Design for Galvanizing

Using Hot-Rolled Sections

Overlapping Sections

Zinc Trap or As Required

Omitting two holes in one section is permitted

General Rules for Overlapping Sections:

a. Overlapping surface area under 10,000mm² generally do not require venting.

b. Overlapping surface areas between 10,000-40,000mm² shall be vented with a minimum 0.015mm vent hole.

c. Above 40,000mm² overlapping surface area, the vent hole sizes shall be minimum 0.015mm².

d. When the overlapped surface area reaches 200,000mm², vent hole sizes shall be equal to 0.025mm² and progressively placed every 2,000,000mm².

For designs with intermittent welds, the space between overlapping surfaces of non-compliant components shall be at least 2.5mm.

Large Overlapping Areas

Identification Markings

Permanent identification

Recommended methods are:

• Heavily embossed markings

• Punched markings

• Marked on the manufacturer’s mark or factory marking

Temporary identification

Before and after galvanizing, recommend use of heavily embossed metal tags, generally attached to the external face via a weld.

Only before galvanizing, recommend water-based paint/marking pens.

Identification methods not acceptable:

• Oil-based paints/marking pens

• Welded markings

• Punched markings

• Stickers

Hanging for Drainage Quality

Zinc drips off causing spikes and a very rough surface

Thin + Thin ± Distortion

Where possible, think 45 degrees!

Open Ends Preferred A

Propriety Drained Preferred B

Centre Hole Unsatisfactory

Purpose of Venting and Draining

Open Ends

Holes should be diagonally positioned.

Completely sealed fabrications cannot be galvanized.

IMPORTANT:

Internal ventilation hole required to ensure internal ventilation (for holes > 0.015mm²)

Venting and draining leads to explosions.

Superheated stream inside leads to explosions.

Natural drain to one point

Thick + Thin ± Distortion

This sheet

Heavy angle

Meets all design criteria

Hole size to be a minimum of 20% of the internal diagonal

Moving Parts – Seating Gate

One Hole

Open Ends Preferred A

Sealed Unit

Superheated stream inside leads to explosions.

One Hole

Will vent steam but unit will float

Two Holes

Allows unit to vent and drain and to be galvanized inside and out

Handrail Hole Positions

Hangs the handrail which is critical for handrail.

Vent and drain holes in steel and steelwork.

Recommended minimum radial clearance before galvanizing

Shaft or spindle size (mm)

Minimum radial clearance (mm)

≥ Ø 38

Ø 38 to Ø 120

Ø 120 to Ø 240

Above Ø 240

≥ Ø 25

2.5

6.5

17

Handrail Hole Positions

Designs which will provide the highest quality HDG finish are:

• Mudholes within a single plane (straight section).

• Modular designs that can be bolted together on-site.

• Larger vent and drain holes in the hollow sections which will allow the air to flow freely and to escape from inside the article.

• Internal venting of all rail portions inside a stanchion is required if the rail runs continuously through the stanchion.

Avoiding Distortion – Basic Design Rules

1) Minimise the uniformity of heat transfer into and out of the steel.

a. Ensure venting and draining is adequate. This will allow the article to be immersed and withdrawn from the molten zinc at as low a quality as possible.

b. Minimise section thickness variations wherever possible in the fabrication.

2) Minimise the effect of stresses while the article is in the molten zinc.

a. Use symmetrically rolled sections in preference to angle or channel. Beam flanges are preferred to angles or channels.

b. Ensure assembly and welding techniques minimise stresses in components making up the article.

3) Avoid designs that require double dipping. It is preferable to build assemblies and sub-assemblies in suitable modules allowing for quick immersion and galvanisation in a single dip, as the entire article can expand and contract uniformly.

4) Ensure the structural design of the item is sufficient to support its own weight at 90% of the steel’s specified yield strength.

5) Avoid using large areas of thin (under 8mm), undersized flat plate.

6) Use temporary bracing or reinforcing on thin-walled and asymmetrical designs.

Standard Hole Sizes

<table>
<thead>
<tr>
<th>Section</th>
<th>Outer Diameter (mm)</th>
<th>Ø (mm)</th>
<th>Hole Size (mm)</th>
<th>Minimum Radial Clearance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SHS</td>
<td>10</td>
<td>≤ 32</td>
<td>32</td>
<td>≥ 3.5</td>
</tr>
<tr>
<td>RHS</td>
<td>10</td>
<td>≤ 32</td>
<td>32</td>
<td>≥ 3.5</td>
</tr>
</tbody>
</table>

Note: 1 hole 2 holes and 4 holes means the number of holes in each otherwise unopen end.

<table>
<thead>
<tr>
<th>Hole Size (mm)</th>
<th>Minimum Radial Clearance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>90</td>
</tr>
<tr>
<td>50</td>
<td>120</td>
</tr>
<tr>
<td>60</td>
<td>180</td>
</tr>
</tbody>
</table>

Designs which will need special consideration to provide the highest quality HDG finish are:

• Handrails with multiple planes (corner or bent sections) so that some parts of the handrail vent and drain slower than others parts within the same handrail. This can affect hanging angles due to both vent and drain designs and bath saw restrictions which could reduce coating quality.

• Vent and drain holes that are internal will need to be verified through the use of external inspection holes.

Using Hollow Sections

Handrail Hole Positions

Vent and drain holes in steel and steelwork.

Snipe Guide

Example: Pipe Sections

<table>
<thead>
<tr>
<th>Section</th>
<th>Outer Diameter (mm)</th>
<th>Ø (mm)</th>
<th>Hole Size (mm)</th>
<th>Minimum Radial Clearance (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSC</td>
<td>150</td>
<td>≤ 32</td>
<td>32</td>
<td>≥ 3.5</td>
</tr>
<tr>
<td>Angle</td>
<td>150</td>
<td>≤ 32</td>
<td>32</td>
<td>≥ 3.5</td>
</tr>
<tr>
<td>UC</td>
<td>250</td>
<td>≤ 32</td>
<td>32</td>
<td>≥ 3.5</td>
</tr>
</tbody>
</table>

Note: Some fettling may be required after galvanizing to enable parts to be free moving.


Download from the App Store and Google Play.

03 9656 1266

gaa@gaa.com.au

gaa.com.au