

Methods of test for petroleum and its products — BS 2000-80: Bitumen and bituminous binders — Determination of the Fraass breaking point (Identical with IP 80/2000)

The European Standard EN 12593:1999 has the status of a
British Standard

ICS 75.140; 91.100.50

National foreword

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Summary of pages

This document comprises a front cover, an inside front cover, the EN title page, pages 2 to 14, an inside back cover and a back cover.

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English version

Bitumen and bituminous binders - Determination of the Fraass breaking point

Bitumes et liants bitumineux - Détermination du point de fragilité Fraass

Bitumen und bitumenhaltige Bindemittel - Bestimmung des Brechpunktes nach Fraaß

This European Standard was approved by CEN on 19 September 1999.

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Foreword

This European Standard has been prepared by Technical Committee CEN/TC 19, Petroleum products, lubricants and related products, the Secretariat of which is held by NNI.

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of an identical text or by endorsement, at the latest by May 2000, and conflicting national standards shall be withdrawn at the latest by May 2000.

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

In this standard, Annex A is normative.

1 Scope

This European Standard specifies a method for determining the Fraass breaking point which provides a measure of the brittleness of bitumen and bituminous binders at low temperature.

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

2 Normative References

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 58, *Sampling bituminous binders.*

EN 1425, *Bitumen and bituminous binders - Characterization of perceptible properties.*

EN 1427, *Bitumen and bituminous binders - Determination of softening point - Ring and ball method.*

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

EN ISO 3838, *Crude petroleum and liquid or solid petroleum products - Determination of density or relative density - Capillary-stoppered pyknometer and graduated bicapillary pyknometer methods (ISO 3838:1983).*

3 Terms and definitions

For the purposes of this European Standard, the following definition applies.

3.1

Fraass breaking point

temperature, expressed in degrees Celsius, at which a film of bituminous binder of a specified and uniform thickness will break under defined loading conditions

4 Principle

A sample of bituminous binder is applied to a metal plate at an even thickness. This plate is submitted to a constant cooling rate and flexed repeatedly until the binder layer breaks; the temperature at which the first crack appears is reported as the Fraass breaking point.

5 Apparatus

Usual laboratory apparatus and glassware, together with the following:

5.1 Plates, made of tempered spring steel, and of the following dimensions: 41,00 mm $\pm$ 0,05 mm long, 20,0 mm $\pm$ 0,2 mm wide and 0,15 mm $\pm$ 0,02 mm thick. The plates shall be kept flat and protected from corrosion when not in use. Any plate which becomes visibly curved or corroded shall be discarded.

5.2 Plate preparation equipment, used for application of the melted sample, and including:

5.2.1 Magnet block, with a flat and smooth surface (Figure 1) holding one to three plates with a suitable cover (Figure 2);

5.2.2 Metal support, with two distinct zones: one temperature regulated and controlled, the other one cooled by water circulation. The support shall be horizontal and include an air bubble level and level adjustment screws;

5.3 Fraass breaking apparatus, as shown in Figure 3, consisting of the parts described in 5.3.1 to 5.3.3.

NOTE: Manual apparatus can be replaced by semi automatic or automatic apparatus reproducing the same conditions. Both apparatus improve the test performance.

5.3.1 Bending apparatus, as shown in Figure 4. The clearance between the two tubes, when assembled so that one can move longitudinally within the other, shall not exceed 1 mm. The tubes shall be made of a material that is of low thermal expansion (linear expansion coefficient: 40×10^{-6} m/K) and a poor conductor of heat (thermal conductivity: $< 0,3$ W/K/m).

The plate shall be held by two steel clips as shown in Figure 5, the upper clip being attached to the bottom end of the outer tube, and the lower clip being attached to the inner tube by means of a metal connecting piece. The clips shall be coplanar, parallel to the axis of the tube, and secured against twisting. The thermometer shall be mounted in such a way that the connecting piece does not act as a shield between thermometer bulb and ambient temperature.

By rotating the crank handle (see Figure 3), which operates a mechanism consisting of a cone of hardened metal, as shown in Figure 6, and a setting screw, the inner tube may be moved up and down relative to the outer tube. Eleven rotations of the handle shall permit the initial distance between the upper and lower clip of 40,0 mm $\pm$ 0,1 mm to be steadily reduced by 3,5 mm $\pm$ 0,1 mm.

A steel strut may be used to fix the initial bending of steel test plate. The height of the strut is such that, when in place, the initial distance between the upper and the lower clips is 40,0 mm $\pm$ 0,1 mm.

The use of semi automatic bending apparatus, in which the raising and lowering of the inner tube is controlled, for example, by a motor-driven cam disc, or of fully automatic apparatus, in which the reduction in temperature and the indication of the breaking point by the bending of the plate are also controlled, is permitted, provided that the test conditions specified in this standard are complied with;