

METALLIC COATING

SUMMARY

Corrosion, also known as oxidation or rust, weakens steel and can contribute to product failure. Metals, including zinc and aluminum can be applied as a coating to provide a protective barrier against corrosion.

Key Differences

The two common types of metallic coating are galvanized and ZINCALUME® (also known as Galvalume®). Galvanized coatings consist of zinc, whereas ZINCALUME consists of both aluminum and zinc.

As a protective element, zinc provides a sacrificial barrier for the steel underneath - this ensures the coating will corrode preferentially to the base steel. Aluminum by comparison, provides an inherent protective barrier which prevents the spread of corrosion. As a result, ZINCALUME combines the benefit of preferential corrosion, while slowing its spread. This provides better overall long-term performance and superior cut edge and edge creep corrosion resistance performance. Extensive field testing has proven that ZINCALUME can outlast galvanized material several times, with the latest tests estimating a 60-year service life in unpainted applications¹. ZINCALUME and licensed Galvalume products will typically carry a corrosion warranty. This warranty is independent of any additional finish warranty provided by the paint system.

Manufacturing Process

The metallic coating is applied to the bare steel before it is painted. In most instances, the metallic coating is applied by passing the steel through a molten pot of the coating, after which it is cooled and treated to create a tightly bonded, consistent finish. This process is performed in accordance with ASTM standards A924, A653 and A792.

Variants and Specification

Metallic coating specification will vary based on type (galvanized or ZINCALUME), and by thickness, called coating weight. The thickness of the metallic coating will impact the longevity of the corrosion resistance.

For galvanized material, the most common thicknesses are G60 and G90. The number denotes the coating of zinc per square foot. For example G60 reflects 0.60 ounces and G90 reflects 0.90 ounces per square foot. For galvanized material, corrosion resistance is typically directly proportional to the amount of coating, in that a G90 product will be 1.5x more resistant compared to a G60 product.

The most common ZINCALUME coating weight is AZ50 (or in some cases AZ55). AZ50 refers to 0.50 ounces of aluminum-zinc coating per square foot. AZ50 forms the most appropriate coating weight for a diverse range of building applications. Due to the difference in the performance between galvanized and ZINCALUME, the numerical terminology does not represent an equivalency (AZ50 is not the same as G50). A thicker coating weight is not required to increase performance like for galvanized.

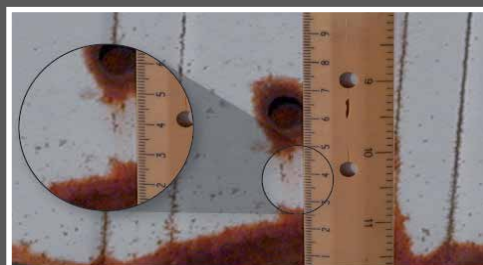
Some specialty applications, such as those within proximity of airborne chemicals or salt spray, may require alternative coating thicknesses. Thicker coating weights can impact other factors such as formability (ability to be formed into a panel) and cost. In these situations, specifiers should consult their preferred product manufacturer before selecting a coating.



Application of the Metallic Coating
at Steelscape Kalama

Case Study 1: *Barrier Protection in Action*

Corrosion comparison of a drip edge at 20 years of service life. Both products are painted and located in an acid rain environment in Pennsylvania. Note how the ZINCALUME product has slowed the spread of corrosion.



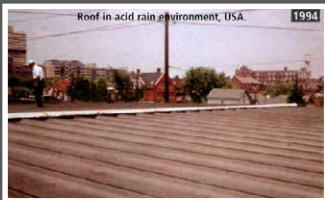
Galvanized



ZINCALUME

¹Reference: ZAC Association, ZINCALUME – Build Once, Roof Once, pg 2

Attribute Summary	Galvanized	ZINCALUME®
Overview	100% Zinc	45% Zinc and 55% Aluminum
In Use	150+ years	Since 1972
Visual Appearance	No to light spangle	Light spangle
Corrosion Protective Properties	Sacrificial - Protects the steel underneath but will be consumed until structural integrity is lost	Sacrificial and barrier - In addition to sacrificial protection, barrier protection will slow the spread
Corrosion Resistance	Good bare, very good when painted with a premium paint system (fluorocarbon or PVDF) Initial observable corrosion is often less (<10 years)	Excellent bare and painted Improved edge creep protection & improved protection at cut edges (i.e exposed edge of panel) providing greater long-term protection
Corrosion Warranty	No warranty	25 years
Price	Comparable	
Availability	Can be produced in common gauges for metal roof and wall building applications including 29ga, 26ga, 24ga, and 22ga	
Lifespan	Heavily dependent on installed environment, however:	
	Bare: 25-50 years Painted: Dependent on paint system (25-50+)	Bare: 60+ years Painted: Dependent on paint system (can be 60+)
Recommended Coating	G90	AZ50
Typical Applications	Steel decking, agricultural, metal buildings, residential roofing, commercial roofing and siding	Residential roofing, metal building, commercial roofing and siding
More Info	galvanizeit.org	galvalume.com



Case Study 2 Service Life

One of the first ZINCALUME applications at 20 & 30 years service life. Application is a low slope, bare, standing seam roof. Corrosion observed is on non-ZINCALUME accessories.

Source: ZAC Association

Recommendations

ZINCALUME offers superior corrosion resistance in most applications. However, when used in conjunction with a premium paint system (such as a PVDF system), both coatings will provide long-lasting corrosion protection in most environments. There are some environments in which ZINCALUME is not suitable including highly alkaline environments, such as those in direct contact with wet cement or when buried in soil, and animal confinement settings.

To avoid premature corrosion, both coatings are not suitable for roof slopes below ¼ : 12 due to the potential for standing water. Designers should also ensure these products are not in direct contact with dissimilar metals in corrosive environments, for example, direct contact with stainless steel or copper in a coastal setting.



Case Study 3 Dissimilar Metals

A stainless-steel fastener installed in a ZINCALUME panel in a coastal home, creating rapid galvanic corrosion. Note how it initially appears as a paint failure, but it is from corrosion underneath.

Source: Steelscape Internal