

# PORE FILLERS

To get a glass-smooth, highly reflective finish on open-grained wood, such as ash, elm, hickory, mahogany, oak and walnut, use a pore filler.

BY CARL DUGUAY

Let's start with a caveat: pore (aka grain) filling is completely optional, even on open-grained wood – it's essentially an aesthetic choice. If you want to obtain the kind of mirror finish associated with guitars and pianos, then filling the pores makes the job so much easier. Otherwise, skip the pore filling and go ahead with your usual finishing regime.

Pore fillers are typically used on large, horizontal surfaces – the tops of tables, desks, sideboards, dressers and the like. While you can apply a filler to vertical surfaces such as legs and

side panels, because these surfaces are less prominent, it's just as expedient to apply a glossy finish or rub out your chosen finish.

Once the filler (and optionally any stain) is applied, you proceed to apply your topcoat, and then to get that glass-smooth look, you end off by rubbing out the finish.

There are two ways to fill the pores – with your finish of choice, or using a commercial filler. If you use a finish to fill the pores, you'll need to apply a number of coats, allowing each coat to dry thoroughly, and lightly sanding between each coat. Five or more coats wouldn't be out of the question to fill the pores. However, with a filler you'll

only need to apply one or two coats of the filler. I've used both methods and find that it's quicker to use a filler. The filler won't shrink over time as some finishes tend to, you won't have to apply and sand as many top coats, and you'll use less finish overall.

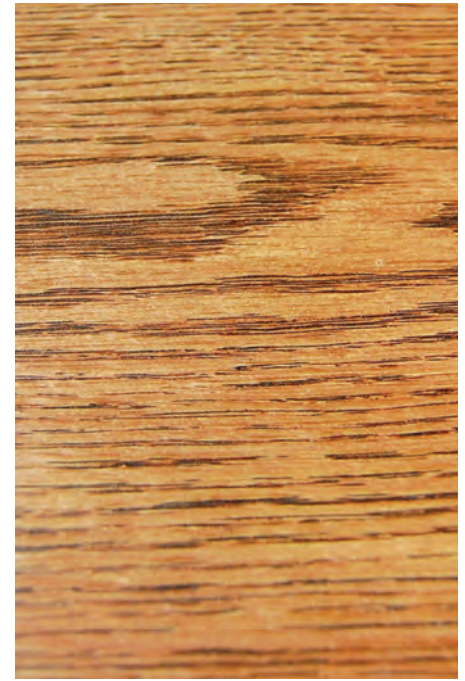
You can purchase both oil-based (OB) – also referred to as solvent-based – and water-based (WB) fillers. Both can be thinned if it makes application easier – OB fillers with mineral spirits or naphtha (some manufacturers have their own thinners) and WB with distilled water. OB fillers have a longer working time than WB fillers, which gives them an advantage when working on very large surfaces, but they

take longer to dry. WB fillers take stain better, sand somewhat more easily, and they clean up with water.

All fillers consist of some kind of filler material such as silica or clay, and a binder, such as varnish (for OB fillers) or acrylic (for WB fillers). OB fillers are generally available in a neutral (light beige) colour or pre-coloured, generally in the darker tones. There is one OB filler that uses shellac as the binder. WB fillers are milky in appearance but dry clear, imparting only a slight change in the wood tone.

## Applying a Filler

Fillers aren't overly difficult to apply, and if you're careful it's not a messy job. The main task is to pack the filler into the pores and remove any excess filler before it dries on the wood surface. The pore structure of the wood you're filling, and how careful you are in filling the pores, will determine how many coats you need to apply and how much coverage you can expect to get. I've found that



**Under or Over?** – In what order you apply a filler and stain will change the final look dramatically. If you apply a filler first, it reduces the surface area and texture of the wood, making stain adhere to the wood less, and causing a more even colouring. (left) Applying a stain first, then the filler, will highlight the visibility of the pores before sealing them, so you can get an even look with the topcoat. (right) These two samples of red oak show how different the final look can be.

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## Closed and Open Grain

Rub your fingers lightly across the surface of a freshly planed maple or cherry board. It feels so smooth that you might be tempted to skip sanding altogether. Take a close look, and you can barely see the pores in the wood. That's because the grain structure is very tight, so we refer to them as closed-pore, closed-grain, or fine-grain wood. Do the same thing with oak or ash, and you'll feel the difference – the surface feels discernibly rough, and on close inspection you can see deep pores on the surface. These are referred to as open-pore, open-grain, or coarse-grained wood. To get an ultra smooth surface you want to fill up those pores.

on average I get good results with two coats of filler.

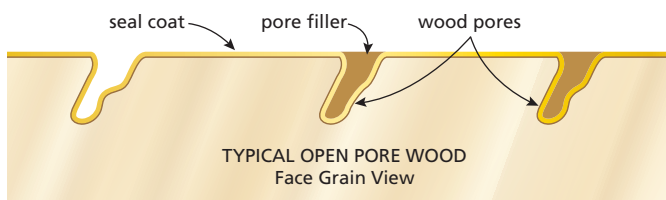
OB fillers come as a thick paste that you'll need to stir until it reaches the consistency of peanut butter. You'll need to re-stir the filler every time you use it. Most require a bit of thinning with mineral spirits before applying. WB fillers (and the shellac-based filler) usually don't require stirring or thinning.

Sealing the wood prior to filling makes cleaning off the excess filler easier. You can use a 1-pound coat of shellac, or a thinned coat of your chosen topcoat under either type of filler. The sealer raises the grain, so once it's dry, lightly sand with 320-grit.

If you plan to stain you can do so before or after applying the filler. Applying a stain under the filler will accentuate the pores. If you use an OB stain under a WB filler, make sure the stain dries completely before applying the filler, and then follow this up with a sealer before filling the pores. You can also apply a colourant to most fillers (make sure to use a water-soluble dye or pigment with WB fillers). In general you can use pigment or dye stains as well as universal tinting colours to either.

While you can use any topcoat over a filler, most woodworkers seem to use a film finish – varnish, lacquer, or water-based – rather than a penetrating finish – tung oil, linseed oil, wiping varnish, or an oil/varnish blend such as Danish oil – which tend not to rub out as well as a film finish. But, the choice is yours.

We all develop preferences when it comes to finishes, and it's no different with fillers – some people prefer OB fillers, others can't praise WB fillers enough. If you've not used either before, it makes sense to buy the smallest quantity available just in case you end up not liking the product. And, as with any new finishing product, test it on some scrap material before committing to your final project.



**Clear or Visible?** – The Behlen filler is the only product Duguay tested that adds a prominent colour to the wood's surface. The greyish Behlen filler highlights the pores, while the other fillers leave virtually no colour change.

Here is the sequence of steps that I follow when applying a filler. With experience you'll come up with a procedure that works best for you.

- Finish sand the work surface.
- Apply a sealer coat, and let dry thoroughly (overnight is best).
- Lightly sand with 320-grit.
- Apply a stain (optional) and let dry thoroughly (overnight is best).
- Spread filler over an area you can comfortably work, and pack the filler into the pores of the wood using a piece of coarse fabric, squeegee, or an old credit card.
- Once the surface begins to haze over, wipe off the filler at a 45-degree angle to the direction of the grain. WB fillers dry so fast you won't have to wait for hazing to occur.
- Let the surface dry as specified by the manufacturer.
- Sand the surface with 320- or 400-grit paper to remove excess filler.
- Repeat as required to ensure pores are filled – typically two coats will suffice.
- Apply your chosen topcoat.

## Six Options

There are considerably more WB than OB fillers on the market, perhaps because they are so easy to use, clean-up is a breeze, they deliver excellent results and they're virtually VOC free. I looked at six popular brands – 2 OB and 4 WB. Only two of these fillers (AquaCoat and Target) are available from Canadian retailers, which makes the other products disproportionately expensive, given the shipping charges and dollar conversion. Still, these products have a long shelf life, and if you only use a filler occasionally ordering from the US shouldn't be a deterrent.

I tried each of the fillers on red oak using the steps listed above. It wasn't a huge surprise to find that all the fillers did a good job. They sand easily and with two coats show no shrinkage. All the resulting filled surfaces were butter smooth, and apart from the Behlen, super clear. I was somewhat surprised that dry times vary so much among the WB fillers – from

30 minutes to four hours. But, water dries quicker than oil. However, if you'll be using both OB and WB products together during your finishing regime, it's probably worth adding on a bit of extra dry time anyway. The AquaCoat and CrystalLac fillers come in containers with twist lids, making them easier to re-seal. There was virtually no odour from the WB fillers, and only a mild odour from the Behlen. Even though the WB fillers have low VOC levels, you should still wear a respirator when using them.



## Behlen Pore-O-Pac

Shellac.net

\$26.80US/946ml, approx.  
\$71.25CA (includes shipping)

Shelf Life: 3 years

Dry Time: Overnight (8 hours)

Tintable with: Furniture Powders, Master Colors, Japan Colors

Topcoat: Any OB finish

Behlen recommends thinning, 4 parts filler to 1 part solvent. It's available in neutral, medium brown walnut, and mahogany colours. The neutral filler, which I tried, was quite noticeable in the pores, so it's best used when you plan to stain the wood. Of any filler, it has the longest working time, making it the best choice for very large surfaces. It sanded out very easily, and completely filled the pores with one application. The industrial version of this filler is sold under the Mohawk brand name. Behlen also makes a WB filler.

## Seal-Lac

ShellacFinishes.com

\$36.95US/946ml, approx. \$86.10CA (includes shipping)

Shelf Life: 2 years+

Dry Time: 4–5 hours

Tintable with: Aniline dye or alcohol-based stain

Topcoat: Any oil-based or water-based finish



I'll admit a slight bias for shellac, as I've been using it exclusively for over three decades on the inside of drawers, display cabinets and boxes. It rubs out beautifully, and is the traditional component in French polishing. Seal-Lac is comprised of de-waxed super blonde shellac (plus other solids and natural resins) and has the consistency of a 3-pound cut of shellac. It dries very clear, was easy to sand, and imparted only a slight amber tone to the wood. The nice thing about this product is that it also acts as its own sealer.



## Aqua Coat

AquaCoat.com

\$28.50CA/473ml (excludes shipping, from LeeValley.com)

Shelf Life: 1 Year +

Dry Time: 1/2–1 hour

Tintable with: Any water-soluble dye, Universal Tinting Colors

Topcoat: Any OB or WB finish

Of the four WB fillers I found the AquaCoat the easiest to apply. It has the consistency of custard – the others are more watery – which I found noticeably extended the working time. It also has the quickest drying time, which means you can lay on the second coat if necessary, to get the job done sooner. It sanded easily and dried crystal clear.



## CrystalLac

[www.crystalac.info/](http://www.crystalac.info/)

\$26.99US/946ml, approx.  
\$70.35CA (includes shipping, from WoodWorker.com)

Shelf Life: 5 Years +

Dry Time: 1–2 hours

Tintable with: Any water-based paint colourant/latex colourant

Topcoat: Any OB or WB finish

This filler has the consistency of heavy cream. It went on nicely, and took only a bit longer than the AquaCoat to dry. It was easy to sand and dried super clear. It has the longest shelf life of any filler. This is the company that makes Brite Tone Instrument Finish, which is widely used by luthiers.



## J.E. Moser Grain-Fil

[WoodWorker.com](http://WoodWorker.com)

\$32.99US/946 ml, approx.  
\$79.61CA (from WoodWorker.com, includes shipping)

Shelf Life: 1 Year

Dry Time: 3–4 hours

Tintable with: Water-based dyes and pigments

Topcoat: Any OB or WB finish

Moser's has a fairly thin consistency, so it's unlikely to ever need thinning. It has a slightly shorter working time than CrystalLac and AquaCoat and requires the longest dry time. Regardless, it went on well, was a cinch to sand and dried crystal clear.



## Target Emtech HSF5000

[TargetCoatings.com](http://TargetCoatings.com)

\$28.00CA/946ml (from WoodEssence.com)

Shelf Life: 2–4 years

Dry Time: 2 hours

Tintable with: Water-based universal tinting colours

Topcoat: Any WB finish

Target calls this a high-solids filler that also acts as a sealer, which may be the reason it completely filled the pores with a single application on the test boards. It also has a fairly thin consistency, and it sands easily. Available in neutral (which dries clear) white and gray. This is the most economically priced filler.



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