



AEROSPACE STANDARD	AS5780™	REV. E
	Issued	2000-09
	Revised	2025-07
Superseding AS5780D		
(R) Specification for Aero and Aero-Derived Gas Turbine Engine Lubricants		

RATIONALE

This standard is being reviewed as a part of SAE's Five-Year Review policy. There has been progress within the E-34 Propulsion Lubricants Committee in creating new test methods that require incorporation within the standard and further developments in lubricant technology that impact the standard. As part of the Five-Year Review, this revision to the standard reflects new test methods and test conditions, updates to all tables, rationalization of requirements, and updates to Tables A1 and A2.

1. SCOPE

This specification defines basic physical, chemical, and performance limits for 5 cSt grades of gas turbine engine lubricating oils used in aero and aero-derived marine and industrial applications, along with standard test methods and requirements for laboratories performing them. It also defines the quality control requirements to assure batch conformance and materials traceability and the procedures to manage and communicate changes in oil formulation and brand. This specification invokes the Performance Review Institute (PRI) product qualification process. Requests for submittal information may be made to PRI at the address in 2.1.3, referencing this specification. Products qualified to this specification are listed on a Qualified Products List (QPL) managed by PRI. Additional tests and evaluations may be required by individual OEMs before an oil is approved for use in their equipment. Approval and/or certification for use of a specific gas turbine engine oil in aero and aero-derived marine and industrial applications is the responsibility of the individual OEMs and/or governmental authorities and is not implied by compliance with or qualification to this specification.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (Outside U.S. and Canada), www.sae.org.

AMS4900	Titanium Sheet, Strip, and Plate, Commercially Pure, Annealed, 55 ksi (379 MPa) Yield Strength
AMS7257	Perfluorocarbon (FFKM), Engine Oil, Fuel and Hydraulic Fluid Resistant, 70 to 80 Hardness, For High Temperature Seals in Engine Oil Systems, Fuel Systems and Hydraulic Systems
AMS-T-9046	Titanium and Titanium Alloy, Sheet, Strip, and Plate
AIR6056	Gas Turbine Engine Lubricant Specifications: Current Technical Review and Future Direction
ARP5088	Test Method for the Determination of Total Acidity in Polyol Ester and Diester Gas Turbine Lubricants by Automatic Potentiometric Titration
ARP5921	Evaluation of Coking Propensity of Aviation Lubricants in an Air-Oil Mist Environment using the Vapor Phase Coker
ARP5996	Evaluation of Coking Propensity of Aviation Lubricants Using the Single Phase Flow Technique
ARP6156	WAM High Speed Load Capacity Test Method
ARP6157	Pressure-Viscosity Coefficient Measurement
ARP6223	Oil Carbon Particulate Test
ARP6255	Aviation Lubricant Tribology Evaluator (ALTE) Method to Determine the Lubricating Capability of Gas Turbine Lubricants
ARP6299	Procedure for Thermal Aging Test for Polyol Ester Gas Turbine Engine Lubricants
ARP6917	Evaluation of Gas Turbine Engine Lubricant Compatibility with Elastomer Slabs - Long Duration Test
ARP6992	Evaluation of Thermal Stability and Corrosivity of Aviation Lubricants
ARP7120	Compatibility of Turbine Lubricating Oils
ARP7355	Assessment of Elastomer Volume Swelling Behavior in Aero-Derived Gas Turbine Engine Lubricants - Short Duration Test
ARP8462	Evaluation of Fouling Propensity of Aviation Lubricants Using the Mixed-Phase Flow Technique (High-Temperature Deposition Test)

2.1.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9500, www.astm.org.

ASTM D92	Determination of Open Flash and Fire Point - Cleveland Method
ASTM D97	Determination of Pour Point
ASTM D341	Viscosity-Temperature Equations and Charts for Liquid Petroleum or Hydrocarbon Products
ASTM D445	Determination of Kinematic Viscosity and Calculation of Dynamic Viscosity

ASTM D892	Determination of Foaming Characteristics of Lubricating Oils
ASTM D972	Evaporation Loss of Lubricating Greases and Oils
ASTM D2270	Calculation of Viscosity Index from Kinematic Viscosity
ASTM D2532	Standard Test Method for Viscosity and Viscosity Change After Standing at Low Temperature of Aircraft Turbine Lubricants
ASTM D2603	Test Method for Sonic Shear Stability of Polymer-containing Oils
ASTM D2624	Electrical Conductivity of Aviation and Distillate Fuels
ASTM D2717	Standard Test Method for Thermal Conductivity of Liquids
ASTM D4052	Determination of Density - Oscillating U-Tube Method
ASTM D4636	Corrosiveness and Oxidation Stability of Hydraulic Oils, Aircraft Turbine Engine Lubricants, and Other Highly Refined Oils
ASTM D5185	Multielement Determination of Used and Unused Lubricating Oils and Base Oils by Inductively Coupled Plasma Atomic Emission Spectrometry (ICP AES)
ASTM D5950	Standard Test Method for Pour Point of Petroleum Products (Automatic Tilt Method)
ASTM D6304	Determination of Water in Petroleum Products, Lubricating Oils, and Additives by Coulometric Karl Fischer Titration
ASTM D6595	Standard Test Method for Determination of Wear Metals and Contaminants in Used Lubricating Oils or Used Hydraulic Fluids by Rotating Disc Electrode Atomic Emission Spectrometry
ASTM E1269	Specific Heat Capacity by Differential Scanning Calorimetry

2.1.3 PRI Publications

Available from Performance Review Institute, 161 Thorn Hill Road, Warrendale, PA 15086-7527, Tel: 724-772-1616, www.p-r-i.org.

OP2004	QPL Qualification Process
OP2007	QPG Operation
PD2000	PRI-QPL Program Requirements

2.1.4 United Kingdom Ministry of Defence - (UK MOD) Publications

Available from Ministry of Defence - UK, UK Defence Standardization, Kentigern House, Room 1138, 65 Brown Street, Glasgow G2 8EX, UK, <https://sts.defencegateway.mod.uk>.

Def Stan 05-50 (Part 61)	Methods for Testing Fuels, Lubricants and Associated Products - Part 61: Methods for Testing Gas Turbine Engine Synthetic Lubricants
	Method 6: Hydrolytic Stability
	Method 9: Resistance to Oxidation and Thermal Decomposition
	Method 22: Assessment of the Compatibility of Gas Turbine Lubricants with Elastomers

2.1.5 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

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

Method 3010: Solid Particle Contamination in Aircraft Turbine Engine Lubricants (Gravimetric Procedure)

Method 3410: High Temperature Deposit and Oil Degradation Characteristics of Aviation Turbine Oils

Method 3411: Thermal Stability and Corrosivity of Aircraft Turbine Engine Lubricants

Method 3500: Monobasic Acid Components of Synthetic Ester Lubricants by Gas Chromatography

Method 5308: Corrosiveness and Oxidation Stability of Light Oils (Metal Squares)

Method 6508: Load Carrying Ability of Lubricating Oils (Ryder Gear Machine)

2.2 Related Publications

The following publications are provided for information purposes only and are not a required part of this SAE Technical Report.

2.2.1 French Armed Forces Publications

Available from Ministère des Armées, 60 Boulevard Général Martial Valin, 75509 Paris, France, www.defense.gouv.fr.

DCSEA 299/A Huile Synthétique Pour Turbomachines D'aviation Type 5 mm²/s à 100°C

2.2.2 Pratt & Whitney Publications

Available from Pratt & Whitney, 400 Main Street, East Hartford, CT 06118, Tel: 860-565-4321, www.prattwhitney.com.

PWA521 (Type II, 5 cSt) Lubricant, Aircraft Turbine Engine, Synthetic Base

2.2.3 United Kingdom Ministry of Defence - (UK MOD) Publications

Available from Ministry of Defence - UK, UK Defence Standardization, Kentigern House, Room 1138, 65 Brown Street, Glasgow G2 8EX, UK, <https://sts.defencegateway.mod.uk>.

Def Stan 91-101 Lubricating Oil Gas Turbine Engine, Synthetic Grade 5 cSt, JSD OX-27

2.2.4 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-PRF-23699 Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

2.3 Definitions

STANDARD PERFORMANCE CAPABILITY (SPC): A class of lubricant intended for normal service in which engine operating conditions and/or service durations do not require higher thermal capability.

HIGH PERFORMANCE CAPABILITY (HPC): A class of lubricant intended for more demanding service in which engine operating conditions and/or service durations require higher thermal capability.

ORIGINAL EQUIPMENT MANUFACTURER (OEM): A manufacturer of an end item, system, or subsystem such as an airframe, engine, auxiliary power unit, etc.

BATCH: The volume of basestock, additive, or finished lubricant receiving final certification analysis and testing.

PERFORMANCE REVIEW INSTITUTE (PRI): An SAE affiliate with the objectives of providing global, unbiased, independent manufacturing process and product assessments and certification services.

QUALIFIED PRODUCTS GROUP (QPG): A mandated body designated by the PRI Qualified Product Management Council (QPMC) in accordance with PRI PD2000. This body is responsible for assessing whether a manufacturer's products comply with the relevant standards. The Mandated Body is known as a Qualified Products Group (QPG) and is composed of members from the original equipment manufacturers (OEMs) and government agencies. The QPMC has mandated a QPG for aerospace gas turbine engine oils.

QUALIFIED PRODUCTS LIST (QPL): A list of products qualified by the QPG to this specification and issued by PRI.

QUALIFICATION REFERENCE NUMBER (QRN): A unique reference number assigned by the QPG to each formulation qualified to this specification.

3. COMPOSITION

The composition of gas turbine engine oils used in aero and aero-derived marine and industrial applications shall be based on polyol ester basestock chemistry. Other basestock chemistries may be considered for qualification at the discretion of the QPG.

Additives containing any of the following are prohibited: barium, organic compounds of titanium, known or suspected carcinogens. If a tricresyl phosphate (TCP) additive is used, the TCP additive shall contain less than 0.20% by weight in total of mono-, di-, and tri-ortho cresyl isomers of tricresyl phosphate.

All chemical ingredients contained in aviation turbine lubricants must comply with all legal, environmental, toxicological, and regulatory requirements of the countries in which the products are manufactured and sold. A Safety Data Sheet (SDS) or other equivalent document shall be available to cover these regulatory requirements.

4. TEST REQUIREMENTS

The test requirements in this section are mandatory requirements for the initial qualification of turbine engine oils to this specification. These requirements are primarily aimed at civil aero and aero-derived marine and industrial applications, but that does not preclude their use for military applications where considered desirable. All tests must be conducted by laboratories approved for the purpose in accordance with Section 5. The tests are grouped into the following property categories:

- Physical Properties
- Chemical Properties
- Stability Properties
- Deposition Properties
- Tribological Properties