

VV-L-765a

April 10, 1967

SUPERSEDING

Fed. Spec. VV-L-765

July 18, 1950

## FEDERAL SPECIFICATION

LUBRICANTS, ENCLOSED-GEAR,  
NONEXTREME-PRESSURE

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

## 1. SCOPE AND CLASSIFICATION

**1.1 Scope.** This specification covers non-extreme pressure gear lubricants for use where design or operating conditions do not require extreme pressure characteristics.

**1.2 Classification.** This specification covers one type of gear lubricant of the following grades:

- Grade—80.
- Grade—90.
- Grade—140.
- Grade—250.

## 2. APPLICABLE DOCUMENTS

**2.1 Specifications and standards.** The following specifications and standards, of the issues in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

*Federal Standards:*

- Fed. Std. No. 123—Marking for Domestic Shipment (Civilian Agencies).
- 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, Standards and Handbooks 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, Washington, D. C., Atlanta, Chicago, Kansas City, Mo., Dallas, Denver, San Francisco, and Auburn, Washington.

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

*Military Standards:*

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

(Copies of Military 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.)

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

*American Society for Testing and Materials (ASTM) Publications:*

- Standards on Petroleum Products and Lubricants.
- Manual on Measurement and Sampling of Petroleum and Petroleum Products.

(Application for copies should be addressed to

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the American Society for Testing and Materials, 1916 Race St., Philadelphia, Pa., 19103.)

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

## 3. REQUIREMENTS

3.1 **Material.** The gear lubricants shall consist of refined petroleum hydrocarbons with or without additives as necessary to meet the requirements of this specification.

3.2 **Chemical and physical requirements.** The chemical and physical requirements of the gear lubricants shall conform to the requirements contained in table I and in subsequent paragraphs.

3.2.1 **Separation characteristics.** The gear lubricant shall have the following characteristics when tested as specified in 4.6. The average increase in weight of each centrifuge tube and residue, when the separated material is solid, over the initial weight of the clean tube shall not exceed 0.25 percent by weight of the nonpetroleum material originally contained in the sample. Where the

separated material is a liquid in the two centrifuge tubes, it shall not exceed 0.50 percent by volume of the nonpetroleum material originally contained in the sample.

3.2.2 **Foaming.** The gear lubricant shall have the following foaming characteristics when tested as specified in 4.6:

(a) In initial aeration test (at  $75 \pm 1^\circ$  F.) — not more than 300 ml. of foam immediately following the 5 minute bubbling period.

(b) In intermediate aeration test (at  $200 \pm 1^\circ$  F.) — not more than 50 ml. of foam immediately following the 5 minute bubbling period.

(c) In final aeration test (at  $75 \pm 1^\circ$  F.) — not more than 300 ml. of foam immediately following the 5 minute bubbling period.

## 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 inspection require-

TABLE I. Chemical and physical requirements

| Characteristics               | Requirements     |                  |                  |                  |
|-------------------------------|------------------|------------------|------------------|------------------|
|                               | Grade 80         | Grade 90         | Grade 140        | Grade 250        |
| Viscosity @ 210°F. (98.9°C.): |                  |                  |                  |                  |
| Centistokes                   | No req.          | 14-25            | 25-43            | 43-87            |
| (SUS)                         | (No req.)        | (75-120)         | (120-200)        | (200-400)        |
| Viscosity @ 100°F. (37.8°C.): |                  |                  |                  |                  |
| Centistokes, min.             | 87               | No req.          | No req.          | No req.          |
| (SUS, min.)                   | (400)            | (No req.)        | (No req.)        | (No req.)        |
| Viscosity @ 0°F. (-17.8°C.):  |                  |                  |                  |                  |
| Centistokes, max.             | 21,700           | No req.          | No req.          | No req.          |
| (SUS, max.)                   | (100,000)        | (No req.)        | (No req.)        | (No req.)        |
| Viscosity index, min.         | No req.          | 50               | 50               | 50               |
| Four point:                   |                  |                  |                  |                  |
| °F., max.                     | Minus 30         | 0                | 35               | 60               |
| °C., max.                     | Minus 34.4       | Minus 17.8       | 1.7              | 15.6             |
| Flashpoint (C.O.C.):          |                  |                  |                  |                  |
| °F., min.                     | 350              | 375              | 400              | 400              |
| °C., min.                     | 177              | 190              | 204              | 204              |
| Ash, percent max.             | 0.02             | 0.02             | 0.05             | 0.80             |
| Neutrality                    | Neutral          | Neutral          | Neutral          | Neutral          |
| Copper corrosion, max.        | 1b. <sup>1</sup> | 1b. <sup>1</sup> | 1b. <sup>1</sup> | 1b. <sup>1</sup> |

<sup>1</sup> Slight tarnish, method 5325, Fed. Test Method Std. No. 791.

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ments as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

**4.2 Lot.** For purposes of sampling and inspection, a lot shall consist of an indefinite number of drums or smaller unit containers of identical size and type, offered for acceptance at one time and filled with a homogeneous mixture from one isolated container.

#### 4.3 Sampling.

**4.3.1 Sampling for examination of the preparation for delivery.** Unless otherwise specified, a random sample of containers fully prepared for delivery shall be taken from each lot in accordance with MIL-STD-105 at inspection level II and acceptable quality level (AQL)=2.5 percent defective to verify compliance with MIL-STD-290, and this specification.

**4.3.2 Sampling for test purposes.** Unless otherwise specified in the contract or order, sampling of a lot for test purposes shall be made in accordance with method 8001 of Fed. Test Method Std. No. 791.

**4.4 Inspection.** Inspection procedures shall be in accordance with method 9601 of Fed. Test Method Std. No. 791.

**4.4.1 Examination of preparation for delivery.** Samples taken as in 4.3.1 shall be examined for compliance with this specification and MIL-STD-290 with regard to fill, closing, sealing, leakage, packaging, packing, and marking of the containers. Any container in the sample having one or more defects or under the required fill shall be rejected, and if the number of rejected containers exceeds the acceptance number for the appropriate sampling plan of MIL-

STD-105, the lot represented by the sample shall be rejected.

**4.4.2 Testing.** The samples taken as in 4.3.2 shall be tested in accordance with the test procedures of 4.6.

**4.5 Classification of tests.** All of the tests included in section 4 are classified as quality conformance tests.

**4.6 Test methods.** Tests shall be conducted in accordance with the methods listed in table II.

## 5. PREPARATION FOR DELIVERY

### 5.1 For civil agency procurement.

**5.1.1 Packaging and packing.** Packaging and packing shall be in accordance with MIL-STD-290 (see 6.2).

**5.1.2 Marking.** Shipping containers shall be marked in accordance with Fed. Std. No. 123.

### 5.2 For military agency procurement.

**5.2.1 Packaging, packing, and marking.** Packaging, packing, and marking shall be in accordance with MIL-STD-290 (see 6.2).

TABLE II. Test methods

| Test  | Test Method,<br>Fed. Test Method Std.<br>No. 791 <sup>1</sup> |
|---|---|
| Viscosity, Kinematic <sup>2</sup>                               | 305   |
| Viscosity, conversion of<br>Kinematic to Saybolt<br>(Universal) | 9101  |
| Viscosity index   | 9111  |
| Pour point  | 201   |
| Flashpoint  | 1103  |
| Ash   | 6421  |
| Neutrality  | 6101  |
| Copper corrosion  | 5325  |
| Separation characteristics                                      | 3455  |
| Foaming   | 3211  |

<sup>1</sup> Certain of the test methods listed here have corresponding ASTM standards and are printed in ASTM Standards on Petroleum Products. (Refer to the index of Fed. Test Method Std. No. 791.)

<sup>2</sup> Kinematic viscosity values shall be determined by method 305 and may be converted to Saybolt Universal Seconds, as required, by means of method 9101.

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## 6. NOTES

## 6.1 Intended use.

6.1.1 Grade 80 gear lubricant is intended for use where temperatures range from minus 20° to plus 20°F. (—29°C. to —7°C).

6.1.2 Grade 90 gear lubricant is intended for use where temperatures range from 20° to 110°F. (—7° to 43°C.).

6.1.3 Grade 140 gear lubricant is intended for use where temperatures range from 110° to 175°F. (43° to 79°C).

6.1.4 Grade 250 gear lubricant is intended for use where temperatures in excess of 175°F. (79°C.) are encountered.

6.1.5 It will be noted that the gear lubricants covered by this specification do not contain extreme pressure additives and are not intended for applications involving extreme pressures. For applications requiring extreme pressure properties such as automotive differential service, gear lubricants meeting the requirements of MIL-L-2105, Lubricating Oil, Gear, Multi-Purpose, should be used.

6.2 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Grade of gear lubricant (see 1.2).
- (c) Quantity.
- (d) Size and type of container (see section 5).
- (e) Selection of applicable levels of packaging and packing (see section 5).

## CUSTODIANS:

Army—MR  
Navy—SH  
Air Force—68

*Review activities:*

Army—MR, MU  
Navy—SH, SA  
Air Force—68

*User activities:*

Army—MO  
Navy—MC, YD, OS  
Air Force—26

*Preparing activity:*

Army—MR

Review/user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be based on the information in the current Federal Supply Classification Listing of DOD Standardization Documents.

U.S. GOVERNMENT PRINTING OFFICE: 1967—253355/268

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 5 cents.