



DPC: 20/30411133 DC

BSI Group Headquarters

389 Chiswick High Road London W4 4AL

Tel: +44 (0)20 8996 9000

Fax: +44 (0)20 8996 7400

www.bsigroup.com

Date: 10 January 2020

Origin: International

Latest date for receipt of comments: 04 March 2020

Project No. 2019/01393

Responsible committee: GEL/7 Overhead electrical conductors

Interested committees:

Title: Draft BS EN IEC 63248 Conductors for overhead lines - Coated or clad metallic wire for concentric lay stranded conductors.

Please notify the secretary if you are aware of any keywords that might assist in classifying or identifying the standard or if the content of this standard

- i) has any issues related to 3rd party IPR, patent or copyright
- ii) affects other national standard(s)
- iii) requires additional national guidance or information

WARNING: THIS IS A DRAFT AND MUST NOT BE REGARDED OR USED AS A BRITISH STANDARD. THIS DRAFT IS NOT CURRENT BEYOND 04 March 2020

This draft is issued to allow comments from interested parties; all comments will be given consideration prior to publication. No acknowledgement will normally be sent. **See overleaf for information on the submission of comments.**

No copying is allowed, in any form, without prior written permission from BSI except as permitted under the Copyright, Designs and Patent Act 1988 or for circulation within a nominating organization for briefing purposes. Electronic circulation is limited to dissemination by e-mail within such an organization by committee members.

Further copies of this draft may be purchased from BSI Shop <http://shop.bsigroup.com> or from BSI Customer Services, Tel: +44(0) 20 8996 9001 or email cservices@bsigroup.com. British, International and foreign standards are also available from BSI Customer Services.

Information on the co-operating organizations represented on the committees referenced above may be obtained from <https://standardsdevelopment.bsigroup.com/>.

Introduction

This draft standard is based on national and international discussions. Your comments on this draft are invited and will assist in the preparation of the consequent standard.

For international standards, comments will be reviewed by the relevant UK national committee before sending the consensus UK vote and comments to the international committee, which will then decide appropriate action. If the international standard is approved, it is usual for the text to be published as a British Standard.

For national standards, comments will be reviewed by the relevant UK national committee and the resulting standards published as a British Standard.

UK Vote

Please indicate whether you consider the UK should submit a negative (with supporting technical reasons) or positive vote on this draft. Please indicate if you are aware of any reason why this draft standard should not be published as a British Standard.

Submission of Comments

- **Annotated drafts are not acceptable and will be rejected.**
- All comments should be submitted online at <https://standardsdevelopment.bsigroup.com/>. You will need to register in order to comment.

Template for comments and secretariat observations

Date: xx/xx/20xx	Document: ISO/DIS xxxx
------------------	------------------------

1	2	(3)	4	5	(6)	7
MB	Clause No./ Subclause No./Annex (e.g. 3.1)	Paragraph/Figure/ Table/Note	Type of comment	Commend (justification for change) by the MB	Proposed change by the MB	Secretariat observations on each comment submitted
	3.1	Definition 1	ed	Definition is ambiguous and needs clarifying.	Amend to read '...so that the mains connector to which no connection...'	
	6.4	Paragraph 2	te	The use of the UV photometer as an alternative cannot be supported as serious problems have been encountered in its use in the UK.	Delete reference to UV photometer.	



7/695/CD

COMMITTEE DRAFT (CD)

PROJECT NUMBER:

IEC 63248 ED1

DATE OF CIRCULATION:

2020-01-10

CLOSING DATE FOR COMMENTS:

2020-04-03

SUPERSEDES DOCUMENTS:

7/685/CD, 7/692A/CC

IEC TC 7 : OVERHEAD ELECTRICAL CONDUCTORS

SECRETARIAT:

China

SECRETARY:

Mr Qiu Zheng

OF INTEREST TO THE FOLLOWING COMMITTEES:

TC 11

PROPOSED HORIZONTAL STANDARD:

☐

Other TC/SCs are requested to indicate their interest, if any, in this CD to the secretary.

FUNCTIONS CONCERNED:

☐ EMC

☐ ENVIRONMENT

☒ QUALITY ASSURANCE

☐ SAFETY

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Conductors for overhead lines - Coated or clad metallic wire for concentric lay stranded conductors

NOTE FROM TC/SC OFFICERS:

The comments to this new Committee Draft from TC7 members are kindly requested. These comments will be discussed at the next PT meeting in April in Frankfurt/Main, Germany.

CONTENTS

FOREWORD.....	4
INTRODUCTION.....	6
1 Scope	7
2 Normative references.....	7
3 Terms and definitions.....	7
4 Material	8
4.1 Steel.....	8
4.2 Aluminium.....	9
4.3 Zinc	9
4.4 Zinc-aluminium alloy	9
5 Freedom from defects	9
6 Joints.....	9
7 Tests	9
7.1 General.....	9
7.2 Place of testing	9
7.3 Sampling rate	9
7.4 Test methods	10
8 Acceptance and rejection	13
9 Certificate of compliance.....	14
10 Packaging.....	14
10.1 Type of packaging	14
10.2 Length and tolerance on length.....	14
Annex A (normative) Properties for recommended IEC wire materials.....	15
Annex B (informative) Properties of wire for calculation purposes	28
Annex C (informative) Method to measure the equivalent diameter by volume	30
Bibliography.....	32
Figure C.1 –OPGW composed of a formed aluminium-clad steel wires.....	30
Figure C.2 – Density measurement apparatus for example	30
Table A.1 – Wire designation	15
Table A.2 –Schedule of tests	16
Table A.3 – Zinc-aluminium alloy slab composition	17
Table A.4 –Requirements for zinc and zinc-aluminium alloy coated steel wires (group 1, group 4 and group 5)	18
Table A.5 –Requirements for aluminium-clad FeNi36 wires (group 2).....	21
Table A.6 –Requirements for aluminium-clad steel wires (group 3)	23
Table A.7 –Initial setting for determining stress at 1% elongation.....	25
Table A.8 –Coating requirements for zinc and zinc-aluminium alloy coated wires.....	26
Table A.9 –Cladding requirements for Group 2 and Group 3 wire	26
Table A.10 –Coating heat resistance test for Group 4 and Group 5 wire	27

45	Table A.11 –Temperatures for linear expansion test for Group 2 wire	27
46	Table A.12 –Minimum number of dips for Zn and Zn Alloy coatings.....	27
47	Table B.1 –Properties of wire for calculation purposes	28
48	Table B.2 –Standard aluminium and steel or FeNi36 ratio in the cross section for	
49	Group 2 and Group 3 wires	29
50		
51		
52		

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**CONDUCTORS FOR OVERHEAD LINES - COATED OR CLADDED
METALLIC WIRE FOR CONCENTRIC LAY STRANDED CONDUCTORS****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 63248 has been prepared by IEC technical committee 7:
OVERHEAD ELECTRICAL CONDUCTORS.

The text of this International Standard is based on the following documents:

FDIS	Report on voting
XX/XX/FDIS	XX/XX/RVD

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.

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

- 105 • reconfirmed,
- 106 • withdrawn,
- 107 • replaced by a revised edition, or
- 108 • amended.
- 109

110 The National Committees are requested to note that for this document the stability date
111 is 20XX..

112 THIS TEXT IS INCLUDED FOR THE INFORMATION OF THE NATIONAL COMMITTEES AND WILL BE
113 DELETED AT THE PUBLICATION STAGE.

114

115

INTRODUCTION

116 The purpose of this standard is to group together similar wire materials that share the same
117 general characteristics and therefore the same test procedures and requirements. Included in
118 this standard are existing wire types from IEC 60888 and IEC 61232 as well as new wire
119 materials that are already in use around the world in new types of conductors.

120 Zinc coating class 2 according to IEC 60888 has not been included in this standard, as the
121 demand for this class of zinc coating is extremely rare. Extra corrosion protection can be
122 provided by other means, including the use of Zinc-aluminium alloy coatings.

CONDUCTORS FOR OVERHEAD LINES - COATED OR CLADDED METALLIC WIRE FOR CONCENTRIC LAY STRANDED CONDUCTORS

1 Scope

This International Standard IEC 63248 specifies the properties of wires in the diameter range of, but not limited to, 1,25 mm to 5,50 mm. This standard is applicable to coated or clad metallic wires before stranding used either as concentric lay overhead stranded conductors, or in the manufacture of cores for concentric lay overhead stranded conductors, for power transmission purposes.

The various wire types and their designation are listed in Table A.1. For calculation purposes the values listed in Table B.1 shall be used.

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 60050, *International electro-technical vocabulary*

IEC 60468, *Method of measurement of resistivity of metallic materials*

ISO 752, *Zinc ingots*

ISO 6892-1, *Metallic materials — Tensile testing — Part 1: Method of test at room temperature*

ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension/compression testing machines — Verification and calibration of the force-measuring system*

ISO 7800, *Metallic materials — Wire — Simple torsion test*

ISO 7801, *Metallic materials — Wire — Reverse bend test*

ISO 7802, *Metallic materials — Wire — Wrapping test*

ISO 7989-2, *Steel wire and wire products — Non-ferrous metallic coatings on steel wire — Part 2: Zinc or zinc-alloy coating*

3 Terms and definitions

For the purposes of this document, the terms and definitions in IEC 60050 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

cladded metallic wire

the result of a process by which a metal is bonded under high pressure by co-rolling, co-extrusion, or others, onto a wire creating a metallic bond between them

3.2**class**

a number attributed to aluminium-clad wires for the purpose of providing an approximate conductivity value

3.3**coated metallic wire**

the result of a process by which a metal is deposited onto a wire by hot-dip or electrolytic process, creating a chemical or metallic bond between them

3.4**equivalent diameter**

the diameter of a round wire, which would have the same cross sectional area as a given formed wire

3.5**formed wire**

a drawn or rolled metal wire having a constant non-circular cross-section

3.6**group**

a designation given to wire types that share a common coating or cladding, or property for a similar purpose

3.7**FeNi36**

a grade of steel-nickel alloy designed to have a very low coefficient of thermal expansion

3.8**lot**

a group of production units of one type and size of wire, which was manufactured by the same manufacturer during the same time period under similar conditions of production. A lot may consist of part or all of a purchased quantity

3.9**nominal**

the value of a measurable property to which tolerance is applied. Nominal values are target values

3.10**production unit**

a coil, reel, spool, or other package of wire that represents a single usable length

3.11**sample**

specimen or specimens removed from a production unit or units which is considered to have properties representative of a lot

3.12**specimen**

a length of wire removed for test purposes

3.13**zinc-aluminium alloy**

a mixture of zinc and aluminium coating applied onto the wire for the purpose of protecting it against corrosion. Sometimes designated as Mischmetal

4 Material**4.1 Steel**

The base metal shall be steel produced by the open hearth, electric furnace, or basic oxygen process and shall be of such composition that the finished wire shall have the properties and characteristics given in this standard.

4.2 Aluminium

The aluminium used for coating or cladding shall have a minimum purity of 99,5% and of sufficient quality to meet thickness and electrical resistance requirements of this standard.

4.3 Zinc

The slab of zinc used for coating shall be high-grade with a minimum zinc content of 99,9%. The zinc coating shall be applied by either the hot-dip or electroplating method. Unless agreed between the purchaser and the manufacturer, the method of coating shall be at the discretion of the manufacturer.

The slab of zinc used for coating shall meet the requirements of ZN-3 according IEC 752.

4.4 Zinc-aluminium alloy

The slab of zinc-aluminium alloy used for coating shall be in accordance with Table A.3.

5 Freedom from defects

The wires shall be smooth and free from all imperfections such as cracks, roughness, grooves, inclusions and other defects which may compromise the performance of the final product.

6 Joints

No joints shall be made in the finished coated wire.

Joints may be made at any stage of processing prior to final cold drawing by the electric butt-weld or flash-welding process.

Welding equipment and procedure shall be such that it can be demonstrated that the ultimate tensile strength of a finished wire specimen containing the welded section shall be not less than 96 % of the specified minimum stress at 1 % extension.

A welded section shall not be required to meet the stress at 1 % extension, elongation, torsion, bend, and wrap tests.

No joints are allowed after heat treatment on wires, which will be used in single wire conductors.

7 Tests

7.1 General

Tests shall be made by the manufacturer on the wires to demonstrate their conformance to this standard. Tests shall be made in accordance with Table A.2.

Tests shall be performed between 10°C and 30°C.

7.2 Place of testing

Unless otherwise agreed between the purchaser and the manufacturer at time of ordering, all tests shall be carried out at the manufacturer's works.

7.3 Sampling rate

Specimen for tests specified in clause 0 shall be taken by the manufacturer from samples of at least 10% of each lot.

Alternatively, if a quality assessment procedure is in place and implemented, the sampling rate shall be subject to agreement between the manufacturer and purchaser.