



**PRODUCT MANUAL FOR
POLYESTER ENAMELLED ROUND COPPER WIRE
CLASS 155 ACCORDING TO IS 13730 (PART 3):2012**

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 13730 (Part 3):2012
	Title	:	Polyester Enamelled Round Copper Wire, Class 155
	No. of Amendments	:	Nil
2.	Sampling Guidelines:		
a)	Raw material	:	--
b)	Grouping guidelines	:	Please refer ANNEX – A
c)	Sample Size	:	50 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	:	Please refer ANNEX – D
6.	Scope of the Licence:		
	Licence is granted to use Standard Mark as per IS 13730 (Part 3):2012 with the following scope:		
	Name of the product	Polyester Enamelled Round Copper Wire, Class 135	
	Grade		
	Nominal Conductor Diameter		

ANNEX AGrouping Guidelines

1. IS 13730 (Part 3):2012 covers two grades of winding wires as given below:

Grade	Range of Nominal Conductor Diameters
Grade 1	0.020 mm up to and including 3.150 mm
Grade 2	0.020 mm up to and including 5.000 mm

1. Further, from IS 13730 (Part 3):2012 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.
2. 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.
3. Temperature Index test is equally applicable for all varieties of winding wire covered in IS 13730 (Part 3):2012 (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.
4. 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.
5. During operation of the Licence, BO shall ensure that all the Varieties covered in the Licence are tested in rotation to the extent possible.

ANNEX B**List Of Test Equipment***Major test equipment required to test as per the Indian Standard*

S. 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.	NaCl, Phenolphthalein alcohol solution, dc source, air circulation oven	Pin hole test, Cl. 23
14.	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. 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 equipment.

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

3. LABELLING AND MARKING – As per the requirements of IS 13730 (Part 3):2012.

4. 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 Standard and covered by the licence should be marked with Standard Mark.

5. CONTROL UNIT – 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.

6. 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.

TABLE 1

(1)				(2)	(3)		
Cl.	Requirement	Test Details		Test equipment requirement R: required (or) S: Sub-contracting permitted	Levels of Control		
		Clause	Test Methods Reference		No. of Sample	Frequency	Remarks
3.2	Appearance	3.3	IS 13730 (Part 0/Sec 1):2018	--	Each coil / spool / reel		--
4	Dimensions	4	IS 13730 (Part 0/Sec 1):2018	R	One	Each coil / spool / reel	--
		3	IS 13778 (Part 2):2013				
5	Electrical Resistance	5	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		3	IS 13778 (Part 5):2012				
6	Elongation	6	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		3	IS 13778 (Part 3):2012				
7	Springiness	7	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		4	IS 13778 (Part 3):2012				
8	Flexibility and Adherence	8	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		5	IS 13778 (Part 3):2012				
9	Heat Shock	9	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		3	IS 13778 (Part 6):2018				
10	Cut-Through	10	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		4	IS 13778 (Part 6):2018				
11	Resistance to Abrasion	11	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		6	IS 13778 (Part 3):2012				
12	Resistance to Solvents	12	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	--
		3	IS 13778 (Part 4):2018				

13	Breakdown Voltage	13	IS 13730 (Part 0/Sec 1):2018	R	One	Each Control Unit	—
		4	IS 13730 (Part 5):2012				
14	Continuity of Insulation	14	IS 13730 (Part 0/Sec 1):2018	R	One	Each coil / spool / reel	--
		5	IS 13730 (Part 5):2012				
15	Temperature Index	15	IS 13730 (Part 0/Sec 1):2018	S	Once in three years	Please see Note 1	
		5	IS 13778 (Part 6):2018				
23	Pin hole test	23	IS 13730 (Part 0/Sec 1):2018	S	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.

Note - 2: Sub-contracting is permitted to a laboratory recognized by the Bureau or Government laboratories empaneled by the Bureau.

Note - 3: 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.

ANNEX – D

POSSIBLE TESTS IN A DAY

- (i) Dimensions as per Cl. 4
- (ii) Electrical Resistance as per Cl. 5
- (iii) Elongation as per Cl. 6
- (iv) Springiness as per Cl. 7
- (v) Flexibility and Adherence as per Cl. 8
- (vi) Heat Shock as per Cl. 9
- (vii) Cut-Through as per Cl. 10
- (viii) Resistance to Abrasion as per Cl. 11
- (ix) Resistance to Solvents as per Cl. 12
- (x) Breakdown voltage as per Cl. 13
- (xi) Continuity of Insulation as per Cl. 14
- (xii) Pin hole test as per Cl. 23