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Petroleum and related products from natural or synthetic sources — Determination of pour point

Produits pétroliers et connexes d'origine naturelle ou synthétique — Détermination du point d'écoulement

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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.

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).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 28, *Petroleum and related products, fuels and lubricants from natural or synthetic sources*.

This third edition cancels and replaces the second edition (ISO 3016:1994), which has been technically revised. The main changes compared to the previous edition are as follows:

— inclusion of digital contact thermometer in 5.2.1;

— update of normative references in Clause 2;

— chemicals and mixtures moved from former Clause 4 to Annex B (alignment with ISO 3015[1]);

— bath and sample temperature ranges have been aligned with ASTM D97[2], changes in bath temperature and the temperatures at which the test jars are moved to the batch with the next lower temperature have over the years (1994 up to the time of publication of this document) not led to observation of a bias versus test results obtained with the former edition;

— option for using automatic apparatus has been removed as being non-applicable;

— automated apparatus no longer being addressed as its use is at the discretion of the laboratory and the precision does not apply to that equipment;

— addition of sampling instructions in Clause 6;

— alignment of Clause 9 on precision, with ASTM D97[2] and introduction of Annex C;

— addition of a Bibliography.

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.

Petroleum and related products from natural or synthetic sources — Determination of pour point

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

1 Scope

This document specifies a method for the determination of the pour point of petroleum products. A separate procedure suitable for the determination of the lower pour point of fuel oils, heavy lubricant base stock, and products containing residual fuel components is also described.

The procedure described in this document is not suitable for crude oils.

NOTE There is equipment available that uses an automated procedure similar to the one described in this document. However, the precision thereof has not been established[1)].

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 3170, *Petroleum liquids — Manual sampling*

ISO 3171, *Petroleum liquids — Automatic pipeline sampling*

ASTM D7962, *Practice for Determination of Minimum Immersion Depth and Assessment of Temperature Sensor Measurement Drift*

ASTM E2877, *Guide for Digital Contact Thermometers*

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:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
pour point
lowest temperature at which a sample of petroleum product will continue to flow when it is cooled under specified standard conditions

1) ISO develops an automated test method standard.

4 Principle

After preliminary heating, the sample is cooled at a specified rate and examined at intervals of 3 °C for flow characteristics. The lowest temperature at which movement ('pour' or 'flow') of the sample is observed is recorded as the pour point.

5 Apparatus

5.1 Test jar, cylindrical, of clear glass, flat-bottomed, 33,2 mm to 34,8 mm outside diameter and 115 mm to 125 mm in height. The test jar shall have an inside diameter of 30,0 mm to 32,4 mm, with the constraint that the wall thickness be no greater than 1,6 mm. The jar shall be marked with a line to indicate a contents level 54 mm ± 3 mm above the inside bottom representing 45 ml ± 1 ml. See Figure 1.

5.2 Temperature measuring device, one of the following:

5.2.1 Digital contact thermometer (DCT), meeting the requirements specified in A.1.

5.2.2 Liquid-in-glass thermometers, partial immersion type conforming to the specifications given in A.2.

Since separation of liquid column thermometers occasionally occurs and may escape detection, thermometers should be checked immediately prior to the test and used only if they prove accurate within ± 1 °C (for example ice point).

5.3 Cork, to fit the test jar, bored centrally for the test temperature measuring device.

5.4 Jacket, watertight, cylindrical metal, flat-bottomed, 115 mm ± 3 mm in depth with inside diameter 44,2 mm to 45,8 mm, and a wall thickness of approximately 1 mm. It shall be supported in a vertical position in the cooling bath (5.7) so that no more than 25 mm projects out of the cooling medium, and shall be capable of being cleaned.

5.5 Disc, of cork or felt approximately 6 mm in thickness, to fit loosely inside the jacket.

5.6 Gasket, ring form, approximately 5 mm in thickness, to fit snugly on the outside of the test jar and loosely inside the jacket. This gasket shall be made of rubber, leather or other suitable material, elastic enough to cling to the test jar and hard enough to hold its shape.

NOTE The purpose of the ring gasket is to prevent the test jar from touching the jacket.

5.7 Cooling baths, maintained at prescribed temperatures with a firm support to hold the jacket vertical. The required bath temperatures may be obtained by refrigeration if available, otherwise by suitable cooling mixtures. Cooling mixtures commonly used for bath temperatures are given in Annex B.

5.8 Timing device, capable of measuring up to 30 s with an accuracy of 0,2 s.