

HDG – SURFACE PREPARATION METHODS

SURFACE PREPARATION OF HDG

The success of any coating system is related directly to the degree of surface preparation carried out. Prior to any surface preparation being carried out, the surface should be carefully inspected for any signs of fabrication and/or galvanising defects, as discussed in Tech Note No. 1.2.2 and be rectified before any preparation commences.

GALVANISED STEEL IN-SHOP

"BRUSH" OR "SWEEP" ABRASIVE BLAST CLEANING

Brush (or "Sweep") abrasive blast cleaning is the preferred method of surface preparation for galvanising, as it is capable of creating the required surface profile of 45 – 75 microns for adequate adhesion of heavy duty protective coatings.

The process is:

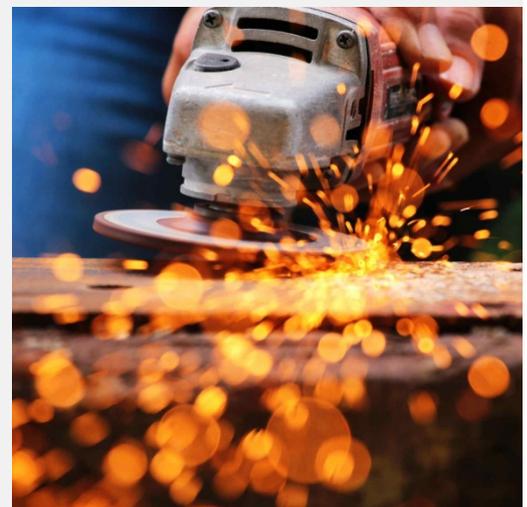
1. Inspect the surface for any defects and rectify.
2. Remove all traces of surface contaminants such as oil, grease, dirt etc., by washing with an alkaline detergent (**Gamlen CA-1**) and potable water. Rinse thoroughly with fresh potable water and allow surface to dry, ensuring no further surface contamination occurs.
3. The surface shall be dry! abrasive "brush" blast cleaned to remove all surface corrosion (such as zinc corrosion products) and contamination (including surface post treatments), and lightly profile the surface with minimal reduction in galvanised coating thickness (less than 10 µm). Visually the finished surface should appear dull, with an adequate surface profile for the adhesion of the coating.
4. Remove all spent abrasive and dust by using compressed air, brush or vacuum prior to application of the coating.
5. Inspect the surface prior to coating for presence of contaminants and surface defects. If detected, rectification is required before coating. Apply initial coating before any surface deterioration occurs.

According to AS/NZS 4680:2006, Appendix I, the following procedure should be observed when sweep blast cleaning is carried out to ensure that a good surface is produced for painting, without severely damaging the existing galvanized coating:

- a) Use fine, non-metallic abrasives of a size which will pass through a test sieve of nominal aperture size 150 µm to 180 µm (80 to 100 mesh), e.g. ilmenite or garnet.
- b) Use a venturi nozzle which has an orifice diameter of 10 mm to 13 mm.
- c) Set the blast pressure at 275 kPa (40 p.s.i.) maximum.
- d) Keep the venturi nozzle at a distance of 350 – 400 mm from the surface of the workpiece and at an angle no greater than 45° to the surface.



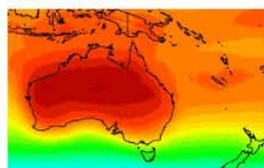
Sweep blast cleaning is fast and efficient



Power tool cleaning is more laborious than sweep blast cleaning, but more portable. Extreme care must be taken whatever the method used, to protect eyes and skin from damage due to high speed abrasive and metal fragments.



Painting over contaminated surfaces is a costly mistake



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GALVANISED STEEL ON-SITE

While the more reliable method of surface preparation for galvanising is to "brush" abrasive blast clean, this process is not always practical in-situ. In such cases, other methods such as power tool cleaning can be used. Power or hand tool cleaning require greater care and effort, and are less likely to achieve a satisfactory result.

POWER TOOL CLEANING

Power tool cleaning generally produces superior result to hand tool cleaning and so is the next best option.

Not all power-tool cleaning methods are equal, however. For example, power wire brush is not acceptable. Why? The steel wire brush leaves behind particles of steel on the surface, which then rusts. The brush also reduces the profile and polishes the surface. Acceptable power tool cleaning methods using abrasive paper (silicon carbide, preferably) are as follows³:

- Abrasion with orbital sander fitted with 80 – 100 grit paper
- Abrasion with rotating disc sander fitted with 80 – 100 grit paper
- Light abrasion with disc sander fitted with 60 - 80 grit paper

The process for power tool cleaning is:

1. Inspect the surface for any defects and rectify
2. Remove all traces of surface contaminants such as oil, grease, dirt etc. by washing with an alkali detergent (Gamlen CA 1) and potable water. Rinse thoroughly with fresh potable water and allow surface to dry, ensuring no further surface contamination occurs.
3. Thoroughly abrade the surface by power tool cleaning to ensure all surface corrosion (such as zinc corrosion products) and surface contamination (including surface post treatments) are removed and a profile is imparted. Visually the finished surface should appear dull, with an adequate surface profile for the adhesion of the coatingsⁱⁱ.
4. Remove all residual dust by using sweeping with a clean brush or vacuum cleaning prior to application of the coating.
5. The surface should be inspected prior to coating to ensure no contamination is present and no surface defects exist. If so, rectification is required before any coating is applied. Apply initial coating before any surface deterioration occurs.

HAND TOOL CLEANING

Generally, hand tool cleaning is not a preferred method of preparation for galvanising due to the difficulty in achieving the necessary level of consistency and thoroughness required to ensure a successful result. While in some circumstances it may be the only available preparation method it is much less likely to provide the high level of cleanliness and uniformity for successful paint application and performance as compared to "brush" abrasive blasting.

For more information, please contact the Dulux Protective Coatings Technical Consultant in your state.

ⁱ This method does not lend itself to "in situ" situations. However, in some such cases this method could be carried out using a "wet" abrasive blast process

ⁱⁱ Care should be taken in the selection of the abrasive as to minimise damage of the zinc coating

ⁱⁱⁱ The surface preparation method must impart an adequate profile with a consistent dull grey appearance, and not polish nor burnish the surface.



The more uniformly dull the surface, the better for coating adhesion. Coatings must be applied immediately after cleaning to minimise surface recontamination from atmospheric salts and zinc corrosion



Excessive abrasion removes the galvanising layer and exposes the steel to corrosion