

PERMA-CRETE[®] PROBLEM SOLVER & SURFACE PREPARATION GUIDE

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Concrete Protection, Durability and Beauty

PROBLEM SOLVER & SURFACE PREPARATION GUIDE FOR CONCRETE & MASONRY SURFACES

Concrete continues to grow in popularity as a building material in construction. Successfully coating concrete, however, can pose many challenges.

Good surface preparation requires that the concrete substrate be not only clean, but also in good repair and free of dirt, chalk, mildew, efflorescence and loose, flaking or peeling paint. It should also be uniform and without stains. When you take the time to make sure the surface is in the proper condition, you will be rewarded with a durable paint job that will last for years.

This guide will help to identify the following nine concrete surface issues and the proper steps and products to overcome them:

CHALKING

EFFLORESCENCE

LAITANCE

BLISTERING

STAINING

ALKALI BURN

FROSTING

CRACKING

MOLD/MILDEW

This tool is a guide to proper problem diagnosis, cause identification and problem resolution. The information is intended to be helpful but should not be considered all-inclusive to the cause of specific defects that may be encountered in the field and possible defect problem solution.

Please refer to the PERMA-CRETE® PRODUCT SELECTOR & SYSTEM GUIDE to assist in selecting the appropriate product to resolve your concrete surface issue.

CHALKING

DEFINITION

- Formation of a fine powder on a painted surface that is caused by excessive erosion of the paint film after weathering
- Noted in the field by wiping hand across surface – chalk will easily transfer when touched

POSSIBLE CAUSES

- Excessive time between priming and topcoating
- Use of low grade exterior paint (primer or topcoat)
 - High pigment content
 - Extender pigments
 - PVA, EVA and some styrenated acrylics
- Use of an interior paint for an exterior application

CHALKING SOLUTIONS

- Remove chalk residue with a stiff bristle brush (or wire brush on masonry)
- Rinse thoroughly with hose or power washer and let surface dry
- Re-check for chalk by running hand over the surface
- If noticeable chalk is still present, repeat surface prep above
- If chalk remains after repeated washings, surface should be restored using a chalk binding sealer or primer prior to topcoating





ALKALI BURN

DEFINITION

- Loss of adhesion and lifting of the paint film due to water and caustic intrusion from masonry surfaces
- Noted in the field as blisters in the paint film

POSSIBLE CAUSES

- Painting of uncured masonry surfaces of pH 13 or greater
- Excess moisture or water movement through exterior walls or the structure in general
- Use of coatings (sealer, primer or topcoat) that are not alkali or efflorescence capable (pH 10-13)

ALKALI BURN SOLUTIONS

- Check surface pH in defect area with a pH pen (true efflorescence typically yields high pH)
- Test small area with a dilute vinegar/water solution (1 part vinegar to 4 parts water) – solution will dissolve efflorescence salts
- If excess moisture is the cause, eliminate the source (repair structural leaks, seal substrate edges, caulk cracks, seams or joints)
- Remove efflorescence with a wire brush, power brush or power washer
- Rinse thoroughly with hose or power washer and let surface dry
- Re-check surface pH and moisture content
- Apply alkali resistant sealer or primer
- Topcoat with high-quality acrylic exterior paint, masonry coating or elastomeric

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EFFLORESCENCE

DEFINITION

- Crusty, white salt deposits leached from mortar and masonry substrates as water passes through it
- Noted in the field as blotchy, irregular discolored areas that may tend to show water flow pattern and build-up of salts in certain areas

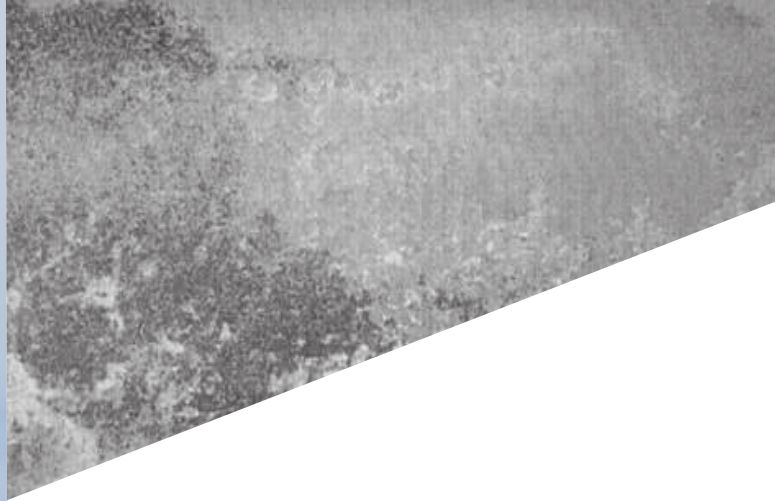
POSSIBLE CAUSES

- Painting of uncured masonry surfaces of pH 13 or greater
- Excess moisture or water movement through exterior walls
- Use of coatings (sealer, primer or topcoat) that are not alkali or efflorescence capable (pH 10-13)
- Failure to remove existing efflorescence prior to paint application

EFFLORESCENCE SOLUTIONS

- Check surface pH in defect area with a pH pen (true efflorescence typically yields high pH)
- Test small area with a dilute vinegar/water solution (1 part vinegar to 4 parts water) – solution will dissolve efflorescence salts
- If excess moisture is the cause, eliminate the source (repair structural leaks, seal substrate edges, caulk cracks, seams or joints)
- Remove efflorescence with a wire brush, power brush or power washer
- Rinse thoroughly with hose or power washer and let surface dry
- Re-check surface pH and moisture content
- Apply alkali-resistant sealer or primer
- Topcoat with high-quality acrylic exterior paint, masonry coating or elastomeric





FROSTING

DEFINITION

- A white, salt-like deposit on the paint film that is not easily removed by wiping or power washing
- On masonry substrates, frosting can be mistaken for efflorescence

POSSIBLE CAUSES

- Can form in protected areas (eaves, porches) that do not receive the cleansing action of rain, dew, etc.
- Use of calcium carbonate extender in exterior formulations, particularly in deeper bases
- Application of dark paint over primer or substrates containing calcium carbonate extender

FROSTING SOLUTIONS

- Frosting can be a stubborn problem which is often not readily removed by washing
- Condition can re-occur as bleed through when a new topcoat is applied
- Remove frosting by wire brushing masonry or sanding surfaces (acid washing may be required)
- Rinse thoroughly with hose or power washer and let surface dry
- Apply high-quality exterior primer before application of a high-quality exterior topcoat
- Topcoat with high-quality acrylic exterior paint, masonry coating or elastomeric

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LAITANCE

DEFINITION

- Loose, fine particles on the surface of concrete
- Larger, loose masonry fragments are sometimes referred to as spalling

POSSIBLE CAUSES

- Excessive water in the concrete mixture
- Overworking of concrete surface during initial set-up
- Chemical attack of concrete by agents such as rock salt
- Mechanical abrasion or damage

LAITANCE SOLUTIONS

- Remove loose surface material by wire brush or power washing
- Allow surface to dry
- Sweep or vacuum remaining loose material
- Seal surface with masonry sealer designed to repair and rebind surface (restore surface to sound state)
- In some cases, masonry patch work will need to be performed prior to sealing





CRACKING

DEFINITION

- Splitting of a dry paint film between coats or down to bare substrate
- Initially, defect appears as fine microscopic or hairline cracks which can expand and connect with nearby cracks; additional stress and water intrusion into these areas develops into a flaking or peeling paint defect

POSSIBLE CAUSES

- Using a paint with inadequate flexibility and adhesion for the substrate to be painted (improper product selection for job application)
- Application of paint to highly caustic or acidic surfaces
- Overspreading or overthinning of the paint resulting in low dry film build
- Painting under improper, adverse weather conditions which do not allow proper cure of the paint film (for example, using a 50°F capable product for a 35°F application)
- Improper surface preparation and/or lack of sealer or primer prior to topcoat application

CRACKING SOLUTIONS

- Remove all cracked, loose peeling paint with a wire brush, paint scraper, power washing, abrasive blasting or paint remover depending on severity of cracking*
- Rinse surface thoroughly and allow to dry
- Check pH and moisture content of surface
- Prime or seal surface with appropriate product for substrate and application conditions
- Apply appropriate quality topcoat for substrate and application conditions

*WARNING! If you scrape, sand, or remove old paint, you may release lead dust or fumes. LEAD IS TOXIC. EXPOSURE TO LEAD DUST OR FUMES CAN CAUSE SERIOUS ILLNESS, SUCH AS BRAIN DAMAGE, ESPECIALLY IN CHILDREN. PREGNANT WOMEN SHOULD ALSO AVOID EXPOSURE. Wear a properly fitted NIOSH-approved respirator and prevent skin contact to control lead exposure. Clean up carefully with a HEPA vacuum and a wet mop. Before you start, find out how to protect yourself and your family by contacting the USEPA National Lead Information Hotline at 1-800-424-LEAD or log on to www.epa.gov/lead.

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BLISTERING

DEFINITION

- Loss of adhesion and raising of the paint film from the substrate or underlying paint layers
- Defect is observed as bubbles (intact or burst) in the paint film

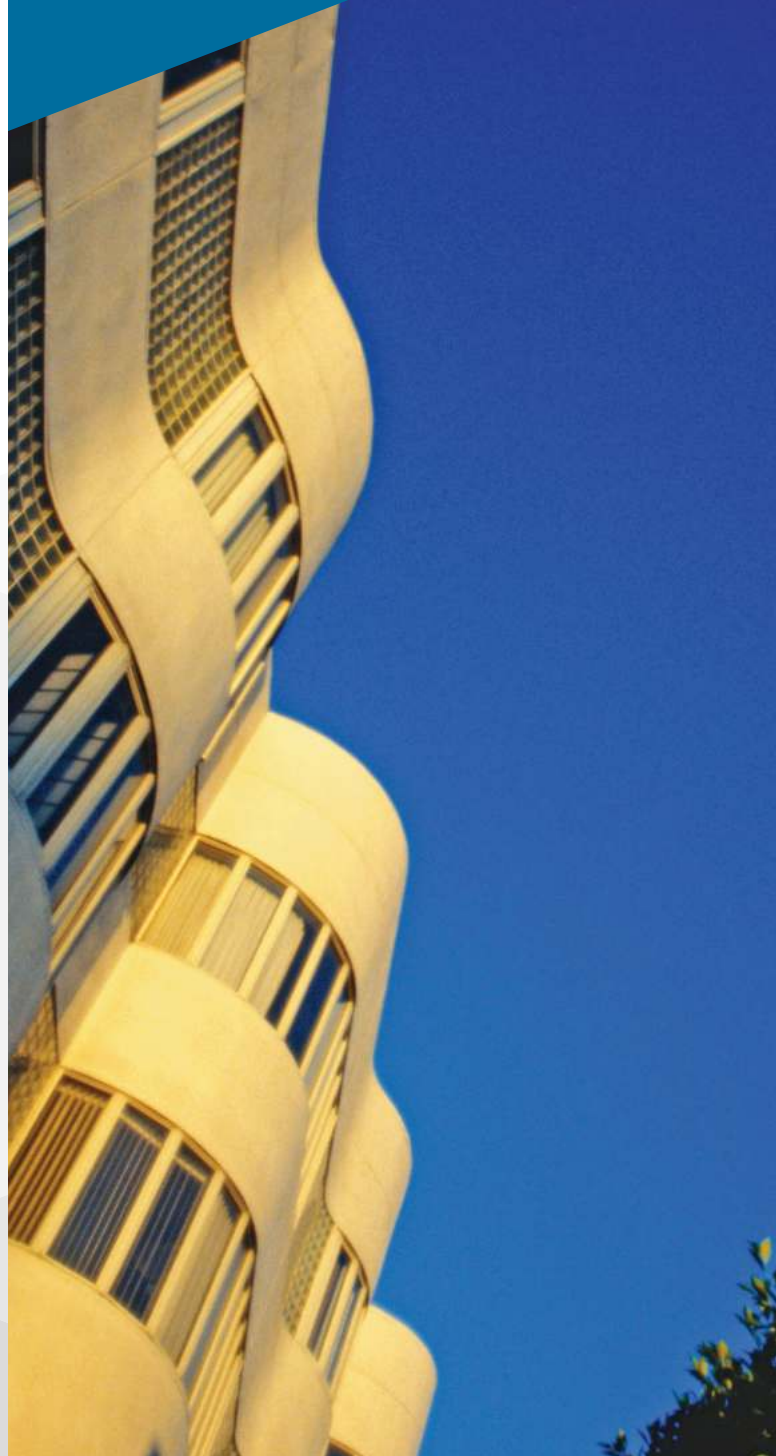
POSSIBLE CAUSES

- Applying paint to damp or wet surfaces
- Overbuilding or over application of product (excessive film build which does not allow proper cure of the paint film)
- Recoating before proper drying and cure of previously applied primer or topcoat layer
- Inadequate or improper surface preparation or building repair, particularly in areas that show residual water problems
- Painting in humid, misty or rainy conditions
- Painting late in the day when dew and condensation are likely to form prior to adequate cure of paint film
- Exposure of the paint film to rain or snow prior to cure
- Painting under hot, humid conditions in direct sunlight
- Improper selection of spray equipment (for example using a retail power sprayer for high viscosity products)

BLISTERING SOLUTIONS

- Repair, correct any structural water problems
- Remove all blistered paint with a wire brush, paint scraper, power washing, abrasive blasting or paint remover*
- Sand to feather areas to a smooth, sound surface
- Patch or chalk open seams that would allow moisture penetration into the structure
- Rinse surface thoroughly and allow to dry completely
- Prime and topcoat properly prepared surface with products appropriate for substrate and application conditions and follow recommended film build and drying instructions

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MOLD/MILDEW

DEFINITION

- Growth and appearance of black and/or colored spots on paint surface that are due to fungal or algal growth (note some algal growth are red and green)
- Spots can have filaments or tentacles that extend beyond the primary spot and can grow above or below into the paint layers and substrate


POSSIBLE CAUSES

- Structural areas which are consistently damp with little to no direct sunlight to allow surface drying (such as northern exposure areas, under eaves, behind shrubbery and trees)
- Failure to remove mildew, mold or algae from surfaces (paint and substrate) prior to paint application
- Use of a low-quality paint that does not contain sufficient mildewcide for protection of the dry paint film
- Presence of rotting or decomposing wood near structure (such as compost heaps, fireplace wood stacks, unpainted or unsealed pallets, etc.)

MOLD/MILDEW SOLUTIONS

- Test surface to confirm fungal growth (as opposed to dirt deposits) with household bleach*, let sit for a minute, and rinse with water. If the dark spots are removed or disappear, the spots are likely mold/mildew due to fungal growth
- Completely remove all mold and mildew growth by using PPG Mildew Check® Multi-Purpose Wash 18-1*
- Treat all exposed areas that are accessible on the structure (board ends and backs)
- Rinse thoroughly and allow surface to dry
- Apply to all exposed areas, high-quality primer and topcoats which contain ingredients for mildew resistance to prevent fungal growth on the surface of the dry paint film

*Manufacturer's instructions must be followed when using these products



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STAINING

DEFINITION

- Appearance of discolored areas or spots on bare or painted surfaces

POSSIBLE CAUSES

- Exposure of painted or unpainted surface to chemicals such as oils, strong acid or caustic chemicals, solvents, household cleaners, automotive fluids and pool water
- On horizontal, traffic-prone areas, such as garages and driveways, hot tires can leave black marks and/or delaminate previously applied coatings

STAINING SOLUTIONS

- Clean surfaces immediately after spills to prevent staining
- Clean stained surfaces to remove as much of the stain as possible with appropriate cleaner or by sanding, wire brushing or power washing
- Properly prepare surface for painting
- Seal oil stains with alkyd product to prevent bleed through
- Paint cleaned surfaces with stain-resistant primer and topcoat products



