



**NSAI**  
Standards

Irish Standard  
I.S. EN 60317-8:2010

**Specifications for particular types of winding wires -- Part 8: Polyesterimide enamelled round copper wire, class 180 (IEC 60317-8:2010 (EQV))**

## I.S. EN 60317-8:2010

*Incorporating amendments/corrigenda 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.

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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.

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**CENELEC**

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

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## **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.

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## **Endorsement notice**

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

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## 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.

<u>Publication</u>	<u>Year</u>	<u>Title</u>	<u>EN/HD</u>	<u>Year</u>
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	1996	Winding wires - Test methods -	EN 60851-4	1996
+ A1	1997	Part 4: Chemical properties	+ A1	1997
+ A2	2005		+ A2	2005

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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**SPECIFICATIONS FOR PARTICULAR TYPES  
OF WINDING WIRES –**

**Part 8: Polyesterimide enamelled round copper wire,  
class 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.
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International Standard IEC 60317-8 has been prepared by IEC technical committee 55: Winding wires.

This fourth edition of IEC 60317-8 cancels and replaces the third edition published in 1990, its amendment 1 (1997) and its Amendment 2 (1997). This edition constitutes a technical revision.

The main changes with respect to the previous edition 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.



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

FDIS	Report on voting
55/1177/FDIS	55/1188/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.

This International Standard is to be read in conjunction with IEC 60317-0-1 (2008).

A list of all the parts in the IEC 60317 series, 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 amendment and the base 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 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  mm	Grade 1		Grade 2		Grade 3	
	Minimum average force to failure  N	Minimum force to failure of each measurement  N	Minimum average force to failure  N	Minimum force to failure of each measurement  N	Minimum average force to failure  N	Minimum force to failure of each measurement  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.

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