SLOVENSKI STANDARD
SIST-TS CLC/TS 50703-2:2021

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Elementi za zaščito pred strelo (LPSC) - 2. del: Posebne zahteve za preskušanje elementov LPS, uporabljenih v eksplozivnih atmosferah

Lightning Protection System Components (LPSC) - Part 2: Specific testing requirements for LPS components used in explosive atmospheres

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91.120.40	Zaščita pred strelo	Lightning protection

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TECHNICAL SPECIFICATION

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English Version

Lightning Protection System Components (LPSC) - Part 2: Specific testing requirements for LPS components used in explosive atmospheres

Composants des systèmes de protection contre la foudre (CSPF) - Part 2: Exigences d'essais spécifiques relatives aux composants des SPF utilisés dans les atmosphères explosives

Blitzschutzsystembauteile (LPSC) - Teil 2: Besondere Prüfanforderungen an Blitzschutzsystembauteile zur Verwendung in explosionsgefährdeten Bereichen

This Technical Specification was approved by CENELEC on 2020-11-09.

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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

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Contents

European foreword

This document (CLC/TS 50703-2:2020) has been prepared by CLC/TC 81X “Lightning protection”.

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.

1 Scope

This document defines the requirements and tests relevant to Lightning Protection System Components suitable for explosive atmospheres (Ex-LPSC).

NOTE This document does not consider EX-LPS Components certified according to EN 60079 series. If a product has already been tested according to ATEX, it does not have to be tested again according to CLC/TS 50703-2.

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.

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

EN 62561-1:2017, *Lightning Protection System Components (LPSC) - Part 1: Requirements for connection components (IEC 62561-1:2017)*

EN 62561-2, *Lightning Protection System Components (LPSC) - Part 2: Requirements for conductors and earth electrodes (IEC 62561-2)*

EN 62561-3, *Lightning Protection System Components (LPSC) - Part 3: Requirements for isolating spark gaps (ISG) (IEC 62561-3)*

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

EN 62561-6, *Lightning protection system components (LPSC) - Part 6: Requirements for lightning strike counters (LSC) (IEC 62561-6)*

EN IEC 60079-0:2018, *Explosive atmospheres - Part 0: Equipment - General requirements (IEC 60079-0:2018)*

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

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

3 Terms and definitions

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

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 https://www.iso.org/obp

3.1
Ex-LPSC
lightning protection system component suitable of being used in explosive atmosphere, such as connection components, conductors, isolating spark gaps, conductor's fasteners, lightning strike counters

3.2
ignition safety
non-ignition of an explosive atmosphere

3.3
explosive mixture
specified explosive mixture used for the testing of electrical equipment for explosive gas atmospheres (see EN IEC 60079-0:2018)

3.4
threshold current
maximum lightning current without ignition of the explosive atmosphere

3.5
type test
test required to be made before supplying a type of material covered by this standard on a general commercial basis, in order to demonstrate satisfactory performance characteristics to meet the intended application

Note 1 to entry: These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made to the accessory materials, design or type of manufacturing process which might change the performance characteristics.

3.6
connection component
part of an external LPS which is used for the connection of conductors to each other or to metallic installations

Note 1 to entry: Connection components include connectors, clamps, bridging components, expansion pieces and test joints.

3.7
conductor
part of an external LPS which is intended to intercept to conduct and to disperse lightning current to the earth

Note 1 to entry: Conductors include air-termination conductors or rods, down conductors and earth conductors.

3.8
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 installation sections are temporarily connected conductively as the result of response of the discharge.

3.9
conductor fastener
metallic, non-metallic or composite component designed to retain and support the air termination and down conductor, installed at intervals along the length of the conductors

3.10
lightning strike counter
device intended to count the number of lightning strikes based on current flowing in a conductor

4 Classification of (Ex-LPSC) used in ATEX

Classification of Ex-LPSCs depends on the explosion group and the ability to withstand lightning current as shown in Table 1, e.g. $1H_{EX}$, $2H_{EX}$, N_{Ex}, $1L_{EX}$, $2L_{EX}$IIA, $2L_{EX}$IIC, etc.

Table 1 — Classification of explosion group

Lightning impulse current according to Table 2	Explosion group
class $1H_{Ex}$ 100 kA	IIA, IIB, IIC
class $2H_{Ex}$ 75 kA	
class N_{Ex} 50 kA	
class $1L_{Ex}$ 25 kA	
class $2L_{Ex}$ 12,5 kA	
class $3L_{Ex}$ 10 kA	
class $4L_{Ex}$ 5 kA	
The manufacturer may declare in his documentation the threshold current	

5 Requirements

5.1 General

Ex-LPSCs 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 to persons and surrounding equipment.

NOTE A summary of the requirements and their corresponding tests is given in Annex E.

5.2 Lightning current carrying capability

Ex-LPSCs shall have sufficient lightning current carrying capability without ignition.

Compliance is checked in accordance with 6.4 following the manufacturer's declaration for the class (HEx, NEx, 1LEx, 2LEx, 3LEx, IIA, IIB, IIC).

The specimens shall be tested at the designated class as per 6.3.

5.3 Installation instructions

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

In addition to the installation instruction as mentioned in the relevant part of EN 62561, the manufacturer of the Ex-LPSCs shall provide a classification according to Table 1.

Compliance is checked by review as per 6.4.

5.4 Marking

The Ex-LPSCs shall be marked at least with the following:

a) manufacturer's or responsible vendor's name or trade mark;

b) identifying symbol (picture, product number etc.);

c) classification as per Table 1;

d) optional threshold current.

The marking shall be durable and legible.

Compliance is checked in accordance with 6.5.

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

6 Tests

6.1 General conditions for tests

The tests in accordance with this standard are type tests and performed in a sequence according to Annex E.

These tests are of such a nature that, after they have been performed, they need not be repeated unless changes are made to the materials, design or type of manufacturing process, which might change the performance characteristics of the product.

a) 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 installation instructions.

b) All tests are carried out on new specimens.

c) Unless otherwise specified, three specimens are subjected to the tests and the requirements are satisfied if all the tests are met.

d) If only one of the specimen does not satisfy a test due to an assembly or a manufacturing fault, that test and any preceding one which could 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.

e) The electrical test shall be carried out in the order given after conditioning/ageing of the arrangement of the specimen in accordance with 6.2.2.

f) The applicant, when submitting the sets of specimens, may also submit an additional set of specimens which could be necessary should one specimen fail. The testing station 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.

6.2 Test preparation

6.2.1 Arrangement of the specimen

LPSCs which shall be tested for use in explosive atmosphere shall comply with the relevant part of EN 62561.

The Ex-LPSCs shall be tested in all the configurations described in Annex B, if applicable.

If not otherwise specified by the manufacturer, Ex-LPSCs specimens' electrical connections shall be cleaned by using a suitable degreasing agent followed by cleaning in demineralizing water and drying. They shall then be assembled in accordance with the manufacturer's instructions, e.g. with the recommended conductors and tightening torques.

The Ex-LPSCs shall be tested in all the connection and material configurations declared by the manufacturer in Annex B.

Any Ex-LPSCs accommodating a range of conductors with any variation on dimension equal to or less than 2 mm and any variation of material as per EN 62561-1, shall be tested using the minimum conductor size recommended. If the range of conductor sizes is greater than 2 mm, it shall be tested using the minimum and maximum size of conductors recommended in any variation of material as per EN 62561-1.

6.2.2 Conditioning/ageing

Following the manufacturer's declaration in accordance with 5.3 the arrangement of the specimen shall be subjected to a conditioning/ageing as per Annex A.

The manufacturer shall provide proof of the copper content of any part of the assembly made from an alloy having a copper content ≥ 80 %.

After the conditioning ageing, the part of the sample which should be tested shall be enclosed into the explosion chamber or a sheet bag.

The arrangement shall be fixed on an insulated plate, if it is required, taking care to avoid any damage to the specimen due to handling. The electrical connectors were connected with the lightning current generator outside the bag.

Components designed for indoor applications only, are tested without conditioning/ageing.

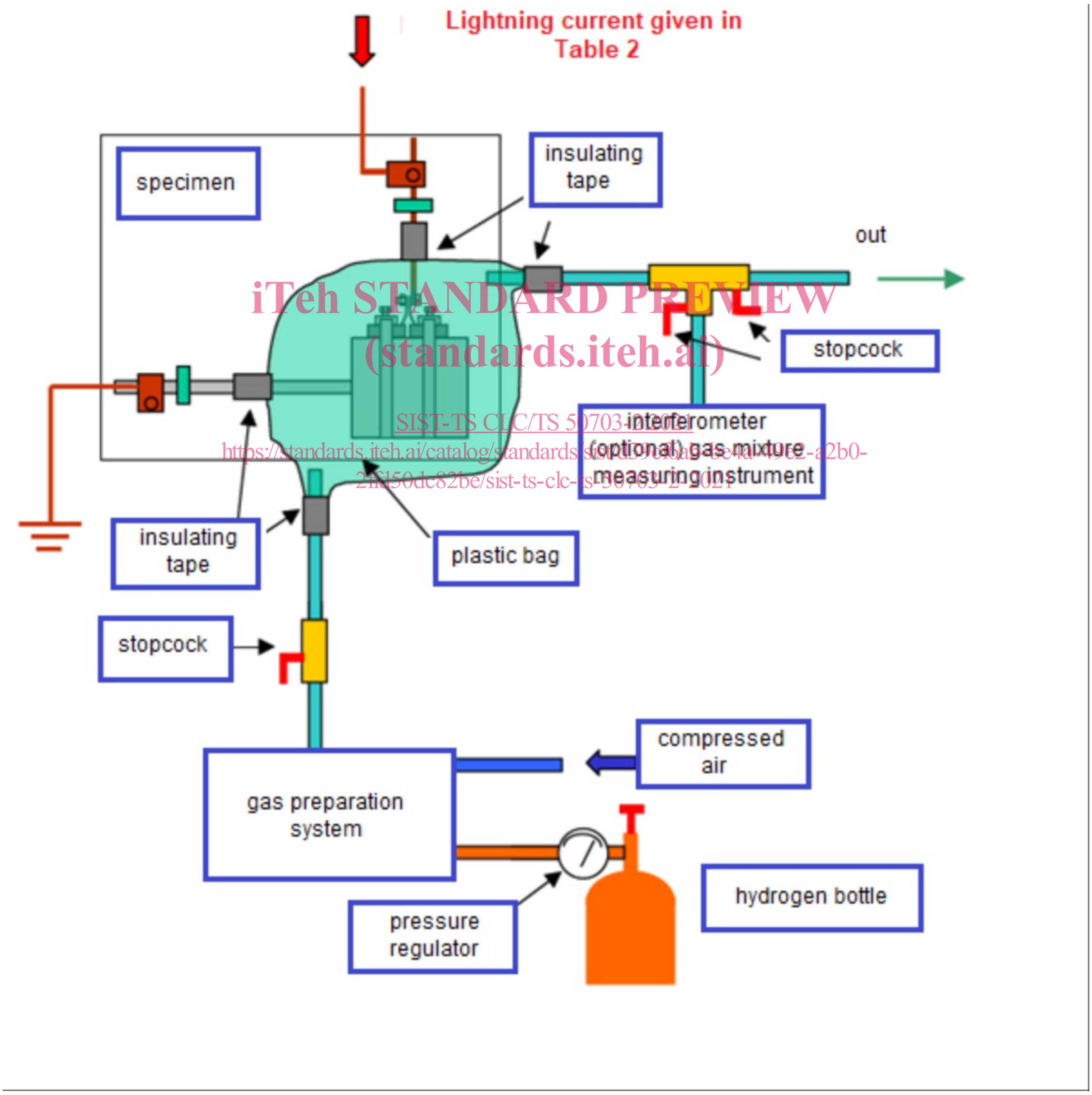

Figure 1 — Test setup of the test arrangement