SLOVENSKI STANDARD
oSIST prEN ISO 3405:2009

01-november-2009

Naftni proizvodi - Določ evanje destilacijskih znač ilnosti pri atmosferskem tlaku (ISO/DIS 3405:2009)

Petroleum products - Determination of distillation characteristics at atmospheric pressure (ISO/DIS 3405:2009)

Mineralölerzeugnisse - Bestimmung des Destillationsverlaufes bei Atmosphärendruck (ISO/DIS 3405:2009)

Produits pétroliers - Détermination des caractéristiques de distillation à pression atmosphérique (ISO/DIS 3405:2009)

Ta slovenski standard je istoveten z: **prEN ISO 3405**

ICS:

75.080	Naftni proizvodi na splošno	Petroleum products in general

oSIST prEN ISO 3405:2009 **en**

EUROPEAN STANDARD

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EUROPÄISCHE NORM

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Will supersede EN ISO 3405:2000

English Version

Petroleum products - Determination of distillation characteristics at atmospheric pressure (ISO/DIS 3405:2009)

Produits pétroliers - Détermination des caractéristiques de distillation à pression atmosphérique (ISO/DIS 3405:2009)

Mineralölerzeugnisse - Bestimmung des Destillationsverlaufes bei Atmosphärendruck (ISO/DIS 3405:2009)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 19.

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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 Management Centre has the same status as the official versions.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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Contents

Page

Foreword

This document (prEN ISO 3405:2009) has been prepared by Technical Committee ISO/TC 28 "Petroleum products and lubricants" in collaboration with 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 document is currently submitted to the parallel Enquiry.

This document will supersede EN ISO 3405:2000.

Endorsement notice

The text of ISO/DIS 3405:2009 has been approved by CEN as a prEN ISO 3405:2009 without any modification.

DRAFT INTERNATIONAL STANDARD ISO/DIS 3405

ISO/TC **28** Secretariat: **ANSI**

Voting begins on: **2009-09-17** Voting terminates on: **2010-02-17**

Petroleum products — Determination of distillation characteristics at atmospheric pressure

Produits pétroliers — Détermination des caractéristiques de distillation à pression atmosphérique

[Revision of third edition (ISO 3405:2000)]

ICS 75.080

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO-lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five-month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

Pour accélérer la distribution, le présent document est distribué tel qu'il est parvenu du secrétariat du comité. Le travail de rédaction et de composition de texte sera effectué au Secrétariat central de l'ISO au stade de publication.

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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

ISO 3405 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

This fourth edition cancels and replaces the third edition (ISO 3405:2000), of which has been technically revised.

Petroleum products — Determination of distillation characteristics at atmospheric pressure

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 International Standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard specifies a laboratory method for the determination of the distillation characteristics of light and middle distillates derived from petroleum with initial boiling points above 0 °C and end-points below approximately 400 °C, utilizing either manual or automated equipment. Light distillates are typically; automotive engine petrols, automotive engine petrols with up to 10% (*V/V*) ethanol, and aviation petrols. Middle distillates are typically; aviation turbine fuels, kerosines, diesel, diesel with up to 20% (*V/V*) FAME, burner fuels, and marine fuels that have no appreciable quantities of residua.

NOTE 1 For the purposes of this International Standard, the term "% (*V/V*)" is used to represent the volume fraction of a material.

NOTE 2 The method is applicable to petroleum products incorporating a minor constitution of components from non-petroleum origin, but the precision data may not apply in all cases.

The distillation (volatility) characteristics of hydrocarbons have an important effect on their safety and performance, especially in the case of fuels and solvents. The boiling range gives important information on composition and behaviour during storage and use, and the rate of evaporation is an important factor in the application of many solvents. Limiting values to specified distillation characteristics are applied to most distillate petroleum product specifications in order to control end-use performance and to regulate the formation of vapours which may form explosive mixtures with air, or otherwise escape into the atmosphere as emissions (VOC).

2 Normative references

The following referenced documents are indispensable for the application 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.

ISO 918:1983, *Volatile organic liquids for industrial use — Determination of distillation characteristics*

ISO 3170:2004, *Petroleum liquids — Manual sampling*

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

ISO 4259:2006, *Petroleum products — Determination and application of precision data in relation to methods of test*

ISO 4788:2005, *Laboratory glassware — Graduated measuring cylinders*

3 Terms and definitions

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

3.1
decomposition point
thermometer reading (corrected) which coincides with the first indications of thermal decomposition of the liquid in the flask

NOTE Characteristic indications of thermal decomposition are an evolution of fumes and erratic thermometer readings which usually show a decided decrease after any attempt has been made to adjust the heat.

3.2
dry point
thermometer reading (corrected) that is observed at the instant the last drop of liquid evaporates from the lowest point in the flask; any drops or film of liquid on the side of the flask or on the thermometer are disregarded

NOTE The end-point (final boiling point), rather than the dry point is intended for general use. The dry point can be reported in connection with special purpose naphthas, such as those used in the paint industry. Also, it is substituted for the end-point (final boiling point) whenever the sample is of such a nature that the precision of the end-point cannot consistently meet the requirements given in Clause 12.

3.3
end-point
final boiling point
maximum thermometer reading (corrected) obtained during the test

NOTE This usually occurs after evaporation of all liquid from the bottom of the flask.

3.4
initial boiling point
thermometer reading (corrected) that is observed at the instant that the first drop of condensate falls from the lower end of the condenser tube

3.5
percent evaporated
sum of the percent recovered and the percent loss

3.6
percent loss
100 minus the total recovery

NOTE Sometimes called “front-end loss”; this is the amount of uncondensed material lost in the initial stages of the distillation.

3.7
corrected loss
percent loss corrected for barometric pressure

3.8
percent recovered
volume of condensate observed in the receiving graduated cylinder at any point in the distillation, expressed as a percentage of the charge volume, in connection with a simultaneous temperature reading

3.9
percent recovery
maximum percent recovered, as observed in accordance with 9.10

3.10
percent residue
volume of residue measured in accordance with 9.11, and expressed as a percentage of the charge volume

3.11
percent total recovery
combined percent recovery and residue in the flask, as determined in accordance with 10.1

3.12
thermometer reading
temperature recorded by the sensor of the saturated vapour measured in the neck of the flask below the vapour tube, under the specified conditions of this test

3.13
temperature reading
thermometer or temperature-measurement device reading (3.12) which is corrected to 101,3 kPa barometric pressure

3.14
emergent stem effect
offset in temperature reading caused by the use of a total immersion mercury-in-glass thermometer in the partial immersion mode

NOTE The emergent part of the mercury column is at a lower temperature than the immersed portion, resulting in a lower temperature reading than that obtained when the thermometer was completely immersed for calibration.

3.15
temperature lag
offset in temperature reading between a mercury-in-glass thermometer and an electronic temperature-measurement device, caused by the different response time of the systems involved

4 Principle

The sample is assigned into one of four groups based on its composition and expected volatility characteristics, each group defining the apparatus arrangement, condenser temperature and operational variables. A 100 ml test portion is distilled under the specified conditions appropriate to the group into which the sample falls, and systematic observations of thermometer readings and volumes of condensate recovered are made. The volume of the residue in the flask is measured, and the loss on distillation recorded. The thermometer readings are corrected for barometric pressure, and the data are then used for calculations appropriate to the nature of the sample and the specification requirements.

5 Apparatus

5.1 General

Typical assemblies of the manual apparatus are shown in Figures 1 and 2. In addition to the basic components described in Clause 5, automated apparatus also are equipped with a system to measure and automatically record the vapour temperature and the associated recovered volume in the receiving cylinder.

Automated equipment manufactured in 1999 and later shall be equipped with a device to automatically shut down power to the unit and to spray an inert gas or vapor in the chamber where the distillation flask is mounted in the event of fire.

NOTE Some causes of fires are breakage of the distillation flask, electrical shorts, and foaming and spilling of liquid sample through the top opening of the flask.