

Compatibility of galvanized coatings with various media

Compatibility of galvanized coatings with various media is summarised in the table below. Further specific information is available from Galvanizers Association of Australia.

Aerosol propellants		excellent
Acid solutions	weak, cold quiescent strong	fair not recommended
Alcohols	anhydrous water mixtures beverages	good not recommended not recommended
Alkaline solutions	up to pH 12.5 strong	fair not recommended
Carbon tetrachloride		excellent
Cleaning solvents	chlorofluorocarbon	excellent
Detergents	inhibited	good
Diesel oil	sulphur free	excellent
Fuel oil	sulphur free	excellent
Gas*	towns, natural, propane, butane	excellent
Glycerine		excellent
Inks	printing aqueous writing	excellent not recommended
Insecticides	dry in solution	excellent not recommended
Lubricants	mineral, acid free organic	excellent not recommended
Paraffin		excellent
Perchloroethylene		excellent
Refrigerants	chlorofluorocarbon	excellent
Sewage		excellent
Soaps		good
Timber preservatives:		
Copper-chromium-arsenic, freshly treated		poor
After drying is completed		excellent
Boron		excellent
Trichloroethylene		excellent

*Chromate passivation is recommended because moisture may be present.

Sewage treatment

Galvanized coatings perform extremely well by comparison with other protective coatings for steel in the severely corrosive conditions prevailing in most sewage treatment operations. As a result galvanized steel is used extensively in sewage treatment plants throughout the world.

In contact with building materials

Galvanized coatings give invaluable protection to steel used in all sections of the building industry. The slight etching action upon galvanizing by mortar, concrete and plaster ceases after setting.

When galvanized steel products and fasteners are installed in direct contact with unseasoned timber it may be necessary to protect them by the application of a suitable paint.

Care should be taken that galvanized products are stored and transported under dry ventilated conditions as discussed above right.

In contact with timber preservatives

Timbers freshly treated with acidic preservatives of copper-chromium-arsenic type, such as Celcure, Copas and Tanalith,

can be severely corrosive to metallic building materials, including galvanized coatings. Once the timber has dried out the preservatives become fixed, and the performance of galvanized coatings in contact is excellent, even when the timber is again wetted. Galvanized coatings also perform well in contact with boron-treated timbers.

Transport and storage

New galvanized products should be handled, transported and stored with the normal care given to any other surface-finished building material. New galvanized steel surfaces which have not yet developed the patina of protective insoluble basic zinc carbonates which normally contributes to the long life of aged coatings are highly reactive and susceptible to premature corrosion under poor conditions of exposure.

Transport should be under dry, well ventilated conditions. When stored on site, material should be covered where possible and raised clear of the ground on dunnage or spacers. When shelter is not possible material should be stacked to allow drainage of rainwater. Storage in contact with cinders, clinkers, unseasoned timber, mud or clay will lead to surface staining and in severe cases, premature corrosion.

Clearance for ventilation between stacked galvanized products is necessary under damp or humid conditions to avoid the possibility of wet storage stain and the development of bulky white corrosion product. Attack on the galvanized coating producing white corrosion is caused by the retention of condensation or run-off water between contacting surfaces under conditions of restricted air circulation. The attack is frequently superficial despite the relative bulkiness of the corrosion product but may be objectionable because of appearance. In severe cases corrosion product should be removed as described on page 44 to allow the natural formation of protective basic zinc carbonate film.

Where galvanized products are likely to be stored or transported under poor conditions the galvanizer can, on request, apply a simple chromate treatment which will minimise wet storage stain. Under severe conditions chromating should not be relied on and new galvanized products should be packed carefully and protected for shipment and storage.

Continuously galvanized sheet steel products designed for outdoor exposure are normally given a carefully controlled chromate treatment during manufacture. This treatment provides excellent resistance to wet storage staining and against early dulling during initial outdoor exposure. Care should nevertheless be taken to see that sheet and coil is kept dry while awaiting fabrication or erection.

Galvanic corrosion

Galvanic or electrolytic corrosion with resulting rapid consumption of the zinc coating is likely if a galvanized article is installed in contact with brass or copper, particularly in a moist environment. Contact between aluminium or cadmium and galvanized surfaces is normally satisfactory.

Galvanic corrosion occurs for the same electrochemical reasons as those by which zinc provides cathodic protection for steel as explained on page 10, but the rate of consumption of zinc coatings by galvanic corrosion may be extremely high.

A guide to compatibility of metals and alloys in contact is given opposite.