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BSI Standards Publication

Resilient and laminate floor coverings — Assessment of static electrical propensity

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National foreword

This British Standard is the UK implementation of EN 1815:2016. It supersedes BS EN 1815:1998 which is withdrawn.

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A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Resilient and laminate floor coverings - Assessment of static electrical propensity

Revêtements de sol résilients et stratifiés - Évaluation à la propension à l'accumulation de charges électrostatiques

Elastische und Laminat-Bodenbeläge - Beurteilung des elektrostatischen Verhaltens

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European foreword

This document (EN 1815:2016) has been prepared by Technical Committee CEN/TC 134 “Resilient, textile and laminate floor coverings”, the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2017, and conflicting national standards shall be withdrawn at the latest by March 2017.

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1 Scope

This standard specifies a method for determining the body voltage generated when a person wearing standardized footwear walks on a resilient or laminate floor covering. The test method can be used under laboratory conditions as well as *in situ*.

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.

EN 61340-4-1, *Electrostatics - Part 4-1: Standard test methods for specific applications - Electrical resistance of floor coverings and installed floors*

3 Terms and definitions

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

3.1
static electrical propensity
tendency for charge to be generated by a person walking on the floor covering

3.2
earthed
connected to a reference earth (part of the Earth considered as conductive, the electric potential of which is conventionally taken as zero)

4 Principle

A floor covering is evaluated for static electrical propensity by means of a walking test with an operator using a pair of standard sandals, walking over the floor covering situated over a earthed metal base plate (resilient floor coverings) or over a PE-foam/PE-foil situated over a grounded metal base plate (laminate floor coverings).

5 Apparatus

5.1 Substructure for resilient floor coverings

A earthed metal base plate shall be used, e.g. a stainless steel plate of approximately (100 × 200) cm and 1 mm thick.

5.2 Substructure for laminate floor coverings

5.2.1 Laminate floor coverings without attached sound absorbing material

A PE foam sheet of approximately (220 × 120) cm and (3 ± 0,5) mm thick, with a vertical resistance ≥ 10^{13} Ω (measured at 500 V DC according to EN 61340-4-1) shall be used. This PE foam sheet is laid on a earthed metal base plate, as specified in 5.1.

5.2.2 Laminate floor coverings with attached sound absorbing material

A water vapour barrier PE foil of approximately (220 × 120) cm and (0,2 ± 0,1) mm thick is laid on a earthed metal base plate, as specified in 5.1.

NOTE The product Trittex 3 mm made by Selit GmbH is an example of a suitable PE-foam product available commercially. This information is given for the convenience of users of this European standard and does not constitute an endorsement by CEN of this product. Equivalent products may be used if they can be shown to lead to the same results.

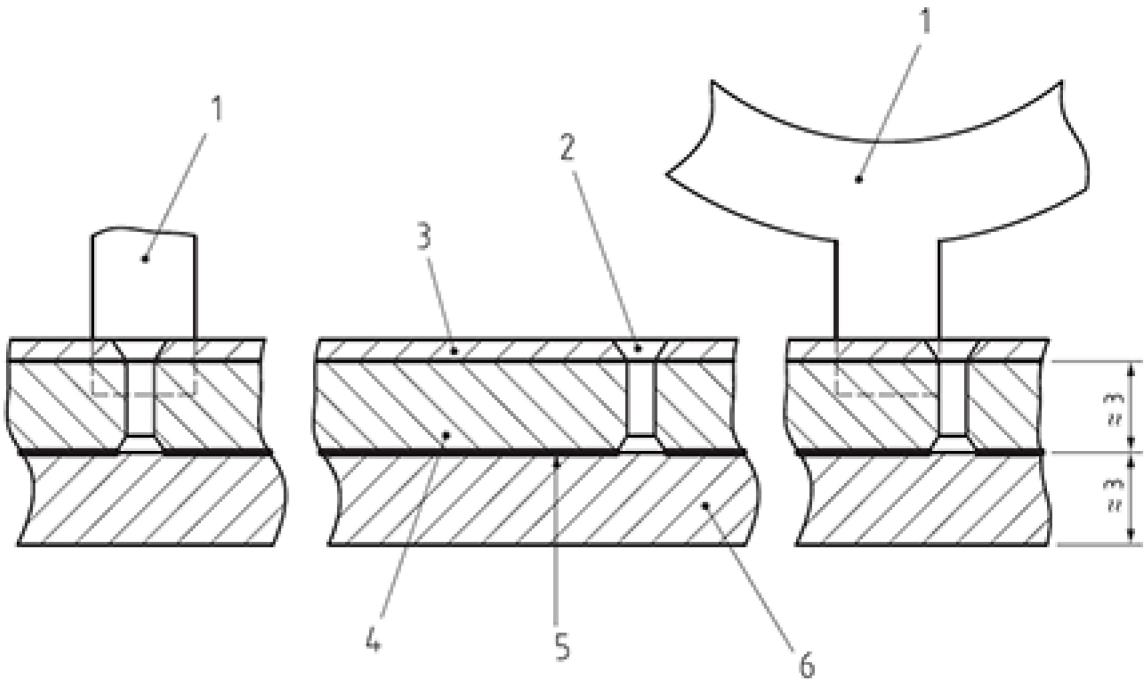
5.3 Test sandals

The test sandals (see Figure 1) shall be reserved exclusively for use in this test method. The test sandals shall be open sandals of European size 42 without heels and with straps mounted to fit various foot sizes. A rubber sole material shall be used. The resistance between the metal plate and the person standing on it wearing the sandals with the soles shall be (10^8 to 10^9) Ω.

NOTE 1 For guidance on the possible effect of the operator's clothing and other factors on test results, see informative Annex A.

NOTE 2 The test sandals made by Fetronic GmbH, Ursulaweg 91, 40764 Langenfeld, Germany are an example of a suitable product available commercially. This information is given for the convenience of users of this European standard and does not constitute an endorsement by CEN of this product. Equivalent products may be used if they can be shown to lead to the same results.

Dimensions in mm



Key

1 straps
2 hollow rivets
3 sock lining
4 insole, e.g. leather
5 adhesive
6 outsole of specified material

Figure 1 — Test sandals

5.4 Means of cleaning the sandals

The following means of cleaning shall be used:

— abrasive paper, P280;

— scoured cotton cloth, free from finish or detergent;

— denatured ethanol or isopropanol.

5.5 Ionizing source

An ionizing source shall be used for discharging the test piece and the PE foam.

5.6 Body voltage measuring system

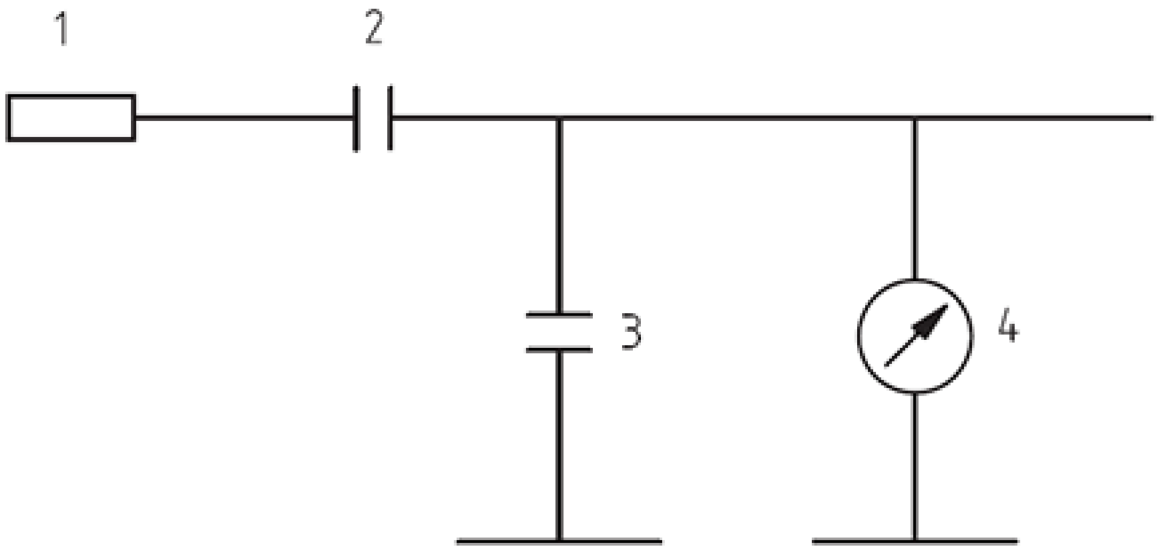
The body voltage measuring system (see Figure 2) consists of a DC static voltmeter, an autographic recorder and a hand electrode (see Figure 3) and shall meet the following requirements:

— input resistance of voltmeter and hand electrode system: ≥ 10^{13} Ω ;

— input capacitance of hand electrode: ≤ 20 pF;

— response time: ≤ 0,25 s;

— capable of measurements between (−20 to + 20) kV.

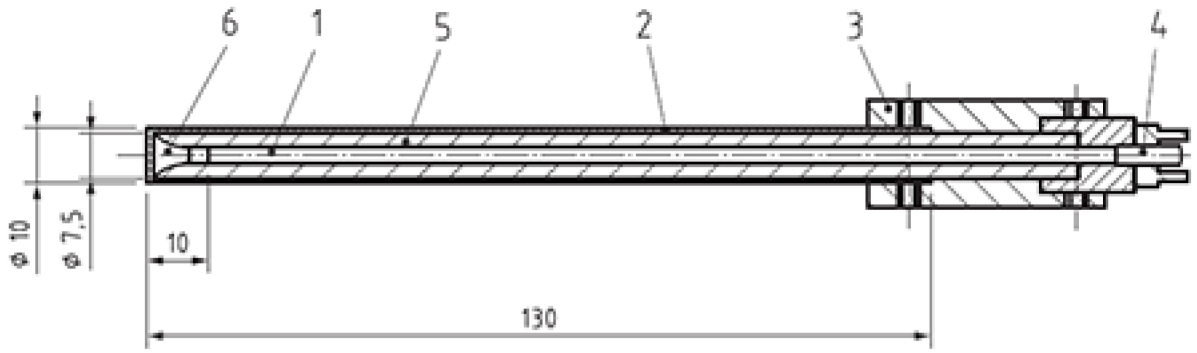


Key

1 hand electrode
2 hand electrode capacitance (C1 = 10 pF)
3 divider capacitance (C2)
4 static voltmeter and recorder

Figure 2 — Measuring system

Dimensions in mm



Key

1 cable core
2 metal tubing
3 polytetrafluoroethylene (PTFE) sleeve
4 BNC plug
5 co-axial cable
6 polyethylene bung

Figure 3 — Typical hand electrode

5.7 Thermometer and hygrometer

Thermometer and hygrometer, with an accuracy of ± 3 %; e.g. a calibrated wet and dry bulb thermometer (psychrometer) with a scale reading to 0,1 °C.

6 Conditioning

Condition the test piece, the PE-foam, the PE-foil (5.2) and the sandals (5.3) at a temperature of (23 ± 2) °C and relative humidity of (25 ± 2) % for a minimum of 7 days, and maintain these conditions during testing.

When the test is carried out *in situ*, the ambient temperature and relative humidity shall be recorded.

7 Test procedure

7.1 Cleaning of test sandals

Before each test series and after each individual test, clean the soles with cotton cloth and ethanol or isopropanol. To roughen the surface, use the abrasive paper and clean again with a clean piece of cloth and ethanol or isopropanol.

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

7.2 Method A: test procedure in laboratory conditions

7.2.1 Preparation

Place the required earthed metal plate, PE-foil/PE-foam (for laminate floor covering) on the floor in the conditioned test room (see Clause 5).

7.2.2 Discharging

Discharge the PE-foam, when used, and the test piece before each individual test, by moving the ionizing source once over a distance of approximately 20 mm over the PE-foam and the test piece to eliminate any residual static charge.

7.2.3 Walking test

Place the sandals on the test piece. Step into the sandals and fasten them. Take the hand electrode, already connected with the static measuring device, and earth the person in order to start from zero voltage.

With the hand electrode in the hand, walk on the test piece with regular paces at a rate of two steps per second, forwards and backwards but always with the body facing the same direction. Avoid scuffing or pivoting.

At each step, lift the sandals approximately between 50 mm and 80 mm above the test piece. Lift and lower the sandal sole in a plane parallel to the test piece. Cover as much of the test piece as possible and continue walking until the peak voltage ceases to rise, but for not more than 60 s. Take off the sandals while still on the test piece.

Perform the test three times.

7.3 Method B: test procedure *in situ*

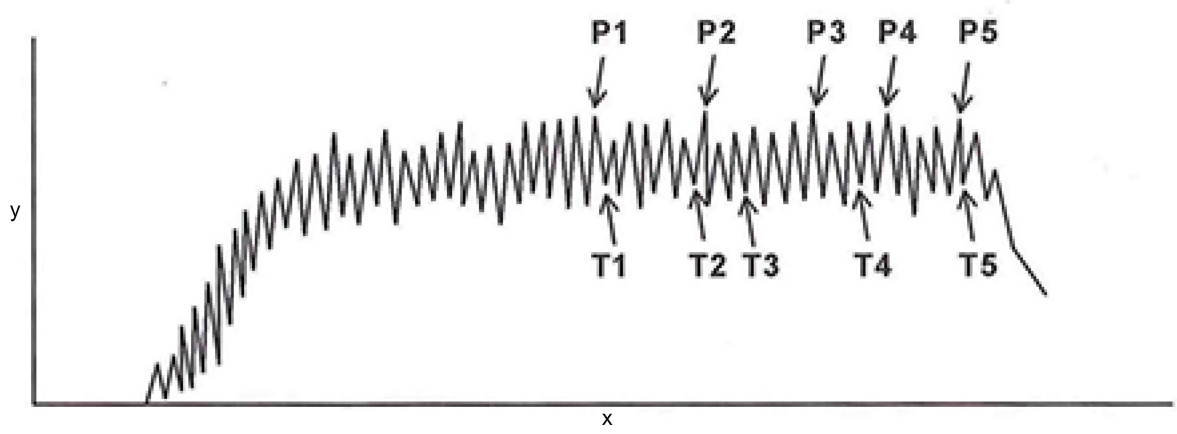
Record the ambient temperature and relative humidity, and the condition of the floor covering and, if relevant, any treatment prior to testing (e.g. cleaning, washing etc.).

Place the sandals on the area of floor covering to be tested and perform the test as in 7.2.3.

8 Calculation and expression of results

The “walking” test will give a voltage diagram as shown in Figure 4 and Figure 5. Determine from the recorder diagram the average of the five highest valleys (Figure 4: T1 – T5) or the lowest peaks (Figure 5: T1-T5) and express the results in kilovolts, to the nearest 0,1 kV by using the absolute value of the calculated average.

Calculate the average of the three test results to the nearest 0,1 kV.

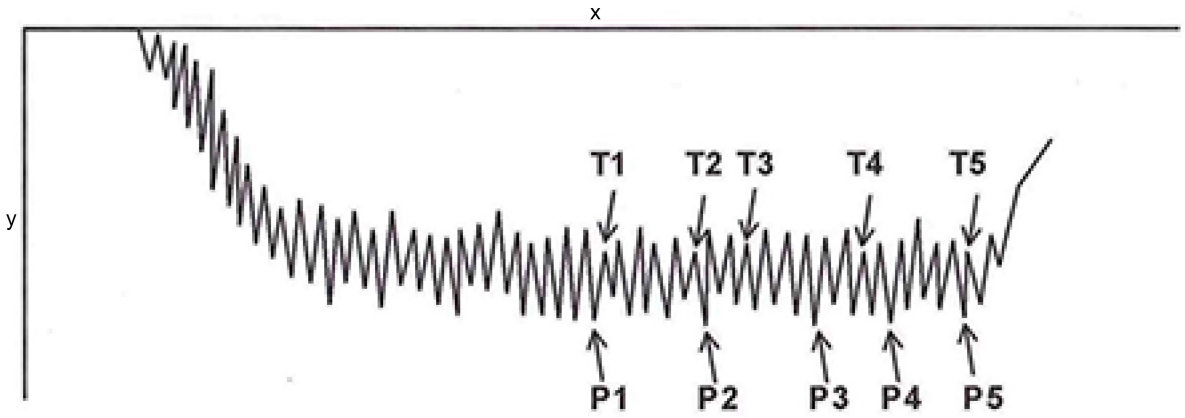


Key

x	time, in s
y	voltage, in kV
T1–T5	five highest valleys
P1–P5	five highest peaks (highest measured voltage values)

NOTE The voltage peaks in the diagram are mainly a result of a lower capacitance of the person performing the test when lifting one of his feet from the test piece. The voltage peak will therefore depend on the distance between the lifted foot and the floor surface.

Figure 4 — Typical voltage diagram with positive charging of the person



Key

x	time, in s
y	voltage, in kV
T1 – T5	five lowest peaks
P1 – P5	five lowest valleys (highest measured absolute voltage values)

NOTE The voltage peaks in the diagram are mainly a result of a lower capacitance of the person performing the test when lifting one of his feet from the test piece. The voltage peak will therefore depend on the distance between the lifted foot and the floor surface.

Figure 5 — Typical voltage diagram with negative charging of the person

9 Test report

The test report shall contain the following information:

a) a reference to this standard and the method used, i.e. EN 1815, method A or B;

b) a complete identification of the product tested, including colour and manufacturer's reference number. If a complete identification is not possible for an *in situ* test, the location of the floor shall be stated;

c) the method of sampling and previous history;

d) the test conditions

e) the material of the sandal sole and the flooring underlay;

f) the individual results and the average of the three tests to the nearest 0,1 kV;

g) any deviation from this standard which may have affected the results.

10 Precision

The test results of static electrical charge generated by a person walking on a floor are affected by the inhomogeneity of the floor covering and can very much depend on the relative humidity. Factors which may affect repeatability and reproducibility are described in informative Annex A.

Annex A
(informative)

Precision of the method

The determination of the body voltage generated when walking on a floor presents many problems and may be affected by many factors. Relative humidity, clothing, sole material, the floor coverings, mode of walking and, not least, the capacitance of a person, may affect the generation of body voltage. Hence the generated body voltage in practice may be different from the laboratory result. Even the voltage at which a person experiences a discharge is different from person to person. It has been found that most persons feel a discharge effect when charged to 3 kV and higher.

The walking test was found to be the most practical test method to simulate the effect of charging under standardized testing conditions. Under different conditions *in situ*, the results will differ from the laboratory results.

Although the precision of this method has been questioned, the method has been used for more than 20 years. During this time it has provided good service in identifying critical floor coverings, giving an approximate result capable of evaluating the ability of floor coverings to create unacceptable static electrical charging.

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