

MIL-T-19588A(CG)  
 10 March 1964  
 SUPERSEDING  
 MIL-T-19588(CG)  
 26 October 1956

MILITARY SPECIFICATION  
 TOLUENE-METHYL ISOBUTYL KETONE MIXTURE

1. SCOPE

1.1 Scope. - This specification covers one type and grade of toluene-methyl isobutyl ketone.

2. APPLICABLE DOCUMENTS

2.1 The following specifications and standard, of the issues in effect on date of invitation for bids, form a part of this specification to the extent specified herein:

SPECIFICATIONS

Federal

TT-M-268	Methyl Isobutyl Ketone (For Use in Organic Coatings)
TT-P-143	Paint, Varnish, Lacquer, and Related Materials; Packaging, Packing, and Marking of
TT-T-548	Toluene Technical
PP-C-96	Gauge, Meter 25 Gage and Lighter

Military

MIL-E-16738	Enamel, Exterior, White, Vinyl-Alkyd (Formula No. 122-82)
MIL-P-23281(CG)	Enamel, Vinyl-Alkyd Lead (For Brush or Spray)

STANDARD

Federal Test Method

141

Paint, Varnish, Lacquer, and Related Materials; Methods of Application, Sampling and Testing

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## PURCHASE DESCRIPTION

U. S. Coast Guard

FS-11-63

Paint, Anti-Fouling, Vinyl-Red

(Copies of specifications and standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

## 3. REQUIREMENTS

3.1 Material. - The mixture furnished under this specification shall consist of equal parts by weight of toluene and methyl isobutyl ketone.

3.1.1 Toluene. - Toluene shall conform to the requirements of Specification TT-T-548.

3.1.2 Methyl isobutyl ketone. - Methyl isobutyl ketone shall conform to the requirements of Federal Specification TT-M-268.

3.2 Quantitative requirements. - The finished mixture shall meet the requirements given in Table I.

TABLE I

	REQUIREMENTS	
	MINIMUM	MAXIMUM
Methyl isobutyl ketone percent by weight	47.5	52.5
Specific gravity at 20/20° Centigrade	0.834	0.837
Nonvolatile matter from 100 ml., mg.	-	3.0
Acidity, mg of KOH/gram of sample	-	0.10
Distillation (at 760 mm. pressure):		
Initial boiling point, °C.	109.0	-
*Dry point, °C.	-	117.0
Flash point, °F. (Tag Closed Cup)	50.0	-

\*"Dry point" is the temperature observed on the distillation thermometer when the last drop of liquid leaves the bottom of the flask.

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3.3 Qualitative requirements. - The mixture shall meet the following qualitative requirements:

3.3.1 Appearance. - The toluene-methyl isobutyl ketone mixture shall be clear and free from sediment and suspended matter when examined by transmitted light.

3.3.2 Color. - The sample shall be no darker than the standard dichromate solution when examined in accordance with paragraph 4.6.9.

3.3.3 Aldehydes. - The mixture shall be free from aldehydes when tested in accordance with paragraph 4.6.7.

3.3.4 Thinning. When used in the proportions outlined in paragraph 4.6.8 to thin vinyl-red anti-fouling paint, vinyl-red lead primer, and vinyl-alkyd type exterior paint, there shall be no "kickout", separation, thickening, or any other objectionable properties of the resulting mixture that would interfere with satisfactory brushing or spraying.

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

4.1 The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examination and tests shall be kept complete and available to the Government as specified in the contract or order. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Inspection procedures. - The procedures of inspection shall be in accordance with 1.1, 1.2, 1.3, or 1.4 of Method 1011 of Federal Standard 141, as stipulated in the contract or order (see 6.2).

4.2 Lots. - For purpose of sampling, inspection, and testing, a lot shall consist of all material offered for delivery at one time.

4.3 Sampling procedures. - The procedures for sampling shall be in accordance with Method 1021 of Federal Standard 141.

4.4 Containers. - Sample filled containers (quart or gallons) selected on the basis of four out of each 100 in the lot shall be examined for defects of construction of the container and the closure, for evidence of leakage, for unsatisfactory markings, and all other preparation for delivery requirements.

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Each sample filled container shall also be weighed to determine the amount of contents. Any container having one or more defects, or under required fill, shall be rejected, and if the number of defective containers exceeds two per each hundred in the lot, the lot shall be rejected.

4.5 Lot acceptance tests. - The samples selected in accordance with 4.3 shall be subjected to the tests specified in 4.6. Lots shall be accepted by the Government inspector on the basis of the laboratory test report on the transmitted samples.

4.6 Test procedures. -

4.6.1 Methyl isobutyl ketone. - The percent of methyl isobutyl ketone by weight reported shall be the average of at least two determinations which differ by not more than 0.2 percent. This determination cannot be performed in the presence of aldehydes.

4.6.1.1 Reagents. -

4.6.1.1.1 Alcoholic hydroxylamine hydrochloride solution. - Dissolve 84 grams (gm.) of hydroxylamine hydrochloride in 250 milliliters (ml.) of distilled water, filter, and dilute to 1 liter with refined anhydrous isopropyl alcohol.

4.6.1.1.2 Standard sodium hydroxide solution. - A 0.5 N aqueous solution which has been properly protected from atmospheric carbon dioxide.

4.6.1.1.3 Bromphenol blue indicator solution. - Dissolve 0.1 gm. of bromphenol blue in 100 ml. of refined anhydrous isopropyl alcohol.

4.6.1.2 Procedure. - Place 150 ml. of the hydroxylamine hydrochloride solution in a 500-ml. wide mouth Erlenmeyer flask and add 10 drops of the bromphenol blue indicator. Neutralize any free acid (HCL) in the solution by adding the 0.5 N sodium hydroxide solution dropwise from a burette until the color becomes blue-green when observed in diffused light through a 50-ml. Nessler tube resting in a color tube rack. Retain 35 ml. of the neutralized solution in a Nessler tube for color comparison. Accurately weigh to the nearest 0.1 milligram 1.0 to 1.5 gm. of the sample from a suitable weighing device into the Erlenmeyer flask containing the remainder (115 ml.) of hydroxylamine hydrochloride solution. Stopper the flask and thoroughly mix by gently swirling the contents of the flask for several minutes. Titrate immediately with the 0.5 N sodium hydroxide solution. As the end point is approached, compare the color of the sample solution by transferring 50 ml. of the solution to a Nessler tube and viewing it side by side with a Nessler tube containing the neutralized hydroxylamine hydrochloride solution. Continue the titration until an exact color match is obtained. (Note: by matching 50 ml. of the sample solution with 35 ml. of the neutralized hydroxylamine hydrochloride solution, a compensation is made for the dilution caused by the titrating reagent.)

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4.6.1.3 Calculation. - Calculate the percentage by weight of methyl isobutyl ketone as follows:

$$\text{Percent methyl isobutyl ketone} = \frac{V \times N \times 10.02}{W}$$

V = milliliters of sodium hydroxide used for titration

N = normality of sodium hydroxide

W = weight of methyl isobutyl ketone used

4.6.2 Specific gravity. - Specific gravity testing shall be in accordance with method 4183 of Federal Standard No. 141.

4.6.3 Nonvolatile matter. - Place 100 ml. of the sample in a weighed porcelain dish and evaporate over a steam bath or hot plate maintained at 115° to 125° C. (239° to 252° F.) almost to dryness. Heat the dish and residue to an oven at 120° ± 2° C. (248° ± 4° F.) to constant weight, cool in a desiccator, and weigh. Report the difference in weight as grams of nonvolatile matter per 100 ml. of the sample.

4.6.4 Acidity. - Acidity shall be tested in accordance with method 5252 of Federal Standard No. 141.

4.6.5 Distillation. - Testing of distillation shall be in accordance with method 4303 of Federal Standard No. 141.

4.6.6 Flash point. - Testing of flash point shall be in accordance with method 4291 of Federal Standard No. 141.

4.6.7 Aldehydes. - Testing for aldehydes shall be in accordance with 4.3.4 of Specification TT-M-268.

4.6.8 Compatibility. - The compatibility of the mixture shall be tested by thinning two samples each of paints conforming to Specifications MIL-E-16738 and MIL-P-23281 and Purchase Description FS-11-63 with an equal volume of the mixture. Observe for evidence of incompatibility as outlined in 3.3.4.

4.6.9 Dichromate solution. - Prepare the standard dichromate solution by dissolving 0.003 gram of A. C. S. reagent grade potassium dichromate in one liter of distilled water. Compare standard with sample in accordance with Method 4247 of Federal Standard 141.

## 5. PREPARATION FOR DELIVERY

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5.1 **Packaging.** - The mixture shall be packaged in 1-quart, 1-gallon or 5-gallon cans, as stipulated (see 6.2). The containers shall conform to type V, class 4, of Federal Specification PPP-C-96.

5.2 **Packing.** - Unless otherwise specified, unit packages of mixture shall be packed in substantial commercial containers of the same type and size to insure acceptance and safe delivery by common or other carriers at the lowest rate, to the point of delivery.

5.3 **Marking.** -

5.3.1 **Individual containers.** - Each individual container of the mixture shall be legible marked by lithograph or securely affixed label conforming to good commercial practice, with information as hereinafter indicated.

5.3.2 The manufacturer's label may be used provided that all the following information is included thereon, or a supplementary label be provided to include all points not covered by the manufacturer's label. Such information shall include:

1. Stock number
2. Name of the material as given in the title of this specification
3. Specification number
4. Quantity in container
5. Contract number
6. Name of manufacturer
7. Month and year of manufacture
8. Manufacturer's lot number
9. A statement of intended use and the manner and limitations involved in such use of the mixture, as follows:

**USE.** - This mixture is intended to be used as a solvent or thinner for vinyl-red anti-fouling paint, vinyl-red lead primer, and vinyl-alkyd type exterior paint. It is NOT satisfactory for use as a thinner for pretreatment, wash primer. This mixture is also intended for use in cleaning spray equipment or brushes used with the vinyl-alkyd paints except pretreatment, wash primer. Spray equipment should be thoroughly cleaned with this mixture before and after use. As part of the cleaning procedure, charge the spray equipment with the mixture and operate spray gun until paint particles are cleared from the lines.

**PRECAUTIONS.** - This mixture is inflammable. Usual painting precautions to keep open flames and sparks away from area where mixture is being used must be strictly enforced. Adequate ventilation is necessary in order to avoid prolonged breathing of the vapors and to prevent the accumulation of explosive vapors.

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5.3.3 Shipping containers. - Unless otherwise specified, shipping containers shall be marked with the name of the material, quantity and size of containers therein, the stock number, the name of the contractor, the number of the contract or order, and the gross weight.

## 6. NOTES

6.1 The toluene-methyl isobutyl ketone mixture is intended primarily as a thinner for certain vinyl type paints such as vinyl-red anti-fouling paint, vinyl-red lead primer, and vinyl-alkyd type exterior paint. The mixture should NOT be used in paints for which a different type of thinner is recommended; and before using in any paint for which a thinner of this type is not specifically recommended, it should be definitely ascertained that this product is suitable for such use.

6.2 Ordering data. - Procurement documents should stipulate the following:

- (a) Title, number, and date of this specification.
- (b) Size of containers (see 5.1).
- (c) Federal stock numbers.
- (d) Inspection procedure (see 4.1.1).

6.3 Basis of purchase. - The toluene-methyl isobutyl ketone shall be purchased by volume, the unit being a U.S. gallon of 231 cubic inches at 20 degrees Centigrade (68 degrees Fahrenheit).

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 and 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.

Preparing Activity:  
U.S. Coast Guard



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