



## उत्पाद मैनुअल

विशिष्ट प्रकार के कुंडलण तारों की विशिष्टियों भाग 13 पॉलीएमाइड-इमाइड एनामेल्ड सहित पॉलिएस्टर या पॉलिएस्टरइमाइड से लेपित गोलाकार तॉबा तारे, वर्ग 200

आईएस 13730 (Part 13): 2014 के अनुसार

## PRODUCT MANUAL

Specification for Particular Types of Winding Wires Part 13 Polyester or Polyesterimide Overcoated with Polyamide-Imide Enameled Round Copper Wire, Class 200 according to IS 13730 (Part 13): 2014

यह उत्पाद नियमावली सभी क्षेत्रीय/शाखा कार्यालयों और लाइसेंसधारियों द्वारा विभिन्न उत्पादों के लिए भारतीय मानक ब्यूरो (अनुरूपता मूल्यांकन) विनियम, 2018 की योजना-1 के अंतर्गत प्रमाणन के संचालन में एकरूपता और पारदर्शिता सुनिश्चित करने के लिए संदर्भ सामग्री के रूप में उपयोग की जाएगी। बीआईएस प्रमाणन प्राप्त करने के इच्छुक भावी आवेदक भी इस दस्तावेज़ का उपयोग कर सकते हैं।

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. | मानक संख्या / IS No.                                                                        | : | IS 13730 (Part 13): 2014                                                                                                                                                                                                                                                                                   |
|    | शीर्षक / Title                                                                              | : | Specification for Particular Types of Winding Wires Part 13 Polyester or Polyesterimide Overcoated with Polyamide-Imide Enameled Round Copper Wire, Class 200                                                                                                                                              |
|    | संशोधनों की संख्या<br>No. of amendments                                                     | : | 1                                                                                                                                                                                                                                                                                                          |
| 2. | नमूनाकरण दिशानिर्देश / Sampling Guidelines                                                  |   |                                                                                                                                                                                                                                                                                                            |
| a) | कच्चा माल<br>Raw material                                                                   | : | Clause 5 of ISS. Further testing may not be required if the copper rod is ISI marked.<br><i>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.</i> |
| b) | समूहीकरण दिशानिर्देश<br>Grouping Guidelines                                                 | : | Please refer <a href="#">ANNEX – A</a>                                                                                                                                                                                                                                                                     |
| c) | नमूने का परिमाण / Sample Quantity                                                           | : | 50 meters                                                                                                                                                                                                                                                                                                  |
| d) | परीक्षण अनुरोध में घोषित किए जाने वाले पैरामीटर / Parameters to be Declared in Test Request | : | As per scope of licence<br><i>Note: Apart from the above, any other requirements/ parameters may also be declared as per the standard, as applicable.</i>                                                                                                                                                  |
| 3. | परीक्षण उपकरण की सूची<br>List of Test Equipment                                             | : | Please refer <a href="#">ANNEX – B</a>                                                                                                                                                                                                                                                                     |

BUREAU OF INDIAN STANDARDS

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|-----------------------------------------------------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 4.                                                                                                        | निरीक्षण एवं परीक्षण योजना<br>Scheme of Inspection and Testing | :                                                                                                  | Please refer <a href="#">ANNEX – C</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 5.                                                                                                        | एक दिन में संभावित परीक्षण<br>Possible tests in a day          | :                                                                                                  | <div><div><div>(i) Dimensions as per Cl. 4</div><div>(ii) Electrical Resistance as per Cl. 5</div><div>(iii) Elongation as per Cl. 6</div><div>(iv) Springiness as per Cl. 7</div><div>(v) Flexibility and Adherence as per Cl. 8</div><div>(vi) Heat Shock as per Cl. 9</div><div>(vii) Cut-Through as per Cl. 10</div><div>(viii) Resistance to Abrasion as per Cl. 11</div><div>(ix) Resistance to Solvents as per Cl. 12</div><div>(x) Breakdown voltage as per Cl. 13</div><div>(xi) Continuity of Insulation as per Cl. 14</div><div>(xii) Pin hole test as per Cl. 23.</div></div><div><div>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.</div></div></div> |
| 6.                                                                                                        | लाइसेंस का दायरा /Scope of the Licence:                        |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| “License is granted to use Standard Mark as per <b>IS 13730 (Part 13): 2014</b> with the following scope: |                                                                |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Name of the product                                                                                       |                                                                | Polyester or Polyesterimide Overcoated with Polyamide-Imide Enamelled Round Copper Wire, Class 200 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Grade                                                                                                     |                                                                |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Nominal Conductor Diameter                                                                                |                                                                |                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

**ANNEX -A**  
**Grouping Guidelines**

1. IS 13730 (Part 13):2014 covers two grades of winding wires as given below:

| <b>Grade</b> | <b>Range of Nominal Conductor Diameters</b> |
|--------------|---------------------------------------------|
| Grade 1      | 0.050 mm up to and including 2.000 mm       |
| Grade 2      | 0.50 mm up to and including 5.000 mm        |

2. Further, from IS 13730 (Part 13):2014 read in conjunction with IS 13730 (Part 0/Sec 1):2018 it is seen that some tests are dependent on Nominal Conductor Diameter. Hence it may not be possible to perform complete tests as per the Standard on samples with certain Nominal Conductor Diameter due to the permitted exclusions. Wherever possible, sample with such Nominal Conductor Diameter shall be selected so that all tests mentioned in the standard are applicable and can be carried out on that sample. Otherwise, separate sample(s) of different Nominal Conductor Diameter(s), shall additionally be drawn for testing of those requirements such that all tests as per the Standard are carried out.
3. The grouping guidelines as given below shall be followed for GoL/CSoL:
  - Sample of any Nominal Conductor Diameter from each Grade shall be tested for the requirements of the Standard considering Sl. No. 2 above. With the testing of all requirements as per the Standard on sample(s) as given above, complete range of Nominal Conductor Diameters of that particular Grade may be considered for GoL/CSoL.
4. Temperature Index test is equally applicable for all varieties of winding wire covered in IS 13730 (Part 13):2014 (i.e. Grade 1 and Grade 2 as well as all sizes of wires) and shall be carried out as per Cl. 15 of IS 13730 (Part 0/Sec 1):2018 read in conjunction with IS 5825:2018 (Identical with IEC 60172:2015). For eg., a manufacturer applying for a license for Grade 1 having any nominal conductor diameter needs to also manufacture a Grade 2 wire, having a nominal conductor diameter between 0.224 and 2.65 mm (both inclusive) to carry out Temperature Index Test for ensuring compliance to the requirement of the Standard.
5. The Firm shall declare the Varieties including the Nominal Conductor Diameter of wires they intend to cover in the Licence. The Scope of Licence may be restricted based on the Manufacturing and Testing capabilities of the Manufacturer.
6. During the operation of the Licence, BO shall ensure all the varieties covered in the Licence are tested in rotation to the extent possible.

**ANNEX- B**  
**List of Test Equipments**  
(Indicative List, For Guidance Only)

| Sl. No. | Test Equipment                                                                                                                                                                                                                      | Tests used in with Clause Reference |
|---------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| 1.      | Micrometer                                                                                                                                                                                                                          | Dimensions, Cl. 4                   |
| 2.      | Milli-ohm meter                                                                                                                                                                                                                     | Electrical Resistance, Cl. 5        |
| 3.      | Elongation tester or Tensile Testing Machine                                                                                                                                                                                        | Elongation, Cl. 6                   |
| 4.      | Springiness tester with mandrels and weights                                                                                                                                                                                        | Springiness, Cl. 7                  |
| 5.      | Equipment for Mandrel winding and stretching tests, elongation device, mandrels, Jerk Tester with appropriate magnifying glass, Peel Tester with loads                                                                              | Flexibility and Adherence, Cl. 8    |
| 6.      | Electric Oven with Thermostatic Control and Mandrels                                                                                                                                                                                | Heat Shock, Cl. 9                   |
| 7.      | Cut Through Tester, Compression device, transformer, overcurrent device, resistor                                                                                                                                                   | Cut-through, Cl. 10                 |
| 8.      | Abrasion Testing Machine                                                                                                                                                                                                            | Resistance to Abrasion, Cl. 11      |
| 9.      | White spirit, xylene, butanol, pencil set for hardness                                                                                                                                                                              | Resistance to Solvents, Cl. 12      |
| 10.     | Breakdown Voltage Tester, Electric Oven with Thermostatic Control and forces air circulation, test transformer, fault detection circuit, polished metal cylinder, twisting device, strips of metal foil, metal shots, metal mandrel | Breakdown voltage, Cl. 13           |
| 11.     | Continuity tester with faults counter, Sodium sulphate solution, felt pads                                                                                                                                                          | Continuity of Insulation, Cl. 14    |
| 12.     | Temperature Index Test Apparatus                                                                                                                                                                                                    | Temperature Index, Cl. 15           |
| 13.     | Siphon cup, pressure vessel, condenser coil, Oven with forced air circulation, refrigerant R22, Al weighing dish, Weighing scale                                                                                                    | Resistance to refrigerants, Cl. 16  |
| 14.     | NaCl, Phenolphthalein alcohol solution, dc source, air circulation oven                                                                                                                                                             | Pin hole test, Cl. 23               |
| 15.     | Facility to maintain temperature from 15 °C to 35 °C and relative humidity from 45 % to 75 %.                                                                                                                                       | General conditions of test          |

*The above list is indicative only and may not be treated as exhaustive.*

## **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 sub-contracting/ 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: *All coils/spools/reels of winding wires of the same size and grade manufactured on the same set of machines from the same consignment of raw materials in a day shall constitute one control unit.*
- 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.
- 1.4 However, all manufacturers shall ensure compliance of their product to all the requirements of the Indian Standard.

#### **2. ENSURING COMPLIANCE THROUGH TESTING**

The 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 licence shall be incorporated legibly and indelibly on the product/ its packaging provided always that the product so marked conforms to each requirement of the specification.

3.1 Marking on the product shall be done as per the requirements of IS 13730 (Part 13): 2014.

3.2 **Additional Marking requirements:** The winding wires shall also be marked with the following additional requirement on each packaging:

a) "For BIS certification details please visit [www.bis.gov.in](http://www.bis.gov.in)"

### 4. 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           |                            |              |                              | -2                       |                          |                                                                                                                                        |
|--------------|----------------------------|--------------|------------------------------|--------------------------|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| Test Details |                            |              |                              | Levels of Control        |                          |                                                                                                                                        |
| Cl.          | Requirement                | Test Methods |                              | No. of Sample            | Frequency                | Remarks                                                                                                                                |
|              |                            | Clause       | Reference                    |                          |                          |                                                                                                                                        |
| 3.3          | Appearance                 | 3.3          | IS 13730 (Part 0/Sec 1):2018 | Each coil / spool / reel |                          | --                                                                                                                                     |
| 4            | Dimensions                 | 4            | IS 13730 (Part 0/Sec 1):2018 | One                      | Each coil / spool / reel | --                                                                                                                                     |
|              |                            | 3            | IS 13778 (Part 2):2013       |                          |                          |                                                                                                                                        |
| 5            | Electrical Resistance      | 5            | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | Further testing of copper rod for conformity as per Paragraph 1 of Clause 5 of IS may not be insisted if the copper rod is ISI marked. |
|              |                            | 3            | IS 13778 (Part 5):2012       |                          |                          |                                                                                                                                        |
| 6            | Elongation                 | 6            | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 3            | IS 13778 (Part 3):2012       |                          |                          |                                                                                                                                        |
| 7            | Springiness                | 7            | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 4            | IS 13778 (Part 3):2012       |                          |                          |                                                                                                                                        |
| 8            | Flexibility and Adherence  | 8            | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 5            | IS 13778 (Part 3):2012       |                          |                          |                                                                                                                                        |
| 9            | Heat Shock                 | 9            | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 3            | IS 13778 (Part 6):2018       |                          |                          |                                                                                                                                        |
| 10           | Cut-Through                | 10           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 4            | IS 13778 (Part 6):2018       |                          |                          |                                                                                                                                        |
| 11           | Resistance to Abrasion     | 11           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 6            | IS 13778 (Part 3):2012       |                          |                          |                                                                                                                                        |
| 12           | Resistance to Solvents     | 12           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 3            | IS 13778 (Part 4):2018       |                          |                          |                                                                                                                                        |
| 13           | Breakdown Voltage          | 13           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | ---                                                                                                                                    |
|              |                            | 4            | IS 13730 (Part 5):2012       |                          |                          |                                                                                                                                        |
| 14           | Continuity of Insulation   | 14           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each coil / spool / reel | --                                                                                                                                     |
|              |                            | 5            | IS 13730 (Part 5):2012       |                          |                          |                                                                                                                                        |
| 15           | Temperature Index          | 15           | IS 13730 (Part 0/Sec 1):2018 | Once in three years      |                          | Please see Note 1                                                                                                                      |
|              |                            | 5            | IS 13778 (Part 6):2018       |                          |                          |                                                                                                                                        |
| 16           | Resistance to Refrigerants | 16           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 4            | IS 13778 (Part 4):2018       |                          |                          |                                                                                                                                        |
| 23           | Pin hole test              | 23           | IS 13730 (Part 0/Sec 1):2018 | One                      | Each Control Unit        | --                                                                                                                                     |
|              |                            | 7            | IS 13730 (Part 5):2012       |                          |                          |                                                                                                                                        |

Note - 1: Test Report for Temperature Index Test (either In-house/OSL) shall be submitted to BIS for records. Surveillance Samples (FS/MS) drawn need not be tested for this parameter and compliance shall be ensured based on the test reports submitted by the firm.