SLOVENSKI STANDARD
SIST-TP CLC/TR 61340-5-2:2009

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Elektrostatika - 5-2. del: Zaġ ita elektronskih naprav pred elektrostatiġ nimi pojavi - Vodilo za uporabnike (IEC/TR 61340-5-2:2007)

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

Elektrostatik -- Teil 5-2: Schutz von elektronischen Bauelementen gegen elektrostatische Phänomene - Benutzerhandbuch

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

Ta slovenski standard je istoveten z: CLC/TR 61340-5-2:2008

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31.020	Elektronske komponente na splošno	Electronic components in general

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English version

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

(IEC/TR 61340-5-2:2007)

Electrostatique - Partie 5-2: Protection des dispositifs électroniques contre les phénomènes électrostatiques - Guide d'utilisation (CEI/TR 61340-5-2:2007)

Elektrostatik - Teil 5-2: Schutz von elektronischen Bauelementen gegen elektrostatische Phänomene - Benutzerhandbuch (IEC/TR 61340-5-2:2007)

This Technical Report was approved by CENELEC on 2008-02-15.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

CENELEC

European Committee for Electrotechnical Standardization
Comité Européen de Normalisation Electrotechnique
Europäisches Komitee für Elektrotechnische Normung

Central Secretariat: rue de Stassart 35, B - 1050 Brussels

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Foreword

The text of the Technical Report IEC/TR 61340-5-2:2007, prepared by IEC TC 101, Electrostatics, was submitted to the vote in accordance with the Internal Regulations, Part 2, Subclause 11.4.3.3 (simple majority) and was approved by CENELEC as CLC/TR 61340-5-2 on 2008-02-15.

This Technical Report supersedes EN 61340-5-2:2001.

The main changes with respect to EN 61340-5-2:2001 are listed below:

CLC/TR 61340-5-2:2008 has been modified to provide guidance for users of EN 61340-5-1. The text has been arranged to follow the requirements of EN 61340-5-1 as closely as possible as well as providing specific guidance on each of the requirements of EN 61340-5-1.

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the Technical Report IEC/TR 61340-5-2:2007 was approved by CENELEC as a Technical Report without any modification.

Annex ZA
(normative)

Normative references to international publications with their corresponding European publications

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

NOTE When an international publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

Publication	Year	Title	EN/HD	Year
IEC 60749-26	-[1]	Semiconductor devices - Mechanical and climatic test methods - Part 26: Electrostatic discharge (ESD) sensitivity testing - Human body model (HBM)	EN 60749-26	2006[2]
IEC 61340-2-1	-[1]	Electrostatics - Part 2-1: Measurement methods - Ability of materials and products to dissipate static electric charge	EN 61340-2-1	2002[2]
IEC 61340-2-3	-[1]	Electrostatics - Part 2-3: Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation	EN 61340-2-3	2000[2]
IEC 61340-4-1	-[1]	Electrostatics - Part 4-1: Standard test methods for specific applications - Electrical resistance of floor coverings and installed floors	EN 61340-4-1	2004[2]
IEC 61340-4-3	-[1]	Electrostatics - Part 4-3: Standard test methods for specific applications - Footwear	EN 61340-4-3	2001[2]
IEC 61340-4-5	-[1]	Electrostatics - Part 4-5: Standard test methods for specific applications - Methods for characterizing the electrostatic protection of footwear and flooring in combination with a person	EN 61340-4-5	2004[2]
IEC 61340-5-1	-[1]	Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements	EN 61340-5-1	2007[2]
ANSI/ESD STM2.1	-[1]	Standard Test Method for the protection of electrostatic discharge susceptible items - Garments	-	-
ANSI/ESD STM3.1	-[1]	Standard Test Method for the protection of electrostatic discharge susceptible items - Ionization	-	-

[1] Undated reference.
[2] Valid edition at date of issue.

IEC/TR 61340-5-2

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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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INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROSTATICS –

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

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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The main task of IEC technical committees is to prepare International Standards. However, a technical committee may propose the publication of a technical report when it has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

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.

ELECTROSTATICS –

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

1 Scope

This technical report has been developed to support IEC 61340-5-1.

The controls and limits referenced in this standard were developed to protect devices that are susceptible to discharges of 100 V or greater using the human body model test method. However, the general concepts are still valid for devices that are susceptible to discharges of less than 100 V.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

IEC 60749-26, *Semiconductor devices – Mechanical and climatic test methods – Part 26: Electrostatic discharge (ESD) sensitivity testing – Human body model (HBM)*

IEC 61340-2-1 – *Electrostatics – Part 2-1: Measurement methods – Ability of materials and products to dissipate static electric charge*

IEC 61340-2-3 – *Electrostatics – Part 2-3:Methods of test for determining the resistance and resistivity of solid planar materials used to avoid electrostatic charge accumulation*

IEC 61340-4-1 – *Electrostatics – Part 4-1:Standard test methods for specific applications – Electrostatic resistance of flloor coverings and installed floors*

IEC 61340-4-3 – *Electrostatics – Part 4-3:Standard test methods for specific applications – Footwear*

IEC 61340-4-5 - *Electrostatics – Part 4-5:Standard test methods for specific applications – Methods for characterizing the electrostatic protection of footwear and flooring in combination with a person*

IEC 61340-5-1, *Electrostatics – Part 5-1: Protection of electronic devices from electrostatic phenomena – General requirements*

ANSI/ESD STM2.1, *Standard Test Method for the protection of electrostatic discharge susceptible items – Garments*

ANSI/ESD STM3.1, *Standard Test Method for the electrostatic discharge susceptible items - Ionization*

3 Terms and definitions

For the purposes of this document, the terms and definitions of IEC 61340-5-1 apply.

4 ESD control program plan

This clause outlines a step-by-step approach that can be used to establish an ESD control Program.

4.1 Developing an ESD control program plan

4.1.1 Assignment of an ESD coordinator

In order to have a well thought out and implemented ESD program an ESD coordinator must be assigned. The ESD coordinator is responsible for all aspects of ESD in the facility. In order to be effective the ESD coordinator needs:

a) the full support of management;

b) a good understanding of electrostatics and how ESD sensitive devices can be damaged. The ESD coordinator will often need to attend educational classes or seminars related to ESD in order to maintain or update their knowledge;

c) a thorough understanding of IEC 61340-5-1 and all of the organization's processes related to the handling of ESD sensitive devices.

d) access to measuring equipment for the purposes of performing compliance verification audits as well as testing new ESD products and materials for use in the ESD program;

e) depending on the size of the facility, the ESD coordinator might also need to have auditors assigned to conduct the ESD audits.

Finally, management must provide the ESD coordinator with the authority and funding necessary to ensure that the ESD control program is maintained and enforced.

4.1.2 Determination of part ESD sensitivity

The next step in developing an ESD control program plan is to determine the part, assembly or equipment sensitivity level under which the plan is to be developed. Although the requirements outlined in IEC 61340-5-1 are effective for handling parts sensitive to 100 V HBM or higher, the organization may choose to develop an ESD program based on ESD sensitivities that are greater or less than 100 V HBM. In this situation, the organization must develop an ESD control program plan that clearly states the ESD sensitivity that the program is based on.

The organization can use various methods to determine the ESD sensitivity of the products that are to be handled. Some of the methods include:

- assumption that all ESD products have an HBM sensitivity of 100 V;
- actual testing of ESD sensitive devices to establish the ESD sensitivity thresholds using IEC 60749-26;
- referencing ESD sensitivity data in published documents such as manufacturer's published data sheets.

4.1.3 Initial process and organizational assessment

Before the ESD control program plan can be developed, an initial assessment of the processes and organizations impacted by an ESD control program should be conducted. Organizations and processes that might be affected include:

- purchasing;