SLOVENSKI STANDARD
SIST EN IEC 61854:2021

01-januar-2021

Nadomešča:
SIST EN 61854:1999

Nadzemni vodi - Zahteve in preskusi za distančnike (IEC 61854:2020)

Overhead lines - Requirements and tests for spacers (IEC 61854:2020)

Freileitungen - Anforderungen und Prüfungen für Feldabstandhalter (IEC 61854:2020)

Lignes aériennes - Exigences et essais applicables aux entretoises (IEC 61854:2020)

Ta slovenski standard je istoveten z: **EN IEC 61854:2020**

ICS:

29.240.20	Daljnovodi	Power transmission and distribution lines

SIST EN IEC 61854:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN IEC 61854

April 2020

ICS 29.240.20

Supersedes EN 61854:1998 and all of its amendments and corrigenda (if any)

English Version

Overhead lines - Requirements and tests for spacers (IEC 61854:2020)

Lignes aériennes - Exigences et essais applicables aux entretoises
(IEC 61854:2020)

Freileitungen - Anforderungen und Prüfungen für Feldabstandhalter
(IEC 61854:2020)

This European Standard was approved by CENELEC on 2020-03-24. 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

European foreword

The text of document 11/265/FDIS, future edition 2 of IEC 61854, prepared by IEC/TC 11 "Overhead lines" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 61854:2020.

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)	2020-12-24
• latest date by which the national standards conflicting with the document have to be withdrawn	(dow)	2023-03-24

This document supersedes EN 61854:1998 and all of its 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.

Endorsement notice

The text of the International Standard IEC 61854:2020 was approved by CENELEC as a European Standard without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: www.cenelec.eu.

Publication	Year	Title	EN/HD	Year
IEC 60050-466	1990	International Electrotechnical Vocabulary. Chapter 466: Overhead lines	-	-
IEC 60888	1987	Zinc-coated steel wires for stranded conductors	-	-
IEC 61284	1997	Overhead lines - Requirements and tests for fittings	EN 61284	1997
ISO 34-1	2015	Rubber, vulcanized or thermoplastic - Determination of tear strength - Part 1: Trouser, angle and crescent test pieces	-	-
ISO 34-2	2015	Rubber, vulcanized or thermoplastic - Determination of tear strength - Part 2: Small (Delft) test pieces	-	-
ISO 37	2017	Rubber, vulcanized or thermoplastic - Determination of tensile stress-strain properties	-	-
ISO 188	2011	Rubber, vulcanized or thermoplastic - Accelerated ageing and heat resistance tests	-	-
ISO 812	2017	Rubber, vulcanized or thermoplastic - Determination of low-temperature brittleness	-	-
ISO 815-1	2014	Rubber, vulcanized or thermoplastic - Determination of compression set - Part 1: At ambient or elevated temperatures	-	-
ISO 815-2	2014	Rubber, vulcanized or thermoplastic - Determination of compression set - Part 2: At low temperatures	-	-
ISO 868	2003	Plastics and ebonite - Determination of indentation hardness by means of a durometer (Shore hardness)	EN ISO 868	2003

ISO 1183-1	2019	Plastics - Methods for determining the density of non-cellular plastics - Part 1: Immersion method, liquid pycnometer method and titration method	EN ISO 1183-1	2019
ISO 1431-1	2012	Rubber, vulcanized or thermoplastic - Resistance to ozone cracking - Part 1: Static and dynamic strain testing	-	-
ISO 1461	2009	Hot dip galvanized coatings on fabricated iron and steel articles - Specifications and test methods	EN ISO 1461	2009
ISO 1817	2015	Rubber, vulcanized or thermoplastic - Determination of the effect of liquids	-	-
ISO 2781	2018	Rubber, vulcanized or thermoplastic - Determination of density	-	-
ISO 2859-1	1999	Sampling procedures for inspection by attributes - Part 1: Sampling schemes indexed by acceptable quality limit (AQL) for lot-by-lot inspection	-	-
+ A1	2011		-	-
ISO 2859-2	1985	Sampling procedures for inspection by attributes - Part 2: Sampling plans indexed by limiting quality (LQ) for isolated lot inspection	-	-
ISO 2921	2011	Rubber, vulcanized - Determination of low-temperature retraction (TR test)	-	-
ISO 3951-1	2013	Sampling procedures for inspection by variables - Part 1: Specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection for a single quality characteristic and a single AQL	-	-
ISO 3951-2	2013	Sampling procedures for inspection by variables - Part 2: General specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection of independent quality characteristics	-	-
ISO 4649	2017	Rubber, vulcanized or thermoplastic - Determination of abrasion resistance using a rotating cylindrical drum device	-	-
ISO 4662	2017	Rubber, vulcanized or thermoplastic - Determination of rebound resilience	-	-
ISO 6502-2	2018	Rubber - Measurement of vulcanization characteristics using curemeters - Part 2: Oscillating disc curemeter	-	-
ISO 9001	2015	Quality management systems - Requirements	EN ISO 9001	2015

IEC 61854

Edition 2.0 2020-02

INTERNATIONAL STANDARD

NORME INTERNATIONALE

colour inside

Overhead lines – Requirements and tests for spacers

Lignes aériennes – Exigences et essais applicables aux entretoises

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COMMISSION ELECTROTECHNIQUE INTERNATIONALE

ICS 29.240.20

ISBN 978-2-8322-7798-0

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

OVERHEAD LINES – REQUIREMENTS AND TESTS FOR SPACERS

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 61854 has been prepared by IEC technical committee 11: Overhead lines.

This second edition cancels and replaces the first edition published in 1998. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

a) Consider the application of spacers on high temperature conductors specifying additional high temperature tests in clamp slip tests and for the characterization of elastic and damping properties;
b) Specify as far as possible test parameters and acceptance values;
c) Avoid as far as possible the alternative procedures for the same test;
d) Introduce a simpler test device for the simulated short circuit current test;
e) Introduce test at low temperature on fastener components such as break away bolts and conical spring washers;

f) Prescribe a different procedure for subspan oscillation tests on spacers equipped with clamps having rod attachments;

g) Modify the test procedure for the aeolian vibration tests;

h) Prescribe a different procedure for aeolian vibration tests on spacers equipped with clamps having rod attachments;

i) Re-edit all the figures in order to make them more clear and homogeneous;

j) Introduce an additional test device for the simulated short circuit current test.

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

FDIS	Report on voting
11/265/FDIS	11/272/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.

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

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

IMPORTANT – The 'colour inside' logo on the cover page of this publication 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.

OVERHEAD LINES –
REQUIREMENTS AND TESTS FOR SPACERS

1 Scope

This document applies to spacers for conductor bundles of overhead lines. It covers rigid spacers, flexible spacers and spacer dampers.

It does not apply to interphase spacers, hoop spacers and bonding spacers.

NOTE This document is written to cover the line design practices and spacers most commonly used at the time of writing. There may be other spacers available for which the specific tests reported in this document may not be applicable.

In some cases, test procedures and test values are left to agreement between purchaser and supplier and are stated in the procurement contract. The purchaser is best able to evaluate the intended service conditions, which should be the basis for establishing the test severity.

In Annex A, the minimum technical details to be agreed between purchaser and supplier are listed.

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(466):1990, *International Electrotechnical vocabulary (IEV) – Chapter 466: Overhead lines*

IEC 60888:1987, *Zinc-coated steel wires for stranded conductors*

IEC 61284:1997, *Overhead lines – Requirements and tests for fittings*

ISO 34-1:2015, *Rubber, vulcanized or thermoplastic – Determination of tear strength – Part 1: Trouser, angle and crescent test pieces*

ISO 34-2:2015, *Rubber, vulcanized or thermoplastic – Determination of tear strength – Part 2: Small (Delft) test pieces*

ISO 37:2017, *Rubber, vulcanized or thermoplastic – Determination of tensile stress-strain properties*

ISO 188:2011, *Rubber, vulcanized or thermoplastic – Accelerated ageing or heat resistance tests*

ISO 812:2017, *Rubber, vulcanized or thermoplastic – Determination of low-temperature brittleness*

ISO 815-1:2014, *Rubber, vulcanized or thermoplastic – Determination of compression set – Part 1: At ambient or elevated temperatures*

ISO 815-2:2014, *Rubber, vulcanized or thermoplastic – Determination of compression set – Part 2: At low temperatures*

ISO 868:2003, *Plastics and ebonite – Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 1183-1: 2019, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method*

ISO 1431-1:2012, *Rubber, vulcanized or thermoplastic – Resistance to ozone cracking – Part 1: Static and dynamic strain testing*

ISO 1461:2009, *Hot dip galvanized coatings on fabricated iron and steel articles – Specifications and test methods*

ISO 1817:2015, *Rubber, vulcanized or thermoplastic – Determination of the effect of liquids*

ISO 2781:2018, *Rubber, vulcanized or thermoplastic – Determination of density*

ISO 2859-1:1999/AMD1: 2011, *Sampling procedures for inspection by attributes – Part 1: Sampling schemes indexed by acceptable quality limit (AQL) for lot-by-lot inspection*

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

ISO 2921:2011, *Rubber, vulcanized – Determination of low-temperature retraction (TR test)*

ISO 3951-1:2013, *Sampling procedures for inspection by variables -- Part 1: Specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection for a single quality characteristic and a single AQL*

ISO 3951-2:2013, *Sampling procedures for inspection by variables -- Part 2: General specification for single sampling plans indexed by acceptance quality limit (AQL) for lot-by-lot inspection of independent quality characteristics*

ISO 4649:2017, *Rubber, vulcanized or thermoplastic – Determination of abrasion resistance using a rotating cylindrical drum device*

ISO 4662:2017, *Rubber, vulcanized or thermoplastic – Determination of rebound resilience*

ISO 6502-2:2018, *Rubber – Measurement of vulcanization characteristics using curemeters – Part 2: Oscillating disc curemeter*

ISO 9001:2015, *Quality management systems – Requirements*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-466 apply as well as the following.

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
rigid spacer
spacer allowing no relative movement between the subconductors at the spacer location

3.2
flexible spacer
spacer allowing relative movements between the subconductors at the spacer location

3.3
spacer system
complex of spacers and the relevant in-span distribution

3.4
high temperature conductors
HTC
conductors which are designed to have a maximum continuous operating temperature over 95 °C

Note 1 to entry: HTCa: conductors using annealed wires; HTCna: conductors using non-annealed wires.

3.5
maximum continuous operating temperature
conductor temperature specified by the manufacturer and measured at the outer wire layers

4 General requirements

4.1 Design

The spacer shall be designed as to:

– maintain subconductor spacing (at spacer locations), within any prescribed limits, under all conditions of service excluding short-circuit currents;

– prevent, in subspans between spacers, physical contact between subconductors, except during the passage of short circuit currents when the possibility of contact is accepted provided that the specified spacing is restored immediately following fault clearance;

– withstand mechanical loads imposed on the spacer during installation, maintenance and service (including short circuit conditions) without any component failure or unacceptable permanent deformation;

– avoid damage to the subconductor under specified service conditions;

– be free from unacceptable levels of corona and radio interference under specified service conditions;

– be suitable for safe and easy installation. For the bolted and latching clamp the design shall retain all parts when opened for attachment to the conductor;

– ensure that individual components will not become loose in service;

– be capable of being removed and re-installed on the subconductors without damage to the spacer or subconductors;

– maintain its function over the entire service temperature range;

– avoid audible noise.

Other desirable characteristics, which are not essential to the basic functions of the spacer but which may be advantageous to the purchaser, include:

- verification of proper installation from the ground,
- ease of installation and removal from energized lines

Detailed information on design, best practice and experience of spacers and spacer dampers is given in [6][1].

4.2 Materials

4.2.1 General

Spacers shall be made of any materials suitable for their purpose. Unless additional requirements are stated, the material shall conform to the requirements of IEC 61284.

4.2.2 Non-metallic materials

In addition to the requirements of IEC 61284, the conductivity of the various non-metallic components shall be such that when properly installed

– potential differences between metallic components do not cause damage due to discharge;
– line current including short circuit current and any current flow through the spacer do not degrade spacer components

4.3 Mass, dimensions and tolerances

Spacer mass and significant dimensions, including appropriate tolerances, shall be shown on contract drawings.

Tolerances applied to the mass and to the dimensions should ensure that the spacers meet their specified mechanical and electrical requirements.

4.4 Protection against corrosion

In addition to the applicable requirements of IEC 61284, stranded steel wires, if used, shall be protected against corrosion in accordance with IEC 60888.

4.5 Manufacturing appearance and finish

The spacers shall be free of defects and irregularities; all outside surfaces shall be smooth and all edges and corners well-rounded.

4.6 Marking

The fitting marking requirements of IEC 61284 shall be applied to all clamp assemblies including those using breakaway bolts.

Correct position of the top of the spacer (for example arrows pointing upward), if necessary, shall also be provided.

4.7 Installation instructions

The supplier shall provide a clear and complete description of the installation procedure and, if required, the in-span location of the spacers.

The supplier shall make available any special installation tool that is required.

4.8 Specimen

All tests described in this document are based on bolted clamps and clamps with helical fixation. If other types of clamps are tested, the clamps should be installed according the suppliers installation instruction.

---

[1] Numbers in square brackets refer to the Bibliography.