

भारतीय मानक

IS 4826 : 2023

Indian Standard

**गोल स्टील तारों पर तप्त निमज्जी जस्तीकरण
लेपन — अपेक्षाएँ**
(दूसरा पुनरीक्षण)

**Hot-Dip Galvanized Coatings on
Round Steel Wires — Requirements**
(Second Revision)

ICS 25.220.40

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BUREAU OF INDIAN STANDARDS

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Corrosion Protection and Finishes Sectional Committee, MTD 24

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Corrosion Protection and Finishes Sectional Committee had been approved by the Metallurgical Engineering Division Council.

In order to rationalize the requirements of different types of galvanized wires, coatings have been classified into three types, that is, heavy, light and medium. Annex A indicates applicability of various types of coatings on different wires. The requirements of electrogalvanized coatings on round steel wire are covered in IS 12753.

This standard was first published in 1968 and subsequently revised in 1979. This revision has been brought out to bring the standard in the latest style and format of the Indian Standards. It also incorporates 3 amendments issued to the last version of the standard. In addition to this, the title has been modified and the following clauses have been added: references clause, terminology clause and packaging clause.

The composition of the Committee responsible for the formulation of this standard is given in Annex B.

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 : 2022 'Rules for rounding off numerical values (*second revision*)'. 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
**HOT-DIP GALVANIZED COATINGS ON ROUND STEEL
WIRES — REQUIREMENTS**
(*Second Revision*)

1 SCOPE

1.1 This standard covers the requirements for zinc coating on hot-dip galvanized wires of circular section of diameters from 0.200 mm up to and including 10.0 mm.

1.2 This standard makes no reference to the quality of the wire itself. It does not apply to the articles made from wire which have been galvanized after fabrication. However, it makes provision for such testing to be carried out before or after the wire has been used for armouring, stranding, barbing or for any similar process.

1.3 The relevant Indian Standard governing a particular type of wire should refer to this standard for specifying the requirements of zinc coating.

2 REFERENCES

The standards given below contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of these standards:

<i>IS No.</i>	<i>Title</i>
IS 209 : 1992	Zinc ingot — Specification (<i>fourth revision</i>)
IS 1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)
IS 2629 : 1985	Recommended practice for hot-dip galvanizing of iron and steel (<i>first revision</i>)
IS 2633 : 1986	Method for testing uniformity of coating on zinc coated articles (<i>second revision</i>)
IS 6745 : 1972	Methods for determination of mass of zinc coating on zinc coated iron and steel articles
IS 13229 : 1991	Zinc for galvanizing — Specification

3 TERMINOLOGY

For the purpose of this standard, the definitions provided in IS 2629 shall apply.

4 SUPPLY OF MATERIAL

General requirements relating to the supply of material shall conform to IS 1387.

5 GENERAL REQUIREMENTS

5.1 Quality of Zinc

Zinc used for galvanizing shall conform to any of the grades specified in IS 209 and IS 13229.

5.2 Galvanizing

The steel wires may, as far as practicable, be galvanized in accordance with IS 2629.

6 COATING REQUIREMENTS

6.1 Mass of Zinc Coating

6.1.1 When determined in accordance with IS 6745 the mass of zinc coating shall not be less than the mass specified in Table 1. For medium coating the requirements given in Table 2 shall apply.

6.1.2 If the wire is tested after being used for armouring, stranding, barbing or any similar process, the figure for minimum mass of coating as specified in Table 1 shall be reduced by 5 percent.

6.1.3 Care shall be taken to avoid damaging the samples in detaching them from the finished strand or cable.

6.2 Uniformity of Zinc Coating

6.2.1 Uniformity of zinc coating shall be determined according to IS 2633.

6.2.2 At all points more than 25 mm from a cut end, the coating shall be able to withstand the minimum number of dips specified in Table 1 and Table 2.

6.2.3 If the wire is tested after being used for armouring, stranding, barbing or for any similar process, the minimum number of dips shall

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reduced by one half-minute dip.

6.3 Freedom from Defects

The zinc coating shall be uniform, adherent,

reasonably smooth and free from such imperfections as flux, ash and dross inclusions, bare patches, black spots, pimples, lumpiness, runs, rust stains, bulky white deposits, and blisters (the terms have been defined in IS 2629).

Table 1 Minimum Mass of Coating and Number of Dips

(Clauses 6.1, 6.1.1 and 6.2.2)

SI No.	Nominal Diameter of Galvanized Wire, mm		Light Coated Wire						Heavily-Coated Wire					
			Soft ¹			Hard ²			Soft ¹			Hard ²		
	Above	Up to and Including	Mass of Coating	Number of Dips		Mass of Coating	Number of Dips		Mass of Coating	Number of Dips		Mass of Coating	Number of Dips	
			g/m ²	1 min	$\frac{1}{2}$ min	g/m ²	1 min	$\frac{1}{2}$ min	g/m ²	1 min	$\frac{1}{2}$ min	g/m ²	1 min	$\frac{1}{2}$ min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
i)	0.20	0.32	20	No test required	No test required	15	No test required	No test required	45	No test required	No test required	45	No test required	No test required
ii)	0.32	0.40	20	do	do	15	do	do	70	do	do	70	do	do
iii)	0.40	0.50	20	do	do	15	do	do	90	—	1	90	—	1
iv)	0.50	0.56	30	do	do	20	do	do	100	1	—	100	1	—
v)	0.56	0.63	30	do	do	20	do	do	110	1	—	110	1	—
vi)	0.63	0.71	30	do	do	20	do	do	120	1	—	120	1	—
vii)	0.71	0.80	30	do	do	30	do	do	140	1	1	140	1	1
viii)	0.80	0.90	40	do	do	30	do	do	150	1	1	150	1	1
ix)	0.90	1.00	40	do	do	40	do	do	170	2	—	150	1	1
x)	1.00	1.25	40	do	do	40	do	do	180	2	—	160	2	—
xi)	1.25	1.40	50	do	do	40	do	do	200	2	—	180	2	—

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Table 1 (Concluded)

Sl No.	Nominal Diameter of Galvanized Wire, mm		Light Coated Wire						Heavily-Coated Wire					
			Soft ¹			Hard ²			Soft ¹			Hard ²		
	Above	Up to and Including	Mass of Coating	Number of Dips		Mass of Coating	Number of Dips		Mass of Coating	Number of Dips		Mass of Coating	Number of Dips	
			g/m ²	1 min	$\frac{1}{2}$ min	g/m ²	1 min	$\frac{1}{2}$ min	g/m ²	1 min	$\frac{1}{2}$ min	g/m ²	1 min	$\frac{1}{2}$ min
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
xii)	1.40	1.60	60	—	1	50	—	—	210	2	—	190	2	—
xiii)	1.60	1.80	60	—	1	60	—	1	230	2	1	200	2	—
xiv)	1.80	2.00	70	1	—	60	—	1	240	3	—	210	2	—
xv)	2.00	2.24	70	1	—	60	—	1	240	3	—	210	2	—
xvi)	2.24	2.50	80	1	1	70	1	—	260	3	—	230	2	1
xvii)	2.50	2.80	90	1	1	70	1	—	260	3	1	230	2	1
xviii)	2.80	3.15	100	1	1	70	1	—	270	3	1	240	3	—
xix)	3.15	3.55	110	1	1	80	1	—	270	3	1	250	3	—
xx)	3.55	4.00	120	1	1	90	1	1	280	3	1	260	3	—
xxi)	4.00	5.00	130	2	—	100	1	1	290	3	1	275	3	1
xxii)	5.00	7.10	140	2	—	110	1	1	290	3	1	290	3	1
xxiii)	7.10	10.00	140	2	—	110	1	1	300	4	—	300	4	—

¹ Soft indicates galvanized after drawing and annealing. Tensile strength up to 545 N/mm² (55 kgf/mm²).

² Hard indicates galvanized after drawing, but without annealing. Tensile strength above 545 N/mm² (55 kgf/mm²).

Table 2 Requirements for Medium Coatings

(Clause 6.1.1 and 6.2.2)

Sl No.	Nominal Diameter of Galvanized Wire (mm)	Mass of Coating g/m ²	Number of Dips	
			1 min	$\frac{1}{2}$ min
(1)	(2)	(3)	(4)	(5)
i)	0.200 mm and up to 0.32 mm inclusive	30	—	—
ii)	Above 0.32 mm and up to 0.40 mm	35	—	—
iii)	Inclusive 0.40 mm and up to 0.50 mm	45	—	—
iv)	Inclusive 0.50 mm and up to 0.56 mm	60	—	1
v)	Inclusive 0.56 mm and up to 0.63 mm	60	—	1
vi)	Inclusive 0.63 mm and up to 0.71 mm	60	—	1
vii)	Inclusive 0.71 mm and up to 0.80 mm	75	—	1
viii)	Inclusive 0.80 mm and up to 0.90 mm	75	—	1
ix)	Inclusive 0.90 mm and up to 1.00 mm	75	—	1
x)	Inclusive 1.00 mm and up to 1.25 mm	90	1	—
xi)	Inclusive 1.25 mm and up to 1.40 mm	90	1	—
xii)	Inclusive 1.40 mm and up to 1.60 mm	95	1	—
xiii)	Inclusive 1.60 mm and up to 1.80 mm	95	1	—
xiv)	Inclusive 1.80 mm and up to 2.00 mm	105	1	—
xv)	Inclusive 2.00 mm and up to 2.24 mm	105	1	—
xvi)	Inclusive 2.24 mm and up to 2.50 mm	110	1	1
xvii)	Inclusive 2.50 mm and up to 2.80 mm	120	1	1
xviii)	Inclusive 2.80 mm and up to 3.15 mm	120	1	1
xix)	Inclusive 3.15 mm and up to 3.55 mm	135	1	1
xx)	Inclusive 3.55 mm and up to 4.00 mm	135	1	1
xxi)	Inclusive 4.00 mm and up to 5.00 mm inclusive	150	2	—

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7 ADHESION OF ZINC COATING

7.1 Test Specimen

The test specimen consists of a piece of wire long enough to allow the test to be carried out properly. The test specimen is wound round a cylindrical mandrel so as to form close spirals as specified in Table 3.

Table 3 Adhesion Test

(Clause 7.1)

Sl No.	Nominal Diameter of Wire mm	Minimum Complete Turns of Wrap	Ratio between Mandrel Diameter and Wire Diameter
(1)	(2)	(3)	(4)
i)	Up to and including 3.55 mm	10	4
ii)	Over 3.55 mm up to and including 7.10 mm	10	6
iii)	Over 7.10 mm up to and including 10.0 mm	$\frac{1}{4}$ (one 90° bend)	6

7.2 Procedure

7.2.1 Winding shall be carried out at a rate not more than 15 turns per minute.

7.2.2 When so wound or bent around the mandrel, the zinc coating shall remain adherent to the steel wire and shall be considered as meeting this requirement if owing to such winding or bending, it does not flake off, nor crack to such an extent that there is possibility of removing any zinc by rubbing with bare fingers, the use of finger nail being not allowed.

8 SAMPLING

8.1 The degree of sampling shall be that specified in the standard governing the wire or article fabricated from wire. In the absence of such a standard, the degree of sampling shall be agreed to between the galvanizer and the purchaser.

8.1.1 Coil for testing shall be selected by the purchaser.

8.1.2 Portions of wire which are obviously damaged shall not be used for samples.

9 PACKAGING

9.1 The galvanized round steel wires shall be grouped into uniform bundles of a specified weight or length, as agreed upon between the supplier and the buyer.

9.2 Each bundle shall be wrapped with moisture-resistant material, such as plastic or waterproof paper, to prevent exposure to humidity, rain, or other environmental factors that could lead to corrosion. The wrapping material shall be securely fastened to ensure it remains intact during transit and storage.

9.3 Each bundle shall be securely bound using suitable strapping material to prevent shifting or unraveling during transportation and storage.

9.4 Bundles shall be labeled with essential information including the name/initials or trade-mark of the manufacturer, product description, details of base wire material, minimum mass of coating in g/m², heat/lot number, date of coating and shelf life if applicable, and any other relevant details.

ANNEX A

(Foreword)

APPLICABILITY OF TYPE OF COATING FOR DIFFERENT APPLICATIONS

Sl No.	Application	Type of Coating		
		Heavy	Light	Medium
(1)	(2)	(3)	(4)	(5)
i)	Fencing wire	X	X	—
ii)	Stay strand wire	X	—	—
iii)	Signal strand wire	X	—	—
iv)	Chain link wire	X	—	—
v)	Rope wire	X	—	X
vi)	Spring wire	—	—	X
vii)	Cable armouring wire	X	—	X
viii)	ACSR wire	X	—	—
ix)	Mild steel wire	X	X	—
x)	Telephone wire	X	—	—
xi)	Cycle spoke wire	—	X	—
xii)	Barbing wire (line)	X	X	—
xiii)	Barbing wire (point)	—	X	—
xiv)	P.C. wire	X	—	—
xv)	Lighting conductor wire	X	—	—
xvi)	Rubber hose reinforcement	X	X	—

NOTES

1 X Applicable

2 — Not applicable

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ANNEX B

(Foreword)

COMMITTEE COMPOSITION

Corrosion Protection and Finishes Sectional Committee, MTD 24

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Amendments Issued Since Publication

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