United States Steel Corporation

Resolution Manual For Metal Building Construction

Job Site Imperfections

TBP 2005.16

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INTRODUCTION

A key component of customer satisfaction in the metal building industry is the speedy resolution of customer complaints, either during the construction, or after building erection. Quite often, the root cause of the customer complaint is not related to how the component was manufactured but to how the component was handled or installed. Many imperfections and associated complaints can be prevented at the job site, or by the building owners. This manual is intended to provide the information and knowledge to identify the job site imperfections commonly observed on metal buildings so that complaints can be addressed in a timely manner.

The most common imperfections include damage during storage, shipping, handling, and installation, improper design of the building components, insulation issues, and maintenance issues. The imperfections are presented with photographs and discussions, which describe the cause of the imperfections and the appropriate actions required for their correction or prevention. Imperfections related to steel manufacturing are not included in this manual.

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DIRT ON ROOFING PANELS

Staining and an inconsistent appearance of bare GALVALUME®[1] Coated Sheet Steel roofs can be caused by dirt being introduced by either foot traffic and/or poor storage practices. The example in Figure 1 showed that the dirt on the roof (Figure 1a) matched the dirt on the ground (Figures 1b). The dirt was concentrated on the roofing panels on the top of the stack (Figure 1c) and transferred to the other panels by construction workers walking on the roof. If the dirt is not cleaned immediately after installation, it will cause staining and an inconsistent appearance to the roof, and possibly cause premature corrosion by trapping the moisture on the roof. Therefore, dirt and other debris should be cleaned immediately after installation.

The best way to avoid staining of panels is to maintain proper storage and handling practices during the entire construction process to avoid dirt getting on the panels in the first place. Annual washing of the building is recommended to maintain the overall appearance of the building. The useful life of the roof will also be extended by removing dirt and other moisture trapping debris, which can cause premature corrosion.

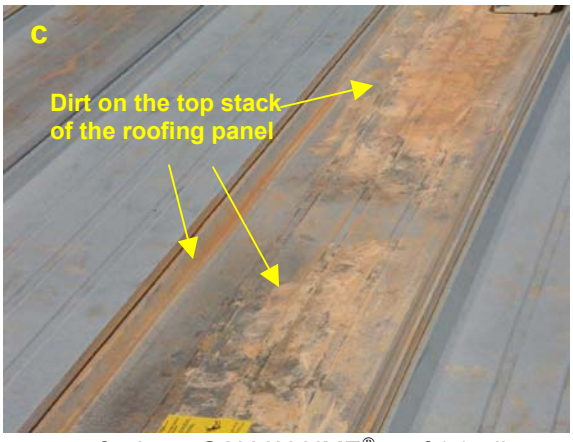

Figure 1. Photographs of stains and inconsistent appearance of a bare GALVALUME® roof (a), dirt on the ground at a building site (b), and dirt concentrated on the roofing panels on the top of the stack (c).

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

Storage, Shipping, Handling, and Installation Issues

DIRT ON PAINTED SIDING PANELS

Similar dirt issues can also occur on prepainted panels. Figure 2 shows dirt and mud on the job site was transferred onto the surface of the prepainted GALVALUME® sidings before installation (Figure 2a), and the mud remained on the panels after installation causing appearance issues (Figure 2b). Dirt also concentrated on the top panel of the stack. The best way to avoid this situation is to maintain proper storage and handling practices during the entire construction process to avoid the dirt and mud getting on the panels in the first place. Dirt and mud should be cleaned immediately after installation.

Figure 2. Photographs of mud and dirt on the prepainted GALVALUME® siding panels (a) before and (b) after the installation.

Storage, Shipping, Handling, and Installation Issues

SMUDGE MARKS ON BARE GALVALUME® SHEET STEEL

Hand and palm prints on bare galvanized and GALVALUME® panels are the likely result of not using clean gloves in handling the panels during installation. Dirt, oil and perspiration have been shown to be detrimental to the appearance of bare coated products, such as galvanized and GALVALUME® Coated Sheet Steels. Figure 3 demonstrates the results of poor handling practice during the installation of bare GALVALUME® siding, which left handprints on the siding. Figure 4 shows the non-uniform darkening smudge marks due to excessive abrading of the surface of the roofing panels and footprints on the GALVALUME® roofing panels. Panel-to-panel contact, walking on the panels, and not using clean gloves can also cause poor appearance. The contractor should be cautioned, prior to installation, to avoid poor handling practices, since the contractor is ultimately responsible for these imperfections. However, it should be noted that the darkening or smudging does not affect the corrosion performance of the panels.

Instead of bare GALVALUME® Coated Sheet Steel, ACRYLUME®[2] Coated Sheet Steel can be used, which provides better hand, footprint and smudge mark resistance. ACRYLUME® Coated Sheet Steel has a very thin clear acrylic coating over GALVALUME® Coated Sheet Steel. The acrylic coating also provides better protection during storage.

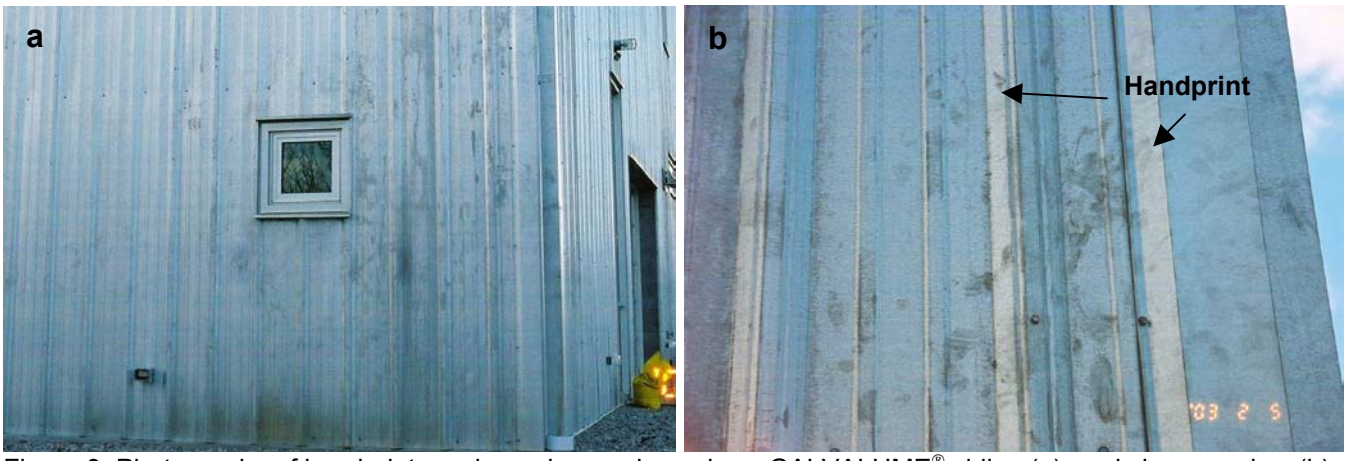

Figure 3. Photographs of handprints and smudge marks on bare GALVALUME® siding (a), and close-up view (b).

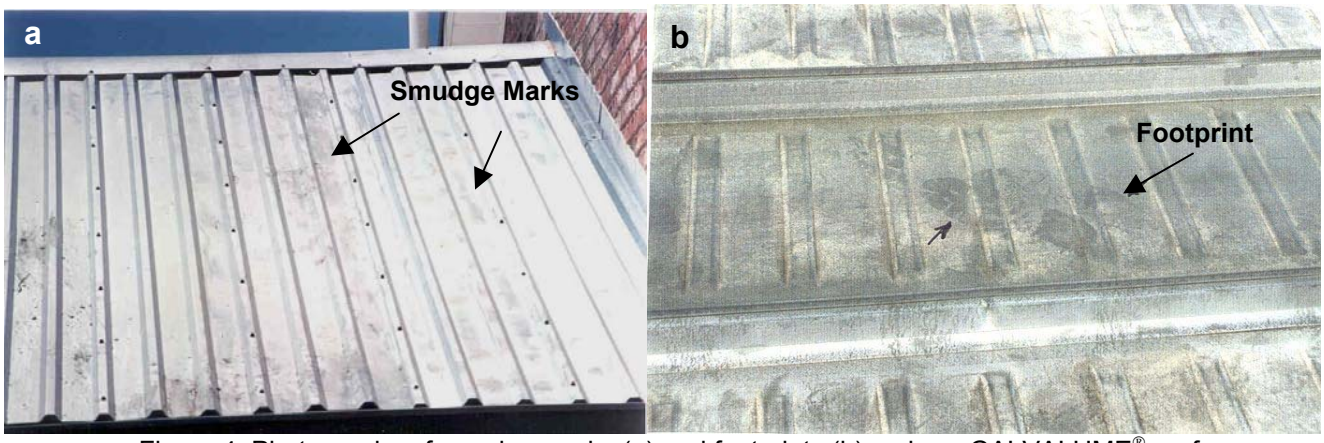

Figure 4. Photographs of smudge marks (a) and footprints (b) on bare GALVALUME® roofs.

[2] ACRYLUME® is a registered trademark of United States Steel Corporation

Storage, Shipping, Handling, and Installation Issues

WET STORAGE STAINS

Wet storage stains are white or black corrosion products formed while the hot dip galvanized or GALVALUME® Coated Sheet Steel is stored in coil form or in a tight stack. One of the most common sources of storage stain occurs when the steel is held in a tight bundle of panels. When steel is exposed to moisture and deprived of oxygen, storage stain can occur. Storage stain should be prevented because it is very difficult to remove without affecting the appearance and/or the performance of the product after it has occurred. To prevent storage stain from occurring in a bundle of stacked panels, one can store under roof until use, allow air circulation around the bundle, slope and cover the bundle, and re-cover partially used bundles. More information on storage stains can be found in U. S. Steel Construction Technical Bulletins on the web site at http://www.ussconstruction.com.

Figure 5. Photographs of wet storage stains on bare galvanized steel siding (a), and wet storage causing paint blistering and peeling on prepainted galvanized steel siding (b).

Figure 5a shows white rust and storage stain, on the bare galvanized steel. Wet storage problems are not limited to bare materials. Prepainted products are also susceptible to wet storage issues, which occur when the panels are in bundle form and exposed to moisture, such as the siding panels shown in Figure 5b. The difference with painted panels is that the corrosion starts underneath the painted surface and first appears in the form of blisters or a rough surface, which eventually progress to the point at which the paint peels from the galvanized steel panels. For more information, see National Coil Coater's Association Technical Bulletins at http://www.coilcoating.org.

Wet storage stain can be easily identified. Typically, there is no orientation to the staining pattern, but the white rust or the stain patterns should be on both sides of the panel. If the panels are still stacked in the bundle, the pattern should be in a mirror image on the bottom side of the panel to the topside of another panel that it was in contact with.

Storage, Shipping, Handling, and Installation Issues

WET STORAGE

Wet storage conditions are frequently found on job sites where panel bundles are improperly stacked (Figure 6a), or are laid flat on the ground, without protection (Figure 6b). Water can penetrate between the panels by condensation, or capillary action, creating wet storage conditions, which cause paint blistering and substrate corrosion on the prepainted panels, while causing storage stain on the bare hot dip galvanized or GALVALUME® Coated Sheet Steel. Therefore, panels and accessories should not be stored in wet conditions. Care should also be taken to avoid handling damage on the job site. The panel storage condition shown in Figure 6a could potentially create a wet storage condition and cause premature corrosion. It could also cause damage to the panel before installation.

Bundles should be positioned with one end slightly elevated to permit runoff of moisture from the top of the bundle or from between nested panels. Water-resistant paper will not necessarily provide long-term resistance to moisture penetration from puddled water on top of the bundle. A waterproof cover should be placed over the bundles while allowing for air circulation under the cover (see Figure 7). More information can be found in U. S. Steel Technical Bulletins at http://www.ussconstruction.com or in the National Coil Coater's Association Technical Bulletins at http://www.coilcoating.org.

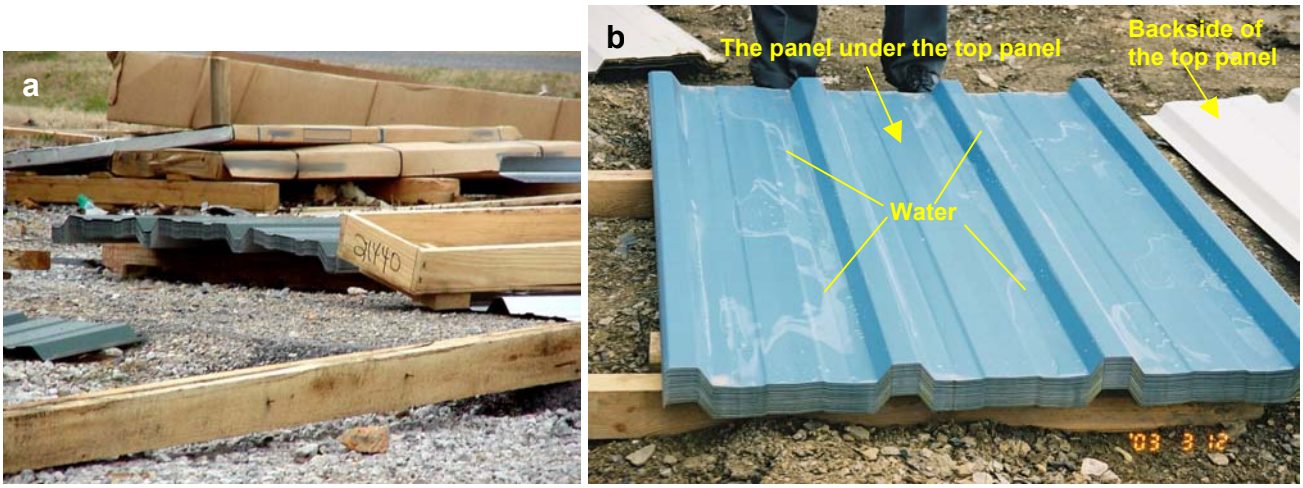

Figure 6. Photographs of panel bundles improperly stacked at the job site (a), and water on the surface of a panel that was in the bundle under the top panel (b).

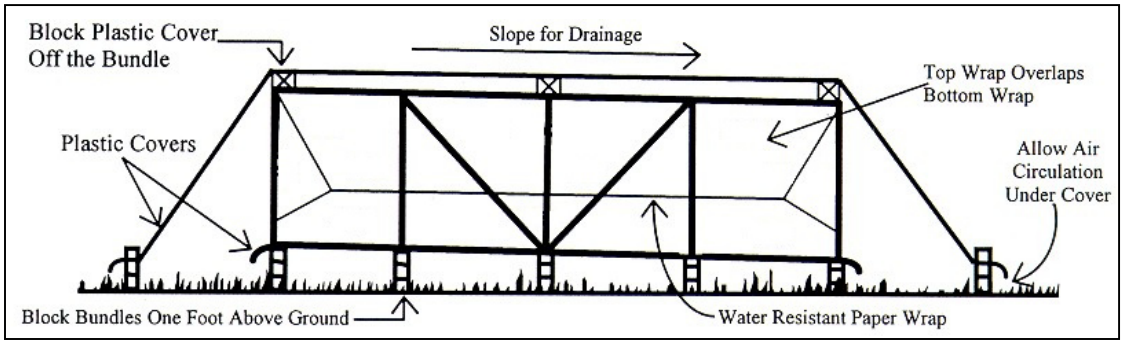

Figure 7. Schematic of proper storage of building panel bundles at job site.

Storage, Shipping, Handling, and Installation Issues

TRANSIT AND HANDLING DAMAGE

Damage related to the transit or handling of the bundles should be recognized and avoided at the construction job site. This kind of damage can be identified on the panel prior to installation. There is usually a pattern to the damage, which is typically isolated to the major ribs on a given panel. The damage may also be associated with loose banding or poor packaging practices, transit, storage and/or the handling of panel bundles prior to installation. The damaged panels should not be installed since the damages will have potentially adverse effect on the performance of the panels.

Figure 8 is an example of transit and handling damage. The pattern of the damage is typical of handling issues while panels are still in bundle form. Regardless of whether the damage was caused by blocking, forklifting or by some other external force, it usually exhibits a repetitive pattern. Nevertheless, the damaged panels should have never been installed. Figure 9 shows other examples. Mishandling of the panels caused paint abrasion damage at the radii of the major ribs in the up-down direction (Figure 9a), which could result in premature corrosion. The scratches on the surface of painted panel caused premature corrosion in the damaged area (Figure 9b).

Figure 8. Photograph of damaged panels on the building's sidewall.

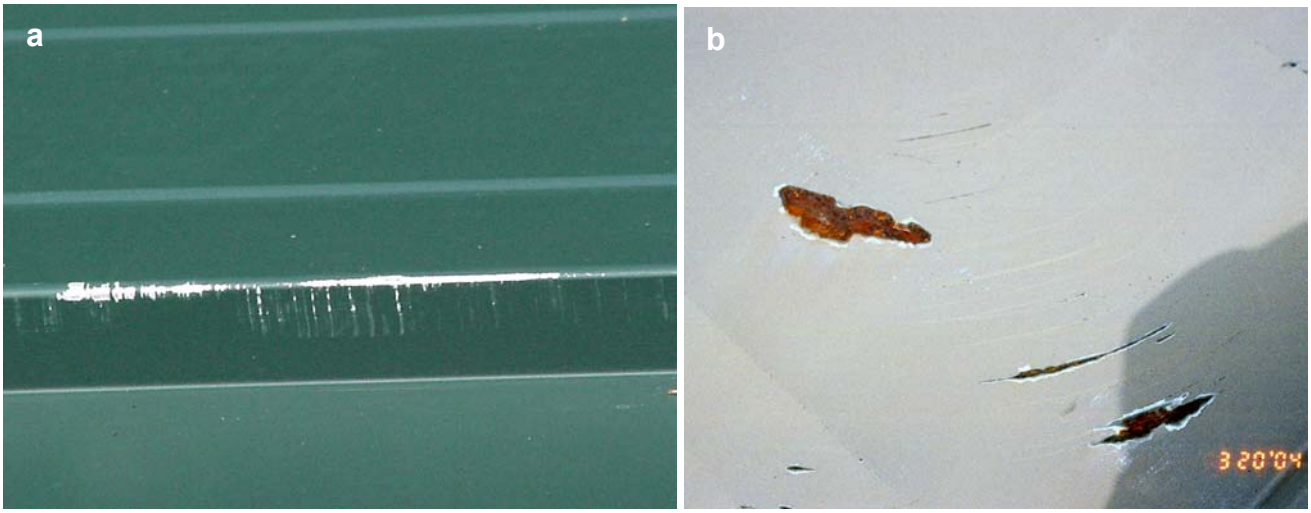

Figure 9. Photographs of paint abrasion damage on the major rib of the panel (a), and scratches on the surface of a painted panel resulted in premature corrosion (b).

Storage, Shipping, Handling, and Installation Issues

FASTENER INSTALLATION

Fasteners should be installed properly to avoid being over-driven, under-driven or driven at an angle. Figure 10 [3] is a schematic example of the proper and improper installation of fasteners. Properly seated and installed fasteners should be watertight and not allow water to leak or allow water to collect around them. Over-driven fasteners may cause depressions around the fasteners, which can collect water and accelerate corrosion. Therefore, impact-type tools should not be used. Figure 11 is an example of over-driven fasteners. The GALVALUME® material around the fasteners was corroded due to water ponding in the depression. The corroded area around the fastener increased with increasing the depth of the depression. Under-driven fasteners or fasteners that "back out" over time can allow water to leak at fasteners allowing water to saturate insulation causing inside-out corrosion (Figure 12 [4]). Driving tools with depth-sensing nose-pieces and suitable speeds can help to avoid these problems.

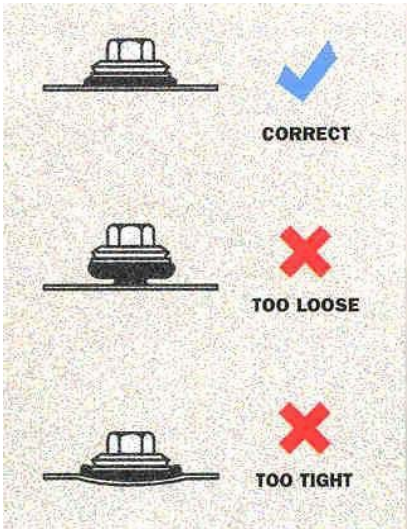

Figure 10. Schematic example of the proper and improper installation of fasteners.

Figure 11. Photograph of the over-driven fasteners. The corroded area around the fastener increased with increasing depth of depression.

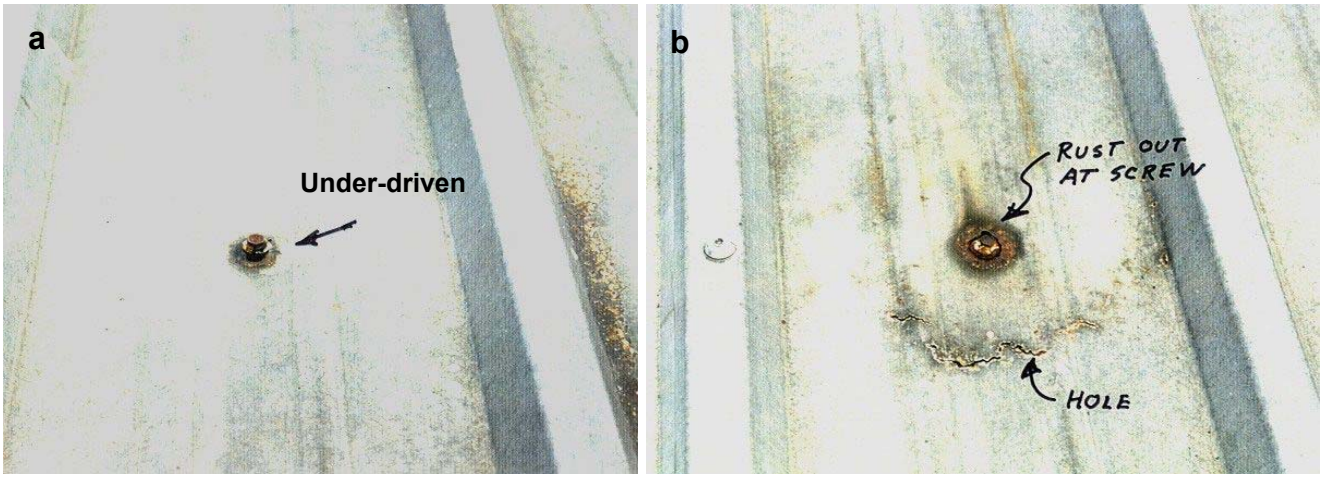

Figure 12. Photographs of under-driven fasteners with water leaking at fastener to cause corrosion at the fastener (a and b), and caused inside-out corrosion due to water saturation of the insulation (b).

[3] Nam ZAC, "A Guide To Best Practices Prepainted GALVALUME® Sheet".
[4] Photographs from Nam ZAC, "Field Performance Survey of 20 Year GALVALUME Roofing".

Storage, Shipping, Handling, and Installation Issues

MISMATCHED FASTENERS

One of the distinctive features of a high slope metal roof is its unique appearance. The choice of the fasteners should match the color and the performance of the roofing panels. Otherwise, the appearance or even the performance of the roof may be adversely affected. Figure 13 shows a green colored prepainted galvanized steel roof with discoloration of the screws. Improper fasteners were used, which resulted in the red rusting of the screws and the discolored appearance of the roof. This problem would not have occurred, if the correct fasteners had been used (Figure 14).

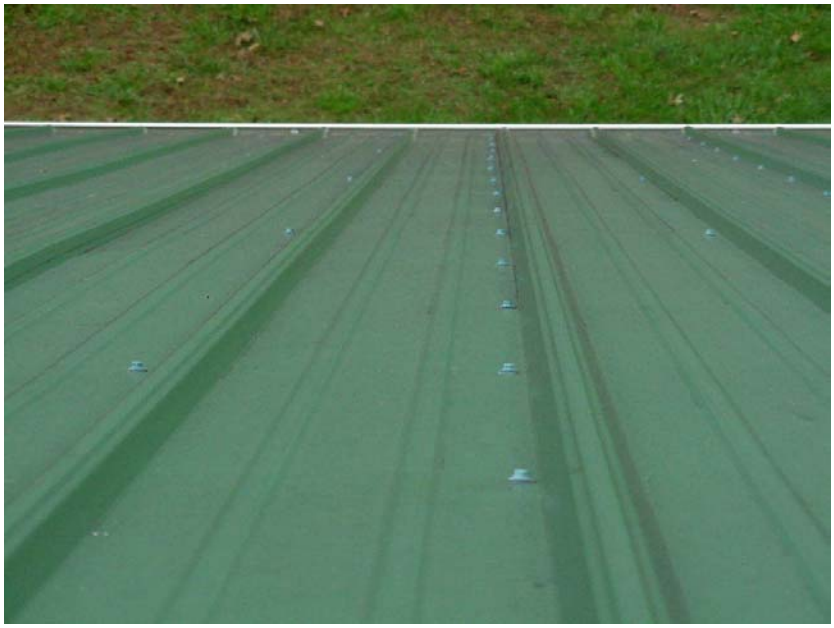

Figure 13. Photograph of the prepainted galvanized steel roof with non-matching screws.

Figure 14. A close view of a non-matching screw with red rust and the correct screw, held in the hand, which should have been used for this application.

Storage, Shipping, Handling, and Installation Issues

WET INSULATION

Insulation provides resistance to heat transfer and protects against condensation forming on cold surfaces inside the building or within the wall/roof system cavities. The insulation should have a vapor retarder face on the "warm" side of the insulation. For most buildings, the vapor retarder is on the inside surfaces facing the building interior. The thickness of the insulation must be designed to maintain the temperature of the vapor retarder above the interior dew point under the worst expected outside temperatures. All perimeter conditions and seams must be adequately sealed to avoid moisture penetration of the vapor barrier and provide a continuous membrane to resist the passage of water vapor. Failure to do so could cause wet insulation, which could cause corrosion on the underside of the roof panels (Figure 15a). This corrosion may lead to perforation corrosion from the inside of the roof panels (Figure 15b).

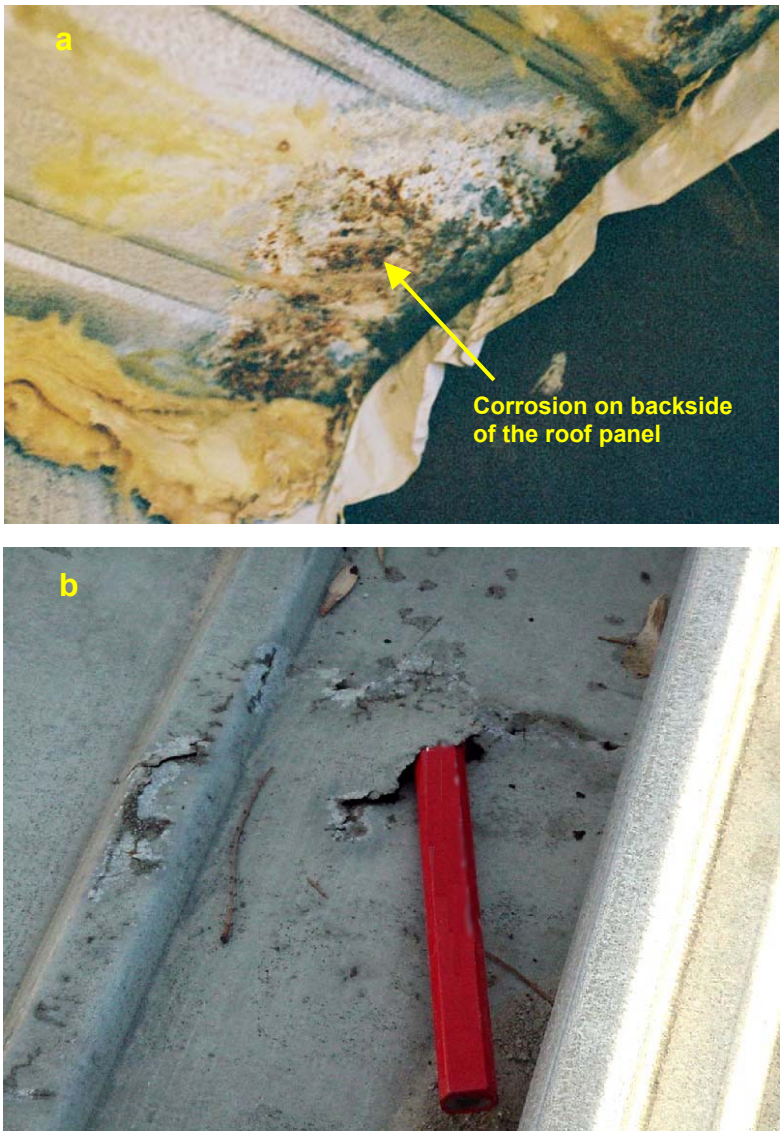

Figure 15. Photographs of roof panel corrosion due to wet insulation. The corrosion of the GALVALUME® panels was observed on the bottom side of the panels after the insulation was removed (a). Perforation corrosion was observed on the topside of the roof panels (b).

Storage, Shipping, Handling, and Installation Issues

IMPROPER SIDING INSTALLATION

Figure 16 is a classic example of "insulation wicking" causing premature failure of the coated panel. The insulation soaked up the available moisture creating an environment that was always wet causing accelerated corrosion. The contractor should be fully aware that insulation and other building materials that can soak up moisture should not be exposed to the exterior of the building. One solution is to install the insulation at least one inch above the bottom edge of the panels and to fold the insulation face around the bottom edge of the fiberglass (see Figure 17).

For bare and painted GALVALUME® products, direct contact with cement foundations is not recommended. Accelerated corrosion can occur due to the lime contained in the cement. An example of which with prepainted GALVALUME® siding is shown in Figure 18. Additionally, close proximity to a cement producing facility is not recommended as airborne cement is similarly corrosive to galvanized and GALVALUME® Coated Sheet Steels.

Figure 16. Premature corrosion at the bottom edges of the GALVALUME® panel caused by insulation wicking.

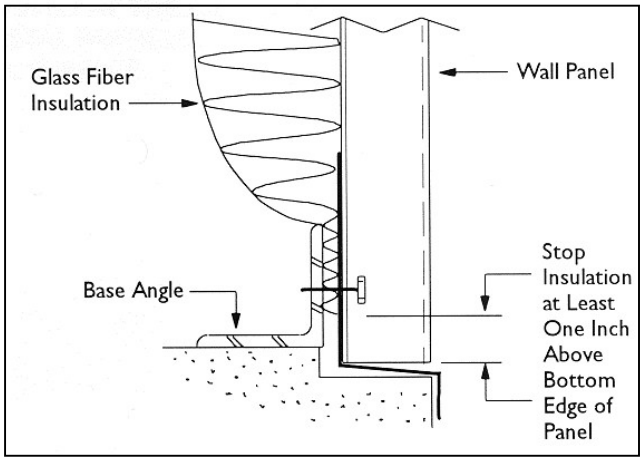

Figure 17. Schematic of properly installed insulation.

Figure 18. Premature corrosion at the bottom edges of the prepainted GALVALUME® panel caused by direct contact with the concrete foundation.

Storage, Shipping, Handling, and Installation Issues

IMPROPER SIDING INSTALLATION

One of the many factors contributing to long-term performance of a steel roof or siding system is the design and installation of panel flashings. The flashing details can significantly affect both weather tightness and corrosion resistance especially at the siding base. The bottom cut edge of a panel should not be in direct contact with concrete to prevent potential premature corrosion. A steel base trim is recommended at the panel termination to direct the water away from the base of the panel. However, the bottom cut edge should also not be in direct contact with the horizontal leg of the steel flashing to allow the free flow of the water (Figure 19). All flashings should be designed to drain water to the outside of the building and away from the cut edges of the panel. A minimum of 5° slope is desired for promoting drainage of rainwater or condensation away from the panel edge (Figure 20).

Figure 21 shows premature corrosion on the bottom edge of prepainted GALVALUME® siding where paint blisters and noticeable white residue stain could be observed along the panel edge and on the concrete surface, one year after the installation. This is a typical example of siding installed without flashing on a flat concrete base that does not allow water drainage.

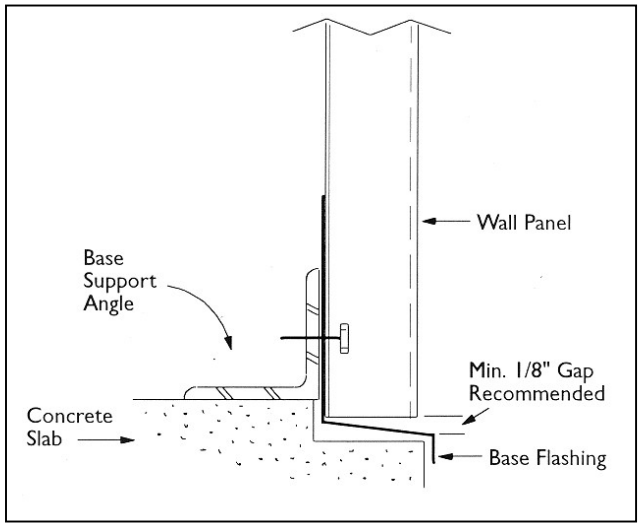

Figure 19. Schematic of proper siding installation.

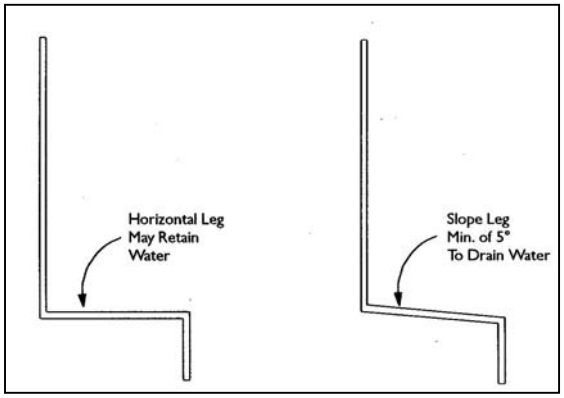

Figure 20. Schematic of the flashing.

Figure 21. Photograph of premature corrosion on the bottom edge of the siding.

Storage, Shipping, Handling, and Installation Issues

WATER PONDING

For low slope GALVALUME® roof applications, a minimum slope of 1/4:12 is recommended to provide positive water drainage maximizing the GALVALUME® roof performance. The examples in Figure 22 show standing seam roofs installed with slopes less than the 1/4:12 minimum, which resulted in water ponding in low areas causing corrosion of the metallic coating.

Water ponding may also occur in areas where localized deformation of the roof panels has occurred. The corrosion of the GALVALUME® roof panel in Figure 23 was caused by water ponding at the low spots caused by the weight of advertisement boards that had been positioned on top of the roof.

Figure 22. Photographs of water ponding on a GALVALUME® roofs due to improper slope of the roof.

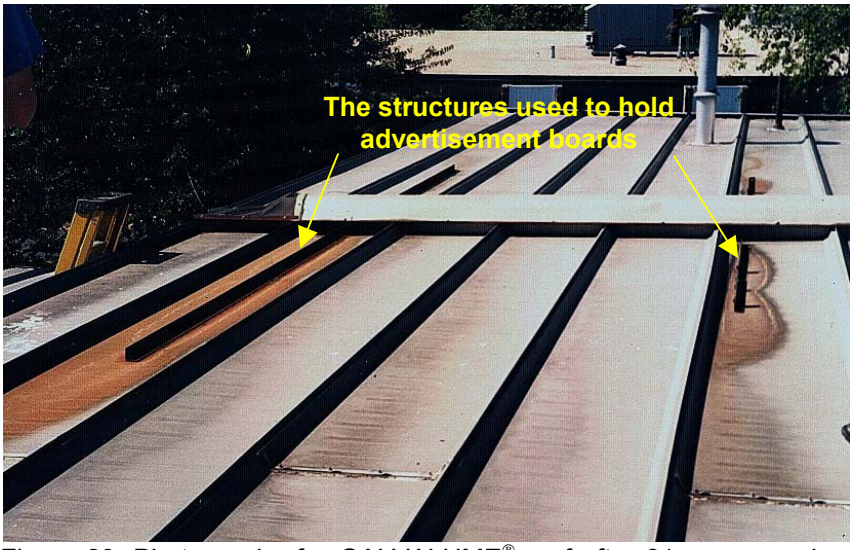

Figure 23. Photograph of a GALVALUME® roof after 21 years service. The localized corrosion was caused by water ponding at the low spots where the advertisement boards were set on top of the roof.

Storage, Shipping, Handling, and Installation Issues

IMPROPER INSTALLATION OF LAP JOINTS

Sealant should be applied at panel end laps to prevent moisture from entering the panel lap joints and causing premature corrosion. Figure 24 [5] shows the crevice corrosion caused by poor end lap sealing on a GALVALUME® roof. Figure 25 shows the paint blistering on a prepainted GALVALUME® roof caused by poor end lap sealing.

Figure 24. Crevice corrosion caused by poor end lap sealing on a GALVALUME® roof.

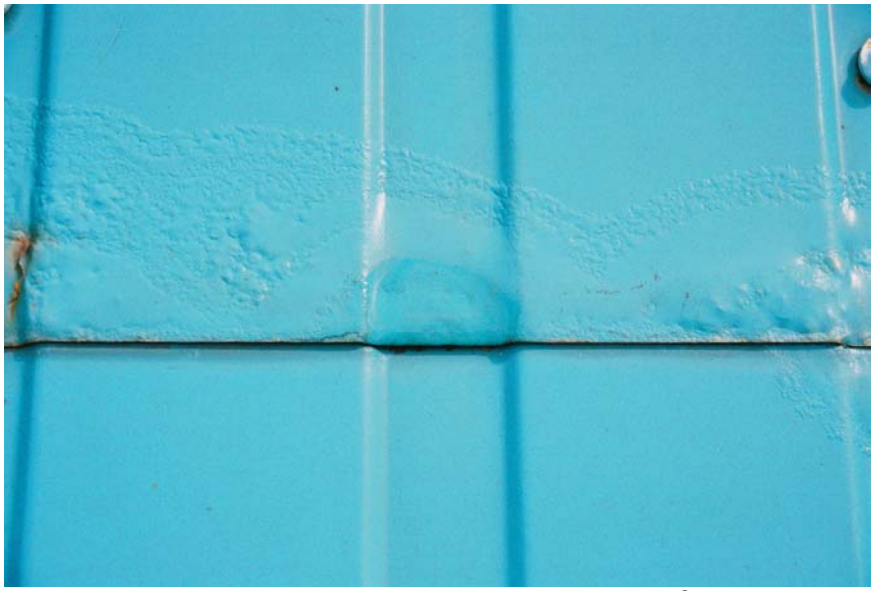

Figure 25. Paint blistering on a prepainted GALVALUME® roof caused by poor end lap sealing.

[5] Photograph from Nam ZAC, "Your Guide To Good Practices for GALVALUME® Sheet Roof"

Storage, Shipping, Handling, and Installation Issues

METAL FILINGS

Metal debris from sawing, drilling and other construction processes should be removed during installation. Otherwise, the metal filings will red rust on the surfaces where they were deposited. Red rust of the metal filings may cause stain or discoloration on the surface of the panel whether it is bare or painted and cause appearance issues. Contractors should be cautioned about the importance of removing any debris generated during installation. Cutting and drilling should be done on the backside of the panels in order to avoid damaging the exposed surface with hot metallic particles. Figure 26 shows red rusted metal filings and the stains on a prepainted siding panel and on the concrete base at the bottom of the siding.

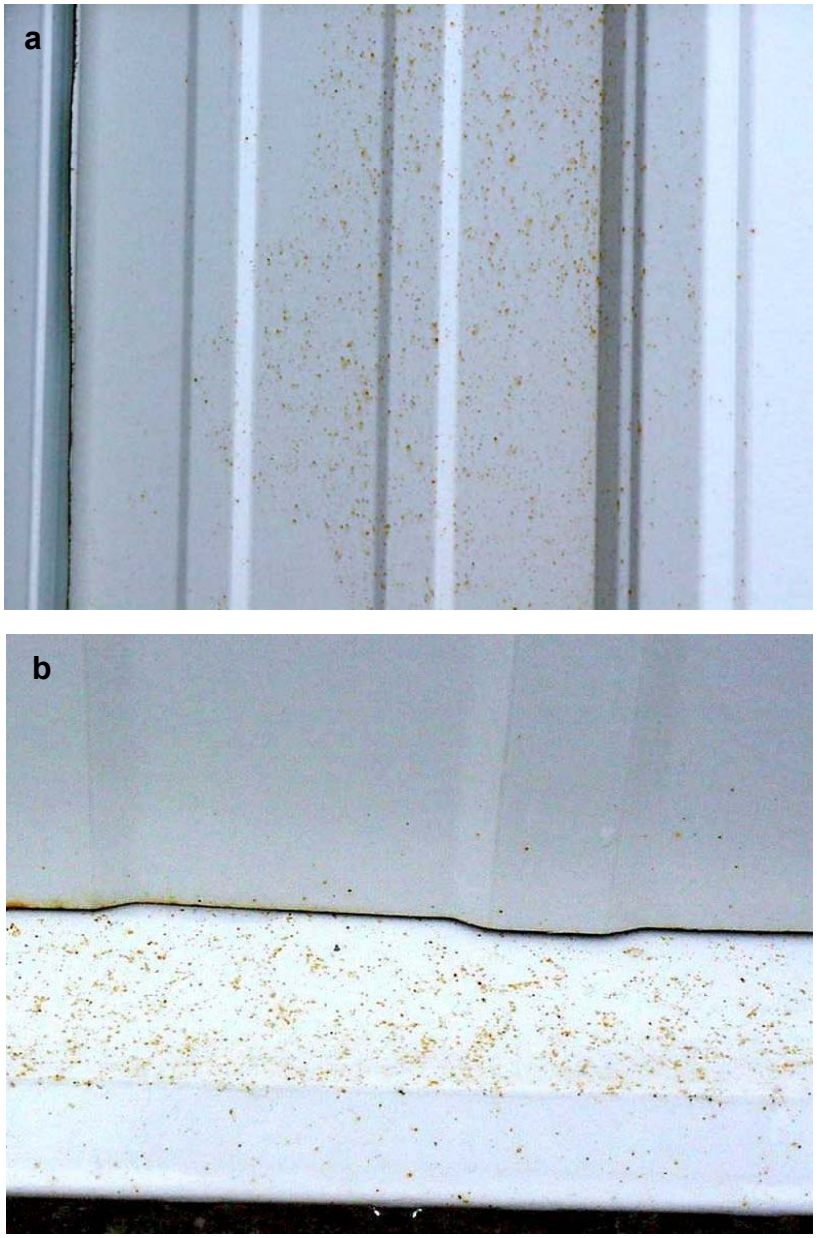

Figure 26. Photographs of red rusted metal filings and the stains on a prepainted siding panel (a) and on the concrete base at the bottom of the siding (b).

Storage, Shipping, Handling, and Installation Issues

METAL FILINGS

Figure 27 shows the red rusted metal filings on the surface of a bare GALVALUME® roof panel around a screw due to failure to remove the metal fines from drilling. Figure 28 shows another example of not removing metal filings after drilling screw holes on a prepainted GALVALUME® roof panel. Care must be taken to minimize the contact of hot metal filings from self-drilling or self-tapping screws with the coated panel surface. Any metal filings remaining on the panel surface must be removed at the end of each workday. Otherwise, those fine metal particles will corrode and result in rust staining on the panel surface.

Figure 27. Photograph of red rusted metal filings on the surface of bare GALVALUME® roof panel around a screw.

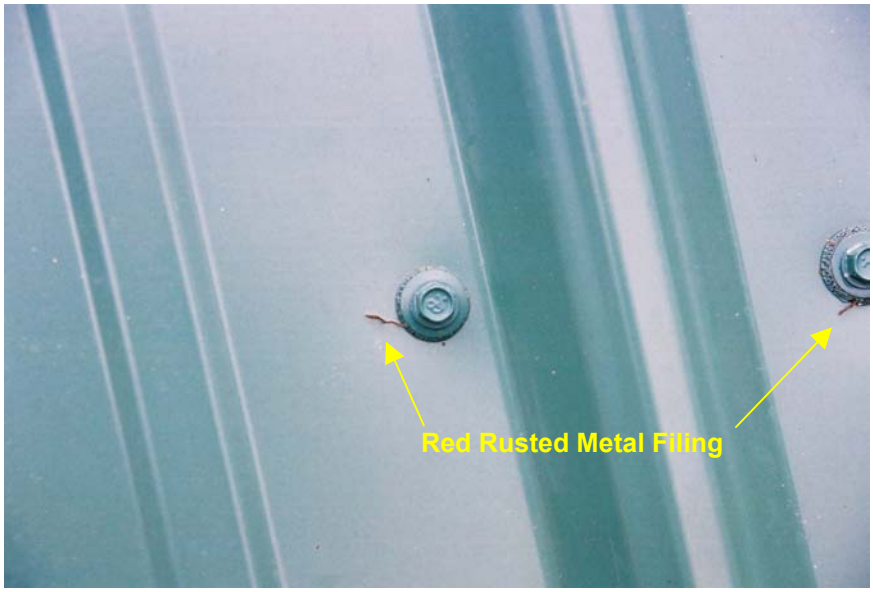

Figure 28. Photograph of red rusted metal filings from the screws on a prepainted GALVALUME® roof panel.

Storage, Shipping, Handling, and Installation Issues

PENCIL MARKS

Pencil is made of graphite. When a pencil is used to write on galvanized steel it leaves graphite powder on the surface. Figure 29 is an example of pencil mark corrosion on galvanized steel sheet. Pencil mark corrosion is a form of galvanic corrosion. Because graphite is electrochemically very noble, 3 to 4 volts more noble than the zinc, a strong galvanic cell is created and the zinc on or adjacent to the pencil mark rapidly corrodes. The open circuit potential of graphite is cathodic to all metals and alloys in most aqueous environments. One should never write on galvanized steel with a pencil.

Figure 29. Photographs of pencil mark corrosion on galvanized steel sheet (a), and a magnified view of the mark (b).

Maintenance Issues

DEBRIS ON THE ROOF

Debris should be removed from the metal roof during or following installation and through regular roof maintenance because debris can cause staining and premature corrosion. Figure 30 [6] shows wood chip debris piled near the ridge cap that caused heavy corrosion of roof panel due to water being retained by the debris. Figure 31 [6] shows that the corrosion occurred under the treated lumber because chemicals, particularly copper compounds, leached from the wood accelerating the corrosion. Figure 32 is another example; a piece of metal tube left on the roof caused staining and corrosion of the roof panel.

Figure 30. The wood chip debris piled near the ridge cap caused heavy corrosion of the roof panel due to water being retained by the debris.

Figure 31. Corrosion occurred under the treated lumber because chemicals, particularly copper compounds, leached from the wood accelerating the corrosion.

Figure 32. A piece of metal tube left on the roof caused staining and corrosion of the roof panel.

[6] Figures 27 and 28 are from Nam ZAC, "Your Guide To Good Practices for GALVALUME® Sheet Roof"

Maintenance Issues

MOLD AND MILDEW

Mold or mildew 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 also brings additional concerns since the by-products of bacteriological growth are also corrosive.

The photographs in Figure 33 show a green/brown appearance of mold or mildew on painted side wall panels and on the under side of the eave, which could cause staining on the surface. This is considered a maintenance issue. Proper ventilation and periodic cleaning should reduce the impact of mold and mildew. Remove mildew by wiping or by using a power spray. Then wash the area with an antiseptic cleaner such as bleach. Rinse the area thoroughly.

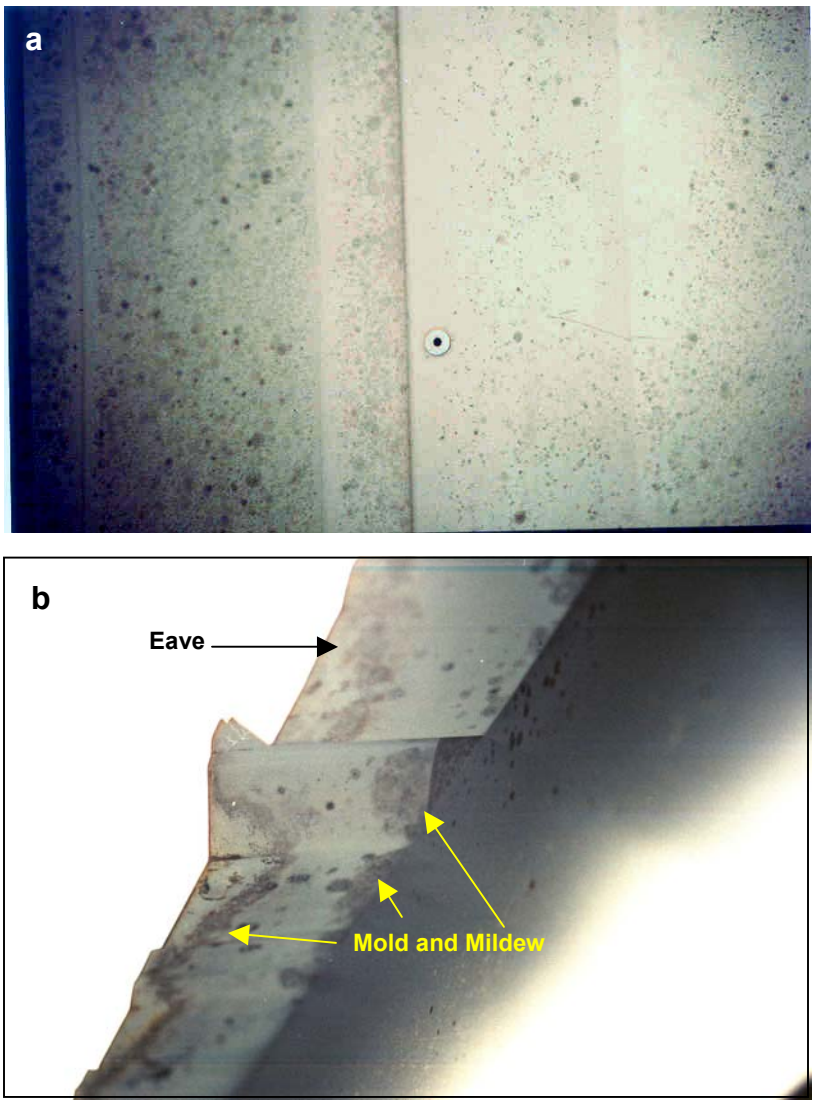

Figure 33. Mold or mildew buildup on painted side wall panel (a) and on the under side of the eave (b) where the building was surrounded by a woody area and constantly exposed to a high humidity environment.

Maintenance Issues

STACKS AND VENTS

Exhausts discharged through roof stacks can sometimes create corrosive environments around them. The roof panels should be inspected periodically. The panels around exhausts can be coated with recommended maintenance paints, if it is necessary. Figure 34 shows a bare GALVALUME® roof corroded around the vent from a laboratory where acid was constantly used. Figure 35 [7] shows that the GALVALUME® roof around the roof stacks was corroded after 20 years due to the exhaust from a space heater.

Figure 34. The bare GALVALUME® roof was corroded around the laboratory vent.

Figure 35. The GALVALUME® roof was corroded around the roof stacks.

[7] Photograph from Nam ZAC, "Your Guide To Good Practices for GALVALUME® Sheet Roof"

Maintenance Issues

DISSIMILAR METALS

Galvanized and GALVALUME® panels should not be in contact with, or subject to, water runoff from copper, lead, or uncoated steel materials. Condensation water from air conditioning units typically contains dissolved copper, which should be discharged through a plastic pipe extended beyond the edge of the roof. The effect of the condensation water runoff from the copper piping on the GALVALUME® panels is significant in both outdoor and indoor situations, such as shown in Figure 36 [8] and in Figure 37.

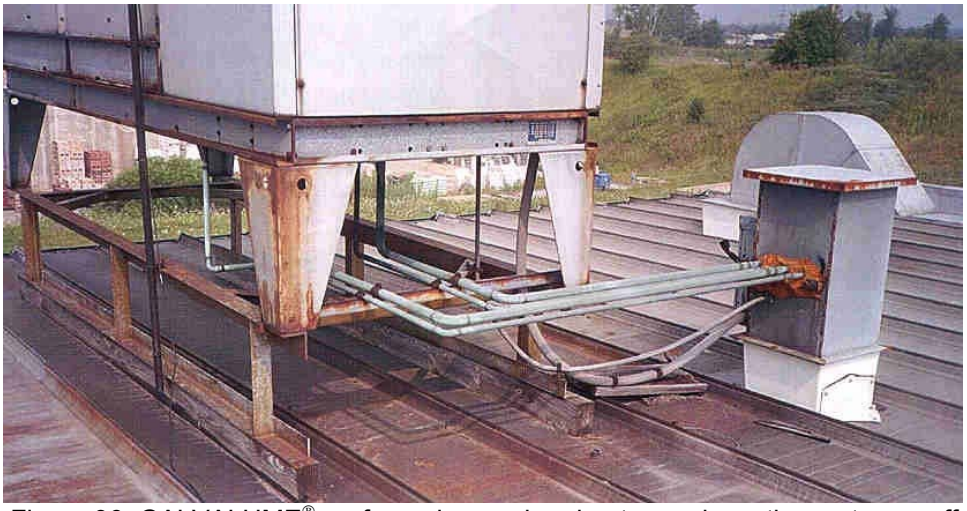

Figure 36. GALVALUME® roof panel corrosion due to condensation water runoff from the copper pipes.

Figure 37. GALVALUME® panel corrosion due to condensation water runoff from the copper pipes.

[8] Photograph from Nam ZAC, "Field Performance Survey of 20 Year GALVALUME Roofing".

Maintenance Issues

DIRT ON PAINT

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 for removal. Detergents, ammoniated cleaners and solvents are particularly effective in removing this greasy kind of dirt. Generally, lighter colors show dirt more than dark colors. However, dirt remaining on a darker roof can also cause discoloration, an example of which is shown in Figure 38. The bright color has been covered by dirt.

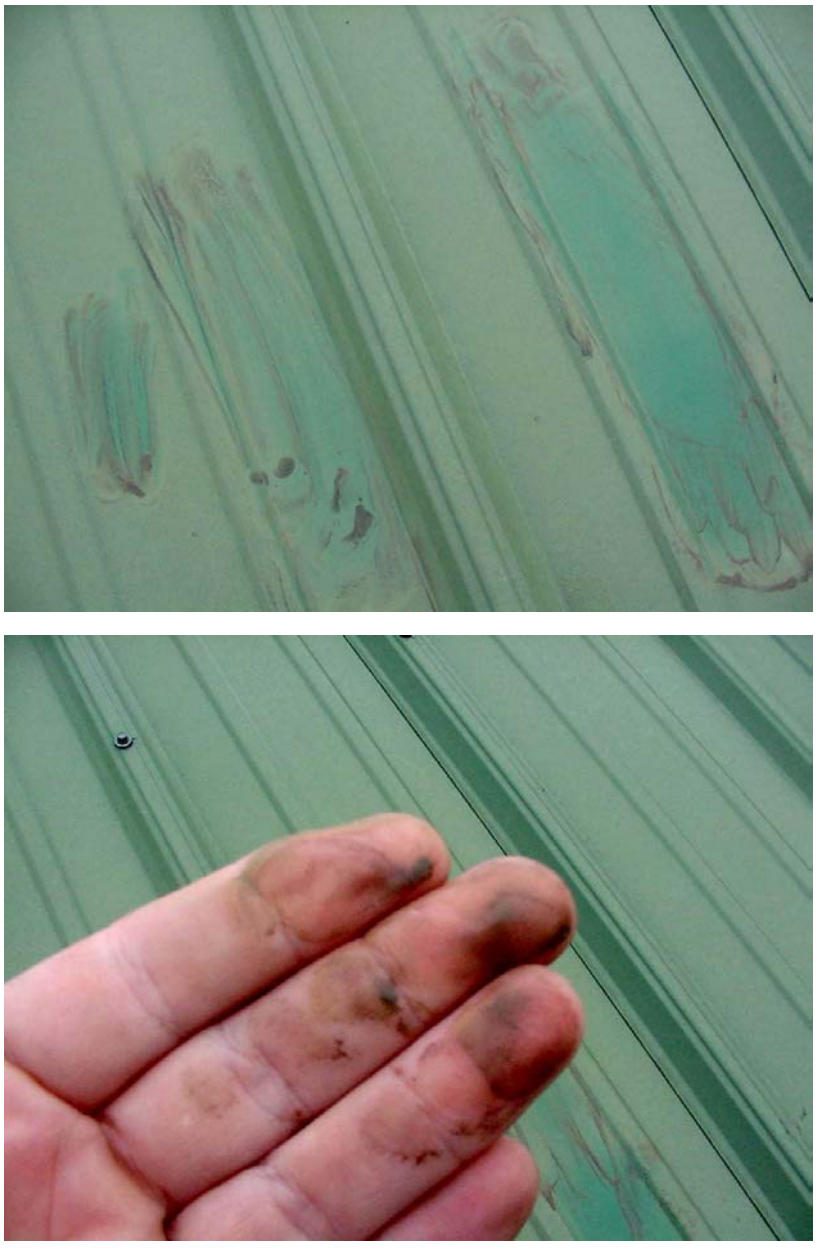

Figure 38. The prepainted GALVALUME® roof panel discoloration is due to dirt coverage.

Design Issues

BARE GALVANIZED SHEET STEEL ON HIGH SLOPE ROOFS

Bare GALVALUME® Coated Sheet Steel is not recommended for high visibility applications, such as the high slope roofing application shown in Figure 39, because of the potential for differential darkening. The darkening variation can be minimized by supplying material from one supplier and from one master coil. Consecutive master coils supplied by the steel mill will also reduce, but not eliminate the possibility of variation. The darkening variation may also be observed on ACRYLUME® Coated Sheet Steel panels (Figure 40). Therefore, if the application requires a consistent surface appearance, a painted product is recommended.

Figure 39. Differential darkening of bare GALVALUME® panels on a high slope roofing application.

Figure 40. Differential darkening of ACRYLUME® panels on a high-slope roofing application.

Design Issues

IMPROPER DESIGN

The design of metal roofing should allow water runoff and also provide adequate ventilation to prevent condensation. An improper design will affect the corrosion performance of the roofing panels whether they are bare or painted. The roof design shown in Figure 41 does not allow rainwater to runoff along the curvature of the roof, causing condensation to accumulate on the backside of the panel along the ribs (Figure 42). Contractors should be warned of the potential impact of such applications and designs, which do not allow effective water runoff or proper ventilation.

Figure 41. Improper roof profile design of a pole building with open sides does not allow rainwater to runoff along the curvature of the roof.

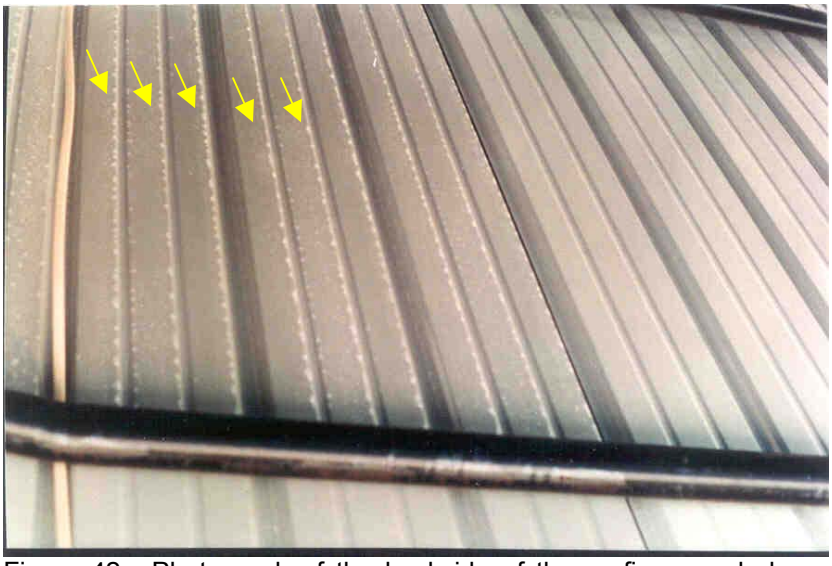

Figure 42. Photograph of the backside of the roofing panel shows condensation accumulating along the ribs of the panel as the arrows indicate.

Paint Issues

CHALK AND FADE OF PAINT

Fading is typically caused by the breakdown of the components of the paint film by UV light from the sun. Paint suppliers indicate the degree of fading that can normally be expected from a particular paint system over a given time period. An area that is blocked from the UV exposure will have less fading than areas exposed to the sun. An example of this is shown on the building in Figure 43. In the case of non-uniform fading of the paint, such as the prepainted roof in Figure 44, there are noticeable differences in color between one section and another section of the roof panels. The amount of fade should be evaluated by the representatives of the coil coater or paint supplier to determine the cause.

Figure 43. Color fading of the paint on prepainted panels due to UV light from the sun.

Figure 44. Non-uniform fading of a prepainted roof with noticeable differences in color from one section to another section (a) and its close look (b).

Paint Issues

TOUCH-UP PAINT

Touch-up paint is often used to repair or cover the scratches, abrasion marks or other lightly damaged areas on prepainted building panels. Appropriate touch-up paints, normally supplied by the paint manufacturers, will match the colors and meet the performance requirements with the paint on the building panels. If unsuitable touch-up paint is used, it may cause differential chalking and fading appearance on the painted panel, which may require repainting of the entire affected surface. The pictures below demonstrate the poor performance of improper touch-up repair paints, which have caused differential chalking and fading appearance on the prepainted GALVALUME® steel roof (Figure 45) and on the prepainted hot-dip galvanized steel siding (Figure 46).

Figure 45. Differential chalking and fading appearance on the prepainted GALVALUME® steel roof with improper touch-up paint.

Figure 46. Differential chalking and fading appearance on prepainted hot-dip galvanized steel siding with improper touch-up paint.

Paint Issues

INTER-COAT ADHESION FAILURE OF PAINT

Generally, paint systems for exterior building panel applications consist of a primer and a topcoat. The primer should provide good adhesion to the coated steel substrate and to the topcoat. Figures 47 to 49 show an example of inter-coat adhesion failure of the paint where the topcoat has delaminated from the primer on the prepainted GALVALUME® Coated Sheet Steel. The primer still remains on the surface of the coated steel sheet substrate (Figure 49). In this case, the failure is not related to the GALVALUME® Coated Sheet Steel. The coil coater and paint supplier should be contacted to resolve this issue.

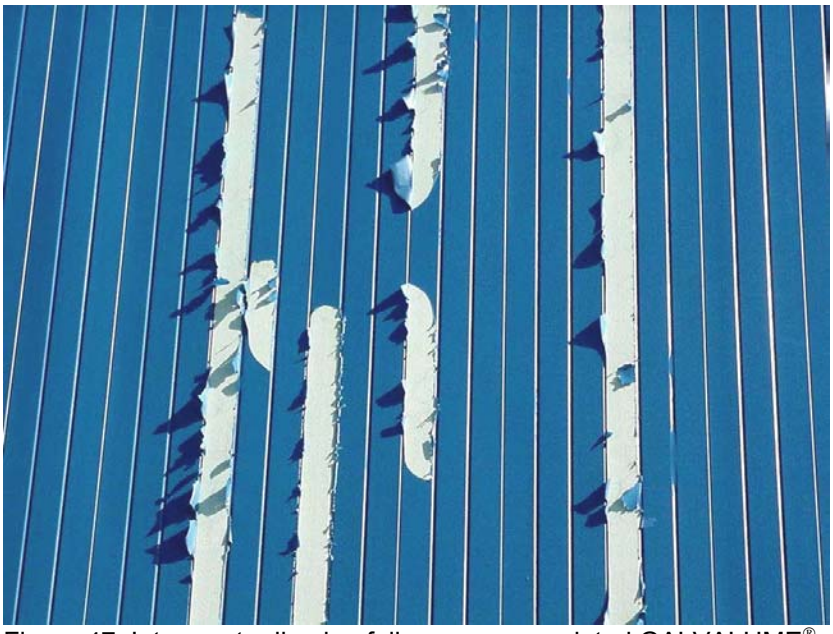

Figure 47. Inter-coat adhesion failure on a prepainted GALVALUME® panel.

Figure 48. The topcoat delaminated from the primer.

Figure 49. The primer remained on the panel where the topcoat peeled off.

NOTES