PD CEN/TS 15963:2014

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

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The UK participation in its preparation was entrusted by Technical Com mittee B/510, Road materials, to Subcommittee B/510/19, Bitumen and related products.

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

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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

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Foreword

This document (CEN/TS 15963:2014) 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. For environmental reasons, it is recommended to limit the use of products, solvents and energy to minimum in order to reduce the emissions to air, water and soil.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 to entry: 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 to entry: 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 1 to entry: 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 1 to entry: Work is expressed in newtons·metres (N·m) or in Joules (J).

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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 1 to entry: Fracture Toughness temperature is expressed in degrees Celsius (°C).

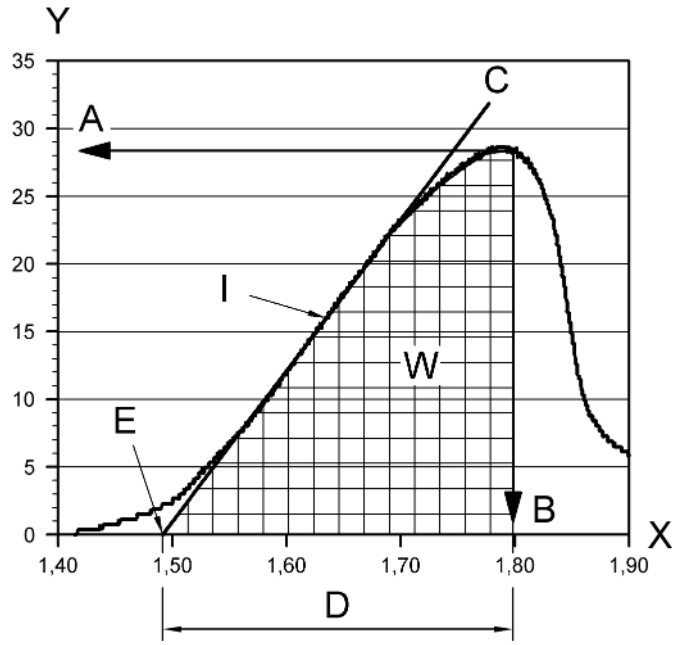
3.5
initial stiffness
S
value calculated as the slope of the tangent of the force-displacement curve at the inflection point

Note 1 to entry: See Figure 1.

Note 2 to entry: 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 expressed in millimetres (mm)

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
		W	work as defined in 3.3
		I	inflection point of *F* versus displacement

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

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