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National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 1426:2000

ICS 75.140
91.100.50

BITUMEN AND BITUMINOUS BINDERS - DETERMINATION OF NEEDLE PENETRATION

National Standards
Authority of Ireland
Dublin 9
Ireland

Tel (01) 807 3800
Tel: (01) 807 3838

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EUROPEAN STANDARD
NORME EUROPÉENNE
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EN 1426

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ICS 75.140; 91.100.50

English version

Bitumen and bituminous binders - Determination of needle penetration

Bitumes et liants bitumineux - Détermination de la pénétrabilité à l'aiguille

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Nadelpenetration

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Central Secretariat: rue de Stassart, 36 B-1050 Brussels

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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of an identical text or by endorsement, at the latest by April 2000, and conflicting national standards shall be withdrawn at the latest by April 2000.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 and annex B is informative.

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1 Scope

This European Standard specifies a method for determining the consistency of bitumen and bituminous binders. A normal procedure is described for penetrations up to 500 × 0,1 mm, but for penetrations above this value, different operating parameters are necessary.

WARNING. The use of this standard may 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 incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 58, *Sampling of 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 10088-3, *Stainless steels – Part 3 : Technical delivery conditions for semi-finished products, bars, rods and sections for general purposes*

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

prEN 12597:1996, *Petroleum products - Bitumen and bituminous binders - Terminology*

ISO 6508, *Metallic materials - Hardness test - Rockwell test (scales A ; B ; C ; D ; E ; F ; G ; H ; K)*

3 Definitions

For the purposes of this European Standard, the definitions given in prEN 12597:1996 and the following apply.

3.1
penetration
consistency, expressed as the distance in tenths of a millimetre that a standard needle will penetrate vertically into a sample of the material under specified conditions of temperature, load and duration of loading.

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4 Principle

The penetration of a standard needle into a conditioned test sample is measured. For penetrations up to 500 × 0,1 mm the operating parameters are a test temperature of 25 °C, an applied load of 100 g, and a duration of loading of 5 s. For penetrations above 500 × 0,1 mm the test temperature is reduced to 15 °C but the operating parameters of the applied load and the duration of loading remain unchanged.

5 Apparatus

Usual laboratory apparatus and glassware, together with the following.

5.1 Penetrometer ; an apparatus that permits a needle holder to move vertically without measurable friction and that enables the penetration of the needle to be determined to the nearest 0,1 mm. The needle holder shall be readily detachable from the apparatus and shall have a mass of 47,50 g ± 0,05 g. A weight of 50,00 g ± 0,05 g suitable for attachment to the needle holder shall be provided if not already fixed to the needle holder. The stand upon which the specimen container, or transfer dish, rests shall be flat and horizontal. The 50 g weight shall be fixed underneath the support (see figure 1).

NOTE 1 An example of a suitable penetrometer is shown in figure 1. To facilitate levelling, the penetrometer should be provided with level adjustment screws

NOTE 2 Equipment that controls the penetration time automatically can also be used. Such equipment should be checked regularly for correct penetration time (see 5.6).

5.2 Penetration needle, (see figure 2), made from fully hardened, tempered and polished stainless steel of type X105CrMo17 (1.4125), conforming to EN 10088-3, taking into account that it is not necessary to comply with the minimum content of molybdenum specified in that standard, and of Rockwell hardness C54 to C60 determined in accordance with ISO 6508. The cylindrical body of the needle shall have a diameter of 1,00 mm to 1,02 mm and one end shall be symetrically tapered by grinding to a cone having an angle of 9° 10' ± 30' over the entire cone length. The cone shall be co-axial with the cylindrical body of the needle ; the total axial variation of the intersection between the conical and cylindrical surfaces shall not exceed 0,2 mm. The conical tip of the needle shall be ground square to the axis of the needle within 2° until the diameter at the tip is between 0.14 mm and 0,16 mm The edge of the ground tip shall be sharp and free from burrs.

For penetrations up to 350 × 0.1 mm the length of the needle shall be approximately 50 mm. For penetrations between 350 × 0.1 mm and 500 × 0,1 mm, use needles that conform to the requirements given for mass and dimensions, but which are longer in length such that the ferrule into which the needle is fixed does not penetrate the material under test.

The needle shall be rigidly mounted in a brass or stainless steel ferrule with 5 mm to 10 mm of the needle inside the ferrule. The run-out of the needle tip or any part of the needle relative to the ferrule axis shall not exceed 1 mm. The ferrule shall be 3,20 mm ± 0,05 mm in diameter and 38 mm ± 1 mm in length.

The mass of the ferrule needle assembly shall be 2,50 g ± 0,05 g.

NOTE 1 A drill hole at the end of the ferrule or a flat on the side is possible to control the mass

Individual identification marking shall be engraved or stamped on the ferrule of each needle ; the same marking shall not be repeated by the manufacturer within a 3 year period.

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