INTERNATIONAL STANDARD

ISO 10965

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Textile floor coverings — Determination of electrical resistance

Revêtements de sol textiles — Détermination de la résistance électrique

Reference numbe
(E)

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 3.

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.

International Standard ISO 10965 was prepared by Technical Committee ISO/TC 38, *Textiles*, Subcommittee SC 12, *Textile floor coverings*.

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Textile floor coverings — Determination of electrical resistance

1 Scope

This International Standard describes a laboratory method for the determination of electrical resistance of textile floor coverings. The method includes both horizontal and vertical measurements.

2 Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

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

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1
horizontal resistance (surface resistance)
electrical resistance measured between two electrodes placed on the surface of a textile floor covering

3.2
vertical resistance (surface to back)
electrical resistance measured between the surface and the back of a textile floor covering

3.3
geometric mean
geometric mean is the nth root of the product of n numbers

4 Principle

The horizontal and the vertical resistances of a conditioned test specimen are measured using a high resistance meter and electrodes in a controlled atmosphere. Horizontal resistance measurement is appropriate for evaluating a floor covering's ability to act as a charge sink. Vertical resistance measurement is appropriate for evaluating a floor covering's ability to conduct charge through to a charge sink beneath it.

5 Apparatus

5.1 Calibrated high resistance meter, having changeable nominal open circuit voltages of 500 V, 100 V and 10 V and a short circuit current limited to 10 mA capable of reading resistances from $1 \times 10^3\ \Omega$ to $1 \times 10^9\ \Omega$ to an accuracy of ± 5 % and over $1 \times 10^9\ \Omega$ to an accuracy of ± 10 %. The voltage to be applied shall be chosen from Table 1.

NOTE An equivalent system is a separate voltage source of equivalent capability and a calibrated milliammeter. Resistance (R) is then calculated by dividing voltage by amperage:

$$R = \frac{U}{I}$$

Table 1 — Circuit voltages

Resistance R Ω	**Voltage** U V
$< 10^5$	10
10^5 to 10^8	100
$> 10^8$	500

5.2 Two metal electrodes (preferably stainless steel), with terminals to make connections to the resistance meter. Each electrode shall weigh a total of (5 ± 0,1) kg, and shall have a flat circular contact area of (60 ± 1,5) mm in diameter.

NOTE A large non-conductive disc may be added as a support platform for the additional weights (see Figure 1).

5.3 Non conductive plate (e.g. made of PMMA or PTFE), of dimensions (600 ± 10) mm × (600 ± 10) mm × (5 ± 1) mm with a vertical resistance of minimum (1×10^{13}) ohms measured in accordance with 7.2.

5.4 Earthed metal plate, of dimensions (600 ± 1) mm × (600 ± 1) mm × (6 ± 1) mm with an electrical terminal at one six-millimetre side.

6 Sampling and conditioning

6.1 Sampling

Sampling and selection shall be in accordance with ISO 1957. From each sample cut three test specimens measuring (500 ± 50) mm × (500 ± 50) mm.

6.2 Conditioning

Pre-condition the test specimen for at least 24 h in an atmosphere of (20 ± 1) °C and (65 ± 2) % relative humidity and then condition for at least 7 days at (23 ± 1) °C and (25 ± 3) % relative humidity. Carry out the tests in the latter conditioning atmosphere.

In certain areas other atmospheric conditions may be used if agreed between the interested parties. When specimens are tested in these conditions, the atmospheric conditions shall be recorded in the test report.

7 Procedure

7.1 Horizontal resistance

Carry out the following procedure on each specimen.

Place the insulating plate (5.3) on the earthed metal plate (5.4). Make sure that any charges are eliminated. Place the test specimen with its face uppermost on the insulating plate. Place the dry electrodes (5.2) diagonally on the test specimen (500 ± 5) mm distance centre to centre. Connect the electrodes to the resistance meter. Select the test voltage using the values given in Table 1. Take the reading 15 s after applying the potential to the electrodes. Take a second reading on the other diagonal. Record the two readings and compute the geometric mean of the results to two significant figures for each specimen and the geometric mean of all individual values.

NOTE For certain applications it may be necessary to determine the minimum path of electrical resistance across or through the floor covering for evaluation against requirements for electrical safety. In such cases meaurements should be made in rectilinear directions, i.e. measurements with the electrodes placed in line parallel to the direction of manufacture and separate measurements with the electrodes in line orthoganal to the direction of manufacture.

7.2 Vertical resistance

Carry out the following procedure on each specimen.

Place the earthed metal plate (5.4) on the insulating plate (5.3). Make sure that any charges are eliminated. Put the specimen with its face uppermost on the metal plate. Place one dry electrode (5.2) no closer than 100 mm to the edge of the test specimen. Connect the electrode and the metal plate to the resistance meter. Make two measurements at two different places on each specimen with at least 200 mm between them and take the readings 15 s after applying the potential to the electrodes. Record the six readings and compute the geometric mean of the results to two significant figures.

8 Test report

The test report shall include the following information:

a) all the information necessary for complete identification of the sample;

b) reference to this International Standard, i.e. ISO 10965;

c) the number of test specimens per sample;

d) the exact testing atmosphere;

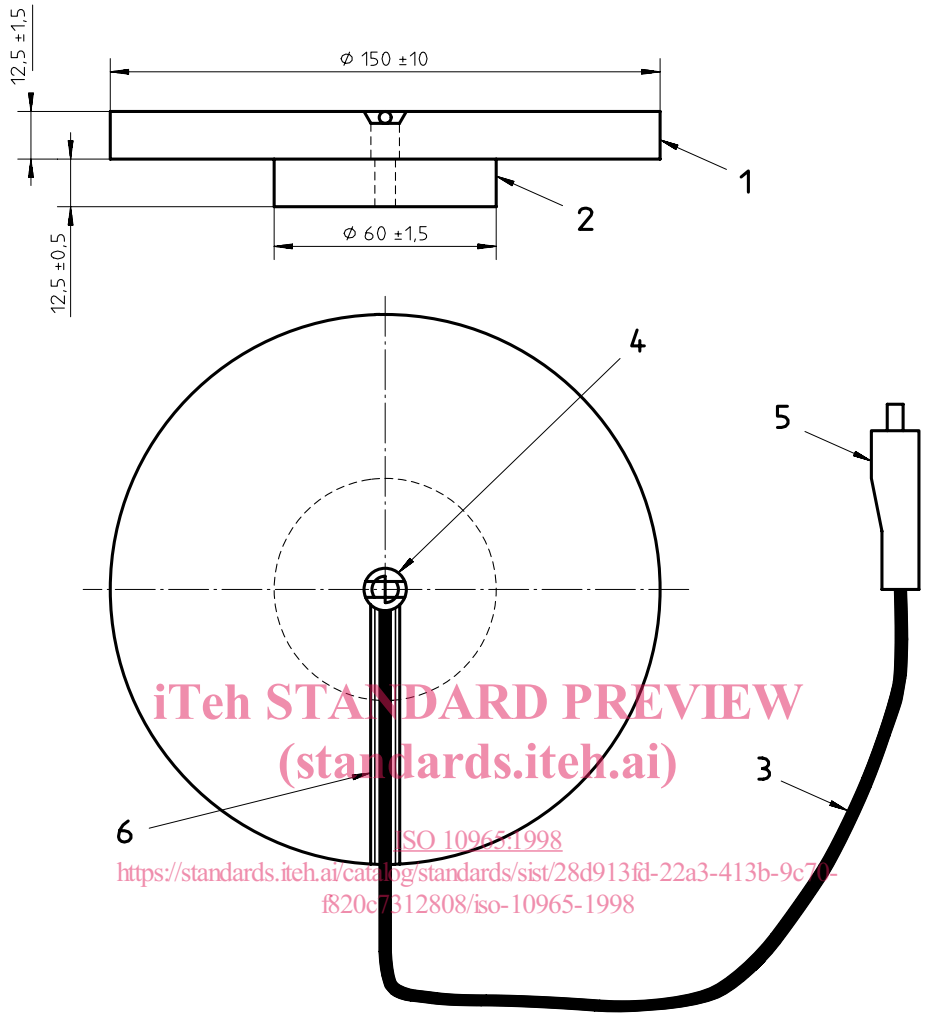
e) individual readings and geometric mean of the horizontal resistance;

f) individual readings and geometric mean of the vertical resistance;

g) any operations not specified in this International Standard or in the International Standards to which reference is made, or regarded as optional, which might have affected the results;

h) date of report.

Dimensions in millimetres



Key

1 Non-conductive weight support disc
2 Metal electrode
3 Low resistance flexible wire
4 Flat head screw
5 Electrical connector
6 Apply epoxy adhesive to bottom of groove to hold wire (3) in place. Strip the wire over 20 mm and wrap around flat head screw (4) prior to assembly

Figure 1 — Assembled electrode

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