SVENSK STANDARD SS-EN 61340-5-1

Fastställd	Utgåva	Sida	Ansvarig kommitté
2008-02-25	2	1 (1+19)	SEK TK 101

Elektrostatiska urladdningar (ESD) – Del 5-1: Skydd av elektronik – Allmänna fordringar

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

Som svensk standard gäller europastandarden EN 61340-5-1:2007. Den svenska standarden innehåller den officiella engelska språkversionen av EN 61340-5-1:2007.

Nationellt förord

Europastandarden EN 61340-5-1:2007

består av:

– **europastandardens ikraftsättningsdokument,** utarbetat inom CENELEC
– **IEC 61340-5-1, First edition, 2007 - Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 61340-5-1, utgåva 1, 2001, gäller ej fr o m 2008-09-01.

ICS 17.220.99; 29.020

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Postadress: SEK, Box 1284, 164 29 KISTA
Telefon: 08 - 444 14 00. *Telefax*: 08 - 444 14 30
E-post: sek@elstandard.se. *Internet*: www.elstandard.se

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Det finns många fördelar med att ha gemensamma tekniska regler för bl a säkerhet, prestanda, dokumentation, utförande och skötsel av elprodukter, elanläggningar och metoder. Genom att utforma sådana standarder blir säkerhetskraven tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

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Stora delar av arbetet sker internationellt

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

Var med och påverka!

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

SEK Svensk Elstandard
Box 1284
164 29 Kista
Tel 08-444 14 00
www.elstandard.se

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 61340-5-1

October 2007

ICS 17.220.99; 29.020

Supersedes EN 61340-5-1:2001

English version

Electrostatics - Part 5-1: Protection of electronic devices from electrostatic phenomena - General requirements

(IEC 61340-5-1:2007)

Electrostatique -
Partie 5-1: Protection des dispositifs électroniques contre les phénomènes électrostatiques -
Exigences générales
(CEI 61340-5-1:2007)

Elektrostatik -
Teil 5-1: Schutz von elektronischen Bauelementen gegen elektrostatische Phänomene -
Allgemeine Anforderungen
(IEC 61340-5-1:2007)

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

Ref. No. EN 61340-5-1:2007 E

SEK Svensk Elstandard

Foreword

The text of document 101/249/FDIS, future edition 1 of IEC 61340-5-1, prepared by IEC TC 101, Electrostatics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61340-5-1 on 2007-10-01.

This European Standard supersedes EN 61340-5-1:2001 + corrigendum April 2001.

The main changes with respect to EN 61340-5-1:2001 are listed below:

EN 61340-5-1:2007 focuses on the requirements for an ESD control program. In addition, EN 61340-5-1:2007 has been aligned with other major ESD control program standards used throughout the world.

The following dates were fixed:

– latest date by which the EN has to be implemented at national level by publication of an identical national standard or by endorsement	(dop)	2008-07-01
– latest date by which the national standards conflicting with the EN have to be withdrawn	(dow)	2010-10-01

Annex ZA has been added by CENELEC.

Endorsement notice

The text of the International Standard IEC 61340-5-1:2007 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following note has to be added for the standard indicated:

IEC 60749-27	NOTE	Harmonized as EN 60749-27:2006 (not modified).

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 60364 (mod)	Series	Low-voltage electrical installations	HD 384/ HD 60364	Series
IEC/TS 60479-1	– [1)]	Effects of current on human beings and livestock - Part 1: General aspects	–	–
IEC/TS 60479-2	– [1)]	Effects of current on human beings and livestock - Part 2: Special aspects	–	–
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 61010-1	– [1)]	Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements	EN 61010-1 + corr. June	2001 [2)] 2002
IEC 61140	– [1)]	Protection against electric shock - Common aspects for installation and equipment	EN 61140	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)]

[1)] Undated reference.

[2)] Valid edition at date of issue.

Publication	Year	Title	EN/HD	Year
IEC/TR 61340-5-2	– [1)]	Electrostatics - Part 5-2: Protection of electronic devices from electrostatic phenomena - User guide	–	–
ANSI/ESD S1.1	– [1)]	Standard Test Method for the protection of electrostatic charge susceptible items - Wrist Straps	–	–
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 electrostatic discharge susceptible items - Ionization	–	–
ANSI/ESD STM11.31	– [1)]	Standard Test Method for evaluating the performance of electrostatic discharge shielding materials - Bags	–	–

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INTRODUCTION

This part of IEC 61340 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, transport or otherwise handle electrical or electronic parts, assemblies and equipment susceptible to damage by electrostatic discharges greater than or equal to 100 V human body model (HBM). This standard covers the ESD control program requirements necessary for setting up a program to handle ESD-sensitive devices (ESDS), based on the historical experience of both military and commercial organizations. The fundamental ESD control principles that form the basis of this standard are as follows:

– avoid a discharge from any charged, conductive object (personnel and especially automated handling equipment) into the ESDS. 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 board ship or on aircraft). This attachment creates an equipotential balance between all conducting objects and personnel. Electrostatic protection can be maintained at a potential different from a “zero” voltage ground potential as long as all conductive objects in the system are at the same potential;

– avoid a discharge from any charged ESD sensitive device. Charging can result from direct contact and separation or it 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;

– once outside of an electrostatic discharge protected area (hereinafter 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, static dissipative materials may provide adequate protection. Outside an EPA, static discharge shielding materials are recommended. Whilst all of these materials are not discussed in this standard, it is important to recognize the differences in their application.

Each company has different processes, and so will require a different blend of ESD prevention measures for an optimum ESD control program. It is vital that these measures are selected, based on technical necessity and carefully documented in an ESD control program plan, so that all concerned can be sure of the program requirements.

Training is an essential part of an ESD control program in order to ensure that the personnel involved understand the equipment and procedures they are to use in order to be in compliance with the ESD control program plan. Training is also essential in raising awareness and understanding of ESD issues. Without training, personnel are often a major source of ESD risk. With training, they become an effective first line of defence against ESD damage.

Regular compliance verification checks and tests are essential to ensure that equipment remains effective and that the ESD control program is correctly implemented in compliance with the ESD control program plan.

Any contact and physical separation of materials or flow of solids, liquids, or particle-laden gases can generate electrostatic charges. Common sources of ESD include charged: personnel, conductors, common polymeric materials, and processing equipment. ESD damage can occur when:

– a charged person or object comes into contact with an ESDS;
– an ESDS comes into direct contact with a highly conductive surface while exposed to an electrostatic field;
– a charged ESDS comes into contact with another conductive surface which is at a different electrical potential. This surface may or may not be grounded.

Examples of ESDS 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 test using simulated ESD events, may not necessarily relate to the level of sensitivity in a real life situation. However, they are used to establish a baseline of susceptibility data for comparison of devices with equivalent part numbers from different manufacturers. Three different models are used for characterization of electronic components - human body model (HBM), machine model (MM), and charged device model (CDM).

ELECTROSTATICS –

Part 5-1: Protection of electronic device from electrostatic phenomena – General requirements

1 Scope

This part of IEC 61340 applies to activities that: manufacture, process, assemble, install, package, label, service, test, inspect, transport or otherwise handle electrical or electronic parts, assemblies and equipment susceptible to damage by electrostatic discharges greater than or equal to 100 V human body model (HBM).

This standard provides the requirements for an ESD control program. The user should refer to IEC 61340-5-2 for guidance on the implementation of this standard.

This standard does not apply to electrically initiated explosive devices, flammable liquids, gases and powders.

The purpose of this standard is to provide the administrative and technical requirements for establishing, implementing and maintaining an ESD control program (hereinafter referred to as the “program”).

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 60364 (all parts), *Low-voltage electrical installations*

IEC/TS 60479-1, *Effects of current on human beings and livestock – Part 1: General aspects*

IEC/TS 60479-2, *Effects of current on human beings and livestock – Part 2: Special aspects*

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

IEC 61010-1, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements*

IEC 61140, *Protection against electric shock – Common aspects for installation and equipment*

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 – Electrical resistance of floor coverings and installed floors*

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