

## Paint Defects

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### Alligatoring

#### PROBLEM

- Application of an extremely hard, rigid coating, like a solvent-based enamel, over a more flexible coating, like a water-based primer.
- Application of a topcoat before the undercoat is dry.
- Natural aging of oil-based paints as temperatures fluctuate. The constant expansion and contraction results in a loss of paint film elasticity.

#### SOLUTION

Old paint should be completely removed by scraping and sanding the surface; a heat gun can be used to speed work on large surfaces, but take care to avoid igniting paint or substrate. The surface should be primed with a high quality water-based primer, then painted with a top quality exterior water-based paint.



**FIGURE 1. Patterned cracking in the surface of the paint film resembling the regular scales of an alligator.**

### Blistering

#### PROBLEM

- Painting a warm surface in direct sunlight.
- Application of oil-based or alkyd paint over a damp or wet surface.
- Moisture escaping through the exterior walls (less likely with latex paint than with oil-based or alkyd paint).
- Exposure of latex paint film to dew, high humidity or rain shortly after paint has dried, especially if there was inadequate surface preparation.

#### SOLUTION

If blisters go down to the substrate, first try to remove the source of moisture. Remove blisters by scraping, then sanding the surface. Prime any bare timber with a high quality water-based primer, and repaint with a high quality water-based exterior paint.



**FIGURE 2. Bubbles resulting from localized loss of adhesion and lifting of the paint film from the underlying surface.**

## Cracking/Flaking

### PROBLEM

- Use of a lower quality paint that has inadequate adhesion and flexibility.
- Over thinning the paint or spreading it too thin.
- Poor surface preparation, especially when the paint is applied to bare timber without Gloss.

### SOLUTION

It may be possible to correct cracking that does not go down to the substrate by removing the loose or flaking paint with a scraper or wire brush, sanding to feather the edges, priming any bare spots and repainting. If the cracking goes down to the substrate remove all of the paint by scraping, sanding and/or use of a heat gun; then prime and repaint with a quality exterior latex paint.



**FIGURE 3. Early on, the problem appears as hairline cracks; later, flaking of paint chips occurs. The splitting of a dry paint film through at least one coat leads to complete paint failure.**

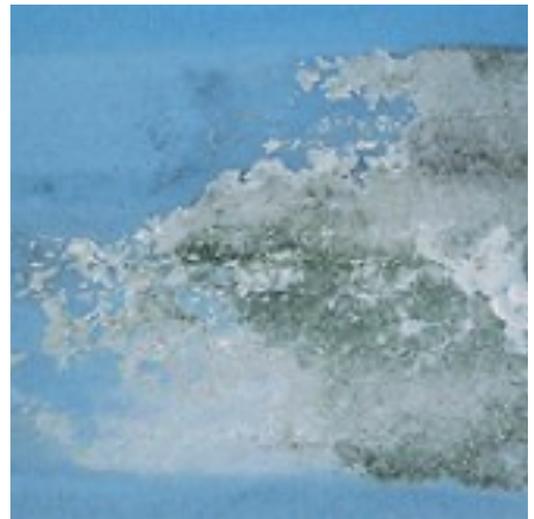
## Efflorescence/Mottling

### PROBLEM

- Failure to adequately prepare surface by removing all previous efflorescence.
- Excess moisture escaping through the exterior masonry walls from the inside.

### SOLUTION

If excess moisture is the cause, eliminate the source by repairing the roof, cleaning out gutters and downspouts, and sealing any cracks in the masonry with a high quality, water-based all-acrylic caulk. If moist air is originating inside the building, consider installing vents or exhaust fans, especially in kitchen, bathroom and laundry areas. Remove the efflorescence and all other loose material with a wire brush, power brush or power washer; then thoroughly rinse the surface. Apply a quality water based or solvent-based masonry sealer and allow it to dry completely; then apply a coat of top quality exterior house paint, masonry paint or elastomeric wall coating.



**FIGURE 4. Crusty, white salt deposits, leached from mortar or masonry as water passes through it.**

## Mold

### PROBLEM

- Forms most often on areas that tend to be damp, and receive little or no direct sunlight (the underside of eaves are particularly vulnerable).
- Use of a lower quality paint.
- Preparation procedures as for new construction.

### SOLUTION

Test to distinguish mildew from dirt by applying a few drops of household bleach to the discolored area; if it disappears, it is probably mildew. Treat the mildew by applying a mixture of water and bleach, 3:1, and leave on for 20 minutes, applying more as it dries. Wear goggles and rubber gloves. Then scrub and rinse the area. Apply an exterior latex primer, then a top-of-the-line exterior latex paint in flat, satin, semigloss or gloss finish, depending on the desired appearance.



**FIGURE 5. Black, gray or brown areas on the painted surface.**

## Chalking

### PROBLEM

- Use of an interior paint outdoors.
- Use of lower quality paint.
- Use of solvent-based paint in direct sunlight areas.

### SOLUTION

First, remove as much of the chalk residue as possible, scrubbing with a stiff bristle brush (or wire brush on masonry) and then rinse thoroughly; or use power washing equipment. Check for any remaining chalk by running a hand over the surface after it dries. If noticeable chalk is still present, apply a quality oil-based or acrylic latex primer (or comparable sealer for masonry), then repaint with a quality exterior coating; if little or no chalk remains and the old paint is sound, no priming is necessary.



**FIGURE 6. Formation of fine powder on the surface of the paint film during weathering, can cause color fading. Although some degree of chalking is a normal, desirable way for a paint film to wear, excessive film erosion can result in heavy chalking.**

## Surfactant Leaching

### PROBLEM

- Painting in cool, humid conditions or just before they occur. The longer drying time allows the paint's water-soluble ingredients — which would normally evaporate, or be leached out by rain or dew — to rise to the surface before paint thoroughly dries.
- Mist, dew or other moisture drying on the painted surface shortly after it has dried.

### SOLUTION

Avoid painting in the late afternoon if cool, damp conditions are expected in the evening or overnight. If the problem occurs in the first day or so after the paint is applied, the water-soluble material can sometimes be rinsed off rather easily. Fortunately, even more stubborn cases will generally weather off in a month or so. Surfactant leaching should not affect the ultimate durability of the coating.



**FIGURE 7. Concentration of water-soluble ingredients on water-based paint, creating a blotchy, sometimes glossy appearance, often with a tan or brownish cast. More likely with tinted paints than with white or factory-colored paints.**

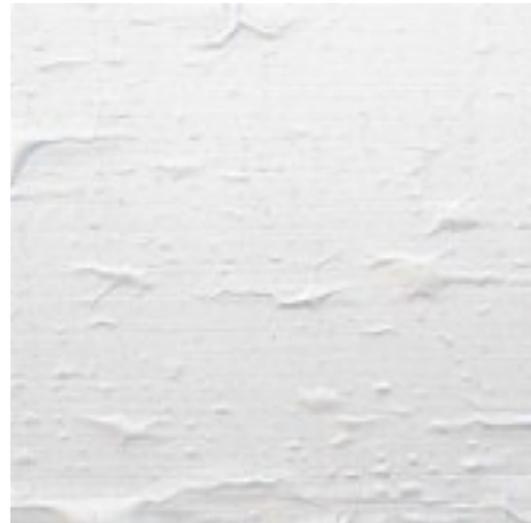
## Wrinkling

### PROBLEM

- Paint applied too thickly (more likely when using solvent-based paints).
- Painting a hot surface or in very hot weather.
- Exposure of uncured paint to rain, dew, fog or high humidity levels.
- Applying the topcoat to insufficiently dried first coat.
- Painting over contaminated surface (e.g., dirt or wax).

### SOLUTION

Scrape or sand substrate to remove wrinkled coating. Repaint, applying an even coat of top quality exterior paint.



**FIGURE 8. A rough, crinkled paint surface occurring.**

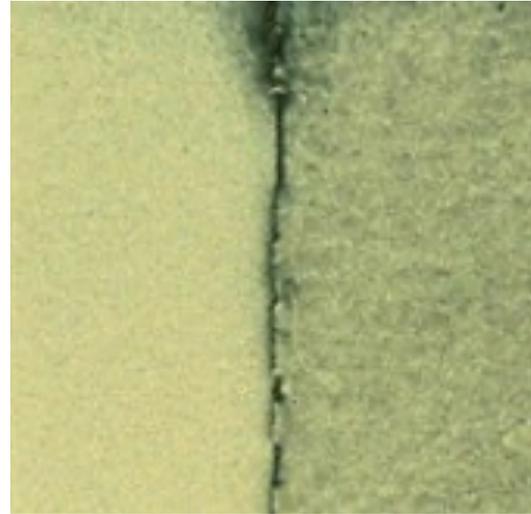
## Dirt Pickup

### PROBLEM

- Use of low quality paint.
- Soil splashing onto the substrate.
- Air pollution, car exhaust and flying dust collecting on house body and horizontal trim

### SOLUTION

Wash off all surface dirt before priming and painting. If unsure whether the problem is dirt or mildew, conduct a simple spot-test (see Mildew). Clean off dirt with a scrub brush and detergent solution, followed by a thorough rinsing with a garden hose. Heavier dirt accumulations may require the use of a power washer. (Higher gloss paints are more resistant to dirt pickup than flat paints, which are more porous and can more easily entrap dirt.



**FIGURE 9. Accumulation of dirt, dust particles and/or other debris on the paint film; may resemble mildew.**

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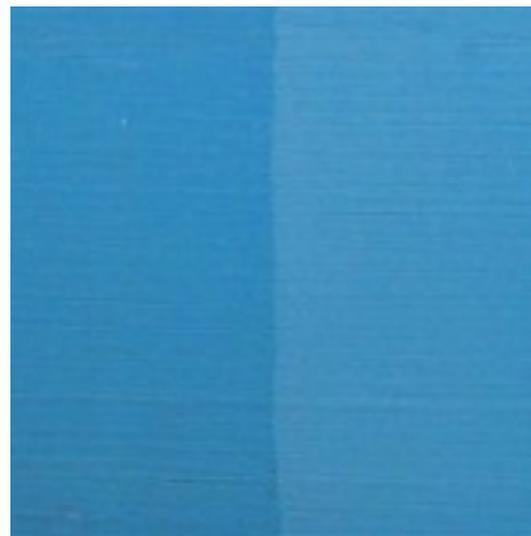
## Fading/Poor Color Retention

### PROBLEM

- Use of an interior grade of paint for an outdoor application.
- Use of lower quality paint, leading to rapid degradation (chalking) of the paint film.
- Use of a paint color that is particularly vulnerable to UV radiation (most notably certain bright reds, blues, and yellows).
- Tinting a white paint not intended for tinting, or over tinting a light or medium paint base.

### SOLUTION

When fading/poor color retention is a result of chalking, it is necessary to remove as much of the chalk as possible (see Chalking). In repainting, be sure to use a quality exterior house paint in colors recommended for exterior use.



**FIGURE 10. Premature and/or excessive lightening of the paint color, which often occurs on surfaces with sunny southern exposure. Fading/poor color retention can also be a result of chalking of the coating.**

## Lapping

### PROBLEM

- Failure to maintain a 'wet edge' when applying paint.

### SOLUTION

Maintain a wet edge when painting by applying paint toward the unpainted area and then back into the just painted surface. This technique (brushing from "wet to dry" rather than vice versa) will produce a smooth uniform appearance. It is also wise to minimize the area being painted, and plan for interruptions at a natural break, such as a window, door or corner (especially important when applying stain to bare wood). Alkyd paints generally have superior wet edge properties.



**FIGURE 11. Appearance of a denser color or higher gloss where wet and dry layers overlap during paint application.**

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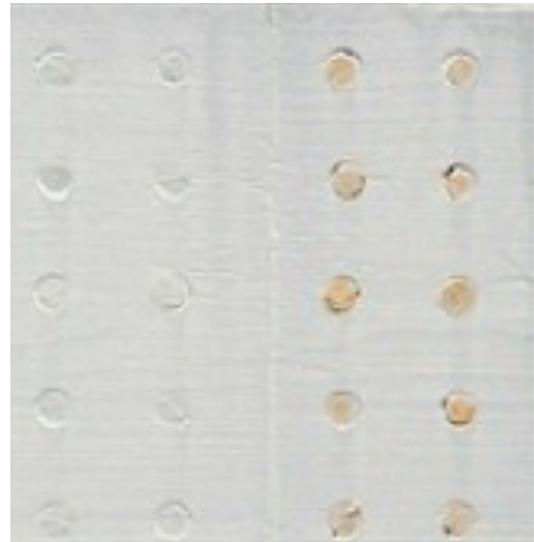
## Nail Head Rusting

### PROBLEM

- Non-galvanized iron nails have begun to rust, causing bleed-through to the top coat.
- Non-galvanized iron nails have not been countersunk and filled over.
- Galvanized nail heads have begun to rust after sanding or excessive weathering.

### SOLUTION

When painting new exterior construction where non-galvanized nails have been used, it is advisable to first countersink the nail heads, then caulk them with a top quality, water-based all-acrylic or siliconized acrylic caulk. Each nail head area should be spot primed, then painted with a quality latex coating. When repainting exteriors where nail head rusting has occurred, wash off rust stains, sand the nail heads, then follow the same surface preparation procedures as for new construction.



**FIGURE 12. Reddish brown stains and spots on the paint surface.**

## Poor Alkali Resistance

### PROBLEM

- Coating was applied to new masonry that has not cured for a full year.
- Fresh masonry is likely to contain lime, which is very alkaline. Until the lime has a chance to react with carbon dioxide from the air, the alkalinity of the masonry remains so high that it can attack the integrity of the paint film.

### SOLUTION

Allow masonry surfaces to cure for at least 30 days, and ideally for a full year, before painting. If this is not possible, apply a quality, alkali-resistant sealer or water-based primer, followed by a top quality 100 percent acrylic exterior paint. The acrylic binder in these paints resists alkali attack.



**FIGURE 13.** Color loss and overall deterioration of paint film on fresh masonry.

## Tannin Staining

### PROBLEM

- Failure to adequately prime and seal the surface before applying the paint.
- Use of a primer that is not sufficiently stain-resistant.
- Excess moisture escaping through the exterior walls, which can carry the stain to the paint surface.

### SOLUTION

Correct any possible sources of excess moisture (see Efflorescence and Mottling). After thoroughly cleaning the surface, apply a high quality stain-resistant oil-based or acrylic latex primer. Oil-based stain-resistant primers are the best type to use on severely staining boards. In extreme cases, a second coat of primer can be applied after the first has dried thoroughly. Finish with a top quality latex paint.



**FIGURE 14.** Brownish or tan discoloration on the paint surface due to migration of tannins from the substrate through the paint film. Typically occurs on 'staining timbers,' such as redwood, cedar and mahogany, or over painted knots in certain other timber species.

ABOUT BELCO FOREST PRODUCTS — In business since 1978, the company operates three manufacturing plants on 16 acres in Shelton, Washington. Belco produces a variety of exterior wood products including the best-selling XT brand, a line of premium treated trim for residential and commercial applications. All Belco products are available through leading distributors nationwide.