

## 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...

## How much heat can a galvanized coating tolerate?



**Galvanized power pole.** Able to survive bushfires and maintain power supplies.

Galvanized items are sometimes used for applications where the steel is subjected to either intermittent or permanent higher temperatures. Zinc has a relatively low melting point – only 420oC. When it reacts with steel to form the galvanized coating, the zinc-iron alloy that is formed has a higher melting point of around 650oC.

Zinc is also unusual among metals in that it vaporizes (turns to gas) at the relatively low temperature of around 950oC. This characteristic is used in the manufacture of zinc dust and zinc oxide.

Galvanized coatings can handle higher temperatures (up to 250°C) in dry heat conditions in intermittent exposures, but are not well suited to continuous exposure to temperatures of this level.

It is for this reason that items such as automobile mufflers are generally manufactured from aluminized coated steel sheet.

When galvanized coatings are heated to over 350°C, a solid state reaction will be initiated between the steel and any free zinc (the shiny surface zone) in the galvanized coating. This will convert the coating into 100% zinc iron alloy, gives it a frosted gray appearance. This is done deliberately in the sheet galvanizing industry to produce a 100% zinc-iron alloy surface which is better for painting because the microscopically rougher surface provides very good coating adhesion. This type of coating is widely used in the white goods industry.

Galvanized coatings do not perform well for hot water storage, where water temperatures are in the order of 70°C. Corrosion rates of the zinc are increased and there is evidence that a polarity reversal takes place with the steel at that temperature and the zinc becomes cathodic to the steel and can increase the corrosion of the base steel.

In short-term exposures to much higher temperatures, galvanized coatings perform very well. Significant research has been done by the Bushfire Co-operative Research Centre for BlueScope Steel to determine hot dip galvanized steel poles performed when exposed to bushfires.

# How much heat can a galvanized coating tolerate?

## TRIED & PROVEN

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

## GALVANIZING AND HEAT

Galvanized steel combines a reflective surface with a large heat 'sink' due to the mass of steel. This means galvanized products are well equipped to survive bushfire flame temperatures, which are high but short-lived.

Galvanized steel power poles are selected for their ability to survive bushfires and maintain power supplies in these harsh conditions.

## 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.

Bushfires can produce very hot fires but they are generally for short local duration as the fire front moves forward. Typical exposure times to maximum bushfire flame temperatures is less than 2 minutes. The combination of the reflectivity of the galvanized surface, and the heat sink provided by the mass of the steel to which the hot dip galvanizing is applied has shown galvanized steel to give excellent performance, with virtually no effect on the coating.

This superior performance of hot dip galvanized power poles has seen power distribution authorities moving to the use of galvanized steel power poles in bushfire prone areas in preference to timber. Although the steel poles have a significantly higher cost, their ability to maintain power supplies in bushfires far outweighs other factors in the selection process.

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