SLOVENSKI STANDARD
oSIST prEN IEC 63248:2021

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Vodniki za nadzemne vode - Prevlečena ali oblečena kovinska žica za koncentrične laične vodnike

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

Ta slovenski standard je istoveten z: prEN IEC 63248:2021

ICS:

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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 CDV to the secretary.
FUNCTIONS CONCERNED: ☐ EMC ☐ ENVIRONMENT ☒ QUALITY ASSURANCE ☐ SAFETY	
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TITLE:

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

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NOTE FROM TC/SC OFFICERS:

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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

FOREWORD

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IEC 63248 has been prepared by IEC technical committee 7: OVERHEAD ELECTRICAL CONDUCTORS. It is an International Standard.

This International Standard cancels and replaces IEC 61232:1993 Edition 1.0, and replaces IEC 60888:1987 Edition 1.0 excluding wires with zinc coating class 2.

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

Draft	Report on voting
7/702/CD	7/703A/CC

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 http://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.

INTRODUCTION

The purpose of this standard is to group together similar wire materials that share the same general characteristics and therefore the same test procedures and requirements. Included in this standard 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 standard, 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 standard is applicable to coated or cladded 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 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 given in IEC 60050 and the following terms and definitions 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

Note: A lot can 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.

Note: Some of these alloys with particular mixture are called Mischmetal.

3.14
advanced zinc-aluminium alloy
a zinc-aluminium alloy reaching specific requirements as specified in ISO7989-2

Note: Examples of advanced zinc-aluminium alloys are Zn90% + 10% aluminium and Zn95% + 5 % aluminium with 0,2 to 0,5 % magnesium.

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 ingot of zinc used for coating shall meet the requirements of ZN-3 according ISO 752.

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.

4.4 Zinc-aluminium alloy

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

4.5 Advanced zinc-aluminium alloy

The ingot of advanced 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 or cladded 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 meet all other requirements, except 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 7.4 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.

7.4 Test methods

7.4.1 Visual test

The surface of the wire shall be visually examined to ensure that it is smooth and free from all imperfections including but not limited to cracks, unevenness, holes and inclusion of impurities.

7.4.2 Diameter

7.4.2.1 Unit for diameter

The nominal diameter of a wire shall be expressed in millimetres to two decimal places.

7.4.2.2 Diameter from direct measurements

The diameter of a round wire shall be the mean of two measurements at right angle taken at the same cross-section. The measurement apparatus shall have an accuracy of at least 0,001 mm.

When tested in accordance with this sub clause the diameter shall not vary from its nominal value by more than the appropriate value indicated in Table A.4, Table A.5, or Table A.6.

7.4.2.3 Diameter from weight measurements

The equivalent diameter of a formed wire shall be obtained from weight measurements made on a sample not less than 1,0 m in length, and its density as defined in Table B.1.

The equivalent diameter, D of the formed wire shall be calculated by the Formula (1).

$$D = \sqrt{\frac{4A}{\pi \rho L}} \quad (1)$$

Where:

D *is the equivalent diameter of the sample in mm*

A *is the weight of the sample with Length L in g*

L *is the length of the sample in m*

ρ *is the density of the sample in g/cm³*

When tested in accordance with this sub clause the equivalent diameter shall not vary from its nominal value by more than the tolerance value indicated in Table A.4, Table A.5, or Table A.6.

7.4.2.4 Diameter from volume measurement

Alternatively the equivalent diameter of a formed wire shall be obtained from volume and weight measurements as described in the informative Annex C.

When tested in accordance with this sub clause the equivalent diameter shall not vary from its nominal value by more than the tolerance value indicated in Table A.4, Table A.5, or Table A.6.

7.4.3 Stress at 1% extension, tensile strength and elongation

7.4.3.1 Sample preparation

The wire samples shall be free from bends or kinks other than the curvature resulting from the usual coiling operation. It shall be straightened before inserting in the grips of the tensile testing equipment with a roller type wire straightening arrangement or by any other means designed to exert the minimum effect upon the mechanical properties of the sample. Samples for tests shall not be less than 450 mm long and shall be fitted in the testing machine so as to leave a free length of minimum 300 mm between the grips.

7.4.3.2 Stress at 1% extension and tensile strength

The test shall be performed in accordance with ISO 6892-1.

The force-measuring system of the testing machine shall be calibrated in accordance with ISO 7500-1, class 1,or better.

The rate of separation of the jaws of the testing machine shall be between 25 mm/min and 100 mm/min.

In order to obtain a straight test piece and ensure the alignment of the test piece and grip arrangement, a preliminary load corresponding with the initial stress in accordance with Table A.7 shall be applied.

This load shall be maintained while a 250 mm gauge is marked on the sample and a suitable extensometer applied on a 250 mm gauge length (not necessarily corresponding with the marked gauge length).

A correction of the extension, in accordance with Table A.7, should be carried out to take into account the effect of the preliminary load.

This load shall then be increased uniformly until the extensometer indicates an extension of 2,5 mm in 250 mm (1% extension).

At this point the tensile testing equipment may be stopped if necessary, and the load read. The value of stress at 1% extension is calculated by dividing this load by the area of the wire based on wire diameter measurements as per clause 7.3.2. Following this operation, the extensometer may be removed. The specimen shall then be loaded to rupture and its tensile strength determined.