

**INSTITUTE OF
ENVIRONMENTAL
SCIENCES AND
TECHNOLOGY**

**Contamination Control Division
Recommended Practice 022.2**

IEST-RP-CC022.2

**Electrostatic Charge in
Cleanrooms and Other
Controlled Environments**

INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY

1827 Walden Office Square, Suite 400 |
Schaumburg, IL 60173 USA
Phone: (847) 981-0100 • Fax: (847) 981-4130
E-mail: iest@iest.org • Web: www.iest.org



COPYING IS ILLEGAL
Currently in preview, click buy full version

This Recommended Practice is published by the INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY to advance contamination control and the technical and engineering sciences. Its use is entirely voluntary, and determination of its applicability and suitability for any particular use is solely the responsibility of the user.

This Recommended Practice was prepared by and is under the jurisdiction of Working Group 022 of the IEST Contamination Control Division.

Copyright © 2004 by the INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY

Third printing, July 2017

ISBN 978-1-877862-88-5

PROPOSAL FOR IMPROVEMENT: The Working Groups of the INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY are continually working on improvements to their Recommended Practices and Reference Documents. Suggestions from those who use these documents are welcome. If you have a suggestion regarding this document, please use the online Proposal for Improvement form found on the IEST website at www.iest.org/proposal/form.html.

INSTITUTE OF ENVIRONMENTAL SCIENCES AND TECHNOLOGY
27 Walden Office Square, Suite 400 | Schaumburg, IL 60173 USA
Phone: (847) 981-0100 • Fax: (847) 981-4130
E-mail: iest@iest.org • Web: www.iest.org

COPYING IS ILLEGAL
Currently in preview, click buy full version

Electrostatic Charge in Cleanrooms and Other Controlled Environments

IEST-RP-CC022.2

CONTENTS

SECTION

1	SCOPE AND LIMITATIONS	7
2	REFERENCES	7
3	TERMS AND DEFINITIONS	9
4	BACKGROUND AND PURPOSE	11
5	ELECTROSTATIC CHARGE CONTROL SYSTEMS	11
6	EQUIPMENT AND PROCEDURES	13

TABLE

1	TYPICAL SOURCES OF ELECTROSTATIC CHARGE IN CONTROLLED ENVIRONMENTS.....	12
2	TYPICAL ELECTROSTATIC VOLTAGE LEVELS GENERATED BY PRODUCTION PERSONNEL	12
3	LIMITS ON STATIC DECA TIME.....	16
4	RELEVANT STANDARDS FOR EVALUATING CHARACTERISTICS OF PLASTIC PACKAGING AND MANAGING MATERIALS.....	18
5	STANDARD TEST METHODS RELEVANT TO THE EVALUATION OF CONTAMINATION PROPERTIES OF MATERIALS	22
6	EXAMPLE OF A TRAINING LOG	23

FIGURE

1	ESD LABELS AND AWARENESS SIGNS	22
A1(A)	TEST POSITIONS (TP) FOR TABLETOP BLOWERS	25
A1(B)	TEST LOCATIONS FOR OVERHEAD; TOP VIEW	25
A1(C)	TEST LOCATION FOR OVERHEAD BLOWERS; FRONT VIEW	25
A2	TEST PLATE POSITION FOR BLOW-OFF GUN	26

A3	TEST POSITIONS FOR UNIDIRECTIONAL-FLOW BENCHES A3(A) END VIEW, VERTICAL FLOW A3(B) END VIEW, HORIZONTAL FLOW.....	26
A4	TEST POSITIONS FOR ROOM IONIZATION; EXAMPLE FOR AC GRIDS (LESS THAN 100% COVERAGE) AND PULSED OR STEADY-STATE DC BARS; TP1 IS DIRECTLY UNDER THE GRID OR BAR, WHILE TP2 IS CENTERED BETWEEN IONIZERS.....	27
A5	TEST POSITIONS FOR ROOM IONIZATION; EXAMPLE FOR SINGLE- POLARITY EMITTER-TYPE DC IONIZATION SYSTEM; THREE MEASUREMENTS ARE REQUIRED	27
A6	TEST POSITIONS FOR ROOM IONIZATION; EXAMPLE FOR DUAL DC LINE IONIZATION SYSTEM; THREE MEASUREMENTS ARE REQUIRED	27
A7	TEST POSITIONS FOR ROOM IONIZATION; EXAMPLE FOR PULSED DC EMITTER IONIZATION SYSTEM; TWO MEASUREMENTS ARE REQUIRED.....	27

APPENDIX

A	AIR IONIZER TESTS.....	24
B	BIBLIOGRAPHY	28

Electrostatic Charge in Cleanrooms and Other Controlled Environments

IEST-RP-CC022.2

1 SCOPE AND LIMITATIONS

1.1 Scope

This Recommended Practice (RP) discusses methods for specifying and evaluating the effectiveness of techniques for controlling electrostatic charge. Proper control of electrostatic charge may reduce particulate contamination on surfaces and the likelihood of electrostatic discharge. This document, which describes typical control systems and their applications, also lists methods of testing and measurement of charge generation, charge neutralization, resistivity of surfaces and materials, and static field attenuation.

1.2 Limitations

This RP excludes specific evaluation and qualification related to the protection of ordnance, flammable materials, and explosives. This RP does not prescribe design or control limits; quality acceptance standards; process issues; or health, safety, and environmental issues and practices outside of contamination control issues. Users should establish their own quality standards.

2 REFERENCES

2.1 Documents

2.1.1 ASTM

D257-78 Standard Test Methods for DC Resistance or Conductance of Insulating Materials

E595-93 Standard Test Method for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment

E1235-01 Standard Test Method for Gravimetric Determination of Nonvolatile Residue (NVR) in Environmentally Controlled Areas for Spacecraft

F331 Test Method for Nonvolatile Residue Extract from Aerospace Components (Using Flash Evaporator)

2.1.2 EIA

EIA-583 Packaging Material Standards for Moisture Sensitive Items

2.1.3 ESD

ESD ADV1.0-1994 for Electrostatic Discharge Terminology – Glossary