

Turning pens, pencils, letter openers and other small projects hones your turning skills; while you produce great gifts for sale or items for thoughtful gifts for loved ones and friends.

The following pages are not a substitute for specific instructions, which will come with or be available from the supplier of your kit, but a compilation of instructions common to most small turning projects.

There are specific steps, which are unique to each project, so read the instructions for your project carefully. This text refers to "pens", but usually the information is applicable to any of many small turning kits.

What do I need to get started?

A home workshop will already have most of the equipment needed to turn pens. A few additional inexpensive tools may be needed. Throughout this text are recommendations for products and techniques that we have found make turning pens easier and help produce a quality project. You will need:

- ∞ Pen Kit(s)
- ∞ Mandrel with Appropriate Bushings
- ∞ Pen Blanks
- ∞ CA Glue
- ∞ Pen Mill or Belt Sander
- ∞ Micro Mesh Foam File (optional)
- ∞ Lathe with a Live Center
- ∞ Turning Tools
- ∞ Sandpaper (ranging from 120 to 12,000 grit)
- ∞ Your choice of finish
- ∞ Bench Vise or Quick-Grip Clamps
- ∞ Wooden Handscrew
- ∞ Drill Press
- ∞ Band Saw or Table Saw
- ∞ Blanks

A "blank" is a general term used to describe whatever material you choose to make your pen from. Blanks are cut to specific sizes for each individual project. Blanks can be in domestic and exotic woods; laminated and dyed woods, such as Dymondwood; "Crushed Velvet" which imitates the classic cellulose acetate pens of the 1930's; and acrylics, impregnated and dyed Maple burl "Wild Wood" and everything in between – deer antler, corian and things you haven't thought of yet...

If you choose to make your own blanks, a band saw is almost indispensable, especially if you are going to turn more than one or two projects. You can use your table saw instead of a band saw, but if you are sawing blanks from expensive exotic or rare wood, the large kerf (width of the cutting path) wastes lots of precious material. A band saw also makes it easier to resaw thicker stock into useable dimensions.

Exact blank length and width are given in the instructions for each project. When getting started, always err on the size of caution and lean to the oversize rather than undersized. You can turn a little extra material off, but you can't add material to an undersized blank.

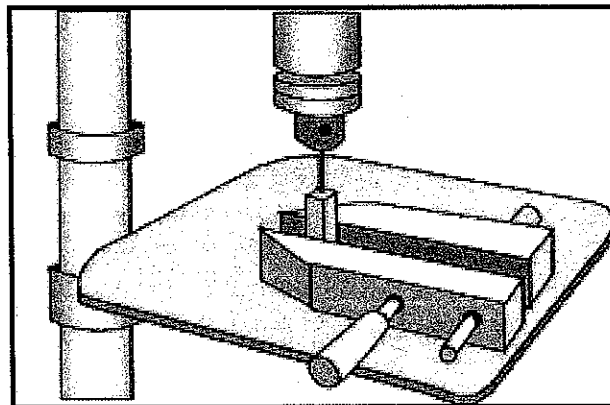
You can grain match blanks, such as for the upper and lower sections of a pen. Add the lengths of the individual blanks together and cut your blank to this length dimension, plus a little extra to allow for the kerf and trimming the blanks square. When assembling your kit, maintain this blank orientation for perfect grain matched pens.

HINT: If you are preparing a number of blanks at one time and wish to keep them matched, use an old muffin pan or egg carton to keep matched pairs together.

Boring the Blank

After a blank is cut to size, it must be bored lengthwise through its centre. An oversize blank gives you more margins for error. Drilling the blanks can be done on the lathe (or with a hand drill if you are steady and brave), but a drill press is faster, more accurate, and you will lose blanks less often. The size of the centre boring is specific for each type project. Draw lines on one end of the blank, connecting opposite corners. The intersection of these lines will be the centre of the blank.

The hole can be easily drilled on the drill press using a handscrew to hold the blank (see illustration #1). With the drill press turned off, align the blank under the bit. Lower the bit until the tip almost touches the blank. Adjust the blank under the bit until they are parallel and tighten the handscrew. Raise the quill, turn on your drill press, and drill through the blank at the centre you located earlier.



HINT: Check your drill press table with a machinist's square to make sure it is at 90 degrees to the bit. If the table is off the slightest amount it will cause the bit to lead in that direction and increases the chance that you will bore through the side of your blank or cause it to "blow out", that is, split due to pressure.

HINT: When drilling blanks, go slow and withdraw the bit frequently to clean out chips. More blanks are lost due to splitting out during drilling, than during any other operation. Although brad point bits will do the job, Parabolic Flute Bits, specifically designed for superior chip ejection in deep hole boring applications, will drill cleaner and faster with less loss of blanks. Woodcraft Pen Makers Bits feature the parabolic flute design, and are the bits we recommend.

Sorting out the Parts

Each type of pen, pencil, perfume applicator, etc., has parts that are unique. If you are using a Woodcraft kit, take time to fully read the instructions and familiarize yourself with the different parts before starting.

Until you are comfortable with all the particular parts for a specific project, match the parts to the exploded diagram each time. Some pens and pencils have parts which look identical, but there are subtle differences which prevent the parts from being interchanged. Be careful to select the proper set of components prior to assembly. By following the step by step instructions, and referring to the diagrams for clarification of terms and parts, you should be able to make a quality piece the first time.

Blanks, Tubes, Glue

Now you're ready to glue the brass tube into the drilled blanks. The brass tubes are the foundation of many small turning projects. The brass tubes are glued into the wood blanks, and after turning, hold the other parts of your project by press fit. Again, carefully select the proper length/size brass tubes. Some kits have two different length tubes. The tubes can be glued in place with cyanoacrylate glue (our favorite because of the quick set up time) or two part epoxy. The proper gluing of the tube is critical to avoid problems when turning.

Test fit the tube in the blank before gluing. The tube should slide in without having to force it. If the fit requires force to insert the tube, you will scrape the glue from the outside of the tube as you insert it, resulting in a weak bond or the tube will become fixed part way into the blank.

HINT: Different woods bore and react to the changes in stress within the blank differently. Always test fit your brass tubes before gluing. If you know you are using the correct bit, but yet the fit is too tight, redrill and slightly ream the hole.

Roughen the outside of the tubes with 180 or 220 grit sandpaper to remove any tarnish or lacquer and provide a better bonding surface for your glue. We like to stand our blanks on end and put a few drops of glue in the blank before putting glue on the tube. This gives the glue in the blank time to run down the inside of the hole, which increases the likelihood of uniform gluing when you insert the tube. Hold the tube by one end and liberally coat all of the tube possible with glue. Insert the tube steadily into the top of the blank; while rotating the tube to ensure the entire inside of the blank receives glue and any excess glue is forced out the bottom of the blank. Pushing the tube into the blank from the bottom forces excess glue up and allows it to run down into the tube. Wear disposable gloves while gluing up your blanks and set your glued up blanks on wax paper, so they don't adhere to your workbench. Allow plenty of time for the glue to dry completely to prevent your project from adhering to your pen mill or mandrel. Use of a CA Accelerator will speed the drying time of CA glues.

HINT: Purchase extra brass tubes for the type of pens or projects you are turning. They are frequently lost due to bad gluing, defects in a blank, or mistakes in pressing. You can turn the blank down to the brass tube if you have a bad blank, but the time wasted in trying to save a tube is excessive when tubes are so inexpensive. Ask for them when you order your small turning project kit(s).

Square Ends

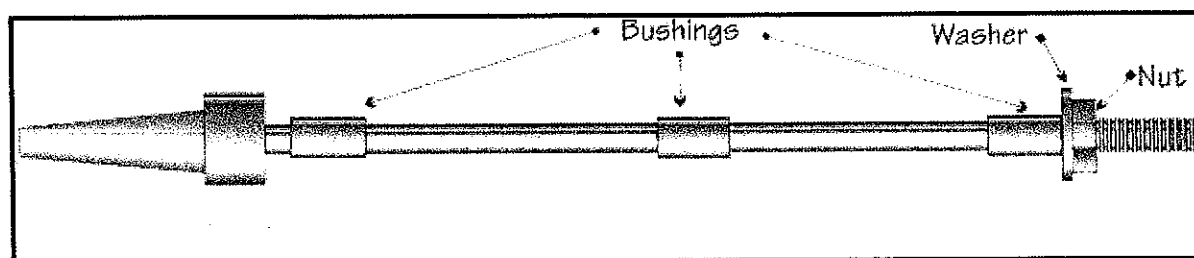
All that is left is to trim and square the ends of the blanks and you're ready for the lathe! The ends of the blanks have to be trimmed flush with the brass tube to prevent splitting the wood when press fitting parts together. This clean, square cut ensures the metal press fit parts seat flush with no gaps in the pen after it is assembled.

Squaring and trimming can be accomplished with a belt or disc sander (for the VERY brave) or with a Pen Mill (better idea – see illustration #5). The pen mill is a quick, easy way to ensure square ends when you don't have access to a power sander. The pen mill, which is turned by hand, has two sets of cutters. The guide, which passes through the tube, cuts and removes any excess glue from inside the tube. Removal of this glue is very important for the proper fit and function of several of the kits. The shoulder of the mill cuts and trims the end of the blank flush with the brass tube.

When a Blank Becomes a Barrel

Almost all pen, pencil, letter opener, key ring and other small turning projects require a mandrel for turning on the lathe. The Mandrel is mounted onto the lathes headstock and the blanks are mounted to this. Uniformity is achieved by using bushing sets with outside diameters dedicated to individual projects and inside diameters common to the mandrel. In other words, if you are turning regular twist pens and want to switch to making Parker style pens, all that is required is sliding the three twist pen bushings off the mandrel and sliding the Parker bushings on.

The mandrel is available in #1 & #2 Morse Tapers for lathes with Morse Taper bored headstocks. The mandrel can also be purchased without the MT adapter, so it can be held in a compression chuck or three jawed chuck.



Mount your mandrel in the lathe's headstock and remove the mandrel hex nut and washer. Follow the instructions for the particular kit you are turning, i.e. slide the proper bushing on the mandrel, then the blank (making sure the brass tube goes over the corresponding shoulder on the bushing, if required), the second bushing and so on. If your kit uses three bushings, mark the middle bushing and the bushing next to the tailstock so they can be used in the same position in the future. Slight distortions occur on the 1st and 3rd bushing when the mandrel is over tightened, and could prevent the proper seating of the tubes if the bushings are not always installed in the same order. We used a punch and put a single punch mark on the centre bushing and two marks on the 3rd or bushing closest to the tail stock.

After installing the bushings and blanks, place the washer on the mandrel and tighten the hex nut just tight enough to keep the blanks from spinning on the mandrel while turning. Do not over tighten! Over tightening may distort a brass tube and make assembly difficult, but most often will crack the blank. It is better to leave the mandrel too loose. If the blank spins on the mandrel when you make contact with your turning tools, stop and slightly tighten the nut. Repeat this process until the blanks are secured in place. After a few projects you will develop the "feel" for the right amount of pressure required to hold the blanks securely.

After installing the blanks and bushings on the mandrel, bring your tailstock with a live (ball bearing) centre up to the mandrel, and lock it in place. Screw the ram (the portion of the tailstock that moves out and in) out until the ball bearing centre just comes in contact with the inside of the dimpled or cupped end of the mandrel shaft. Do not over tighten the tailstock, or you will bow the mandrel, resulting in oval, off centre pens! If you severely over tighten the tailstock, the mandrel will stay bowed and have to be replaced.

All woodworkers have their own favourite tools and techniques for turning pens. Almost everyone starts with a 3/4" roughing gouge, turning the blank down to within a 1/16" or 1/32" of the bushings. From this point some switch to a scraper to gently scrape down to the bushings. More experienced turners often switch to a skew chisel and smoothly cut the blank down to sanding size; while others stick with the large roughing gouge, rolling it over until it cuts like a skew to finish.

There is another method of removing stock to the finished (bushing) diameter. It doesn't improve your turning skills, but if you are worried about ruining a one of a kind set of blanks, no one will ever know but you! After turning the blanks to within approximately 1/32" of the bushings, stop your lathe and remove the tool rest. Wrap a small block of wood cut to the length of your blank with 120 grit sandpaper and hold this block against your blank as it spins. Sand the blank down until it is a few thousandths of an inch larger than the bushings, then do your final sanding. After final sanding your blank has now become a "barrel". This method actually ensures the sides of your barrel are exactly parallel and produces a perfectly symmetrical pen barrel.

HINT: If you discover a small void or tear-out in a turned barrel, coat the area with Super Glue Adhesive, coat the adhesive with turning dust from the same wood to fill the defect, spray the area with Super Glue Accelerator, and sand as usual.

Finally, Final Sanding

How much do you have to sand to be finished? Until you are happy with the finish you achieve. Most turners progress through grits starting at 240 through 700 to 12,000. We like to use cloth strip abrasive for the initial grits. With the tool rest removed and the lathe set to its highest speed, loop a strip of sandpaper, cut to approximately 1" wide x 12" long, around the turning blanks and gently pull the loop of sandpaper against the blanks. Move the sandpaper back and forth across the blanks changing grits progressively as the blanks smooth. Be careful and cautious! With the blanks spinning a little sanding goes a long way. Do not sand the bushings! You will change their diameter and your metal parts will not align with the next barrels you turn. After using regular sand paper, we like to switch to Micro-Mesh for a final, high gloss finish. Available in sheets, pads or sanding sticks, Micro-Mesh has superior durability to other abrasives available in ultra fine grits. Our favourite for small turnings are the sanding sticks. The foam "file" is coated with 2,400 and 4,000 grit on one side, 12,000 grit on the other, giving an ultimate polished surface to finish. The foam also has some "give" which allows it to conform slightly to your turning. Remember to keep these files moving, if you don't the heat build-ups from friction will melt the file and possibly destroy your blanks (TIP: a little water will help your sanding along).

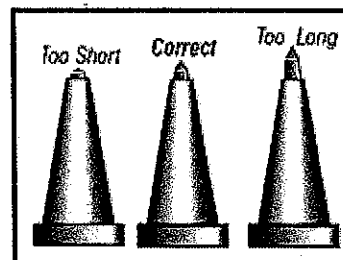
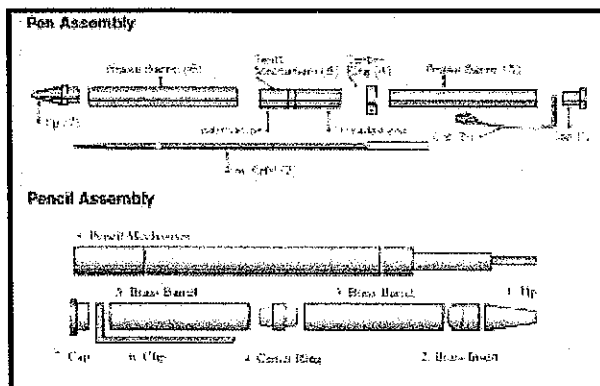
Finishing

Many people have seen and/or tried just about everything available to finish a pen. Most have not found a glossy finish which will withstand constant use. Natural body oils and wear on a heavily used pen will dull any finish. PPP (Perfect Pen Polish) by HUT Wax, which is a combination of synthetic waxes and inert polishing compounds, gives a quick, durable finish and is applied; while the barrels are still on the lathe. Also, wax finishes are easily refurbished after they wear. There is the perennial favourite of EEE and Shellawax, but once again, eventually will wear down/discolour like most finishes. One that I have tried is a finish called Isoguard which is a Wattyl lacquer that is available in a range of different gloss finishes. I have tried the semi gloss and in the jar it separates into two distinct layers. To use it shake the jar and get the mixed semi-gloss finish, or just use the un-mixed fluid as a matt finish. The only drawback is that it comes as 4 litre or 20 litre tins! I know that Bruce Leadbeatter sells it in recycled pasta sauce jars! For me, it is a very durable finish on timber that is not too shiny or "plasticly" looking. I'm sure it's available from bigger paint and similar stores.

Assembling the Pen, or Your Last Chance to Ruin Your Work!

Pretty much every supplier who sells pen kits has instructions to cover the assembly of the turning project. Almost all of the small turnings are assembled by press fitting. Assembly order is critical. For example, if you press the twist mechanism in the lower barrel of a pen prior to the nib, the twist mechanism will most likely push in too far for the pen to operate before the nib is seated. Making this kind of error will ruin a project.

HINT: If you have "grain matched" blanks for the upper and lower tubes of a pen, be sure to align the grain before pressing the two halves together. This is especially important when assembling Parker style pens, since the top of the pen cannot be removed after assembly to re-orient the grain.



There are several methods of pressing the parts together. A woodworking bench vise or metal bench vise, which will open far enough to accommodate the parts, work well. If your vise has metal jaw faces they need to be padded with wood, plastic or any material with some give to prevent distorting or scratching the parts as pressure is applied. Quick Grip Clamps also provide an easy, controllable means of pressing parts. Regardless of what you use to press with, go slow, and keep the parts square with the jaws of your press and parallel to the pen barrel. If the parts are slightly cocked in the press they will jam, and as you add pressure, destroy your project. I know that the purist will cluck their tongues but I personally use a small wooden mallet to assemble my pens, which works fine for me and I have learned to judge how hard to hit the pen kits. A piece of hardwood turned in the lathe to fit into your drill press with a flat surface will do nicely as most everyone has a drill press. See above:

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