

INCH-POUND

MIL-PRF-83261B(USAF)

13 February 1998

SUPERSEDING

MIL-G-83261A(USAF)

10 September 1990

PERFORMANCE SPECIFICATION

GREASE, AIRCRAFT, EXTREME PRESSURE, ANTI-WEAR

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

1. SCOPE

1.1 Scope. This specification covers a grease intended to lubricate aircraft accessories which operate at high speeds and under heavy loads in a temperature range of -73°C to +232°C.

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.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: ASC/ENSI, 2530 Loop Road West, Wright-Patterson AFB OH 45433-7101, by using the Standardization 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.

MIL-PRF-83261B(USAF)**2.2 Government documents**

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 will be 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).

STANDARDS**FEDERAL**

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

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

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 that 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 D217	Cone Penetration of Lubricating Grease (DoD adopted)
ASTM D1264	Water Washout Characteristics of Lubricating Greases (DoD adopted)
ASTM D1478	Low-Temperature Torque of Ball Bearing Greases (DoD adopted)
ASTM D1742	Separation, Oil from Lubricating Grease during Storage (DoD adopted)
ASTM D2266	Wear Preventive Characteristics of Lubricating Grease (Four-Ball Method)(DoD adopted)
ASTM D2595	Evaporating Loss of Lubricating Greases Over Wide Temperature Range (DoD adopted)
ASTM D2596	Extreme-Pressure Properties of Lubricating Grease (Four-Ball Method), Measurement of (DoD adopted)
ASTM D3336	Performance Characteristics of Lubricating Greases in Ball Bearings at Elevated Temperatures
ASTM D4057	Manual Sampling of Petroleum and Petroleum Products (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.)

SOCIETY OF AUTOMOTIVE ENGINEERS (SAE), INC.

AMS 6447	Bars, Forgings and Tubing, Premium Quality (52100) (DoD adopted)
AMS 6491	Bars, Forgings and Tubing, Premium Aircraft Quality for Bearing Applications (M-50) (DoD adopted)

(Application for copies should be addressed to the Society of Automotive Engineers, Inc., 400 Commonwealth Drive, Warrendale PA 15096-0001; telephone (412) 776-4841.)

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, supersedes applicable laws and regulation unless a specific exemption has been obtained.

MIL-PRF-83261B(USAF)**3. REQUIREMENTS**

3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection in accordance with 4.2.

3.2 Materials. The grease shall be a mixture consisting of a base fluid, a gelling agent and the necessary additives. A formulation of a fluorinated polysiloxane fluid, a non-soap gelling agent, and the necessary additives is recommended but it is not mandatory.

3.3 Physical properties. The physical properties of the grease shall be in accordance with those listed in *table I*.

3.3.1 Penetration unworked. The unworked penetration of the grease shall not be less than 280 when tested as specified in *section 4*.

3.3.2 Penetration worked. The worked penetration of the grease shall not be less than 270 nor more than 350 when tested as specified in *section 4*.

3.4 Workmanship. The grease shall be a high quality, smooth, homogeneous product free from abrasives and impurities when examined as specified in 4.4.2.

TABLE I. Physical properties of grease

CHARACTERISTIC	PERFORMANCE	LIMITS	UNITS
Penetration Unworked Worked		280 270-350	minimum
Worked Stability, 100,000 strokes penetration		375	maximum
Evaporation		15.0	% maximum
Oil Separation		20.0	% maximum
Load Carrying Capacity		90	kg, minimum
Water Resistance		20	% maximum
Steel-on-Steel Wear 52100 Steel M-50 Steel		1.30 1.30	mm, maximum mm, maximum
Storage Stability, Penetration Unworked Worked (change from original)		200 30	mm/10 mm/10, minimum maximum
Low Temperature Torque	Starting Running	5000 1000	gm/cm, maximum gm/cm, maximum
High Temperature Performance	Average 4 tests	500	hours, maximum

MIL-PRF-83261B(USAF)**4. VERIFICATION**

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

- a. First article inspection (see 4.2)
- b. Conformance inspection (see 4.3)

4.2 First article inspection

4.2.1 First article samples. When required, first article inspection shall be performed on the first one-gallon bulk lot (see 6.3) to determine conformance with *section 3*.

4.2.2 First article tests. First article sample(s) shall be subjected to all the tests specified in 4.4, method of inspection, and in *table II*.

4.3 Quality conformance inspection. Quality conformance inspection shall consist of sampling plans A and B. Samples shall be labeled completely with information which identifies the purpose of the sample, name of the product, specification number, lot and batch number (see 6.3), date of sampling, and contract number.

4.3.1 Sampling plan A. A one-gallon bulk lot (see 6.3)) shall be selected in accordance with *ASTM D4057* and subjected to inspection and tests specified in 4.4.1 and 4.4.2, and shall be subjected to inspections for penetration, evaporation, and steel-on-steel wear as specified in *table II*. If the packaged sample size is less than one half pound, all tests in Sampling Plan B will also be run on the one-gallon bulk lot. The inspection lot shall be rejected if the sample fails any of the tests.

4.3.2 Sampling plan B. A random sample of filled unit containers shall be selected from each packaged lot (see 6.3) of fluid in accordance with the following table. This sample(s) shall be subjected to inspections for worked stability, oil separation, load carrying capacity, water resistance, low temperature torque and high temperature performance, as specified in *table II*. If any sample fails, the lot shall be rejected.

4.4 Method of inspection

4.4.1 Inspection. Inspection shall be in accordance with *method 9601* of *Federal Test Method Standard No. 791* and 4.4.2 of this specification.

4.4.2 Examination of the product. Sample grease (see 3.2) shall be inspected visually and a suitable portion shall be worked with a spatula on a glass surface. After working, the grease shall be spread with a straight edge and observed for uniformity as indicated by a smooth surface.

4.4.3 Storage stability. Penetration after the storage test shall be determined on a sample of grease (see 3.2) which has been stored at a temperature of $38^{\circ}\text{C} \pm 3^{\circ}\text{C}$ in a one-pound, oil-tight container for 6 months subsequent to the original determination of the penetration. The unworked and worked penetration after storage shall be determined in accordance with *ASTM D217*.

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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.

MIL-PRF-83261B(USAF)**TABLE II. Test methods for grease.**

CHARACTERISTIC	TEST METHOD		TEST
	<i>FED-STD-791</i>	ASTM	PARAGRAPH
Penetration Unworked Worked			4.4.3 4.4.3
Storage Stability			4.4.3
Worked Stability	313.3		
Evaporation ^{1/}		D2595	
Oil Separation ^{1/}		D1742	
Load Carrying Capacity		D2596	
Water Resistance ^{2/}		D1264	
Steel-on-Steel Wear ^{3/} 52100 Steel M-50 Steel		D2266 D2266 D2266	
Low Temperature Torque ^{4/}		D1478	
High Temperature Performance ^{1/}		D3336	

^{1/} The test temperature shall be 232°C.^{2/} The test temperature shall be 38°C ±3°C.^{3/} The test temperature for 52100 steel shall be 75°C, in accordance with AMS 6447.

The test temperature for M-50 steel shall be 232°C, in accordance with AMS 6491.

^{4/} The test temperature shall be -73°C ±3°C.

LOT SIZE	SAMPLE SIZE
1-4	all
5-50	5
51-90	7
91-150	11
151-280	13
281-500	16
501-12,000	19
(acceptance number is zero, [c = 0])	

MIL-PRF-83261B(USAF)**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 covered by this specification is intended for use in aircraft actuators, gears, gearboxes, anti-friction bearings, plain spherical bearings, miniature bearings, and other applications that involve heavy loads and sliding, rolling, or oscillatory motions. It is particularly suitable for use over the temperature range of -73°C to +232°C.

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 2.2 and 2.3).
- c. Packaging requirements (see 5.1).
- d. Quantity desired.

6.3 Definitions

6.3.1 Bulk lot. A bulk lot (batch) is an indefinite quantity of a homogeneous mixture of material (see 3.2) offered for acceptance in a single, isolated container; or manufactured in a single plant run (not to exceed 24 hours), through the same processing equipment, with no change in ingredient material.

6.3.2 Packaged lot. A packaged lot is an indefinite number of 55-gallon drums, or smaller unit containers (such as one-gallon cans) 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 to exceed 24 hours), through the same processing equipment, with no change in ingredient material.

6.4 Subject term (key word) listing.

Evaporation
Fluorinated
Oil separation
Polysiloxane fluid
Worked stability

6.5 Changes 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. The changes are due to Acquisition Reform initiatives requiring Government specifications to be performance-based.

Custodian:
Air Force - 11

Preparing activity:
Air Force - 11

Review activities:
Air Force - 68
DLA - GS

(Project 9150-0823)

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.
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I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER

2. DOCUMENT DATE (YYMMDD)

MIL-PRF-83261B(USAF)

98/02/13

3. DOCUMENT TITLE

GREASE, AIRCRAFT, EXTREME PRESSURE, ANTI-WEAR

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, Middle Initial)

b. ORGANIZATION

c. ADDRESS (include Zip Code)

d. TELEPHONE (Include Area Code
(1) Commercial

e. DATE SUBMITTED
(YYMMDD)

(2) AUTOVON
(If applicable)

8. PREPARING ACTIVITY

a. NAME

ASC/ENSI
Air Force Code 11

b. TELEPHONE (Include Area Code

(1) Commercial
(937) 255-0175

(2) AUTOVON
785-0175

c. ADDRESS (Include Zip Code)

2530 Loop Road West
Wright-Patterson AFB OH 45433-7101

IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT:

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5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466
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