Prepainted Galvalume® Sheet

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Prepainted Galvalume sheet is an ideal product for many painted applications where superior atmospheric corrosion resistance is needed, such as in pre-engineered buildings, architectural panels, siding, roofing (conventional and standing seam) and other building components. It is also suitable for appliances and other end uses. A wide variety of colors and finishes are available to satisfy most applications.

TECHNICAL DATA

Typical Mechanical Properties (Commercial Steel):

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield Strength</td>
<td>40-55 ksi</td>
</tr>
<tr>
<td>Tensile Strength</td>
<td>55-70 ksi</td>
</tr>
<tr>
<td>Total Elongation</td>
<td>20-36%</td>
</tr>
<tr>
<td>Hardness</td>
<td>50-65 HRB</td>
</tr>
</tbody>
</table>

(Structural steels, including 50 ksi and 80 ksi minimum yield strengths, are also available.)

Substrate: The Galvalume sheet coating consists of an alloy of nominally 55% aluminum, 1.6% silicon, and the balance zinc by weight, as listed in ASTM designation A 792. On a volume basis, the coating is approximately 80% aluminum. The high aluminum content of the coating results in Galvalume sheet having a lower density and less weight per unit area than G90 galvanized sheet of equivalent thickness.

This means that a ton of Galvalume sheet will yield more square feet of useable product than a ton of G90 galvanized of equivalent thickness. A Bethlehem sales representative can provide specific details for a particular application.

The metallic coating is applied by a continuous hot-dip process whereby properly cleaned low carbon, cold-rolled steel is dipped into a molten aluminum-zinc bath. The patented alloy coating of Galvalume sheet provides an optimum balance between (a) the long-term general corrosion resistance of aluminum, and (b) the galvanic protection of zinc at scratches and cut edges.

Processing: Galvalume sheet is cleaned and pretreated in preparation for painting. Surface contaminants are removed using a suitable alkaline cleaner. The sheet is then pretreated with a chromate pretreatment. The pretreatment is a uniform, continuous deposit applied in a manner to provide excellent paint adhesion and corrosion resistance.

A minimum of two coats of paint are applied to both the face side and back side of the sheet: a corrosion inhibitive primer and a top coat. The primers are selected from a list of Bethlehem-approved paint systems. The primer is a uniform continuous film, compatible with the subsequently applied top coat. It is applied to each surface at a thickness specified by the paint manufacturer (typically 0.2-0.25 mil.). Top coat thickness varies depending on paint type and end use. The face side top coat has excellent long-term outdoor weathering characteristics. Both face side and back side top coats must meet various quality...
assurance tests, such as adhesion, flexibility and hardness.

**Paint Adhesion:** Paint adhesion on Galvalume sheet is consistently better and less variable than on G90 galvanized sheet. Adhesion is determined by pick-off on a tape pull on a cross-hatch, wedge bend and nine joule (80 inch-pound) reverse impact dimple.

**Flexibility:** Based on laboratory reverse impact testing, the coating flexibility of Galvalume sheet is superior to that of G90 galvanized sheet. When subjected to the nine joule reverse impact dimple test, pre-painted Galvalume sheet shows less evidence of paint crazing than does pre-painted G90 galvanized. Less paint crazing occurs with pre-painted Galvalume sheet because the aluminum-zinc coating is less susceptible to micro-fracturing during forming than is the zinc coating on G90 galvanized. Less paint crazing results in improved corrosion resistance.

**Corrosion Resistance:** Based on 30-year atmospheric test results, bare Galvalume sheet is at least two to four times more resistant to atmospheric corrosion than G90 galvanized. Pre-painted Galvalume sheet has also exhibited excellent corrosion resistance in a variety of accelerated tests and atmospheric exposures. It has demonstrated equal or better performance than pre-painted G90 galvanized in corrosion protection at flat areas, paint damaged areas, and formed areas where paint crazing has occurred. Pre-painted Galvalume sheet exhibits less than 3mm of edge creep along sheared edges and no scribe creep after 750 hours salt-spray exposure (Specification ASTM B 117). Additionally, no blistering or loss of paint adhesion occurs after 1,000 hours waterfog exposure (100% relative humidity at 100°F).

**Edge Creep:** Edge creep is paint undercutting along sheared edges on pre-painted metal sheets. Outdoor exposures of Bethlehem-approved paint systems applied to Galvalume sheet demonstrate the product’s excellent resistance to edge creep.

In tests of siliconized polyester paint systems, widely used in the industry, pre-painted Galvalume sheet exhibits consistently low edge creep that tends to level off to about 1 mm after three years of exposure at Bethlehem’s most corrosive test site at Kure Beach, NC. This low level of edge creep is maintained up through at least 10 years of exposure, the longest exposure time for which data are available.

**INSTALLATION**

Certain precautions should be taken when installing pre-painted Galvalume sheet, including:

- Pre-painted Galvalume sheet should not come in direct contact with wet concrete. Concrete’s high alkalinity attacks the aluminum, causing the coating to peel.
- Pre-painted Galvalume sheet should not be placed in contact with copper, lead, or the water run-off from either. Electrochemical reaction between these elements and the aluminum-zinc alloy coating will lead to premature corrosion of the coating.
- Fasteners should have corrosion resistance at least equivalent to the expected life of the base material.

Otherwise, pre-painted Galvalume sheet can be stored, handled, and installed using the same procedures as with pre-painted galvanized steels. Good installation practice includes removal of metal fines due to drilling, cutting, etc. from the sheet surface and avoiding exposure of insulation to the weather.

**AVAILABILITY AND COST**

**Availability:** Pre-painted Galvalume sheet is manufactured at Bethlehem’s plants at Sparrows Point, MD and Jackson, MS, and painted at approved coil coaters throughout the country. Pre-painted Galvalume sheet can be obtained in thicknesses from 0.014” to 0.055” and in widths up to 48”. Inquire for heavier thicknesses.

**Cost:** Pre-painted Galvalume sheet is priced competitively with pre-painted G90 galvanized on a per square foot (or per part) basis. Specific price quotations will be furnished upon request.

**WARRANTY**

Pre-painted Galvalume sheet is conditionally warranted against rupture, structural failure or perforation due to corrosion for a period of 20 years and six months when used for building panel applications.

Paint finishes are warranted depending upon application, paint system and color. More specific information regarding warranties will be furnished upon request.

**MAINTENANCE**

Pre-painted Galvalume sheet requires no special maintenance under normal use. Recommended touch-up paint systems are available from the paint manufacturers for repairing areas damaged during erection.

**TECHNICAL SERVICES**

For more information call Bethlehem Steel at (800) 521-4789 or write: Bethlehem Steel Corp., Coated Sheet Marketing, 5111 North Point Boulevard, Sparrows Point, MD 21219; or visit our website at www.bethsteel.com.