



Standard Test Method for Foots in Raw Linseed Oil (Gravimetric Method)¹

This standard is issued under the fixed designation D 1966; 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 method covers the determination of foots in raw linseed oil by the gravimetric method. The procedure is commonly known in Europe as the PAT foots method.

1.2 *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 1193 Specification for Reagent Water²

3. Terminology

3.1 Definition:

3.1.1 *foots*—those solid impurities that precipitate from raw linseed oil during storage and which then settle to the bottom or “foot” of a storage tank.

3.2 Definition of Term Specific to This Standard:

3.2.1 *foots*—in this method, the material that is precipitated from the oil by phosphoric acid and which is insoluble in acetone under the specific conditions of the test.

4. Summary of Test Method

4.1 The oil to be tested is refined with 85 % phosphoric acid. The precipitated material is settled by centrifuging and is washed free of oil with acetone. It is dried and weighed to determine the foots content gravimetrically.

5. Apparatus

5.1 *Fritted Glass Filtering Crucibles*, having a medium porosity (10 to 15 μm) and a capacity of 30 mL.

5.2 *Agitator*—The agitator shall consist of a horizontal shaft suitably supported and fitted with clamps or a clamping device for holding pear-shaped centrifuge tubes. The tubes shall be held in such fashion that when the shaft rotates, the tubes will be tipped end over end, thus allowing the liquid content of the tube to mix as it flows from one end of tube to the other. The

shaft shall be rotated mechanically by any means desired that allows one to choose either of two fixed speeds; a slow speed of 16 ± 2 rpm and a fast speed of 32 ± 2 rpm.

5.3 *Centrifuge Tube*, pear-shaped conforming to dimensions given in Fig. 1, and made of thoroughly annealed glass. The graduations, numbered as shown in Fig. 1, shall be clear and distinct and the mouth shall be constricted in shape for closure with a stopper.

5.4 *Centrifuge*—Capable of whirling two or more filled tubes at a speed that can be controlled to give a relative centrifugal force of between 500 to 800 *g* at the tip of the tubes. Calculate the speed of the rotating head as follows:

$$\text{rpm} = 265 \sqrt{\text{rcf}/d} \quad (1)$$

where:

rcf = relative centrifugal force, *g*, and

d = diameter of swing, in., measured between tips of opposite tubes when in rotating position.

5.4.1 If *d* is given in millimetres, use the following equation:

$$\text{rpm} = 1346 \sqrt{\text{rcf}/d} \quad (2)$$

NOTE 1—A list of applicable rotational speeds is given in Table 1.

5.5 *Pipet*, 1-mL measuring type graduated in 0.01-mL subdivisions.

5.6 *Desiccator*, containing an efficient desiccant. Anhydrous calcium sulfate is satisfactory.

6. Reagents

6.1 *Purity of Reagents*—Reagent grade chemicals shall be used in all tests. Unless otherwise indicated, it is intended that all reagents shall conform to the specifications of the Committee on Analytical Reagents of the American Chemical Society, where such specifications are available.³ Other grades may be used, provided it is first ascertained that the reagent is of sufficiently high purity to permit its use without lessening the accuracy of the determination.

6.2 *Purity of Water*—Unless otherwise indicated, references to water shall be understood to mean reagent water conforming to Type II of Specification D 1193.

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 D01.32 on Drying Oils.

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² *Annual Book of ASTM Standards*, Vol 11.01.

³ *Reagent Chemicals, American Chemical Society Specifications*, American Chemical Society, Washington, DC. For suggestions on the testing of reagents not listed by the American Chemical Society, see *Analar Standards for Laboratory Chemicals*, BDH Ltd., Poole, Dorset, U.K., and the *United States Pharmacopeia and National Formulary*, U.S. Pharmacopeial Convention, Inc. (USPC), Rockville, MD.