

VENTING TIPS FOR HOT DIP GALVANIZING

YOUR CONCERNS ARE OUR CONCERNS

At Joseph Ash Galvanizing, your concerns are our concerns. That's why we'll always go out of our way to offer advice on any subject you're concerned about. This poster deals with some of the most important questions our customers have raised in the past but please feel free to ask us for further clarification on these or any other issues.

LOCATION AND SIZES OF VENT HOLES

Some general principles to follow for the location and sizes of vent holes are:

- Holes both for venting and draining should be as large as possible. The absolute minimum hole sizes are given in Table 1.
- Holes for venting and draining should be diagonally opposite one another at the high point and low point of the fabrication as it is suspended for galvanizing.
- With hollow sections sealed at the ends, holes should be provided, again diagonally opposite one another, as near as possible to the ends of the hollow member (fig. 11). In some cases it may be more economical to provide 'V' or 'U' shaped notches (fig. 3) in the ends of the tubes, or to grind the corners off rectangular hollow sections. These procedures will provide ideal means for venting and draining.
- Where holes are provided in end plates or capping pieces, they should be placed diagonally opposite to one another, off centre and as near as possible to the wall of the member to which the end plate is connected (fig.11).

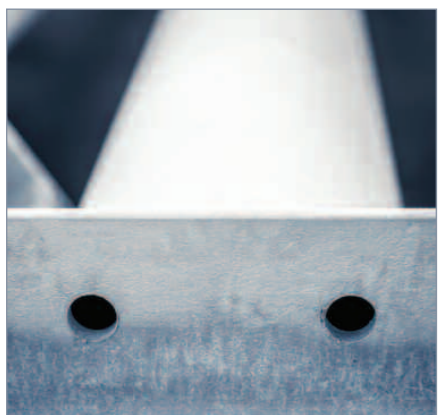
Table 1

Diameter of width of hollow section (mm)	Minimum diameter of hole (mm)
<25	10
>25 to 50	12
>50 to 100	16
>100 to 150	25
>150	Consult with Joseph Ash Galvanizing

The total area of the venting holes should be as large as possible but as a minimum, should exceed 15% of the internal area of the article.

For large structural fabrication, please consult location and sizes of vent holes with our Technical Support Team.

VENTING REQUIREMENTS



Suitably-sized vent holes. The photo shows how large structural hollow section members should have suitably-sized vent holes, as well as holes on the opposite side.



Internal venting. Before welding on the SHS leg, create internal flow by venting the main RHS member in appropriate places, as per the photo.



End plate venting. This is how a hollow section end plate should be cropped at all corners prior to attaching to prevent zinc and air traps.



Overlapping surfaces. Leave minimum gap of 2mm between overlapping surfaces. Where seal welding is not practicable stitch welding should be used.



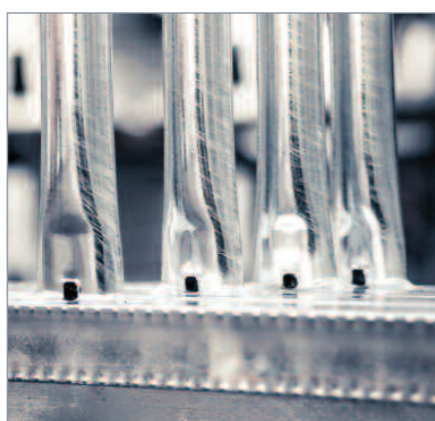
Air lock prevention. The photo shows how stopping short the end plate prevents an air lock.



Zinc free flow. Stopping short cross beams eliminates air locks and allows free flow of zinc through the fabrication.



External venting in hollow section frames. The photo shows a RHS fabrication. The hole size is adequate.



External venting in hollow frames. Note how the holes drilled close to the point of insertion will prevent air locks and zinc traps.



Hole stamping. Holes stamped out prior to weld assembly.

THE IMPORTANCE OF VENTING AND DRAINAGE

To achieve the best quality zinc coating, it is important to ensure that the molten zinc can flow freely over all surfaces, external and internal. So, where there are sealed hollow sections or cavities, vent and drain holes are essential.

When adequately sized and correctly located, these holes will:

- Allow faster immersion and withdrawal speeds which will help to minimise excessive coating build-up and reduce the risk of distortion by minimising temperature differentials.
- Virtually eliminate the risk of damage to product, plant and equipment caused by the explosive vaporisation of entrapped moisture.
- Improve the characteristics of the galvanized coating by restricting the effects of zinc solidification during drainage and reduce the mass of zinc required to achieve a good finish.

Overall, a correctly vented product will ensure total corrosion protection, produce an optimum quality finish and reduce customers' costs.

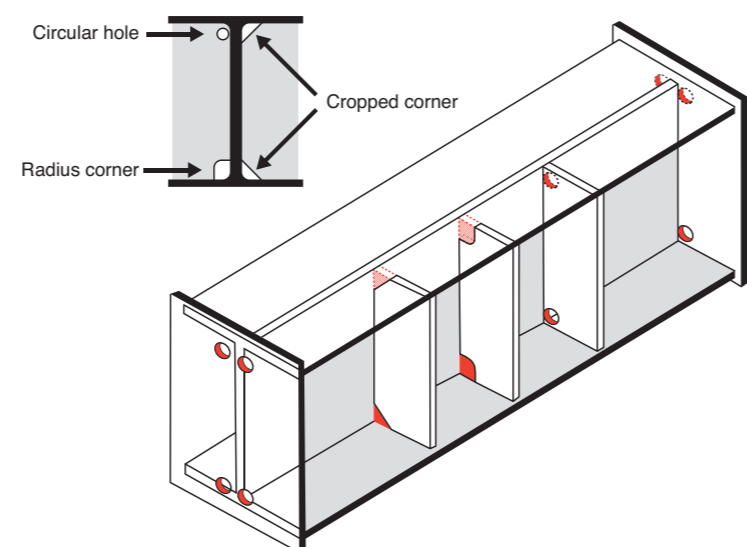
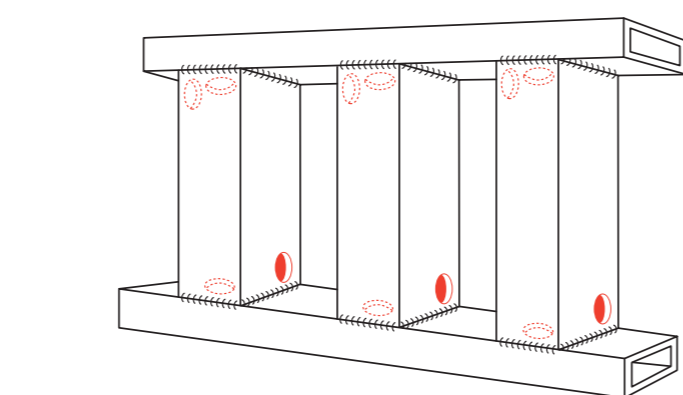


Fig. 1

External stiffeners, welded gussets, webs on columns and beams, and gussets in channel sections should always have corners cropped. Gaps created should be as large as possible without compromising on strength. If welding is required around the edge, a radius corner will facilitate the continuity of weld around the cut end to the other side. Circular holes are less effective but, if used, should be as close as possible to the corners and edges.

Ask us about the best vent and drainage hole sizes. We are happy to help.



"V" or "U" notches can be cut into ends or end corners of members before welding.

Fig. 2

On structural hollow sections, provision must be made for venting and draining.

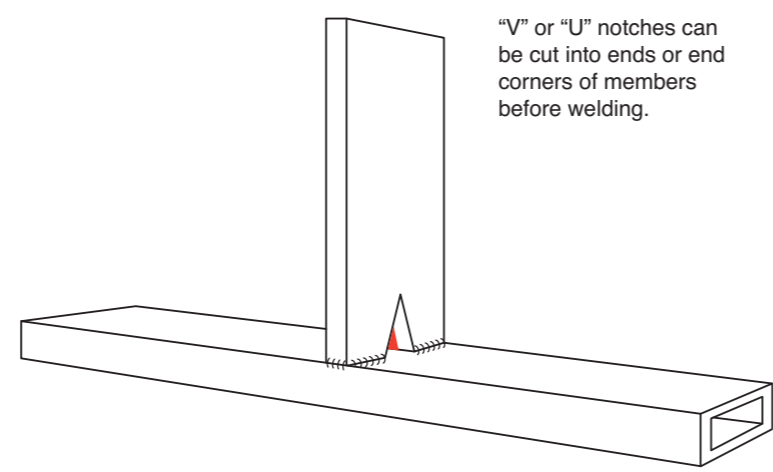


Fig. 3

With vertical members, drilled holes or V notches should be provided, diagonally opposite each other, at top and bottom.

OVERLAPPING SURFACES

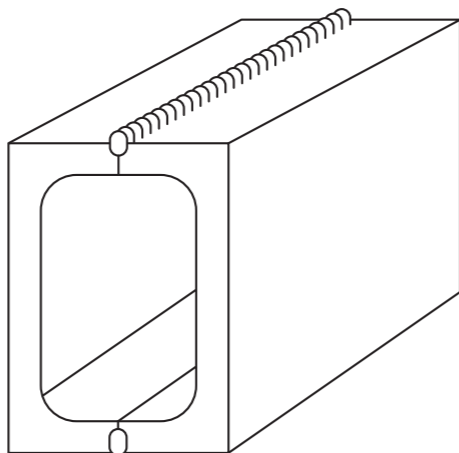


Fig. 4

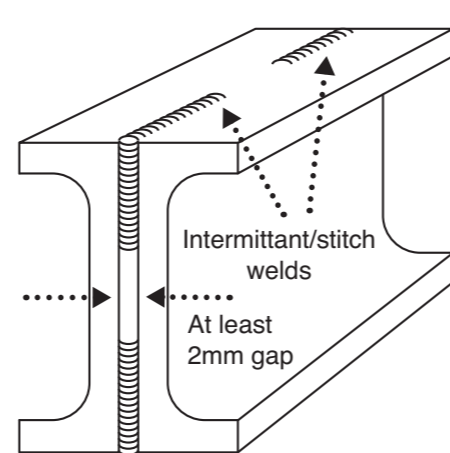


Fig. 5

Overlapping surfaces. There should be a minimum gap of at least 2mm between plates, overlapping surfaces and back-to-back angles and channels (figs. 5 & 6). When small overlaps are unavoidable, seal edges by welding (fig. 4). Where seal welding is not practical, temporary surface staining in crevices may be apparent after galvanizing and quenching. Clean with a bristle brush and mild detergent. Crevices can be sealed after galvanizing with a suitable sealant.

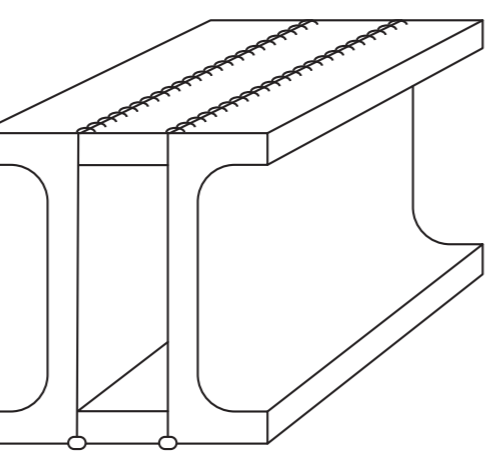


Fig. 6

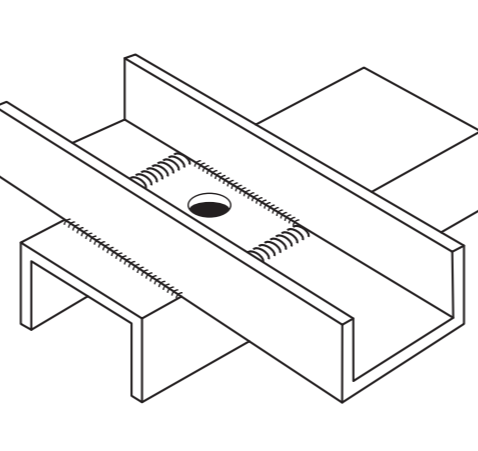


Fig. 7

Larger overlapping surfaces. If contacting surfaces is unavoidable, a single hole 10mm in diameter or the thickness of the section, whichever is greater, should be provided in both members for every 100cm² of overlap area and perimeter of contacting area continuously welded (fig. 7). This is particularly important when using thin steels. Vent hole sizes for thicker steel >10mm thick and overlap areas >300cm² should be agreed with us prior to fabrication. A vent hole in both members will ensure the safety of our employees and prevent damage.

PIPES AND TUBULAR FABRICATIONS

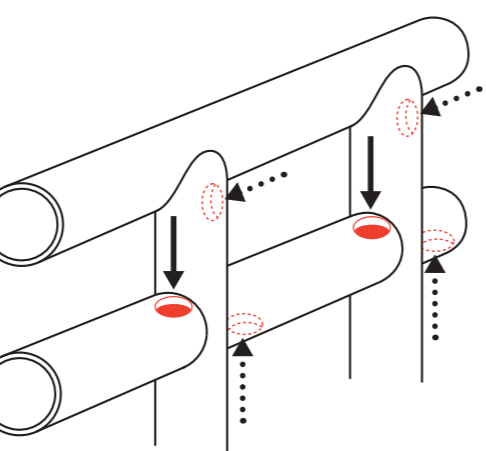


Fig. 8

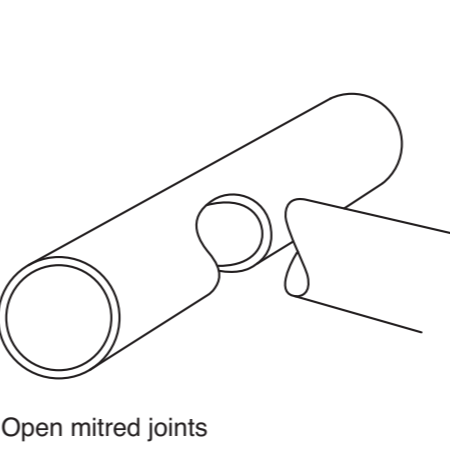


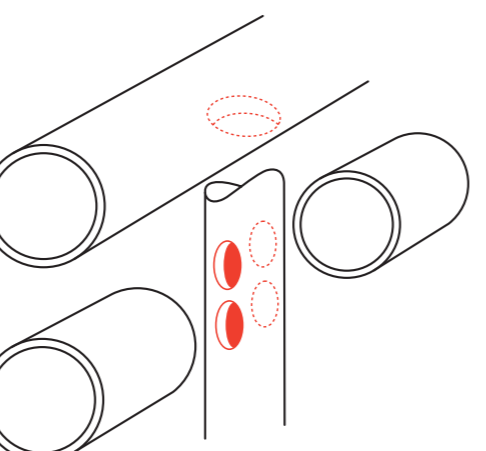
Fig. 9

Welded pipe sections. Closed sections must never be incorporated. External holes may be positioned (as in fig. 8), enabling our galvanizing experts to make a quick visual inspection to ensure the work is safe to galvanize. Sections can be interconnected using open mitred joints (as in fig. 9), or interconnecting holes drilled before fabrication (as in fig. 10). Pipe ends can be left open or plugged after galvanizing (see unwanted vent holes below).

Small tubular fabrications. Small tubular fabrications must be vented, preferably with holes not less than 10mm in diameter.

Unwanted vent holes. May be closed by hammering in lead or plastic plugs after galvanizing and filing off flush with surrounding surfaces.

Tubular fabrications/hollow structures. Drain/vent hole sizes should be preferably 25% of internal diameter or diagonal dimension for sections yielding a maximum cross section area 180cm². The percentage can depend on the shape of the fabrication. We recommend that you consult with a Joseph Ash galvanizer at the design stage.



Holes 20mm diameter or larger (Please consult in all instances relating to internal venting)

Fig. 10

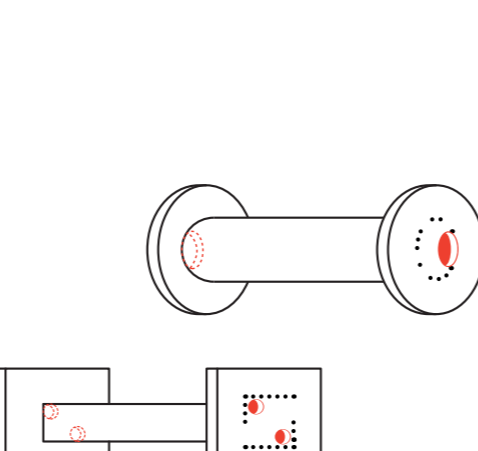


Fig. 11

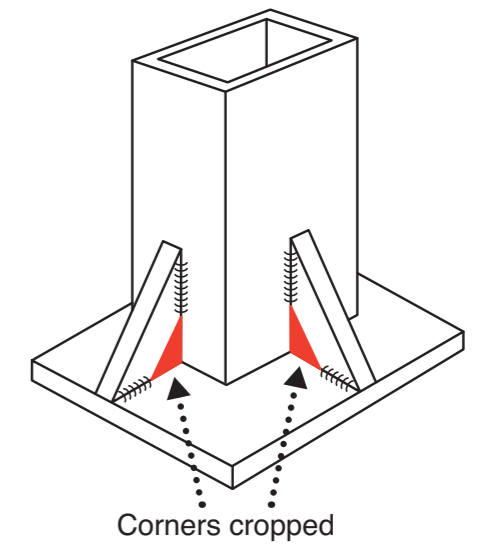


Fig. 12

Welded strengthening gussets and webs on columns and beams, and strengthening gussets in members fabricated from the channel of I-beam sections should have corners cropped or holed (figs. 1 and 12) to prevent air being trapped in pockets and corners, allowing cleaning solutions and molten zinc access to the entire surface area and facilitating drainage.

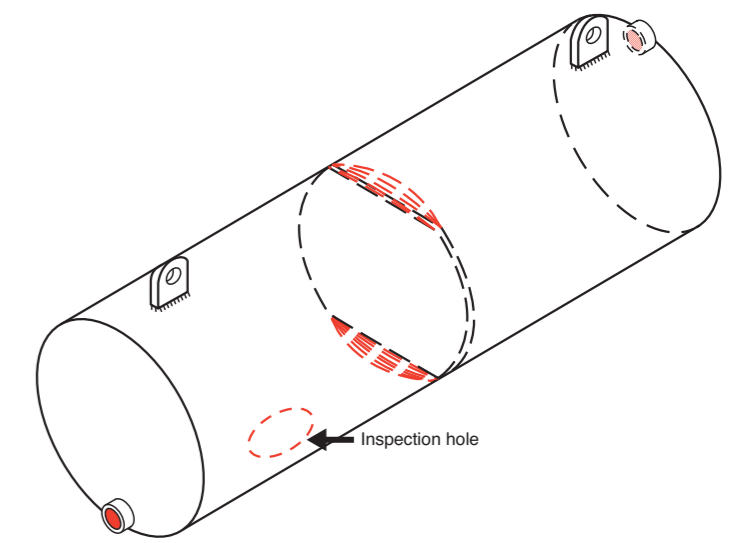


Fig. 13

For tanks, vents should be diametrically opposite and at least 50mm in diameter. Internal baffles should be cropped top and bottom. Lifting lugs required as indicated. Baffles to be viewable through vent holes or an inspection hole. Contact us to discuss the position of the inspection hole.

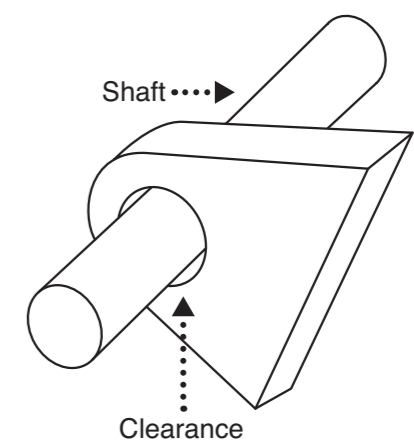


Fig. 14

Clearance for moving parts. Drop handles, hinges, shackles, shafts and spindles require minimum radial clearance to allow for thickness of galvanized coating (see also Table 2).

Table 2

Shaft of spindle size	Min. radial clearance
Up to 30mm diameter	2.0mm
Over 30mm diameter	2.5mm

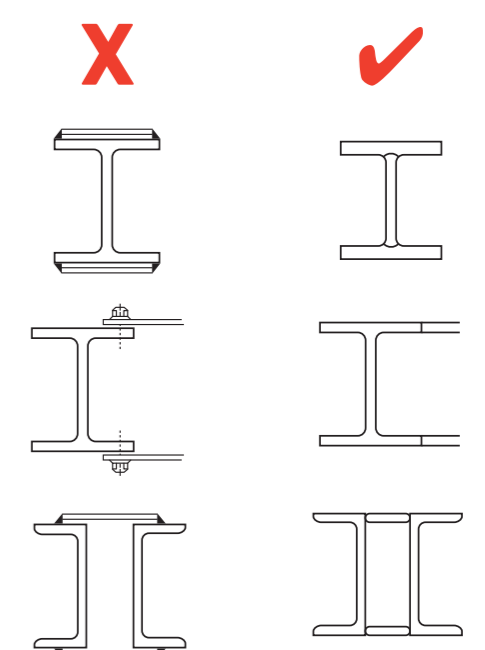


Fig. 15

Welded joints should be continuous if not enclosing an otherwise unvented surface. Bolted joints best made after galvanizing.

WE ARE HERE TO HELP

Our Technical Support Team is available to answer any queries through the galvanizing process from design to end of life and are happy to attend to consult with design staff, carry out site inspections and provide technical advice.

Technical Support Team

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www.josephash.co.uk

For more information visit the Joseph Ash Galvanizing YouTube channel and watch a video called "Design for Galvanizing".

