SAE International

SURFACE VEHICLE STANDARD

SAE J1966 AUG2011

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Superseding J1966 JUL2005

Lubricating Oils, Aircraft Piston Engine (Non-Dispersant Mineral Oil)

RATIONALE

This Standard was revised based on recommendations made at the 22 April 2010 SAE E-38 Aviation Piston Engine Fuels and Lubricants Committee meeting. The revision is part of the standard SAE five-year review process and it includes both technical and editorial changes. The name of the preparing SAE committee has changed to E-38 and is now under the SAE Aerospace Council.

1. SCOPE

This SAE Standard establishes the requirements for nondispersant, mineral lubricating oils to be used in four-stroke cycle piston aircraft engines. This document covers the same lubricating oil requirements as the former military specification MIL-L-6082. Users should consult their airframe or engine manufacturers manuals for the latest listing of acceptable lubricants.

1.1 Classification

The lubricating oils shall be furnished in the viscosity grades as per Table 1:

TABLE 1 - VISCOSITY GRADE COMPARISON TABLE

SAE Viscosity Table	Military Grade	Commercial Grade	NATO Code Number
30	1065	65	0—113
40	1080	80	none
50	1100	100	0—117
60	1120	120	none
Multi-Grade	none	none	none

NOTE—The Military Grade designations are being phased out in favor of the NATO Code Numbers, when available, or the SAE viscosity grade classifications. Commercial grade designations are being phased out in favor of the SAE viscosity grade classifications.

TO PLACE A DOCUMENT ORDER: **Tel: 877-606-7323 (inside USA and Canada)**
Tel: +1 724-776-4970 (outside USA)
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SAE WEB ADDRESS: http://www.sae.org

1.2 Commercial Products

Commercial products sold under this document must meet all of the requirements of Sections 3 and 4 of this document with the following exceptions:

a. Qualification samples and test results do not have to be submitted to the Naval Air Systems Command (NAVAIR), but must be retained by the manufacturer for a period of at least three years.

b. Individual products acceptance lists for commercial aviation piston engine oils will be maintained by each of the original aircraft engine manufacturers.

c. The detailed sampling and inspection procedural requirements of 4.4.2.2 through 4.4.3.2 do not apply.

d. Commercial products do not have to meet the packaging requirements of Section 5.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 Government Documents

2.1.1.1 The following publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents shall be those numbers 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). The military specifications are listed only for reference and are not current.

Specifications

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, http://assist.daps.dla.mil/quicksearch/.)

(Copies of specifications, standards, other Government documents and publications required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting activity.)

2.1.1.1.1 Military

MIL-L-6082 Lubricating Oil, Aircraft Piston Engine, Non-Dispersant Mineral Oil, Cancelled November 1995

MIL-L-22851 Lubricating Oil, Aircraft Piston Engine, Ashless Dispersant, Cancelled November 1995

Standards

2.1.1.1.2 Federal

FED-STD-313 Material Safety Data Sheets, Preparation and the Submission of

2.1.1.1.3 Military

MIL-STD-290 Packaging, Packing and Marking of Petroleum and Related Products

2.2 Related Publications

The following publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), www.sae.org.

SAE International Standards

SAE J300 Engine Oil Viscosity Classification

SAE J1787 Measurement of the Total Ash Content of Aviation Piston Engine Oils by a Calculation Method

SAE J1899 Lubricating Oil, Aircraft Piston Engine (Ashless Dispersant)

2.2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM D 92 Flash and Fire Points by Cleveland Open Cup

ASTM D 93 Flash Point by Pensky-Martens Closed Cup Tester

ASTM D 97 Pour Point of Petroleum Oils

ASTM D 129 Sulfur in Petroleum Products (General Bomb Method)

ASTM D 130 Detection of Copper Corrosion from Petroleum Products by the Copper Strip Tarnish Test

ASTM D 445 Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity)

ASTM D 482 Ash from Petroleum Products

ASTM D 664 Acid Number for Petroleum Products by Potentiometric Titration

ASTM D 892 Foaming Characteristics of Lubricating Oils

ASTM D 1298 Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method

ASTM D 1552 Sulfur in Petroleum Products (High-Temperature Method)

ASTM D 2270 Calculating Viscosity Index from Kinematic Viscosity at 40 and 100 °C

ASTM D 2273 Trace Sediment in Lubricating Oils

ASTM D 2622 Sulfur in Petroleum Products (X-Ray Spectrographic Method)

ASTM D 4052 Density and Relative Density of Liquids by Digital Density Method

ASTM D 4057 Manual Sampling of Petroleum and Petroleum Products

ASTM D 4177 Automatic Sampling of Petroleum and Petroleum Products

ASTM D 4683 Measuring Viscosity at High Temperature and High Shear Rate by Tapered Bearing Simulator

ASTM D 4684 Determination of Yield Stress and Apparent Viscosity of Engine Oils at Low Temperature

ASTM D 4741 Measuring Viscosity at High Temperature and High Shear Rate by Tapered-Plug Viscometer

ASTM D 4927 Elemental Analysis of Lubricant and Additive Components—Barium, Calcium, Phosphorus, Sulfur and Zinc by Wavelength—Dispersive X-Ray Fluorescence Spectroscopy

ASTM D 4951 Determination of Additive Elements in Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectroscopy

ASTM D 5185 Determination of Additive Elements, Wear Metals, and Contaminants in Used Lubricating Oils by Inductively Coupled Plasma Atomic Emission Spectroscopy

ASTM D 5293 Apparent Viscosity of Engine Oils Between -5 and -30 °C Using the Cold-Cranking Simulator

ASTM D 5481 Measuring Apparent Viscosity at High Temperature and High Shear Rate by Multicell Capillary Viscometer

ASTM D 5949 Pour Point of Petroleum Products (Automatic Pressure Pulse Method)

ASTM D 5950 Pour Point of Petroleum Products (Automatic Tilt Method)

ASTM D 5985 Pour Point of Petroleum Products (Rotational Method)

ASTM D 6709 Evaluation of Automotive Engine Oils in the Sequence VIII Spark-Ignition Engine (CLR Oil Test Engine)

ASTM D 6922 Determination of Homogeneity and Miscibility in Automotive Engine Oils

2.2.3 ANSI Publications

Available from American National Standards Institute, 25 West 43rd Street, New York, NY 10036-8002, Tel: 212-642-4900, www.ansi.org.

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

2.2.4 ASQ Publications

Available from American Society for Quality, 600 North Plankinton Avenue, Milwaukee, WI 53203, Tel: 800-248-1946 (United States or Canada) or +1-414-272-8575 (International), www.asq.org.

ASQ-Z1.4 Sampling Procedures and Tables for Inspection by Attributes (DoD Adopted)

2.2.5 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 shall take precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 Qualification

The lubricating oils furnished under this document shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time for opening of bids (see 4.3 and 6.2.2). Detailed information on the procedures to be followed when submitting a candidate lubricating oil are available from the Naval Air Systems Command, AIR-4.4.1, Fuels and Lubricants Systems Engineer, Building 2360, 22229 Elmer Road, Unit 4, Patuxent River, MD 20670.

3.1.1 Read-Across Approvals

Read-across approvals will only be granted to different grades of oil that are composed of varying percentages of the same base stocks blended with identical additive packages (adjustments in pour point depressant concentration will be permitted). Complete chemical and physical property test results shall be submitted for each grade of oil for which qualification is requested. Single Cylinder Engine tests shall be performed on the lightest and heaviest single SAE grade oils to be blended from the same base stock materials (neutral and bright stock). All single grade oils blended from the same base stock materials and meeting SAE viscosity classification standards between the two tested products will be granted qualification approval based on similarity. No read-across approvals will be granted for multi-grade oils.

3.1.2 Requalification

Requalification will be required in the event any change is made in the source or composition of the lubricant, the ingredients used, the manufacturing processes, or the plant location.

3.2 Materials

The single grade lubricating oils shall be refined petroleum products and may contain pour point depressants up to a maximum amount of 1.0% by weight as well as an antioxidant in an amount not to exceed 0.5% by weight. In addition to these materials, multi-grade oil may also contain a viscosity index improver. Silicone antifoam additives may be used up to a maximum of 25 ppm. Crude source(s) and the types of processing used in the manufacture of the base stocks shall be identified in accordance with Appendix A. If re-refined materials are used, the manufacturer must demonstrate the consistency of the products to the qualifying agency.

3.3 Chemical and Physical Properties

The finished lubricating oil shall conform to the physical and chemical property requirements specified in Table 2.

3.4 Sulfur

The sulfur content of the oil shall not exceed the value shown for each grade in Table 2. For quality conformance inspection, the sulfur content shall be within ±0.15% mass of the qualification value or within a 0.3% mass range selected by the manufacturer to bracket the qualification value.

TABLE 2 - CHEMICAL AND PHYSICAL PROPERTY REQUIREMENTS FOR FINISHED LUBRICANT

Characteristic (Limits) SAE Grade	30	40	50	60	Multi-Grade	Test Method
Viscosity, mm^2/s (cSt),						ASTM D 445
@ 100 °C, Min	9.3	12.5	16.3	21.9	(1)	
@ 100 °C, Less Than	12.5	16.3	21.9	26.1	(1)	
Flash Point, °C Min	220	225	243	243	220	ASTM D 92
Flash Point, °C	Report	Report	Report	Report	Report	ASTM D 93
Sulfur, Mass % Max	0.6	0.8	1.0	1.2	0.6	ASTM D 129, ASTM D 1552, ASTM D 2622, ASTM D 4951, ASTM D 5185
Pour Point, °C Max	–18	–15	–12	–9	—	ASTM D 97, ASTM D 5949, ASTM D 5950, ASTM D 5985
Viscosity, Low Temp., Pumping	—	—	—	—	(1)	ASTM D 4684
Viscosity, Low Temp., Cold Crank Sim.	—	—	—	—	(1)	ASTM D 5293
Viscosity, High Temp., High Shear, at 150 °C, cP, Min	2.9	3.7	3.7	3.7	(1)	ASTM D 4683, ASTM D 4741, ASTM D 5481
	---------- All Grades ----------					
Viscosity, mm^2/s (cSt), @ 40 °C	report					ASTM D 445
Viscosity Index, Min.	85					ASTM D 2270
Acid Number, mg K0H/g, Max(2)	0.10					ASTM D 664
Density @ 15 °C, g/mL	report					ASTM D 4052
Gravity @ 60 °F, °API(3)	report					ASTM D 1298, ASTM D 4052
Ash Content(4) Mass % Max	0.011					ASTM D 482, SAE J1787
Trace Sediment ml/100 mL Oil, Max.	0.005					ASTM D 2273
Copper Strip Corrosion, Max Rating						ASTM D 130
3 h @ 100 °C	1					
3 h @ 204 °C(5)	3					
Foaming Tendency/Stability						ASTM D 892
Sequence 1						
Aerated Volume, mL, max	50					
Volume after 10 min, mL, max	0					
Sequence 2						
Aerated Volume, mL, max	50					
Volume after 10 min, mL, max	0					
Sequence 3						
Aerated Volume, mL, max	50					
Volume after 10 min, mL, max	0					
Compatibility(6)	pass					ASTM D 6922

1. Oil shall meet the viscosity requirements of SAE J300 for the designated grade.
2. Titrate to a pH 11 end point.
3. API gravity may be computed from the relative density measured by ASTM D 4052.
4. ASTM D 482 is required for qualification. Either ASTM D 482 or SAE J1787 may be used for Quality Assurance Testing.
5. Conduct the test in accordance with ASTM D 130 but at the temperature specified.
6. Specific reference oils will be identified by NAVAIR at the time of candidate submission.

3.5 API Gravity

The American Petroleum Institute (API) gravity of the oil shall be determined but not limited on qualification inspection. For quality conformance inspection, the gravity shall be within ±1.0 °API of the qualification value, or within a 2.0 °API range selected by the manufacturer to bracket the qualification value.

3.6 Workmanship

The lubricating oil shall be a homogeneous blend when examined visually at room temperature (25 °C ± 3 °C) in a well-lighted room or daylight. It shall exhibit no separation or fallout of the additives. Any jelly-like substance or very viscous material observed in the bottom of the container will be considered evidence of additive fallout.

3.7 Bench Performance Requirements (Single Cylinder Engine Test)

3.7.1 The finished lubricating oil shall meet the requirements of Table 3 when tested in the Sequence VIII spark-ignition engine test run in accordance with ASTM D 6709, except as modified herein. The test shall be run with the oil gallery temperature controlled at 135 °C ± 1 °C (275 °F ± 2 °F).

3.7.1.1 The test fuel shall be Soltrol 10 plus 0.779 to 0.806 mL/L (2.95 to 3.05 mL/US gallon) tetraethyllead (TEL) in place of the KA24E unleaded fuel. The air-to-fuel ratio is to be 14.0:1 as calculated by exhaust gas analysis (refer to ASTM D 6709, paragraph 7.6).

3.7.1.2 The test need not be conducted using an ASTM Test Monitoring Center (TMC) calibrated test stand and power section (refer to ASTM D 6709, paragraph 10). In place of TMC reference oils a substitute aviation piston engine reference oil shall be used to validate test operation for individually authorized qualification programs as follows:

3.7.1.2.1 Immediately prior to performing a candidate lubricant test run a separate aviation reference oil test shall be conducted. The oil used in the reference test shall be identified by the Naval Air Systems Command, Fuels and Lubricants Systems Engineer (AIR-4.4.1), and will be based on discussions with the candidate oil supplier. The reference lubricant shall be a retained sample of an originally qualified product (or a recent production batch of the manufacturers qualified lubricant) conforming to the SAE Standard for which candidate approval is sought. The results obtained with the reference oil must be reported to the Naval Air Systems Command immediately following completion of the reference test and before conducting the candidate oil test. The results obtained with the reference oil must correlate with the ASTM D 5119 or ASTM D 6709 data previously obtained on that approved formulation.

3.7.1.2.2 Laboratory operators should be aware of the impact of conducting non-standard Sequence VIII test on their TMC calibration status (refer to ASTM D 6709, paragraph 10.1.3.3).

3.7.1.3 The final lab test report shall be the same format as that used for the normal ASTM D 6709 test, paragraph 13, but shall also include the following supplemental report items for Aviation Piston Engine Oil approval:

- Viscosity at 40 °C and 100 °C on the 20, 30 and 40 hour oil samples.
- Stripped viscosity (per ASTM D 6709, Annex A14) at 40 °C on the 40 h oil sample for single grade products.
- Stripped viscosity (per ASTM D 6709, Annex A14) at both 40 °C and 100 °C on the 10 h and 40 h oil samples for multi-grade products.
- Acid Number per ASTM D 664 on the new oil, 10, 20, 30 and 40 h oil samples.
- Post-test photographs of the bearing (top and bottom halves) and of the piston skirts (thrust and non-thrust sides).

TABLE 3 - SINGLE CYLINDER ENGINE TEST REQUIREMENTS AT 40 H (END OF TEST)[1]

End of Test Characteristic	Limit Single Grade	Limit Multigrade	Test Method
BEARING			
Bearing Weight Loss (Uncorrected), Total, mg, Max	500	500	ASTM D 6709
USED OIL			
Viscosity, % Change, @ 40 °C [2]	–5 to +10	</= +10	ASTM D 445
Viscosity, @ 100 °C	—	[3]	ASTM D 445
Acid Number Change, Max[4]	2.0	2.0	ASTM D 664

1. The engine test is to be run in accordance with ASTM D 6709 with an oil gallery temperature controlled at 135 °C ± 1 °C (275 °F ± 2 °F).
2. Viscosity change of the 40 hour sample shall be as shown for the spedified grade
3. Stripped viscosity of the 10 hour sample shall remain in original SAE grade.
4. Titrate to a pH 11 end point.

3.8 Material Safety Data Sheets

When applying for qualification, the manufacturer shall submit to the qualifying activity Material Safety Data Sheets prepared in accordance with FED-STD-313 (see 6.4).

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 facility 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 document where such inspections are deemed necessary to assure 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 document shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the document shall not relieve the contractor of the responsibility of assuring 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. Qualification inspection (see 4.3).

b. Quality assurance inspection (see 4.4).

4.3 Qualification Inspection

The qualification inspection shall consist of a review and acceptance of the manufacturer's test results (see 4.3.2) by the Naval Air Systems Command. Additional testing of the qualification inspection sample shall be performed by NAVAIR to confirm compliance with the requirements of Table 2.

4.3.1 Qualification Inspection Sample

All qualification and NAVAIR testing must be conducted on the same homogeneous batch of oil. The NAVAIR qualification inspection test samples shall consist of a 3.8 L (1 gal) sample of each grade of blended base oil without additives and a 38 L (10 gal) sample of each grade of the finished oil for which qualification approval is sought. Material Safety Data Sheets completed in accordance with FED-STD-313 shall also be included with the test samples. At the direction of the Naval Air Systems Command, AIR-4.4.1, these samples should be forwarded to the AIR-4.4.1 test laboratory at an address to be specified at the time of sample submission. The sample should be plainly identified by a securely attached durable tag or label marked with the following information:

SAMPLE FOR QUALIFICATION INSPECTION
LUBRICATING OIL, AIRCRAFT PISTON ENGINE,
(NONDISPERSANT MINERAL OIL)
Type of sample (base stock or finished oil)
Name of manufacturer
Product code number
Batch number
Date of manufacture
Submitted by (name) (date) for qualification inspection in accordance with SAE J1966 under authorization of (reference authorizing letter) (see 6.2.2).

4.3.2 Test Results

The manufacturer shall forward a certified copy of the test report to NAVAIR. The report shall contain complete test data showing the results of all tests required by this document. Photographs of the test parts from the Single Cylinder engine test will be included along with data on the test oil's viscosity (measured at 40 °C and 100 °C), and acid number properties at 0, 10, 20, 30, and 40 h into the test (including the stripped viscosity at 40 °C and 100 °C of the 10 h and 40 h samples as specified in paragraph 3.7.1.3 for the appropriate grade). The test report shall also include complete formulation data including the brand name and manufacturer of each of the additives used, the concentration of each additive in the finished oil, the percentages of neutral, bright stock or other components used in the blending of the product, as well as the crude oil sources and type of processing used in the manufacture of those base stock components. The manufacturer shall also specify the manufacturing blending tolerances for each of the additives and base stock components used in the formulation.

4.3.3 Requalification

Requalification shall be required when any reformulation or change is made in source of manufacture, purity, origin, or composition of the lubricating oil base stock(s) or additives. Requalification is also required for any changes in the manufacturing process or plant locations of the finished product, its additives or base stock(s). No changes shall be made unless approved by the qualifying activity (see 6.2.2).

4.4 Quality Conformance Inspection

Quality assurance inspection shall consist of all the tests included in Table 4. Oil manufacturers must retain a copy of each batch test report in their files for at least three years. A copy of the test report on each batch of oil produced for the U.S. Government shall be forwarded to Naval Air Systems Command.

4.4.1 Lot Formation

4.4.1.1 Bulk Lot

A bulk lot is considered as an indefinite quantity of homogeneous mixture of material in a single isolated container or manufactured by a single plant run (not exceeding 24 h) through the same processing equipment, with no change in ingredient material.

4.4.1.2 Packaged Lot

A packaged lot is considered as an indefinite number of 208 L (55 gal) drums or smaller unit packages of identical size and type filled with a homogeneous mixture of material manufactured by a single plant run (not exceeding 24 h) through the same processing equipment, with no change in ingredient material.

TABLE 4 - QUALITY ASSURANCE TEST REQUIREMENTS FOR FINISHED LUBRICANT

Characteristic (Limits) SAE Grade	30	40	50	60	Multi-Grade	Test Method
Viscosity, mm^2/s (cSt),						ASTM D 445
@ 100 °C, Min	9.3	12.5	16.3	21.9	(1)	
@ 100 °C, Less Than	12.5	16.3	21.9	26.1	(1)	
Flash Point, °C Min	220	225	243	243	220	ASTM D 92
Sulfur, Mass % Max(2)	0.6	0.8	1.0	1.2	0.6	ASTM D 129, ASTM D 1552, ASTM D 2622, ASTM D 4951, ASTM D 5185
Pour Point, °C Max	–18	–15	–12	–9	—	ASTM D 97, ASTM D 5949, ASTM D 5950, ASTM D 5985
Viscosity, Low Temp., Cold Crank Sim.	—	—	—	—	(1)	ASTM D 5293
	---------- All Grades ----------					
Acid Number, mg K0H/g, Max(3)	0.10					ASTM D 664
Density @ 15 °C, g/mL	report					ASTM D 4052
Gravity @ 60 °F, °API(4)	report					ASTM D 1298, ASTM D 4052
Ash Content(5) Mass % Max	0.011					ASTM D 482, SAE J1787
Trace Sediment ml/100 mL Oil, Max.	0.005					ASTM D 2273
Copper Strip Corrosion, Max Rating 3 h @ 100 °C	1					ASTM D 130
Foaming Tendency/Stability Sequence II						ASTM D 892
Aerated Volume, mL, max	50					
Volume after 10 min, mL, max	0					

1. Oil shall meet the viscosity requirements of SAE J300 for the designated grade.
2. See 3.4 for conformance limit range.
3. Titrate to a pH 11 end point.
4. API gravity may be computed from the relative density measured by ASTM D 4052.
5. ASTM D 482 is required for qualification. Either ASTM D 482 or SAE J1787 may be used for Quality Assurance Testing.

4.4.2 Sampling

4.4.2.1 Sampling for Verification of Product Quality

Each bulk lot of material shall be sampled at random in accordance with ASTM D 4057 or ASTM D 4177 for verification of product quality as specified in 4.4.

4.4.2.2 Sampling for Examination of Filled Containers

Each packaged lot of containers shall be sampled in accordance with ASQ-Z1.4 for leakage, fill, closure, and preparation for shipment (packaging, packing, marking) in accordance with Section 5.

4.4.2.3 Sampling for Examination of Sedimentation of Filled and Sealed Containers

Samples of filled and sealed 0.95 L (1 qt) containers shall be taken at such periodic intervals as to be representative of each day of operation. The number of samples to be taken each day shall be in accordance with ASQ-Z1.4, when tested against the sedimentation requirement of Table 4.

4.4.3 Inspection

4.4.3.1 Inspection of Material

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

4.4.3.2 Examination of Filled Containers

Examine samples taken in accordance with 4.4.2.2 for compliance with MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing, and marking requirements. Reject any container having one or more defects or under the required fill. If the number of defective or unfilled containers exceeds the acceptance number for the appropriate plan of ASQ-Z1.4, reject the lot represented by the sample.

4.5 Test Methods

Tests shall be performed in accordance with the applicable methods of Tables 2, 3, and 4.

5. PACKAGING (FOR MILITARY PROCUREMENTS)

5.1 Preservation and Packing

For acquisition purposes, the packaging requirements shall be as specified in the contract order (see 6.2.1.1).

5.2 Marking

All unit, intermediate, and shipping containers shall be marked in accordance with the contract order. All unit and intermediate packs of toxic and hazardous chemicals and materials shall also be labeled in accordance wit the applicable laws, statutes, regulations, or ordinances, including Federal, State, and Municipal requirements. In addition, unit or 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

This section contains information of a general or explanatory nature that may be helpful but is not mandatory.

6.1 Intended Use

The lubricating oil covered by this document is intended for use in four cycle piston aircraft engines where the dispersant additives found in SAE J1899 (formerly military specification MIL-L-22851) oil are not needed or desired. This document covers the same lubricating oil requirements as the former military specification MIL-L-6082. Users should consult their airframe or engine manufacturers manuals for the latest listing of acceptable lubricants.

6.2 Military Procurements

6.2.1 Ordering Data

6.2.1.1 Acquisition Requirements

Procurement documents should specify the following:

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

b. Grade of lubricating oil required (see 1.2).

c. Type and size of containers required (see 5.1).

d. Level of packing required (see 5.1).

e. Quantity desired.

f. Submittal of test results (see 4.4).

6.2.2 Qualification

With respect to products requiring qualification, awards will be made only for the products that are at the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List 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 of purchase orders for the products covered by this document. The activity responsible for the Qualified Products List is Commander, Naval Air Systems Command, AIR-4.4.1, Fuels and Lubricants Systems Engineer, Building 2360, 22229 Elmer Road, Unit 4, Patuxent River, MD 20670. Information pertaining to qualification of products may be obtained from that activity.

6.2.3 International Standardization Agreement

Certain provisions of this document are the subject of an international standardization agreement with NATO (STANAG 1135). When amendment, revision, or cancellation of this document is proposed, which will affect or violate the international agreement concerned, the preparing activity will take appropriate reconciliation action through international standardization channels, including departmental standardization offices, if required.

6.3 Revisions

Revisions or changes to this document must have concurrence from the Naval Air Systems Command.

6.4 Material Safety Data Sheets

Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent Government mailing addresses for submission of data are listed in Section 4 of FED-STD-313.