IEC 60317-28

Edition 2.1 2024-06
CONSOLIDATED VERSION

INTERNATIONAL STANDARD

colour inside

Specifications for particular types of winding wires – Part 28: Polyesterimide enamelled rectangular copper wire, class 180

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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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This consolidated version of the official IEC Standard and its amendment has been prepared for user convenience.

IEC 60317-28 edition 2.1 contains the second edition (2013-10) [documents 55/1415/FDIS and 55/1436/RVD] and its amendment 1 (2024-06) [documents 55/1988/CDV and 55/2023/RVC].

In this Redline version, a vertical line in the margin shows where the technical content is modified by amendment 1. 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 60317-28 has been prepared by IEC technical committee 55: Winding wires.

This second edition cancels and replaces the first edition published in 1990, Amendment 1:1997 and Amendment 2:2007. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– new subclause containing general notes on winding wire, formerly a part of the scope;
– revision to references to IEC 60317-0-2:~~2013~~2020 to clarify that their application is normative;
– new 3.3, Appearance;
– deletion of Clause 22, High temperature failure;
– modification to Clause 23, Pin hole test.

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

This International standard is to be read in conjunction with the IEC 60317-0-2:~~2013~~2020.

The numbering of clauses in this standard is not continuous from Clauses 20 and 30 in order to reserve space for possible future wire requirements prior to those for wire packaging.

A list of all parts in the IEC 60317 series, published under the general title *Specifications for particular types of winding wires*, can be found on the IEC website.

The committee has decided that the contents of this document and its amendment 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

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The *'colour inside'* logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

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).

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 28: Polyesterimide enamelled rectangular copper wire, class 180

1 Scope

This part of IEC 60317 specifies the requirements of enamelled rectangular copper 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.

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

– width: min. 2,0 mm max. 16,0 mm;
– thickness: min. 0,80 mm max. 5,60 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 width/thickness ratio are given in IEC 60317-0-2~~:2013~~.

2 Normative references

~~The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application.~~ 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:~~2013~~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

~~Subclause 3.1 of IEC 60317-0-2:2013 applies.~~

For the purposes of this document, the terms and definitions given in IEC 60317-0-2 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 60317-0-2:2020 applies.

In case of inconsistencies between IEC 60317-0-2 and this standard, IEC 60317-28 shall prevail.

3.2.2 Winding wire

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.

3.3 Appearance

Subclause 3.3 of IEC 60317-0-2:~~2013~~2020 applies.

4 Dimensions

Clause 4 of IEC 60317-0-2:~~2013~~2020 applies.

5 Electrical resistance

Clause 5 of IEC 60317-0-2:~~2013~~2020 applies.

6 Elongation

Clause 6 of IEC 60317-0-2:~~2013~~2020 applies.

7 Springiness

Clause 7 of IEC 60317-0-2:~~2013~~2020 applies.

8 Flexibility and adherence

Clause 8 of IEC 60317-0-2:~~2013~~2020 applies.

9 Heat shock

Clause 9 of IEC 60317-0-2:~~2013~~2020 applies. The minimum heat shock temperature shall be 200 °C.

10 Cut-through

Clause 10 of IEC 60317-0-2:~~2013~~2020 applies.

11 Resistance to abrasion

Test inappropriate.

12 Resistance to solvents

Clause 12 of IEC 60317-0-2:~~2013~~2020 applies.

13 Breakdown voltage

Clause 13 of IEC 60317-0-2:~~2013~~2020 applies. The elevated temperature shall be 180 °C.

14 Continuity of insulation

Test inappropriate.

15 Temperature index

Clause 15 of 60317-0-2:~~2013~~2020 applies. 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 requirements under consideration.

21 Loss of mass

Test inappropriate.

23 Pin hole test

Test inappropriate.