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TECHNICAL REPORT

Electrostatics –
Part 1-1: Electrostatic phenomena – Measurement errors, uncertainties and expression of results

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FOREWORD

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IEC TR 61340-1-1 has been prepared by IEC technical committee 101: Electrostatics. It is a Technical Report.

The text of this Technical Report is based on the following documents:

Draft	Report on voting
101/728/DTR	101/735/RVDTR

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

The language used for the development of this Technical Report is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all 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 document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

INTRODUCTION

Measurement in electrostatics poses unique challenges, often requiring the use of high impedance measurement techniques. Electrostatic fields and potentials are challenging to measure without disturbing the actual situation being observed. Additionally, materials used in various applications can have very high electrical resistance above $1 \times 10^9\,\Omega$, complicating measurements due to the low currents that are vulnerable to disturbances.

Electrostatic field meters, high impedance voltmeters and high resistance meters are often used in compliance verification or qualification of electrostatic discharge (ESD) control items. Many meters available in the market offer a user-friendly interface and a digital display, making them easier to operate. However, it is important to note that a friendly user interface does not guarantee accurate measurements without a proper understanding of the factors and sources of errors that can influence the results.

It is important to know the basics of electrostatic theory so that measurement errors and measurement uncertainties can be accurately evaluated. Measurements are incomplete without consideration of error and uncertainty estimation, and this can lead to significant deviations in conclusions.

This document provides practical guidance on how to understand and mitigate different types of measurement errors and how to estimate measurement uncertainties when making measurements according to the test methods of IEC 61340 series documents. This document also includes examples of how to express the results.

ELECTROSTATICS –

Part 1-1: Electrostatic phenomena – Measurement errors, uncertainties and expression of results

1 Scope

This part of IEC 61340 gives guidance on error consideration and uncertainty estimation in electrostatics and ESD control measurements. It provides guidance on minimizing measurement errors and estimating measurement uncertainties using practical methods. The document also outlines how measurement results can be expressed in a test report. It is important to note that this document serves as an informative guideline intended for individuals who already have a solid understanding of the basics of electrostatics theory and measurement techniques.

2 Normative references

There are no normative references in this document.