



Standard Test Method for Unsaponifiable Contents of Tricresyl Phosphate¹

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1. Scope

1.1 This test method covers the determination of the amount of unsaponifiable impurities in tricresyl phosphate.

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.* For specific hazard statements, see Section 7.

1.3 For hazard information and guidance, see the supplier's Material Safety Data Sheet.

2. Referenced Documents

2.1 ASTM Standards:

D 1193 Specification for Reagent Water²

3. Summary of Test Method

3.1 The specimen is refluxed in the presence of an aqueous solution of sodium hydroxide which converts the phosphate ester to water-soluble salts. The saponified material is extracted with petroleum ether which dissolves any unsaponifiable or water-insoluble material. The combined extracts are evaporated in a tared evaporating dish, and the residual nonvolatile material is determined.

4. Significance and Use

4.1 This test method determines the amount of unsaponifiable impurities in tricresyl phosphate remaining after manufacture or that may be introduced during handling and storage.

4.2 Water-insoluble materials, which do not evaporate on a steam bath or in a drying oven operated at $75 \pm 5^\circ\text{C}$ for 1 h, will be included as unsaponifiable material.

5. Apparatus

5.1 *Reflux Apparatus*, consisting of a 250-mL Erlenmeyer flask equipped with a 24/40 standard-taper joint attached to an Allihn-type reflux condenser similarly equipped with a 24/40 standard-taper joint.

5.2 *Separatory Funnel*, having a capacity of 250 mL.

5.3 *Evaporating Dish*, porcelain or glass, having a capacity of 120 mL.

5.4 *Steam Bath*.

5.5 *Drying Oven*, thermostatically controlled, at a temperature of $75 \pm 5^\circ\text{C}$.

6. Reagents

6.1 *Purity of Reagents*—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 Otherwise, the best available grade shall be used.

6.2 *Purity of Water*—References to water shall be understood to mean reagent water conforming to Type IV of Specification D 1193.

6.3 *Petroleum Ether*, having a boiling range from 30 to 65°C .

6.4 *Sodium Hydroxide (NaOH) Pellets*.

7. Hazards

7.1 Tricresyl phosphate is hazardous through inhalation or skin absorption. Care should be taken in handling the material.

7.2 Ortho-isomer of tricresyl phosphate is considered toxic. Trace amounts may be present in tricresyl phosphate specimens.

8. Procedure

8.1 Place approximately 30 mL of water in the 250-mL Erlenmeyer flask and to this carefully add approximately 10 g of NaOH pellets. Carefully swirl the flask to dissolve the NaOH, and cool the solution to room temperature.

8.2 By means of a weighing pipet, transfer a 10-g specimen, weighed to 1 mg, to the flask. Add several boiling-stones, connect the flask to the reflux condenser, and reflux for 1 h. (**Warning**—See 7.1 and 7.2.)

8.3 At the end of the refluxing period remove the flask from the heat and wash the condenser down with 50 mL of water.

8.4 Cool the flask to room temperature and transfer its content to the 250-mL separatory funnel. Extract the saponified

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 D01.35 on Solvents, Plasticizers, and Chemical Intermediates.

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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.