Safe and sound design 3

Design for safety

Vessels or hollow structures that incorporate enclosed sections must have provision for adequate venting during galvanizing. At galvanizing temperatures, any moisture present in enclosed sections is rapidly converted to superheated steam. This process generates explosive forces unless adequately vented to the atmosphere. For the safety of galvanizing personnel, equipment and the work being galvanized, it is essential that adequate venting is provided.

Correct venting also ensures that the entire internal surface of work is properly galvanized and fully protected.

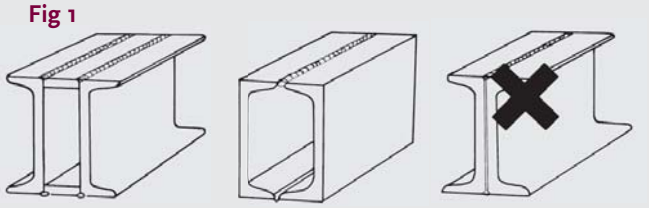
Closed vessels which are not to be galvanized inside, such as certain types of heat exchanger, must be provided with snorkel-type vent pipes long enough to project above the level of pickling, fluxing and galvanizing baths when the work is fully immersed.

The exact venting requirement should be discussed with Perry Metal Protection.

Overlapping surfaces

Avoid narrow gaps between plates, overlapping surfaces and back-to-back angles and channels. When small overlaps are unavoidable, seal the edges by welding. When left unsealed, small overlapping areas may trap pickle acid which can later escape to discolour or damage the galvanized coating. (Refer Fig 1)

Fig 1

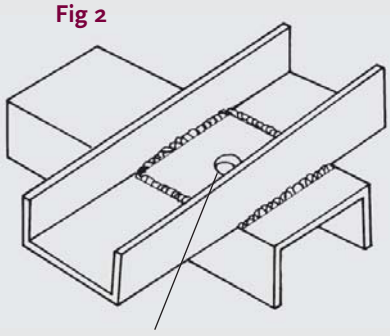


A Satisfactory **B** Satisfactory **C** Unsatisfactory

Larger overlapping surfaces

If contacting surfaces cannot be avoided, a hole 6mm in diameter for every 100cm^2 of overlap area should be placed in one of the members. The perimeter of the contacting area should be continuously welded. The vent hole in one member will ensure the safety of galvanizing personnel and prevent damage to the article. (Refer Fig 2)

Fig 2



Vent holes 6mm diameter for every 100cm^2 of overlap area

Tubular fabrications and hollow structurals

Holes should be placed at locations agreed with Perry Metal Protection – ideally at both sides of members or diagonally opposite each other. (Refer Fig 3 and 4)

Fig 4

Alternatively 'V' notches can be cut in ends of members before welding

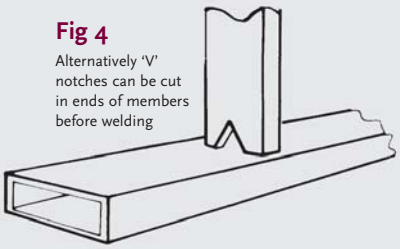
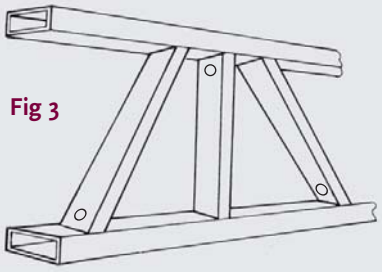


Fig 3



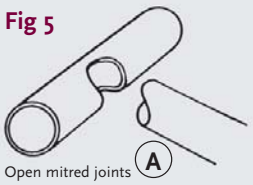
Holes placed at locations agreed with the galvanizer – ideally on both sides of members or diagonally opposite each other

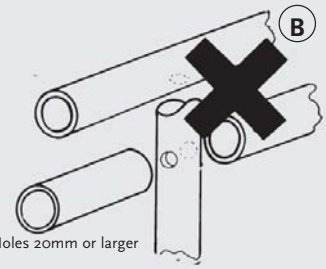
Welded pipe sections

Closed sections must never be incorporated (Refer Fig 5). Sections should be interconnected using open mitred joints as illustrated at 'A'. Interconnecting holes as in 'B' are not acceptable unless there is an external viewing hole to confirm the venting is appropriate. External holes may be positioned as in 'C', a method which is the preferred by the galvanizer, since quick visual inspection shows that the work is safe to galvanize.

- Pipe ends should be left open or provided with removable plugs
- Small tubular fabrications must be vented, with holes not less than 6mm in diameter
- Unwanted vent holes may be closed by hammering in lead plugs after galvanizing, filing off flush with surrounding surfaces

Fig 5





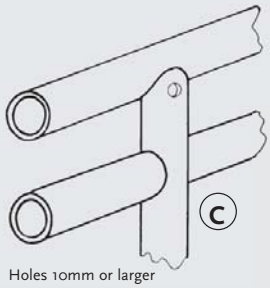
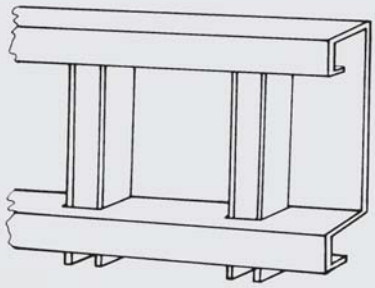
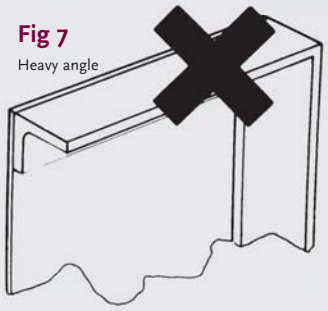


Fig 6



Use of symmetrical sections minimises distortion during galvanizing. Avoid combinations of thick and thin materials

Fig 7
Heavy angle



Distortion

Distortion can be prevented or minimised by the use of:

- symmetrical designs
- relatively uniform sections
- accurately preformed members to avoid locked-in stresses
- balanced or staggered welding techniques to avoid locked-in stresses
- temporary cross stays to prevent distortion during galvanizing of large open fabrications and tanks

Use of symmetrical sections minimises distortion during galvanizing. Avoid combinations of thick and thin materials. (Refer Fig 6 and 7)

TALKING TECHNICAL
Design, specification and inspection of galvanized products

To ensure consistently good galvanized steel products, it is essential that the basic requirements outlined in these guides are incorporated at the design and fabrication stages of production.

These technical guides are designed to be introductory only. All design features should be discussed with a member of our advisory team. Close liaison between the design engineer, materials engineer, specifier, fabricator and galvanizer will ensure the highest galvanizing standards. Perry Metal Protection also distributes a free wallchart and a summary booklet.

PERRY
METAL PROTECTION

Perry Metal Protection is a member of the Galvanizing Association of New Zealand, Galvanizers Association of Australia and is ISO9001 certified.

0800 508 506

For advice on service, quotations and technical knowledge on hot dip galvanizing, contact your local Perry Metal Protection site:

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Christchurch 5 Chinook Place, Hornby *03 349 0290*

Alternatively, visit our website *www.perrymetalprotection.co.nz* or email *enquiry@perry.co.nz*

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