

# SLOVENSKI STANDARD

## SIST EN 61340-3-1:2008

01-januar-2008

Nadomešča:

SIST EN 61340-3-1:2002

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**Elektrostatika - 3-1. del: Metode za simulacijo elektrostatičnih učinkov - Model človeškega telesa (HBM) - Preskušanje sestavnih delov (IEC 61340-3-1:2006)**

Electrostatics -- Part 3-1: Methods for simulation of electrostatic effects - Human body model (HBM) electrostatic discharge test waveforms

Elektrostatik - Teil 3-1: Verfahren zur Simulation elektrostatischer Effekte - Prüfpulsformen der elektrostatischen Entladung für das Human Body Model (HBM)

Électrostatique -- Partie 3-1: Méthodes pour la simulation des effets électrostatiques - Formes d'onde d'essai des décharges électrostatiques pour le modèle du corps humain (HBM)

**Ta slovenski standard je istoveten z: EN 61340-3-1:2007**

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**ICS:**

17.220.99	Drugi standardi v zvezi z električno in magnetizmom	Other standards related to electricity and magnetism
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**SIST EN 61340-3-1:2008**

**en,fr,de**

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EUROPEAN STANDARD  
NORME EUROPÉENNE  
EUROPÄISCHE NORM

# EN 61340-3-1

July 2007

ICS 17.220.99; 29.020

Supersedes EN 61340-3-1:2002

English version

**Electrostatics -**  
**Part 3-1: Methods for simulation of electrostatic effects -**  
**Human body model (HBM) electrostatic discharge test waveforms**  
**(IEC 61340-3-1:2006)**

Électrostatique -  
Partie 3-1: Méthodes pour la simulation  
des effets électrostatiques -  
Formes d'onde d'essai  
des décharges électrostatiques  
pour le modèle du corps humain (HBM)  
(CEI 61340-3-1:2006)

Elektrostatik -  
Teil 3-1: Verfahren zur Simulation  
elektrostatischer Effekte -  
Prüfwellenformen  
der elektrostatischen Entladung  
für das Human Body Model (HBM)  
(IEC 61340-3-1:2006)

STANDARD PREVIEW  
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This European Standard was approved by CENELEC on 2007-07-01. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the Central Secretariat has the same status as the official versions.

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**

## Foreword

The text of document 101/236/FDIS, future edition 2 of IEC 61340-3-1, prepared by IEC TC 101, Electrostatics, was submitted to the IEC-CENELEC parallel vote and was approved by CENELEC as EN 61340-3-1 on 2007-07-01.

This European Standard supersedes EN 61340-3-1:2002.

The major change of this document is that it no longer contains the application to semiconductor devices.

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) | 2008-04-01 |
| – latest date by which the national standards conflicting with the EN have to be withdrawn   | (dow) | 2010-07-01 |

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## Endorsement notice

The text of the International Standard IEC 61340-3-1:2006 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 60749-26	NOTE	Harmonized as EN 60749-26:2006 (not modified).
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**NORME  
INTERNATIONALE  
INTERNATIONAL  
STANDARD**

**CEI  
IEC**

**61340-3-1**

Deuxième édition  
Second edition  
2006-12

**Électrostatique –**

**Partie 3-1:**

**Méthodes pour la simulation  
des effets électrostatiques –**

**Formes d'onde d'essai des décharges  
électrostatiques pour le modèle du corps  
humain (HBM)**

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**Electrostatics –**

**Part 3-1:**

**Methods for simulation of electrostatic effects –  
Human body model (HBM) electrostatic discharge  
test waveforms**

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Commission Electrotechnique Internationale  
International Electrotechnical Commission  
Международная Электротехническая Комиссия

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For price, see current catalogue

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

## ELECTROSTATICS –

**Part 3-1: Methods for simulation of electrostatic effects –  
Human body model (HBM) electrostatic discharge test waveforms**

## 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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International Standard IEC 61340-3-1 has been prepared by IEC technical committee 101: Electrostatics.

This second edition cancels and replaces the first edition, published in 2002, and constitutes a technical revision.

The major change of this document is that it no longer contains the application to semiconductor devices.

It recognizes the direction of the IEC SMB (Standardization Management Board) in terms of considering inputs from TC 47 documents with regard to ESD test methods. TC 101 has revised this publication IEC 61340-3-1, concerning the human body model, in collaboration with the JWG of TC 47/TC 101. IEC 61340-3-1 incorporates TC 47 input, based on the corresponding IEC 60749-26 of TC 47.

The text of this standard is based on the following documents:

FDIS	Report on voting
101/236/FDIS	101/238/RVD

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.

The list of all parts of 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.

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**ELECTROSTATICS –****Part 3-1: Methods for simulation of electrostatic effects –  
Human body model (HBM) electrostatic discharge test waveforms****1 Scope**

This part of IEC 61340 describes the discharge current waveforms used to simulate human body model (HBM) electrostatic discharges (ESD) and the basic requirements for equipment used to develop and verify these waveforms.

This standard covers HBM ESD waveforms for use in general test methods and for application to materials or objects, electronic components and other items for ESD withstand-test or performance-evaluation purposes. The specific application of these HBM ESD waveforms to non-powered semiconductor devices is covered in IEC 60749-26.

The waveforms defined in this standard are not intended for use in the testing of powered electronic systems for electromagnetic compatibility (EMC), which is covered in IEC 61000-4-2.

**2 Terms and definitions**

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For the purposes of this document, the following terms and definitions apply.

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**2.1****unit under test****UUT**

material, object, item or product to be subjected to the HBM ESD test

**2.2****UUT failure**

condition in which a UUT does not meet one or more specified parameters as a result of the ESD test

**2.3****ESD withstand voltage**

maximum applied ESD voltage level that does not cause failure parameter limits to be exceeded, provided that all UUTs stressed at lower levels have also passed



### 3 Equipment

#### 3.1 HBM ESD waveform generator

This equipment produces an electrostatic discharge current pulse simulating an HBM ESD event for application to the UUT. The equivalent waveform generator circuit and tester evaluation loads are illustrated in Figure 1.

#### 3.2 Waveform verification equipment

##### 3.2.1 General

Equipment capable of verifying the HBM current waveform is defined in this standard. This equipment includes but is not limited to a waveform recording system, a high-voltage resistor and a current transducer.

##### 3.2.2 Waveform recording system

The waveform recording system shall have a minimum single shot bandwidth of 350 MHz.

##### 3.2.3 Evaluation loads

Two evaluation loads are necessary to verify the functionality of the waveform generator:

- a) load 1: a shorting wire,
- b) load 2: a 500  $\Omega$  low-inductance resistor, with a tolerance of  $\pm 1$  % appropriately rated for the voltages that will be used for waveform qualification.

The lead length of the evaluation loads (shorting wire or resistor) shall be as short as possible and consistent with connecting the evaluation load to the appropriate reference terminals (A and B in Figure 1) while passing through the current transducer.

##### 3.2.4 Current transducer

The current transducer shall have a minimum bandwidth of 350 MHz.

### 4 HBM current waveform requirements

#### 4.1 General

Prior to UUT testing, HBM ESD waveform generator qualification shall ensure waveform integrity of the discharge current through both a shorting wire and a resistive load. The shorting wire waveform requirements are specified in Figures 2a and 2b for all positive and negative voltages defined in Table 1, while the resistive load waveform requirements for  $\pm 1\,000$  V are shown in Figure 3 and Table 1.

#### 4.2 Waveform qualification and verification

Equipment qualification shall be performed during initial acceptance testing. Re-qualification is required whenever equipment repairs are made that may affect the waveform. Additionally, the waveforms shall be verified periodically.