Tolerances on dimensions and shape

Thickness

The thickness tolerances from EN 10143 : 2006 for the four ranges of yield strength – and for specific grades in the case of table 5 – are shown in tables 4-7 on pages 40 and 41.

Thickness refers to the total thickness (including the coating), measured at least 40mm from either edge.

For the zinc coatings Z450 and Z600, the tolerances on thickness shown in the tables should be increased by 0.01mm.

The thickness tolerances in the region of coil welds may be increased by a maximum of 50% over a length of 10 metres.

Coil width

The coil width tolerances in table 8 on page 42 are from EN 10143 : 2006.

Flatness

Flatness complies with EN 10143 : 2006. Table 9 on page 42 shows the flatness tolerances for steel grades with R_{eL}<260N/mm². Table 10 on page 42 shows the flatness tolerances for steel grades with $R_{p0.2}$≥260N/mm² and <360N/mm² and for grades DX51D and S550GD.

Edge camber

The deviation over a length of 2 metres will not exceed 5mm as specified in EN 10143 : 2006.

Health and safety

Tata Steel publishes the health and safety information for its Galvatite hot-dip galvanised steels in *Product health and safety data sheet 18*, which is available at *www.tatasteeleurope.com/en.*

Table 1: Coating type, finish and designation

Coating type	Coating finish	Description	Coating designation[Note]								
			Z100	Z120	Z140	Z200	Z225	Z275	Z350	Z450	Z600
Zinc (Z)	MA	Minimised spangle, as coated surface	•	•	•	•	•	•	•	•	•
	MB	Minimised spangle, improved surface	•	•	•	•	•	•	•	–	–
	MC	Minimised spangle, best quality surface	•	•	•	•	•	•	•	–	–

Notes:

1. The number contained in the coating designation indicates the coating mass in g/m2, which includes both surfaces. Consult Tata Steel about the availability of coating masses other than those shown here, including coating masses between those shown.
2. • = Available
   – = Consult Tata Steel

Table 2: Thickness and width limits

Condition	Thickness		Width	
	Min	Max	Min	Max
Mill edge	0.40	2.5	700	1820
Side trimmed	0.40	2.5	700	1810

Note: Dimensions are in millimetres.

Table 3: Diameter of Galvatite coil

Inside diameter	610mm standard, 508mm on request
Outside diameter	Max 10/7 x width (limit 2135mm)

Table 4: Thickness tolerances: EN 10143 : 2006 : $R_{p0.2}$ or R_{eL}<260N/mm²

Nominal thickness		Normal tolerances for a nominal width of			Special tolerances (S) for a nominal width of		
		≤1200	>1200 ≤1500	>1500	≤1200	>1200 ≤1500	>1500
>	≤	±	±	±	±	±	±
0.20	0.40	0.04	0.05	0.06	0.030	0.035	0.040
0.40	0.60	0.04	0.05	0.06	0.035	0.040	0.045
0.60	0.80	0.05	0.06	0.07	0.040	0.045	0.050
0.80	1.00	0.06	0.07	0.08	0.045	0.050	0.060
1.00	1.20	0.07	0.08	0.09	0.050	0.060	0.070
1.20	1.60	0.10	0.11	0.12	0.060	0.070	0.080
1.60	2.00	0.12	0.13	0.14	0.070	0.080	0.090
2.00	2.50	0.14	0.15	0.16	0.090	0.100	0.110

Notes:

1. 1N/mm² = 1MPa
2. Dimensions are in millimetres.

Table 5: Thickness tolerances: EN 10143 : 2006 : $R_{p0.2}$≥260N/mm² and <360N/mm² and grades DX51D and S550GD

Nominal thickness		Normal tolerances for a nominal width of			Special tolerances (S) for a nominal width of		
		≤1200	>1200 ≤1500	>1500	≤1200	>1200 ≤1500	>1500
>	≤	±	±	±	±	±	±
0.20	0.40	0.05	0.06	0.07	0.035	0.040	0.045
0.40	0.60	0.05	0.06	0.07	0.040	0.045	0.050
0.60	0.80	0.06	0.07	0.08	0.045	0.050	0.060
0.80	1.00	0.07	0.08	0.09	0.050	0.060	0.070
1.00	1.20	0.08	0.09	0.11	0.060	0.070	0.080
1.20	1.60	0.11	0.13	0.14	0.070	0.080	0.090
1.60	2.00	0.14	0.15	0.16	0.080	0.090	0.110
2.00	2.50	0.16	0.17	0.18	0.110	0.120	0.130

Notes:

1. 1N/mm² = 1MPa
2. Dimensions are in millimetres.

Table 8: Tolerances on coil width: EN 10143 : 2006

Nominal width		Normal tolerances		Special tolerances (S)	
		lower	upper	lower	upper
		−	+	−	+
≤1200		0	5	0	2
>1200	≤1500	0	6	0	2
>1500	≤1800	0	7	0	3
>1800		0	8	0	3

Note: Dimensions are in millimetres.

Table 9: Flatness tolerances : EN 10143 : 2006 : R_{eL} or $R_{p0.2}$<260N/mm²

Tolerance class	Nominal width		Nominal thickness		
			<0.7	≥0.7<1.6	≥1.6
Normal	<1200		10	8	8
	≥1200	<1500	12	10	10
	≥1500		17	15	15
Special (FS)	<1200		5	4	3
	≥1200	<1500	6	5	4
	≥1500		8	7	6

Notes:

1. The tolerances in this table represent maximum deviation from flatness when the sheet is placed on a horizontal surface.
2. Dimensions are in millimetres.

Table 10: Flatness tolerances : EN 10143 : 2006 : $R_{p0.2}$≥260N/mm² and <360N/mm² and grades DX51D and S550GD

Tolerance class	Nominal width		Nominal thickness		
			< 0.7	≥0.7<1.6	≥1.6
Normal	<1200		13	10	10
	≥1200	<1500	15	13	13
	≥1500		20	19	19
Special (FS)	<1200		8	6	5
	≥1200	<1500	9	8	6
	≥1500		12	10	9

Notes:

1. The tolerances in this table represent maximum deviation from flatness when the sheet is placed on a horizontal surface.
2. For $R_{p0.2}$>360N/mm², please specify flatness tolerances at the time of the enquiry or order.
3. Dimensions are in millimetres.

Surface

Surface quality

Galvatite is available in surface quality A, B or C to EN 10346 : 2009.

The surface qualities shown below are not necessarily available in every dimensional combination for this product. Please consult Tata Steel for more information.

Surface quality A: As coated surface
Imperfections such as small pits, differences in spangle size, dark spots, stripes and light passivation from the chemical treatment are permissible.

Surface quality B: Improved surface
This surface quality is obtained by temper rolling. To a small extent, imperfections are permissible, such as stretch-levelling breaks, skin-pass marks, scratches, indentations, spangle structure, zinc run-off marks and light passivation from chemical treatment. The surface has no pits.

Surface quality C: Best quality surface
This surface quality is obtained by temper rolling. The better side is suitable for the uniform appearance of a high-quality paint finish. The other side must at least conform to surface quality B.

Inspected side
As a rule, the upper side of the strip is inspected; on request, the strip can be turned over so that the underside is the inspected side.

Surface texture

All Galvatite products are available in several surface textures. Unless the customer specifies otherwise, Tata Steel will supply a matt surface texture.

Table 11 below shows the range of surface textures available from Tata Steel.

Surface treatment

Galvatite is available oiled, chemically passivated, or both.

Oiling (O)
The material surface can be oiled with preservative oil. Other kinds of oil may be available, depending upon your requirement.

Table 12 below shows the levels of oiling available. If no particular level of oiling is specified by the customer, a normal level will be applied.

Chemical passivation (C)
Chemical passivation, which includes chromium-free treatment, protects against the effects of humidity and thereby reduces the risk of white rust formation during shipment and storage.

Chromium-free passivation (NCP) is available in coating finishes MA and MB. Please consult Tata Steel for more information on product range and compliance to environmental legislation.

Chemical passivation and oiling (CO)
This combination of surface treatments increases the degree of protection against white rust.

Untreated (U)
Tata Steel does not recommend that Galvatite be ordered in the untreated condition (dry) owing to the risk of white rust formation during shipment and storage. However, if untreated material is specified, it is supplied on the condition that the purchaser is responsible for any corrosion arising from material ordered in the untreated condition.

Table 11: Roughness

	R_a(µm) cut off 2.5mm	R_a(µm) cut off 0.8mm
Matt	0.9-1.5	0.70-1.30
Middle rough	1.2-1.8	1.00-1.55

Table 12: Levels of oiling

Level of oiling	Approximately g/m²/side
Light	0.7
Medium/Normal	1.1
Heavy	1.8

Galvatite for forming

Galvatite for cold forming offers a range that extends from bending and profiling qualities to extra deep drawing qualities.

Typical applications

- automotive components and body panels
- tubes
- domestic appliances
- steel furniture
- electrical goods
- domestic heating
- drums
- building components
- components for agricultural machinery

Standards

Galvatite for cold forming complies with European standard EN 10346 : 2009 and is available in the grades shown below.

EN 10346 : 2009

- DX51D+Z
- DX52D+Z
- DX53D+Z
- DX54D+Z
- DX56D+Z
- DX57D+Z

Mechanical Properties

The values shown for the mechanical properties in table 13 below are for test pieces taken transverse to the rolling direction.

Chemical composition

Galvatite for cold forming meets the requirements of the cast analysis shown in table 14 below.

Dimensions

The width and thickness limits are shown in table 15 on page 45. The minimum width is 900mm. Widths below this may be available after consultation.

The surface finishes, treatments and coating weights shown in the general section for Galvatite are not necessarily available in all the dimensional combinations for this product. Please consult Tata Steel about your specific requirements.

Table 13: Mechanical properties : EN 10346 : 2009

	R_{eL} [5] (N/mm²)	R_m (N/mm²)	A_{80} (%) [2]	r_{90} [3,4]	n_{90} [4]
Grade	Min-Max	Min-Max	Min	Min	Min
DX51D+Z	–	270-500	22	–	–
DX52D+Z	140-300	270-420	26	–	–
DX53D+Z	140-260	270-380	30	–	–
DX54D+Z	120-220	260-350	36	1.6	0.18
DX56D+Z	120-180	260-350	39	1.9	0.21
DX57D+Z	120-170	260-350	41	2.1	0.22

Notes:

1. This range of values applies to skin-passed products only.
2. For thicknesses >0.5mm and ≤0.7mm (including coating), the minimum elongation after fracture is decreased by 2 units. For thicknesses ≤0.5mm, the reduction is 4 units.
3. For thicknesses greater than 1.5mm, the r_{90} value is decreased by 0.2 units.
4. For thicknesses less than or equal to 0.7mm (including coating), the r_{90} value is decreased by 0.2 units and the n_{90} value is decreased by 0.01 units.
5. If the yield point is not pronounced, values apply to the 0.2% proof strength ($R_{p0.2}$). If the yield strength is pronounced, values apply to the lower yield point (R_{eL}).

Table 14: Chemical composition: EN 10346 : 2009

Grade	C	Si	Mn	P	S	Ti
	Max	Max	Max	Max	Max	Max
All grades	0.12	0.50	0.60	0.10	0.045	0.30

Note: Values are in weight percentages.

Table 15: Dimensions

Coating type Z : Finishes MA, MB, MC

Thickness		Width					
		Max					
≥	<	DX51D+Z	DX52D+Z	DX53D+Z	DX54D+Z	DX56D+Z	DX57D+Z
0.40	0.50	1375	1375	–	–	–	–
0.50	0.55	1375	1375	1250	1250	1250	1250
0.55	0.65	1520	1570	1570	1570	1570	1570
0.65	0.70	1650	1640	1640	1630	1630	1640
0.70	0.80	1750	1670	1670	1670	1670	1670
0.75	0.80	1750	1670	1670	1820	1670	1670
0.80	0.90	1800	1670	1670	1820	1820	1670
0.90	0.95	1830	1670	1670	1820	1820	1670
0.95	1.00	1830	1650	1650	1820	1820	1650
1.00	1.25	1830	1650	1650	1820	1820	–
1.25	1.45	1830	1640	1650	1720	1720	–
1.45	1.50	1830	1640	1640	1720	1720	–
1.50	1.60	1750	1640	1640	1720	1720	–
1.60	1.65	1650	1640	1640	1720	1720	–
1.65	1.70	1650	1380	1380	1380	1380	–
1.70	1.80	1560	1380	1380	1380	1380	–
1.80	1.90	1450	1380	1380	1380	1380	–
1.90	2.00	1400	1380	1380	1380	1380	–
2.00	2.50	1375	–	–	–	–	–

Notes:

1. Please consult Tata Steel about the availability of specific coating weights and surface finishes.
2. Dimensions are in millimetres.