

---

---

## विशेष प्रकार के कुंडलण तार — विशिष्टि

भाग 25 पॉलिएमाइड-इमाइड एनामेल्ड गोल  
एल्युमीनियम तार से लेपित पॉलिएस्टर या  
पॉलिएस्टरइमाइड, कक्षा 200

( पहला पुनरीक्षण )

## Particular Types of Winding Wires — Specification

Part 25 Polyester or Polyesterimide  
Overcoated with Polyamide-Imide  
Enamelled Round Aluminium Wire,  
Class 200

( First Revision )

ICS 29.060.10

© BIS 2024

© IEC 2020



भारतीय मानक ब्यूरो

BUREAU OF INDIAN STANDARDS

मानक भवन, 9 बहादुर शाह ज़फर मार्ग, नई दिल्ली - 110002

MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG

NEW DELHI - 110002

[www.bis.gov.in](http://www.bis.gov.in) [www.standardsbis.in](http://www.standardsbis.in)

## NATIONAL FOREWORD

This Indian Standard (Part 25) (First Revision) which is identical with IEC 60317-25 : 2020 'Specifications for particular types of winding wires — Part 25: Polyester or polyesterimide overcoated with polyamide-imide enamelled round aluminium wire, Class 200' 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 was first published in 2015. This revision has been brought out to align it with the latest version of IEC 60317-25 : 2020.

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, Cass 180
Part 9	Polyester enamelled round aluminium wire, Class 138
Part 12	Specifications for particular types of winding wires 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 17	Polyvinyl acetal enamelled rectangular copper wire, Class 105
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 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
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

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 exists. 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 60317-0-3: 2008 Specifications for particular types of winding wires — Part 0-3: General requirements — Enamelled round aluminium wire	IS 13730 (Part 0/Sec 3) : 2012/ IEC 60317-0-3 : 2008 Specifications for particular types of winding wires: Part 0 General requirements, Section 3 Enamelled round aluminium wire ( <i>first revision</i> )	Identical

Only English language text has been retained while adopting it in this Indian Standard, and as such the page numbers given here are not the same as in the International Standard.

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.

## CONTENTS

INTRODUCTION.....	vi
1 Scope.....	1
2 Normative references .....	1
3 Terms, definitions, general notes and appearance .....	1
3.1 Terms and definitions.....	1
3.2 General notes .....	2
3.2.1 Methods of test.....	2
3.2.2 Winding wire.....	2
3.3 Appearance .....	2
4 Dimensions.....	2
5 Electrical resistance .....	2
6 Elongation .....	2
7 Springiness .....	2
8 Flexibility and adherence .....	2
9 Heat shock .....	2
10 Cut-through .....	2
11 Resistance to abrasion (nominal conductor diameters up to and including 2,500 mm).....	3
12 Resistance to solvents.....	3
13 Breakdown voltage .....	3
14 Continuity of insulation .....	3
15 Temperature index .....	3
16 Resistance to refrigerants.....	4
17 Solderability .....	4
18 Heat or solvent bonding.....	4
19 Dielectric dissipation factor.....	4
20 Resistance to transformer oil .....	4
21 Loss of mass .....	4
23 Pin hole test .....	4
30 Packaging .....	4
Bibliography.....	5
Table 1 – Resistance to abrasion .....	3

## 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*

**PARTICULAR TYPES OF WINDING WIRES —  
SPECIFICATION**

**PART 25 POLYESTER OR POLYESTERIMIDE OVERCOATED  
WITH POLYAMIDE-IMIDE ENAMELLED ROUND ALUMINIUM  
WIRE, CLASS 200**

*( First Revision )*

## **1 Scope**

This part of IEC 60317 specifies the requirements of enamelled round aluminium winding wires of class 200 with a dual coating. The underlying coating is based on polyester or polyesterimide resin, which can be modified provided 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.

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

- Grade 1: 0,250 mm up to and including 3,150 mm;
- Grade 2: 0,250 mm up to and including 5,000 mm.

The nominal conductor diameters are specified in Clause 4 of IEC 60317-0-3:2008 and IEC 60317-0-3:2008/AMD1:2013.

## **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 60317-0-3: 2008, *Specifications for particular types of winding wires – Part 0-3: General requirements – Enamelled round aluminium wire*

IEC 60317-0-3: 2008/AMD1:2013

IEC 60317-0-3: 2008/AMD2:2019

## **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 60317-0-3 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 3.2.1 of IEC 60317-0-3:2008, IEC 60317-0-3:2008/AMD1:2013 and IEC 60317-0-3:2008/AMD2:2019 applies. In case of inconsistencies between IEC 60317-0-3 and this document, IEC 60317-25 shall prevail.

### **3.2.2 Winding wire**

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.

## **3.3 Appearance**

Subclause 3.3 of IEC 60317-0-3:2008 applies.

## **4 Dimensions**

Clause 4 of IEC 60317-0-3:2008 and IEC 60317-0-3:2008/AMD1:2013 applies.

## **5 Electrical resistance**

Clause 5 of IEC 60317-0-3:2008 and IEC 60317-0-3:2008/AMD2:2019 applies.

## **6 Elongation**

Clause 6 of IEC 60317-0-3:2008 applies.

## **7 Springiness**

Test inappropriate.

## **8 Flexibility and adherence**

Clause 8 of IEC 60317-0-3:2008 applies.

## **9 Heat shock**

Clause 9 of IEC 60317-0-3:2008 applies. 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 up to and including 2,500 mm)

The wire shall meet the requirements given in Table 1.

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

**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
0,400	1,95	1,65	3,15	2,65
0,450	2,10	1,75	3,40	2,85
0,500	2,25	1,90	3,60	3,05
0,560	2,40	2,05	3,85	3,25
0,630	2,55	2,20	4,15	3,50
0,710	2,75	2,35	4,45	3,75
0,800	2,95	2,50	4,75	4,05
0,900	3,15	2,70	5,10	4,30
1,000	3,40	2,90	5,45	4,60
1,120	3,70	3,10	5,80	4,90
1,250	3,95	3,35	6,25	5,25
1,400	4,25	3,60	6,65	5,45
1,600	4,60	3,90	7,15	5,85
1,800	5,00	4,20	7,70	6,50
2,000	5,30	4,50	8,20	6,95
2,240	5,70	4,80	8,75	7,40
2,500	6,10	5,15	9,30	7,90

## 12 Resistance to solvents

Clause 12 of IEC 60317-0-3:2008 applies.

## 13 Breakdown voltage

Clause 13 of IEC 60317-0-3:2008 and IEC 60317-0-3:2008/AMD1:2013 applies. The elevated temperature shall be 200 °C.

## 14 Continuity of insulation

Clause 14 of IEC 60317-0-3:2008 applies.

## 15 Temperature index

Clause 15 of IEC 60317-0-3:2008 and IEC 60317-0-3:2008/AMD1:2013 applies. The minimum temperature index shall be 200.

## **16 Resistance to refrigerants**

The percentage of extractable matter shall not exceed 0,5 %. The requirement for breakdown voltage shall be 75 % of the minimum specified value.

## **17 Solderability**

Test inappropriate.

## **18 Heat or solvent bonding**

Test inappropriate.

## **19 Dielectric dissipation factor**

Test inappropriate.

## **20 Resistance to transformer oil**

Test inappropriate.

## **21 Loss of mass**

Test appropriate.

## **23 Pin hole test**

Test inappropriate.

## **30 Packaging**

Clause 30 of IEC 60317-0-3:2008 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*

ISO 3:1973, *Preferred numbers – Series of preferred numbers*

---





## Bureau of Indian Standards

BIS is a statutory institution established under the *Bureau of Indian Standards Act, 2016* to promote harmonious development of the activities of standardization, marking and quality certification of goods and attending to connected matters in the country.

### Copyright

BIS has the copyright of all its publications. No part of these publications may be reproduced in any form without the prior permission in writing of BIS. This does not preclude the free use, in the course of implementing the standard, of necessary details, such as symbols and sizes, type or grade designations. Enquiries relating to copyright be addressed to the Head (Publication & Sales), BIS.

### Review of Indian Standards

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).

This Indian Standard has been developed from Doc No.: ETD 33 (25303).

### Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

## BUREAU OF INDIAN STANDARDS

### Headquarters:

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110002

Telephones: 2323 0131, 2323 3375, 2323 9402

Website: [www.bis.gov.in](http://www.bis.gov.in)

### Regional Offices:

Central : 601/A, Konnectus Tower -1, 6<sup>th</sup> Floor,  
DMRC Building, Bhavbhuti Marg, New  
Delhi 110002

Telephones

{ 2323 7617

Eastern : 8<sup>th</sup> Floor, Plot No 7/7 & 7/8, CP Block, Sector V,  
Salt Lake, Kolkata, West Bengal 700091

{ 2367 0012  
{ 2320 9474

Northern : Plot No. 4-A, Sector 27-B, Madhya Marg,  
Chandigarh 160019

{ 265 9930

Southern : C.I.T. Campus, IV Cross Road, Taramani, Chennai 600113

{ 2254 1442  
{ 2254 1216

Western : 5<sup>th</sup> Floor/MTNL CETTM, Technology Street, Hiranandani Gardens,  
Powai, Mumbai 400076

{ 2570 0030  
{ 2570 2715

**Branches :** AHMEDABAD, BENGALURU, BHOPAL, BHUBANESHWAR, CHANDIGARH, CHENNAI, COIMBATORE, DEHRADUN, DELHI, FARIDABAD, GHAZIABAD, GUWAHATI, HARYANA (CHANDIGARH), HUBLI, HYDERABAD, JAIPUR, JAMMU, JAMSHEDPUR, KOCHI, KOLKATA, LUCKNOW, MADURAI, MUMBAI, NAGPUR, NOIDA, PARWANOO, PATNA, PUNE, RAIPUR, RAJKOT, SURAT, VIJAYAWADA.