

विशेष प्रकार की कुंडलण तारों की  
विशिष्टि

भाग 17 पॉलीविनाइल एसीटल एनामेल्ड  
आयताकार तांबे के तारों, कक्षा 105  
(दूसरा पुनरीक्षण)

Specification for Particular Types of  
Winding Wires

Part 17 Polyvinyl Acetal Enamelled  
Rectangular Copper Wire, Class 105  
( Second Revision )

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## NATIONAL FOREWORD

This Indian Standard (Part 17) (Second Revision) which is identical to IEC 60317-17 : 2020 'Specifications for particular types of winding wires — Part 17: Polyvinyl acetal enamelled rectangular copper wire, class 105' Issued by The International Electrotechnical Commission (IEC) was adopted by the Bureau of Indian Standards on the recommendation of the Winding Wire Sectional Committee and approval of the Electrotechnical Division Council.

This standard is published in various parts. Other parts in this series are:

- Part 0 General requirements
- Part 1 Polyvinyl acetal enamelled round copper wire, class 105
- Part 2 Solderable polyurethane enamelled round copper wire, class 130, with a bonding layer
- Part 3 Polyester enamelled round copper wire, class 155
- Part 4 Solderable polyurethane enamelled round copper wire, class 130,
- Part 5 Polyester enamelled round aluminium wire, Class 155
- Part 6 Oleo-resinous enamelled round aluminium wire, class 105
- Part 8 Polyesterimide enamelled round copper wire, class 180
- Part 9 Polyester enamelled round aluminium wire, class 138
- Part 12 Polyvinyl acetal enamelled round copper wire, class 120
- Part 13 Polyester or polyesterimide overcoated with polyamide-imide enamelled round copper wire, class 200
- Part 15 Polyesterimide enamelled round aluminium wire, class 180
- Part 16 Polyester enamelled rectangular copper wire class 155
- Part 20 Solderable polyurethane enamelled round copper wire, class 155
- Part 21 Solderable polyurethane enamelled round copper wire overcoated with polyamide, class 155
- Part 23 Solderable polyesterimide enamelled round copper wire, class 180
- Part 25 Polyester or polyesterimide overcoated with polyamide-imide enamelled round aluminium wire, class 200
- Part 26 Polyamide-imide enamelled round copper wire, class 200
- Part 27 Paper tape covered rectangular copper wire
- Part 28 Polyesterimide enamelled rectangular copper wire, class 180
- Part 29 Polyester or polyesterimide overcoated with polyamide-imide enamelled rectangular copper wire, class 200
- Part 31 Glass fibre wound, resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 180
- Part 32 Glass fibre wound, resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 155
- Part 33 Glass fibre wound, resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 200
- Part 34 Polyester enamelled round copper wire, class 130 L

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## INTRODUCTION

This part of IEC 60317 forms an element of a series of standards which deals with insulated wires used for windings in electrical equipment. It is composed of the following series:

- 1) *Winding wires – Test methods* (IEC 60851 series);
- 2) *Specifications for particular types of winding wires* (IEC 60317 series);
- 3) *Packaging of winding wires* (IEC 60264 series).

*Indian Standard*

SPECIFICATION FOR PARTICULAR TYPES OF WINDING  
WIRES

**PART 17 POLYVINYL ACETAL ENAMELLED RECTANGULAR  
COPPER WIRE, CLASS 105**

( *Second Revision* )

**1 Scope**

This part of IEC 60317 specifies the requirements of enamelled rectangular copper winding wires of class 105 with a sole coating based on polyvinyl acetal resin, which can be modified provided it retains the chemical identity of the original resin and meets all specified wire requirements.

NOTE 1 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.

NOTE 2 Polyvinyl acetate is a general name for a family of thermoplastic vinyl resins produced by the condensation of polyvinyl alcohol with an aldehyde. Examples are polyvinyl acetal, polyvinyl formal and polyvinyl butyral.

The range of nominal conductor dimensions covered by this document is:

- width: min. 2,0 mm max. 31,5 mm;
- thickness: min. 0,80 mm max. 10,00 mm.

Wires of grade 1 and grade 2 are included in this specification and apply to the complete range of conductors.

The specified combinations of width and thickness as well as the specified ratio of width/thickness are given in IEC 60317-0-2.

**2 Normative references**

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60317-0-2:2020, *Specifications for particular types of winding wires – Part 0-2: General requirements – Enamelled rectangular copper wire*

**3 Terms, definitions, general notes and appearance**

**3.1 Terms and definitions**

For the purposes of this document, the terms and definitions given in IEC 60317-0-2 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

### 3.2 General notes

#### 3.2.1 Methods of test

Subclause 3.2 of IEC 60317-0-2:2020 applies. In case of inconsistencies between IEC 60317-0-2 and this document, IEC 60317-17 shall prevail.

#### 3.2.2 Winding wire

Class 105 is a thermal class that requires a minimum temperature index of 105 and a heat shock temperature of at least 155 °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.

### 3.3 Appearance

Subclause 3.3 of IEC 60317-0-2:2020 applies.

## 4 Dimensions

Clause 4 of IEC 60317-0-2:2020 applies.

## 5 Electrical resistance

Clause 5 of IEC 60317-0-2:2020 applies.

## 6 Elongation

Clause 6 of IEC 60317-0-2:2020 applies.

## 7 Springiness

Clause 7 of IEC 60317-0-2:2020 applies.

## 8 Flexibility and adherence

### 8.1 Mandrel winding test

The coating shall show no crack after the wire has been bent flatwise and edgewise on a mandrel with a diameter as specified in Table 1.

**Table 1 – Mandrel winding**

Wire bent on		Mandrel diameter
Width	Sizes up to and including 10 mm	2 × width
	Sizes over 10 mm	3 × width
Thickness	All dimensions	2 × thickness

### 8.2 Adherence test

The wire shall be stretched by 20 % or until it breaks, whichever is less.

The distance of loss of adhesion shall be less than 1 x thickness.

## **9 Heat shock**

Clause 9 of IEC 60317-0-2:2020 applies, where the minimum heat shock temperature shall be 155 °C.

## **10 Cut-through**

Test under consideration.

## **11 Resistance to abrasion**

Test inappropriate.

## **12 Resistance to solvents**

Clause 12 of IEC 60317-0-2:2020 applies.

## **13 Breakdown voltage**

Clause 13 of IEC 60317-0-2:2020 applies, where the elevated temperature shall be 105 °C.

## **14 Continuity of insulation**

Test inappropriate.

## **15 Temperature index**

Clause 15 of IEC 60317-0-2:2020 applies, where the minimum temperature index shall be 105.

## **16 Resistance to refrigerants**

Test inappropriate.

## **17 Solderability**

Test inappropriate.

## **18 Heat or solvent bonding**

Test inappropriate.

## **19 Dielectric dissipation factor**

Test inappropriate.

## **20 Resistance to transformer oil**

Test according to Clause 6 of IEC 60851-4:2016 appropriate. Test requirements are under consideration.

## **21 Loss of mass**

Test inappropriate.

## **23 Pin hole test**

Test inappropriate.

## **30 Packaging**

Clause 30 of IEC 60317-0-2:2020 applies.



## Bibliography

IEC 60264 (all parts), *Packaging of winding wires*

IEC 60317 (all parts), *Specifications for particular types of winding wires*

IEC 60851 (all parts), *Winding wires – Test methods*

IEC 60851-4:2016, *Winding wires – Test methods – Part 4: Chemical properties*

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- Part 35 Solderable polyurethane enamelled round copper wire, class 155, with a bonding layer
- Part 36 Solderable polyesterimide enamelled round copper wire, class 180, with a bonding layer
- Part 37 Polyesterimide enamelled round copper wire, class 180, with a bonding layer
- Part 38 Polyester or polyesterimide overcoated with polyamide-imide, enamelled round copper wire, class 200, with a bonding layer
- Part 39 Glass-fibre braided resin or varnish-impregnated, bare or enamelled rectangular copper wire, temperature index 180
- Part 43 Aromatic polyimide tape wrapped round copper wire, class 240
- Part 44 Aromatic polyimide tape wrapped rectangular copper wire, class 240
- Part 45 Polyester enamelled round copper wire, class 130
- Part 46 Aromatic polyimide enamelled round copper wire, class 240
- Part 47 Aromatic polyimide enamelled rectangular copper wire, class 240
- Part 48 Glass-fibre wound resin or varnish impregnated, bare or enamelled round copper wire, temperature index 155
- Part 49 Glass-fibre wound, high temperature resin or varnish-impregnated, bare or enamelled round copper wire, class 180
- Part 50 Glass-fibre wound, silicone resin or varnish impregnated, bare or enamelled round copper wire, class 200
- Part 53 Aromatic polyimide (aramid) tape wrapped rectangular copper wire, temperature index 220

This standard was first published in 1996 and subsequently revised in 2014. This revision has been undertaken to align it with the latest version of IEC 60317-17 : 2020.

The text of the IEC standard has been approved as suitable for publication as an Indian Standard without deviations. 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' appears referring to this standard, they should be read as 'Indian Standard'; and
- 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.

In this adopted standard, reference appears to International Standards for which Indian Standards also exist. The corresponding Indian Standards, which are to be substituted, are listed below along with their degree of equivalence for the editions indicated:

<i>International Standard</i>	<i>Corresponding Indian Standard</i>	<i>Degree of Equivalence</i>
IEC 60317-0-2 : 2020 Specifications for particular types of winding wires — Part 0-2: General requirements — Enamelled rectangular copper wire	IS 13730 (Part 0/Sec 2) : 2018/ IEC 60317-0-2 : 2013 Specifications for particular types of winding wires: Part 0 General requirements, Section 2 Enamelled rectangular copper wire ( <i>second revision</i> )	Identical

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, shall be rounded off in accordance with IS 2 : 2022 'Rules for rounding off numerical values (*second revision*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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Amendments are issued to standards as the need arises on the basis of comments. Standards are also reviewed periodically; a standard along with amendments is reaffirmed when such review indicates that no changes are needed; if the review indicates that changes are needed, it is taken up for revision. Users of Indian Standards should ascertain that they are in possession of the latest amendments or edition by referring to the website-[www.bis.gov.in](http://www.bis.gov.in) or [www.standardsbis.in](http://www.standardsbis.in).

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### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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