



PM/ IS 12444/ 1/ May 2020

PRODUCT MANUAL FOR
Continuously cast and rolled electrolytic copper wire rods for
electrical conductors
According to IS 12444:1988

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 12444:1988
	Title	:	Continuously cast and rolled electrolytic copper wire rods for electrical conductors
	No. of amendments	:	2
2.	Sampling Guidelines		
a)	Raw material	:	NA
b)	Grouping Guidelines	:	Annex-A
c)	Sample Size	:	6m for physical tests 100g drilled for chemical tests or 5 nos. of 5cm length
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 tests
6.	Scope of the Licence :		
	Licence is granted to use Standard Mark as per IS 12444:1988 with the following scope:		
	Name of the product	Continuously cast and rolled electrolytic copper wire rods for electrical conductors	
	Dimensions(Dia in mm)	Diameter from 6mm upto and including 9mm	

ANNEXURE A
TO PRODUCT MANUAL FOR
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GROUPING GUIDELINES

1. Continuously cast and rolled electrolytic copper wire rods for electrical conductors according to IS 12444: 1988 is classified on the basis of Nominal Diameter, ranging from 6 mm to 18mm.
2. Accordingly, following grouping based on diameter of the product, shall be followed for considering grant of licence/change in licence scope as per IS 12444: 1988: -

Group	Nominal Diameter (in mm)	
	Over	Upto and including
1	6 (including 6)	9
2	9	12
3	12	18

3. One sample from each group of any size for licence/inclusion may be drawn and has to be tested for all the requirements of the specification and applicable to the size tested. If the sample passes, then licence may be granted/inclusion be done for all sizes for Continuously cast and rolled electrolytic copper wire rods for electrical conductors of the Group, provided that the firm is having all the necessary manufacturing and testing facilities for the manufacture and testing of the sizes of Continuously cast and rolled electrolytic copper wire rods for electrical conductors to be included in the licence.
4. Manufacturing/Testing facilities & capabilities to be verified with respect to sizes and accordingly same may be covered in the scope of licence.
5. While considering GOL/Inclusion of additional varieties in licence scope, it shall be ensured that the applicant/licensee has got the complete manufacturing and testing facilities for all the sizes varieties applied.
6. During the operation of licence, BO shall ensure that all the sizes covered in the licence 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 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.	Weighing balance, Scale, Micrometer, Angle Protractor or sensor rotation around the wire	Dimensions (5)
3.	Instrumental methods Optical emission spectrometer, Milling machine, Sulphur analyser, Oxygen analyser	Chemical composition (4)
4.	Electro analyser with Platinum electrodes(400 mesh/cm Gauze cathode with wire 0.2mm and spiral anode) of height 130mm, flattened and welded platinum-iridium, platinum-rhodium or platinum-ruthenium having dia of approximately 1.5 mm(approx.), Sulphuric acid sp.Gr 1.84, Nitric acid Sp Gr 1.42, Ethanol or Methanol - 95%, Ferric Nitrate, Ammonium Hydroxide, Ammonium Sulphate, Hot plate, Hot air oven, stop watch, urea, filter paper	Cu content by electrolytic method alternative to Difference method by instrumental analysis (4)
5.	Universal Tensile Testing Machine(UTM)	Tensile Test (7.1)
6	Hammer, Platform capable of holding sample at fixed position during hammering	Surface test(7.2)

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

**ANNEXURE C
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SCHEME OF INSPECTION AND TESTING

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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– The Standard Mark as given in the Schedule of the license and Licence Number (i.e. CM/L.....) shall be incorporated, and the marking 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. In addition, details of BIS website shall be stencilled or mentioned on label affixed on package of coils as follows: “For details of BIS certification please visit www.bis.gov.in”

4. CONTROL UNIT – Coils of wire rod of same size, manufactured from same charge/cast under identical conditions at the same place shall constitute a control unit.

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.

5.2 General requirements relating to the supply of material shall conform to IS 1387.

6. TEST CERTIFICATE - For each consignment of BIS Certified material conforming to IS 12444:1988 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.

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				
4	Chemical Composition	4.1, 4.2, 4.3 8.4 & 8.5 Table 1	IS 191 IS 12444 IS 440 Or any established Chemical/ Instr. Method.	R	One	Each coil	1.The method of determination of oxygen shall be as agreed to between the supplier and the purchaser. 2.Records of agreement on methods of determination for oxygen content shall be maintained for BIS verification. Also see Note-3.
5	Dimensions and Tolerances						
	Dimensions	5.1 5.1.1	IS 12444	R	Three	Each coil	
	Tolerances	5.2 5.2.1, 8.3 & Table-2		R	-do-	-do-	
	Ovality of wire rod	5.2.2		R	-do-	-do-	
Freedom from Defects	6	IS 12444		R	Adequate inspection on each item to ensure freedom from defects		
7.1	Tensile Test	7.1,8.4. 2,8.5.1 Table-3	IS 12444 IS 1608 Pt.1	R	One	Each Coil	
7.2	Surface Test (Compression Test)	7.2 8.4.2, 8.5.1	IS 12444	R	One	Each Coil	

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: Levels of control given in column 3 are only recommendatory in nature. The manufacturer may define the control unit/batch/lot and submit his own levels of control in column 3 with proper justification for approval by BO Head.

Note-3: The manufacturer shall declare the established instrumental method adopted for chemical analysis along with details of the reference material accompanied with test certificate used for its calibration and frequency of calibration.

ANNEXURE I

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(Para 6 of the Scheme of Inspection and Testing)

XYZ COPPER COMPANY

(Registered office Address and works address)



TEST CERTIFICATE FOR Continuously cast and rolled electrolytic copper wire rods for electrical conductors

TEST CERTIFICATE No. _____

DATE _____

To M/s _____

We certified that the material described below fully conforms to IS 12444:1988 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 LicenceNo.CM/L _____ are as indicated below against each order No.

(PLEASE REFER TO IS 12444:1988 FOR DETAILS OF SPECIFICATION REQUIREMENTS)

TEST RESULTS

Order No. & Date	(Nom Size)	Control Unit No.	Tolerances	Qty in tonnes	CHEMICAL COMPOSITION											PHYSICAL PROPERTIES			Remarks				
					Cu (%)	Te %	Se %	Bi %	Sb %	Ar %	Sn (%)	Pb (%)	Fe %	Ni %	O %	Ag %	S %	Total Impurities		TS	EL	Surface test	

Applicable for Cu-DHP, Cu-DPA and Cu-ATP

REMARKS

WAGON NO.

TRUCK NO.

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

FOR XYZ COPPER COMPANY