

INTERNATIONAL STANDARD



Specifications for particular types of winding wires –
Part 61: Polyester glass-fibre wound, ~~minimum class 180~~ resin or varnish
impregnated, bare or enamelled rectangular copper wire, temperature index 180



THIS PUBLICATION IS COPYRIGHT PROTECTED
Copyright © 2020 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
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 It also gives information on projects, replaced and withdrawn publications.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.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 000 terminological entries in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

INTERNATIONAL STANDARD



REDLINE VERSION

Specifications for particular types of winding wires –
Part 61: Polyester glass-fibre wound, ~~minimum class 180~~ resin or varnish
impregnated, bare or enamelled rectangular copper wire, temperature index 180

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.060.10

ISBN 978-2-8322-8347-9

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

CONTENTS

FOREWORD	3
INTRODUCTION	2
1 Scope	6
2 Normative references	6
3 Terms, definitions, general notes and appearance	6
3.1 Terms and definitions	6
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	8
8 Flexibility and adherence	8
9 Heat shock	8
10 Cut-through	8
11 Resistance to abrasion	8
12 Resistance to solvents	8
13 Breakdown voltage	8
14 Continuity of insulation	8
15 Temperature index	8
16 Resistance to refrigerants	8
17 Solderability	8
18 Heat or solvent bonding	8
19 Dielectric dissipation factor	9
20 Resistance to transformer oil	9
23 Pin hole test	9
30 Packaging	9
Bibliography	10

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 61: Polyester glass-fibre wound, ~~minimum class 180~~ resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 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.
- 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) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

International Standard IEC 60317-61 has been prepared by IEC technical committee 55: Winding wires.

This second edition cancels and replaces the first edition published in 2012. This edition constitutes a technical revision.

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

- a) revision of the title of the standard;
- b) revision to Clause 1, Scope;
- c) revision to the descriptions of grades of thickness of polyester glass-fibre coverings in 3.2.2.

The text of this International Standard is based on the following documents:

CDV	Report on voting
55/1771/CDV	55/1819/RVC

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

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

This International standard is to be used in conjunction with the IEC 60317-0-8:2019.

A list of all the 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 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.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

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 61: Polyester glass-fibre wound, ~~minimum class 180~~ resin or varnish impregnated, bare or enamelled rectangular copper wire, temperature index 180

1 Scope

This part of IEC 60317 specifies the requirements of polyester glass-fibre wound, resin or varnish impregnated bare, grade 1 or grade 2 enamelled rectangular copper winding wires, temperature index 180. The impregnating agent can be, for instance, epoxy, polyester, or polyesterimide resin based.

NOTE For this type of wire, the heat shock test is inappropriate and therefore a heat shock temperature cannot be established. Consequently, a class based on the requirements for temperature index and heat shock temperature cannot be specified.

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.

The specified combinations of width and thickness as well as the specified width/thickness ratio are according to IEC 60317-0-8.

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 60317-0-8:20122019, *Specifications for particular types of winding wires – Part 0-8: General requirements – Polyester glass-fibre wound unvarnished and fused, or resin or varnish ~~impregnated or not~~ impregnated, bare or 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 ~~3.1 of~~ IEC 60317-0-8:2012 ~~shall~~ 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 60317-0-8:20122019 applies. In case of inconsistencies between IEC 60317-0-8 and ~~this standard, IEC 60317-61~~ this document, the latter shall prevail.

3.2.2 Winding wire

The fibre covering shall consist of a combination of polyester and glass fibres. The glass fibres shall be electrical-grade continuous-filament glass yarn. The polyester fibre shall be a high-grade yarn resulting from the linear polymerization of ethylene glycol and terephthalic acid. The maximum content by weight of polyester fibre in the yarn shall not exceed 50 %.

The enamelled wire shall have a temperature index of at least 180 and shall be agreed between purchaser and supplier.

The temperature index of the wire is dependent upon the type of impregnating agent used. The impregnating agent applied to the polyester glass fibres ~~s shall not contain silicone and~~ shall have a minimum temperature index of 180.

The covering shall have one of the following grades of thickness:

- PG1: ~~one polyester glass fibre covering over a bare conductor~~ bare conductor with 1 layer of polyester glass fibre or 2 layers of finer polyester glass fibres that together, comply with the dimensional requirements in IEC 60317-0-8;
- PG2: ~~two polyester glass fibre coverings over a bare conductor~~ bare conductor with 2 layers of polyester glass fibre;
- Grade 1 PG1: ~~one polyester glass fibre covering (GL1) over grade 1 enamelled conductor (Grade 1)~~ enamelled grade 1 (grade 1) with 1 layer of polyester glass fibre (PG1);
- Grade 1 PG2: ~~two polyester glass fibre coverings (GL2) over grade 1 enamelled conductor (Grade 1)~~ enamelled grade 1 (grade 1) with 2 layers of polyester glass fibre (PG2);
- Grade 2 PG1: ~~one polyester glass fibre covering (GL1) over grade 2 enamelled conductor (Grade 2)~~ enamelled grade 2 (grade 2) with 1 layer of polyester glass fibre (PG1);
- Grade 2 PG2: ~~two polyester glass fibre coverings (GL2) over grade 2 enamelled conductor (Grade 2)~~ enamelled grade 2 (grade 2) with 2 layers of polyester glass fibre (PG2).

3.3 Appearance

Subclause 3.3 of IEC 60317-0-8:20122019 applies.

4 Dimensions

Clause 4 of IEC 60317-0-8:20122019 applies.

5 Electrical resistance

Clause 5 of IEC 60317-0-8:20122019 applies.

6 Elongation

Clause 6 of IEC 60317-0-8:20122019 applies.

7 Springiness

Clause 7 of IEC 60317-0-8:20122019 applies.

8 Flexibility and adherence

Clause 8 of IEC 60317-0-8:20122019 applies.

9 Heat shock

Test inappropriate.

10 Cut-through

Test inappropriate.

11 Resistance to abrasion

Test inappropriate.

12 Resistance to solvents

Test inappropriate.

13 Breakdown voltage

Clause 13 of IEC 60317-0-8:20122019 applies.

14 Continuity of insulation

Test inappropriate.

15 Temperature index

Clause 15 of IEC 60317-0-8:20122019 applies.

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 inappropriate.

23 Pin hole test

Test inappropriate.

30 Packaging

Clause 30 of IEC 60317-0-8:~~2012~~2019 applies.