
**Determination of flash point — Pensky-
Martens closed cup method**

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



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Printed in Switzerland

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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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 2719 was prepared by Technical Committee ISO/TC 28, *Petroleum products and lubricants*.

This third edition cancels and replaces the second edition (ISO 2719:1988), which has been technically revised.

Annexes B and C form a normative part of this International Standard. Annexes A and D are for information only.

Introduction

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

Flash point determinations should not 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 will not induce decomposition, explosion or other adverse effects.

The interpretation of flash point results obtained on material containing halogenated hydrocarbons should be considered with caution, as these mixtures can give anomalous results.

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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 determine the applicability of regulatory limitations prior to use.

1 Scope

This International Standard describes two procedures, A and B, 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 and other liquids. It is applicable for liquids with a flash point above 40 °C.

NOTE 1 Although technically kerosines with a flash point above 40 °C may be tested using this International Standard, it is standard practice to test kerosines according to ISO 13736^[8]. Similarly, unused lubricating oils are normally tested according to ISO 2592^[5].

Procedure A is used for the determination of the flash point of paints and varnishes that do not form a surface film, unused lubricating oils and other petroleum products not covered by Procedure B.

Procedure B is used for the determination of the flash point of residual fuel oils, cutback bitumens, used lubricating oils, liquids that tend to form a surface film, liquids with suspensions of solids and highly viscous materials such as polymeric solutions and adhesives.

NOTE 2 For the comparison of the flash points of used and unused lubricating oils, such as in a lubricant monitoring scheme, used lubricating oils may be tested using Procedure A. However, the precision data for these materials is only valid for Procedure B.

This International Standard is not applicable to water-borne paints or liquids contaminated by traces of highly volatile materials.

NOTE 3 Water-borne paints may be tested using ISO 3679^[6]. Liquids contaminated by traces of highly volatile materials may be tested using ISO 1523^[4] or ISO 3679.

NOTE 4 Precision data is only valid for the flash point ranges given in clause 13.

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 ISO and IEC maintain registers of currently valid International Standards.

ISO 1513:1992, *Paints and varnishes — Examination and preparation of samples for testing*

ISO 3170:—¹⁾, *Petroleum liquids — Manual sampling*

1) To be published. (Revision of ISO 3170:1988)

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

ISO 15528:2000, *Paints, varnishes and raw materials for paints and varnishes — Sampling*

3 Term and definition

For the purposes of this International Standard, the following term and definition applies.

3.1

flash point

lowest temperature of the test portion, corrected to a barometric pressure of 101,3 kPa, at which the 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 in 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 propagate over the surface of the liquid is recorded as the flash point at the ambient barometric pressure. This temperature is corrected to standard atmospheric pressure using an equation.

5 Chemicals and materials

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

NOTE 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, may be efficacious for the removal of gum-type deposits.

5.2 Verification liquids, as described in annex A.

6 Apparatus

6.1 Flash point apparatus, Pensky-Martens closed cup test apparatus as specified in annex B.

If automated equipment is used, ensure that it has been established that the results obtained are within the precision of this International Standard and that the test cup and cover assembly conform to the dimensional and mechanical requirements as specified in annex B. If automated testers are used, 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 may give different results to those obtained when using a flame ignition source. In addition, electric ignition sources may give variable results.

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

6.2 Thermometers, low, medium and high range, conforming to annex C. The initial choice of thermometer shall be based on the expected flash point.

NOTE Other types of temperature-measuring devices may be used, provided that they meet the requirements for accuracy and have the same response as the thermometers specified in annex C.

6.3 Barometer, accurate to 0,1 kPa. Barometers precorrected to give sea-level readings, such as those used at weather stations and airports, shall not be used.