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मानक

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“Step Out From the Old to the New”

IS 13730-13 (1993): Particular types of winding wires, Part 13: Polyester or polyesterimide overcoated with polyamide-imide enamelled round copper wire, Class 200 [ETD 33: Winding Wire]



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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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भारतीय मानक

कुंडलन तारों के विशेष प्रकारों की विशिष्टि

भाग 13 पोलिएमाइड-इमाइड इनैमलकृत वाले पालीएस्टर अथवा पालीइस्टरमाइड
अतिलेपित गोल तांबे के तार, वर्ग 200

Indian Standard

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES

Part 13 Polyester or Polyesterimide Overcoated with Polyamide-Imide
Enamelled Round Copper Wire, Class 200

UDC 621'315'337'4 : 621'315'55 (669'3-426) : 621'3'045

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BUREAU OF INDIAN STANDARDS
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NATIONAL FOREWORD

This Indian Standard which is identical with IEC 317-13 issued by the International Electrotechnical Commission was adopted by the Bureau of Indian Standards on the recommendations of the Winding Wires Sectional Committee and approval of the Electrotechnical Division Council.

Presently requirements of enamelled round and enamelled rectangular winding wires are covered under IS 4800 series and IS 3855 series respectively. Over the years, changes in technology and developments resulted in publishing of number of amendments to these standards. Even though Indian Standards were following the developments in IEC level, but for some specific properties, namely resistivity of copper, methods of test etc. IEC Standards were not adopted in totality. In the present context it was decided to adopt IEC Standards in totality. In addition to this series, methods of tests (IEC 851 series) standards were decided to adopt without deviation. With the publication of this series and also other related series, corresponding parts of IS 4800 series and IS 3855 series would be withdrawn.

The text of IEC standard has been approved as suitable for publication as Indian Standard without deviation. Certain conventions are, however, not identical to those used in Indian Standards. Attention is particularly drawn to the following:

- a) Wherever the words 'International Standard' appear, referring to this standard, they should be read as 'Indian Standard'.
- b) Comma (,) has been used as a decimal marker, while in Indian Standards, the current practice is to use a point (.) as the decimal marker.

CROSS REFERENCES

In this Indian Standard IEC 317-0-1 : 1990 'Specifications for particular types of winding wires: Part 0 General requirements, Section 1 Enamelled round copper wire is referred to. Read in its respective place IS 13730 (Part 0/Sec 1) : 1993 'Specifications for particular types of winding wires: Part 0 General requirements, Section 1 Enamelled round copper wire which is identical with IEC 317-0-1 : 1990.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (revised)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Indian Standard***SPECIFICATIONS FOR PARTICULAR TYPES
OF WINDING WIRES****Part 13 Polyester or Polyesterimide Overcoated with Polyamide-Imide
Enamelled Round Copper Wire, Class 200****1 Scope**

This International Standard specifies the requirements of enamelled round copper winding wire of class 200 with a dual coating. The underlying coating is based on polyester or polyesterimide resin, which may be modified providing it retains the chemical identity of the original resin and meets all specified wire requirements. The superimposed coating is based on polyamide-imide resin.

NOTE — A modified resin is a resin that has undergone a chemical change, or contains one or more additives to enhance certain performance or application characteristics.

Class 200 is a thermal class that requires a minimum temperature index of 200 and a heat shock temperature of at least 220°C.

The temperature in degrees Celsius corresponding to the temperature index is not necessarily that at which it is recommended that the wire be operated and this will depend on many factors, including the type of equipment involved.

The range of nominal conductor diameters covered by this standard is:

- Grade 1: 0,050 mm up to and including 2,000 mm
- Grade 2: 0,050 mm up to and including 5,000 mm

The nominal conductor diameters are specified in clause 4 of IEC 317-0-1.

2 Normative references

The following standard contains provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the edition indicated was valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the standard indicated below. Members of IEC and ISO maintain registers of currently valid international standards.

IEC 317-0-1: 1990, *Specifications for particular types of winding wires — Part 0: General requirements — Section 1: Enamelled round copper wire.*

3 Definitions and general notes on methods of test

For definitions and general notes on methods of test see clause 3 of IEC 317-0-1.

In case of inconsistencies between IEC 317-0-1 and this standard, IEC 317-13 shall prevail.

4 Dimensions

See clause 4 of IEC 317-0-1.

5 Electrical resistance

See clause 5 of IEC 317-0-1.

6 Elongation

See clause 6 of IEC 317-0-1.

7 Springiness

See clause 7 of IEC 317-0-1.

8 Flexibility and adherence

See clause 3 of IEC 317-0-1, where the constant K used for the calculation of the number of revolutions for the peel test shall be 110 mm.

9 Heat shock

See clause 9 of IEC 317-0-1, where the minimum heat shock temperature shall be 220°C.

10 Cut-through

No failure shall occur within 2 min at 320°C.

11 Resistance to abrasion (nominal conductor diameters from 0,250 mm up to and including 2,500 mm)

The wire shall meet the requirements given in table 1.

Table 1 Resistance to abrasion

Nominal conductor diameter mm	Grade 1		Grade 2	
	Minimum average force to failure N	Minimum force to failure of each measurement N	Minimum average force to failure N	Minimum force to failure of each measurement N
0,250	3,00	2,55	4,90	4,15
0,280	3,25	2,75	5,25	4,45
0,315	3,50	2,95	5,65	4,80
0,355	3,75	3,20	6,05	5,15
0,400	4,05	3,45	6,50	5,50
0,450	4,35	3,70	7,00	5,90
0,500	4,65	3,95	7,50	6,35
0,560	5,00	4,25	8,00	6,80
0,630	5,35	4,55	8,60	7,30
0,710	5,70	4,85	9,20	7,80
0,800	6,10	5,15	9,90	8,40
0,900	6,55	5,55	10,6	9,00
1,000	7,05	5,95	11,3	9,60
1,120	7,60	6,45	12,1	10,2
1,250	8,20	6,95	12,9	11,0
1,400	8,80	7,45	13,9	11,8
1,600	9,45	8,00	14,9	12,6
1,800	10,1	8,60	16,0	13,5
2,000	10,9	9,20	17,1	14,4
2,240	—	—	18,2	15,4
2,500	—	—	19,4	16,4

NOTE — For intermediate nominal conductor diameters, the value of the next largest nominal conductor diameter shall be taken.

12 Resistance to solvents

See clause 12 of IEC 317-0-1.

13 Breakdown voltage

See clause 13 of IEC 317-0-1, where the elevated temperature shall be 200°C.

14 Continuity of insulation

See clause 14 of IEC 317-0-1.

15 Temperature index

See clause 15 of IEC 317-0-1, where the minimum temperature index shall be 200.

16 Resistance to refrigerants

This test is only applicable to wires used in refrigerant systems.

16.1 Extraction with trichloroethylene

The percentage of extractable matter shall not exceed 0,6 % for nominal conductor diameters over 0,100 mm up to and including 3,000 mm.

16.2 Extraction with monochlorodifluoromethane (refrigerant 22)

The percentage of extractable matter shall not exceed 0,25 % for nominal conductor diameters over 0,100 mm up to and including 3,000 mm.

16.3 Blistering in monochlorodifluoromethane (refrigerant 22)

This test is made only when agreed between purchaser and supplier.

None of the specimens shall show more than four blisters. Any blister less than half the diameter of the wire shall be ignored when the piece of coating affected is still firmly attached to the rest of the coating.

The adherence of the coating after the blister test is checked by winding the wire on a mandrel of 4D*; the wire shall then show no cracks.

17 Solderability

Test inappropriate.

18 Heat or solvent bonding

Test inappropriate.

19 Dielectric dissipation factor

Test inappropriate.

20 Resistance to transformer oil

Test appropriate but no requirements specified.

21 Loss of mass

Test inappropriate.

22 High temperature failure

The appropriate but no requirements specified.

30 Packaging

See clause 30 of IEC 317-0-1.

* D is the overall diameter of the wire.

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