SLOVENSKI STANDARD
SIST EN 16329:2023

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Nadomešča:
SIST EN 16329:2013

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

Dieselkraftstoffe und Haushaltsheizöle - Bestimmung des Temperaturgrenzwertes der Filtrierbarkeit - Verfahren mit einem linearen Kühlbad

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

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ICS:

75.160.20	Tekoča goriva	Liquid fuels

SIST EN 16329:2023 **en,fr,de**

EUROPEAN STANDARD

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English Version

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

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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (EN 16329:2022) 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of an identical text or by endorsement, at the latest by May 2023, and conflicting national standards shall be withdrawn at the latest by May 2023.

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

This document supersedes EN 16329:2013.

A significant technical difference between this document and the previous edition of EN 16329 is:

— Addition of the bias correction reporting format.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

The method included in this document is an alternative technique to EN 116 [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.

Inter-laboratories studies (ILS) conducted for this determination method showed improved precision compared to EN 116. The studies covered currently marketed fuels, including non-fossil components (FAME-blends) or biofuels and paraffinic diesel fuels. The range of CFPP values for the fuels tested was from – 47 °C to +11 °C.

1 Scope

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

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

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. 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)*

EN ISO 17034, *General requirements for the competence of reference material producers (ISO 17034)*

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.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

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

4 Principle

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 (CRM), from suppliers according to EN ISO 17034.

NOTE CRM as specified in EN 116 can be used, see Clause 11. CRM can be obtained from the European Commission's Joint Research Centre (JRC).

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.

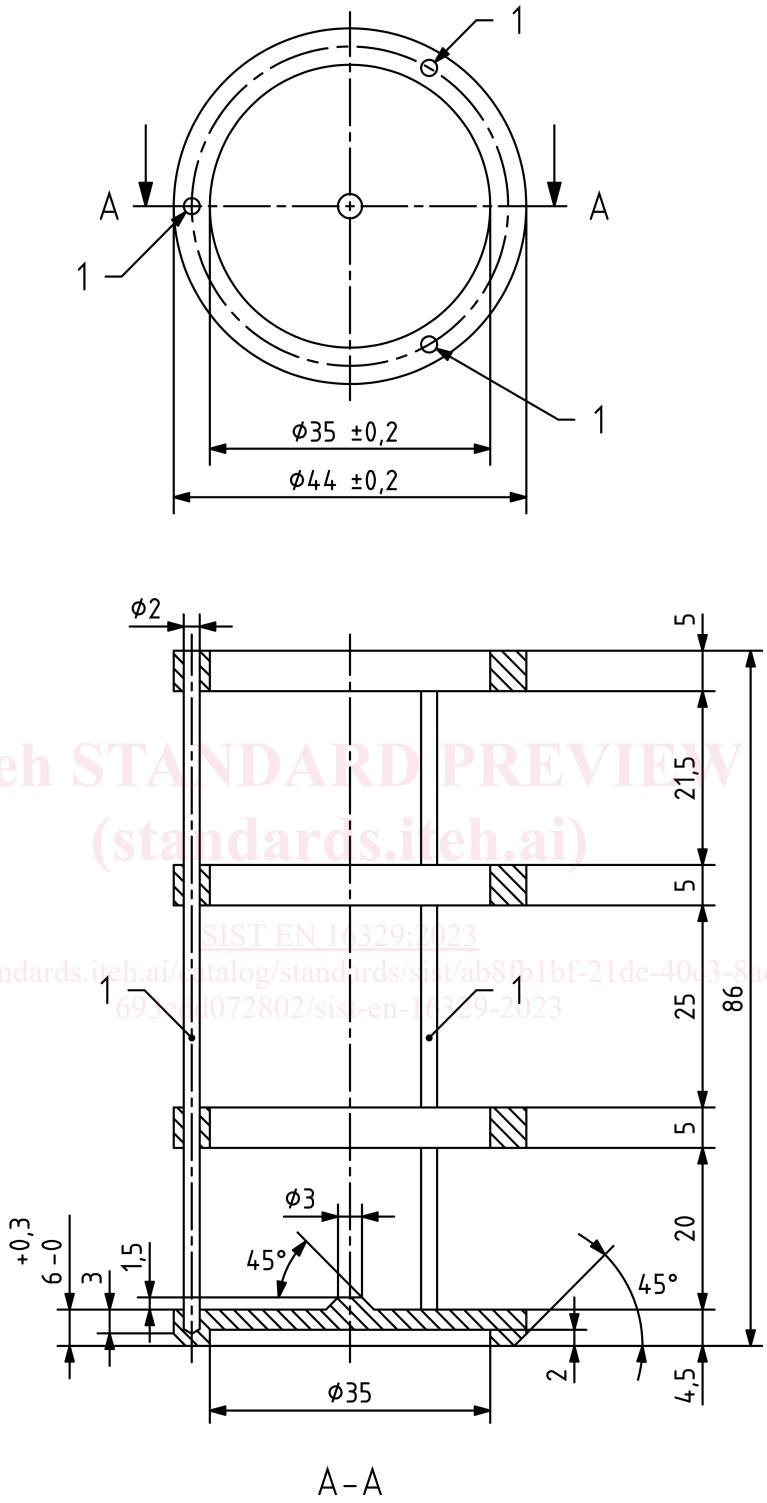
6.2 Test jar, cylindrical, of clear glass, flat bottomed, with an outside diameter of (34 ± 0,5) mm, a wall thickness of (1,20 ± 0,15) mm and a height of (120 ± 5) mm. The jar shall have a permanent mark at the 45 ml level.

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

6.4 Spacer, made from POM-C[1], 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 is Polyoxymethylen Copolymer.

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.

6.6 Pipette with filter unit

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

Dimensions in millimetres

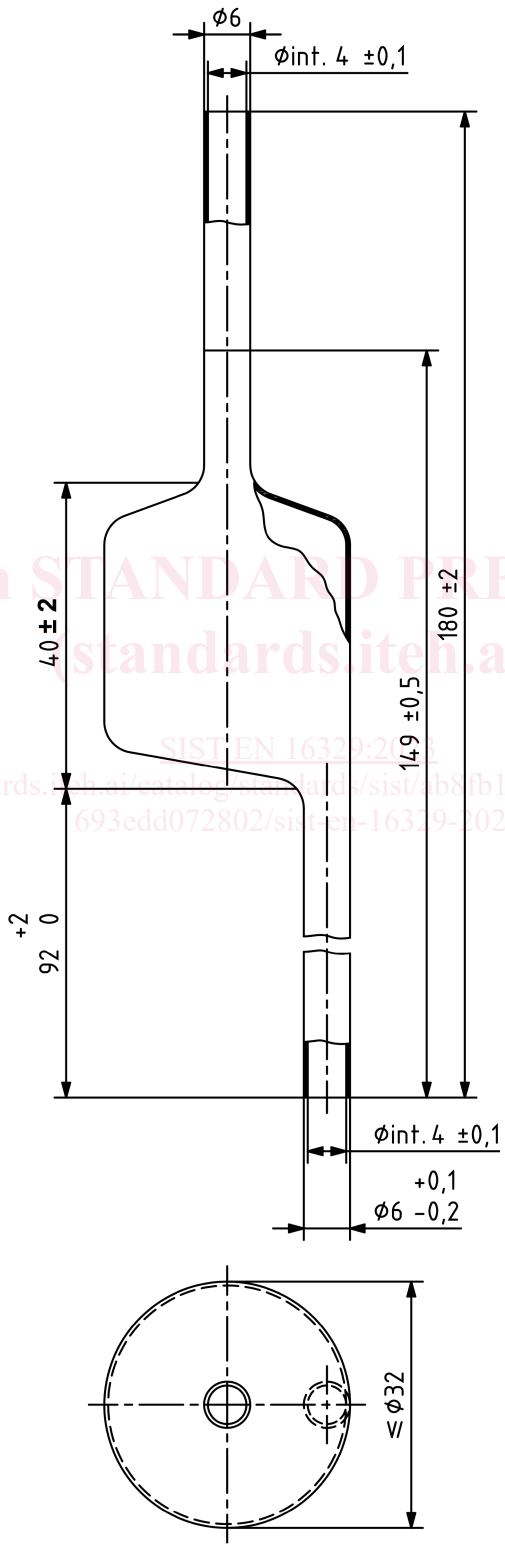


Figure 2 — Pipette

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:

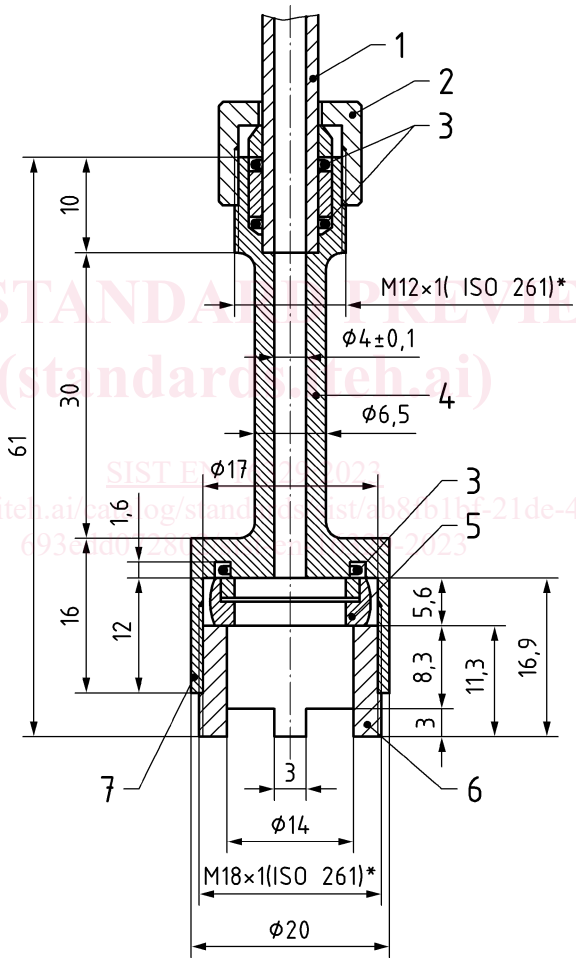
a) no aperture size shall exceed the nominal size by more than 22 µm;

b) the average aperture size shall be within ± 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 can be made for methods for testing the gauze.

Dimensions in millimetres



Key

1	pipette tube (6.6.1)	5	filter holder (Figure 4)
2	brass screw cap	6	threaded brass cylinder
3	oil-resistant plastics O-ring	7	knurl
4	brass body		

Figure 3 — Filter unit