# SURFACE PREPARATION

Like a building, paint systems are only as good as the foundation which supports them. For maximum performance of a coating, the surface must be adequately prepared to provide long lasting adhesion of the coating to the substrate, thereby reducing the cost of maintenance repainting. The number one cause of paint system failure is improper or insufficient surface preparation.

This section covers the proper and most effective surface preparation methods. The recommended surface prep will vary depending on the substrate, the condition of the substrate and/or existing coatings, and the material to be applied. The selection of tools and surface preparation methods are the responsibility of the painting contractor.

Prior to any surface preparation, correct all construction defects such as spalled bricks, rotting wood, or rusting steel which may cause or contribute to paint failure. The most common cause of exterior paint failure is moisture intrusion. Leaking gutters, missing caulk, improperly installed flashing, roof leaks and open or uncapped parapets are just a few of the construction defects which will allow water to attack the paint film. These defects should be addressed prior to surface preparation and selection of finishing systems.

Varying conditions and coating requirements may alter the methods of surface preparation listed in this section. Upon request, Farrell Calhoun will send a technical representative to visit a project for the purpose of generating a surface preparation and painting specification. Farrell-Calhoun cannot be held responsible for improper or inadequate surface preparation.

# ALUMINUM

**GENERAL:**

Aluminum and aluminum alloys are widely used as materials of construction for store fronts, windows, doors, boats and aircraft. Aluminum products have an advantage over ferrous metals in that they are light in weight and do not rust or corrode when exposed to the air. Under normal exposure, aluminum produces aluminum oxide which forms a tight film and aids in preventing further oxidation.

Aluminum will rapidly corrode and pit when exposed to acids, alkalis, or their fumes. When aluminum is used under these exposures, it must be protected with the proper coating.

**SURFACE PREPARATION: *NEW* Aluminum**

Remove fabricating oil and lubricants by solvent cleaning with per SSPC-SP1. Weathering for a month to 2 months should remove these contaminants, but since this method is uncontrollable, Farrell-Calhoun recommends non-Hydrocarbon solvent cleaning prior to painting.

Prime with a 100% acrylic primer such as Farrell-Calhoun #697 100% Acrylic Bonding Primer or Farrell-Calhoun #5-56 All Purpose Metal Primer.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Aluminum / Aluminum Siding /Anodized Aluminum**

Remove all loose paint, dirt, and other surface contaminants by power washing, scraping, or sanding. Aluminum is a soft metal; caution should be taken when preparing the surface so as not to damage the aluminum. When power washing aluminum siding, never spray in an upward direction forcing water behind the siding. Remove mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section). Feather all rough and irregular paint edges as not to show through subsequent coatings. Anodized aluminum should be scuff sanded to provide tooth for paint application.

Prime with a 100% acrylic primer such as Farrell-Calhoun #697 100% Acrylic Bonding Primer or Farrell-Calhoun #5-56 All Purpose Metal Primer.

Priming is not required when using Farrell-Calhoun exterior 100% Acrylic products such as #200, #2200 or #2400 due to their excellent adhesion properties. It is always appropriate to check adhesion on all substrates before proceeding with the entire job.

# CONCRETE and MASONRY

**GENERAL:**

Concrete is made up of three basic components: water, aggregate (rock, sand, or gravel) and Portland cement. Cement, usually in powder form, acts as a binding agent when mixed with water and aggregate. Through a chemical reaction called hydration, the mix hardens and gains strength to form the rock-like mass known as concrete.

# TILT-UP CONCRETE

**GENERAL:**

Tilt-up concrete is poured into flat, horizontal forms on the floor of the building under construction. After curing, these slabs are lifted into place to form walls. Tilt-up concrete that has been cast against forms may be so smooth that it can adversely affect the adhesion of a coating.

Form release materials are used to separate the wall unit from the slab or form. Whenever tilt-up concrete is scheduled to be painted, forms should be coated with a release agent that will not leave a film on the concrete. Form oils or waxes should not be used on surfaces to be painted. This should be addressed in the concrete specifications. Where this type of form release material has been used, sandblasting may be necessary to assure proper adhesion between the paint and the concrete.

When tilt-up walls are raised into place, defective and/or irregular areas may need to be repaired. These irregularities are accentuated or magnified when painted with a coating with any amount of angular sheen. To minimize this condition, use a textured or flat finish with very little or no angular sheen.

**SURFACE PREPARATION: *NEW* Tilt-Up Concrete**

Allow new concrete to cure and dry for 30 days. Check for the presence of curing compounds, bond breakers, and form release agents by splashing water on entire panel surface. Water will not absorb into areas where these materials are present.

Remove all curing compounds, bond breakers, wax, form release agents, efflorescence, dirt, mildew and other surface contaminants by power washing or sandblasting (refer to *Mildew Removal* and *Efflorescence* on pages 17-18 of this section).

The surface must be thoroughly dry prior to painting. Check the alkalinity prior to painting - the pH should not exceed 10. If the pH reading is in excess of 10, consult your Farrell-Calhoun representative.

# CONCRETE MASONRY UNITS (CMU)

**GENERAL:**

Concrete Masonry Units (or Concrete Blocks) are available in a variety of types and sizes. CMU types include smooth faced, split faced, fluted and scored. Depending on the manufacturer, concrete block can vary dramatically in porosity and surface texture. This should be taken into consideration when selecting a primer, finish coat or stain system.

When the porosity of the CMU varies significantly from one block to another, it can cause textural differences which can make the finish paint coat appear to have different levels of sheen. This problem can be partially corrected by block filler; however, block fillers are not designed to resurface walls and will not completely obscure this surface difference. The blocks should be checked prior to installation, and the irregular blocks should not be used. Fill blocks using Farrell-Calhoun #470 Latex Masonry Block Filler or #470A Acrylic Latex Masonry Block Filler prior to painting. Block fillers must always be back-rolled or brushed into the surface to fill all voids and honeycombs.

**SURFACE PREPARATION: *NEW* Concrete Masonry Unit (CMU)**

Remove efflorescence, dirt, mildew and other surface contaminants by power washing (refer to *Mildew Removal* and *Efflorescence* on pages 17-18 of this section). Allow the surface to dry. Check the surface for alkalinity - the pH should not exceed 10. If the pH reading is in excess of 10, consult your Farrell-Calhoun representative. Bee holes, cracked or missing mortar and other surface defects should be repaired prior to painting. Parapets not protected by a metal cap must be sealed with an elastomeric sealant. Back sides of parapet walls must be coated or sealed.

# STUCCO

**GENERAL:**

Stucco is a cement mix with less aggregate. Stucco is used to form exterior finished walls and is applied by troweling over a wire mesh in a two coat application. Stucco can be troweled to any desired texture ranging from sand to knock down finish. If the stucco is troweled smooth, it is referred to as smooth cement plaster. Smooth cement plaster is a difficult surface for paint adhesion. Farrell Calhoun #697 100% Acrylic Bonding Primer should be used as a prime coat on smooth cement plaster.

Some stucco mixes have a very high alkalinity. If the pH is higher than 10 when the stucco is painted, adhesion and color will be affected. The most common problem with high pH or a "hot surface" is color burn out of the finish coat. Stucco should cure for at least 15 days prior to painting and a pH test performed.

**SURFACE PREPARATION: *NEW* Stucco**

Remove efflorescence, dirt, mildew and other surface contaminants by power washing (refer to *Mildew Removal* and *Efflorescence* on pages 17-18 of this section). Allow the surface to dry. Check the surface for alkalinity - the pH should not exceed 10. If the pH reading is in excess of 10, consult your Farrell-Calhoun representative.

# BRICK

**SURFACE PREPARATION:**

Remove efflorescence, dirt, mildew and other surface contaminants by power washing (refer to *Mildew Removal* and *Efflorescence* on pages 17-18 of this section). Allow the surface to dry. Point up missing or cracked mortar joints.

Glazed brick must be brush blasted prior to painting. Bricks that contain iron salts may require a stain killing primer such as Farrell-Calhoun #697 100% Acrylic Stain Killer/Bonding Primer. Two primer coats may be required. A small area should be tested before completing the entire job.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Concrete and Masonry**

Remove all dirt, chalk, efflorescence, mildew and other surface contaminants by power washing and scraping (refer to *Mildew Removal* and *Efflorescence* on pages 17-18 of this section). Patch holes and other surface defects with the proper patching material. Texture patched areas to blend with the adjacent wall surface. Patched areas may have a different porosity and require additional primer coats to achieve a uniform sheen. Point up all bee holes and missing mortar as needed on CMU walls. Replace caulk which is missing or in bad repair. Parapets that are not protected by a metal cap should be coated with an elastomeric sealant. Back sides of parapet walls must be painted or sealed.

Below grade concrete products, such as stem walls and foundations should be coated with a film forming waterproof coating from the ground level down to the footing. This will prevent wicking moisture from attacking the above grade coating.

# CONCRETE FLOORS

**GENERAL:**

Surface preparation and cleaning of the concrete are the foundations for success or failure of concrete floor coatings. Concrete must be permitted to cure for 30 days to 6 months, depending on the surface conditions and the coatings to be applied. Concrete floor are initially very alkaline or "hot" having a pH of 13 to 14. The curing period allows the concrete to become less alkaline and the moisture content to drop or normalize. When adequately cured, the pH of the concrete should be around 9.0 to 10.0.

When applying a coating, it is important to have a firm base free of dirt, loose particles, grease, oils and laitance. Laitance is a fine powder-like material which may be found on the surface of hardened concrete. It can be as much as 1/16 inch thick and it is very weak and brittle. If painted over, this thin and brittle layer of cement rich material can disintegrate, causing paint failure.

Before painting a floor, determine if curing agents were applied at the time the concrete was poured. These membranes, which can be clear or pigmented, are applied in a liquid form to freshly poured concrete. They dry quickly to form a film of low permeability that retains moisture in the floor. The membranes may be weakly bonded to the concrete and provide little or no bond to subsequent coatings. Certain curing membranes may become softened by coatings containing solvents, or the curing membranes may break the bond between the concrete substrate and the subsequent coatings.

Various hardener chemicals or slick troweling methods are frequently applied to floor slabs to reduce dusting. These chemical hardeners produce a very slick, hard and dense surface to which the paint coating will not adhere. When painting a floor to which these hardeners have been applied, sandblasting is required as the primary method of surface preparation.

**SURFACE PREPARATION: *NEW* Concrete Floors**

Select the finish coat prior to preparing any concrete floor for painting. Select a finish coat appropriate for the intended use of the floor and prepare the floor according to the coating manufacturer's written instructions.

Moisture content should not exceed 12%. Perform a moisture test by taping down a one foot square piece of heavy gauge plastic to the floor in several areas. Leave overnight and inspect for condensation after 12 to 24 hours. If moisture is present, contact your Farrell-Calhoun representative. Moisture in concrete may cause excessive internal vapor pressure, which may cause the coating to blister and peel.

Remove all dirt, dust, grease, oil, laitance, curing compounds, chemical hardeners, and other surface contaminants prior to coating by solvent cleaning, acid etching, scarifying, sandblasting or water blasting. The floor should be dry, and neutral or slightly alkaline prior to paint application. If solvent-based coatings are to be applied, ventilation should be adequate to draw off the solvent vapors, which are heavier than air. Accumulation of these vapors could cause an explosion and/or health hazards.

Where the wall comes in contact with the floor, apply an acrylic caulk to prevent moisture from getting under the paint film. It is imperative that the floor is dry prior to the application of any coating. Always follow the manufacturer's written instructions.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Concrete Floors**

Remove all loose paint, dirt, dust, grease, oil, laitance and other surface contaminants by solvent cleaning followed by a detergent wash. Rinse with clear water and allow the floor to dry. Feather rough and irregular paint edges so that they do not show through subsequent coats. Test areas of bare concrete for openness of the concrete. If the concrete is not open, follow the acid etching instructions. Power sanding or shot blasting of the floor may be necessary, depending on the condition of the original coating and the requirements of the coating that is to be applied. Fill holes and other surface defects with a floor leveling material.

Check the floor for moisture. Moisture content should not exceed 12%. Caulk areas where the walls come in contact with the floors to prevent moisture from getting under the paint film.

**NOTE:** Many concrete floors, such as those found in maintenance or automotive facilities, have grease and oil deeply imbedded in them. This grease and oil can migrate to the surface of the floor if it is forced dried. These contaminants can be removed by detergents, TSP, or other appropriate cleaners. If both degreasing and acid etching are necessary, the degreasing must be done prior to etching. Allow the floor to dry at room temperature after cleaning, and after coating application. Do not use space heaters or any other methods to force dry the floor.

**NOTE:** Compatibility between the old and new paint must be considered when selecting a paint system for repainting. Always test the area before painting to check for adhesion, lifting or cratering problems**.**

**SURFACE PREPARATION METHODS: ACID ETCHING INSTRUCTIONS**

**NOTE:** <u>If Acid Staining the concrete, **DO NOT** Acid Etch.</u>

**CAUTION:** Always pour acid into water to prevent the mixture from splashing hot acid. Acid is capable of producing severe chemical burns. Always wear protective goggles, rubber gloves, rubber footwear, and protective clothing, and provide sufficient ventilation, when using acid mixtures.

1. Mix 1 gallon of muriatic acid to 4 gallons of water in an all plastic bucket.
2. Pour the acid mixture over the entire floor area that is to be painted.
3. Allow the acid to work for 15 to 20 minutes or until the bubbling action has stopped.
4. Flush the floor with clean water wash to neutralize the acid.
5. Rinse thoroughly with clean water and allow the floor to dry.
6. Test the concrete by pouring some water on the floor. If the water penetrates quickly the concrete is open. If the water puddles, repeat the above process. Shot blasting may be necessary to open some concrete floors.

# ACID STAINING – CONCRETE FLOORS

Acid stains react with the alkalinity in the concrete. Acid stains chemically bond metallic ions with the lime component in the concrete to form various colors that are permanent.

**SURFACE PREPARATION:**

First, test the concrete to determine if it will accept the stain by pouring water on to the floor. If the water is absorbed, the floor will accept the stain. If the water beads, open the concrete (allowing the stain to penetrate the concrete) using a concrete grinding machine, sandblasting, or sanding equipment.

**NOTE: Never use alkali cleaners or muriatic acid on a concrete floor to be acid stained.**

**NOTE: New concrete slabs must cure for at least 6 weeks prior to staining.**

**NOTE: For best results, use a pure cement mix (a mix without fly ash). Fly ash will inhibit the ability of the acid stain to react properly with the alkalinity in the concrete.**

1. Clean the floor thoroughly with a mild solution of TSP and a stiff scrub brush. Rinse the floor thoroughly with fresh water and remove with a wet/dry vacuum. If mopping, it may take several moppings in order to get the floor completely clean. Allow the floor to dry completely.

2. If cutting or scoring the floor, perform these after the floor has been cleaned and allowed to dry. Depth of the cuts should not exceed 1/8 inch. Vacuum up the concrete dust created by the cutting or scoring.

3. Always protect walls, woodwork, metal and other surrounding surfaces. Stain the floor to desired color. Concrete stains will produce a mottled effect due to porosity differences in the concrete. Always test the intended color before staining the entire floor.

4. After the floor has completely dried, remove the residue with clean water and a stiff scrub brush. Use a wet/dry vacuum to remove water. Allow to completely dry. Seal the surface using a seal coat designed for the intended use of the floor.

# FERROUS METAL

**GENERAL:**

Ferrous metals contain iron and include mild steel, carbon steel, stainless steel, cast iron, and wrought iron. Ferrous metals are produced by cold rolling, hot rolling, casting and forging. Hot rolling is a mill process that involves rolling the steel at extremely high temperatures and can result in the formation of magnetic iron oxide (mill scale). This mill scale must be removed prior to painting.

Due to the high amounts of carbon in ferrous metals, most are vulnerable to rust when exposed to the elements. Because of this, ferrous metals are usually shop primed at the fabricating facility. Always check the primer coat after delivery to the job site to assess if primer was applied at the proper mil thickness. When high performance coatings are to be applied, the shop coat primer is often removed and/or re-primed with a compatible primer for the finish coat.

**SURFACE PREPARATION: *NEW* Ferrous Metal**

Remove all dirt, grease, mill scale and other surface contaminants by solvent washing. Remove loose primer and rust by sanding or scraping. Sand blast the metal in accordance with the Steel Structures Painting Council Specification for the exposure applicable to the steel use (refer to *SSPC Specifications* on pages 19-20 of this section).

Weld spatter should be removed prior to painting by the use of a chipping hammer, spud bar or scraper. Tightly adhering weld spatter may require removal by grinding.

Prime ferrous metal with Farrell-Calhoun Rust-Stop Primers #1022, #1024, #1028, #1069 or Barrier Coat Primers #23-54, #1025, #1029.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Ferrous Metal**

Many exterior metals have been previously painted with an alkyd coating or high performance coating such as an aliphatic urethane. These coating tend to chalk on exterior exposure and require special attention for the removal of this chalk. The most efficient method of removal is power washing. Perform a cross-hatch test for adhesion before proceeding with the entire job.

Remove all rust, loose and peeling paint, dirt, chalk and other surface contaminants by power washing, sanding, scraping or sand-blasting. Remove mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section).

Feather all rough and irregular paint edges as not to show through the subsequent paint coats. Immediately after cleaning, prime all bare metal with the appropriate Farrell-Calhoun Rust-Stop or Barrier Coat Primer.

# GALVANIZED/ZINC COATED METAL

**GENERAL:**

Galvanized metal is a ferrous metal which has been coated with molten zinc by either hot dipping in molten zinc or electroplating. By preventing air and moisture from reaching the ferrous metal, zinc coated metals are highly resistant to rusting. If the zinc film is disturbed by scratching or gouging, a chemical reaction occurs forming zinc hydroxides and carbonates, which prevents the underlying ferrous metal from rusting.

Under humid conditions, zinc coated metals produce white rust. Manufacturers may use chromate solutions, oils, waxes and silicones to minimize white rust. These solutions, which protect the galvanized metal, will cause adhesion problems for paint coatings and must be removed prior to paint application.

**SURFACE PREPARATION: *NEW* Galvanized Metal**

Allow galvanized metal to weather at least 6 months prior to coating. Remove mill scale, fabricating oil, lubricants and other surface contaminants by non-hydrocarbon solvent cleaning per SSPC-SP1. Weathering will remove these contaminants, however this method is uncontrollable and Farrell-Calhoun recommends solvent cleaning galvanized metal prior to painting. Chromate or silicate treatments must be removed by sanding or brush-off blast cleaning. Consult the manufacturer for the type of "white rust" protector used.

Prime new galvanized/zinc coated metals with a 100% acrylic primer such as Farrell-Calhoun #697 100% Acrylic Bonding Primer or Farrell-Calhoun #5-56 All Purpose Metal Primer.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Galvanized Metal**

Remove loose paint, oil, chalk, dirt and other surface contaminants by power washing, scraping or sanding. Remove mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section). Feather rough, irregular paint edges as not to show through subsequent paint coats. Fill dents and other surface imperfections with an appropriate patching material and sand back to the original surface level. Glossy surfaces should be scuff sanded and dulled to provide "tooth" for the new coating.

Prime bare metal areas with a 100% acrylic primer such as Farrell-Calhoun #697 100% Acrylic Bonding Primer or Farrell-Calhoun #5-56 All Purpose Metal Primer.

# GYPSUM BOARD

**GENERAL:**

Gypsum is a rock like material, generally colorless or white, that is made up of calcium sulfate and 20% water. Gypsum wallboard is produced by pressing a gypsum core between two strong, durable paper layers. The strength of the product is proportional to thickness. When installed, the joints between the panels and the fasteners are coated with tape and joint cement to form a continuous smooth wall. A variety of textures may be added to the wall to create the desired aesthetic appearance.

Drywall finishing is divided into six levels (Level 0 to Level 5) according to the "Recommended Specification: Levels of Gypsum Board Finis." Level 5, which is a complete skim coating of joint compound applied to the gypsum board, is recommended for achieving the most uniform surface for painting. Level 5 minimizes the possibility of the joints and fasteners showing through the finish coats of paint.

Water resistant gypsum wallboard is primarily used in wet areas such as showers, steam rooms or saunas that are exposed to high humidity levels, or as a base for ceramic tile. It is made with specially treated paper and waterproof gypsum. The paper is tinted light green to distinguish it from regular gypsum wallboard.

**SURFACE PREPARATION: *NEW* Gypsum Board**

Repair all holes and surface imperfections with putty or spackling compound and sand to a smooth finish. The gypsum board should be dry and free of any dirt, sanding dust or other foreign contaminants. Remove sanding dust and dirt by vacuuming or wiping with a damp sponge. Prime with Farrell-Calhoun #380 Perfik-Seal Latex Primer/Sealer or #475 Perfik-Kote High Build Primer/Sealer.

#380 Perfik-Seal Latex Primer/Sealer and #381 Clear Perfik-Seal are also recommended as a base coat for wall coverings. Check the wall covering manufacturer's recommendation for sealers before installing.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Gypsum Board**

Remove dirt, grease, mildew and other surface contaminants by washing with a mild abrasive cleaner and water. The gypsum board should be dry before painting. Fill all holes and other surface imperfections with putty or spackling material. Remove mildew (refer to *Mildew Removal* on page 17).

**NOTE:** Most abrasive cleaners leave a residue which will act as a bond breaker for paint. This gritty layer must be rinsed off the surface prior to painting to prevent adhesion problems.

Repair any damaged areas with the proper patching material and sand smooth. Texture patched areas to blend with adjacent wall surfaces. Prime patched areas with Farrell-Calhoun #380 Perfik-Seal Primer/Sealer or #475 Perfik-Kote High Build Latex Primer/Sealer. #475 has a heavy bodied film which helps to minimize surface imperfections and irregularities.

# WOOD

Wood has been a favorite structural material for centuries. Wood plays a dominant role in residential construction and design, including cabinetry, trim, decking, siding, posts, columns and fences.

Wood is classified as “hard” or “soft”. Hardwood comes from deciduous trees such as oak and maple. Softwood comes from coniferous trees such as cedar or pine. Hardwoods are the choice for cabinetry and architectural mill-work and are normally stained or finished naturally. When soft woods are stained, special sealers are needed to assure even stain penetration due to their varying grain hardness.

Wood is dimensionally unstable, and if left unprotected, will warp, bend and twist leading to decomposition. Wood shrinks when it loses moisture and swells when it absorbs moisture which can make paint adhesion to wood surfaces difficult. Kiln drying helps to prevent some of these conditions.

Back priming or painting the unexposed side of architectural mill-work and exterior trim woods prior to installation prevents moisture from entering the wood from the back side, minimizing warping and paint peeling.

Due to the great differences in surface preparation requirements and finish coats selections, we separated wood into two sections; Interior Wood and Exterior Wood.

## INTERIOR WOOD

**GENERAL:**

Interior stained and naturally finished woods are normally hard woods due to their defined grain pattern and stability. Some soft woods are also used for these applications; however, special surface preparation may be required.

Soft woods are often chosen for interior trim work and shelving when paint is the selected finish. They are much lower in cost, and with their closed grain, provide a smooth surface for paint application. Alkyd or latex enamels are generally used as the finish coats.

Staining wood changes the color of the wood fibers without obscuring the texture or graining pattern. Since all woods take stain differently with regard to color and intensity of color, a sample of the intended stain should always be placed on the actual wood used for the project.

**SURFACE PREPARATION: *NEW* Interior Stained or Naturally Finished Woods**

When finishing any type wood with a stain or natural finish, solvent wash the surface to remove oil, grease, wax, dirt and other surface contaminants. Oil is often deposited on wood by handling. These oils will greatly affect the absorption rate of stain, causing a blotchy finish. Always solvent wash the wood and use care when handling cleaned wood. After solvent washing, sand any surface irregularities.

Never sand wood prior to solvent cleaning as this will drive oils into the wood grain causing uneven stain penetration. Sand only in the direction of the wood grain. Sanding across the grain will scratch the wood and show sanding marks when stained. Fill nail holes and other defects with a wood filler which will accept stain, or use pigmented wood filler. When an unstained or natural finish wood is desired, fill nail holes and other defects after application of the sealer coat. This will prevent the oils in the fillers from being drawn into the wood, and may greatly reduce the shrinkage of the filler.

When staining soft woods such as pine or fir, a pretreatment will even the porosity of the wood grain, providing a more even and desirable stain appearance.

**SURFACE PREPARATION: *PREVIOUSLY* Interior Stained or Naturally Finished Woods**

Surface must be dry and free of dirt, oil, grease, wax and remnants of old finishes. Removal of wax is assured only by using mineral spirits or commercial wax removing agents. Change wiping cloths often to assure wax pick-up. Fill nail holes and other surface irregularities with a sandable wood filler. Sand the areas to be coated leaving a smooth and level surface. If paint is the selected finish, prime with Farrell-Calhoun #599 Enamel Undercoater or #699 100% Acrylic Undercoater.

**SURFACE PREPARATION: *NEW* Interior Painted Wood**

Remove oil, grease, wax, dirt and other surface contaminants by solvent washing. Fill nail holes and other surface irregularities with a sandable wood filler. Priming the wood prior to filling the nail holes and irregularities will prevent oils in the filler from being absorbed into the wood. Failure to prime could cause improper drying, shrinking and cracking of the wood filler.

Priming bare wood is essential to maintain a uniform sheen. Primers are formulated to hold out enamels evenly and sand easily. Enamel hold out means that the paint will not penetrate the primer unevenly causing sheen loss or reduction of gloss.

Sand the entire area to be painted leaving a smooth and level surface. Prime the surface with Farrell-Calhoun's #599 Enamel Undercoater or #699 100% Acrylic Undercoater. After drying, sand the primer to a smooth finish and remove all sanding dust.

**NOTE:** When using latex enamel as a finish coat on shelving, always be certain that it is a 100% Acrylic or 100% Cross-linking Acrylic non-blocking type. Blocking is a term which refers to a paint coating sticking to itself or other objects which are placed on them, or are touching them with applied pressure.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Interior Wood**

Remove dirt, oil, grease, and other surface contaminants by solvent washing. Remove mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section). Sand glossy, enameled finishes in order to provide tooth for the new finish coat. Prime all bare wood with Farrell-Calhoun #599 Enamel Undercoater or #699 100% Acrylic Undercoater. When repainting over old finishes, always test a small area to insure the finishing system is compatible with the existing finish or coating.

# EXTERIOR WOOD

**GENERAL:**

Exterior woods are generally of the soft variety. These woods are used for trim, decorative columns, decks, overhangs, porches and siding.

When preparing wood for painting, bleeding woods such as redwood and red cedar must be primed with an oil-based primer such as Farrell-Calhoun #160 Exterior Undercoater to prevent tannins from bleeding through the paint film. Tannins are soluble pigments which are carried to the wood surface by moisture. Knotholes may require shellac to stop the tannin bleed through.

Lumber may be treated with a metallic wood preservative or a water soluble wood preservative which prevents wood decay, mildew and insect infestation. These materials may affect the adhesion and cause discoloration of paint on treated lumber. Treated lumber needs to dry for at least 30 days prior to painting in order to remove all moisture before painting. All six sides of the lumber must be painted for complete enclosure. For best results a breathable type of latex primer such as Farrell-Calhoun #235 100% Acrylic Primer should be brush or roller applied as the first coat.

**NOTE:** Freshly treated ACQ and CBA lumber is often a greenish brown color and will turn to a light tan color after exposure to sunlight. Once this color change happens, the wood will not discolor the latex stain or paint applied. If the lumber is stained or painted before the wood is seasoned, the preservatives may discolor the latex stain or paint.

**NOTE:** When staining bleeding woods such as redwood and cedar with Farrell-Calhoun #260 Exterior 100% Acrylic Stain, tannins may bleed through and discolor light or pastel colors. This tannin bleed through will highlight the wood grain and knotholes. If this is not the desired effect, use a paint system including a stain killing primer or oil-based stain.

Back priming or painting the unexposed side of exterior wood trim prior to installation prevents moisture from entering the wood from the back side. Back priming is highly recommended to minimize warping and paint peeling.

**SURFACE PREPARATION*: NEW* Exterior Wood**

Remove dirt, oil, wax, silicone and other surface contaminants by solvent cleaning, washing or sanding. Treat mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section). Fill nail holes and other surface defects with proper filler or caulk. Butt joints must be caulked after prime coat to prevent moisture from attacking the open end grain.

Prime all wood to be painted with Farrell-Calhoun #160 Exterior Undercoater or #235 100% Acrylic Primer, depending on the type of wood and the finish coat used. All exterior grade plywood should be primed with #235 100% Acrylic Primer.

**NOTE:** For best results, primer coats should be brush or roller applied to work the primer into the wood grain. If spray application is used, back rolling is essential on raw wood.

**SURFACE PREPARATION: *PREVIOUSLY PAINTED* Exterior Wood**

When repainting exterior wood, care should be taken to assure proper surface preparation. Aged exterior grade woods usually have loose dead fibers on the surface. These fibers will prevent the paint or primer from reaching a solid surface and may cause premature paint failure.

Remove dirt, chalk, loose and peeling paint, dead wood fibers and other surface contaminants by power washing, sanding or scraping. Power washing is the best recommendation for proper surface preparation. Silicone residue must be removed by solvent washing. Treat mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section). When power washing siding, never spray in an upward direction forcing water under the siding. Prime all areas where bare wood is exposed with Farrell-Calhoun #235 100% Acrylic Primer or #160 Exterior Undercoater.

# HARDBOARD SIDING

**GENERAL:**

Hardboard siding is composed of wood by-products. It is available with a baked-on factory primer or unprimed. If the hardboard is unprimed, check the manufacturer's recommendations for the appropriate type of primer and when to apply it.

Hardboard siding is used more frequently due to the shortage of quality virgin wood. Hardboard siding is generally dimensionally stable and accepts paint. Occasionally manufacturers will add silicone or wax to their primers to prevent the siding from blocking. This treatment can make paint adhesion very difficult, especially with latex coatings.

**SURFACE PREPARATION: *NEW* Hardboard Siding**

Remove dirt, dust and other surface contaminants by power washing. When power washing, do not spray in an upward direction forcing water under the siding. Remove oil, wax or silicone treatments by solvent cleaning. If water beads on the surface, waxes remain and additional cleaning is needed. Remove mildew with a bleach solution (refer to *Mildew Removal* on page 17 of this section). Caulk all butt joints and dissimilar materials with a quality acrylic latex caulking after priming. Caulk the bottom of the siding where it comes in contact with a concrete foundation to prevent wicking moisture.

Pre-primed siding must be spot primed when the factory primer has been damaged during shipment or installation. Prime all unprimed siding with Farrell-Calhoun's #235 100% Acrylic Primer. Consult manufacturer for recommendations.

**SURFACE PREPARATION:** ***PREVIOUSLY PAINTED*** **Hardboard Siding**

Remove dirt, chalk, mildew, loose and peeling paint and other surface contaminants by power washing (refer to *Mildew Removal* on page 17 of this section). When power washing, do not spray in an upward direction forcing water under the siding. Prime all areas as needed with Farrell-Calhoun #235 Acrylic Latex Undercoater.

**NOTE:** If swelling occurs on areas of the siding, check those areas for missing or damaged caulking or damaged siding.

# NOTES AND CAUTIONS

Always use caution and follow the manufacturer's warning labels prior to using chemicals and solutions which may pose a health hazard.

## MILDEW

Mildew growth is a common problem on both interior and exterior surfaces. Paint failure can result if mildew is not removed. Mildew thrives in warm, moist conditions, as well as in areas of low sunlight exposure. Mildew is a living organism and feeds on other organic material. If painted over, mildew will grow completely through the paint film even if the paint contains a mildewcide. Mildewcides are added to paint to inhibit mildew growth on the paint film itself. Mildewcides cannot neutralize existing mildew.

To remove and neutralize mildew, the following procedure is recommended:

1. Prepare a cleaning/neutralizing solution of 2 quarts warm water into which add 2 quarts liquid chlorine bleach, and 2 ounce liquid detergent.*

2. Use a medium soft brush or a power washer with a chemical injector to apply the solution.

3. After scrubbing, rinse thoroughly with plenty of clean water. The cleaning bleach may leave a residue which will drastically affect the adhesion of the new paint film if not completely removed.

4. After thorough drying, repaint the surface with a quality Farrell-Calhoun paint. Repaint as soon as possible after the surface has dried to prevent possible mildew spore growth from reoccurring.

***CAUTION:** Chlorine bleach should never be mixed with ammonia or any detergent containing ammonia. These mixtures will form vapors which can be harmful or fatal. When using mildew removers always wear protective glasses, rubber gloves and protective clothing. In case of skin contact, flush with plenty of clean water. In case of eye contact, flush with clean water and consult a physician.

**CAUTION:** When removing and neutralizing mildew on the exterior surfaces, wet down and then cover all vegetation in the work area. The bleach solution can harm or kill any vegetation which it contacts.

For a severe case of mildew, the mildew may need to be treated twice with the neutralizing solution or with straight bleach

Some interior surfaces are particularly prone to mildew growth. Shower stalls, bathrooms, and kitchens walls can have mildew growth on them because of the amount of moisture in the room. It may be advisable to apply #235 100% Acrylic Primer and an exterior paint to these areas to guard against mildew growth.

# EFFLORESCENCE

Efflorescence is a crystalline deposit of alkaline salts that have been carried to the surface of concrete or masonry by moisture. The degree of efflorescence can be greatly affected by ambient conditions of temperature and moisture.

Efflorescence is usually white in color and causes white discoloration, blotchy spots and streaks on concrete and masonry. Besides creating a cosmetic problem, efflorescence will cause an adhesion problem if not removed prior to painting.

Because most efflorescence salts are water soluble, they can be removed by dry brushing and water rinsing, Power washing is also very effective.

To remove efflorescence on more stubborn areas, follow this procedure:

**CAUTION:** Always pour acid into water to prevent the mixture from splashing hot acid. Acid is capable of producing severe chemical burns. Always wear protective goggles, rubber gloves, rubber footwear, and protective clothing when using acid mixtures.

1. Mix 1 part muriatic acid to 6 parts of water (make a 5% solution of muriatic acid). Before applying acid, dampen the surface with clean water to prevent absorption into the surface.

2. Apply the mixed solution to the affected areas using a plastic sprayer. Light scrubbing may be necessary to dissolve the efflorescence.

3. Rinse the treated area thoroughly with plenty of clean water, and allow to dry.

# SSPC SPECIFICATIONS

These are the basic standards for preparing ferrous metal as determined by the Society for Protective Coatings (SSPC) and the National Association of Corrosion Engineers International (NACE).

SSPC-SP1 Solvent Cleaning
Removal of all visible oil, grease, dirt, soil, drawing and cutting compounds, and other soluble contaminants from steel surfaces with solvent, vapor, cleaning compound, alkali, emulsifying agent, or steam.

SSPC-SP2 Hand Tool Cleaning
Removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by hand chipping, scraping, sanding, and wire brushing.

SSPC-SP3 Power Tool Cleaning
Removes all loose mill scale, loose rust, loose paint, and other loose detrimental foreign matter by power wire brushing, power sanding, power grinding, power tool chipping, and power tool descaling.

SSPC-SP5 / NACE 1 White Metal Blast Cleaning
When viewed without magnification, the surface shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter.

SSPC-SP6 / NACE 3 Commercial Blast Cleaning
When viewed without magnification, the surface shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter of at least 66-2/3% of unit area, which shall be a square 3 in. x 3 in. (9 sq. in.). Light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coating in less than 33-1/3% of the unit area is acceptable.

SSPC-SP7 / NACE 4 Brush-Off Blast Cleaning
When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating. Tightly adherent mill scale, rust, and coating may remain on the surface. Mill scale, rust, and coating are considered tightly adherent if they cannot be removed by lifting with a dull putty knife.

SSPC-SP10 / NACE 2 Near-White Blast Cleaning
When viewed without magnification shall be free of all visible oil, grease, dust, dirt, mill scale, rust, coating, oxides, corrosion products and other foreign matter of at least 95% of each unit area. Staining shall be limited to no more than 5 percent of each unit area, and may consist of light shadows, slight streaks, or minor discolorations caused by stains of rust, stains of mill scale, or stains of previously applied coatings. Unit area shall be approximately 3 in. x 3 in. (9 sq. in.).

SSPC-SP11 Power Tool Cleaning to Bare Metal

When viewed without magnification, the surface shall be free of all visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter. Slight residues of rust and paint may be left in the lower portion of pits if the original surface is pitted. The surface profile shall not be less than 1 mil (25 microns).

SSPC-SP12 / NACE 5 Surface Preparation and Cleaning of Steel and Other Hard Materials by High- and Ultra High- Pressure Water Jetting Prior to Recoating

This standard requires water jetting at high- or ultra high-pressure to prepare a surface for recoating using pressure above 10,000 psi. Water jetting will not produce a profile; rather, it exposes the original abrasive-blasted surface profile. Water jetting shall be performed to meet four conditions: WJ-1, WJ-2, WJ-3, and WJ-4, and a minimum acceptable surface shall have all loose rust, loose mill scale, and loose coatings uniformly removed.

SSPC-SP13 / NACE 6 Surface Preparation of Concrete

Provides requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.

SSPC-SP14 / NACE 8 Industrial Blast Cleaning

Removal of all visible oil, grease, dust and dirt, when viewed without magnification. Traces of tightly adherent mil scale, rust, and coating residues are permitted to remain on 10% of each unit area of the surface if they are evenly distributed. Shadows, streaks, and discoloration caused by stains of rust, stains of mill scale, and stains of previously applied coating may be present on the remainder of the surface

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