

MIL-L-3150C  
 25 July 1985  
 SUPERSEDING  
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## MILITARY SPECIFICATION

### LUBRICATING OIL, PRESERVATIVE, MEDIUM

This specification is approved for use by all Departments and Agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification covers one grade of preservative lubricating oil, identified by Military Symbol PL-M and NATO Code Number 0-192.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified (see 6.2), the following specifications and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation, form a part of this specification to the extent specified herein.

#### SPECIFICATIONS

##### FEDERAL

O-M-232	- Methanol (Methyl Alcohol).
TT-N-95	- Naphtha, Aliphatic.
PPP-C-96	- Cans, Metal, 28 Gage and Lighter.

#### STANDARDS

##### FEDERAL

FED-STD-791	- Lubricants, Liquid Fuels, and Related Products; Methods of Testing.
FED-STD-313	- Material Safety Data Sheets, Preparation and the Submission of.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: USA Belvoir Research and Development Center, ATTN: STRBE-DS, Fort Belvoir, VA 22060-5606 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.
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MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes.
- MIL-STD-290 - Packaging of Petroleum and Related Products.

HANDBOOKS

MILITARY

- MIL-HDBK-200 - Quality Surveillance Handbook for Fuels and Lubricants (Overseas Areas).

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

2.2 Other publications. The following document(s) form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- B 117 - Salt Spray (Fog) Testing.
- D 97 - Pour Point of Petroleum Oils.
- D 130 - Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test.
- D 445 - Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosities).
- D 446 - Spec and operating instructions for Glass Capillary Kinematic Viscosimeters.
- D 972 - Evaporation Loss of Lubricating Greases and Oils.
- D 4057 - Manual Sampling (of Petroleum Products).
- D 4177 - Automatic Sampling of Petroleum and Petroleum Products.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Qualification. Lubricating oils furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.5.1 and 6.3).

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3.1.1 Requalification. Any change in the formulation of a qualified product will necessitate its requalification. The oil supplied under contract shall be identical to the approved qualification sample within tolerances indicated in this specification for individual properties.

3.2 Material. The lubricating oil shall be a petroleum fraction containing whatever additive materials are necessary to meet the specified requirements.

3.3 Physical and chemical requirements. The lubricating oil shall conform to the respective requirements specified in table I and in 3.4 through 3.10.

Table I. Requirements (see table III).

Properties	Values
Viscosity at 40° C (104° F), kinematic, centistokes	95 to 125
Pour point, max, ° C (° F)	-6 (21)
Evaporation loss at 100° C (212° F) max, percent	5.0
Copper strip corrosion at 100° C (212° F) ASTM D 130 classification, max	2e

Table II. Acceptable deviations from qualification test results.<sup>1/</sup>

Properties	Deviations	
	Quality conformance tests	Storage stability and surveillance tests <sup>4/</sup>
Viscosity at 40° C (100° F), kinematic, centistokes	± 15	± 15
Pour point: ° C (° F)	± 2 (4)	± 2 (4)
Evaporation loss at 40° C (104° F), percent	± 1.0	± 1.0
Copper strip corrosion at 40° C (104° F), ASTM classification	2/	2/
Humidity cabinet	3/	2/
Salt-spray resistance	2/	2/
Removal	3/	2/
Accelerated stability	2/	2/
Low-temperature stability	2/	2/
Toxicity	3/	2/

<sup>1/</sup> After application of acceptable deviations, all values shall remain within the limits specified in table I and in 3.4 through 3.8, as applicable.

<sup>2/</sup> No deviations are specified for this property.

<sup>3/</sup> This test is not required for quality conformance.

<sup>4/</sup> Surveillance testing shall be performed in accordance with MIL-HDBK-200.

3.4 Corrosion-protection.

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3.4.1 Humidity cabinet. After testing as specified in table III (30 days exposure in a humidity cabinet), not more than three corrosion dots, none of which exceeds one millimeter in length, width, or diameter, shall be evident on the test panels. The total of such corrosion dots on all three test panels shall not exceed three. Corrosion on the outer 6 mm (1/4-inch) of the panels shall not be cause for rejection.

3.4.2 Salt-spray resistance. After testing as specified in 4.6.1 (48 hours exposure to a spray of 5-percent salt solution), not more than three corrosion dots, none of which exceeds one millimeter in length, width, or diameter, shall be evident on any one of the test panels. The total of such corrosion dots on all three test panels shall not exceed nine. Corrosion on the outer 6 mm (1/4 inch) of the panels shall not be cause for rejection.

3.5 Removal. After testing as specified in 4.6.2, there shall be no visual evidence of oil or residue on the panels. The presence of a stain or of discoloration shall be cause for rejection.

### 3.6 Stability.

3.6.1 Accelerated. After testing as specified in 4.6.3.1, the oil shall flow freely to its new level within a period of five seconds, and the viscosity shall not have changed more than  $\pm 5$  percent from the original viscosity.

3.6.2 Low temperature. After testing as specified in 4.6.3.2, the oil shall flow freely to its new level within a period of five seconds, and the viscosity shall not have changed more than  $\pm 5$  percent from the original viscosity.

3.7 Storage stability. After completion of the 6-month storage stability test specified in 4.6.4, the oil shall meet all of the requirements specified in 3.10, table I (viscosity at 40° C, pour point, evaporation loss, and copper-strip corrosion), 3.4.1, 3.4.2, 3.5, 3.6.1, and 3.6.2. The test results for these properties shall fall within the limits specified in table II.

3.8 Toxicity. The lubricating oil shall have no adverse effects on human health when it is used as intended (see 6.1). Questions on toxicity shall be referred by the procuring activity to the appropriate departmental medical service after consulting the qualifying activity (see 6.3). A material safety data sheet will be submitted in accordance with 4.6.5.

3.9 Acceptable deviations from qualification test results. For quality conformance, storage stability, and surveillance testing, the acceptable deviations from qualification test results shall be as specified in table II.

3.10 Workmanship. The oil shall be free from suspended matter, grit, or other foreign matter and shall be uniform in appearance when examined visually through transmitted light.

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor 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 contractor 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 Lot.

4.2.1 Bulk lot. An indefinite quantity of a homogeneous mixture of oil offered for acceptance in a single, isolated container, or manufactured in a single plant run (not exceeding 24 hours), through the same processing equipment, with no change in the ingredient materials.

4.2.2 Packaged lot. An indefinite number of 55-gallon drums or smaller unit containers of identical size and type, offered for acceptance, and filled with a homogeneous mixture of oil manufactured in a single plant run (not exceeding 24 hours), through the same processing equipment, with no change in the ingredient materials.

#### 4.3 Sampling.

4.3.1 Sampling for examination of filled containers. Take a random sample of filled containers from each lot in accordance with MIL-STD-105 at inspection level II and acceptable quality level (AQL) = 2.5 percent defective.

4.3.2 Sampling for tests. Take samples for tests in accordance with ASTM D 4057 or D 4177.

#### 4.4 Inspection.

4.4.1 Inspection of material. Perform inspection of material in accordance with method 9601 of FED-STD-791.

4.4.2 Examination of filled containers. Examine samples taken in accordance with 4.3.1 for compliance with MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing and marking requirements. Reject any container having one or more defects or under the required fill. If the number of defective or underfilled containers exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, reject the lot represented by the sample.

#### 4.5 Classification of tests. Tests are classified as follows:

- a. Qualification tests.
- b. Quality conformance tests.
- c. Inspection of packaging.

4.5.1 Qualification tests. Qualification tests consist of tests for all of the requirements specified in section 3.

4.5.2 Quality conformance tests. Quality conformance tests consist of tests for the following requirements only (see table I and 3.4.2 and 3.6):

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Viscosity (D 445)  
 Pour point (D 97)  
 Evaporation loss at 100° C (212° F) (D 972)  
 Copper strip corrosion at 100° C (212° F) (D 130)  
 Salt-spray resistance (4.6.1)  
 Stability (4.6.3)

4.6 Test methods. Perform tests in accordance with the applicable methods listed in table III and in 4.6.1 through 4.6.5.

Table III. Test methods.

Test	Method No., FED-STD-791	Method No., ASTM
Viscosity, kinematic <sup>1/</sup>		D 445
Pour point		D 97
Evaporation loss		D 972
Copper strip corrosion		D 130
Humidity cabinet	5329 <sup>2/</sup>	

- <sup>1/</sup> Allow the sample for viscosity determination to stand for one hour at 40° C  $\pm$  1/2° C (104° F  $\pm$  1° F) before performing the test.  
<sup>2/</sup> After completing the humidity cabinet test, use the same panels for the removal test (4.6.2).

4.6.1 Salt-spray resistance.

4.6.1.1 Test panels. This test will require three test panels, measuring 76x51x16mm (3x2x1/16 inches), and made from steel of the type specified in method 5329 of FED-STD-791. Clean and sand-blast the panels as specified in method 5329.

4.6.1.2 Test procedure. Immerse the panels in the test oil for one minute with mild agitation and drain them for 2 hours  $\pm$  10 minutes at 24  $\pm$  3° C (75  $\pm$  5° F). Expose the panels for 48 hours to a spray of 5 percent salt (NaCl) solution as specified in ASTM B 117. The panels shall be supported 15 degrees from vertical and parallel to the principal direction of horizontal flow. Adjust the fog-collection rate to 0.75 to 2.0 ml per hour. At the completion of the exposure period, rinse the panels first in water, then in methanol specified by O-M-232 (grade A), and clean them by immersion in aliphatic naphtha specified by TT-N-95. Finally, rinse the panels in methanol and examine them for conformance to 3.4.2.

4.6.2 Removal. Wash the test panels used in the humidity cabinet test (see table III) first in cold aliphatic naphtha, then in warm aliphatic naphtha, specified by TT-N-95, and finally in warm methanol specified by O-M-232. During each rinse, agitate the panel continuously with an easy forward and backward motion for 30  $\pm$  3 seconds.

4.6.3 Stability.

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4.6.3.1 Accelerated. Fill a pour-point jar conforming to ASTM D 97 to the mark with test oil, stopper it, and subject the oil to the following test sequence:

<u>Temperature</u>	<u>Time (hours <math>\pm</math> 10 minutes)</u>
54 $\pm$ 3° C (130 $\pm$ 5° F)	2
4 $\pm$ 3° C (40 $\pm$ 5° F)	2
54 $\pm$ 3° C (130 $\pm$ 5° F)	2
4 $\pm$ 3° C (40 $\pm$ 5° F)	2
25 $\pm$ 3° C (77 $\pm$ 5° F)	16
54 $\pm$ 3° C (130 $\pm$ 5° F)	8
4 $\pm$ 3° C (40 $\pm$ 5° F)	64
25 $\pm$ 3° C (77 $\pm$ 5° F)	4

At the completion of the test sequence, turn the pour-point jar to a horizontal position and observe the rate of flow. Then pour the oil into a standard viscosity tube conforming to ASTM D 446, figure A 2.4 and allow it to stand for one hour at 40° C (104° F). Make consecutive viscosity determinations in accordance with ASTM D 445 until three such determinations yield values that agree within 0.2 centistokes. Report the average value of these determinations as the viscosity of the oil (for the purpose of determining stability only) and compare to the viscosity determined prior to stability testing.

4.6.3.2 Low temperature. Fill a pour-point jar conforming to ASTM D 97 to the mark with test oil, stopper it, and subject the oil to the following sequence:

<u>Temperature</u>	<u>Time (hours + 10 minutes)</u>
-40° +3° C (-40° +5° F)	24
25° +3° C (77° +5° F)	24
-18 +3° C (0 +5° F)	24
25° +3° C (77° +3° F)	24

At the completion of the test sequence, turn the pour-point jar to a horizontal position and observe the rate of flow. Then pour the oil into a standard viscosity tube conforming to ASTM D 446, figure A 2.4 and allow it to stand for one hour at 40° C (104° F). Make consecutive viscosity determinations in accordance with ASTM D 445 until three such determinations yield values that agree within 0.2 centistokes. Report the average values as the viscosity of the oil (for the purpose of determining stability only) and compare to the viscosity determined prior to stability testing.

4.6.4 Storage stability. Fill three 1-quart cans conforming to PPP-C-96, type V, class 2 with the test oil to within approximately 6 mm (1/4 inch) of the top of the can. Seal all three cans tightly. Store each of the three sample cans at the temperatures and for the time periods indicated below:

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	<u>Temperature</u>	<u>Storage period months</u>
1st sample	-40 $\pm$ 3° C (-40 $\pm$ 5° F)	3
	-18 $\pm$ 3° C (0 $\pm$ 5° F)	3
2nd sample	-18 $\pm$ 3° C (0 $\pm$ 5° F)	3
	25 $\pm$ 3° C (77 $\pm$ 5° F)	3
3rd sample	25 $\pm$ 3° C (77 $\pm$ 5° F)	3
	54 $\pm$ 3° C (130° F)	3

At the end of the 6-month storage period, examine and test the samples for conformance with the requirements of 3.7.

4.6.5 Toxicity. A safety data sheet conforming to FED-STD-313 is required at the time of qualification.

#### 4.7 Inspection of packaging.

##### 4.7.1 Quality conformance inspection of pack.

4.7.1.1 Unit of product. For the purpose of inspection, a complete pack prepared for shipment shall be considered a unit of product.

4.7.1.2 Inspection lot. The inspection lot shall be as defined in 4.2, packed for shipment.

4.7.1.3 Sampling. Samples for examination of packaging shall be selected at random from each inspection lot in accordance with procedure prescribed in MIL-STD-105.

4.7.1.4 Examination. Samples selected in accordance with 4.7.1.3 shall be examined for the defects listed below. AQL shall be 4.0 percent defective.

101. Unit container not as specified in MIL-STD-290.
102. Intermediate container, when required, not as specified in MIL-STD-290.
103. Quantity and arrangement of unit containers packed in intermediate containers not as specified in MIL-STD-290.
104. Quantity and arrangement of intermediate containers packed in exterior containers not as specified in MIL-STD-290.
105. Exterior container not as specified in MIL-STD-290.
106. Metal cans with protruding closures not protected as specified in MIL-STD-290.
107. Marking not as specified in MIL-STD-290 and herein.

## 5. PACKAGING

5.1 Unit, intermediate and exterior packing. Unit, intermediate and exterior packing shall be in accordance with MIL-STD-290, level B, level C or Commercial as specified (see 6.2). Type and size of unit container shall be as specified (see 6.2). Gas pressurized containers shall be 16 ounce capacity and shall conform to PPP-C-96, type IX, class 2.



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5.2 Marking. Marking shall be as specified in MIL-STD-290 and herein.

5.2.1 Item description. Mark each unit, intermediate and exterior container as follows:

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5.2.2 Toxicity warning. Mark each unit and intermediate container as follows:

WARNING!

Do not use this oil in food-processing or food handling equipment on surfaces that may contact food. Do not allow the oil to contaminate foodstuffs.

In addition, label the containers with appropriate information from the safety data sheet. Especially indicate the need for any personnel protective equipment and precautions to be taken when using the product for its intended purpose.

6. NOTES

6.1 Intended use. Oil covered by this specification is intended for the preservation of ferrous and non-ferrous metals and as a general purpose and ordinance lubricant where light loads are anticipated. The oil is not intended for the protection of internal combustion engines.

6.2 Ordering data. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Date of issue of DoDISS applicable and exceptions thereto (see 2.1.1).
- c. Quantity (for bulk deliveries, specify the quantity in U.S. gallons; for deliveries in pressurized cans, specify the number of 16-ounce cans).
- d. Type and size of container (see 5.1).
- e. Degree of packaging required (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are at the time set for opening of bids qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or orders for the products covered by this specification. The activity responsible for the Qualified Products List is U.S. Army Belvoir Research and Development Center, ATTN: STRBE-VF, Fort Belvoir, VA 22060-5606. Information pertaining to qualification of products may be obtained from that activity.

6.4 Storage Conditions. Before use, the lubricating oil may be stored under conditions of covered or uncovered storage at temperatures ranging from -40 to 54° C (-40 to 130° F).

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6.5 International standardization. Certain provisions of this specification are the subject of international standardization agreements (NATO STANAGS 1135, and 2845). When amendment, revision, or cancellation of this specification is proposed which would affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels, including departmental standardization offices, if required.

6.6 Waste disposal instructions.

6.6.1 Recovery (RC). The very first step in disposal is to coordinate with Defense Property Disposal Office (DPDO) for turn-in for disposal of any excess items of supply. Defense Disposal Manual DOD 4160.21-M (with pertinent supplements/messages) describes the requirements for such turn-ins. Variations exist as to whether the DPDO accepts physical custody of the disposal turn-in. The potential for DPDO acceptance and disposal processing is enhanced by comprehensive identification. If the DPDO does not accept the item for disposal (accountability) or returns the item to the generator for disposal, the manufacturer/supplier should be contacted for chemical recovery before proceeding with ultimate disposal management procedures.

## DISCLAIMER

THE RECOMMENDED DISPOSAL INSTRUCTION IS FORMULATED FOR USE BY ELEMENTS OF THE DEPARTMENT OF DEFENSE. THE UNITED STATES OF AMERICA IN NO MANNER WHATSOEVER EXPRESSLY OR IMPLIEDLY WARRENTS, STATES, OR INTENDS SAID INSTRUCTION TO HAVE ANY APPLICATION, USE, OR VIABILITY BY OR TO ANY PERSON OR PERSONS OUTSIDE THE DEPARTMENT OF DEFENSE NOR ANY PERSON OR PERSONS CONTRACTING WITH ANY INSTRUMENTALITY OF THE UNITED STATES OF AMERICA AND DISCLAIMS ALL LIABILITY FOR SUCH USE. ANY PERSON UTILIZING THIS INSTRUCTION WHO IS NOT A MILITARY OR CIVILIAN EMPLOYEE OF THE UNITED STATES OF AMERICA SHOULD SEEK COMPETENT PROFESSIONAL ADVICE TO VERIFY AND ASSUME RESPONSIBILITY FOR THE SUITABILITY OF THIS INSTRUCTION TO THEIR PARTICULAR SITUATION REGARDLESS OF SIMILARITY TO A CORRESPONDING DEPARTMENT OF DEFENSE OR OTHER GOVERNMENT SITUATION.

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Navy - OS  
Air Force - 20

## Preparing activity:

Army - ME

Project 9150-0667

## Review activities:

Army - MD, MI, AR, SM, AL  
Navy - SH, AS  
Air Force - 68  
DLA - GS, PS

## User activities:

Army - AT  
Navy - MC, SA, YD

International Interest (see 6.5)

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