

Nederlandse norm

NEN-EN 15323

(en)

Bitumen en bitumineuze bindmiddelen -
Versnelde lange-termijn verouderingscondities
door de roterende cilinder methode (RCAT)

Bitumen and bituminous binders - Accelerated
long-term ageing conditioning by the Rotating
Cylinder Method (RCAT)

Vervangt NEN-EN 15323:2005 Ontw.

ICS 75.140; 91.100.50

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Normcommissie 353 008 "Bitumen"

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Voor de in deze norm vermelde normatieve verwijzingen bestaan in Nederland de volgende equivalenten:

<u>vermelde norm</u>	<u>Nederlandse norm</u>	<u>titel</u>
EN 12594	NEN-EN 12594	Bitumen en bitumineuze bindmiddelen - Monstervoorbehandeling (en)
EN 12607-1	NEN-EN 12607-1	Bitumen en bitumineuze bindmiddelen - Bepaling van de weerstand tegen verharding onder de invloed van warmte en lucht - Deel 1: RTFOT- methode (en)
EN 12607-2	NEN-EN 12607-2	Bitumen en bitumineuze bindmiddelen - Bepaling van de weerstand tegen verharding onder de invloed van warmte en lucht - Deel 2: TFOT- methode (en)
EN 14895	NEN-EN 14895	Bitumen en bitumineuze bindmiddelen - Stabilisatie van bindmiddelen van bitumineuze emulsies of van vloeibare bitumineuze bindmiddelen (en)

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ICS 91.100.50

English Version

Bitumen and bituminous binders - Accelerated long-term ageing/conditioning by the rotating cylinder method (RCAT)

Bitumes et liants bitumineux -
Vieillessement/conditionnement long-terme accéléré par la
méthode du cylindre tournant (RCAT)

Bitumen und bitumenhaltige Bindemittel - Beschleunigte
Langzeit-Alterung mit dem Verfahren mit rotierendem
Zylinder (RCAT)

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Foreword

This document (EN 15323:2007) 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of an identical text or by endorsement, at the latest by October 2007, and conflicting national standards shall be withdrawn at the latest by October 2007.

This European Standard is based upon documents [1], [2] and [3], referenced in Bibliography.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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1 Scope

This European Standard specifies an accelerated ageing/conditioning procedure for bitumen, bituminous binders and bituminous mastics. The procedure involves rotating cylinder ageing (RCA), i.e binder ageing at moderate temperatures in a large cylinder rotating in an oven under oxygen flow conditions. Prior to long-term ageing with this method, samples are prepared in the condition they would be applied to the road.

This method is also applicable to modified binders and bituminous mastics.

NOTE For binders used in hot asphalt applications pre-conditioning of the sample would typically be by one of the methods given in EN 12607-1 or EN 12607-2 or directly in the RCAT cylinder to an equivalent ageing level. For binders used in bituminous emulsion and cut-back application, stabilising the sample would typically be by methods given in EN 14895. For bituminous emulsion, stabilising the sample can also be realised directly in the RCAT cylinder under a nitrogen flow (quantity-temperature-time have still to be experienced).

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If there is a likelihood that more than 1 % mass fraction in a binder of volatile components is present, this procedure must not be used.

2 Normative references

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

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

EN 12607-1, *Bitumen and bituminous binders — Determination of the resistance to hardening under the influence of heat and air — Part 1: RTFOT method*

EN 12607-2, *Bitumen and bituminous binders — Determination of the resistance to hardening under the influence of heat and air — Part 2: TFOT method*

EN 14895, *Bitumen and bituminous binders — Stabilisation of binder from bituminous emulsions or from cut-back and fluxed bituminous binders*

3 Terms and definitions

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

3.1

rotating cylinder ageing test

RCAT

ageing procedure performed using a rotating cylinder

3.2

short-term ageing/conditioning

conditioning a binder undergoes during the method described in EN 12607-1 and EN 12607-2 or directly in the rotating cylinder to an equivalent level of ageing

NOTE 1 Short-term ageing/conditioning simulates the hardening which a bituminous binder undergoes during the mixing in an asphalt mixing plant

NOTE 2 See Annex A

3.3

stabilisation

conditioning of the binders from bituminous emulsions, cut-back or fluxed bitumen to produce residual binders to further determine their characteristics

NOTE E.g. the procedure described in EN 14895

3.4

long-term ageing

ageing that the binder undergoes during its service life

3.5

accelerated long-term ageing conditioning

simulated long-term ageing that the binder undergoes during the accelerated rotating cylinder ageing procedure.

NOTE 1 In the case of hot-mix asphalt binders the long-term ageing is carried out on binders that have already been conditioned through short-term ageing/conditioning.

NOTE 2 In the case of bituminous emulsions or cut-back or fluxed bitumen the long-term ageing is carried out on binders that have already been conditioned through the stabilisation procedure

3.6

mastic

homogenous mixture of filler and bituminous binder

NOTE 1 The mixture can be prepared directly in the rotating cylinder

NOTE 2 See Annex B

4 Principle

A rotating film of binder is heated to a specified temperature under a specified rotation speed and under a specified oxygen flow for a given period of time. This is to simulate the changes that occur to the binder during service (pavement or other bituminous applications, e.g. roofing). The standard procedure is RCAT90 as described in Subclause 6.4. For other purposes, e.g. research, other conditions may be used.

The effects of this ageing procedure are evaluated on the residual binder after the test. However, as samples can be taken at intermediate exposure times, the ageing process can be monitored on the basis of a kinetic approach.

NOTE Ageing of binders during service is affected by ambient temperature and air pressure as well as by mixture-associated variables such as volumetric mixture proportions, mixture permeability, aggregate properties and other factors. This procedure is intended to provide an evaluation of the relative ageing behaviour of binders under specified conditions, but cannot account entirely for mixture variables or provide relative resistance to ageing at in-service conditions.

5 Apparatus

Usual laboratory apparatus and glassware, together with the following:

5.1 Test system comprised of a cylinder with a grooved inner roller, an oxygen supply system with flow control devices, a forced-draft oven equipped with an appropriate outlet for the evacuation of volatile

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