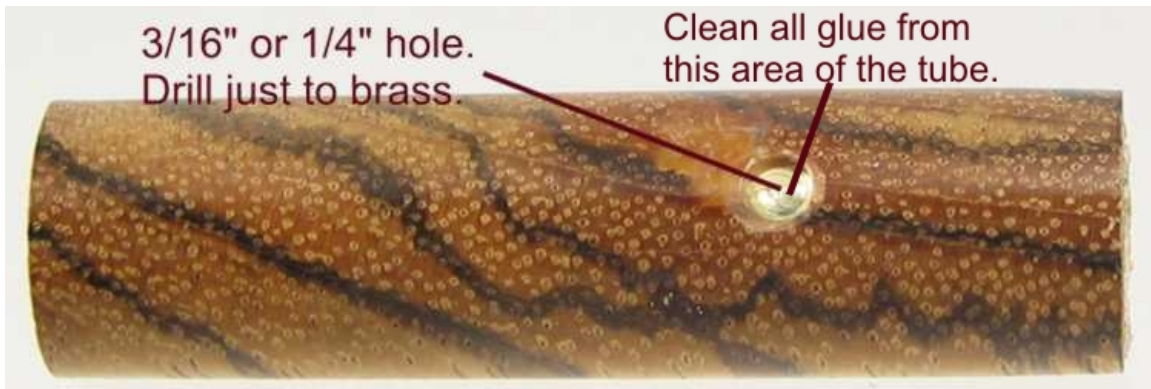
11. Insert the tube with a twisting motion until it is almost in the material blank. Then use the dowel to push it until the end is flush with the blank. Use the stick to rake off the excess glue even with the blank and the tube.
12. Push the brass tube through the blank until the other end is flush with the blank. Then rake the glue flush with that end. Now push the tube back into the blank until the tube is equidistant between both ends of the blank.
13. One the upper tube adjust the position of the tube until it is flush with the top end. That's the one you squared off.
14. Move it aside for 60 minutes until the epoxy has had time to reach its maximum strength.
15. If you are using CA glue, the wait is much shorter. When using polyurethane the wait will be about 24 hours.
16. 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 or a rolled up piece of sandpaper to remove any glue that may have gotten into the tubes.
17. Not cleaning out all glue from the tubes is the most common cause of pen failure. BE CERTAIN that all dried glue is removed from inside the tubes before proceeding.
18. Using a barrel trimmer of the proper size, face off the ends of the blanks until you can just see bright brass. STOP facing at this point. Be extremely careful on the top end of the upper blank. Face a minimal amount of material from here to preserve the 1 3/8" dimension to the clip hole you drilled. 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.
19. 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 with the barrel trimmer.
20. 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 until the desired contour is accomplished.

Turning the Blanks



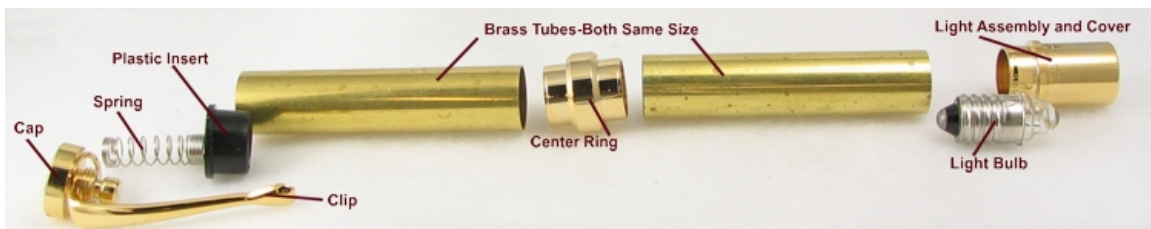
1. Assemble the blanks on the mandrel with the bushings. All bushings are the same so positioning of the bushings is not a problem.
2. Tighten the tailstock before tightening the blanks on the mandrel. This will center the mandrel first. Then tighten the nut that holds the blanks.
3. Turn the blanks to the desired contour making sure that the area next to the bushing is turned to the size of the adjacent bushing.
4. After turning the blank, sand the surface in progressive steps until you get to 400 or 500 grit.

5. After sanding, stop the lathe and,
6. If a higher polish finish is desired continue sanding with Micro Mesh through 12000 grit.
7. Apply the finish of your choice and polish.
8. Remove the blanks from the mandrel.



9. Clean all glue and debris from the hole so that no material or glue remains and only bright brass is seen.

Assembling the Pen



Please refer to the Pen Parts diagram

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 good 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 be corrected by using a SMALL spot of glue, usually CA, on these parts before pressing them home.

1. Press both blanks onto the center ring observing grain and pattern matching techniques. Make sure the hole you drilled is closest to the center band.

2. Insert the black plastic insert into the end of the blank where the clip will be attached. Make sure the precut notch in the plastic lines up with the hole you drilled in the blank.
3. Press the threaded light assembly into the other end of the pen.
4. Slip the spring on the top cap stud.
5. Place the clip into the cut out in the plastic insert and screw in the cap and spring assembly.
6. Put 2 AAA batteries into the open end, negative end first.
7. Insert bulb and screw in the light cover.

To turn on the light, press the clip. Some adjustment, bending, of the clip may be required to get the light to turn on and off properly and reliably.

Now that's a nice gift.

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