

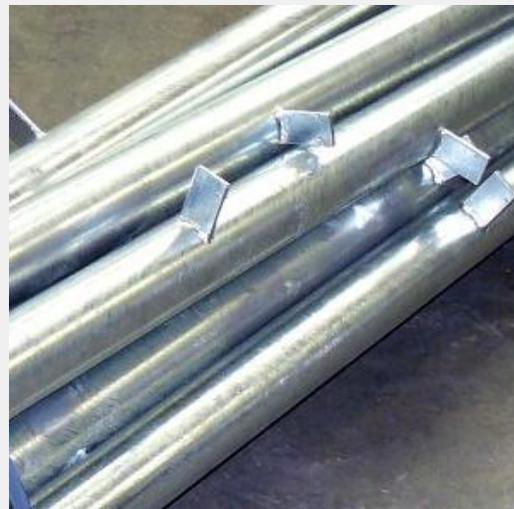
HDG – SURFACE PREPARATION ISSUES

PREPARATION OF HDG - ISSUES AND PRECAUTIONS

The most critical factor to success or failure in all coating projects is the degree of surface preparation undertaken. A hot-dip galvanised (HDG) steel surface is no different. In fact, as far as we (as leading manufacturers of protective coatings) are concerned, it is considered that the surface preparation of a HDG steel surface is even more critical than most other substrates because of its nature.

The following are some of the main reasons that great care **MUST** be taken when preparing a HDG steel surface prior to painting:

- New HDG steel surfaces usually have a very smooth surface that lacks sufficient profileⁱ to provide a key for coating adhesion.
- New HDG steel surfaces are commonly subjected to some form of post treatment that leaves a deposit. Depending on the type of treatment these deposits can range from oily lubricants to chromate solution baths and other forms of passivationⁱⁱ. These post treatments are applied for varying reasons, eg chromates are to protect the HDG steel surface from aggressive corrosion (white rust or storage stain) during shipment and storage. In all cases the presence of post treatments can lead to delamination of a subsequent coating. Great care must be taken to ensure the complete removal of post treatments before any other surface preparation is undertaken. It is more prudent to request that the post treatments are not used if it is known that the item is to be subsequently painted (AS2312: 2002).
- A common belief that allowing the newly HDG steel surface to "weather" will provide a satisfactory surface for painting. The weathering process changes the smooth, bright zinc surface to a dull, finely etched surface and tends to remove the presence of any post treatment deposits. Weathering does provide a better surface profile to improve adhesion of a coating to the surface, but, other than the obvious time delay between the galvanising process and weathering, great care must be taken to remove all corrosion products from the etched surface. A weathered zinc surface is contaminated with loosely bound white rust (zinc oxide products) that will adversely affect the performance of any coating applied over it.
- Careful inspection of a HDG steel surface should be undertaken prior to any surface preparation. In some cases the quality of the galvanising may not be satisfactory and so should be inspected for defects such as pinholes, blowholes, dags (or lumps in the galvanising) and any indications of scale, inclusions or laminations, which were not removed prior to galvanising. In most cases these defects will have an effect on the performance and appearance of the subsequent coating system and must be rectified prior to paint application.



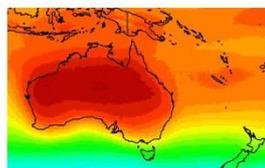
Newly galvanised steel is extremely smooth and provides a poor surface for painting



The smooth surface provided no key for the coating system to adhere to



HDG peaks and dags were abraded in an attempt to smooth the surface prior to painting



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To ensure a HDG steel surface is clean and rough enough to ensure effective coating adhesion, the paint industry prefers a preparation method of "sweep" or "brush" abrasive blast cleaning. The purpose of this method is to provide an evenly etched surface, with a 5 - 10 micron profile. This method is ideally suited for "shop" applied coatings, which can be sometimes impractical for site work. Care must be taken during this process to ensure minimal loss of zinc from the surface, however the selection of a suitable abrasive can assist in reducing this risk.

- Acid washing is not advisable for the surface preparation of galvanising. While it is normally effective in etching the surface to promote good paint adhesion, it is very difficult to ensure all of the acid has been removed prior to painting. Any residual acid present under the paint will continue to act on the zinc, causing blistering and delamination of the coating. On this basis the use of any form of acid washing of galvanising is to be avoided as a preparation for painting.
- The coating process must be carried out as soon as possible after the surface preparation has been completed to ensure the surface is not re-contaminated, i.e. particularly to ensure zinc corrosion products do not redevelop before paint application and subsequently affect adhesion properties. This is most critical especially when work is being carried out in marine, coastal and chemical environments.

For preferred surface preparation methods, please refer to Dulux Protective Coatings Tech Note No. 1.2.3

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



Defects on HDG steel



White rust stains form during storage of HDG steel

ⁱ Profile or Surface Profile - can be described as the miniature ridges and valleys that give the surface the "teeth" to form a successful bond with a coating.

ⁱⁱ Passivation or Passive - surface that has shown no active corrosion due to the formation of a protective oxide film as a result of a reaction.