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

Part 2: Test method using rotary mechanical friction

Textiles — Méthodes d'essai pour l'évaluation de la propension des étoffes électrostatique —

Partie 2: Méthode d'essai de frottement mécanique rotatif

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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*

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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.

This test method simulates electrostatic charging typically experienced in wearing conditions. The standard rubbing cloths and mechanical conditions have been selected from long experience.

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

Part 2:
Test method using rotary mechanical friction

1 Scope

This part of ISO 18080 specifies a test method using rotary mechanical friction with measurement of the friction-charged electrostatic potential on specimens of fabric. The test method is suitable for fabrics of all types of composition and construction that are capable of withstanding frictional charging.

Some fabrics, e.g. fabrics of low strength or loose construction, may not be physically capable of withstanding the mechanical friction used in this test method or may give false results. In such cases, the test method described in ISO 18080-1 can be used to evaluate electrostatic propensity.

The test method 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 105-F01, *Textiles — Tests for colour fastness — Part F01: Specification for wool adjacent fabric*

ISO 105-F02, *Textiles — Tests for colour fastness — Part F02: Specification for cotton and viscose adjacent fabrics*

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 5084, *Textiles — Determination of thickness of textiles and textile products*

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
friction-charged electrostatic potential
potential generated on a material by friction with another or same material obtained as voltage

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3.3
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.

4 Principle

A fabric specimen is mounted on a rotary drum and mechanically rubbed against a stationary rubbing cloth as the drum rotates. The electrostatic potential caused by the friction between the specimen and the rubbing cloth is measured by a detector electrode during the rotation cycle.

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 For measurements, refer to ISO 139.

6 Apparatus

6.1 Testing apparatus, one possible test apparatus is shown in Figures 1 to 3 as an example with further details shown below. Other apparatus may also be used after appropriate validation.

6.2 Rotary drum (Figure 1, key 5), aluminium drum with specimen mounting holders. The outside diameter of the drum is 150 mm ± 1 mm, the width is 60 mm ± 1 mm, and it is rotated at (400 ± 1) rpm by a motor.

— **Mounting pedestal for specimen** (Figure 1, key 3, and Figure 2), made from a metal frame with an insulating plastic insert such as polytetrafluoroethylene, the surface of which is level with the upper edge of the metal frame and of the same radius of curvature.

NOTE Figure 1 shows a drum fitted with four mounting pedestals. This is necessary to keep the drum in balance as it rotates. Only one pedestal is used for mounting the test specimen.

— **Specimen cover** (Figure 3), made of stainless steel with a thickness of 1 mm ± 0,1 mm.

— **Friction position** (shown in Figure 1), a rubbing cloth (key 1) of 25 mm ± 1 mm width by 150 mm ± 1mm length is held by clamps (key 2) at both ends with a distance of 130 mm ± 3 mm between the clamps and held in tension by a load of 4,9 N ± 0,1 N (key 6). The vertical distance between the rubbing cloth surface and a horizontal line tangential to the specimen pedestal surface shall be 1,0 mm ± 0,1 mm measured at the left side clamp and 3,0 mm ± 0,1 mm measured at the right side clamp.

— **Detector electrode** (Figure 1, key 4) a plate type field sensor with a plate diameter of 20 mm ± 1 mm, measurement range from 0 kV to 10 kV with an accuracy of ±5 %, and response time less than 7 ms. Other types of electrostatic fieldmeters or non-contacting voltmeters of suitable dimensions can be used.

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