BS EN 62561-6:2011

BSI Standards Publication

Lightning protection system components (LPSC)

Part 6: Requirements for lightning strike counters (LSC)

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 62561-6:2011. It was derived by CENELEC from IEC 62561-6:2011. It supersedes BS EN 50164-6:2009, which will be withdrawn on 28 July 2014.

The CENELEC common modifications have been implemented at the appropriate places in the text. The start and finish of each common modification is indicated in the text by 〉C〈.

The UK participation in its preparation was entrusted to Technical Committee GEL/81, Protection against lightning.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

ISBN 978 0 580 68405 0

ICS 29.020; 91.120.40

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2011.

Amendments/corrigenda issued since publication

Date	Text affected

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 62561-6

September 2011

ICS 29.020; 91.120.40

Supersedes EN 50164-6:2009

English version

Lightning protection system components (LPSC) - Part 6: Requirements for lightning strike counters (LSC)

(IEC 62561-6:2011, modified)

Composants de système de protection contre la foudre (CSPF) - Partie 6: Exigences pour les compteurs de coups de foudre (LSC) (CEI 62561-6:2011, modifiée)

Blitzschutzsystembauteile (LPSC) - Teil 6: Anforderungen an Blitzzähler (LSC) (IEC 62561-6:2011, modifiziert)

This European Standard was approved by CENELEC on 2011-07-28. 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, 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Management Centre: Avenue Marnix 17, B - 1000 Brussels

Ref. No. EN 62561-6:2011 E

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Foreword

The text of document 81/392/FDIS, future edition 1 of IEC 62561-6, prepared by IEC TC 81, Lightning protection, was submitted to the IEC-CENELEC parallel vote.

A draft amendment, prepared by the Technical Committee CENELEC TC 81X, Lightning protection, was submitted to the formal vote.

The combined texts were approved by CENELEC as EN 62561-6:2011 on 2011-07-28.

This European Standard supersedes EN 50164-6:2009.

The following dates were fixed:

– latest date by which the amendment has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2012-07-28
– latest date by which the national standards conflicting with the amendment have to be withdrawn	(dow)	2014-07-28

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 62561-6:2011 was approved by CENELEC as a European Standard with agreed common modifications as given below.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

IEC 60068-2-52:1996	NOTE	Harmonized as EN 60068-2-52:1996 (not modified).
IEC 61000-6-2	NOTE	Harmonized as EN 61000-6-2.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application 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 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 60060-1	-	High-voltage test techniques - Part 1: General definitions and test requirements	EN 60060-1	-
IEC 60068-2-52 + corr. July	1996 1996	Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic (sodium chloride solution)	EN 60068-2-52	1996
IEC 60068-2-75	1997	Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests	EN 60068-2-75	1997
IEC 60529	-	Degrees of protection provided by enclosures (IP Code)	EN 60529	-
IEC 61000-6-4	-	Electromagnetic compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments	EN 61000-6-4	-
IEC 61180-1	-	High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements	EN 61180-1	-
IEC 62305	Series	Protection against lightning - Part 1: General principles	EN 62305	Series
ISO 4892-2	2006	Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps	EN ISO 4892-2	2006
ISO 4892-3	2006	Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps	EN ISO 4892-3	2006
ISO 4892-4	2004	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 - Sulfur dioxide test with general condensation of moisture	EN ISO 6988	1994

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

CONTENTS

INTRODUCTION

This Part 6 of ⟨C⟩EN 62561⟨C⟩ deals with the requirements and tests for lightning protection system components (LPSC) used for the installation of a lightning protection system (LPS) designed and implemented according to the ⟨C⟩EN 62305⟨C⟩ series of standards.

LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 6: Requirements for lightning strike counters (LSC)

1 Scope

This Part 6 of 〈C〉 EN 62561 〈C〉 specifies the requirements and tests for devices intended to count the number of lightning strike pulses flowing in a conductor. This conductor may be part of a lightning protection system (LPS) or connected to an SPD installation (or other conductors which are not intended to conduct a significant portion of lightning currents).

NOTE Lightning strike counters may also be suitable for use in hazardous atmospheres. Regard should then be taken of the extra requirements necessary for the components to be installed in such conditions.

2 Normative references

〈C〉 The following referenced documents are indispensable for the application 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.

EN 60068-2-52:1996, *Environmental testing - Part 2: Tests - Test Kb: Salt mist, cyclic* (*sodium chloride solution)* (IEC 60068-2-52:1996 + corr. July 1996)

EN 60068-2-75:1997, *Environmental testing - Part 2-75: Tests - Test Eh: Hammer tests* (IEC 60068-2-75:1997)

EN 60529, *Degrees of protection provided by enclosures* (*IP Code)* (IEC 60529)

EN 61000-6-4, *Electromagnetic compatibility* (*EMC) - Part 6-4: Generic standards - Emission standard for industrial environments* (IEC 61000-6-4)

EN 61180-1, *High-voltage test techniques for low-voltage equipment - Part 1: Definitions, test and procedure requirements* (IEC 61180-1)

EN 62305 (series), *Protection against lightning* (IEC 62305 series)

EN ISO 4892-2:2006, *Plastics - Methods of exposure to laboratory light sources - Part 2: Xenon-arc lamps* (ISO 4892-2:2006)

EN ISO 4892-3:2006, *Plastics - Methods of exposure to laboratory light sources - Part 3: Fluorescent UV lamps* (ISO 4892-3:2006)

EN ISO 6988:1994, *Metallic and other non-organic coatings - Sulfur dioxide test with general condensation of moisture* (ISO 6988:1985)

ISO 4892-4:2004, *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* 〈C〉

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

3 Terms and definitions

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

3.1
lightning strike counter
device intended to count the number of lightning strikes based on current flowing in a conductor

3.2
threshold current
I_{tc}
peak value of the discharge current with an 8/20 waveform that the lightning strike counter will count in 100 % of the cases

3.3
maximum counting discharge current
$I_{mcw,\ 8/20}$
peak value of a current through the conductor having an 8/20 waveform and magnitude according to the counting and withstand current test

NOTE 8/20 waveform can be used only for lightning strike counters connected to SPDs Type 2.

3.4
maximum withstand discharge current
$I_{mcw,\ 10/350}$
peak value of a current through the conductor having an 10/350 waveform and magnitude according to the counting and withstand current test

3.5
degree of protection of enclosure
IP
numerical classification according to 〚C〛 EN 60529 〚C〛, preceded by the symbol IP, applied to the enclosure of electrical apparatus to provide:

– protection of persons against contact with, or approach to, live parts and against contact with moving parts (other than smooth rotating shafts and the like) inside the enclosure,
– protection of the electrical apparatus against ingress of solid foreign objects, and
– where indicated by the classification, protection of the electrical apparatus against harmful ingress of water

[IEC 60050:2008, 426-04-02]

4 Requirements

4.1 General

The lightning strike counter shall be designed in such a way that in normal use their performance is reliable and without danger to persons and the surrounding.

The choice of a material depends on its ability to match the particular application requirements.

4.2 Documentation

The manufacturer or supplier of the lightning strike counter shall provide adequate information in his literature to ensure that the installer can select and install the counter in a suitable and safe manner.

Compliance is checked by inspection.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

4.3 Marking

All products complying with this standard shall be marked at least with the following:

a) the name of the manufacturer or his trademark;

b) the reference of the type or the serial number;

c) the position of the assembly if necessary;

d) the degree of protection (IP) if applicable;

e) conformity to the present standard (of which in particular I_{tc} and I_{mcw} if applicable).

For small devices, if the place available is not sufficient for all the indications to appear, the indications cited in a) and b) above shall at least be reproduced on the apparatus and visible once installed. The indications cited in c), d) and e), can be carried on the packaging and/or in installation data sheet and/or the catalogue of the manufacturer.

Compliance is checked in accordance with 6.7.

NOTE Marking may be applied, for example, by moulding, pressing, engraving, printing adhesive labels, or water slide transfers.

4.4 Design

The design of the lightning counter shall be such that it carries out its function of counting the number of lightning strikes flowing in a conductor.

These devices shall detect and record lightning strikes regardless of the polarity of the discharge current.

Lightning strike counters intended to be used outdoors shall be able to withstand environmental conditions including temperature, dust and humidity. The minimum degree of protection is IP 43 obtained by itself or in combination with a box in accordance with 〈C〉EN 60529〈C〉.

The manufacturer shall provide the operation environmental conditions such as temperature and humidity

The threshold current I_{tc}, the maximum counting discharge current ($I_{mcw,8/20}$) and the maximum discharge withstand current ($I_{mcw,10/350}$) are declared by the manufacturer. At $I_{tc}/2$, the surge lightning strike counter shall not operate. Compliance is checked in accordance with 6.6.2, 6.6.3 and 6.6.4.

The size of display if any, shall allow a normal reading of the number of lightning strikes recorded, when it is installed in accordance with the instructions of the manufacturer.

The fixing system of the lightning strike counter should not apply an unacceptable stress to the conductor.

Its material shall be compatible with that of the conductor (galvanic coupling).

5 Classification

Lightning strike counters are classified according to their application, threshold currents and maximum counting and withstand current.

Application: for connection on LPS conductors, for connection on SPD conductors and for connection on both conductors.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

NOTE This standard is applicable to those lightning strike counters that may be mounted in SPD enclosures but may not be required for those lightning strike counters which are integral to an SPD.

The values I_{tc} and I_{mcw} should comply with Table 1.

Table 1 – Typical values for I_{tc} and I_{mcw}

Application	Values for I_{tc}		Values for I_{mcw}				
Connection on LPS conductors	–	1 kA 8/20[b]	–	–	–	–	100 kA 10/350[a]
Connection on SPD conductors	500 A 8/20[b]	–	20 kA 8/20[b]	40 kA 8/20[b]	60 kA 8/20[b]	80 kA 8/20[b]	100 kA 8/20[b]
Connection on LPS and SPD conductors	–	1 kA 8/20[b]	–	–	–	–	100 kA 10/350[a]

[a] The 10/350 impulse is defined by three parameters, a peak current value I_{peak}, a charge Q and a specific energy W/R (see 〈C〉 EN 62305-1 〈C〉).

[b] The 8/20 impulse is defined according to 〈C〉 EN 60060-1 〈C〉.

6 Tests

6.1 General test conditions

The tests in accordance with this standard are type tests.

Unless otherwise specified, tests are carried out with the specimens assembled and installed as in normal use according to the manufacturer's or supplier's instructions.

All tests are carried out on new specimens.

Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met. If only one of the specimens does not satisfy a test due to an assembly or a manufacturing fault, that test and any preceding one which may have influenced the results of the test shall be repeated and also the tests which follow shall be carried out in the required sequence on another full set of specimens, all of which shall comply with the requirements.

NOTE The applicant, may also submit an additional set of specimens which may be used should one specimen fail. The testing laboratory will then, without further request, test the additional set of specimens and will reject only if a further failure occurs. If the additional set of specimens is not submitted at the same time, the failure of one specimen will entail rejection.

The lightning strike counters submitted for testing shall be identified by means of the following elements:

– marks and indications specified in 4.3;
– assembly instructions with reference and date.

The lightning strike counters shall be mounted in accordance with the instructions specified by the manufacturer in his assembly instructions.

The number of samples is 3 for the electric tests and 1 for the other tests.

NOTE The use of the same sample for several tests is possible after agreement of the manufacturer.

Unless otherwise specified, the tests are carried out at an ambient temperature ranging between 5 °C and 35 °C and shall not vary during the duration of test by more than 3 K. The lightning strike counters shall be protected from excessive heating or excessive external cooling.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

6.2 Resistance to UV radiation tests

This test is necessary for lightning strike counters designed to be installed outdoors or in specific environments.

Non-metallic lightning strike counter housings for outdoor application shall withstand UV effects.

In order that a lightning strike counter meets the requirements of this standard, environmental tests shall be carried out as per Annex A.

One counter shall be assembled and mounted rigidly on an insulating plate (e.g. brick, polytetrafluorethylene (PTFE) in accordance with the manufacturer's installation instructions.

The specimen shall be subjected to an environmental test consisting of an ultra violet light test as specified in Annex A .

The specimen is deemed to have passed this part of the test if there are no signs of disintegration and no cracks visible to normal or corrected vision.

NOTE Ensure that the surface of the mounting plate is suitable to resist UV radiation.

6.3 Resistance tests to corrosion (for metallic parts)

This test is necessary for lightning strike counters designed to be installed outdoors or in specific environments.

The specimen used and complied with 6.2 test, shall be subjected to corrosion tests as per Annex B, consisting of a salt mist treatment, as specified in Clause B.1, followed by a humid sulphurous atmosphere treatment, as specified in Clause B.2, and an additional ammonia atmosphere treatment for specimens made of copper alloy with a copper content less than 80 % as specified in Clause B.3.

After the parts have been dried during 10 min in a drying oven at a temperature of 100 °C ± 5 °C, they shall not present any trace of rust on surfaces.

One does not take into account traces of rust on the edges, nor a yellowish veil, disappearing by simple friction. White rust is not considered as corrosive deterioration.

6.4 Mechanical tests

A used specimen complying with 6.2 and 6.3 shall be stressed three times by a mechanical test.

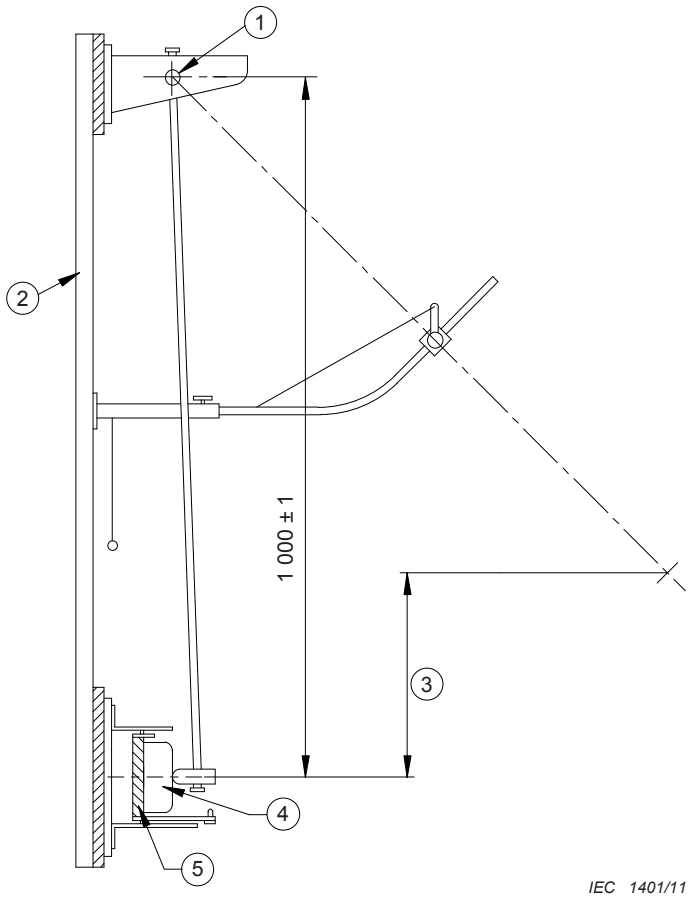
The lightning strike counter is subjected to a mechanical test by applying mechanical impacts.

The impacts are carried out on the accessible parts of the lightning strike counter, which may be mechanically stressed accidentally.

The specimen is assembled under its normal operating conditions specified in the manufacturer's documentation.

The lightning strike counter is mounted on a pendulum hammer test apparatus according to Clause 4 of [C] EN 60068-2-75:1997 as shown in Figure 1. The striking element material shall be polyamide as per Table 1 of EN 60068-2-75:1997 and its mass shall be 200 g as per Table 2 of EN 60068-2-75:1997 [C].

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013 Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013



Key
1 pendulum
2 frame
3 height of fall
4 arrangement of specimens
5 mounting fixture

Figure 1 – Pendulum hammer test apparatus

The hammer is allowed to fall from a height of 200 mm so that one impact on each side is applied, as far as possible perpendicular to the length of the arrangement. The drop height is the vertical distance between the position of the point of control, when the pendulum is released, and the position of this point at the time of the impact.

The point of control is located on the surface of the striking part where the line passing by the point of intersection of the axes of the steel tube of the pendulum and the part of striking, perpendicular to the plan crossing the two axes, comes into contact with surface.

The impacts are not applied to the display window or to the connectors.

NOTE In theory, the centre of gravity of the striking part should be the point of control. As, in practice, it is difficult to determine the centre of gravity, the point of control has been chosen as described above.

After the test, the lightning strike counter shall show no cracks or similar damage visible to normal or corrected vision without magnification and shall not present damage which can potentially affect its later use.

After the test, the lightning strike counter shall not have increased nor decreased the count value in the display (especially for electromechanical lightning strike counters).

6.5 Index of protection confirmation (IP Code)

IP confirmation shall be performed in accordance with 〈C〉EN 60529〈C〉, on the used specimen and in compliance with the test of 6.4.

The specimen shall be in compliance with 〈C〉EN 60529〈C〉 requirements.

6.6 Electrical tests

6.6.1 General conditions for test

After the test of 6.5, each specimen shall be tested with the following electrical tests.

The tests are carried out in accordance with 〈C〉 EN 61180-1〈C〉.

6.6.2 Minimum threshold current (I_{tc})

The minimum threshold current is given by the manufacturer according to the classification as per Clause 5.

The test is carried out with a 8/20 waveform current and peak value I_{tc}. The test is carried out once on each polarity.

After the test, the indication of the lightning strike counter shall have incremented by two.

6.6.3 Checking of non detection with $I_{tc}/2$

The test shall be identical to the test described in 6.6.2.

After the test the indication of the lightning strike counter shall not be incremented.

6.6.4 Withstand and counting at I_{mcw} current

This test is carried out on the lightning strike counters having passed the tests of 6.6.3.

The maximum discharge current $I_{mcw\ 8/20}$ and $I_{mcw\ 10/350}$ is given by the manufacturer.

The test is carried out with a waveform depending of the classification as per Clause 5 and the peak value equal to $I_{mcw}\ ^{+5}_{0}$ %. The test is carried out once for each polarity of the current.

After the test one shall observe no opening or degradation of the parts carrying the current, neither for the housing of the lightning strike counter. The count value in the display of the lightning counter shall be increased by two.

6.6.5 Multi pulse test

Under consideration.

6.7 Marking test

All three specimens used and complying with 6.6 tests, shall be subjected to marking test.

Marking made by moulding, pressing or engraving is not subjected to this test.

The marking is checked by inspection and by rubbing it by hand for 15 s with a piece of cloth soaked with water and again for 15 s with a piece of cloth soaked by white spirit.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

After the test the marking shall be legible. Marking shall allow the identification of the lightning strike counter. It should not be possible to easily remove the labels and those do not retract.

7 Electromagnetic compatibility (EMC)

7.1 Electromagnetic immunity

Lightning strike counters containing electronic circuits shall fulfil the requirements of 〖C〉EN 61000-6-4〈C〗.

This clause is not applicable for lightning strike counters which do not contain electronic circuits.

7.2 Electromagnetic emission

Lightning strike counters containing electronic circuits shall fulfil the requirements of 〖C〉EN 61000-6-4〈C〗.

This clause is not applicable for lightning strike counters which do not contain electronic circuits.

8 Structure and content of the test report

8.1 General

The purpose of this clause is to provide general requirements 〖C〉 for type test reports issued by the laboratory 〈C〗 and to promote clear, complete reporting procedures for laboratories submitting test reports.

The results of each test carried out by the laboratory shall be reported accurately, clearly, unambiguously and objectively, in accordance with any instructions in the test methods. The results shall be given in a test report and shall include all the information necessary for the interpretation of the test results and all information required by the method used.

Particular care and attention shall be paid to the arrangement of the report, especially with regard to presentation of the test data and ease of assimilation by the reader. The format shall be carefully and specifically designed for each type of test carried out, but the headings shall be standardized as indicated below.

The structure of each report shall include at least the information according to 8.2 to 8.9.

8.2 Report identification

8.2.1 A title or subject of the report.

8.2.2 Name, address and telephone number of the test laboratory.

8.2.3 Name, address and telephone number of the sub test laboratory where the test was carried out if different from company which has been assigned to perform the test.

8.2.4 Unique identification number (or serial number) of the test report.

8.2.5 Name and address of the vendor.

8.2.6 Report shall be paginated and the total number of pages indicated.

8.2.7 Date of issue of report.

8.2.8 Date(s) of performance of test(s).

8.2.9 Signature and title, or an equivalent identification of the person(s) authorized to sign for the testing laboratory for the content of the report.

8.2.10 Signature and title of person(s) conducting the test.

8.3 Specimen description

8.3.1 Detailed description and unambiguous identification of the test sample and/or test assembly.

8.3.2 Characterization and condition of the test sample and/or test assembly.

8.3.3 Sampling procedure, where relevant.

8.3.4 Date of receipt of test items.

8.3.5 Photographs, drawings or any other visual documentation, if available.

8.4 Standards and references

8.4.1 Identification of the test standard used and the date of issue of the standard.

8.4.2 Other relevant documentation with the documentation date.

8.5 Test procedure

8.5.1 Description of the test procedure.

8.5.2 Justification for any deviations from, additions to or exclusions from the referenced standard.

8.5.3 Any other information relevant to a specific test such as environmental conditions.

8.5.4 Configuration of testing assembly.

8.5.5 Location of the arrangement in the testing area and measuring techniques.

8.6 Testing equipment description

Description of equipment used for every test conducted, i.e. conditioning/ageing device, etc.

8.7 Measuring instruments description

Characteristics and calibration date of all instruments used for measuring the values specified in the standard, i.e. meters.

8.8 Results and parameters recorded

The measured, observed or derived results shall be clearly identified at least for:

a) current;

b) charge;

c) specific energy;

d) duration.

The above shall be presented by means of tables, graphs, drawings, photographs or other documentation of visual observations as appropriate.

8.9 Statement of pass/fail

A statement that the specimen passed or failed the tests shall be reported. In the case where the specimen has failed, a description of failure is necessary.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Annex A
(normative)

Resistance to ultraviolet light

A.1 General

For non-metallic lightning strike counter housings, one sample shall be subjected to ultraviolet light conditioning specified in Clauses B.1, B.2 or B.3. All sets tested are considered representative of the material's entire colour range.

The sample shall be mounted on the inside of the cylinder in the ultraviolet light apparatus and shall be positioned in such a way that the fixation surface for the rod is perpendicular to the light source.

Passing criteria: After the test there shall be no sign of disintegration nor shall there be any crack visible to normal or corrected vision.

A.2 Exposure to xenon arc lamp

The specimens shall be exposed for (1 000 ± 1) h to xenon-arc, Method A, in accordance with [C〉EN ISO 4892-2:2006〈C]. Continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of (120 ± 1) min consisting of a (102 ± 1) min light exposure and a (18 ± 1) min exposure to water spray with light, shall be used. The apparatus shall operate with a water-cooled xenon-arc lamp, borosilicate glass inner and outer optical filters, a spectral irradiance of 0,35 $W \times m^{-2} \times nm^{-1}$ at 340 nm and a black panel temperature of (65 ± 3) °C. The temperature of the chamber shall be (45 ± 5) °C. The relative humidity in the chamber shall be (50 ± 5) %.

A.3 Exposure to carbon arc lamp (alternative to Clause A.2)

The specimens shall be exposed for (720 ± 1) h to open-flame sunshine carbon-arc, in accordance with ISO 4892-4. Continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of (120 ± 1) min consisting of a (102 ± 1) min light exposure and an 18 min exposure to water spray with light, shall be used. The apparatus shall operate with an open-flame sunshine carbon-arc lamp, borosilicate glass Type 1 inner and outer optical filters, a spectral irradiance of 0,35 $W \times m^{-2} \times nm^{-1}$ at 340 nm and a black panel temperature of (63 ± 3) °C. The temperature of the chamber shall be (45 ± 5) °C. The relative humidity in the chamber shall be (50 ± 5) %.

A.4 Exposure to fluorescent lamp (alternative to Clause A.2)

The specimens shall be exposed to a total irradiation energy equal to the values give in Clause A.2 for fluorescent UV, in accordance with [C〉EN ISO 4892-3:2006〈C]. The exposure conditions will be by continuous exposure to light and intermittent exposure to water spray, with a programmed cycle of (360 ± 1) min light exposure and (60 ± 1) min exposure to water spray with light as per Table 4, Method A, cycle 3 of [C〉EN ISO 4892-3:2006〈C].

Annex B
(normative)

Conditioning/ageing for lightning strike counters

B.1 Salt mist treatment

Salt mist treatment shall be in accordance with Ⓒ EN 60068-2-52:1996 Ⓒ except for Clauses 7, 10 and 11 which are not applicable. The test is carried out using severity (2).

NOTE If the salt mist chamber can maintain the temperature conditions as specified in 9.3 of Ⓒ EN 60068-2-52:1996 Ⓒ and a relative humidity of not less than 90 %, then the specimen may remain in it for the humidity storage period.

B.2 Humid sulphurous atmosphere treatment

Humid sulphurous atmosphere treatment shall be in accordance with Ⓒ EN ISO 6988:1994 Ⓒ with seven cycles with a concentration of sulphur dioxide of 667 x 10^{-6} (in volume) ± 25 x 10^{-6}, except for Clauses 9 and 10 which are not applicable.

Each cycle which has duration of 24 h is composed of a heating period of 8 h at a temperature of 40 °C ± 3 °C in the humid saturated atmosphere which is followed by a rest period of 16 h. After that, the humid sulphurous atmosphere is replaced.

NOTE If the test chamber maintains the temperature conditions as specified in 6.5.2 of Ⓒ EN ISO 6988:1994 Ⓒ then the specimen may remain in it for the storage period.

B.3 Ammonia atmosphere treatment

Ammonia atmosphere treatment shall be in accordance with ISO 6957:1988 for a moderate atmosphere with the pH value 10 except for 8.4 and Clause 9, which are not applicable.

Licensed copy: Lee Shau Kee Library, HKUST, Version correct as of 03/01/2015, (c) The British Standards Institution 2013

Bibliography

IEC 60050-426:2008, *International Electrotechnical Vocabulary – Part 426: Equipment for explosive atmospheres*

〈C〉 EN 60060-1, *High-voltage test techniques - Part 1: General definitions and test requirements* (IEC 60060-1) 〈C〉

〈C〉 EN 60068-2-52 :1996〈C〉, *Environmental testing – Part 2-52: Tests – Test Kb: Salt mist, cyclic (sodium chloride solution)*

〈C〉 EN 61000-6-2 〈C〉, *Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity for industrial environments*

ASTM D 785-65, *Standard Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials*

_____

This page deliberately left blank

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards -based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

Useful Contacts:

Customer Services
Tel: +44 845 086 9001
Email (orders): orders@bsigroup.com
Email (enquiries): cservices@bsigroup.com

Subscriptions
Tel: +44 845 086 9001
Email: subscriptions@bsigroup.com

Knowledge Centre
Tel: +44 20 8996 7004
Email: knowledgecentre@bsigroup.com

Copyright & Licensing
Tel: +44 20 8996 7070
Email: copyright@bsigroup.com

bsi.

...making excellence a habit.™