IEC 60317-71

Edition 2.0 2020-04

REDLINE VERSION

colour inside

Specifications for particular types of winding wires – Part 71: Polyester glass-fibre wound ~~fused~~ and resin or varnish impregnated, bare or enamelled round copper wire, temperature index 180

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 29.060.10

ISBN 978-2-8322-8257-1

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

® Registered trademark of the International Electrotechnical Commission

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 6
3.2.1 Methods of test 6
3.2.2 Winding wire 6
3.3 Appearance 7
4 Dimensions 7
5 Electrical resistance 7
6 Elongation 7
7 Springiness 7
8 Flexibility and adherence 7
9 Heat shock 7
10 Cut-through 7
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 8
20 Resistance to transformer oil 8
21 Loss of mass 8
23 Pin hole test 8
30 Packaging 9
Bibliography 10

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 71: Polyester glass-fibre wound ~~fused~~ and resin or varnish impregnated, bare or enamelled round 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.

DISCLAIMER
This Redline version is not an official Standard and is intended to provide the user with an indication of what changes have been made to the previous version. Only the IEC International Standard provided in this package is to be considered the official Standard.

This Redline version provides you with a quick and easy way to compare all the changes between this standard and its 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 60317-71 has been prepared by IEC technical committee 55: Winding wires.

This second edition cancels and replaces the first edition published in 2017. The document 55/1767/CDV, circulated to the National Committees as Amendment 1, led to the publication of this new edition.

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

– modification of the title;
– revision to the Scope;
– revision to 3.2.2.

The text of this standard is based on the first edition, its Amendment 1 and the following documents:

CDV	Report on voting
55/1767/CDV	55/1816/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.

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.

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. 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 71: Polyester glass-fibre wound ~~fused~~ and resin or varnish impregnated, bare or enamelled round copper wire, temperature index 180

1 Scope

This part of IEC 60317 specifies the requirements of polyester glass-fibre wound ~~fused~~ resin ~~or~~ /varnish impregnated, bare, grade 1 or grade 2 enamelled round copper winding wire, 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 nominal conductor diameters are specified in IEC 60317-0-10:2017, Clause 4.

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 60317-0-10:2017, *Specifications for particular types of winding wires – Part 0-10: General requirements – Polyester glass-fibre wound fused, unvarnished, or resin or varnish impregnated, bare or enamelled round copper wire*

IEC 60317-71

Edition 2.0 2020-04

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Specifications for particular types of winding wires – Part 71: Polyester glass-fibre wound and resin or varnish impregnated, bare or enamelled round copper wire, temperature index 180

Spécifications pour types particuliers de fils de bobinage – Partie 71: Fil de section circulaire en cuivre nu ou émaillé, guipé de fibres de verre polyester imprégnées de vernis ou de résine, d'indice de température 180



IEC 60317-71:2020-04(en-fr)

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 6
3.2.1 Methods of test 6
3.2.2 Winding wire 6
3.3 Appearance 7
4 Dimensions 7
5 Electrical resistance 7
6 Elongation 7
7 Springiness 7
8 Flexibility and adherence 7
9 Heat shock 7
10 Cut-through 7
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 8
20 Resistance to transformer oil 8
21 Loss of mass 8
23 Pin hole test 8
30 Packaging 9
Bibliography 10

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 71: Polyester glass-fibre wound and resin or varnish impregnated, bare or enamelled round 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.

International Standard IEC 60317-71 has been prepared by IEC technical committee 55: Winding wires.

This second edition cancels and replaces the first edition published in 2017. The document 55/1767/CDV, circulated to the National Committees as Amendment 1, led to the publication of this new edition.

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

– modification of the title;
– revision to the Scope;
– revision to 3.2.2.

The text of this standard is based on the first edition, its Amendment 1 and the following documents:

CDV	Report on voting
55/1767/CDV	55/1816/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.

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.

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. 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 71: Polyester glass-fibre wound and resin or varnish impregnated, bare or enamelled round copper wire, temperature index 180

1 Scope

This part of IEC 60317 specifies the requirements of polyester glass-fibre wound resin/varnish impregnated, bare, grade 1 or grade 2 enamelled round copper winding wire, temperature index 180.

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 nominal conductor diameters are specified in IEC 60317-0-10:2017, Clause 4.

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 60317-0-10:2017, *Specifications for particular types of winding wires – Part 0-10: General requirements – Polyester glass-fibre wound fused, unvarnished, or resin or varnish impregnated, bare or enamelled round copper wire*

SOMMAIRE

AVANT-PROPOS 13
INTRODUCTION 15
1 Domaine d'application 16
2 Références normatives 16
3 Termes, définitions, notes générales et aspect 16
3.1 Termes et définitions 16
3.2 Notes générales 16
3.2.1 Méthodes d'essai 16
3.2.2 Fil de bobinage 16
3.3 Aspect 17
4 Dimensions 17
5 Résistance électrique 17
6 Allongement 17
7 Effet de ressort 17
8 Souplesse et adhérence 17
9 Choc thermique 17
10 Thermoplasticité 18
11 Résistance à l'abrasion 18
12 Résistance aux solvants 18
13 Tension de claquage 18
14 Continuité de l'isolation 18
15 Indice de température 18
16 Résistance aux réfrigérants 18
17 Brasabilité 18
18 Adhérence par chaleur ou par solvant 18
19 Facteur de dissipation diélectrique 18
20 Résistance à l'huile de transformateur 18
21 Perte de masse 18
23 Détection des microfissures en immersion 19
30 Conditionnement 19
Bibliographie 20

COMMISSION ÉLECTROTECHNIQUE INTERNATIONALE

_____

SPÉCIFICATIONS POUR TYPES PARTICULIERS DE FILS DE BOBINAGE –

Partie 71: Fil de section circulaire en cuivre nu ou émaillé, guipé de fibres de verre polyester imprégnées de vernis ou de résine, d'indice de température 180

AVANT-PROPOS

1) La Commission Electrotechnique Internationale (IEC) est une organisation mondiale de normalisation composée de l'ensemble des comités électrotechniques nationaux (Comités nationaux de l'IEC). L'IEC a pour objet de favoriser la coopération internationale pour toutes les questions de normalisation dans les domaines de l'électricité et de l'électronique. A cet effet, l'IEC – entre autres activités – publie des Normes internationales, des Spécifications techniques, des Rapports techniques, des Spécifications accessibles au public (PAS) et des Guides (ci-après dénommés "Publication(s) de l'IEC"). Leur élaboration est confiée à des comités d'études, aux travaux desquels tout Comité national intéressé par le sujet traité peut participer. Les organisations internationales, gouvernementales et non gouvernementales, en liaison avec l'IEC, participent également aux travaux. L'IEC collabore étroitement avec l'Organisation Internationale de Normalisation (ISO), selon des conditions fixées par accord entre les deux organisations.
2) Les décisions ou accords officiels de l'IEC concernant les questions techniques représentent, dans la mesure du possible, un accord international sur les sujets étudiés, étant donné que les Comités nationaux de l'IEC intéressés sont représentés dans chaque comité d'études.
3) Les Publications de l'IEC se présentent sous la forme de recommandations internationales et sont agréées comme telles par les Comités nationaux de l'IEC. Tous les efforts raisonnables sont entrepris afin que l'IEC s'assure de l'exactitude du contenu technique de ses publications; l'IEC ne peut pas être tenue responsable de l'éventuelle mauvaise utilisation ou interprétation qui en est faite par un quelconque utilisateur final.
4) Dans le but d'encourager l'uniformité internationale, les Comités nationaux de l'IEC s'engagent, dans toute la mesure possible, à appliquer de façon transparente les Publications de l'IEC dans leurs publications nationales et régionales. Toutes divergences entre toutes Publications de l'IEC et toutes publications nationales ou régionales correspondantes doivent être indiquées en termes clairs dans ces dernières.
5) L'IEC elle-même ne fournit aucune attestation de conformité. Des organismes de certification indépendants fournissent des services d'évaluation de conformité et, dans certains secteurs, accèdent aux marques de conformité de l'IEC. L'IEC n'est responsable d'aucun des services effectués par les organismes de certification indépendants.
6) Tous les utilisateurs doivent s'assurer qu'ils sont en possession de la dernière édition de cette publication.
7) Aucune responsabilité ne doit être imputée à l'IEC, à ses administrateurs, employés, auxiliaires ou mandataires, y compris ses experts particuliers et les membres de ses comités d'études et des Comités nationaux de l'IEC, pour tout préjudice causé en cas de dommages corporels et matériels, ou de tout autre dommage de quelque nature que ce soit, directe ou indirecte, ou pour supporter les coûts (y compris les frais de justice) et les dépenses découlant de la publication ou de l'utilisation de cette Publication de l'IEC ou de toute autre Publication de l'IEC, ou au crédit qui lui est accordé.
8) L'attention est attirée sur les références normatives citées dans cette publication. L'utilisation de publications référencées est obligatoire pour une application correcte de la présente publication.
9) L'attention est attirée sur le fait que certains des éléments de la présente Publication de l'IEC peuvent faire l'objet de droits de brevet. L'IEC ne saurait être tenue pour responsable de ne pas avoir identifié de tels droits de brevets et de ne pas avoir signalé leur existence.

La Norme internationale IEC 60317-71 a été établie par le comité d'études 55 de l'IEC: Fils de bobinage.

Cette deuxième édition de l'IEC 60317-71 annule et remplace la première édition parue en 2017. Le document 55/1767/CDV, circulé comme Amendement 1 auprès des Comités nationaux de l'IEC, a conduit à la publication de cette nouvelle édition.

Cette édition inclut les modifications techniques majeures suivantes par rapport à l'édition précédente:

– modification du titre;

– révision du Domaine d'application;

– révision du 3.2.2.

Le texte de cette norme est issu des documents suivants:

CDV	Rapport de vote
55/1767/CDV	55/1816/RVC

Le rapport de vote indiqué dans le tableau ci-dessus donne toute information sur le vote ayant abouti à l'approbation de cette Norme internationale.

Ce document a été rédigé selon les Directives ISO/IEC, Partie 2.

Une liste de toutes les parties de l'IEC 60317, publiées sous le titre général *Spécifications pour types particuliers de fils de bobinage*, peut être consultée sur le site web de l'IEC.

La numérotation des articles de la présente norme n'est pas continue entre les Articles 21 et 30 afin de réserver un espace pour d'éventuelles futures exigences applicables au fil avant celles applicables au conditionnement du fil.

Le comité a décidé que le contenu de ce document ne sera pas modifié avant la date de stabilité indiquée sur le site web de l'IEC sous "http://webstore.iec.ch" dans les données relatives au document recherché. A cette date, le document sera

- reconduit,
- supprimé,
- remplacé par une édition révisée, ou
- amendé.

INTRODUCTION

La présente partie de l'IEC 60317 appartient à l'une des séries de normes qui traitent des fils isolés utilisés pour les enroulements des appareils électriques. L'ensemble est composé des trois séries de normes suivantes:

1) *Fils de bobinage – Méthodes d'essai* (série IEC 60851);
2) *Spécifications pour types particuliers de fils de bobinage* (série IEC 60317);
3) *Conditionnement des fils de bobinage* (série IEC 60264).

SPÉCIFICATIONS POUR TYPES PARTICULIERS DE FILS DE BOBINAGE –

Partie 71: Fil de section circulaire en cuivre nu ou émaillé, guipé de fibres de verre polyester imprégnées de vernis ou de résine, d'indice de température 180

1 Domaine d’application

La présente partie de l'IEC 60317 spécifie les exigences relatives au fil de bobinage de section circulaire en cuivre nu ou émaillé de grade 1 ou de grade 2, guipé de fibres de verre polyester imprégnées de vernis ou de résine, d'indice de température 180.

NOTE Pour ce type de fil, l'essai de choc thermique n'est pas approprié et c'est la raison pour laquelle il n'est pas possible d'établir une température de choc thermique. Par conséquent, il n’est pas possible de spécifier une classe fondée sur les exigences d'indice de température et de température de choc thermique.

Les diamètres nominaux du conducteur sont spécifiés à l'Article 4 de l'IEC 60317-0-10:2017.

2 Références normatives

Les documents suivants cités dans le texte constituent, pour tout ou partie de leur contenu, des exigences du présent document. Pour les références datées, seule l’édition citée s’applique. Pour les références non datées, la dernière édition du document de référence s'applique (y compris les éventuels amendements).

IEC 60317-0-10:2017, *Spécifications pour types particuliers de fils de bobinage – Partie 0-10: Exigences générales – Fil de section circulaire en cuivre nu ou émaillé, guipé de fibres de verre polyester fondues, non vernies ou imprégnées de vernis ou de résine*