

STEEL Fact File

An information source for design professionals

FF2 – ZINCALUME® steel or galvanised steel

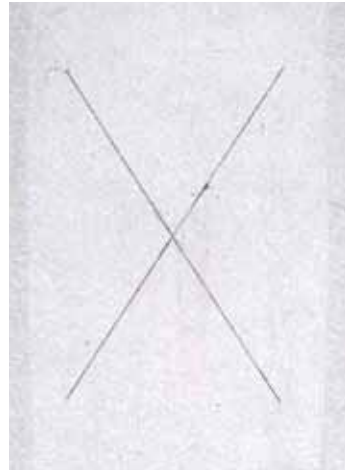
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Fast Facts

- Both products have a high degree of formability
- ZINCALUME® steel provides up to four times the service life of galvanised steel
- Galvanised steel relies mainly on sacrificial protection to resist corrosion
- ZINCALUME® steel employs a combination of both barrier and sacrificial protection



Z275 galvanised steel @ 240 hours of salt spray testing.



ZINCALUME® steel @ 240 hours of salt spray testing.



ZINCALUME® steel @ 2000 hours of salt spray testing.



Galvanised steel, foreground, and ZINCALUME® steel after 20 years of natural exposure.

Behind the Facts

Q. What are the differences between galvanised steel and ZINCALUME® steel?

A. Galvanised steel is coated in almost pure zinc while ZINCALUME® steel is coated in an alloy of approximately 55% aluminium, 43.5% zinc and 1.5% silicon. Although both products are produced as continuously hot dip coated products, they perform very differently, especially in construction industry applications such as roofing and walling.

All coatings protect steel sheets from corrosive attack by acting as a barrier to exclude air, water and other corrosion causes from contact with the steel substrate.

The rate of corrosion of ZINCALUME® steel is initially very similar to that of galvanised steel. However, the longer life of ZINCALUME® steel is attributed to the rapid slowing down of this corrosion rate shortly after the initial exposure to the environment. This is due to the formation of aluminium-containing corrosion products that consequently add to the barrier protection of the coating.

All the while, the zinc present in the ZINCALUME® coating is available to sacrificially protect the steel at cut edges. This sacrificial mechanism is similar to galvanised steel in the typical (thinner) product thicknesses used in roofing and walling applications.



Q. Is corrosion protection similar with similar coating masses for the two materials?

A. Because the coatings on galvanised steel and ZINCALUME® steel perform in different ways, ZINCALUME® steel has much better corrosion protection (and service life) than galvanised steel.

Side by side exposure testing has shown corrosion protection provided by ZINCALUME® steel with an AZ150 (150g/m²) coating mass is far superior to that provided by galvanised steel with a Z275 (275g/m²) coating mass.

The tests demonstrated that ZINCALUME® steel corrosion protection can last at least four times longer than the corrosion protection provided by traditional zinc coated steels in roofing and walling applications in identical environments.

Q. How does ZINCALUME® steel outperform galvanised steel?

A. Extensive research by BlueScope Steel on aluminium/zinc alloy coatings has confirmed that the overall optimum performance occurs in an alloy of around 55% aluminium, 43.5% zinc and 1.5% silicon.

In ZINCALUME® steel this coating provides a milder degree of sacrificial protection at the cut edge, but because the coating survives longer, its protective effect is far more long lasting.

Q. How does reducing the AZ150 coating mass to AZ70 impact the life of the product?

A. Compared to ZINCALUME® AZ150 steel, a Zinc Aluminium coating of AZ70 will reduce the life of the product by more than 50% (or half the life).



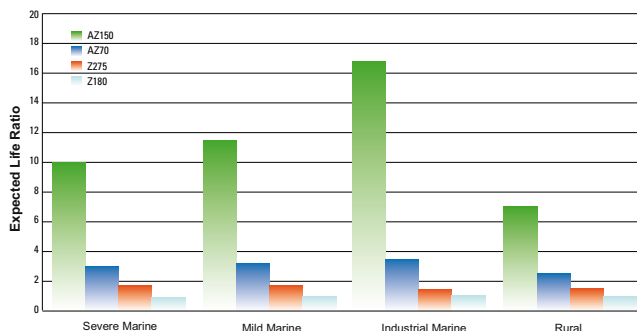
ZINCALUME® Steel AZ150
Washed Panels – Exposed for 21 years



Galvanised Steel Z300
Washed Panels – Exposed for 21 years

Resistance to Atmospheric Corrosion

Expected Life Ratio Comparison of ZINCALUME® AZ150, and Zinc/Aluminium AZ70, and galvanised Z275, and Z183 Coating Mass



This graph shows the relative difference in expected life of four products, namely ZINCALUME® AZ150 steel, as well as an AZ70 zinc/aluminium steel, a Z275 galvanised steel and a Z183 galvanised steel, after exposure at East Coast Australia test sites, conditions ranging from rural to severe marine.

A comparison across the various test sites shows that:-

- ZINCALUME® AZ150 steel has at least 4 times the life of Z275 galvanised steel
- ZINCALUME® AZ150 steel has at least 7 times the life of Z183 galvanised steel
- Zinc/aluminium AZ70 steel has at least 1.5 times the life of Z275 galvanised steel
- Zinc/aluminium AZ70 steel has at least 2.5 times the life of Z183 galvanised steel

BlueScope Steel

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