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ILNAS-EN 16346:2023

Bitumen and bituminous binders - Determination of breaking behaviour and immediate adhesivity of cationic bituminous emulsions

Bitumen und bitumenhaltige Bindemittel
- Bestimmung der Brechzeit und des
kurzfristigen Haftverhaltens von
kationischen Bitumenemulsionen

Bitumes et liants bitumineux -
Détermination du comportement à la
rupture et de l'adhésivité immédiate des
émulsions bitumineuses cationiques

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National Foreword

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English Version

**Bitumen and bituminous binders - Determination of
breaking behaviour and immediate adhesivity of cationic
bituminous emulsions**

Bitumes et liants bitumineux - Détermination du
comportement à la rupture et de l'adhésivité
immédiate des émulsions bitumineuses cationiques

Bitumen und bitumenhaltige Bindemittel -
Bestimmung der Brechzeit und des kurzfristigen
Haftverhaltens von kationischen Bitumenemulsionen

This European Standard was approved by CEN on 20 November 2023.

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European foreword

This document (EN 16346:2023) has been prepared by Technical Committee CEN/TC 336 “Bitumens and bituminous binders”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by June 2024, and conflicting national standards shall be withdrawn at the latest by June 2024.

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 CEN/TS 16346:2012.

In comparison with the previous edition, the main technical changes are:

- change of the name of the document, new version does not include the 2/4 aggregate size as the document now allows the assessment of various aggregate sizes;
- instead of defining the amount of emulsion, which is to be mixed with aggregate, the residual binder amount was specified (see 8.2.3.);
- assessment of the breaking behaviour (3.3) is now evaluated via washout water appearance in up to eight beakers (see 8.3.1.) instead of using a slow stream of water;
- immediate adhesivity (3.4) and immediate adhesivity after drying (3.5) are now assessed in a quantitative way instead of using indicative sketches;
- time when the immediate adhesivity (3.4) is assessed is fixed at 10 minutes (see 8.3.1);
- new procedure for evaluating the adhesivity after a certain rest time was introduced. This procedure is named “immediate adhesivity after drying” (3.5);
- aggregate (5.2) and washed out aggregate (see 8.3.1 and 8.4.4) are to be dried until a constant mass (3.6) is reached instead of about a 2 hours drying period;
- new aggregate sizes were introduced (5.1) to have a higher level of versatility;
- the maximum mixing time to obtain the full breaking (3.1) is restricted to 45 seconds (see 8.2.4);
- the possibility to use a camera for depicting the actual state of washout water in beakers was introduced (see 8.3.1 and 8.4.4);
- pictures depicting different results of the assessment of the breaking behaviour (3.3) were included in Clause 9.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North

Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

1 Scope

This document specifies a method for the determination of the breaking and immediate adhesivity behaviour of cationic bituminous emulsions in contact with aggregate. The method applies to emulsions used for surface dressing and similar applications and can be used for formulation as well as for production control purposes.

WARNING — The use of this document can 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 1428, *Bitumen and bituminous binders — Determination of water content in bituminous emulsions — Azeotropic distillation method*

EN 1431, *Bitumen and bituminous binders — Determination of residual binder and oil distillate from bitumen emulsions by distillation*

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

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

EN 16849, *Bitumen and bituminous binders — Determination of water content in bituminous emulsions — Method using a drying balance*

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:

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

3.1

full breaking

stage at which, during the mixing process between aggregate particles and emulsion conducted as specified in (8.2), all aggregate particles have agglomerated into a single compact mass

3.2

breaking time

time in seconds, counted from the start of the mixing process, until the *full breaking* (3.1) is reached

3.3**breaking behaviour**

appreciation of the actual degree of breaking of the emulsion after the mixture has reached the full breaking stage

Note 1 to entry: The breaking behaviour is measured by the number of successive washings of the final mixture that are necessary until the water runs clear.

3.4**immediate adhesivity**

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

Note 1 to entry: Immediate adhesivity is assessed in a quantitative way (loss of mass after washing with water).

3.5**immediate adhesivity after drying**

ability of the binder from a bituminous emulsion to resist the action of water after aggregate coating and after a certain resting time of the coated aggregate was applied before washing

Note 1 to entry: Immediate adhesivity after drying is assessed in a quantitative way (loss of mass after washing with water).

3.6**constant mass**

weight which, on subsequent weighing after drying for at least one hour, does not change by more than 0,1 %

4 Principle

Prescribed quantities of emulsion and aggregate are mixed under specified conditions. The necessary time to obtain a single agglomerated mass is the measure of the breaking time of the emulsion (3.2). If full breaking (3.1) is not obtained after 45 s, mixing is stopped. After 10 min, the final mixture is washed with water and the percentage of residual binder remaining on aggregates is assessed through weighing (3.4).

If needed or required, the procedure is repeated while spreading coated aggregate evenly and applying the washing procedure after the curing period of 60 min. This procedure is usually performed when it is not possible to obtain clear water after 8 successive washings or when the evolution of adhesivity over time is studied. If not specifically requested, this part is optional.

Depending on the result, additional tests may be conducted at shorter or longer curing periods, e.g. 30 min or 90 min. Such deviations shall be noted in the report.

5 Reagents and materials

5.1 Aggregate, being either reference aggregate or aggregate to be used on a specific job site. Reference aggregate, which passes through a sieve (see Reference [1]) having a mesh size of 4 mm or 5,6 mm and is retained on a sieve having a mesh size of 2 mm (sieve sizes shall belong to the [basic set plus set 1] specified in EN 13043), shall be utilized. Alternatively, aggregate which passes through a sieve having a mesh size of 6,3 mm or 8 mm and is retained on a sieve having a mesh size of 2 mm, 4 mm or 5 mm (sieve sizes shall belong to the [basic set plus set 2 and set 1] specified in EN 13043) can be utilized.

NOTE Each country can specify petrographically its own reference aggregates, for instance, in a national specification document.