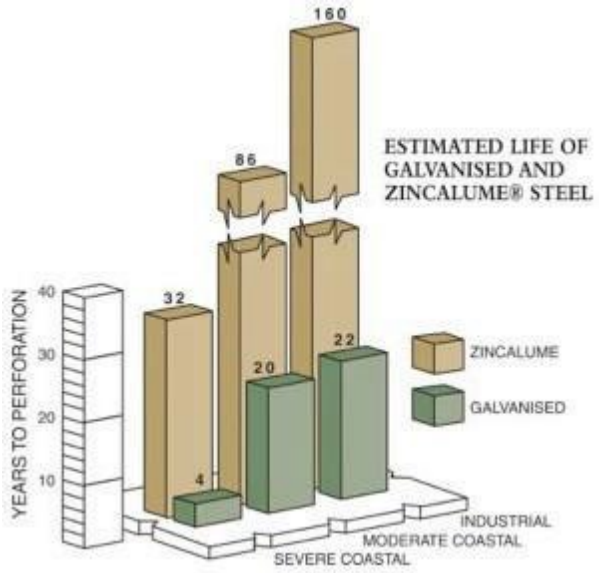
TECHNICAL NOTE

Aluminium-Zinc Substrate Performance

Gerard has developed an adhesive system that bonds the stone granules to the surface of the tiles for the life of the tile, these coatings provide protection to the aluminium-zinc surface increasing its durability. The aluminium-zinc steel uses an alloy of aluminium 55% and zinc 43.5% as the protective coating for the steel. This coating's protection mechanism utilises the zinc's sacrificial protection in the same way as does the galvanised steel, as well as having a barrier protection provided by the aluminium portion. The aluminium-zinc coating make up is such that the aluminium portion of the coating is the continuous phase material, with the zinc portion being encapsulated by the aluminium.

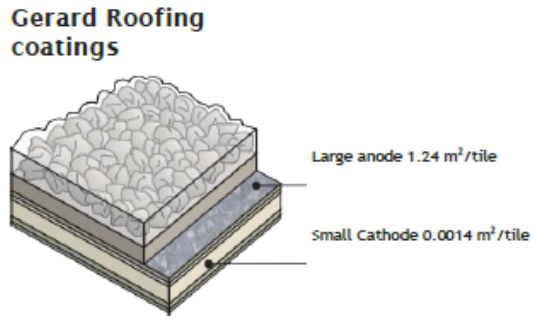
The aluminium-zinc coating differs from the zinc-only galvanised steel protection mechanism in that the aluminium forms a very stable oxide that is not removed by weathering as quickly as the zinc corrosion products. It therefore acts as a barrier keeping moisture away from the steel substrate eliminating corrosion. In areas where steel is exposed the zinc portion provides sacrificial protection. Its corrosion products are also retained for a longer period as they are trapped within the aluminium-zinc coating matrix. This results in aluminium-zinc coating of a similar thickness to a zinc coating lasting a projected 4 to 19 times longer than the zinc coating, depending on the environment (BIEC – the developers of Galvalume, Aluzinc and Zincalume).



Edge or scratch damage corrosion spots are protected by the zinc that is close to the damaged area as well as the little understood small cathode/ large anode principle where little corrosion occurs to an edge of steel (small cathode) in the present of a large galvanic coated surface (large anode). This also helps explain why nails (galvanised) that have little protection from the elements remain in good condition for so long.

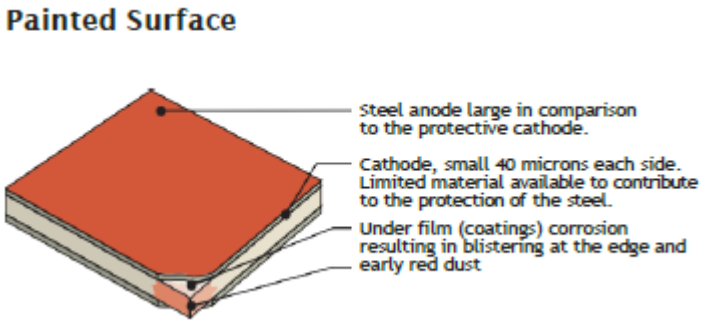
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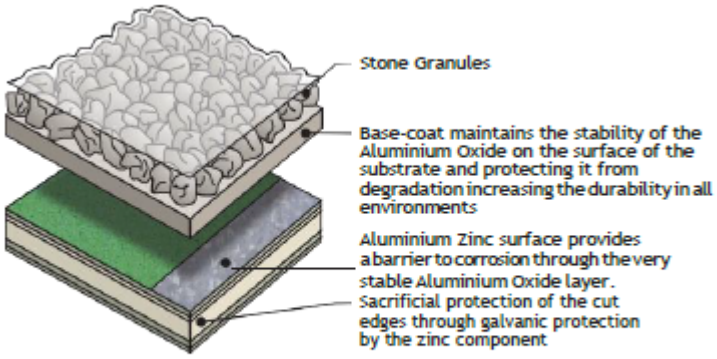
TECHNICAL NOTE



The protection offered by Gerard coatings systems lays in their ability to maintain the highest possible anode (galvanic surface area) / cathode (small cut edges) ratio as physically possible. Other coating finishes reduce this ratio, increasing the rate of galvanic corrosion where steel is present.

Gerard coating systems allow the natural reactions of the galvanic coatings to occur without effecting the protection offered to cut edges or scratches. The acrylics used are not totally impermeable to oxygen or water vapour transfer and as such allow the reactions to take place, but they do however reduce the loss of the protective oxides and as a result prolong the life of the substrates.





The adhesion of the layers of coatings is excellent in all temperature ranges. This also enhances the systems ability to reduce the onset of corrosion.

In the past, primers contained chromates to reduce the corrosion that occurred with galvanised steel. Aluminium-zinc coated steel has not required this material to be included as the barrier protection offered by the aluminium provides superior protection.

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TECHNICAL NOTE

Gerard have had aluminium-zinc tiles on exposure in a marine environment for over 30 years. In that time tiles have been removed from a roof at 8, 15, 20, 25, 30 and 36 years. The substrates aluminium-zinc coating has been analysed, after 25 years the projected life expectancy was 75 years, however after 36 years the level of aluminium-zinc remaining had not deteriorated any further than the 25-year sample. The roof has outlasted pre-painted galvanised steel on roofs and accessories next door to this roof which were replaced after 25 years.



Figure 1: Gerard 30-year marine exposure site



Figure 2: Gerard 30-year marine exposure site



Figure 3: Nose edge



Figure 4: Galvanised nails

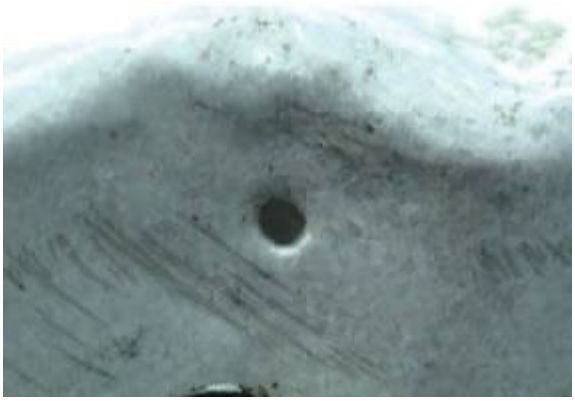


Figure 5: Nail hole

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Figure 6: Underside of overlap section edge corrosion

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