INCH-POUND

MIL-G-82798(OS)
29 December 1989
SUPERSEDING
WS 20633A
16 June 1986

MILITARY SPECIFICATION

GREASE, CALCIUM

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 **Scope.** This specification covers the requirements for a calcium grease, herein referred to as the grease.

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

FEDERAL

O-T-620 — 1, 1, 1-Trichloroethane, Technical, Inhibited (Methyl Chloroform)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commanding Officer, Naval Ordnance Station, Standardization Branch (3730), Indian Head, MD 20640-5000, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 9150

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

MILITARY

MIL-R-83248/2 Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistant, O-Rings, Class 2, 90 Hardness

STANDARDS

FEDERAL

FED-STD-791 Lubricants, Liquid Fuels, and Related Products

MILITARY

MIL-STD-129 Marking for Shipment and Storage

(Unless otherwise indicated, copies of federal and military specifications, standards and handbooks are available from Military Specifications and Standards, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.1.2 **Other Government documents, drawings, and publications.** The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

CODE OF FEDERAL REGULATIONS (CFR)

49 CFR 100-199 Transportation

(Application for copies of CFRs should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402-0001.)

2.2 **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 128 Lubricating Grease, Analysis of (DoD adopted)

ASTM D 217 Cone Penetration of Lubricating Grease

ASTM D 566 Dropping Point of Lubricating Grease

ASTM D 740 Methyl Ethyl Ketone (DoD adopted)

ASTM D 1092 Apparent Viscosity of Lubricating Greases

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

AMERICAN TRUCKING ASSOCIATION, INC.

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Association, Inc., Attn: Traffic Dept., 2200 Mill Road, Alexandria, VA 22314-4677.)

NATIONAL RAILROAD FREIGHT COMMITTEE

Uniform Freight Classification (UFC) 6000

(Application for copies should be addressed to the National Railroad Freight Committee, 222 South Riverside Plaza, Suite 1120, Chicago, IL 60606-5945.)

(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.** When specified (see 6.2), a sample of the grease shall be subjected to first article inspection (see 6.4) in accordance with 4.3.

3.2 **Material.** The grease shall be a smooth homogeneous mixture of a lubricating oil and a gelling agent with or without the addition of additive agents. The grease shall be free from any abrasive or otherwise undesirable fillers or impurities as specified herein.

3.3 **Composition.** The composition of the grease shall be established at the time of first article submission. Material purchased under contract shall be the same, within normal manufacturing tolerances, as that given first article acceptance.

3.3.1 **Silicones.** There shall be no silicones allowed in the grease.

3.3.2 **Molybdenum disulfide.** There shall be no molybdenum disulfide allowed in the grease.

3.4 **Homogeneity.** The grease shall be completely homogeneous without oil separation or bleeding in the container at the time of inspection or during storage. The grease shall be of a smooth consistency without lumps, crusts, or granular particles.

3.5 **Corrosion.** After 24 hours exposure, the grease shall show no green color, pitting, or etching on copper, nor shall a brown or black stain remain on a copper strip after washing with benzene. A slight discoloration on the copper strip shall not be classified as a brown or black stain and shall not be cause for rejection.

3.6 **Penetration.** The normal worked penetration for the grease shall be established on the first article tests and the penetration of any succeeding lot shall not differ from the established penetration by more than 20 points.

3.7 **Dropping point.** The grease dropping point shall be at least 500°F and shall not differ by more than 24°F during the repeatability and reproducibility tests.

3.8 **Apparent viscosity.** The apparent viscosity of the grease shall not exceed 500 SSU at a temperature of 100°F.

3.9 **Contamination.** The grease shall meet the following contamination limits:

a. Maximum of 7500 contaminants per cubic centimeter (cc) with a diameter equal to or greater than 25 micrometers.

b. Maximum of 1600 contaminants per cc with a diameter equal to or greater than 75 micrometers.

c. No contaminants with diameter equal to or greater than 125 micrometers.

3.10 **O-ring compatibility.** After a M83248/2-903, Type I, Class 2, O-ring has been liberally coated with the grease specified herein and the combination exposed to an environment of 250°F (minimum) for at least 10 hours, the O-ring shall meet the applicable hardness and dimensional requirements.

3.11 **Removability.** The grease shall be completely removable from steel surfaces by a solvent wipe using common solvents such as methyl chloroform conforming to O-T-620 or methyl ethyl ketone (MEK) conforming to ASTM D 740.

3.12 **Shelf life.** The material shall have a shelf life of 36 months from date of manufacture when stored at ambient conditions (see 6.3.1).

3.13 **Workmanship.** Workmanship shall be such that the grease is uniform in appearance and free from visible contamination.

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) 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 the 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. First article inspection shall consist of the examination and tests specified in table I. Failure to meet all of the requirements specified herein shall be cause for rejection of the first article sample.

4.4 Quality conformance inspection. Quality conformance inspection shall consist of the following:

a. Testing of the material dropping point requirements of 3.7 in accordance with the procedure specified in 4.5.2c.

b. Testing for contamination requirements of 3.9 in accordance with the test procedure specified in 4.5.2e.

c. Visual examination of the material sample for conformance to 3.13.

d. Random examination of filled containers (see 4.5.1) for conformance to the requirements of section 5.

TABLE I. First article inspection.

Tests and Examination	Requirement	Test Method
Visual examination	3.4, 3.13, and section 5	4.5.1
Penetration	3.6	4.5.2a
Corrosion	3.5	4.5.2b
Dropping point	3.7	4.5.2c
Apparent viscosity at 100°F	3.8	4.5.2d 1/
Contamination	3.9	4.5.2e
Composition Silicone content Molybdenum disulfide content	3.3 3.3.1 3.3.2	4.5.2f 1/ 1/
Compatibility	3.10	4.5.2.1
Removability	3.11	4.5.2.2

1/ Unless otherwise specified, contractor certification verifying conformance to the requirement shall be required.

4.4.1 **Lot.** A lot shall consist of all grease offered for acceptance at one time.

4.5 **Inspection methods.** The following inspection methods shall be used. Unless otherwise specified in the applicable test method, all weights, volumes, temperatures, and times shall be measured to the nearest specified unit or decimal.

NOTE: Reagent grade chemicals shall be used for chemical reactions in the conduct of all tests defined herein. Solvents and indicators may be commercial nonreagent grade materials.

4.5.1 **Visual examination.** Visual examination shall be made to verify conformance to the requirements of 3.4, 3.13, and section 5.

4.5.2 **Test procedures.** The following tests shall be performed in accordance with the following applicable methods:

Determination	Method Number
a. Penetration	ASTM D 217
b. Corrosion	FED-STD-791, Method 5309
c. Dropping point	ASTM D 566
d. Apparent viscosity	ASTM D 1092
e. Contamination	FED-STD-791, Method 3005
f. Composition	ASTM D 128

4.5.2.1 **Compatibility.** After the O-ring has been treated as specified in 3.10, it shall meet all dimensional and hardness requirements.

4.5.2.2 **Removability.** Ten QLS test specimens shall be prepared and pulled to failure in shear to verify conformance to 3.11. Prior to fabrication of test specimens, all QLS test coupons shall have been cleaned in the same manner. The clean QLS test coupons for five of the test specimens shall be coated with grease, solvent wiped clean with MEK or methyl chloroform, and identified as having been grease coated. Five test specimens shall be prepared using the QLS test coupons which were grease coated and then cleaned and five test specimens shall be prepared from the other QLS test coupons. All test specimens shall be prepared by bonding the test coupons to NBR rubber with an applicable adhesive system. Test specimens prepared with the applicable adhesive system shall be cured a minimum of 1 hour at 325 $\pm$ 10°F. The test specimens shall then be cooled to room temperature and pulled to failure in shear at 2.0 inches per minute. The average test results obtained from the five test specimens which were fabricated from the grease-coated, solvent-cleaned QLS test coupons shall be a minimum of 80 percent of the average test results obtained from the other five test specimens.

4.6 **Inspection of packaging.** The grease containers and container markings shall be visually examined to verify compliance with Section 5.

5. PACKAGING

5.1 **Packaging.** Unless otherwise specified in the contract or order (see 6.2), packaging shall be level C as specified herein.

5.1.1 **Level C.** The grease shall be packaged to afford adequate protection against loss, contamination, deterioration, and damage during shipment from the supply source to the first receiving activity and during storage under the shelf life period and conditions specified in 3.12. Containers in the same shipment shall be of the same size. The packaging shall conform to UFC 6000, National Motor Freight Classification, 49 CFR 171-178, or to other carrier rules and regulations as applicable to the mode of transportation.

5.2 **Marking.**

5.2.1 **Standard marking.** In addition to any special marking required by the contract or order (see 6.2), interior and exterior containers shall be marked in accordance with MIL-STD-129.

5.2.2 **Special marking.** In addition to the marking requirements of 5.2.1, each container marking shall include the following:

a. Title, number, and date of this specification.

b. Manufacturer's name and address.

c. Date of manufacture.

d. Material trade name and lot number.

e. Net weight.

f. Shelf life expiration date.

g. Storage conditions.

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 grease is intended for use as a lubricant in the manufacture of the Standard Missile Mk 104 Dual Thrust Rocket Motor and as a lubricant for nonsilicone O-rings.

6.2 **Acquisition requirements.** Acquisition documents must specify the following:

a. Title, number and date of this 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 2.1.2).

c. Whether first article inspection is required (see 3.1 and 6.4).

d. DOD FAR 52.246-15 (see table I).

e. Special marking, if other than as specified in 5.2.2.

6.3 **Definitions.**

6.3.1 **Ambient conditions.** Ambient conditions are those conditions of temperature and relative humidity experienced by the material when stored in an enclosed warehouse.

6.4 **First article.** When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the

item(s) should be a preproduction sample, a first article sample, a first production item, a sample selected from the first production items, or a standard production item from the contractor's current inventory (see 3.1), and the number of items to be tested as specified in 4.3. The contracting officer should also 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 such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract. Bidders should not submit alternate bids unless specifically requested to do so in the solicitation.

6.5 **Possible material.** The following material has been found to meet the requirements of this specification. This is given only for information and is not restrictive. Conoco HD-2 Calcium Grease manufactured by Continental Oil Company, Houston, Texas, has been found to meet the requirements of this specification.

6.6 **Subject term (key word) listing.**

Rocket Motor, Dual Thrust, Mk 104
Standard Missile

Preparing Activity:
NAVY-OS
(Project 9150-N813)

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.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-G-82798	2. DOCUMENT DATE (YYMMDD) 29 December 1989

3. DOCUMENT TITLE
GREASE, CALCIUM

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 NAVAL ORDNANCE STATION (CODE 3730) INDIAN HEAD, MD 20640-5000

a. NAME	b. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON
c. ADDRESS (Include Zip Code)	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