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Flexible sheets for waterproofing — Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles — Determination of the resistance to compaction of an asphalt layer

bsi.

National foreword

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Flexible sheets for waterproofing - Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles - Determination of the resistance to compaction of an asphalt layer

Feuilles souples d'étanchéité - Étanchéité des tabliers de ponts en béton et autres surfaces en béton circulables par les véhicules - Détermination de la résistance au compactage de la couche bitumineuse

Abdichtungsbahnen - Abdichtung von Betonbrücken und anderen Verkehrsflächen auf Beton - Bestimmung des Widerstandes gegenüber Verdichtung der Asphaltschicht

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

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European Foreword

This document (EN 14692:2017) 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of an identical text or by endorsement, at the latest by September 2017, and conflicting national standards shall be withdrawn at the latest by September 2017.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 14692:2005.

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 in Clause 2, Normative references, and the substitution of the terms “bitumen sheet” with the generic wording “waterproofing sheet” in every clause where needed, including the title.

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Introduction

The purpose of the test is to determine the ability of a waterproofing system to resist damage from the compaction of an asphalt layer.

1 Scope

This European Standard specifies a test method for the evaluation of the resistance of a waterproofing sheet to the compaction of an asphalt layer.

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 1928, *Flexible sheets for waterproofing - Bitumen, plastic and rubber sheets for roof waterproofing - Determination of watertightness*

EN 13375, *Flexible sheets for waterproofing - Waterproofing of concrete bridge decks and other concrete surfaces trafficable by vehicles - Specimen preparation*

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*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 13375, EN 14695, prEN 17048 and the following apply.

3.1
resistance to compaction
ability of a waterproofing system to resist the compaction of an asphalt concrete overlay without damage

4 Test methods

4.1 Principle

The test consists of compacting a defined asphalt layer on a waterproofing sheet laid on a base specimen.

It may be carried out in two alternative ways:

— Method 1: The asphalt layer is laid directly on the sheet bonded to the base specimen;

— Method 2: A de-bonding interface is laid between the base specimen and the sheet and between the sheet and the asphalt layer.

After compacting of the test specimen, the waterproofing sheet is recovered for observation of its condition and any perforations. Depending on the results of the observations, the watertightness of the recovered waterproofing sheet should be checked.

4.2 Apparatus and materials

4.2.1 Compaction equipment, as referred to in EN 13375.

4.2.2 Standard equipment and materials, such as, site gas torch, brush, etc.

4.2.3 Oven, with circulating air (without fresh supply), capable of maintaining (100 ± 5) °C

4.3 Preparation of test specimens

4.3.1 General

Take samples and test pieces in accordance with EN 13416.

4.3.2 Test specimen with sheet bonded to the base specimen (Method 1)

The test specimen is prepared in accordance with EN 13375.

The size of the test specimen is 600 mm × 400 mm.

4.3.3 Test specimen with sheet not bonded to the base specimen (Method 2)

Place a de-bonding interface between the base specimen and the waterproofing sheet, and on the upper surface of the waterproofing to prevent the asphalt layer adhering to it.

For the interface between the base specimen and the waterproofing sheet, use one non-woven glass fibre sheet of (70 ± 5) g/m^2.

For the interface between the waterproofing sheet and the asphalt layer mix, use two non-woven glass fibre sheets of (70 ± 5) g/m^2.

The size of the test specimen is 600 mm × 400 mm [400 mm × 400 mm, resp. 500 mm × 500 mm].

4.3.4 Asphalt layer, compaction and test specimens

4.3.4.1 General

Lay and compact the asphalt layer mix in accordance with EN 13375.

4.3.4.2 Test specimen with sheet bonded to the base specimen (Method 1)

In the case of the sheet bonded to the base specimen, obtain four equal parts by wet sawing the test specimen, prepared as described in 4.3.1 and 4.3.2.

4.3.4.3 Test specimen with sheet not bonded to the base specimen (Method 2)

In the case of test specimens with de-bonding interfaces, let the asphalt layer cool and remove the sheet for visual inspection and testing.

4.4 Procedure

4.4.1 Test specimen with sheet bonded to the base specimen (Method 1)

4.4.1.1 Inspect visually the cross-section of the parts of the test specimen to check the sheet/asphalt layer interface, and whether any binder from the sheet is bleeding into the asphalt layer.

4.4.1.2 Heat two parts of the test specimen in an oven at (100 ± 5) °C for (120 ± 5) min.

4.4.1.3 Separate the sheet manually from the base specimen and asphalt layer, taking care not to destroy the asphalt layer so that its interface surface can be examined.

4.4.1.4 Check the condition of the sheet that was removed from the part of the test specimen, and hold up to the light to detect any perforations due to compacting of the asphalt layer.

4.4.1.5 For bitumen sheets remove the binder from the reinforcement by extraction (for example with toluene as solvent).

4.4.1.6 Dry the reinforcement in an oven at (100 ± 5) °C for 30 min approximately, and hold up to the light to detect any perforations.

4.4.1.7 In case of perforations, test on the two remaining parts of the test specimen (see 4.4.1.2) the waterproofing complex (bitumen sheet and asphalt layer) for watertightness according to the test method described in Annex A.

4.4.2 Test specimen with sheet not bonded to the base specimen (Method 2)

Separate the waterproofing sheet, and visually inspect its condition. If the visual inspection reveals perforations in the waterproofing sheet, the watertightness test need not be performed. If the visual inspection reveals no perforations, test the waterproofing sheet for watertightness according to EN 1928, Method B with a pressure of 100 kPa for 24 h.

4.5 Expression of results

4.5.1 Visual inspection test

For Method 1: Report any perforation after the operations of 4.4.1. In case of no perforations, express the resistance to compaction of an asphalt layer as “resistant”.

For Method 2: Report any perforation after the operations of 4.4.2. In case of perforations, express the resistance to compaction of an asphalt layer as “not resistant”.

4.5.2 Watertightness test

For Method 1: In case of perforations detected according to 4.4.1, express the resistance to compaction of an asphalt layer as “resistant” if no leak is detected when tested according to Annex A.

For Method 2: Express the resistance to compaction as “resistant” if the waterproofing sheet does not leak when tested according to the method given in 4.4.2.

4.5.3 Precision of the test method

No precision data are currently available.

4.6 Test report

The test report shall include at least the following information:

a) all details necessary to identify the product tested and identification of the whole waterproofing system including asphalt layer and application temperature, type and quantity of the primer;

b) a reference to this document and any deviation from it;

c) information on preparation of test specimens in accordance with 4.3 and EN 13375, and prepared by and witnessed by which organization;

d) the dates of delivery of sample and preparation of test specimens;

e) information about the chosen procedure in accordance with 4.1 (Method 1 or Method 2);

f) the test result and failure mode for each individual test as indicated in 4.5;

g) the date of tests.

Annex A
(normative)

Determination of watertightness for Method 1

A.1 General

A.1.1 Purpose of the test

The purpose of the test method is to determine the watertightness of test specimen according to Method 1 (4.1).

A.1.2 Principle of the method

The test consists of subjecting a specimen of the waterproofing system in a closed cell to a specified water pressure and observing the absence of water transmission through the system.

A.2 Equipment

A.2.1 Apparatus, suitable for applying pressures up to 1 MPa in measuring cells in which the test specimens to be tested are placed (see an example of apparatus in Figure A.1).

A.3 Test specimens

Obtain test specimens with a diameter of 150 mm and a maximum thickness of 70 mm by coring.

After coring, heat the test specimens under a controlled temperature (4.4.1), and separate the complex at the waterproofing/concrete interface.

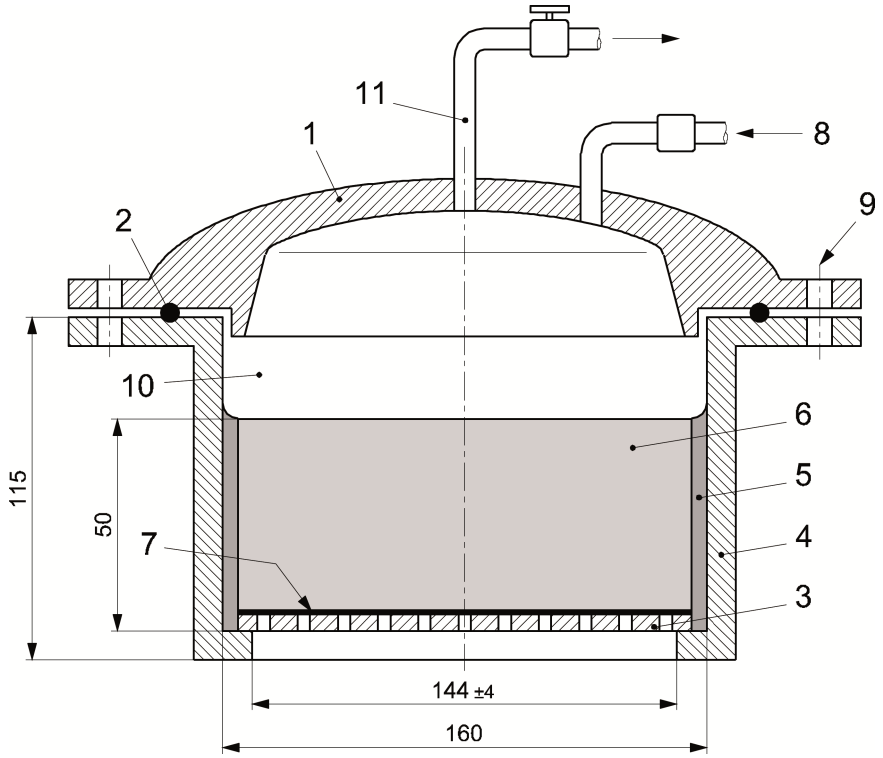
A.4 Test procedure

A.4.1 Installation of test specimens

Place the lower shells of the measuring cells and tins of hard bitumen (20/30 pen) in an oven at 140 °C for at least 2 h.

Remove the lower shells from the oven and place the test specimens in them. Pour the hot bitumen into the gap between the test specimen and the side of the test cell in order to ensure a perfect seal.

After cooling, fit the cells with the top shell and connect to the apparatus (see Figure A.1).



Key

1	Upper shell	7	Waterproofing sheet
2	Waterproofing joint	8	Water inlet
3	Grid (thickness: 6 mm)	9	6 bolts Ø 10 mm
4	Lower shell	10	Chamber, filled with water (Volume < 3 dm^3)
5	Sealing bitumen (20/30 pen)	11	Air bleeding
6	Test specimen (Ø 150 mm)		

Figure A.1 — Example of apparatus used for watertightness evaluation

A.4.2 Testing

Perform the test at room temperature with the following steps:

— 24 h in contact with water at each of the following pressures;

a) room pressure;

b) (0,1 ± 0,01) MPa;

c) (0,5 ± 0,01) MPa;

d) (0,7 ± 0,01) MPa.

— 3 h at (1,0 ± 0,01) MPa.

Check after each pressure increment that there is no water beneath the measuring cell.

A.5 Expression of results

Keep a record of the pressure at which any water is observed to pass through the specimen, or of the fact that no water passed through during the test.

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BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK

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