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INDUSTRIAL
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CORPORATION

Tech Tips

How does the durability of other zinc coatings compare with hot-dip galvanizing?

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...

Various types of fastener coatings. Most lack the Class 3 durability required for exterior exposure. Hot dip building screw on the right is the only one of these to comply: others are zinc electroplated.

Consumers at the domestic and industrial level are frequently confronted with the need to select steel products that are already galvanized. The fact that they are 'galvanized' is used as a major selling point. In many cases, the standard of the 'galvanized' coating may not be not clearly represented, and in some cases, misrepresented.

Claims may be made by the manufacturer that can not be substantiated in the field. With other products, particularly those that are zinc plated, descriptions such as 'galvanized' are used on the packaging that deliberately mislead buyers into expectations of durability that will never be realised.

More and more products are being introduced that are galvanized by high-speed, in line galvanizing technology. This allows a thin zinc coating to be applied to the steel at low cost.

These thin zinc coatings are frequently treated with clear polymer topcoats to enhance their claims that the addition of these polymer topcoats significantly improves the durability of the coating compared to a conventional galvanized coating.

The addition of organic coatings to zinc plated parts is also a common technique that the manufacturers claim improves the corrosion resistance of their products. What are the facts?

Coating characteristics.

Zinc plating involves the electrolytic application of zinc by immersing clean steel parts in a zinc salt solution and applying an electric current. This process applies a layer of pure zinc that ranges from a few microns on cheap hardware components to 15 microns or more on good quality fasteners. Technical and cost issues prevent the economical plating of components with much heavier coatings.

In-line galvanized coatings are applied during the manufacturing process of hollow or open sections, with the cleaned steel section exiting the mill and passing into the galvanizing bath. This process applies a coating of zinc to the surface that can be controlled in thickness. This coating is usually measured as coating mass in grams per square metre and ranges from a minimum of about 100 g/m2 upwards, with an average around 175 g/m2 .

Accelerated weathering testing of coatings has traditionally been done in salt spray cabinets. This testing technique has been largely discredited with respect to metallic coatings as it does not reflect the way metallic coatings weather in atmospheric exposure conditions where the development of stable oxide films gives these coatings there excellent anti-corrosion performance.

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TRIED & PROVEN

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

IS ALL GALVANIZING THE SAME?

Simply put - no. Zinc plated components have an attractive, shiny appearance but do not provide the lasting corrosion protection of a hot-dip galvanized coating. The tough, complete alloy coating provided by hot-dip galvanizing will give decades of protection.

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.

The addition of polymer topcoats to metallic coatings will significantly improve their apparent performance in salt spray tests but field performance will not necessarily reflect this.

Finding the facts.

The South African Bureau of Standards has undertaken accelerated weathering trials of polymer coated in-line galvanized coatings and compared them with conventional in-line galvanized and hot dip galvanized coatings to evaluate the effect on durability of the addition of these this polymer topcoats. A summary of this report follows. (A full copy of the report is available from the Galvanizers Association of Australia, *www.gaa.com.au*).

S.A.B.S. Report.

The samples were subjected to Salt Fog Testing, Damp SO_2 Atmosphere testing and QUV Weatherometer testing as well as Hardness Testing. The conclusion of the SABS report states the following:-

"The results of the accelerated corrosion tests indicate that the expected life of the continuously galvanized and lacquer coated samples will not be essentially different from the commercially continuously galvanized sheet material. Test results demonstrate that the expected life exhibited by the standard hot-dip galvanized panels (zinc coating thickness approx. 100 microns) can be considered to be significantly superior to the continuous galvanized/lacquer samples. The lacquer coating appears not to be fully effective in inhibiting the onset of corrosion under damp conditions due to porosity.

It is well known that the zinc/iron alloy layers of standard hot-dip galvanized coatings are hard in nature (in excess of 200HV - often harder than the base steel itself). Conventional hot dip galvanized coatings, consisting of alloy layers with a soft zinc outer layer, therefore provide in essence a buffer stop coating which withstands knocks and abrasion. The soft nature of continuous galvanized lacquer coating (75 HV) coupled with the low coating thickness indicates that these coatings will not have the same ability to withstand rough handling compared to conventional hot-dip galvanized items."

Poor performance from plated coatings.

Zinc plated coatings are not suitable for exterior exposure applications. Zinc plated bolts and hardware fittings such as gate hinges will not provide adequate protection from corrosion, and will rarely last more than 12 months in exterior exposures in most urban coastal environments.

Zinc plated products have an attractive appearance when new as the zinc coating is bright and smooth, where a hot dip galvanized coating has a duller and less smooth surface. There is typically about 10 times as much zinc applied to small parts in the hot dip galvanizing process than is the case with zinc plating. A bright, shiny smooth zinc finish on builders hardware (bolts, nuts, hinges, gate latches, post shoes) indicates a plated coating that will not provide adequate corrosion resistance and will rarely provide more than 12 months protection in most of the coastal population centres.

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