



उत्पाद मैनुअल
टायरों के लिए बीड तार - विशिष्ट
IS 4824:2022 के अनुसार

Product Manual for
Bead Wire For Tyres
According to IS 4824: 2022

विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना- I के तहत प्रमाणन के संचालन में एकरूपता और पारदर्शिता के लिए इस उत्पाद मैनुअल का उपयोग सभी क्षेत्रीय / शाखा कार्यालयों और लाइसेंसधारियों द्वारा संदर्भ सामग्री के रूप में किया जाएगा। दस्तावेज़ का उपयोग बीआईएस प्रमाणन प्राप्त करने के इच्छुक संभावित आवेदकों द्वारा भी किया जा सकता है।

This Product Manual shall be used as reference material by all Regional/Branch Offices & licensees to ensure uniformity 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.

1.	भारतीय मानक संख्या IS No.	:	IS 4824: 2022
	शीर्षक Title	:	Beed Wire for Tyres
	संशोधनों की संख्या No. of amendments	:	01
2.	नमूना दिशानिर्देश Sampling Guidelines		
a)	कच्चा माल Raw material	:	No specific requirement Note: This section indicates the requirements for raw material (if specified in the IS) for which compliance is to be established during Grant of Licence/Change in Scope of Licence/Factory Surveillance.
b)	समूहीकरण दिशानिर्देश Grouping Guidelines	:	Please refer Annex-A
c)	नमूने का परिमाण Sample Quantity	:	Approx 25 m of bead wire for complete testing

		Note: This section indicates the quantity of the sample of the product and/or the raw material (if applicable), required to be sent to the laboratory for testing, for the purpose of Grant of Licence/Change in Scope of Licence/ Factory Surveillance (in case of market surveillance, effort may be made to procure the required quantity of product sample, as far as possible since raw material sample may not be available in market)
d)	परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर Parameters to be Declared in Test Request	Form, Sizes, Level of Tensile Strength, Type of Coating : Note: Apart from the above, any other requirements/parameters may also be declared as per the standard, as applicable.
3.	परीक्षण उपकरणों की सूची List of Test Equipment	: Please refer to Annex- B
4.	निरीक्षण और परीक्षण की स्कीम Scheme of Inspection and Testing	: Please refer to Annex- C
5.	एक दिन में संभावित परीक्षण Possible tests in a day	
	All Tests Note: This section is for the guidance of BIS Certification Officers/Technical Auditors of BIS Authorized Outside Surveillance Agencies (OSAs) during factory inspection to provide ready reference regarding the tests which can be witnessed during the inspection in the factory by the officer/auditor.	
6.	लाइसेंस का दायरा /Scope of the Licence:	
	IS 4824: 2022 के अनुसार मानक मुहर का उपयोग करने के लिए लाइसेंस निम्नलिखित कार्यक्षेत्र के लिए प्रदान किया जाता है "Licence is granted to use Standard Mark as per IS 4824: 2022 with the following scope:	
7.	उत्पाद का नाम Name of the product	Beed Wire for Tyres
	Form	Round or Flat
	Sizes	From 0.80 mm up to and including 2.10 mm
	Level of tensile Strength	NT, HT
	Type of Coating	Copper, Bronze low tin (Sn), Bronze high tin (Sn), Brass or Zinc (Zinc coating is applicable for Flat Wires Only)

BUREAU OF INDIAN STANDARDS
Manak Bhawan, 9, Bahadur Shah Zafar Marg,
New Delhi – 110002

Annex-A
To Product Manual for
Bead Wire for Tyres
According to IS 4824:2022

GROUPING GUIDELINES

1. IS 4824:2022 covers bead wires in the form of rounds and flats. The round wires from 0.80 mm to 2.10 mm diameter and flat wires of 2 mm × 1.30 mm and 3 mm × 1.50 mm can be supplied under this specification.

2. The Bead wire is supplied in two levels of tensile strength, designated as:

- a) NT – Normal standard (or regular) tensile strength; and
- b) HT – High tensile strength.

Further, bead wires can be supplied in 05 types of coating i.e. Copper, Bronze high tin (Sn), Bronze low tin (Sn), Brass and Zinc

3. Wires of lower diameter are having higher specified tensile strength (for both NT and HT levels) and also shall be subjected to higher no. of turns in case of torsion. However, for both the flat wire sizes the specified tensile strength (NT level tensile strength is applicable on flat wires) are same.

4. In view of above, the following grouping guidelines shall be considered for the purpose of GoL/CSoL:-

Group	Wire Form	Sampling
1	Round	(i) One sample of the smallest wire diameter for each level of tensile strength shall be drawn to cover all sizes and levels of tensile strength in the scope of the licence. (ii) Separate Samples for each type of coating are also required to be drawn.
2	Flat	The sample of each size intended to be covered under scope of the licence shall be drawn and tested. Note: Only Zinc coating is applicable to flat wires.

5. If the sample passes, the licence/inclusion can be granted for all sizes/levels of tensile strength and types of coating mentioned in the specification and as applied by the applicant/licensee, provided that the firm is having all necessary manufacturing and testing facilities for manufacturing and testing of all sizes/levels of tensile strength and types of coating proposed to be included in the licence.

6. During the operation of licence, BO shall ensure that all sizes/levels of tensile strength and types of coating covered in the license are drawn for independent testing on rotation over a period of time.

ANNEX – B

LIST OF TEST EQUIPMENTS
(INDICATIVE LIST, FOR GUIDANCE ONLY)

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

Sl. No.	Test Equipment/Chemicals and Identification Numbers (Where applicable)	Tests Used in with Clause Reference
1	Instrumental methods Spectrometer: atomic-absorption spectrometry, inductively coupled plasma atomic emission, inductively coupled plasma mass spectrometry techniques, spark source optical emission spectrometry. Spectrophotometer	Chemical Composition Cl 6.1,6.2 for C, S, P, Mn, Si, N Mn, S, P, Si
2	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 Reagents for C: tin granules or pure iron fillings, acidulated water/brine water, methyl red, caustic potash Reagents for S: Ceramic boats/crucibles – desiccators, Fluxes -Low sulphur copper, tin or iron, Dilute hydrochloric acid, Starch Iodide solution, Potassium iodate	cl. 6.1,6.2 –C& S (chemical method, alternative to instrumental method)
3	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 Potassium Permanganate (KMnO₄), Sodium Nitrite (NaNO₂), Ammonium Molybdate [(NH₄)₂ MoO₇], Ammonium Phosphate [(NH₄)₃ PO₄], Potassium Nitrate (KNO₃), 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	Phosphorus content Cl 6.1, cl.6.2 (chemical method, alternative to instrumental method)
4	Hot plate, Conical flask	Manganese content Cl 6.1, cl.6.2 (chemical method, alternative to

	Reagents: silver nitrate, ammonium persulphate sodium arsenite solution, Dilute Nitric Acid, Phosphoric Acid, Dilute Sulphuric Acid, Concentrated Nitric Acid, NaCl Solution, Permanganic acid	instrumental method)
5	Medium textured filter paper, Porcelain casserole, platinum crucible, filter paper pulp, hot plate, hot air oven, muffle furnace Reagents: Silver nitrate solution, concentrated nitric acid, concentrated sulphuric acid, Dilute Hydrochloric Acid, Dilute Sulphuric Acid, Perchloric Acid, Tartaric acid and hydrofluoric acid	Silicon content Cl 6.1, cl.6.2 (chemical method, alternative to instrumental method)
6	Determination of Nitrogen by Thermal Conductivity Method/ By Inert gas fusion followed by thermal conductivity detection/ By Steam Distillation Method	Nitrogen Content cl. 6.1, cl.6.2
7	UTM (0-10kN), Least Count- 0.1N, Super Heated Steam Chamber upto-1700C, LC-0.10C	Tensile Test cl. 7...2, ..Table-3
8	Torsion testing machine RPM-60Max, Measuring Counter 0-9999 No.s	Torsion Test cl 7.3, Table 4
9	<u>1) Method for Determination of Copper Brass and Bronze Coating Weight on Bead Wire for Tyres by X-Ray Fluorescence Spectroscopy Method</u> Energy Dispersive XRF (ED XRF) or Wavelength Dispersive XRF (WD XRF), Weighing Balance (L.C. 0.001 g), Dispense with accuracy of 25.00 ml$\pm$0.05 ml, X/Y shaker with variable frequency, General Glasswares Reagents: For Brass- Acetone or diethyl ether, ammonium persulphate (> 98 percent), ammonia (> 25 percent, density not more than 0.91 g/cc` at temperature 20 0C) , Distilled Water For Copper and Bronze- Acetone or diethyl ether, persulphate (> 98 percent), ammonia (> 25 percent, density not more than 0.91 g/cc` at temperature 20 0C), zinc sulphate, Distilled Water Standard Solutions of Copper, Bronze and Brass <u>2) Method for Determination of Copper or Bronze Coating on Tyre Bead Wire by Gravimetric Analysis</u> Beakers, Ammonium Hyrdoxide 25-30 percent lab grade, Hydrogen Peroxide 6 percent lab grade, Wire cutter, Carbon tetrachloride (CTC), Electronic Balance (L.C. 1 mg), General Glasswares, Hot Air Oven,	Protective Coating cl.7.4, Table 5, Table 6

	<u>3) Method for Determination of Copper or Bronze Coating on Bead Wire for Tyres using GEDET Method</u> 40 percent sodim nitrate solution, Measuring scale, Table lamp, GEDET Machine, Carbon tetrachloride (CTC)	
10	Micrometer (L.C. 0.001 mm)	Dimensions and Tolerances Cl.7.6
11	Mould, Grips, Adhesion Press Machine (Pressure: 0-3000 psi, Temperature: 35 to 200 0C), Solvent (lead-free gasoline with distillation range from 40 to 1410 C and minimum recovery of 97 percent, Rubber Stock, Soft cloth or brush, Hot Plate, Wooden Peg or Knife Butt or Roller,	Adhesion Test cl. 7.6.4, Annex B

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

ANNEX- C SCHEME OF INSPECTION AND TESTING

1. QUALITY ASSURANCE PLAN

1.1 It is expected that during operation of BIS licence, manufacturers will implement a Quality Assurance Plan (QAP) i.e. a plan of regular testing and in-process controls, designed to ensure that the product bearing the Standard Mark conforms to all requirements of the Indian Standard.

1.2 The manufacturers shall define a Quality Assurance Plan (QAP) defining the control unit (i.e. lot/batch etc.), the levels of control (i.e. the frequency and number of samples for conducting the different tests as per the Indian Standard) and declare the arrangement for testing i.e. whether in-house or subcontracting/sharing for each applicable test and submit the same to BIS Branch Office for information. The manufacturer shall comply with the QAP and maintain test records in accordance with para 2.1.

1.3 RECOMMENDED LEVELS OF CONTROL/CONTROL UNIT:

1.3.1 For the guidance of manufacturers, the recommended definition of control unit is: For the purpose of this scheme, a control unit is defined as wire drawn to same nominal size, level of tensile strength, coating and manufactured under essentially similar conditions using steel of one cast.

1.3.2 For the guidance of manufacturers in preparing the Quality Assurance Plan, recommended levels of control are given in Table 1. Manufacturer has the discretion of declaring their own levels of control or accept the levels of control given in this document.

1.3.3 The manufacturer shall ensure inspection and testing as per the Quality Assurance Plan submitted by them on the whole production of the factory which is covered by this plan.

2. ENSURING COMPLIANCE THROUGH TESTING- manufacturers shall ensure compliance of their products to all the requirements of the Indian Standard for which they may have in-house test facilities. However, there is no obligation to maintain in-house laboratory. Licensee may use alternative arrangements for tests of the production as per the declared QAP. Various alternatives are available for operation of BIS certification as given below and the relevant guidelines for availing such relaxations by the manufacturers, as amended from time to time, are to be referred:

- i) Shared testing resources like common facility,
- ii) Cluster based testing facility,
- iii) Sub-contracting to outside laboratories which may either be:
 - a) BIS recognised/empanelled laboratories, or
 - b) Any accredited laboratory as per ISO/IEC 17025

2.1 TEST RECORDS- The manufacturers shall maintain test records for the tests carried out (either in-house or at a sub-contracted or at shared test facility) to establish conformity of the product to the Standard for operation of licence. For the tests being subcontracted or conducted at a shared test facility, test results issued by the laboratories or test facilities, shall be made available for inspection by BIS.

3. PACKING AND MARKING - The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L...) shall be incorporated suitably on each coil of wire and on the Test Certificate issued along with each Consignment provided always that the product thus marked and packed conforms to all the requirement of the specification.

3.1 Packing and Marking shall be done as per the Indian Standard.

3.2 Additional Marking requirements: Additionally, the following shall also be marked on each package of the material:

- a) “For BIS certification details please visit www.bis.gov.in”
- b) Any other requirement not specified in the Indian Standard

4. TEST CERTIFICATE – For each consignment of BIS Certified material conforming to IS 4824:2022 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).

5. REJECTION - The production which conforms to the Indian Standard and covered under the scope of this licence shall be marked with the Standard Mark. 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.

TABLE 1
(Recommended Levels of Control by BIS- For Guidance Only)

(1)				(3)		(4)
TEST DETAILS				LEVELS OF CONTROL		REMARKS
Clause	Requirements	Test Method		No. of Samples	Frequency	
		Clause	Reference			
6	Chemical Composition					
	Ladle Analysis	6.1, Table 1	IS 228 (Various Parts) / any established Chemical/ Instr. Method.	One	Each Heat	Applicable for manufacturers with steel making facilities
	Product Analysis	6.2, Table 2		i) Nil <		

7.3	Torsion Test	7.3 Table-4	IS 4824:2022 IS 1717	One	Each Unit	Control	Torsion Test shall not be applicable for flat wires
7.4	Protective Coating i) Chemical composition of coating material ii) Surface Quality iii) Coating Weight	7.4.1 7.4.2 7.4.3 Table 5 Table 6	IS 4824:2022 Annex B	One	Each Unit	Control	Only Zinc coating is applicable to flat wires.
7.5	Delivery Conditions i) Unit Package ii) Welds iii) Wire Straightness iv) Residual Torsions	7.5.1 7.5.2 7.5.3 7.5.4	IS 4824:2022	Adequate inspection to ensure that wires conform to the requirements of the specification			
7.6	Dimensions and Tolerances ii) Size Tolernaces iii) Out-of-roundness	7.6.1 7.6.2 7.6.3	IS 4824:2022	Adequate inspection to ensure that wires conform to the requirements of the specification			
7.6.4	Adhesion	7.6.4	IS 4824:2022 Annex A	The minimum pull out load and mean pull out load observed during the test shall be as agreed between the purchaser and the manufacturer			

Annexure-I
(Para 4 of the Scheme of Inspection and Testing)
XYZ IRON AND STEEL COMPANY
(Registered office Address and works address)

ISI Mark
With IS No.
and CM/L
no.

Test Certificate for Bead Wire for Tyres
According to IS 4824:2022
TEST CERTIFICATE NO. _____

To M/s _____ Dated _____

We certified that the material described below fully conforms to IS 4824:2022. Chemical composition and Physical properties of the product as tested in accordance with the Scheme of Inspection and Testing contained in the BIS Certification Marks Licence No. CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS 4824:2022 FOR DETAILS OF SPECIFICATION REQUIREMENTS)
TEST RESULTS

Order No. & Date	Wire Form	Nom Size	Control Unit No.	Type of coating	Level of TS	Qty. (in tonnes)	Chemical Composition (%)					Mechanical Properties		Adhesion Test	Protective Coating	Torsion Test	Remarks
							C	S	P	Si	Mn	TS	% minimum elongation at rupture				

Remarks
Wagon No.
Truck No.

FOR XYZ IRON AND STEEL COMPANY

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