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6 ]li a Yb`]b`V]li a Ybg\_Uj Ynj U!`8 c`c Yj Ub`Y`dc`Ufbcghj`XYWj `V]li a Ybg\_]l `Ya i `nj^

Bitumen and bituminous binders - Determination of particle polarity of bitumen emulsions

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Teilchenpolarität von Bitumenemulsionen

Bitumes et liants bitumineux - Détermination de la polarité des particules des émulsions de bitume

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**ICS:**

|           |  |  |
|-----------|--|--|
| 75.140    | Voski, bitumni in drugi naftni proizvodi | Waxes, bituminous materials and other petroleum products |
| 91.100.50 | Veziva. Tesnilni materiali               | Binders. Sealing materials                               |

**SIST EN 1430:2000****en**

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EUROPEAN STANDARD

EN 1430

NORME EUROPÉENNE

EUROPÄISCHE NORM

October 1999

ICS 75.140; 91.100.50

English version

## Bitumen and bituminous binders - Determination of particle polarity of bitumen emulsions

Bitumes et liants bitumineux - Détermination de la polarité des particules des émulsions de bitume

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Teilchenpolarität von Bitumenemulsionen

This European Standard was approved by CEN on 5 September 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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

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EN 1430:1999

## 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 June 2002.

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.

This draft is part of a package including 15 standards : EN(WI 00019104), EN 1428, EN 1429, EN 1430, EN 1431, EN 12846, EN 12847, EN 12848, EN 12849, EN 12850, EN 13074, EN 13075-1, EN 13075-2, EN 13614-1, EN 13614-2.

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## 1 Scope

This European Standard specifies a method for the determination of the particle polarity of bitumen emulsions.

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

EN ISO 3696, *Water for analytical laboratory use - Specification and test methods* (ISO 3696:1987)

ISO 5280, *Xylene for industrial use - Specification*

## 3 Definition

For the purposes of this standard, the following definition applies :

### 3.1

#### **particle polarity**

sign of the electric charge carried by particles in ionic emulsions.

NOTE In cationic emulsions, particles have positive polarity. In anionic emulsions, particles have negative polarity.

## 4 Principle

A direct or rectified current is passed through a bitumen emulsion between two parallel plate electrodes. Deposition of a layer of bitumen on the anode indicates negative polarity and that the emulsion is anionic. Deposition of particles on the cathode indicates positive polarity and that the emulsion is cationic.

## 5 Reagents and materials

Use only reagents of recognized analytical grade and water conforming to grade 3 of EN ISO 3696.

5.1 **Xylene**, conforming to ISO 5280.

5.2 **Propan-2-ol**.

5.3 **Ethanol**, 99 % minimum.

## 6 Apparatus

Usual laboratory apparatus and glassware, together with the following :

6.1 **Electrical circuit**, (see figures 1 and 2) consisting of the following components :

6.1.1 **Current source**, capable of supplying a direct or rectified current of 8 mA at a potential of 12 V to 15 V for 30 min.

6.1.2 **Milliammeter**, with a full scale deflection of 10 mA.

6.1.3 **Variable resistor**.

6.1.4 **Electrodes**, two stainless steel plates approximately 100 mm long, 25 mm wide and 1,0 mm thick, with an insulating device to hold the plates parallel and 12 mm apart in the emulsion (see figure 2).

6.1.5 **Insulator**, polytetrafluoroethylene resin square rod, virgin electrical grade, 12 mm long.

6.2 **Glass beaker**, 150 ml or 250 ml capacity.

6.3 **Glass rod**, approximately 100 mm long and 6 mm thick or other suitable device that is capable of insulating and suspending the electrode assembly in the emulsion.

6.4 **Timing device**, stop watch or other suitable device.

## 7 Sampling

The laboratory sample shall be sampled in accordance with EN 58 and shall be prepared in accordance with EN 12594.

The sample shall be divided into two portions; in case of doubt concerning the results, both portions shall be tested.

NOTE : The second portion is tested only in the exceptional case where the observation made according to 8.6 results in a doubtful conclusion.

## 8 Procedure

### 8.1 Preparation of electrodes

Clean the electrodes (6.1.4) and any electrodes which are reused in the following sequence :

- Wash with water;
- Wash with propan-2-ol (5.2) or ethanol (5.3) ;
- Wash with xylene (5.1) ;
- Wash with propan-2-ol (5.2) or ethanol (5.3) ;
- Wash with water.

**8.2** Pour sufficient emulsion into a beaker (6.2) to permit immersion of the electrodes to a depth of approximately 25 mm in the emulsion. Suspend the electrodes, separated by the insulator (6.1.5), from the glass rod (6.3) across the top of the beaker. Immerse the electrodes to the required depth in the emulsion by placing the glass rod across the top of the beaker.

NOTE : Any apparatus capable of manual height adjustment and of insulating and suspending the electrodes in the emulsion, may be used.

**8.3** Connect the electrodes (6.1.4), which have been cleaned (see 8.1) and dried, to the direct current source (6.1.1), as shown in figure 2.

**8.4** Adjust the current to between 8 mA and 10 mA with the variable resistor (6.1.3) and start timing with a suitable timing device (6.4). Record the current used.

**8.5** When the current drops to 2 mA, or at the end of 30 min, whichever occurs first, disconnect the current source, and gently wash the electrodes in running water.

**8.6** Observe the deposition of bituminous binder deposit on the electrodes, and record the polarity of this.

NOTE : A cationic emulsion (with positive polarity) will deposit an appreciable layer of binder on the cathode (negative electrode). An anionic emulsion (with negative polarity) will deposit an appreciable layer of binder on the anode (positive electrode).

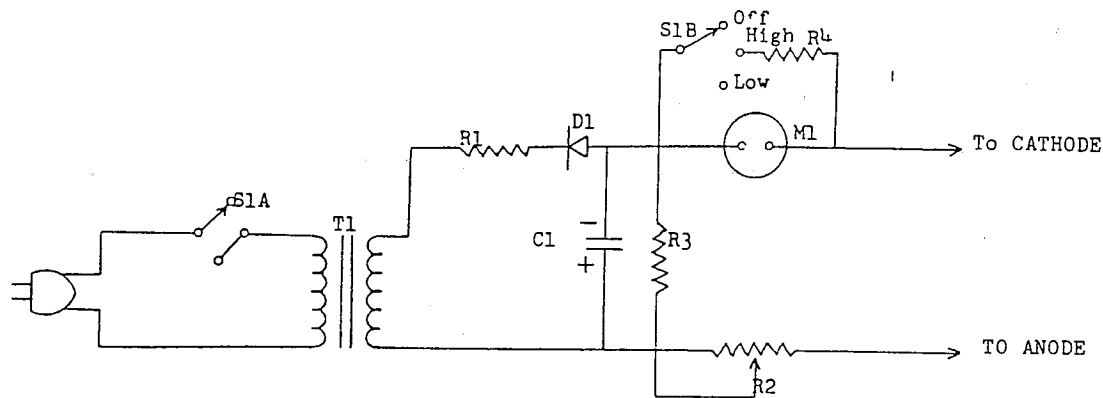
## 9 Expression of results

Express the polarity of bitumen particles in the emulsion as positive or negative (see 8.6).

## 10 Test report

The test report shall contain at least the following information :

- a) the type and complete identification of the sample under test ;
- b) a reference to this European Standard ;
- c) the current used (see 8.4) ;
- d) the result of the test (clause 9) ;
- e) any deviation, by agreement or otherwise, from the procedure specified ;
- f) the date of the test.



R1 - 47  $\Omega$ , 1 W resistor

R2 - 5 000  $\Omega$  potentiometer

R3 - 6 800  $\Omega$ , 1/4 W resistor

R4 - meter shunt (determined by type of meter used)

C1 - 500  $\mu$ F, 25V capacitor

D1 - silicon diode

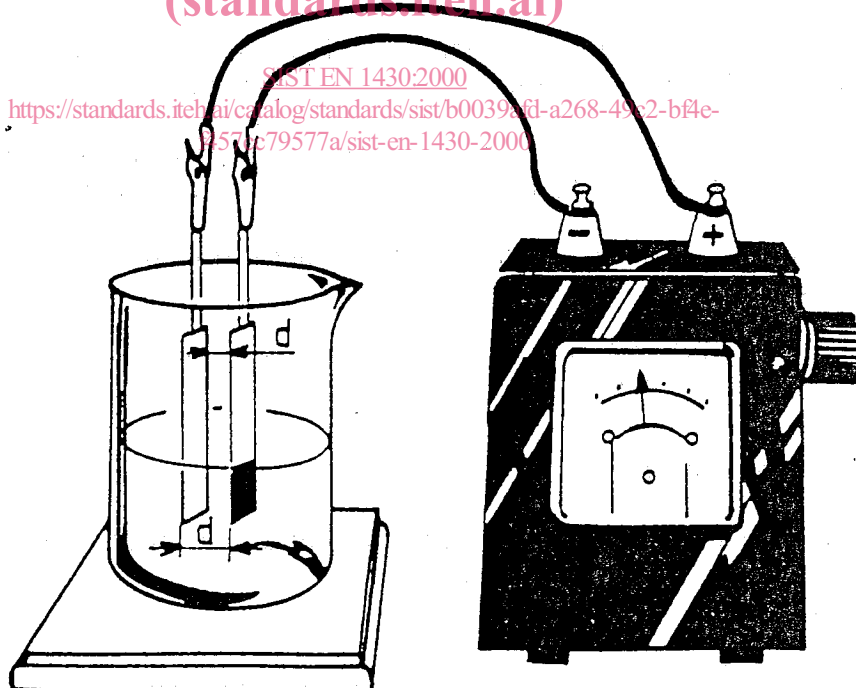
S1 - 2-pole 3-position rotary switch

M1 - 0 to 10 mA milliammeter

T1 - 12,6 V filament transformer

Figure 1 : Example of the circuit diagram of the apparatus

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d = distance between the two electrodes  
d = 12 mm

Figure 2 : Example of test apparatus layout