

**PRODUCT MANUAL FOR
Specification for Round Steel Wire for Ropes
According to IS 1835:1976**

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure coherence of practice and transparency in operation of certification under Scheme-I of Bureau of Indian Standards (Conformity Assessment) Regulations, 2018 for various products. The document may also be used by prospective applicants desirous of obtaining BIS certification licence/certificate.

1.	Product	:	IS 1835:1976
	Title	:	Specification for Round Steel Wire for Ropes
	No. of amendments	:	3
2.	Sampling Guidelines		
a)	Raw material	:	Any raw material suitable for chemical composition as per Cl 5 and producing wires with desired mechanical properties as per Cl 8. Eg: IS 7904 High Carbon Steel Wire Rods (Covers all the varieties of IS 1835)
b)	Grouping Guidelines	:	Please refer Annex – A
c)	Sample Size	:	For mechanical test: 10 meters For chemical test : 5 meters
3.	List of Test Equipment	:	Please refer Annex – B
4.	Scheme of Inspection and Testing	:	Please refer Annex – C
5.	Possible tests in a day	:	All mechanical and chemical tests
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 1835:1976 with the following scope:		
	Name of the product	Round Steel Wire for Ropes	
	Type	<ul style="list-style-type: none"> • Bright wire / Galvanized Type A, B or AB (Cl 3) • Tensile designation 	
	Size	E.g. Size from 0.20mm upto and including 5.00mm	

ANNEXURE A
TO PRODUCT MANUAL FOR
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GROUPING GUIDELINES

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Round Steel Wire for Ropes according to IS 1835: 1976 are designated as per the following:

- Bright wire / Galvanized Type A, AB or B (Cl 3)
- Bundle / Coil /Piece form (Cl 2)
- Tensile designation
- Size from 0.20mm upto and including 5.00mm

- Samples shall be drawn for the range of tensile designations, nominal diameter and finish type applied for. A declaration on chemical composition suitably selected from Table1 of IS 1835:1976 against all tensile designations and corresponding size ranges intended to manufacture shall be obtained from the manufacturer.

- One sample from bright finish for each tensile designation applied for, preferably for the lowest size, shall be tested for physical, mechanical and chemical tests, as per the grade and range of elements declared.

- For covering wires classified further on type of galvanizing, one additional galvanized sample of any tensile designation but of the highest size (as galvanizing of higher size requires more competency of manufacturing) shall be drawn. The wire so drawn is to be tested for requirements applicable for coated samples only, such as test for coating, adhesion test only. To cover all types of galvanizing, a sample of most stringent type, i.e. Type A, shall be tested. For covering type AB and B only, testing of a sample of Type-AB, of any tensile designation, for coating test would suffice.

- While considering Grant of licence/inclusion of additional varieties, it shall be ensured that the applicant/licensee has got the complete manufacturing and testing facilities for all the sizes/grades/tensile designations applied.

- During the operation of license, BO shall ensure that all the sizes/grades/delivery conditions covered in the license are drawn for independent testing on rotation over a period of time.

ANNEXURE B
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LIST OF TEST EQUIPMENTS

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Major test equipment essentially required to test as per requirements of Indian Standard.

Sr. No	Test Equipment/Chemicals	Tests Used in with Clause Reference
1	Steel Scale	10(length)
2	Vernier Calipers	10(dia)
3	Micrometer	10(Diameter)
4	Tensile Testing Machine	8.1 & 12.2.3, Table no 2. (Tensile Strength)
5	Torsion Testing Machine	12.3.2 & 12.3.3 Table no 5. (Twists)
6	Wrapping Machine, 10X magnifying glass	12.5 to 12.6 (Ductility of wire)
7	Reverse Bend Testing Machine	12.4 .2 & Table 6 (Reverse Bend test)
8	Rough Polishing Machine Cutting Machine, Fine Polishing Machine Grinder Machine	5 (chemical composition) Preparation of specimen
9	Antimony trioxide / Antimony tri chloride, HCl , Volatile organic solvent such as ether, trichloroethylene, carbon tetrachloride, etc. (Con. & Dil.) and other chemicals and reagents applicable	11.3(Mass of Zinc Coating)
10	Weighing balance	
11	Clean soft cotton cloth, 100 ml glass burette with stopcock, rubber tube, reservoir (for Volumetric method) and other glassware as applicable	
12	Copper carbonate (laboratory grade) or Copper hydroxide (laboratory grade), Copper Sulphate Crystals – Technical grade, Ammonium Hydroxide, Alcohol, Distilled water, Volatile organic solvent such as ether, trichloroethylene, carbon tetrachloride, etc. and other chemicals and reagents applicable	11.2 (Uniformity of Zinc Coating)
13	Room Air conditioner with temperature control facility	
14	Thermometer	
15	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	Cl 5.1 for C,S,P,Mn,Si,Ni,Cu,Cr Mn,S,P,Si

16	<p>Strohlein or Leco apparatus with all attachments Barometer with chart, Hot plate, Muffle furnace, Complete range of glass wares, measuring cylinders, Desiccator, porcelain boats or ceramic crucibles, Thermometer, Electronic Balance, Distilled Water, Hot air oven, Oxygen - 99.5 percent minimum purity, ether or acetone, Standard Reference Material (NML) with certificate</p> <p>Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, caustic potash</p> <p>Reagents for S: Ceramic boats/crucibles – desiccators, Fluxes - Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate</p>	cl.5.1, for C & S (chemical method, alternative to instrumental method)
17	<p>Weighing balance, Heater/ Heating element along with energy regulator, Ice water bath, Vol Flask Cap – 1 litre, (Whatman) filter paper No. 040, Suction Filtration Facility, Filter paper pulp pad, Standard Reference Material (NML) with certificate</p> <p>Potassium Permanganate (KMnO₄), Sodium Nitrite (Na₂NO₃), Ammonium Molybdate [(NH₄)₂ Mo₂O₇], Ammonium Phosphate [(NH₄)₃ PO₄], Potassium Nitrate (K₂NO₃), Phenolphthalein Solution, Rectified spirit or methyl alcohol, Sodium Hydroxide (NaOH), Hydrofluoric Acid (HF), Perchloric Acid (HClO₄), Sulphurous Acid, Hydrobromic Acid (HBr), other chemicals and reagent as applicable</p>	Phosphorus content Cl 5.1 (chemical method, alternative to instrumental method)
18	<p>Hot plate, Conical flask</p> <p>Reagents:</p> <p>silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid</p>	Manganese content Cl 5.1 (chemical method, alternative to instrumental method)
19	<p>Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace</p> <p>Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid</p>	Silicon content Cl 5.1 (chemical method, alternative to instrumental method)
20	<p>Plate, Muffle Furnace, porcelain or silica crucible,</p> <p>Reagents: Hot Wash Solution (dilute sulphuric acid solution 1 : 99 v/v with hydrogen sulphide), dilute sulphuric acid, hydrogen sulphide, Dilute Nitric Acid, Sodium Fluoride, solid, Dilute Ammonium Hydroxide, Acetic Acid, Potassium Iodide, Starch Solution, Sodium Thiosulphate Solution, Ammonium Bifluoride Solution</p>	Cu content Cl 5.13 (chemical method, alternative to instrumental method)

21	ashless paper pulp, paper pulp pad, hot plate, dessicator, Reagents: ammonium nitrate, methyl red, dilute ammonium hydroxide, Concentrated hydrochloric acid Concentrated nitric acid, Perchloric acid, Hydrofluoric Acid	Ni content Cl 5.1 (chemical method, alternative to instrumental method)
22	Hot plate, stop watch Reagents: dilute sulphuric acid and phosphoric acid mixture, concentrated nitric acid, ammonium persulphate, silver nitrate, dilute hydrochloric acid, ferrous ammonium sulphate, standard potassium permanganate solution.	Cr content Cl 5.1 (chemical method, alternative to instrumental method)
23	Mandrels of suitable sizes	9.3 (Adhesion tests)

Note: The above is an indicative list for the purpose of guidance only

ANNEXURE C
TO PRODUCT MANUAL FOR
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SCHEME OF INSPECTION AND TESTING

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1. LABORATORY - A laboratory shall be maintained which shall be suitably equipped (as per the requirement given in column 2 of Table 1) and staffed, where different tests given in the specification shall be carried out in accordance with the methods given in the specification.

1.1 The manufacturer shall prepare a calibration plan for the test equipments.

2. TEST RECORDS – The manufacturer shall maintain test records for the tests carried out to establish conformity.

3. LABELLING, MARKING, PACKING –

The Standard Mark as given in Schedule of the license and Licence Number (i.e. CM/L.....) shall be incorporated, and the marking and packing shall be done as per the provisions of the Indian Standard, provided always that the product thus marked and packed conforms to all the requirement of the specification.

4. CONTROL UNIT – All round steel wire for ropes drawn to same dimensions representing the same cast, tensile designation, type and manufactured under uniform conditions of production.

5. LEVELS OF CONTROL - The tests as indicated in column 1 of Table 1 and the levels of control in column 3 of Table 1, shall be carried out on the whole production of the factory which is covered by this plan and appropriate records maintained in accordance with paragraph 2 above.

5.1 All the production which conforms to the Indian Standards and covered by the licence should be marked with Standard Mark.

6. TEST CERTIFICATE-For each consignment of BIS Certified material conforming to IS 1835:1976 there shall be a test certificate which shall contain the Standard Mark, the cast/Control Unit number and the corresponding test results (as given in Annexure-I enclosed)

7. REJECTIONS – Disposal of non-conforming product shall be done in such a way so as to ensure that there is no violation of provisions of BIS Act, 2016. Any rejected material which is potentially re-salable be sheared or cut or deformed in such a manner that it cannot be used for any other purpose except re-melting. A separate record shall be maintained giving information on quantity and cast number/coil number/control unit number, as applicable, relating to all such rejections/defective/sub-standard material of the production not conforming to the requirements of the Specification and the method of its disposal. Such material shall in no case be stored together with that conforming to the Specification.

ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

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TABLE 1: LEVELS OF CONTROL

(1)		(2)	(3)		(4)		
TEST DETAILS			LEVELS OF CONTROL		REMARKS		
Clause	Requirements	Test Method		Test equipment requirement R: required (or) S: Sub-contracting permitted		No. of Samples	Frequency
		Clause	Reference				
5	Chemical Composition	5.1 Table 1	IS 1835: 1976 IS 228 (various parts)	R	1	Each Cast	No testing is required in case each consignment of material used for wire drawing is ISI marked and received with test certificate.
7	Freedom from defects	7.1	IS 1835: 1976	R	2	Each coil	
10	Tolerances on Diameter	10.1, Table-4,13.1	IS 1835: 1976	R	2	Each coil	
11	Tests for Coating						
	Uniformity of Zinc Coating	11.1, 11.2, 13.1	IS 2633	R	1	1 in every 5 coils or part thereof for each control unit	Other frequency may also be agreed to between buyer and manufacturer.
	Mass of Zinc Coating	11.1, 11.3 Table-3, 13.1	IS 6745	R	1	1 in every 5 coils or part thereof for each control unit	Other frequency may also be agreed to between buyer and manufacturer.

12	Mechanical Test						
	Tensile test	12.1, 12.2, 12.2.1, 12.2.2, 12.2.3 Table-2	IS 1835: 1976 IS 1608(pt.1)	R	1	1 in every 5 coils or part thereof for each control unit	
	Torsion test	12.1, 12.3, 12.3.1, 12.3.2, 12.3.3, Table-5	IS 1835: 1976 IS 1717	R	-do-	-do-	
12.4	Reverse bend test	12.1, 12.4, 12.4.1, 12.4.2, Table-6	IS 1835: 1976 IS 1716	R	Test may be conducted if required by the rope specification and so specified by the purchaser.		
12.5	Wrapping test	12.5	IS 1835: 1976 IS 1755	R	As and when specified by the purchaser for bright wires only.		
12.6	Adhesion test	12.6	IS 1835: 1976	R	1	1 in every 5 coils or part thereof for each control unit	for galvanized wires only.
14	Marking	14.1, 14.1.1, 14.1.1. 1	IS 1835: 1976	R	Each package of Coil shall bear a label affixed with details of type, size, tensile designation, trade mark or name, and other markings as agreed between purchaser and supplier.		

Note-1: Whether test equipment is required or sub-contracting is permitted in column 2 shall be decided by the Bureau and shall be mandatory. Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note-2: The control unit and levels of control as decided by the Bureau are obligatory to which the licensee shall comply with.

**Annexure-I
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(Para 6 of the Scheme of Inspection and Testing)
XYZ IRON AND STEEL COMPANY
(Registered office Address and works address)



TEST CERTIFICATE FOR SPECIFICATION FOR ROUND STEEL WIRE FOR ROPES

TEST CERTIFICATE No. _____

DATE _____

To M/s _____

We certified that the material described below fully conforms to 1835:1976 Chemical composition and Mechanical properties of the product, as tested in accordance with the Scheme of Testing and Inspection contained in the BIS Certification Marks LicenceNo.CM/L_____ are as indicated below against each order No.

(PLEASE REFER TO IS 1835:1976 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	(nom Size)	Control Unit No.	Grade & Tensile Designation	Qty	CHEMICAL COMPOSITION								MECHANICAL PROPERTIES			Type & Mass of Zn Coating	*Reverse bend/ torsion	*Special requirements	
					C %	S %	P %	Si %	Mn %	Cu %	Ni %	Cr %	S+P %	TS	Torsion				adhesion

*if required by purchaser

REMARKS

WAGON NO.

TRUCK NO.

FOR XYZ IRON AND STEEL COMPANY

(It is suggested that size A4 paper be used for this test certificate)