इंटरनेट मानक

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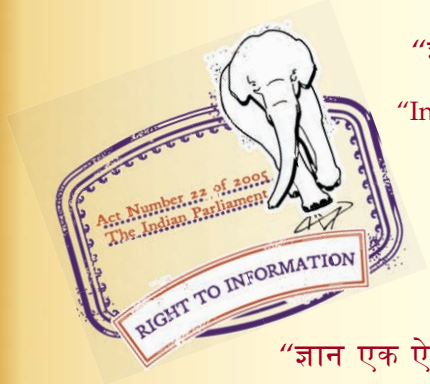
IS 14246 (1995): Continuously pre-painted galvanised steel sheets and coils [MTD 4: Wrought Steel Products]



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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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IS 14246 : 1995
(Reaffirmed 2000)

भारतीय मानक

सतत् पूर्व-रोगनित जस्तीकृत इस्पात की चद्दरें एवं कुंडलियाँ — विशिष्टि

Indian Standard

CONTINUOUSLY PRE-PAINTED GALVANIZED STEEL SHEETS AND COILS — SPECIFICATION

UDC 669.14-41 : 669.58

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

May 1995

Price Group 2

Wrought Steel Products Sectional Committee, MTD 4

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Metallurgical Engineering Division Council.

Galvanized steel is one of the most cost effective material for the production of steel products requiring protection in most corrosive environments. However in those cases where conventional galvanizing is not adequate to meet the manufacturing demands, several new coating systems are now coming up. Steel sheets in coils and cut lengths produced by coating durable synthetic resin paint such as Alkyd, Epoxy, Polyester, Acrylic, etc, on galvanized steel by hot dip process has the advantage of superior corrosion resistance, better adhesion and beautiful finish.

Pre-painted galvanized steel sheets and coils covered by this standard are intended to be used for roofing, architectural siding, home appliances and other general sheet metal article purposes.

For guidance, type of coating, material for coating, thickness of coating and their applications are given in Annex A.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

CONTINUOUSLY PRE-PAINTED GALVANIZED STEEL SHEETS AND COILS — SPECIFICATION

1 SCOPE

1.1 This standard covers the requirement of continuously pre-painted hot-dip galvanized steel sheets and coils.

1.2 Sheets and coils are produced by uniformly coating and baking durable synthetic resin paint, for example, Alkyd, Epoxy, Polyester, Acrylic, etc, over one or both surfaces of galvanized steel sheets and coils using cold rolled steel sheets and coils as base.

2 REFERENCES

The Indian Standards listed below are the necessary adjuncts to this standard:

IS No.	*Title*
277 : 1992	Galvanized steel sheets (plain and corrugated) (*fifth revision*)
513 : 1994	Cold rolled low carbon steel sheets and strips (*fourth revision*)
8910 : 1978	General technical delivery requirements for steel and steel products
9844 : 1981	Method of testing corrosion resistance of electroplated and anodized aluminium coating by neutral salt spray test

3 SUPPLY OF MATERIAL

General requirements relating to the supply of pre-painted galvanized steel sheets and coils shall be as laid down in IS 8910 : 1978

4 MANUFACTURE

The base metal for pre-painted galvanized sheets and coils shall conform to IS 513 : 1994 with zinc coating as per IS 277 : 1992.

5 COATINGS

5.1 The minimum recommended grade of zinc coating shall be 120 of IS 277 : 1992 for various thicknesses of sheets and coils.

5.2 The organic coating thickness shall be measured in microns.

5.3 The top side coating shall be 20 microns minimum and the bottom side coating shall be 7 microns minimum.

NOTE — Higher coating thicknesses can be supplied as per mutual agreement between the manufacturer and the supplier.

5.4 Classification of durability of paint coating shall be as given in Table 1.

Table 1 Classification of Durability of Paint Coatings

Classification	Duration of Salt Spray Test in Hours, *Min*	
	Top side	Bottom side
(1)	(2)	(3)
Class 1	350	200
Class 2	500	200
Class 3	750	200

NOTE — Other coatings may also be supplied if agreed between the manufacturer and the purchaser.

6 TESTS FOR PHYSICAL PROPERTIES OF PAINT COATING

6.1 Sampling of Test Specimens

One sample for bend test, pencil hardness test, impact resistance test and cross hatch adhesion test shall be taken from every 10 tonnes of sheets or part thereof or one coil of the same quality, dimensions, grade of zinc coating and colour.

6.2 Bend Test

6.2.1 Bend test shall be carried out for annealed and skin passed material.

6.2.2 The test piece shall have a width of 75 mm to 125 mm and 230 mm long. Unless otherwise specified, one test piece shall be cut out of each test sheet in parallel to the rolling direction of the base metal.

6.2.3 The test specimen shall be bent through an angle of 180° around a mandrel having diameter specified in Table 2 with a hand vice or any other suitable means. The axis of the bend shall be in the direction of rolling. Bending shall be done such that painted surface is outside.

6.2.4 There shall be no peeling or cracking of paint film on the bent portion.

6.3 Pencil Hardness Test

6.3.1 Standard pencils of hardness as given in Table 2 should be used for the pencil hardness test.

Table 2 Physical Properties of Paint Coating
(*Clauses* 6.2.3 *and* 6.3.1)

	Tests (1)	Requirements (2)
1.	Bend Test	
	a) For roofing and cladding	$4t$
	b) For appliance and other internal applications	$2t$
2.	Pencil Hardness Test	
	a) For roofing and cladding	$2H$
	b) For appliance and other internal applications	H

where
t = nominal thickness of sheet, and
H = hardness of pencil.

6.3.2 The pencil shall be sharpened so as to expose about 3 mm of lead. Holding the pencil at an angle of 90° to the abrasive paper grit No. 400, rub the lead against the paper maintaining an angle of 90° to the abrasive paper until a flat, smooth and circular cross section is obtained. The tip of the lead shall be ground flat before use for each test.

6.3.3 Place the coated panels on a level, firm horizontal surface. Holding the pencil against the panel surface at 45° angle, push the pencil away from the operator with moderate pressure (*see* Fig. 1).

6.3.4 On visual inspection, there shall not be any scratch on the tested portion.

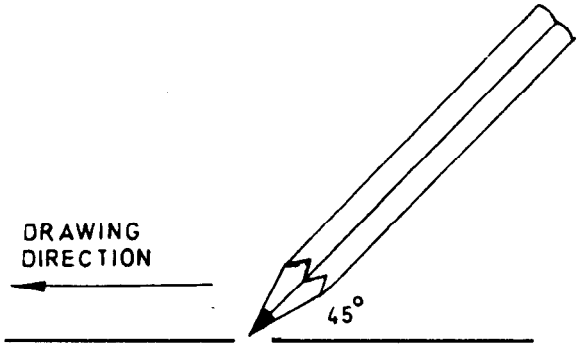


FIG. 1 PENCIL HARDNESS TEST

6.4 Impact Resistance Test

6.4.1 Place the test panel on the impact tester with the coated side either up or down as specified or agreed upon. Drop a 500 g mass of weight from 600 mm height on the test panel.

6.4.2 On visual inspection there shall not be any crack or peeling of the paint film.

6.5 Cross Hatch Test

6.5.1 Select an area free from blemishes and other surface imperfections. Make straight lines on the test panel with a cutting tool or cutting guide so as to reach the surface of the metal through paint film. Eleven such straight lines shall be made crosswise at right angles at intervals of 1 mm.

6.5.2 After making the required cuts, brush the film lightly with a soft brush or tissue to remove any detached flakes or nibbons of coating. Cut a piece about 75 mm long from a standard one-inch wide semitransparent pressure sensitive tape. Place the centre of the tape over the grid and in the area of the grid smooth into place by finger. To ensure good contact with the paint film, rub the tape firmly with finger.

6.5.3 Remove the tape by holding the free end steadily (without jerk) pulling it off at as close to 180° angle as possible. Inspect the grid area for removal of paint film from the substrate.

6.5.4 There should not be any lifting of paint by the tape (*see* Fig. 2).

6.6 Salt Spray Test (Corrosion Resistance)

The test shall be carried out in accordance with IS 9844 : 1981 for the duration as given in Table 1.

6.7 Other Tests

Any test other than those described in **6.1** may be carried out if agreed to between the manufacturer and the purchaser.

7 APPEARANCE

7.1 Pre-painted sheets and coils shall be reasonably flat and free from holes, tears, distinct colour differences and other defects detrimental to practical use.

7.2 Coils, however, may contain some abnormal imperfections which render a portion of the coil unusable since the imperfections in the coil can not be removed as in case of cut lengths.

7.3 Gloss and shade of sheets and coils shall be as agreed to between the manufacturer and the supplier.

8 DIMENSIONS AND TOLERANCES

8.1 The dimensions of sheets shall be as per IS 513 : 1994.

8.2 In the case of coils, the internal diameter of coils shall be 450 mm, 510 mm or 610 mm, and the mass of each coil shall not exceed 10 tonnes.

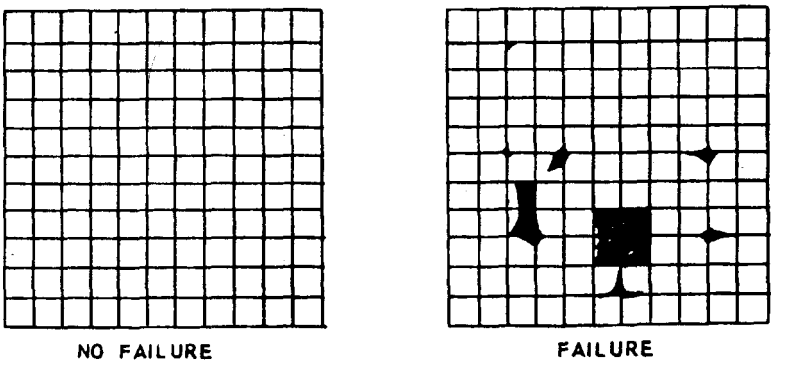


FIG. 2 CROSS HATCH TEST

8.3 The nominal thicknesses of sheets and coils shall be as given in IS 277 : 1992

8.4 Tolerances

8.4.1 *Thickness*

The tolerances on thickness of sheets and coils shall be as given in IS 513 : 1994.

8.4.2 *Width*

No sheet or coil shall be smaller in width than that specified. The positive tolerance on width shall be 10 mm.

8.4.3 *Length*

No sheet shall be smaller in length than that specified. Tolerance on length on plus side shall be 15 mm or 0.5 percent of length, whichever is greater.

8.4.4 *Mass*

The tolerance on mass of individual sheets shall be within ±10 percent and tolerance on mass of each bundle of sheets shall be ±5 percent.

8.5 Sheets and coils of sizes other than those specified in **8.1**, **8.2**, **8.3** and **8.4** may be supplied, if agreed between the purchaser and the manufacturer.

9 SHAPES

9.1 Camber

Maximum camber values for coils and sheets shall be as given in IS 513 : 1994.

9.2 Deviations from Squareness (Out-of Square)

Deviation from squareness for flat sheets shall be given in IS 513 : 1994.

9.3 Deviations from Flatness

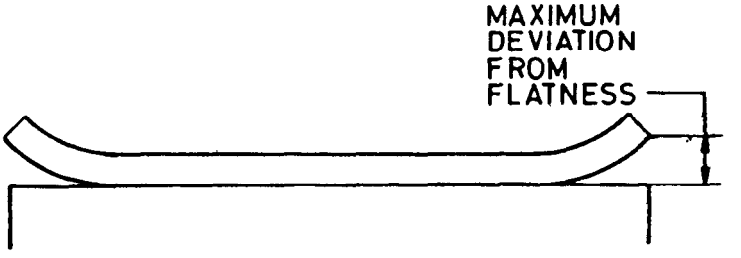
Maximum deviation from flatness for cut sheets shall be as given in Table 4 (*see* Fig. 3).

Table 4 Deviations from Flatness
(*Clause* 9.3)
All dimensions in millimetres.

Thickness	Tolerances on Specified Width	
	Up to 1 200	Above 1 200
(1)	(2)	(3)
Up to and including 0.7	15	18
Above 0.7 up to 1.6	12	15

10 PACKING

10.1 Coils should be wrapped with polylaminated covering. Inner wrap surface (*ID*) should also be covered with polylaminated covering. The coil should then be wrapped with either steel sheet



NOTE — Maximum deviation from flatness is the maximum distance between the lower surface of the sheet and flat horizontal surface on which the sheet is made to rest with its own weight.

FIG. 3 DEVIATION FROM FLATNESS

along with side covers or with hessian cloth covering both sides as agreed between the purchaser and the manufacturer. Circumferential rings and inner rings should be fitted along the edges. Finally it should be strapped with steel tape.

10.2 Sheets should be first wrapped with polylaminated covering and then with steel sheet or hessian cloth as agreed between the purchaser and the manufacturer. Finally it should be strapped with steel tape.

10.3 Every precaution should be taken against paint coating damage and contact with water during transit. Mixed loading with corrosive substances such as chemicals should be avoided.

11 MARKING

11.1 The following shall be legibly and indelibly marked on the top of each bundle or package of sheets or shown on a tag attached to each coil:

a) Manufacturer's name or trade-mark;
b) Material identification, coil number, packet number, batch number, etc;
c) Product dimensions;
d) Number of sheets or mass;
e) Name of top colour; and
f) Date of packing.

11.2 BIS Certification Marking

The material may also be marked with the Standard Mark.

11.2.1 The use of the Standard Mark is governed by the provisions of Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of the conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

ANNEX A

(Foreword)

RECOMMENDATIONS FOR THE USE OF PRE-PAINTED STEEL SHEETS AND COILS FOR VARIOUS APPLICATIONS

Type of Coating (1)	*Material of Coating* (2)	*Thickness in Microns* (3)	*Remarks* (4)
Top coat	Epoxy	20-30	For external and internal applications
	Polyester Polyurethane	20-30	For external and internal application and appliances
	PVDE	20-30	For external applications Very good corrosion and weathering resistant
	Silicon modified polyester	20-30	For external applications Very good corrosion and weathering resistant
	Plastisol	70-200	For bus body, railway coaches and panels. Better flexibility and corrosion resistant
	PVC	100-200	For internal applications and interior decoration
	Zinc rich primer coated CRCA	14-16 (one side) Oiling (other side)	All automobile and railway coaches which are subjected to corrosion
Back coat	Alkaloid epoxy or polyester	7 *Min*	Mainly one coat system or two coat system (optional) with primer

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the latest issue of 'BIS Handbook' and 'Standards Monthly Additions'.

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