

Success with **EXTERIOR STAINS**

Use a good oil-based product
and properly seasoned wood



With a trained eye and lightscope, author Samuel Perry examines the siding of the historic Weatherbee farmhouse, in Westwood, Mass., to determine type, colors, and number of layers of exterior finish.

“Why paint when you can stain?” After all, stain is easier to apply and maintain, is less expensive, and doesn’t peel and flake like paint—or so goes the popular wisdom. Yet as the popularity of stain increases, so does the number of problems we see with stain. The truth is that stain is not a cure-all for wood exteriors, and does not compensate for bad preparation or sloppy workmanship. In fact, stains give wood far less protection from the weather than paint—and need recoating more often than a good paint job. You can get good performance with stains, but you should understand what the product is and how to take advantage of its strengths.

What’s a Stain?

Essentially, a stain is a paint with less

pigment. Whereas a paint will contain 40 to 50 percent pigment, a stain will have only 25 to 35 percent. Like a paint, stain’s main purpose is to preserve the wood’s natural oils and protect it from moisture penetration. Aesthetics—looking good—is really its secondary purpose.

Both stains and paints achieve these goals by mixing pigments in with a vehicle and an evaporating agent. In oil-based products, the vehicle is linseed oil or alkyd, and the evaporating agent is either turpentine or mineral spirits. Paint offers protection by forming a film that seals the surface of the wood—locking out water and locking in the wood resins. Stain, because it has reduced pigment and therefore less

bulk, soaks into the wood. It offers protection primarily by replenishing the natural oils in the wood.

Traditional high-quality paints and stains (see sidebar) were formulated to be very elastic, and to gradually chalk away. By the time the surface was ready for painting 8 to 12 years later, most of paint had worn off and little or no scraping was needed. Modern paints, however, are less elastic and do not chalk—rather they are prone to chip and peel. At repainting time, 80 percent of the job will be prep work—scraping, spot stripping, and otherwise fixing the mess left by the previous finish. Since this is most people’s expe-

by Samuel Perry

rience with paint, it's no wonder that stain has become so popular for wood sidings.

Before converting to stain forever, however, remember that stain does not provide the same protection as paint. Stain exposes the wood to more oxidation, and water penetration, causing the wood's natural oils to dry out faster. Even though stained siding may still look good after several years, it needs recoating every four to six years to keep the oils in the wood replenished.

Stain Quality

While paints have gotten worse since the ban on lead in 1971, and the oil embargo in the mid 1970s, stains have generally gotten better. They are more consistent, dry faster, and are more color-fast with the introduction of universal colors.

Because stains do not block water penetration well, however, make sure the product you choose contains a mildewcide. If not, you can purchase this at most paint stores and add it yourself. We prefer to use linseed-oil stains, and these in particular are prone to support mildew growth.

Other things to look for in a stain are a high percentage of titanium dioxide in the pigment portion for elasticity, muted or earth-oxide colors which will resist fading, and a touch of paraffin to improve resistance to water.

Acrylic vs. Latex

Oil-based stains will outperform latex for most purposes. An oil stain penetrates into the wood and replaces the natural oils that have dried out. Each time the siding is restained with an oil finish, the wood is replenished. Acrylic binders, on the other hand, will not replenish the wood's natural oils, but at best will form a film and seal the surface. Additional coats of acrylic finish over the years will recoat the surface, but will not restore the wood oils. Over the long run, wood periodically coated with oil will fare better and last longer.

Water-based stains do serve a purpose. We use them where we want the color without the body of the stain. For example, we have used such products to tint concrete floors. In one case, we successfully used a latex stain to tint bricks that were not the color the architect had specified. But we do not recommend their use on wood.

We also avoid using latex paints. They perform satisfactorily until several coats are on. Then the bottom coat is prone to fail under the weight of the paint. The bond to the wood does not seem to be as good as with oil. About the only advantages we find with acrylic products is that they tend to be more resistant to mildew growth, and cleaning up after application is easier.

Opaque Stains

An opaque stain has more pigment than a semi-transparent stain, but less than a paint. It gives you the worst of both worlds: It does not fully penetrate into the wood, but it does not give a heavy enough film to provide good long-lasting surface protection.

These products are marketed to people who want the appearance of paint without all the problems they associate with paint—peeling, scraping, and so on. However, these stains will peel and act like paint and they do not have the ability of paint to keep moisture from penetrating beneath the film. In general, opaque stains are a bad idea.

Application

When we get calls from customers with stain failures, the first question we ask is whether the wood was allowed to "season" before staining. We strongly believe in letting new wood weather. This lets the extractives dry out at the wood's surface, enabling it to absorb the oils in the stain. Weathering is particularly important with today's wood, which is often of a lower quality than in earlier times, has more sapwood, and is kiln-dried rather than air-dried. Even though kiln-dried lumber is dry based on average moisture levels, it may not be uniformly so.

For resinous woods such as red cedar, we recommend waiting at least six months. For pine, we may wait only a month; redwood, about three months. If this step is not taken, the stain may not take well, since the outer cells of the wood are still full of resin. In some cases, stains on unseasoned wood fail within a year or two. To speed up the weathering process, and to help the wood better accept a stain, it is a good idea to install new siding rough side out.

Another important technique is back-priming. This will help keep moisture from coming through the siding, which in turn will help prevent cupping and peeling. We usually back-

prime with thinned-down leftover paint from other jobs, but any primer or stain will do. We also recommend coating cut ends on siding boards, when feasible.

When applying the stain, stir frequently to keep the pigments evenly mixed, since they settle out rapidly. Also, plan your work in sections so you do not let a painted edge dry out midway across a wall. It will show up as a line. Rather you should always keep a "wet edge" until you reach a corner, window, or other border.

Don't worry about small areas of high-resin wood that do not accept the stain. These may appear shiny at first, but this "flashing" will dull soon enough and blend in.

After applying the first coat, it's desirable to wait about a month before applying the second coat of stain. This wait, again, will let the second coat be absorbed more thoroughly. After these first two coats, you should only need a single coat of stain every four to six years.

Recoating

When it comes time to recoat a stained surface, take the time to prepare the surface well. Remove any mildew by scrubbing with household bleach. If a large area has darkened unevenly from oxidation, you can treat it with a solution of oxalic acid (oxalic crystals dissolved in water), or a commercial wood bleach. Just apply the solution with a brush and let it dry.

If the surface is merely dirty, wash with water and if necessary, a little trisodium-phosphate (TSP). Once the wall is dry, apply the new coat of stain.

After several coats of oil-based stain have been applied over the years, the pigments may begin to build up on the surface and flake like old paint. If the finish is not too far gone, it can often be restored by applying a very thin-bodied stain (less pigment), or a coating with no pigment at all. For a clear coating, we would mix equal parts of linseed oil and turpentine (with a mildewcide). As long as the finish will still allow the oil through, this clear "dressing" should do the job of restoring the finish and rejuvenating the wood.

In any recoating job, you want the more elastic coating on the outside. With either paints or stains, this argues against putting acrylics over oil. With paints, we don't put oil over acrylics

because the weight of the paint can break the bond of the acrylic to the wood. The best practice is to stick with the same type coating. (You can do a quick paint test with wood alcohol. It will dissolve an acrylic, but not oil.)

Clear Finishes

In this age of "maintenance-free" products, many customers want the beauty of natural wood with the convenience of vinyl siding. Unfortunately, there is still no magical product that will permanently preserve the original appearance of new wood siding.

About the closest thing to a "natural" finish is a product such as clear Cuprinol which combines a preservative with a little paraffin mixed in as a water repellent. This type of coating will not eliminate color change altogether (due to oxidation of the surface), but will slow it down. Whether or not the siding will weather evenly depends largely on how consistent the wood quality is. If you have prime heartwood cedar mixed with sapwood, you're not likely to get even weathering.

One problem with this type of finish is that it needs to be re-applied at least every two years, so it's not particularly "low-maintenance."

If a weathered silver-gray look is desired, a product such as Cabot's bleaching oil can work well. As its name implies, it combines the protective action of an oil with the lightening action of bleach. It also has a little white or gray pigment to help get a uniform look.

In some instances, we have treated houses with an exterior "salad dressing." This is simply linseed oil and turpentine with a mildewcide added. However, with the passage of time, the wood tends to darken. Thus, if you follow this approach, expect this change and be prepared to pressure wash and bleach the surface every four to five years before re-oiling. ■

Samuel Perry is a painting consultant and the director of the Edward K. Perry Company, based in Braintree, Mass. The company, founded in 1858, specializes in historic restoration and decorative painting.



Painters at the Edward K. Perry Co. mix their paints and stains the old way—starting with linseed oil as a base and turpentine as the evaporating agent. They started out in 1858 using lead-based pigments, but when these were made illegal in 1971, they had to find alternatives. The best base pigment now, says Samuel Perry, is titanium dioxide. It offers the elasticity and chalking characteristics of lead. And with the addition of a little zinc oxide, the toughness of a lead-based coating can be achieved.

Because of the high costs of petrochemicals, says Perry, the titanium-dioxide content of commercial paints has been falling off steadily since the oil embargo in 1974. Now most manufacturers use

a high percentage of "extenders," inexpensive inert ingredients which have no flexibility, and are akin to "adding sand to the mix." The inelastic paints are more prone to crack and let water penetrate, and further deteriorate the paint. Also, they do not chalk; rather, they crack and peel.

In fact, Perry is aware of only one commercial product now that matches his home brew: Pratt & Lambert's top-of-the-line exterior paint. In a top quality paint, he says, over 75 percent of the pigment should be titanium dioxide. For most paints now, under 50 percent of the pigment portion is titanium dioxide. This information should be printed on the paint label. The same caveat applies to the pigment portion of a stain.

As a vehicle, Perry prefers linseed oil thinned with turpentine, partly because he's a traditionalist, but also because he feels it does the best job. This mixture tends to dry slowly, thus extending the protec-

tive life of the coating. The one problem with linseed oil, he says, is that it makes a good host for mildew. For this reason, all linseed oil finishes should have a mildewcide added.

In addition, Perry shuns the modern colorfast universal finishes in favor of the older type of tints. The universal finishes hold well, says Perry, but the older types fade to the softer hues favored in the restoration work, in which his company specializes.

Unfortunately, Perry's company manufactures paint only for its own use. Because of the high cost of the ingredients, to market a paint of that quality, he says, they'd have to charge close to \$50 a gallon. And even though it can double the life span of many of today's paints, and requires far less work at repainting time, it seems like a product whose time has passed—except for clients who regard good painting as an investment.

—NEB



KEEPING THE "NATURAL LOOK" ON WOOD SIDING

by Steve Carlson

Newly-applied natural wood siding can be beautiful to look at, and many homeowners would like to keep it that way. Unfortunately, once you remove the bark, the sun and rain begin to take their toll on untreated wood. Discoloration is caused by ultraviolet rays and by water-based extractives that rise to the surface of the wood. Mildew forms, creating black blotches. The wood shrinks and expands unevenly, cupping and cracking in the process.

The easiest solution is to let the wood weather. But it may take decades for weathered blotches to turn to a uniform grey. And the cups, cracks and checks that add character to a rustic farmhouse may be out of place in, say, a suburban neighborhood.

Is there a feasible alternative? Can you maintain the natural beauty of newly-installed wood siding?

To find out which products and techniques — if any — work best, we spoke with a number of professionals who face this problem regularly. Although no definitive answer emerged, we turned up a variety of useful insights and a few consistent themes.

What the Experts Do Agree On

Many clear finishes have been reformulated in recent years, because toxic ingredients, notably the preservative pentachlorophenol, are being phased out.

There are strong differences of opinion on the merits of products now on the market. But experts generally agree that clear finishes do not screen ultraviolet rays as effectively as do pigmented stains, and need more frequent recoating.

The following suggestions were universally agreed upon:

- Clear finish should only be applied on durable wood, like cedar or redwood.
- If possible, apply siding with the rough-side out. It will absorb more finish, but it may last twice as long before recoating is needed.
- Use a good quality finish. "Cheap" products will almost always cost more in the long run, as recoating will be more frequent.
- Consider a stain with a slight pigment that matches the wood you are using. It might look more "natural" than a clear finish, and it might hold up twice as long!

Penetrating or Film-Forming

There are two general types of

transparent coatings. Penetrating sealants, the most widely used, soak into the wood and leave the surface appearance relatively unchanged. "Film-forming" finishes (such as Behr Super Liquid Rawhide, Behr Process Corp., Santa Ana, Calif.) leave a varnish-like coat on the surface.

The choice may be dictated by aesthetic preferences, but other issues are involved. Proponents of film-forming finishes say the surface provides extra protection, similar to that of a coat of paint. Proponents of penetrating finishes say their products are easier to apply (they can be sprayed rather than brushed) and there's no need to scrape when it's time to recoat.

New Products

When we asked about new products on the market, two names were frequently mentioned: Penofin and Sikkens. Several of the people we talked with said these products seem promising, but stopped short of endorsement because they had not had enough experience with them over a long enough period of time.

Penofin (Performance Coatings Inc., Ukiah, Calif.) is a penetrating sealant that uses Brazilian rosewood oil as its base. The company advertises that Penofin contains no known carcinogens nor pentachlorophenol, and that 90 percent of ultraviolet rays are blocked by microscopically ground metallic particles.

Penofin is available in clear form, but according to company spokesperson Ken Mayginn, it "comes out slightly yellow, like tung oil." Mayginn says many people find that the slightly pigmented redwood and cedar shades appear more "natural." Sikkens (D.L. Anderson and Associates, Inc., Maple Grove, Minn.) produces a film-forming exterior coating called Cetol HLS. Dennis Anderson, president of the company, informed us that there is no "clear" version. However, others we talked with said a carefully selected shade of Sikkens goes on with as "natural" an appearance as clear varnish, and is far more durable.

Both firms tout the durability of their products, but note that lifespan depends on application, the type and quality of wood, the extent of exposure to sunlight, and weather conditions.

"The life expectancy of our product is three years or more" says

Anderson. "How much more depends on a lot of factors" Penofin's literature says a new coat may be needed as often as every year or two, but Mayginn says "I've seen applications in Colorado and Utah that are six years old and as good as new."

What Some of the Experts Say

Here are some of the diverse opinions we received from those who were willing to express opinions on the record.

Ron Davis, spokesman for Pan Abode, a manufacturer of cedar home kits: "We've been using and recommending Behr for ten years now. In the last year, we've also been using Sikkens. Both are good, although Sikkens is more expensive.

"We insist that something be put on our houses. Otherwise, they turn grey, and get cracks around the knots. The Sikkens finish that we use has an oak color, but it goes on clear when it's applied to our cedar."

Bill Prochnow, spokesman for Mid-America Cedar, a major cedar wholesaler: "The rule of thumb is that the more pigmentation you put in, the less it will fade. Redwood and red cedar colors will darken slightly, but retain their natural appearance. They can go for three to five years—you'd have to apply transparent sealers more often.

"Almost all of our cedar is red, and Cabot [Samuel Cabot Inc., Boston, Mass.] produces a red cedar stain with a natural appearance. Transparent sealers are better than nothing. But we do recommend semi-transparent sealers."

Christopher Donnelly, East Coast Representative, Western Wood Products Association: "With dimensionally stable woods, like western cedar, finishing or not is an aesthetic choice. The wood won't suffer structurally unless there's a build-up of moisture.

"There are several water-repellent finishes that work well, but they may need regular re-treatment. For UV protection, we tend to suggest darker stains. However, that suggestion may not take into account some of the newer products [such as Penofin]. That's only because they haven't been established long enough."

Jon Slose, Engineer, Acorn Structures of Acton, Mass: "We've spent a lot of time talking with our own network of builders and their painters, as well as performing our own simple tests. We've arrived at

the conclusion that the best clear finish is the best of the worst of the bunch.

"Oil-based stains are best. They should have as much solids and pigments as possible. With that in mind, a semi-transparent stain may be acceptable for siding, but not on the trim around windows and doors. There's nothing that even resembles a clear coating that will hold up around windows and doors.

"With smooth siding, one coat of stain will hold up for two to four years, and two coats will last for four to seven years. If you use the rough side, you may be able to double that."

John Fijalkowski, President, Siding Specialty Wholesalers, East Long Meadow, Mass: "We've used a number of clear finishes, including Cuprinol Clear Wood Preservative [Darworth Inc., Avon, Conn.], Benjamin Moore, and Flood's CWF.

"They're all good products, but the effect is not completely natural. Flood's CWF, for example, looks like a natural color, but adds an orange tint.

"If you use a clear finish, you should plan to [recoat] every year or two. You may be able to double that time span if you use rough wood. But semi-transparent stains will last longer. Olympic 716, for example, has most of the same effects—it looks natural [even though it contains pigment].

Karen Nelson, spokesperson for Plunkett-Webster, a wholesaler of lumber and specialty building products: "When a customer asks for a clear-finished product, we suggest they use cedar. Clear coatings will preserve wood, but the wood will weather through them. We always recommend staining with spruce, pine, and cypress.

"C.W. Flood makes a good clear coating, although it leaves a shiny, wet look. We can't use it, because of the machinery we use for pre-coating.

"We think pre-coating [prior to application] is important. That's the only way to coat the front, back, and sides of the wood, as the manuals recommend. Otherwise, builders may be liable for problems like extractive bleeding that occur later.

"There are a lot of nice natural colors, like Olympic 716 for natural tone cedar and Olympic 718 for natural tone redwood. They could last three or four years, as opposed to two years for a clear coating. Those figures may be doubled if

siding is applied with the rough side out."

William C. Feist, research chemist, U.S. Forest Products Laboratory: "A water-repellent preservative may be used as a natural finish. The treatment reduces warping and checking, prevents water staining at the edges and ends of wood siding, and helps control mildew growth.

"During the first few years, a fresh finish may have to be applied every year or so. But after the wood has gradually weathered to a uniform tan color, additional treatments may last two to four years because the weathered boards absorb more of the finish.

"As with semi-transparent stain, the addition of pigment to the finish helps stabilize the color and increase the durability of the finish."

California Redwood Association. The association's literature, passed along to us by New England Redwood Inc., says water-repellent treatments are most frequently recommended. Despite redwood's natural durability, "preservative" chemicals are encouraged to prevent mildew growth.

Clear water repellents listed as meeting the association's recommendations include: Cuprinol #20 (Darworth Inc., Avon, Conn.); Pentaseal (Zehrunge Chemical Co., Portland, Ore.); Penta-Wood-Seal (Samuel Cabot Inc., Boston, Mass.); Seal-Treat (W.M. Barr Co., Memphis, Tenn.); Woodlife (U.S. Plywood Corp., Kalamazoo, Mich.); and Wood Tox (Wood Treating Chemicals Co., St. Louis, Mo.).

The association says that some water repellents that are not on its list give wood a greenish color, and "should not be used if the color is objectionable." The association also cautions that repellents should not be stored for lengthy periods, particularly after a can has been opened, as they "may become contaminated and cause a bluish-black stain when the treated redwood surface becomes wet."

In summary, if your customer wants a clear finish, there are some good products on the market and a lot of experts willing to give you advice on the subject. But if your customer also wants a worry-free, hassle-free finish that will remain attractive with minimal effort, there are many voices of experience who will tell you that clear finish is not the best choice.