

ANSI/ESD STM7.1-2020

ESD Association Standard Test Method

ANSI/ESD STM7.1-2020
Revision of ANSI/ESD STM7.1-2013



*For the Protection of Electrostatic
Discharge Susceptible Items*

*Flooring Systems
Resistive Characterization*

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

*An American National Standard
Approved XXXXXXXXX*

*ESD Association Standard Test Method for
the Protection of Electrostatic Discharge
Susceptible Items*

*Flooring Systems
Resistive Characterization*

Approved September 1, 2020
EOS/ESD Association, Inc.



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FOREWORD

This standard test method¹ is intended to provide test methods for evaluating flooring systems used to control electrostatic charge. This standard test method covers flooring systems, including floor mats, floor coverings, coatings, paints, raised access panels, and floor finishes.

This standard test method is limited to defining procedures for measuring electrical resistance. Electrical resistance is one property that can be used to evaluate the electrostatic performance of flooring systems. However, resistance does not fully characterize these systems. An additional property to be considered in the selection and use of flooring systems includes triboelectric charge generation combined with personnel and mobile equipment. See ANSI/ESD STM97.2 for the test method for voltage generation in combination with a person.

A common source of electrostatic charge in a work environment is the separation of a foot from the floor or rolling a caster or wheel across the floor, resulting in the generation of electrostatic charge that can accumulate on personnel and equipment. This generation's effect and accumulation of electrostatic charge can be minimized with appropriate selection or treatment of the flooring system.

To effectively control electrostatic charge, flooring systems should be used in conjunction with ESD controlled footwear, foot grounders, seating (chairs), shelving, and mobile equipment (carts/trolleys), as appropriate.

In this latest revision, the test method's scope was changed to a flooring system test rather than floor materials. This highlights that the test is applied to a system of materials combined to make the flooring system and that those materials' interactions can affect the overall resistance measured.

There was also a minor change in the definition of conductive versus dissipative systems so that conductive systems have a measured resistance of $< 1.0 \times 10^6$ ohms. In prior versions, measurements of $\leq 1.0 \times 10^6$ ohms were characterized as conductive.

Finally, an Annex was added to provide some historical context of the characterization of flooring systems as either conductive or dissipative, along with the potential pitfalls of using these definitions. This is a particular concern in the case of materials with a resistance of $\geq 1.0 \times 10^6$ ohms when measured with a test voltage of 10 volts but a resistance of $< 1.0 \times 10^6$ ohms when measured with a test voltage of 100 volts.

This standard test method was originally designated ESD S7.1-1994 and was approved on February 27, 1994. ANSI/ESD STM7.1-2001 was a reaffirmation, re-designation of ESD S7.1-1994 and was approved on May 20, 2001. ANSI/ESD S7.1-2005 was a revision, re-designation of ANSI/ESD STM7.1-2001 and was approved on February 15, 2005. ANSI/ESD STM7.1-2013 was a revision and re-designation of ANSI/ESD S7.1-2005 and was approved on July 15, 2013. ANSI/ESD STM7.1-2020 is a revision of ANSI/ESD STM7.1-2013 and was approved on September 1, 2020.

¹ **ESD Association Standard Test Method (STM):** A definitive procedure for the identification, measurement, and evaluation of one or more qualities, characteristics, or properties of a material, product, system, or process that yields **reproducible test** results.

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ESD Association Standard Test Method for the Protection of Electrostatic Discharge Susceptible Items - Flooring Systems - Resistive Characterization**1.0 PURPOSE, SCOPE, AND APPLICATION****1.1 Purpose**

This document is intended to be used for the resistive characterization of flooring systems used for controlling electrostatic charge. It also provides test methods for the qualification of flooring systems before installation or application and test methods for acceptance of flooring systems after installation or application.

1.2 Scope

This document is intended for testing flooring systems used for grounding personnel and equipment in areas engaged in working with ESD sensitive items. The resistances measured here are from the flooring system's top surface to its groundable point (or the ground reference) and from top surface to top surface locations. This document provides a method for measuring the resistance of flooring systems with resistance greater than 1.0×10^4 ohms and less than 1.0×10^9 ohms.

Use of this document or the procedures defined herein does not apply to facilities where ordnance, flammables, or explosives are stored or handled. For these concerns, refer to ASTM F150.

1.3 Application

Resistance to groundable point measurements on product qualification samples may differ from resistance to ground measurements performed on installed areas, especially when evaluating materials such as floor finishes. Product qualification is typically done in a laboratory, and product acceptance is done on the flooring system after it is installed. This test method provides procedures for both situations.

This standard test method relies on resistance measurements utilizing standard instruments to evaluate flooring systems.

2.0 REFERENCED PUBLICATIONS

Unless otherwise specified, the following documents of the latest issue, revision, or amendment form a part of this standard test method to the extent specified herein:

ESD ADV1.0, Glossary²

ANSI/ESD S6.1, Grounding²

ANSI/ESD STM11.11, Surface Resistance Measurement of Static Dissipative Planar Materials²

ASTM D257, Standard Test Methods for DC Resistance or Conductance of Insulating Materials³

ANSI/IICRC S100, Standard for Professional Cleaning of Textile Floor Coverings⁴

AATCC 171, Test Method for Carpets: Cleaning of; Hot Water Extraction⁵

AATCC 138, Cleaning: Washing of Textile Flooring Coverings⁵

² EOS/ESD Association, Inc. 7900 Turin Road, Bldg 3, Rome, NY 13440, USA, 315-339-6937, www.esda.org

³ American Society for Testing and Materials (ASTM), 100 Barr Harbor Dr., PO Box C700, West Conshohocken, PA 19428-2959, USA, 877-909-2786, www.astm.org

⁴ Institute of Inspection, Cleaning and Restoration Certification (IICRC), 4043 South Eastern Ave., Las Vegas, NV 89119

⁵ AATCC, P.O. Box 12215, Research Triangle Park, N.C. 27709-2215, 919-549-8141