

METRIC

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SUPERSEDING
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MILITARY SPECIFICATION
GREASE, SILICONE

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

1. SCOPE

1.1 Scope. The specification covers two types of lubricating silicone grease.

1.2 Classification. Silicone grease shall be of the following types:

Type I - Light consistency

Type II - Medium consistency

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, U.S. Army Missile Command, ATTN: AMSMI-RD-SE-TD-ST, Redstone Arsenal, AL 35898-5270 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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FSC 9150
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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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).

SPECIFICATIONS

MILITARY

MIL-P-116 - Preservation, Methods of

STANDARDS

FEDERAL

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

MILITARY

MIL-STD-105 - Sampling Procedure and Tables for
Inspection by Attributes

MIL-STD-129 - Marking for Shipment and Storage

MIL-STD-290 - Packaging of Petroleum and
Related Products

MIL-STD-1190 - Minimum Guidelines for Level C
Preservation, Packing and Marking

(Unless otherwise indicated, copies of the federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Bldg. 4D, 700 Robbins Ave., Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein.

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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 217 - Cone Penetration of Lubricating Grease, Standard Test Methods for
- ASTM D 566 - Dropping Point of Lubricating Grease, Standard Test Method for
- ASTM D 942 - Oxidation Stability of Lubricating Greases by the Oxygen Bomb Method, Standard Test Method for

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

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.3 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.

3. REQUIREMENTS

3.1 First article sample. Unless otherwise specified (see 6.2), a first article sample shall meet all of the requirements of this specification (see 4.3 and 6.3). The first article inspection sample shall be selected based on Level II single sampling criteria of MIL-STD-105 with no AQL.

3.2 Material. The material shall be a smooth homogeneous mixture of a polymethyl phenyl silicone fluid and a lithium

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soap plus additive. It shall have an unctuous (oily, soapy) consistency free of lumps, crusts, or granular particles (see 4.5.1 and 4.5.2).

3.3 Chemical and physical properties. The chemical and physical properties of silicone grease shall conform to the following.

3.3.1 Foreign particles. The material shall contain no more than 7500 particles per cubic centimeter of foreign material 25 microns or greater in size. Additionally, no more than 1600 of these particles shall be greater than 75 microns in size. No particle shall be greater than 125 microns (see 4.5.3).

3.3.2 Oxidation stability. The oxygen pressure shall not decrease more than 34.47 kilo Pascals (kPa) during 50 hours of exposure to the material at a temperature of 150° Celsius (C) (see 4.5.4).

3.3.3 Penetration. The penetration of the material, expressed in tenths of a millimeter, shall conform to the following (see 4.5.5):

Type I - penetration shall be not greater than 340 and shall be not less than 300.

Type II - penetration shall be not greater than 300 and shall be not less than 260.

3.3.4 Dropping point. The dropping point shall be not less than 190° C (see 4.5.6).

3.3.5 Evaporation and bleeding. The material shall lose not greater than 3.0 percent of its original weight by evaporation. Type I shall lose not greater than 5.0 percent and Type II not greater than 4.0 percent of its original weight by bleeding (see 4.5.7).

3.3.6 Solidification. The material shall show no evidence of solidification after exposure for 24 hours at a temperature of -55° C (see 4.5.8).

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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 inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

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

4.3 First article inspection. Unless otherwise specified in the contractual document (see 6.2), a first article sample shall be subjected to all of the tests referenced in Section 3 and tables I and II (see 6.3). If the first article sample does not meet the requirements of this specification, it shall be rejected. Subsequent units shall not be considered for acceptance until Government approval of the first article sample has been obtained.

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4.4 Quality conformance inspections. All inspections specified in table II are classified as quality conformance inspections.

4.4.1 Inspection lot. An inspection lot shall consist of material produced from the same batch or blending operation by one manufacturer and one unchanged process, presented for inspection at one time (see 6.2).

TABLE I. Sampling for rough handling tests and cyclic exposure tests.

Lot Size	Sample Size
2 to 13	All
14 to 150	13
151 to 280	20
281 to 500	29
501 to 1200	34
1201 to 3200	42
3201 to 10,000	50
10,001 to 35,000	60
35,001 to 150,000	74
150,001 to 500,000	90
500,001 and over	102

NOTE: The acceptance number in all cases is ZERO.
The rejection number in all cases is ONE.

4.4.2 Sampling. Sampling for visual examination shall be conducted on one sample from each lot. Failure of the sample to meet the requirements of 3.1 and 3.2 shall cause rejection of the individual sample. For all other examinations and tests, a sample of material, as specified in the applicable test paragraphs, shall be selected at random. For first article inspection all tests shall be performed on samples taken from each of the containers of lubricant in the first article sample (see 3.1). Failure of any sample to comply with the requirements of this specification shall cause rejection of the lot.

4.4.3 Procedure. Samples taken in accordance with 4.4.2 shall be subjected to the examinations and tests listed in table II.

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TABLE II. Quality conformance inspection.

Inspection	Requirement paragraph	Test paragraph
Visual examination	3.2	4.5.1
Material	3.2	4.5.2
Foreign particles	3.3.1	4.5.3
Oxidation stability	3.3.2	4.5.4
Penetration	3.3.3	4.5.5
Dropping point	3.3.4	4.5.6
Evaporation and bleeding	3.3.5	4.5.7
Solidification	3.3.6	4.5.8

4.5 Inspection methods.

4.5.1 Visual examination. Visually examine all containers in the lot to determine compliance with 3.2.

4.5.2 Material. A 28-gram sample of the material shall be worked with a spatula on a clean glass. During working, the material shall show no visual evidence of non-uniformity and shall spread by means of a straight edge to a smooth, glossy, level surface.

4.5.3 Foreign particles. The size and amount of foreign particles in the material shall be determined in accordance with FED-STD-791, Method 3005.4.

4.5.4 Oxidation stability. The oxidation stability of the material shall be determined in accordance with ASTM D 942 with the following exceptions:

- a. The test shall be conducted at a temperature of 150°C.
- b. An air bath may be substituted for the oil bath.
- c. The duration of the test shall be 50 hours.

4.5.5 Penetration. The worked penetration of the material shall be determined in accordance with ASTM D 217.

4.5.6 Dropping point. The dropping point of the material shall be determined in accordance with ASTM D 566.

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4.5.7 Evaporation and bleeding. The percentage of evaporation and of bleeding of oil from the material shall be determined in accordance with 4.5.7.1 thru 4.5.7.5.

4.5.7.1 Equipment specification. The equipment shall be as specified in FED-STD-791, Method 321.3, with the exception that the joint of the mesh cone may be crimp-locked rather than soldered.

4.5.7.2 Sample weighing. A sample shall be accurately weighed into the wire gauze cone. The exposed surface of the grease shall be smooth and convex to prevent trapping of free oil. Suspend the cone in the clean, tared beaker by means of the wire handle and a wire support rod. The beaker shall remain uncovered throughout the entire test. Accurately weigh the entire test assembly.

4.5.7.3 Assembly heating and weighing. Place the cone, support rod and beaker in an oven maintained at 150°C. At the end of 24 hours, the assembly shall be removed from the oven and allowed to cool to room temperature. When the assembly has cooled, accurately weigh the entire assembly.

4.5.7.4 Separated oil weight. Remove the cone and support rod from the beaker and gently tap the cone against the inside edge of the beaker to remove any oil adhering to the tip of the cone. Accurately weigh the beaker containing the oil which has separated.

4.5.7.5 Weight percent calculation. Calculate and report the weight percent of evaporation and of bleeding as follows:

$$\text{Weight percent of evaporation} = \frac{(B - A)}{S} \quad \times 100$$

$$\text{Weight percent of bleeding} = \frac{(D - C)}{S} \quad \times 100$$

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where:

A = Weight of test assembly after 24 hours at 150° C

B = Weight of test assembly prior to heating

C = Tare weight of beaker

D = Weight of beaker and separated oil

S = Sample weight.

4.5.8 Solidification. Put 20 milliliters of grease in a 2.54 centimeter diameter test tube. Immerse the test tube in a suitable bath and cool to -55°C for a period of 24 hours. Remove the sample from test tube and examine for evidence of solidification such as lumps, crusts or granular particles.

4.6 Inspection of packaging. Except when commercial packaging is specified, the sampling and inspection of the preservation and interior package marking shall be in accordance with groups A and B quality conformance inspection requirements of MIL-P-116. The sampling and inspection of the packing for shipment and storage shall be in accordance with the quality assurance provisions of the applicable container specification shown in section 5. The inspection of marking for shipment and storage shall be in accordance with MIL-STD-129. The inspection of commercial packaging shall be as specified in the contract (see 6.2).

5. PACKAGING

5.1 Preservation, packing, unitization, and marking. - Level A, B, or C, as specified (see 6.2h).

5.1.1 Level A or B. Preservation, packing, unitization, and marking shall be in accordance with MIL-STD-290 and specifications referenced therein.

5.1.2 Level C. Preservation, packing, unitization, and marking shall be in accordance with MIL-STD-1190. Additional marking shall include shelf-life and storage limitations, if applicable, in accordance with MIL-STD-129 (see 6.2i).

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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 two types of silicone greases are intended for lubrication applications in missile systems.

6.2 Acquisition requirements. Acquisition documents must specify the following:

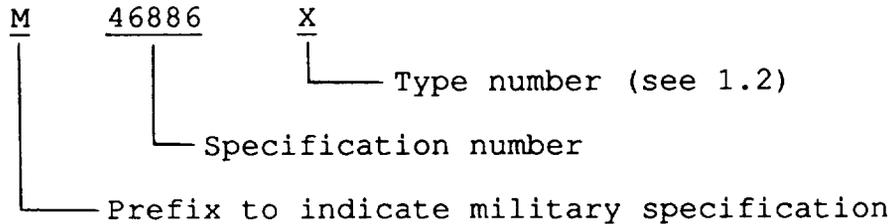
- a. Title, number, and date of the specification
- b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2)
- c. Part or identification number (see 6.4)
- d. Lot size, if applicable (see 4.4.1)
- e. Place of delivery
- f. Size of containers and quantity required to include first article sample size.
- g. Disposition of test data
- h. Packaging level required (see 5.1)
- i. Additional marking if required (see 5.1.2)
- j. When first article is required (see 3.1).

6.3 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerers whether the item(s) should be a first article sample, a first production item, or a number of items to be tested as specified in 3.1. The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on

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such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract.

6.4 Part or identifying number (PIN). The PIN to be used for grease acquired to this specification is created as follows:



6.5 Subject term (keyword) listing.

Lubricants
 Petroleum products
 Oils

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

Custodians:
 Army-MI
 Navy-OS

Preparing activity:
 Army-MI

Review activity:
 Army-CD
 DLA-GS, PS

Project no. 9150-1065

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.
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.

1. RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-G-46886B (MI)	2. DOCUMENT DATE (YYMMDD) 92/08/17
3. DOCUMENT TITLE Grease, Silicone		
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 (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME Commander U.S. Missile Command	b. TELEPHONE (Include Area Code) (1) Commercial (205-876-6980) (2) AUTOVON 746-6980	
c. ADDRESS (Include Zip Code) ATTN: AMSMI-RD-SE-TD-ST Redstone Arsenal, AL 35898-5270	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	