

Finishing for Woodturners

Introduction

When I first started woodturning I went looking for the perfect finish. I'm still looking. There are no "perfect" finishes, only ones that are better at meeting some requirements than others. In this article I will try to cover the characteristics of the major types so you can make your own decision about which one to choose. For more information and insight into all of the nuances and techniques of finishing, I highly recommend Bob Flexner's book "Understanding Wood Finishing".

Why Bother With A Finish Anyway?

A lot of different woods look good without any applied finish when they've been sanded and burnished carefully. Ebony and cocobolo are examples, but that beauty fades rather rapidly. Other compelling reasons to apply a finish are enhanced appearance, protection of the wood, ease in cleaning and water vapor resistance (Important in the case of lidded vessels to preserve the fit of the lid and in segmented turnings to avoid undue stresses between segments).

Choosing a Finish

There are several characteristics of finishes that influence our choices. Here is a listing of the ones I think are most important to turners:

- Ease of Application – Wipe-on, brush or spray, flaw repair, final leveling and buffing
- Appearance – Clarity, color, tint
- Durability – Scratch, wear, stain, chemical resistance (Including fingerprints)
- Distortion – Water vapor resistance (Important in lidded vessels and segmented turnings)

Pertinent Characteristics of the Generally Available Finishes

There are two general categories of finish available. Those you can wipe on with a cloth and those that are best put on using a brush or spray. As a general rule, the wipe-on finishes are easiest to put on but offer the least protection. The brush or spray finishes offer better protection but are generally harder (more labor intensive) than the wipe-ons. A complete rundown is beyond the scope of this article, but here are the major factors I believe you should use in choosing a finish.

Wipe-on Finishes

Wax (e. g. Trewax, Briwax, Minwax, Arborwax)

Wax is very transparent, non-yellowing and easy to apply. But it offers almost no protection against scratches and dings or distortion caused by water vapor absorption. It must be refurbished every six months or so for optimum appearance. I do not recommend it as the only finish coat for turnings.

100% Tung and Linseed Oil (Behlen and Hope's)

These are old time finishes that are very easy to apply. They offer very little protection, are very slow curing and have a very strong odor until thoroughly cured. Not recommended; there are better finishes that are just as easy to apply.

Oil/varnish Blends (Minwax and Behr "Tung Oil Finish" and Watco and Deft "Danish Oil Finish")

These are blends of tung oil and/or boiled linseed oil mixed with a varnish. They are usually wiped on with a cloth and therefore are very easy to apply and repair. They have low scratch and vapor resistance because they are relatively soft and do not build up a thick film. They impart an amber tint to dark woods, such as walnut. I use them as a first coat, under lacquer, to provide a "warmer" final color but do not try to use them for filling pores or building a high gloss finish.

Wiping varnish - (Jasco, Zar, McCluskey, Waterlox, Formby's)

These are varnishes that have been thinned with a slow evaporating solvent so they can be applied with a cloth. They are not as easy to apply as oil/varnish blends but can be built up to a thicker film. They cure to a harder finish than the oil/varnish blends but still have low vapor and scratch resistance unless a thicker film is built up. Build up is slow because of the curing process and rubbing and buffing quality is mediocre.

Cyanoacrylate Adhesive (CA) – (Hot Stuff, Star Bond, Insta-bond)

Lately this “instant glue” has been being used as a surface finish. It is applied by pouring the adhesive onto the wood and spreading it smoothly with a finger protected by a fingerstall or glove. It does a very good job as a first coat in strengthening and hardening the wood, as well as preserving the original color and figure of the wood. My experience indicates it is extremely hard to repair, level and buff when used as a final finish coat.

Spray and Brush-on Finishes

Shellac

Shellac is not a very durable finish but it is very easy to apply and sand. It has exceptional water vapor resistance, which should make it useful on lidded boxes. This would probably help preserve the precise fit we all try for in our lidded vessels.

Lacquer

Lacquer is very easy to apply and repair when applied as a spray, which is the main reason I use it for most of my applications. It and shellac have the very best qualities for the final rubbing and buffing. It has very high clarity with just a hint of an amber tint. Among its lesser qualities are average scratch and water vapor resistance and poor solvent and heat resistance. Those lesser qualities are usually not significant unless people with perfume, cologne or hand lotion on their hands decide to pick them up.

Varnish (Including polyurethane)

Varnish is considered to be one of the easiest film building finishes for brushing because of its longer curing time. Since brushing introduces its own set of problems, this quality is not attractive to me. It sprays as easily as any finish but the sag and run repair can be very frustrating. If you happen to sand through the top layer while leveling or during run repair, a milky, ghost line (the bond line between the two layers) will appear around the area of penetration. The only way to remove that line is to scuff sand and recoat the entire surface. To avoid this problem, the final coat must not be penetrated during the final leveling and buffing process. The final rubbing and buffing qualities are noticeably poorer than those of lacquer, although a high gloss can be achieved if you are willing to put enough time into the effort. The major attraction of this set of finishes is their scratch and chemical resistance, especially polyurethane. If you're planning to actually use that wine goblet you turned, I strongly recommend using solvent-based polyurethane. It is the most resistant of all of the practical, commonly available finishes. Two-part conversion finishes (e. g. epoxy) may be tougher but I don't believe they are practical for the home-based workshop.

Water Based Finishes

Water based finishes have the decided advantage of using water for clean up. They have very high scratch and wear resistance as well as non-yellowing properties. I use one when I do not want an amber tint on the whiter woods such as holly and bleached maple. Flexner says they are superior to varnishes (very superior to polyurethane) but inferior to lacquer for run repair. Their buffing qualities are roughly equivalent to varnish but more difficult than lacquer. Because of their non-yellowing quality and the fact they can be obtained with UV resistance from artist supply stores; I am experimenting with them as a means of slowing down the darkening of highly colored exotic woods such as pink ivory or chakte kok. It is very disappointing to buy a very expensive piece of pink ivory and then have it turn brown in a few months because you displayed it in a brightly lit room. I plan to run a series of experiments this summer to see if UV protectants will actually slow down the darkening.

Applying the Finish

Prepare the Surface

The first step in achieving any good finish is to prepare the surface properly. A transparent or very thin finish will emphasize any surface defect. That is why tool marks, sanding scratches, dents or unwanted voids must be eliminated before any finish is applied. The level of quality depends on your “market” or your preference. A high quality finish will require more time than a mediocre one but your satisfaction will be greater. Choose the one to fit your audience.

Begin your finishing process by cutting or scraping the smoothest surface you can with your turning tools. Good tool technique will greatly reduce the time you will need to spend sanding. Even the smallest tear out will change color and pop out visually when the finish coat is applied. Next sand until all surface scratches and tool marks disappear to the naked eye. For open pore, light colored wood, like oak or ash; this will generally be at around 220 or 320 grit. For darker, denser wood, like ebony or cocobolo; it may require going to 600 grit. I do most of my sanding on the lathe. It makes a good holding fixture and, of course, the lathe does most of the work. I also do a lot of final touch-up sanding off of the lathe. Check for scratches by highlighting the surface with a bright, low angle light. Be sure to look as deep into the nooks and crannies as you can. Once the scratches are gone, you’re ready to apply the finish.

The following process is predicated on building a film finish that can be leveled and buffed to any degree between a matte to high gloss sheen, as desired. It also assumes that the finish will be sprayed. Since most turners produce small turnings, spray cans are a practical way to apply it. Especially if your shop space is limited and you want to avoid the hassle of filling and cleaning a spray gun for every small touch-up job you have. I almost never apply finish while the turning is on the lathe. Ventilation is not adequate there so I take it outside. Visibility is much better and I can adjust the spray angles more easily.

First Coat

I never use fillers or finishes labeled “Matte” or “Satin Gloss” because the additives in them degrade the clarity and obscure the figure and color of the wood. Sanding sealers may ease the sanding somewhat but are not worth the extra hassle. I sometimes use Watco Danish Oil to impart a warmer tint to walnut but generally I just use whatever finish I plan for the final coat. After allowing the first coat to dry thoroughly, I sand to remove the raised grain and inspect carefully to make sure I have not overlooked some flaw. If I find one I sand it out, patch the finish and repeat the process until I’m satisfied.

Build Coats

I build up the film by repeatedly coating with whatever finish I have selected. Even if I have a porous wood such as oak, I use the final coat finish as filler. I generally do not sand between coats unless I cannot meet the maximum time limits specified for between coats (e. g. polyurethane). There are no time limits for lacquer so I just apply multiple coats until I have filled the pores to the level I want for that particular piece. Once I have reached that level, I sand out any runs or sags (inevitable in my case) and check to make sure I have not penetrated to the bare wood. If it looks good I'm ready for the final coat.

Final Coat

For the final coat I am especially careful to avoid sags and runs and to make sure the entire surface is covered. With lacquer you can do this in stages. For example, you can spray the bottom, allow it to dry, turn it over and spray the top without worrying about over spray. I'm not sure about varnish. There's that ghost separation line between layers to worry about. Allow the finish to dry at least two or three days for lacquer and a week for varnish before you attempt to do the final leveling and buffing. You'll be happier with the effort and results, I believe.

The Final Stage: Leveling and Buffing

Begin the final process by leveling the finish coat. This provides a smooth finish free of ripples, over spray and dust nibs. I use wet 400 grit, followed by 600 grit wet-or-dry sandpaper. I sand until I have a uniformly scuffed surface. Then I am ready for the final buffing to achieve the sheen I want. For lacquer, I go directly to a soft cotton buffing wheel charged with white diamond buffing compound. For varnish and water based, I find it is better to start with a tripoli charged wheel and then graduate to a white diamond charged wheel if I want a higher gloss.

Summary

The critical operations for a good quality finish are the preparation of the wood before applying the finish and the final leveling and buffing. The preparation gets rid of unwanted tool and sanding marks. The leveling gives a smooth surface and eliminates dust nibs and sags. The buffing brings up the shine to whatever level you desire.

Final Word

A high quality finish requires an extra effort but the tactile feel and sight of a smooth, glossy film finish is more than worth it. That is, if you're into that sort of sexy stuff.