CORROSION

ZINC COATINGS ON STEEL

TECHNICAL BULLETIN CTB-3

Rev 3, November 2003
This issue supersedes all previous issues

In relatively dry air a zinc oxide film is initially formed on zinc surfaces by reaction of zinc with atmospheric oxygen. In the presence of moisture in the atmosphere the zinc oxide film is quickly converted to zinc hydroxide and the carbon dioxide normally present in the air reacts to form insoluble basic zinc carbonate. Zinc owes its high degree of atmospheric corrosion resistance to the formation of such films.

The more important factors which control the rate at which zinc corrodes in atmospheric exposures are relative humidity, rain fall, temperature and industrial or marine pollutants such as chlorides, ammonia, sulphur dioxide and dust.

The principals of galvanic corrosion are used to an advantage for protecting steel with a metallic coating of zinc which is more active than the steel substrate.

Provided the coating is continuous and impervious, the galvanized steel's corrosion behaviour will be identical to that of the zinc coating. However, should the zinc coating become perforated or discontinuous as a result of mechanical damage *(ie. deep scratches or sheared edges)* a steel/zinc galvanic couple will be created and in the presence of moisture, corrosion or dissolution of the zinc will occur. The zinc will become the anode of the corrosion cell and its corrosion rate will be increased whilst the steel will become cathodic and its corrosion rate reduced. The steel is then said to be sacrificially or galvanically protected.

The information and advice contained in this Bulletin is of a general nature only, and has not been prepared with your specific needs in mind. You should always obtain specialist advice to ensure that the materials, approach and techniques referred to in this Bulletin meet your specific requirements.
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