BS EN 60317-8:2010

BSI Standards Publication

Specifications for particular types of winding wires

Part 8: Polyesterimide enamelled round copper wire, class 180

National foreword

This British Standard is the UK implementation of EN 60317-8:2010. It is identical to IEC 60317-8:2010. It supersedes BS EN 60317-8:1995 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee GEL/55, Winding wires.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

ISBN 978 0 580 67172 2

ICS 29.060.10

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 June 2010.

Amendments issued since publication

Amd. No.	Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 60317-8

May 2010

ICS 29.060.10

Supersedes EN 60317-8:1994 + A1:1997 + A2:1998

English version

Specifications for particular types of winding wires - Part 8: Polyesterimide enamelled round copper wire, class 180

(IEC 60317-8:2010)

Spécifications pour types particuliers de fils de bobinage - Partie 8: Fil de section circulaire en cuivre émaillé avec polyesterimide, classe 180 (CEI 60317-8:2010)

Technische Lieferbedingungen für bestimmte Typen von Wickeldrähten - Teil 8: Runddrähte aus Kupfer, lackisoliert mit Polyesterimid, Klasse 180 (IEC 60317-8:2010)

This European Standard was approved by CENELEC on 2010-05-01. 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 Central Secretariat 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 Central Secretariat 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

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

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 60317-8:2010 E

Foreword

The text of document 55/1177/FDIS, future edition 4 of IEC 60317-8, prepared by IEC TC 55, Winding wires, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60317-8 on 2010-05-01.

This European Standard supersedes EN 60317-8:1994 + A1:1997 + A2:1998.

The main changes with respect to EN 60317-8:1994 are as follows:

– introduction of requirements for appearance;
– new reference to resistance to refrigerants test method;
– deletion of high temperature failure requirements;
– introduction of pin hole test requirements.

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

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2011-02-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2013-05-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60317-8:2010 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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.

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

Publication	Year	Title	EN/HD	Year
IEC 60317-0-1	2008	Specifications for particular types of winding wires - Part 0-1: General requirements - Enamelled round copper wire	EN 60317-0-1	2008
IEC 60851-4 + A1 + A2	1996 1997 2005	Winding wires - Test methods - Part 4: Chemical properties	EN 60851-4 + A1 + A2	1996 1997 2005

CONTENTS

INTRODUCTION 5
1 Scope 6
2 Normative references 6
3 Terms, definitions and general notes on methods of test and appearance 6
3.1 Terms and definitions 6
3.2 General notes on methods of test 7
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 (nominal conductor diameters from 0,250 mm up to and including 2,500 mm) 7
12 Resistance to solvents 8
13 Breakdown voltage 8
14 Continuity of insulation 8
15 Temperature index 8
16 Resistance to refrigerants 9
17 Solderability 9
18 Heat or solvent bonding 9
19 Dielectric dissipation factor 9
20 Resistance to transformer oil 9
21 Loss of mass 9
23 Pin hole test 9
30 Packaging 9

Table 1 – Resistance to abrasion 8

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 and methods of test (IEC 60851) ;
2) specifications for particular types of winding wires (IEC 60317);
3) packaging of winding wires (IEC 60264).

SPECIFICATIONS FOR PARTICULAR TYPES OF WINDING WIRES –

Part 8: Polyesterimide enamelled round copper wire, class 180

1 Scope

This Part of IEC 60317 specifies the requirements of enamelled round copper winding wires of class 180 with a sole coating based on polyesterimide resin, which may 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.

Class 180 is a thermal class that requires a minimum temperature index of 180 and a heat shock temperature of at least 200 °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.

The range of nominal conductor diameters covered by this standard is as follows:

– Grade 1: 0,018 mm up to and including 3,150 mm;
– Grade 2: 0,020 mm up to and including 5,000 mm;
– Grade 3: 0,250 mm up to and including 1,600 mm.

The nominal conductor diameters are specified in Clause 4 of IEC 60317-0-1.

2 Normative references

The following referenced documents are indispensable for the application 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 60317-0-1:2008, *Specifications for particular types of winding wires – Part 0-1: General requirements – Enamelled round copper wire*

IEC 60851-4:1996, *Methods of test for winding wires – Part 4: Chemical properties*
Amendment 1 (1997)
Amendment 2 (2005)

3 Terms, definitions and general notes on methods of test and appearance

3.1 Terms and definitions

For terms and definitions see 3.1 of IEC 60317-0-1. In case of inconsistencies between IEC 60317-0-1 and this standard, IEC 60317-8 shall prevail.

3.2 General notes on methods of test

For general notes on methods of test, see 3.2 of IEC 60317-0-1. In case of inconsistencies between IEC 60317-0-1 and this standard, IEC 60317-8 shall prevail.

3.3 Appearance

See 3.3 of IEC 60317-0-1.

4 Dimensions

See Clause 4 of IEC 60317-0-1.

5 Electrical resistance

See Clause 5 of IEC 60317-0-1.

6 Elongation

See Clause 6 of IEC 60317-0-1.

7 Springiness

See Clause 7 of IEC 60317-0-1.

8 Flexibility and adherence

See Clause 8 of IEC 60317-0-1, where the constant *K* used for the calculation of the number of revolutions for the peel test shall be 110 mm.

9 Heat shock

See Clause 9 of IEC 60317-0-1, where the minimum heat shock temperature shall be 200 °C.

10 Cut-through

No failure shall occur within 2 min at 300 °C.

11 **Resistance to abrasion** (nominal conductor diameters from 0,250 mm up to and including 2,500 mm)

The wire shall meet the requirements given in Table 1.

Table 1 – Resistance to abrasion

Nominal conductor diameter	Grade 1		Grade 2		Grade 3	
	Minimum average force to failure	Minimum force to failure of each measure-ment	Minimum average force to failure	Minimum force to failure of each measure-ment	Minimum average force to failure	Minimum force to failure of each measure-ment
mm	N	N	N	N	N	N
0,250	2,85	2,45	4,70	4,00	5,80	4,90
0,280	3,10	2,60	5,05	4,30	6,25	5,30
0,315	3,35	2,80	5,45	4,60	6,70	5,70
0,355	3,60	3,05	5,85	4,95	7,20	6,10
0,400	3,85	3,25	6,25	5,30	7,70	6,50
0,450	4,15	3,50	6,75	5,70	8,25	7,00
0,500	4,45	3,75	7,20	6,10	8,85	7,50
0,560	4,75	4,05	7,70	6,50	9,50	8,05
0,630	5,10	4,35	8,25	7,00	10,2	8,65
0,710	5,45	4,65	8,85	7,50	10,9	9,25
0,800	5,85	4,95	9,50	8,05	11,7	9,90
0,900	6,30	5,35	10,2	8,60	12,5	10,6
1,000	6,75	5,75	10,9	9,20	13,3	11,3
1,120	7,35	6,20	11,6	9,80	14,2	12,0
1,250	7,90	6,70	12,5	10,5	15,2	12,9
1,400	8,50	7,20	13,3	11,3	16,4	13,9
1,600	9,20	7,80	14,3	12,1	17,6	14,9
1,800	9,95	8,40	15,4	13,0	–	–
2,000	10,6	9,00	16,4	13,9	–	–
2,240	11,7	9,90	17,5	14,8	–	–
2,500	12,8	10,8	18,6	15,8	–	–

For intermediate nominal conductor diameters, the value of the next largest nominal conductor diameter shall be taken.

12 Resistance to solvents

See Clause 12 of IEC 60317-0-1, however, the change shall not be a reduction of more than three grades of pencil hardness.

13 Breakdown voltage

See Clause 13 of IEC 60317-0-1, where the elevated temperature shall be 180 °C.

14 Continuity of insulation

See Clause 14 of IEC 60317-0-1.

15 Temperature index

See Clause 15 of IEC 60317-0-1, where the minimum temperature index shall be 180.

16 Resistance to refrigerants

When tested according to IEC 60851-4, Clause 4, the percentage of extractable matter shall not exceed 0,5 %. The requirement for breakdown voltage shall be 75 % of the minimum specified value.

17 Solderability

Test inappropriate.

18 Heat or solvent bonding

Test inappropriate.

19 Dielectric dissipation factor

Test inappropriate.

20 Resistance to transformer oil

Test appropriate but no requirements specified.

21 Loss of mass

Test inappropriate.

23 Pin hole test

See Clause 23 of IEC 60317-0-1.

30 Packaging

See Clause 30 of IEC 60317-0-1.

This page deliberately left blank

This page deliberately left blank

British Standards Institution (BSI)

BSI is the independent national body responsible for preparing British Standards and other standards-related publications, information and services.
It presents the UK view on standards in Europe and at the international level.

It is incorporated by Royal Charter.

Revisions

British Standards are updated by amendment or revision. Users of British Standards should make sure that they possess the latest amendments or editions.

It is the constant aim of BSI to improve the quality of our products and services. We would be grateful if anyone finding an inaccuracy or ambiguity while using this British Standard would inform the Secretary of the technical committee responsible, the identity of which can be found on the inside front cover.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001

BSI offers Members an individual updating service called PLUS which ensures that subscribers automatically receive the latest editions of standards.

Tel: +44 (0)20 8996 7669 Fax: +44 (0)20 8996 7001
Email: plus@bsigroup.com

Buying standards

You may buy PDF and hard copy versions of standards directly using a credit card from the BSI Shop on the website **www.bsigroup.com/shop.** In addition all orders for BSI, international and foreign standards publications can be addressed to BSI Customer Services.

Tel: +44 (0)20 8996 9001 Fax: +44 (0)20 8996 7001
Email: orders@bsigroup.com

In response to orders for international standards, it is BSI policy to supply the BSI implementation of those that have been published as British Standards, unless otherwise requested.

Information on standards

BSI provides a wide range of information on national, European and international standards through its Knowledge Centre.

Tel: +44 (0)20 8996 7004 Fax: +44 (0)20 8996 7005
Email: knowledgecentre@bsigroup.com

Various BSI electronic information services are also available which give details on all its products and services.

Tel: +44 (0)20 8996 7111 Fax: +44 (0)20 8996 7048
Email: info@bsigroup.com

BSI Subscribing Members are kept up to date with standards developments and receive substantial discounts on the purchase price of standards. For details of these and other benefits contact Membership Administration.

Tel: +44 (0)20 8996 7002 Fax: +44 (0)20 8996 7001
Email: membership@bsigroup.com

Information regarding online access to British Standards via British Standards Online can be found at **www.bsigroup.com/BSOL**

Further information about BSI is available on the BSI website at **www.bsigroup.com/standards**

Copyright

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Tel +44 (0)20 8996 9001
Fax +44 (0)20 8996 7001
www.bsigroup.com/standards

raising standards worldwide™