

| | | |
|------------|---|--|
| STN | Vodiče na vonkajšie vedenie Koncentricky zlanované vodiče s povrchovou úpravou | STN EN IEC 63248 34 7505 |
|------------|---|--|

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

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 07/22

Obsahuje: EN IEC 63248:2022, IEC 63248:2022

Oznámením tejto normy sa od 11.04.2025 ruší
STN EN 61232 (34 7505) z augusta 2001

STN EN 50189 (34 7508) z decembra 2001

135285



EUROPEAN STANDARD

EN IEC 63248

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2022

ICS 29.060.01; 29.240.20

Supersedes EN 61232:1995/corrigendum Feb. 1996,
EN 50189:2000, EN 61232:1995 + A11:2000

English Version

**Conductors for overhead lines - Coated or cladded metallic wire
for concentric lay stranded conductors
(IEC 63248:2022)**

Conducteurs pour lignes aériennes - Fil métallique revêtu
ou recouvert pour conducteurs toronnés à couches
concentriques
(IEC 63248:2022)

Leiter für Freileitungen - Beschichtete oder ummantelte
Metalldrähte für Leiter aus konzentrisch verseilten Drähten
(IEC 63248:2022)

This European Standard was approved by CENELEC on 2022-04-08. 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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre 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, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

EN IEC 63248:2022 (E)**European foreword**

The text of document 7/715/FDIS, future edition 1 of IEC 63248, prepared by IEC/TC 7 "Overhead electrical conductors" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 63248:2022.

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) 2023-04-11
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2025-04-11

This document supersedes EN 61232:1995 and EN 50189:2000, and all of their amendments and corrigenda (if any).

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

Any feedback and questions on this document should be directed to the users' national committee. A complete listing of these bodies can be found on the CENELEC website.

Endorsement notice

The text of the International Standard IEC 63248:2022 was approved by CENELEC as a European Standard without any modification.



IEC 63248

Edition 1.0 2022-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



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

Conducteurs pour lignes aériennes – Fil métallique revêtu ou recouvert pour conducteurs toronnés à couches concentriques

**THIS PUBLICATION IS COPYRIGHT PROTECTED****Copyright © 2022 IEC, Geneva, Switzerland**

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Secretariat
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigendum or an amendment might have been published.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee, ...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and once a month by email.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Discover our powerful search engine and read freely all the publications previews. With a subscription you will always have access to up to date content tailored to your needs.

Electropedia - www.electropedia.org

The world's leading online dictionary on electrotechnology, containing more than 22 300 terminological entries in English and French, with equivalent terms in 19 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Recherche de publications IEC - webstore.iec.ch/advsearchform

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études, ...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et une fois par mois par email.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: sales@iec.ch.

IEC Products & Services Portal - products.iec.ch

Découvrez notre puissant moteur de recherche et consultez gratuitement tous les aperçus des publications. Avec un abonnement, vous aurez toujours accès à un contenu à jour adapté à vos besoins.

Electropedia - www.electropedia.org

Le premier dictionnaire d'électrotechnologie en ligne au monde, avec plus de 22 300 articles terminologiques en anglais et en français, ainsi que les termes équivalents dans 19 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.



IEC 63248

Edition 1.0 2022-03

INTERNATIONAL STANDARD

NORME INTERNATIONALE



Conductors for overhead lines – Coated or cladded metallic wire for concentric lay stranded conductors

Conducteurs pour lignes aériennes – Fil métallique revêtu ou recouvert pour conducteurs toronnés à couches concentriques

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

ICS 29.060.01; 29.240.20

ISBN 978-2-8322-1080-7

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

| | |
|--|----|
| FOREWORD..... | 4 |
| INTRODUCTION..... | 6 |
| 1 Scope..... | 7 |
| 2 Normative references | 7 |
| 3 Terms and definitions | 7 |
| 4 Material | 9 |
| 4.1 Steel..... | 9 |
| 4.2 Aluminium..... | 9 |
| 4.3 Zinc | 9 |
| 4.4 Zinc-aluminium alloy | 9 |
| 4.5 Advanced zinc-aluminium alloy | 9 |
| 5 Freedom from defects..... | 9 |
| 6 Joints | 10 |
| 7 Tests | 10 |
| 7.1 General..... | 10 |
| 7.2 Place of testing..... | 10 |
| 7.3 Sampling rate | 10 |
| 7.4 Test methods | 10 |
| 7.4.1 Visual test | 10 |
| 7.4.2 Diameter..... | 10 |
| 7.4.3 Stress at 1 % extension, tensile strength and elongation | 11 |
| 7.4.4 Ductility tests..... | 12 |
| 7.4.5 Coating or cladding tests | 13 |
| 7.4.6 Coefficient of linear expansion..... | 14 |
| 7.4.7 Resistivity..... | 14 |
| 7.4.8 Coating adherence heat resistance test..... | 15 |
| 8 Acceptance and rejection | 15 |
| 9 Certificate of compliance | 15 |
| 10 Packaging | 15 |
| 10.1 Type of packaging..... | 15 |
| 10.2 Length and tolerance on length | 15 |
| Annex A (normative) Tables of properties for recommended IEC wire materials..... | 16 |
| Annex B (informative) Properties of wire for calculation purposes | 31 |
| Annex C (informative) Method to measure the equivalent diameter by volume | 33 |
| Annex D (informative) Ratio of aluminium and steel or FeNi36 cross-sectional areas..... | 35 |
| D.1 Standard ratio in cross-section..... | 35 |
| D.2 Average aluminium thickness..... | 35 |
| Bibliography..... | 37 |
| Figure C.1 – Optical ground wire (OPGW) composed of formed aluminium-clad steel wires..... | 33 |
| Figure C.2 – Example of density measurement apparatus..... | 33 |
| Table A.1 – Wire designation | 16 |
| Table A.2 – Schedule of tests | 17 |

| | |
|---|----|
| Table A.3 – Zinc-aluminium alloy ingot composition (group 4 and group 5) | 18 |
| Table A.4 – Requirements for zinc and zinc-aluminium alloy coated steel wires (group 1, group 4 and group 5) | 19 |
| Table A.5 – Requirements for aluminium-clad FeNi36 wires (group 2)..... | 23 |
| Table A.6 – Requirements for aluminium-clad steel wires (group 3) | 24 |
| Table A.7 – Initial setting for determining stress at 1 % extension..... | 27 |
| Table A.8 – Coating requirements for zinc and zinc-aluminium alloy coated wires..... | 28 |
| Table A.9 – Cladding requirements for group 2 and group 3 wire | 29 |
| Table A.10 – Coating heat resistance test for group 4 and group 5 wire | 29 |
| Table A.11 – Temperatures for linear expansion test for group 2 wire | 29 |
| Table A.12 – Minimum number of dips for zinc and zinc alloy coatings (group 1, group 4, group 5) | 30 |
| Table B.1 – Properties of wire for calculation purposes | 31 |
| Table D.1 – Standard aluminium and steel or FeNi36 ratio in the cross section for group 2 and group 3 wires | 35 |
| Table D.2 – Average aluminium thickness..... | 36 |

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.

IEC 63248 has been prepared by IEC technical committee 7: Overhead electrical conductors. It is an International Standard.

This first edition cancels and replaces the first edition of IEC 61232 published in 1993 and the first edition of IEC 60888 published in 1987. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous editions of IEC 61232 and IEC 60888:

- a) wire designations have been modified and grouped;
- b) wires with zinc coating class 2 were removed;
- c) new wire designations have been added;
- d) aluminium-clad FeNi36 wires have been added;
- e) advanced zinc-aluminium alloy coated steel wires have been added.

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

| | |
|------------|------------------|
| Draft | Report on voting |
| 7/715/FDIS | 7/720/RVD |

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/standardsdev/publications.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The "colour inside" logo on the cover page of this document indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

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

Zinc coating class 2 according to IEC 60888 has not been included in this document, as the demand for this class of zinc coating is extremely rare. Extra corrosion protection can be 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 document specifies the properties of wires in the diameter range of, but not limited to, 1,25 mm to 5,50 mm. This document 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 designations are listed in Table A.1. For calculation purposes the values listed in Annex B are 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 (all parts), *International Electro-technical Vocabulary (IEV)* (available at www.electropedia.org)

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 – Calibration and verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Calibration and verification 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*

koniec náhľadu – text ďalej pokračuje v platenej verzii STN