AEROSPACE INFORMATION REPORT

AIR1392™	REV. A

Issued 1977-10
Revised 1998-12
Reaffirmed 2023-08

Superseding AIR1392

Oxygen System Maintenance Guide

RATIONALE

AIR1392A has been reaffirmed to comply with the SAE Five-Year Review policy.

FOREWORD

Changes in this revision are format/editorial only.

1. SCOPE:

   This document is intended to give general instructions and directions for personnel performing maintenance and modification work on Oxygen Systems.

2. REFERENCES:

2.1 FAA/DOT Specifications and Documents Applicable to Aircraft Oxygen Systems:

Advisory Circular 43.13-2 Oxygen System Installation

2.2 SAE Documents Applicable to Aircraft Oxygen Systems:

2.2.1 Aerospace Standards (AS):

AS861	Minimum General Standards for Oxygen Systems

2.2.2 Aerospace Information Reports (AIR):

AIR822	Oxygen Systems for General Aviation Aircraft
AIR825A	Oxygen Equipment for Aircraft
AIR1059	Transfilling and Maintenance of Oxygen Cylinders
AIR1176	Oxygen System and Component Cleaning and Packaging
AIR1223	Installation of Liquid Oxygen Systems in Civil Aircraft

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3. SAFETY:

The use of oxygen and oxygen systems involves a certain degree of hazard. With the proper design, installation, and maintenance, this hazard can be reduced to an acceptable level.

Oxygen in gaseous or liquid form is chemically stable and nonflammable. However, combustible materials ignite more rapidly and the intensity of a fire increases tremendously in an oxygen-rich atmosphere.

A major factor in oxygen systems is cleanliness. This is most important in fabrication, installation, and maintenance of equipment. From the installation standpoint, the hazards of contamination should be minimized, if not completely eliminated, by choosing proper locations for the equipment and by adequate precautions and shielding where choice of location is limited.

4. INSTALLATION:

Care should be taken in the installation of the oxygen system. Protect all lines and fittings from any unnecessary abuse or scratches during installation. Low pressure aluminum alloy plumbing lines are likely to become damaged; therefore, installation and location should be so accomplished as to prevent oxygen equipment or plumbing from subjection to vibration, abrasion, or damage during other maintenance operations. All oxygen system lines, after installation, should be carefully inspected for damage and leakage. Leak testing can be accomplished by introducing the oxygen pressure into the system and examining connections by the use of a leak detection solution specifically approved for oxygen service. Before any oxygen system component is removed or any connection is loosened, oxygen system pressure should first be dissipated.

5. EQUIPMENT HANDLING:

All oxygen equipment should be handled with care to avoid association with hydrocarbons such as fuels and lubricants which are ever present where aircraft are serviced and/or maintained. Because most oxygen components are of an intricate nature and all require cleanliness for proper operation, they should be kept in their original containers or be provided with a proper protective covering until ready for installation in the aircraft. This is also necessary when any of the items from an aircraft are removed for service and/or overhaul. Keep protective caps in position on equipment as long as possible and replace as soon as possible. Do not tamper with safety device or mar identifying markings or symbols and/or nameplates.

6. MODIFICATION INSTALLATION:

When oxygen equipment is modified and/or replaced with new or different equipment, the following should be taken into consideration prior to making the actual installation:

The oxygen equipment, tubing, and fittings shall be located as remotely as practicable from fuel, oil, hydraulic fluid, storage batteries, exhaust sacks and manifolds, electrical radios, and insulating materials. Insofar as practical, oxygen lines should not be grouped with lines carrying flammable fluids. Where necessary, deflector plates should be used to keep flammable fluids away from oxygen lines and equipment. Components of any oxygen system should not be installed where they will be subjected to temperatures in excess of that specified in the individual component specifications, and no part of the system shall be installed in an area which will be subjected to a temperature of 180 °F (82 °C) or greater.

7. CLEARANCE REQUIREMENTS:

Wherever possible oxygen lines, fittings, and equipment shall be installed above and at least 6 inches (152.4 mm) away from fuel, oil, and hydraulic systems to avoid contamination. Deflector plates should be used where necessary to keep hydraulic fluid away from oxygen lines, fittings, and equipment. Open ends of cleaned and died tubing should be plugged with impermeable caps at all times except during attachment or detachment. There should be at least 2 inches (50.8 mm) of clearance between the oxygen system and flexible moving parts of the aircraft. There should be at least half-inch clearance between the oxygen system and rigid parts of the aircraft. The oxygen system tubings, fitting and equipment should be separated by at least 6 inches (152.4 mm) from all electrical wiring, heat conduits and heat emitting equipment in the aircraft. Insulation shall be provided on the hot ducts, conduits, or equipment to prevent overheating of the oxygen system.

8. TORQUENING OF JOINTS:

Tightening of flared tube and pipe connections shall be accomplished in accordance with the best commercial practice. Torque wrenches shall be used, and the torque applied shall be within the limits specified in Tables 1 and 2.

TABLE 1 - Torque Requirements for Flared Tube Connections

Tubing O.D. Inch (mm)	Minimum Torque Inch-Pounds (N·m)	Maximum Torque Inch-Pounds (N·m)
5/16 (8)	100 (135.6)	125 (169.5)
3/8 (10)	200 (271.2)	250 (339.0)
1/2 (13)	300 (406.8)	400 (542.3)

TABLE 2 - Torque Requirements for Pipe Connections[1]

Nominal Pipe Size Inch (mm)	Minimum Torque Inch-Pounds (N·m)	Maximum Torque Inch-Pounds (N·m)
1/8 (3)	40 (54.2)	150 (203.4)
1/4 (6)	60 (81.4)	200 (271.2)
3/8 (10)	100 (135.6)	400 (542.3)

[1] Torque to specified minimum value and check for leakage. If additional torque is required to stop leakage, torque may be applied up to specified maximum value.

9. OXYGEN SYSTEM AND COMPONENT CLEANING:

9.1 Oxygen system components, including supply plumbing, can most effectively be cleaned when not installed in the system. Components containing plastic or elastomeric parts are subject to damage when exposed to some cleaning agents and they result in odors which are difficult to remove satisfactorily. Contaminants, such as oil, dust, metal chips, etc., cannot be easily removed by gas purging or liquid flushing within the installed system. Such contaminants can eventually become trapped in some narrow orifices causing either partial or complete failure of the system. In addition, if the contaminant is of the combustible type, a fire hazard is possible. Such contaminants can only be removed by complete disassembly of the affected component followed by proper cleaning procedures and controlled handling of the clean component until reinstalled into the using system.

9.2 Cleaning materials and processes used shall be compatible with the pieces being cleaned. Solutions and solvents used for cleaning and gases used for drying shall be of sufficient purity to prevent accumulation of undesirable residue after drying.