



# SLOVENSKI STANDARD

## SIST EN 17306:2024

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### Tekoči naftni proizvodi - Določanje destilacijskih značilnosti pri atmosferskem tlaku - Mikrodestilacija

Liquid petroleum products - Determination of distillation characteristics at atmospheric pressure - Micro-distillation

Flüssige Mineralölerzeugnisse - Bestimmung der Destillationseigenschaften bei atmosphärischem Druck - Mikrodestillation

Produits pétroliers liquides - Détermination des caractéristiques de distillation à la pression atmosphérique - Micro-distillation

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#### **ICS:**

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EUROPEAN STANDARD

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## Liquid petroleum products - Determination of distillation characteristics at atmospheric pressure - Micro-distillation

Produits pétroliers liquides - Détermination des caractéristiques de distillation à la pression atmosphérique - Microdistillation

Flüssige Mineralölerzeugnisse - Bestimmung der Destillationseigenschaften bei atmosphärischem Druck - Mikrodestillation

This European Standard was approved by CEN on 18 September 2023.

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

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## EN 17306:2023 (E)

### European foreword

This document (EN 17306:2023) 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of an identical text or by endorsement, at the latest by May 2024, and conflicting national standards shall be withdrawn at the latest by May 2024.

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 17306:2019.

In comparison with the previous edition, a bias correction explanation has been introduced, which has no effect on the method precision.

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.

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## Introduction

The distillation (volatility) characteristics of hydrocarbons and other liquids have an important effect on their safety and performance, especially in the case of fuels and solvents. The boiling range gives information on the composition, the properties, and the behaviour of the fuel during storage and use. Volatility is the major determinant of the tendency of a hydrocarbon mixture to produce potentially explosive vapours.

The distillation characteristics are critically important for both automotive and aviation gasolines, affecting starting, warm-up and tendency to vapour lock at high operating temperature or at high altitude, or both. The presence of high boiling point components in these and other fuels can significantly affect the degree of formation of solid combustion deposits.

Distillation limits are often included in petroleum product specifications, in commercial contract agreements, process refinery/control applications, and for compliance to regulatory rules.

This test method can be applied to contaminated products or hydrocarbon mixtures. This is valuable for fast product quality screening, refining process monitoring, fuel adulteration control, or other purposes including use as a portable apparatus for field testing.

This document is at of the time of publication technically equivalent to ASTM D7345 [1], on which it is based.

This test method uses an automatic micro distillation apparatus, provides fast results using small sample volume, and eliminates much of the operator time and subjectivity in comparison to EN ISO 3405 or ASTM D1160 [2].

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# EN 17306:2023 (E)

## 1 Scope

This document specifies a laboratory method for the determination of the distillation characteristics of light and middle distillates derived from petroleum and related products of synthetic or biological origin with initial boiling points above 20 °C and end-points below approximately 400 °C, at atmospheric pressure utilizing an automatic micro distillation apparatus.

This test method is applicable to such products as light and middle distillates, automotive spark-ignition engine fuels, automotive spark-ignition engine fuels containing up to 20 % (V/V) ethanol, aviation gasolines, aviation turbine fuels, (paraffinic) diesel fuels, FAME (B100), diesel blends up to 30 % (V/V) fatty acid methyl esters (FAME), special petroleum spirits, naphtha's, white spirits, kerosene's, burner fuels, and marine fuels.

The test method is also applicable to hydrocarbons with a narrow boiling range, like organic solvents or oxygenated compounds.

The test method is designed for the analysis of distillate products; it is not applicable to products containing appreciable quantities of residual material.

**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 user of this document to take appropriate measures to ensure the safety and health of personnel prior to application of the document, and to fulfil statutory and regulatory requirements for this purpose.**

NOTE For the purpose of this document, the expression “% (V/V)” is used to represent the volume fraction.

## 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 3405, *Petroleum and related products from natural or synthetic sources — Determination of distillation characteristics at atmospheric pressure (ISO 3405)*

## 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

#### **automatic apparatus**

microprocessor-controlled unit that performs the procedures of automatically controlling the evaporation of a liquid specimen under specific conditions of this test method, collecting measurement data and converting this data by patented algorithm in order to predict distillation results in correlation with industry recognized reference method

### 3.2

#### **corrected temperature reading**

temperature readings, corrected to 101,3 kPa barometric pressure

### 3.3

#### **end point**

#### **final boiling point FBP**

maximum thermometer reading (corrected) obtained during the test

Note 1 to entry: This usually occurs after the evaporation of all liquid from the bottom of the distillation flask.

Note 2 to entry: The term maximum temperature is a frequently used synonym.

### 3.4

#### **flask internal pressure**

pressure within the distillation flask obtained during the test by a differential pressure sensor of automatic apparatus

Note 1 to entry: The flask internal pressure data recorded during the test is automatically converted to the volume percent recovered or evaporated data by patented algorithm employed by automatic apparatus.

### 3.5

#### **initial boiling point IBP**

corrected temperature readings that corresponds to the instant of the flask internal pressure rise observed

### 3.6

#### **liquid temperature**

temperature of the liquid specimen in the distillation flask during the test obtained by a liquid temperature measuring device of automatic apparatus

### 3.7

#### **percent recovered**

volume of condensate observed by the automatic apparatus at any point in the distillation, expressed as a percentage of the charge volume, in connection with a simultaneous temperature reading

### 3.8

#### **percent recovery**

recovery predicted by the automatic apparatus and expressed as a percentage of the charge volume

### 3.9

#### **percent residue**

volume of residue in the distillation flask expressed as a percentage of the charge volume

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### 3.10

#### reference method

test method or its analogues which is widely used for expression of the distillation characteristics of petroleum products in industry

### 3.11

#### temperature reading

adjusted vapour and liquid temperature by using an algorithm of the automatic apparatus to mimic the same temperature lag and emergent stem effects as would be seen when using a liquid-in-glass thermometer to determine the distillation characteristics

### 3.12

#### vapour temperature

temperature of the vapour in the distillation flask during the test obtained by a vapour temperature measuring device of automatic apparatus

## 4 Principle

A sample is transferred into the distillation flask, the distillation flask is placed into position on the automatic apparatus, and heat is applied to the bottom of the distillation flask.

The automatic apparatus measures and records sample vapour and liquid temperatures, and pressure in the distillation flask as the sample gradually distils under atmospheric pressure conditions. Automatic recordings are made throughout the distillation and the data stored into the apparatus memory.

At the conclusion of the distillation, the collected data are treated by the data processing system, converted to distillation characteristics and corrected for barometric pressure.

Test results are commonly expressed as percent recovered or evaporated versus corresponding temperature in compliance with industry recognized standard form and reference method either in a table or graphically, as a plot of the distillation curve.

## 5 Reagents and materials

**5.1 Cleaning solvents**, suitable for cleaning and drying the test flask such as; petroleum naphtha and acetone.

**5.2 Toluene**, 99,5 % (V/V) purity.

**5.3 n-Hexadecane**, 99 % (V/V) purity.

**5.4 Chemicals** of at least 99 % purity shall be used in the calibration procedure (see 9.3).

**5.5 Granular pumice stones**, clean and dry fine grade pumice stones of diameter 0,8 mm to 3,0 mm, approximately 10 grains are necessary for each test.

**5.6 Sample drying agent**, Anhydrous sodium sulphate has been found to be suitable.

### 5.7 Verification fluids

**5.7.1 Certified Reference Material (CRM)**, CRM is a stable mixture of hydrocarbon or other stable petroleum product with a method-specific distillation characteristic established by a method-specific interlaboratory study produced in accordance with the principles of ISO 17034 [11] or ISO Guide 35 [3] or equivalent standards. The method-specific distillation