SLOVENSKI STANDARD
SIST EN 61284:1999

01-november-1999

Nadzemni vodi - Zahteve in preskusi za obesno opremo (IEC 61284:1997)

Overhead lines - Requirements and tests for fittings

Freileitungen - Anforderungen und Prüfungen für Armaturen

Lignes aériennes - Exigences et essais pour le matériel d'équipement

Ta slovenski standard je istoveten z: **EN 61284:1997**

ICS:

29.240.20	Daljnovodi	Power transmission and distribution lines

SIST EN 61284:1999 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61284

November 1997

ICS 29.240.20

Supersedes EN 61284:1995

Descriptors: Overhead lines, joints, insulators, fittings

English version

Overhead lines - Requirements and tests for fittings
(IEC 61284:1997)

Lignes aériennes - Exigences et essais pour le matériel d'équipement
(CEI 61284:1997)

Freileitungen - Anforderungen und Prüfungen für Armaturen
(IEC 61284:1997)

This European Standard was approved by CENELEC on 1997-10-01. 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.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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 11/119/FDIS, future edition 2 of IEC 61284, prepared by IEC TC 11, Overhead lines, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61284 on 1997-10-01.

This European Standard supersedes EN 61284:1995.

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) 1998-07-01
- latest date by which the national standards conflicting with the EN have to be withdrawn (dow) 1998-07-01

Annexes designated "normative" are part of the body of the standard.
Annexes designated "informative" are given for information only.
In this standard, annexes A, B, C, D, E and ZA are normative and annexes F, G, H, I, and J are informative.
Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61284:1997 was approved by CENELEC as a European Standard without any modification.

Annex ZA (normative)

Normative references to international publications with their corresponding European publications

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

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 60050(466)	1990	International Electrotechnical Vocabulary (IEV) Chapter 466: Overhead lines	-	-
IEC 60060-1	1989	High-voltage test techniques Part 1: General definitions and test requirements	HD 588.1 S1[1)]	1991
IEC 60120	1984	Dimensions of ball and socket couplings of string insulator units	HD 474 S1	1986
IEC 60372	1984	Locking devices for ball and socket couplings of string insulator units Dimensions and tests	-	-
IEC 60471	1977	Dimensions of clevis and tongue couplings of string insulator units	-	-
IEC 60826	1991	Loading and strength of overhead transmission lines	-	-
IEC 61089	1991	Round wire concentric lay overhead electrical stranded conductors	-	-
CISPR 16-1	1993	Specification for radio disturbance and immunity measuring apparatus and methods Part 1: Radio disturbance and immunity measuring apparatus	-	-
CISPR 18-2	1986	Radio interference characteristics of overhead power lines and high-voltage equipment Part 2: Methods of measurement and procedure for determining limits	-	-

1) HD 588.1 S1 includes the corrigendum March 1990 to IEC 60060-1.

Publication	Year	Title	EN/HD	Year
ISO 1461	199X	Hot dip galvanized coatings on fabricated ferrous products - Specifications[2)]	-	-
ISO 9000-1	1994	Quality management and quality assurance standards - Part 1: Guidelines for selection and use	EN ISO 9000-1	1994
ISO 9001	1994	Quality systems - Model for quality assurance in design development, production, installation and servicing	EN ISO 9001	1994
ISO 9002	1994	Quality systems - Model for quality assurance in production, installation and servicing	EN ISO 9002	1994
ISO 9003	1994	Quality systems - Model for quality assurance in final inspection and test	EN ISO 9003	1994
ISO 9004-1	1994	Quality management and quality system elements Part 1: Guidelines	EN ISO 9004-1	1994
ISO 2859-1	1989	Sampling procedures for inspection by attributes Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection	-	-
ISO 2859-2	1985	Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection	-	-
ISO 3951	1989	Sampling procedures and charts for inspection by variables for percent non-conforming	-	-

2) To be published.

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Lignes aériennes –

Exigences et essais pour le matériel d'équipement

Overhead lines –

Requirements and tests for fittings

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For price, see current catalogue

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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OVERHEAD LINES –

REQUIREMENTS AND TESTS FOR FITTINGS

FOREWORD

1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The 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 the 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 National Committees.

3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.

4) In order to promote international unification, IEC National Committees undertake to apply IEC International Standards transparently to the maximum extent possible in their national and regional standards. Any divergence between the IEC Standard and the corresponding national or regional standard shall be clearly indicated in the latter.

5) The IEC provides no marking procedure to indicate its approval and cannot be rendered responsible for any equipment declared to be in conformity with one of its standards.

6) Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. The IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 61284 has been prepared by IEC technical committee 11: Overhead lines.

This second edition cancels and replaces the first edition published in 1995 and constitutes a technical revision.

The text of this standard is based on the following documents:

FDIS	Report on voting
11/119/FDIS	11/133/RVD

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

Annexes A, B, C, D and E form an integral part of this standard.

Annexes F, G, H, I and J are for information only.

The contents of the corrigendum of Septembre 1998 have been included in this copy.

OVERHEAD LINES –

REQUIREMENTS AND TESTS FOR FITTINGS

1 Scope

This International Standard applies to fittings for overhead lines of nominal voltage above 45 kV. It may also be applied to fittings for overhead lines of lower nominal voltage and to similar fittings for substations.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication of this standard, the editions indicated were valid. All normative documents are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

IEC 60050(466): 1990, *International Electrotechnical Vocabulary (IEV) – Chapter 466: Overhead lines*

IEC 60060-1: 1989, *High-voltage test techniques – Part 1: General definitions and test requirements*

IEC 60120: 1984, *Dimensions of ball and socket couplings of string insulator units*

IEC 60372: 1984, *Locking devices for ball and socket couplings of string insulator units – Dimensions and tests*

IEC 60471: 1977, *Dimensions of clevis and tongue couplings of string insulator units*

IEC 60826: 1991, *Loading and strength of overhead transmission lines*

IEC 61089: 1991, *Round wire concentric lay overhead electrical stranded conductors*

CISPR 16-1: 1993, *Specification for radio disturbance and immunity measuring apparatus and methods – Part 1: Radio disturbance and immunity measuring apparatus*

CISPR 18-2: 1986, *Radio interference characteristics of overhead power lines and high-voltage equipment – Part 2: Methods of measurement and procedure for determining limits*

ISO 1461, — *Hot dip galvanized coatings on fabricated ferrous products – Specifications*[1)]

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1) To be published.

ISO 9000-1: 1994, *Quality management and quality assurance standards – Part 1: Guidelines for selection and use*

ISO 9001: 1994, *Quality systems – Model for quality assurance in design, development, production, installation and servicing*

ISO 9002: 1994, *Quality systems – Model for quality assurance in production, installation and servicing*

ISO 9003: 1994, *Quality systems – Model for quality assurance in final inspection and test*

ISO 9004-1: 1994, *Quality management and quality system elements – Part 1: Guidelines*

ISO 2859-1: 1989, *Sampling procedures for inspection by attributes – Part 1: Sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection*

ISO 2859-2: 1985, *Sampling procedures for inspection by attributes – Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection*

ISO 3951: 1989, *Sampling procedures and charts for inspection by variables for percent non-conforming*

3 Definitions

For the purpose of this International Standard the following definitions apply. These definitions are those which do not appear in the International Electrotechnical Vocabulary (IEV) or differ from those given in the IEV.

3.1 **ball and socket coupling:** Coupling consisting of a ball, a socket and a locking device.

3.2 **bimetallic fitting:** Device which is suitable for jointing conductors of different materials.

3.3 **characteristic dimension:** Dimension of a component of the test circuit or of a fitting which characterizes its effect on the electric field. In the case of a bundle, this dimension is approximately the diameter of an enclosing circle; in the case of a corona ring or sphere, it is its largest dimension, etc.

3.4 **clevis and tongue coupling:** Coupling consisting of a clevis, a tongue and a clevis pin or bolt.

3.5 **connector:** Device for jointing one or more conductors or earth wires. It may be a tension or non-tension fitting.

3.6 **corona discharge:** Electric discharge that only partially breaks down the gas insulation around the fittings under test.

3.7 **corona extinction:** Voltage or conductor voltage gradient at which corona discharges cease during a decreasing test voltage sequence.

3.8 **corona inception:** Voltage or conductor voltage gradient at which corona discharges initiate during an increasing test voltage sequence.

3.9 **earth wire fitting:** Any component of an assembly for attaching an earth wire to a supporting structure other than a suspension clamp, a tension fitting or a mechanical protective fitting.

3.10 **factory-formed helical conductor fitting:** Fitting consisting of helically formed wires which provide the force necessary to grip the conductor or earth wire by self-tightening.

3.11 **insulator set fitting:** Any component of a suspension or tension insulator set other than a string insulator unit, a suspension clamp, a conductor tension fitting, an insulator protective fitting or a mechanical protective fitting.

3.12 **joint:** Connector and that part of the conductor or earth wire that has been brought into intimate contact with it by compression or other mechanical means.

3.13 **mechanical damage load:** Maximum load which can be applied to a fitting without an unacceptable permanent deformation when the fitting is tested under specified test conditions.

NOTE – The unacceptable permanent deformation should be agreed upon between purchaser and supplier.

3.14 **mechanical failure load:** Maximum load which can be applied to a fitting under specified test conditions.

3.15 **mechanical protective fitting:** Any device attached to a conductor or to an earth wire for their mechanical protection.

3.16 **radio-interference voltage (RIV):** Voltage in the radio frequency range produced by an electromagnetic disturbance and which can be measured in accordance with CISPR 16 on the test circuit equipped with the fitting.

3.17 **spacer damper:** Device which keeps apart the subconductors of a bundle in a given geometrical configuration and is able to reduce aeolian vibrations and subspan oscillations of the subconductors. [IEV 466-11-02, modified]

3.18 **specified maximum radio-interference voltage:** Maximum acceptable radio-interference voltage at a specified test voltage or conductor voltage gradient. This is specified by the purchaser or declared by the supplier.

3.19 **specified minimum corona extinction:** Minimum acceptable voltage or conductor voltage gradient at which corona discharges cease. This is specified by the purchaser or declared by the supplier.

3.20 **specified minimum failure load:** Minimum load specified by the purchaser or declared by the supplier at which mechanical failure will not take place.

NOTE – From the probabilistic point of view, the specified minimum failure load corresponds to the value having the probability of e % in the distribution function of the strength of the fitting. The exclusion limit e % is usually taken within 2 % to 5 % with 10 % being the upper limit (see IEC 60826).

3.21 **specified minimum mechanical damage load:** Minimum load specified by the purchaser or declared by the supplier at which unacceptable permanent deformation will not take place.

3.22 **specified minimum slip load:** Minimum load specified by the purchaser or declared by the supplier at which slippage will not take place.

3.23 **vibration damper:** Device attached to a conductor or an earth wire in order to reduce aeolian vibrations. [IEV 466-11-16, modified]

4 Requirements

4.1 *General requirements*

4.1.1 *Design*

The fittings shall be designed so as to

- avoid damaging the conductor under service conditions;
- withstand the mechanical loads relevant to installation, maintenance and service, the designed service current, including short-circuit current, the service temperatures and environmental circumstances;
- ensure that individual components are secured against becoming loose in service;
- have limited corona effects.

Fittings for live line maintenance shall be suitably designed for safe and easy handling.

Surfaces of compression fittings in contact with the conductor or earth wire shall be protected from becoming contaminated before installation.

Brittleness of finished parts shall be avoided by adopting suitable materials and manufacturing process.

4.1.2 *Materials*

Fittings shall be made of any material suitable for the purpose.

4.1.2.1 *Metallic materials*

The materials shall meet service life requirements and shall not be liable to intergranular or stress corrosion. They shall not cause corrosion of any other parts of the conductor or earth wire.

The materials of compression fittings shall be capable of withstanding the cold working due to compression. Furthermore, the steel compression components shall also have a sufficient impact strength after the compression.

Examples of suitable materials are the following:

- aluminium or aluminium alloy;
- galvanized steel;
- galvanized malleable or ductile iron;
- stainless steel;
- copper and copper alloys.