



SLOVENSKI STANDARD

SIST EN 16329:2013

01-julij-2013

Dizelsko gorivo in kurilno olje za gospodinjstvo - Ugotavljanje filtrirnosti - Metoda linearnega ohlajanja v kopeli

Diesel and domestic heating fuels - Determination of cold filter plugging point - Linear cooling bath method

Dieselmotoren und Haushaltheizöl - Bestimmung des Temperaturgrenzwertes der Filtrierbarkeit - Linear-gekühlter Bade Methode

Combustibles pour moteurs diesel et pour installations de chauffages domestiques - Détermination de la température limite de filtrabilité - Méthode d'un bain avec refroidissement linéaire

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Ta slovenski standard je istoveten z: **EN 16329:2013**

ICS:

75.160.20 Tekoča goriva Liquid fuels

SIST EN 16329:2013 **en,de**

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EUROPEAN STANDARD

EN 16329

NORME EUROPÉENNE

EUROPÄISCHE NORM

May 2013

ICS 75.160.20

English Version

Diesel and domestic heating fuels - Determination of cold filter plugging point - Linear cooling bath method

Combustibles pour moteurs diesel et pour installations de chauffage domestique - Détermination de la température limite de filtrabilité - Méthode au bain à refroidissement linéaire

Dieselmotoren und Haushaltsheizöl - Bestimmung des Temperaturgrenzwertes der Filtrierbarkeit - Verfahren mit einem linearen Kühlbad

This European Standard was approved by CEN on 21 March 2013.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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Foreword

This document (EN 16329:2013) has been prepared by Technical Committee CEN/TC 19 "Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin", the secretariat of which is held by NEN.

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of an identical text or by endorsement, at the latest by November 2013, and conflicting national standards shall be withdrawn at the latest by November 2013.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

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Introduction

This document specifies in detail an automated method as an alternative technique to EN 116:1997 [1]. The cooling bath is no longer operated in several temperature stages (as in EN 116), but is replaced by a refrigeration unit with linear cooling.

Round Robin studies conducted for this determination method [2] showed improved precision compared to EN 116:1997. The studies covered currently marketed fuels, including non-fossil components (FAME-blends) or biofuels. Although a bias has been identified during the statistical comparison of EN 116 and this document, this is not considered to be significant because the bias is within the repeatability of both methods. The range of CFPP values for the fuels for the Round Robin – therefore the basis of the determined precision – was from -47 °C to $+11\text{ °C}$, but the results also showed indications of issues for fuel samples with a CFPP below -30 °C . Further CEN studies are planned to assess the magnitude of these issues and the bias in additional market samples. A separate study is planned to further confirm the precision for paraffinic diesel fuels as the amount of these samples included in the Round Robin had been limited.

A report with further statistical details of the Round Robin is under development within CEN. At the same time, EN 116 [1] will be revised as well following conclusions from the Round Robin studies.

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1 Scope

This European Standard specifies an automated method for the determination of the cold filter plugging point (CFPP) of diesel and domestic heating fuels using linear cooling.

This European Standard is applicable to fatty-acid methyl esters (FAME) and to distillate fuels as well as paraffinic diesel fuels, including those containing FAME, flow-improvers or other additives, intended for use in diesel engines and domestic heating installations.

The results obtained from the method specified in this European Standard are suitable for estimating the lowest temperature at which a fuel will give trouble-free flow in the fuel system.

NOTE In the case of diesel fuels, the results are usually close to the temperature of failure in service except when the fuel system contains, for example, a paper filter installed in a location exposed to the weather or if the filter plugging temperature is more than 12 °C below the cloud point of the fuel. Domestic heating installations are usually less critical and often operate at a satisfactory level at temperatures somewhat lower than those indicated by the test results.

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

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 ISO 3170, *Petroleum liquids — Manual sampling (ISO 3170)*
EN ISO 3171, *Petroleum liquids — Automatic pipeline sampling (ISO 3171)*

ISO 261, *ISO general purpose metric screw threads — General plan*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

cold filter plugging point CFPP

highest temperature at which a given volume of fuel fails to pass through a standardized filtration device in a specified time, when cooled under standardized conditions

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4 Principle

This European Standard describes the use of automated test equipment only.

A test portion of the fuel is cooled under the specified conditions and is drawn at intervals of 1 °C into a pipette under a controlled vacuum of 2 kPa through a standardized wire mesh filter. The procedure is repeated, as the fuel continues to cool, for each 1 °C below the first test temperature. Testing is continued until the amount of wax crystals, which have separated out of solution, is sufficient to stop or slow down the flow so that the time taken to fill the pipette exceeds 60 s or the fuel fails to return completely to the test jar before the fuel has cooled by a further 1 °C.

The indicated temperature at which the last filtration was commenced is recorded as the cold filter plugging point (CFPP).

5 Reagents and materials

5.1 **Hydrocarbon solvents**, technical grade, e.g. Heptane

5.2 **Light hydrocarbon solvents**, technical grade, e.g. Isopentane

5.3 **Lintless filter paper**, with particle retention of 30 µm

5.4 **Certified reference materials**

NOTE Certified reference materials can be obtained from the European Commission, JRC. The Institute for Reference Materials and Measurements (IRMM), Retieseweg 111, B-2440 Geel, Belgium, can be contacted to obtain further information.

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6 Apparatus

6.1 General

The equipment is described in detail in 6.2 to 6.12. Unless otherwise stated, all dimensions in the figures are given in mm.

IMPORTANT — Parts of the apparatus made of copper, zinc or brass can interact with bio-components like Fatty Acid Methyl Ester (FAME). Care shall be taken. Parts made from alternative materials are available.

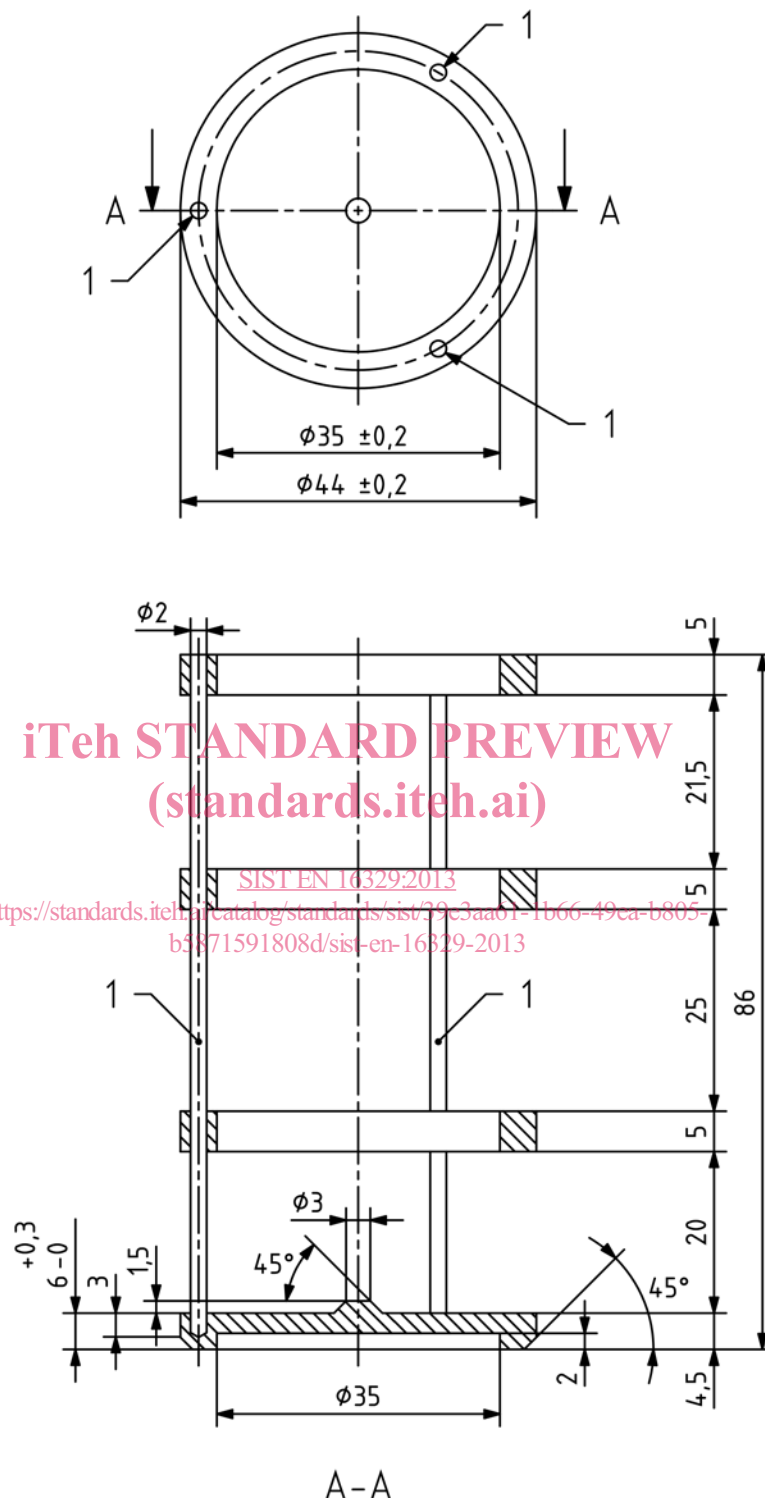
6.2 **Test jar**, cylindrical, of clear glass, flat bottomed, with an outside diameter of $(34 \pm 0,5)$ mm, a wall thickness of $(1,20 \pm 0,15)$ mm and a height of (120 ± 5) mm. The jar shall have a permanent mark at the 45 ml level.

6.3 **Jacket**, watertight, cylindrical, flat bottomed, to be used as an air bath. It shall have an inside diameter of $(45 \pm 0,25)$ mm and a height of (115 ± 3) mm.

6.4 **Spacer**, made from POM-C¹⁾, except for the stainless steel rods with 2 mm diameter, to be placed into the jacket (6.3), conforming to the dimensions as shown in Figure 1.

1) POM-C Polyoxymethylen Copolymer, trademarks e.g. DELRIN.

Dimensions in millimetres

**Key**

1 rod (3 in total)

Figure 1 — Spacer

6.5 Stopper, of oil-resistant and non-thermal conductive material, having three holes to accommodate the pipette with filter unit (6.6), the thermometer (6.9) and to allow venting of the system, and able to ensure that pipette and thermometer are safely positioned in the test jar.

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6.6 Pipette with filter unit

6.6.1 A pipette of clear glass with a volume of $(20 \pm 0,2)$ ml at a point $(149 \pm 0,5)$ mm from the bottom of the pipette (see Figure 2). It shall be connected to the filter unit.

Dimensions in millimetres

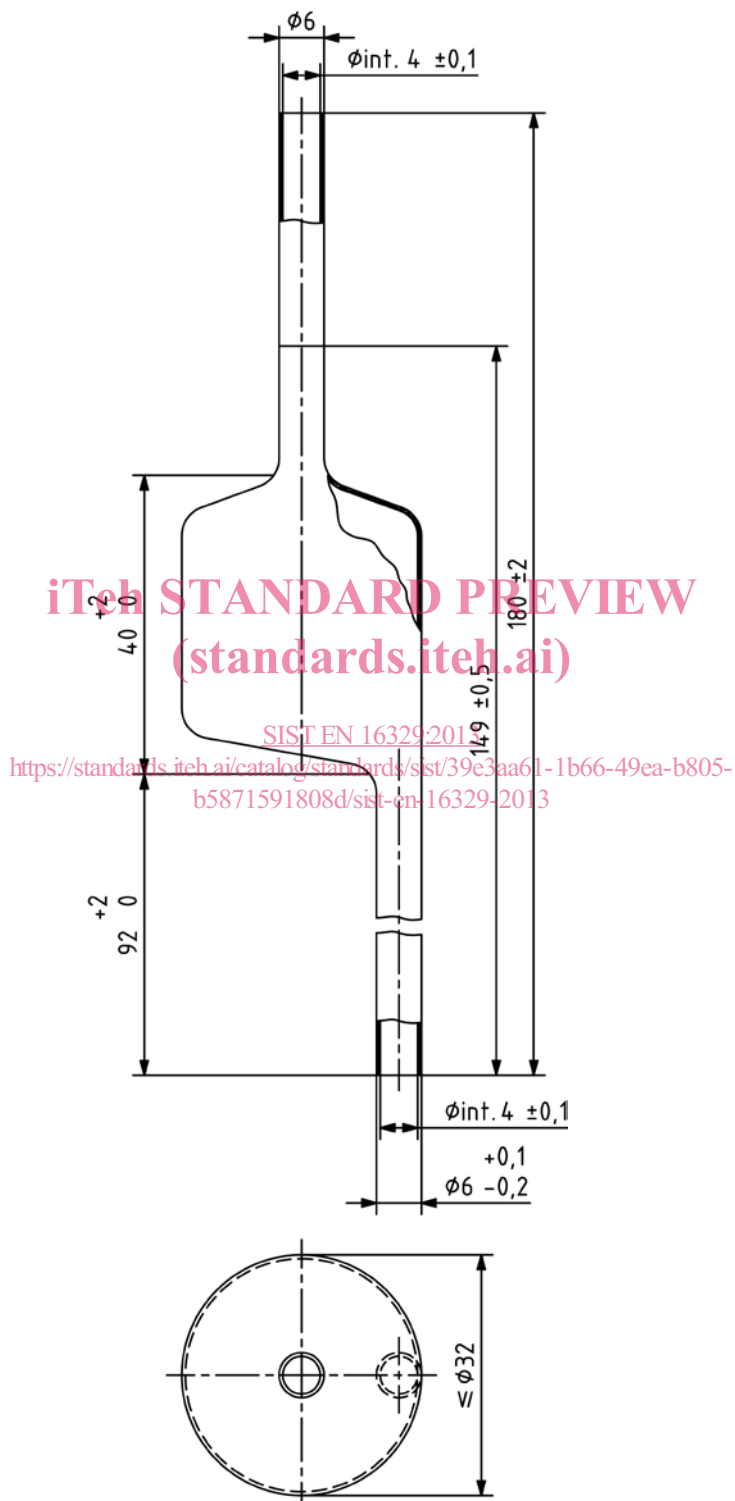


Figure 2 — Pipette

6.6.2 A **filter unit** as in Figure 3, with general purpose metric screw threads according to ISO 261, further consisting of a filter holder as in Figure 4 and a disc, 15 mm diameter, stainless steel wire mesh gauze with a nominal aperture size of 45 µm in basket weave (not twill). The nominal diameter of the wire shall be 32 µm and the tolerance for the size of an individual aperture shall be as follows:

- a) no aperture size shall exceed the nominal size by more than 22 µm;
- b) the average aperture size shall be within $\pm 3,1$ µm of the nominal size; and
- c) not more than 6 % of the apertures shall be above the nominal size by more than 13 µm.

NOTE The requirements for the wire mesh are taken from ISO 3310-1 [3], to which reference may be made for methods for testing the gauze.

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