

MIL-G-6032D

29 June 1984

SUPERSEDING

MIL-G-6032C

13 November 1978

MILITARY SPECIFICATION

GREASE, PLUG VALVE, GASOLINE AND OIL RESISTANT,
NATO CODE NUMBER G-363, METRIC

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 two types of gasoline and oil resistant grease for lubrication of tapered plug valves, gaskets, and for other applications in fuel and oil systems. The type I grease is identified by NATO symbol G-363 (see 6.4)

1.2 Classification. The grease shall be furnished in the following types and classes, as specified (see 6.2)

1.2.1 Types.

Type I - Bulk
Type II - Stick in the form of cylindrical sticks of the size,
shown in 1.2.2.

1.2.2 Classes.

<u>Class</u>	<u>Diameter, mm (inches)</u>	<u>Length, mm (inches)</u>	<u>Sticks per box</u>	<u>Boxes per carton</u>
A	6.35 (1/4)	22.23 (7/8)	24	30
B	10.32 (13/32)	34.93 (1 3/8)	24	150
C	13.89 (35/64)	50.80 (2)	24	120
D	16.67 (21/32)	73.02 (2-7/16)	24	80
G	21.83 (55/64)	85.73 (3-3/8)	24	24
J	37.31 (1-15/32)	104.78 (8-3/4)	6	10
K	38.89 (1-17/32)	254.00 (10)	6	10

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Engineering Specifications and Standards Department (Code 93), Naval Air Engineering Center, Lakehurst, NJ 08733, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter

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2 APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications, standards, and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

- O-E-751 - Ether, Petroleum, Technical-Grade
- P-D-680 - Dry Cleaning Solvent.

MILITARY

- MIL-S-7952 - Steel, Sheet and Strip, Uncoated, Carbon (1020 and 1025) (Aircraft Quality).

STANDARDS

FEDERAL

- FED-STD-313 - Material Safety Data Sheets, Preparation and Submission of
- FED-STD-791 - Lubricants, Liquid Fuels and Related Products, Methods of Testing

MILITARY

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

2.1.2 Other Government documents, drawings, and publications The following other Government documents, drawings, and publications form a part of this specification to the extent specified herein

PUBLICATIONS

CODE OF FEDERAL REGULATIONS

- 49 CFR - Transportation - Hazardous Materials.

(Applications for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402)

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer)

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2.2 Other publications The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM D 1403 - Cone Penetration of Lubricating Grease Using One-Quarter and One-Half Scale Cone Equipment.
- ASTM D 2265 - Dropping Point of Lubricating Grease Over Wide Temperature Range
- ASTM D 4048 - Detection of Copper Corrosion From Lubricating Grease by the Copper Strip Tarnish Test.
- ASTM D 4057 - Manual sampling of petroleum & petroleum products.
- ASTM D 4177 - Automatic sampling of petroleum & petroleum products.

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

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

- ANSI Z129.1 - American National Standard for the Precautionary Labeling of Hazardous Industrial Chemicals.

(Application for copies should be addressed to the American National Standards Institute, 1430 Broadway, New York, NY 10018.)

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

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Qualification. The grease furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.3 and 6.3).

3.2 Materials. The grease shall be a mixture consisting of animal, vegetable or synthetic oil, or a combination thereof, and a suitable gelling agent. The grease shall contain no solid fillers such as graphite, mica, sulfur, clay, asbestos or chalk.

3.3 Physical properties Physical properties of the grease shall be in accordance with Table I, when tested in accordance with 4.6.2 through 4.6.4.

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3.4 Material safety data sheets. Material safety data sheets shall be prepared and submitted in accordance with FED-STD-313. Material safety data sheets shall also be forwarded as specified in 4.3.2. The grease shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency (see 4.3.2 and 6.2.1h)

3.5 Workmanship. The grease, when examined visually, shall appear smooth and homogeneous, free of lumps, crusts, and separated oil

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 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements

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

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

4.3 Qualification inspection. Qualification inspection shall consist of a review of the manufacturer's test report (see 4.3.2) to determine that the qualification inspection sample (see 4.3.1) complies with all the requirements for the physical properties specified in Table I, when tested in accordance with the inspection methods specified in Table III, 4.6.3 and 4.6.4.

4.3.1 Qualification inspection sample. The qualification inspection samples shall consist of five, 0.5 kg (one pound) cans of type I grease and five boxes, each containing 24 sticks, of class B, type II grease. The samples shall be forwarded to the Aircraft and Crew Systems Technology Directorate, Code 60612, Naval Air Development Center, Warminster, PA 18974. The samples shall be plainly identified by securely attached durable tags or labels, marked with the following information

Samples for qualification inspection
GREASE, PLUG VALVE, GASOLINE AND OIL RESISTANT, NATO CODE NUMBER
G-363.

Name of manufacturer

Product code number

Batch number

Date of manufacture

Submitted by (name) (date) for qualification inspection in accordance with MIL-G-6032D under authorization of (reference authorizing letter) (see 6.3)

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4.3.2 Test reports Two copies of the manufacturer's test report, containing complete test data showing that material submitted for qualification conforms to the requirements of this specification, shall be submitted with the qualification sample. Location and identity of the plant which produced the sample tested plus complete information as to the source and type of base stock and gelling agent used shall also be supplied. Material safety data sheets on toxicity, prepared as specified in 3.4, shall be submitted to the qualifying laboratory (see 4.3.1).

4.3.3 Retention of qualification In order to retain qualification of a product approved for listing on the Qualified Products List (QPL), the manufacturer shall verify by certification to the qualifying activity, that the manufacturer's product complies with the requirements of this specification. The time of periodic verification by certification shall be in two-year intervals from the date of original qualification. The Government reserves the right to re-examine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specification requirements.

4.4 Quality conformance inspection The quality conformance inspection of the grease shall consist of tests of samples from 4.4.2.2 in accordance with Table IV and an examination of samples from 4.4.2.1 for conformance with 4.6.1.

4.4.1 Lot formation A lot shall consist of all the grease produced by one manufacturer, at one plant, from the same materials and under essentially the same conditions, provided the operation is continuous and does not exceed a 24 hour period. In the event the process is a batch operation, each batch shall constitute a lot (see 6.5).

4.4.2 Sampling

4.4.2.1 For examination of filled containers A random sample of filled containers, fully prepared for delivery, shall be selected from each lot of grease in accordance with MIL-STD-105, inspection level II with an acceptable quality level (AQL) of 2.5 percent defective.

4.4.2.2 For tests Samples for tests shall be selected in accordance with ASTM D 4057 or ASTM D 4177. The lot shall be unacceptable if any sample fails to comply with any of the requirements for the tests specified in 4.6.2 through 4.6.4.

4.5 Test conditions Test conditions shall be in accordance with 4.6 and the physical values specified in Table I apply to the average of determinations made on the sample unless otherwise specified, all tests shall be conducted on unworked grease.

4.6 Methods of examinations and tests

4.6.1 Examinations Each of the filled containers, selected in accordance with 4.4.2.1, shall be examined for defects of the container and closure, for evidence of leakage and for unsatisfactory markings to determine conformance with 5.1 and 5.1.1. Each type I sample container shall also be weighed to determine the amount of contents. Each type II sample shall also be examined for number of grease sticks per box and for number of boxes per carton. If the number of defective containers exceeds the acceptance number of the sampling plan specified in 4.4.2.1, the lot shall be rejected.

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4.6.2 Tests. Tests shall be performed in accordance with Table III, 4 6.3 and 4.6 4 to determine conformance with the requirements specified in 3.3

4 6.3 Film stability and corrosion on steel Surface ground test panels of 1020 steel, MIL-S-7952, measuring 3 2 by 50 8 by 101 6 mm, shall be employed. Aluminum shims, measuring 0 4 by 25 4 by 50.8 mm, shall be employed as spacers. The test panels shall be cleaned in hot dry cleaning solvent conforming to type I of P-D-680, followed by immersion in petroleum ether conforming to O-E-751. One of the shims shall be placed at each end of a panel so as to provide a test area measuring approximately 50 by 50 mm. Approximately 2000 milligrams of the grease shall be placed in the center of the test panel. Another panel shall be placed on top and the two panels shall be pressed together and clamped to form the test assembly. Grease which exudes from the test assembly shall be cleaned off with a spatula. The test assembly shall then be placed in an oven maintained at $100^{\circ} \pm 1^{\circ}\text{C}$ for 1 week. Upon removal from the oven, the test assembly shall be opened and the grease shall be examined for indications of hardening, separation and evident changes other than color. The areas of the test panels which were in contact with the grease shall be examined for evidence of corrosion.

4 6 4 Dimensions (type II only). Type II grease sticks shall be measured for conformance to the dimensions of 1 2.2 and the tolerances of Table II. The dimensions shall be determined with the use of any suitable measuring device.

5. PACKAGING

5 1 Packaging and packing The grease shall be packaged, and packed in accordance with MIL-STD-290. The type and size of the containers and the level of packaging and packing shall be as specified by the acquiring activity (see 6.2 1).

5 1.1 Marking. All unit, intermediate and shipping containers shall be marked in accordance with MIL-STD-290 and Title 49 of the Code of Federal Regulations and any other additional special markings specified by the acquiring activity (see 6.2 1h). All unit and intermediate packs of toxic and hazardous chemicals and materials shall also be labeled in accordance with the applicable laws, statutes, regulations, and ordinances, including Federal, State, and Municipal requirements. In addition, unit and intermediate containers, including unit containers that serve as shipping containers, such as pails and drums, shall be marked with the applicable precautionary information detailed in ANSI Z129 1.

6. NOTES

6 1 Intended use The grease is intended for use in tapered plug valves. The two types provide for the use of high pressure lubrication equipment or for servicing those valves which require a stick type lubricant. The grease may be used also as a gasket lubricant or seal and for general plug valve service in systems where gasoline, oil, alcohol or water resistance is required.

6 2 Ordering data.

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6.2.1 Acquisition requirements. Acquisition documents should specify the following.

- a Title, number and date of this specification.
- b Type desired (see 1.2.1)
- c Selection of class, if type II is desired (see 1.2.2)
- d Quantity desired.
- e Size and type of container for grease (see 5.1)
- f Applicable levels of packaging and packing and other options (see 5.1).
- g Special markings when required (see 5.1.1).
- h Specify DAR Clauses 7-104.98 and 1-323.2.

6.3 Qualification With respect to products requiring qualification, awards may be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL-6032) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is Commander, Naval Air Systems Command, Attn: AIR-5304C1, Washington, DC 20361; however, information pertaining to qualification of products and letter of authorization for submittal of sample may be obtained from the Aircraft and Crew Systems Technology Directorate, Code 60612, Naval Air Development Center, Warminster, PA 18974.

6.3.1 Qualification information It is understood that the grease furnished under this specification subsequent to final approval should be of the same composition and shall be equal to products upon which approval was originally granted. In the event that the grease furnished under contract is found to deviate from the composition of the approved product, or that the product fails to perform satisfactorily, approval of such products will be subject to immediate withdrawal from the Qualified Products List.

6.4 International standardization agreements Certain provisions of this specification (see 1.1) are the subject of international standardization agreement, ASCC Air Standard 15/1, NATO STANAG NAT-STD-1135. When amendment, revision, or cancellation of this specification is proposed, which will modify the international agreement concerned, the preparing activity will take appropriate action through international standardization channels including departmental standardization offices to change the agreement or make other appropriate accommodations.

6.5 Batch A batch is defined as that quantity of material which has been manufactured by some unit chemical process and subjected to some physical mixing operation intended to make the final product substantially uniform.

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

Custodians
 Army - ME
 Navy - AS
 Air Force - 68

Preparing activity
 Navy - AS
 (Project no 9150-0622)

Review activities
 Army - AR
 DLA - PS, GS

User activity
 Army - AT
 Navy - SH

International Interests:
 NATO (see 6.4)

TABLE I Physical properties

Characteristics	Limits	Test Paragraph
Dropping point, °C, min	126.7	4.6.2
Resistance to fuel:		4.6.2
Solubility, percent by weight, maximum	20	
Appearance <u>1/</u>	pass	
Resistance to aqueous solutions <u>2/</u>		4.6.2
Distilled water	pass	
50 percent solution alcohol and distilled water	pass	
Corrosiveness (copper strip), maximum <u>3/</u>	1b	4.6.2
Film stability and corrosion on steel <u>4/</u>	pass	4.6.3
Penetration (1/4 scale):		4.6.2
Type I.		
Unworked, minimum	20	4.6.2
Worked, maximum	76	4.6.2
Type II		
Unworked, maximum	23	4.6.2
Worked	20 - 42	4.6.2
Storage stability		4.6.2
Type I and II <u>5/</u>	pass	
Type II		
Unworked penetration, maximum (1/4 scale)	23	4.6.2
Physical condition <u>6/</u>	pass	
Dimensions and tolerances (type II only) <u>7/</u>	pass	4.6.4

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- 1/ A layer of the grease on an aluminum test panel shall not be visibly affected by immersion in fuel. The fuel shall not cause swelling, blistering or cracking of the grease, nor shall the adhesion of the grease to the metal be weakened.
- 2/ The grease shall not disintegrate or dissolve. Slight turbidity of the solutions is acceptable.
- 3/ The grease shall show no green color in the portion contacting the copper strip. The copper strip shall not tarnish more than classification 1b of the ASTM copper strip corrosion standards.
- 4/ There shall be no evidence of corrosion or resinous deposit formation on steel panels.
- 5/ The grease shall show no separation of oil, formation of granular particles or any non-homogeneity in the container.
- 6/ Type II grease sticks shall show no softening deformation or deterioration of the stick. The sticks shall be in a condition that allows ready separation without crumbling or distortion.
- 7/ Type II grease sticks shall conform to the dimensions (see 1 2.2) and the dimensional tolerances of Table II.

TABLE II Dimensional tolerances (type II only).

Class	Tolerances, mm (inches)	
	Diameter	Length
A	± 0.8 (1/32)	± 3.2 (1/8)
B	± 1.6 (1/16)	± 3.2 (1/8)
C	± 1.6 (1/16)	± 4.8 (3/16)
D	± 1.6 (1/16)	± 4.8 (3/16)
G	± 1.6 (1/16)	± 4.8 (3/16)
J	± 1.6 (1/16)	± 4.8 (3/16)
K	± 1.6 (1/16)	± 4.8 (3/16)

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TABLE III. Inspection methods.

Tests	Method	
	FED-STD-791	ASTM
Dropping point	-	D 2265
Resistance to fuel	5414	-
Resistance to aqueous solutions	5415	-
Corrosiveness (copper strip) <u>1/</u>	-	D 4048
Penetration:		
Type I <u>2/</u>	-	D 1403
Type II	-	D 1403
Storage stability		
Type I <u>3/</u>	-	-
Type II <u>4/</u>	-	D 1403

- 1/ Test temperature shall be maintained at $100^{\circ} \pm 10^{\circ}\text{C}$ for 24 hours
- 2/ For unworked penetration, after preparing the sample for measurement, it shall be presoaked at 10°C for 2 hours and the unworked penetration determined immediately. The worked penetration shall be determined determined in accordance with ASTM D 1403.
- 3/ A 0.5 kg (one-pound) can of grease, with the lid tightly sealed on, shall be stored for 120 days at $54^{\circ} \pm 5^{\circ}\text{C}$.
- 4/ An unopened box, containing 24 sticks of grease, shall be stored for 120 days at $54^{\circ} \pm 5^{\circ}\text{C}$.

TABLE IV. Quality conformance tests.

Inspection	Paragraph	
	Requirement	Test method
Dropping point	3.3	4 6 2
Corrosiveness (copper strip)	3 3	4 6 2
Penetration	3 3	4 6 2
Examination of filled containers	5 1	4 6 1
Dimensional check (type II only)	1.2.2 and Table II	4 6 4

INSTRUCTIONS. In a continuing effort to make our standardization documents better, the DoD submitting comments and suggestions for improvements. All users of military standardization documents suggestions. This form may be detached, folded along the lines indicated, taped along the loose end mailed. In block 5, be as specific as possible about particular problem areas such as wording which is too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes with problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If acknowledgment will be mailed to you within 30 days to let you know that your comments were considered.

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

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Commanding Officer
Naval Air Engineering Center
Engineering Specifications and Standards Department
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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1 DOCUMENT NUMBER MIL-G-6032D		2 DOCUMENT TITLE GREASE, PLUG VALVE, GASOLINE AND OIL RESISTANT, NATO CODE NUMBER G-363, METRIC	
3a. NAME OF SUBMITTING ORGANIZATION		4 TYPE OF ORGANIZATION <i>(Mark one)</i> <input type="checkbox"/> VENDOR <input type="checkbox"/> USER <input type="checkbox"/> MANUFACTURER <input type="checkbox"/> OTHER <i>(Specify)</i> _____	
b ADDRESS <i>(Street City, State ZIP Code)</i>			
5 PROBLEM AREAS			
a. Paragraph Number and Wording			
b. Recommended Wording			
c. Reason/Rationale for Recommendation			
6 REMARKS			
7a NAME OF SUBMITTER <i>(Last First MI)</i> - Optional		b WORK TELEPHONE NUMBER <i>(Include Area Code)</i> - Optional	
c MAILING ADDRESS <i>(Street City State ZIP Code)</i> - Optional		8 DATE OF SUBMISSION <i>(YMMDD)</i>	

(TO DETACH THIS FORM CUT ALONG THIS LINE)