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BSI Standards Publication

Bitumen and bituminous binders — Determination of the flexural creep stiffness — Bending Beam Rheometer (BBR)

bsi.

National foreword

This British Standard is the UK implementation of EN 14771:2023. It supersedes BS EN 14771:2012, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PTI/13, Petroleum Testing and Terminology.

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

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Bitumes et liants bitumineux - Détermination du module de rigidité en flexion - Rhéomètre à flexion de barreau (BBR)

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Biegekriechsteifigkeit - Biegebalkenrheometer (BBR)

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European foreword

This document (EN 14771:2023) has been prepared by Technical Committee CEN/TC 336 “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of an identical text or by endorsement, at the latest by January 2024, and conflicting national standards shall be withdrawn at the latest by January 2024.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 EN 14771:2012.

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

a) Scope aligned with other test standards;

b) reference to EN 14023 moved from normative references to bibliography;

c) Notes in 3.3 and 3.4 updated with reference to SI unit;

d) wording of test specimen and sample applied consistently;

e) 5.1.1.1 reworded to provide more clarity;

f) 5.1.3 Note updated;

g) former 5.2.1, now 5.3, reworded to provide more clarity;

h) numbering in Clause 5 aligned with CEN-CENELEC Internal regulations: former 5.2.1, now 5.3;

i) 6.1 Sample preparation aligned with EN 12594 and reference to scope added in note;

j) 6.2: reference to plastic films added in Note 2;

k) 6.2: Note 3 turned into standard text and moved before notes;

l) 6.3 clarified with regards to pouring, and inconsistencies in the description of storage removed; Note 1 deleted as in conflict with standard text;

m) text on heated moulds moved from 6.3 to 6.2;

n) description reworded to provide more clarity; timing of trimming adjusted;

o) information to discard damaged or distorted test specimen added in 6.3, in c) wording aligned with 5.1.1.1;

p) information added in 7.1 to place test specimen 5 minutes apart into testing bath, wording aligned;

q) description of flexural creep stiffness worded more precisely in keys to formulae in 8.2 and 8.3;

r) writing of decimal logarithm aligned with ISO 80000-2:2019 [6] in 8.3, 8.4 and Annex A;

t) Keys in Figures 1 to 4 updated and formatted;

u) Figure 5: load in legend and in figure renamed as P, also consistent with Formula (1);

v) Annex A added;

w) Annex B added;

x) Bibliography updated with EN 1427.

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.

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1 Scope

This document specifies a method for the determination of the flexural creep stiffness of bitumen and bituminous binders in the range of 30 MPa to 1 GPa by means of the bending beam rheometer.

The method can be applied to a variety of bitumens, including unmodified as well as modified binders, as fresh (unused) binders, as well as binders after laboratory ageing conditioning (e.g. EN 12607-1, EN 14769), and also binders that have been recovered from asphalt mixtures.

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 12594, *Bitumen and bituminous binders - Preparation of test samples*

3 Terms and definitions

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

ISO and IEC maintain terminology 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
flexural creep stiffness
S(t)
ratio obtained by dividing the bending stress by the bending strain, given in MPa

Note 1 to entry: The strain will increase with the loading time and therefore the flexural creep stiffness will also be a function of time.

3.2
m-value
absolute value of the slope of the curve of the logarithm of the stiffness versus the logarithm of time

3.3
contact load
$\boldsymbol{P_c}$
load required to maintain positive contact between the test specimen, supports and the loading shaft

Note 1 to entry: The SI unit for the load is N, however for practical reasons loads are given in mN for this test. The contact load of 25 mN to 45 mN is used in this method.