

INTERNATIONAL STANDARD



**Specifications for particular types of winding wires –
Part 15: Polyesterimide enamelled round aluminium wire, class 180**

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INTERNATIONAL STANDARD



**Specifications for particular types of winding wires –
Part 15: Polyesterimide enamelled round aluminium wire, class 180**

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CONTENTS

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 15: Polyesterimide enamelled round aluminium wire, class 180

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 60317-15 edition 3.2 contains the third edition (2004-08) [documents 55/908/FDIS and 55/914/RVD], its amendment 1 (2010-06) [documents 55/1121/CDV and 55/1149/RVC] and its amendment 2 (2024-06) [documents 55/1984/CDV and 55/2020/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendments 1 and 2. Additions are in green text, deletions are in strikethrough red text. A separate Final version with all changes accepted is available in this publication.

International Standard IEC 60317-15 has been prepared by IEC technical committee 55: Winding wires.

This third edition of IEC 60317-15 cancels and replaces the second edition published in 1990 and amendment 1 (1997). This edition constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

- new requirements for appearance, Subclause 3.2, added;
- springiness test, Clause 7, determined to be inappropriate;
- cut-through test, Clause 10, determined to be inappropriate;
- high temperature failure test, Clause 22, deleted;
- new pin hole test, Clause 23, added.

This International Standard is to be read in conjunction with IEC 60317-0-3.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The committee has decided that the contents of this document and its amendments will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

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- revised.

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INTRODUCTION

This part of IEC 60317 is one of a series which deals with insulated wires used for windings in electrical equipment. The series has three groups describing

- 1) winding wires – Test methods (IEC 60851);
- 2) specifications for particular types of winding wires (IEC 60317);
- 3) packaging of winding wires (IEC 60264).

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SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 15: Polyesterimide enamelled round aluminium wire, class 180

1 Scope

This part of IEC 60317 specifies the requirements of enamelled round aluminium winding wire of class 180 with a sole coating based on polyesterimide resin, which may be modified providing it retains the chemical identity of the original resin and meets all specified wire requirements.

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 180 is a thermal class that requires a minimum temperature index of 180 and a heat shock temperature of at least 200 °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 as follows:

- grade 1: 0,400 mm up to and including 1,600 mm;
- grade 2: 0,400 mm up to and including 5,000 mm.

The nominal conductor diameters are specified in Clause 4 of IEC 60317-0-3.

2 Normative references

The following ~~referenced~~ documents are ~~indispensable for~~ referred to in the ~~application~~ 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 60317-0-3¹:2008, *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 Definitions and general notes on methods of test and appearance~~

~~3.1 Definitions and general notes on methods of test~~

~~For definitions and general notes on methods of test, see Clause 3 of IEC 60317-0-3.~~

~~In case of inconsistencies between IEC 60317-0-3 and this standard, IEC 60317-15 shall prevail.~~

¹ There exists a consolidated edition 3.2:2019 that includes IEC 60317-0-3:2008, its Amendment 1:2013 and its Amendment 2:2019.

~~3.2 Appearance~~

~~See Clause 3 of IEC 60317-0-3.~~

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 terminology databases for use in standardization at the following addresses:

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

3.2 General notes

3.2.1 Methods of test

Subclause 3.2.1 of 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 60317-15 shall prevail.

3.2.2 Winding wire

Subclause 3.2.2 of IEC 60317-0-3:2008/AMD1:2013 applies.

3.3 Appearance

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

4 Dimensions

See Clause 4 of IEC 60317-0-3.

5 Electrical resistance

~~See Clause 5 of IEC 60317-0-3.~~

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

6 Elongation

See Clause 6 of IEC 60317-0-3.

7 Springiness

Test inappropriate.

8 Flexibility and adherence

See Clause 8 of IEC 60317-0-3.

9 Heat shock

See Clause 9 of IEC 60317-0-3, where the minimum heat shock temperature shall be 200 °C.

10 Cut-through

Test inappropriate.

11 Resistance to abrasion

(nominal conductor diameters up to and including 2,500 mm)

The wire shall meet the requirements given in Table 1.

Table 1 – Résistance to abrasion

Nominal conductor diameter mm	Grade 1		Grade 2	
	Minimum average force to failure	Minimum force to failure of each measurement	Minimum average force to failure	Minimum force to failure of each measurement
	N	N	N	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	–	–	7,70	6,50
2,000	–	–	8,20	6,95
2,240	–	–	8,75	7,40
2,500	–	–	9,30	7,90
For intermediate nominal conductor diameters, the value of the next larger nominal conductor diameter shall be taken.				

12 Resistance to solvents

See Clause 12 of IEC 60317-0-3.

13 Breakdown voltage

See Clause 13 of IEC 60317-0-3, where the elevated temperature shall be 180 °C.

14 Continuity of insulation

See Clause 14 of IEC 60317-0-3.

15 Temperature index

See Clause 15 of IEC 60317-0-3, where the minimum temperature index shall be 180.

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 appropriate but no requirements specified.~~

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

21 Loss of mass

Test inappropriate.

23 Pin hole test

See Clause 23 of IEC 60317-0-3.

30 Packaging

See Clause 30 of IEC 60317-0-3.

CONTENTS

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

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SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 15: Polyesterimide enamelled round aluminium wire, class 180

1 Scope

This part of IEC 60317 specifies the requirements of enamelled round aluminium winding wire of class 180 with a sole coating based on polyesterimide resin, which may be modified providing it retains the chemical identity of the original resin and meets all specified wire requirements.

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 180 is a thermal class that requires a minimum temperature index of 180 and a heat shock temperature of at least 200 °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 as follows:

- grade 1: 0,400 mm up to and including 1,600 mm;
- grade 2: 0,400 mm up to and including 5,000 mm.

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

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3.2 General notes

3.2.1 Methods of test

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In case of inconsistencies between IEC 60317-0-3 and this document, IEC 60317-15 shall prevail.

3.2.2 Winding wire

Subclause 3.2.2 of IEC 60317-0-3:2008/AMD1:2013 applies.

3.3 Appearance

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

4 Dimensions

See Clause 4 of IEC 60317-0-3.

5 Electrical resistance

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

6 Elongation

See Clause 6 of IEC 60317-0-3.

7 Springiness

Test inappropriate.

8 Flexibility and adherence

See Clause 8 of IEC 60317-0-3.

9 Heat shock

See Clause 9 of IEC 60317-0-3, where the minimum heat shock temperature shall be 200 °C.