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Bitumens and bituminous binders - Multiple Stress Creep and Recovery Test (MSCRT)

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 05/26

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EUROPEAN STANDARD
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EUROPÄISCHE NORM

EN 16659

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ICS 75.140; 91.100.50 Supersedes EN 16659:2015

English Version

Bitumens and bituminous binders - Multiple Stress Creep and Recovery Test (MSCRT)

Bitumes et liants bitumineux - Essai de fluage-recouvrance sous contraintes répétées (essai MSCR)

Bitumen und bitumenhaltige Bindemittel - MSCR-Prüfung (Multiple Stress Creep and Recovery Test)

This European Standard was approved by CEN on 9 February 2026.

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

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European foreword

This document (EN 16659:2026) 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of an identical text or by endorsement, at the latest by September 2026, and conflicting national standards shall be withdrawn at the latest by September 2026.

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 16659:2015.

EN 16659:2026 includes the following significant changes with respect to EN 16659:2015:

a) throughout the whole document:

   — the term “load” was replaced by the term “stress”;

   — the wording of shear strain and shear stress was aligned;

b) in Clause 1, the scope has been revised to clarify that the document is not applicable to bituminous binders with particles larger than 250 µm and the safety waring was revised;

c) in Clause 2, the normative references have been updated including the withdrawal of reference to EN 58;

d) in Clause 3, the term 3.4 “*shear strain*” was added; the shear strain is now expressed in per cent instead of absolute values and the symbol of shear strain was changed from ε to γ;

e) in Clause 4, the testing temperature range was adjusted to [40 to 90] °C and the safety caution, moved from Clause 7, was added;

f) in 5.1, the minimum range of rheometer control temperature was adjusted to [40 to 90] °C;

g) in 5.2, the dimensions of the silicone mould were defined;

h) in 5.3, the definition of opaque cover was added;

i) Clauses 6, 7 and 8 have been revised in order to align with EN 14770 with regard to DSR zero gap setting, specimen manufacturing, specimen storage conditions, specimen placing into the rheometer and gap setting;

j) in 7.1, the heating procedure was simplified with reference to EN 12594;

k) in Clause 8, more detailed information about torque values, pre-loading cycles, more shear stress levels and subsequent testing at several test temperatures have been provided;

l) in 8.3, Figure 1 has been revised for clarification;

m) in 8.3.1, the testing temperature range was adjusted to [40 to 90] °C and a recommendation for the testing temperatures was added;

n) in 8.3.5, the requirement for repeating the test with a separate specimen has been introduced so that the result reported consists in the arithmetic mean of two individual values (see Clause 10);

o) in Clause 9, Figure 2 has been revised for clarification;

p) Clause 11 was revised and complemented with new precision data;

q) Clause 12 was revised for comprehensiveness;

r) Bibliography was added;

s) the document has been editorially revised.

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 test method for the determination of per cent recovery and non-recoverable creep compliance of bitumens and bituminous binders by means of a Multiple Stress Creep and Recovery (MSCR) test. The MSCR test is conducted using the Dynamic Shear Rheometer (DSR) in creep mode at a specified temperature.

The per cent recovery at multiple shear stress levels is intended to determine the presence of elastic response and the stress dependence of bituminous binders. The non-recoverable creep compliance at multiple shear stress levels is intended as an indicator for the sensitivity to permanent deformation and stress dependence of bituminous binders.

This document is applicable to un-aged, aged, stabilized and recovered bituminous binders. The test procedure in accordance with this document is not applicable for bituminous binders with particles larger than 250 µm (e.g. filler material, granulated rubber).

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, workers protection, and to determine the applicability of regulatory limitations prior to use. The use of this document involves handling of apparatus and binders at very high temperatures.

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 12594, *Bitumens and bituminous binders — Preparation of test samples*

EN 12597, *Bitumens and bituminous binders — Terminology*

EN 14770, *Bitumen and bituminous binders — Determination of complex shear modulus and phase angle — Dynamic Shear Rheometer (DSR)*