



IS 280 : 2006

भारतीय मानक

सामान्य इंजीनियरी अनुप्रयोगों के लिए मृदु इस्पात की तार
(चौथा पुनरीक्षण)

Indian Standard

MILD STEEL WIRE FOR GENERAL ENGINEERING
PURPOSES
(*Fourth Revision*)

ICS 77.140.65

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BUREAU OF INDIAN STANDARDS
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Price Group 2

FOREWORD

This Indian Standard (Fourth Revision) 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.

This standard was first published in 1951 and revised in 1962, 1972 and 1978.

In this revision, following changes have been made:

- a) All the three Amendments issued have been incorporated.
- b) Clause on reference of Indian Standard has been modified.

For all the tests specified in the standard (chemical / physical / others), the method as specified in relevant ISO standard may also be followed as an alternate method.

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

MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Fourth Revision)

1 SCOPE

This standard covers the requirements for mild steel wire of sizes 0.125 mm to 12.5 mm diameter for general engineering purposes.

2 REFERENCES

The standards listed below contain provisions, which through reference in this text constitute provisions 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 the standards indicated below:

IS No.	Title
228 (All parts)	Methods for chemical analysis of steels
1387 : 1993	General requirements for the supply of metallurgical materials (<i>second revision</i>)
1608 : 2005	Metallic materials — Tensile testing at ambient temperature (<i>third revision</i>)
1755 : 1983	Method for wrapping test for metallic wire (<i>first revision</i>)
1956 (Part 5) : 1975	Glossary of terms relating to iron and steel: Part 5 Bright steel bar and steel wire
4826 : 1979	Hot-dipped galvanized coatings on round steel wires (<i>first revision</i>)
4905 : 1968	Methods for random sampling
7887 : 1992	Mild steel wire rods for general engineering purposes (<i>first revision</i>)
12753 : 1989	Electro galvanized coatings on round steel wire

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1956 (Part 5) shall apply.

4 SUPPLY OF MATERIAL

General requirements relating to the supply of mild steel wire shall be as laid down in IS 1387.

5 MANUFACTURE

The wire shall be drawn from the wire rods conforming to IS 7887.

6 CHEMICAL COMPOSITION

The chemical analysis of the material when carried out either by the method specified in the relevant parts of IS 228 or any other established instrumental/chemical method shall be as given in IS 7887. In case of dispute, the procedure given in IS 228 and its relevant parts shall be the referee method. However, where the method is not given in IS 228 or its relevant parts, the referee method shall be as agreed to between the purchaser and the manufacturer.

7 SIZES

7.1 Mild steel wire for general engineering purposes shall be of the following diameters:

mm	mm	mm	mm	mm
0.125	0.315	0.80	2.00	5.00
0.140	0.355	0.90	2.24	5.60
0.160	0.400	1.00	2.50	6.30
0.180	0.450	1.12	2.80	7.10
0.200	0.500	1.25	3.15	8.00
0.224	0.560	1.40	3.55	9.00
0.250	0.630	1.60	4.00	10.00
0.280	0.710	1.80	4.50	11.2
				12.5

7.2 Sizes other than those mentioned above shall be supplied subject to agreement between the purchaser and the manufacturer.

8 TOLERANCES

Tolerances permitted on the diameter of wire shall be as given in Table 1.

9 MECHANICAL PROPERTIES

9.1 Tensile Test

The tensile strength of wire when tested in accordance with IS 1608 shall be within the limits given in Table 2.

9.2 Wrapping Test

Wire smaller than 5 mm diameter shall be subjected to wrapping test in accordance with IS 1755. The wire shall

Table 1 Tolerances on Diameter of Wire
(Clause 8)

All dimensions in millimetres.

Size of Wire (1)	Tolerance (2)	Maximum Difference Between Two Readings Taken on Any Two Diameters on the Cross-Section (3)
All finishes other than galvanized:		
Up to 0.25	± 0.01	0.01
Over 0.25 up to 0.50	± 0.015	0.015
Over 0.50 up to 1.00	± 0.02	0.02
Over 1.00 up to 1.50	± 0.03	0.03
Over 1.50 up to 2.50	± 0.04	0.04
Over 2.50 up to 5.00	± 0.05	0.05
Over 5.0	± 0.06	0.06
Galvanized: All sizes	± 2.5 percent with a minimum of ± 0.025	2.5 percent with a minimum of 0.025

Table 2 Tensile Properties
(Clause 9.1)

Condition (1)	Tensile Strength	
	Finishes Other Than Galvanized MPa (2)	Galvanized MPa (3)
Annealed	500 Max	300-550
Soft drawn	550 Max	—
¼ hard	450-650	—
½ hard	600-800	—
Hard	700-950	550-900

NOTES

1 1 MPa = 1N/mm² = 1MN/m² = 0.102 0 kgf/mm².

2 Restricted ranges of tensile strength in case of galvanized wire may be agreed to at the time of enquiry and order.

withstand without breaking or splitting being wrapped eight times round its own diameter and subsequently straightened.

9.3 Bend Test

Wire of 5 mm diameter and over shall be subjected to bend test. The wire shall withstand being bent through an angle of 90° round a former of diameter equal to twice its own diameter without breaking or splitting.

10 FINISH

The wire shall have one of the following finishes as specified by the purchaser:

- Annealed;
- Annealed, cleaned and limed;
- Bright drawn;
- Dull grey (dry drawn);
- Galvanized;
- Coppered;
- Tinned; and
- Coated and drawn (coating may be of tin, copper or zinc).

11 COATING TEST

11.1 The galvanized coating of steel wire shall conform to the requirements for any one of the types of coatings given in IS 4826 as per agreement with the purchaser. The coating requirements of electro galvanized wires shall conform to the requirements for any one of the types coating given in IS 12753 or as agreed to between the purchaser and the manufacturer.

11.2 The coating test for finishes other than galvanized, copper coated or tinned shall be subject to agreement between the purchaser and the manufacturer.

12 SAMPLING

Unless otherwise agreed to, the method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in Annex A.

13 FREEDOM FROM DEFECTS

All finished wires shall be well and cleanly drawn to the dimensions specified. The wire shall be sound, free from splits, surface flaws, rough jagged and imperfect edges and other harmful surface defects.

14 PACKING

Each coil of wire shall be suitably bound and fastened compactly. If required by the purchaser, each coil shall be protected by suitable wrapping.

15 MARKING

15.1 Each coil of wire shall be marked legibly with the finish, size of wire, lot number and trade-mark or the name of the manufacturer.

15.2 BIS Certification Marking

The material may also be marked with the Standard Mark.

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

ANNEX A

(Clause 12)

SAMPLING AND CRITERIA FOR CONFORMITY

A-1 LOT

A-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.

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

A-2 SAMPLING

A-2.1 The number of coils to be taken from a lot shall be according to col 2 and 4 of Table 3. These coils shall be chosen at random (see IS 4905). Samples shall be cut from each coil so chosen as per A-3.1 and A-3.2 for physical and chemical requirements.

Table 3 Scale of Sampling and Permissible Number of Defectives
(Clauses A-2.1, A-3.1 and A-3.2)

No. of Coils in a Lot	No. of Coils for Physical Requirements	Permissible Defective	No. of Coils for Chemical Requirements
(1)	(2)	(3)	(4)
Up to 25	2	0	1
26-50	3	0	1
51-150	5	0	2
151-300	8	1	2
301 and above	13	1	2

A-3 PREPARATION OF SAMPLES AND NUMBER OF TESTS

A-3.1 Tests for Physical Requirements

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

A-3.2 Tests for Chemical Requirements

Unless otherwise agreed, the following procedure shall be followed for chemical requirements:

From those test pieces which have conformed to physical requirements, further test pieces shall be selected at random according to col 4 of Table 3. These samples shall be tested for all the chemical requirements. If a test piece fails to meet the respective chemical requirements, 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.

A-4 CRITERIA FOR CONFORMITY

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

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Amendments Issued Since Publication

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