

MIL-P-81351A(OS)

22 JULY 1976

SUPERSEDING

MIL-M-81351(WP)

24 January 1966

and

AMENDMENT 1

19 January 1969

## MILITARY SPECIFICATION

### PEROXIDE, METHYL ETHYL KETONE

This specification is approved for use by the Naval Sea Systems Command (OS), Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 This specification covers one grade of methyl ethyl ketone peroxide furnished as a 60% solution in dimethyl phthalate.

#### 2. APPLICABLE DOCUMENTS

2.1 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specifies herein.

#### SPECIFICATIONS

##### FEDERAL

PPP-C-300	Chemical, Liquid; Packaging and Packing of
PPP-B-591	Box, Fiberboard, Wood-cleated
PPP-B-601	Box, Wood, Cleated Plywood
PPP-B-621	Box, Wood, Nailed and Locked Corners
PPP-B-636	Box, Shipping, Fiberboard

##### MILITARY

MIL-B-10377	Box, Wood, Cleated, Veneer, Paper Overlaid
MIL-V-23776	Vermiculite, Expanded
MIL-B-26701	Bottle, Screw Cap and Carboys, Polyethylene Plastic

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STANDARDS

Fed. Test Method                      Paint, Varnish, Lacquer, and Related Materials;  
Std. No. 141                            Methods of Inspection, Sampling, and Testing

MILITARY

MIL-STD-105                            Sampling Procedures and Tables for Inspection  
by Attributes  
MIL-STD-129                            Marking for Shipment and Storage

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

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

CODE OF FEDERAL REGULATIONS

49 CFR 171-179                            Department of Transportation Rules and Regulations  
for the Transportation of Explosives and Other  
Dangerous Articles

(The Department of Transportation regulations are a part of the Code of Federal Regulations available from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Orders for the above publication should cite "49 CFR 171-179.")

MANUFACTURING CHEMISTS' ASSOCIATION (MCA)

MANUAL L-1                                Guide to Precautionary Labeling of Hazardous  
Chemicals

(Copies may be purchased from the Manufacturing Chemists' Association, Inc., 1825 Connecticut Avenue, N.W., Washington, D.C. 20009)

NATIONAL FIRE PROTECTION ASSOCIATION

Fire Protection Guide on Hazardous Materials (contains NFPA 325A, 325M, 49, 491M and 704M) (Third Edition 1969)

(Copies may be purchased from the National Fire Protection Association, 60 Batterymarch Street, Boston, MA 02110)

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## INTER-GOVERNMENTAL MARITIME CONSULTATIVE ORGANIZATION

## International Maritime Dangerous Goods Code

(Copies may be purchased from Headquarters, Inter-Governmental Maritime Consultative Organization, IMCO Secretariate, Publications, 22 Berners, London W1 England or New York Nautical Instrument Co; 140 W. Broadway, New York, NY 10013 or Southwest Instrument Company, 235 West 7th Street, San Pedro, CA 90731)

## 3. REQUIREMENTS

\*3.1 First article inspection. The methyl ethyl ketone peroxide furnished under this specification shall be a product which has been inspected and passed the first article inspection specified herein (see 4.2 and 6.2.1).

3.2 Material. The material shall be a 60% solution of methyl ethyl ketone peroxide in dimethyl phthalate.

\*3.3 Chemical and physical properties. The methyl ethyl ketone peroxide shall conform to the chemical and physical properties listed in Table 1.

TABLE 1

## CHEMICAL AND PHYSICAL PROPERTIES

Characteristic	Requirement	Test Paragraph
Color	Water-white	4.4.2.3
Active oxygen, min.	11.0 percent	4.5.1
Specific gravity, 25° C, min.	1.1020	4.5.2
Refractive index, 25° C, min.	1.4550	4.5.3
Flash point, C.O.C., min.	200° F	4.5.4
Viscosity, 25° C, centipoises	19-24	4.5.5

\*3.4 Workmanship. The material shall be processed in accordance with high-grade commercial practice, to produce a homogeneous and uniform product that meets the requirements herein specified. The finished product shall be free from foreign material and visual defects that could adversely affect its intended use.

## 4. QUALITY ASSURANCE PROVISIONS

\*4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all

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inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

\*4.2 Classification of inspection. The inspection of the methyl ethyl ketone peroxide solution shall be classified as follows:

- (a) First article inspection (4.3)
- (b) Quality conformance inspection (4.4)

\*4.3 First article inspection. First article inspection shall consist of an examination for acceptability of quality control methods used by the manufacturer and an examining and testing of the first article samples (4.4.1.2) for all the requirements of this specification.

\*4.3.1 Sampling for first article inspection. Unless otherwise specified (see 6.2.1) as soon as practicable after award of a contract or order, the supplier shall furnish first article samples to determine conformance with this specification. First article samples shall consist of the samples specified in 4.4.2.1 which shall be subjected to the first article inspection in 4.3. Failure to meet all requirements shall be cause for rejection of the first article sample.

\*4.4 Quality conformance inspection. The quality conformance inspection shall consist of an examination for acceptability of the quality control methods used by the manufacturer, examining and testing the quality conformance samples (4.4.1.2) for all the requirements of this specification except flash point and viscosity (Table 1).

\*4.4.1 Sampling.

\*4.4.1.1 Size of lot. For the purpose of sampling, a lot of methyl ethyl ketone peroxide solution shall consist of a manufacturer's batch. If the material cannot be identified by batch, a lot shall consist of not more than 1,000 pounds of methyl ethyl ketone peroxide solution offered for delivery at one time.

\*4.4.1.2 For product examination and test. From each lot offered for acceptance under contract, two 1/2 pound samples of methyl ethyl ketone peroxide solution shall be removed from separate unit containers taken at random. If more than one batch is included in the lot, two random 1/2 pound samples shall be taken from each batch.

\*4.4.2 Inspection procedure.

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\*4.4.2.1 For tests. The samples selected in accordance with 4.4.1.2 shall be subjected to all the tests specified under 4.5. Failure of any test sample to meet any test requirement shall be cause for rejection of the lot represented. Containers which have samples removed shall be shipped as part of the lot if the lot is accepted.

4.4.2.2 For examination of preparation for delivery. Using the sample of filled containers selected in 4.4.1.2, adjust the sample to conform to MIL-STD-105, Inspection Level I, Acceptable Quality Level 2.5 percent defective. The sample unit shall be one filled and closed shipping container. Sample containers shall be examined for compliance with all requirements of this specification if regard to contents, closure, damaged or leaking container, improper container, and marking.

\*4.4.2.3 Examination of product. The samples selected in accordance with 4.4.1.2 shall be examined for conformance with the requirements of this specification with respect to color and workmanship.

#### 4.5 Test methods.

4.5.1 Active oxygen. The active oxygen content shall be determined using the following method: Prepare glass stoppered 125 ml. Erlenmeyer flasks by adding 20 ml. of glacial acetic acid and then passing carbon dioxide into the acid in each flask for about 2 minutes. Weigh accurately approximately 0.2 grams samples into these flasks. Add 10 ml. KI solution (1 part KI to 2 parts water) and let stand in the dark for 15 minutes. Add 10 ml. water and titrate with N/10 sodium thiosulfate solution to a colorless end point. A blank determination shall be run in a similar manner. Subtract the blank from the sample titration before calculation.

$$\% \text{ Active Oxygen} = \frac{(\text{ml. thio.} - \text{blank}) \times N \times 0.008 \times 100}{\text{Sample weight}}$$

N = Normality of sodium thiosulfate solution

\*4.5.2 Specific gravity. Specific gravity shall be determined in accordance with Method 4183 of Federal Test Method Standard No. 141.

\*4.5.3 Refractive index. Refractive index shall be determined in accordance with Method 4371 of Federal Test Method Standard No. 141.

\*4.5.4 Flash point. Flash point shall be determined in accordance with Method 4294 of Federal Test Method Standard No. 141.

\*4.5.5 Viscosity. Viscosity shall be determined in accordance with Method 4287 of Federal Test Method Standard No. 141, except a Brookfield LV Viscometer with a UL adapter shall be used. Report the average of the 6, 12, and 30 RPM readings. If material is limited, readings may be accomplished using 25 ml. of sample in the special Brookfield accessory for small samples.

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**\*5. PACKAGING**

**\*5.1 Unit packaging.** Methyl ethyl ketone peroxide solution furnished under this specification shall be packaged as specified in PPP-C-300 in clean, dry, new polyethylene bottles with screw top closures as specified by MIL-B-26701. Closure lining, where used, shall not react with contents. Closures shall be sealed to the bottle by shrink film sealers or equivalent. Net capacity of bottles shall be either 1, 8, or 45 pounds as specified by the procuring activity (see 6.2). The wall thickness of the 45-pound bottles shall be not less than 0.015 inches as per Department of Transportation Specification 2U of 49 CFR 178.24.

**\*5.1.1 Intermediate packaging.** Methyl ethyl ketone peroxide solution packaged specified in 5.1 shall be packed in snug fitting corrugated or solid fiberboard boxes conforming to level A, B, or C as indicated by contractor or procuring activity (see 6.2). Quantity of unit packages per shipping container shall be as specified by the following.

<u>Unit Container Capacity (lbs)</u>	<u>Unit Quantity Per Shipping Container</u>
1	1 or 25
8	1, 2, or 4
45	1

Section 178.205-34 of the Department of Transportation Regulations shall apply for the shipment of the 45 pound bottle.

**\*5.2 Packing.** Packing shall be level A, B, or C, as specified (see 6.2)

**\*5.2.1 Level A.** Unless otherwise specified, intermediate packages, or unit packages where intermediate packaging is not required of methyl ethyl ketone peroxide solution in containers of uniform type and size shall be packed with closures on top in quantities not to exceed 70 pounds gross weight. Shipping containers shall conform to PPP-B-601, overseas type; or PPP-B-621, class 1. Fiberboard fillers shall be placed between intermediate packages and between unit packages where there is no intermediate packing, and between the package and the sides, ends, tops, and bottoms of shipping containers to make a tight pack. Closures or handles extending above the containers shall be protected by fiberboard pads so that bearing on the closure or handles will be prevented. Fiberboard fillers and pads shall conform to PPP-B-636, class 2, W5c. The shipping containers shall be closed and strapped in accordance with the applicable box specification and appendix thereto.

**\*5.2.2 Level B.** Methyl ethyl ketone peroxide solution shall be packed in accordance with 5.2.1, except that shipping containers shall conform to PPP-B-636, type I or II, class 2, W5c or W5s; PPP-B-621, class 1; PPP-B-601, domestic type; PPP-B-591, domestic type; or MIL-B-10377, domestic type.

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\*5.2.3 Level C. Unless otherwise specified, methyl ethyl ketone peroxide solution shall be packed in snug fitting corrugated or solid fiberboard boxes conforming to Department of Transportation Specification 12B of 49CFR 178.205.

\*5.2.4 Packing separators, liners and cushioning. Fiberboard boxes shall have full-height partition and liners and full-size top and bottom pads. The cells formed by the partitions shall snugly fit the unit packages. Partitions are not required when the fiberboard boxes are used for consolidating paperboard set-up boxes. Separators shall be placed between all layers of unit packages. Paperboard set-up boxes shall have snug-fitting slotted partitions and noncombustible cushioning material conforming to MIL-V-23776, or equivalent, in sufficient quantity to completely absorb liquid contents in the event of breakage. Indexed fiberboard pads shall be used over can closures and handles. Pads, liners, partitions, and separators shall be of corrugated fiberboard conforming to PPP-B-636, class 2, W5c. Fiberboard intermediate packages shall be closed and strapped in accordance with the appendix of the box specification.

\*5.3 Marking. In addition to any special marking specified herein, or in the contract or order, shipment shall be marked in accordance with MIL-STD-129, MCA L-1 and as per Department of Transportation 49CFR 178.205-18.

5.3.1 Special markings. Each unit and shipping container shall have the following special markings.

CAUTION! OXIDIZING MATERIAL, STRONG IRRITANT, HARMFUL IF SWALLOWED

Store in original closed container below 100° F (38° C).

Protect from all sources of heat, including direct sunlight.

Keep away from sparks and open flames.

Do not add to hot materials; vigorous decomposition may result.

Do not add accelerator to contents; may cause vigorous reaction.

Avoid contact with skin and eyes. In case of contact, flush immediately with water.

For eyes get medical attention. In case of ingestion, call a physical immediately.

\*5.3.2 Shipping container. In addition to the special markings specified in 5.3 and 5.3.1, each shipping container shall have a Department of Transportation oxidizing material label in accordance with 49CFR 173.413 and MIL-STD-129 Appendix D.

## \*6. NOTES AND CONCLUDING MATERIAL.

6.1 Intended use. Methyl ethyl ketone peroxide solution covered by this specification is intended for use in explosives.

6.2 Ordering data. Procurement documents should specify the following:

(a) Title, number and date of this specification.

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(b) Quantity in pounds (Avoirdupois).

(c) Size and type of container desired (see 5.1 and 5.1.1).

\*6.2.1 Contracts or orders should specify the following provisions for first article inspection.

6.2.1.1 Whether first article inspection is required. When a supplier is in continuous production from contract to contract, consideration should be given to waive the first article inspection. If first article inspection is required, indicate:

(a) Where the first article inspection is to be conducted (at the supplier's or Government plant).

(b) That approval of first article samples or the waiving of the first article inspection shall not relieve the supplier of his obligation to fulfill all other requirements of this specification and contract.

\*6.2.2 Shelf life. When stored between 65° and 85° F, methyl ethyl ketone peroxide solution should have a minimum useful shelf life of 12 months. Ordering activities should consider this shelf life under these storage conditions in computing requirements.

\*6.3 Criteria for use of the proper level of packing shall be as follows.

\*6.3.1 Level A. This level shall be designed to protect items subjected to multiple domestic shipments from direct exposure to all extremes of climatic, terrain, operational, and transportation environments without protection other than that provided by the package and pack.

\*6.3.2 Level B. This level shall be designed to protect items which will be subjected to multiple domestic shipments, from physical and environmental damage during shipment, handling, and storage for conditions other than those identified for level A or level C protection.

\*6.3.3 Level C. This level shall be designed to protect items which will be used at the first receiving activity against physical and environmental damage during known favorable conditions of shipment, handling, and storage.

6.4 Changes from previous issue. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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PREPARING ACTIVITY  
Navy - OS  
(Project No. 6810-NA27)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL		OMB Approval No. 22-R255
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DOCUMENT IDENTIFIER AND TITLE MIL-P-81351A(OS), PEROXIDE, METHYL ETHYL KETONE		
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	MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT	
1. HAS ANY PART OF THE DOCUMENT CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.  B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES		
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