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Withdrawn

Lightning protection system components (LPSC) – Part 7: Requirements for earthing enhancing compounds

Composants des systèmes de protection contre la foudre (CSPF) – Partie 7: Exigences pour les enrichisseurs de terre

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IEC Central Office
3, rue de Varembé
CH-1211 Geneva 20
Switzerland
Email: inmail@iec.ch
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LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 7: Requirements for earthing enhancing compounds

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International Standard IEC 62561-7 has been prepared by IEC technical committee 81: Lightning protection.

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

FDIS	Report on voting
81/413/FDIS	81/415/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.

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

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INTRODUCTION

This Part 7 of IEC 62561 deals with the requirements and tests for earthing enhancing compounds as being a lightning protection system components (LPSC) designed and implemented according to the IEC 62305 series of standards.

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LIGHTNING PROTECTION SYSTEM COMPONENTS (LPSC) –

Part 7: Requirements for earthing enhancing compounds

1 Scope

This Part 7 of IEC 62561 specifies the requirements and tests for earthing enhancing compounds producing low resistance of an earth termination system.

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.

ISO 4689-3, *Iron ores – Determination of sulfur content – Part 3: Combustion/infrared method*

ISO 14869-1, *Soil quality – Dissolution for the determination of total element content – Part 1: Dissolution with hydrofluoric and perchloric acids*

EN 12457-2, *Characterization of waste – Leaching – Compliance test for leaching of granular waste materials and sludges – Part 2: One stage batch test at a liquid to solid ratio of 10 l/kg for materials with particle size below 4 mm (without or with size reduction)*

EN 12506, *Characterization of waste – Analysis of eluates – Determination of pH, As, Ba, Cd, Cl^-, Co, Cr VI, Cu, Mo, Ni, NO^2, SO_4^{2-}, V and Zn*

ASTM G57-06. *Standard Test Method for Field Measurement of Soil Resistivity, Using the Wenner, Four-Electrode Method*

ASTM G59-97, *Standard Test Method for Conducting Potentiodynamic Polarization Resistance Measurements*

ASTM G102-89, *Standard Practice for Calculation of Corrosion Rates and Related Information from Electrochemical Measurements*

3 Terms and definitions

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

3.1
earthing enhancing compound
conductive compound producing low resistance of an earth termination system

3.2
manufacturer's instructions
supplier's instructions
written instructions provided by the manufacturer or the supplier in his documentation (see 4.2)

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3.3
leaching test
test during which the earthing enhancing compound is put into contact with a leachant and some constituents of the material are extracted

4 Requirements

4.1 General

Earthing enhancing compounds shall be so designed and constructed 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 earthing enhancing compounds shall provide adequate information in his literature to ensure that the installer can select and install the materials in a suitable and safe manner.

Compliance is checked by inspection.

NOTE The manufacturer in his literature should provide information regarding the maintenance followed by the user over time in order for the characteristics of the earthing enhancing compound to remain stable.

4.3 Material

The material of the earthing enhancing compound shall be chemically inert to subsoil. It shall not pollute the environment. It shall provide a stable environment in terms of physical and chemical properties and exhibit low resistivity. The earthing enhancing compound shall not be corrosive to the earth electrodes being used.

Compliance is checked by the tests specified in 5.2, 5.3, 5.4 and 5.5.

4.4 Marking

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

a) manufacturer's or responsible vendor's name or trade mark;
b) identifying symbol;
c) resistivity.

The marking should be given on the packing unit.

Compliance is checked in accordance with 5.6.

5 Tests

5.1 General

The tests in accordance with this standard are type tests.

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

All tests are carried out on new specimens.

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NOTE Unless otherwise specified, three samples are subjected to each individual test and the requirements are satisfied if all the criteria are met. The applicant, when submitting the material to be tested, may also submit an additional quantity which may be necessary should one test fail. The testing station will then, without further request, repeat the test and will reject only if a further failure occurs. If the additional sample is not submitted at the same time, the failure of one test will entail rejection.

5.2 Leaching test

5.2.1 General

The leaching test shall be performed according to EN 12457-2:

– Fe (iron);
– Cu (copper);
– Zn (zinc);
– Ni (nickel);
– Cd (cadmium);
– Co (cobalt);
– Pb (lead).

5.2.2 Determination of leachable ions

Determination of the concentrations of constituents of interest shall be performed according to EN 12506.

5.2.3 Passing criteria

The criteria are given by national or international regulations.

5.3 Sulphur determination

5.3.1 General

A test for the determination of sulphur shall be performed according to ISO 4689-3 or ISO 14869-1 and the adapted analyses instrumentation (ICP-OES, ICP-AES or other ICP methods).

5.3.2 Passing criteria

The material is deemed to have passed the test if all measured values are less than 2 %. The recorded value resulting from this test shall be indicated within the product documentation.

5.4 Determination of resistivity

5.4.1 General

The four–electrode method is used to measure the resistivity of earthing enhancing compounds as described in ASTM G57-06. Representative samples of the materials shall be taken from a typical package as provided by the manufacturer and prepared in accordance with the manufacturer's instructions. Three samples of the earthing enhancement material shall be tested in a four-electrode soil box.

With the four-electrode method, a voltage is impressed on the outer electrodes which causes current to flow. The resulting voltage drop between the inner electrodes is measured using a voltmeter and the resulting resistance is calculated. The resistance of the material can also be measured directly.

The resistance of each earthing enhancing compound sample shall be converted to the resistivity value using the following formula:

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