
Bitumen in bitumenska veziva - Določanje obstojnosti bitumenskega filma pod vodo

Bitumen and bituminous binders - Determination of adhesivity of bituminous emulsions by water immersion test

Bitumen und bitumenhaltige Bindemittel - Bestimmung des Haftverhaltens von Bitumenemulsionen bei Wasserlagerung

Bitumes et liants bitumineux - Détermination de l'adhésivité des émulsions de bitume par l'essai d'immersion dans l'eau

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Ta slovenski standard je istoveten z: prEN 13614

ICS:

75.140	Voski, bitumni in drugi naftni proizvodi	Waxes, bituminous materials and other petroleum products
91.100.50	Veziva. Tesnilni materiali	Binders. Sealing materials

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EUROPEAN STANDARD
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Will supersede EN 13614:2011

English Version

**Bitumen and bituminous binders - Determination of
adhesivity of bituminous emulsions by water immersion
test**

Bitumes et liants bitumineux - Détermination de
l'adhésivité des émulsions de bitume par l'essai
d'immersion dans l'eau

Bitumen und bitumenhaltige Bindemittel -
Bestimmung des Haftverhaltens von
Bitumenemulsionen bei Wasserlagerung

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 336.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents	Page
European foreword.....	3
1 Scope	4
2 Normative references	4
3 Terms and definitions	4
4 Principle	5
5 Reagents and materials.....	5
6 Apparatus.....	5
7 Sampling.....	6
8 Procedure.....	6
8.1 General.....	6
8.2 Determination of immediate adhesivity.....	6
8.3 Water effect on binder adhesion	6
8.3.1 General.....	6
9 Expression of results.....	7
10 Precision.....	7
11 Test report.....	8
Annex A (informative) Guidance for the marking of coated surface area	9

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European foreword

This document (prEN 13614:2019) has been prepared by Technical Committee CEN/TC 336 “Bituminous binders”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 13614:2011.

The main changes with respect to the previous edition are listed below:

- curing and conditioning the coated aggregates within a Petri dish or crystallizer in the form of a single layer instead of placing them into a beaker (8.2.4 and 8.3.5);
- making the assessment under water, which can be replaced if dirty, with the help of an appropriate desk lamp (8.2.5 and 8.3.7);
- no requirements for a specific thermometer (6.9) since room temperature can be checked with ordinary means. After drying, aggregates are to be left to cool down to room temperature before starting the test procedure (8.1 and 8.3.1);
- acceptable tolerance on conditioning time (8.3.6) is reduced from ± 4 h to ± 2 h;
- guidance for the marking of covered surface area (Annex A) is improved by complementing the sketches with actual pictures.

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1 Scope

This document specifies a method for determining the adhesion of a bituminous emulsion coated onto aggregate when immersed in water.

The method considers two different aspects of adhesivity, i.e. immediate adhesivity and water effect on binder adhesion.

The method may be used with a reference aggregate. In that case, it measures the intrinsic adhesion behaviour of a bituminous emulsion. The method may also be used with a specific aggregate as used on a job site.

WARNING — The use of this document may involve hazardous materials, operations and equipment. This document does not purport to address all of the safety problems associated with its use. It is the responsibility of the user of this document to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 58, *Bitumen and bituminous binders — Sampling bituminous binders*

EN 12594, *Bitumen and bituminous binders — Preparation of test samples*

EN 13043, *Aggregates for bituminous mixtures and surface treatments of roads, airfields and other trafficked areas*

EN 13808, *Bitumen and bituminous binders — Framework for specifying cationic bituminous emulsions*

EN ISO 3696, *Water for analytical laboratory use — Specification and test methods (ISO 3696)*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

adhesion

ability of a binder to coat the surface of an aggregate and to remain bonded over time in the presence of water

3.2

adhesivity

qualitative assessment of the measurement of the adhesion

3.3

immediate adhesivity

qualitative assessment of the ability of the binder from a bituminous emulsion to resist the action of water just after coating of the aggregate

3.4

water effect on binder adhesion

qualitative assessment of the ability of the binder from a bituminous emulsion to resist the action of water after coating of the aggregate and a period of curing

4 Principle

The bituminous emulsion is mixed thoroughly with the considered aggregate under specified conditions.

When testing immediate adhesivity, the mixture is immediately washed under running water and the percentage of the aggregate surface covered with binder is assessed visually under specified conditions.

When testing water effect on binder adhesion, the mixture is first left to cure and then immersed under water under specified conditions. The percentage of the aggregate surface covered with binder is assessed visually under specified conditions.

Conformity to the “adhesivity” requirement specified in EN 13808 is to be assessed while measuring the water effect on binder adhesion with a reference aggregate.

5 Reagents and materials

5.1 Reference aggregate, as light in colour as possible, or aggregate from a specific job site, which either passes through a sieve having a mesh size of 10 mm and is retained on a sieve having a mesh size of 6,3 mm (sieve sizes belonging to the “basic set plus set 2” sizes specified in EN 13043), or passes through a sieve having a mesh size of 11 mm and is retained on a sieve having a mesh size of 8 mm (sieve sizes belonging to the “basic set plus set 1” sizes specified in EN 13043).

NOTE Each country can define petrographically its own reference aggregates, for instance, in a national informative annex.

5.2 **Water**, distilled or deionised, conforming to grade 3 of EN ISO 3696.

5.3 **Cleaning agents**, conventionally used in a laboratory.

6 Apparatus

6.1 **Ventilated oven**, capable of maintaining a temperature of $(60 \pm 3) ^\circ\text{C}$.

6.2 **Spatula**.

6.3 **Two dishes**, diameter approximately 15 cm to 20 cm.

6.4 **Timer**, accurate to at least 1 s over 60 s.

6.5 **Two heat resistant glass Petri dishes or crystallizers with cover**, diameter of at least 20 cm, and minimum height of 25 mm.

6.6 **Balance**, of sufficient capacity, accurate to ± 1 g.

6.7 **Measuring cylinder**, 250 ml to 500 ml capacity.

6.8 **Ventilated oven**, capable of maintaining a temperature of $(110 \pm 5) ^\circ\text{C}$.

7 Sampling

Sample the test material in accordance with EN 58. Prepare the test samples in accordance with EN 12594.

8 Procedure

8.1 General

Carry out the procedure under normal laboratory conditions (23 ± 5) °C, as indicated by usual room temperature measuring device.

If the intrinsic adhesivity of the emulsion is controlled, the procedure shall be carried out with the reference aggregate(s). The reference aggregate(s) shall be washed with water (5.2) and dried in the ventilated oven (6.8) at (110 ± 5) °C for about 2 h, then let to cool down to room temperature.

If the adhesivity behaviour of a specific emulsion/aggregate combination is controlled for a specific job site, the aggregate shall be used in its job site conditions (5.1).

8.2 Determination of immediate adhesivity

8.2.1 Weigh (100 ± 5) g of aggregate (5.1) into a dish (6.3) and (150 ± 5) g of emulsion into another dish (6.3).

8.2.2 Pour the aggregate into the emulsion, start the timer (6.4) and allow contacting for (60 ± 5) s without stirring; the dish may be gently shaken to disperse any air bubbles which might prevent proper moistening of the aggregate.

8.2.3 Remove excess emulsion by carefully tilting the dish and wash the aggregate at room temperature, holding the dish tilted under a slow stream of water (5.2) until the water runs clear.

8.2.4 Introduce and spread even the coated aggregate into a Petri dish or crystallizer (6.5) and cover completely with approximately 400 ml of water (5.2) at room temperature.

NOTE Depending on the actual size of the Petri dish or crystallizer, the amount of water could have to be increased to ensure total coverage of the coated aggregate.

8.2.5 Immediately assess the surface coated with the film of binder and grade it according to the scheme indicated in Clause 9. Assessment is to be done with the aggregate still under water and, if necessary, with the help of an appropriate desk lamp to overcome reflections and shades.

8.3 Water effect on binder adhesion

8.3.1 General

This procedure shall be used, with reference aggregate(s), to check conformity to the intrinsic "adhesivity" requirement specified in EN 13808. The reference aggregate(s) is (are) then washed with water (5.2) and dried in the ventilated oven (6.8) at (110 ± 5) °C for about 2 h, then let to cool down to room temperature.

It may also be used to check water effect on binder adhesion for a specific emulsion/aggregate combination used on a specific job site. The aggregate shall then be used in its job site conditions (5.1).

8.3.2 Weigh (200 ± 5) g of aggregate (5.1) into a dish (6.3) and an amount of emulsion corresponding to (10 ± 1) g of residual bituminous binder into another dish (6.3).

8.3.3 Pour the aggregate into the emulsion and thoroughly mix by means of a spatula (6.2).

8.3.4 If full coating (100 % of coverage) is not achieved, restart the procedure as from 8.3.1 by increasing the amount of emulsion corresponding to (20 ± 1) g of residual bituminous binder. The amount of residual bituminous binder actually used shall be mentioned in the test report (11, f).

8.3.5 Spread the mixture evenly into a Petri dish or crystallizer (6.5) and place it, uncovered, in the ventilated oven (6.8) at (60 ± 3) °C for (24 ± 1) h.

8.3.6 Pour approximately 400 ml of water (5.2), heated to (60 ± 3) °C onto the mixture and install the cover of the Petri dish or crystallizer. Place the dish in the ventilated oven (6.8), at (60 ± 3) °C for (20 ± 2) h.

NOTE Depending on the actual size of the Petri dish or crystallizer, the amount of water could have to be increased to ensure total coverage of the coated aggregate.

8.3.7 Remove the cover and assess the surface coated with the film of binder and grade it according to the scheme indicated in Clause 9. Assessment is to be done with the aggregate still under water and, if necessary, with the help of an appropriate desk lamp to overcome reflections and shades. If dirty, the water shall be replaced by clear water.

9 Expression of results

The surface coated with the film of binder shall be graded according to the following scheme:

- 100: all the surface is coated;
- 90: more than approximately 90 % of the surface is coated;
- 75: approximately 75 % to 90 % of the surface is coated;
- 50: approximately 50 % to 75 % of the surface is coated;
- < 50: less than approximately 50 % of the surface is coated;
- < 10: the binder is separate from the aggregates, except for some faint marks.

The simple coloration of the aggregate surface by adsorbed light binder fractions shall not qualify this surface as a coated surface.

NOTE 1 A guidance for the grading of the surface covered with binder is given, in the form of indicative sketches, and photographic pictures in Annex A.

NOTE 2 If necessary, to facilitate the assessment, it can be compared with an untreated and immersed aggregate.

NOTE 3 If necessary, to facilitate the assessment, the opinion of a second operator can be sought.

10 Precision

The method is qualitative and it is not possible to quantify the precision. However, tests carried out by the same operator have shown that the same result is generally achieved for any given bitumen emulsion.