



BSI Standards Publication

**Flexible sheets for
waterproofing —
Waterproofing of concrete
bridge decks and other
concrete surfaces trafficable by
vehicles — Determination of
water absorption**

National foreword

This British Standard is the UK implementation of EN 14223:2017. It supersedes BS EN 14223:2005 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/546, Flexible sheets for waterproofing and water vapour control.

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

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English Version

Flexible sheets for waterproofing - Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles - Determination of water absorption

Feuilles souples d'étanchéité - Étanchéité des tabliers
de ponts en béton et autres surfaces en béton
circulables par les véhicules - Détermination de
l'absorption d'eau

Abdichtungsbahnen - Abdichtung von Betonbrücken
und anderen Verkehrsflächen aus Beton - Bestimmung
der Wasserabsorption

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European foreword

This document (EN 14223:2017) has been prepared by Technical Committee CEN/TC 254 “Flexible sheets for waterproofing”, the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14223:2005.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association

The significant technical changes are the new reference to prEN 17048:2016 at Clause 2, Normative references, and substitution of the terms “bitumen sheet” with the generic wording “waterproofing sheet” at every clause where needed.

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1 Scope

This European Standard specifies a test method for the determination of water absorption in waterproofing sheets which could influence the functional behaviour of these sheets.

NOTE It is primarily the reinforcement's ability to absorb water which is examined by this test.

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 1109, *Flexible sheets for waterproofing - Bitumen sheets for roof waterproofing - Determination of flexibility at low temperature*

EN 13416, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Rules for sampling*

EN 14695, *Flexible sheets for waterproofing - Reinforced bitumen sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete - Definitions and characteristics*

prEN 17048, *Flexible sheets for waterproofing - Plastic and rubber sheets for waterproofing of concrete bridge decks and other trafficked areas of concrete - Definitions and characteristics*

ISO 5725-2, *Accuracy (trueness and precision) of measurement methods and results — Part 2: Basic method for the determination of repeatability and reproducibility of a standard measurement method*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13416, EN 14695, prEN 17048 and the following apply.

3.1 water absorption

increase in mass of test specimen after immersion in water expressed as a percentage

4 Test method

4.1 Principle

The water absorption of the waterproofing sheet is measured after the test specimen has been immersed in water for a defined period and determined as the increase in mass of the test specimen.

4.2 Apparatus and materials

4.2.1 Balance, capable of measurements to the nearest 0,1 g.

4.2.2 Water bath, capable of maintaining a temperature of (23 ± 3) °C.

4.2.3 Chamber (or laboratory), capable of maintaining a temperature of (23 ± 3) °C and (50 ± 5) % RH.

4.2.4 Distilled water, or de-ionized water.

4.2.5 Equipment for hanging test specimens, without damaging the specimens.

4.2.6 Steel wire brush, medium hard.

4.2.7 Oven with circulating air, (without fresh air supply) and capable of maintaining a temperature of $(50 \pm 3) ^\circ\text{C}$.

4.3 Preparation of test specimens

Take samples in accordance with EN 13416. The test specimens shall be taken at random and at least 1 m from the end of the roll and 100 mm from the edge of the sheet.

Five test specimens with dimensions of $(200 \pm 1) \text{ mm} \times (200 \pm 1) \text{ mm}$ shall be prepared for testing. If the reinforced waterproofing sheet has a surfacing of fine mineral or granules, the surface shall be brushed gently with a steel wire brush to remove any loose mineral or granule. A protective film on the bottom side should be removed as described in EN 1109. Should problems with heterogeneous results occur (4.6.2) due to surfacing of fine mineral or granules, test specimens may be taken from parts free from such surfacing. The test specimen area shall be the same as described above.

4.4 Drying and conditioning of the test specimens

Dry the test specimens for $24 \text{ h} \pm 30 \text{ min}$ at $(50 \pm 3) ^\circ\text{C}$ and then condition them for $1 \text{ h} \pm 5 \text{ min}$ at $(23 \pm 3) ^\circ\text{C}$ and $(50 \pm 5) \% \text{ RH}$ before testing. During drying and conditioning the test specimens are placed hanging vertically with a space of at least 20 mm between test specimens.

4.5 Procedure

4.5.1 Weigh the test specimen (m_1) and then immerse it in water for $28 \text{ days} \pm 4 \text{ h}$ at $(23 \pm 3) ^\circ\text{C}$. The test specimen shall be placed hanging vertically in the water with a space of at least 20 mm between test specimens. The entire area of the test specimen shall be covered with water during the entire test period.

4.5.2 After the 28 days of immersion in water, air dry the test specimen for $5 \text{ h} \pm 5 \text{ min}$ at $(23 \pm 3) ^\circ\text{C}$ and $(50 \pm 5) \% \text{ RH}$. During air drying the test specimen shall be placed hanging vertically with a space of at least 20 mm between the test specimens. The set of five test specimens shall be placed in the laboratory with a free space of air surrounding it (at least 0,5 m on each side).

4.5.3 Reweigh the test specimen (m_2).

4.6 Expression of results

4.6.1 Calculation

The water absorption w for each test specimen (expressed as a percentage by mass) shall be calculated using Formula (1)

$$w = \frac{m_2 - m_1}{m_1} 100 \quad (1)$$

where:

m_1 is the mass of the test specimen after drying and conditioning;

m_2 is the mass of the test specimen after immersion in water for 28 days and drying for 5 h.

The water absorption mean value of the five test specimens shall be calculated and recorded.

4.6.2 Precision

The repeatability r and the reproducibility R is determined by:

$$r = 0,0995w + 0,0766 \quad (2)$$

$$R = 0,154w + 0,1048 \quad (3)$$

where w is the water absorption, in % by mass.

Based on the given repeatability, the test shall be repeated if the difference between w_{max} and w_{min} is higher than $0,3098w_{mean} + 0,2385$.

NOTE 1 Precision data are based on a ring test performed in accordance with ISO 5725-2 for water absorption values between 0,2 % and 5,1 % by mass.

NOTE 2 The precision data have only been found for bitumen sheets.

4.7 Test report

The test report shall include at least the following information:

- a) all details necessary to identify the product tested;
- b) reference to this European Standard and any deviation from it;
- c) information about sampling, preparation, drying and conditioning of test specimens in accordance with 4.3 and 4.4;
- d) information about the procedure in accordance with 4.5;
- e) test results in accordance with 4.6;
- f) date of tests.

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