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Berea Hardwoods Co., Inc.
Kit Instructions

Berea Hardwoods LED, Stylus, Pen (Berea # STY1403/LB *xx*)

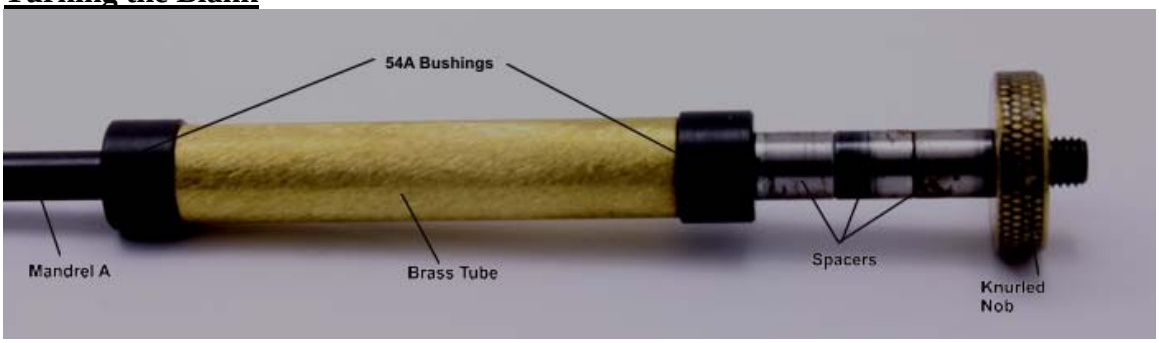
Needed: Mandrel-A
Bushings-54A
Drill-12.5 mm
Wood Size- 3/4" x 3/4" (You might prefer 1" x 1" if available)

Preparing the Material Blank

1. This is a large bore tube. Consider cutting your blank about ½" longer than the length of the tube. Then mark the length of the tube on the blank. Drill a pilot hole smaller than the 12.5mm.
2. Then drill with the 12.5mm bit until the full diameter of the bit is at your blank mark. This will lessen the chances of splitting the blank. Now saw off the blank at the tube length mark you made.
3. Polish the brass tube 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.
4. Plug the ends of the tube with the material of your choice. Some use base wax, a dental product, or Play Dough, or even a slice of potato. Just push the ends of the tube into a thin section of the material. This will form a plug to keep the glue from getting into the tube.
5. Clean the tube, after plugging, with acetone or alcohol on a rag.
6. 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.
7. Place some epoxy into the blank using a small piece of dowel or other small stick.
8. Roll the appropriate tube in the epoxy.
9. Insert the tube with a twisting motion until it is almost in the material blank. Then use the dowel to push it in until the end is flush with the blank. Use the stick to rake off the excess glue even with the blank and the tube.

10. 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.
11. Move it aside for 60 minutes until the epoxy has had time to reach its maximum strength.
12. If you are using CA glue, the wait is only about 60 seconds. When using polyurethane the wait will be about 24 hours.
13. 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 that may have gotten into the tube.
14. Not cleaning out all glue from the tube is the most common cause of pen failure. BE CERTAIN that all dried glue is removed from inside the tubes before proceeding.
15. Using a barrel trimmer of the proper size, face off the ends of the blank 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.
16. 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.
17. 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.

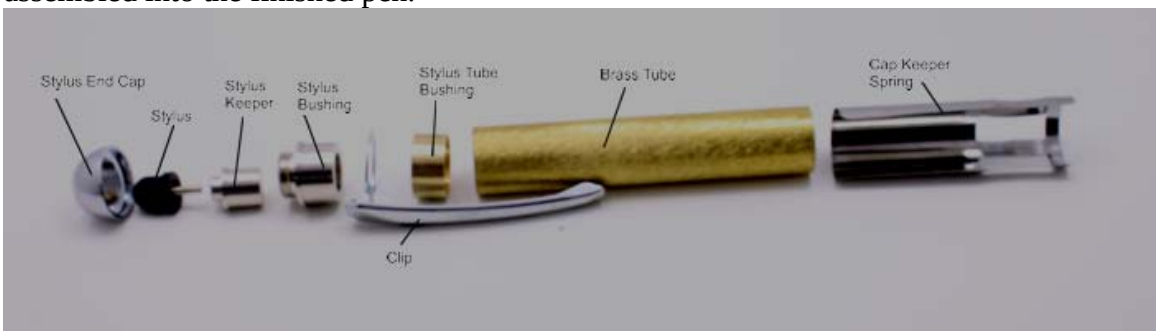
Turning the Blank



1. Assemble the blank on the mandrel using the 54A bushings. With these bushings it is not necessary to be particular with the order they go on the mandrel. They are both identical. Use a spacer take up the extra mandrel space.
2. Tighten the tailstock before tightening the blanks on the mandrel. This will center the mandrel first. Then tighten the nut that holds the blank.
3. Turn the blank 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. 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 blank from the mandrel.

Assembling the Pen

This pen will have 3 sub assemblies. Each will be dealt with separately here and then assembled into the finished pen.

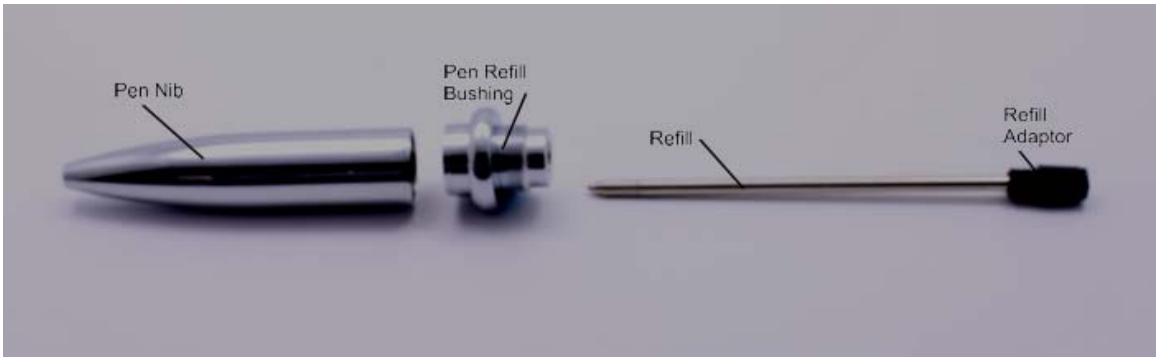


Assembly #1-the stylus. Please refer to the Pen Parts diagram above.

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 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!

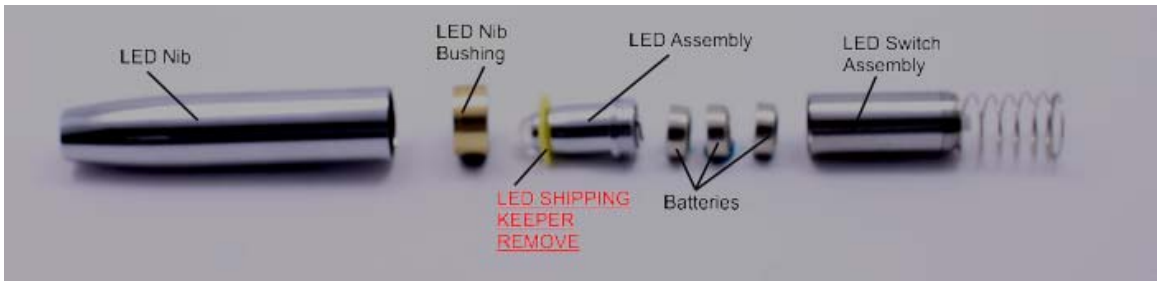
One other word about pen parts. Occasionally, you will encounter parts that are a little loose fitting. This can be corrected by using a SMALL spot of glue, usually CA, on these parts before pressing them home.

1. Press the stylus keeper into the threaded end of the stylus bushing.
2. Slide the clip onto the other end of the stylus bushing.
3. Now press the stylus tube bushing onto the stylus bushing trapping the clip in place.
4. Press this entire assembly into one end of your blank.
5. Place the rubber stylus into the stylus cap. Align the tiny spring with the hole in the stylus keeper.
6. Screw this onto the stylus keeper making sure to keep the rubber stylus centered in the hole.
7. Slide the cap keeper spring into the inside of the barrel as you see it oriented in the picture. NOTE: To prevent any scratches on your finished pen you need to check that there are no rough edges or burs on the inside of this spring. If there are a little fine sand paper will smooth them out.
8. This sub assembly is now done. Lay it aside for a few minutes.



Assembly 2-The pen part.

1. Press the pen refill bushing into the pen nib with the threaded part sticking out.
2. Screw in the refill with the adaptor in place. By the way, when you change refills you might want to keep the adaptor and not throw it away. You'll need it on the new refill.
3. OK, you're done with this assembly. Lay it aside for now.



Assembly 3-The LED part.

1. Place the batteries into the LED switch assembly. Make sure they are all oriented properly.
2. Screw the LED assembly into the LED switch assembly.
3. Remove the YELLOW shipping keeper from the LED assembly.
4. Now, take something small and depress the white button, inside the spring, on the LED switch assembly. The LED should light. Press it again and it should go off. The most common cause of problems here is incorrect battery orientation.
5. Next, press the LED nib bushing, small end first, into the LED nib.
6. Slide the LED through the nib bushing. Push the spring all the way past the bushing.

1. Screw the pen assembly into the LED assembly as shown above.
2. Slide the cap onto either end and you are done.

OK! My batteries are dead. What now!!

1. Unscrew the pen assembly from the LED assembly.
2. Fish out the spring, you may need a small tool or hook to do this.
3. Open the LED switch assembly by unscrewing it.
4. Dump out the batteries. Replace with new ones.
5. Screw it back together and test operation.
6. Replace all parts and you are in business again.

Have fun with this. It's a cool kit!