IEC 62561-3

Edition 3.0 2023-07
REDLINE VERSION

INTERNATIONAL STANDARD

colour inside

Lightning protection system components (LPSC) – Part 3: Requirements for isolating spark gaps (ISGs)



IEC 62561-3:2023-07 RLV(en)



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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 91.120.40

ISBN 978-2-8322-7216-9

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INTERNATIONAL ELECTROTECHNICAL COMMISSION

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LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 3: Requirements for isolating spark gaps (ISGs)

FOREWORD

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This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC 62561-3:2017. A vertical bar appears in the margin wherever a change has been made. Additions are in green text, deletions are in strikethrough red text.

IEC 62561-3 has been prepared by IEC technical committee 81: Lightning protection. It is an International Standard.

This third edition cancels and replaces the second edition, published in 2017. This edition constitutes a technical revision.

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

a) alignment with the latest edition of ISO 22479 relating to humid sulphurous atmosphere treatment;
b) addition of a new normative Annex D for the applicability of previous tests.

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

Draft	Report on voting
81/727/FDIS	81/729/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/publications.

A list of all parts in the IEC 62561 series, published under the general title *Lightning protection system components (LPSC)*, can be found on the IEC website.

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

This part of IEC 62561 deals with the requirements and tests for lightning protection system components (LPSC), specifically isolating spark gaps (ISGs) used for the installation of a lightning protection system (LPS) designed and implemented according to the IEC 62305 series.

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 3: Requirements for isolating spark gaps (ISGs)

1 Scope

This part of IEC 62561 specifies the requirements and tests for isolating spark gaps (ISGs) for lightning protection systems.

ISGs can be used to indirectly bond a lightning protection system to other nearby metalwork where a direct bond is not permissible for functional reasons.

Typical applications include the connection to

- earth-termination systems of power installations,
- earth-termination systems of telecommunication systems,
- auxiliary earth electrodes of voltage-operated, earth fault circuit breakers,
- rail earth electrodes of power and DC railways,
- measuring earth electrodes for laboratories,
- installations with cathodic protection and stray current systems,
- service entry masts for low-voltage overhead cables,
- bypassing insulated flanges and insulated couplings of pipelines.

~~This does not cover applications where follow currents occur.~~

~~NOTE Lightning protection system components (LPSC) can also be suitable for use in hazardous conditions such as fire and explosive atmosphere. Due regard will be taken of the extra requirements necessary for the components to be installed in such conditions.~~

Applications where follow currents occur are not included.

Extra requirements for the components can be necessary for LSCs intended for use in hazardous atmospheres.

NOTE 1 In CENELEC member countries, testing requirements of components for explosive atmospheres are specified in CLC/TS 50703-2.

NOTE 2 Testing of components for an explosive atmosphere (as defined in the IEC 60079-10 series) is not covered by this document.

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 60068-2-52:~~1996~~2017, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*[1]

IEC 60068-2-75:~~1997~~2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*[2]

IEC 62305-1:2010, *Protection against lightning – Part 1: General principles*

IEC 62561-1, *Lightning protection system components (LPSC) – Part 1: Requirements for connection components*

ISO 4892-2:~~2006~~2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*[3]

ISO 4892-3:~~2006~~2016, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*[4]

ISO 4892-4:2013, *Plastics – Methods of exposure to laboratory light sources – Part 4: Open-flame carbon-arc lamps*

ISO 6957:1988, *Copper alloys – Ammonia test for stress corrosion resistance*

~~ISO 6988:1985, *Metallic and other non-organic coatings – Sulphur dioxide test with general condensation of moisture*~~

ISO 22479:2019, *Corrosion of metals and alloys – Sulphur dioxide test in a humid atmosphere (fixed gas method)*

3 Terms and definitions

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

ISO and IEC maintain terminology 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
ISG
isolating spark gap
component with discharge distance for isolating electrically conductive installation sections

Note 1 to entry: In the event of a lightning strike, the isolated sections are temporarily connected conductively as the result of response to the discharge.

~~[1] 2nd edition (1996). A 3rd edition IEC 60068-2-52: *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)* is under preparation. Stage at the time of publication: IEC PRVC 60068-2-52:2017.~~

~~[2] 1st edition (1997). This 1st edition was replaced in 2014 by a 2nd edition IEC 60068-2-75:2014, *Environmental testing – Part 2-75: Tests – Test Eh: Hammer tests*.~~

~~[3] 2nd edition (2006). This 2nd edition was replaced in 2013 by a 3rd edition ISO 4892-2:2013, *Plastics – Methods of exposure to laboratory light sources – Part 2: Xenon-arc lamps*.~~

~~[4] 2nd edition (2006). This 2nd edition was replaced in 2016 by a 3rd edition: ISO 4892-3: 2016, *Plastics – Methods of exposure to laboratory light sources – Part 3: Fluorescent UV lamps*.~~

3.2
sparkover voltage
maximum voltage value before disruptive discharge between the electrodes of the ISG

3.3
withstand voltage
value of the test voltage to be applied under specified conditions in a withstand test, during which a specified number of disruptive discharges is tolerated

3.4
power frequency withstand voltage
RMS value of a sinusoidal power frequency voltage that the ISG can withstand

3.5
DC withstand voltage
value of a DC voltage that the ISG can withstand

3.6
rated withstand voltage
value of a withstand voltage declared by the manufacturer to characterize the isolating behaviour of an ISG

3.7
$U_{\text{W AC}}$
rated power frequency withstand voltage
value of a power frequency withstand voltage declared by the manufacturer to characterize the isolating behaviour of an ISG

3.8
$U_{\text{W DC}}$
rated DC withstand voltage
value of a DC withstand voltage declared by the manufacturer to characterize the isolating behaviour of an ISG

3.9
impulse sparkover voltage
impulse voltage of the waveshape 1,2/50 to classify the sparkover behaviour of the ISG

3.10
U_{imp}
rated impulse sparkover voltage
manufacturer’s declaration of the ISG sparkover voltage

3.11
isolation resistance
ohmic resistance of the ISG between the active parts

3.12
I_{imp}
lightning impulse current
impulse current that classifies an ISG

Note 1 to entry: Five parameters ~~are to~~ shall be considered: the peak value, the charge, the duration, the specific energy and the rate of rise of the impulse current.