

Bitumen and bituminous binders — Determination of the fracture toughness temperature by a three point bending test on a notched specimen

ICS 91.100.50

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English Version

Bitumen and bituminous binders - Determination of the fracture toughness temperature by a three point bending test on a notched specimen

Bitumes et liants bitumineux - Détermination de la température de résistance à la fissuration par un essai de flexion 3 points sur un barreau entaillé

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Bruchwiderstandstemperatur mittels eines Drei-Punkt-Biegeversuches an einem gekerbten Probekörper

This Technical Specification (CEN/TS) was approved by CEN on 26 October 2009 for provisional application.

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Foreword

This document (CEN/TS 15963:2010) has been prepared by Technical Committee CEN/TC 336 “Bituminous binders”, the secretariat of which is held by AFNOR.

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1 Scope

This Technical Specification specifies a method for the determination of the Fracture Toughness temperature, T_{FT} , of bituminous binders by means of a three point bending test on a notched binder sample.

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

2 Normative references

The following referenced documents are indispensable for the application 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.

3.1

maximum force

F

highest force measured during the bending test

NOTE 1 The test is done in the brittle state or close to that, so that the maximum force is considered as the onset of the crack propagation.

NOTE 2 Force is expressed in Newtons (N).

3.2

displacement at maximum force

D

bending of the test beam from the beginning of the test (from the zero point) to the break point

NOTE Displacement is expressed in millimetres (mm).

3.3

work

W

area under the force-displacement curve from the beginning of the test to the break of the sample, i.e. at the maximum force

NOTE Work is expressed in Newtons · metres (N·m) or in Joules (J).

3.4

Fracture Toughness temperature

T_{FT}

temperature at which the displacement at the maximum force is 0,3 mm (from the zero point)

NOTE Fracture Toughness temperature is expressed in degrees Celsius (°C).

3.5
initial stiffness
S

value calculated as the tangent of the force-displacement curve at the inflection point

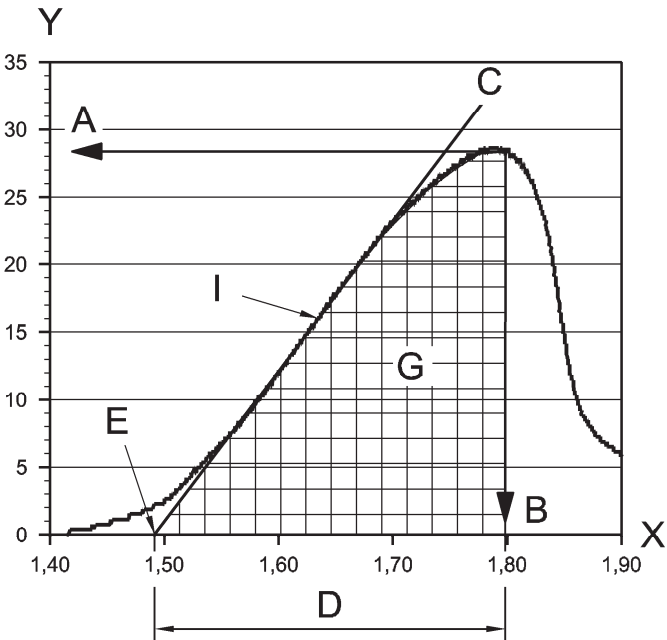
NOTE 1 See Figure 1.

NOTE 2 Stiffness is expressed in Newtons per millimetre (N/mm).

3.6
zero point

intersection of the x-axis and the tangent of the force-displacement curve at the inflection point

Figure 1 presents an example of the Force versus displacement curve at a temperature T close to T_{FT} .



Key

- | | |
|--|---|
| X displacement, in millimetres (mm) | A maximum force (defined as F) |
| Y force, in Newtons (N) | B X point at maximum force |
| | C tangent at the inflection point |
| | D displacement at maximum force, ($D = B - E$) |
| | E zero point |
| | G work (defined as W) |
| | I inflection point of F versus displacement |

Figure 1 — Example of a Force versus displacement curve at temperature T (close to T_{FT})