ESD Association Standard

ANSI/ESD S20.20-2014

ANSI/ESD S20.20-2014
Revision of ANSI/ESD S20.20-2007

For the Development of an Electrostatic Discharge Control Program for –

Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

Electrostatic Discharge Association
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ESD Association Standard for the Development of an Electrostatic Discharge Control Program for –

Protection of Electrical and Electronic Parts, Assemblies and Equipment (Excluding Electrically Initiated Explosive Devices)

Approved June 11, 2014
EOS/ESD Association, Inc.

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FOREWORD

This standard covers the requirements necessary to design, establish, implement and maintain an Electrostatic Discharge (ESD) Control Program for activities that manufacture, process, assemble, install, package, label, service, test, inspect or otherwise handle electrical or electronic parts, assemblies and equipment susceptible to damage by electrostatic discharges greater than or equal to 100 volts Human Body Model (HBM) and 200 volts Charged Device Model (CDM). The CDM voltage level as used in this document is based on managing process essential insulators to mitigate field induced voltages on devices that could lead to damage.

This standard also defines the requirements for isolated conductors. The reference to Machine Model (MM) is retained in this standard for the historical association to the MM robustness of devices to isolated conductors.

The ESD robustness of devices is fully characterized by HBM and CDM. The CDM model describes the metal-to-metal contact that was formerly associated with MM. Therefore, MM testing is no longer required for qualification of devices and test data may not be available.

This document covers the ESD Control Program requirements for setting up a program to handle ESD sensitive (ESDS) items based on the historical experience of both military and commercial organizations. References include ESD Association, U.S. Military and ANSI approved standards for material properties and test methods. The fundamental ESD control principles that form the basis of this document are:

A. All conductors in the environment, including personnel, shall be bonded or electrically connected and attached to a known ground or contrived ground (as on shipboard or on aircraft). This attachment creates an equipotential balance between all items and personnel. Electrostatic protection can be maintained at a potential above a “zero” voltage ground potential as long as all items in the system are at the same potential.
B. Necessary non-conductors (i.e. process-required insulators) in the environment cannot lose their electrostatic charge by attachment to ground. Ionization systems provide neutralization of charge on these necessary non-conductive items (circuit board materials and some device packages are examples of necessary non-conductors). Assessment of the ESD hazard created by electrostatic charge on the necessary non-conductors in the work place is required to ensure that appropriate actions are implemented, commensurate with risk to ESDS items.
C. Transportation of ESDS items outside an ESD Protected Area (hereafter referred to as “EPA”) requires enclosure in static protective materials, although the type of material depends on the situation and destination. Inside an EPA, low charging and static dissipative materials may provide adequate protection. Outside an EPA, low charging and static discharge shielding materials are recommended. While these materials are not discussed in the document, it is important to recognize the differences in their application. For more clarification see ANSI/ESD S541.

Any relative motion and physical separation of materials or flow of solids, liquids or particle-laden gases can generate electrostatic charge. Common sources of ESD include personnel, items made from common polymeric materials, and processing equipment. ESD damage can occur in a number of ways, including:

i. A charged object (including a person) coming into contact with an ESDS item.
ii. A charged ESDS device making contact with ground or another conductive object at a different potential.
iii. An ESDS device is grounded while exposed to an electrostatic field.

Examples of ESDS items are microcircuits, discrete semiconductors, thick and thin film resistors, hybrid devices, printed circuit boards and piezoelectric crystals. It is possible to determine device and item susceptibility by exposing the device to simulated ESD events. The level of sensitivity, determined by testing using simulated ESD events, may not necessarily relate to the level of sensitivity in a real life situation. However, the levels of sensitivity are used to establish a baseline

of susceptibility data for comparison of devices with equivalent part numbers from different manufacturers. Two different models are used for characterization of electronic components: HBM and CDM.

Compliance to this standard can be demonstrated through third party certification. The certification process is similar to any quality management system certification such as ISO 9001. Information on the certification process can be obtained by contacting an ESD Association approved Certification Body. For a list of ESD Association approved Certification Bodies, see www.esda.org.

This standard[1] was originally designated ANSI/ESD S20.20-1999 and was approved on August 4, 1999. ANSI/ESD S20.20-2007 was a revision of ANSI/ESD S20.20-1999 and was approved on February 11, 2007. ANSI/ESD S20.20-2014 is a revision of ANSI/ESD S20.20-2007 and was approved on June 11, 2014.

At the time the ANSI/ESD S20.20-2014 was prepared, the 20.20 ESD Control Program Subcommittee had the following members:

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[1] **ESD Association Standard (S)**: A precise statement of a set of requirements to be satisfied by a material, product, system or process that also specifies the procedures for determining whether each of the requirements is satisfied.

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