



IEC 62561-8

Edition 1.0 2026-06

# INTERNATIONAL STANDARD

COMMENTED VERSION

Lightning protection system components (LPSC) -  
Part 8: Requirements for components for **isolated** electrically insulated LPS

## CONTENTS

FOREWORD .....	4
INTRODUCTION .....	6
1 Scope .....	7
2 Normative references .....	7
3 Terms and definitions .....	8
4 Insulating stand-off .....	10
4.1 Classification .....	10
4.1.1 General .....	10
4.1.2 According to conductor clamping arrangement .....	10
4.1.3 According to mounting .....	10
4.2 Requirements .....	10
4.2.1 General .....	10
4.2.2 Construction .....	10
4.2.3 Mechanical requirements .....	11
4.2.4 Electrical requirements .....	12
4.2.5 Documentation and installation instructions .....	13
4.2.6 Marking .....	13
4.3 Tests .....	14
4.3.1 General test conditions .....	14
4.3.2 General test setup .....	16
4.3.3 Documentation .....	17
4.3.4 Marking test .....	17
4.3.5 Environmental influence tests .....	17
4.3.6 Mechanical tests .....	18
4.3.7 Electrical test .....	25
4.4 Electromagnetic compatibility (EMC) .....	27
4.5 Structure and content of the test report .....	27
4.5.1 General .....	27
4.5.2 Report identification .....	27
4.5.3 Specimen description .....	28
4.5.4 Characterization and condition of the test specimen or test assembly .....	28
5 Insulating down-conductor .....	29
5.1 Classification .....	29
5.2 Lightning current carrying capability .....	29
5.3 Preferred values of equivalent separation distance ( $s_e$ ) .....	30
5.4 Requirements .....	30
5.4.1 General .....	30
5.4.2 Environmental requirements .....	30
5.4.3 Mechanical requirements .....	30
5.4.4 Electrical requirements .....	30
5.4.5 Documentation .....	31
5.4.6 Marking .....	31
5.5 Tests .....	32
5.5.1 General test conditions .....	32
5.5.2 General test setup .....	33
5.5.3 Documentation .....	34

5.5.4	Marking test.....	34
5.5.5	Environmental influence tests .....	34
5.5.6	Mechanical tests.....	36
5.5.7	Electrical tests.....	40
5.6	Electromagnetic compatibility (EMC).....	48
5.7	Structure and content of the test report.....	48
5.7.1	General .....	48
5.7.2	Report identification.....	49
5.7.3	Specimen description .....	49
5.7.4	Characterization and condition of the test specimen or test assembly.....	49
5.7.5	Insulating down-conductor .....	49
5.7.6	Standards and references.....	50
5.7.7	Test procedure .....	50
5.7.8	Testing equipment description .....	50
5.7.9	Measuring instruments description.....	50
5.7.10	Results and parameters recorded .....	50
Annex A (normative)	Environmental test – Corrosion resistance .....	51
A.1	General.....	51
A.2	Salt mist test.....	51
A.3	Humid sulphurous atmosphere test .....	51
A.4	Ammonia atmosphere test.....	51
Annex B (normative)	Environmental test – Resistance to ultraviolet light .....	52
B.1	General.....	52
B.2	Test .....	52
B.3	First alternative test to Clause B.2 .....	52
B.4	Second alternative test to Clause B.2 .....	52
Annex C (normative)	Flow chart of tests for insulating stand-offs .....	53
Annex D (normative)	Flow chart of tests for insulating down-conductors .....	55
Annex E (informative)	High voltage impulse test to determine the actual correction factor $k_x$ for insulating stand-offs .....	57
E.1	Specimen preparation .....	57
E.2	Test setup.....	57
E.3	Test procedure.....	57
Annex F (informative)	Installation arrangement test to determine the influence of supporting structures on the separation distance .....	59
F.1	General.....	59
F.2	Specimen preparation for the high voltage installation arrangement test .....	59
F.3	Test procedure.....	60
Annex G (normative)	Alternate test arrangement for high voltage impulse test.....	61
Annex H (normative)	Applicability of previous tests.....	64
Bibliography	.....	65
List of comments	.....	66
Figure 1 – Typical insulating stand-off with a metallic fastener .....		11
Figure 2 – Typical insulating stand-off with a non-metallic fastener .....		12
Figure 3 – Typical insulating stand-off with a metallic fastener prepared for testing .....		14
Figure 4 – Typical insulating stand-off with a non-metallic fastener prepared for testing .....		15

Figure 5 – Basic arrangement for bending test.....	19
Figure 6 – Pendulum hammer test apparatus.....	20
<del>Figure 7 – Basic arrangement for pull-out test on rigidly fixed insulating stand-off.....</del>	<del>21</del>
Figure 7 – Two alternative basic arrangements for pull out test on rigidly fixed insulating stand-off.....	22
<del>Figure 8 – Basic arrangement for pull-out test on free standing insulating stand-off.....</del>	<del>23</del>
Figure 8 – Two alternative basic arrangements for pull out test on free standing insulating stand-off.....	24
Figure 9 – <del>General description of the</del> Typical test arrangement for the high voltage impulse test of an insulating stand-off.....	25
Figure 10 – Specimen preparation for UV light test.....	35
<del>Figure 11 – Basic arrangement for lateral load test.....</del>	<del>36</del>
<del>Figure 12 – Typical arrangement for axial movement test.....</del>	<del>37</del>
<del>Figure 14 – General description of the test setup for the high voltage impulse test of the insulating down-conductor.....</del>	<del>40</del>
Figure 11 – Basic arrangement for the lightning current carrying capability test.....	41
Figure 12 – Test arrangements for the high voltage impulse test of the insulating down-conductor.....	44
<del>Figure 15 – Test arrangement for insulating down-conductors.....</del>	<del>45</del>
<del>Figure 16 – Test arrangement for partial insulating down-conductors.....</del>	<del>46</del>
Figure 13 – Test arrangements for insulating down conductors.....	47
Figure C.1 – Tests for insulating stand-offs.....	54
Figure D.1 – Tests for insulating down-conductors.....	56
<del>Figure E.1 – General description of the test arrangement to determine the actual correction factor <math>k_x</math> for insulating stand-offs.....</del>	<del>57</del>
Figure F.1 – Example for installation arrangement test – Specimen under test.....	59
Figure F.2 – Alternate example for installation arrangement test – Specimen under test.....	60
Figure G.1 – Typical test arrangement for the high voltage impulse test of an insulating stand-off – Alternate test arrangement to Figure 9.....	61
Figure G.2 – General description of the test setup for the high voltage impulse test of the insulating down-conductor – Alternate test set-up to Figure 12 a).....	62
Figure G.3 – Alternate test arrangement for the high voltage impulse test of the insulating down conductor – alternate test set-up to Figure 12 b).....	62
Figure G.4 – General description rod tip and rod – Plane arrangement geometry.....	63
Table 1 – Type test requirements for an insulating stand-off.....	16
Table 2 – Lightning impulse current ( $I_{imp}$ ) parameters.....	29
Table 3 – Type test requirements for an insulating down-conductor <del>and fasteners</del> .....	33
Table H.1 – Differences in the requirements for electrically insulated LPS complying with IEC TS 62561-8:2018.....	64

INTERNATIONAL ELECTROTECHNICAL COMMISSION

**Lightning protection system components (LPSC) -  
Part 8: Requirements for components for ~~isolated~~ electrically  
insulated LPS 1**

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

This redline version of the official IEC Standard allows the user to identify the changes made to the previous edition IEC TS 62561-8:2018. 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 62561-8 has been prepared by IEC technical committee 81: Lightning protection. It is an International Standard.

This first edition cancels and replaces IEC TS 62561-8 published in 2018. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to IEC TC 62561-8:2018:

- a) title and scope of the standard has been adjusted;
- b) the document has been updated in line with IEC 60068-2-52:2017 on salt mist treatment;
- c) the document has been updated in line with ISO 22479:2019 on humid sulphureous atmosphere treatment;
- d) two different possible example configurations for pull out tests have been introduced;
- e) additional information on pollution has been included;
- f) an alternate test arrangement for high voltage impulse test has been included;
- g) a new normative Annex H for applicability of previous tests has been introduced;
- h) pass criteria for high voltage impulse testing updated;
- i) explanation on high voltage impulse testing with negative polarity has been added.

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

Draft	Report on voting
81/806/FDIS	81/808/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](http://www.iec.ch/members_experts/refdocs). The main document types developed by IEC are described in greater detail at [www.iec.ch/publications](http://www.iec.ch/publications).

A list of all parts in the 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](http://webstore.iec.ch) in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

## INTRODUCTION

This part of IEC 62561 deals with the requirements and tests for lightning protection system components (LPSC), specifically components for electrically insulated LPS, used for the installation of a lightning protection system (LPS) designed and implemented according to the IEC 62305 series [1]<sup>1</sup>.

---

<sup>1</sup> Numbers in square brackets refer to the Bibliography.

## 1 Scope

This document specifies the requirements and tests for components used for electrically insulated LPS. These components, which can reduce the separation distance, are as follows:

- insulating stand-offs, used in conjunction with an air-termination system and down-conductors with the aim of maintaining the proper separation distance, ~~and the requirements and tests for insulating down-conductors, including their specific fasteners, able to reduce the separation distance;~~
- insulating down-conductors, including their specific fasteners. **2**

Testing of insulating stand-offs and insulating down-conductor components for an explosive atmosphere is not covered by this document.

~~Requirements and tests for other types of components for isolated LPS are under consideration.~~

## 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 60060-2:~~2010~~2025, *High-voltage test techniques - Part 2: Measuring systems*

IEC 60068-2-52:2017, *Environmental testing - Part 2-52: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)* **3**

IEC 60068-2-75:2014, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests*

IEC 61083-1, *Instruments and software used for measurements in high-voltage ~~impulse~~ and high-current tests - Part 1: Requirements for instruments for impulse tests*

IEC 61083-2, *Instruments and software used for measurement in high-voltage and high-current tests - Part 2: Requirements for software for tests with impulse voltages and currents*

IEC 62305-3, *Protection against lightning - Part 3: Physical damage to structures and life hazard*

IEC 62561-1:~~2017~~2023, *Lightning protection system components (LPSC) - Part 1: Requirements for connection components*

IEC 62561-2:~~2012~~2025, *Lightning protection system components (LPSC) - Part 2: Requirements for conductors and earth electrodes*

IEC 62561-4, *Lightning protection system components (LPSC) - Part 4: Requirements for conductor fasteners*

ISO 4892-2, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps*

ISO 4892-3:~~2016~~2024, *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps*

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

## Bibliography

~~IEC 60060-1:2010, High-voltage test techniques – Part 1: General definitions and test requirements~~

~~IEC 60332-3 (all parts), Tests on electric cables under fire conditions~~

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

- [1] IEC 62305 (all parts), *Protection against lightning*
- [2] R. Brocke, O. Beierl: "*Probability of Insulation Failures in Isolated LPS according to the used Insulation Technologies*", Proceedings of the XI SIPDA, Fortaleza, Brazil, Nov. 2011
- [3] R. Brocke, O. Beierl: "*Influence of humidity and pollution on the dielectric strength of components used in Isolated LPS*", 32th International Conference on Lightning Protection (ICLP), Shanghai, China, Oct. 2014
- [4] W. Zischank, J. Wiesinger, P. Hasse: "*Insulators for Isolated or Partly Isolated Lightning Protection Systems to Verify Safety Distances*" Proceedings of the 23. ICLP, Florenz 1996, pp. 513-518
- [5] S. Grzybowski, J. Kappenman, W. A. Radasky: "*Electrical Strength of Distribution Insulators under steep front, short duration pulse*", 17th International Zurich Symposium on Electromagnetic Compatibility, 2006
- [6] IEC 62305-1:2024, *Protection against lightning - Part 1: General principles*
- [7] IEC TS 62561-8:2018, *Lightning protection components (LPSC) - Part 8: Requirements for components for isolated LPS*
- [8] IEC 62305-2:2024, *Protection against lightning - Part 2: Risk management*
- [9] IEC 62305-4:2024, *Protection against lightning - Part 4: Electrical and electronic systems within structures*
- [10] IEC 60332 (all parts), *Tests on electric cables under fire conditions*
- [11] IEC 61034 (all parts), *Measurement of smoke density of cables burning under defined conditions*

## List of comments

- 1 The title of IEC 62561-8 has been revised, and the new term “electrically insulated LPS” has been introduced to align with the definitions given in IEC 62305-3 Edition 3.0.
  - 2 The scope of the standard and the description of the components covered by the standard have been revised in accordance with the new definition of an electrically insulated LPS given in IEC 62305-3.
  - 3 The standard has been updated in line with the latest requirements for salt mist testing.
  - 4 The standard has been updated in line with the latest requirements for sulfur dioxide testing.
  - 5 Based on an IEC questionnaire and the conclusions of a Task Force on pollution testing, which reviewed the scientific research on this topic in detail, additional information has been included in the bibliography.
  - 6 Two typical test configurations have been included based on testing experience.
  - 7 The test criteria for the high-voltage impulse test have been revised for improved clarity.
  - 8 An explanation of high-voltage impulse testing with negative polarity has been added, together with additional bibliographic references. Testing with negative polarity represents the worst-case condition.
  - 9 A new normative annex describing an alternative test arrangement for the high-voltage impulse test has been included as an outcome of a Task Force on high voltage testing.
  - 10 The test criteria for the high-voltage impulse test have been revised for improved clarity.
  - 11 The document has been updated in line with IEC 60068-2-52:2017 regarding salt mist testing.
  - 12 The document has been updated in line with ISO 22479:2019 regarding humid sulfurous atmosphere testing.
  - 13 The test criteria for the high-voltage impulse test have been revised for improved clarity.
  - 14 An alternative test arrangement for the high-voltage impulse test has been included as an outcome of a Task Force on high voltage testing.
  - 15 A new normative annex describing an alternative test arrangement for the high-voltage impulse test has been included as an outcome of a Task Force on high voltage testing.
  - 16 A new normative annex has been introduced to align with IEC 62561 requirements for lightning protection system components (LPSC).
-