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

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FOREWORD

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

The text of this standard is based on ANSI/ESD STM3.1-2006. It was submitted to the National Committees for voting under the Fast Track Procedure.

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

FDIS	Report on voting
101/292/FDIS	101/299/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, 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 maintenance result date indicated on the IEC web site 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- withdrawn,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.

A bilingual version of this publication may be issued at a later date.

INTRODUCTION

Grounding is the primary method used to limit static charge fwhen protecting electrostatic discharge-susceptible items in the work environment. However, grounding methods are not effective in removing static charges from the surfaces of non-conductive (insulative) or isolated conductive materials. Air ionization techniques may be employed to reduce these charges as the active parameters in charge neutralization are the conductivities of the air for each polarity. It would be appropriate to measure either the conductivities themselves or the ion concentrations for each polarity as this would determine the ability of the ionized air to neutralize a charge in a given location. Annex A provides information on performance of ionizers.

In practice, these measurements are difficult to make. A more feasible 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 standard test method:

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 part of IEC 61340. Users of this standard 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 part of IEC 61340 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 standard test method should be prepared to establish reasonable performance requirements for their own application of ionizers.

Annex B has been provided in order to provide a method for measuring capacitance of the charged plate.

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1 Scope

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

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

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

As contained in this standard, the test methods and test conditions may 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 (refer to ESD SP3.3). The user will need to decide the extent of the data required for each application.

2 Normative references

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.

ESD ADV1.0, *Glossary of terms*[1]

ESD SP3.3, *Standard practice for protection of electrostatic discharge susceptible items – Periodic verification of air ionizers*[1]

29 CFR 1910.1000, *Ozone, (OSHA) Air contaminants*[2]

29 CFR 1910.95, *(OSHA) Occupational noise exposure*[2]

29 CFR 1910.242 (b), *(OSHA) Compressed air used for cleaning*[2]

10 CFR 20, *(NRC) Standards for protection against radiation*[2]

21 CFR 1020, *(FDA) Performance standards for ionizing radiation emitting products*[2]

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1 ESD Association, 7900 Turin Road, Bldg. 3, Rome, NY 13440-2069, 315-339-6937, www.esda.org

2 CFR (Code of Federal Regulations) U.S. Government printing office, 732 N. Capitol Street NW, Washington, DC 20401, 866-512-1800, http://bookstore.gpo.gov