



SURFACE VEHICLE STANDARD

J1966™**OCT2020**

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Superseding J1966 AUG2011

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

RATIONALE

SAE J1966 has been reaffirmed to comply with the SAE Five-Year Review policy.

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.

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Documents

Document Sharing Hub

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 $\pm 0.15\%$ mass of the qualification value or within a 0.3% mass range selected by the manufacturer to bracket the qualification value.