



Standard Test Method for Specific Gravity of Askarels¹

This standard is issued under the fixed designation D 1810; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This test method describes the measurement of the specific gravity (relative density) of askarels. Askarels are liquids containing chlorinated aromatic hydrocarbons used as electrical insulation and coolant in transformers and capacitors. This test method applies to those askarels remaining in service which contain polychlorinated biphenyls (PCB's). The test method may also be applied to unused or in-service non-PCB askarels, which have been introduced as replacements in these applications.

1.2 The values stated in inch-pound units are to be regarded as the standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 ASTM Standards:

D 923 Test Method for Sampling Electrical Insulating Liquids²

E 1 Specification for ASTM Thermometers³

3. Terminology

3.1 Definitions of Terms Specific to This Standard:

3.1.1 *specific gravity (relative density) of an askarel*—the ratio of the masses of equal volume of askarel and water. For askarels of low viscosity, both masses are determined with the liquid at a temperature of 60°F (15.56°C), and both weights are corrected for the buoyant effect of air. This characteristic is expressed as “Specific Gravity 60/60°F” wherein the first 60°F refers to the temperature of the askarel and the second 60°F refers to the temperature of the water. For askarels of high viscosity, which cannot be tested at 60°F, the standard test temperature is 194°F (90°C) and the specific gravity is recorded as 194/60°F.

4. Significance and Use

4.1 Low-viscosity askarels are frequently sold on the basis of volume delivered at 60°F. Delivery is often made on the basis of new weight of product in drums, and the specific gravities are often measured at temperatures other than 60°F. The value of specific gravity at 60°F must be known to compute the volume at 60°F of the askarel delivered.

4.2 The specific gravity may be indicative of composition of the askarels.

5. Apparatus

5.1 *Hydrometer*—Use a hydrometer of the conventional floating glass type, calibrated in terms of specific gravity. The range of the instrument shall be any suitable portion of the interval between 1.0000 and 2.0000, with the scale divided in 0.001 of a unit of specific gravity, and the scale divisions spaced not less than 0.75 mm (0.03 in.) nor more than 1.5 mm (0.06 in.) apart. The scale shall be so marked that it can be easily read, and the accuracy of the calibration of the hydrometer shall be such that the error at any point of the scale shall not exceed 0.0005.

5.2 *Hydrometer Cylinder*—Use a clear glass cylindrical receptacle to test the liquid. The inside diameter of the cylinder shall be at least 2.54 cm (1.0 in.) greater than the outside diameter of the hydrometer, and the height of the cylinder shall be such that the column of liquid under test exceeds by at least 2.54 cm the submerged portion of the hydrometer after a state of equilibrium has been reached.

5.3 *Thermometer*—Use an ASTM thermometer of the total immersion type and conforming to the requirements prescribed in Specifications E 1, to take the temperature of the liquid under test.

5.4 *Temperature-Control Apparatus*—Provide suitable apparatus for controlling the temperature of the liquid under test to 60 ± 1°F (15.56 ± 0.56°C) or 194 ± 1°F (90 ± 0.56°C). This may consist of a liquid bath, into which the hydrometer cylinder is placed, or a conditioning chamber in which temperature-controlled air is the regulating medium.

6. Sampling

6.1 Obtain the sample of askarel in accordance with Test Method D 923.

7. Procedure

7.1 Determine the specific gravity of the askarel at a temperature of 60°F (15.56°C) or 194°F (90°C). Pour the

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² Annual Book of ASTM Standards, Vol 10.03.

³ Annual Book of ASTM Standards, Vol 14.03.

sample to be tested into the clean hydrometer cylinder without splashing, so as to avoid, as much as possible, the formation of air bubbles. If air bubbles are formed, remove them after they have collected on the surface by touching them with a piece of clean blotting or filter paper before placing the hydrometer in the sample. Then put the hydrometer and thermometer in the liquid and place the cylinder in the conditioning medium. Keep them there until the required temperature of the sample, as indicated by the thermometer, is reached. An occasional gentle stirring will facilitate reaching the desired temperature. If a liquid bath is used, set the apparatus in a location as free from air currents as possible. If an air conditioning chamber is used, shut off any fans used for air circulation as soon as the test temperature is reached, so that disturbance from air currents will be minimized.

7.2 When the liquid under test has reached the test temperature, raise the hydrometer slightly and carefully wipe the stem clean. Then lower the hydrometer slowly into the sample to a level of two smallest scale divisions below that at which it will float, and then release it. When the hydrometer has come to rest, floating freely away from the wall of the cylinder, read and record the specific gravity. In the case of transparent liquids, read the hydrometer with the eye at the level of the surface of the liquid and at the point where the bottom of the

meniscus of the liquid intersects the hydrometer scale. In the case of nontransparent liquids, read the hydrometer at the highest point on the scale to which the liquid rises. Correct the hydrometer reading by an amount equal to the height to which the liquid rises on the scale above the main surface of the sample.

7.3 Immediately after the specific gravity is determined, read the thermometer and record the temperature of the sample.

8. Precision and Bias

8.1 *Repeatability*—Duplicate determinations should agree within 0.001 unit of specific gravity when the same hydrometer and thermometer are used in the tests.

8.2 *Reproducibility*—Separate laboratories using different hydrometers and thermometers should obtain duplicate results, agreeing within 0.002 unit of specific gravity.

8.3 *Bias*—Since there is no accepted reference material suitable for determining the bias for the procedure in Test Method D 1810 for measuring the specific gravity of askarels, no statement on bias is being made.

9. Keywords

9.1 askarels; chlorinated aromatic hydrocarbons; PCB; specific gravity

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