BS EN 60317-56:2012

BSI Standards Publication

Specifications for particular types of winding wires

Part 56: Solderable fully insulated (FIW) zero-defect polyurethane enamelled round copper wire, with nominal conducter diameter of 0,040 mm to 1,600 mm, class 180

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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.

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English version

Specifications for particular types of winding wires - Part 56: Solderable fully insulated (FIW) zero-defect polyurethane enamelled round copper wire with nominal conductor diameter of 0,040 mm to 1,600 mm, class 180

(IEC 60317-56:2012)

Spécifications pour types particuliers de fils de bobinage - Partie 56: Fil brasable de section circulaire, isolé en continu, en cuivre émaillé avec polyuréthane sans défaut d'isolation électrique, avec diamètre nominal de conducteur compris entre 0,040 mm et 1,600 mm, classe 180 (CEI 60317-56:2012)

Technische Lieferbedingungen für bestimmte Typen von Wickeldrähten - Teil 56: Isolationsfehlerfreie Runddrähte (FIW) aus Kupfer, verzinnbar, lackisoliert mit Polyurethan, mit Nenndurchmesser von 0,040 mm bis 1,600 mm, Klasse 180 (IEC 60317-56:2012)

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Foreword

The text of document 55/1311/FDIS, future edition 1 of IEC 60317-56, prepared by IEC/TC 55 "Winding wires" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN 60317-56:2012.

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)	2013-03-19
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2015-06-19

This standard is to be read in conjunction with EN 60317-0-7:2012.

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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 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 60317-0-7	2012	Specifications for particular types of winding wires - Part 0-7: General requirements - Fully insulated (FIW) zero-defect enamelled round copper wire with nominal conductor diameter of 0,040 mm to 1,600 mm	EN 60317-0-7	2012

CONTENTS

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);
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 56: Solderable fully insulated (FIW) zero-defect polyurethane enamelled round copper wire with nominal conductor diameter of 0,040 mm to 1,600 mm, class 180

1 Scope

This part of IEC 60317 specifies the requirements of solderable fully insulated (FIW) zero-defect enamelled round copper wire, class 180, with a single coating based on polyurethane resin, which may be modified providing it retains its chemical identity and satisfies all the required technical specifications.

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

– Grade of FIW 3 to FIW 08: 0,040 mm up to and including 0,067 mm;
– Grade of FIW 3 to FIW 09: 0,071 mm up to and including 0,355 mm;
– Grade of FIW 3 to FIW 08: 0,375 mm up to and including 0,475 mm;
– Grade of FIW 3 to FIW 07: 0,500 mm up to and including 0,750 mm;
– Grade of FIW 3 to FIW 06: 0,800 mm up to and including 1,000 mm;
– Grade of FIW 3 to FIW 05: 1,060 mm up to and including 1,600 mm.

The nominal conductor diameters are specified in IEC 60317-0-7.

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 60317-0-7:2012, *Specifications for particular types of winding wires – Part 0-7: General requirements – Fully insulated (FIW) zero-defect enamelled round copper wire with nominal conductor diameter of 0,040 mm to 1,600 mm*

3 Terms and definitions, general notes and appearance

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in 3.1 of IEC 60317-0-7:2012 apply.

3.2 General notes

3.2.1 Methods of test

Subclause 3.2 of IEC 60317-0-7:2012 applies.

In case of inconsistencies between IEC 60317-0-7 and this standard, IEC 60317-56 shall prevail.

3.2.2 Winding wire

A modified resin is one 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 requiring a temperature index of at least 180 °C and a heat shock temperature of at least 200 °C.

The temperature in °C corresponding to the temperature index is not necessarily the temperature recommended as the wire's temperature in use, since this temperature depends on many factors, including the type of electrical equipment involved.

3.3 Appearance

Subclause 3.3 of IEC 60317-0-7:2012 applies.

4 Dimensions

Clause 4 of IEC 60317-0-7:2012 applies.

5 Electrical resistance

Clause 5 of IEC 60317-0-7:2012 applies.

6 Elongation

Clause 6 of IEC 60317-0-7:2012 applies.

7 Springiness

Clause 7 of IEC 60317-0-7:2012 applies.

8 Flexibility and adherence

Clause 8 of IEC 60317-0-7:2012 applies.

9 Heat shock

Clause 9 of IEC 60317-0-7:2012 applies. The minimum heat shock temperature shall be 200 °C.

10 Cut-Through

No failure shall occur within 2 minutes at 245 °C.

11 **Resistance to abrasion** (for nominal diameters of 0,250 mm up to and including 1,000 mm)

The wire shall satisfy the requirements in Table 1. For intermediate nominal diameters, the amount of resistance to abrasion for the next larger nominal diameter shall apply.

Table 1 – Resistance to abrasion

Nominal conductor diameter	Resistance to abrasion	
	Grade of FIW 3 to FIW 9	
	Minimum of average value	Minimum
mm	N	N
0,250	4,10	3,50
0,280	4,40	3,70
0,315	4,75	4,00
0,355	5,10	4,30
0,400	5,45	4,60
0,450	5,80	4,90
0,500	6,20	5,25
0,560	6,65	5,60
0,630	7,10	6,00
0,710	7,60	6,45
0,800	8,10	6,90
0,900	8,70	7,40
1,000	9,30	7,90

12 Resistance to solvents

Clause 12 of IEC 60317-0-7:2012 applies.

13 Breakdown voltage

Clause 13 of IEC 60317-0-7:2012 applies. The elevated temperature shall be 180 °C.

14 Continuity of insulation

Clause 14 of IEC 60317-0-7:2012 applies.

15 Temperature index

Clause 15 of IEC 60317-0-7:2012 applies. The minimum temperature index shall be 180.

16 Resistance to refrigerants

Test inappropriate.

17 Solderability

The temperature of the solder bath shall be (390 ± 5) °C. The maximum immersion time (in seconds) shall be the following multiple of the nominal conductor diameter (in millimetres) with a minimum of 4 s:

All grades of FIW
18 s/mm

The surface of the tinned wire shall be smooth and free of holes and enamel residue.

18 Heat or solvent bonding

Test inappropriate.

19 Dielectric dissipation factor

A test method shall be agreed between the user and the supplier.

20 Resistance to transformer oil

Test inappropriate.

21 Loss of mass

Test inappropriate.

23 Pin-hole test

Clause 23 of IEC 60317-0-7:2012 applies.

30 Packaging

Clause 30 of IEC 60317-0-7:2012 applies.

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BSI Group Headquarters

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