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Indian Standard

SPECIFICATION FOR GALVANIZED STEEL WIRE FOR TELEGRAPH AND TELEPHONE PURPOSES

(Third Revision)

(Incorporating Amendment Nos. 1 & 2)

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BUREAU OF INDIAN STANDARDS
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Price Group 3

Indian Standard

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Indian Standard

SPECIFICATION FOR GALVANIZED STEEL WIRE FOR TELEGRAPH AND TELEPHONE PURPOSES

(Third Revision)

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 15 September 1981, after the draft finalized by the Wrought Steel Products Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard was first published in 1951 and was revised in 196l and in 1972. While reviewing the standard in the light of the experience gained during these years, the Sectional Committee decided that this standard be further revised. In this revision the following main modifications have been made:

a) Load is specified in terms of newtons (N) in alignment with the adoption of the SI units both nationally and internationally,

b) Sampling requirements have been modified, and

c) Reference has been given to the latest standards available for supply of material (IS : 8910-1978*) and for chemical composition (IS : 7887-1975†).

0.3 This edition 4.2 incorporates Amendment No. 1 (March 1984) and Amendment No. 2 (June 2001). Side bar indicates modification of the text as the result of incorporation of the amendments.

0.4 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‡. The number of significant places retained in the rounded off value should be same as that of the specified value in this standard.

*General technical delivery requirements for steel and steel products.

†Mild steel wire rod for general engineering purposes.

‡Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers the requirements for two grades of galvanized steel wires (*see* Table 1) suitable for use as:

a) telegraph and telephone line wires, and

b) binding and jointing wires for telegraph and telephone wires.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 1956 (Part V)-1976* shall apply.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of galvanized steel wire for telegraph and telephone purposes shall conform to IS : 8910-1978†.

4. MANUFACTURE

4.1 Wire shall be drawn from the wire rods conforming to IS : 7887-1975‡.

4.2 The wire shall be drawn in a continuous piece of specified diameter as given in Table 1.

4.3 Zinc ingots used for galvanizing shall conform to any of the grades specified in IS : 209-1992 Zinc ingot or IS : 13229-1991 Zinc for galvanizing.

5. CHEMICAL COMPOSITION

5.1 The requirements for chemical composition for the wires shall conform to those given in IS : 7887-1975‡.

6. PHYSICAL PROPERTIES

6.1 The physical and electrical properties of the wire shall be in accordance with those given in Table 1.

6.2 Wrapping Test — Wrapping test shall be conducted in accordance with IS : 1755-1961§. The wire, when wrapped eight times round its own diameter and subsequently unwrapped, shall withstand the test without breaking or cracking.

*Glossary of terms relating to iron and steel: Part V Bright steel bar and steel wire (*first revision*).

†General technical delivery requirements for steel and steel products.

‡Specification for mild steel wire rod for general engineering purposes.

§Method for wrapping test of wire.

TABLE 1 PHYSICAL PROPERTIES OF TELEGRAPH AND TELEPHONE WIRES

(*Clauses* 1.1, 4.2, 4.3, 6.1, 6.3, 6.5 *and* 7.1)

Diameter			Mass*	Breaking Load*	Resistance of Wire at 27°C†, *Max*	
Nom	*Min*	*Max*		*Min*	Grade 1	Grade 2
(1)	(2)	(3)	(4)	(5)	(6)	(7)
mm	mm	mm	kg/km	N	Ω/km	Ω/km
1.50	1.46	1.54	13.8	660	71.4	87.7
1.80	1.76	1.84	19.9	940	49.5	60.9
2.0	1.95	2.05	24.7	1160	40.1	49.3
2.12	2.07	2.17	27.6	1305	35.7	43.9
2.50	2.44	2.56	38.3	1815	25.7	31.6
2.80	2.73	2.87	48.3	2295	20.5	25.2
3.55	3.46	3.64	77.3	3660	12.7	15.7
4.0	3.90	4.10	98.0	4680	10.0	12.3
5.60	5.50	5.70	192.3	9170	5.1	6.3

*The values are based on nominal diameter of wire.
†The values are based on mass of nominal sizes of wire.

6.3 Tensile Test — The breaking load of the wire, when tested in accordance with IS : 1521-1972*, shall not be less than the values given in Table 1.

6.4 Coating Test — The galvanized coating of steel wire shall conform to the requirements of heavy coating as given in IS : 4826-1968†.

6.5 Resistance Test — The electrical resistance in ohm per kilometre of the test sample multiplied by $\frac{W}{K} \times C$ shall be taken as the resistance per kilometre of the wire at 27°C and shall not exceed the maximum resistance values given in Table 1 for the two grades of wire.

In this formula, the symbols shall have the following meanings assigned to them:

W = Mass of test sample in kg/km,

K = Mass (based on nominal size) in kg/km (*see* Table 1), and

C = multiplier constant for correcting to 27°C (*see* Appendix A).

*Method for tensile testing of steel wire (*first revision*).
†Specification for galvanized coatings on round steel wires.

7. TOLERANCES

7.1 The permitted tolerances regarding the diameter of each piece or coil shall conform to the requirements given in Table 1.

8. FREEDOM FROM DEFECTS

8.1 All finished wire shall be well and cleanly drawn to the dimensions specified. It shall have a smooth and uniform galvanized coating and shall be sound and free from splits; surface flaws; rough, jagged and imperfect edges; and all other harmful surface defects. Each piece shall be in continuous length and shall not contain any joint or weld other than those in the rod before it was drawn.

9. SAMPLING AND CRITERIA FOR CONFORMITY

9.1 Sampling and criteria for conformity shall be as given in Appendix B.

10. PACKING

10.1 Each coil of wire shall be bound securely at four places and suitably packed to avoid damage during transit.

10.1.1 The inner diameter of each coil shall not exceed 600 mm.

11. MARKING

11.1 Each coil of wire shall be securely tagged with a label suitably marked with the following:

a) Manufacturer's name or trade-mark,

b) Year of manufacture,

c) Coil number, and

d) Weight of coil.

11.2 Each coil shall be sealed with a lead disc which shall bear the purchaser's acceptance mark. The lead disc shall be perforated parallel to the face so that the wire can be passed through it. The end of the wire shall then be flattened and the disc slipped over the flattened portion and secured by one or two blows with a hammer and stamped.

11.2.1 The coil may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors may be obtained from the Indian Standards Institution.

APPENDIX A

(*Clause* 6.5)

MULTIPLIER CONSTANTS FOR CONVERSION OF ELECTRICAL RESISTANCE TO 27°C

Temperature at which Resistance is Measured	Multiplier Constant for Converting to 27°C	Temperature at which Resistance is Measured	Multiplier Constant for Converting to 27°C
(1)	(2)	(1)	(2)
°C		°C	
5	1.1127	28	0.9953
6	1.1070	29	0.9909
7	1.1014	30	0.9864
8	1.0959	31	0.9819
9	1.0904	32	0.9775
10	1.0848	33	0.9732
11	1.0796	34	0.9688
12	1.0742	35	0.9645
13	1.0689	36	0.9602
14	1.0637	37	0.9560
15	1.0585	38	0.9516
16	1.0534	39	0.9472
17	1.0483	40	0.9430
18	1.0432	41	0.9384
19	1.0383	42	0.9339
20	1.0333	43	0.9296
21	1.0284	44	0.9251
22	1.0236	45	0.9209
23	1.0188	46	0.9165
24	1.0140	47	0.9122
25	1.0093	48	0.9077
26	1.0046	49	0.9033
27	1.0000	50	0.8989

APPENDIX B

(*Clause* 9.1)

SAMPLING AND CRITERIA FOR CONFORMITY

B-1. LOT

B-1.1 In any consignment, all the coils of wire of the same grade and diameter, manufactured under essentially similar conditions of manufacture, shall be grouped together to constitute a lot.

B-1.1.1 Samples shall be taken from each lot and tested for conformity to the standard.

B-2. SAMPLING

B-2.1 The number of coils to be taken from a lot shall be according to col 1 and 2 of Table 2. These samples shall be taken at random by using number tables (*see* IS : 4905-1968*).

TABLE 2 SCALE OF SAMPLING AND PERMISSIBLE NUMBER OF DEFECTIVES

(*Clauses* B-2.1, B-3.1 *and* B-3.2)

NO. OF COILS IN A LOT	NO. OF COILS FOR PHYSICAL REQUIREMENTS	PERMISSIBLE NO. OF DEFECTIVE COILS	NO. OF TESTS FOR CHEMICAL REQUIREMENTS
Up to 25	2	0	1
26 to 50	3	0	1
51 to 150	5	0	2
151 to 300	8	1	2
301 and above	13	1	2

B-3. PREPARATION OF SAMPLES AND NUMBER OF TESTS

B-3.1 Tests for Physical Requirements — From the coils selected from col 1 and 2 of Table 2, adequate length of test piece shall be cut from each end and subjected to physical tests, namely, size, surface condition, tensile, wrapping, coating and resistance tests. A test piece failing to meet any one of the requirements, shall be called a defective. If the number of defectives found is less than or equal to the permissible number of the defectives specified in col 3 of Table 2, the lot shall be considered to have conformed to physical requirements.

*Methods for random sampling.

B-3.2 Tests for Chemical Requirements — Unless otherwise agreed, the following procedure shall be followed for chemical requirements:

From those tests pieces which have conformed to physical requirements, further test pieces shall be selected at random according to col 4 of Table 2. These samples shall be tested for all the chemical requirements. If a test piece fails to meet the respective chemical requirement, it shall be called a defective. The lot shall be considered to have conformed to the chemical requirements if all the individual test pieces tested for chemical requirements pass the test.

B-4. CRITERIA FOR CONFORMITY

B-4.1 A lot shall be considered to have conformed to the requirements of the specification if **B-3.1** and **B-3.2** are satisfied.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 $kg.m/s^2$
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m^2
Frequency	hertz	Hz	1 Hz = 1 c/s (s^{-1})
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m^2

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Review of Indian Standards

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