GUIDE FOR THE PROPER PREPARATION OF STEEL STRUCTURES IN ORDER TO BE PROTECTED AGAINST CORROSION THROUGH HOT-DIP GALVANIZING

BEST PRACTICES FOR SAFETY, VENTING AND DRAINAGE

CONTENT

INTRODUCTION

It is important to pay attention already in the engeneering design fase how to atkle the steel prepared to be anticorrosive protected through hot dip galvanizing.

The mandatory parameters to be considered when designing a seel structure for hot dip galvanizing:

- **Safety operations during the hot dip galvanizing process**
- **Quality of the zinc cover**
- **Surface appearance after hot dip galvanizing**

This guide supplies general infomation regarding the design and good practices, including the venting and drainage holes, as parts of the safetyof the prcess and quality of the hot dip galvanized products.

The importance of the venting and drainage holes

1. Purpose

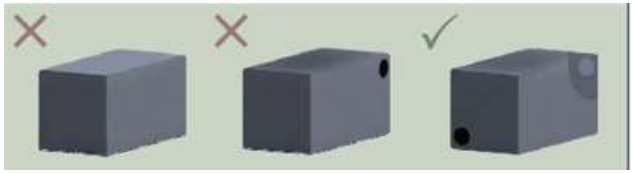


Fig. 1

Closed volumes
The hot atmosphere Inside, will lead to explosion

One hole
There will be venting, but the part will float

Two holes
Insure the xistence of venting and drainage during process and a propperly galvanized (inside and outside) part

In hot dip galvanizing, the cover is a result of the iron as the main component of the basic steel and the molten zinc interaction. It is mandatory that the steel surface was prior cleaned, with no scale mills and rust in excess, free of silicone materials used for welding and paints. These are the condition for a proper reaction take place and the complience with the standards.

The purpose of venting and drainage is related with the safety of dipping and extracting, with the efficiency and effectivness during all the process fases.

For the both main stages, chemical preparation and immersion in the molten zinc respectively, all the substances and the molten zinc must freely flow inside of the steel product and on all its faces. So, the complete contact is assured and at the end of the process, the air has been completly released and no accumulation of zinc has occur.

2.

In the case of immerssion of a closed volumes, the overheating of the internal air will occur and at the end will lead to explosion (fir. No.1. Further all the inside remained liquids will immediately increase their volumes at the moment of dipping in the molten zinc bath, therefore, it is an added reason for high attention.

The air captured inisde an unproperly venting volume will bring two unlike effects:

1. Will block the chemicals acces in all the areas to be prepared for hot dip galvanizing and/or will lead to apearance of areas where the galvanizing will not take place, so, uncovered surfaces will occur.

2. As a consequence of the close density between steel and zinc, the parts may float. For pipes, as a rule, if the inside captured air represents more than 15% of thetotal inside volume, the pipe will not sink.

3. This is why the holes most be correctly made, in order to permit a proper air flow and a proper emptying of the liquids.

Density and viscosity of the molten zinc are as well, important parameters for the zinc flow after the extraction of the part.

The importance of the venting and drainage holes

1. Quality

The dimmension of the venting and drainage holes and the dipping position has a major impact while the parts are immersed and extracted.

Along with the safety risks brought by the captured air in the closed volumes, it can cause quality issues (ex. uncovered zinc areas). Larger holes assure a faster flow of the zinc inside the parts and on the sides as well. The output is a ease immersion and extraction of the steel parts and a better quality of the finished fgoods.

A slow flow of zinc, crossing holes with inproper diameters or position will bring the tendency to anaesthetic zinc liquiges traces and blisters.

Inproper venting and drainage (which results in extremly low speed immersion and extraction), in the case of high reactive steels, will increase the zinc layer thickness, vill affect the aspect and will increase the surface embritlement.

When unproper drainage from inside towards exterior surfaces, the product waeight could rapiddly increase and could bring difficulties in lifting up of the parts after the hot dip galvanizing process. This situation can generate dimenssional deviations in the case of recipients with small thickness wals (ex. reservoires).

2. Aspect

The factors influencing the quality of hot dip galvanizing may also have impact on the aesthetic.

The venting and drainage holes position may be a topic related also to the finished good aesthetic and is stongly recomended to be discuddes early in the designing phase. As example, choosing between pipes or profile will result in different numbers, kinds and positions of the venting and drainage holes, required for an safety and good grom the quality point of view.

Availability of the proper hanging points is a high influencing requirement and will represent one of the the facts to turn out as good results.

Any specific request regarding aesthetics must be discussed with the galvanizer while the design is work in progress, or until the beginning of the hot dip galvanizing process itself.

General principles

1. Hanging and handling

There are facilities able to realize hot dip galvanizing for almost all the dimmensions and shapes, depending of course by the lifting and moving equipments and the location of the hot dip galvanizing plant.

The vaste majority of products following to be galvanized are hanged on a jig and lifted by overhead cranes or monorail cranes, using during the production process wires, chains or hangers.

Maximum dimmensions and weight caracteristic for each production plant should be known and checked during in the designing phase.

PLANT	BATH WORKING DIMMENSIONS (mm)
Timișoara	6200 x 1200 x 2000
Făgăraș	12300 x 1500 x 2880
Câmpia Turzii	10000 x 1500 x 2880

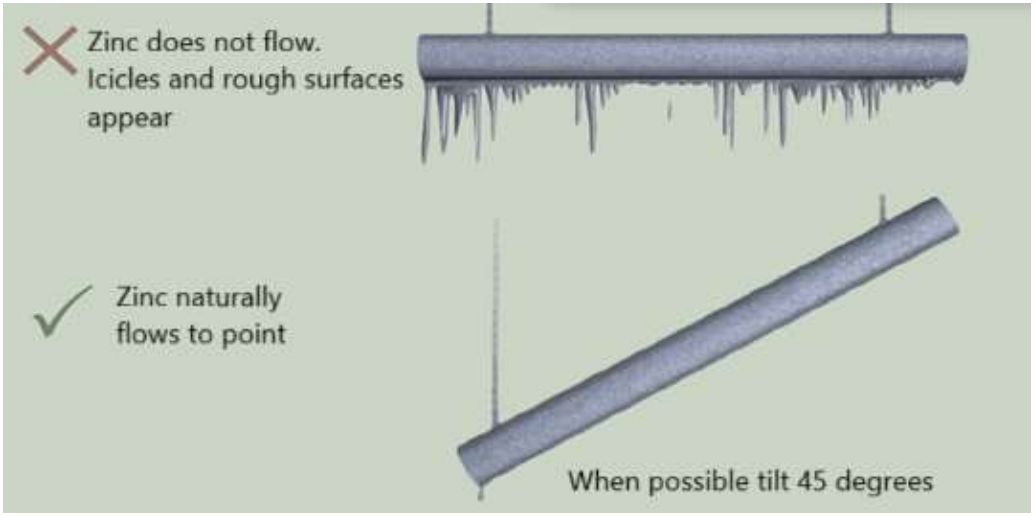


Fig. 2

The hanging points should be supplied, as example the hanginh holes, considering the product dimmension and thelifting capacity of the lifring equipment.

For long and straight sections is preffered using two hanging holes in order to reduce the wire or chains traces.

As much as possible, the articles should be suspended under an angle of approx 45° in order to assure the the effectivness of the drainage of the liquids and molten zinc. This aproach will avoid appearance of high roughness surfaces and ease the air flow exit on the highest point, preventing the explosions.

General principles

1. Hanging and handling

- Long parts will often be removed from the molten zinc bath at a smaller angle to avoid the risk of touching the bottom of the bath. This angle will decrease the zinc to flow speed, which will lead to a greater mass of zinc coating and a greater quantity of ashes trapped in the part.
- For small parts such as fastening elements, nuts, brackets, etc., it is advisable to perform galvanizing in centrifugal installations instead of the hanging solution (see the chapter "Technological process of thermal galvanizing by centrifugation").
- Traces generated by hanging are generally unavoidable (fig. 3).

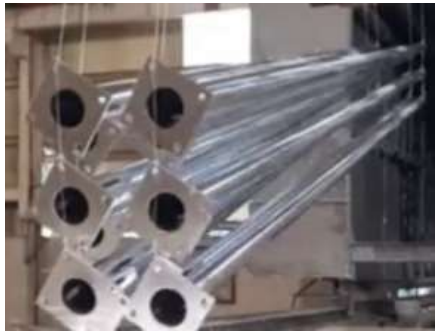


Fig. 3

General principles

2. Holes position

The positioning of the venting and drainage holes will take into account the shape of the structure, the angle and suspending inclination planes and the constructive volumes through which the zinc must flow. A good rule of thumb to follow is that when designing the structure, an inclination angle of 45° should be considered for immersion and extraction of the part in and out of the galvanizing bath.

- Holes should be positioned as close to corners/junctions as possible.
- The holes should be positioned close to the highest point and the lowest point of the void volumes, in order to eliminate the risk of traping the air, retention of the chemicals comming from the manufacturing flow, and zinc freezing.
- The holes must be oriented in the same plane as the plane of the structure.
- The holes are NOT positioned on the center of the end plates and junctions.
- The holes must be positioned diagonally opposite

3. Holes dimension

The size of the holes is determined by the volume of air under the risk to be trapped in the volumes of the structure and the surface areas where venting is required. Each m² of steel surface produces approximately 200 g of zinc ash, which must be able to pass through the holes. Dimensiunea minimă a găurii este Ø 10 mm

- The diameter of the hole must be at least the same size as the thickness of the steel
- A larger hole size will always benefit hot-dip galvanizing results.
- Regarding the gap sections, the dedicated dimension chart applies.
- Regarding containers, the dedicated dimension chart d applies.

General principles

4. Dimensions and weights

4.1. Centrifugal hot dip galvanizing

Small parts (weight between 0.1 and 3 kg, with a maximum length of 500 mm) are placed in a metal basket to be immersed in the molten zinc bath and then centrifuged.

The centrifugal galvanizing process follows the same steps as the classic process, adding only the centrifugation phase.

The controlled spinning speed of the loaded basket will release the excess of zinc, including for the threads and holes areas

Therefore, the requirements regarding the deposited thickness and mass are slightly different compared to the classic galvanizing.

Although not all galvanizers have centrifugal hot-dip galvanizing installations, it is recommended to apply this method to parts belonging to this category as weight and size.

General principles

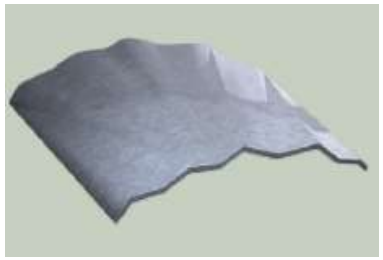
4. Dimensions and weights

4.2. Deformations (Dimensional Stability)

When immersing steels in the zinc bath (profiles, pipes, fabricated structures) the temperature increases towards that of molten zinc (450 °C).

The rate of temperature increase depends on several factors:

- The wall thickness of each part of the structure
- Total weight of the structure (part)
- Structure (part) dimension
- Immersion speed



At the hot-dip galvanizing temperature there are no structural changes in the steel structure. HDG process is carried out at a lower temperature than the one of regular thermal treatments (annealing) which means there are no thermal impact leading to structural changes of the steel. However, at the hot-dip galvanizing process temperature, the average strength of the steel could decrease, so it is recommended to used the data comprised by the SR EN 1993-1-9 Standard. If some of the components are not at the same temperature and if any form of tension occurs, the less resistant area will be subject to deformations generated by the more resistant area. There is therefore a responsibility for the designer, the welder and the galvanizer to cooperate so that the risk of deformation is minimal, or even avoided.

Basic rules to be applied in order to avoid deformations:

I. Maximizing the uniformity of heat transfer at the level of the steel structure when entering the bath and when extracting)

a. Ensuring adequate ventilation and drainage. This will allow the part to be immersed and extracted at high speed

b. Minimizing the variation of the sections thickness of the parts making up a structure

II. Minimizing the effect of stresses during the period in which the product is immersed in molten zinc

a) Use preferably symmetrical sections instead of angled or frame-type sections. I-sections are preferable to angled or frame-type construction.

b) b) Use assembly and welding techniques that minimize stresses in the components of the structure.

c) When cutting components, ensure that all sides are cut using the same method.

- Make bends at the largest possible radius to minimize local stresses.
- Accurately obtain the shapes of all components of a structure already in the manufacturing phase, so that during assembly thee installer does not have to apply force to position them properly.
- Use balanced welding techniques to reduce uneven thermal stresses.
- Recommendations: for thick materials, chamfering (grooving if the strength condition requires it), welded seams with similar thicknesses, welding on both sides is recommended.
- Cross welding (applied alternately on one side or both sides with welding seams of the same length and thickness) is accepted
- For cross welding of materials up to 4 mm thick, the centers of the weld beads must be less than 100 mm apart.

General principles

4. Dimensions and weights

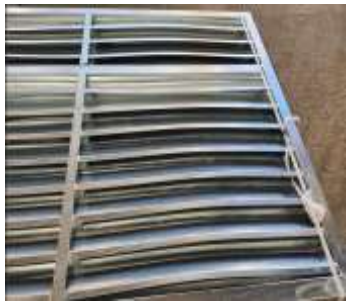
4.2. Warpage (Dimensional Stability)

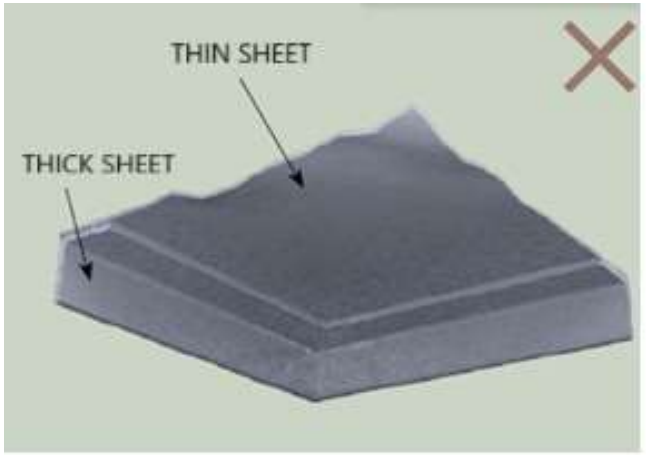
III. Avoid dimensions that require double dipping when designing. It is preferable to manufacture assemblies and subassemblies of modules that allow hot dip galvanizing in a single rapid dip, so that the entire part can expand and contract evenly.

IV. Ensure that the structural design is adequate so that the part does not deform under its own weight to a strength 50% lower than the performance of the steel, as described in the specifications.

V. Avoid using large areas of thin sheet metal (thickness less than 8 mm) without reinforcements.

VI. Use temporary reinforcements or stiffeners for structures with thin-walled sheets and for structures with asymmetrical shapes.





Risk of deformation for different types of parts:

Low deformation risk:
All rolled profiles, structures containing angles, channels and rolled profiles, round and rectangular pipes, stiffened plates, corrugated sheets, gratings, and plates with large thicknesses (over 16 mm).

Medium deformation risk:
Rolled profiles with small sections, pipes with long lengths and thin walls, structures containing asymmetric shapes and welds or steels with significantly different thicknesses, plates with medium thicknesses (8 mm to 16 mm), and parts galvanized by double immersion.

High deformation risk:
Steel and sheets (with a thickness of less than 8 mm, depending on shape, depending on the areas with ribs), soles, braced beams made of elements with thin walls, platforms, long parts with multiple welds (especially when they are located on a single side).

Types of Sections

Rectangular and round pipes

Basic rules for a proper venting and drainage

Holes dimension

- The holes must be sized in correlation with the cross-section size of the parts to be galvanized. The tables on the following pages (tables 1, 2 and 3) show the hole sizes as recommended for each pipe section.
- The vent holes must have a minimum diameter of 10 mm, or the same diameter as the thickness in mm of the part material. Table 4 defines the diameter requirements for holes depending on the length of the pipes and the volumes to be vented and drained.
- Large volume containers require holes for ventilation and drainage for every 0.5 m³ of enclosed volume, each of which has a minimum diameter of 50 mm (see table 4).
- The ventilation and drainage holes must each have a surface area of at least 25% of the diagonal cross-section area of the pipe (rectangular or round). If this is not possible, several holes shall be made whose combined area covers this requirement.
- The preferred design is to keep the pipe ends completely open (Fig. 4, option A and Fig. 5, option A). This preparation method will improve the quality and appearance of the hot-dip galvanizing.
- Where the pipe cannot be completely opened at its end, preparation requires the existence of at least 2 holes positioned diametrically opposite (fig. 4 variant B and fig. 5 variant B).
- Regardless of the size of the holes, positioned in the center of the pipe section, they are non-compliant (fig. 4 variant C and fig. 5 variant C)

Fig. 4 A

Fig. 4 B

Fig. 4 C

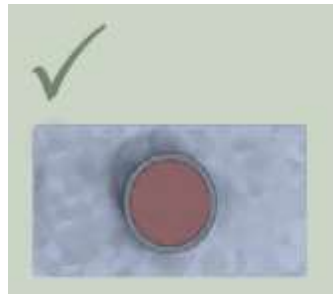


Fig. 5 A

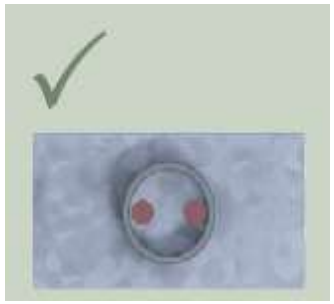
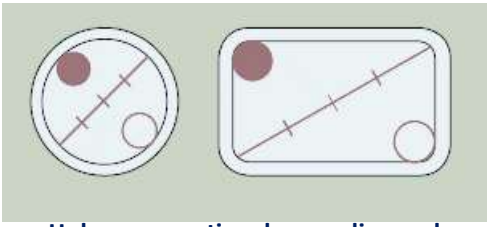


Fig. 5 B



Hole cross-sectional area - diagonal cross-sectional area of the pipe

Fig. 5 C

Types of Sections

Rectangular and round pipes

Basic rules for proper ventilation and drainage

Positioning of holes

- Ventilation and drainage holes must be positioned as close as possible to the highest and lowest points of the void, respectively, so that when hanging, the risk of blocking the circulation of air, preparation chemicals and zinc is prevented. Also, the positioning of the holes is oriented in the same plane as that of the structure.
- The holes must NOT be positioned on the center of the pipe. This will generate blockage of chemical solutions and will lead to the appearance of ungalvanized areas inside the plate or junction. Additionally, material bubbles may appear from that area which can generate uncovered areas including on the visible surface of the part. When extracted from the galvanizing bath, we will have zinc remaining trapped in the free and undrained volume.
- The junctions of two or more pipes require drilling for ventilation and drainage. The holes must be positioned as close as possible to the junction area. Internal drilling between the pipes is possible to ensure good ventilation and good flow of chemicals and zinc. However, for this process the galvanizer must be consulted and some mandatory practices must be followed (subchapter frames and structures made of pipes)

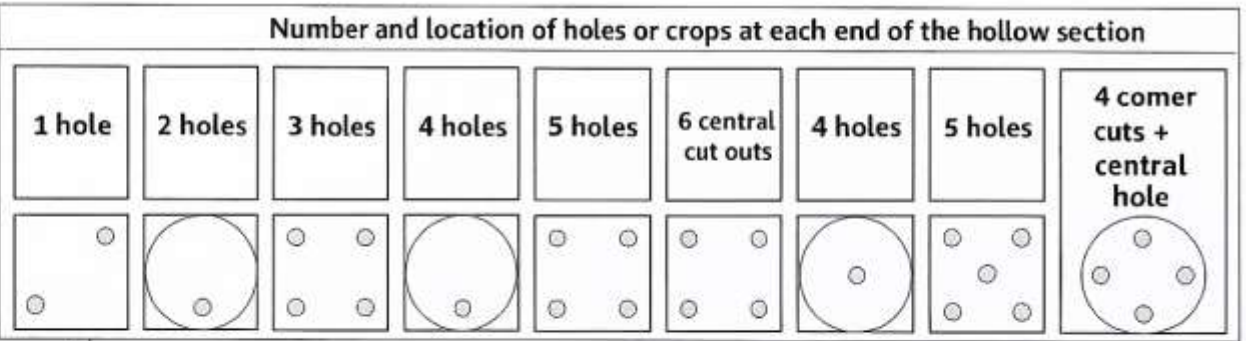
Types of Sections

Recommended size and position of ventilation and drainage holes for pipes

Note 1: Marked areas refer to holes or cutouts that are positioned oppositely on the ends of the pipes

Note 2: The cutout dimensions in the table refer to the lengths measured in the section at the corner of the pipe (does not represent the length of the diagonal)

Note 3: Situations for which data are inapplicable are marked with ,, - “



Cross sectional shape and dimension (mm)			Hole Ø mm) (mm)				Cutzut size (mm)	Central hole Ø mm)	Central Hole (mm)
Round	Square	Rectangle							
15	**25**	–	–	10	–	–	–	–	–
20	20	20 × 15	10	10	–	–	–	10	–
30	40	40 × 20	10	12	–	–	–	12	40
40	50	50 × 40	14	14	15	20	25	30	50
60	60	60 × 40	16	13	15	30	25	40	55
80	60	60 × 40	14	15	20	25	30	40	60
80	60	80 × 50	12	25	25	25	35	55	100
100	120	100 × 50	16	25	25	25	40	55	120
130	120	160 × 60	25	27	30	35	40	85	150
140	140	140 × 80	23	25	35	35	45	110	180
160	160	200 × 500	25	25	35	35	55	150	170
190	200	300 × 300	20	30	45	45	80	150	200
600	600	200 × 400	20	30	50	35	30	150	165

Note 4: For situations where cuts are made (flat or three-dimensional), the galvanizer's recommendation is that these be made on all corners.

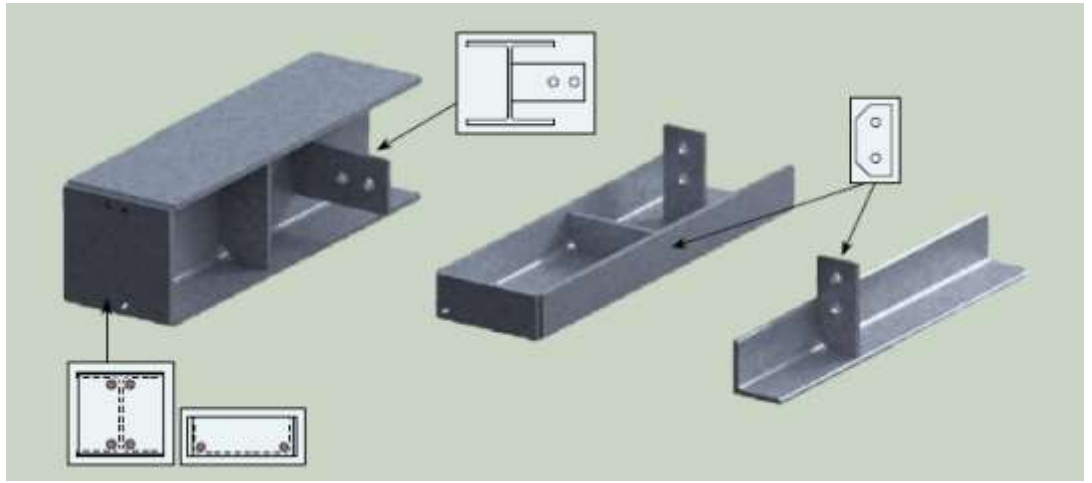
Note 5: For any situation that occurs, for which there is no explanation in this table, it is recommended to consult the galvanizer.

Types of Sections

Profile laminate la cald

- Tălpile, guseele și rigidizările restricționează drenajul. Trebuiesc realizate găuri sau decupaje de aerisire și drenaj. Ele trebuiesc poziționate la colțuri în zonele în care se realizează joncțiuni între componentele structurii (fig. 6)
- Sunt recomandate decupajele care vor reduce costurile operaționale la uzinare și vor asigura o mai buna drenare în timpul procesului de zincare (fig 6 și fig. 7)
- Pentru dimensiunile decupajelor urmariți indicațiile din fig. 7, fig. 8 și fig. 9

Fig. 6



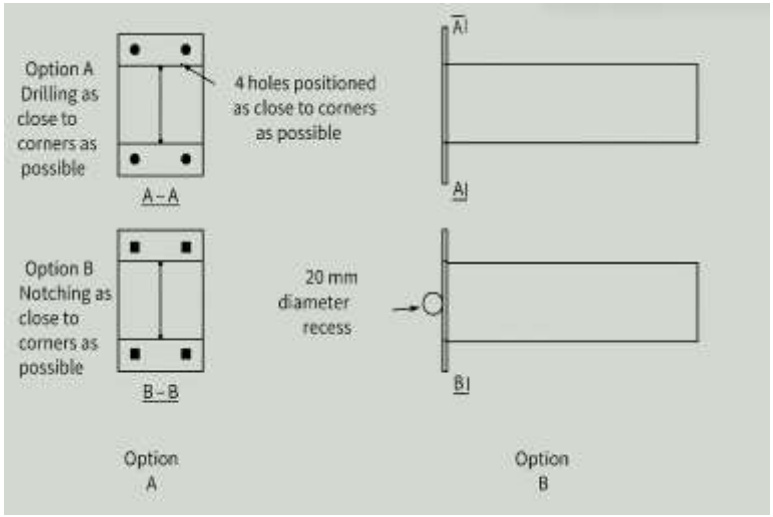


Fig. 7

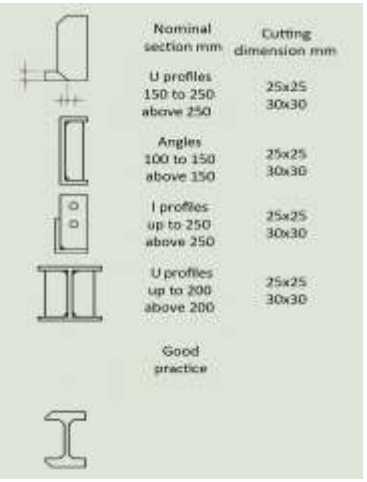
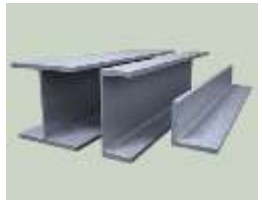


Fig. 8

Fig. 9

Types of Sections

Hot rolled profiles



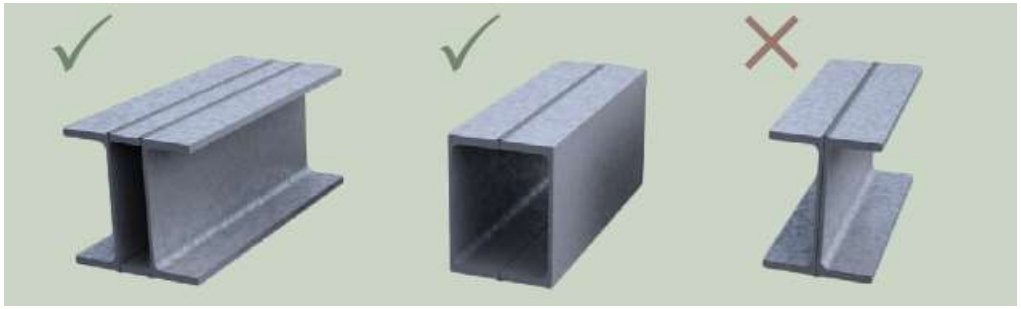


Fig. 10

- Positioning examples (see fig. 10 and pictures)

Frames and structures

- Design details are important when the subject is a structure that is to be hot-dip galvanized.
- Figures 11 through 21 present the basic design practices to ensure that products are properly prepared for safe, high-quality hot-dip galvanizing with the desired appearance.
- There are designs that provide an adequate solution, resolving ventilation and drainage without requiring drilling (fig. 12).

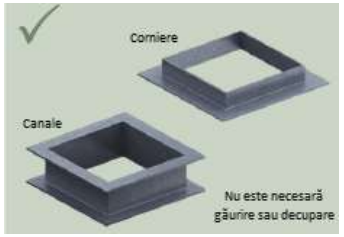


Fig. 11

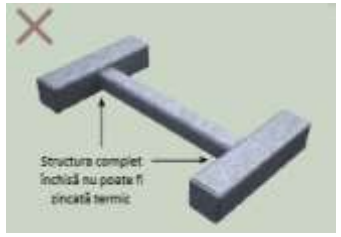


Fig. 12

Regarding tubular structures

External holes

- To ensure worker safety and the integrity of the parts, external holes are required. These also allow for quick evaluation by the galvanizing personnel.
- Each structural component must have two holes at each end, oriented according to the structure's layout.
- External holes should be positioned as close as possible to the junction areas.
- The external holes must cover 25% of the cross-sectional area of the pipe.

Fig. 13

External holes of Ø 10 mm are required in the pipe junction areas, as defined in the detailed construction drawings. These holes will allow for efficient checking and guarantee a safe process.

Regarding tubular structures

Internal holes

- Internal holes intended for ventilation must have a surface area of at least 50% of the junction area. It is recommended that they match the inner diameter of the pipe (see explanations in the figures).
- Ventilation holes must be shown in the detailed execution drawings, which must be approved by the galvanizer. Only after this step can the hot-dip galvanizing process proceed. This ventilation method is also recommended to be approved by the structural engineer.
- For inspection purposes during hot-dip galvanizing, the internal holes must be visible, or their existence must be provable by a simple and accessible method.

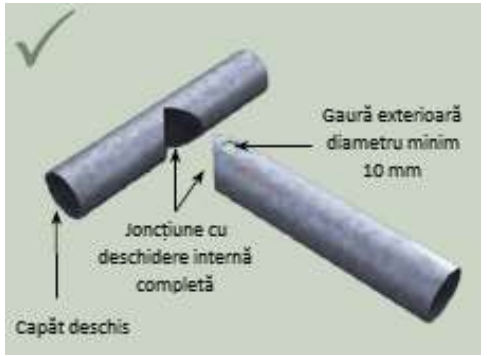


Fig. 14

Frames and structures

Fig. 15

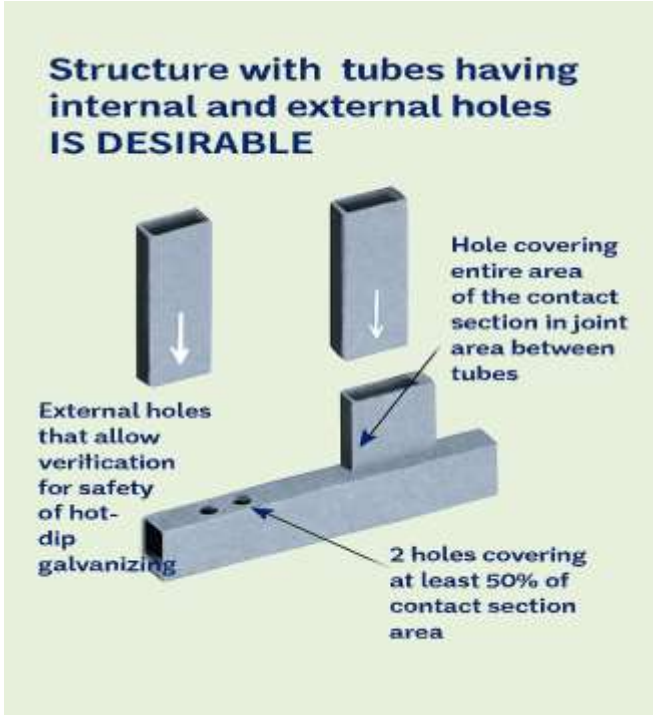


Fig. 16

Frames and structures

Other types of metal fabrication

- Regarding the design and construction of ventilation and drainage holes, the principles presented so far apply in all situations. The following are just a few examples of possible design solutions for some frequently encountered situations.

Fig. 17

Fig. 19

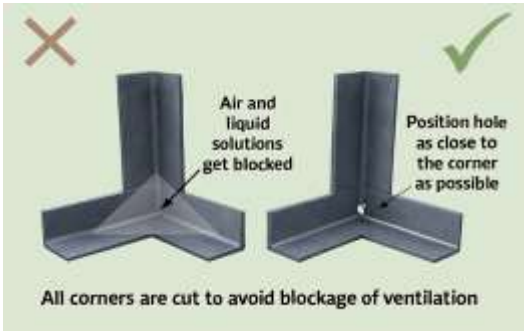


Fig. 21

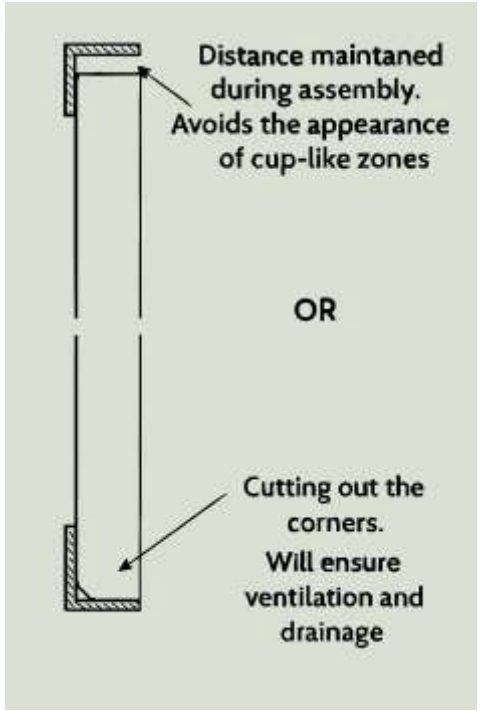
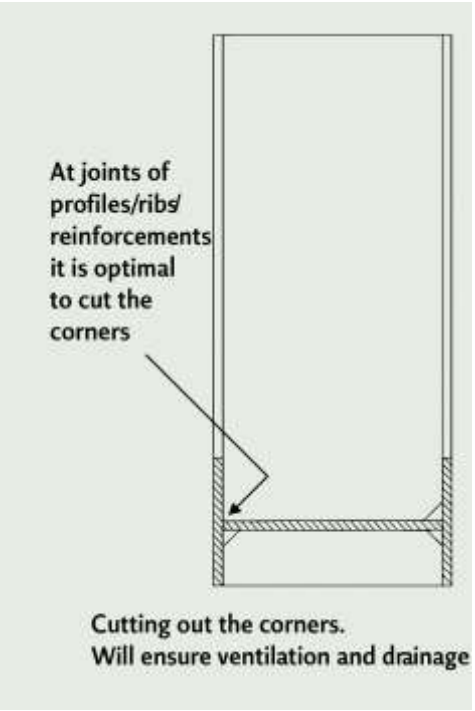


Fig. 22



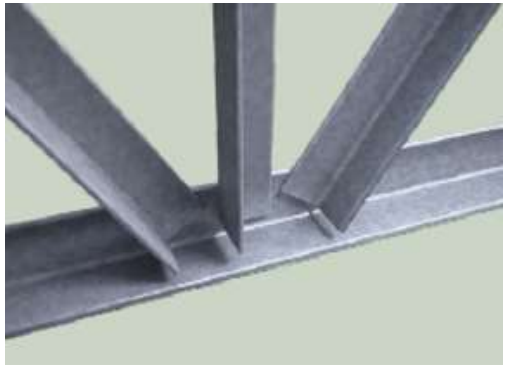


Fig. 18

Fig. 20

Railings

Other types of metal fabrication

There is a wide variety of handrails and balustrades.

They can be hot-dip galvanized assembled or in components (when the assembly is removable).

Handrails made of pipes require special attention to how ventilation and drainage are provided to achieve a high quality work. Figure 23 shows typical aspects regarding the positioning of the holes.

The design that will provide the best level of quality of the finished product is designed as follows:Module realizate într-un singur plan

- Modular design allows for on-site assembly
- Large ventilation and drainage holes for pipe railings
- Internal holes ensure good ventilation in all areas with pipe joints, including for aesthetic joining elements in these areas.

The best practice for preparing a railing for hot-dip galvanizing is shown in Figure 23. This approach to preparation gives the galvanizer degrees of freedom in terms of the bonding method.

For any other constructive solution for railings, a detailed discussion with the galvanizer is required.

In the case of railings that are built according to several plans, different ventilation and drainage speeds occur for the same piece and difficulties may arise in finding the best bonding position. Both aspects can qualitatively influence the result of hot-dip galvanizing.

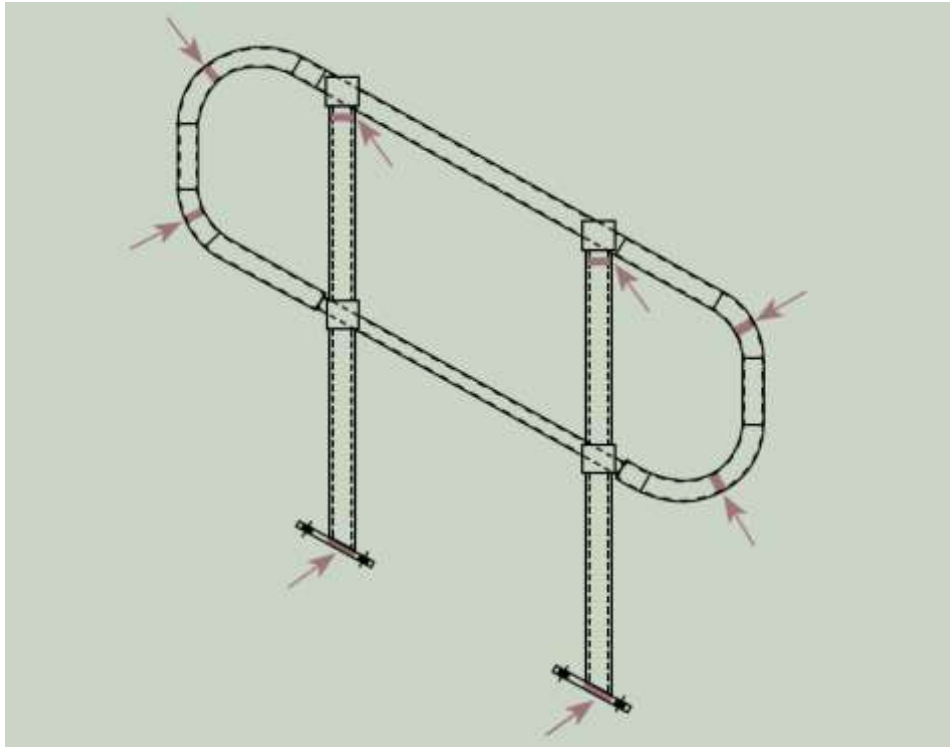


Fig. 23

Railings

Preparation examples

Fixing railing posts

Fig. 24

Recipients

- Hot dip galvanizing of containers may require a holding time during the process to reduce the risk of deformation.
- Containers must have a minimum of 2 holes, one for ventilation and one for drainage.
- The standard hole size for containers (vessels with closed volumes) is 50 mm in diameter for every 0.5 m^3 of volume (see table 4).
- Openings must terminate inside the container at wall level.
- If baffles are present inside the container, these must be provided with cut-outs. A minimum of 75 millimeters is required (see figures 6, 7, 8 and 9)

Tabel 4. Hole size depending on the recipient volume

Recommendations for hole Diameters Based on Container Volume				
Volum L	2 holes Ø mm	2 holes Ø mm	4 holes Ø mm	8 holes Ø mm
500	50	50	35	25
1000	70	70	65	35
1500	90	90	70	45
2000	100	125	90	55
2500	125	125	95	60
3000	135	125	100	75
4500	135	125	110	80
5000	145	145	120	95
5500	160	165	125	90
6000	175	175	125	95
6500	180	180	130	100
7000	190	195	135	105
7500	205	210	145	110
8000	200	215	160	115
9000	225	225	160	115

Fig. 25

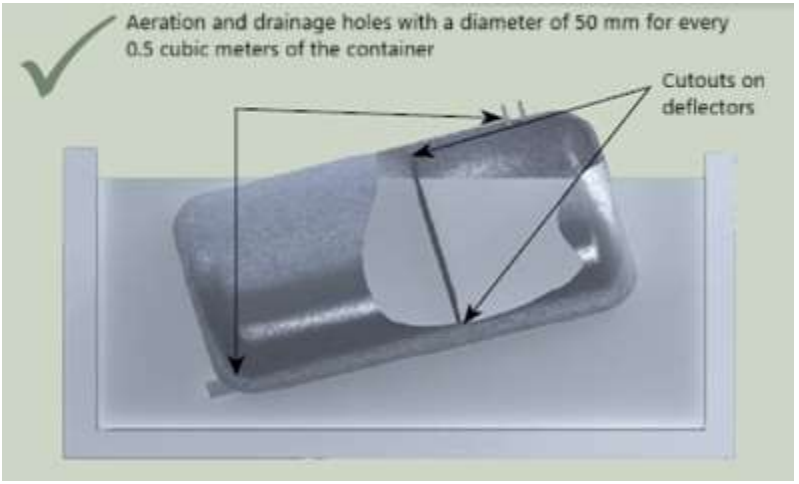
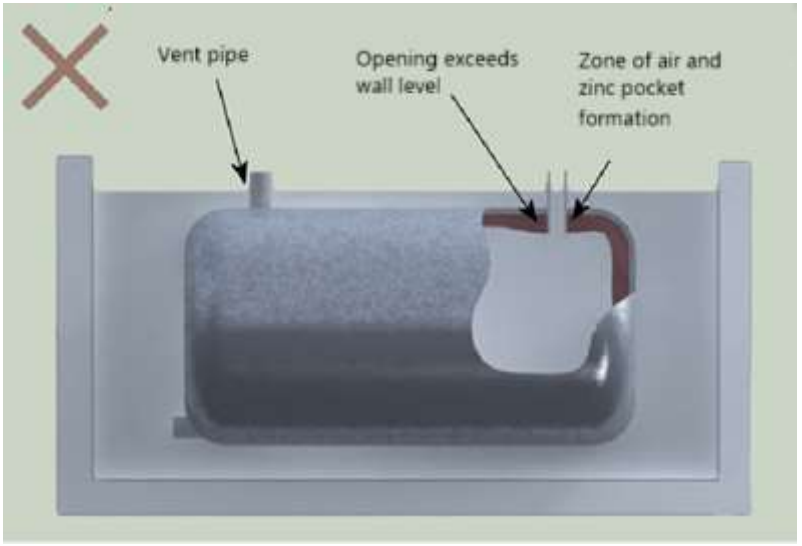


Fig. 26



Overlapping surfaces

- Overlapping surfaces that are completely enclosed by a welded seam require ventilation and drainage holes in one of the overlapping parts. Enclosed surfaces may contain condensation from welding and may have small cracks through which chemicals used for preparation can penetrate. These reasons make hot-dip galvanizing unsafe during the period when the parts reach 450°C.
- Overlaps can pose a safety risk to the galvanizing process if not properly designed. Good communication with the galvanizer is required to obtain the best technical solution.
- Avoiding the existence of spaces between the 2 metal surfaces will reduce the risk of having chemicals trapped in these narrow areas, the risk of explosion and the risk of the appearance of areas not covered with zinc and therefore the risk of corrosion.

General rules that apply to parts made by overlapping:

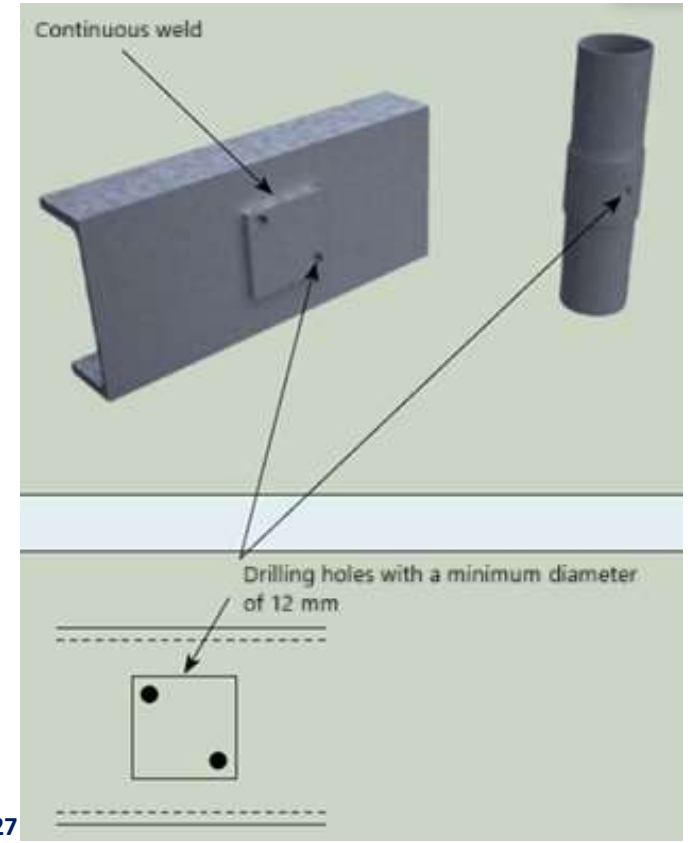
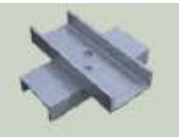


Fig. 27

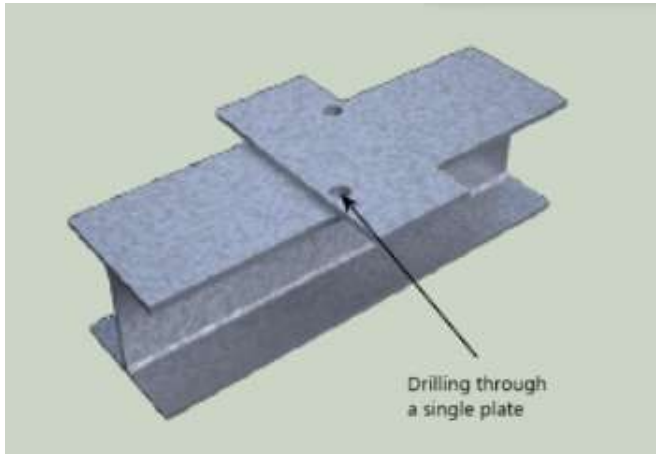
Overlap Area	Recommended Actions
Up to 100 cm²	Continuous veld bead along the contour. Material used must be lightweight during the welding operation, and the overlapping areas must be smooth and assembled without any gap between them
100 cm² to 1000 cm²	Diagonally positioned holes: • 2 x 12 mm drilled at corners • or • 4 x 25 mm intermittent welds at the corners
≥ 2500 cm²	Diagonally positioned holes: • 4 x 12 mm drilled at corners and circumferentially spaced no more than 300 mm starting from the corners • 8 x 25 mm intermittent welds at the corners and circumferentially spaced

Overlapping surfaces



- When Overlapping Cannot Be Avoided
- Ensure a fully sealed weld and create two ventilation holes
- Avoid any openings or cracks in the welded area—these defects are highly dangerous during hot-dip galvanizing
- Hole dimensions must be larger than the steel wall thickness, with a minimum diameter of Ø10 mm
- Avoid gaps between the two materials, or ensure a minimum spacing of 2.5 mm between them. In this case, additional holes are not required
- The same rule applies to this technical situation: holes should be placed opposite each other, at the corners
- Drilling through both materials is the recommended approach

Fig. 28



Overlapping surfaces

Intermittent Welds

The minimum space between two overlapping components is 2.5 mm.

Ensure that:

- The overlapping area is ventilated
- Pretreatment chemical solutions are properly drained
- All surfaces are adequately coated

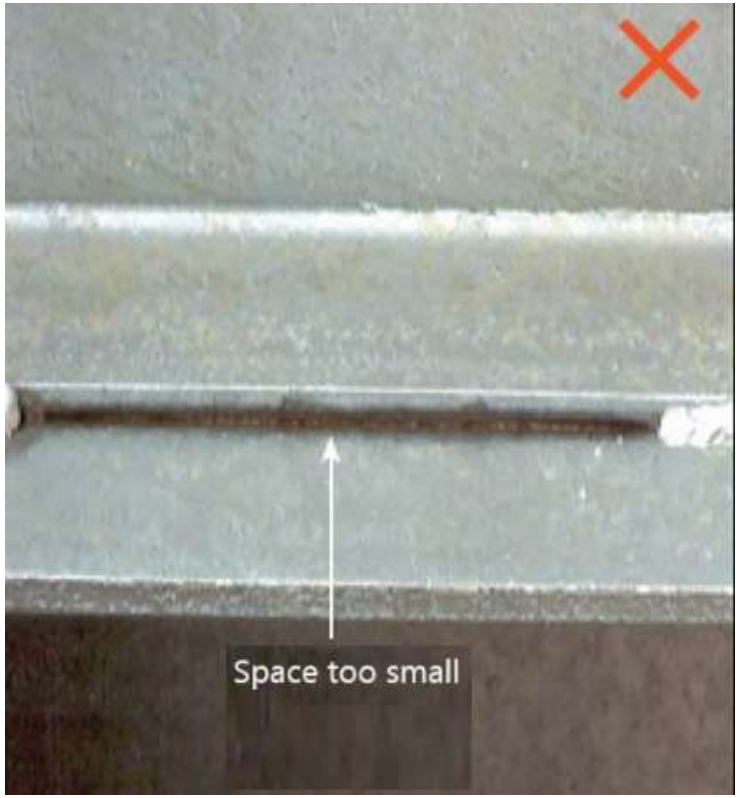


Fig. 29

Fastenings

- For Hot-Dip Galvanizing of Fasteners (such as bolts, nuts, washers, etc.) Consultation with the galvanizer is required.
- Berg Banat is equipped with a fully automated centrifugal galvanizing system, advanced preparation technology for high-strength fasteners, and the expertise necessary to properly prepare parts for galvanizing.

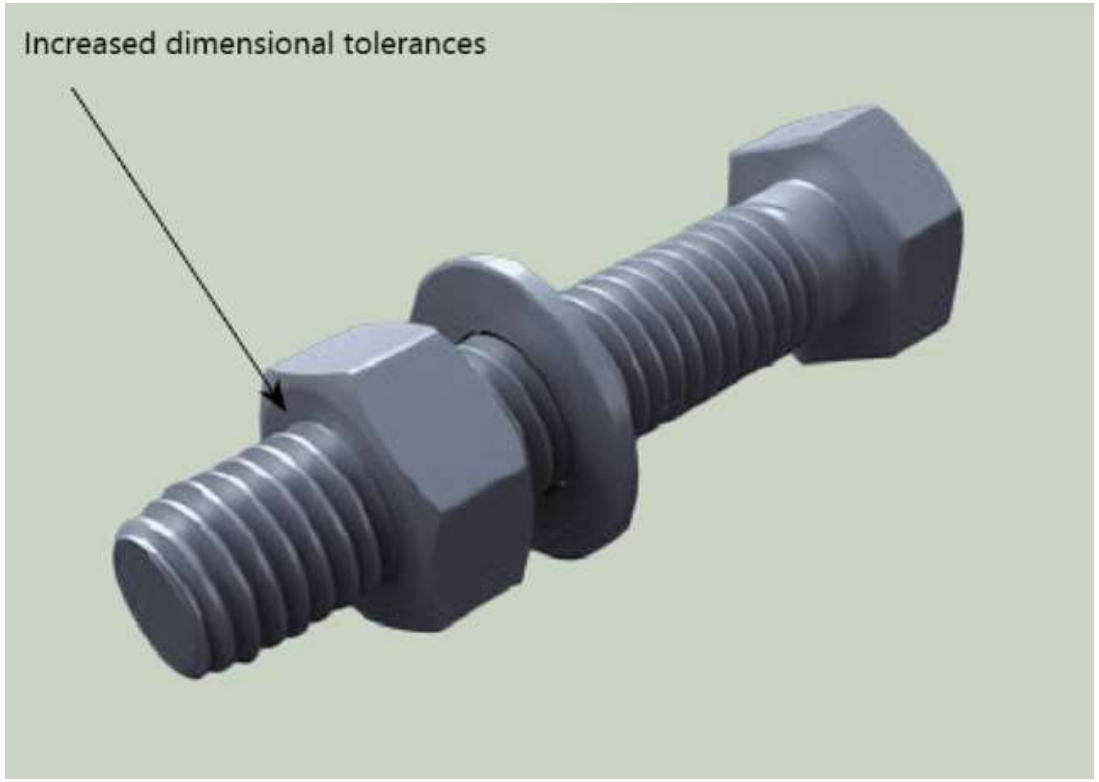


Fig. 30

Annexess

Additional Aspects Recommended for Discussion with the Galvanizer

- Types of materials suitable for hot-dip galvanizing (steel, special steel, cast iron, etc.)
- Considerations regarding welding sprays
- Considerations regarding marking for traceability of parts to be hot-dip galvanized
- Edges

Annexes

Types of materials suitable for hot-dip galvanizing

An essential aspect in analyzing steels suitable for hot-dip galvanizing is their reactivity.
In hot-dip galvanizing, the thickness of the zinc coating is primarily influenced by the concentration of two elements:

- Silicon (Si) – the element with the greatest impact on reactivity (see the steel classification table for hot-dip galvanizing). Its concentration should be:
  - > 0.01% and < 0.03%, or *
  - > 0.12% and < 0.25%
- Phosphorus (P) – its concentration should be < 0.035% (see the steel classification table for hot-dip galvanizing)

* Refer to the information on page 29 for further details.

CLASSES	Elements, %		
	Si	Si + 2,5 P	P
CLASS 1	≤ 0,030	≤ 0,090	-
CLASS 3	0,14 < Si ≤ 0,25	-	≤ 0,035

Annexes

Types of materials suitable for hot-dip galvanizing

- * Low silicon content results in zinc coating thicknesses that fall below the standard requirements (This situation is addressed in Standard SR EN ISO 1461:2022.)
- For steel parts with section thicknesses greater than 3 mm, made from steels containing ≤ 0.01% silicon and > 0.035% aluminum, which exhibit ultra-low reactivity during galvanizing and therefore cannot meet the minimum coating thickness specified in the standard, the requirements of the next lowest section thickness category indicated in the table must be applied.
- In such cases, if a declaration of conformity is required, it must refer to this variation and include the adjusted minimum average coating thickness requirement that was applied to the inspection lot.

Annexes

Types of materials suitable for hot-dip galvanizing

For metal assemblies that contain both steel and cast iron components, the reactivity of the cast iron often influences the surface of the adjacent steel.

Annexes

Aspects related to anti-spatter sprays used in the welding area (type and quantity)

For welded metal structures, increased attention is recommended regarding the use of welding sprays—their type and quantity. A prior discussion with the galvanizer is required.

Înainte de zincare

După zincare

The affected area caused by the type and quantity of anti-spatter spray used in the welding zone is clearly visible.

Annexes

Aspects related to the marking for traceability of parts to be hot-dip galvanized.

Metal tags that withstand the entire hot-dip galvanizing process will be used.

Annexes

Aspects related to edges

- After cutting, a visual inspection is required, and sharp (live) edges must be chamfered to eliminate:
- Safety risk (especially around connection holes)
- Quality risk (in all areas with cuts and drillings), due to reduced zinc adhesion. The result is that zinc may mechanically peel off (detach) from these areas when impacted.

Thanks

Acest material este conceput pe baza datelor preluate din standardele de zincare termică (SR EN ISO 1461:2022, SR EN ISO 14713-2:2019) și conexe, a datelor preluate de la EGGA (European General Galvanizers Association | EGGA : European General Galvanizers Association (galvanizingeurope.org)), din ghidului ANAZ dedicat inginerilor și proiectanților (Asociația Națională a Zincatorilor – ANAZ) și structurat pe baza informațiilor preluate de la GAA (Galvanizers Association of Australia | Hot Dip Galvanizing in Australia (gaa.com.au))

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