finish line

The impact of light on dyes and stains

BY TERI MASASCHI

Hidden color. *The candlestick protected the tabletop from sun damage, preserving the original darker color.*

Whatever dye or pigment stain you use, it will fade or change color with exposure to bright light. The solution is not to swear you'll never stain wood again (after all, natural colors in wood are affected by light too), but rather to learn which coloring agents to use, how to use them, and what else you can do to preserve the intended color.

The degree of lightfastness varies enormously between different dye stains and pigmented stains. The problem is that many products contain both dyes and pigments, and the dyes fade faster. With time, the effect can be disappointing. With the right technique, you can stop dye-and-stain combinations from fading at different rates, and take advantage of the ultraviolet protection offered by some clear coats.

NGR dyes are more lightfast

When measuring lightfastness, many variables come into play, such as what substrate the dye is on, the concentration of the mix, and of course the type of light exposure. To give a rough indication of the relative lightfastness of different dyes and stains, manufacturers use a scale from 1 to 8, with 8 being the most lightfast.

Dyes come in both powders and liquids, with the former divided by the solvent in which they dissolve: water, alcohol, or oil. As a group, powdered dyes have lower fade resistance; water-based dyes fall into the 2 to 5 range while alcohol and oil-soluble dyes range from 2 to 3. In general, powdered dyes in darker tones containing a lot of black are more lightfast than the medium to light tones of reds and blues.

The modern metallized dyes are even more lightfast. Better known as non-grain raising (NGR) dyes, they come either in ready-to-use strength (such as Solarlux) or 2-oz. liquid dye concentrates (such as TransTint or WizardTint). This group falls from 4 to 7 on the scale, with the very darkest approaching 8.

The older NGR stains did not have the lightfastness of today's products, hence the continuing belief that these alcohol-based stains are not very light resistant.

Pigments are fade resistant

As a group, pigment stains resist fading better than dyes. The actual pigments can be natural or man-made, with many of the former recognizable by earthy names such as raw umber or burnt sienna. The bright primaries such as blue or red are now mostly man-made. The two groups

SUNLIGHT FADES DYES

Red and yellow dyes were applied to birch plywood. The bottom half of each board was exposed to full sun for six weeks.

Water-based powder dyes faded fast. *After only five weeks, the extent of the sun damage, particularly to the red-dyed areas, is obvious.*

More lightfast. *Alcohol-based, non-grain-raising dyes suffered some damage from the sunlight but not as much as the water-based dyes.*

Photos: Mark Schofield

don't differ markedly in their lightfastness. New on the market are micronized pigments whose particles are so small that they mimic the transparency of a dye but offer the benefit of superior lightfastness. These "super" pigments are mostly confined to commercial systems and are very expensive, but they are finding their way into consumer exterior stains. Check the ingredients label for "transparent" red, yellow, or brown.

How to combine dye and pigment stains

When you open a can of Minwax Golden Oak, you'll notice that both the liquid in the top two-thirds of the can (the dye) and the thick sediment at the bottom (the pigment) are the same color. This dye and pigment stain combination, with its one-step ease of application, is common among mass-market stains. However, with prolonged exposure to bright light, the dye in the product will fade faster than the pigment, altering the original effect.

To offset this, select a separate NGR dye and a pigment stain of the same color. Apply the dye and let it dry. Then go over it with a thick pigment stain such as a gel stain that will act as a shield.

Further ways to protect the colors

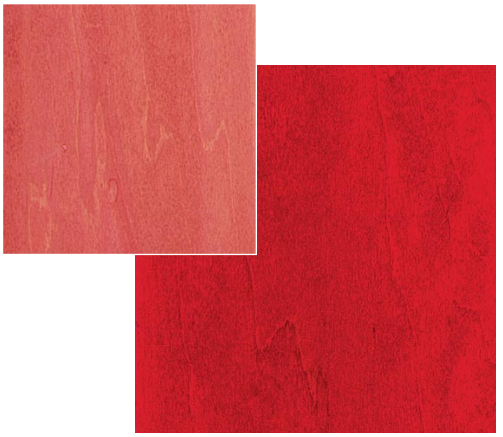
Manufacturers of clear coatings use additives to slow down the degradation of a color. The best finishes for sun protection contain both ultraviolet absorbers (UVAs) and hindered amine light stabilizers (HALS). UVAs absorb the damaging rays and protect the underlying surface color, whether stained or natural; HALS protect the clear coat itself.

Because both types of additive are expensive, finish manufacturers use them sparingly unless the product is designed for a sun-exposed location and can command a premium. In general, marine finishes contain large amounts of UV protection, mass-market exterior finishes have smaller amounts, and most interior finishes contain little if any. The can probably will mention if the contents include UV inhibitors, but to be safe, contact the manufacturer.

Even in a good exterior finish, the additives eventually will break down from exposure to light. □

USE A CLEAR COAT TO PROTECT THE COLOR

Clear finishes designed for exterior use should contain ingredients to block and/or absorb ultraviolet light.



The benefits of UV protection. *Compared to the severe fading of the water-based dyes with no clear topcoat (top), those sealed with three coats of an exterior finish containing ultraviolet absorbers showed only a slight change in color.*

APPLY STAIN AND DYE SEPARATELY

Two-step process adds depth to a workpiece. *The best way to combine dyes and stains is to apply the dye first (left), in this case an oil-based dye dissolved in mineral spirits, and to let it dry. Then wipe on a heavy pigment stain with a similar color (below). This will add depth to the look and will give the dye underneath some protection.*