



SLOVENSKI STANDARD

SIST EN 12846:2003

01-januar-2003

6]li a Yb`]b`V]li a Ybg_Uj Yn]j U!`8 c`c Yj Ub`Y`j]g_cnbcgh]`V]li a Ybg_] \ `Ya i `n]`n]nrc b]a `j]g_cn]a Yfca

Bitumen and bituminous binders - Determination of efflux time of bitumen emulsions by the efflux viscometer

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Ausflusszeit von Bitumenemulsionen mittels Ausflussviskosimeter

Bitumes et liants bitumineux - Détermination du temps d'écoulement des émulsions de bitume a l'aide d'un viscosimètre a écoulement

Ta slovenski standard je istoveten z: EN 12846:2002

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 12846:2003

en

iTeh STANDARD PREVIEW
(standards.iteh.ai)

SIST EN 12846:2003

<https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003>

ICS 75.140; 91.100.50

English version

Bitumen and bituminous binders - Determination of efflux time of bitumen emulsions by the efflux viscometer

Bitumes et liants bitumineux - Détermination du temps d'écoulement des émulsions de bitume à l'aide d'un viscosimètre à écoulement

Bitumen und bitumenhaltige Bindemittel - Bestimmung der Ausflusszeit von Bitumenemulsionen mittels Ausflussviskosimeter

This European Standard was approved by CEN on 15 February 2002.

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 Management Centre 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 Management Centre 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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

[SIST EN 12846:2003](https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003)

<https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003>



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

Management Centre: rue de Stassart, 36 B-1050 Brussels

Foreword

This document EN 12846:2002 has been prepared by Technical Committee CEN/TC 336 "Bituminous binders", the secretariat of which is held by AFNOR.

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 November 2002, and conflicting national standards shall be withdrawn at the latest by November 2002.

This European Standard is part of a package including 14 standards: 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 and EN 13808.

Annex A forms a normative part of this document.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[SIST EN 12846:2003](https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003)

<https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003>

1 Scope

This European Standard specifies a method for the determination of the efflux time of bitumen emulsions.

NOTE For the purposes of this European Standard, the term “% (m/m)” is used to represent the mass fraction.

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 (including amendments).

EN 58¹⁾, *Bitumen and bituminous binders - Sampling bituminous binders.*

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

ISO 4788, *Laboratory glassware - Graduated measuring cylinders.*

iTeh STANDARD PREVIEW
(standards.iteh.ai)

3 Terms and definitions

SIST EN 12846:2003

<https://standards.iteh.ai/catalog/standards/sist/615822b1-f176-42b4-8564-115dd15207a/sist-en-12846-2003>

For the purposes of this European Standard, the following term and definition apply.

3.1

efflux time

time required for a specified volume of emulsion to flow out of the cup of a specified efflux viscometer

NOTE Efflux time gives an indication of the pseudoviscosity of a bitumen emulsion.

4 Principle

The efflux time of a bitumen emulsion is determined, using an efflux viscometer, as the time of efflux of a given quantity of the emulsion through an orifice of a specified size at a specified temperature.

5 Reagents and materials

5.1 Light mineral oil

5.2 Solution Sa

An aqueous solution containing 1 % (m/m) of sodium lauryl sulfate or, failing that, an aqueous solution containing 1 % (m/m) of sodium oleate. In these solutions, 1 % (m/m) of sodium hydroxide shall be added.

This type of solution shall be used for testing anionic emulsions.

¹⁾ In course of revision.

NOTE Solution Sa can be prepared also using potassium lauryl sulfate, potassium oleate and potassium hydroxide.

5.3 Solution Sc

An aqueous solution containing 1 % (m/m) of alkyltrimethylammonium chloride or 1 % (m/m) of cetyltrimethylammonium bromide or, failing those, 1 % (m/m) of fatty amine hydrochloride. In these solutions, 1 % (m/m) of 1 mol/l hydrochloric acid shall be added.

This solution shall be used for testing cationic emulsions.

NOTE The aqueous solutions (5.2) and (5.3) can be replaced by aqueous phases of the same ionic structure as the tested emulsion.

6 Apparatus

Usual laboratory apparatus and glassware, together with the following:

6.1 Efflux viscometer of the type shown in Figure 1, utilizing viscometer-cups with orifices of 10 mm, 4 mm or 2 mm in diameter fitted with a ball-and-socket valve of the appropriate size as indicated in Figure 2.

Choose the diameter of the orifice of the cup amongst the following conditions:

Table 1 – Diameter of the orifice of the cup

Orifice size, mm	Efflux time, s	
	min	max
10 and 4	5	Non-continuous flow
2	5	Non-continuous flow

The viscometer cups shall be provided with stoppers suitable for closing the orifices with the ball valve in position, and some means of covering the cups to prevent evaporation of water.

The viscometer-cup holder shall be capable of:

- supporting one or more cups in a vertical position;
- providing a clearance of 280 mm ± 20 mm between the bottom of the orifice of the cup and the base on which the holder stands;
- providing a means of maintaining the test material in the cup at the test temperature during the period of efflux;
- providing a valve support to hold the valve 16 mm ± 1 mm vertically above the orifice of the cup during efflux of the test material.

The cup holder can be heated either by gas, as illustrated in Figure 1, or by electricity, or can be combined with a separate source of hot water.

When the cup holder is heated by gas or electricity, according to Figure 1, the stirring device consists of a cylinder surrounding the sleeve with an easy sliding fit and provided with four vanes the upper and lower portions of which are twisted in opposite directions (see Figure 1 – item 12).

NOTE An apparatus, suitable for holding a single cup, which meets the above requirements is illustrated in Figure 1.

6.2 Constant temperature water bath, maintained at $40,0\text{ °C} \pm 0,5\text{ °C}$, in which one or more of the viscometer cups can be immersed up to the rim of the cup.

NOTE Alternative test temperatures are $25,0\text{ °C} \pm 0,5\text{ °C}$ and $50,0\text{ °C} \pm 0,5\text{ °C}$.

If a multiple-cup heating bath is used, the cups shall be separated from each other and from the walls of the bath by at least 55 mm.

A suitable support shall be provided to maintain the cup(s) in a vertical position.

6.3 Thermometers, two (see annex A).

Other temperature devices may be used instead of mercury stem thermometers. However, the mercury stem thermometer is the reference device. Therefore any alternative device employed shall be calibrated so as to provide the same readings as would be provided by the mercury stem thermometer, recognising and allowing for the fact of changed thermal response times compared with the mercury thermometer.

6.4 Receiver, 100 ml cylinder with graduations to capacities of 20 ml, 25 ml and 75 ml, complying with the requirements of ISO 4788.

6.5 Timing device, capable of measuring times up to 300 s, with an accuracy of $\pm 0,2\text{ s}$.

7 Sampling

The material under test shall be sampled in accordance with EN 58 and prepared in accordance with EN 12594. The test shall be carried out in duplicate.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

8 Procedure

[SIST EN 12846:2003](https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003)

<https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003>

8.1 General

Carry out the procedure under normal laboratory conditions.

NOTE "Normal laboratory conditions" mean that the range of temperature is 18 °C to 28 °C .

Before starting the test, ensure that all of the parts of the apparatus in contact with the sample are clean and dry.

8.2 Test

8.2.1 With the orifice closed with the stopper and ball valve, carefully fill the viscometer cup to just above the level peg with the emulsion test sample. Cover the top of the cup, for example with a suitable lid, to prevent evaporation of water.

8.2.2 Stir the water in the bath with the vanes and check that the temperature in the water bath of the efflux viscometer is at the required value for the test, using a thermometer (6.3).

8.2.3 Place the filled cup into the viscometer-cup holder and stir the emulsion test sample from time to time using a second thermometer, until the emulsion test sample is at the required value for the test.

NOTE If required, the viscometer-cup and emulsion can be brought to the required temperature for the test before transfer to the cup holder (6.1). This operation can be carried out in a thermostatically controlled water bath (6.2) or, alternatively, the emulsion can be brought to the specified temperature in a sealed container such as a plastic bottle.

8.2.4 Remove the bottom stopper and then the top cover (see 8.2.1) while at the same time removing any excess emulsion sample above the centre line of the level peg using the thermometer. If it is necessary to adjust the level of emulsion sample by adding emulsion, discontinue the test.

8.2.5 Pour 20 ml of light mineral oil (5.1) or Sa solution (5.2) or Sc solution (5.3) into the receiver (6.4).

8.2.6 With the receiver in position under the orifice of the cup, lift the ball valve and suspend it on the valve support. When the level in the receiver reaches the 25 ml mark, start the timing device and stop it when the level reaches the 75 ml mark. Record the time of efflux to the nearest second.

If the efflux time is out of the range indicated in Table 1 of 6.1, the test results shall be discarded. Repeat the test with a cup with another orifice.

8.2.7 Repeat 8.2.1 to 8.2.6 on a second emulsion test sample.

9 Expression of results

Report the diameter of the orifice used and the test temperature.

Express the result as the arithmetic mean of the two results obtained in accordance with clause 8 to the nearest second, provided that individual results do not differ by more than 10 % of the arithmetic mean.

If the two results differ by more than 10 %, repeat the whole procedure.

10 Precision

NOTE The precision of the method was evaluated in accordance with EN ISO 4259 [1], and is validated for 20 °C and 40 °C, with 4 mm and 10 mm cups only. With 2 mm cups, the precision is not available.

10.1 Repeatability

The difference between two successive test results, obtained by the same operator with the same apparatus under constant operating conditions on identical test material would, in the long run, in the normal and correct operation of the test method, exceed the following values in only one case in twenty:

Table 2 - Repeatability

Viscosity, s	Repeatability
below 20	1 s
20-40	2 s
above 40	5 % of the mean

10.2 Reproducibility

The difference between two single and independent results obtained by different operators working in different laboratories on identical test material would, in the long run, in the normal and correct operation of the test method, exceed the following values in only one case in twenty:

Table 3 - Reproducibility

Viscosity, s	Reproducibility
below 20	2 s
20-40	10 % of the mean
above 40	10 % of the mean

11 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 result of the test (see clause 9);
- d) any deviation, by agreement or otherwise, from the procedure specified;
- e) the date of sampling, the date of sample preparation and the date of the test.

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[SIST EN 12846:2003](#)

<https://standards.iteh.ai/catalog/standards/sist/615822b1-fd76-42b4-8564-113ddd152d9a/sist-en-12846-2003>