One Turner's Guide to Finishing

By Peter M. Smith

There may be nearly as many ways to finish a turning as there are turners, since it is such an important and individual component to the process. Finishing also is a large part of the work—accounting for anything up to one-third of the time spent on a piece.

I use a five-step process sand, seal, sand, oil, and buff. Everyone sands and oils, but I believe the key is the sealing step.

Over the years, I have experimented with various methods and would like to discuss the approach I have come to use on just about all of my work. It is relatively straightforward, general, and usually effective. I hasten to add that although this isn't the only way to finish a turning, many turners use variations of this approach. I would be happy if this article stimulates a discussion on finishing and other turners write about their successful techniques.

I use a five-step process: sand, seal, sand, oil, and buff. Everyone sands and oils, but I believe the key is the sealing step. Sealing the wood prior to final sanding provides three major advantages: It exposes rough grain and tool marks; it stiffens the grain so sanding is more effective; and it fills the surface pores—more or less—to produce a smoother surface for the final sanding and finish coats.

Step 1: Initial sanding

Often called "rough sanding," the idea is to finalize the surface shape and get it to a preliminary smoothness. Power-sanding works best for me; I use 3" Powerlock sanding disks in an electric drill (Photos A and B). The spin of the disk against the

Power-sand your turnings with 3" disl

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revolving piece on the lathe reduces swirl lines. Grits 80 and/or 100 are hard and aggressive. Some subtle shaping of the curves is possible, but the emphasis is on cleaning up tool marks and preparing the surface for sealing. Many turners use foam-backed pads with 5" or 6" PSA disks rather than the stiff resin paper of Powerlocks. If you are not after subtleness, I believe foam disks are unnecessary.

A couple of observations: The lathe speed should be slow to avoid the sandpaper skating over the surface. In addition, power-sand carefully at the edges so you don't sand them too sharp or blunt the details with too coarse of an action. Some turners progress through finer grits and move to the oil finish, but I recommend the next step of sealing the wood.

Step 2: Sealing

Apply a liberal coat of sealer (Photo C), then wipe off the excess. If you've overlooked tool marks, rough areas, nicks or bumps, they're certain to reveal themselves. I prefer this to wiping with solvent because sealer doesn't disappear immediately.

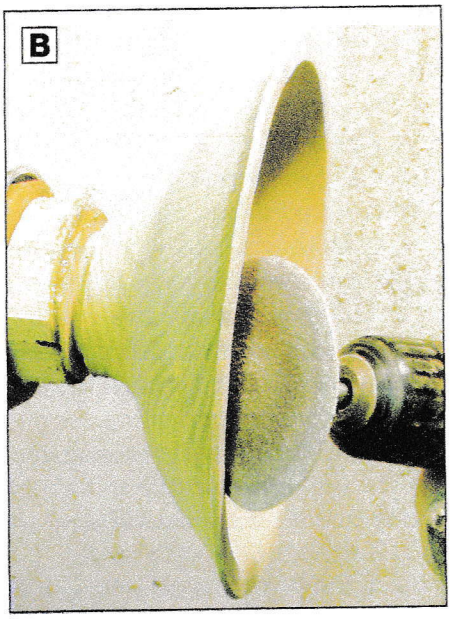
Of all the sealers on the market, I prefer shellac. I've also had good luck with lacquer-based sealers such as Deft, which dries quickly and penetrates well.

The disadvantage of shellac as a sealer is that it can be gummy when sanding off and seems superficial in its penetration. I have tried water-based sealers and like the advantage of raising the grain of the wood. One disadvantage of a water-based sealer is that it requires extra drying time.

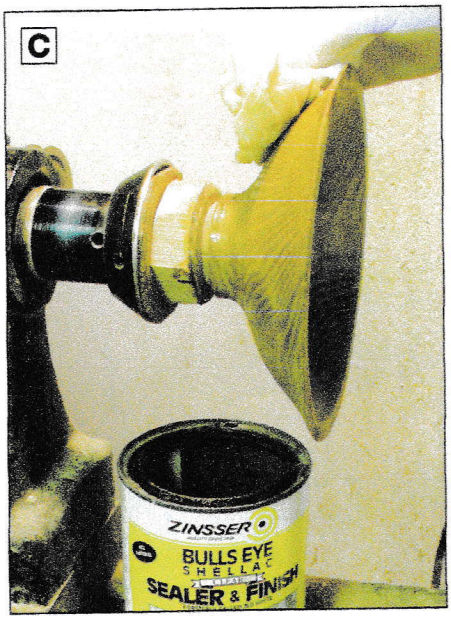
Step 3: Final power-sanding

After about 30 minutes or when the sealer is dry, it's time to remove it by more power sanding. I first use some 100-grit sheets of paper, cut into quarters, to remove most of the sealer by hand sanding (Photo D), which rapidly clogs the sandpaper. I then switch to Powerlock disks (100 or 150 grit), even if they quickly become filled. One trick is to lightly coat the disks with blackboard chalk before sanding the surface; the chalk makes it easier to remove the gunk with an abrasive cleaner.

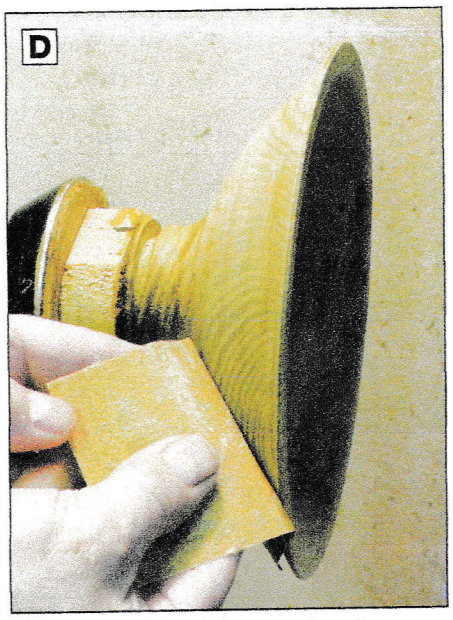
Concentrate on the tool marks and rough grain, removing most blemishes and feathering in the sanding with the rest of the surface. This is done with the piece fixed in place with the lathe index pin (if available), and moving the piece round notch by index notch,



Even on the interior, 3" disks are nimble.



With shellac, seal the grain.



After the shellac dries, sand again.

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and working each area. If you sense you've reached bare wood, reseal and repeat. Finally, turn on the lathe and sand the piece all over with 150-grit paper. Use chalk and sanding cleaner to keep the disk surface fresh.

Step 4: Oiling

After the 150-grit power disks, the surface should be almost bare wood—but it is sealed bare wood! The difference is at once apparent with the next step when you apply finishing oil (Photo E). The sealed surface comes up smooth and easy, whereas unsealed wood will soak up oil and look patchy.

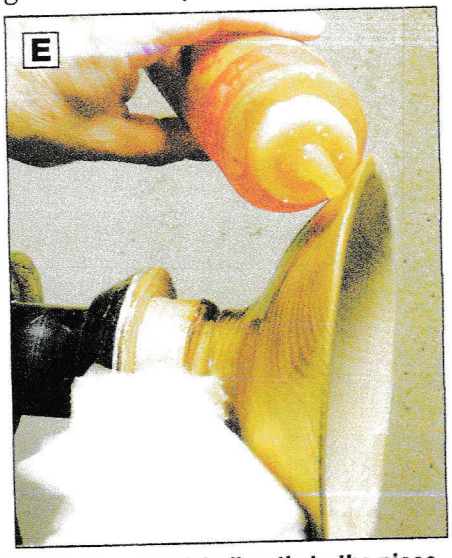
I am a great fan of Danish oils. I'm sure many of the other oils out there will do. It is easy to mix your own penetrating oil varnish from 1 cup of any brand of polyurethane varnish, 1 cup of naphtha solvent, and 1/3 cup boiled linseed oil. Mix and store in a plastic squeeze bottle (e.g. shampoo).

Don't worry about building up a finish since the sealer has gone some way to make this unnecessary. However, there is more sanding required by hand—first with 150-grit, then 220- and 400- or 600-grit paper (Photo F). The oil acts as a lubricant, thus is applied liberally. The sandpaper sheets quickly clog up with mud, which is wiped off the wood.

These oils are amber colored in general and give a rich glow to darker woods. On light woods—particularly maple—the oils often give an unsatisfactory grayish tinge to the wood.

I have recently experimented with water-based polyacrylic finishes at this stage. These dry quickly and are crystal clear, and leave the wood pale. Water-based finishes, which do seem to be improving all the time, are a viable alternative for some woods, although the "mud" is missing (water evaporates). This finish also works at the sealing stage.

After the 600-grit paper, the wood surface should be sensually smooth. Stroke it and feel for yourself. Inspect the piece under a bright light and look for the telltale scratch marks. You can usually remove these with lots of oil, 220-grit paper, and a circular action. You can feather out anything really bad with the power sander and 150-grit disks, although the oil and mud will make this only effective in small areas. Follow this with 220 and then 400 grit to match the rest of the surface. Part the bowl and finish the foot with the same look as the rest of it, then polish the whole piece at one time.



Apply the oil finish directly to the piece.

Use oil as a lubricant with sandpaper.

Step 5: Polishing & buffing

The oil takes about 1 week to dry. After a day or two, you can rub a second coat of oil into the wood if there are any dry patches (on end grain usually). Now is the time to hand-sand and touch-up if required. When dry, the wood has a nice smooth matte finish, which might be suitable for some pieces. In the Winter 1996 isue of *American Woodturner*, Alan Hollar discusses film finishes and why gloss is not always advisable on large spreading bowls (the reflecting light over-emphasizes the different surface planes).

However, for many bowls, hollow vessels, and small pieces, polishing is the mark of distinction. Polish—so hard to get right, so easily lost—indicates additional preparation whether it is on shoes, nails, or silverplate.

A coat of gloss varnish is rarely satisfactory. First, it is hard to get an even coat on the work piece since the varnish will run and sag on the slopes. Some turners would agree that it's the gloss varnish that looks artificial on a small object. From my observations, a gloss coat seems to obscure the wood grain and texture.

Polyurethane (oil- or water-based) makes a great tough film on tables and floors, but on turnings it looks like plastic (see Hollar's article). Some finishers recommend using a gloss varnish for its clarity, and then "knocking down the gloss" with fine steel wool and a lubricant (such as Murphy's oil soap) to produce a more subtle sheen.

Carnauba wax—widely used in furniture polishing—is a hard natural wax from the South American carnauba palm. Although not very serviceable as a work surface, the shine it produces is much admired.

Experienced turners often suggest that a wax polish be applied to the work while it is turning, using the lathe rotation for buffing. This works fine for spindles, but the problem with applying wax—or any finish—to a bowl while still on the lathe is that the polish can't reach the area of the parting cuts.

The popular Hut Polish, a mixture of wax and fine abrasives, is applied while the work is rotating, and then pressing a cloth against the spinning piece brings up the shine. This makes it superb for pen barrels, but since it does not reach the cut-off areas, not for other turnings. Moreover, any oil finish will not be dry and will disturb the final surface. So rather than apply one fine shine over 90 percent of the piece and complete the remainder a week later, leave the final polishing until later when the oil is dry.

For final polishing, the Beall System attracts many turners, and is my favorite. It includes three separate cloth wheels on a 1,750 rpm motor for three specialized polishes. The first polish is tripoli, a fine grit, which produces a dull shine. Next is white-diamond—a finer polish on a softer wheel. The third buffing—solid carnauba wax on a cotton wheel—is the final act. The heat of the turning melts the wax to a uniform film. The carnauba produces a semi-gloss surface with a deep shine that brings out the best of the wood. To restore the luster, rebuff the wax.

The science of sanding and polishing

Shine on a surface comes from reflected light, and light is reflected from a uniform, smooth surface. Non-uniformity breaks up the light and disperses the light rays; light rays lose their coherence and thus the reflection diminishes.

A gloss varnish will cover a smooth surface with an even smoother film that is highly reflective when dry. To make that varnish matte, finely ground sand is added to the gloss base, which is what we stir from the bottom of the can, and the fine particles disperse the light rays. (These particles are much finer than can be sensed by touch.)

Sanding from 100 to 150 to 220 to 400 grit produces increasingly finer surface scratch marks that go beyond tactile sensations and provide increasingly uniform light reflections. This is why sanding down to these levels is so critical: No amounts of gloss varnish will coverup a poorly finished surface. But even 600-grit sandpaper is not enough for an unaided gloss. The Micro-mesh ultra-grits (6,000 and 12,000) add enough uniformity to the surface to provide shine.

Polishing goes beyond sandpaper by using finely ground minerals—rouge (iron oxide), diatomaceous earth (microscopic sea shells), ground pumice stone, and rottenstone (fine dust). These abrasives are by definition harder than the surface they abrade. They progressively produce a smoother and smoother surface to reflect light. The finest of these powders can gloss up a matte surface by reducing all non-uniformity and leaving scratch marks so fine they do not interfere with light rays. Often these powders are managed in a liquid medium to provide lubrication and ease of use. Cream polishes, for example, suspend the abrasive in a wax/water emulsion.

Conclusions

So there we have it—both the practice and the theory. Although by no means the only approach, these five steps produce predictable and satisfying results. I continue to follow this process after many years and several flirtations with alternatives.

Peter Smith (peter@sandsmith.com) is a 14-year AAW member who lives in Princeton, NJ.