# IEC 60317-82

Edition 1.1 2024-06
CONSOLIDATED VERSION

# INTERNATIONAL STANDARD

colour inside

## Specifications for particular types of winding wires – Part 82: Polyesterimide enamelled rectangular copper wire, class 200



IEC 60317-82:2020-06+AMD1:2024-06 CSV(en)

IEC Secretariat
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

**About the IEC**
The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

**About IEC publications**
The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

**IEC publications search - webstore.iec.ch/advsearchform**
The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, …). It also gives information on projects, replaced and withdrawn publications.

**IEC Just Published - webstore.iec.ch/justpublished**
Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

**IEC Customer Service Centre - webstore.iec.ch/csc**
If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

**IEC Products & Services Portal - products.iec.ch**
Discover our powerful search engine and read freely all the publications previews, graphical symbols and the glossary. With a subscription you will always have access to up to date content tailored to your needs.

**Electropedia - www.electropedia.org**
The world's leading online dictionary on electrotechnology, containing more than 22 500 terminological entries in English and French, with equivalent terms in 25 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

# IEC 60317-82

Edition 1.1 2024-06
CONSOLIDATED VERSION

# INTERNATIONAL STANDARD

colour inside

## Specifications for particular types of winding wires – Part 82: Polyesterimide enamelled rectangular copper wire, class 200



INTERNATIONAL ELECTROTECHNICAL COMMISSION

ICS 29.060.10

ISBN 978-2-8322-9221-1

**Warning! Make sure that you obtained this publication from an authorized distributor.**

# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

# SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

# Part 82: Polyesterimide enamelled rectangular copper wire, class 200

## 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

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

**IEC 60317-82 edition 1.1 contains the first edition (2020-06) [documents 55/1848/FDIS and 55/1869/RVD] and its amendment 1 (2024-06) [documents 55/2002/CDV and 55/2038/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 60317-82 has been prepared by IEC technical committee 55: Winding wires.

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

This International Standard is to be used in conjunction with IEC 60317-0-2:2020.

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 numbering of clauses in this document is not continuous from Clauses 21 through 30 in order to reserve space for possible future wire requirements prior to those for wire packaging.

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 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).

# SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

# Part 82: Polyesterimide enamelled rectangular copper wire, class 200

## 1 Scope

This part of IEC 60317 specifies the requirements of enamelled rectangular copper winding wires of class 200 with a sole coating based on polyesterimide resin, which can be modified provided 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 document 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.

## 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, the latter 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 60317-0-2:2020 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.

NOTE When the value of the proof strength of the copper is specified between minimum and maximum limits, the requirements are agreed upon between the purchaser and supplier. The description of the term “proof strength” and the method of determination are given in ISO 6892-1.

## 7 Springiness

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

## 8 Flexibility and adherence

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

## 9 Heat shock

Clause 9 of IEC 60317-0-2:2020 applies, where the minimum heat shock temperature shall be 220 °C.

## 10 Cut-through

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

## 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 200 °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 200.

## 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.~~

Test inappropriate.

## 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*

ISO 6892-1:2016, *Metallic materials – Tensile testing – Part 1: Method of test at room temperature*

# CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

# SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

# Part 82: Polyesterimide enamelled rectangular copper wire, class 200

## 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.
2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
6) All users should ensure that they have the latest edition of this publication.
7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
9) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at https://patents.iec.ch. IEC shall not be held responsible for identifying any or all such patent rights.

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

**IEC 60317-82 edition 1.1 contains the first edition (2020-06) [documents 55/1848/FDIS and 55/1869/RVD] and its amendment 1 (2024-06) [documents 55/2002/CDV and 55/2038/RVC].**

**This Final version does not show where the technical content is modified by amendment 1. A separate Redline version with all changes highlighted is available in this publication.**

International Standard IEC 60317-82 has been prepared by IEC technical committee 55: Winding wires.

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

This International Standard is to be used in conjunction with IEC 60317-0-2:2020.

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 numbering of clauses in this document is not continuous from Clauses 21 through 30 in order to reserve space for possible future wire requirements prior to those for wire packaging.

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.

# 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).

# SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

# Part 82: Polyesterimide enamelled rectangular copper wire, class 200

## 1 Scope

This part of IEC 60317 specifies the requirements of enamelled rectangular copper winding wires of class 200 with a sole coating based on polyesterimide resin, which can be modified provided 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 document 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.

## 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, the latter 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 60317-0-2:2020 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.

NOTE When the value of the proof strength of the copper is specified between minimum and maximum limits, the requirements are agreed upon between the purchaser and supplier. The description of the term “proof strength” and the method of determination are given in ISO 6892-1.

## 7 Springiness

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

## 8 Flexibility and adherence

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

## 9 Heat shock

Clause 9 of IEC 60317-0-2:2020 applies, where the minimum heat shock temperature shall be 220 °C.

## 10 Cut-through

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

## 11 Resistance to abrasion

Test inappropriate.