BS EN 15812:2011

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Polymer modified bituminous thick coatings for waterproofing — Determination of crack bridging ability

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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

Polymer modified bituminous thick coatings for waterproofing - Determination of crack bridging ability

Revêtements bitumineux épais modifiés aux polymères pour imperméabilisation - Détermination de l'aptitude à ponter les fissures

Kunststoffmodifizierte Bitumendickbeschichtungen zur Bauwerksabdichtung - Bestimmung des Rissüberbrückungsvermögens

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Foreword

This document (EN 15812:2011) has been prepared by Technical Committee CEN/TC 361 “Project Committee — Polymer modified bituminous thick coatings for waterproofing — Definitions/requirements and test methods”, the secretariat of which is held by DIN.

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of an identical text or by endorsement, at the latest by September 2011, and conflicting national standards shall be withdrawn at the latest by September 2011.

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1 Scope

This European Standard specifies two methods (method A and method B) for determining the crack bridge properties of polymer modified bituminous thick coatings for waterproofing. The two test methods may be applied equally.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1062-7:2004, *Paints and varnishes — Coating materials and coating systems for exterior masonry and concrete — Part 7: Determination of crack bridging properties*

EN 1766:2000, *Products and systems for the protection and repair of concrete structures — Test methods — Reference concretes for testing*

FprEN 15814:2011, *Polymer modified bituminous thick coatings for waterproofing — Definitions and requirements*

ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in FprEN 15814:2011 and the following apply.

3.1
crack bridge ability
ability of a product to bridge a crack under specified conditions and without damage

4 Principle

After coating the substrate, a defined crack is made in the substrate at a nominal crack point. The applied bitumen coating is stretched over this crack. The mechanical stress is applied to the bitumen coating. The crack width is continuously enlarged with defined speed.

The measurement is finished, when a failure in the bitumen coating occurs or when the required crack width is reached. The required crack width is kept constant for a period of 24 h. After that period a visual judgement is made. The crack-bridging properties are determined at a specified temperature.

Two different test methods can be applied: The bending test (method A) or the tensile test (method B).

5 Apparatus

The test apparatus shall ensure that the movement of the cracks lies between given limits, and that shearing (horizontal and vertical movement) of the crack is avoided during the measurement.

It shall be provided with a device for maintaining the temperature at which the determination of the crack-bridging properties is to be carried out (normally 4 °C). The tolerance of the test temperature shall be ± 1 °C.

6 Sampling

The specimen preparation is to be made in accordance with the manufacturer instruction. Usually the preparation is accomplished at room temperature.

7 Test specimens

7.1 General

Take at least 2 test specimens.

7.2 Method A

7.2.1 Substrate

7.2.1.1 Dimensions

The test piece is a reinforced concrete slab measuring 300 mm × 200 mm × 40 mm.

7.2.1.2 Fabrication and storage

Concrete slabs are fabricated and stored according to EN 1766:2000, 6.3 to 6.5, Type MC 0,45, with a maximum aggregate size of 8 mm.

For details see EN 1062-7:2004, Figures C.5 and C.6.

The surface of the concrete slab has to be free of substances that may influence the bonding. After curing process according to EN 1766 the concrete slabs have to be stored at least 7 days in a normal climate of (23 ± 2) °C and a relative humidity of (50 ± 5) % in accordance with ISO 554 before they are coated.

7.2.2 Coating

The concrete slabs have to be coated in accordance with the manufacturer's instructions, with a width of 150 mm on the whole length of the slab. At the edges on the long sides of the surface of the slab a strip of 25 mm width is not coated for detecting cracks during the crack-bridging test. The test pieces are cured and stored in a climate according to the manufacturer's instructions (normally (23 ± 2) °C and a relative humidity of (50 ± 5) % in accordance with ISO 554).

The thickness of the wet layer has to be applied that after the drying process the required dry layer thickness is achieved with a permitted tolerance of 10 %. The dry layer thickness should be the minimum possible thickness, but at least 3 mm. To provide the designated dry layer thickness the wet coating has to be levelled off with the help of a frame or gauge of accordant height.

7.2.3 Conditioning of test specimens

The test specimen are then subjected to conditioning in a normal climate of (23 ± 2) °C and a relative humidity of (50 ± 2) % for 28 days.

After than the test specimens shall be conditioned under 4 °C ± 1 K for 12 h before testing.

7.2.4 Processing bending test (method A)

The tear bridging is tested in a distance or deformation controlled bending tension machine at a temperature of 4°C ± 1 K according to the load arrangement shown in EN 1062-7:2004, Figure C.6. Then the test can be started with the speed of 0,1 mm/min according to the requirement and till the necessary crack wide is reached.

The crack width of 2 mm has to be controlled with applicative devices for measuring or sensors fixed on both sides of the slab.

7.3 Method B

7.3.1 Substrate

7.3.1.1 Dimensions

The test piece is a concrete slab deviating from EN 1062-7:2004, Figure C.10, with a size of 150 mm × 150 mm × 40 mm.

7.3.1.2 Fabrication and storage

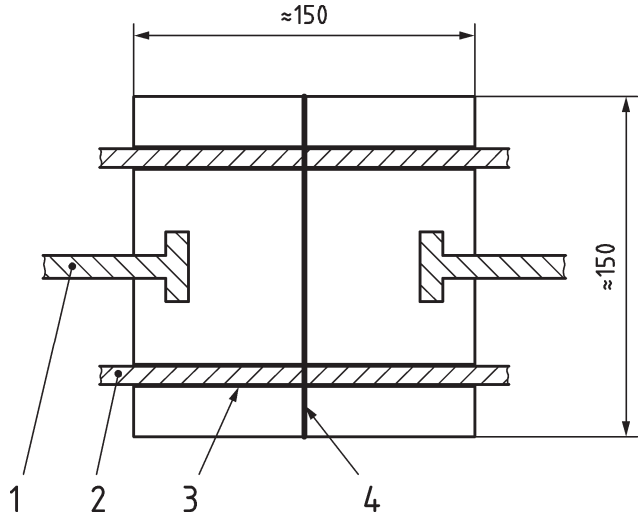
Concrete slabs are fabricated according to EN 1766:2000, 6.3 to 6.5, Type MC 0,45, using a test concrete with the following specifications:

— test pieces according to EN 1062-7:2004, Figure C.10, but with deviated size (see 7.3.1.1);

— devoid of the notch;

— instead of two fasteners on each side of the slab one tie-rod may be used in the middle of the both sides according to Figure 1.

Dimensions in millimetres



Key

1 tie - rod, round steel with a Ø of 10 mm to 15 mm

2 steel rod, round steel with a Ø of 8 mm to 12 mm

3 steel tube suitable for the round steel

4 plastic spacer

Figure 1 — Tensile test with one tie-rod on both sides

The surface of the concrete slabs has to be free of substances that may influence the bonding.

After storage according to EN 1766 the concrete slabs have to be stored at least 7 days in normal climate of (23 ± 2) °C and a relative humidity of (50 ± 2) % before they are coated.

7.3.2 Coating

The concrete slabs are coated over an area of 120 mm × 120 mm.

The thickness of the wet layer has to be applied that after the drying process the required dry layer thickness is achieved with a permitted tolerance of 10 %. The dry layer thickness should be the minimum possible thickness, but at least 3 mm. To provide the designated dry layer thickness the wet coating has to be levelled off with the help of a frame or gauge of accordant height.

7.3.3 Conditioning of test specimens

The test specimen are then subjected to conditioning in a climate (23 ± 2) °C and a relative humidity of (50 ± 5) % for 28 days.

After than the test specimens shall be conditioned under (4 ± 1) °C for 12 h before testing.

7.3.4 Processing tensile test (method B)

Both stainless steels are removed for cleaning from concrete and replaced back into the tubes. Outside the slab they are fixed e.g. with a piece of rubber, to keep them in the right position.

Than the test piece is attached to the test machine by locating the tie rods on both sides of the concrete slab into the brackets of the machine. The tie rods are fixed with nuts.

The crack width of 2 mm has to be controlled with applicative devices for measuring or sensors fixed on both sides of the slab.

The test piece is so positioned that the coated surface can be seen.

Now the test can be started with the speed of 0,1 mm/min according to the requirements until the necessary crack width is reached.

8 Procedure

After the crack width is reached, the test apparatus is kept in this position for 24 h with the same temperature used during the test. Afterwards the coating is checked for damages on the surface visually.

Changes of any kind (incipient, partial or through thickness cracks) shall be stated in the test report. The test is deemed to have been passed if the crack is bridged in two out of three substrates.

9 Expression of results and precision

9.1 Expression of results

The test is passed under the described conditions without any kind of cracks: yes/no.

9.2 Precision

Precision data are currently not available.

10 Test report

The test report shall include at least the following information:

a) a reference to this European Standard (i.e. EN 15812);

b) all details necessary to identify the product tested;

c) test method A or B;

d) test procedure including:

- wet layer thickness;
- dry layer thickness;
- test temperature;
- deviation of test conditions;
- test speed;

e) the test results in accordance with Clause 9;

f) the date of the tests.

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