Designation: D 1981 – 86 (Reapproved 1995)ε1

Standard Test Method for Measuring Color After Heating of Fatty Acids[1]

This standard is issued under the fixed designation D 1981; 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.

ε[1] NOTE—Unit of measurement statement and Keywords were added editorially in May 1995.

1. Scope

1.1 This test method covers the measurement of the color of normal fatty acids after heating under the conditions specified in the test and is applicable to all normal fatty acids.

1.2 The values stated in SI units are to be regarded as the standard. The values given in parentheses are for information only.

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 1544 Test Method for Color of Transparent Liquids (Gardner Color Scale)[2]

E 1 Specification for ASTM Thermometer[3]

3. Significance and Use

3.1 The color of a fatty acid is readily affected by heat and oxidization. Variations in degree of heat, time of heat, and exposure to atmosphere during heating have a marked effect on the color obtained; therefore, conformity to the equipment and procedure outlined in this test method is essential to accuracy and precision.

4. Apparatus and Materials

4.1 *Oil Bath*—A 5-L stainless steel beaker equipped with a mechanical stirrer and containing any light-colored alkali-refined oil such as hydrogenated cottonseed oil.

4.2 *Heat Source*—Either three Tirrill burners or electric immersion heaters with suitable thermostatic control may be used. Burners or heaters shall be of sufficient capacity so that when placing several tubes in the bath, the bath temperature does not drop more than 5°C below the minimum bath temperature and the recovery time to reach 205°C does not exceed 5 min.

4.3 *Thermometer*—An ASTM Partial Immersion Thermometer, having a range from 95 to 255°C, and conforming to the requirements for Thermometer 42C as prescribed in Specification E 1.

4.4 *Tubes*, 25 mm (1 in.) in diameter, 240 mm (9½in.) in length with ground-glass joints[4] (Fig. 1).

4.5 *Test Tube Holder* (Fig. 2).

4.6 *Timer*, capable of registering up to 120 min.

4.7 *Nitrogen*—A source of nitrogen capable of being regulated to a pressure of 7 to 14 kPa (1 to 2 psi).

5. Procedure

5.1 Adjust the oil level so that the tubes will be immersed to a depth of 140 mm (5½in.). Bring the bath to a temperature of 205 ± 2°C and maintain the temperature within the specified range.

5.2 If the sample to be tested is not liquid at room temperature, liquefy by heating on a water bath to a temperature not more than 20°C above the melting point of the sample. Fill a clean, dry tube to a depth of 127 mm (5.0 in.) with the sample and place it in the oil bath.

5.3 Place a fitted stopper in each tube and adjust the flow of nitrogen so that the surface of the specimen is blanketed by inert gas at all times. Set the timer for 60 min if the sample has an iodine value greater than 15, or for 120 min if the sample has an iodine value of 15 or less. At the end of the applicable time remove the tubes from the bath and read the color immediately in accordance with Test Method D 1544.

6. Precision and Bias

6.1 Precision and bias were not established at the time this test method was written. An effort is being made to obtain the precision and, if obtainable, will be published in future

[1] This test method is under the jurisdiction of ASTM Committee D-1 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.34 on Naval Stores.

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[2] *Annual Book of ASTM Standards*, Vol 06.01.

[3] *Annual Book of ASTM Standards*, Vol 14.03.

[4] Joints from Lab-Crest Scientific Glass Co., Div. of Fischer & Porter, East County Line Rd., Warminster, PA 18974 have been found suitable for this purpose.