

AEROSPACE MATERIAL SPECIFICATION

Grease, Pneumatic System

FSC 9150

NOTICE

This document has been taken directly from U.S. Military Specification MIL-G-4343C and contains only minor editorial and format changes required to bring it into conformance with the publishing requirements of SAE technical standards. The initial release of this document is intended to replace MIL-G-4343C. Any part numbers established by the original specification remain unchanged.

The original Military Specification was adopted as an SAE standard under the provisions of the SAE Technical Standards Board (TSB) Rules and Regulations (TSB 001) pertaining to accelerated adoption of government specifications and standards. TSB rules provide for (a) the publication of portions of unrevised government specifications and standards without consensus voting at the SAE Committee level, and (b) the use of the existing government specification or standard format.

Under Department of Defense policies and procedures, any qualification requirements and associated qualified products lists are mandatory for DOD contracts. Any requirement relating to qualified products lists (QPL's) has not been adopted by SAE and is not part of this SAE technical document.

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be reaffirmed, revised, or cancelled. SAE invites your written comments and suggestions.

Copyright 1999 Society of Automotive Engineers, Inc.
All rights reserved.

Printed in U.S.A.

QUESTIONS REGARDING THIS DOCUMENT:
TO PLACE A DOCUMENT ORDER:
SAE WEB ADDRESS:

(724) 772-7121
(724) 776-4970
<http://www.sae.org>

FAX: (724) 776-0243
FAX: (724) 776-0790

1. SCOPE:**1.1 Scope:**

This specification covers a pneumatic system grease. This grease is identified by NATO Code Number G 392 (see 6.5).

2. APPLICABLE DOCUMENTS:

The following publications, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

2.1 U.S. Government Publications:

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

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

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

2.2 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 217 Cone Penetration of Lubricating Grease, Test for
ASTM D 270 Petroleum and Petroleum Products, Sampling
ASTM D 942 Oxidation Stability of Lubrication Greases by the Oxygen Bomb Method, Test for
ASTM D 1092 Apparent Viscosity of Lubricating Greases, Test for
ASTM D 1743 Rust Preventive Properties of Lubricating Greases, Test for
ASTM D 2265 Dropping Point of Lubricating Grease of Wide Temperature Range, Test for
ASTM D 2595 Evaporation Loss of Lubricating Greases Over Wide Temperature Range, Test for

3. REQUIREMENTS:**3.1 Qualification:**

The grease furnished under this specification shall be a product which is qualified for listing on the applicable qualified products list at the time set for opening of bids. (see 4.4 and 6.3) Any change in the formulation of an approved product shall require requalification.

3.2 Materials:

The pneumatic system grease shall consist essentially of, but not be limited to, a gelling agent and a suitable liquid lubricant. (See 6.1.1).

3.3 Physical requirements:

The grease covered by this specification shall conform to the requirements of Table I when tested in accordance with 4.7.1.

Table I Physical Requirements (3.3)

<u>Property</u>	<u>Limits</u>
Corrosion on copper <u>1/</u>	pass
Dropping point, °C,(°F), min.	163 (325)
Penetration, worked, points	260 - 300
Apparent viscosity @ shear rate of 20 reciprocal seconds, poises, max.	5,000
Oil separation, percent weight loss in 30 hours, max.	5.0
Evaporation, percent weight loss in 22 hours at 99°C (210°F), max	2.5
Oxidation, pressure drop in 100 hours, psi, max.	5
Rubber swell, Standard L type rubber (see 6.4), percent	19 - 30
Rust preventative properties <u>2/</u>	pass
Storage stability, change from original worked penetration, points, max	30

- 1/ After 24 hours, the material shall show no green color, pitting, etching on copper, nor shall a dark brown or black stain remain on the copper strip after washing with n-hexane. A slight brown stain is permissible.
- 2/ The grease coated bearings shall show no discoloration or corrosion in excess of three small spots per bearing. Pitting or etching shall not be acceptable.

3.4 Odor:

The grease shall have only the odor of the pure liquid component and there shall be no odor of rancidity or perfume when examined in accordance with 4.7.2.

3.5 Workmanship:

The grease shall be a smooth homogenous mixture, free of lumps and abrasive materials when examined in accordance with 4.7.3.

3.6 Toxicity:

The grease shall have no adverse effect on the health of personnel when used for its intended purpose. The grease shall contain no components which produce noxious vapors in such concentrations as to be an annoyance to personnel during formulation or use under conditions of adequate ventilation while exercising caution to avoid prolonged contact with the skin and while observing Occupational Safety and Health Administration (OSHA) guidelines. Questions pertaining to the toxic effects shall be referred by the procuring activity to the appropriate departmental-medical service who will act as an advisor to the procuring activity (see 4.4).

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 requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 inspection:

The examination and testing of the grease shall be classified as follows:

- (a) Qualification inspection (4.4)
- (b) Periodic qualification re-evaluation (4.5)
- (c) Quality conformance inspection (4.6)

4.3.2 (Continued):

Sample for periodic qualification reevaluation
GREASE, PNEUMATIC SYSTEM
MIL-G-4343C
Name of manufacturer
Product code number
Date of manufacture
Contract or order number
Batch number

4.3.3 Quality conformance inspection samples: The quality conformance inspection samples shall consist of a sample for tests (4.3.3.3) and samples for examination of filled containers (4.3.3.4). Samples shall be labeled completely with information identifying the purposes of the sample, name of product, specification number, lot or batch number, date of sampling, and contract number.

4.3.3.1 Bulk lot: A bulk lot (batch) is an indefinite quantity of homogeneous mixture or material offered for acceptance in a single isolated container; or manufactured in a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

4.3.3.2 Packaged lot: A packaged lot is an indefinite number of 55-gallon drums or smaller unit containers of identical size and type, offered for acceptance, and filled with a homogeneous mixture of material from one isolated container; or filled with a homogeneous mixture of material manufactured in a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

4.3.3.3 Samples for tests: Take samples for tests in accordance with ASTM D 270. The samples shall be subjected to all the applicable Quality conformance tests. If the samples for tests fail any of the Quality conformance tests, the inspection lot shall be rejected.

4.3.3.4 Samples for examination of filled containers: Random samples of filled unit containers and a sample of shipping containers fully prepared for delivery shall be selected from each lot of grease in accordance with MIL-STD-105 at inspection level II and acceptable quality level (AQL) = 2.5 percent defective.

4.4 Qualification inspection:

Qualification inspection shall consist of a review for approval of the submitted manufacturer's report and subjecting the qualification samples (4.3.1) to examination and testing for all the requirements of this specification. Material Safety Data Sheets on toxicity shall be prepared and submitted to the Qualifying Laboratory (4.3.1) in accordance with FED-STD-313 (see 3.6).

4.5 Periodic qualification reevaluation:

The periodic qualification reevaluation performed by the qualification laboratory shall consist of examining and testing the periodic qualification reevaluation sample for all the requirements of this specification except storage stability. Delivery of the grease will not be delayed pending completion of this inspection. If the results of the periodic qualification reevaluation are in accordance with the requirements of this specification, the consistency of production quality shall be thereby verified. Failure of the grease to pass a periodic qualification reevaluation shall require the acceptance and further shipment of the grease to be withheld until the contractor has corrected the conditions which led to the failure (see 6.3.1). Further failure will constitute cause for rejection and removal from the Qualified Products List.

4.6 Quality conformance inspection:

Quality conformance inspection shall consist of testing the samples for test (4.3.3.3) for all the requirements specific in section 3 except apparent viscosity, rubber swell, rust preventative properties, storage stability and examination of the samples of filled containers (4.3.3.4) for conformance to 5.1.

4.7 Inspection methods:

Inspection shall be in accordance with Method 9601 of FED-STD-791.

4.7.1 Tests shall be performed in accordance with the applicable methods specified in Table II, and 4.7.2 through 4.7.4. Physical values specified in Section 3 apply to the average of the determinations made on the samples for those values which fall within any stated repeatability limits of the applicable test method.

Table II Test Methods (4.7.1)

<u>Test</u>	<u>FTMS 791 Method No.</u>	<u>ASTM Method No.</u>
Corrosion on copper	5309	
Dropping point		D2265
Penetration, worked		D217
Apparent viscosity <u>1</u> /		D1092
Oil separation	321	
Evaporation		D2595

Table II Test Methods (4.7.1)

<u>Test</u>	<u>FTMS 791 Method No.</u>	<u>ASTM Method No.</u>
Oxidation		D942
Rubber swell <u>2/</u>	3603	
Rust preventative properties <u>3/</u>		D1743
Storage stability <u>4/</u>		D217

1/ Test shall be performed at $-54 \pm 0.3^{\circ}\text{C}$ ($-65 \pm 0.5^{\circ}\text{F}$) by placing the apparatus in a suitable low temperature box or cold bath. The grease shall be conditioned at the test temperature for a period of 16 to 24 hours if in an air bath or 4 hours minimum in a liquid bath, prior to making the viscosity determination.

2/ See 6.4

3/ Disregard Numerical Ratings for corrosion.

4/ After testing for worked penetration, the original sample shall be stored for 4 months at $38 \pm 3^{\circ}\text{C}$ ($100 \pm 5^{\circ}\text{F}$) and retested for worked penetration.

4.7.2 Odor: The odor of the finished grease shall be compared with the odor of a sample liquid lubricant base stock. Comparison shall be performed with both samples at room temperature.

4.7.3 Workmanship: Approximately a three ounce sample of finished grease shall be spread on a clean glass plate to a thickness of 0.001 in maximum and visually examined for conformance with 3.5.

4.7.4 Examination of filled containers: Each sample of filled container and shipping container shall be examined for defects of construction of the container and closure, evidence of leakage, and net content. Any container in the sample having one or more defects or under required fill shall be rejected, and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected. Rejected lots may be resubmitted for acceptance inspection provided that the contractor has removed or repaired all non-conforming containers.

5. PACKAGING:

5.1 Packaging, packing and marking:

Packaging, packing and marking shall be in accordance with MIL-STD-290.