

32. SURFACE PREPARATION FOR PAINTING GALVANIZED COATINGS

There are many instances where hot dip galvanized coatings need to be painted. There are well established quality assurance procedures for the painting of hot dip galvanized components in a controlled environment, but it is a common requirement to apply paint coatings to hot dip galvanizing under separate contract arrangements or on site.



When a steel item is first hot dip galvanized, its surface is free from oxidation and contamination and is in the best condition for coating. It is also highly susceptible to oxidation, particularly reaction with atmospheric moisture. Most galvanizers quench the work in a weak sodium dichromate solution to passivate the surface. This chromate passivation film weathers away with time and is replaced by a stable complex carbonate oxide film. This dynamic set of surface conditions needs to be considered when painting galvanized steel.

Specific abrasive blasting parameters are required when preparing galvanized surfaces for painting. The same techniques used for preparing 'black' steel will damage the galvanized coating.

In addition, surface contamination can occur that will interfere with paint adhesion. Diesel fumes are a common source of surface contamination that is very difficult to detect, as the galvanized coating may still appear clean and bright.

Handling the galvanized items with dirty or oil-contaminated gloves can leave residues on the surface of the galvanizing that will interfere with the adhesion of the paint coating.

Where close control of surface condition is not possible, the best alternative to ensure a high quality paint application is to brush or sweep blast the galvanized surface immediately prior to painting. This is a poorly understood technique with many paint contractors. Incorrect technique will cause serious damage to the hot dip galvanized coating.

The following specification is recommended for abrasive blasting of hot dip galvanized surfaces prior to painting.

Compliance with this specification will ensure that not more than 10 microns of zinc will be removed from the galvanized coating during the blasting process, and that the coating will not be damaged by fracturing of the alloy layers through excessive impact energy of the blast media on the galvanized coating.

BRUSH OR SWEEP BLASTING PROCEDURES FOR PREPARING HOT DIP GALVANIZING FOR PAINTING

1. Blast nozzle pressure 40 psi (280 kpa) maximum
2. Abrasive grade 0-2 - 0.5 mm
3. Abrasive type - clean limonite or garnet
4. Distance of nozzle from surface 400 - 500mm
5. Nozzle type - 10mm minimum diameter venturi type
6. Blasting angle to surface - 45 degrees

The aim of this blasting procedure is to remove any oxide films and surface contaminants from the surface. It is NOT to produce a profile similar to that required on bare steel. The brush blasting of the relatively soft zinc will automatically produce a fine profile, giving the clean surface a satin appearance. With inexperienced operators, a test section should be evaluated by measuring coating thickness before and after blasting with an approved magnetic thickness gauge.

A maximum 5-10 micron reduction in galvanized coating thickness indicates an acceptable technique.

Over 10 microns of coating removed indicates an unacceptable technique.

On reactive steel, the coating may already have a matte gray or satin appearance. This indicates the presence of the zinc-iron alloy layers at the surface, which also indicates a thicker than standard galvanized coating. Grey galvanized coatings are more susceptible to mechanical damage than shiny coatings and should be treated accordingly.

The micro-roughness of the alloy layers already provides a good mechanical key for appropriate paint, and only very light brush blasting is required on galvanized coatings of this type.

Weathering of the galvanized surface will generally result in any residual chromate passivation films being removed. However, the galvanized surface can also accumulate corrodents during the weathering period and should be evaluated for cleanliness prior to any coating application.

With weathered galvanizing, free of organic contamination, high pressure water blasting of the surface will often be sufficient to ensure adequate coating adhesion to the galvanizing, given that appropriate primers are used.





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SPECIFIERS MANUAL

01	SPECIFIERS MANUAL
02	INDUSTRIAL GALVANIZERS COMPANY PROFILE
03	ADHESION OF PROTECTIVE COATINGS
04	BOLTING GALVANIZED STEEL
05	BURIED GALVANIZED STEEL
06	CONCRETE DURABILITY & GALVANIZED REBAR
07	CORROSION MAPPING
08	COST FACTORS FOR HOT DIP GALVANIZED COATINGS
09	CUSTOM COATING PACKAGES
10	CUT EDGE PROTECTION
11	DESIGNING FOR GALVANIZING
12	ILLUSTRATED GUIDE TO DESIGN FOR GALVANIZING
13	DEW POINT TABLES
14	DIFFICULT STEELS FOR GALVANIZING
15	DOCUMENTATION - CORRECT PAPERWORK ENSUES EFFICIENT PROCESSING
16	ENVIRONMENTAL ISSUES FOR INDUSTRIAL COATINGS
17	ZINC, HUMAN HEALTH AND THE ENVIRONMENT
18	DEFECTS IN GALVANIZED COATINGS
19	GALVANIC SERIES
20	GLOSSARY OF GALVANIZING TERMS
21	GUARANTEES FOR HOT DIP GALVANIZED COATINGS
22	LIFE CYCLE COSTS OF INDUSTRIAL PROTECTIVE COATING SYSTEMS
23	PAINING OVER GALVANIZED COATINGS
24	POWDER COATING OVER GALVANIZED COATINGS
25	QUALITY AND SERVICE FACTORS AFFECTING GALVANIZED COATINGS
26	RESTORATION OF PREVIOUSLY GALVANIZED ITEMS
27	REPAIR OF GALVANIZED COATINGS
28	STEEL STRENGTH AND HOT DIP GALVANIZING
29	STANDARDS - AS/NZS 4680:2006
30	STANDARDS - AUSTRALIAN AND INTERNATIONAL STANDARDS
31	STEEL SURFACE PREPERATION
32	SURFACE PREPERATION FOR PAINTING HOT DIP GALVANIZED COATINGS
33	THICKNESS MEASUREMENT OF PROTECTIVE COATINGS
34	WELDING GALVANIZED STEEL
35	AN INTRODUCTION TO THE HOT DIP GALVANIZING PROCESS
36	ZINC COATING PROCESSES - OTHER METHODS
37	GALVANIZED COATINGS AND BUSHFIRE
38	LIQUID METAL ASSISTED CRACKING OF GALVANIZED STRUCTURAL STEEL SECTIONS
39	GALVANIZING 500N GRADE REINFORCING BAR
40	PREDICTING THE LIFE OF GALVANIZED COATINGS
41	CHEMICALS IN CONTACT WITH GALVANIZED COATINGS.
42	ATMOSPHERIC CORROIVITY ASSESSMENT
43	GLOBAL WARMING - CLIMATE CHANGE AND GALVANIZING
44	STEEL - ITS CORROSION CHARACTERISTICS
45	GALVANIZED STEEL AND TIMBER
46	WHITE RUST PREVENTION AND TREATMENT

01 - SPECIFIERS MANUAL – THIRD EDITION

Industrial Galvanizers Australian Galvanizing Division (IGAG) operates nine galvanizing plants around Australia, ranging in size from large structural galvanizing facilities to specialised small plants designed to process small parts.

The Australian Galvanizing Division has galvanized in excess of 2 million tonnes of steel products in Australia since its first plant was commissioned in 1965 and is recognized for its ability to handle complex and difficult projects, as well as routine contracts.

This experience has been collated in the Specifiers Design Manual, to assist those involved in the design of steel products and projects to better understanding the galvanizing process and allow the most durable and cost-effective solutions to be delivered to these products and projects. All sections of this Third Edition have been completely updated and additional sections have been included to provide additional technical information related to the use of hot dip galvanized steel.

In addition to its Australian Galvanizing operations, Industrial Galvanizers Corporation has a network of manufacturing operations in Australia, as well as galvanizing and manufacturing businesses throughout Asia and in the USA.

The company's staff in all these locations will be pleased to assist with advice on design and performance of hot dip galvanized coatings and products. Contact details for each of these locations are located elsewhere in this manual.

This edition of the Industrial Galvanizers Specifiers Manual has been produced in both html and .pdf formats for ease of access and distribution and all documents in the Manual are in .pdf format and can be printed if paper documents are required.

The Specifiers Manual is also accessible in its entirety on the company's web site at www.ingal.com.au.

Additional copies of the Specifiers Manual are available on CD on request.

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