Deck Finishes

Be prepared for regular maintenance no matter what finish you choose

by Scott Gibson

Despite the growing use of wood-plastic composites and all-plastic or metal decking, most new residential decks are still made from wood. And while pressure-treated lumber and naturally decay-resistant species such as cedar and redwood can last a very long time outside, they aren't immune from the effects of weather. Thus, most homeowners and deck professionals will turn to a deck finish to slow the aging process and prolong the life of their decking.

The available finishes run the gamut from semisolids that hide wood grain to clear preservatives designed to keep wood looking lumberyard fresh — and the options continue to multiply. In addition to traditional finishes made from natural oils, there are finishes made from modified oils called "alkyds"; water-based acrylics; and coatings that combine acrylics and alkyds.

No finish does everything perfectly, especially in a grueling environment where heavy foot traffic, unrelenting sun, and exposure to rain and snow are the norm. Also, there's no such thing as a permanent, maintenance-free finish — all will need periodic cleaning and recoating.

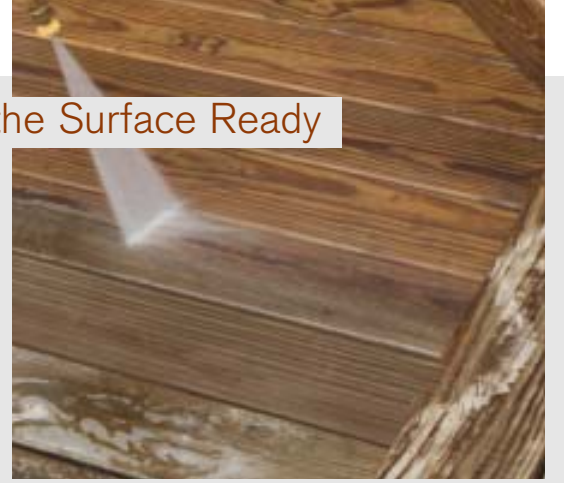
That said, there are fundamental differences between families of finishes that affect performance, appearance, longevity, and (of course) price. And just as your painter will tell you, surface preparation is everything (**see "Before You Finish, Get the Surface Ready"**).

The Basics: What Pigments Do

There are three basic flavors of deck finishes: clear, semitransparent, and semisolid. Formulations differ widely, but a key difference among them is the amount of pigmentation they contain. Whether the finish is water-based or oil-based, finely ground pigments are the ingredients that prevent surface damage and natural graying due to ultraviolet radiation. Increasingly, coating manufacturers are exploring the use of extremely fine pigment particles to limit UV damage (**see "Big Promise From Very Small Things"**).

Clear sealers last only about a year, or possibly two, before they need recoating, but they are relatively easy to apply and require the least amount

Before You Finish, Get the Surface Ready



WOLMAN WOOD CARE PRODUCTS

Refinishing is all about preparation. New wood can (and should) be finished within a couple of weeks of installation to prevent UV damage. Older decks will likely require the use of a cleaning agent and a light, careful pressure washing (left) before refinishing.

Surface prep makes all the difference (see "Maintenance & Restoration of Wood Decks," Mar/Apr 07). Getting a durable, uniform finish on a wood deck depends on having a surface that's ready to accept a coating.

In some cases timing is key, as well. The longer new wood sits in the sun, the more damage UV radiation will do to the lignin, the essential binder of wood fiber. Lignin begins to break down immediately with exposure to sunlight in a process called "photochemical degradation," turning the surface gray and making it more porous. This increases the absorption of penetrating oil and alkyd finishes, but makes it difficult for an acrylic finish to bond well and can significantly shorten the life of a paint film.

If you've chosen an acrylic finish, it should be applied as soon as possible. Wood should not be allowed to weather. For penetrating oil finishes, a few weeks or even months of weathering won't make much difference and, in fact, will make the surface more porous so it absorbs more finish.

When it comes to applying maintenance coats, some deck finishes should be stripped back nearly to new wood before a new coat is applied. Read the manufacturer's directions carefully. A clear alkyd finish won't need as much attention as a heavily pigmented deck stain, because much of it will have worn away. More robust coatings may need chemical strippers or sanding to adequately prepare the surface.

Also, coatings can weather unevenly, depending on where they are applied. Surfaces protected by roof overhangs or shade trees will not show as much wear as areas in heavy traffic zones. Applying new finish to a deck that has weathered or worn unevenly invites a blotchy, unattractive job.

A variety of deck cleaners are available that are capable of removing dirt and mold, probably a better bet than brewed-at-home blends of bleach, water, and laundry soap. Power washers can be useful, but take care to control pressure so the surface isn't abraded or "pulped." Decks should dry out for a day or two after washing before a finish is applied.

Big Promise From Very Small Things

Nanotechnology is a word that's steadily creeping into our vocabulary. It comes from nanometer, or one billionth of a meter, and it means the manipulation of matter at an extremely small scale in order to change its physical properties or behavior. Scientists believe nanotechnology will have a profound effect on our lives in the decades ahead, making possible advances in medicine, agriculture, and dozens of other fields. When it comes to paints and finishes, the future may already be here.

Nanotechnology allows UV-blocking compounds that are normally opaque to become transparent, giving clear finishes the ability to protect against UV damage as effectively as a pigmented stain. Finish manufacturers are no doubt developing new formulations that take advantage of this phenomenon, but that's apparently nothing new. "Paint companies have been working on nanotechnology for 15 years," says Sam Williams of the Forest Products Laboratory, "except that they didn't call it that. They just said they had UV-resistant pigments in there."

When transoxides, a kind of pigment, are ground down into the nano range, Williams explains, they become opaque to UV light and transparent to visible light. "If you take a clear film and load it with these nano particles, you can see through it," he says, "but you'll never get a suntan through it." Improved performance from clear and semiclear finishes can be attributed to these precisely ground pigments that interact with UV radiation – even when you don't know they're there.

of prep work before a reapplication (**Figure 1, page 3**). They may be either oil- or water-based, and may contain ingredients to absorb UV radiation to slow natural graying and a fungicide to retard the growth of mold. What makes clear finishes appealing is they allow the natural figure of the wood to show through – and if you've just spent a boatload of money on a deck of all-heart redwood, that argument can be persuasive.

For these reasons, a clear water repellent containing an agent to combat mold is the first choice of Sam Williams, a research chemist at the Forest Products Laboratory in Madison, Wis., when he finishes his own deck. Although he can count on reapplying the finish every couple of

years, Williams can prep the deck and reapply finish in an elapsed time of only about 60 minutes.

After clear finishes, next on this gradient of increasing opacity is a class of tinted sealers and stains, sometimes called toners or semitransparents, that contain some light-blocking pigments (**Figure 2**). Their advantage is that they offer some protection from UV damage while allowing some wood grain to show. Depending on weather, sun exposure, and foot traffic, you can count on two or possibly three years of service on a horizontal surface before recoating.

The most opaque finishes are the semisolid stains, which contain a lot of pigmentation — enough to offer the best long-term protection against sun and weather damage (**Figure 3, page 4**). They might not be the first choice for a deck of clear redwood or cedar, but semisolid stains come in a wide range of colors that can spruce up the uniformity of pressure-treated softwood. These stains last longer than the others — up to five years, according to one deck-restoration specialist.

There are a couple of downsides, however, to semisolid finishes. They are harder to apply evenly and may show brush marks where the surface doesn't dry evenly. The best advice is to apply the finish on just a couple of deck boards at a time, following them from one end to the other, and then move on to the next section of deck.

Semisolid stains will make wear patterns on the deck more obvious, and they require the most prep work before they can be recoated. The manufacturer may, in fact, recommend the surface be completely stripped and cleaned before any new finish is applied. Bottom line: Semisolid stains offer more protection for a longer period of time, but they're harder to apply evenly and require more work to prepare for recoating.

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Figure 1. Clear sealers are the easiest to apply and they show the wood's figure. However, they're the least durable type of finish — with an expected life span of only a year or two — and many clear finishes offer little protection against UV degradation of the underlying wood.

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Figure 2. Tinted sealers offer a couple of years' durability and show off the grain of the wood. Also called "semitransparent," these finishes are fairly easy to apply. Their pigments change the wood's color while providing some defense against UV.

Avoid Film-Forming Finishes

Paint forms a tough film designed to block sun and water for long stretches of time. These attributes make paint ideal for exterior trim and siding, but they're not advantages for a deck. Penetrating deck stains and sealers are designed to protect without forming a film.

As explained by lumber-industry veteran Ed Burke, who's a member of the coatings advisory committee at the Forest Products Laboratory, film-forming finishes are very good at protecting wood, but they inevitably develop hairline cracks — particularly on a deck. When they do, rainwater will get beneath the film. "And then these coatings are going to do an equally good job of keeping it there," Burke says. "The problem with that is that any time wood does not dry out between rainstorms, you have the potential for decay and rot."

Opaque deck stains can be paintlike in this respect when too much is applied. Homeowners sometimes take a look at the result and think the deck needs multiple coats. Yet when they try

to make the surface of the deck look as uniform as a freshly painted ceiling by applying more finish, the stain morphs into a film-forming finish.

"The problem is," explains Burke, "there's so much pigment in this stuff that if you put it on too heavily or you put on two coats, bingo — you've got an oil-based paint. It doesn't matter what you put on the can. It's paint because it forms a paint film." Avoid the problem by following the recommendations of the manufacturer.

Oil- or Water-Based?

For a variety of reasons, acrylic latex paint is gradually replacing traditional oil-based formulations, and manufacturers are showing equal resolve in developing water-based deck finishes. There have been steady improvements in their durability: Some now perform as well as their oil-based counterparts (**Figure 4**). "Three years ago I would have said don't ever use them," Williams says. "But some of the acrylics are starting to get a little better. It's a brand-by-brand situation. Some of the waterbornes seem to work as well as some of the old [oil] systems."

Water-based finishes, however, typically don't penetrate very deeply into wood decking (if they penetrate at all), so they wear differently — they're more likely to peel than gradually erode like oil-based products, according to the makers of Thompson's deck products. But they are lower in volatile organic compounds (VOCs), making them a natural choice where air-quality regulations are toughest. They also hold color well and can be cleaned up with soap and water — all decided advantages.

Everett Abrams, owner of Deck Restoration Plus in Shamong, N.J., calls water-based finishes the "enigma of the industry." He explains that while water-based finishes are durable, they also are harder to strip back when it's time to recoat. And if the surface isn't consistent when a new coat is applied, he notes, the finish can look blotchy. Abrams says strippers that effectively remove water-based finishes are becoming more widely available, but when faced with a deck that's been finished with a water-based product, he's still likely to sand before recoating.

Among oil-based finishes, linseed and soy oils have been traditional choices. They are easy to apply and they penetrate more deeply than water-based coatings. Another plus: They wear gradually by erosion.

On the other hand, natural oils have two big disadvantages: First, these finishes contain more solvents containing VOCs than water-based coatings do — and VOCs are falling under increasingly stringent government regulations, though rules vary around the country. In California,

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Figure 3. Semisolid stains show only a hint of the underlying wood grain. Their heavy pigments offer the best UV protection, and they can be expected to last as long as five years.

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Figure 4. Water-based finishes can be as durable as oil-based. This clear finish looks milky during application but dries to a satin finish. Water-based finishes wear differently than oil-based, tending to eventually flake or peel away, rather than abrading with time. Refinishing may be more likely to require stripping the deck to bare wood than with oil-based finishes.

the South Coast Air Quality Management District regulates products sold in several counties in the Los Angeles area. In the Northeast, the Ozone Transport Commission has jurisdiction over a dozen states plus the District of Columbia. Manufacturers may sometimes adjust their formulations to meet these local or regional requirements.

Second, natural oil can be what Burke calls "mold fertilizer." Given the right moisture and temperature, mold colonies thrive as they feed on the organic compounds in oil as well as on the extractives in the wood decking itself (**Figure 5**). "When you load up a piece of redwood or western red cedar with linseed oil, the mildew just goes to town on it," Williams says. "In fact, you can turn a piece of redwood black in about a week under the right weather conditions. It's really a disaster."

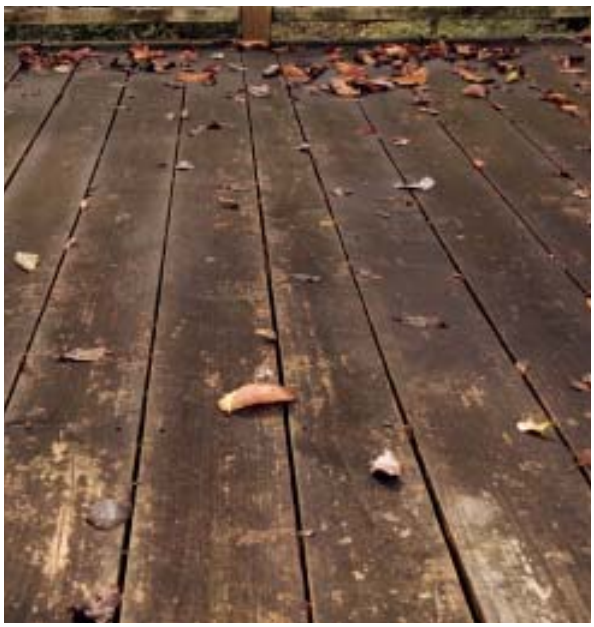

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Figure 5. Natural oil-based finishes soak in to seal out water but may bring other problems. Linseed oil is itself gourmet mold food. If you're planning to use such a product, be sure it's got a factory-blended fungicide.

CABOT STAINS

Figure 6. Yes, you can finish composite decking. No manufacturer requires that composite decking be finished, but colors can be changed, and older decks can be made to look newer.

Fungicides added to the mix by the manufacturer can control the problem. Beware of the anti-mildew additives sold at paint stores, however: They probably have limited usefulness.

Alkyds, which are modified oils, don't have the same potential for mold. Greg Portincasa, a technical and customer support supervisor for Sikkens Wood Finishes, says alkyds are more expensive than natural oils, but they cure faster and last longer.

Increasingly, manufacturers are finding ways of combining alkyds with acrylics for a finish that forms a shell of acrylic resin around a core of alkyd resin — what Thompson's describes as something like a Tootsie Pop. These finishes can be produced with lower VOCs, and they wear by erosion like other oil-based products.

Ipe and Wood-Plastic Composites

While most woods last longer and look better with a finish, caring for super-hard tropical hardwoods, such as ipe, and for the growing number of wood-plastic composites can be more complicated.

Ipe is a naturally decay-resistant wood that will last a long time in the weather, even if it turns gray in sunlight and the board ends show some minor cracking or checking. These characteristics might seem to make this family of South American hardwoods a good candidate for a clear UV

protector, except that finishes have a tough time penetrating the surface. Some manufacturers have developed finishes that are specifically marketed for this purpose. But in the end, ipe, like other naturally durable woods, can be allowed to weather naturally if the homeowner doesn't find fading objectionable. A water-repellent preservative applied to the end grain can reduce checking.

Composites pose a different problem (**Figure 6, page 5**). There are now many brands on the market, each with its own formulation. But because these man-made planks contain significant amounts of wood fiber, they are susceptible to fading and mold growth — just like wood. The material itself is challenging, too. A mix of wood flour and recycled or virgin plastics, composite decking combines two materials with dramatically different characteristics. The finishing industry has been stymied at times as decking producers continue to modify their formulations.

Should some kind of finish be applied? It depends. Trex says its decking needs no stains or sealants, just regular cleaning. CorrectDeck, on the other hand, says clear or solid-color stains may be used. The Forest Products Lab has found that composites with high wood content can be maintained with a clear penetrating finish after the boards weather for several years. Given the difference in composite content, however, it would be a good idea to check with the manufacturer to see which, if any, type of finish or stain is recommended. Regular cleaning will take care of any mold and dirt.

No Magic Answer

If you're looking for the single best deck finish, one that works on every decking material all the time, no matter where you are, you're going to be disappointed. There are just too many variables.

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Figure 7. Sample boards help customers decide between finish options. There's no substitute for seeing the real thing.

Keeping the pros and cons of various families of finishes in mind will help determine what finish to use, as will the particular requirements of the homeowner. Should, for example, the finish enhance the natural color and grain of the wood (clear preservative) or mask it (pigmented stain)? How much maintenance is the homeowner willing to accept — a minor cleaning before recoating or more extensive chemical stripping and sanding? How long does the finish have to last? What is the decking material?

Long-term third-party testing of finishes would be useful, but there's not much of that around. *Consumer Reports* magazine conducts multiyear weather tests for a variety of finishes, periodically reporting the results. Those surveys may provide clues about performance, as will asking around for what brands and types of finishes seem to work best locally.

Williams suggests trying a couple of brands to see which look best and then contacting the manufacturer's customer service department to ask specific questions about the formulation (**Figure 7**). Does the finish contain alkyds? Or is it made with a natural oil or with a polymer such as acrylic or vinyl acrylic? If it's a polymer base, don't expect much penetration. If it's made from a natural oil, expect a higher risk for mold.

Finally, take a close look at the surface of the wood after the finish has been applied. If it's shiny, it means the finish hasn't really penetrated the surface. What you're looking for is a dull surface, meaning the finish has soaked in.

Ultimately, Mother Nature is going to prevail. Finishes can help preserve color, at least temporarily, and a preservative applied every couple of years won't hurt.

"Does the wood need it?" asks Williams. "To a certain extent, yes, but not to the extent that you're out there every year for three or four hours finishing your deck. Most people finish their decks because they want a certain look. They want to maintain the natural look of the wood or match the color scheme of their home. If you have a redwood or cedar deck, it's really important to put a penetrating preservative on it every two or three years. Other than that, decks don't require much maintenance." ❖

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