

NOT MEASUREMENT SENSITIVE

MIL-PRF-3572B

21 January 2000

SUPERSEDING

MIL-L-3572A

6 October 1983

PERFORMANCE SPECIFICATION

LUBRICANT, COLLOIDAL GRAPHITE IN OIL

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

1. SCOPE

1.1 Scope. This specification covers colloidal graphite in oil lubricant primarily for ordnance but may be used for other purposes (see 6.1).

1.2 Classification. The lubricant covered by this specification should be of the grades and sizes, as specified (see 6.2):

Grade A - Light	Size I - 2.0 ounces
Grade B - Medium	Size II - 1.0 quart
Grade C - Heavy	Size III - 1.0 gallon

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 documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

<p>Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be used in improving this document should be addressed to: Defense Supply Center Richmond, Standardization Program Branch, ATTN: DSCR-VBD, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.</p>
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AMSC N/A

FSC 9150

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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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

STANDARD

FEDERAL

FED-STD-791 - Lubricants, Liquid Fuels, and Related Products Methods of Testing

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 the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2):

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM D 92	Test for Flash and Fire Points by Cleveland Open Cup (DoD adopted)
ASTM D 97	Pour Point of Petroleum Oils (DoD adopted)
ASTM D 445	Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity) (DoD adopted)
ASTM D 482	Ash from Petroleum Products (DoD adopted)
ASTM D 524	Ramsbottom Carbon Residue of Petroleum Products (DoD adopted)
ASTM D 2805	Hiding Power of Paints by Reflectometry (DoD adopted)

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Barr Harbor Drive, 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, supercedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Performance characteristics.

3.1.1 Materials and foreign matter. The lubricants shall consist of stabilized colloidal electric furnace graphite dispersed in refined mineral lubricating oils. Solids other than stabilized colloidal graphite shall not be used. The lubricants shall be homogeneous and free from lumps and foreign matter.

3.1.2 Physical and chemical requirements. The colloidal graphite in oil lubricants shall conform to the physical and chemical requirements shown in table I.

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TABLE I. Physical and chemical requirements.

PROPERTY	GRADE A	GRADE B	GRADE C
Viscosity, centistokes (cSt) (mm ² /s) at 4° C	90 - 110	-----	-----
Viscosity, cSt (mm ² /s) at 99° C	-----	22 - 27	57 (min)
Flash point, degrees C minimum	140	160	160
Pour point, degrees C maximum	- 46	- 9	- 9
Solids content, weight percent *	2.00 +/- 0.05	10.00 +/-0.25	10.00 +/- 0.25
Ash, weight percent (maximum) *	.75	.75	.75
Hiding power of lubricant containing 2 weight percent solids, sq. ft. per gallon (minimum)	1,200	1,200	900

*Conversion must be made from weight percent to mass percent for application of verification test methods in section 4.

3.1.3 Stability. After centrifuging, not less than 95 weight percent of the solids shall be in suspension for grades A and B and not less than 85 weight percent of the solids shall be in suspension for grade C.

3.1.4 Particle size, grades A and B. Over 50 percent of the graphite particles shall be smaller than one micron (in largest dimension). The remainder of the graphite particles shall be smaller than four microns.

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

4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as conformance inspection.

4.2 Conformance inspection. Unless otherwise specified, conformance inspection shall consist of all of the requirements and verifications in table II (see 6.2).

TABLE II. Verification methods.

TITLE	REQUIREMENT	VERIFICATION
Performance Requirements	3.1	4.3
Foreign matter	3.1.1	4.3.3
Viscosity, cSt (mm ² /s)	3.1.2, table I	4.3.4
Flash point, degrees C (minimum)	3.1.2, table I	4.3.5
Pour point, degrees C (maximum)	3.1.2, table I	4.3.6
Solids content, mass percent	3.1.2, table I	4.3.7
Ash, mass percent (maximum)	3.1.2, table I	4.3.8
Hiding power	3.1.2, table I	4.3.9

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4.2.1 Inspection conditions. Unless otherwise specified (see 6.2), all inspections shall be performed in accordance with the test conditions specified in FED-STD-791, Method 9601.

4.3 Performance requirements verification. Complete the verifications in section 4.2 through section 4.3.11.1.

4.3.1 Verification methods. Acceptable verification methods included in this section are visual inspection, measurement, sample tests, full-scale demonstration tests, simulation, modeling, engineering evaluation, component properties analyses, and similarity to previously approved or previously qualified designs.

4.3.2 Verification alternatives. The manufacturer may propose alternative test methods, techniques, or equipment, including the application of statistical process control, tool control, or cost-effective sampling procedures to verify performance. Refer to the contract for alternatives that replace verifications required by this specification.

4.3.3 Foreign matter. The lubricant shall be visually inspected or examined for any lumps or foreign matter.

4.3.4 Viscosity. The viscosity shall be determined in accordance with ASTM D 445.

4.3.5 Flash point. The flash point shall be determined in accordance with ASTM D 92.

4.3.6 Pour point. The pour point shall be determined in accordance with ASTM D 97.

4.3.7 Solids content. The solids content (mass percent) shall be determined in accordance with ASTM D 524. A sample of 0.5 g of the lubricant shall be used.

4.3.8 Ash. The ash (mass percent) shall be determined in accordance with ASTM D 482. A sample of 10.00 +/- 0.01 g of the lubricant shall be used.

4.3.9 Hiding power. The hiding power of the lubricant (containing 2 weight percent of the solids) shall be determined by using either the Pfund Cryptometer or ASTM D 2805. If using the Pfund Cryptometer method, a plate of wedge constant of 0.0002 shall be used.

4.3.9.1 Dilution of grades B and C. Grades B and C are too opaque for examination and shall be blended with a neutral refined petroleum oil of the characteristics given below. A 2.00 +/- 0.01 g portion of the grade B or C lubricant is diluted to 10.00 +/- 0.01 g with the oil specified above and the mixture thoroughly blended at a temperature of approximately 66° C.

Relative density	0.9100 - 0.8984
Flash point, ° C (minimum)	202
ISO viscosity grade	68
Viscosity, cSt at 100° C	7 - 8

4.3.10 Stability. The stability shall be determined by centrifuging and analyzing samples using ASTM D 524.

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4.3.10.1 Grade A. The stability test of grade A lubricant shall be determined on a representative sample of the product which has been thoroughly stirred to ensure uniformity. From sample, remove and analyze two portions specified and centrifuge as specified in 4.3.10.3.

4.3.10.2 Grades B and C. The stability test of grades B and C lubricants shall be conducted on a blend of one part of the lubricant with 49 parts of the neutral refined mineral oil specified in 4.3.9.1. Heat a 98 g portion of the neutral refined mineral oil to 66° +/- 5° C and blend thoroughly with the 2 g of the lubricant. Determine the solids content of this blend using ASTM D 524. Two samples of the blend weighing approximately 15 g each should be analyzed. The results of this analysis gives the initial solids content of the material to be centrifuged. The blended samples shall be centrifuged as specified in 4.3.10.3.

4.3.10.3 Centrifuge test procedure. The centrifuging shall be conducted in a machine which allows the tubes to swing in a horizontal position at a speed of 2,000 +/- 50 r.p.m. with a diameter of swing (tip to tip of whirling tubes) of 14 to 17 inches. The centrifuge head shall carry tubes of 15 ml capacity with tapered bottoms. Two centrifuge tubes shall be filled with the samples prepared as specified in 4.3.10.1 and 4.3.10.2 to a depth of 4 inches and adjusted to 21° C. The tubes are centrifuged for 11 minutes. After this treatment, decant the supernatant liquid from the tubes into tared beakers, pouring out only that which flows quickly, the whole operation not to require more than 30 seconds. Weigh the decanted material and analyze in accordance with ASTM D 524. Calculate the percent solids in suspension after centrifuging as follows:

Grade A:

$$\text{Percent solids in suspension after centrifuging} = \frac{\text{percent solids after centrifuging}}{\text{percent solids before centrifuging}} \times 100$$

Grades B and C:

$$\text{Percent solids in suspension after centrifuging} = \frac{\text{percent solids after centrifuging}}{\text{percent solids in blend before centrifuging}} \times 100$$

4.3.11 Particle size, grades A and B. The particle size shall be determined on grade A lubricant as received; and on grade B, by blending one part of grade B lubricant with 49 parts of the oil specified in 4.3.9.1. The samples shall be thoroughly stirred to insure uniformity.

4.3.11.1 Particle size test procedure. A drop of the sample prepared as specified in 4.3.11, is placed on a glass microscopic slide using the utmost care to avoid contamination of the product, slides, or cover glass, with foreign material picked up in normal surroundings. The particle size is determined by taking a photomicrograph of the particles followed by measurement on the print, or by direct measurement using a metallographic microscope. A magnification of exactly 1000 diameters shall be used.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the contract or order shall specify packaging Requirements (see 6.2). When DoD personnel perform material packaging, those personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. The Inventory Control Point packaging activity within the Military Department of Defense Agency, or within the Military Department's System Command, maintains packaging requirements. 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.

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6. NOTES

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

6.1 Intended use. The lubricants are considered military unique since the majority of use is on gun barrel/gun slide bearing assemblies associated with Navy guns. The use of the lubricants are critical to affecting the accuracy of the guns. The requirements of the lubricants, that impact the performance of the lubricants, are not commercially available. General descriptions of varying uses for each of grades A, B, and C are specified in 6.1.1, 6.1.2, and 6.1.3.

6.1.1 Grade A. Grade A lubricant is suitable for the lubrication of machine gun housing guides, windshield wipers, and other lightly loaded sliding members exposed to the weather for both low and elevated temperatures.

6.1.2 Grade B. Grade B lubricant is suitable for the lubrication of gear trains of torpedoes.

6.1.3 Grade C. Grade C lubricant is suitable for the lubrication of medium or heavy duty gun slides without causing excessive resistance to counter recoil at ambient temperatures down to -23° C. It should retain sufficient lubricating properties to permit free recoil and counter recoil when the gun is heated as a result of sustained fire.

6.1.4 Warning. The lubricant will not be used if there is a corrosion concern and should never be used where dissimilar metals are present.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Grade and size required (see 1.2).
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1, 2.3).
- d. Conformance inspection (see 4.2).
- e. Inspection condition (see 4.2.1).
- f. Packaging requirements (see 5.1).

6.3 Part Identification Number (PIN). The following part identification number procedure is for government purposes and does not constitute a requirement for the contractor.

<u>M</u>	<u>3572</u>	-	<u>X</u>	-	<u>X</u>
└	└		└		└
Prefix to indicate military specification	Specification number		Grade A		Size I: 2.0 ounces
			Grade B		II: 1.0 quart
			Grade C		III: 1.0 gallon

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6.4 Subject term (key word) listing.

Ordnance
Gun barrel/gun slide bearing assemblies
Gear train
Recoil

6.5 Change 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.

Custodians:
Navy - OS
Army - CR4
Air Force - 68

Preparing Activity:
DLA - GS
Project (9150-1194)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7, and send to preparing activity.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-PRF-3572B

2. DOCUMENT DATE (YYYYMMDD)
20000121

3. DOCUMENT TITLE LUBRICANT, COLLOIDAL GRAPHITE IN OIL

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)*

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME *(Last, First, Middle Initial)*

b. ORGANIZATION

c. ADDRESS *(Include Zip Code)*

d. TELEPHONE *(Include Area Code)*
(1) Commercial
(2) AUTOVON
(if applicable)

7. DATE SUBMITTED
(YYYYMMDD)

8. PREPARING ACTIVITY

a. NAME DEFENSE SUPPLY CENTER RICHMOND
STANDARDIZATION PROGRAM BRANCH

b. TELEPHONE *Include Area Code)*
(1) Commercial (2) AUTOVON

c. ADDRESS *(Include Zip Code)*
ATTN: DSCR-VBD
8000 JEFFERSON DAVIS HIGHWAY
RICHMOND, VA 23297-5610

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:
Defense Standardization Program Office (DLSC-LM)
8725 John J. Kingman road, Suite 2533 Ft. Belvoir, VA 22060-2533
Telephone (703) 767-6888 AUTOVON 427-6888