IEC/TR 61340-5-2

Edition 1.0 2007-08

TECHNICAL REPORT

RAPPORT TECHNIQUE

Electrostatics –
Part 5-2: Protection of electronic devices from electrostatic phenomena – User guide

Electrostatique –
Partie 5-2: Protection des dispositifs électroniques contre les phénomènes électrostatiques – Guide d'utilisation

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CONTENTS

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ELECTROSTATICS –

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FOREWORD

1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
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IEC 61340-5-2, which is a technical report, has been prepared by IEC technical committee 101: Electrostatics.

This version cancels and replaces the first edition, which was issued as a technical specification in 1999. It constitutes a technical revision.

The main changes with respect to the previous edition are listed below:

This version of IEC 61340-5-2 has been modified to provide guidance for users of IEC 61340-5-1. The text has been arranged to follow the requirements of IEC 61340-5-1 as closely as possible as well as providing specific guidance on each of the requirements of IEC 61340-5-1.

The text of this technical report is based on the following documents:

Enquiry draft	Report on voting
101/219/CDV	101/233/RVC

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.

The contents of the corrigendum of May 2009 have been included in this copy.

INTRODUCTION

This user guide and has been produced for individuals and organizations that are faced with controlling electrostatic discharge (ESD). It provides guidance that can be used for developing, implementing and monitoring an electrostatic discharge control program in accordance with IEC 61340-5-1.

This user guide applies to 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 V using the human body model (HBM). The 100 V HBM limit was selected for IEC 61340-5-1 as the baseline susceptibility threshold, since a large majority of the ESD products on the market have a sensitivity of greater than 100 V.

The limits established for each of the ESD control items are specified for an ESD program designed for 100 V HBM devices. The 100 V value is predicated on maximum voltage levels attainable on an individual when they are grounded via techniques accepted throughout the electronics industry as outlined in IEC 61340-5-1.

For organizations concerned with charged device model damage, IEC 61340-5-1 establishes requirements concerning the use of insulators in the ESD protected area (EPA) based on maximum electrostatic field limits. This topic is addressed in more detail in 4.6.

The general principals described in IEC 61340-5-1 are not limited in their applicability to ESDS with ESD sensitivities of 100 V or greater. For companies that handle ESDS with sensitivities of less than 100 V (HBM), the general principals of IEC 61340-5-1 can still be used. The organization may have to modify some of the required limits specified in Tables 2 to 4. The program documentation would then identify that ESDS with sensitivities of less than 100 V HBM were being handled and that this required a change to the limits established in IEC 61340-5-1.

The fundamental ESD control principles that form the basis of IEC 61340-5-1 are as follows:

a) Avoid a discharge from any charged, conductive object (personnel, equipment) into the device:

   This can be accomplished by bonding or electrically connecting all conductors in the environment, including personnel, 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 different from “zero” voltage ground potential, as long as all items in the system are at the same potential.

b) Avoid a discharge from any charged ESD sensitive device (the charging can result from direct contact and separation or can be field induced):

   Necessary insulators in the environment cannot lose their electrostatic charge by attachment to ground. Ionization systems provide neutralization of charges on these necessary insulators (circuit board materials and some device packages are examples of necessary insulators). Assessment of the ESD hazard created by electrostatic charges on the necessary insulators in the work place is required to ensure that appropriate actions are implemented, according to the risk.

c) Once outside of an electrostatic discharge protected area (hereafter referred to as an EPA) it is often not possible to control the above items, therefore, ESD protective packaging may be required.

   ESD protection can be achieved by enclosing ESD sensitive products 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 all of these materials are not discussed in this standard, it is important to recognize the differences in their application.