

HOT-DIP GALVANIZING

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Characteristics of the classes of steels according to UNI EN ISO 14713-2:2010 standard.

COATING CHARACTERISTICS	UNI EN ISO 14713 STANDARD
Steels of this class or category tend to obtain regular coatings with bright surfaces. The coating structure includes the outer zinc layer	Category A $Si \leq 0.04\%$ $P < 0.02\%$ For cold rolled steels these characteristics are seen when the composition of the steel satisfies the formula: $Si + 2.5 P \leq 0.04\%$
Steels of this category or class determine regular coatings but with bigger thicknesses. The appearance is still bright.	Category B $0.14 < Si \leq 0.25\%$ $P < 0.035\%$
Steels of this category or class (chemical compositions are within the Sandelin range) can form excessively thick coatings (lower resistance to damage caused during handling due to low adhesion to substrate). The coating has a darker appearance and a rougher texture.	Category C $0.04 < Si \leq 0.14\%$
Steels of this category or class (chemical compositions are within the Hyper-Sandelin range) can form excessively thick coatings (lower resistance to damage caused during handling due to low adhesion to substrate). The coating varies from light grey to dark grey with texture with or without appearance of cells.	Category D $Si > 0.25\%$

THE REFERENCE STANDARD FOR HOT DIP GALVANIZING

The standard to which our company makes reference is UNI EN ISO 1461 “Hot dip galvanized coatings on fabricated iron and steel articles” .

The standard provides all information concerning the galvanized material specifications.

COATING PROPERTIES

APPEARANCE :

The formation of lighter or darker grey areas (e.g. the cell design of dark grey areas) or a lack of surface uniformity must not lead to rejects.

Stains caused by storage in damp environments (white or dark products due to corrosion, mainly zinc oxides formed during storage in damp places after galvanizing) must not lead to rejects, as long as the thickness of the coating is greater than the minimum specified thickness.

No zinc clots and ashes must be allowed when these could affect the use for which the hot dip galvanized article is intended or its resistance to corrosion. When special requirements exist (e.g. when the zinc coating has to be painted), a sample must be produced on request.

THICKNESS:

Coatings applied by hot dip galvanizing are intended to protect iron and steel products from corrosion.

The duration of the period of protection against corrosion by the coating (both grey and light colour) is proportionate to the thickness of the coating.

In case of extremely aggressive conditions, coatings can be requested with greater thicknesses than those specified. More consistent coating specifications must be subject to an agreement between the galvanizer and the customer.

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Minimum coating thicknesses on non-centrifuged samples

ARTICLE AND THICKNESS OF MATERIAL	LOCAL COATING THICKNESS (minimum) μ m	AVERAGE COATING THICKNESS (minimum) μ m
Steel > 6 mm	70	85
3 mm < Steel \leq 6 mm	55	70
1.5 mm \leq Steel \leq 3 mm	45	55
Steel < 1.5 mm 35	35	45
Iron castings \geq 6 mm	70	80
Iron castings < 6 mm	60	70

Corrosion resistance of hot dip galvanized steel.

Code	Corrosivity class	Aggressivity environment	Average consumption of zinc (μ m/year)
C1	Inside: dry	Very low	< 0,1
C2	Inside: occasional condensation Outside: rural area exposed internal land	Low	da 0,1 a 0,7
C3	Inside: high humidity, light pollution Outside: Internal land area or urban area, coastal temperate	Medium	da 0,7 a 2
C4	Inside : swimming pools, chemical plants, etc. Outside: Industrial area or internal land , coastal urban area	High	Da 2 a 4
C5	Outside: Industrial area with high humidity or coastal area high salinity	Very high	Da 4 a 8
Im2	Sea water in temperate regions* Very high	Very high	Da 10 a 20

* it means immersion in sea water in the temperate regions of Europe. These conditions for zinc, are less aggressive than in tropical marine waters where the corrosion rate is higher.

To predict the corrosion rate of the zinc layer we must refer to the UNI-EN-ISO 14713 which provides information on the average annual loss of coating thickness, after identifying the category of corrosivity, or aggressiveness of the environment. The following table shows the values of average annual loss of thickness of the zinc as a function of six different environments of exposure.