

# The finish line

A Forest Products Laboratory finishing factsheet



## Finishes for Wood Decks

In recent years, wood decks have become an important part of residential construction. Wood decks can add versatile living space to a home and, with minimal maintenance, provide decades of use. However, wood decks are exposed to high levels of stress from the severe weather conditions that shrink and swell the wood. Without proper maintenance, wood decks can develop problems such as checks and cracks, raised grain, and mildew, thus increasing the risk of decay and insect attack. Because of these risks, lumber used in decks is usually pressure treated with a preservative, or the lumber used is a naturally durable wood such as redwood or western redcedar. Applying an additional finish to wood decks will minimize the problems of cracking, raised grain, and mildew growth.

A penetrating finish applied to wood decks provides better overall performance and is easier to reapply than a film-forming finish (e.g., paint, solid-color stain). In addition to the continuous shrinking and swelling of the wood caused by changes in the moisture content, film-forming finishes are subjected to excessive wear, especially in high-traffic areas. For these reasons, penetrating finishes, not film-forming finishes, should be used on wood decks.

### Penetrating Finishes

Penetrating finishes are recommended for use on wood decks. These finishes include water-repellent preservatives, colored water-repellent preservatives, and semitransparent stains.

**Water Repellents and Water-Repellent Preservatives**—Water repellents are traditionally formulated with organic solvents such as mineral spirits or turpentine, a sealer such as linseed oil or varnish, and a water repellent such as paraffin wax. The solvent carries the oil or varnish and wax into the wood. During the past 10 years, waterborne formulations have become popular. Some of these formulations carry the sealers into the wood similar to the solventborne formulation; however, other waterborne formulations may form a thin film. The only difference between a water repellent (WR) and a water-repellent preservative (WRP) is the addition of a mildewcide or preservative to the formulation. WRPs give much better performance than WRs. Use of WRs without the mildewcide often leads to blotchy staining of the wood.

WRPs are also formulated with nondrying oils that act as solvents (e.g., paraffin oil). These oils penetrate the wood, but do not dry, and protect the wood from degradation and mildew attack.

Because the oils do not dry, the deck surface may remain oily until the finish absorbs. This usually takes several days, depending on the application rate and porosity of the wood.

Several commercial wood treaters use a WR combined with a CCA treatment for 5/4 radial-edged decking. This lumber is marketed under brand names such as Ultrawood, Wolman Extra, MELCO, and Weathershield. This dual treatment gives the wood additional resistance to weathering. Although the WR is supposed to thoroughly penetrate and saturate the wood, it is still advisable to treat the ends cut during construction with a WRP. For the treated wood currently available, these treatments should improve the wood characteristics and extend the product's service life, particularly with sustained maintenance using a WRP.

**Colored Water-Repellent Preservatives**—Several new WRP colored finishes are being marketed both in waterborne and solventborne formulations that are lightly pigmented, but not to the extent of semitransparent stains. These finishes penetrate the wood much like a traditional WRP but tend to form a thin film. They slightly color the wood but permit most of the wood grain pattern to show. Compared with the uncolored WRPs, the added pigment increases the service life of the wood about 2 years.



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### **Semitransparent Stains—**

Solventborne, semitransparent stains have pigment concentrations much greater and coarser than the colored WRPs. The addition of pigment greatly increases the durability of the finish compared with that of the WRP. The semitransparent stains penetrate the wood without forming a continuous layer; consequently, this type of stain will not blister or peel even if excessive moisture enters the wood. The pigment also protects the wood surface from sunlight, thus increasing service life. The binder in the solventborne, oil-based semitransparent stain absorbs into the wood surface similar to the WRP, and there is no film formation.

If the decking material was given a factory applied WR finish or if recently finished with a WRP, a semitransparent stain may not absorb properly. In these situations, the wood should be allowed to weather for 2 to 3 months before finishing. This is the **only** situation where it is beneficial to wait this long before applying a penetrating finish. Note that lumber should **not** be left unfinished for 6 to 12 months as recommended by some product literature or paint and lumber suppliers.

### **Choosing a Finish**

The service life of a WRP finish is about 1 year on the exposed surfaces of wood decks; however, a WRP is the easiest finish to reapply. It absorbs readily into the end grain of lumber and can prevent water absorption into the end grain much longer than 1 year. Because WRP finishes are not pigmented, problems with uneven wear and brush marks are eliminated. Lap marks occur during finishing of semitransparent stains when the finish being applied to an area laps over an adjacent area that has already

been finished. This results in stripes of finish with two coats, whereas the surrounding area has only one coat.

If you are unsure whether to stain or use a WRP, apply the WRP to the deck first. You can switch to a semitransparent stain when the deck needs to be refinished. Even if the deck has been maintained with a WRP for several years, refinishing with a semitransparent stain will provide satisfactory performance.

The second easiest finish to apply is a semitransparent, oil-based stain. Film-forming finishes, such as paints and solid-color stains, are prone to trap moisture and fail by peeling.

Railings around decks can be finished in the same way as the deck. However, the railing does not require the abrasion resistance of the finish used on the deck; it can be designed to avoid trapping moisture, therefore giving more flexibility in choosing the finish. Paints and solid-color stains may perform quite well on the railings.

### **Care of Wood Decks**

The bright color of the wood on weathered decks can be restored by application of commercial products (called deck cleaners, brighteners, or restorers). These products do not add color to the deck, but remove mildew and dirt, allowing the natural color of the wood to show. If all the natural color has been leached from the surface, the wood will appear silver gray following cleaning. These commercial cleaning products may remove the weathered wood surface; therefore, care should be exercised to avoid damaging the surface of the wood. Aggressive scrubbing with a caustic cleaner can remove wood from the surface, particularly on softer wood such as western redcedar. Mildew can

also be removed using a liquid household bleach. Dilute the bleach with 3 parts water and add some detergent. **CAUTION:** Do not use a liquid detergent or a detergent containing ammonia. Ammonia reacts with bleach to form a toxic gas. The bleach solution should be rinsed from the deck with water. If the deck is to be finished after cleaning, allow 1 to 2 days drying time.

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