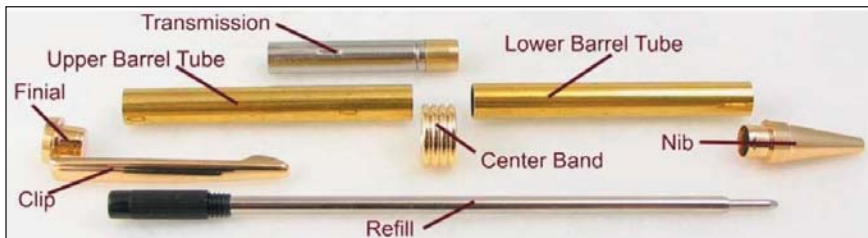


Streamline Flat-Top 7mm Pen Hardware Kit

Requires standard "A" mandrel, streamline flat-top bushings (88K78.76), 7mm or letter "J" drill bit, and minimum 5/8" square blank.



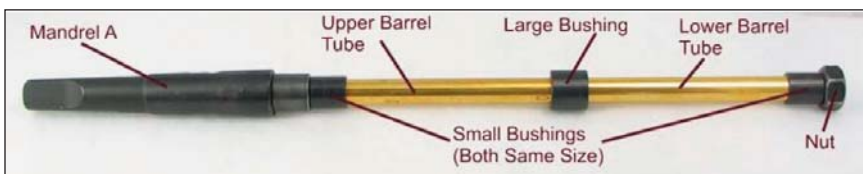
Pen parts diagram.

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.
2. Drill each blank with the 7mm or letter "J" drill bit.
3. 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.
4. Plug the ends of the tubes 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 tubes 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. You can use a fast-drying, two-part epoxy, 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 cyanoacrylates (CAs) can also be used. (If not using epoxy, go to step 9.)
7. Place some of the 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 all the way into the material blank. Then use the dowel to push it in until the end is flush with the blank. Use the dowel 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 ends are equidistant from the ends of the blank.
11. Set 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 or a rolled up piece of sandpaper to remove any glue that may have gotten into the tubes.
14. 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.
15. Using a barrel trimmer of the proper size, face off each end of the blank until it just touches the 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 disc or belt sander.
16. Not having the proper tube length is the #2 cause of pen failure. Sanding, on a disc sander, using a jig to hold the tube square with the disc, 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 disc, just touch the ends to the disc. 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 above, starting with the next-to-largest bushing.
2. Place the short blank on the mandrel, observing any grain or pattern matching techniques desired.
3. Next place the largest bushing on the mandrel and then the longest blank, again watching any grain or pattern matching necessary.

4. Now place the smallest bushing on the mandrel. Add spacers (as needed), the washer, and the nut.
5. Tighten the tailstock before tightening the blanks on the mandrel. This will center the mandrel first. Then tighten the nut that holds the blanks.
6. When turning this pen, keep in mind that it tapers on both ends. The lower barrel tapers more severely than the cap.
7. Turn the blanks to the desired contour making sure that the blank diameters are the same as the bushings.
8. After turning the blanks, sand the surface in progressive steps until you get to 400 or 500 grit.
9. Apply the finish of your choice and polish.
10. Remove the blanks from the mandrel.

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!

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 nib into the smallest end of the longest blank.
2. Next, press the transmission into the other end of this same blank up to the notch in the transmission. It is best to "creep up" on this operation by pressing to near the right dimension, inserting the refill, twisting the transmission open, and checking the exposed tip at the nib. You want about $\frac{1}{8}$ " of refill tip exposed, but make sure that the tip is fully enclosed in the nib when it is retracted. This method can make up for slight errors made in trimming the barrel to the proper length.
3. Place the center band on the exposed transmission.
4. Place the finial into the clip.
5. Press this assembly into one end of the other blank.
6. Align the grain or pattern as desired.

This pen uses a standard Cross-style refill.

