

Pen Making

Pen making by Bob Hewson, London, Ontario.

Contents

Discussion of pen making

Walk through/demo of the process

Finishing

Assembly

Miscellaneous

Workshop (hands on!)

What materials you need to turn pens

A Discussion of pen making

- ✓ **Why Bother?**
- ✓ **Kit types** – Kits are gold plated in one of several alloys. Which one is best for you?
 - There is 24K, the most common, it looks good, but is relatively thin, pure, and soft and will wear quickly with heavy use. There are light plating and heavy (ours is “heavy”).
 - 10K is also available from some sources, it is an alloy, less pure than 24K, but more resistant to wear and looks great.
 - Titanium Gold as supplied in “premium” kits combines wear resistance and more gold for lasting good looks, at a premium price.
 - Titanium is also supplied without a gold alloying and gives an excellent wearing “golden” color finish
 - Black titanium gives an excellent high gloss silver/grey long wearing finish.
 - “Platinum” finish plating is also available, but is not platinum but rather rhodium and is often used in the jewelry trade. It gives a classy platinum look finish.
- ✓ **Woods and other materials**
 - Domestic and imported hardwoods
 - Spalted woods (look great adding interesting patterns, but use proper care and safety gear, spaling is caused by fungi and requires special care when handling)
 - Colorwoods (laminated precolored strips of Baltic birch bonded together into a “blank”)
 - Dymondwood (laminated Baltic birch, colored and laminated using phenolic resin under high pressure). Dymondwood is very hard and stable. It can be finished with “wet or dry” sand-papers, used wet. Lee Valley has Dymondwood available in several colors.
 - Cellulose acetate, a material hand made in France, used in pens in the 1920s and ‘30s makes a stylish pen.
 - “Acryligem”, a very hard acrylic material, looks great, but is difficult to work with.
 - Composites made of acrylic and seeded with materials i.e. fools gold (iron Pyrites), real gold, etc.
 - Antler (or bone)
 - Snakeskin encapsulated and cast in a clear acrylic.
 - Hand cast acrylics.
 - Laminated blanks can be constructed using various laminateion and can result in spectacular results. This technique can be enhanced by special high cost kits of laser cut laminates and inserts, used to make the “stars & stripes”, the Canadian flag, piano keyboards, your imagination is the only limit.
 - Ivory (synthetic or natural, old or new) although there are restrictions if you use real ivory and resell it! I’ve seen mammoth fossil ivory that is available and makes a spectacular pen but at a spectacular price too!
 - Any special piece of wood of significance to some one (for example, I came upon a piece of New Zealand wood that was recovered from under a glacier and estimated to be 30,000 years old. I made some custom pens for a friend and for his kids, pens out of 100-year-old walnut from the old family farm).
- ✓ **Finishes**

We will deal with these later.
- ✓ **Quality image for gifts or resale**

Quality reflects your craftsmanship and level of your competence when you make a gift or sell a pen. Poor quality reflects on the maker and the buyer/gift giver. **Don't settle for second best!**
- ✓ **Tools and lathes**

Buy quality, you won't regret it!

✓ **Why a "mini"**

Why not, it is low in cost, versatile and convenient however, pens may be turned with a full size lathe too.

✓ **A walk through the process**

- Your choice of pen is very personal. My favourite is the "Mt. Blanc" or "European" style. Classy and good grip. Enjoyed by both men and women. The large size works well for both men and women and is particularly suitable for people with arthritic hands. This is the style we will make today.
- Choice of wood or other material. Choose highly figured or "wild" grained woods for visual interest 1/2" or 3/4" stock (minimum of 5/8" for Mt Blanc style). Today we are using Cocobolo a beautiful tropical hardwood from Brazil.
- Blanks are cut to length (slightly oversize, they will be trimmed later). Prior to cutting make witness marks to realign the grain.
- Drill holes using appropriate drill speed (not too fast) and a clamping device. Drill in small increments to prevent overloading flutes and increasing temperature and pressure that can lead to breakage and/or wandering of the bit (*particularly with synthetics*).
[There are several types of drill bits available, only three are suitable for drilling the accurate holes necessary. The "Special" pen bit is designed to clear debris quickly, but is somewhat flexible and will drift in hardwood following the grain. Parabolic bits with a different drill cutting geometry do a good job on hard materials like "Dymondwood", "Acryligem", and stabilized materials, but tend to drift in hardwoods, following the grain. The lipped brad point is my preference, stiff and sharp, cutting with minimal drift in hardwoods.]
I prefer to use a self-centering vice to hold my blanks for drilling, this ensures fast easy drilling with the hole centered!
- Brass Inserts are cleaned with solvent to remove machining oils and grease, roughened with 180 or 220 sandpaper to improve bond, then bonded using 5-minute epoxy, Polyurethane adhesive (Excel or similar), or Hot Stuff (CyanoAcrylate adhesive). The polyurethane (PU) is my preferred adhesive for wood, giving a strong flexible bond with no mixing (refer to the product info sheet before use). Epoxy is preferred for the harder synthetic materials although the PU glues are proving satisfactory too.
- Trim the ends square with a pen mill. A non-squared end is very noticeable in your finished pen and reflects on your quality/skill level. It can be done manually or on a drill press. Other methods can do the job such as hand sanding or using a disc-sander or a Forstner bit, but the pen mill used in a drill press is fast, accurate and simple to use.
- A mandrel is installed on the lathe using a collet in the headstock end of the lathe and a live centre in the tailstock. The mandrel/shaft accommodates bushings for both parts to be turned at once. A Morse taper or chuck could also be used if your lathe uses one (a Morse taper is more commonly found on midi or full size lathes).
- Install bushings and blanks (refer to the instruction sheet that comes with your kit). Ensure proper lengths line up with the proper bushing ends! Ensure witness marks are correct to align grain. Don't use excessive force when tightening the nut on mandrel.
 - Too much tightening pressure is the main cause for break-age when turning, particularly with Dymondwood and Acryligem!
 - Too much pressure will distort the mandrel too resulting in an off-centre turning
- What speed to turn?:
 - Your choice, as fast as you are comfortable with
 - As fast as your **sharp** tools will allow
 - As fast as your blank material will allow (some woods or materials require different speeds).
- Turn parts for barrel and top.

Measure, measure, and measure! Proper tolerance makes a quality pen that is comfortable to the hand. *A sketch showing the dimensions used with the European ("Mt Blanc" style) pen is at the end of the handout on page 8. The most common mistakes encountered in classes or at home are rushing to do the job (we have lots of time) and not measuring (ie. turning the piece undersize so metal parts won't fit).*

- Taper the bottom of pen (barrel) to proper dimension. Use the bushings as your primary guide. Use a micrometer or caliper to verify the final size. Take your time here, this is one time for caution, approach the final size carefully and slowly!
- Work on the top section of pen, ensuring a smooth contour, not too fat, not too thin. Use the bushings as your primary guide. Use a micrometer or caliper to verify final size
- Once the shape is defined sand to final "pre-finish" smoothness using grits from 150 to 1200. *(I have determined during research into an article on Sandpapers that while many woodworkers skip grit grades, your sanding progresses much quicker using each grade of grit in sequence. While most feel the "extra" sanding beyond 300 grit is questionable, pen makers generally strive for ultra smooth finishes prior to the final laquer/wax finish).*

SAFETY is important, use a dust mask and vacuum to remove fine dust while doing the finish sanding.

Once you have sanded to perfection (no flaws or tool marks) and verified for OD, its time to apply a finish.

Use a dust mask when doing any sanding with woods, particularly exotics, walnut, and cedar.

*Use a dust **mask when doing any work with spalted wood** i.e. Sawing, drilling, turning, or finishing. All these operations can release fungi spores. **Fungi spores can cause severe lung disorders if inhaled.***

Finishing is a fast and simple process on the lathe. The first and most important step was the sanding. Next is application of the finish. There are several ways; I'll describe three.

- **Turner's wax**
 - The turner's wax is supplied in a stick, it is rubbed against the turning item and you will see that a thin coating is applied.
 - Next you buff by applying friction to heat, melt and flow the wax. This makes a nice finish, but is susceptible to the oils in you hand and soon dulls and the finish is no longer visible, but it can be renewed by the owner using a high grade furniture polish
- **Lacquer and Wax**
 - Apply several coats of lacquer by brush, polishing briefly with a paper towel between coats
 - Apply a liberal coat of a high grade furniture polish and buff
 - This finish is more durable and is my preference.
- **Turner's polish**
 - This is a mix of shellac and waxes, and is applied by cloth pad (or paper towels), and allowed to dry
 - Friction polish with a cloth or paper towel.

Safety: *Paper toweling is preferred over a cloth/rag as a safety consideration. If you use cloth and your cloth grabs on the lathe you could do severe damage to your fingers. If the paper toweling grabs it tears off, no damage to you!*

You still need to use caution and pay attention as you apply finish

Assembly

We are now ready to assemble our pen. To do so, familiarize yourself with the components and sequence of assembly (from the kit's instruction sheet). Ensure that you have all the kit parts. We will require an EZ Clamp to do the assembly. This clamp acts as a low cost arbour press (you can also

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use a bench vice that will open sufficiently to allow assembly. A hammer and piece of softwood will also do the job). When pressing the parts together, follow the sequence in the instructions. Be sure that parts are properly aligned as you press (a crooked part will damage the tube and or turning.

- Follow the instructions provided with your kit (copy attached).
- In the case of the Mt Blanc/European Style pen you will need a couple of drops of 5-minute epoxy to bond the decorative band to the tenon of the top.
- Refills are provided with your kit. They are "Cross" style. They are not "Cross" quality, although the Lee Valley kits have an improved refill. I usually replace them with genuine "Cross" refills to prevent leakage and provide top quality ink!
- Laser engraving can be done on all woods and plastics that I have encountered to add a further touch to personalize a gift.
- A box can be obtained, a simple plastic style, fancier velveteen, or a rosewood box.

Miscellaneous

Other small kits that are available are: Perfume pens and atomizers, mini-pens, wine bottle stoppers, desk pens, "bobbies", letter openers, flash lights, etc. Small vases, turned lidded boxes, turned music boxes all made great gift item as well. The opportunities are unlimited for small gift items, and you need not restrict yourself to kits.

While a mini lathe is a great convenience for turning, pens and other small items, they can also be turned on a full size lathe with full size tools. I did it for a year before receiving my Taig lathe as a Christmas gift from my wife several years ago.

Thanks, I hope you enjoyed the seminar and learned something of value and will enjoy your pen for the foreseeable future or until someone *borrow*s it.



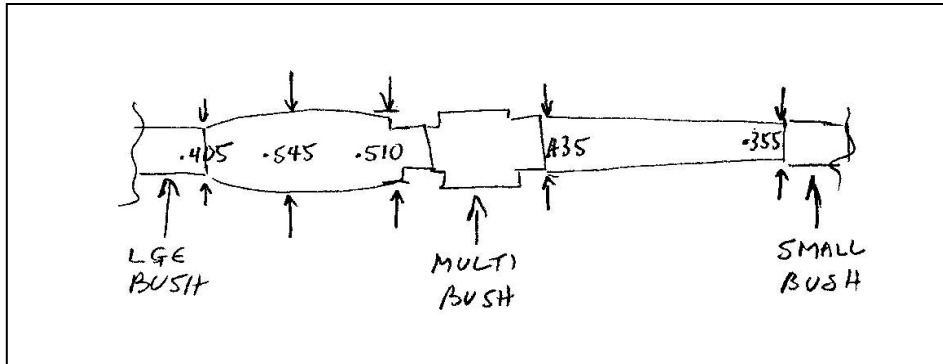
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Attachments: Mt Blanc style pen dimensions
Mt Blanc pen kit instruction sheet.
Excel product info sheet.

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All dimensions are exact and should be turned to ± 0.002 " or better



Dimensions for the "Mt Blanc" style pen kit

An assortment of European (Mt Blanc Style) pens.



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What do you need to turn a pen?

Item	Part #	Large lathe	Taig Mini lathe	Price + tax (qty 1)**
"Mt Blanc" Style 24k Pen kit*	88K7045	Yes	Yes	\$7.75
Shaft nut & washer	88K7103	No	Yes	\$6.95
Standard mandrel (#1MT)	88K7115	Yes or next	No	\$13.95
Standard mandrel (#2MT)	88K7116	Yes or above	No	\$13.95
Bushing set	88K7127	Yes	Yes	\$5.95
Pen blank 3/4"x3/4"x5"	As desired	Yes	Yes	~\$1.50 – \$10.00
Collet set	03J7011	No	Yes	\$41.50
Sandpaper		Yes	Yes	\$0.85 – \$1.35 sheet
Chisels		Yes	Yes	
Taig Lathe (wood)	03J7102			\$320
1/4 HP Motor	03J6040		Yes	\$115
Mounting board	03J7004		Desirable	\$8.95
Safety glasses		Yes	Yes	\$8.00 – \$18.00

* Quantity discounts are available

**These prices are From Lee Valley Tools and are based on my original research dating from 2002 and should be used as a reference only.

4/15/02

For other suppliers of kits and components for pen making a simple google search will turn up many in the US and Canada. Woodchuckers is a Canadian company that now handles the US Penn State Line of kits.

There are also special interest groups under Yahoo that discuss the ins and outs of pen-making and design. Check out this group <http://groups.yahoo.com/group/penturners/>