

ANSI/ESD SP3.3-2006

ESD Association Standard Practice

ANSI/ESD SP3.3-2006

Reaffirmation of ESD SP3.3-2000

*for the Protection of Electrostatic
Discharge Susceptible Items –*

*Periodic Verification of
Air Ionizers*



*Electrostatic Discharge Association
7900 Turin Road, Bldg. 3
Rome, NY 13440-2069*

*An American National Standard
Approved February 23, 2007*

***ESD Association Standard Practice for the
Protection of Electrostatic Discharge
Susceptible Items –
Periodic Verification of Air Ionizers***

Approved June 11, 2006
ESD Association



CAUTION NOTICE

Electrostatic Discharge Association (ESDA) standards and publications are designed to serve the public interest by eliminating misunderstandings between manufacturers and purchasers, facilitating the interchangeability and improvement of products and assisting the purchaser in selecting and obtaining the proper product for his particular needs. The existence of such standards and publications shall not in any respect preclude any member or non-member of the Association from manufacturing or selling products not conforming to such standards and publications. Nor shall the fact that a standard or publication is published by the Association preclude its voluntary use by non-members of the Association whether the document is to be used either domestically or internationally. Recommended standards and publications are adopted by the ESDA in accordance with the ANSI Patent policy.

Interpretation of ESDA Standards: The interpretation of standards in-so-far as it may relate to a specific product or manufacturer is a proper matter for the individual company concerned and cannot be undertaken by any person acting for the ESDA. The ESDA Standards Chairman may make comments limited to an explanation or clarification of the technical language or provisions in a standard, but not related to its application to specific products and manufacturers. No other person is authorized to comment on behalf of the ESDA on any ESDA Standard.

DISCLAIMER OF WARRANTIES

THE CONTENTS OF ESDA'S STANDARDS AND PUBLICATIONS ARE PROVIDED "AS-IS," AND ESDA MAKES NO REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, OF ANY KIND WITH RESPECT TO SUCH CONTENTS. ESDA DISCLAIMS ALL REPRESENTATIONS AND WARRANTIES, INCLUDING WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE OR USE, TITLE AND NON-INFRINGEMENT.

DISCLAIMER OF GUARANTY: ESDA STANDARDS AND PUBLICATIONS ARE CONSIDERED TECHNICALLY SOUND AT THE TIME THEY ARE APPROVED FOR PUBLICATION. THEY ARE NOT A SUBSTITUTE FOR A PRODUCT SELLER'S OR USER'S OWN JUDGMENT WITH RESPECT TO ANY PARTICULAR PRODUCT DISCUSSED, AND ESDA DOES NOT UNDERTAKE TO GUARANTY THE PERFORMANCE OF ANY INDIVIDUAL MANUFACTURERS' PRODUCTS BY VIRTUE OF SUCH STANDARDS OR PUBLICATIONS. THUS, ESDA EXPRESSLY DISCLAIMS ANY RESPONSIBILITY FOR DAMAGES ARISING FROM THE USE, APPLICATION OR RELIANCE BY OTHERS ON THE INFORMATION CONTAINED IN THESE STANDARDS OR PUBLICATIONS.

LIMITATION ON ESDA'S LIABILITY: NEITHER ESDA, NOR ITS MEMBERS, OFFICERS, EMPLOYEES OR OTHER REPRESENTATIVES WILL BE LIABLE FOR DAMAGES ARISING OUT OF OR IN CONNECTION WITH THE USE OR MISUSE OF ESDA STANDARDS OR PUBLICATIONS, EVEN IF ADVISED OF THE POSSIBILITY THEREOF. THIS IS A COMPREHENSIVE LIMITATION OF LIABILITY THAT APPLIES TO ALL DAMAGES OF ANY KIND, INCLUDING WITHOUT LIMITATION, LOSS OF DATA, INCOME OR PROFIT, LOSS OF OR DAMAGE TO PROPERTY AND CLAIMS OF THIRD PARTIES.

Published by:

**Electrostatic Discharge Association
7900 Turin Road, Bldg. 3
Rome, NY 13440**

Copyright © 2007 by ESD Association
All rights reserved

No part of this publication may be reproduced in any form, in an electronic retrieval system or otherwise, without the prior written permission of the publisher.

Printed in the United States of America

ISBN: 1-58537-118-1

(This foreword is not part of ESD Association Standard Practice SP3.3-2006)

FOREWORD

Grounding of conductive and static dissipative materials, personnel and equipment is the primary method used to limit static charge for the protection of electrostatic discharge susceptible items in the work environment. A static control program may include air or nitrogen ionization techniques to deal with charge on isolated conductors (conductors that cannot be grounded), and insulating materials (e.g., most common plastics).

The ionization standard ANSI/ESD STM3.1 defines test procedures and instrumentation for evaluating the discharge time and balance performance of four types of air ionization equipment. These test methods are applicable to the process of selecting an air ionizer for a specific application, as well as subsequently determining that incoming product meets the selection criteria. The test methods and procedures of the standard are also useable for the periodic verification of ionizer performance.

Detailed performance testing under laboratory conditions may be required during selection and acceptance testing due to the variety of use environments for ionizers. Periodic verification, however, is most often performed under actual use conditions. In general, all ionizers must be tested, rather than a sample of product types or incoming lots. Periodic verification procedures should also be part of the initial acceptance process to provide a baseline for comparison with future measurements. Periodic verification may be necessary to meet audit requirements.

The test procedures in the ionization standard ANSI/ESD STM3.1 are complete enough to be used for selection or acceptance testing, as well as for periodic verification. However, these procedures require a typically expensive test instrument and a substantial amount of time to test each ionizer. The cost of this testing is often unacceptable for purposes of periodic verification.

There is a need for a simpler verification procedure using a less expensive, preferably portable test instrument. Periodic verification provides a relative measure of performance and can indicate when it is necessary to check the calibration of the ionizer under test with the charged plate monitor (CPM) (refer to ANSI/ESD STM3.1).

This standard practice presents a test method and instrumentation for periodic verification of the four classes of ionizers contained in existing ionization standard ANSI/ESD STM3.1. These classes are room, laminar flow hood, worksurface and compressed gas ionizers. The verification test method can be carried out under actual use conditions and is capable of rapidly demonstrating ionizer performance. Discharge time and offset voltage (balance) testing contained in the ionization standard was adapted to the verification test method. It is important that a simplified verification procedure correlate reasonably with CPM test results.

The objective of the test method described in this document is to identify if a significant change in ionizer performance has occurred. The test setups proposed 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 setups different from those described in this standard practice. For purposes of periodic verification, it is important that ionizers are tested in their normal operating configuration. Users of this standard practice should be prepared to adapt the test method and setups as required to produce meaningful data in their own application of ionizers.

Similarly, the test method and conditions chosen in this standard practice 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 an agreement between the user and manufacturer of the ionizer in each application. Compliance with these specifications should be demonstrated during selection and acceptance testing of the ionizers.

Users of this standard practice will be able to establish baseline performance in the actual use location for their own application of ionizers. At any time in the future, using the same procedures in this standard practice, the user will be able to verify whether or not the ionizer is providing a comparable level of performance. The user will need to decide the extent of the data required for each application.

The 2006 revision of this document contains various minor changes from the previous document. The voltage source for testing was changed from "at least 1200 volts" to "in excess of the initial test voltage" to provide flexibility in user selection of initial and final test voltages. Maximum time to measure offset voltage was added for each ionizer type (it was previously one value for all ionizer types). Various editorial changes to the text were made to clarify the document.

Suggestions for improvement of this standard practice will be welcome. They should be sent to: ESD Association, 7900 Turin Road, Bldg. 3, Rome, NY 13440-2069.

This standard practice was originally designated ESD SP3.3-2000 and approved on February 6, 2000. This standard practice is a reaffirmation of ESD SP3.3-2000. It was approved on June 11, 2006 and was prepared by the 3.0 Ionization Subcommittee. The 2000 version was prepared by the 3.0 Ionization Subcommittee. At that time the 3.0 Ionization Subcommittee had the following members:

Richard Rodrigo, Chair Simco		
Ron Gibson, TAS Celestica International	Tim Jarrett CPI – Guidant Corp	Carl Newberg River's Edge Technical Service
Dale Parkin IBM	Donald Pritchard Trek, Inc.	Jeff Salisbury Semtronics Corp.
Jim Schiffhauer NRD, Inc.	Arnold Steinman Ion Systems	Gene Williams NOVX

The following individuals made significant contributions to this document:

Ron Gibson Celestica International	Jim Curtis Simco	Donald Pritchard Trek, Inc.
Niels Jonassen Technical University of Denmark	Stephen Halperin Stephen Halperin & Associates	William Vosteen Monroe Electronics

TABLE OF CONTENTS

1.0 PURPOSE.....	1
2.0 SCOPE.....	1
3.0 REFERENCED PUBLICATIONS	1
4.0 DEFINITIONS	1
5.0 PERSONNEL SAFETY	1
6.0 TEST FIXTURES	2
7.0 GENERAL MEASUREMENT PROCEDURE	3
8.0 SPECIFIC PERIODIC VERIFICATION PROCEDURES FOR IONIZER TYPES.....	4
8.1 ROOM IONIZATION	4
8.2 LAMINAR FLOW HOOD IONIZATION	7
8.3 WORKSURFACE IONIZATION	9
8.4 COMPRESSED GAS IONIZATION	12
ANNEX A	13

FIGURES

Figure 1: Test Fixture Components	2
Figure 2: Example of a Test Fixture with 15 cm x 15 cm Plate.....	3
Figure 3: Example Test Location for Room Ionization – AC Grid Ionizer	4
Figure 4: Example Test Location for Room Ionization – AC, Steady DC or Pulsed DC Bar Ionizer	5
Figure 5: Example Test Location for Room Ionization – Discrete Emitter DC Ionizer	5
Figure 6: Example Test Location for Room Ionization – Pulsed DC Ionizer.....	5
Figure 7: Example Test Location for Room Ionization – Typical Side View	6
Figure 8: Example Test Location for Vertical Laminar Flow Hood Ionization – Top View	7
Figure 9: Example Test Location for Vertical Laminar Flow Hood Ionization – Side View	7
Figure 10: Example Test Location for Horizontal Laminar Flow Hood Ionization – Top View.....	8
Figure 11: Example Test Location for Horizontal Laminar Flow Hood Ionization – Side View.....	8
Figure 12: Example Test Location for Bench Top Ionizer – Top View	10
Figure 13: Example Test Location for Bench Top Ionizer– Side View	10
Figure 14: Example Test Location for Overhead Ionizer – Top View	11
Figure 15: Example Test Location for Overhead Ionizer– Side Vie.....	11
Figure 16: Example Test Location for Compressed Gas Ionizer – Gun or Nozzle.....	12

ESD Association Standard Practice for Protection of Electrostatic Discharge Susceptible Items – Periodic Verification of Air Ionizers

1.0 PURPOSE

This standard practice provides test methods and procedures for periodic verification of the performance of air ionization equipment and systems (ionizers).

2.0 SCOPE

This standard practice establishes a measurement technique, under recommended conditions, to periodically determine offset voltage (ion balance) and discharge (neutralization) time for ionizers in their actual use locations. This standard practice does not include measurements of electromagnetic interference (EMI), or uses of ionizers in connection with ordnance, flammables, explosive items or electrically initiated explosive devices.

3.0 REFERENCED PUBLICATIONS

ESD ADV1.0, ESD Association's Glossary of Terms¹

ANSI/ESD STM3.1, Ionization¹

ESD TR20.20, ESD Handbook¹

ESD TR3.0-02-05, Selection and Acceptance of Air Ionizers¹

4.0 DEFINITIONS

Initial Test Voltage. The voltage on the test plate of the periodic verification instrument at which the discharge time test begins.

Final Test Voltage. The voltage on the test plate of the periodic verification instrument at which the discharge time test ends.

Periodic Verification. Testing done to indicate that the performance of an air ionizer has not changed from initial baseline values to exceed selected limits.

5.0 PERSONNEL SAFETY

5.1 The procedures and equipment described in this document may expose personnel to hazardous 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.

Ground fault circuit interrupters (GFCI) and other safety protection should be considered wherever personnel may come into contact with electrical sources.

Electrical hazard reduction practices should be exercised and proper grounding instructions for the equipment must be followed.

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

6.0 TEST FIXTURES

The following sections describe the instrumentation required for periodic verification of air ionization equipment and systems (ionizers). The instrumentation may consist of separate components (voltage monitor, isolated plate, HV source and timer), or these components may be integrated into a single instrument. A Charged Plate Monitor (CPM) as described in ANSI/ESD STM3.1 may be used for periodic verification.

6.1 The test fixture is to consist of an isolated conductive plate separated from a ground plate on insulating standoffs (refer to Figure 1).

6.2 The isolated conductive plate, when charged to a desired initial test voltage, shall not decay more than 10% of the test voltage within 1 minute, in the absence of ionization.

6.3 The voltage on the plate shall be monitored in such a way that the system conforms to 6.2. The response time of the monitoring device shall be sufficient to accurately measure changing plate voltages.

6.4 A voltage source providing in excess of the initial test voltage of each polarity is required to charge the isolated plate of the test fixture. The voltage source should be current limited so as to meet the requirements of Section 5.

6.5 A stopwatch or other appropriate means should be used to measure the discharge time.

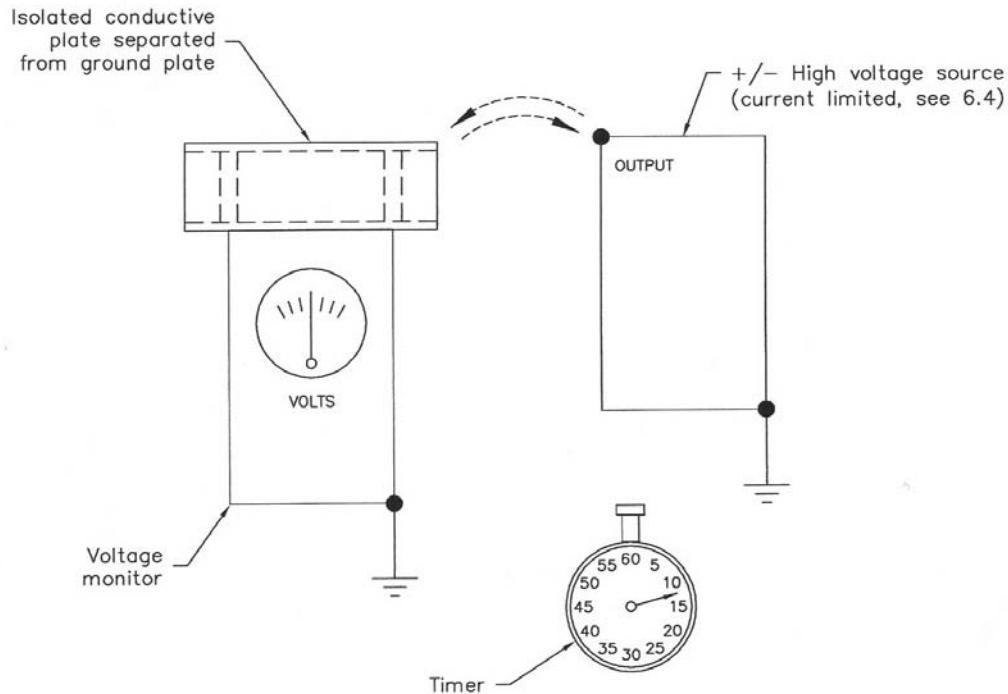


Figure 1: Test Fixture Components

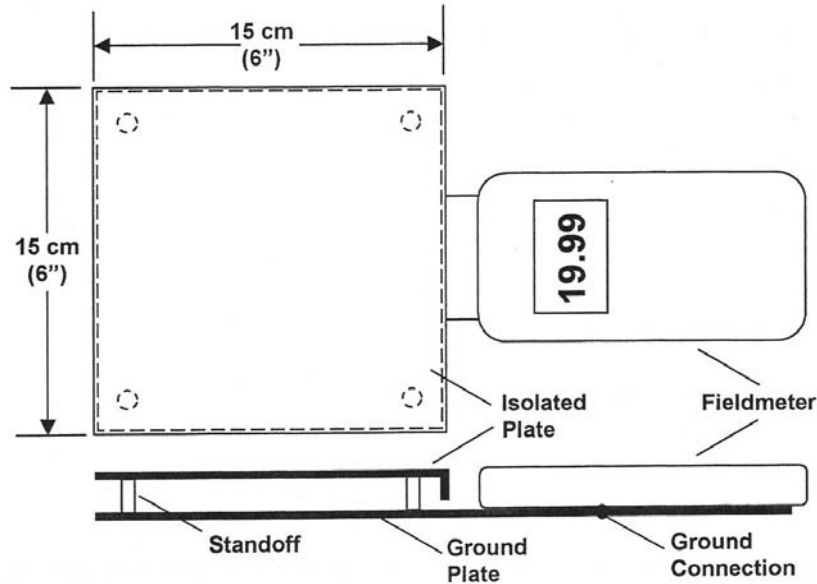


Figure 2: Example of a Test Fixture with 15 cm x 15 cm Plate

7.0 GENERAL MEASUREMENT PROCEDURE

Each type of ionizer will require a different test setup for periodic verification testing. Initial and final test voltages may be changed as desired. The actual test procedures and parameters (e.g., equipment, test voltages, test plate distance and location, air velocity, fan speed settings, compressed air pressure, etc.) should be documented and attached to the test data for use during subsequent verification testing. Periodic verification procedures should be a part of the initial acceptance process to provide baseline data for comparison with future measurements. A schedule should be established for periodic verification testing.

The following test steps are common elements to the periodic verification testing of all types of ionizers:

7.1 All test areas are to be surveyed just after initial installation. Large metal objects or obstructions to airflow are to be noted, but are not to be removed from the test area. The documented test parameters and test results from initial testing will be used for comparison during subsequent periodic verification.

7.2 The test technician and test fixtures are to be properly grounded during the test. The test fixture may be held by the test technician in the test location during testing.

7.3 The test plate is to be charged to a convenient voltage in excess of the initial test voltage for each polarity (e.g., 1200–1500 volts).

7.4 The discharge time measurement begins when the test plate voltage has decayed to the initial test voltage (e.g., 1000 volts) and stops when the test plate voltage has decayed to the final test voltage (e.g., 100 volts). Repeat 7.3 and 7.4 for the opposite polarity. A stopwatch or other suitable device should be used for the time measurement.

以上内容仅为本文档的试下载部分，为可阅读页数的一半内容。如要下载或阅读全文，请访问：<https://d.book118.com/375310343320011044>