TECHNICAL BULLETIN

Dark Colors for Exterior Applications

Painting the exterior of your home is a major investment, and it is important to consider the color choice. It is essential to consider longevity when choosing your exterior colors. Color selection has a strong influence on paint performance and life of a coating. While dark colors can be appealing, and may provide a pleasant contrast and draw attention to architectural details, it is possible that they will be affected by environmental conditions more than light colors.

Exterior Exposure

Darker colors will absorb more heat and energy than lighter colors, which may lead to faster degradation of the binder and paint film. The binder degradation may be perceived as discoloration and/or even loss of gloss (Figure 1). Lighter colors will reflect more light and harmful UV rays, and do not absorb as much heat and energy. This could potentially lead to an improvement in film durability, but is also dependent on the type of pigments used, based on the color selection. When choosing a color, a good indicator of how well a color reflects light is to look at its Light Reflectance Value or LRV. Higher values (closer to 100) indicate colors that reflect more light and will remain cooler when exposed to sunlight.

Figure 1: *Premature degradation of dark colored paint on horizontal surface.*

Slower Cure Time

When using a dark paint color, the colorant pigment/resin ratio changes because more colorant is required to achieve the darker colors. This results in a softer paint film during the curing process and can continue until the coating reaches its full cure. It is typical for dark colors with a high loading of colored pigments to take longer to cure than light-colored paints. Additives contained in store mixed colorants, such as surfactants, could further slow the curing process in dark colors, causing them to remain tacky and have that softer feeling for a longer duration. Also, note that lower sheens, such as flats, will be more susceptible to moisture even after it is fully cured.

Blistering

While blisters can appear on many types of coatings in both light and dark colors, the rate and extent of blistering may be more prevalent in dark colors. Dark colors will absorb more heat than lighter colors and will therefore put more stress on the existing paint system, due to greater expansion and contraction of the paint film and even the substrate. Painted surfaces that receive direct sun will be placed under the greatest stress. Applying a dark colored paint over an existing paint system that is in poor condition could also result in blistering, typically down to the previous coating or to the substrate (Figure 2).

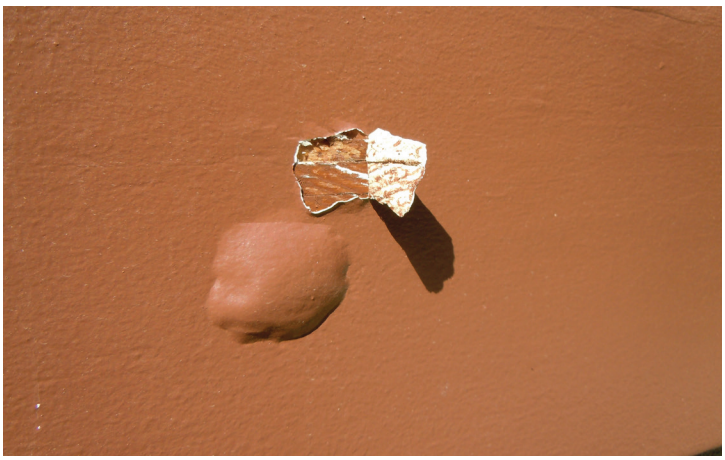

Figure 2: *Blistering down to previous coatings and/or substrate.*

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Blisters can also occur due to solvent or moisture entrapment, and may be more prevalent in darker colors, as they absorb more heat than lighter colors (Figure 3). Blisters typically form because the heat from the sun causes the surface of the newly applied coating to dry more rapidly than the body of the coating film. This rapid surface drying process creates a rigid, or "skinned over" surface layer that prevents solvent within lower level of the coating film from escaping. As the solvent in the lower layers heats, it volatilizes and expands, creating vapor pressure within the coating film. It is the vapor pressure that causes blisters to form.

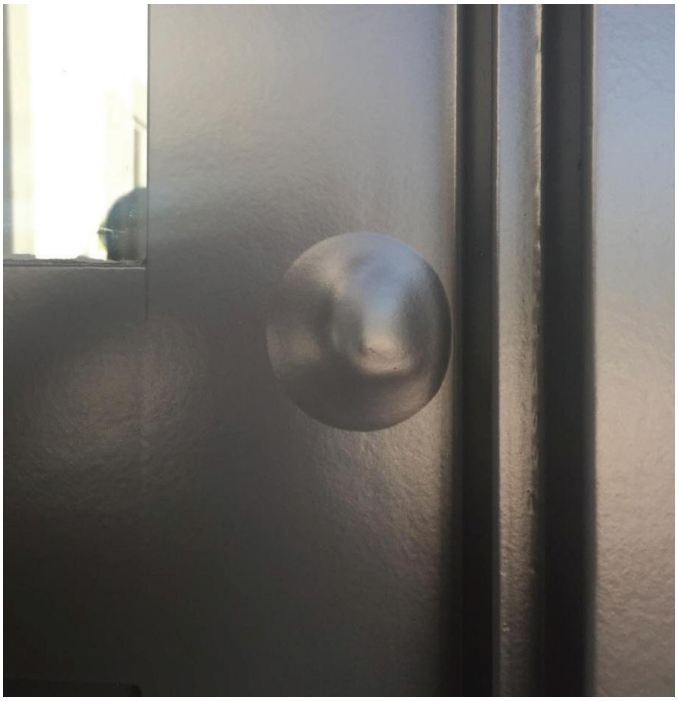

Figure 3: *Blistering of dark colored paint.*

If Blistering Occurs

It is important to determine if the blisters were caused by heat or moisture. The paint film should be carefully cut open, and the substrate as well as the backside of the blistered paint should be examined. If only the newest coat of paint has blistered, then the blister was probably caused by heat. If the blister removed contains several coats of paint and the bare surface is exposed, then the blister was probably caused by moisture.

If the blisters were caused by heat, they should be removed by scraping, or pressure-washing down to the underlying coats of paint or primer (a sound, paintable surface). The surface can be repainted with a high-quality paint, ensuring that the surface temperature is below 90°F. It is important that the surface to be painted is shaded before, during, and after a coating has been applied.

If the blisters were caused by moisture, it is important to determine and repair any cause of excess moisture before repainting. Any loose caulking should be removed and repaired, then primed and painted. An effort should be made to improve ventilation of the building to prevent a recurring problem. All blisters should be removed by scraping or sanding down to a bare and sound surface. Bare surfaces should be primed and then repainted with a high-quality paint. Finally, the moisture content of the substrate should be at an acceptable level before painting.

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