



United States Steel Corporation

# Technical Bulletin Construction

## GALVALUME® SHEET STEEL

TBP 2005.6

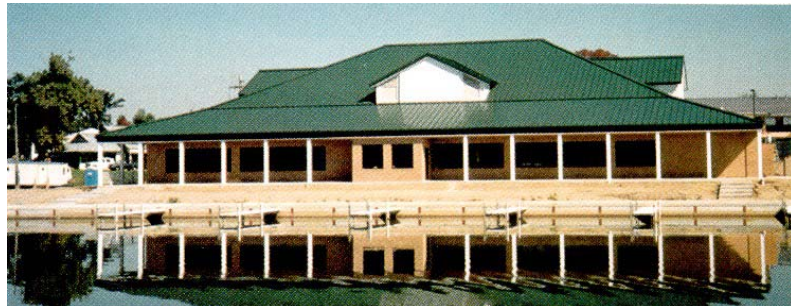
### PRODUCT DESCRIPTION

GALVALUME®<sup>1</sup> is the trade name for a sheet steel product having a highly corrosion resistant coating of a nominally 55% aluminum, 43% zinc alloy. The coating is applied using a continuous hot-dip coating process. The metallic coating on GALVALUME® Sheet Steel combines the galvanic corrosion protection of zinc with the passivating barrier protection of aluminum into an economical long-lasting sheet steel product.

GALVALUME® Sheet Steel is intended for uses where excellent corrosion resistance is required. Typical applications are roofs, siding, air-conditioning equipment, appliances, and automotive under-body parts or high temperature applications. The metallic coating provides galvanic protection to the steel and has excellent barrier protection.



Bare standing seam roof



Add beauty to the natural corrosion resistance by using pre-painted GALVALUME®

In certain environments, U. S. Steel recommends either not using GALVALUME® Sheet Steel or taking precautions to limit the corrosion. These environments include:

- Contact with lead, graphite, cement or copper. This includes but is not limited to treated lumber containing copper and other corrosive elements.
- Use in harshly corrosive environments, including proximity to seawater, exposure to very long wet times, chronic corrosive chemical exposure and animal confinement applications.

### MATERIAL DESCRIPTION

GALVALUME® Sheet Steel is offered in a number of grades. Common ASTM designations for the construction industry are Commercial Steel (CS) Types A and B, Forming Steel (FS), and Structural Steel Grades 33, 37, 40, 50 and 80. U. S. Steel also offers Structural Steel Grade 60, combining many desirable properties of Grade 80 and 50 (see U. S. Steel Technical Bulletin "ASTM Designations for Steel Properties of Hot-Dip Galvanized and GALVALUME® Coated Steel Sheet" for further information). GALVALUME® Sheet Steel may be temper passed and/or tension leveled to improve sheet shape and surface finish.

<sup>1</sup> GALVALUME® is an internationally registered trademark of BIEC International, Inc. and some of its licensed producers

GALVALUME® coatings are approximately 43% zinc, 55% aluminum, with the balance containing primarily silicon and iron for good coating adhesion. U. S. Steel uses low silicon for improved coating ductility (see U. S. Steel Technical Bulletin on “Tension-Bend Staining of Prepainted GALVALUME® Sheet” for more information). U. S. Steel recommends chemical treatment for bare and painted applications. GALVALUME® Sheet Steel is produced to customer specifications, often in conformance with ASTM A792. Table 1 lists ASTM coating weights.

<b>Table 1. ASTM GALVALUME Coating Weights</b>			
<b>Coating Weight</b>	<b>Triple-Spot, Total Both Sides (oz/ft<sup>2</sup>)</b>	<b>Single-Spot, Total Both Sides (oz/ft<sup>2</sup>)</b>	<b>Triple-Spot, Minimum Pre Side (oz/ft<sup>2</sup>)</b>
AZ 50	0.50	0.43	Not Specified
AZ 55	0.55	0.50	Not Specified
AZ 60	0.60	0.52	Not Specified

## CORROSION PROTECTION

Bare GALVALUME® Sheet Steel has exceptional corrosion protection. Samples from the initial GALVALUME® Sheet production are still in outdoor exposure testing and are performing very well. Figure 1 shows recent results. Inspections of 25-year-old bare GALVALUME® roofs support these tests. For most environments, the full lifetime of the product has not yet been determined.

With GALVALUME® Sheet Steel’s excellent bare corrosion resistance, it is typically only painted for aesthetic reasons in high slope roofing applications. U. S. Steel qualifies paints that provide the best corrosion protection. Using these paints with qualified coil coaters ensures the best corrosion performance.

Each prepainted coil must pass on-line quality control tests of paint thickness, curing, adhesion, color, and gloss. In addition, U. S. Steel routinely audits the quality of prepainted GALVALUME® products.

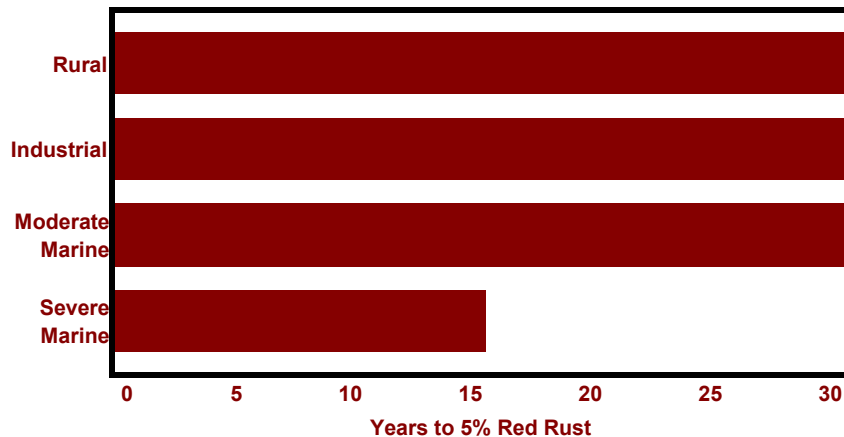


Figure 1. Outdoor exposure results for bare GALVALUME® Sheet Steel.

Figure 2 shows the average edge corrosion as measured on painted GALVALUME® Sheet Steel at acid rain, non-marine, subtropical and industrial sites. The edge creep is slight and stops increasing after 2 years.

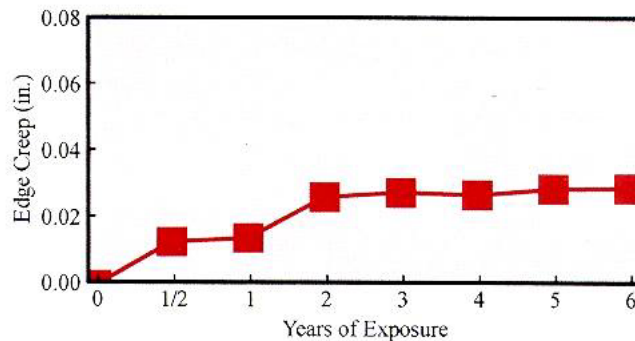


Figure 2. Outdoor exposure results for prepainted GALVALUME® Sheet Steel.

## OTHER HOT DIP GALVANIZED PROPERTIES AND SERVICES

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### Technical Support

U. S. Steel has technical service and regional sales representatives located throughout the country. For technical support and literature contact your technical service or sales representative.

### Quality Control

U. S. Steel GALVALUME® Sheet Steel at the customer's request, is often tested for coating adhesion, surface appearance, hardness, tensile and coating weight before shipping, ensuring customers only the highest quality product.

### Handling

Exposure to moisture while in coil form or in a tight stack of formed panels can cause storage stain on GALVALUME® Sheet Steel. To help prevent the stain, U. S. Steel applies a chemical treatment to all GALVALUME® Sheet Steel, unless requested otherwise.

### Formability

GALVALUME® Sheet Steel is easily roll-formed or stamped. Vanishing oil can be mill applied as a lubricant to assist in roll forming the unpainted product. Also available for enhanced formability and corrosion resistance is a mill-applied acrylic coating on the surfaces of GALVALUME® Sheet Steel, referred to as ACRYLUME® Sheet Steel (see U. S. Steel Technical Bulletin on ACRYLUME® Sheet Steel for more information). Prepainted GALVALUME® Sheet Steel can be roll formed without the need for additional lubricants. Formability help is available through the U. S. Steel Construction Group.

### Installation

GALVALUME® Sheet Steel is readily installed in the same manner as HDG. Fasteners should be chosen that have a life expectancy equivalent to GALVALUME® Sheet Steel. Sealants should be neutral cure only.

### **High Temperature Properties**

GALVALUME® Sheet Steel has excellent heat reflection properties, similar to aluminum and is more resistant to higher temperature than HDG. It will maintain its bright surface appearance and reflectivity in prolonged exposure at 600°F and is not heavily oxidized by temperatures up to 1200°F.

### **Warranty**

U. S. Steel warrants GALVALUME® Sheet Steel AZ55 for 25 years and 6 months against perforation and AZ50 for 20 years and 6 months against perforation. This warranty applies to unpainted product and painted material only when an approved paint is applied by a qualified coil coater. It only applies for normal exposure conditions. In highly corrosive environments or situations where design issues control the product life, the warranty may not be in effect.

### **DISCLAIMER**

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