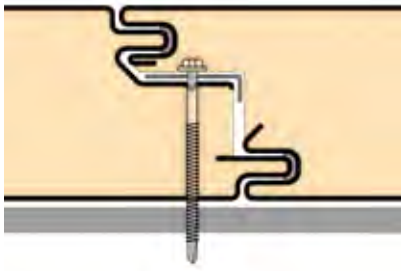
ATAS International, Inc.

Sustainable Building Envelope Technology

HANDLING AND MAINTENANCE GUIDE

ISOLEREN®
INSULATED METAL PANELS



ISOLEREN HANDLING AND MAINTENANCE GUIDE

ISOLEREN ML

ALL INFORMATION CONTAINED IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE

Table of Contents

Handling

Receiving the Shipment

Immediately upon delivery of the insulated metal panels and accessories, crosscheck the delivered materials against the Shipper to insure a complete shipment. Any discrepancy, shortage or damage must be noted immediately on the Bill of Lading. The shipping company is responsible for delivering material in an undamaged state. If damage is observed, segregate the damaged materials. Freight claims are handled directly with the shipping company.

Unloading the Materials

Exercise extreme care when unloading insulated metal panels. The panels may be unloaded by forklift, crane or by hand. When unloading with a forklift, unload the bundles one at a time. Hard surfaces such as the forklift mast should be padded to guard against damage. Use two forklifts if unloading 2" , 2.5" & 3" panel bundles greater than 36' or 4", 5" & 6" panel bundles greater than 48'. Ensure the forks are as far apart as possible (5' minimum). Hand unloading is appropriate on smaller projects.

Material Movement

Use proper care in moving the insulated panels. Handle panels in a fashion that will not bend, dent, scratch and/or otherwise damage the product. Improper handling of the panels can be hazardous to the workers and can cause damage to the panels and adjacent materials. It is the installer's responsibility to ensure a safe and secure method of lifting and setting panels. Always lift panels when separating from a bundle, avoid dragging. Lift panels from the bottom face only. Do not lift the panels by the edge of the top metal face; this may cause the metal face to delaminate from the foam core. When turning or tilting the panels, place a cushioning material under the panel edge to prevent crushing or other damage. Roll the panel on the male leg only.

Installation

Use proper care when installing the insulated panels. During installation, examine the individual panels both before and after placement. Damage may not be readily apparent until a panel is installed. Considering the interlocking side-joint, it is vitally important to examine each previously installed panel prior to installation of the next panel. Immediately notify the manufacturer of any panel defects. Do not install defective/damaged panels.

Storage

Store the panels in a clean, level, protected and sufficiently compacted area. Provide ventilation if the bundles are exposed to moisture; further, elevate one end of the bundle to ensure adequate runoff. Slit the stretch wrap at 5'-0" intervals along each side at the bottom of the bundles to allow for evaporation of any moisture within the bundles. Do not stack more than two bundles high. Stack material to prevent twisting, bending, abrasion, scratching and denting. Protection must extend to open bundles as well. If left overnight, open bundles must be temporarily tarped and tied down.

- *Please review USS Technical Bulletin: Storage Stain*

Strippable Film

Panels and trim are delivered with strippable film. This film is utilized to provide protection of the metal surfaces during manufacture, shipment and installation. Remove any and all strippable films either prior to or directly following installation. Take deliberate measures to avoid exposure of the film to direct sunlight for more than 24 hours.

Steel Debris

Immediately remove any and all steel debris including but not limited to iron fines left from cutting and/or drilling, weld splatter, nails, screws, staples, nuts, and rivet shanks.

- *Please review USS Technical Bulletin: Staining of Building Panels From Steel Debris*

Corrosion

Prevent galvanic action of dissimilar metals. This includes but is not limited to any direct contact of panels and/or trim with treated lumber or copper lightening attenuation equipment or indirect contact constituted by water runoff from HVAC drain-lines, etc.

- *Please review USS Technical Bulletin: Conditions Corrosive to Hot-Dip Galvanized and Galvalume® Coated Steel Sheet*

Cleaning

Keep the interior and exterior panel surfaces clean. Immediately remove dust, dirt, mud, mortar, chalk, excess sealants or any other type of foreign substance from the panel surfaces.

- *Please review Valspar document: Cleaning and Maintenance Guide for Fluoropolymer Coatings*
- *Please review Valspar document: Cleaning and Maintenance Guide for Silicone Polyester Coatings*
- *Please review Valspar document: Cleaning and Maintenance Guide for Polyester Coatings*
- *Please review USS Technical Bulletin: Cleaning Painted Metal Buildings*

Field Painting

"Touch up" minor damage to factory applied finishes using factory approved, matching coatings provided by the manufacturer.

- *Please review MCA Technical Bulletin 1051: Metal Panel Field Repainting*

Appendix

1. United States Steel Corporation Technical Bulleting: *Storage Stain*
2. United States Steel Corporation Technical Bulleting: *Staining of Building Panels From Steel Debris*
3. United States Steel Corporation Technical Bulleting: *Conditions Corrosive to Hot-Dip Galvanized and Galvalume® Coated Sheet Steel*
4. Valspar Document: *Cleaning and Maintenance Guide for Fluoropolymer Coatings*
5. Valspar Document: *Cleaning and Maintenance Guide for Silicone Polyester Coatings*
6. Valspar Document: *Cleaning and Maintenance Guide for Polyester Coatings*
7. United States Steel Corporation Technical Bulleting: *Cleaning Painted Metal Buildings*
8. MCA Technical Bulletin 1051: *Metal Panel Field Repainting*

United States Steel Corporation

Technical Bulletin Construction

STORAGE STAIN

TBP 2012.9

What is Storage Stain?

Metallic coated steel products, such as hot-dip galvanized and GALVALUME®[1] Coated Sheet Steel, owe much of their excellent corrosion resistance properties to a protective oxide which is formed and replenished when their surfaces are exposed to freely circulating air. However, if the same surfaces are exposed to moisture for prolonged periods of time, in the absence of freely circulating air, white or black corrosion products begin to develop. Such conditions can occur when moisture is trapped between the laps of a coil of hot-dip galvanized or GALVALUME® Coated Sheet Steel. The same conditions can also occur when moisture is trapped between the stacks or bundles of improperly stored formed panels at a construction site. The ensuing white, black or intermediate gray corrosion products are commonly referred to as storage stain.

Figure 1 shows an example of a black storage stain on a roof panel. Figure 2 shows an example of white rust storage stain on a hot-dip galvanized coil. Staining can also occur when moisture permeates between a strippable film and the metal coating. This unique "worm tracking" pattern is a combination of black and white corrosion product as shown in Figure 3.

Once the storage stain is formed, it is very difficult to remove. It is not only aesthetically unappealing, it can also indicate permanent damage to the integrity of the products depending on the amount of time the product has been stored under the improper conditions. The only practical option is to prevent storage stain from occurring in the first place.

Figure 1. Black storage stain on a GALVALUME® roof panel.

Figure 2. White rust on the surface and sidewall of a galvanized coil.

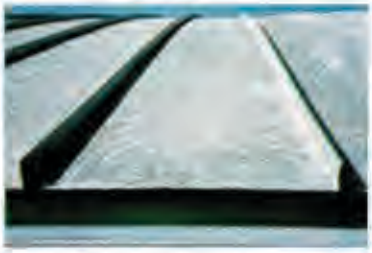


Figure 3. Stain on a GALVALUME® roof panel under strippable coating.

Preventing of Storage Stain in Coils

To prevent storage stain, manufacturers of galvanized and GALVALUME® Coated Sheet Steel use two basic principles: prevent water from penetrating the laps of coils, and reduce the corrosive effect of moisture should it penetrate the coil laps.

Moisture is prevented from damaging the surfaces of coated steels in coil form by a variety of methods including:

1. Passivation Treatment
A chemical treatment is applied to the surface of coated steel products, which chemically reduces the reactivity of the coated surface with moisture. Such treatments significantly extend the storage life of coated steel products when they are stored under adverse conditions, but it cannot indefinitely prevent the occurrence of storage stain. In addition, the passivation treatments cannot always be used if the product is to be subsequently painted.

2. Oiling
The application of oil to the surface of coated products during manufacture prior to coiling is also effective in reducing moisture penetration. Two types of oils are used: slushing oils and vanishing oils. These oils generally also contain corrosion inhibitors, which can slow the effects of moisture during storage. They also provide lubrication during subsequent forming operations. Vanishing oils are often used for construction products since they are designed to evaporate during manufacturing.

3. Edge Sealers
These are more viscous oils or greases applied to the side-walls of steel products after coiling to prevent moisture from entering between the coil laps.

4. Packaging
Coils are wrapped in tear resistant, waterproof paper wrapping for transportation and storage. The papers often contain vapor phase corrosion inhibitors (VPI), which are volatile at ambient temperatures and are slowly released from the paper, and then penetrate the laps of the enclosed coil along with any water vapor that might also be present and reduce its corrosive effect.

5. Storage
If the temperature of a steel coil is lower than the dew point of the surrounding air, water from the surrounding air will condense on the surfaces of the coil. This is a condition known as "sweating". The mass of a steel coil is capable of condensing large quantities of water under such conditions. This water can penetrate the laps either by capillary action or by high humidity air penetrating the laps and subsequently condensing water on surfaces between coil laps.

Therefore, it is important to store coils of coated steel products in controlled environments so that the dew point of the ambient air is always below the temperature of the coils being stored.

Storage and Handling of Formed Panels

Formed panels are normally stacked and bundled for shipment and storage. This also introduces conditions for storage stain if sufficient care is not taken in the packaging and storage of these bundles.

Paper wrapping should be used to protect the bundles of material from dirt and moisture. Plastic or other non-breathing material should not be used for wrapping bundles because these materials prevent air passage and tend to trap moisture in the bundle. The top wrapping sheet of each bundle should lap **over** the bottom paper, to prevent rainwater from entering the bundle (see Figure 4). All panel bundles should be accompanied by a tag or other listing that clearly describes each bundle's contents.

Each bundle should be inspected upon receipt, and any damage, corrosion or wet material must be noted on the delivery documents. Wet material should be dried according to the panel manufacturer's instructions. Panels and accessories should not be stored in a wet condition.

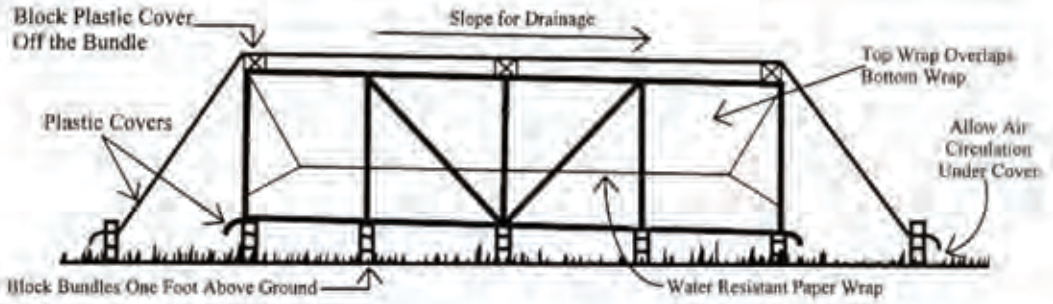


Figure 4. Proper Storage of Building Panel Bundles at Job Site

STORAGE AT THE JOB SITE

It is recommended that panel bundles be stored under a roof whenever possible. If panel bundles are stored outside, the following list of requirements should be adhered to:

1. The storage area should be reasonably level, and should be located to minimize handling of bundles during the construction process.
2. When storing on bare ground, place a plastic ground cover under the bundles to minimize condensation on the panels.
3. Store bundles at least 12 inches above ground level to allow air circulation beneath the bundle, and to prevent rising water from entering the bundle.
4. Elevate one end of the bundle slightly to permit runoff of moisture from the top of the bundle or from between nested panels. Water-resistant paper will not provide long-term resistance to moisture penetration from puddled water on top of the bundle. A waterproof cover should be placed over the bundles, with allowance for air circulation under the cover (see Figure 4).
5. Inspect stored bundles daily and repair any tears or punctures in the water-resistant wrapping with a compatible waterproof tape.
6. Re-cover opened bundles at the end of each day to prevent entry of moisture.

SUMMARY

1. Storage stains are white or black corrosion products formed while the hot dip galvanized or GALVALUME® Coated Sheet Steel is in a coil form or in a tight stack.
2. Long term exposure to water or moisture in an oxygen deprived environment can cause storage stain.

3. The most common sources of storage stain are when the steel is in a coil or a bundle of panels. Any time a portion of the steel is exposed to moisture and deprived of oxygen, storage stain can occur.

4. Storage stain should be prevented because it is very difficult to remove without affecting the appearance and/or the performance of the products.

5. Passivation treatments (chemical treatments) can be used to resist storage stain. However, the chemical treatment should not be used on the galvanized products that would be subsequently painted.

6. Oils may be applied to prevent water from reaching the metal surface, thus retarding the appearance of storage stain.

7. To prevent stain while the steel is in a coil, several steps can be taken:
   - Use a climate controlled storage area
   - Wrap in VPI paper
   - Use edge sealers
   - Use First-In, First-Out inventory control

8. To prevent storage stain in a bundle of stacked panels, take the following steps:
   - If possible, store under a roof until use
   - Keep the bundle 1 foot off the ground
   - Slope the bundle
   - Cover the bundle
   - Keep a plastic sheet under the bundle
   - Allow air circulation around the bundle
   - Inspect the bundle daily for rips or tears
   - Re-cover partially used bundles
   - Use a conveniently located, level storage area

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United States Steel Corporation

Technical Bulletin
Construction

STAINING OF BUILDING PANELS FROM STEEL DEBRIS

TBP 2012.1

BACKGROUND

Steel debris, when allowed to remain on a building following its construction, will quickly rust, causing an unsightly stain that is difficult to remove. To the untrained eye, steel debris looks like premature corrosion. As a result of the appearance, the owner of the building may become understandably upset, believing the contractor used inferior materials that have little or no corrosion protection.

Steel debris includes iron fines left from cutting and/or drilling operations when using friction saws, abrasive discs, drills, etc. Additionally, weld splatter from welding operations may also contribute to steel debris. Steel debris may include other construction materials left on the roof, such as nails, screws, staples, nuts, rivet shanks, etc.

Prevention of steel debris staining is the responsibility of the installer. Materials suppliers will not accept claims for it. Stain prevention is much easier and less expensive than cleaning and repairing the stain caused by the steel debris. In severe cases, such staining can lead to replacement of the panels.

WHAT DOES STEEL DEBRIS STAIN LOOK LIKE?

Fresh steel debris stains are small red-brown colored spots with a central dark spot (the remains of the steel particle). Steel corrosion eliminates fine steel debris within a couple of years on painted panels. The stain will remain long after the metallic iron has rusted away. The panel feels rough from loose or embedded particles. On bare panels, galvanic action protects the debris, possibly depleting the metallic coating in the immediate vicinity. An old steel debris stain will appear as a smoother surface with a localized red-brown stain in the area where the steel particle corroded away. Iron fines from drilling cause groups of stain spots around the hole. Cutting often causes a line of stain spots along the cut. Tracked particles cause randomly dispersed spots on the roof. Inadequate washing moves particles to the inside of the profile.

Preventing Steel Debris Stain

There are four steps to preventing steel debris staining. The best method is to not form the iron fines in the first place. When this is not possible, the exposed surface should be protected from debris generated during cutting, drilling or welding. Additionally, the panels need to be protected against tracking. Finally, all debris should be cleaned off the panels.

Preventing Steel Debris Stain – Cutting

Where possible, minimize cutting by using factory supplied cut-to-length sheets. The custom shears used by the factory to cut the profiles to length leave no debris on the sheet.

To prevent formation of steel fines, the best tools for on-site cutting are profile shears, hand shears, or electric nibblers. Because these methods form a smooth edge, they are the only acceptable cutting methods with respect to corrosion of exposed edges. Rechargeable or plug-in hand-held electric nibblers easily cut standard panels. Hand shears may not be suitable for longer cuts, but may be useful when multiple layers of steel require cutting.

A power saw with a metal cutting steel blade is the next best way to cut sheets on-site. Power saws generate larger and cooler particles than abrasive discs. The particles are thus less likely to burn into a painted surface. If material needs to be cut near installed sheets, mask the area near the cut to keep the hot particles away from the completed work.

If on-site cutting is necessary, cutting on the ground keeps steel particles away from other panels. Facing the exterior color finish of the prepainted steel down prevents steel particles from landing on the exterior surface. Take care to ensure that hot steel particles do not come into contact with prepainted steel sheets and DO NOT cut above other coated products, where debris may fall onto other sheets.

Preventing Steel Debris Stain – Welding

Unlike fines from cutting and drilling, weld splatter is much more likely to burn through the paint to the metal surface. This is also likely to be a problem with bare metal. If possible, avoid welding on or near building panels. When welding is necessary, mask the surrounding area with scrap metal to prevent the splatter from hitting panel surfaces.

Preventing Steel Debris Stain – Fastener Holes

The best method for making a fastener hole is to start it with a punch and then to use a self-tapping screw. To prevent bending the panel, make the hole using a backer. Punching holes will not leave fines, but may create an inside burr. Using a punch works best on a wood frame.

There are circumstances when punching a hole is not practical. In these cases, drilling should be conducted on the ground in the manner described above for cutting. If drilling holes on the building is unavoidable, mask the area around the hole to shield the panel from hot metal.

Always use sharp drill bits to reduce the formation of steel fines. Dull bits form smaller, hotter steel particles that are more likely to melt into the paint. Sharper bits will often form easily removed spirals.

Preventing Steel Debris – Clean-up

Sweep or hose the steel particles from the job as the job progresses to remove loose particles and particles not well embedded in the paint. Take great care to avoid any action that is likely to remove the paint or metal when attempting to detach embedded debris. Any damage to these coatings will lead to a reduced life of the material.

Clean the debris from the panel progressively or at least at the end of each day. When sweeping or hosing into a gutter, clean it out before leaving the job in order to prevent premature corrosion of the gutter. Upon completion, give the job a final wash. Manually remove larger pieces, such as nails and screws, not washed off as part of the final clean-up.

For critical applications or bare metal, inspect the job after two weeks. Rain or condensation will cause the remaining steel particles to rust, highlighting affected areas. On bare roofs, steel particles not removed can become a serious corrosion problem.

Preventing Steel Debris Stain – Tracking

All construction sites generate steel particles on the ground. Construction crews can track these particles onto the roof or panels on the ground from the soles of their shoes.

Bare GALVALUME®[1] Coated Sheet Steel or HDG coated sheet steel roofs are subject to staining from tracking of dirt and other construction area soils onto the roof. Painted panels can become scratched or marred when the soles of shoes grind soils or steel debris into the paint surface.

Ribbed or soft soles carry the particles easier than smooth or hard-soled shoes. One possible solution would be to use slip-on shoe covers to wear on the finished surface. This would ensure no debris being tracked on the roof. Any worker that walks on a new roof panel should take precautions not to transfer dirt or steel debris to the fresh surface.

Another solution is for the roofing workers not to switch to the ground and back. Once the crew is on the roof, the workers on the ground should send up all materials needed rather than the roof crew retrieving them. The workers on the roof should remove the dirt and debris on the soles of their shoes.

Architects and general contractors need to know about the problems arising from tracking of steel debris. They must then warn the appropriate supervisors so that they discuss the necessary precautions with all workers at the site. Precautions against panels on the ground being walked on is necessary for construction site visitors.

Effect of Steel Debris on Panel Corrosion

The main effect of steel particle staining on painted panels is aesthetic. It is usually not detrimental to the overall corrosion performance. Typically, paint separates the debris from the metallic coating. It forms red rust until completely rusted away. The natural weathering action will deplete the red stain on top of the paint.

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[1] GALVALUME® is an internationally registered trademark of BIEC International, Inc. and some of its licensed producers.

Only rarely, will steel particles penetrate the paint and contact the protective metallic coating. The red rust is inert, but steel particles in contact with the coating will accelerate zinc corrosion, leading to premature coating depletion and paint peeling.

On bare metal coating, steel debris will cause accelerated corrosion in a small area. The zinc in the coating sacrifices itself to prevent oxidation of both the steel debris and any exposed areas of the base steel. This leads to premature coating failure and a shorter panel life. Any cleaning that does not remove the steel particles will not help the coating.

Leaving the Debris and Stain

Leaving the stain and debris on bare metal roofs is not an option. Failure to remove the particles quickly will lead to galvanic attack of the coating and possible premature perforation of the panel.

In virtually all circumstances, the stain on painted panels is only a cosmetic imperfection. Not cleaning the stain is a viable option. Removing the stain after a couple of year's exposure is easier than removing it immediately. The steel particles embedded in the paint will corrode away in that time. Any steel particles that remain after cleaning will rust again, causing more stain.

On paints that chalk, natural washing action will remove the stain. On paints that do not chalk, such as fluorocarbons, the stain will remain for a very long time if not cleaned.

Removing the Stain – Bare Steel Sheet

Brush the surface with a bristle (not metallic wire) brush to dislodge particles. Completely remove them by washing the dislodged particles off the building. Leaving the particles in the gutter could reduce the life of the gutter. Wire brushing can change the panel's appearance and could remove some of the metallic coating. If corrosion from the debris severely damages the metallic coating, affected areas may require painting to obtain the desired protection. **Do not use any kind of steel wool** as it will break up and create steel particles. Any steel particles that remain after cleaning will cause further stain.

Removing the Stain – Prepainted Steel Sheet

Completely remove the steel debris, through natural corrosion of the particles or through mechanical methods. Permanently remove the stain with a recommended cleaner.

A mild abrasive cleaner, applied lightly with a non-abrasive pad, can remove normal staining and most of the particles causing the stain. It is necessary to only use light pressure as the cleaner may remove the paint and will affect the paint gloss. Do not use steel wool.

More severe staining requires extensive cleaning. There will be more particles and more rust. In this situation, use a nylon brush or a non-marring abrasive pad to remove embedded steel particles. Test any cleaning procedure on a non-exposed section to ensure it will not remove the paint. The abrasion will probably lower the surface gloss.

Sandpaper or nylon abrasive pads (not steel wool) are acceptable for removing difficult steel debris when repainting an area. Since this also removes most of the rust staining, subsequent washing with a mild abrasive cleaner or another recommended cleaner will

remove the remaining rust. Otherwise, follow the standard procedures for repair painting specified by the paint supplier. Never use strong acids or alkalis.

Paint blistering in the immediate vicinity of a stain indicates penetration by the steel debris. This penetration is very rare, but the corrosion causing the blistering will continue if not removed.

SUMMARY

1. Steel debris from cutting, welding, and drilling or steel debris from small pieces, such as nails, will cause red rust stain spots on painted or bare panels.
2. To avoid staining: do not form steel particles; if the steel particles are formed, keep the particles off the panel surface and clean off those particles that get on the panel as soon as practical.
3. Make fastener holes without drilling by punching holes. Make cuts without much debris by using an electric nibbler or profile shear.
4. Drilling or cutting on the ground keeps the fines off the building. If the exposed side is down, the particles stay off the exterior paint.
5. Mild abrasive cleaning will remove the stain and most of the particles, but any remaining steel particles will cause the stain to return.

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Technical Bulletin
Construction

CONDITIONS CORROSIVE TO HOT-DIP GALVANIZED AND GALVALUME® COATED STEEL SHEET

TBP 2012.18

Hot-Dip Galvanize (HDG) and GALVALUME®[1] Coated Steel Sheet are intended for applications where excellent corrosion resistance is required. The metallic coatings provide barrier and galvanic protection to the steel. However, under certain conditions, United States Steel Corporation (U. S. Steel) does not recommend using HDG and GALVALUME® Coated Products or recommends using additional precautions to minimize corrosion. These conditions include:

CONTACT WITH ELEMENTS LESS ACTIVE THAN ZINC OR ALUMINUM

Galvanic corrosion occurs when two dissimilar metals are electrically coupled in the presence of a corrosive electrolyte, one of them is preferentially corroded while the other is protected from corrosion. Any alloy will be preferentially corroded when coupled to a less active alloy. The relative activities of various metals are ranked in the Galvanic Series of metals for a given corrosive electrolyte such as seawater. The relative positions of some common metals in the Galvanic Series for seawater are:

Magnesium > Aluminum > Zinc > Chromium > Iron > Nickel > Tin > Copper > Silver > Graphite

(More Active) ← → (Less Active)

The relative positions of the metals may change in different environments. Even so, this is a good guideline for the environments in which HDG and GALVALUME® Coated Products are commonly used. Examples of some materials to avoid contacting with HDG and GALVALUME® Coated Products are:

- Copper, including copper bearing chemicals from pressure treated lumber, and water drainage from copper pipes such as air conditioning units.
- Iron, including iron debris and saw fines left over from cutting panels, or weld splatter.
- Graphite including pencil marks. Coal dust, although not graphite, should not be allowed to accumulate on HDG or GALVALUME® Coated Products.
- Lead.

TIME OF WETNESS AND CONDITIONS THAT DO NOT ALLOW PROTECTIVE OXIDES TO FORM

Zinc and aluminum form a protective oxide layer when exposed to air, which reduces the corrosion rate of the metal. Conditions that lead to the breakdown of the protective films and adversely affect the corrosion resistance of the HDG or GALVALUME® Coated Products include:

- Harshly corrosive environments such as marine environments. Salt water destroys the protective oxide films of aluminum and zinc making them much more chemically active.

[1] GALVALUME® is an internationally registered trademark of BIEC International, Inc. and some of its licensed producers.

- Contact with materials that retain moisture including wet insulation, piles of leaves, ash, dust, or other organic debris, etc., which can become wet. Extend the time of wetness should not be left in contact with the coated sheet.
- Ponding water or maintaining wet conditions for extended periods of time. The GALVALUME® warranty is voided to bare GALVALUME® roof panel that has a pitch less than ¼ :12 (1 degree).
- Material kept in tight wraps, bundles or coils and allowed to get wet either by rain or condensation. Under these conditions, air cannot move in to repair the protective oxide films and corrosion can be developed quite rapidly. It is important that HDG and GALVALUME® Coated Products are not allowed to get wet during storage or at the construction site. More information on storage stains can be found in U. S. Steel Construction Technical Bulletins on the web site at http://www.ussconstruction.com.

Corrosive Environments

Zinc and aluminum are readily attacked by acids having a pH less than 4, for example:

- Muriatic Acid (hydrochloric acid, HCl) that is contained in some of the cleaning products used to clean brick and concrete, which is very corrosive to HDG and GALVALUME® Coated Products.
- Oil of Vitriol (sulfuric acid, H_2SO_4), sulfur dioxide (SO_2) from chemical plants dissolves in water and forms sulfuric acid. Very strong acid can develop as the water evaporates.
- Similarly, hydrogen sulfide (H_2S) in animal confinement buildings can dissolve in water condensate to eventually produce sulfuric acid.
- Nitric acid (HNO_3) in fertilizers and also present in animal wastes.

Zinc and Aluminum can be attacked by alkalis having a pH greater than 9, for example:

- Caustic Soda (Sodium Hydroxide, NaOH).
- Lime and Slaked Lime (CaO and $Ca(OH)_2$). For this reason, HDG and GALVALUME® Coated Products should not come in contact with uncured concrete.
- Fly ash from power stations.
- Ammonia (NH_3) dissolves in water to form an alkaline solution of ammonium hydroxide (NH_4OH).

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valspar
if it matters, we're on it.®

CLEANING AND MAINTENANCE GUIDE Fluoropolymer Coatings

The molecules on the surface of Valspar's fluoropolymer coating systems are so tightly bound together that it makes them resistant to many elements found in the environment such as air pollution, acid rain and general airborne dirt.

Although Valspar factory-applied finishes are extremely durable, a periodic cleaning to remove build-ups of resins and other residue is a good idea to extend coating life. A variety of methods for removal of surface deposits are available. Simple washing with plain water using hoses or pressure spray equipment is usually adequate. When heavy deposits of dirt or other contaminants dull surfaces, stronger methods may be needed.

Two precautions: (1) do not use wire brushes, abrasives or similar cleaning tools which will mechanically abrade the coatings surface, and (2) certain cleaning agents listed below should be tested in an inconspicuous area before use on a large scale.

GROUP A
Hot or Cold Detergent Solutions

A 5% solution in water of commonly used commercial (non-industrial detergents) will not have any destructive effect on a fluoropolymer surface. These solutions should be followed by an adequate rinse of water. Use a cloth or sponge for application.

GROUP B
Solvents

Most organic solvents are flammable and/or toxic, and must be handled accordingly. Read the manufacturer's Material Safety Data Sheets (MSDS). Keep away from open flames, sparks and electrical motors. Use adequate ventilation, protective clothing, and goggles.

Solvents that may be used to remove non-water soluble deposits such as tar, grease, oil, paint, and graffiti from fluoropolymer surfaces include:

Alcohols

- Denatured alcohol (ethanol)
- Isopropyl (rubbing alcohol)

Typically, the above alcohols have no permanent effect on fluoropolymer surfaces.

GROUP C
Petroleum Solvents and Turpentine

- VM&P naphtha
- Mineral spirits
- Kerosene
- Turpentine (wood or gum spirits)

Typically, the above solvents have no permanent effect on fluoropolymer surfaces.

GROUP D
Aromatic and Chlorinated

- Xylol (Xylene)
- Toluol (Toluene)
- Perchlorethylene (Perclene)
- Tricholorethylene (Triclene)

The above solvents should be used with caution on a fluoropolymer surface. Limit contact with solvent to five minutes maximum and test before using.

GROUP E
Ketones, Esters, Lacquer Thinner, and Paint Remover

- Methyl isobutyl ketone (MIBK)
- Ethyl acetate (nail polish remover)
- Butyl acetate
- Lacquer thinner
- Paint remover (non-flammable)

The above solvents should be used cautiously on a fluoropolymer surface. Limit contact to fluoropolymer surface and test before using. Note: There are many formulations of paint remover on the market. It is possible that some will remove the fluoropolymer surface. Proceed very cautiously in use of paint remover. Metal suppliers and coating manufacturers are not responsible for damage from unrestricted use.

Graffiti

Graffiti presents a special problem because of the many possible agents used, generally aerosol paint. It is best to try soap and water first, then solvents. If none of these are satisfactory, it may be necessary to resort to touch up, repaint or replacement.

Valspar fluoropolymer coatings include:

- Fluropon®
- Fluropon Classic®
- Fluropon Classic® II
- Fluropon® Premiere
- Fluropon® Hardcoat
- Flurothane® II
- Flurothane® IV
- Flurothane® Coastal
- Valflon®

Chemical Solutions

Mildew: In areas subjected to high humidity levels, dirt and spore deposits can permit mildew growth to occur. The following solution is recommended to remove mildew when necessary:

- 1/3 cup dry powdered laundry detergent (such as Tide®)
- 1 quart sodium hypochlorite 5% solution (such as Clorox®)
- 3 quarts water

Rust Stains: Hydrochloric, citric or muriatic acid, diluted with ten volumes of water, may assist in removing rust stains from fluoropolymer surfaces. Limit contact to five minutes. Oxalic acid solutions or acetic acid (vinegar) may be used for the same purpose. Flush with water. Caution: Acid solutions are corrosive and toxic. Flush all surfaces with copious amounts of water after use.

Warranty

Misuse or abuse of any of the cleaning agents listed in this bulletin could result in a voiding of warranty.

Valspar Coil and Extrusion Coating Division
Phone: 888-306-2645
Email: coilhelp@valspar.com
www.valsparcoilextrusion.com

VAL0048C 2012-09

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CLEANING AND MAINTENANCE GUIDE Silicone Polyester Coatings

WeatherX™ silicone polyester coatings are resistant to many elements found in the environment such as air pollution, acid rain, and general airborne dirt. However, if the need to clean or remove deposits from your coating does arise, a variety of methods for removal of surface deposits are available. Two precautions: (1) do not use wire, brushes, abrasives, or similar cleaning tools which will mechanically abrade the coatings surface, and (2) certain cleaning agents listed below should be tested in an inconspicuous area before use on a large scale.

GROUP A
Hot or Cold Detergent Solutions

A 5% solution in water of commonly used commercial (non-industrial) detergents will not have any deleterious effect on a painted surface. These solutions should be followed by an adequate rinse of water. Use a cloth or a soft bristle brush for application.

GROUP B
Solvents

Most organic solvents are flammable and/or toxic, and must be handled accordingly. Read the manufacturer's Material Safety Data Sheet (MSDS) on solvent used. Keep away from open flames, sparks and electrical motors. Use adequate ventilation, protective clothing, and goggles.

Solvents that may be used to remove on-water soluble deposits such as tar, grease, oil, paint, and graffiti from Coil Clad 10S and WeatherX surfaces include:

Alcohols

- Denatured alcohol (ethanol)
- Isopropyl (rubbing alcohol)

The above alcohols have no permanent effect on Coil Clad 10S and WeatherX surfaces.

GROUP C
Petroleum Solvents and Turpentine

- VM&P naphtha
- Mineral spirits
- Kerosene
- Turpentine (wood or gum spirits)

The above solvents have no permanent effect on Coil Clad 10S and WeatherX surfaces.

GROUP D
Aromatic and Chlorinated

- Xylol (Xylene)
- Toluol (Toluene)

The above solvents should be used with caution on a silicone polyester surface. Limit contact of the Coil Clad 10S and WeatherX surfaces with solvent to five minutes maximum and test before using.

GROUP E
Ketones, Esters, Lacquer Thinner, and Paint Remover

- Methyl isobutyl ketone (MIBK)
- Ethyl acetate (nail polish remover)
- Butyl acetate
- Lacquer thinner
- Paint remover

The above solvents should not be used on a Coil Clad 10S or WeatherX surface.

Graffiti

Graffiti presents a special problem because of the many possible agents used, generally aerosol paint. It is best to try soap and water first, then the solvents. If none of these are satisfactory, it may be necessary to resort to touchup, repaint,or replacement.

Warranty

Misuse or abuse of any of any of the cleaning agents listed above will result in a voiding of warranty for the surface affected.

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CLEANING AND MAINTENANCE GUIDE Polyester Coatings

Polyester coatings are resistant to many elements found in the environment such as air pollution, acid rain, and general airborne dirt. However, if the need to clean or remove deposits from your coating does arise, a variety of methods for removal of surface deposits are available. Two precautions: (1) do not use wire brushes, abrasive, or similar cleaning tools which will mechanically abrade the coatings surface, and (2) certain cleaning agents listed below should be tested in an inconspicuous area before use on a large scale.

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Hot or Cold Detergent Solutions

A 5% solution in water of commonly used commercial (non-industrial) detergents will not have any deleterious effect on a painted surface. These solutions should be followed by an adequate rinse of water. Use a cloth or a soft bristle brush for application.

GROUP B
Solvents

Most organic solvents are flammable and/or toxic, and must be handled accordingly. Read the manufacturer's Material Safety Data Sheets (MSDS). Keep away from open flames, sparks and electrical motors. Use adequate ventilation, protective clothing, and goggles.

Solvents that may be used to remove on-water soluble deposits such as tar, grease, oil, paint and graffiti from polyester surfaces include:

Alcohols

- Denatured alcohol (ethanol)
- Isopropyl (rubbing alcohol)

The above alcohols have no permanent effect on polyester surfaces.

GROUP C
Petroleum Solvents and Turpentine

- VM&P naphtha
- Mineral spirits
- Kerosene
- Turpentine (wood or gum spirits)

The above solvents have no permanent effect on polyester surfaces.

GROUP D
Aromatic and Chlorinated

- Xylol (Xylene)
- Toluol (Toluene)

The above solvents should be used with caution on a polyester surface. Limit contact of the polyester surfaces with solvent to five minutes maximum and test in an inconspicuous area before using.

GROUP E
Ketones, Esters, Lacquer Thinner, and Paint Remover

- Methyl isobutyl ketone (MIBK)
- Ethyl acetate (nail polish remover)
- Butyl acetate
- Lacquer thinner
- Paint remover

The above solvents have no permanent effect on polyester surfaces.

Graffiti

Graffiti presents a special problem because of the many possible agents used, generally aerosol paint. It is best to try soap and water first, then the solvents. If none of these are satisfactory it may be necessary to resort to touchup, repaint, or replacement.

Valspar polyester products include:

Krystal Kote, PolyKote and Alamo White coil coatings, Super Dynapon super durable polyester extrusion coating, and the Polylure family of polyester extrusion coatings. Krystal Kote, Super Dynapon, Polylure, and the Valspar logo are registered trademarks of The Valspar Corporation.

Chemical Solutions

Mildew: In areas subject to high humidity levels, dirt and spore deposits can permit mildew growth to occur. The following solution is recommended to remove mildew when necessary:

- 1/3 cup dry powdered laundry detergent (such as Tide)
- 1 quart sodium hypochlorite 5% solution (such as Clorox)
- 3 quarts water

Rust Stains: Hydrochloric, citric, or muriatic acid, diluted with ten volumes of water, may assist in removing rust stains from polyester surfaces. Limit contact to five minutes. Oxalic acid solutions or acetic acid (vinegar) may be used for the same purpose. Flush with water. Caution: Acid solutions are corrosive and toxic. Flush all surfaces with copious amount of water after use.

Warranty

Misuse or abuse of any of the cleaning agents listed above will result in a voiding of warranty for the surface affected.

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United States Steel Corporation

Technical Bulletin Construction

CLEANING PAINTED METAL BUILDINGS

TBP 2012.11

Background

With the purchase of a painted metal building, the owner has invested in a structure that can be expected to remain both functional and attractive for many years to come. The painted panels are generally made of either hot-dip galvanized or GALVALUME®[1] Coated Sheet Steel that has been painted under controlled conditions on a coil coating paint line.

In a coil coating process, the coated steel is first thoroughly cleaned and rinsed so that a uniformly clean surface is provided for the subsequent painting steps. Next, a pretreatment is applied to the coated steel surface. This is a very thin layer of treatment that chemically bonds to the coated steel surface and provides a surface to which paint can bond. A paint system normally consists of primer and topcoat. In the next step, a layer of primer is applied to the chemically treated surface. The primer provides flexibility to the paint system as well as corrosion resistance since it contains corrosion inhibitors. Finally, the topcoat is applied to complete the paint system. This layer contains the color pigments as well as ingredients, which provide the desired gloss and protection for ultraviolet radiation from the sun. At each step of the process, the paint is applied with carefully controlled thickness and baked to ensure the desired properties.

The attractive appearance of a painted building is the result of an engineered product manufactured under carefully controlled conditions. To maintain this attractive appearance, occasional cleaning will be required.

Care must be taken to ensure that the cleaning methods and solutions employed only remove unwanted material without damaging the underlying paint. It is the purpose of this Technical Bulletin to provide guidelines for cleaning painted metal buildings.

Common Problems Requiring Cleaning

All painted buildings chalk and retain dirt to some degree. Mildew builds up especially in damp areas. A building may start to look old or dull even though it still has a long life left. Often, the only thing the building needs is cleaning. Removal of the dirt restores much of the building's brightness and the original color. Rust problems can be unsightly, but may only need cleaning or minor repair while cleaning. However, more severe appearance problems may require cleaning and repainting.

The selection of a cleaning method will depend on the type of contaminant to be removed. Common types of contaminants associated with painted metal buildings include:

- **Airborne Dirt** can collect on the building along with greasy, organic residues, which cannot be removed by rainwater.

[1] GALVALUME® is an internationally registered trademark of BIEC International, Inc. and some of its licensed producers.

- **Chalk** is a natural white by-product of ultra-violet degradation of the paint system. Over a period of several years, a light white chalky film is produced on the surface of the paint film, which makes colors appear lighter and reduces the natural gloss of the original paint.

- **Mildew**, or more generally, biological growth, commonly appears on surfaces which remain moist for extended periods such as north walls, under eaves or sheltered areas.

- **Rust Stains** may be caused by rundown from steel debris left on the building following erection, unprotected cut edges, or similar situations. These sources of rust stain should be eliminated prior to cleaning.

- **Graffiti** on prepainted buildings is especially difficult to remove since it requires removing one kind of paint without harming the original paint and finish.

In addition, at some point in the life cycle of the building, it may be desirable to repaint the building. Prior to repainting, the building must be thoroughly cleaned. In this case the cleaning process can and should be more aggressive; otherwise the new paint will not adhere well.

Cleaning Painted Sheet

When a building needs painting, it must first be washed. Use the procedures recommended for dirt, mildew and chalk removal with these differences:

1. Clean aggressively so that the paint surface is dulled or partially removed.
2. Good rinsing is critical. Any kind of cleaner residue will cause poor paint adhesion.
3. Removal of waxes is necessary. Solvents are best for this.
4. Remove rust stain as described later in this Bulletin.
5. Remove loose paint by scraping or by using a high-pressure spray.
6. Use of an alkaline phosphate cleaner (i.e. trisodium phosphate) will improve paint adhesion on a new unpainted building.

Application Method

The two basic application methods used in cleaning buildings are spraying and wiping. Spraying can cover large areas more easily. Wiping can provide improved cleaning since it also involves physical abrasion.

On prepainted buildings, the abrasion of wiping can easily cause roughening of the surface and change the appearance visibly. Avoid abrading the paint unless preparing to repaint the surface. Wiping should be low pressure with a soft sponge or cloth.

For either method, check the cleaning solution on an unexposed area to be sure that it will clean as required and will not damage the paint more than is acceptable.

Types of Cleaners

A variety of cleaners remove dirt, mildew and chalk:

- ¼ cup phosphate-free laundry detergent per gallon of water
- 1 ounce liquid dishwashing detergent per gallon of water
- ¼ cup household bleach per gallon of water
- ¼ cup household ammonia per gallon of water
- Solvents or solvent cleaners

It is important to rinse cleaners thoroughly. Detergents, ammoniated cleaners and bleaches leave corrosive residues if not rinsed properly. Solvent and detergent residues attract dirt. Cleaner residues can resemble chalk and are usually unsightly. When cleaning compounds remain on the building, it will not only get dirty faster but may also be subject to more rapid corrosion.

Powder and liquid laundry detergents are excellent general cleaners. The low concentration dishwashing detergents are milder and could be all that is needed. The specific brand is of minor importance although house brands may require a higher concentration to work well. Do not use phosphated detergents.

Some mildew will not come off even with strong detergents. In these situations bleach may be helpful. The colorfast bleaches used in powdered detergents may be helpful, but can be too mild for stubborn mildew stains. Household bleach should work well on heavy mildew.

Ammonia is especially good at cleaning greasy dirt when solvents are inappropriate. Always dilute and mix it in well-ventilated areas.

Solvents are the most effective choice for grease removal. When detergents cannot remove the grease, solvents are the best alternative. There are three serious limitations to the use of solvents:

1. Solvents are flammable. Always use with adequate ventilation. Keep away from open flames, sparks, electrical motors, or any other source of ignition. Do not use solvents for large cleaning operations.

2. Solvents can remove paint. Always test the paint to determine if the solvent will damage it. The following presents some guidelines:
   - Polyesters and silicone-modified polyester (SMP) topcoats are less solvent sensitive than Kynar® and plastisol topcoats.
   - Alcohols are the least aggressive solvents.
   - Petroleum solvents (kerosene, naptha, mineral spirits, turpentine, Xylol, Toluol) and chlorinated solvents are moderately aggressive.
   - Ketones, esters and paint removers are very aggressive to paints. When using them, expect to at least see a dulling to the finish.

3. Most solvents are toxic. Take great care in limiting working exposure. Use proper disposal methods.

Any of these cleaners may be used on unpainted metal buildings. When cleaning bare hot-dip galvanized or GALVALUME® Coated Sheet Steel, solvent cleaners can damage paint if spilled on adjacent painted areas. If this possibility exists, test the solvent on those areas to determine the paint's resistance to solvent damage.

Dirt Retention

Two types of dirt accumulate on buildings: dry soil and greasy or organic residues. The dry dirt, by itself, washes off with rain or high-pressure water spray. Greasy residues do not wash off in rain and hold dry soil and chalk tightly to the surface. These residues originate from automobile exhaust, fireplaces, ventilation fan oil, pesticides, and various other common sources. This is the kind of dirt that requires cleaners to remove. Detergents, ammoniated cleaners and solvents are particularly effective on this greasy kind of dirt.

Figure 1 shows the effect of cleaning dirt from a building panel material. Lighter colors show dirt more than dark colors. SMP and polyester tend to retain dirt more than fluorocarbons. Plastisol chalks so heavily that the dirt is often washed off with the chalk, by rainwater.

Chalk

Chalk is a white by-product of ultraviolet light (UV) degradation of the paint system. It makes colors look lighter, reduces the natural gloss of the paint and deposits on lower building materials. Chalk builds up over a period of years because rainwater only partially washes it off.

The rate of chalk buildup very strongly depends on the type of resin and pigment color in the topcoat. In general, Plastisols chalk more than polyesters, which chalk more than SMP's, which chalk more than fluorocarbons. Chalking on darker colors is more noticeable than on lighter colors. There are significant variations by paint brand within each category.

Chalking increases with greater exposure to the sun. Parts of the building, such as the roof, south side of the building, and areas not shaded from the sun along with buildings in southern climates, may experience greater degrees of chalking. Generally high-pressure water spray is all that is required to remove chalk and restore the building's original appearance. Figure 2 shows the large effect of chalk on color.

Figure 1. Effect of cleaning dirt off a building

Figure 2. Effect of chalk on color

Mildew

Mildew build-up, or more generally biological growth, on buildings requires a long wet time and a source of nutrients to form. There is a sufficient supply of organisms in dust to initiate growth anywhere. North walls, under eaves, sheltered corners or areas that have layers of dirt buildup are most susceptible. Dust or airborne organics would be common in animal confinement buildings and provide sufficient nutrients for growth. A visible growth of mildew holds moisture easily. Mildew is also a corrosion issue since the by-products of bacteriological growth are corrosive.

Remove mildew by wiping or by using a power spray. Then wash the area with an antiseptic cleaner such as bleach described above. Rinse the area thoroughly. Eliminating the cause of the mildew prevents its return.

Bleaches can be unsafe to mix with other cleaners. Use premixed laundry detergents with bleach if extra cleaning is needed. Bleach is toxic and corrosive. Avoid eye or skin contact. Keep it off nearby plants, shrubs and grass.

Rust Removal

Cleaning red rust and red rust stains from buildings includes the need to eliminate the source of the red rust before cleaning. Otherwise, long term elimination of the red rust staining is an unreasonable goal. In many circumstances, removing the rust is the final step in the repair of a rust source. The following are useful examples of rust removal.

1. Rust Rundown – Rust can stain panels when rust runs down from a higher, rusting panel. After elimination of the upper panel rusting, cleaning permanently removes rust on the lower panel.

2. Rust from Steel Debris – After removal of steel debris left on a building, cleaning permanently removes the stain.

3. Edge Rust – The bottom edges of panels that have prolonged wet time will have red rust. After correcting the edge design to allow easy drying, cleaning permanently removes the rust. If it is not possible to correct the design, repainting of the edges following rust removal may be required.

4. Painting Rusted Area – Completely remove the rust prior to painting or the paint will not adhere.

The preferred treatment is a phosphoric acid-based cleaner, such as ABR 50. Use the cleaner from 10% to 50% strength depending on the severity of the rust and exposure to the building. Typically, using the cleaner at 50% strength means rinsing it off within a hour of application. Lower concentrations will remove the rust more slowly and will allow the cleaner to remain on the building longer without causing damage.

The cleaner should be completely rinsed off after application. Rinse with tap water very thoroughly. Acid cleaners attack the metallic coatings if left on for a sufficiently long time.

Muriatic acid, used to clean rust from concrete, will damage steel buildings. Never use it to clean rust from a metal building. If cleaning rust off adjacent concrete, protect metal surfaces before cleaning.

Typically, the acid cleaners will not be as effective as other cleaners in removing chalk, mildew and dirt. If dirt and/or chalk removal is needed after the acid cleaning, use an alkaline cleaner such as laundry detergent. If bare GALVALUME® Coated Sheet Steel or hot-dip galvanized steel is being cleaned, the procedure and warnings are the same.

GRAFFITI

Graffiti on prepainted buildings is especially difficult to remove because it requires removing one kind of paint without harming the original paint. Removal will likely require an aggressive solvent. Test a hidden area to determine the effect of the solvent on the paint. With more aggressive solvents the paint may be unharmed by short exposures, but damaged if exposed for longer times. With very solvent-resistant graffiti, repainting may be needed.

For unpainted buildings, use the more aggressive solvents: acetone, n-Methyl-2-Pyrrolidinone (MEK), or commercial paint removers. The use of abrasive pads to scrub graffiti may cause shiny spots that can detract from the building's overall appearance.

For further assistance on the use of steel building panels or related topics, contact U. S. Steel Construction Sales Group:

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1-412-433-1121, ext 4680

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Metal Panel Field Repainting

Metal Construction Association

The factory applied coating on metal siding and roof panels is a baked-on finish designed to provide trouble-free performance for many years with minimum service required. When repainting metal siding and roof panels care must be taken to prepare the factory applied finish and to assess the adhesion between this surface and the coating to be used to repaint the panels.

Polyester factory-applied coatings are standard technology and present the least difficulty in repainting. Polyvinylidene fluoride (PVDF) and plastisol factory applied coatings require special precautions.

SURFACE PREPARATION

Before any repainting process can begin the following procedures should be followed:

DIRT, LOOSE CHALK AND MILDEW MUST BE REMOVED

a. ***Polyester coatings*** should be washed with a mild solution of detergent or household ammonia. Use a solution of one cup of common detergent, containing less than 0.5% phosphate (example -"Tide"), dissolved into five gallons of warm water. A solution containing one cup of household ammonia dissolved into 5 gallons of water (at room temperature) will also aid in the cleaning of dirt, mildew and chalking. Solvent containing cleaners (examples "Fantastic" or "Formula 409") and detergents with greater than 0.5% Phosphate may be used if mildew or other fungal growth resists the milder treatments.

b. ***PVDF and Plastisol*** coatings should be washed as above with the exception that solvent containing cleaners should generally not be used. If solvent containing cleaners are used, a small area should be tested before general application; contact should be limited to ***five minutes***

Following the above cleaning processes. the metal panel surface must be thoroughly flushed with water to remove any residual cleaning agents. Any cleaning agents left on the metal panel surface will damage the adhesion of the newly applied paint system.

SURFACE IMPERFECTIONS

Minor scratches, which have not exposed the substrate, may be lightly sanded or buffed to create a smooth surface for repainting. Care must be taken not to expose the substrate. If the substrate becomes exposed, refer to paragraph 3)

EXPOSED METAL AND RUST

Exposed metal must be treated to prevent rust from developing. A light sanding of the exposed, unrusted area should be followed by application of a high quality primer. Special care must be exercised to avoid the possibility that solvents (example - NMP or acetone types) in some primers may delaminate the factory applied PVDF and plastisol finishes.

If either red or white rust is evident, it should be totally removed by scraping or brushing followed by a light sanding and the application of a high quality primer. Care must be taken not to destroy the metal coating on the steel substrate.

TESTING FOR ADEQUATE INTERCOAT ADHESION

Repainting should not be done until after the intercoat adhesion is known to be acceptable. Unacceptable intercoat adhesion could result in delamination after long term exposure.

The following test can be used to determine the intercoat adhesion of a repaint material to a well prepared factory-applied coating.

Equipment:

+ Sharp utility knife
+ Scotch #610 Cellophane Tape

Procedure:

Step 1 After properly cleaning and preparing the surface to be repainted, repaint a 4" x 4" area with the repaint material according to the manufacturer's instructions. Allow to dry completely before proceeding.

Step 2 Use a utility knife to cut a two-inch "X" into the repaint coating.

Step 3 Place a three-inch strip of Scotch #610 tape over the "X" and rub with heavy pressure, leaving one half-inch of tape free for easy removal.

Step 4 Pull the tape back over itself at a 180 degree angle.

Step 5 Examine the tape and the panel for signs of paint removal.

Evaluation of Test Results

If the tape removes more than 1/16" of the repaint material from the "X" cut, or if any material is removed from the face of the panel, the intercoat adhesion is inadequate for repainting. Do not proceed to repaint the panels since long term adhesion failure would be likely. Determination that acceptable intercoat adhesion has been achieved is the responsibility of the repainting contractor.

ADDITIONAL SURFACE PREPARATION METHODS

A layer of factory applied wax is often applied to protect the metal panels during forming and transit. Failure to remove this wax layer will result in poor intercoat adhesion and the probable peeling or flaking of a new coating. After washing the metal panel, the wax can be removed by wiping the surface with a clean cloth saturated with an industrial solvent (example - Xylene). An industrial solvent will facilitate the removal of the wax layer and assure maximum intercoat adhesion. After solvent cleaning, the acceptability of the intercoat adhesion of the cleaned metal panel must again be determined.

If intercoat adhesion is still unacceptable, it will be necessary to 'rough-up' the panel surface by light sanding (#400 grit sandpaper is recommended) or power washing. Care must be exercised so that the factory applied finish is not removed during this process. Building panels must be repainted within 24 hours after the surface preparation is completed.

MIXING AND REDUCTION

The paint must be thoroughly mixed before using. Mechanical mixing is recommended to assure that no settlement remains in the bottom of the container. Paint can be reduced for spraying by adding a solvent (example - xylene) to the paint and mixing thoroughly. The recommendation of the paint supplier concerning the use of specific solvents should be followed. The use of more, or less of the solvent recommended may be required depending upon the temperature conditions at the job site and application equipment used.

APPLICATION

The metal panel surface should be completely dry before starting to paint. Painting should not be done in the early morning and should not be done at job site temperatures less than 50 degrees Fahrenheit. Paint application should be at the rate recommended by the paint manufacturer. Excessive or heavy film application thickness can result in cracking or wrinkling.

COVERAGE

The application of paint at the rate of 1.0 mil dry film should result in approximately 400-500 square feet of coverage per gallon. This assumes minimum application losses. Some spray equipment and application methods can result in significant losses (up to 50%) which should be considered in estimating paint requirements.

CLEAN-UP

The solvent recommended by the paint manufacturer should be used to clean all equipment.

This technical bulletin has been distributed, prior to publication, for review and comment by those organizations believed to have a direct interest in and knowledge of the subject matter.

Metal Construction Association

ISSUED 7/97

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