INTERNATIONAL STANDARD

**ISO 18080-1**

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# Textiles — Test methods for evaluating the electrostatic propensity of fabrics —

## Part 1: Test method using corona charging

*Textiles — Méthodes d'essai pour l'évaluation de la propension des étoffes électrostatique —*
*Partie 1: Méthode d'essai de charge Corona*



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# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) are worldwide federations of national standards bodies (ISO member bodies and IEC national committees). The work of preparing International Standards is normally carried out through ISO and IEC technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with IEC on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information



The committees responsible for this document are Technical Committee ISO/TC 38, *Textiles* and IEC/TC 101 *Electrostatics* as JWG 26, *Antistatic*, in the lead of ISO/TC 38.



ISO 18080 consists of the following parts, under the general title, *Textiles — Test methods for evaluating the electrostatic propensity of fabrics*:

— *Part 1: Test method using corona charging*

— *Part 2: Test method using rotary mechanical friction*

— *Part 3: Test method using manual friction*

— *Part 4: Test method using horizontal mechanical friction*

# Introduction

In addition to safety hazards and damage or disruption of sensitive electronic devices and systems which are covered by other International Standards, electrostatic charging of clothing can also cause problems of clinging, uncomfortable shocks and the attraction of airborne dust and other contaminants.

Clothing designed to avoid airborne dust contamination is required in a number of expanding industries relating to precision technology, biotechnology, food, hygiene, etc. It is also generally desirable to have clothing that does not cling or cause uncomfortable shocks.

Test methods are required to evaluate the propensity of fabrics used to make clothing designed to avoid problems associated with electrostatic charging. Test methods are specified in a number of National and International Standards, including those published by ISO and IEC. However, the relationship between measurable electrostatic properties and end use performance is rather complex and may require a combination of different test methods depending on application.

The test method described in this International Standard is one of a number of test methods that can be used to evaluate the electrostatic propensity of textile materials. Definitive performance requirements are not given, but guidance on the interpretation of results is given in informative Annex A. The qualitative interpretation scheme is based on anecdotal experience in industry in controlling clinging, uncomfortable shocks and attraction of particulate contaminants. Nevertheless, it is provided for guidance only and users of this International Standard are advised to check its validity for their own applications.

NOTE IEC 61340-2-1 describes an alternative test method that can be used to determine electrostatic propensity of fabrics and garments using corona charging.

# Textiles — Test methods for evaluating the electrostatic propensity of fabrics —

# Part 1:
# Test method using corona charging

## 1 Scope

This part of ISO 18080 specifies a test method using corona charging with measurement of the impressed peak voltage and charge decay time on specimens of fabric or all types of composition and construction.

The test methods described may not be suitable for evaluating garments and garment materials in relation to safety of personnel and protection of electrostatic discharge sensitive devices.

## 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.



ISO 3175-2, *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 2: Procedure for testing performance when cleaning and finishing using tetrachloroethene*



ISO 3175-3, *Textiles — Professional care, drycleaning and wetcleaning of fabrics and garments — Part 3: Procedure for testing performance when cleaning and finishing using hydrocarbon solvents*

ISO 6330, *Textiles — Domestic washing and drying procedures for textile testing*

## 3 Terms and definitions

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

**3.1**
**antistatic**
property of a material that reduces its propensity to acquire electrostatic charges or allows electrostatic charges to dissipate quickly

**3.2**
**decay time**
time for the impressed voltage to decay to a percentage of the peak voltage

**3.3**
**half decay time**
**HDT**
time for the impressed voltage to decay to half of the peak voltage

**3.4**
**corona discharge**
electric discharge with slight luminosity produced around a current conductor, without greatly heating it, and limited to the region surrounding the conductor in which the electric field exceeds a certain value

**3.5**
**corona charging**
charging of test specimens by means of corona discharge created by a sharply pointed electrode

**3.6**
**conductive**
providing a sufficiently high conductivity so that potential differences over any parts of a material or object are not sufficiently large as to be of practical significance

Note 1 to entry: In general, a conductive material has a resistance below about $10^5$ Ω but different standards may define different resistance ranges for this term.

**3.7**
**conductive fibre**
fibre in which conductive components are included

Note 1 to entry: If conductive components are exposed at the surface, the fibre is called surface conductive fibre. If the conductive components are completely embedded in non-conductive polymer, the fibre is called core conductive fibre.

## 4 Principle

A fabric specimen is charged by corona charging and the peak value of the impressed voltage is obtained immediately after the application of high voltage is stopped. The impressed voltage on the specimen decays towards zero, but not necessarily down to zero. The electrostatic propensity of the test specimen is quantified by determining the peak voltage value and the half decay time, or decay time to some other percentage.



## 5 Conditioning and testing atmosphere



Unless otherwise agreed or specified, the atmosphere for conditioning and testing shall be a temperature of (20 ± 2) °C and a relative humidity of (40 ± 4) %. If a different temperature or humidity is used for conditioning or testing, record it in the test report.

NOTE The measurements of temperature and humidity are specified in ISO 139.

## 6 Apparatus

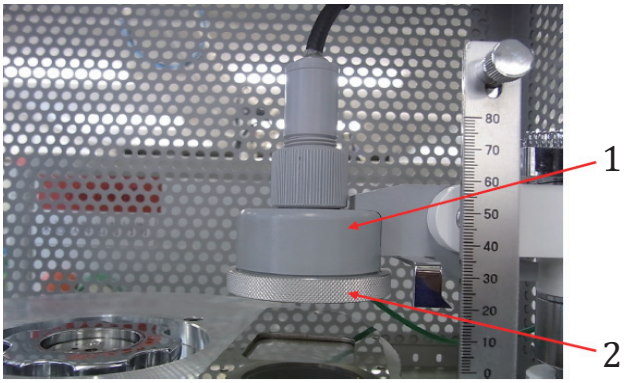
### 6.1 General

One possible test apparatus is shown below as an example. Other apparatus capable of measuring impressed peak voltage and charge decay time from corona charged specimens may also be used after appropriate validation.

### 6.2 Test apparatus

The apparatus is composed of the following parts.

— **Emitter**, shown in Figure 1 and Figure 2, a needle type, applied voltage of (−10 ± 1) kV, negative polarity. When the high voltage is applied to this electrode, corona discharge occurs; this is used to charge the test specimen.




**Key**

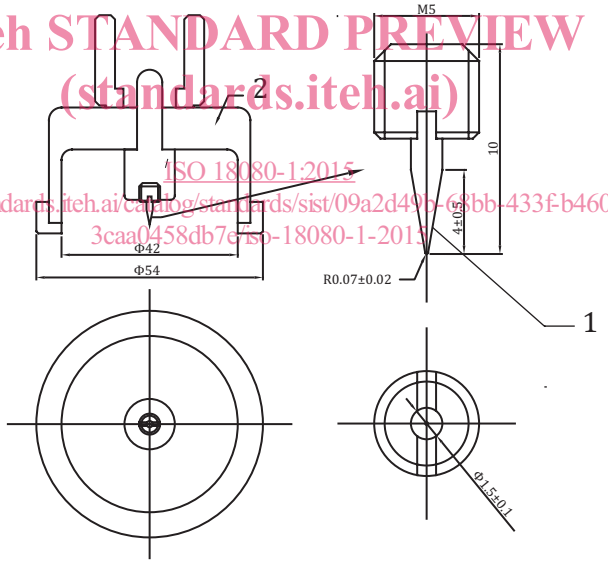
1 exterior cladding (Polyvinyl chloride)

2 exterior cladding (aluminium)

**Figure 1 — Appearance of emitter**

Dimensions in millimetres






**Key**

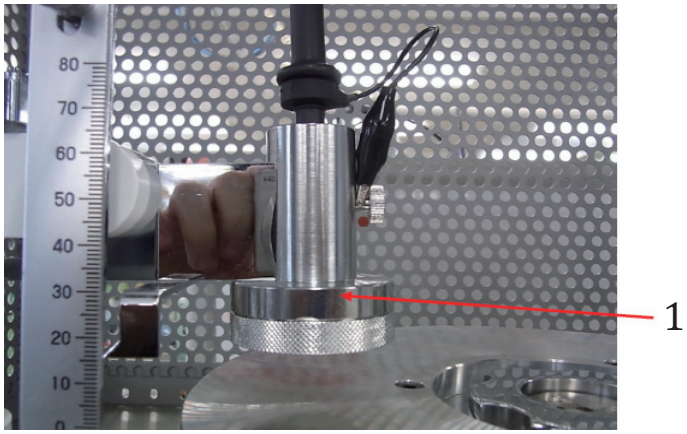
1 discharging electrode

2 insulator (PVC)

NOTE All dimensions have a tolerance of ±0,5 mm, except where stated.

**Figure 2 — Dimension of emitter**

— **Detective electrode**, a plate type field sensor shown in Figure 3 and Figure 4 with a plate diameter of 28 mm ± 0,5 mm, measurement range from 0 kV to –10 kV with an accuracy of ±5 %, and response time less than 4 ms.



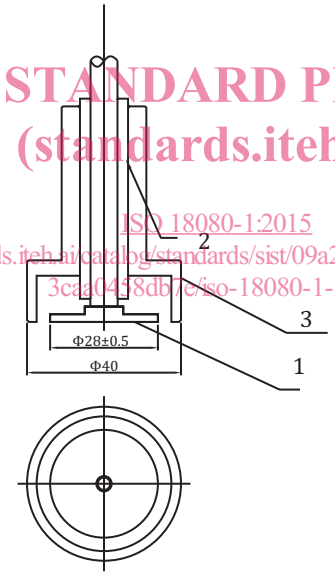

**Key**

1 exterior cladding (metal)

**Figure 3 — Appearance of detective electrode**

Dimensions in millimetres






**Key**

1 detectiveelectrode

2 insulator (PVC)

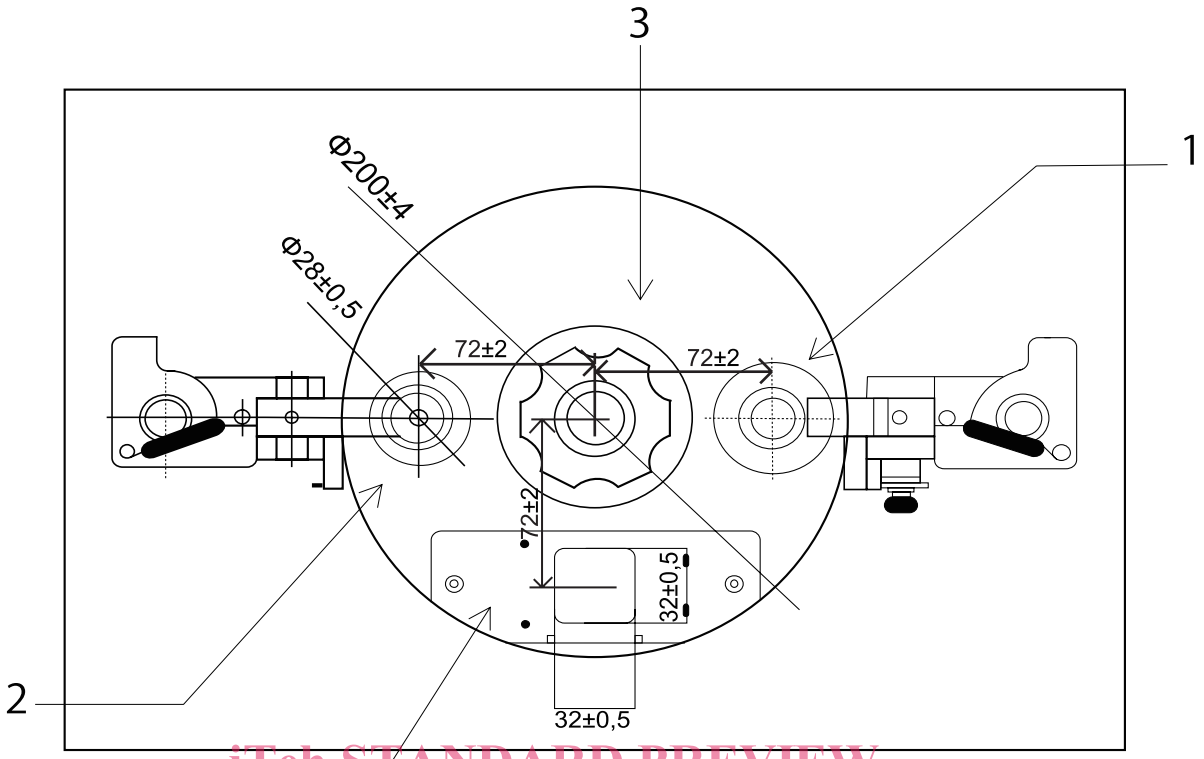
3 cladding

NOTE All dimensions have a tolerance of ±0,5 mm.

**Figure 4 — Dimension of detective electrode**

— **Turntable**, Figure 5 and Figure 6, solid plain metal with a diameter of 200 mm ± 4 mm, and with a rotation of at least 1 000 r/min.

Dimensions in millimetres






**Key**

1 emitter
2 detective electrode
3 turntable
4 specimen cover



**Figure 5 — Top view of turntable**