



## Standard Test Method for Specific Gravity of Oils and Liquid Fats<sup>1</sup>

This standard is issued under the fixed designation D 5355; 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 ( $\epsilon$ ) indicates an editorial change since the last revision or reapproval.

### 1. Scope

1.1 This test method covers the determination of the specific gravity of oils and liquid fats by calculating the ratio of the weight of a unit volume of the sample to the weight of a unit volume of water at 25°C.

1.2 The values stated in SI 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. Terminology

#### 2.1 Definitions:

2.1.1 *density*—weight/unit volume expressed as grams per centimetre.

2.1.2 *liquid fats*—fats that melt below 58°C.

2.1.3 *oils*—substances that are fluid at 25°C, consisting of glycerides of fatty acids, aliphatic hydrocarbons, and aromatic hydrocarbons.

2.1.4 *specific gravity*—the ratio of the density of a substance to the density of the reference substance.

### 3. Significance and Use

3.1 This test method is used to measure the specific gravity of all oils and liquid fats that are used to soften leather, or that are used in products to soften leather. The specific gravity is one parameter that can be used to monitor the quality of these products.

### 4. Apparatus

4.1 *Specific Gravity Bottles*, with well-fitting ground glass joints and a capacity of approximately 50 mL.

4.2 *Water Bath*, maintained at  $25 \pm 0.2^\circ\text{C}$ .

4.3 *Water Bath*, maintained at  $60 \pm 0.2^\circ\text{C}$ .

4.4 *Thermometer*, laboratory thermometer having a range from  $-20$  to  $102^\circ\text{C}$  with 0.1 or 0.2 subdivisions.

<sup>1</sup> This test method is under the jurisdiction of ASTM Committee D31 on Leather and is the direct responsibility of Subcommittee D31.08 on Fats and Oils. This test method was developed in cooperation with the American Leather Chemists Assn. (Method H 15-1957).

Current edition approved May 15, 1995. Published July 1995. Originally published as D 5355 – 93. Last previous edition D 5355 – 93.

### 5. Procedure

5.1 *Calibration of the Specific Gravity Bottles*—Clean and dry thoroughly and then fill with recently boiled and cooled distilled water at 20 to 23°C. Fill the bottle to overflowing by holding the bottle on its side in such a manner as to prevent the entrapment of air bubbles. Insert the stopper and immerse in a water bath at  $25 \pm 0.2^\circ\text{C}$ . Keep the entire bulb completely covered with water and hold at the specified temperature for 30 min. Carefully remove any water that has exuded from the side opening. Remove the bottle from the bath and wipe completely dry. Weigh the bottle and contents. Calculate the weight of water in the flask by subtracting the weight of the empty bottle from the weight of the bottle plus the water.

#### 5.2 Specific Gravity at 25/25°C:

5.2.1 Melt the sample and filter through filter paper to remove any impurities and the last traces of moisture. The sample must be completely dry.

5.2.2 Cool the sample from 20 to 23°C and fill the bottle to overflowing, holding the bottle on its side in such a manner as to prevent the entrapment of air bubbles.

5.2.3 Insert the stopper, immerse, and hold in the water bath at  $25 \pm 0.2^\circ\text{C}$  for 30 min.

5.2.4 Carefully wipe off any oil that has come through the capillary opening and remove from the bath. Clean and dry thoroughly.

5.2.5 Weigh the bottle and contents. Calculate the specific gravity as directed in 5.1.

#### 5.3 Specific Gravity at 60/25°C:

5.3.1 Melt the sample and filter through filter paper to remove any impurities and the last traces of moisture. The sample must be completely dry.

5.3.2 Pour the melted fat into the bottle at 56 to 58°C to overflowing, holding the bottle on its side in such a manner as to prevent the entrapment of air bubbles.

5.3.3 Insert the stopper, immerse, and hold in the water bath at  $60 \pm 0.2^\circ\text{C}$  for 30 min.

5.3.4 Carefully wipe off any oil that has come through the capillary opening and remove from the bath. Clean and dry thoroughly.

5.3.5 Weigh the bottle and contents. Calculate the specific gravity as directed in 5.1.

### 6. Calculation and Report

6.1 Specific gravity at 25/25°C =

$$\frac{\text{weight of bottle and oil} - \text{weight of bottle}}{\text{weight of water at } 25^{\circ}\text{C}}$$

6.2 Specific gravity at 60/25°C =

$$\frac{F}{W[1 + (0.000025 \times 35)]}$$

where:

- (1)  $F$  = weight of sample at 60°C and  
 $W$  = weight of water at 25°C.

## 7. Keywords

- (2) 7.1 density; liquid fats; oil; specific gravity

*The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.*

*This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, at the address shown below.*

*This standard is copyrighted by ASTM, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, United States. Individual reprints (single or multiple copies) of this standard may be obtained by contacting ASTM at the above address or at 610-832-9585 (phone), 610-832-9555 (fax), or service@astm.org (e-mail); or through the ASTM website (www.astm.org).*