



Relevant steelmaking regulation
EUROPEAN STANDARD: UNI EN 1152 : 2009

Areas of use

- Telecommunications
- Cars
- Home appliances
- Shelving
- Air conditioners
- Computers
- Construction

Zinc-coated steels by electrolytic or electro-galvanized route

These products consist of a steel substrate onto which a coating of pure zinc is applied by electrolysis, on one or both surfaces, from an aqueous solution of zinc salts. The presence of the zinc coating is intended to protect steel from corrosion, and compared to the hot dip process, electroplating allows for lower zinc thicknesses, therefore more suitable for interior applications or painting.

The thickness of the coating is extremely regular, and the surface, being uniform and manicured, makes an excellent substrate for paint.

Technical supply conditions

Unlike the hot-dipping process, electroplating also allows only one of the two faces to be coated; therefore, ZE 25/0, ZE 50/0, ZE75/0, and ZE100/0 combinations are also possible, for which it is necessary to specify whether you want the electro-galvanized face to be the top or the bottom.

Electro-galvanized products can be supplied with special requirements for appearance and surface protection.

Appearance and surface protection

The surface appearance can be either type A or B; unless otherwise requested at the time of order, the material is supplied with appearance A.

- **Surface Appearance A:** minor imperfections such as small honeycombs, light scratching or slight staining are possible, which will not affect the suitability for forming and adherence of subsequently applied coatings.

- **Surface appearance B:** the better of the two surfaces must be free from imperfections that would impair a quality paint job; the other face conforms to surface appearance A.

Surface protection can be of different types and must be appropriately indicated when placing the order

Whatever the type of protection, it is very important that during transportation and storage, electro-galvanized materials avoid contact with moisture or water as much as possible and are kept in a dry environment.

These steels are available in different ranges of properties, from commercial to deep drawing and high-strength grades.

SURFACE PROTECTION

P	Phosphating
PC	Phosphating and chemical passivation
C	Chemical passivation
PCO	Phosphating, chemical passivation and oiling
CO	Oiling and chemical passivation
PO	Phosphating and oiling
O	Oiling
S	Organic passivation
U	Without any protection

CHEMICAL COMPOSITION



Name			Chemical composition max %				
Steel grade		Coating type symbol					
Quality	Type of coating:		C	P	S	Mn	Ti
DC01	1.0330	+ZE	0.12	0.045	0.045	0.60	-
DC03	1.0347	+ZE	0.10	0.035	0.035	0.45	-
DC04	1.0338	+ZE	0.08	0.030	0.030	0.40	-
DC05	1.0312	+ZE	0.06	0.025	0.025	0.35	-
DC06	1.0873	+ZE	0.02	0.020	0.020	0.25	0.3
DC07	1.0898	+ZE	0.01	0.020	0.020	0.20	0.2

MECHANICAL FEATURES OF FLAT STEEL PRODUCTS WITH ELECTRONIC ZINC



Name			R _e MPa	R _m MPa	A ₈₀ % min	r ₉₀ min	n ₉₀ min
Steel grade		Coating type symbol					
Quality	Steel number						
DC01	1.0330	+ZE	-/280	270 to 410	28	-	-
DC03	1.0347	+ZE	-/240	270 to 370	34	1.3	-
DC04	1.0338	+ZE	-/220	270 to 350	37	1.6	0.170
DC05	1.0312	+ZE	-/200	270 to 330	39	1.9	0.190
DC06	1.0873	+ZE	-/180	270 to 350	41	2.1	0.210
DC07	1.0898	+ZE	-/160	250 to 310	43	2.5	0.220

e = laminate thickness in mm

Tensile tests performed on transverse specimens

ELECTROLYTIC ZINC COATINGS

Name coating	Nominal galvanizing values on each face		Minimum galvanizing values on each face	
	Thickness μm	Weight g/m^2	Thickness μm	Weight g/m^2
ZE 25/25	2.5	18	1.7	12
ZE 50/50	5.0	36	4.1	29
ZE 75/75	7.5	54	6.6	47
ZE 100/100	10.0	72	9.1	65

* A 50 g/m² coating corresponds to an approximate thickness of 7.1 μm

Tolerances by size and shape

The standard applies to cold-rolled flat products, uncoated and coated with zinc or zinc-nickel by electrolytic means, of low-carbon, high-strength steel, by cold drawing and bending, with a minimum thickness of 0.35 mm and, unless otherwise specified in the order, less than or equal to 3 mm, supplied in the form of sheets, wide strips, sheared wide strips, or strips obtained from sheared wide strips or sheets.

Thickness tolerance for steels with minimum yield strength **Re < 260 MPa**

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They come in the form of thin metal sheets, wide strips, sheared wide strips, or cut-to-length strips (bands) made from sheared wide strips or thin sheets. **The standards involved are UNI EN 10292, UNI EN 10326, UNI EN 10327, and hot dip-coated products are according to prEN 10336.**

Nominal thickness	Normal tolerance ^a for nominal width w			Special tolerance ^a for nominal width w		
	≤ 1200	> 1200 to ≤ 1500	> 1500	≤ 1200	> 1200 to ≤ 1500	> 1500
= 0.35 to 0.40	± 0.03	± 0.04	± 0.05	± 0.020	± 0.025	± 0.030
> 0.40 to 0.60	± 0.03	± 0.04	± 0.05	± 0.025	± 0.030	± 0.035
> 0.60 to 0.80	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.80 to 1.00	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 1.00 to 1.20	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 1.20 to 1.60	± 0.08	± 0.09	± 0.10	± 0.050	± 0.060	± 0.070
> 1.60 to 2.00	± 0.10	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
> 2.00 to 2.50	± 0.12	± 0.13	± 0.14	± 0.080	± 0.090	± 0.100
> 2.50 to 3.00	± 0.15	± 0.15	± 0.16	± 0.100	± 0.110	± 0.120

Thickness tolerance for steels with minimum yield strength **Re < 260 MPa ≤ Re < 340 MPa**

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Nominal thickness	Normal tolerance ^a for nominal width w			Special tolerance ^a for nominal width w		
	≤ 1200	> 1200 to ≤ 1500	> 1500	≤ 1200	> 1200 to ≤ 1500	> 1500
= 0.35 to 0.40	± 0.04	± 0.05	± 0.06	± 0.025	± 0.030	± 0.035
> 0.40 to 0.60	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.60 to 0.80	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 0.80 to 1.00	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 1.00 to 1.20	± 0.07	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
> 1.20 to 1.60	± 0.09	± 0.11	± 0.12	± 0.060	± 0.070	± 0.080
> 1.60 to 2.00	± 0.12	± 0.13	± 0.14	± 0.070	± 0.080	± 0.100
> 2.00 to 2.50	± 0.14	± 0.15	± 0.16	± 0.100	± 0.110	± 0.120
> 2.50 to 3.00	± 0.17	± 0.18	± 0.18	± 0.120	± 0.130	± 0.140

Tolerances by size and shape

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Thickness tolerance for steels with minimum yield strength $Re < 340 \text{ MPa} \leq Re < 420 \text{ MPa}$

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Thickness tolerance for steels with minimum yield strength $Re < 420 \text{ MPa} < Re$

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Nominal thickness	Normal tolerance [°] for nominal width w			Special tolerance [°] for nominal width w		
	≤ 1200	> 1200 to ≤ 1500	> 1500	≤ 1200	> 1200 to ≤ 1500	> 1500
≤ 0.35 to 0.40	± 0.04	± 0.05	± 0.06	± 0.030	± 0.035	± 0.040
> 0.40 to 0.60	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 0.60 to 0.80	± 0.06	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 0.80 to 1.00	± 0.07	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
> 1.00 to 1.20	± 0.09	± 0.10	± 0.11	± 0.060	± 0.070	± 0.080
> 1.20 to 1.60	± 0.11	± 0.12	± 0.14	± 0.070	± 0.080	± 0.100
> 1.60 to 2.00	± 0.14	± 0.15	± 0.17	± 0.080	± 0.100	± 0.110
> 2.00 to 2.50	± 0.16	± 0.18	± 0.19	± 0.110	± 0.120	± 0.130
> 2.50 to 3.00	± 0.20	± 0.20	± 0.21	± 0.130	± 0.140	± 0.150

Nominal thickness	Normal tolerance [°] for nominal width w			Special tolerance [°] for nominal width w		
	≤ 1200	> 1200 to ≤ 1500	> 1500	≤ 1200	> 1200 to ≤ 1500	> 1500
≤ 0.35 to 0.40	± 0.05	± 0.06	± 0.07	± 0.035	± 0.040	± 0.050
> 0.40 to 0.60	± 0.05	± 0.07	± 0.08	± 0.040	± 0.050	± 0.060
> 0.60 to 0.80	± 0.06	± 0.08	± 0.10	± 0.050	± 0.060	± 0.070
> 0.80 to 1.00	± 0.08	± 0.10	± 0.11	± 0.060	± 0.070	± 0.080
> 1.00 to 1.20	± 0.10	± 0.11	± 0.13	± 0.070	± 0.080	± 0.100
> 1.20 to 1.60	± 0.13	± 0.14	± 0.16	± 0.080	± 0.100	± 0.110
> 1.60 to 2.00	± 0.16	± 0.17	± 0.19	± 0.100	± 0.110	± 0.130
> 2.00 to 2.50	± 0.19	± 0.20	± 0.22	± 0.130	± 0.140	± 0.160
> 2.50 to 3.00	± 0.22	± 0.23	± 0.24	± 0.160	± 0.170	± 0.180

Tolerances by size and shape

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Tolerance on the width of sheets and wide strips

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Tolerance on sheets and strips width less than 600 mm

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Length tolerances

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Nominal width w	Normal tolerance		Special tolerance	
	UNDER	OVER	UNDER	OVER
w ≤ 1200	0	+4	0	+2
1200 < w ≤ 1500	0	+5	0	+2
w > 1500	0	+6	0	+3

Tolerance class	Nominal thickness t	Nominal width							
		w < 125		125 ≤ w < 250		250 ≤ w < 400		400 ≤ w < 600	
		under	over	under	over	under	over	under	over
Normal	t < 0.6	0	+0.4	0	+0.5	0	+0.7	0	+1.0
	0.6 ≤ t < 1.0	0	+0.5	0	+0.6	0	+0.9	0	+1.2
	1 ≤ t < 2	0	+0.6	0	+0.8	0	+1.1	0	+1.4
	2 ≤ t ≤ 3	0	+0.7	0	+1.0	0	+1.3	0	+1.6
Special (s)	t < 0.6	0	+0.2	0	+0.2	0	+0.3	0	+0.5
	0.6 ≤ t < 1.0	0	+0.2	0	+0.3	0	+0.4	0	+0.6
	1 ≤ t < 2	0	+0.3	0	+0.4	0	+0.5	0	+0.7
	2 ≤ t ≤ 3	0	+0.4	0	+0.5	0	+0.6	0	+0.8

Nominal length	Normal tolerance		Special tolerance	
	under	over	under	over
< 2000	0	6	0	3
≥ 2000	0	0.3% of the length	0	0.15% of the length

Tolerances by size and shape



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Thickness tolerance for steels with minimum yield strength $R_e < 260 \text{ MPa}$

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Class tolerance	Nominal width w	Nominal thickness		
		t < 0.7	0.7 ≤ t < 1.2	t ≥ 1.2
Normal	w < 600	7	6	5
	600 ≤ w < 1200	10	8	7
	1200 ≤ w < 1500	12	10	8
	w ≥ 1500	17	15	13
Special	w < 600	4	3	2
	600 ≤ w < 1200	5	4	3
	1200 ≤ w < 1500	6	5	4
	w ≥ 1500	8	7	6
	w < 1500	Height of edge wave of length over 200 mm must be less than 1% of its length		
	w ≥ 1500	Height of edge wave of length over 200 mm must be less than 1,5% of its length For edge waves of length less than 200 mm the maximum height must not exceed 2mm		

Flatness tolerance for sheets with minimum yield strength $260 \leq R_e < 340 \text{ MPa}$

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Class tolerance	Nominal width w	Nominal thickness		
		t < 0.7	0.7 ≤ t < 1.2	t ≥ 1.2
Normal	600 ≤ w < 1200	13	10	8
	1200 ≤ w < 1500	15	13	11
	w ≥ 1500	20	19	17
Special	600 ≤ w < 1200	8	6	5
	1200 ≤ w < 1500	9	8	6
	w ≥ 1500	12	10	9

Steels with **minimum** yield strength of $R_{e2} \geq 340 \text{ MPa}$

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For these steel grades, the flatness tolerance values should be specified in the order.

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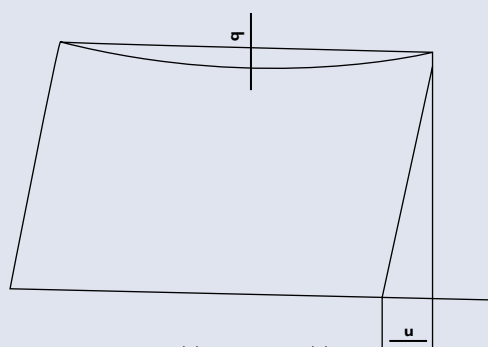
Out-of-square tolerance

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Lapping tolerance

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Figure 1



Out-of-square (u) and lapping (q)

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The out-of-square (u) is the orthogonal projection of the transverse side along the longitudinal side (see Figure 1).

Out-of-square must not exceed 1% of the sheet width.

The lapping (q) is the maximum distance between the longitudinal edge and a reference straight side (see Figure 1).

The lapping should be measured on the concave side. The base of the measurement should be 2 meters, taken on any point on the concave edge.

If the metal sheet has a length of less than 2 meters, the base of the measurement should be equal to its length.

Lapping should not exceed 5 mm over a length of 2 meters. For lengths of less than two meters, the lapping should not exceed 0.25 percent of the length itself.

For strips less than 600 mm wide, a special lapping tolerance (CS) of maximum 2 mm on a length of 2 meters can be specified.

This special tolerance is not applicable to strips with a high yield strength.