Sealers: Secret for Finishing Success

Techniques for smooth, durable results

by Chris A. Minick

Seal first for a better finish. *Sealer promotes adhesion and acts as a barrier between separate layers of finish. It can also reduce absorption of the final finish and simplify sanding between layers. Here, Minick brushes a 2-lb. cut of his favorite sealer, super-blond shellac, onto a mahogany tabletop.*

Ever try to duplicate the glass-smooth finish that you saw on a fine piece of furniture? Even if you match the stain color exactly, fill the grain pores properly and use an identical topcoat, somehow your finish looks different, or it doesn't feel as smooth. The reason may be that you didn't use a sealer. Understanding why to use sealers and how to apply them will bring a new dimension to your work.

Sealers are the unsung heroes of finishing. For example, high-end furniture often has several layers of finish (usually lacquer or varnish) bonded together with sealers to form a cohesive film. But you would be hard-pressed to know that the sealers are there. When I finished the mahogany tabletop shown in the photo above, I sealed before grain-filling and again before the final finish layer. However, when I started woodworking, I didn't see the usefulness of sealing. It looked like an extra step. Just by dumb luck, the oil-based varnish I used back then worked without a sealer. My early finishes were acceptable, but not great. With time, I began to experiment with different finishing techniques. Several peeling finishes later, I came to realize the error of my non-sealing ways.

Types of sealers

Sealers serve a variety of functions in the woodshop: They ease sanding, decrease finish absorption, promote finish adhesion, and they act as a barrier coat between separate finish layers. Sealers come in several chemical compositions, each tailored to perform a specific task (see the bottom right photo on p. 86). There are three basic sealer types: varnish-based sanding sealers; lacquer-type sealers, including thinned nitrocellulose lacquer and shellac (super blond and orange); and vinyl sealers, which are tougher than the other two.

Sealers make sanding easier— Sanding sealers perform a dual function: They seal the wood and provide a smooth, flat substrate for the final finish. A thin coat of sanding sealer stiffens the wood fibers, so subsequent sanding will cut them off cleanly. The result is a flat, smooth ready-to-finish surface. Most sanding sealers contain metal stearates to make sanding easy. This is the same stuff used on non-loading sandpaper. The soft stearate pigments add volume to the coating. As a result, sanding sealers build fast and dry quickly, but they're relatively soft.

Resist the temptation to use sanding sealer as build coats for your finish; it's never a good idea to apply a thin, hard finish over a thick, soft one. This practice

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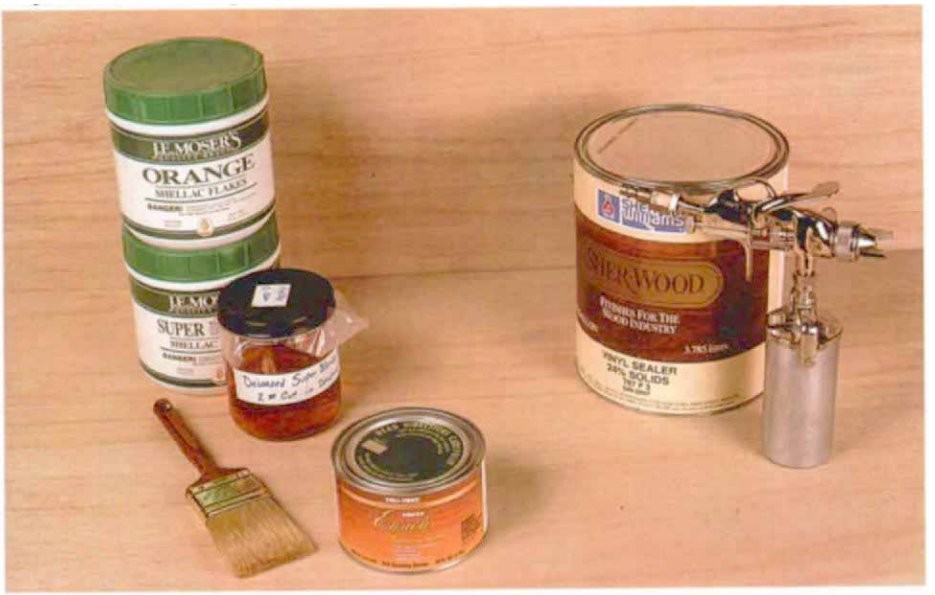
Shellac between finish layers *improves finishes. You can sand grain-filler smooth without scratching the under layers, add colored glaze coats without them bleeding, and alternate oil- and water-based layers of finish if shellac is used between layers. Here, shellac sealer helps achieve an instrument-quality finish on mahogany.*

To avoid blotchiness, seal before grain-filling. *The author treated the halves of this ash board differently to show the effect of sealing the wood. The dark lower part, which was not sealed before the grain was filled, displays ghost-like smudges. The more even-looking upper part was sealed before the grain was filled.*

The best ways to apply common sealers *are to brush on shellac, both super blond and orange (left); brush on varnish-based sanding sealer (front); and spray on vinyl-based sealers (right).*



causes increased cold-checking and impact-cracking of hard lacquer finishes. To envision these phenomena, picture a thin layer of ice over soft, unfrozen mud. As you step on the ice, the mud moves, and the ice cracks. Just remember that sanding sealers are meant to be sanded down to the wood before you apply the topcoat finish. If you do this, you shouldn't have problems.

Sealers decrease finish absorption— Finish-thirsty woods like cherry, pine and lauan benefit from a sanding-sealer coat, even if they don't need to be sanded smooth. The stearate solids in combination with the resin in the sealer stuff up the small pores and soft areas in the wood, thus minimizing absorption of the next coat of finish. This is particularly beneficial when you spray on a low-solids lacquer. But, if you use similar reasoning for stain, you can run into trouble. I've seen woodworkers brush sanding sealers on wood before staining in an attempt to eliminate unevenness on blotch-prone woods like pine. I haven't found this helpful. Instead, I use a home-brew of linseed oil as a pre-stain conditioner to reduce blotchiness (see *FWW* #101, p. 67).

Once you've stained the wood and it's dry, you should seal in the stain layer. This way, you can sand before the next finish layer while the sealer protects the stain from scratches. This is especially helpful if you have to do some grain-filling. Fresh shellac makes a great sealer for this, as does a thinned coat of clear lacquer. But a thin coat of vinyl sealer provides even more protection from sanding abrasion because vinyl sealers are tougher. Sealing before filling the grain will also eliminate smudges that give an undesirable ghosting effect to the wood (see the photo at left).

Sealers promote finish adhesion— Oily woods like teak, rosewood and cocobolo contain natural resins that can cause major finishing problems (see the photo at right on the facing page). Lacquers may peel from the surface or become sticky after they have dried. Worse yet, some oil-based varnishes applied over these woods will refuse to dry at all. Luckily, special vinyl sealers have been developed to make the overlying finish fast, which eliminates these headaches. Vinyl sealers derive their name from the vinyl-toluene-modified alkyd resins with which they are formulated. Vinyl sealers come in a fast-drying lacquer mix for spraying or dissolved in mineral spirits for brushing under an oil-based varnish. Regardless of the carrier solvent, vinyl resins form an impervious layer between the wood and the finish, thus preventing future finish failure. For similar reasons, pigmented primers, such as BIN (William Zinsser & Co., 173 Belmont Drive, Somerset, N.J. 08875; 908-469-8100), are useful when applied under painted finishes.

When you're using vinyl sealer, pay attention to the manufacturer's instructions regarding cure time. Failure to overcoat some vinyl sealers within the specified time can lead to finish delamination. Similarly, vinyl sealers are not really compatible with water-based finishes because water-based resins will not properly ad-

***Incompatible sealer leads to a peeling finish**—Always check sealer and finish compatibility first on scrapwood. As the author discovered many years ago on this butternut door, vinyl sealer and water-based polyurethane don't mix.*

***Sealers increase finish adhesion on oily woods** like teak (an unfinished piece is at top). A water-based topcoat knifed with an X shows adhesion differences (from left below): shellac-sealed (good adhesion); not sealed (poor adhesion); vinyl-sealed (poor adhesion). But vinyl sealer is excellent under an oil-based topcoat.*

here to vinyl-alkyd coatings (see the photo at right). But shellac has tremendous barrier properties and adheres phenomenally to both oil-based and water-based finishing materials. Professional furniture refinishers often apply shellac over stripped wood to seal in waxes, silicones and stripper residue that would otherwise interfere with the finish. You can buy shellac pre-mixed, but I prefer to mix shellac fresh using dry flakes and ethyl alcohol. Fresh shellac brushes or sprays on, dries quickly, seals well, is compatible with all common finishes and sands easily. That's why shellac is the sealer of choice in my shop.

Sealing between layers of finish— Sealers allow different finishes to be overlaid on the same project (for more on this, see *FWW*#104, p. 87). That's why sealers became an indispensable part of my finishing routine when I started doing multi-layer finishes. For instance, my favorite mahogany finish consists of a yellow ground stain followed by grain filler, three different-colored glaze layers and two or three finish coats. Although I don't use this finish sequence often, when I do, it sure is pretty (see the top right photo on the facing page).

Here's how the sealer works: Each layer is separated from the next by a coat of shellac. The sealer over the ground stain protects it from abrasion when sanding the filler, and sealer prevents the color from bleeding into subsequent layers. The grain filler is sealed to prevent the porous filler from absorbing color from the first (rosewood) glaze coat. Sealing after this glaze layer keeps it from "walking" into the next (walnut) glaze coat. Another layer of shellac lets me use an oil-based asphaltum glaze (needed for its color) over the water-based glazes. After I seal the asphaltum layer, I brush on a water-based topcoat. This finish would not be possible without the shellac sealer coats.

A word of caution when you're layering finishes: Make sure all your base coats, topcoats, sealer coats and fillers are chemically compatible. The door in the photo at left is a classic example of what can happen when you ignore this simple rule. I left the peeling water-based topcoat as a reminder of this lesson. Generally, it's wise to choose all your materials from the same finishing family. For instance, varnish sealer and oil-based pore filler can be used under polyurethane. The same philosophy holds true for finishes in the lacquer family and for the water-based finish family. I've had good luck combining oil-based sealers, fillers and stains with water-based topcoats, as long as I seal between each layer with fresh shellac. But the only sure way to tell if your finish layers will be compatible is to test your entire finishing sequence on scrap before you commit it to your project. A little up-front sealer testing can save hours of stripping hassles later. □

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