How to Mark Your Items for Identification

Remember the most important considerations in identification markings:

1) The identification must be made so as to be legibl after galvanizing.

2) The markings must not disrupt the integrity of the zinc coating and compromise the rustproofing.

For example: Oil-based paints, oil-based markers, or crayon markers will not come off in the cleaning solution used to prepare items for galvanizing. These types of markings may create ungalvanized areas. For temporary identification, use water-soluble markers or detachable metal tags.

For permanent identification, there are three methods that enable items to be rapidly identified at the job site after galvanizing:

STAMPED/WELDED TAG SEAL-WELDED **STAMPED/WELDED TAG**

STAMPED **WELDED**

1) Stamp the surface

Create identification marks by using die-cut deep stencils or by making a series of center punch-marks. These marks should be placed in a standard position on each of the items, preferably toward the center.

The marking must be a minimum of 1/2" (13 mm) high and 1/32" (.8 mm) deep to ensure readability after galvanizing.

Important: Do not use this method to mark fracture-critical members.

2) Use a series of weld beads

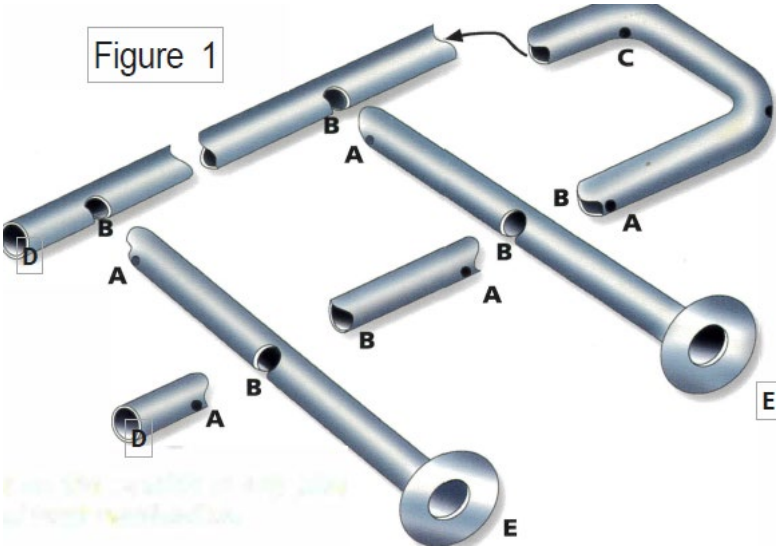
Letters or numbers can be made directly on the items using this method.

Important: All welding flux must be removed after welding or it will interfere with proper galvanizing.

3) Attach deep-stenciled steel tags

Tags should be wired loosely to the items so that the area beneath the wire will not freeze to the items when the molten zinc solidifies. Or, if you prefer, tags may be seal-welded directly to the materials. Important: Tags must be a minimum of #12 gauge, and the attaching wire must be a minimum of #9 gauge steel wire.

Two methods for fabricating handrails for galvanizing



Vent holes should be visible on the outside of any pipe assembly to provide internal vent verification.

1. If full internal holes are incorporated into the design (Best method)

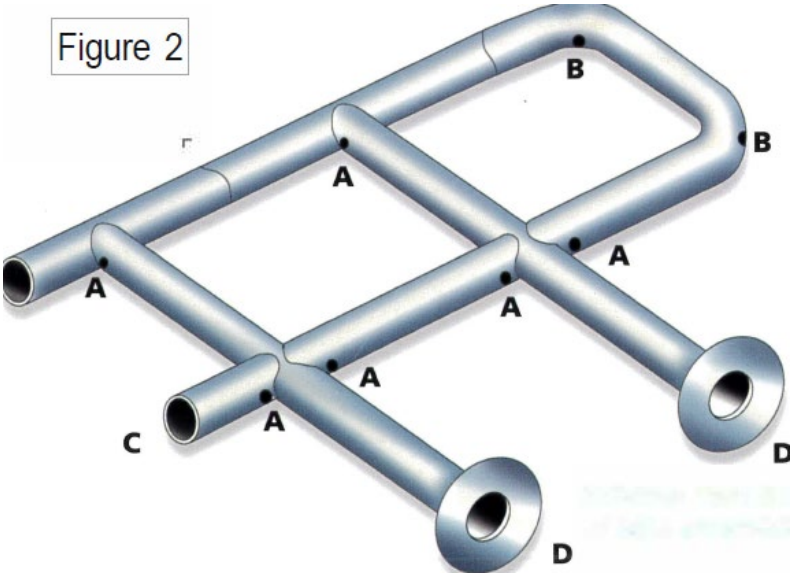
A. External vent holes must be as close to the weld as possible and a minimum of 3/8" (9.5 mm) in diameter. NOTE: Most pipe rails are 1¼" or 1½" pipe which require minimum 9/16" vent holes.

B. For the best galvanizing quality and the lowest cost, internal holes should be the full I.D. of the pipe.

C. Vent holes in end sections or in similar sections must be 1/2" (13 mm) in diameter.

D and E. Ends should be left completely open. Any device used for erection in the field that prevents full openings on ends of horizontal rails and vertical legs should be galvanized separately and attached after galvanizing.

2. If full internal holes are NOT incorporated into the design (Alternative method)



A. Each external vent must be as close to the welds as possible and must be 25% of the I.D. of the pipe but not less than 3/8" (9.5 mm) in diameter. The two holes at each end and at each intersection must be 180° apart and in the proper location.

B. Vent holes in end sections or in similar sections must be 1/2" (13 mm) in diameter.

C and D. Ends should be left completely open. Any device used for erection in the field that prevents full openings on ends of horizontal rails and vertical legs should be galvanized separately and attached after galvanizing.

External vent holes should be visible on the outside of pipe assemblies.

How to fabricate trusses for galvanizing

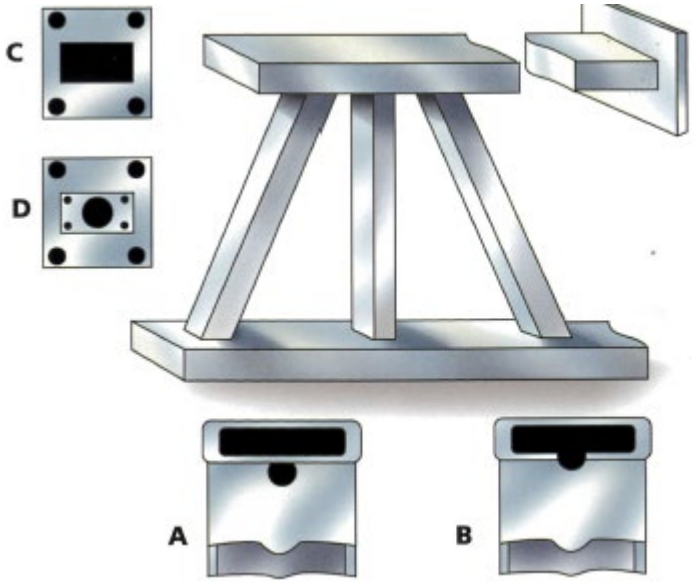


Figure 3

Rectangular tube trusses

Vertical Sections

Hole locations for vertical members should be placed as shown in examples A and B on Figure 3.

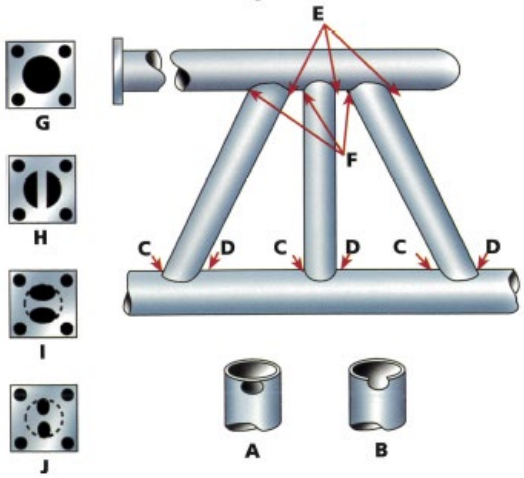
Each vertical member should have two holes at each end, 180° apart and in line with the horizontal members. It is best if the holes are of equal size, and the combined area of the two holes at either end of the verticals should be at least 30% of the cross-sectional area.

Horizontal End Plates

Preferably, the fabrication is completely open. (See example Con Figure 3.)

• If H + W = 24" (61 cm) or larger, the area of the hole (plus clips) should equal 25% of the area of the tube (H x W).
• If H + W = less than 24" (61 cm) but more than 16" (41 cm), the area of the hole (plus clips) should equal 30% of the area of the tube (H x W).
• If H + W = less than 16" (41 cm) but more than 8" (20 cm), the area of the hole (plus clips) should equal 40% of the area of the tube (H x W).
• If H+W = less than 8", leave it open **See Figure 6**

Figure 4



Pipe Trusses 3" (7 .6 cm) or larger

Vertical Sections

Hole locations for vertical members should be placed as shown in examples A and B on Figure 4. Each vertical member should have two holes at each end, 180° apart and in line with the horizontal members as indicated by the arrows. It is best if the holes are of equal size, and the combined area of the two holes at either end of the verticals (Areas C and D or Areas E and F) should be at least 30% of the cross-sectional area.

Horizontal End Plates

Preferably, the fabrication is completely open with the same hole diameter as the inner diameter of the tube. (See example G on Figure 4.)
Alternatives would have openings at least 30% of the area of the inside diameter. (See examples H, I, and J on Figure 4.)

How to fabricate pipe columns, pipe girders, street lights, and transmission poles for galvanizing (with base-plates and with or without cap-plates)

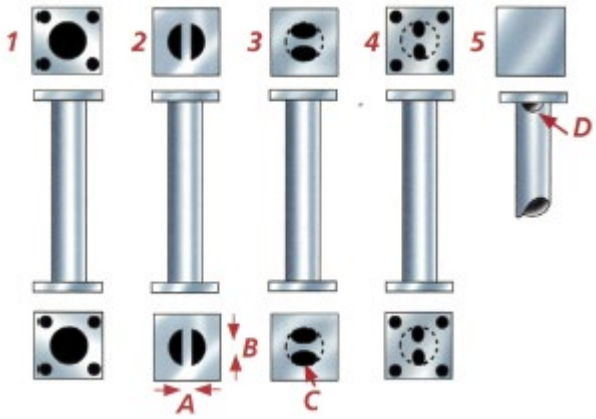


Figure 5

Location of openings:
1 The best design of fabrication is to have the end completely open with the same diameter as the section top and bottom.
2, 3, and 4. This is an acceptable substitute if it is not possible to have a full opening.
5. When no holes are allowed in the cap- or base-plate, two half-circles 180° apart at opposite ends of the pole must be used.

Dimensions:
Openings at each end must be at least 30% of the I.D. area of the pipe for pipes 3" (7.6 cm) and greater, and 45% of the I.D. area for pipes smaller than 3".
Allow 30% of the area of the I.D. for hole sizes at each end.
1. End completely open
2. Slot A= 3/4" (19 mm), Center hole B = 3" (7.6 cm) in diameter
3. An example of sizes for a 6" (15 cm) diameter section.
Half-circle C = 1.75" (4.5 cm) radius
4. Oval opening= 1.75" (4.5 cm) radius
5. Half-circle D = 1 5/8" (1.9 cm) radius

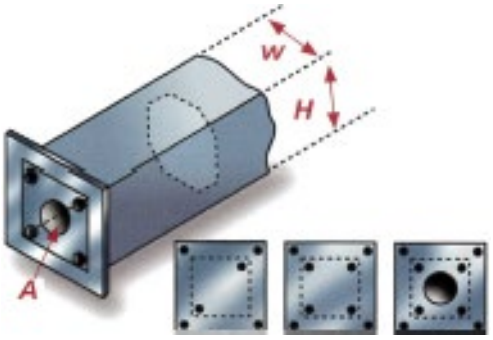


Figure 6

How to Fabricate Box Sections for Galvanizing

Holes and clipped corners must be flush as shown. Using the following formulas, the table shows typical sizes of holes:

Box Size (H+W)	Holes A-Dia.
48" (122 cm)	8" (20 cm)
36" (91 cm)	6" (15 cm)
32" (81.3 cm)	6" (15 cm)
28" (71 cm)	6" (15 cm)
24" (61 cm)	5" (12.7 cm)
20" (50.8 cm)	4" (10.2 cm)
16" (40.6 cm)	4" (10.2 cm)
12" (30.5 cm)	3" (7.6 cm)

- Internal gussets: Space at a minimum of 36" (91 cm).
- Box sections: When H + W = 24" (61 cm) or larger, the area of the hole (plus clips) should equal 25% of the cross-sectional area of the box (H x W).

When H + W = less than 24" (61 cm) but greater than 16" (40.6 cm), the area of the hole (plus clips) should equal 30% of the cross-sectional area of the box (H x W).

When H + W = less than 16" (40.6 cm) but equal to or greater than 8" (20 cm), the area of the hole {plus clips) should equal 40% of the cross-sectional area of the box (H x W).

When H + W = less than 8" (20 cm), leave completely open with no end-plate or internal gusset.

The table is for square box sections only. For rectangular sections, calculate the required area, and check with South Atlantic for position of openings.

Venting

The primary reason for vent and drain holes is to allow air to be evacuated, permitting the object to be completely immersed into cleaning solutions and molten zinc. Proper sizing and location make it safer to galvanize and provide the optimal finish. The secondary reason is to prevent damage to the parts. Any pickling solutions or rinse waters that might be trapped in a blind or closed joining connection will be converted to superheated steam or gas and can develop a pressure of up to 3600 psi (1100 MPa) when immersed in molten zinc. Not only is there risk of damage to the fabrication being galvanized, but there also is risk of serious hazard to galvanizing personnel and equipment.

Air and frothy fluxes must be allowed to flow upward and completely out. Cleaning solutions and molten zinc must be allowed to flow in and completely wet the surfaces. Proper galvanizing results when the inside and outside of a product are completely cleaned and zinc-coated.

The structure must be lowered into the solution without trapping any air, then raised from the bath without trapping any solution. Consequently, ample passageways allowing unimpeded flow into and out of the part must be designed into assemblies.

Because items to be galvanized are immersed and withdrawn at an angle, the vent holes should be located at the highest point and drain holes at the lowest.

All sections of fabricated pipe-work should be interconnected with full open-tee or miter joints. Each enclosed section must be provided with a vent hole at each end.

Most galvanizers prefer to visually identify the venting from the outside. This is necessary to verify the adequacy of the venting as well as to determine that venting has not been mistakenly omitted. Some galvanizers may hesitate to process complicated pipe assemblies unless all venting is visible on the outside and readily accessible for inspection.

Base-plates and end-plates must be designed to facilitate venting and draining. Fully cutting the plate provides minimum obstruction to a full, free flow into and out of the pipe. Since this is not always possible, using vent holes in the plate often provides the solution.

Vent holes are frequently left open but can be closed with drive caps or plugs after galvanizing.

Various methods of venting are acceptable, but the subsequent plugging of these holes should be kept in mind, where necessary or desired.

It is recommended that tubular structures be completely submerged in one dip into the galvanizing kettle. This minimizes potential internal coating problems that, because of the size and shape of the item, may be difficult to discover during inspection.