HDG DATASHEET: 18

Venting and Drainage

Published October [2024]

VENTING OF HOLLOW SECTIONS

Where hollow sections are sealed they must be vented for reasons of safety so allowing the escape of air and the ingress and drainage of zinc during the dipping process. Vent holes are required at each sealed end either in the end plate or the section.

Where holes are provided in end plates they should be placed diagonally opposite one another, off centre and as near as is practically possible to the wall of the member to which the end plate is connected as shown in figure 1, which shows optimum venting with two sets of diagonal holes.

Where holes are provided in the member these should be diagonally opposite one another and as near to the end of the section as is practically possible. Examples of good venting practice are shown in figures 2-3.

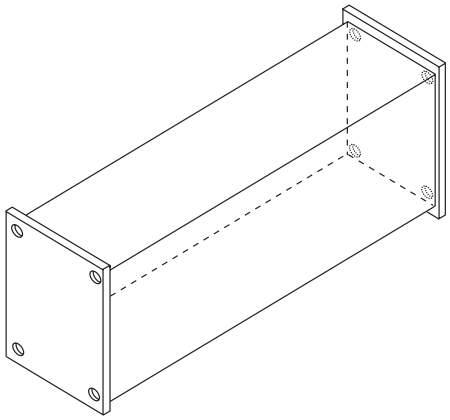


Figure 1: Venting of hollow sections in the cap plates

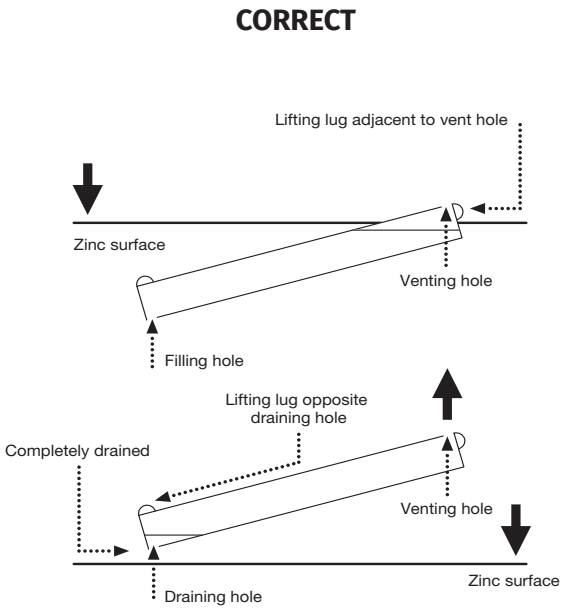
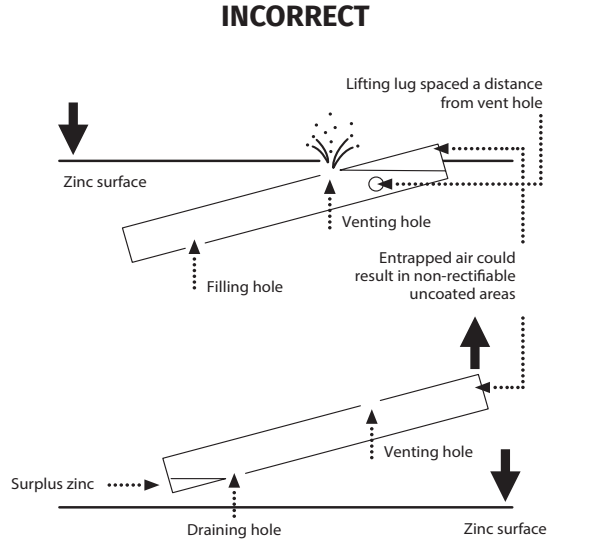


Figure 2: Location of Venting and Drainage

Figure 2 illustrates vent holes positioned in the hollow section diagonally opposite one another. These are positioned as close as possible to the ends of the hollow section to prevent formation of an air lock or zinc trap.

Alternatives to vent holes include U or V notches, or grinding off the corners of square or rectangular hollow sections as this provides ideal locations for venting and drainage. Where these options are used it is important that they have an equivalent surface area to the vent hole that would otherwise have been provided.



Note: If there are any doubts or questions, please contact your galvanizer.

Figure 3: Examples of good venting practice for hollow sections

Figure 3a*.

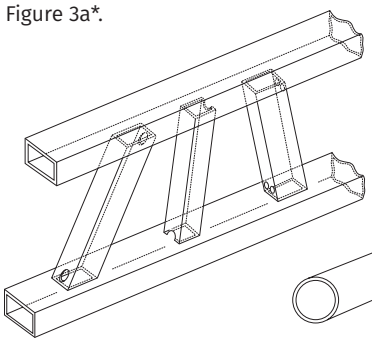
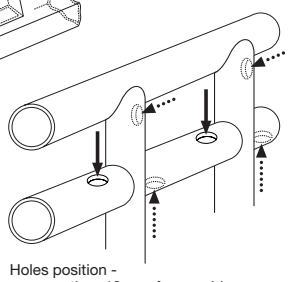


Figure 3b.



Wren's Court, 56 Victoria Road, Sutton Coldfield, West Midlands B72 1SY
T: +44 (0)121 355 8838 F: +44 (0)121 355 8727 www.galvanizing.org.uk

Galvanizers Association

Every sealed section of a fabrication must be vented for reasons of safety and to allow access and drainage of molten zinc. Holes diagonally opposite each other should be as close as possible to the sealed end (figure 2 and 3).

An indication of the vent hole size required is given in table 1, the vent hole size being dependent upon the size of the hollow section to be galvanized. Note that where long hollow sections are to be galvanized additional vent holes may be required so as to aid drainage and to help produce a better surface finish.

The guidance given in table 1 is provided to allow drainage of zinc in order to achieve the best quality surface finish. Hole sizes smaller than provided in this table may be required for specific designs and applications, e.g. children's playground equipment. However, in all instances hole sizes must satisfy minimum health and safety criteria for galvanizing. It is recommended that you consult your galvanizer for such guidance, as required.

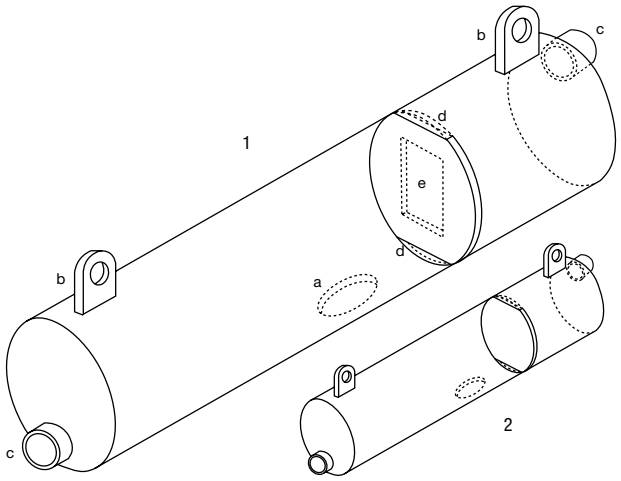


Figure 5

Venting of sealed containers or enclosed tanks is essential so as to allow a means of access and drainage for molten zinc and for the escape of gases from internal compartments so as to allow safe processing of work. Such venting will have the added benefits of ensuring complete coverage of internal surfaces so providing full corrosion protection as well as improving the quality of the galvanized coating and reducing cost.

In addition, cropping of internal diaphragms is required while design should avoid potential zinc traps and air locks which might result in uncoated areas inside the tank. Design detailing for these issues is illustrated in figures 5-6.

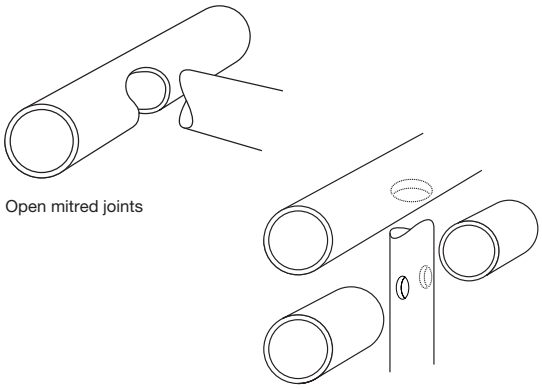


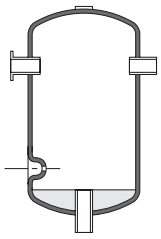
Figure 4: Example of internal venting used within larger fabrications

Note:
- Where internal venting / drainage (Figure 4) is used, venting of every section must be verifiable by the galvanizer on site.
- It is critical to discuss and agree the procedure for processing internally vented / drilled work with the galvanizer during the design stages and before fabrication.
- Photographs during fabrication or design drawings may be required.

Key - Figure 5

1	large vessel
2	small vessel
a	inspection or access hole
b	lifting lugs
c	vents
d	internal baffles (cropped top and bottom)
e	man-way (large vessels)

Avoid



Prefer

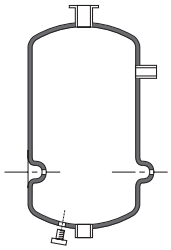


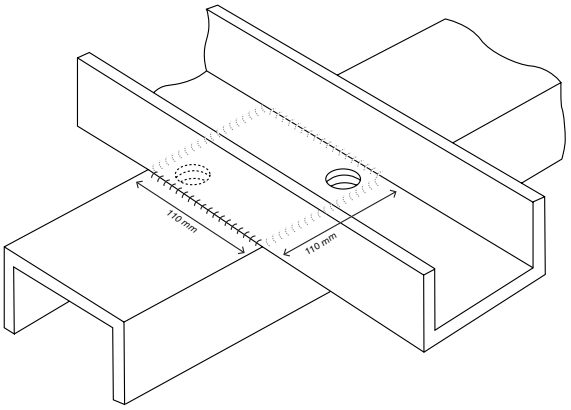
Figure 6*: Design of tanks to avoid zinc traps and air locks. The raised drain hole at the bottom of the tank creates a zinc trap within the hollow section.

Wren's Court, 56 Victoria Road, Sutton Coldfield, West Midlands B72 1SY
T: +44 (0)121 355 8838 F: +44 (0)121 355 8727 www.galvanizing.org.uk
Published October 2024. This sheet is part of the series 'HDG Datasheets' and can be requested from Galvanizers Association.

Galvanizers Association

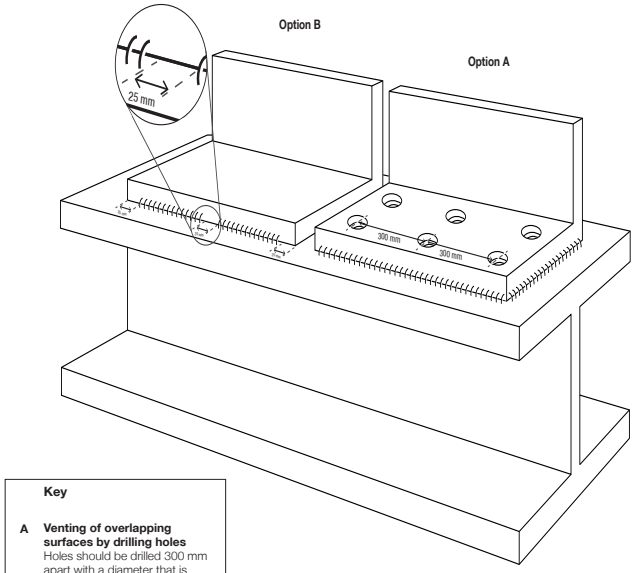
VENTING OF OVERLAPPING AREAS

Overlapping surfaces are potentially dangerous as air trapped between surfaces may be converted to superheated steam in the galvanizing bath and can lead to an explosion. For overlapping surfaces which are larger than 100 cm² and sealed by continuous welding, holes should be drilled as indicated in figures 7 and 8, which illustrate venting for small and large overlapping areas.



7a*. Venting overlapping surfaces - 110 mm x 110 mm

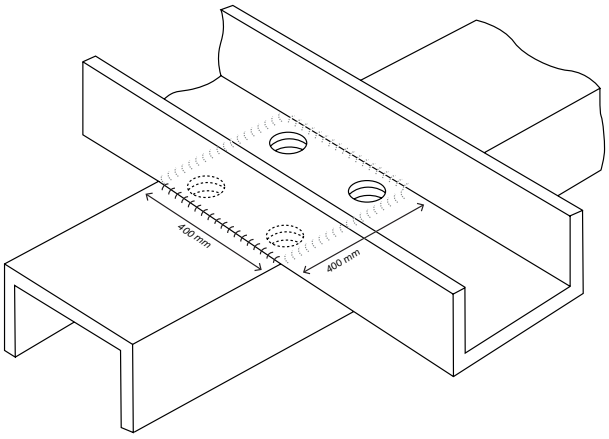
Figure 8: Venting of a large overlapping area



Key

A **Venting of overlapping surfaces by drilling holes**
Holes should be drilled 300 mm apart with a diameter that is ≥12 mm Ø

B **Venting of overlapping surfaces by intermittent welding**
Welding is 300 mm wide with gaps of 25 mm



7b. Venting overlapping surfaces - 400 mm x 400 mm

The number and size of holes required to vent an overlapping area takes account of the area of overlap and guidance is provided in Table 2. Ideally holes should be through both sections to aid the free flow of zinc. An alternative is to use intermittent welds but this may result in pretreatment solutions becoming trapped between the overlapping surfaces resulting in seepage staining during service.

Area of Overlap 'a'	Recommended Action
a ≤ 100 cm²	Circumferential tight weld. The material should be dry for the welding process and overlapping parts should be smooth and assembled without gaps.
100 < a ≤ 1000 cm²	In diagonally opposite corners, either: 2 x ≥ 12 mm holes at corners or 2 x ≥ 25 mm intermittence of weld at corners
1000 < a ≤ 2500 cm²	Either: 4 x ≥ 12 mm holes at corners or 4 x ≥ 25 mm intermittence of weld at corners
a > 2500 cm²	In diagonally opposite positions, either: ≥ 12 mm holes at corners and circumferentially at least every 300 mm from the corners or ≥ 25 mm intermittence of weld at corners and circumferentially at least every 300 mm from the corners.
Note 1	An overlapping area of 100 cm² means 10 cm x 10 cm or 20 cm x 5 cm etc.
Note 2	Area of overlap 'a' represents areas shown in figures 7 and 8.

Wren's Court, 56 Victoria Road, Sutton Coldfield, West Midlands B72 1SY
T: +44 (0)121 355 8838 F: +44 (0)121 355 8727 www.galvanizing.org.uk

Published October 2024. This sheet is part of the series 'HDG Datasheets' and can be requested from Galvanizers Association. DISCLAIMER – the content of this datasheet may have been updated. Please ensure you have the most up-to-date version by checking www.galvanizing.org.uk/publications/datasheets

Galvanizers Association

Table 1*: Guidance on vent hole sizes for hollow sections of different sizes

	Number and location of holes or crops at each end of the hollow section												
	1 hole	1 hole	2 holes	2 holes	4 holes	4 holes	2 crops at corners	4 crops at corners	4 holes of 15 mm + 1 central hole	4 holes of 15 mm + 1 central hole	4 crops at corners of 25 mm + 1 central hole		
Section cross-sectional shape and dimensions (mm)													
Round	Square	Rectangular	Diameter of the hole (mm)						Size of Crop (mm)		Diameter of central hole (mm)		
15	15	—	10	10	—	—	—	—	—	—	—	—	—
20	20	30 × 15	10	10	—	—	—	—	—	—	—	—	—
30	30	40 × 20	12	12	10	10	—	—	—	—	—	—	—
40	40	50 × 30	14	14	12	12	—	—	10	—	—	—	—
50	50	60 × 40	16	16	12	12	10	10	13	—	—	—	—
60	60	80 × 40	20	20	12	12	10	10	15	12	—	—	—
80	80	100 × 60	25	20	16	16	12	12	20	15	—	—	—
100	100	120 × 80	30	25	20	20	14	15	25	20	—	—	—
120	120	160 × 80	35	30	25	25	20	20	30	25	—	—	—
160	160	200 × 120	45	40	35	30	25	20	40	30	35	—	—
200	200	260 × 140	60	50	40	35	30	25	50	35	50	40	—
300	300	350 × 250	—	—	60	55	45	40	75	55	80	70	75
400	400	450 × 250	—	—	80	75	60	50	100	75	110	100	110
500	500	600 × 300	—	—	100	90	75	65	125	90	140	125	135
600	600	700 × 400	—	—	120	110	85	75	150	110	170	150	165

Note 1 The shaded holes or crops indicate the hole or crop in the opposite end of the hollow section.
Note 2 The size of crop given in this table refers to the length of the adjacent side (not the diagonal length).
Note 3 Table entries that are not applicable are designated by '-'.

Wren's Court, 56 Victoria Road, Sutton Coldfield, West Midlands B72 1SY
T: +44 (0)121 355 8838 F: +44 (0)121 355 8727 www.galvanizing.org.uk
Published October 2024. This sheet is part of the series 'HDG Datasheets' and can be requested from Galvanizers Association.

Galvanizers Association