

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Specifications for particular types of winding wires –
Part 27-4: Paper tape covered rectangular aluminium wire**

**Spécifications pour types particuliers de fils de bobinage –
Partie 27-4: Fil de section rectangulaire en aluminium recouvert de ruban papier**



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.

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
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 It also gives information on projects, replaced and withdrawn publications.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.

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.

Recherche de publications IEC -

webstore.iec.ch/advsearchform

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

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

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 000 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 16 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

67 000 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.

INTERNATIONAL STANDARD

NORME INTERNATIONALE

**Specifications for particular types of winding wires –
Part 27-4: Paper tape covered rectangular aluminium wire**

**Spécifications pour types particuliers de fils de bobinage –
Partie 27-4: Fil de section rectangulaire en aluminium recouvert de ruban papier**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.10

ISBN 978-2-8322-8417-9

**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.....	3
INTRODUCTION.....	5
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
4.1 Conductor dimensions	7
4.2 Tolerance on conductor dimensions.....	7
4.3 Rounding of corners.....	7
4.4 Increase in dimensions due to paper tape covering.....	7
4.5 Maximum overall dimensions	8
5 Electrical resistance	8
6 Elongation	8
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.....	9
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 hydrolysis and to transformer oil.....	9
21 Loss of mass	9
23 Pin hole test	9
30 Packaging	9
Bibliography.....	11
 Table 1 – Increase in dimensions.....	 8

INTERNATIONAL ELECTROTECHNICAL COMMISSION

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 27-4: Paper tape covered 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 60317-27-4 has been prepared by IEC technical committee 55: Winding wires.

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

FDIS	Report on voting
55/1837/FDIS	55/1859/RVD

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 IEC 60317-0-9:2015.

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 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.

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.

www.international-electrotechnical-commission.org

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 27-4: Paper tape covered rectangular aluminium wire

1 Scope

This part of IEC 60317 specifies the requirements of paper tape covered rectangular aluminium winding wires. This covering consists of two or more layers of paper tape and is primarily intended for winding coils for oil immersed transformers.

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

- width: min. 2,00 mm max. 16,0 mm;
- thickness: min. 0,80 mm max. 5,60 mm.

The paper tapes included in this document are restricted to those specified in IEC 60554-1 and IEC 60554-3-5.

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

IEC 60554-1, *Specification for cellulosic papers for electrical purposes – Part 1: Definitions and general requirements*

IEC 60554-3-5, *Specification for cellulosic papers for electrical purposes – Part 3: Specifications for individual materials – Sheet 5: Special papers*

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 60317-0-9 and the following 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>

3.1.1 covering

material which is wound, wrapped or braided around a bare or insulated conductor

[SOURCE: IEC 60317-0-6:2020, 3.1.3]

3.2 General notes

3.2.1 Methods of test

Subclause 3.2.1 of IEC 60317-0-9:2015 applies. In case of inconsistency between IEC 60317-0-9:2015 and this document, IEC 60317-27-4 shall prevail.

3.2.2 Winding wire

The number of paper tapes, type of paper, paper tape thickness, and the degree of overlap shall be agreed upon between the purchaser and supplier.

When a reference is made to winding wire according to this document, the following information shall be given in the description:

- reference to IEC 60317-27-4;
- nominal conductor dimensions in millimetres (width × thickness);
- nominal increase in dimensions due to paper.

EXAMPLE: IEC 60317-27-4 4,00 × 1,00 + 0,20

- (Eventually) Proof stress minimum (and maximum) value

EXAMPLE: IEC 60317-0-9 4,00 × 1,00 + 0,20

IEC 60317-0-9 7,00 × 2,50 + 1,00 R p0,2 = 150 MPa

3.3 Appearance

The conductor shall be essentially free from aluminium dust and other extraneous matter when examined with normal vision, as wound on the original spool or reel. The paper covering shall be of one or more tapes wrapped firmly, closely, evenly, and continuously around the conductor.

No bonding or adhesive material shall be used except to anchor the ends of paper tapes.

4 Dimensions

4.1 Conductor dimensions

Subclause 4.1 of IEC 60317-0-9:2015 applies.

4.2 Tolerance on conductor dimensions

Subclause 4.2 of IEC 60317-0-9:2015 applies.

4.3 Rounding of corners

Subclause 4.3 of IEC 60317-0-9:2015 applies.

4.4 Increase in dimensions due to paper tape covering

The increase in width or thickness due to the paper tape covering shall be agreed between purchaser and supplier and the minus tolerance shall not exceed the values given in Table 1.

The increase in width due to the paper covering shall be equal to or less than the increase in thickness.

The maximum increase may be exceeded, provided that the maximum overall dimension does not exceed the sum of the maximum dimensions of the conductor plus the maximum increase given in Table 1.

Table 1 – Increase in dimensions

Increase in diameters due to the paper covering mm		Tolerance %
Over	Up to and including	
-	0,50	-10 0
0,50	1,25	-7,5 0
1,25	-	-5 0

4.5 Maximum overall dimensions

The overall dimensions shall not exceed the sum of the maximum bare dimensions given in 4.2 and the maximum increase in dimensions permitted in 4.4.

5 Electrical resistance

Clause 5 of IEC 60317-0-9:2015 applies.

6 Elongation

Clause 6 of IEC 60317-0-9:2015 applies.

NOTE When the value of the proof strength of the aluminium 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 6892-1:2016.

7 Springiness

Test appropriate but no requirements specified.

8 Flexibility and adherence

Because of the great variation in the number and the thickness of papers applied, the requirements for flexibility shall be agreed between purchaser and supplier at the time of placing the order.

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

Test inappropriate.

14 Continuity of insulation

Test inappropriate.

15 Temperature index

Test requirements under consideration.

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 hydrolysis and to transformer oil

Test appropriate but no requirements specified.

21 Loss of mass

Test inappropriate.

23 Pin hole test

Test inappropriate.

30 Packaging

The kind of packaging can influence certain properties of the wire, for example flexibility and adherence. Therefore, the kind of packaging, for example the type of spool, shall be agreed between purchaser and supplier.

The wire shall be evenly and compactly wound on spools. Where wires are delivered in coils, the dimensions and the maximum masses of such coils shall be agreed between purchaser and supplier. Any additional protection for coils shall also be agreed between purchaser and supplier.

A clearance of at least 25 mm shall be arranged between the outermost layer and the periphery of the spool flange. Where there is a requirement for a protective paper between the layers and between the wire and the spool, this shall be agreed between the purchaser and the supplier. Marking of the label when there is more than one length, identification of the separate lengths and identification of joints shall also be by agreement between the purchaser and supplier.

Bibliography

IEC 60264 (all parts), *Packaging of winding wires*

IEC 60317 (all parts), *Specifications for particular types of winding wires*

IEC 60317-0-6:2020, *Specifications for particular types of winding wires – Part 0-6: General requirements – Glass-fibre wound resin or varnish impregnated, bare or enamelled round copper wire*

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

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

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/186003004211010123>