



Quality - Inspection Before & After Hot Dip Galvanizing

11.1 INSPECTION BEFORE HOT DIP GALVANIZING

Good quality hot dip galvanized coatings on fabricated articles are more likely to be achieved if correct fabrication techniques have been adhered to. Inspection of fabricated assemblies, castings and other components for hot dip galvanizing, should be carried out before despatch to the galvanizer (table 21) in order to ensure conformity to the design requirements detailed in Chapter 9. This may avoid costly rectification and unnecessary delays at the galvanizers premises.

11.2 INSPECTION AFTER HOT DIP GALVANIZING

As a final step in the process, the hot dip galvanized coating is inspected for compliance with relevant specifications. Interpretation of inspection results should be made with a clear knowledge of the causes of various conditions which may be encountered and their potential influence on the ultimate objective of providing long term corrosion protection.

Inspectors should remember that the **purpose of hot dip galvanizing is to protect steel from corrosion**. The length of time that this protection can be expected to last, is called its "service life or time to first maintenance". This is defined as the time taken for the appearance on an article of 5% surface rust. **The service life of a hot dip galvanized coating is directly related to the thickness of the protective zinc coating. Corrosion protection is greatest when the coating is thickest. Thus coating thickness is the single most important quality check.**

Coating thickness is only one inspection aspect. Other checks must include conti-

nuity, coating adhesion and appearance. Embrittlement and defects, which arise from specific materials, design and fabrication, must also be considered when inspecting susceptible items.

While minimum standards must be satisfied in all these considerations, their relative importance varies according to the end use of the finished product. For example, the aesthetic appearance of hot dip galvanized structural steel in an industrial application is less important than when a structure is destined for use in a decorative application. Understanding of the specific requirements as well as the limits to what can be achieved by hot dip galvanizing is essential for effective inspection.

11.3 THICKNESS TESTING

Several methods are used to determine the thickness of the zinc coating on a hot dip galvanized article. The size, shape and number of pieces to be tested, will dictate the method to be used. Specified test methods are either destructive or non-destructive. These are detailed in **SANS 121/ISO 1461** and in **SANS 32/EN 10240**. The most practical test is the non-destructive method utilising the electromagnetic principle for determining coating thickness (figure 84).

Threaded articles must fit their mating parts and, in the case of assemblies that contain both externally and internally threaded articles, it shall be possible to screw mating parts together by hand.

For small items, particularly those with complex geometries, **ISO 1460** provides for gravimetric measurements aimed at determining mass of coating per unit area as

opposed to thickness. This is a destructive test method.

11.4 APPEARANCE

The ability of a hot dip galvanized coating to meet its primary objective which is to provide corrosion protection, should be the chief criterion when evaluating coating acceptability.

The specified requirements for a hot dip galvanized coating are that it be:

- continuous,
- relatively smooth,
- free from gross imperfections,
- free from sharp points (that can cause injury), and
- free from uncoated areas

To be essentially free from uncoated areas was best described in **SABS 763 4.3.2 b**. This reads as follows:

"The area of an individual bare spot or thin area shall not exceed 5mm². The combined area of bare spots or thin areas shall not exceed 25mm² per metre of length or per square metre of surface of an article."

It is recommended that the above clause is retained for the guidance of inspectors.

The above requirements are of particular importance when a subsequent organic paint coating is to be applied onto a galvanized surface. Smoothness and absence of roughness achieved on mechanically wiped products, such as continuously galvanized sheeting or wire, are not to be used as the criteria for assessing surface finish on general hot dip galvanized products. Roughness and smoothness are relative terms. The end use of the product must be the determining factor in setting standards.

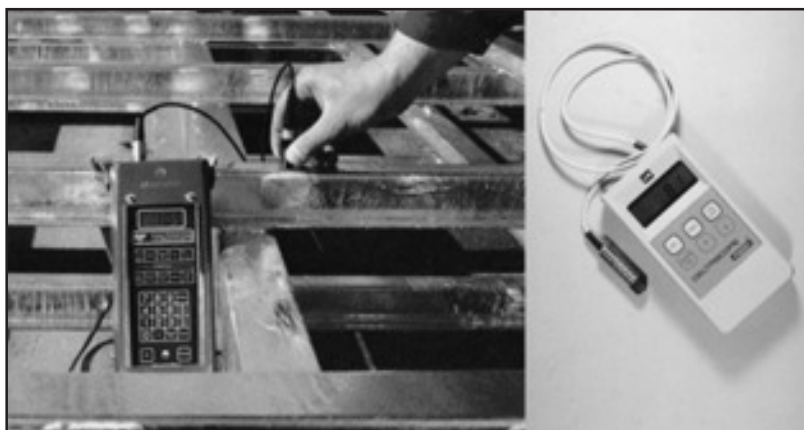


Figure 84. Using a digital instrument to measure zinc coating thickness.

In order to provide optimum corrosion protection, the hot dip galvanized coating should be continuous. Handling techniques for hot dip galvanized articles may entail the use of chain slings or other holding devices if suitable lifting fixtures are not attached to the item. In exceptional circumstances, chains and special jigs may leave a contact touch mark on the hot dip galvanized item. These marks are not always detrimental and a reason for rejection. Should these marks, be greater than 5mm² with bare steel exposed, suitable repairs should be carried out using the method described in **SANS 121/ISO 1461**. Refer to Chapter 15 - Reconditioning Damaged or Site Modified Hot Dip Galvanized Coatings.