

# **The Berea Hardwoods CO. Inc**

18745 Sheldon Road  
Middleburg Heights, Ohio 44130  
Toll Free 1-877-736-5487

Berea Hardwoods Co., Inc.  
Pen Instructions

## **Turbin Pen (Berea #STY1405N/B -xx-x)**



**Berea Hardwoods**

Turbin Pen

Needed: Mandrel-A  
Bushing Set-56A  
Drill-Letter "O"  
Blank Size- 5/8" x 5/8"

### **Preparing the material blanks**

1. Cut the blanks the length of each brass tube giving a little extra length for the facing of the blank after the tubes have been glued in. Note that the tubes are NOT the same length so you have to keep them separate. Drill each blank with the letter "O" drill bit.
2. 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.
3. 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.
4. Clean the tube, after plugging, with acetone or alcohol on a rag.
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 drawbacks.
6. Place some of the 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 appropriate length 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.
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 equidistant between both ends of the blank.
10. Move it 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 much shorter. 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 or a rolled up piece of sandpaper to remove any glue that may have gotten into the tubes.
13. 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.
14. **Important Note: This pen is very sensitive to barrel length. Make sure to get this right!** 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. 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 with the 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 until the desired contour is accomplished.



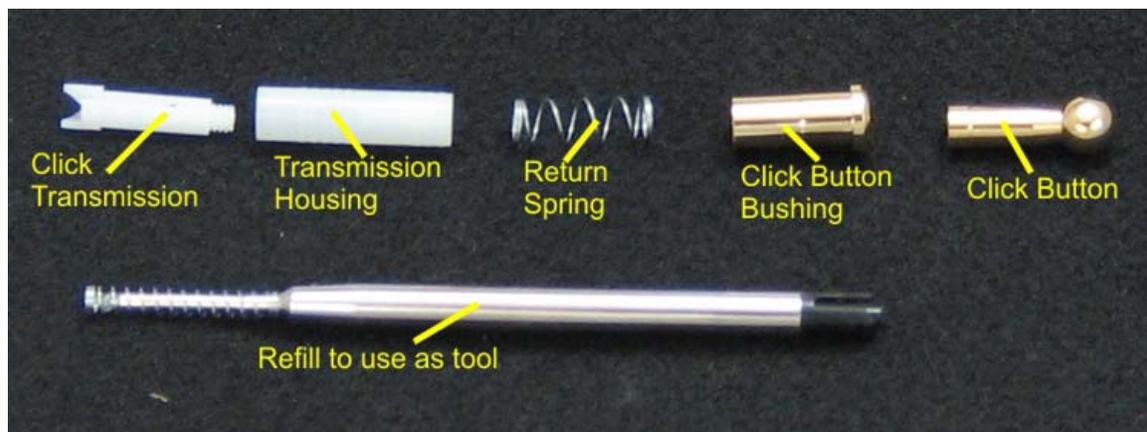
### **Turning the Blanks**

1. Assemble the blanks on the mandrel using the right bushings in the right place. Place them in the order shown in the mandrel picture.

2. Place the next to the largest bushing on the mandrel.
3. Place one of the blanks on the mandrel observing any grain or pattern matching techniques desired.
4. Next place the largest bushing on the mandrel and then the other blank again watching any grain or pattern matching necessary.
5. Now place the smallest bushing on the mandrel. Add spacers, as needed, the washer, and the nut.
6. Tighten the tailstock before tightening the blanks on the mandrel. This will center the mandrel first. Then tighten the nut that holds the blanks.
7. When turning this pen you must realize that it tapers on both ends. The lower barrel taper more severely than the cap.
8. Turn the blanks to the desired contour making sure that the blank diameters are the same as the bushings.
9. After turning the blanks, sand the surface in progressive steps until you get to 400 or 500 grit.
10. If a higher polish finish is desired continue sanding with Micro Mesh through 12000 grit.
11. Apply the finish of your choice and polish.
12. Remove the blanks from the mandrel.

### Transmission Sub Assembly

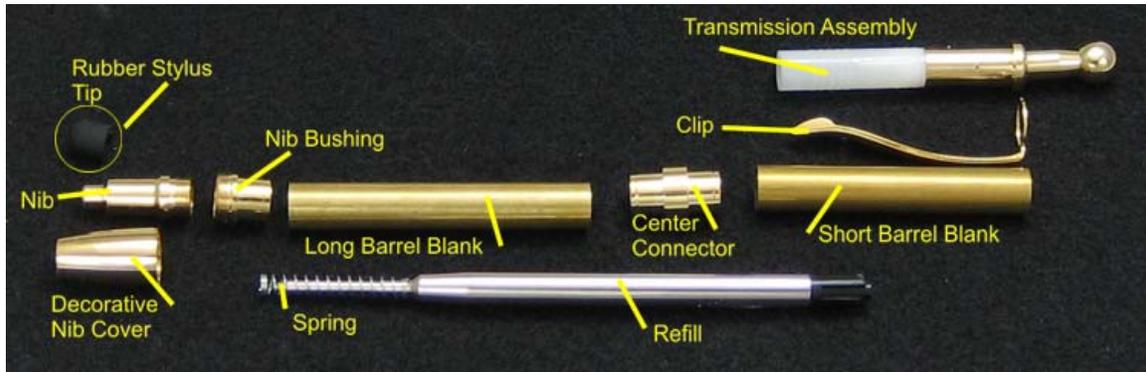
The transmission needs to be assembled prior to installation. This will aid you in that assembly.



1. Drop the Click Transmission into the large end of the Transmission Housing. The threaded end should stick out the small end.
2. Drop the Return Spring over the exposed threaded end.
3. Slide the Click Button into the larger end of the Click Button Bushing.
4. Place the black end of the refill into the large end of the Transmission to maintain pressure on the Click Transmission.
5. Push the Click Button and Click Button Housing over the spring.
6. Maintaining pressure on the “refill tool” and on the Click Button screw the button onto the threaded part of the Click Transmission. Once it is tight you are finished.

7. Lay this aside until needed in the final assembly.

### Pen Assembly



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 the shorter blank onto one end of the Center Connector. Be sure to get your grain and/or pattern alignment right.
2. Next, press the longer blank onto the other end of the Center Connector again observing proper alignment.
3. Place the Clip over the above assembled Transmission Sub Assembly.
4. Press this into the other end of the short blank. Make **SURE** you use a press block that will **NOT** press on the button but on the boss just below the button. Pressing on the button may damage the transmission.
5. Now, press the Nib Bushing into the other open end of the pen.
6. Drop in the refill, black end first and screw on the Nib.
7. Push the Rubber Stylus Tip onto the exposed end of the nib.
8. Screw on the Nib Decorative Cover and you are done.

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