

AEROSPACE INFORMATION REPORT

AIR6945™

Issued 2021-07

Supplemental Information for Design of Measuring Devices
for Measurement of Aircraft Cabin Air Quality

RATIONALE

Manufacturers of devices that collect real-time measurements of gaseous and/or particulate airborne contaminant on aircraft during maintenance troubleshooting would benefit from additional information about the gaseous and/or particulate chemical constituents in relevant sources of onboard contaminants. This information is relevant for both portable and aircraft-installed sensor devices. This SAE Aerospace Information Report (AIR) lists primary sources of onboard smoke, fumes, or odor, and identifies selected constituents for each source. It is applicable to any future standard for portable or installed sensors.

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Documents

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1. SCOPE

This document provides information applicable to the design and development of portable and aircraft mounted cabin air contaminant sensors. This AIR complements any future portable or aircraft-mounted cabin air sensor standards.

1.1 Purpose

The purpose of this document is to provide supporting information for design and development of portable and aircraft installed sensors for maintenance troubleshooting of passenger cabin and flight deck air quality issues. It lists primary sources of onboard smoke, fumes, or odor, and identifies selected constituents and combustion, decomposition, and hydrolysis byproducts that may be associated with each source. Additional regulatory requirements must be met for installation of systems on airplanes.

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.

2.1.1 SAE Publications

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

AMS1424	Fluid, Aircraft Deicing/Anti-Icing, SAE Type I
AMS1428	Fluid, Aircraft Deicing/Anti-Icing, Non-Newtonian (Pseudoplastic), SAE Types II, III, and IV
AMS1476	Deodorant, Aircraft Toilet
AMS3052	Grease, Aircraft, General Purpose, Low Temperature Range, Lithium Thickened
AIR4766/2	Airborne Chemicals in Aircraft Cabins
ARP4737	Aircraft Deicing/Anti-Icing Methods
AS1241	Fire Resistant Phosphate Ester Hydraulic Fluid for Aircraft
AS5780	Specification for Aero and Aero-Derived Gas Turbine Engine Lubricants

2.1.2 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 D1356	Standard Terminology Related to Sampling and Analysis of Atmospheres
ASTM D7911	Standard Guide for Using Reference Material to Characterize Measurement Bias Associated with Volatile Organic Compound Emission Chamber Test
ASTM F484-08	Standard Test Method for Stress Cracking of Acrylic Plastics in Contact with Liquid or Semi-Liquid Compounds
ASTM F502-08	Standard Test Method for Effects of Cleaning and Chemical Maintenance Materials on Aircraft Surfaces

2.1.3 Code of Federal Regulations (CFR) Publications

Available from the United States Government Printing Office, 732 North Capitol Street, NW, Washington, DC 20401, Tel: 202-512-1800, www.gpo.gov.

Title 14, CFR Part 5 Safety Management System

2.1.4 FAA Publications

Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591, Tel: 866-835-5322, www.faa.gov.

AC 91.21-1D Use of Portable Electronic Devices Aboard Aircraft

AC 120-92 Safety Management Systems for Aviation Service Providers

EPA-420-R-09-901 Recommended Best Practice for Quantifying Speciated Organic Gas Emissions from Aircraft Equipped with Turbofan, Turbojet, and Turboprop Engines

2.1.5 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 11076 Aircraft - De-Icing/Anti-Icing Methods on the Ground

2.1.6 RTCA Publications

Available from RTCA, Inc., 1150 18th Street, NW, Suite 910, Washington, DC 20036, Tel: 202-833-9339, www.rtca.org.

DO-160 Environmental Conditions and Test Procedures for Airborne Equipment

2.1.7 U.S. Government Publications

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

MIL-PRF-7808 Performance Specification Lubricating Oil, Aircraft Turbine Engine, Synthetic Base

MIL-PRF-23699 Performance Specification: Lubricating Oil, Aircraft Turbine Engine, Synthetic Base, NATO Code Numbers: O-152, O-154, O-156, and O-167

MIL-PRF-85704 Performance Specification: Cleaning Compound, Turbine Engine Gas Path

MIL-STD-810 Environmental Engineering Considerations and Laboratory Tests

2.1.8 Other Publications

Industrial ventilation: A Manual of Recommended Practice for Operation and Maintenance, 2nd edition. American Conference of Governmental Industrial Hygienists, 2020.

Johnson, D.W. [2016]. Lubricants for Turbine Engines. Chapter 2 in Recent Progress in Some Aircraft Technologies, Ed. Edited by R.K. Agarwal, pp. 35-53, ISBN: 978-953-51-2482-5, 8 Sept. 2016.

Johnson, D.W. and Hils, J.E. [2013]. Phosphate Esters, Thiophosphate Esters and Metal Thiophosphates as Lubricant Additives. Lubricants, 1: 132-148; <http://dx.doi.org/10.3390/lubricants1040132>.

UK Defence Standard 79-18/2. Cleaning Fluid for Compressors of gas Turbine Engines. Available from https://infostore.saiglobal.com/en-us/Standards/DEFSTAN-79-18-1-1994-INTERIM-366747_SAIG_DEFSTAN_DEFSTAN_836228/.