IEC 61340-2-1

Edition 2.0 2022-06

INTERNATIONAL STANDARD

HORIZONTAL PUBLICATION

AMENDMENT 1

Electrostatics –
Part 2-1: Measurement methods – Ability of materials and products to dissipate static electric charge

IEC 61340-2-1:2015-08/AMD1:2022-06(en)

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INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 17.220.99; 29.020

ISBN 978-2-8322-3937-7

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ELECTROSTATICS –

Part 2-1: Measurement methods – Ability of materials and products to dissipate static electric charge

AMENDMENT 1

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Amendment 1 to IEC 61340-2-1:2015 has been prepared by IEC technical committee 101: Electrostatics.

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

Draft	Report on voting
101/639/CDV	101/651/RVC

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 Amendment 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/standardsdev/publications/.

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- withdrawn,
- replaced by a revised edition, or
- amended.

INTRODUCTION

Replace the second paragraph of the Introduction with the following new text:

For homogeneous conductive materials, this property can be evaluated indirectly by measuring resistance or resistivity parameters. Care should be exercised when determining the homogeneity of materials, as some materials that appear homogenous do exhibit non−homogeneous electrical characteristics. If the homogeneity of materials is not known and cannot be otherwise verified, it is possible that resistance measurements will not be reliable or will not give enough information. It is also possible that resistance measurements will not be reliable when evaluating materials in the dissipative or insulative range and especially for high ohmic materials that include conductive fibres (e.g. textiles with a metallic grid). In such cases, the rate of dissipation of static charge should be measured directly.

1 Scope

Replace the third paragraph of Clause 1 with the following new text:

The two test methods for measuring charge decay time, one using corona charging and one using a charged metal plate are different and it is possible that they will not give equivalent results. Nevertheless, each method has a range of applications for which it is best suited. The corona charging method is suitable for evaluating the ability of materials, for example textiles, packaging, to dissipate charge from their own surfaces. The charged metal plate method is suitable for evaluating the ability of materials and objects such as gloves, finger cots, hand tools, to dissipate charge from conductive objects placed on or in contact with them. It is possible that the charged plate method will not be suitable for evaluating the ability of materials to dissipate charge from their own surfaces.

2 Normative references

Add the following normative references:

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

IEC 61010-2-030, *Safety requirements for electrical equipment for measurement, control, and laboratory use – Part 2-030: Particular requirements for equipment having testing or measuring circuits*

3 Terms and definitions

3.2
charge decay time

Replace Note 1 to entry in 3.2 with the following new Note 1 to entry:

Note 1 to entry: 1/e and 10 % are appropriate fractions (e is the base of natural logarithms, equal to 2,718). If the initial voltage is low, the accuracy of decay time measurements to a small fraction of the initial voltage can be susceptible to the noise level of the fieldmeter.

3.5
static dissipative material

Replace Note 1 to entry in 3.5 with the following new Note 1 to entry:

Note 1 to entry: Materials that are considered conductive in other contexts are included within this definition for the purposes of this part of IEC 61340.

4.1 Principles

Replace the Caution statement of 4.1 with the following new Warning statement:

WARNING – The test methods specified in this document involve the use of high-voltage power supplies that can present hazards if handled incorrectly, particularly by unqualified or inexperienced personnel. Users of this document are encouraged to carry out proper risk assessments and pay due regard to local regulations before undertaking any of the test procedures. Electrical equipment for measurements shall comply with the safety requirements specified in IEC 61010-1 and IEC 61010-2-030.

4.3.3 Corona charge deposition

Replace the second paragraph of 4.3.3 with the following new text:

The corona duration shall be no more than 50 ms, and 10 ms or 20 ms is usually appropriate in order to achieve an adequate initial peak voltage for measurements. Excessively long deposition times (more than some seconds) can damage the material.

4.3.4 Fieldmeter

Replace the third paragraph of 4.3.4 with the following new text:

Any residual ionization shall contribute less than 20 V to the measurement of the surface voltage. Excess ionization shall be removed, for example, by using an air dam. This can be tested by measurements on a fully conducting test surface.

4.4.1 Physical design features

Figure 2

Replace Key 3 in Figure 2 in 4.4.1 with the following new text:

3 Conductive plate (e.g. nominal dimensions 150 mm × 150 mm)

Replace the second paragraph of 4.4.1 with the following new text:

The instrument to measure the charge dissipation of objects under test is the charged plate monitor (see Figure 2). The capacitance of the conductive plate shall be (20 ± 2) pF when mounted in the test fixture. The dimensions of the plate do not significantly affect results and any practical size may be used (e.g. nominal dimensions 150 mm × 150 mm). The wire between the switch and the plate shall be as short as possible.

4.4.2 Charge decay time (t_{sd})

Replace the second paragraph of 4.4.2 with the following new text:

There can be occasions when the potential decay approaches a non-zero value. This final offset voltage is designated U_0.

Figure 4

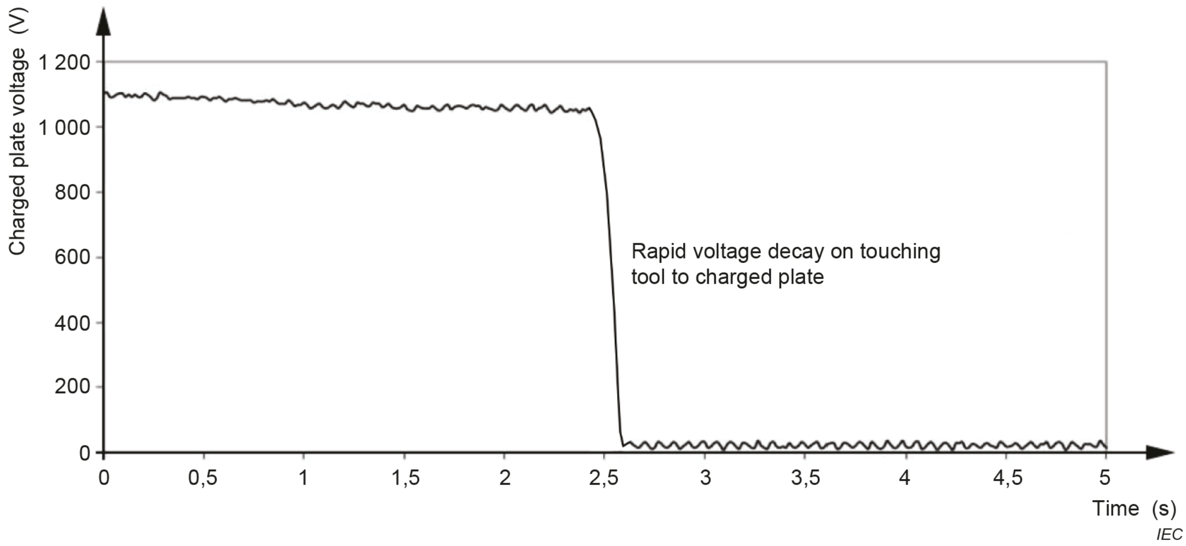
Replace the NOTE in Figure 4 in 4.4.2 with the following new NOTE:

NOTE The decay curve can go down to 0 V or not.

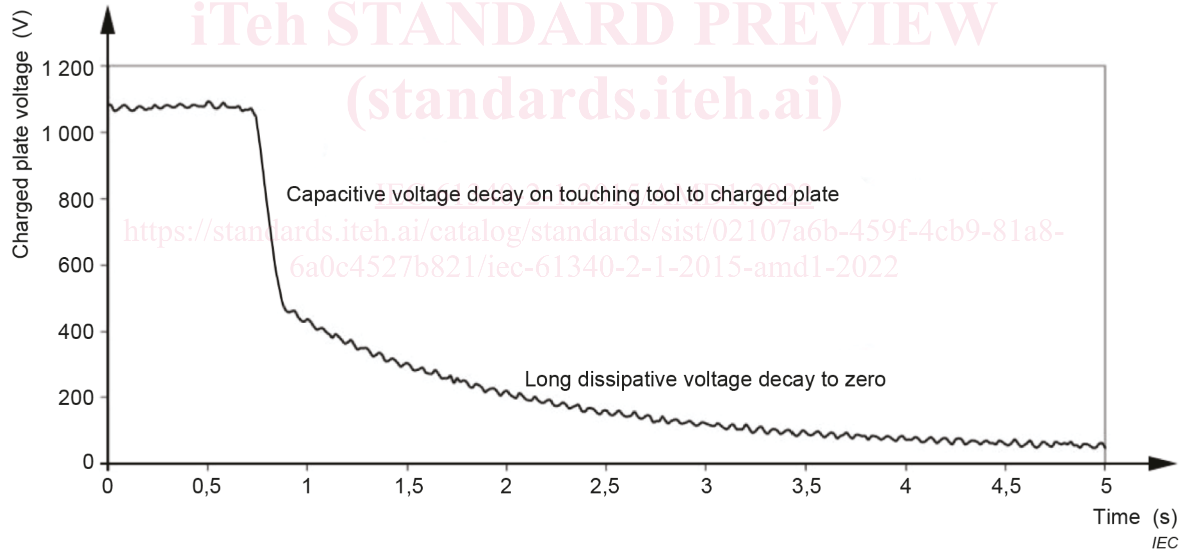
5.3.6 Test procedure for the charge decay properties of tools

Add the following new text and Figure 5 after step 11) of 5.3.6:

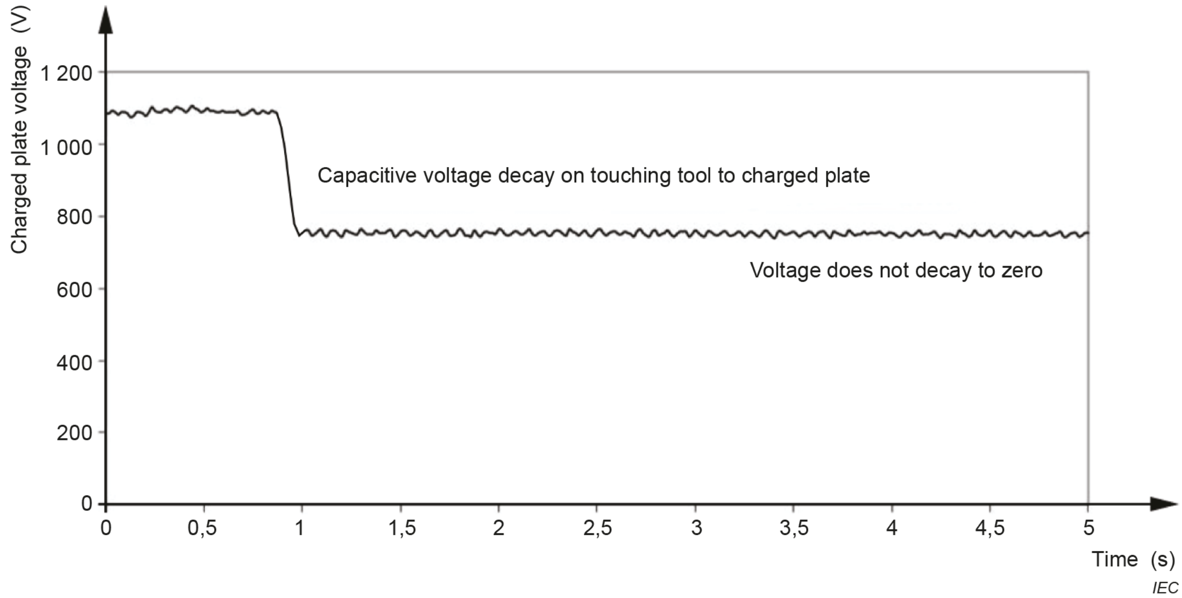
An example of a waveform for a tool showing a fast decay to low voltage is shown in Figure 5 a). A tool with a high resistance or insulating handle can sometimes give an initial apparent fast decay to an intermediate voltage, either followed by a slow decay for the remaining voltage (Figure 5 b)) or no further voltage decay (Figure 5 c)). The initial decay in these cases is caused by discharging of the charged plate into the capacitance between the tool and hand, rather than dissipation through resistance. In some cases, the voltage can fall rapidly below 100 V when the tool touches the charged plate, but then rise above 100 V again when the tool is removed, as shown in Figure 5 d). Performance requirements referencing this test procedure should take account of the possibility of these effects occurring.



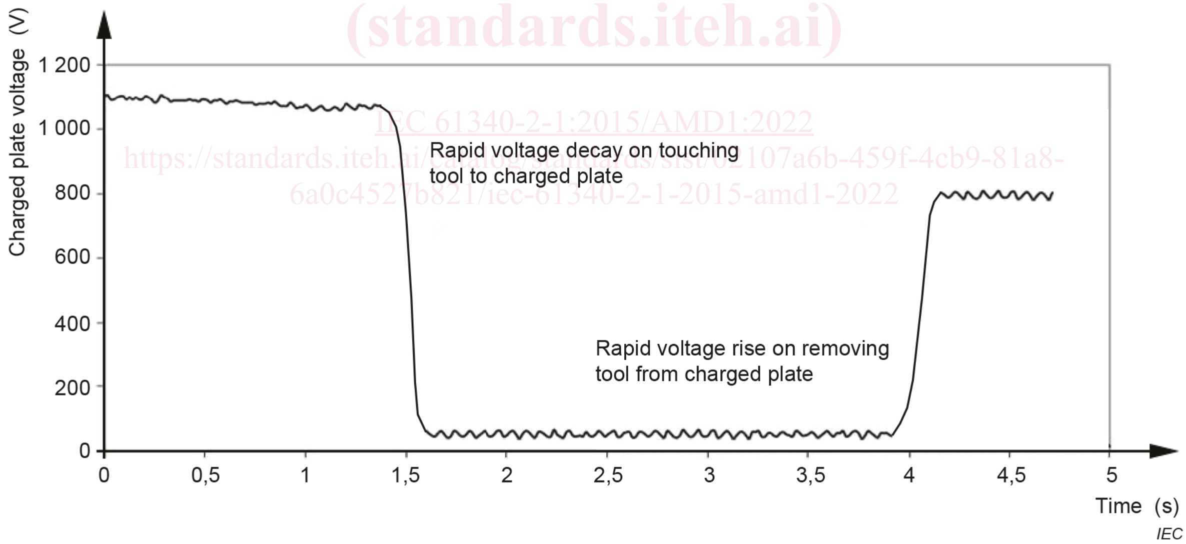
a) Example of a decay waveform for a tool showing a fast decay to low voltage



b) Example of a decay waveform showing initial fast decay caused by a capacitance effect, followed by slow decay via resistance



c) Example of a decay waveform showing no further decay after initial fast decay caused by a capacitance effect



d) Example of a waveform showing rapid changes in charged plate voltage caused by a capacitance effect

Figure 5 – Examples of decay waveforms when testing tools

Annex A

A.1.2 Surface potential sensitivity verification

Replace the paragraph of A.1.2 with the following new text:

The surface potential sensitivity verification is made in terms of a uniform potential on a plane conducting surface covering the whole test aperture area. The voltage source shall provide a stable, low ripple voltage of both polarities to at least 1 000 V. The voltage measuring system shall cover the measurement of both polarities and be separate from the voltage source so it can be formally verified independently. The accuracy of voltage measurement shall be better than 0,2 %. The stability of the verification voltage shall be 0,2 %.