



**NSAI**  
Standards

Irish Standard  
I.S. EN 60317-0-9:2015

# Specifications for particular types of winding wires - Part 0-9: General requirements - Enamelled rectangular aluminium wire

**I.S. EN 60317-0-9:2015**

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

The National Standards Authority of Ireland (NSAI) produces the following categories of formal documents:

I.S. xxx: Irish Standard — national specification based on the consensus of an expert panel and subject to public consultation.

S.R. xxx: Standard Recommendation — recommendation based on the consensus of an expert panel and subject to public consultation.

SWiFT xxx: A rapidly developed recommendatory document based on the consensus of the participants of an NSAI workshop.

*This document replaces/revises/consolidates the NSAI adoption of the document(s) indicated on the CEN/CENELEC cover/Foreword and the following National document(s):*

*NOTE: The date of any NSAI previous adoption may not match the date of its original CEN/CENELEC document.*

*This document is based on:*

EN 60317-0-9:2015

*Published:*

2015-12-04

*This document was published under the authority of the NSAI and comes into effect on:*

2015-12-22

ICS number:

NOTE: If blank see CEN/CENELEC cover page

NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

Údarás um Chaighdeáin Náisiúnta na hÉireann

## National Foreword

I.S. EN 60317-0-9:2015 is the adopted Irish version of the European Document EN 60317-0-9:2015, Specifications for particular types of winding wires - Part 0-9: General requirements - Enamelled rectangular aluminium wire

This document does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

**Compliance with this document does not of itself confer immunity from legal obligations.**

*In line with international standards practice the decimal point is shown as a comma (,) throughout this document.*

This page is intentionally left blank

EUROPEAN STANDARD

**EN 60317-0-9**

NORME EUROPÉENNE

EUROPÄISCHE NORM

December 2015

---

ICS 29.060.10

English Version

**Specifications for particular types of winding wires - Part 0-9:  
General requirements - Enamelled rectangular aluminium wire  
(IEC 60317-0-9:2015)**

Spécifications pour types particuliers de fils de bobinage -  
Partie 0-9: Exigences générales - Fil de section  
rectangulaire émaillé en aluminium  
(IEC 60317-0-9:2015)

Technische Lieferbedingungen für bestimmte Typen von  
Wickeldrähten - Teil 0-9: Allgemeine Anforderungen -  
Flachdrähte aus Aluminium, lackisoliert  
(IEC 60317-0-9:2015)

This European Standard was approved by CENELEC on 2015-06-09. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

---

EN 60317-0-9:2015 (E)

## **European foreword**

The text of document 55/1519/FDIS, future edition 1 of IEC 60317-0-9, prepared by IEC/TC 55 "Winding wires" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60317-0-9:2015.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2016-06-04
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2018-06-09

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC [and/or CEN] shall not be held responsible for identifying any or all such patent rights.

## **Endorsement notice**

The text of the International Standard IEC 60317-0-9:2015 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

- |                  |      |                                |
|------------------|------|--------------------------------|
| IEC 60264 series | NOTE | Harmonized in EN 60264 series. |
| IEC 60317 series | NOTE | Harmonized in EN 60317 series. |

## Annex ZA (normative)

### Normative references to international publications with their corresponding European publications

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE 1 When an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
IEC 60172	2015	Test procedure for the determination of the temperature index of enamelled and tape wrapped winding wires	EN 60172	2015
IEC 60317-0-1	-	Specifications for particular types of winding wires -- Part 0-1: General requirements - Enamelled round copper wire	EN 60317-0-1	-
IEC 60851	series	Winding wires - Test methods	EN 60851	series
ISO 3	-	Preferred numbers; Series of preferred numbers	-	-

This page is intentionally left blank





**IEC 60317-0-9**

Edition 1.0 2015-05

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

---

**Specifications for particular types of winding wires –  
Part 0-9: General requirements – Enamelled rectangular aluminium wire**

**Spécifications pour types particuliers de fils de bobinage –  
Partie 0-9: Exigences générales – Fil de section rectangulaire émaillé en  
aluminium**





## THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2015 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.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office  
3, rue de Varembe  
CH-1211 Geneva 20  
Switzerland

Tel.: +41 22 919 02 11  
Fax: +41 22 919 03 00  
[info@iec.ch](mailto:info@iec.ch)  
[www.iec.ch](http://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 corrigenda or an amendment might have been published.

#### IEC Catalogue - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

#### IEC publications search - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

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](http://webstore.iec.ch/justpublished)

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 15 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

#### IEC Glossary - [std.iec.ch/glossary](http://std.iec.ch/glossary)

More than 60 000 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.

#### IEC Customer Service Centre - [webstore.iec.ch/csc](http://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: [csc@iec.ch](mailto:csc@iec.ch).

### A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

### A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

#### Catalogue IEC - [webstore.iec.ch/catalogue](http://webstore.iec.ch/catalogue)

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

#### Recherche de publications IEC - [www.iec.ch/searchpub](http://www.iec.ch/searchpub)

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

#### IEC Just Published - [webstore.iec.ch/justpublished](http://webstore.iec.ch/justpublished)

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

#### Electropedia - [www.electropedia.org](http://www.electropedia.org)

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 15 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

#### Glossaire IEC - [std.iec.ch/glossary](http://std.iec.ch/glossary)

Plus de 60 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

#### Service Clients - [webstore.iec.ch/csc](http://webstore.iec.ch/csc)

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: [csc@iec.ch](mailto:csc@iec.ch).



**IEC 60317-0-9**

Edition 1.0 2015-05

# **INTERNATIONAL STANDARD**

# **NORME INTERNATIONALE**

---

**Specifications for particular types of winding wires –  
Part 0-9: General requirements – Enamelled rectangular aluminium wire**

**Spécifications pour types particuliers de fils de bobinage –  
Partie 0-9: Exigences générales – Fil de section rectangulaire émaillé en  
aluminium**

INTERNATIONAL  
ELECTROTECHNICAL  
COMMISSION

COMMISSION  
ELECTROTECHNIQUE  
INTERNATIONALE

---

ICS 29.060.10

ISBN 978-2-8322-2667-4

**Warning! Make sure that you obtained this publication from an authorized distributor.  
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

## CONTENTS

FOREWORD .....	4
INTRODUCTION .....	6
1 Scope .....	7
2 Normative references .....	7
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 .....	8
3.3 Appearance .....	8
4 Dimensions .....	8
4.1 Conductor dimensions .....	8
4.2 Tolerance on conductor dimensions .....	9
4.3 Rounding of corners .....	9
4.4 Increase in dimensions due to the insulation .....	11
4.5 Overall dimensions .....	11
4.5.1 Nominal overall dimensions .....	11
4.5.2 Minimum overall dimensions .....	11
4.5.3 Maximum overall dimensions .....	11
5 Electrical resistance .....	12
6 Elongation .....	12
7 Springiness .....	12
8 Flexibility and adherence .....	12
8.1 Mandrel winding test .....	12
8.2 Adherence test .....	12
9 Heat shock .....	12
10 Cut-through .....	12
11 Resistance to abrasion .....	13
12 Resistance to solvents .....	13
13 Breakdown voltage .....	13
14 Continuity of insulation .....	13
15 Temperature index .....	13
16 Resistance to refrigerants .....	13
17 Solderability .....	14
18 Heat or solvent bonding .....	14
19 Dielectric dissipation factor .....	14
20 Resistance to transformer oil .....	14
21 Loss of mass .....	14
23 Pin hole test .....	14
30 Packaging .....	14
Annex A (informative) Nominal cross-sectional areas for preferred and intermediate sizes .....	15
Annex B (informative) Special tolerances .....	24

Bibliography.....	25
Table 1– Conductor tolerances .....	9
Table 2 – Nominal cross-sectional areas of preferred sizes.....	10
Table 3 – Corner radii .....	11
Table 4 – Increases in dimensions .....	11
Table 5 – Mandrel winding .....	12
Table 6 – Breakdown voltage .....	13
Table A.1 – Nominal cross-sectional areas ( <i>1 of 9</i> ) .....	15
Table B.1 – Overall dimensional tolerances for grade 2 .....	24

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

**SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –****Part 0-9: General requirements – Enamelled rectangular aluminium wire****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.

International Standard IEC 60317-0-9 has been prepared by IEC technical committee 55: Winding wires.

The text of this standard is based on the following documents:

FDIS	Report on voting
55/1519/FDIS	55/1525/RVD

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

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

The numbering of clauses in this standard is not continuous from Clauses 21 through 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 publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

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

## 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 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 0-9: General requirements – Enamelled rectangular aluminium wire

#### 1 Scope

This part of IEC 60317 specifies the general requirements of enamelled rectangular aluminium winding wires.

The range of nominal conductor dimensions is given in the relevant specification sheet.

When reference is made to a winding wire according to a standard of the IEC 60317 series mentioned under Clause 2, the following information is given in the description:

- reference to IEC specification;
- nominal conductor dimensions in millimetres (width × thickness);
- grade.

EXAMPLE IEC 60317-16 – 4,00 x 1,00 Grade 1

#### 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60172<sup>1</sup>, *Test procedure for the determination of the temperature index of enamelled and tape wrapped winding wires*

IEC 60317-0-1, *Specifications for particular types of winding wires – Part 0-1: General requirements – Enamelled round copper wire*

IEC 60851 (all parts), *Winding wires – Test methods*

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

#### 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 60317-0-1 apply.

##### 3.2 General notes

###### 3.2.1 Methods of test

All methods of test to be used for this standard are given in IEC 60851.

---

<sup>1</sup> Fourth edition to be published.

This is a free preview. Purchase the entire publication at the link below:

[Product Page](#)

- 
- [Looking for additional Standards? Visit Intertek Inform Infostore](#)
  - [Learn about LexConnect, All Jurisdictions, Standards referenced in Australian legislation](#)
-