



BSI Standards Publication

Electrostatics

Part 1: Electrostatic phenomena —
Principles and measurements

National foreword

This Published Document is the UK implementation of IEC/TR 61340-1:2012, incorporating corrigendum March 2013.

The start and finished of tet introduced or altered by corrigendum is indicated in the text by tags. Text altered by IEC corrigendum March 2013 is indicated in the text by AC1 AC1.

The UK participation in its preparation was entrusted to Technical Committee GEL/101, Electrostatics.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Published by BSI Standards Limited 2013

ISBN 978 0 580 82950 5

ICS 17.200.99; 29.020

Compliance with a British Standard cannot confer immunity from legal obligations.

This Published Document was published under the authority of the Standards Policy and Strategy Committee on 30 September 2013.

Amendment corrigenda issued since publication

Date	Text affected
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TECHNICAL REPORT

RAPPORT TECHNIQUE

**Electrostatics –
Part 1: Electrostatic phenomena – Principles and measurements**

**Electrostatique –
Partie 1: Phénomènes électrostatiques – Principes et mesures**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

X

ICS 17.200.99; 29.020

ISBN 978-2-83220-195-4

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ELECTROSTATICS –

Part 1: Electrostatic phenomena –
Principles and measurements

FOREWORD

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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/TR 61340-1, which is a technical report, has been prepared by IEC technical committee 101: Electrostatics.

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

Enquiry draft	Report on voting
101/344/DTR	101/355/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 publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 61340 series, published 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 stability 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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INTRODUCTION

Static electricity has been known for around 2 500 years but until recently had little impact on humankind. More recently in the last century the nature of static electricity became better understood and the principles of charge separation and accumulation could be described. Despite this improved understanding, it remains difficult to predict with certainty the polarity and magnitude of charges built up in any situation due to the many factors involved, and to many electrostatics remains a “black art” rather than a science.

The development of modern materials, especially polymers, and their nearly ubiquitous application in fields such as floor materials, furnishings, clothing and engineering materials, has made static electricity an everyday phenomenon. In some industries, such as electronics manufacture and processes using flammable materials, unintended and invisible electrostatic discharges can lead to substantial component damage or unreliability, or fires or explosions. In everyday life, experience of electrostatic shocks to personnel has become common place. This has led to increasing need to understand such phenomena, and to specify materials, equipment and procedures for use in preventing and controlling electrostatic problems in the human environment.

This technical report gives an overview of the field of electrostatics and has been prepared to give the user a view of the background, principles, methods of measurement and industrial applications prepared in conformity with IEC TC101 publications.

ELECTROSTATICS –

Part 1: Electrostatic phenomena – Principles and measurements

1 Scope

This part of IEC 61340, which is a technical report, describes the fundamental principles of electrostatic phenomena including charge generation, retention and dissipation, and electrostatic discharges.

Methods for measuring electrostatic phenomena and related properties of materials are described in a general way.

Hazards and problems associated with electrostatic phenomena and principles of their control are outlined.

Useful applications of electrostatic effects are summarized.

The purpose of this technical report is to serve as a reference for the development of electrostatics related standards, and to provide guidance for their end-users.

2 Normative references

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

IEC 60079-10-1, *Explosive atmospheres – Part 10-1: Classification of areas – Explosive gas atmospheres*

IEC 60079-10-2, *Explosive atmospheres – Part 10-2: Classification of areas – Combustible dust atmospheres*

IEC 61000-4-2, *Electromagnetic compatibility (EMC) – Part 4-2: Testing and measurement techniques – Electrostatic discharge immunity test*

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

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

IEC 60243-1, *Electrical strength of insulating materials – Test methods – Part 1: Tests at power frequencies*

IEC 60243-2, *Electric strength of insulating materials – Test methods – Part 2: Additional requirements for tests using direct voltage*