

Low-frequency cables with polyolefin insulation and moisture barrier polyolefin sheath (IEC 60708:2005)

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National foreword

This British Standard is the UK implementation of EN 60708:2005. It is identical to IEC 60708:2005, incorporating corrigendum August 2016.

The UK participation in its preparation was entrusted to Technical Committee EPL/46, Cables, wires and waveguides, radio frequency connectors and accessories for communication and signalling.

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.

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Amendments/corrigenda issued since publication

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31 October 2016	Implementation of IEC corrigendum August 2016: Subclause 4.7 corrected

English version

**Low-frequency cables with polyolefin insulation
and moisture barrier polyolefin sheath
(IEC 60708:2005)**

Câbles pour basses fréquences
à isolation polyoléfine et gaine polyoléfine
à barrière d'étanchéité
(CEI 60708:2005)

Niederfrequenzkabel mit Isolierung
aus Polyolefin und mit Polyolefin-
Schichtenmantel
(IEC 60708:2005)

This European Standard was approved by CENELEC on 2005-09-13. 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

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

Foreword

The text of document 46C/713/FDIS, future edition 1 of IEC 60708, prepared by SC 46C, Wires and symmetric cables, of IEC TC 46, Cables, wires, waveguides, R.F. connectors, R.F. and microwave passive components and accessories, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 60708 on 2005-09-13.

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) | 2006-07-01 |
| – latest date by which the national standards conflicting
with the EN have to be withdrawn | (dow) | 2008-10-01 |

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 60708:2005 was approved by CENELEC as a European Standard without any modification.

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LOW-FREQUENCY CABLES WITH POLYOLEFIN INSULATION AND MOISTURE BARRIER POLYOLEFIN SHEATH

1 Scope

This standard is intended to define polyolefin-insulated cables for insertion into local outdoor networks.

This standard is applicable to polyolefin insulated and moisture barrier polyolefin sheathed telephone cables, filled or unfilled with copper conductors, and used as:

- a) Cables suitable for installation in ducts.
- b) Cables suitable for direct burial in the ground.
- c) Cables with integral suspension strand for aerial installations.

This standard is in accordance with ITU-T Recommendations.

This standard includes general design details and requirements for dimensions and other constructional details as well as mechanical, electrical and environmental characteristics for all types of low-frequency cables with polyolefin insulation (solid or cellular), filled or unfilled, and moisture barrier polyolefin sheath (with integral suspension strand).

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 60028, *International Standard of Resistance for Copper*

IEC 60189-1, *Low-frequency cables and wires with PVC Insulation and PVC sheath – Part 1: General test and measuring methods*

IEC 60304, *Standard colours for insulation for low-frequency cables and wires*

IEC 60794-1-2, *Optical fibre cables – Part 1-2: Generic specification – Basic optical cable test procedures*

IEC 60811-1-1, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section 1: Measurement of thickness and overall dimensions – Tests for determining the mechanical properties*

IEC 60811-1-2, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section Two: Thermal ageing methods*

IEC 60811-1-3, *Insulating and sheathing materials of electric cables – Part 1: General application – Section 3: Methods for determining the density – Water absorption tests – Shrinkage test*

IEC 60811-1-4, *Common test methods for insulating and sheathing materials of electric cables – Part 1: Methods for general application – Section Four – Test at low temperature*

IEC 60811-4-1, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 4-1: Methods specific to polyethylene and polypropylene compounds – Resistance to environmental stress cracking – Measurement of the melt flow index – Carbon black and/or mineral filler content measurement in polyethylene by direct combustion – Measurement of carbon black content by thermogravimetric analysis (TGA) – Assessment of carbon black dispersion in polyethylene using a microscope*

IEC 60811-4-2, *Insulating and sheathing materials of electric and optical cables – Common test methods – Part 4-2: Methods specific to polyethylene and polypropylene compounds – Tensile strength and elongation at break after conditioning at elevated temperature – Wrapping test after conditioning at elevated temperature – Wrapping test after thermal ageing in air – Measurement of mass increase – Long-term stability test – Test method for copper-catalyzed oxidative degradation*

IEC 60811-5-1, *Common test methods for insulating and sheathing materials of electric cables – Part 5-1: Methods specific to filling compounds – Drop point – Separation of oil – Lower temperature brittleness – Total acid number – Absence of corrosive components – Permittivity at 23 °C – DC resistivity at 23 °C and 100 °C*

IEC 61156-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

ITU-T L.3, *Armouring of cables*

3 Quality assurance

It is the responsibility of the manufacturer to establish quality assurance by quality control procedures which will ensure that the product will meet the requirements of this standard.

It is not intended that a complete testing programme shall be carried out on every length of conductor and cable. When the purchaser wishes to specify acceptance tests or other quality procedures, it is essential that agreement be reached between the purchaser and the manufacturer by the time of ordering.

4 Cable construction

4.1 Conductor

4.1.1 Conductor material

The conductor shall consist of annealed copper, uniform in quality and free from defects. The properties of the copper shall be in accordance with IEC 60028.

4.1.2 Type of conductor

The conductor shall consist of a single strand circular in section. The nominal diameter shall be at least 0,4 mm.

4.1.3 Conductor-finish

The conductor shall be plain.

4.1.4 Continuity of conductor

Joints in the conductor are permitted provided that the tensile strength of a joint is not less than 90 % of the tensile strength of the jointed conductor.

4.2 Insulation

4.2.1 Insulation material

The conductor shall be covered with solid or cellular polyolefin insulation or any combination thereof.

For cellular insulation, the cells produced by the expanding process shall be uniformly distributed circumferentially and should be substantially non-intercommunicating.

The material for the insulation shall be a virgin thermoplastic compound suitably stabilized. Examples of suitable materials are:

- Polyethylene.
- Polypropylene.

4.2.2 Insulation thickness

The insulation shall be continuous and shall have a thickness such that the completed cable will meet the electrical requirements specified.

4.2.3 Colour of insulated conductor

The insulated conductors shall be coloured. Colours shall be readily identifiable and shall correspond reasonably with the standard colours shown in IEC 60304.

4.3 Cabling element

A cabling element (Figure 1) shall be:

- a pair of two insulated conductors twisted together and designated wire a and b respectively,

or

- a quad of four insulated conductors twisted together and designated wire a, wire c, wire b, and wire d respectively.

The maximum length of lay in the finished cable shall not exceed 150 mm.

NOTE Forming the element with a variable lay can lead to the infrequent but acceptable occurrence of the maximum lay being longer than specified.

4.4 Stranding

The cable elements shall be formed into a number of sub-units or units which can be stranded into a regular make up to produce the required number of pairs.

4.5 Colour code

4.5.1 General

Three different colour schemes for identifying pair or quad counts are defined. One with 10 pair or 5 quad sub-units, one for 25 pair colour groups and a third for 25 quad colour groups.