SLOVENSKI STANDARD
oSIST prEN IEC 61340-4-7:2022

01-junij-2022

Elektrostatika - 4-7. del: Standardne preskusne metode za posebno uporabo - Ionizacija

Electrostatics - Part 4-7: Standard test methods for specific applications - Ionization

Elektrostatik - Teil 4-7: Standard-Prüfverfahren für spezielle Anwendungen – Ionisation

Electrostatique - Partie 4-7: Méthodes d'essai normalisées pour des applications spécifiques - Ionisation

Ta slovenski standard je istoveten z: **prEN IEC 61340-4-7:2022**

ICS:

17.220.99	Drugi standardi v zvezi z elektriko in magnetizmom	Other standards related to electricity and magnetism

oSIST prEN IEC 61340-4-7:2022 **en**

101/650/CDV

COMMITTEE DRAFT FOR VOTE (CDV)

PROJECT NUMBER: **IEC 61340-4-7 ED3**	
DATE OF CIRCULATION: **2022-04-08**	CLOSING DATE FOR VOTING: **2022-07-01**
SUPERSEDES DOCUMENTS: **101/629/CD, 101/635A/CC**	

IEC TC 101 : ELECTROSTATICS

SECRETARIAT: Germany	SECRETARY: Mr Hartmut Berndt
OF INTEREST TO THE FOLLOWING COMMITTEES:	PROPOSED HORIZONTAL STANDARD: ☐ Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.

FUNCTIONS CONCERNED:

☐ EMC ☐ ENVIRONMENT ☒ QUALITY ASSURANCE ☐ SAFETY

☒ SUBMITTED FOR CENELEC PARALLEL VOTING	☐ NOT SUBMITTED FOR CENELEC PARALLEL VOTING
Attention IEC-CENELEC parallel voting The attention of IEC National Committees, members of CENELEC, is drawn to the fact that this Committee Draft for Vote (CDV) is submitted for parallel voting. The CENELEC members are invited to vote through the CENELEC online voting system.	

This document is still under study and subject to change. It should not be used for reference purposes.

Recipients of this document are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

TITLE:

Electrostatics - Part 4-7: Standard test methods for specific applications - Ionization

PROPOSED STABILITY DATE: 2027

NOTE FROM TC/SC OFFICERS:

CONTENTS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

_____

ELECTROSTATICS –

Part 4-7: Standard test methods for specific applications – Ionization

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 61340-4-7 has been prepared by IEC technical committee 101: Electrostatics.

This third edition cancels and replaces the second edition, published in 2010, and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

– A reference to Annex A was added for regarding theoretical background and additional information on the standard test method for the performance of ionizers.

– NOTE 3, Figure 5 as added to clarify for AC bars and grids a single emitter alternating between +/- polarity is used.

– Updated Annex B relative error for measurement equipment to include the consideration for the resolution of the voltmeter

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

FDIS	Report on voting
101/xxx/FDIS	101/xxx/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 parts in the IEC 61340 series, published under the general title *Electrostatics*, 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 website 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.

INTRODUCTION

Grounding is the primary method used to limit static charge when protecting electrostatic discharge sensitive items in the work environment. However, grounding methods are not effective in removing static charges from the surfaces of non-conductive (insulative) or isolated (ungrounded) conductive materials. Air ionization techniques, by means of ionizer systems, can be utilized to reduce this charge.

The preferred way of evaluating the ability of an ionizer to neutralize a static charge is to directly measure the rate of charge decay. Charges to be neutralized may be located on insulators as well as on isolated conductors. It is difficult to charge an insulator reliably and repeatably. Charge neutralization is more easily evaluated by measuring the rate of decay of the voltage of an isolated conductive plate. The measurement of this decay should not interfere with or change the nature of the actual decay. Four practical methods of air ionization are addressed in this document:

a) radioactive emission;

b) high-voltage corona from a.c. electric fields;

c) high-voltage corona from d.c. electric fields;

d) soft X-ray emission.

This part of IEC 61340 provides test methods and procedures that can be used when evaluating ionization equipment. The objective of the test methods is to generate meaningful, reproducible data. The test methods are not meant to be a recommendation for any particular ionizer configuration. The wide variety of ionizers, and the environments within which they are used, will often require test methods different from those described in this document. Users of this document should be prepared to adapt the test methods as required to produce meaningful data in their own application of ionizers.

Similarly, the test conditions chosen in this document do not represent a recommendation for acceptable ionizer performance. There is a wide range of item sensitivities to static charge. There is also a wide range of environmental conditions affecting the operation of ionizers. Performance specifications should be agreed upon between the user and manufacturer of the ionizer in each application. Users of this document should be prepared to establish reasonable performance requirements for their own application of ionizers.

Annex B provides a method for measuring capacitance of the isolated conductive plate.

ELECTROSTATICS –

Part 4-7: Standard test methods for specific applications – Ionization

1 Scope

This part of IEC 61340 provides test methods and procedures for evaluating and selecting air ionization equipment and systems (ionizers).

This document establishes measurement techniques, under specified conditions, to determine offset voltage (ion balance) and decay (charge neutralization) time for ionizers.

This document does not include measurements of electromagnetic interference (EMI), or the use of ionizers in connection with ordnance, flammables, explosive items or electrically initiated explosive devices.

As contained in this document, the test methods and test conditions can be used by manufacturers of ionizers to provide performance data describing their products. Users of ionizers are urged to modify the test methods and test conditions for their specific application in order to qualify ionizers for use, or to make periodic verifications of ionizer performance. The user will decide the extent of the data required for each application.

See Annex A for information regarding theoretical background and additional information on the standard test method for the performance of ionizers.

CAUTION: Procedures and equipment described in this document can expose personnel to hazardous electrical and non-electrical conditions. Users of this document are responsible for selecting equipment that complies with applicable laws, regulatory codes and both external and internal policy. Users are cautioned that this document cannot replace or supersede any requirements for personnel safety. See Annex C for safety considerations.

2 Normative references

IEC 6101-1, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 1*

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 http://www.iso.org/obp

3.1
air conductivity
ability of air to conduct (pass) an electric current under the influence of an electric field

3.2
air ions
molecular clusters of about ten molecules (water, impurities, etc.) bound by polarization forces to a singly charged oxygen or nitrogen molecule

3.3
charge decay
decrease and/or neutralization of a net electrostatic charge

3.4
charged plate monitor
CPM
instrument using a charged metal plate of a defined capacitance and geometry which is discharged in order to measure charge dissipation/neutralization properties of products or materials

Note 1 to entry: This note applies to the French language only.

3.5
compressed gas ionizer
ionization device that can be used to neutralize charged surfaces and/or remove surface particles with pressurized gas

Note 1 to entry: This type of ionizer may be used to ionize the gas within production equipment.

3.6
corona
production of positive or negative ions by a very localized high electric field

Note 1 to entry: The field is normally established by applying a high voltage to a conductor in the shape of a sharp point or wire.

3.7
decay time
time necessary for a voltage (due to an electrostatic charge) to decay from an initial value to some chosen final value

3.8
emitter
conducting sharp object, usually a needle or wire, which will cause a corona discharge when kept at a high potential

3.9
horizontal laminar flow
non-turbulent airflow in a horizontal direction

3.10
ionizer
device designed to generate positive and/or negative air ions

3.11
isolated conductor
non-grounded conductor

3.12
laminar flow hood ionization
device or systems that provide local area ionization coverage in vertical or horizontal laminar flow hoods or benches

3.13
non-contacting voltage measurement
measurement technique using an electrostatic fieldmeter or voltmeter to monitor the voltage induced on an isolated conductive plate where there is no direct connection from the measurement sensor to the isolated conductive plate

3.14
offset voltage
ion balance
observed voltage on the isolated conductive plate of a charged plate monitor (CPM) that has been placed in an ionized environment

3.15
peak offset voltage
for pulsed ionizers, maximum value of the offset voltage for each polarity, as the ionizer cycles between positive and negative ion outputs

3.16
room ionization
ionization systems that provide large area coverage with air ions

3.17
work surface ionization
ionization devices or systems used to control static charges at a work surface

Note 1 to entry: This type includes benchtop ionizers, overhead work surface ionizers and laminar flow hood ionizers.

3.18
vertical laminar flow
non-turbulent airflow in a vertical direction

3.19
contacting voltage measurement
measurement technique using high input impedance circuitry used to monitor the voltage induced on an isolated conductive plate where there is a direct connection from the circuitry to the conductive plate

4 Test fixture and instrumentation

The instrument described in this document to make performance measurements on air ionization equipment is the charged plate monitor (CPM); refer to Figure 1 and Figure 2. The conductive plate shall be (15,0 ± 0,1) cm × (15,0 ± 0,1) cm and the total capacitance of the test circuit, with plate, while the instrument is in its normal operating mode, shall be 20 pF ± 2 pF (refer to Annex B). See Figure 3 and Figure 4. The instrument described in this document may also be used for compliance verification of air ionizers.

For the isolated conductive plate design shown in Figure 3, there shall be no objects, grounded or otherwise, closer than dimension "A" of the conductive plate, except the supporting insulators or plate voltage contacts, as shown in Figure 3 (refer to Annex B). For the conductive plate assembly shown in Figure 4, there shall be no objects, grounded or otherwise, within 2,5 cm of the plate assembly in any direction, other than a support structure (e.g. a tripod) located below the ground plate of the assembly.

The conductive plate, when charged to the desired test voltage, shall not decay more than 10 % of the test voltage within 5 min, in the absence of ionization.