IEC 62561-3

Edition 1.0 2012-02

INTERNATIONAL STANDARD

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

IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
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 corrigenda or an amendment might have been published.

Useful links:

IEC publications search - www.iec.ch/searchpub

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It also gives information on projects, replaced and withdrawn publications.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in additional languages. Also known as the International Electrotechnical Vocabulary (IEV) on-line.

IEC Just Published - webstore.iec.ch/justpublished

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

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: csc@iec.ch.

IEC 62561-3

Edition 1.0 2012-02

INTERNATIONAL STANDARD

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

INTERNATIONAL ELECTROTECHNICAL COMMISSION

PRICE CODE R

ICS 29.020; 91.120.40

ISBN 978-2-88912-923-2

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 3: Requirements for isolating spark gaps (ISG)

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 62561-3 has been prepared by IEC technical committee: Lightning protection.

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

FDIS	Report on voting
81/418/FDIS	81/424A/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

The content of this part of IEC 62561 is taken from the European Standard EN 50164-3.

A list of all the 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 publication will remain unchanged until the stability date indicated on the IEC web site under "http://webstore.iec.ch" in the data related to the specific publication. At this date, the publication will be

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- withdrawn,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

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

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

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 3: Requirements for isolating spark gaps (ISG)

1 Scope

This part of IEC 62561 specifies the requirements and tests for isolating spark gaps (ISG) 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 electrode of AC 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 standard 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.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

IEC 61643-11, *Low-voltage surge protective devices – Part 11: Surge protective devices connected to low-voltage power systems – Requirements and test methods*

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

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

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*

3 Terms and definitions

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

3.1
isolating spark gap
ISG
component with discharge distance for isolating electrically conductive installation sections

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

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
r.m.s value of a sinusoidal power frequency voltage that the ISG can withstand during tests made under specified conditions and for a specified time

3.5
DC withstand voltage
value of a DC voltage that the ISG can withstand during tests made under specified conditions and for a specified time

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

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

3.8
rated DC withstand voltage
$U_{W\,DC}$
value of a DC withstand voltage declared by the manufacturer to characterise 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
rated impulse sparkover voltage
$U_{r\,imp}$
manufacturer's declaration of the ISG sparkover voltage

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

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

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

4 Classification

According to the ISG's capability to withstand lightning current, as per Table 1, the following classes apply:

a) class H for heavy duty;
b) class N for normal duty;
c) class 1L for light duty;
d) class 2L for light duty;
e) class 3L for light duty.

5 Requirements

5.1 General

ISGs shall be designed in such a manner that when they are installed in accordance with the manufacturer's instructions, their performance shall be reliable, stable and safe for persons and surrounding equipment.

5.2 Environmental requirements

ISGs shall be designed in such way that they operate satisfactorily under the environmental conditions given by the normal service conditions. Outdoors ISG shall be contained in a weather shield of glass-glazed ceramic, or other acceptable material, that is resistant to UV radiation, corrosion and erosion.

5.3 Installation instructions

The manufacturer of the ISG shall provide adequate instructions in their literature to ensure that the installer of the ISG can select and install them in a suitable and safe manner.

These instructions shall contain at least the following information:

– classification and lightning current capability (I_{imp});
– rated withstand voltage;
– rated impulse sparkover voltage ($U_{r\ imp}$);
– rated power frequency withstand voltage ($U_{W\ AC}$);
– rated DC withstand voltage ($U_{W\ DC}$);
– assembly instructions with installation location (if crucial to the function);
– appropriate connection components for the installation if not part of the ISG.

Compliance is checked by inspection.