

INCH-POUND

MIL-DTL-83767C  
24 September 2007  
SUPERSEDING  
MIL-L-83767B  
8 February 1980

## MILITARY SPECIFICATION

### LUBRICATING OIL, VACUUM PUMP, MECHANICAL

Reactivated after 24 September 2007 and may be used  
for new and existing designs and acquisitions.

This specification is approved for use by all departments and agencies of the Department of Defense.

#### 1. SCOPE

1.1 Scope. This specification covers the requirements for four types of lubricating oils for use in mechanical vacuum pumps (see 6.1).

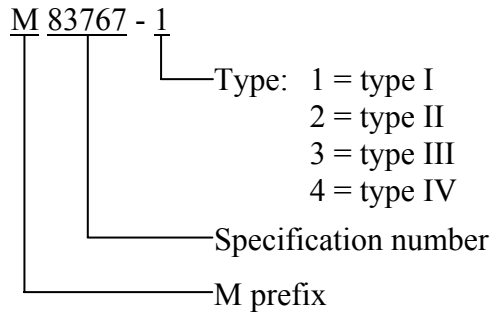
1.2 Classification. The lubricating oils are of the following types, as specified (see 6.2):

Type I - light viscosity  
Type II - medium viscosity  
Type III - heavy viscosity  
Type IV - extra heavy viscosity

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Richmond, ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616 or e-mailed to [STDZNMGT@dla.mil](mailto:STDZNMGT@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at <http://assist.daps.dla.mil>.

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1.3 Part or identifying number (PIN). The PIN to be used for vacuum pump oil acquired to this specification is created as follows:



## 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

#### DEPARTMENT OF DEFENSE STANDARDS

MIL-STD-290	- Packaging and Marking of Petroleum and Related Products.
MIL-STD-1916	- DoD Preferred Methods for Acceptance of Product.

(Copies of these documents are available online at <http://assist.daps.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract (see 6.2).

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## ASTM INTERNATIONAL

ASTM D 92	- Standard Test Method for Flash and Fire Points by Cleveland Open Cup Tester.
ASTM D 97	- Standard Test Method for Pour Point of Petroleum Products.
ASTM D 130	- Standard Test Method for Corrosiveness to Copper from Petroleum Products by Copper Strip Test.
ASTM D 445	- Standard Test Method for Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity).
ASTM D 524	- Standard Test Method for Ramsbottom Carbon Residue of Petroleum Products.
ASTM D 611	- Standard Test Methods for Aniline Point and Mixed Aniline Point of Petroleum Products and Hydrocarbon Solvents.
ASTM D 664	- Standard Test Method for Acid Number of Petroleum Products by Potentiometric Titration.
ASTM D 892	- Standard Test Method for Foaming Characteristics of Lubricating Oils.
ASTM D 972	- Standard Test Method for Evaporation Loss of Lubricating Greases and Oils.
ASTM D 1298	- Standard Test Method for Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method.
ASTM D 2270	- Standard Practice for Calculating Viscosity Index from Kinematic Viscosity at 40 and 100 °C.
ASTM D 4057	- Standard Practice for Manual Sampling of Petroleum and Petroleum Products.
ASTM D 4636	- Standard Test Method for Corrosiveness and Oxidation Stability of Hydraulic Oils, Aircraft Turbine Engine Lubricants, and Other highly Refined Oils.
ASTM D 5949	- Standard Test Method for Pour Point of Petroleum Products (Automatic Pressure Pulsing Method).

(Copies of these documents are available online at <http://www.astm.org/> or from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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## 3. REQUIREMENTS

3.1 Materials. The lubricating oil shall consist of highly refined petroleum base stocks with additives necessary to provide a product that meets the requirements of this specification.

3.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided that the material meets or exceeds the operational and maintenance requirements and promotes economically advantageous life cycle costs.

3.3 Appearance and workmanship. The finished lubricating oil shall be uniform in appearance and shall be free from sediment and suspended matter when examined visually.

3.4 Properties. The properties of the finished oil shall be as specified in table I and paragraphs 3.5 and 3.6.

TABLE I. Properties of finished oil.

Property	Type I		Type II		Type III		Type IV	
	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.
Specific gravity 25 °C/25 °C <sup>1</sup>	--	--	--	--	--	--	--	--
Viscosity cSt at 104 °F (40 °C)	25	50	60	85	100	120	300	330
Viscosity cSt at 212 °F (100 °C) <sup>1</sup>	--	--	--	--	--	--	--	--
Viscosity index	90	--	90	--	90	--	90	--
Flash point °F	400	--	430	--	460	--	480	--
Flash point °C	204.4	--	221.1	--	237.8	--	248.9	--
Fire point °C <sup>1</sup>	--	--	--	--	--	--	--	--
Pour point °F	--	0	--	+10	--	+10	--	+10
Pour point °C	--	-17.8	--	-12.2	--	-12.2	--	-12.2
Copper corrosion 212 °F (100 °C), 3 hrs	--	1	--	1	--	1	--	1
Total acid no.	--	0.3	--	0.3	--	0.3	--	0.3
Evaporation loss, percent at 210 °F (98.9 °C)	--	0.8	--	0.8	--	0.8	--	0.8
Carbon residue, percent	--	0.2	--	0.2	--	0.2	--	0.2
Aniline point °F	220	--	230	--	240	--	250	--

<sup>1</sup>To be reported - not limited.

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3.5 Corrosion and oxidation stability. The oil shall comply with the following requirements when tested as specified in table III of paragraph 4.4.2.

3.5.1 Corrosion (72-hour test). The change in weight of copper, steel, aluminum alloy, magnesium alloy, and cadmium shall not exceed  $\pm 0.2$  milligrams per square centimeter of surface when subjected to the action of the oil for 72 hours at 250 °F (121 °C). There shall be no pitting, etching, or visible corrosion on the surface of any of the metals when viewed under a magnification of 20 diameters.

3.5.2 Oxidation. The oil shall not have changed more than -5 percent or +15 percent from the original viscosity in centistokes at 104 °F (40.0 °C) after the oxidation-corrosion test. The total acid number shall not have increased by more than 1.0 after oxidation and there shall be no evidence of separation of insoluble materials or gumming of oils.

3.6 Foaming characteristics. The foaming characteristics of the lubricating oil shall not exceed the limits indicated in table II.

TABLE II. Foaming characteristics of finished oil.

Test	Foaming tendency (max. foam volume in mL at end of 5-minute blowing period)	Foam stability (max. foam volume in mL at end of 10-minute settling period)
At 75 °F (24 °C)	250	10
At 200 °F (93.5 °C)	75	0
At 75 °F (24 °C) after test at 200 °F (93.5 °C)	250	0

#### 4. VERIFICATION

4.1 Classification of inspection. The inspection requirements specified herein are classified as conformance inspection (see 4.4).

4.2 Lot. For the purposes of inspection, bulk lot and packaged lot sizes are as follows:

4.2.1 Bulk lot. A bulk lot is an indefinite quantity of homogeneous mixture of one type 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. A packaged lot is an indefinite number of 55-gallon drums or smaller unit containers of identical size and type filled with a homogeneous mixture of material from one isolated container or filled with a homogeneous mixture of material manufactured in a single plant run (not exceeding 24 hours) through the same processing equipment with no change in ingredient materials.

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4.3 Sampling. Sampling for packaged lots and sampling for tests shall be as follows:

4.3.1 Packaged lot. A random sample of packaged containers shall be selected from each lot in accordance with inspection level II of MIL-STD-1916. The sample shall be examined in accordance with 4.4.1.

4.3.2 Sampling for tests. Samples shall be selected for tests in accordance with ASTM D 4057. The samples shall be tested in accordance with 4.4.2.

4.4 Conformance inspection. Conformance inspection shall be performed in accordance with method 9601 of FED-STD-791, the examination of 4.4.1, and the tests of 4.4.2.

4.4.1 Examination of the preparation for delivery. Samples taken in accordance with 4.3.1 shall be examined for compliance with MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing, and marking requirements. Any container having one or more defects or under the required fill shall be rejected.

4.4.2 Tests. The following tests shall be conducted in accordance with the applicable test method given in table III.

TABLE III. Tests.

Test	Test method
Specific gravity	ASTM D 1298
Viscosity	ASTM D 445
Flash point	ASTM D 92
Pour point	ASTM D 97 or ASTM D 5949
Fire point	ASTM D 92
Copper corrosion	ASTM D 130
Acid or base no.	ASTM D 664
Evaporation loss	ASTM D 972
Carbon residue	ASTM D 524
Corrosion and oxidation stability	ASTM D 4636
Foaming characteristics	ASTM D 892
Aniline point	ASTM D 611
Viscosity index	ASTM D 2270

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## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the inventory control point's packaging activities within the military service or defense agency, or within the military service's system command. Packaging data retrieval is available from the managing military department's or defense agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The vacuum pump oil covered by this specification is intended to provide an oil seal, to act as a coolant, and to serve as a lubricant or working fluid for mechanical vacuum pumps. The choice of type should be in accordance with the vacuum pump manufacturer's recommendations.

6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number, and date of this specification.
- b. Type (see 1.2.1).
- c. The specific issue of individual documents referenced (see 2.2.1 and 2.3).
- d. Packaging (see 5.1).

6.3 Subject term (key word) listing.

coolant  
fluid  
lubricant  
petroleum  
seal

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

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Custodians:

Army - AT  
Navy - SH  
Air Force - 68

Preparing Activity:

DLA - GS3

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Review Activities:

Army - AV  
Air Force - 11  
DTRA - DS  
DESC - PS

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <http://assist.daps.dla.mil>.