

# STEEL Fact File

An information source for design professionals

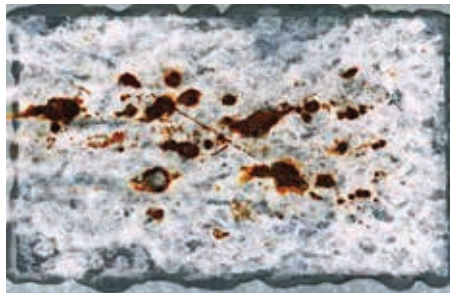
## Next Generation ZINCALUME® steel or original ZINCALUME® steel or galvanised steel

Version 1 August 2015

### FAST FACTS

- All three products, depending on final grade and thickness chosen, have a high degree of formability
- Galvanised steel relies on a combination of barrier protection and sacrificial protection to resist corrosion
- Original ZINCALUME® steel provides up to four times the service life of galvanised steel
- Next Generation ZINCALUME® steel is proven to be superior to original ZINCALUME® steel in terms of corrosion resistance, in particular cut-edge protection

#### Galvanised vs original ZINCALUME® steel



Z275 galvanised steel @ 240 hours of salt spray testing.



ZINCALUME® steel @ 240 hours of salt spray testing.

#### Original ZINCALUME® steel vs Next Generation ZINCALUME® steel

Mass loss panels of AZ150 and AM150 after 18 years 9 months washed exposure at Bellambi Point marine test site. Panel dimensions are 100mm x 150mm.



AZ150



AM150

# BEHIND THE FACTS

## HOW DOES METAL COATING WORK TO MAKE THE BASE STEEL MORE RESISTANT TO CORROSION?

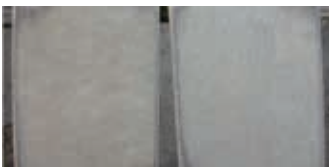
All metallic coating on coated steel serves to protect the base steel against corrosion. Coatings act as a barrier to exclude air, water and other corrosive elements from contacting the base metal substrate.

## WHAT IS THE DIFFERENCE BETWEEN GALVANISED STEEL AND ORIGINAL ZINCALUME® STEEL?

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 (AZ). Although both products are produced as continuously hot dipped coated products, they perform very differently especially in construction industry applications such as roofing and walling.

Aluminium works with the zinc coating to rapidly slow down the corrosion rate shortly after the product's 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.

Side by side exposure testing has shown corrosion protection provided by ZINCALUME® steel with an AZ150 (150g/m<sup>2</sup>) coating mass is far superior to that provided by galvanised steel with a Z275 (275g/m<sup>2</sup>) coating mass.



ZINCALUME® steel:  
Washed panels - Exposed for 12 years



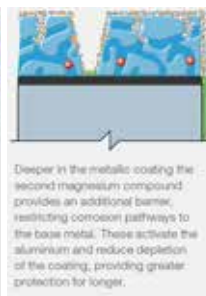
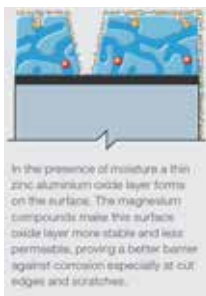
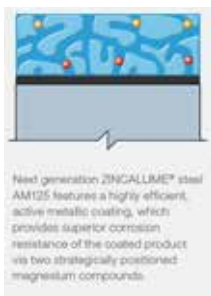
Galvanised steel:  
Washed panels - Exposed for 12 years

## WHAT MAKES NEXT GENERATION ZINCALUME® STEEL DIFFERENT?

Next Generation ZINCALUME® steel sets a new industry benchmark with the addition of BlueScope's patented ACTIVATE™ technology. ACTIVATE™ introduces magnesium into the aluminium-zinc alloy coating (AM), which through 17 years of rigorous testing by BlueScope, is proven to improve galvanic protection by activating the aluminium - the coating structure and composition is changed resulting in enhanced durability in most environments.

BlueScope research and testing has found that **the addition of 2% magnesium to 55% Aluminium-Zinc is the optimum level for corrosion performance and coating integrity. Studies show that AM coatings tend to corrode about 35% slower than AZ coatings.**

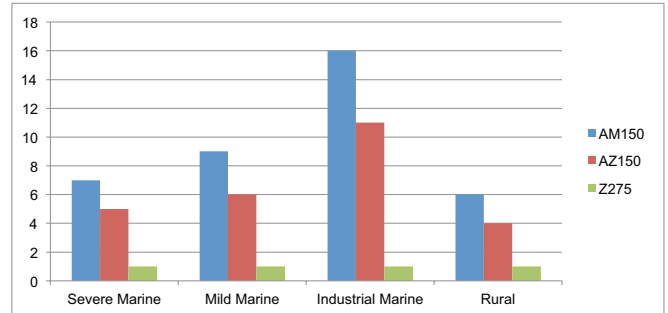
### Self-sealing Activate™ Technology



Protective coating  
Base metal

## IS CORROSION RESISTANCE SIMILAR WITH SIMILAR COATING MASSES?

No. Next Generation ZINCALUME® steel is the superior product in terms of corrosion protection (and service life). Side by side exposure testing has shown corrosion protection provided by Next Generation ZINCALUME® steel with an AM150 coating mass is superior to that provided by original ZINCALUME® steel with an AZ150 coating mass. Both ZINCALUME® steel coating classes well and truly outperform Z275 galvanised material.



This graph shows the relative differences in expected life of products, namely Next Generation ZINCALUME® AM150 steel, original ZINCALUME® AZ150 steel, and Z275 galvanised steel.

- Next Generation ZINCALUME® AM150 steel has at approximately 40% more life than original ZINCALUME® AZ150 steel
- Original ZINCALUME® AZ150 steel has at least 3 times the life of Z275 galvanised

## HOW DOES NEXT GENERATION ZINCALUME® STEEL PERFORM IN TERMS OF CUT EDGES?

Unprotected edges are created on coated steel products when the sheet is cut or pierced. When an AM coating is in service, galvanic action of the metallic coating causes zinc, aluminium and magnesium to sacrificially corrode in order to protect the exposed steel at cut edges. These corrosion compounds build up at cut edges and scratches and slow the rate at which the surrounding coating is consumed. This effect is sometimes referred to as the **"self healing"** property of metallic coatings containing Zinc.

In general it can be said that within a particular coating type, the higher the coating mass the greater the level of cut-edge protection. However Next Generation ZINCALUME® steel with ACTIVATE™ technology, is proven to provide a more effective means for protecting cut edges, therefore AM125 is capable of providing better cut edge protection than AZ150.

Unpainted sheltered walling (i.e. unwashed) in a severe marine environment after 50 months.



AZ150: Dark areas indicate metallic coating corrosion originating from the cut-edge.



AM125

Note: The samples shown in above have been tested in a severe environment to accelerate corrosion rates. Use of the product in this location is not recommended by BlueScope Steel.