

Selecting an Exterior Finish, Part II

by Jim McNamara

Because maintenance is absolutely required for exterior finishes, the cost of a finish schedule must include maintenance costs to be realistic. A huge number of exterior finishing products is available. This is just a quick overview of commonly used finishes and required maintenance, with some extra information on wooden outdoor signing.

A discussion of some common exterior finish choices and maintenance:

- Raw wood
- Oils & oil finishes
- Varnish
- Stain
- Paint
- Pre-treatment
- Finishes not recommended
- Special application notes
- Outdoor signs

Raw Wood

Leaving wood unfinished is sometimes necessary because of esthetics, like for Southwest architecture, or because of cost.

Rot and insect resistant woods like Teak, Jarrah, or Western Cedar can be left unfinished and in contact with the ground for extended periods of time. These woods will develop a patina of UV damage that may be attractive. For really long periods of time, UV erosion will seriously alter the appearance if not the integrity of absolutely any species.

Finish will never fully guarantee the unlimited longevity of exterior wood. Therefore, no finish on some species is definitely a good, cost-effective option, especially if the wood tends to last well outdoors.

Raw wood requires no finish maintenance, but will require some repair as wood degrades to the point of possible structure failure. Raw wood offers the least possible cost, long-term.

Oils & Oil Finishes

Drying oils and oil finishes offer a reasonable solution as a clear finish, but are not universally applicable for exterior use. They do not resist marring as well as varnishes.

Drying oils provide a small moisture vapor barrier, which will slightly reduce warping, cracking, and checking. They do reduce liquid water penetration into wood. Tung oil is somewhat better for this purpose than boiled linseed oil. It requires 3 coats of boiled linseed oil or tung oil to achieve a reasonable level of protection. Oils suffer UV degradation, so a product like Behr Exterior Tung Oil is recommended. Consider using drying oils only on applications that are sheltered from direct sun, like exterior doors under a weather porch.

Linseed oil turns black on exposure to UV light, so its use on sun decks and patios may be a poor choice. Oils are also prone to buildup of soot from air pollution, and require periodic cleaning. Oils provide only a moderate amount protection against liquid water, so cupping may become a problem in some applications. Be sure to allot ample curing time, as most drying oils take several weeks to cure completely.

Under optimum circumstances drying oil finishes require maintenance close to every 18 months. Maintenance (yearly is recommended) is simple and not very costly. Clean and then reapply oil. In terms of overall costs, drying oils are considered low to moderate cost.

Drying oils are available from most home centers like Home Depot and Lowe's. Boiled linseed oil does not usually have UV inhibitors, unless the label specifically states that it is for exterior use. Even then it may blacken in direct sun.

Oil finish is a mixture of drying oil, varnish and thinner. Its properties are intermediate between plain drying oil and exterior varnish. Linseed oil based oil finishes also may suffer from blackening in the sun. Unless you formulate your own oil finish, costs are substantially greater for oil finishes than for drying oils. Oil finishes should be scheduled for maintenance every 24 months for optimum results. Interior oil finishes are not recommended for outdoor use.

There are several oil finishes that are the best in terms of water resistance and longevity: one is Amteco TWP 511C (Total Wood Preservative), made by Gemmi Coatings Inc, El Reno OK 73036, available through Kelly-Moore Paints. It is not cheap, but is suitable for full-sun applications, and is available only in larger (1 & 5 gallon) quantities. This product is suitable for direct sun applications like patios and decks.

Varnish

Varnish is esthetically pleasing, but probably is the least cost-effective finish because maintenance expense is high. Varnish is mar resistant, and is suitable for decking, architectural millwork and exterior furniture.

Exterior marine varnishes generally need to be sanded and recoated every 24-36 months or more often in full-sun applications. Once varnish starts to crack, it must be stripped and a new varnish coating applied. Re-finishing over cracked or peeled varnish is not ever recommended. Therefore, it is prudent to refinish long before the finish show signs of degrading.

Best results with varnish over raw wood are obtained with applying a first coat of varnish diluted 50-50 with mineral spirits, then applying 2-3 additional coats of slightly thinned varnish (1 part thinner : 9 parts varnish). The cost of varnish products for the initial application is considered moderate.

Helmsman Spar Varnish and others by Glidden, Behr, Sherwin-Williams, are all products worthy of consideration for low direct sun applications. Use only exterior long oil (spar) varnishes. These would be good choices for an exterior door facing onto a large enclosed porch or for a protected porch ceiling.

Tung oil based marine varnishes are better choices for applications that are exposed to a lot of liquid water or for direct sun applications. Consider products like Waterlox Marine finish from <http://www.waterlox.com> for these applications. Marine finishes have more UV inhibitors and can better stand direct sun than most spar varnishes. They are double the cost, however.

Varnish is a clear film and is therefore subject to extensive damage from UV, even with special additives. The best quality, exterior marine varnishes are often in very poor shape after 60 months of exposure to full sun. They require complete removal at this point.

A reasonable maintenance schedule would be to recoat the varnish every three years.

Pigmented varnishes fare better because the pigment blocks the effect of UV radiation on the binder material, and are maintained more like paint finishes. See Opaque Stains under Stains below.

Stains

Because semi-transparent stains contain pigments that partially block the effects of UV light, their longevity is generally better than varnish. Their upkeep is also less costly and simpler. Esthetically, they do not provide the warm, clear finishes that varnishes provide. Selecting a semi-transparent stain is probably a very good choice where some limited grain visibility is required. It is definitely less costly than varnish.

Semi-transparent stains usually need recoating after 48-60 months of exposure to full sun. In terms of moisture vapor barrier, selecting a product based on linseed oil is the way to go. Most of the oil-based deck stains, like Thompson's Deck Stain, will meet this criterion. In California, and other areas linseed oil products are not available. Water-base products offer a reasonable alternative, but are not as inexpensive as their o-b counterparts.

Opaque stains last well, even better than their semi-transparent cousins, in fact. Consider a maintenance schedule for these products that requires repainting every 5-7 years. Opaque stains from reputable manufacturers like Glidden, Dutch Boy, and Thompson's are available at all home centers. Opaque stains are often pigmented urethane tung oil varnishes, and these are the best choice.

Paint

In terms of film longevity, 2 coats of a quality exterior latex paint over a coat of oil-based pigmented primer provide the best possible finish. In terms of UV resistance, film stretch, moisture vapor barrier, and longevity this combination is unbeatable.

Since the average recoat interval for full sun applications averages 10 years, the overall costs associated with its use are lower. Paint is considered a moderate cost finish overall.

Esthetically, paint does not provide a natural grain look and so is appropriate only for some applications.

Pre-treatment

Wood that has been pre-treated, and then painted or even stained with semi-transparent stain

gives the optimum cost-effectiveness in terms of outdoor survival of wood. Left unfinished, this wood resists rot and insects, but does not resist UV degradation. This kind of wood, often sold as pressure-treated wood, is green because of heavy metal content. PT wood must be worked and sanded carefully because the dust is toxic.

Any of the finishes mentioned above may be used on PT wood, but clear finishes end up an odd color because of the green ground color underlying them. Amber overtones normally provided by varnish become yellow-green or bluish.

To insure film adhesion on PT wood, be sure to give the raw wood a little tooth by sanding lightly with 120 grit paper prior to finishing. This also removes any UV patina.

Finishes Not Recommended

Wax

Wax provides no moisture vapor barrier, and washes off in heavy rain. It does provide a minimal liquid water barrier. Essentially, to maintain a decent wax finish requires re-waxing almost after every significant rainfall for fully exposed applications. It is possible, but not necessarily a good idea, to wax a completely sheltered exterior door or some architectural millwork. The type of wax makes no difference. There is very little difference between raw wood and raw wood with wax in an exterior application.

Shellac

Although shellac provides the best possible moisture vapor barrier, it does not resist long term liquid water at all. Pigmented shellac (like Kilz) is suitable as a primer under latex paint in low exposure areas. It may also be useful as a back primer under some circumstances (see special notes below)

Lacquer

Nitrocellulose wood lacquer is not considered an exterior finish. It crazes and blisters badly in direct sun applications. It also is not sufficiently flexible to deal with expansion/contraction in outdoor applications. Avoid it. Automobile finishes will last well outside, but may not flex sufficiently to deal with outdoor expansion/contraction of wood. Contact the manufacturer for details. In general, they do not recommend it for exterior wood applications.

Interior finishes

Completely avoid any finish labeled for interior applications.

Dye based stains

Dyes fade under UV exposure. Using any of the aniline dyes, even under films that provide some UV protection, is not recommended. Pigmented stains last a lot better than dye-based stains, and are preferred for outdoor use.

You can tell a pigmented stain from a dye-based stain with the following steps:

Let the product sit undisturbed overnight. If the liquid becomes fairly clear and there is a muddy layer on the bottom, you have a pigment based stain. Dye does not settle out. Many stains

contain both dye and pigment. Pigmented stains tend to be less transparent on wood than dye-based stains.

Special Application Notes

For exterior applications, especially for films like latex paint that provide a moisture vapor barrier, you may want to consider finishing all surfaces of the wood, or at least back-priming with an o-b primer or a pigmented shellac primer. This will balance the moisture exchange rate from side-to-side. It also helps to prevent outer film blistering on siding for an old house that has no vapor barrier.

Be sure to finish raw wood quickly. Wood left out in full sun quickly develops a patina of UV degraded wood. This patina seriously degrades finish performance. Consider either finishing pieces before they are installed outside, or sanding off the patina before finishing.

Films adhere better to surfaces that have been sanded only coarsely. Fine sanding reduces film adhesion. Some manufacturers will not guarantee their products on wood that has been sanded to grits finer than 220. Consider sanding raw wood to 120 grit if you are using a film-forming product (not oil or oil finish), like varnish, stain, or paint.

Consider soaking endgrain in diluted (1:1) tung oil, then allowing it to cure for one week. This helps to retard liquid water infiltration into the wood and may be desirable for rot-prone woods that contact the ground, regardless of the finish used. For example, pine Adirondack chairs for lakeside use may benefit by soaking the ends of the legs prior to painting.

Since varnish films are generally noted for poor interfilm adhesion, it is always best to lightly sand an old good varnish film with 150 grit paper before applying a new coat. This is particularly true if the varnish is a polyurethane type. Avoid the use of steared sandpaper (white or light gray) when sanding between coats. Stearate residues reduce adhesion, also, especially for waterborne polyurethane varnishes.

Generally avoid the use of steel wool for exterior finishing. Embedded steel wool will cause dark brown spots to occur on high tannin woods like oak. It also causes rust spots to appear in any finish, including paint. Use synthetic steel wool (3M pads) instead. These are available in different colors (colors indicate effective grit).

Avoid latex paint on exterior plywood. Rotary cut veneer has facechecks that promote water entry into the veneer and finish. Latex does not stop water from entering the small cuts. Using an o-b primer before latex helps improve this situation.

Double prime edges of laminates like plywood to reduce water intrusion and subsequent delamination. For clear coats, consider using dilute tung oil as a pre-primer on edges. Allow sufficient time for the tung oil to cure.

Outdoor Signs

Signs require unreasonably high maintenance when they are made from or finished with

inappropriate materials. Exterior plywood is generally a terrible substrate because of water intrusion. Solid wood signs with routed lettering generally require a fair amount of maintenance to remain decent looking, but are better than exterior plywood, by long shot. When using laminates, consider MDO then consider marine grade plywood.

Varnish on wooden signs is essentially a poor choice. Oil finishes require more maintenance, but do provide a better choice, because they are not prone to peel. The best choice for a natural look is to use clear sign overcoat, on top of semi-transparent sign lettering enamel.

The optimum solution (least maintenance) for painted signs is to use sign enamel with primer and block out over a carefully cleaned MDO substrate. MDO (medium density overlay) is really the only suitable substrate for a paint-lettered sign that is intended to last more than a few months. It is the substrate governments stipulate for traffic signs and professional sign shops require for guaranteed wood signs. MDO can be special ordered from home centers. Marine plywood is a decent alternative, and has to be special ordered from lumberyards.

Using other substrates and finishes generally increases maintenance costs by a large amount. The properties of finishes required for siding and for signing is radically different. For example, latex paint often chalks, which may be unnoticeable on siding, but is totally unacceptable on a sign.

Here is a really brief look at the steps in creating a quality enamel-lettered sign on MDO: MDO must be cleaned thoroughly with alcohol, then primed with a stainblock primer. The edges are double primed to prevent water intrusion. The primer is then covered with white (or color) gloss blockout. Lettering requires the use of lettering enamel and stencils. High gloss, acrylic-polyurethane clearcoat (with a ton of UV blockers) is the final coat. Many of the available products are spray-on finishes or airbrushed. Some are brush application. Check with your supplier.

Signing products are used most often as integrated systems, for example, the Chromatic system from [Akzo-Nobel](#), which includes Tri-Cote lettering enamel, plus primers, blockout and overcoat. You buy the separate components as needed: clearcoat, enamel, primer, etc. Sign enamel and primer is available from sign supply stores. These products are usually acrylic-polyurethane films that have archival pigments with a LOT of UV additives. These are expensive products, but perform well.

Signing with routed lettering fares better with sign lettering enamel over universal sign primer, but will get by using good quality oil based opaque stains over good primer. Opaque stains are available from home centers and have a maintenance schedule similar to latex paint. Sign enamels from sign supply shops are an excellent, but expensive choice, if they meet the esthetic requirements.

Semi-transparent lettering and background sign enamels are available. Semi-transparent primers meant for signing are also available. Using clear sign overcoat will extend the life of the lettering made from any finish.

Signing requires maintenance, which varies from region to region, but generally speaking, properly finished signs need scheduled maintenance every 8-10 years. Usual maintenance for signs consists of cleaning, blocking out, and re-lettering the sign. Signs have an extra, almost unreasonable, burden. Whenever they start to appear even slightly stained or damaged in any way, the client promptly has a hissy fit. Clients generally want signs that last an awfully long time. A contract with clauses that explain sign duration, and with the client's repair and replacement options for defective signing is virtually mandatory. Unless you have experience signing, I would suggest you limit sign making to stuff for your own shop or for friends. Signs are close to the ultimate in specialty finishing techniques and materials.

Jim McNamara

Editor's Note: Jim started working on wood in his grandfather's church furniture shop at age 13 and learned wood finishing there from the shop's head finisher. He went through college in Wood Science and taught at college for about 10 years. He's been in woodworking for about 40 years.

Jim live's in New Mexico on the Santo Domingo Reservation where they build reproduction Southwest furniture and try to duplicate old finishes, sometimes with materials like amber or turquoise. They also do refinishing work.