IS : 280 - 1978
(Reaffirmed 1997)

Indian Standard

SPECIFICATION FOR MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Third Revision)

Third Reprint AUGUST 1997

UDC 669.141.24 — 426

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

Gr 2 *October* 1986

Indian Standard

SPECIFICATION FOR MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Third Revision)

Wrought Steel Products Sectional Committee, SMDC 5

Chairman	*Representing*
DR U. N. BHRANY	Modella Steel & Alloys Ltd, Bombay
Members	
SHRI H. S. ASWATH	Bokaro Steel Plant (SAIL), Bokaro Steel City
SHRI S. G. TUDEKAR (*Alternate*)	
SHRI S. BANERJEE	Steel Re-Rolling Mills Association of India, Calcutta
SHRI S. K. BASU	Guest, Keen, Williams Ltd, Howrah
SHRI A. ROYCHOWDHURY (*Alternate*)	
SHRI B. C. BISWAS	National Test House, Calcutta
SHRI P. K. CHAKRAVARTY	Tata Iron & Steel Co Ltd, Jamshedpur
SHRI M. C. KUMARASWAMY (*Alternate*)	
SHRI G. CHATTERJEE	Durgapur Steel Plant (SAIL), Durgapur
SHRI K. Z. MATHEM (*Alternate*)	
SHRI P. K. CHATTERJEE	Ministry of Defence (DGI)
SHRI V. RAMASWAMY (*Alternate*)	
DR N. S. DATAR	Rourkela Steel Plant (SAIL), Rourkela
SHRI K. S. SINGH (*Alternate*)	
DR A. Y. DEGANI	Mukand Iron & Steel Works Ltd, Bombay
SHRI R. V. PAREKH (*Alternate*)	
SHRI S. C. DEY	Central Boilers Board
DIRECTOR (M & C), RDSO	Ministry of Railways
JOINT DIRECTOR (MET), RDSO (*Alternate*)	
SHRI A. K. GUHA	Directorate General of Supplies & Disposals, New Delhi
SHRI K. M. TANEJA (*Alternate*)	
JOINT DIRECTOR (WAGON)-I, RDSO	Ministry of Railways
JOINT DIRECTOR, RS (IRON & STEEL), RAILWAY BOARD (*Alternate*)	

(*Continued on page* 2)

(*Continued from page* 1)

Members	*Representing*
DR V. C. KASHYAP	Special Steels Limited, Bombay
SHRI S. S. MURANJAN (*Alternate*)	
SHRI M. N. KHANNA	Bhilai Steel Plant (SAIL), Bhilai
SHRI K. C. SOM (*Alternate*)	
DR D. M. LAKHIANI	The Indian Iron & Steel Co Ltd, Burnpur
SHRI T. K. DATTA (*Alternate*)	
SHRI P. LAXMINARAYANA	Hindustan Shipyard Limited, Visakhapatnam
SHRI N. C. MAGOTRA	The Tinplate & Co of India Limited, Golmuri
SHRI P. K. BANERJEE (*Alternate*)	
SHRI R. C. MAHAJAN	The Indian Steel & Wire Products Limited, Jamshedpur
SHRI A. N. KATAKI (*Alternate*)	
SHRI M. K. PRAMANIK	Iron & Steel Control, Calcutta
SHRI B. K. DUTTA (*Alternate*)	
SHRI RAGHUBIR SINGH	National Metallurgical Laboratory (CSIR), Jamshedpur
SHRI D. SEN	Ministry of Defence (DGOF)
SHRI Y. C. SUBRAMANY (*Alternate*)	
SHRI L. SIKAND	The Metal Box Co of India Ltd, Calcutta
SHRI K. R. NARASIMHAN (*Alternate*)	
SHRI A. SRINIVASULU	Bharat Heavy Electricals Limited
SHRI A. K. MITTAL (*Alternate*)	
SHRI D. SRINIVASAN	Joint Plant Committee, Calcutta
SHRI B. P. GHOSH (*Alternate*)	
SHRI K. S. VAIDYANATHAN	M. N. Dastur & Co Pvt Ltd, Calcutta
SHRI C. R. RAMA RAO, Director (Struc & Met)	Director General, ISI (*Ex-officio Member*)

Secretary

SHRI SHANTI SWARUP
Deputy Director (Metals), ISI

Panel for Steel Wires for General Engineering Purposes, SMDC 5/P-38

Convener

DR V. C. KASHYAP	Special Steels Limited, Bombay

Members

ADDITIONAL CHIEF ENGINEER	Posts & Telegraphs Department, Jabalpur
SHRI K. R. BANERJEE	Hindustan Wires Ltd, Calcutta
LT-COL S. K. GUPTA	Ministry of Defence (DGI)
SHRI M. M. L. KHULLAR	Modi Steels, Modi Nagar
SHRI V. M. KULKARNI	Usha Martin Black (Wire Ropes) Ltd, Ranchi
SHRI R. C. MAHAJAN	The Indian Steel & Wire Products Ltd, Jamshedpur
SHRI J. P. PATEL	Tensile Steels Ltd, Vadodara

Indian Standard

SPECIFICATION FOR MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Third Revision)

0. FOREWORD

0.1 This Indian Standard (Third Revision) was adopted by the Indian Standards Institution on 1 August 1978, 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 issued in 1951 and revised in 1962 and 1972. As a result of experience gained during these years, it has been decided to revise this standard aligning the requirements of tensile properties with the practices being followed in the industry in this field.

0.2.1 In this revision, the tensile strength has been specified in terms of MPa (N/mm^2), in alignment with the adoption of SI units, both nationally and internationally.

0.3 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 the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements for mild steel wire of sizes 0·125 mm to 12·5 mm diameter for general engineering purposes.

2. TERMINOLOGY

2.1 For the purpose of this standard, the definitions given in IS : 1956 (Part V)-1975† shall apply.

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

†Glossary of terms relating to iron and steel: Part V Bright steel bar and steel wire.

3. SUPPLY OF MATERIAL

3.1 General requirements relating to the supply of mild steel wire shall be as laid down in IS : 1387-1967*.

4. MANUFACTURE

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

5. CHEMICAL COMPOSITION

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

6. SIZES

6.1 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

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

7. TOLERANCES

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

8. MECHANICAL PROPERTIES

8.1 Tensile Test — The tensile strength of wire when tested in accordance with IS : 1521-1972‡ shall be within the limits given in Table 2.

*General requirements for the supply of metallurgical materials (*first revision*).
†Specification for mild steel wire rods for general engineering purposes.
‡Methods for tensile testing of steel wire (*first revision*).

TABLE 1 TOLERANCES ON DIAMETER OF WIRE

(*Clause* 7.1)

Size of Wire	Tolerance*	Maximum Difference Between Two Readings Taken on Any Two Diameters on the Cross-Section
(1)	(2)	(3)
mm	mm	mm
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

*The tolerances shall be applicable only to coils of wire.

TABLE 2 TENSILE PROPERTIES

(*Clause* 8.1)

Condition	Tensile Strength, MPa	
	Finishes Other Than Galvanized	Galvanized
(1)	(2)	(3)
Annealed	500 *Max*	300-550
Soft drawn	550 *Max*	—
1/4 hard	450-650	—
1/2 hard	600-800	—
Hard	700-950	550-900

1MPa = 1N/mm² = 1MN/m² = 0·102 0 kgf/mm².

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

8.2 Wrapping Test — Wire smaller than 5 mm diameter shall be subjected to wrapping test in accordance with IS : 1755-1961*. The wire shall withstand without breaking or splitting being wrapped eight times round its own diameter and subsequently straightened.

8.3 Bend Test — Wire of 5 mm diameter and over shall be subjected to this 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.

9. FINISH

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

a) Annealed;
b) Annealed, cleaned and limed;
c) Bright drawn;
d) Dull grey (dry drawn);
e) Galvanized;
f) Coppered;
g) Tinned; and
h) Coated and drawn (coating may be of tin, copper or zinc).

10. COATING TEST

10.1 The galvanized coating of steel wire shall conform to the requirements for any one of the types of coatings given in IS : 4826-1968† as per agreement with the purchaser.

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

11. SAMPLING

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

12. FREEDOM FROM DEFECTS

12.1 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.

*Method for wrapping test of wire.
†Specification for galvanized coatings on round steel wires.

13. PACKING

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

14. MARKING

14.1 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.

14.2 BIS Certification Marking

The product may also be marked with Standard Mark.

14.2.1 The use of the 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 Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

APPENDIX A

(*Clause* 11.1)

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 1 and 2 of Table 3. These samples shall be taken at random by using number tables (*see* IS : 4905-1968*).

*Methods for random sampling.

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 No. of Defective Coils	No. of Tests 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 1 and 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 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 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 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.

A-4. CRITERIA FOR CONFORMITY

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

BUREAU OF INDIAN STANDARDS

Headquarters:
Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002
Telephones: 323 0131, 323 3375, 323 9402
Fax : 91 11 3234062, 91 11 3239399, 91 11 3239382

Telegrams : Manaksanstha
(Common to all Offices)

	Telephone
Central Laboratory:	
Plot No. 20/9, Site IV, Sahibabad Industrial Area, Sahibabad 201010	8-77 00 32
Regional Offices:	
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg, NEW DELHI 110002	323 76 17
*Eastern : 1/14 CIT Scheme VII M, V.I.P. Road, Maniktola, CALCUTTA 700054	337 86 62
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160022	60 38 43
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600113	235 23 15
†Western : Manakalaya, E9, Behind Marol Telephone Exchange, Andheri (East), MUMBAI 400093	832 92 95
Branch Offices:	
'Pushpak', Nurmohamed Shaikh Marg, Khanpur, AHMEDABAD 380001	550 13 48
‡Peenya Industrial Area, 1st Stage, Bangalore-Tumkur Road, BANGALORE 560058	839 49 55
Gangotri Complex, 5th Floor, Bhadbhada Road, T.T. Nagar, BHOPAL 462003	55 40 21
Plot No. 62-63, Unit VI, Ganga Nagar, BHUBANESHWAR 751001	40 36 27
Kalaikathir Buildings, 670 Avinashi Road, COIMBATORE 641037	21 01 41
Plot No. 43, Sector 16 A, Mathura Road, FARIDABAD 121001	8-28 88 01
Savitri Complex, 116 G.T. Road, GHAZIABAD 201001	8-71 19 96
53/5 Ward No.29, R.G. Barua Road, 5th By-lane, GUWAHATI 781003	54 11 37
5-8-56C, L.N. Gupta Marg, Nampally Station Road, HYDERABAD 500001	20 10 83
E-52, Chitaranjan Marg, C- Scheme, JAIPUR 302001	37 29 25
117/418 B, Sarvodaya Nagar, KANPUR 208005	21 68 76
Seth Bhawan, 2nd Floor, Behind Leela Cinema, Naval Kishore Road, LUCKNOW 226001	23 89 23
NIT Building, Second Floor, Gokulpat Market, NAGPUR 440010	52 51 71
Patliputra Industrial Estate, PATNA 800013	26 23 05
Institution of Engineers (India) Building 1332 Shivaji Nagar, PUNE 411005	32 36 35
T.C. No. 14/1421, University P. O. Palayam, THIRUVANANTHAPURAM 695034	6 21 17

---

*Sales Office is at 5 Chowringhee Approach, P.O. Princep Street, CALCUTTA 700072	27 10 85
†Sales Office is at Novelty Chambers, Grant Road, MUMBAI 400007	309 65 28
‡Sales Office is at 'F' Block, Unity Building, Narashimaraja Square, BANGALORE 560002	222 39 71

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 1 JULY 1984

TO

IS:280-1978 SPECIFICATION FOR MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Third Revision)

Alterations

(*Page 6, clauses 10, 10.1 and 10.2*) - Substitute the following for the existing clauses:

10. COATING REQUIREMENTS

10.1 The galvanized coating of hot dip galvanized steel wire shall conform to the requirements for any one of the types of coatings given in IS:4826-1979† as agreed between the contracting parties. The coating requirements for electro-galvanized wires shall be as agreed to between the contracting parties.

10.2 The coating requirements for finishes other than hot dip galvanized shall be subject to agreement between the contracting parties.'

(*Page 6, foot-note with '†' mark*) - Substitute the following for the existing foot-note:

'†Specification for hot-dipped galvanized coatings on round steel wires (*first revision*)

(SMDC 5)

AMENDMENT NO. 2 APRIL 2002
TO
IS 280 : 1978 SPECIFICATION FOR MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Third Revision)

(*Page* 4, *clause* **3.1**) — Substitute 'IS 1387 : 1993*' *for* 'IS 1387 : 1967*'.

(*Page* 4, *clauses* **4.1** *and* **5.1**) — Substitute 'IS 7887 : 1992†' *for* 'IS 7887 : 1975†'.

(*Page* 4, *clause* **8.1**) — Substitute 'IS 1608 : 1995‡' *for* 'IS 1521 : 1972‡'.

(*Page* 4, *footnotes*) — Substitute the following for the existing footnotes:

*General requirements for the supply of metallurgical materials (*second revision*).

†Specification for mild steel wire rods for general engineering purposes (*first revision*).

‡Mechanical testing of metals — Tensile testing (*second revision*).

(*Page* 6, *clause* **8.2**) — Substitute 'IS 1755 : 1983*' *for* 'IS 1755 : 1961*'.

[*Page* 6, *footnote with* (*) *mark*] — Substitute the following for the existing footnote:

*Method for wrapping test for metallic wire (*first revision*).

(MTD 4)

Reprography Unit, BIS, New Delhi, India

AMENDMENT NO. 3 NOVEMBER 2002
TO
IS 280 : 1978 SPECIFICATION FOR MILD STEEL WIRE FOR GENERAL ENGINEERING PURPOSES

(Third Revision)

(*Page* 3, *clause* **0.2.1**) — Insert the following new clause after **0.2.1** and renumber the subsequent clause:

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

(MTD 4)

Reprography Unit, BIS, New Delhi, India