SLOVENSKI STANDARD
SIST EN ISO 3675:1999

01-november-1999

Nadomešča:
SIST EN ISO 3675:1998

Surova nafta in tekoči naftni proizvodi - Laboratorijsko določevanje gostote ali relativne gostote z areometrom (ISO 3675:1998)

Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method (ISO 3675:1998)

Rohöl und flüssige Mineralölerzeugnisse - Bestimmung der Dichte oder der relativen Dichte im Labor-Aräometerverfahren (ISO 3675:1993)

Pétroles bruts et produits pétroliers liquides - Détermination en laboratoire de la masse volumique ou de la densité relative - Méthode à l'aréomètre (ISO 3675:1993)

Ta slovenski standard je istoveten z: EN ISO 3675:1998

ICS:

75.040	Surova nafta	Crude petroleum
75.080	Naftni proizvodi na splošno	Petroleum products in general

SIST EN ISO 3675:1999 **en**

EUROPEAN STANDARD

NORME EUROPÉENNE

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Descriptors: see ISO document

Supersedes EN ISO 3675:1995

English version

Crude petroleum and liquid petroleum products - Laboratory determination of density - Hydrometer method (ISO 3675:1998)

Pétrole brut et produits pétroliers liquides - Détermination en laboratoire de la masse volumique - Méthode à l'aréomètre (ISO 3675:1998)

Rohöl und flüssige Mineralölerzeugnisse - Bestimmung der Dichte im Labor - Aräometerverfahren (ISO 3675:1998)

This European Standard was approved by CEN on 6 June 1998.

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.

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

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

Foreword

The text of the International Standard ISO 3675:1998 has been prepared by Technical Committee ISO/TC 28 "Petroleum products and lubricants" in collaboration with Technical Committee CEN/TC 19 "Petroleum products, lubricants and related products", the secretariat of which is held by NNI.

This European Standard supersedes EN ISO 3675:1995.

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 December 1998, and conflicting national standards shall be withdrawn at the latest by December 1998.

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.

NOTE FROM CEN/CS: The foreword is susceptible to be amended on reception of the German language version. The confirmed or amended foreword, and when appropriate, the normative annex ZA for the references to international publications with their relevant European publications will be circulated with the German version.

Endorsement notice

The text of the International Standard ISO 3675:1998 was approved by CEN as a European Standard without any modification.

INTERNATIONAL STANDARD

ISO 3675

Third edition
1998-06-15

Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method

Pétrole brut et produits pétroliers liquides — Détermination en laboratoire de la masse volumique — Méthode à l'aréomètre

Reference number
ISO 3675:1998(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3675 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*, subcommittee SC 3, *Static petroleum measurement*.

This third edition cancels and replaces the second edition (ISO 3675:1993), of which it constitutes a Technical revision.

Annex A forms an integral part of this International Standard. Annex B is for information only.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

Crude petroleum and liquid petroleum products — Laboratory determination of density — Hydrometer method

WARNING — The use of this International Standard may involve hazardous materials, operations and equipment. This International 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.

1 Scope

This International Standard specifies a method for the laboratory determination, using a glass hydrometer, of the density at 15 °C of crude petroleum, liquid petroleum products, and mixtures of petroleum and non-petroleum products normally handled as liquids and having a Reid vapour pressure (RVP) of 100 kPa or less.

This International Standard is suitable for determining the density of mobile transparent liquids. It can also be used for viscous liquids by carrying out the determinations at temperatures above ambient using a suitable liquid bath for temperature control. It can also be used for opaque liquids by reading the hydrometer scale where the top of the meniscus meets the stem of the hydrometer and applying a correction from table 1 (see 11.2).

Since hydrometers are calibrated to read correctly at the specified temperature, scale readings made at other temperatures are only hydrometer readings and not values of density at these other temperatures.

NOTES

1 The accuracy of the density, determined by the procedures given in this International Standard, for volatile and/or waxy crude oils containing free and/or suspended water and sediments can be less than inferred from the precision data quoted in clause 13. This is due to the possible loss of light components during sample mixing. However, sample mixing is necessary to ensure that the test portion transferred to the hydrometer cylinder is as representative as possible of the bulk sample. Techniques are given in clause 7 which are designed to minimize such loss of light component.

2 Values of density at 15 °C can be converted using standard measurement tables to equivalent values of API gravity or relative density so that measurements may be made in the units of local convenience.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 91-1:1992, *Petroleum measurement tables — Part 1: Tables based on reference temperatures of 15 °C and 60 °F.*

ISO 649-1:1981, *Laboratory glassware — Density hydrometers for general purposes — Part 1: Specification.*

ISO 3170:1988, *Petroleum liquids — Manual sampling.*

ISO 3171:1988, *Petroleum liquids — Automatic pipeline sampling.*

3 Definitions

For the purposes of this International Standard, the following definitions apply.

3.1
density
mass per unit volume expressed in either kilograms per cubic metre or grams per millilitre at 15 °C and 101,325 kPa

3.2
cloud point
temperature at which a cloud of wax crystals first appears in a liquid when it is cooled under specified conditions

3.3
wax appearance temperature
WAT
temperature at which waxy solids form when petroleum or petroleum products are cooled under specified conditions

3.4
pour point
lowest temperature at which a sample of petroleum or petroleum product will continue to flow when it is cooled under specified conditions

4 Principle

The sample is brought to a specified temperature and a test portion transferred to a hydrometer cylinder that has been brought to approximately the same temperature. The appropriate hydrometer, whose temperature has also been regulated, is lowered into the test portion and allowed to settle. After temperature equilibrium has been reached, the hydrometer scale is read, the temperature of the test portion taken and the observed hydrometer reading reduced to 15 °C using standard measurement tables. If necessary, the hydrometer cylinder and its contents are placed in a constant temperature bath to avoid excessive temperature variation during the test.

5 Apparatus

5.1 Hydrometer cylinder, of clear glass, plastics material, or metal, with an inside diameter at least 25 mm greater than the outside diameter of the hydrometer (5.2) and a height such that the hydrometer floats in the test portion with at least 25 mm clearance between the bottom of the hydrometer and the bottom of the cylinder.

Plastics material used for the construction of hydrometer cylinders shall be resistant to discolouration or attack and shall not affect the properties of the material being tested. In addition, they shall not become opaque under prolonged exposure to light.

NOTE — For convenience in pouring, the hydrometer cylinder may have a lip on the rim.

5.2 Hydrometers, of glass, graduated in units of density, conforming to ISO 649-1 and the requirements given in table 1. (See also annex A.)

Table 1 — Requirements for hydrometers

Unit	Density range	Each unit	Scale interval	Maximum scale error	Meniscus correction
kg/m^3 at 15 °C	600 to 1100 600 to 1100 600 to 1100	20 50 50	0,2 0,5 1,0	± 0,2 ± 0,3 ± 0,6	+ 0,3 + 0,7 + 1,4
g/ml at 15 °C	0,600 to 1,100 0,600 to 1,100 0,600 to 1,100	0,02 0,05 0,05	0,000 2 0,000 5 0,001 0	± 0,000 2 ± 0,000 3 ± 0,000 6	+ 0,000 3 + 0,000 7 + 0,001 4

5.3 Constant temperature bath, if required, of dimensions such that it can accommodate the hydrometer cylinder with the test portion fully immersed below the surface of the bath liquid and a temperature control system capable of maintaining the bath at the test temperature ± 0,25 °C, throughout the duration of the test.

5.4 Thermometer, having a range, graduation intervals and maximum permitted scale error as shown in table 2.

Table 2 — Requirements for thermometers

Range °C	Graduation interval	Maximum scale error
– 1 to 38	0,1	± 0,1
– 20 to 102	0,2	± 0,15

NOTES

1 Thermometers IP 39C and IP 64C/ASTM 12C are suitable.

2 Resistance thermometers may be used, provided that the total uncertainty of the calibrated system is not greater than the uncertainty when using liquid-in-glass thermometers.

5.5 Glass or plastics stirring rod, optional, approximately 450 mm in length.

6 Sampling

Samples shall be taken in accordance with ISO 3170, ISO 3171, or an equivalent National Standard.

NOTE — When sampling volatile liquids using an automatic sampling technique, unless a sample receiver of variable volume is used to collect the sample and transport it to the laboratory, loss of light components may occur which will affect the accuracy of the density measurement.

7 Sample preparation

7.1 Sample mixing

The portion of the sample tested shall be as representative as possible of the bulk sample, and sample mixing may be necessary. However, precautions shall be taken to maintain the integrity of the sample during this operation.