



Designation: D 1950 – 86 (Reapproved 1995)^{ε1}

Standard Test Method for Acetone Tolerance of Heat-Bodied Drying Oils¹

This standard is issued under the fixed designation D 1950; 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.

ε¹ NOTE—Unit of measurement statement and Keywords were added editorially in May 1995.

1. Scope

1.1 This test method covers the determination of the acetone tolerance of heat-bodied drying oils when no nonfatty material is present.

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 whoever uses this standard to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.* Specific hazard statements are given in Section 6.

2. Terminology

2.1 Definitions of Terms Specific to This Standard:

2.1.1 *acetone tolerance*—of a drying oil, the number of grams of acetone required to produce a persistent cloudiness in 100 g of the oil at 25°C, under the conditions prescribed in this test method.

3. Significance and Use

3.1 Unbodied drying oils are miscible with acetone. As drying oils are heat-bodied, higher molecular weight species are formed that are acetone insoluble. Therefore, addition of acetone to a drying oil can be used as an indication of the degree of polymerization present in the oil. Since solubility of a polymer is extremely temperature-dependent, the temperature must be precisely controlled. This test method is applicable to heat-bodied oils only when no other nonfatty material is present.

3.2 There is no correlation between the acetone tolerance and the usefulness of an oil, but, if acetone tolerance and other

properties of an oil are the same as those of an accepted sample, the two probably have been produced by the same technique.

4. Apparatus

4.1 *Balance*, capable of weighing to an accuracy of 0.5 mg.

4.2 *Erlenmeyer Flasks*, 250-mL, glass-stoppered.

4.3 *Bath Clamp*.

4.4 *Ringstand*, approximately 4 ft (1.2 m) high.

4.5 *Buret*, with a capacity of 50 mL, fitted at the top with a suitable drying tube.

4.6 *Water Jacket Assembly for Buret*, as shown in Fig. 1.

4.7 *Water Bath*—A constant-temperature water bath capable of maintaining a temperature of $25 \pm 0.1^\circ\text{C}$. The bath shall be fitted with a water pump for circulating water through the bath and the water jacket as shown in Fig. 1.

NOTE 1—Details for the thermostatic control unit and heating element have been omitted from the drawing in Fig. 1, since the proper selection and construction of this unit may be left to the discretion of the analyst.

4.8 *Volumetric Flask*, 25-mL, glass-stoppered, for use as a specific gravity bottle.

4.9 *Glass Beads*, approximately 1.5 to 3 mm ($\frac{1}{16}$ to $\frac{1}{8}$ in.) in diameter.

5. Reagents and Materials

5.1 Acetone (Warning—See 6.1):

5.1.1 Place a suitable quantity of acetone in a round-bottom, glass-stoppered flask and to it add 25 % of its weight of anhydrous cupric sulfate (CuSO_4). Stopper the flask and allow the mixture to stand for at least 3 days. At the end of this period, attach the flask and its contents to an all-glass distillation apparatus that previously has been thoroughly dried and distill the acetone directly from the drying agent, using a steam bath for heating. Discard the first 10 % and the last 10 % of the distillate. During the distillation, protect the apparatus from atmospheric moisture by means of a trap containing anhydrous CuSO_4 . Collect and store the acetone in the same receiving bottle, fitted with a similar moisture trap.

5.1.2 Determine the specific gravity at 25/25°C and the percent of moisture in the acetone. The acetone shall be

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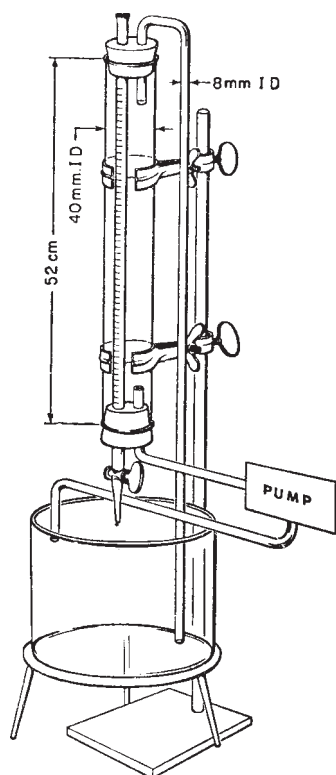


FIG. 1 Apparatus for Acetone Tolerance Test

considered suitable for use if the specific gravity is between 0.7864 and 0.7872, equivalent to a water content of 0.00 to 0.24 %.

5.2 *Cupric Sulfate, Anhydrous*—Technical grade, anhydrous, powdered cupric sulfate (CuSO_4).

6. Hazards

6.1 *Acetone* is a flammable liquid. It is harmful if inhaled, use only with adequate ventilation. Avoid prolonged contact with skin or any contact with the eyes. See supplier's Material Safety Data Sheet.

7. Procedure

7.1 Weigh the glass-stoppered Erlenmeyer flask, containing three or four glass beads, to 0.1 mg. Transfer about 30 g of the sample of the Erlenmeyer flask and weigh the flask and contents to 0.1 mg. Record the weight of the specimen by difference.

7.2 Immerse the flask and its contents in the constant-temperature bath so that the level of the water in the bath is above the level of the specimen. Clamp the flask into position by means of the bath clamp. Fill the buret with acetone and attach the drying tube. Bring the flask and its contents, and the acetone, to $25 \pm 0.1^\circ\text{C}$ by allowing them to stand for at least 10 min.

7.3 Disconnect the flask from the clamp, remove the stopper, and run in the acetone from the buret. Add the acetone in small portions, while keeping the flask immersed in the water bath. After the addition of each portion of acetone, stopper the flask and swirl it gently to dissolve the contents properly. If it should become necessary to remove the flask from the bath to facilitate mixing, reimmerse the stoppered flask in the bath and allow to stand for at least 5 min before continuing with the titration. Take care not to splash the contents over the upper part of the flask during the titration. Each addition of acetone produces a dense cloudiness that will be discharged by agitating the mixture. As the end point is neared, the cloudiness will persist for longer periods of time. At this point, add the reagent dropwise until the addition of 1 drop of the reagent produces a persistent dense cloudiness. Stopper the flask immediately and wipe dry with a clean cloth.

NOTE 2—A suitable magnetic stirring apparatus may be used instead of the beads.

7.4 Weigh the flask and its contents to 0.1 mg. Record the weight of acetone by difference.

8. Calculation

8.1 Calculate the acetone tolerance, T , as follows:

$$T = (A/S) \times 100$$

where:

A = acetone required for titration of the specimen, g, and
 S = specimen used, g.

9. Precision and Bias

9.1 Precision and bias data 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 revisions. This test method has been in use for many years, and its usefulness has been well established.

10. Keywords

10.1 acetone tolerance of drying oils; drying oils; heat bodies

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