INTERNATIONAL STANDARD

ISO 6250

Second edition
1997-12-15

Petroleum products — Determination of the water reaction of aviation fuels

Produits pétroliers — Détermination de la réaction à l'eau des carburants aviation

Reference number
ISO 6250:1997(E)

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.

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.

International Standard ISO 6250 was prepared by Technical Committee ISO/TC 28, *Petroleum products*.

This second edition cancels and replaces the first edition (ISO 6250:1982), which has been technically revised.

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet central@iso.ch
X.400 c=ch; a=400net; p=iso; o=isocs; s=central

Printed in Switzerland

Petroleum products — Determination of the water reaction of aviation fuels

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 specifies a method for the determination of the presence of water-miscible components in aviation fuels, and the effect of these components on volume change, the condition of the fuel-water interface and their tendency to form emulsions.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3170:1988, *Petroleum liquids — Manual sampling.*

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

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods.*

3 Principle

A test portion of the fuel is shaken, using a standardized technique, at room temperature, in scrupulously clean glassware with a phosphate buffer solution. The change in volume of the aqueous layer when testing aviation gasoline, the appearance of the interface and the degree of separation of the two phases for all aviation fuels, are reported as the water reaction of the fuel.

4 Reagents and materials

For the analysis described in this International Standard, use only reagents of recognized analytical grade, and water complying with the requirements of Grade 3 of ISO 3696.

4.1 Acetone, $(CH_3)_2CO$.

4.2 Wash solvent, heptane or petroleum spirit, 60 °C to 80 °C boiling range.

4.3 Glass cleaning solution (see 7.2).

Chromic acid is the reference cleaning agent, but is not preferred for routine analysis. Other strong oxidizing acids may be used if the conditions specified in 7.3 are met. Certain non-ionic surfactant cleaning agents have been found to meet the cleanliness and lack of reactivity required.

CAUTION — Chromic acid is a health hazard. It is toxic, a recognized carcinogen as is contains Cr-VI compounds, highly corrosive and potentially hazardous in contact with organic materials. When using chromic acid cleaning solution, eye protection and protective clothing are essential. Never pipette the cleaning solution by mouth. After use, do not pour cleaning solution down the drain, but neutralize it with great care owing to the concentrated sulfuric acid present, and dispose of it in accordance with standard procedures for toxic laboratory waste (chromium is highly dangerous to the environment).

Non-chromium containing, strongly oxidizing acid cleaning solutions are also highly corrosive and potentially hazardous in contact with organic materials, but do not contain chromium which has special disposal problems.

4.4 Phosphate buffer solution, pH 7, prepared as follows:

Dissolve 1,15 g of anhydrous potassium monohydrogen phosphate (K_2HPO_4) and 0,47 g of anhydrous potassium dihydrogen phosphate (KH_2PO_4) in 100 ml of water.

5 Apparatus

Ordinary laboratory apparatus and:

5.1 Graduated glass cylinder, glass stoppered of capacity 100 ml with 1 ml graduations. The distance between the 100 ml mark and the top of the shoulder of the cylinder shall be within the range of 50 mm to 60 mm.

5.2 Timing device, mechanical or electronic, capable of measuring 120 s ± 2 s.

6 Sampling and sample preparation

6.1 Unless otherwise specified in the product specification, samples shall be taken in accordance with ISO 3170 or ISO 3171.

6.2 From the laboratory sample, take a test portion of at least 100 ml and decant it into a clear, clean container.

6.3 Do not filter the fuel after collection. If the fuel is contaminated with particulate matter, allow it to settle before testing.

NOTES

1 Test method results are known to be sensitive to trace contamination from sampling containers.

2 Filtration media can remove surfactants, the detection of which is one of the purposes of this International Standard.

7 Preparation of apparatus

Clean the cylinder (5.1) thoroughly before carrying out this test. The cleaning procedure shall provide a cleanliness which matches that obtained by the method specified in 7.1, 7.2 and 7.3.

7.1 Remove traces of oil or fuel residue from the cylinder and stopper by flushing with hot potable water, brushing if necessary. Alternatively, remove all traces of oil or fuel residue from the cylinder and stopper using the wash solvent (4.2). Rinse with acetone (4.1) followed by potable water.

NOTE — It is good practice to reserve a number of cylinders exclusively for this test with aviation fuels. The above procedure can then be shortened.

7.2 Immerse the cylinder and stopper in the glass cleaning solution (4.3) for at least 1 h, rinse thoroughly with potable water, then with Grade 3 water and finally rinse with the phosphate buffer solution (4.4) and drain.

7.3 Use only cylinders that drain cleanly. If the cylinder does not drain cleanly (without drops forming), soak in cleaning solution at approximately 65 °C for approximately 30 min, and follow the rinsing procedure in 7.2.

NOTE — If the degree of separation obtained for the test fuel is 2 or less, the required cleanliness of the cylinder may be assumed to have been attained. A degree of separation of greater than 2 for the test fuel however, does not imply, by itself, that the cylinder does not meet the cleanliness required. See table 1.

Table 1 — Separation

Rating	Appearance
(1)	Complete absence of all emulsions and/or precipitates within either layer or upon the fuel layer
(2)	Same as (1) except small air bubbles or small water droplets in the fuel layer
(3)	Emulsions or precipitates within either layer or upon the fuel layer, or droplets in the water layer or adhering to the cylinder walls, excluding the walls above the fuel layer

8 Procedure

8.1 Measure 20 ml of the phosphate buffer solution (4.4) at room temperature into the cylinder (5.1) and record the volume to the nearest 0,5 ml. Add 80 ml of the fuel to be tested, prepared as specified in clause 6, at room temperature, and stopper the cylinder.

8.2 Shake the cylinder vigorously for 120 s ± 2 s with an up and down motion (2 strokes to 3 strokes per s of 125 mm to 250 mm amplitude), taking care to avoid a swirling motion during shaking.

NOTE — Swirling tends to break any emulsion that might be formed.

8.3 Immediately place the cylinder on a vibration-free surface and allow the contents to settle undisturbed for 5 min.

8.4 Without picking up the cylinder, record the results as specified in clause 9. View the cylinder in diffused light.

9 Evaluation and expression of results

9.1 Record any change in volume of the aqueous layer rounded off to the nearest 0,5 ml.

9.2 Record and rate the interface in accordance with table 2.

Table 2 — Interface conditions

Rating	Appearance
1	Clear and clean
1b	Clear bubbles covering not more than an estimated 50 % of the interface and no shreds, lace or film at the interface
2	Shred, lace or film at the interface

9.3 The presence of scum at the interface shall result in an interface rating of “greater than 2”.

9.4 Record and rate the degree of separation of the two phases in accordance with table 1.

Disregard any slight cloudiness in the fuel layer that is no longer visible when viewed against a white background.

10 Precision

10.1 The change in volume of the aqueous layer is a measure of water reaction of aviation gasoline and is a qualitative indication of water-miscible components and is not subject to a statement of precision.

10.2 It is not practicable to specify the precision of the interface rating as a measure of the water reaction of aviation turbine fuels because results of the ratings described in table 2 are purely qualitative. Table 2 assigns a number to descriptions of interface appearance as a convenient guide to qualitative ratings.

11 Test report

The test report shall contain at least the following information:

a) a reference to this International Standard;

b) the type and complete identification of the product tested;

c) the result of the test (see clause 9);

d) any deviation, by agreement or otherwise, from the standard procedures specified;

e) the date of the test.