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INDUSTRIAL
GALVANIZERS
CORPORATION

Tech Tips

Cold galvanizing is not galvanizing – facts about zinc rich paint.

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...

Bridge Beams. Hot dip galvanized beams are protected. Zinc-rich painted attachments are showing signs of corrosion.

For many years, there has been debate over the relative merits of zinc rich paint and hot dip galvanizing. There has also been debate within the paint industry about the relative merits of one type of zinc rich paint compared to another.

This has generated a degree of confusion with end users of these corrosion prevention products as much of the information requires interpretation or may, in fact, be misleading.

Making valid performance comparisons.

Hot dip galvanized coatings have been widely used for nearly 150 years. The technology involved in their application has not fundamentally changed in that time. The main coating component (zinc) has also been a consistent component of the coating since its invention.

Thus, a hot dip galvanized coating applied to a piece of steel in 1900 is technically identical to a hot dip galvanized coating applied to a piece of steel in 2000. There is no difference in adhesion, metallurgy or durability.

For this reason, hot dip galvanized coatings have established an international reputation for consistent performance based on case history observation of the coating in service for over 100 years.

Zinc rich paints were invented in Australia in the 1930's. Since that time, the technology has gone through a number of manifestations in terms of binders, fillers and curing technology. The original inorganic zinc rich paints were heat-cured products. This technology was followed by acid-cured, lithium water based, potassium silicate water based, colloidal silicate water based, lithium/potassium (high ratio) water based and solvent based ethyl silicates.

Each of these inorganic zinc rich paint technologies has its own characteristics for hardness, durability, film-build and ease of application and comparison between them is not valid. The zinc rich paint industry commonly uses examples such as the Morgan -Whyalla pipeline as a long-term case history. The technology used on this project has not been used for forty years!

Australian Standard AS/NZS 2312:1994 Guide to the Protection of Iron and Steel Against Exterior Atmospheric Corrosion , lists only two types of inorganic zinc rich paint of the six mentioned in AS 3750 - Inorganic Zinc Rich Paint.

It is thus important to verify that the type of zinc rich paint being specified is the same as the type of zinc rich paint being used as a case history example.

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TRIED & PROVEN

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

HOT-DIP GALVANIZING (HDG) vs. ZINC RICH PAINT (ZRP)

HDG involves chemical pre-treatments and metallurgical reaction between steel and zinc. The reliability of HDG coatings in protecting steel in a given environment is an order of magnitude higher than that of paint.

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.

How much zinc do you get?

The most important anti-corrosive component in both galvanized and zinc rich paint coatings is zinc. The mass of zinc present is the standard method of rating the durability of metallic coatings and all international standards use mass per square metre (or mass per square foot in the USA) to define coating durability for a wide range of galvanized products.

The amount of zinc in a zinc-rich paint (ZRP) coating is not clearly defined and the method of specification is misleading. Zinc rich paint specifications nominate the percentage of zinc by weight, in the dry film of the paint coating.

Thus, inorganic ZRP may nominate 78% zinc in the dry film and a high quality organic (epoxy) ZRP may nominate more than 90% zinc in the dry film. Because zinc is approximately 7X as dense as the organic binder material, the volume of zinc in a ZRP coating is much less.

The mass of zinc per square metre will thus be significantly lower than that of a galvanized coating of the same thickness. Tests done by South Australian Roads Authority in testing the zinc content of various types of zinc rich paint has found the following:

Inorganic Zinc Rich Paint	75 micron coating
Solvent Based	185g/m^2
Water Based	280g/m^2
Organic Zinc Rich Paint	75 micron coating
Solvent Based	185g/m^2

Hot dip galvanized coatings range from 450 g/m2 on thinner steel sections, to well over 600 g/m2 on heavier structural sections.

Reliability factors.

There is no question that properly specified and applied ZRP coatings give excellent performance in many applications. However, as with most paint coatings, the quality of the application is a major factor in determining the long-term performance of the coating.

Using statistical methods, reliability factors of coatings can be estimated, where factors affecting coating quality are considered. With paint coatings, these factors include:

- Initial steel surface condition (new, rusty, contaminated)
- Surface preparation (blasting equipment, operator skill, access, design)
- Weather conditions (wet, dry, dew point)
- Paint application (equipment, operator skill, paint mixing, pot life)
- Paint curing (humidity, temperature, time)
- Handling (paint hardness, full curing time, handling methods)

With galvanized coating, the process involves chemical pre-treatments and metallurgical reaction between steel and zinc, which is process - rather than operator - dependent. The reliability of hot dip galvanized coatings in protecting steel in a given environment is an order of magnitude higher than that of paint because galvanized coatings never fail in service through application related factors

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