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ISO

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

ISO RECOMMENDATION R 1516

PAINTS AND VARNISHES

DETERMINATION OF THE DANGER CLASSIFICATION BY FLASHPOINT
(CLOSED CUP METHOD)

1st EDITION

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BRIEF HISTORY

The ISO Recommendation R 1516, *Paints and varnishes – Determination of the danger classification by flashpoint (closed cup method)*, was drawn up by Technical Committee ISO/TC 35, *Paints and varnishes*, the Secretariat of which is held by the Nederlands Normalisatie-instituut (NNI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1516 which was circulated to all the ISO Member Bodies for enquiry in November 1968. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

Australia	Ireland	Spain
Austria	Israel	Sweden
Denmark	Italy	Switzerland
France	Netherlands	Turkey
Germany	Peru	U.A.R.
Greece	Poland	United Kingdom
India	Portugal	U.S.S.R.
Iran	South Africa, Rep. of	

No Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

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INTRODUCTION

This ISO Recommendation is one of a series dealing with the sampling and testing of paints, varnishes and related products and should be read in conjunction with ISO Recommendation R 1523, *Paints and varnishes – Determination of the flashpoint (closed cup method)*.*

This method of test does not determine the flashpoint of the product under test, but merely its danger classification, which is required to be known in order to comply with laws or regulations relating to the storage, transport and use of flammable products. For this purpose it is not necessary to determine the exact flashpoint, but whether or not flashing occurs at a single given temperature, i.e. the lowest allowable temperature of the relevant danger class (see Notes below). By the procedure described, differences between test apparatus of various standard designs are minimised by ensuring that the test is carried out only when the product under test, and the air/vapour mixture above it in the test vessel, are exactly in temperature equilibrium.

NOTES

- 1. The danger classes for various applications are not defined in this ISO Recommendation but are to be laid down by the appropriate national or international authorities, for example in the form:

Danger class Flashpoint (closed) not below . . . °C.

- 2. When there is a series of danger classes, in which the class of lowest flashpoint is defined only by an upper limit, for example flashpoint not above . . . °C (this being also the lower limit of the next class), there is clearly no "lowest allowable flashpoint temperature" for this class. In such cases, it is assumed that the product can be allocated to this class if it flashes at the lowest allowable temperature of the next class.

1. SCOPE

This ISO Recommendation describes a method of test to determine if a paint, varnish or related product, when maintained at a specified temperature and under the conditions of test, gives off sufficient flammable vapour at this temperature to cause ignition on application of an external source of flame applied in a standard manner.

The method is suitable for use over the temperature range 5 to 65 °C, although some of the apparatus listed in the Appendix cannot cover all of this range using the thermometer supplied with the apparatus. The procedure also makes allowance for deviations from standard barometric pressure.

2. PRINCIPLE

The test portion is heated in a suitably designed closed cup on a suitable water-bath. The ignition trial is carried out after the test portion has been maintained under equilibrium conditions for at least 10 minutes at the lowest allowable flashpoint temperature (within a permitted tolerance) of the relevant danger class. This procedure ensures that the air/vapour space above the test portion has attained the saturation concentration of flammable vapour before the ignition trial is performed. The test report records whether or not ignition occurs at this temperature.

* At present at the stage of Draft ISO Recommendation.

3. APPARATUS

- 3.1 *Test cup.* The test cup used must be a closed cup with an internal level indicator; the closed cups specified in a number of national standards satisfy the necessary requirements (see Appendix).

NOTE. – If a stirrer is fitted to the test cup used, it should be operated during the heating-up period but must be stopped during the ignition trial. If a stirrer originally fitted to the test cup is removed, the aperture in the cover should be securely plugged before starting the test.

Essentially the test cup should be fitted with a tightly fitting cover which carries an opening slide and an ignition device capable, when the slide is open, of inserting an ignition flame (diameter 3.5 ± 0.5 mm); when inserted, the nozzle of the ignition device should be 1 ± 1 mm above the underside of the cover. The equipment is such that an ignition trial can be performed by opening the slide, inserting and removing the nozzle of the ignition device, and closing the slide again in a period of 2.5 ± 0.5 seconds. A mechanically driven device for doing this is permitted. The source of flame in the ignition device may be any suitable flammable gas.

- 3.2 *Water-bath.* Any suitable water-bath capable of being adjusted to the required temperature (see clause 5.1), and of adequate heat capacity to meet the requirements of clause 5.3, may be used. A bath fitted with a stirrer and an adjustable thermostat is convenient.
- 3.3 *Thermometers.* The test cup should be fitted with a thermometer of appropriate dimensions and suitable range and accuracy, which is immersed in the sample for measuring its temperature.
The water-bath should be fitted with a thermometer of equal precision for measuring the water temperature.
- 3.4 *Support.* A suitable support should be provided for holding the test cup in the water-bath so that the cover and upper edge are horizontal and the cup is immersed in direct contact with the water in such a position that the level of the test portion in the cup is the same as that of the water in the water-bath.

4. SAMPLING

- 4.1 A representative sample of the product under test should be obtained and prepared by the methods described in ISO Recommendation R 1512, *Paints and varnishes – Sampling*, and R 1513, *Paints and varnishes – Examination and preparation of samples for testing*. The sample should be provided and kept in an air-tight container.
- 4.2 Because of the possibility of loss of volatile constituents, the sample should receive only the minimum treatment to ensure uniformity. After removing the test portion, the sample container should be immediately closed tightly to ensure that no volatile flammable components escape from the container (otherwise a new sample may be necessary if further testing is required).

5. PROCEDURE

5.1 Preparation of apparatus

- 5.1.1 Adjust the temperature of the bath to, and maintain it at the lowest allowable flashpoint temperature (subject to a tolerance of $+ 0.5$ °C) of the relevant danger class, having made any necessary correction to this temperature for difference of barometric pressure from the standard (1013 mbar, 760 mmHg), by raising the test temperature for a higher pressure or lowering the test temperature for a lower pressure at the rate of 1 °C for each 40 mbar (30 mmHg) difference.
- 5.1.2 Carefully clean and dry the test cup, the cover and the cup thermometer and then bring them to at least 2 °C below the lowest allowable flashpoint temperature of the relevant danger class.