NUMBER
14
MARCH
2013

INDUSTRIAL
GALVANIZERS
CORPORATION

Tech Tips

How long do galvanized coatings last?

WHY GALVANIZE?

Hot dip galvanized coatings are applied to steel to improve the anti-corrosion performance of the steel to ensure that it lasts as long as possible with a minimum of maintenance

COATINGS DIFFER

Only hot-dip galvanizing gives a coating that can reach the 50 year life required of structural building products.

THICKNESS COUNTS

Compared to other zinc-rich coatings, hot-dipped galvanizing is:-

- THICKER
- HARDER
- FULLER

HOT-DIP GALVANIZED PRODUCTS LAST LONGER...

Testing Rack for hot dip galvanizing. The open rack simulates conditions on a roof; sheltered rack simulates under roof & non rain-washed situations.

Galvanized coatings have an unusual characteristic compared to other protective coatings in that they fail by weathering and oxidation from the surface. Paint coatings, once breached, deteriorate through under-film corrosion and can suffer rapid failure as a result.

Because of the electrochemical protection provided to steel by zinc (galvanized) coatings, no corrosion of the steel will occur while there is any zinc present, regardless of the thickness or condition of the galvanized coating.

Galvanized coatings, in atmospheric exposure conditions, corrode at an approximately linear rate. Once this rate has been established for a particular environment, the expected life of the coating can be defined by relating the rate of corrosion to the thickness of the coating.

Factors affecting galvanized coating life.

The durability of galvanized coatings depends on a number of environmental factors.

These include:

- Time of wetness
- Ambient temperature
- pH of moisture
- Chloride levels in atmosphere
- Sulfate levels in atmosphere
- Contact with other chemicals
- Contact with dissimilar metals
- Orientation of exposure (vertical, horizontal)
- Nature of exposure (sheltered, open)
- Ventilation conditions

Corrosion engineers take these factors into account when assessing the life-cycle performance of galvanized coatings. Organisations such as the CSIRO have developed environmental assessment techniques based on atmospheric computer models that facilitate the accurate assessment of metallic corrosion rates.

A number of international (ISO) standards have also been developed that use combinations of the parameters listed above to tabulate corrosion rate data for zinc (galvanizing) and other metals.

INDUSTRIAL GALVANIZERS
A valmont COMPANY

How long do galvanized coatings last?

TRIED & PROVEN

Over 40 years of field testing shows that galvanized coatings perform well even in harsh environments.

LIFE OF GALVANIZED COATINGS

When correctly applied, hot-dip galvanized coatings on structural steel sections will give up to 50 years life before first rust in other than marine or heavy industrial environments.
Case history studies of existing installations in tropical and urban environments indicate that 100-year life is achievable with galvanized coatings applied after fabrication.

WHY GALVANIZE WITH INDUSTRIAL GALVANIZERS?

For steel users requiring fast, proven corrosion protection for local or national projects Industrial Galvanizers is the established hot dip galvanizer with nationwide coverage.

Classification of environments.

Most standards and documents associated with coating performance use exposure classifications to define corrosivity of the atmosphere.

For metallic coatings such as galvanizing, factors such as UV exposure do not impact on coating life, where with paint coatings, UV levels are an important factor in their durability.

For galvanized coatings, common Australia exposure classifications are arid/rural, mild/urban, industrial, marine and tropical. Much exposure testing has been done to obtain corrosion rate data in these environments, and this work is ongoing.

Testing done by Industrial Galvanizers in a number of long-term case studies has indicated that hot dip galvanized coatings in service may have lower corrosion rates than those of zinc coupon samples exposed in test facilities.

Reasons for this apparent lower rate of in-service corrosion have not been quantified, but are thought to be related to the quite different characteristics of a hot dip galvanized coating compared to pure zinc, typical of the samples used in exposure testing.

The hot dip galvanized coating contains alloys of iron, aluminium and sometimes nickel, each of which may modify the way the coating reacts with the environment.

The following table shows typical corrosion rates of hot dip galvanized coatings in the various environmental classifications.

Corrosion rate – microns per year	
Arid/rural	< 1
Mild/urban#	1 - 3
Industrial	3 - 5
Marine*	5 - 15
Tropical	1- 3

Metropolitan and urban areas within 25 km of the Australian coastline outside the ocean surf spray zone.

*Within the ocean surf spray zone from 0 – 1000m from ocean surf, depending on topography.

Coating thickness versus coating life.

All continuously galvanized and after-fabrication galvanized steel products have coating thickness specified in various Australian, New Zealand and international standards. By relating this coating thickness to the corrosion rates in the table, an accurate estimate of galvanized coating life can be obtained.

Hot dip galvanized coatings that comply with AS/NZS 4680 – 2006 are those that will give the longest life, as they are typically 3–5X the thickness of zinc coatings applied to continuously galvanized products.

On structural steel sections, 50 years life before first rust in other than marine or heavy industrial environments is a reasonable expectation. Case history studies of existing installations in tropical and urban environments indicate that 100-year life is achievable with galvanized coatings applied after fabrication.

A.C.N. 000 545 415

Registered Office:
11 Talavera Road,
Macquarie Park, NSW 2113

INDUSTRIAL GALVANIZERS (AUSTRALIA)

Townsville | Brisbane | Newcastle | Sydney | Port Kembla | Melbourne | Launceston | Perth

www.ingal.com.au www.valmont.com

A valmont COMPANY