

**O-E-751b**

APRIL 11, 1956

**SUPERSEDING**

Int. Fed. Spec. O-E-00751b

January 25, 1955, and

Fed. Spec. O-E-751a

April 11, 1945

**FEDERAL SPECIFICATION****ETHER, PETROLEUM; TECHNICAL-GRADE**

*This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.*

**1. CLASSIFICATION**

**1.1 Type and grade.**—Petroleum ether, as specified herein, shall be furnished in one type and in one grade.

**2. APPLICABLE SPECIFICATIONS AND OTHER PUBLICATIONS**

**2.1** The following specification and standard, of the issues in effect on date of invitation for bids, form a part of this specification.

*Federal Specification:*

UU-P-236—Paper, Filter, Analytical.

*Federal Standard:*

Fed. Test Method Std. No. 791—Lubricants, Liquid Fuels, and Related Products; Methods of Testing.

(Activities outside the Federal Government may obtain copies of Federal Specifications and Standards as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.)

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, Los Angeles, Seattle, and Washington, D. C.)

(Federal Government activities may obtain copies of Federal Specifications and Standards and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

**2.2 Other publications.**—The following publications, of the issues in effect on date of invitation for bids, form a part of this publication.

*Governmental*

Code of Federal Regulations, Title 49, Transportation, Chapter 1, Interstate Commerce Commission, Parts 71-78; Explosives and Other Dangerous Articles—49 CFR 71-78.

(Copies of Governmental publication referenced above may be obtained from the Superintendent of Documents, Government Printing Office, Washington 25, D. C. Prices may be obtained from the Superintendent of Documents.)

*Nongovernmental**American Society for Testing Materials Publications:*

ASTM Method D 216—Distillation of Natural Gasoline.

ASTM Method D 130—Method of Test for Free and Corrosive Sulfur in Petrolatum Products.

(Copies of the ASTM publications may be obtained from the American Society for Testing Materials, 1916 Race Street, Philadelphia 3, Pa.)

**3. REQUIREMENTS**

**3.1 Material.**—The material shall be as specified hereinafter.

**3.2 Appearance.**—Petroleum ether shall be a clear liquid, free from suspended matter and sediment.

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**3.3 Odor.**—The odor of the material as received and during evaporation shall not be disagreeable or sulfuretted. There shall be no residual odor after evaporation. (See 4.2.2.)

**3.4 Color.**—The color shall be not darker than No. 28 Saybolt. (See 4.2.3.)

**3.5 Nonvolatile matter.**—When tested in accordance with 4.2.4 the nonvolatile matter shall be not more than 0.0010 gm. per 100 ml. of material.

**3.6 Spot test.**—Petroleum ether shall pass test specified in 4.2.5.

**3.7 Acidity.**—Acidity shall pass test specified in 4.2.6.

**3.8 Distillation range.**—Initial boiling point shall be not less than 35° C.; dry flask end point, not above 65° C, when tested in accordance with 4.2.7.

**3.9 Specific gravity.**—Specific gravity shall be not less than 0.6360 (91.0° API) nor more than 0.6476 (87.0° API) when tested in accordance with 4.2.8.

**3.10 Unsaturation-aromatics.**—The bromine number shall be not more than 0.35 gm. per 100 gm. of material, and aromatics shall be not greater than 3.0 percent when tested in accordance with 4.2.9.

**3.11 Free and corrosive sulfur.**—There shall be no more than a light orange tarnish on a copper strip specimen when tested in accordance with 4.2.10.

#### **4. SAMPLING, INSPECTION, AND TEST PROCEDURES**

**4.1 Sampling.**—When practicable, an original unopened container shall be sent to the laboratory for test. When this is not practicable, a representative composite sample shall be taken from each delivery, placed in a clean glass bottle, sealed, and sent to the laboratory for test. The sample shall be not less than 2 quarts nor more than 2 gallons.

**4.2 Tests.**—(Caution.—Petroleum ether is highly flammable; and when mixed with air may form an explosive mixture.)

**4.2.1 Appearance.**—Pour some of the thoroughly mixed sample into a test tube. Stopper. Allow to stand for at least 10 minutes at room temperature (20° to 30° C.). Examine by transmitted light for clarity, suspended matter, and sediment.

**4.2.2 Odor.**—Note the odor of the material in the container. Dip uniform strips of double acid-washed filter paper in the sample. Allow to dry in a well ventilated room at 20° to 30° C. for 1 hour. Note odor at the start of the drying period and at 15-minute intervals during the drying period. At the end of the drying period, note whether there is any residual odor.

**4.2.3 Color.**—Determine in accordance with method 101 of Federal Test Method Standard No. 791.

**4.2.4 Nonvolatile matter.**—Evaporate 100 ml. of the material in a tared dish over a steam bath until all of the petroleum ether is gone. Place in an oven at 100° ± 2° C. for an additional 15 minutes. Cool in a desiccator and weigh.

**4.2.5 Spot test.**—Place 10 ml. of the material in 10-drop portions in the center of a quantitative double acid-washed medium texture filter paper (type II, class 6, of Federal Specification UU-P-236). The center portion of the under surface of the filter paper shall not be in contact with any object. A 10-cm. petri dish may be used for supporting the paper. Allow each portion to evaporate before application of next portion, in a well-ventilated room, away from direct sunlight, at room temperature (20° to 30° C.). There shall be no stain or spot after a 1-hour drying period beginning from the time the last portion was added.

**4.2.6 Acidity.**—Shake 25 ml. of the sample with an equal volume of freshly boiled and cooled distilled water (free from CO<sub>2</sub>) in a separatory funnel. Draw off the aqueous layer. Add 1 drop of methyl orange indicator (1 percent solution) to the aqueous liquid. A yellow color shall be present (limit of acidity).

**4.2.7 Distillation range.**—Determine the distillation range in accordance with ASTM method D 216 (Distillation of Natural Gasoline). The flask end point shall be taken as the temperature recorded when all liquid disappears from the flask, and not the maximum temperature reached by continued heating.

**4.2.8 Specific gravity.**—Determine the specific gravity in accordance with method 401 (Gravity (Hydrometer)) of Federal Test Method Standard No. 791.

**4.2.9 Unsaturation and aromatics.**—Determine the bromine number and percent aromatics in accordance with method 3701 (Olefins and aromatics in petroleum distillates) of Federal Test Method Standard No. 791.

**4.2.10 Free and corrosive sulfur.**—Determine the copper corrosion in accordance with ASTM method D-130, using the test bomb.

## 5. PREPARATION FOR DELIVERY

**5.1 Packaging.**—Unless otherwise specified, suitable commercial packages are acceptable under this specification.

**5.2 Packing.**—Unless otherwise specified, the subject commodity shall be packed in substantial commercial containers of the type, size, and kind commonly used for the purpose, so constructed as to insure acceptance and safe delivery by common or other carriers, at the lowest rate to the point of delivery called for in the contract or purchase order.

### 5.3 Marking.

**5.3.1 Issue packages.**—Unless otherwise specified, each package shall be marked with the name of the material, the quantity contained therein, the name of the manufacturer or contractor, and an adequate warning of the flammable nature of the contents.

**5.3.2 Shipping containers.**—Unless otherwise specified, shipping containers shall be marked

with the name of the material and the quantity contained therein, as defined by the contract or order under which the shipment is made, the name of the contractor and the number of the contract or order. Each container shall bear the red label prescribed by the Interstate Commerce Commission for flammable liquids.

## 6. NOTES

**6.1 Intended use.**—The petroleum ether, as covered by this specification, is a grade intended for use as a solvent. The petroleum ether is not intended for medical purposes.

**6.2** Purchasers should exercise any desired options offered herein. (See 5.1, 5.2, 5.3.1, and 5.3.2.)

**6.3** It is believed that this specification adequately describes the characteristics necessary to secure the desired material, and that normally no samples will be necessary prior to award to determine compliance with this specification. If, for any particular purpose, samples with bids are necessary, they should be specifically asked for in the invitation for bids, and the particular purpose to be served by the bid sample should be definitely stated, the specification to apply in all other respects.

**6.4** Federal Specifications do not include all types, classes, grades, sizes, etc. of the commodities indicated by the titles of the specifications, or which are commercially available but are intended to cover the types, etc., which are suitable for Federal Government requirements.

**Patent notice.**—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data, is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.