SLOVENSKI STANDARD
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Določevanje plamenišča - Metoda Pensky-Martens z zaprto posodo (ISO/DIS 2719:2024)

Determination of flash point - Pensky-Martens closed cup method (ISO/DIS 2719:2024)

Bestimmung des Flammpunktes - Verfahren nach Pensky-Martens mit geschlossenem Tiegel (ISO/DIS 2719:2024)

Détermination du point d'éclair - Méthode Pensky-Martens en vase clos (ISO/DIS 2719:2024)

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Determination of flash point — Pensky-Martens closed cup method

Détermination du point d'éclair — Méthode Pensky-Martens en vase clos

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Contents

Page

Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources,* in conjunction with Technical Committee ISO/TC 35 Paints and varnishes and in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 19, Gaseous and liquid fuels, lubricants and related products of petroleum, synthetic and biological origin, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition cancels and replaces the fourth edition (ISO 2719:2016), which has been technically revised.

The main changes are as follows:

— revisions to Clauses 3.1, 5.2, 6.1, 7.1, 7.2, 7.5, 10.1.1, 11.2, 14, C.2 and Table A.1;

— incorporation and revision of Amendment 1;

— revision of Annex A and change to Normative;

— New normative Annex D and informative Annex F.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

Flash point values are used in shipping, storage, handling, and safety regulations, as a classification property to define “flammable” and “combustible” materials. Precise definition of the classes is given in each particular regulation.

A flash point value can indicate the presence of highly volatile material(s) in a relatively non-volatile or non-flammable material and flash point testing can be a preliminary step to other investigations into the composition of unknown materials.

It is not appropriate for flash point determinations to be carried out on potentially unstable, decomposable, or explosive materials, unless it has been previously established that heating the specified quantity of such materials in contact with the metallic components of the flash point apparatus, within the temperature range required for the method, does not induce decomposition, explosion or other adverse effects.

Flash point values are not a constant physical-chemical property of materials tested. They are a function of the apparatus design, the condition of the apparatus used, and the operational procedure carried out. Flash point can therefore be defined only in terms of a standard test method, and no general valid correlation can be guaranteed between results obtained by different test methods or with test apparatus different from that specified.

ISO/TR 29662[6] gives useful advice in carrying out flash point tests and interpreting their results.

Determination of flash point — Pensky-Martens closed cup method

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 users of this document to take appropriate measures to ensure the safety and health of personnel prior to the application of the standard, and to determine the applicability of any other restrictions for this purpose.

1 Scope

This document describes three procedures, A, B and C, using the Pensky-Martens closed cup tester, for determining the flash point of combustible liquids, liquids with suspended solids, liquids that tend to form a surface film under the test conditions, biodiesel and other liquids in the temperature range of 40 °C to 370 °C.

CAUTION — For certain mixtures no flash point, as defined, is detected; instead a significant enlargement of the test flame (not halo effect) and a change in colour of the test flame from blue to yellowish-orange can occur. Continued heating can result in significant burning of vapours outside the test cup, and can be a potential fire hazard.

NOTE 1 Although, technically, kerosene with a flash point above 40 °C can be tested using this document, it is standard practice to test kerosene according to ISO 13736[5]. Similarly, lubricating oils are normally tested according to ISO 2592[2].

Procedure A is applicable to distillate fuels (diesel, biodiesel blends, heating oil and turbine fuels), new and in-use lubricating oils, paints and varnishes, and other homogeneous liquids not included in the scope of procedures B or C.

Procedure B is applicable to residual fuel oils, cutback residua, used lubricating oils, mixtures of liquids with solids, liquids that tend to form a surface film under test conditions or are of such kinematic viscosity that they are not uniformly heated under the stirring and heating conditions of procedure A.

Procedure C is applicable to fatty acid methyl esters (FAME) as specified in specifications such as EN 14214[11] or ASTM D6751[13].

This document is not applicable to water-borne paints and varnishes.

NOTE 2 Water-borne paints and varnishes can be tested using ISO 3679.[3] Liquids containing traces of highly volatile materials can be tested using ISO 1523[1] or ISO 3679.

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.

ISO 1513, *Paints and varnishes — Examination and preparation of test samples*

ISO 3170, *Petroleum liquids — Manual sampling*

ISO 3171, *Petroleum liquids — Automatic pipeline sampling*

ISO 15528, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Terms and definitions

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

3.1
flash point
lowest temperature of the test portion, adjusted to account for variations in atmospheric pressure from 101,3 kPa, at which application of an ignition source causes the vapour of the test portion to ignite and the flame to propagate across the surface of the liquid under the specified conditions of test

4 Principle

The test portion is placed into the test cup of a Pensky-Martens apparatus and heated to give a constant temperature increase with continuous stirring. An ignition source is directed through an opening in the test cup lid at regular temperature intervals with simultaneous interruption of stirring. The lowest temperature at which the application of the ignition source causes the vapour of the test portion to ignite and a flame propagate over the surface of the liquid is recorded as the flash point at the absolute barometric pressure. This temperature is corrected to standard atmospheric pressure using a specified formula.

5 Chemicals and materials

5.1 Cleaning solvent, for removal of traces of sample from the test cup and cover.

The choice of solvent will depend upon the previous material tested and the tenacity of the residue. Low volatility aromatic (benzene free) solvents may be used to remove traces of oil, and mixed solvents such as toluene-acetone-methanol can be efficacious for the removal of gum-type deposits.

5.2 Reference materials (RM), for flash point, certified reference materials (CRM) and/or secondary working standards (SWS), as described in normative Annex A.

NOTE Reference materials are available from apparatus manufacturers and other commercial sources, or as retained samples from proficiency testing schemes.

6 Apparatus

6.1 Flash point apparatus, as described in normative Annex B.

Annex B describes the manual apparatus. It is permitted for automated apparatus to divert from the standard configuration, for example, to enable the use of electronic thermometers, flash detectors and safety measures; Informative Annex E gives an example of a typical automated implementation of the cover assembly.

If automated equipment is used, ensure that the test cup and cover assembly conform to the key dimensions specified in Annex B and the procedures described in Clause 10 are followed. The user shall ensure that all of the manufacturer's instructions for adjusting and operating the instrument are followed.

NOTE Under certain circumstances, the use of electric ignition sources can give different results to those obtained when using a flame ignition source.

In cases of dispute, unless explicitly agreed otherwise, the flash point as determined using a flame ignition source shall be considered the referee test.

6.2 Temperature measuring devices, meeting the requirements for accuracy and have the response as specified in normative Annex C.

6.3 Barometer, absolute pressure reading, accuracy of ±0,5 kPa, and with a resolution of 0,1 kPa.

Barometers pre-corrected to give sea level readings, such as those used at weather stations and airports, shall not be used.

NOTE Some automated apparatus include an integral barometer that automatically measures and records the absolute barometric pressure and makes the required corrections to the detected flash point.

6.4 Heating bath or oven, capable of controlling the temperature to ±5 °C, for warming the sample if required.

The oven shall be ventilated and constructed in such a way that it will not cause ignition of any flammable vapours that can be produced when the sample is heated.

It is recommended that the oven is an explosion-protected type.

7 Apparatus preparation

7.1 General

Follow the manufacturer's instructions for the correct setup, calibration, verification (7.5) and operation of the apparatus including the integral barometer (if fitted), flash detector (if fitted) and temperature measuring device (see Annex C), especially the operation and setting of the ignition source. Annex D (normative) gives supporting information on electric ignitors and flash detectors.

7.2 Location of the apparatus

Support the flash point apparatus (see 6.1 and Annex B) on a level and steady surface in a draught-free position.

NOTE When draughts cannot be avoided, it is good practice to surround the apparatus with a shield.

WARNING — When testing materials that can produce toxic vapours, the apparatus should be located in a fume hood with individual air flow control, adjusted so that vapours can be withdrawn without causing air currents around the test cup during the test.

7.3 Cleaning the test cup

Wash the test cup, cover and its accessories with an appropriate cleaning solvent (5.1) to remove any traces of gum or residue remaining from a previous test. Dry using a stream of clean air to ensure complete removal of the solvent used.

7.4 Apparatus assembly

Examine the test cup, the cover and other parts to ensure that they are free from signs of damage and deposits. Assemble the apparatus in accordance with Annex B.

7.5 Apparatus verification

7.5.1 Check the temperature measuring devices and barometer at least once a year to ensure that they are in accordance with Annex C and 6.3, respectively. Follow the manufacturers instructions to make any necessary corrections.

7.5.2 Ensure the correct operation of ignition sources and flash detectors, in accordance with the manufacturers' instructions and this test method (see Annexes B and D).