INTERNATIONAL STANDARD

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Textile and laminate floor coverings — Assessment of static electrical propensity — Walking test

Revêtements de sol textiles et laminés — Évaluation de la propension à l'accumulation des charges électrostatiques — Essai du marcheur

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO 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 the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 6356 was prepared by Technical Committee ISO/TC 219, *Floor coverings*.

This second edition cancels and replaces the first edition (ISO 6356:2000), which has been technically revised.

Introduction

This test is a measurement of the electric potential (voltage) due to the accumulation of static charge on a person walking on the surface of a textile and laminate floor covering under controlled conditions. It is important that this measurement is made under carefully controlled conditions to minimize test variability.

Textile and laminate floor coverings — Assessment of static electrical propensity — Walking test

1 Scope

This International Standard specifies a method of evaluating the electrostatic propensity of textile and laminate floor coverings under controlled conditions. Since the potential generated varies with humidity, shoe materials, walk surface and individuals' mannerisms, the values generated by this test will not necessarily reflect actual field experience, but will provide a relative comparison of the performance of different surfaces.

For classification purposes and in cases of dispute, the measurement procedure specified in this International Standard can be used under controlled conditions specified in the relevant classification standard or agreed between disputing parties. There may be occasions where measurements are required under non-controlled conditions, e.g. *in situ* measurements on installed floor coverings. The principle of measurement using the equipment specified in this International Standard can be used to make measurements, either with the standard footwear specified or with specific footwear relevant to the end use.

2 Normative references

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

ISO 48:2010, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 1957, *Machine-made textile floor coverings — Selection and cutting of specimens for physical tests*

ISO 2424, *Textile floor coverings — Vocabulary*

ISO 9407:1991, *Shoe sizes — Mondopoint system of sizing and marking*

ISO 10965:2011, *Textile floor coverings — Determination of electrical resistance*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 2424 apply.

4 Principle

The difference in electrical potential, in relation to the earth's potential (zero), produced by a person walking

a) on the floor covering under test,

b) with standardized footwear,

c) in a prescribed manner, and

d) under controlled atmospheric conditions

is measured and used to evaluate the risk of a person experiencing the discomfort of static electrical shock from in-service use of this floor covering.

5 Apparatus

5.1 Grounded metal base plate

Grounded metal base plate, e.g. aluminium, of approximate dimensions 100 cm × 200 cm and 1 mm thick.

5.2 Rubber mat

For textile floor coverings: *rubber mat*, of approximate dimensions 220 cm × 120 cm and a minimal thickness of 3 mm, having a vertical resistance ≥ 10^{13} Ω in relation to a surface area of 1 cm^2, measured at 500 V of direct current (d.c.) laid on a *grounded metal base plate*, e.g. aluminium, of approximate dimensions 100 cm × 200 cm and 1 mm thick.

Alternatively: *grounded metal base plate* (see 5.1).

5.3 Polyethylene foam (PE-foam)

For laminate floor coverings without attached sound-absorbing material: *PE-foam*, of approximate dimensions 220 cm × 120 cm and with a thickness of (3 ± 0,5) mm, having a vertical resistance ≥ 10^{13} Ω in relation to a surface area of 1 cm^2, measured at 500 V of direct current (d.c.), laid on a *grounded metal base plate*, e.g. aluminium, of approximate dimensions 100 cm × 200 cm and 1 mm thick.

Alternatively: *grounded metal base plate* (see 5.1).

5.4 Polyethylene foil (PE-foil)

For laminate floor coverings with attached sound-absorbing material: *PE-foil* for water vapour barrier, of approximate dimensions 220 cm × 120 cm and with a thickness of (0,2 ± 0,1) mm, having a vertical resistance ≥ 10^{13} Ω in relation to a surface area of 1 cm^2, measured at 500 V of direct current (d.c.), laid on a *grounded metal base plate*, e.g. aluminium, of approximate dimensions 100 cm × 200 cm and 1 mm thick.

Alternatively: *grounded metal base plate* (see 5.1).

5.5 Test sandals

Test sandals (see Figure A.1), reserved for use in this test method. The test sandals are open sandals of Mondopoint size 270/100 (see ISO 9407:1991) with no heels and with straps mounted to fit various foot sizes. A BAM rubber[1)] sole (Annex C) material has to be used. The resistance between the metal plate and the person standing on it wearing the sandals with the soles shall be 10^8 Ω to 10^9 Ω.

Only for textile floor coverings: Alternatively, the sole material XS-664P Neolite[2)] (Annex B) may be used. The resistance between the metal plate and the person standing on it wearing the sandals with the soles shall be > 10^{11} Ω.

NOTE For guidance on the possible effect of the operator's clothing and other factors on test results, see Annex A.

5.6 Means of cleaning the sandals

5.6.1 Abrasive paper, from P280 to P360.

5.6.2 Scoured cotton cloth, free from finish or detergent.

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1) The BAM rubber material is available from BAM, Berlin, Germany. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product. Equivalent products may be used if they can be shown to lead to the same results.

2) The Neolite material is available from AATCC, P.O. Box 12215, Research Triangle Park, NC 27709, USA. This information is given for the convenience of users of this document and does not constitute an endorsement by ISO of the product. Equivalent products may be used if they can be shown to lead to the same results.

5.6.3 Denatured ethanol or isopropanol

5.6.4 Demineralized water

5.7 Ionizing source

Ionizing source (e.g. ion blower), for discharging the test piece and rubber mat/PE-foam/PE-foil.

5.8 Body voltage measuring system

Body voltage measuring system (see Figure E.2), consisting of a d.c. static voltmeter, an autographic recorder and a hand electrode (see Figure E.3) meeting the following requirements:

— input resistance of voltmeter and hand electrode system: $\geq 10^{13}\ \Omega$;

— input capacitance of hand electrode: ≤ 20 pF;

— response time: $\leq 0{,}25$ s;

— capable of measurements from −20 kV to +20 kV.

5.9 Measuring devices for temperature and relative humidity

Measuring devices should meet the following requirements:

— resolutions: for temperature, 0,1 °C or better, and for relative humidity, 0,1 % or better;

— uncertainty of measurement: for temperature, ± 0,5 °C or better, and for relative humidity, ± 2,0 % or better.

6 Sampling and selection of specimens

6.1 Textile floor coverings

Carry out sampling and selection of specimens for textile floor coverings in accordance with ISO 1957. From each sample, select a specimen measuring 2 000 mm × 1 000 mm in the machine production direction.

Generally, the test is performed on the floor covering as received, i.e. with finishes and special treatments as appropriate. If the permanency of such finishes and treatments is being investigated, the specimen may be submitted to a cleaning process or to practical wear conditions before testing.

6.2 Laminate

Carry out sampling and selection of specimens for laminate, trying to cover an area measuring 2 000 mm × 1 000 mm.

7 Preconditioning of specimens, PE-foam, PE-foil and rubber mats

Pre-condition the test specimen for at least 24 h in an atmosphere of (23 ± 3) °C and (55 ± 10) % relative humidity.

If possible, ensure free air circulation by, for example, placing samples on a rack or suspending them.

The rubber mat (5.2), PE-foam (5.3), PE-foil (5.4) and sandals (5.5) shall not be used for any other purpose and should be permanently maintained in the test atmosphere. If this is not possible, the rubber mat, PE-foam, PE-foil and sandals shall be conditioned for 2 d prior to testing.

Care should be taken to ensure specimens and equipment are adequately conditioned, particularly where certain finishes can lead to slow conditioning.

8 Atmosphere for conditioning and testing

Condition the test piece at a temperature of (23 ± 2) °C and relative humidity of (25 ± 2) % for a minimum of 7 d, and maintain these conditions during testing. When the test is carried out *in situ*, record the ambient temperature and relative humidity.

NOTE Several standard atmospheres are specified by various regional authorities based upon the severity of conditions the floor covering normally experiences in service. Values determined under one set of conditions cannot be compared to those using another set of test conditions.

9 Test procedures

9.1 Preparation

9.1.1 Cleaning the sandals

9.1.1.1 BAM sandals

Before beginning a test series, scrub the BAM sole material using a piece of scoured cotton (5.6.2) wetted with ethanol or isopropanol (5.6.3) to remove any chemical substance from the surface. Repeat the cleaning procedure with demineralized water (5.6.4) until no dark marks appear on the cloth. Repeat the ethanol/isopropanol and water cleaning procedure prior to testing each specimen.

Wait at least 5 min and make sure the soles are completely dry before testing.

If the sole material becomes severely contaminated, it may be necessary to use more rigorous cleaning procedures prior to commencing a test series. Especially in the case of the BAM-soles, it is recommended to abrade the dry soles with a fine sandpaper (5.6.1) and then remove the dust. It is generally recommended to clean the sandals before each test series and before storing the soles at the end of the day.

9.1.1.2 Neolite sandals

Before beginning a test series, scrub the Neolite sole material using a piece of scoured cotton (5.6.2) wetted with ethanol or isopropanol (5.6.3) to remove any chemical substance from the surface. Wait at least 5 min and make sure the soles are completely dry before testing.

9.2 Method A: test procedure in laboratory conditions

9.2.1 Test procedure for textile floor coverings

9.2.1.1 Recording the testing atmosphere

Measure and record the temperature and humidity of the test chamber immediately before and after each test series, using the measurement device (5.9).

9.2.1.2 Discharging the specimen and testing materials

9.2.1.2.1 For textile floor coverings tested on the rubber mat

Eliminate any residual static charge using the ionizing source (5.5). Treat the rubber mat (5.2) in its operating position on the metal base plate (5.1) and the front and back of the specimen while it is hanging or standing freely. Carefully lay the specimen on the rubber mat, ensuring that it neither slides on the mat nor comes into contact with the metal base plate.