

TECHNICAL REPORT

IEC TR 61340-5-1

First edition
1998-12

Electrostatics –

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

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Withheld

INTERNATIONAL ELECTROTECHNICAL COMMISSION

ELECTROSTATICS –

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

FOREWORD

- 1) The IEC (International Electrotechnical Commission) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of the 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, the IEC publishes International Standards. 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. The IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of the IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested National Committees.
- 3) The documents produced have the form of recommendations for international use and are published in the form of standards, technical reports or guides and they are accepted by the National Committees in that sense.
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The main task of IEC technical committees is to prepare International Standards. In exceptional circumstances, a technical committee may propose the publication of a technical report of one of the following types:

- type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;
- type 2, when the subject is still under technical development or where for any other reason there is the future but no immediate possibility of an agreement on an International Standard;
- type 3, when a technical committee has collected data of a different kind from that which is normally published as an International Standard, for example "state of the art".

Technical reports of types 1 and 2 are subject to review within three years of publication to decide whether they can be transformed into International Standards. Technical reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

IEC 61340-5-1, which is a technical report of type 2, has been prepared by IEC technical committee 101: Electrostatics.

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

Committee draft	Report on voting
101/18/CDV	101/38/RVC

Full information on the voting for the approval of this technical report can be found in the report on voting indicated in the above table.

This document is issued in the type 2 technical report series of publications (according to G.3.2.2 of part 1 of the IEC/ISO Directives) as a "prospective standard for provisional application in the field of protection of electronic devices from electrostatic phenomena" because there is an urgent requirement for guidance on how standards in this field should be used to meet an identified need.

This document is not to be regarded as an "International Standard". It is proposed for provisional application so that information and experience of its use in practice may be gathered. Comments on the content of this document should be sent to the IEC Central Office.

A review of this type 2 technical report will be carried out not later than three years after its publication, with the options of either extension for a further three years or conversion into an International Standard or withdrawal.

Annex A forms an integral part of this technical report.

Annexes B and C are for information only.

IEC 61340 consists of the following parts, under the general title: *Electrostatics*

- Part 1: General
- Part 2-1: Measurement methods in electrostatics – Chargeability
- Part 2-2: Measurement methods in electrostatics – Resistances and resistivities
- Part 3-1: Methods for simulating electrostatic effects – Electrostatic discharge simulation – Human Body Model (HBM)
- Part 3-2: Methods for simulating electrostatic effects – Electrostatic discharge simulation – Machine Model (MM)
- Part 3-3: Methods for simulating electrostatic effects – Electrostatic discharge simulation – Charged Device Model (CDM)
- Part 4-1: Standard test methods for specific applications – Electrostatic behaviour of floor coverings and installed floors
- Part 4-2: Under consideration
- Part 4-3: Standard test methods for specific applications – Test methods for the characterisation of electrostatic protective footwear
- Part 5-1: Protection of electronic devices from electrostatic phenomena – General requirements
- Part 5-2: Protection of electronic devices from electrostatic phenomena – User guide

The contents of the corrigendum of February 1999 and December 2002 have been included in this copy.

INTRODUCTION

Compliance with this technical report concerns the installation of new equipment only. Existing equipment should be replaced as soon as is practical. For the duration of the changeover period, extra precautions should be considered.

Some of the effects of static electricity have been known for several thousands of years. In more recent times, their properties have been understood and have been used to advantage in many applications. Unfortunately some properties of static electricity cause problems, particularly in the electronics industry. This technical report gives rules which, if followed, will minimize the unwanted effects of electrostatic discharge. Additional information on how the technical report should be applied is contained in IEC 61340-5-2 (user guide).

When the requirements of this technical report are applied, they will provide a low risk of damage to the vast majority of components and assemblies used in the electronics industry, particularly for devices which have a damage threshold of greater than 100 V (human body model). Where ultra-sensitive devices are used, additional specialist precautions will need to be applied.

The definitions used in this technical report apply for this document, and different definitions or ranges may apply in some other areas of electrostatics.

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WITHDRAWN

ELECTROSTATICS –

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

1 Scope

This technical report specifies the general requirements for the protection of electrostatic discharge sensitive devices (ESDS) from electrostatic discharges and fields. It applies only to the manufacture and use of electronic devices.

This technical report specifies how to design, use and control a protected area to ensure that electrostatic sensitive devices, having a withstand threshold voltage of 100 V (human body model) or higher, can be handled with a minimum risk of damage resulting from electrostatic phenomena.

Normal precautions given in this report are applicable for areas with clean room types in excess of ISO 14644-1 class 5. Alternative precautions may be required in clean rooms of ISO 14644-1 class 5 or less if contamination is formed as a result of using the procedures specified in this technical report.

Although this technical report does not include requirements for personnel safety, attention is drawn to the need for all concerned to comply with relevant local statutory requirements regarding the health and safety of all persons in all places of work, including those covered by this technical report. Generally, there is no minimum value of resistance for the protection of ESDS (see 3.2). However, a minimum resistance value may be required for the safety of personnel. See the relevant requirements and/or publications IEC 61010-1, IEC 60479, IEC 60536, IEC 60364.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of IEC 61340. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this part of IEC 61340 are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

IEC 60093:1980, *Methods of test for volume resistivity and surface resistivity of solid electrical insulating materials*

IEC 60167:1964, *Methods of test for the determination of the insulation resistance of solid insulating materials*

IEC 60364 (all parts), *Electrical installations of buildings*

IEC 60417:1973, *Graphical symbols for use on equipment – Index, survey and compilation of the single sheets*

IEC 60479-1:1994, *Effects of current on human beings and livestock – Part 1: General aspects*

IEC 60479-2:1987, *Effects of current on human beings and livestock – Part 2: Special aspects*

IEC 60536:1976, *Classification of electrical and electronic equipment with regard to protection against electric shock*

IEC 61010-1:1990, *Safety requirements for electrical equipment for measurement, control and laboratory use – Part 1: General requirements*

IEC 61340-4-1:1998, *Electrostatics – Part 4-1: Standard test methods for specific applications – Electrostatic behaviour of floor coverings and installed floors*

IEC 61340-5-2, —, *Electrostatics – Part 5-2: Protection of electronic devices from electrostatic phenomena – User guide*¹⁾

ISO 14644-1, —, *Cleanrooms and associated controlled environment – Part 1: Classification of air cleanliness*¹⁾

3 Definitions

For the purpose of this technical report, the following definitions apply.

3.1

electrostatic discharge (ESD)

transfer of charge between bodies at different electrostatic potentials caused by direct contact or induced by electrostatic field

3.2

electrostatic discharge sensitive device (ESDS)

discrete device, integrated circuit or assembly that may be damaged by electrostatic fields or electrostatic discharge encountered in routine handling, testing or transit

3.3

bonding

connecting together of non-insulating elements by means of a conductor

3.4

clean room

area with a specified maximum number and size of airborne particles per unit volume

3.5

device hazardous voltage

voltage capable of damaging an ESDS

¹⁾ To be published.