

Distortion



If steel fabrications distort during galvanizing, this is usually due to 'built-in' stresses being released, as the steel is heated to the galvanizing temperature. Stresses may be inherent in the steel, but they can also be introduced by welding, cold forming, and hole punching.

Efforts can be made at the design stage and elsewhere to minimise residual stresses, for example:

1. Controlling welding procedures during fabrication.
2. Arranging weld seams symmetrically. The size of weld seams should be kept to a minimum.
3. Avoiding large changes in structural cross-section, which may increase distortion and thermal stress in the galvanizing bath.

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Avoiding Distortion During Hot Dip Galvanizing

Common cause of distortion during hot dip galvanizing is uneven immersion. There are a number of engineering principles that can be used to avoid this.

Causes

Distortion is caused by the effect of uneven immersion on the rate of galvanizing. Areas that are immersed first will be more heavily galvanized than areas that are immersed later. This uneven galvanizing leads to uneven expansion and contraction, which causes distortion.

Prevention

- To prevent or reduce distortion, design components so that they can be immersed in a single dip.
- If immersion is unavoidable, design components so that they can be immersed in a single dip.
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Fig 1. Illustration of the galvanizing process

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Fig 100. Illustration of the galvanizing process

Avoiding Distortion

Where there is an inherent tendency to distort, e.g. in asymmetrically shaped fabrications, the effect can be minimised or possibly eliminated by restricting the fabrication to such a size and design that it can be rapidly immersed in a single dip.

The galvanizer should be consulted for advice at an early stage if this is being considered. The size and position of filling and drainage holes in fabricated vessels can have a major effect on distortion, as can the size and position of lifting holes or lugs, particularly on hollow fabrications.