BRITISH STANDARD

BS EN
1815:1998

Resilient and textile floor coverings — Assessment of static electrical propensity

The European Standard EN 1815:1997 has the status of a British Standard

ICS 59.080.60; 97.150

National foreword

This British Standard is the English language version of EN 1815:1997. It supersedes DD 68:1980, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/60, Resilient floor coverings, which has the responsibility to:

— aid enquirers to understand the text;

— present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;

— monitor related international and European developments and promulgate them in the UK.

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

When the standard was at the Formal Vote stage, the UK voted against it because it considers that ISO/DIS 6356 represents a more advanced "state-of-the-art" method.

Cross-references

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Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, the EN title page, pages 2 to 6, an inside back cover and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Amendments issued since publication

Amd. No.	Date	Comments

This British Standard, having been prepared under the direction of the Sector Board for Materials and Chemicals, was published under the authority of the Standards Board and comes into effect on 15 March 1998

ISBN 0 580 29196 0

Contents

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

EN 1815

November 1997

ICS 59.080.60; 97.150

Descriptors: Floor coverings, tests, electrostatic discharge tests, footwear

English version

Resilient and textile floor coverings — Assessment of static electrical propensity

Revêtements de sol résilients et textiles — Evaluation de la propension à l'accumulation de charges électrostatiques

Elastische und textile Bodenbeläge — Beurteilung des electrostatischen Verhaltens

This European Standard was approved by CEN on 16 October 1997.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart 36, B-1050 Brussels

Ref. No. EN 1815:1997 E

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 134, Resilient and textile floor coverings, the secretariat of which is held by BSI.

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 May 1998, and conflicting national standards shall be withdrawn at the latest by May 1998.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Contents

1 Scope

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

2 Definitions

For the purposes of this standard, the following definition applies.

static electrical propensity

The static electrical charge generated by a person walking on a floor.

3 Principle

A resilient or a textile 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 grounded base plate.

4 Conditioning

Condition the test piece 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, record the ambient temperature and relative humidity.

5 Apparatus

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

5.2 *Rubber mat*, of approximate dimensions (220 × 120) cm and with a thickness of (4,5 ± 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.).

5.3 *Test sandals* (see Figure 1), reserved for use in this test method. The test sandals are open sandals of European size 42 with no heels and with straps mounted to fit various foot sizes. Two sole materials shall be used, conductive rubber and polyvinyl chloride. The resistance between the metal plate and the person standing on it wearing the sandals with the conductive soles shall be (10^8 to 10^9) Ω for rubber and (10^{11} to 10^{12}) Ω for polyvinyl chloride.

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

5.4 *Means of cleaning the sandals*

5.4.1 *Abrasive paper*, P280.

5.4.2 *Scoured cotton cloth*, free from finish or detergent.

5.4.3 *Denatured ethanol*

5.5 *Ionizing source*, for discharging the test piece and rubber mat.

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

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

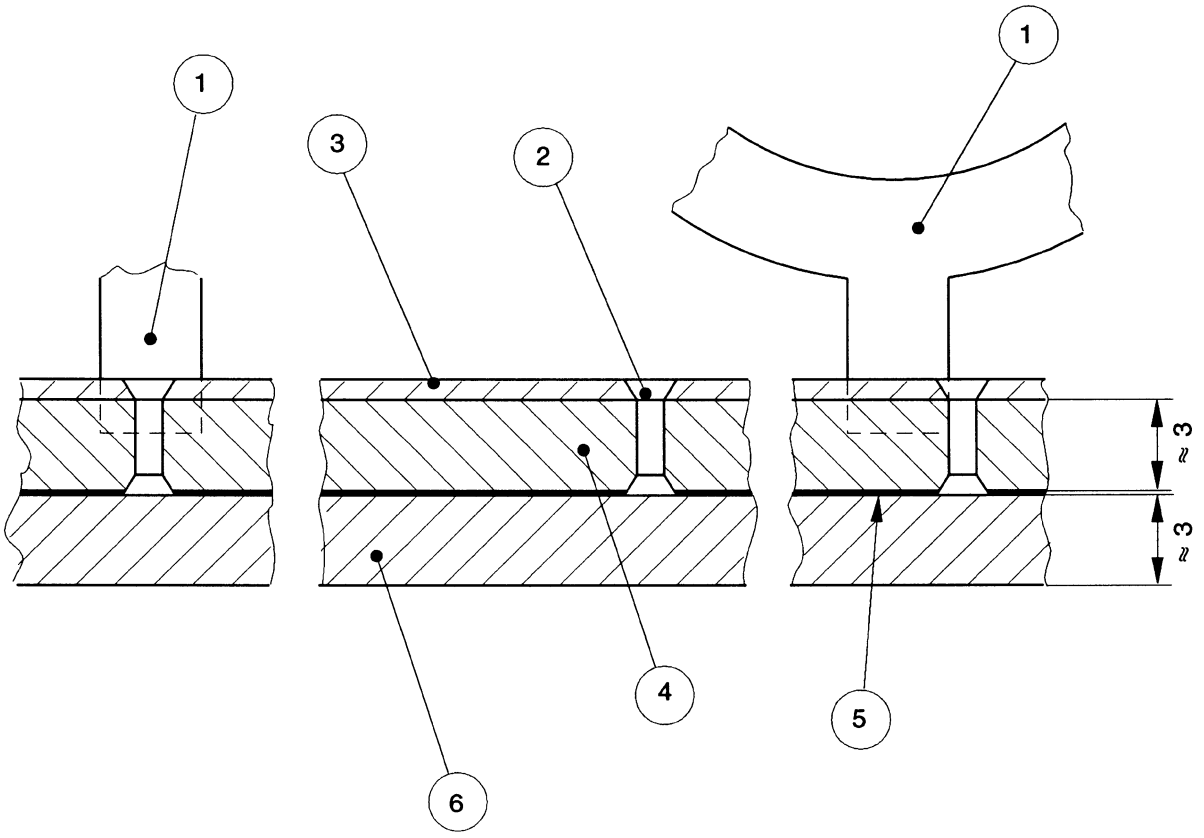
b) input capacitance of hand electrode: ≤ 20 pF;

c) response time: ≤ 0,25 s;

d) capable of measurements between (– 20 to + 20) kV.

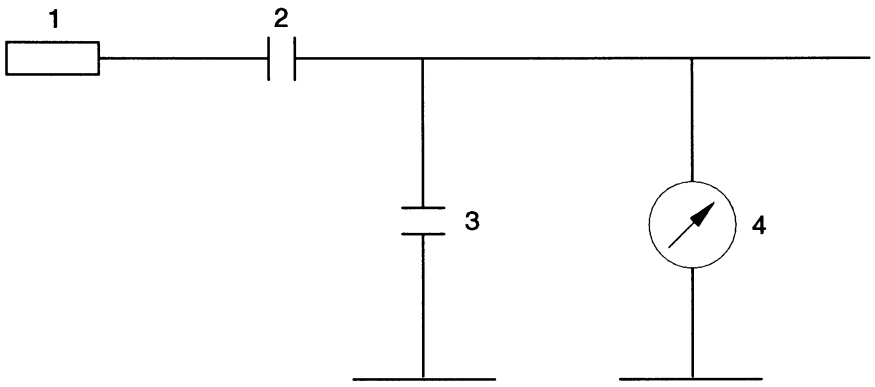
5.7 *Thermometer and hygrometer*, with an accuracy of ± 1 %; for example a calibrated wet and dry bulb thermometer (psychrometer) with a scale reading to 0,1 °C.

Dimensions in millimetres



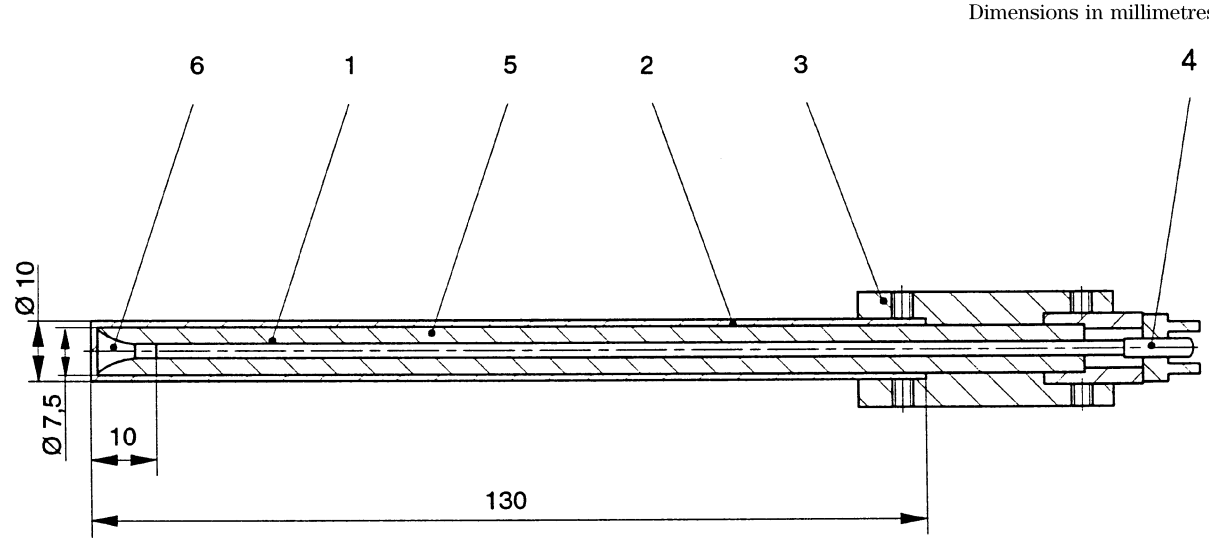
1. Straps
2. Hollow rivets
3. Sock lining
4. Insole, e.g. leather
5. Adhesive
6. Outsole of specified material

Figure 1 — Test sandals



1 Hand electrode
2 Hand electrode capacitance, C_1 = 10 pF
3 Divider capacitance, C_2
4 Static voltmeter and recorder

Figure 2 — Measuring system



1 Cable core
2 Metal tubing
3 Polytetrafluoroethylene (PTFE) sleeve
4 BNC plug
5 Coaxial cable
6 Polyethylene bung

Figure 3 — Typical hand electrode

6 Test procedure

6.1 Cleaning of test sandals

Before each test series and after each individual test, clean the soles with cotton cloth and ethanol. To roughen the surface, use the abrasive paper and clean again with a clean piece of cloth and ethanol. The test shall start after a minimum drying time of 5 min.

6.2 Method A: test procedure in laboratory conditions

6.2.1 *Preparation*

Place the grounded metal base plate on the floor in the conditioned test room (see clause 4).

If it is specified that the floor covering to be tested is to be stuck down on to a surface having a resistance to earth of $> 10^9\ \Omega$, place the rubber mat on the grounded metal base plate. Place the test piece on the rubber mat, taking care that the test piece is not in contact with the metal base plate.

If it is specified that the floor covering is to be stuck down on to concrete or on any surface having a resistance to earth $\leq 10^9\ \Omega$, do not use the rubber mat but place the test piece directly on the metal plate.

6.2.2 *Discharging*

Discharge the rubber mat, when used, and the test piece before each individual test, using the ionizing source to eliminate any residual static charge.

6.2.3 *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 to 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 with both sole materials three times each.

6.3 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 **6.2.3**.

7 Calculation and expression of results

The "walking" test will give a voltage diagram as shown in Figure 4. Determine from the recorder diagram the average of the five highest valleys and express the results in kilovolts, to the nearest 0,1 kV.

Calculate the average of the three test results for each sole material to the nearest 0,1 kV.

8 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;

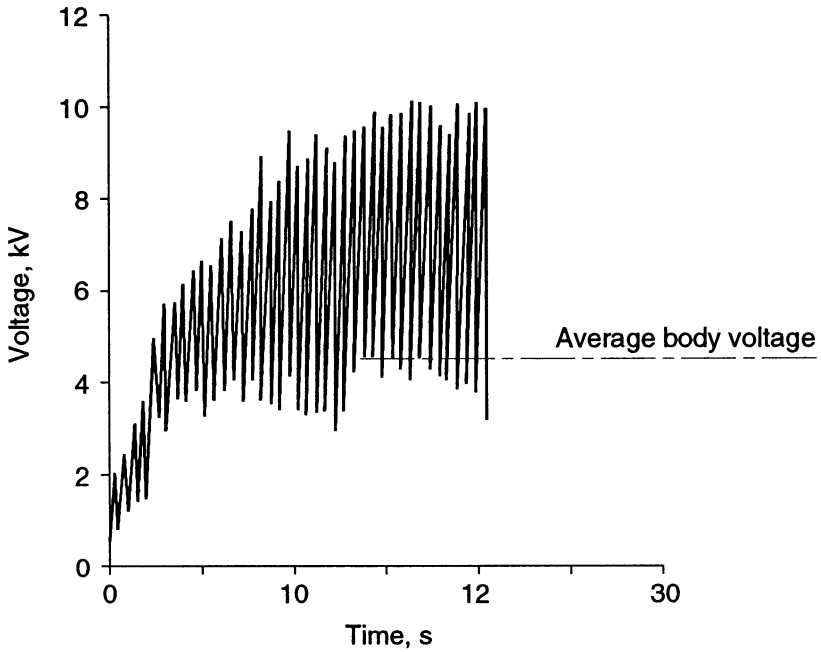
d) the test conditions;

e) the individual results and the average of the three tests to the nearest 0,1 kV for both sole materials;

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

9 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.



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

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[1)]. 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.

[1)] The test sandals complete with the specified sole materials are supplied for polyvinyl chloride by TNO Centre for Textiles, 2600 JH Delft. The Netherlands and for rubber by BAM, Bundesamt für Materialprüfung, 12200 Berlin, Germany. This information is given for the convenience of users of the standard and does not constitute an endorsement by CEN of the product. Equivalent products may be used if they can be shown to lead to the same results.

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