



Standard Test Method for Titer of Fatty Acids¹

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1. Scope

1.1 This test method covers the determination of the solidification (titer) point of fatty acids and is applicable to all fatty acids.

1.2 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this 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*:²

E1 Specification for ASTM Liquid-in-Glass Thermometers

2.2 *AOCS Standard*:³

Specification H 6-40

3. Significance and Use

3.1 Saturated fatty acids solidify at a higher temperature than unsaturated fatty acids. This test method provides a means of measuring the solidification temperature of a sample containing both unsaturated and saturated fatty acids by cooling the specimen and measuring the temperature at which solidification occurs.

3.2 Samples containing higher levels of saturated acids will have a higher titer (solidification temperature) than those with lower levels of saturated acids.

3.3 Water present in the sample will raise the titer, so provisions are made in the test method to remove traces of moisture.

¹ This test method is under the jurisdiction of ASTM Committee D01 on Paint and Related Coatings, Materials, and Applications and is the direct responsibility of Subcommittee D01.34 on Pine Chemicals and Hydrocarbon Resins.

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² For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

³ Available from American Oil Chemists' Society (AOCS), 2710 S. Boulder, Urbana, IL 61802-6996, <http://www.aocs.org>.

4. Apparatus

4.1 *Beaker*, Griffin low-form, 2-L capacity.

4.2 *Bottle*, wide-mouth, 450-mL capacity, 190-mm height, inside diameter of neck 40 mm.

4.3 *Test Tubes*, 100 mm in length, 25 mm in diameter, with or without rim. These tubes may have an etched mark extending around the tube at a distance of 57 mm from the bottom to show the height to which the tube is to be filled.

4.4 *Stirrer*, 2 to 3 mm in outside diameter, with one end bent in the form of a loop 20 mm in outside diameter. Glass or stainless steel wire may be used. The upper end can be formed to accommodate hand stirring or to be attached to a mechanical stirrer.

4.5 *Laboratory Thermometer*, having a range from 0 to 150°C.

4.6 *Titer Test Thermometer*—An ASTM Titer Test Thermometer having a range from –2 to +68°C and conforming to the requirements for Thermometer 36C as prescribed in Specification E1. Thermometric devices such as RTDs, thermistors and liquid-in-glass thermometers of equal or better accuracy in the specified temperature range, may be used.

NOTE 1—Thermometers conforming to the requirements for the AOCS Titer Thermometer (AOCS Specification H 6-40) meet these requirements.

5. Procedure

5.1 Heat the sample on a hot plate to 130°C to remove traces of moisture, and fill a test tube (see 4.3) to a height of 57 mm from the bottom.

5.1.1 Do not hold the sample at 130°C nor reheat to this temperature more than once. If excessive moisture is present, allow the water to settle, decant the fatty acids, and then refilter and reheat. The acids must be dry and free of suspended matter.

5.2 Fill the water bath to the designated level (Fig. 1) and adjust the temperature to 15 to 20°C below the expected titer point.

5.3 Place the test tube containing the fatty acids in the assembly as shown in Fig. 1. Insert the titer thermometer to the immersion mark so that it will be equidistant from the sides of the tube.

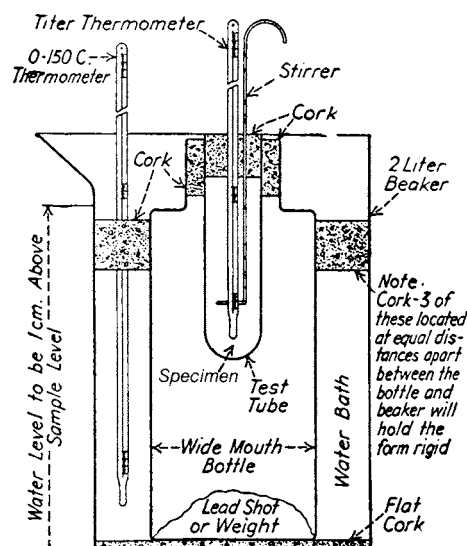


FIG. 1 Apparatus Assembly for Titer Test

5.4 Stir with the stirring rod through a vertical distance of about 40 mm at the rate of 100 complete up-and-down motions per minute (Note 2). Start the agitation while the temperature is at least 10°C above the titer point.

NOTE 2—Stirring may be performed mechanically by attaching a small motor with suitable speed-reducing mechanism to the stirring rod.

5.5 Stir at the specified rate until the temperature remains constant for 30 s or begins to rise in less than a 30-s interval. Discontinue stirring immediately, remove the stirrer or raise it out of the specimen, and observe the increase in temperature. The titer point is the highest temperature indicated by the thermometer during this rise.

6. Precision and Bias

6.1 *Precision*—Duplicate determinations by the same operator should agree within 0.2°C.

6.2 *Bias*—Bias has not been determined.

7. Keywords

7.1 fatty acids; saturated fatty acids; solidification point; titer

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