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INDUSTRIAL
GALVANIZERS
CORPORATION

Tech Tips

Size of vent and drain holes needed for hot-dip galvanizing of hollow sections and tanks.

WHY GALVANIZE?

Hot dip galvanized coatings are applied to steel to improve the anti-corrosion performance of the steel to ensure that it lasts as long as possible with a minimum of maintenance

COATINGS DIFFER

Only hot-dip galvanizing gives a coating that can reach the 50 year life required of structural building products.

THICKNESS COUNTS

Compared to other zinc-rich coatings, hot-dipped galvanizing is:-

- THICKER
- HARDER
- FULLER

HOT-DIP GALVANIZED PRODUCTS LAST LONGER...

Hollow section showing well designed draining.

One of the most common issues in designing fabrications for hot dip galvanizing is ensuring that fabrications are vented and drained correctly. All steel to be galvanized needs to be immersed in molten zinc and the zinc needs to be able to flow freely into and out of all hollow sections and corners.

The flow of molten zinc into, off, and out of the fabrication is one of the most important factors in determining the final quality of the coating. Inadequate venting and draining can cause the following galvanized coating defects:

- misses in the coating caused by air locks ;
- puddling of zinc in corners, wasting zinc and interfering with subsequent assembly;
- ash trapped on zinc surface causing surface defects;
- irregularities in surface appearance caused by erratic immersion because item floats;
- thick zinc runs on surface caused by zinc freezing during draining;
- any water trapped inside a hollow section will expand 1750 times its original volume as steam and generate pressures as high as 50 MPa (7250 psi).

Basic Venting Rules.

- no vent hole should be smaller than 8 mm;
- the preferred minimum size is 12 mm;
- about 200 grams of zinc ash will be produced for each square metre of steel surface galvanized. This ash is a solid powder and will not pass through small openings. Large internal areas need larger vent holes to allow ash to escape;
- hollow vessels require 1250 mm^2 of vent hole for each cubic metre of volume. This means that a 40 mm^2 diameter hole is required for each cubic metre of volume;
- hollow sections such as tube, RHS and SHS require minimum vent hole area equivalent to 25% of the section's diagonal cross section;
- vent holes should be at the edges of hollow sections.

Basic Draining Rules.

- no drain hole should be less than 10 mm;
- preferred minimum drain hole size is 25 mm;
- large hollow sections (tanks, pressure vessels) require a 100 mm diameter drain hole for each cubic metre of enclosed volume.
- drain holes should be at the edges of hollow sections;
- hollow sections such as tube, RHS and SHS require minimum drain hole area equivalent to 25% of the section' diagonal cross section. The preferred design option is to leave the ends of tubes, RHS and SHS open.

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Size of vent and drain holes needed for hot-dip galvanizing of hollow sections and tanks.

Circular Hollow Section Bore	Rectangular hollow section (mm)	Square hollow section (mm)	Vent hole diameter (mm)	
			Single hole	Double hole
8			8	
10			10	
15			10	
20		13 x 13	10	
25		16 x 16	10	
32		19 x 19	10	
40	38 x 19	25 x 25	10	
50	38 x 25	32 x 32	12	2 x 10
65	64 x 30 – 76 x 38	51 x 51	16	2 x 12
80	76 x 51 - 89 x 38	64 x 64	20	2 x 14
100	102 x 51 – 102 x 76	76 x 76	25	2 x 18
	127 x 51 – 127 x 64	89 x 89	25	2 x 18
125	127 x 76 – 152 x 76	102 x 102	32	2 x 22
150	152 x 102	127 x 127	38	2 x 27
200	203 x 102 – 203 x 152	152 x 152	50	2 x 35
250	254 x 152	202 x 203	63	2 x 45
300	305 x 203	254 x 254	75	2 x 54
350	305 x 254	305 x 305	88	2 x 63
400			100	2 x 70

Table of vent and drain holes for tanks and pressure vessels:-

Capacity (litres)	Single drain hole diam. (mm)	Double drain hole diam. (mm)	Vent hole diam. (mm)
500	80		25
1000	115	2x 80	40
1500	140	2x100	45
2000	160	2x115	55
2500	175	2x125	60
3000	200	2x140	70
3500	225	2x150	75
4000	225	2x160	80
4500	240	2x170	85
5000	250	2x175	90
5500	265	2x185	95
6000	280	2x200	100
7000	300	2x220	110
8000	325	2x225	115
9000	350	2x240	120
10000	350	2x250	125

TRIED & PROVEN

Over 40 years of field testing shows that galvanized coatings perform well even in harsh environments.

WHY IS VENTING AND DRAINING IMPORTANT?

All steel to be galvanized needs to be immersed in molten zinc and the zinc needs to be able to flow freely into and out of all hollow sections and corners. Correctly sized and place vent and drain holes allow this to happen—preventing damage to the work and injury to personnel. This reduces rework and improves turnaround time.

WHY GALVANIZE WITH INDUSTRIAL GALVANIZERS?

For steel users requiring fast, proven corrosion protection for local or national projects Industrial Galvanizers is the established hot dip galvanizer with nationwide coverage.

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