



AEROSPACE INFORMATION REPORT

AIR825™/12

REV. A

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Superseding AIR825/12

Oxygen System Integration and Performance Precautions

RATIONALE

AIR825/12A has been reaffirmed to comply with the SAE five-year review policy.

FOREWORD

This document is one of a set of related documents. These documents comprehensively address the "Introduction to Oxygen Equipment for Aircraft", and are referred to as slash (/) documents, rather than chapters. The documents may be obtained as a set or individually. As the field of oxygen systems for aircraft has evolved, it became cumbersome for one document to cover the full range of subject matter. The reader who is seeking overall familiarity with oxygen systems for aircraft should read all of these documents that combine to form a general reference to oxygen systems. The reader who is familiar with oxygen systems for aircraft may want to obtain only the slash documents that pertain to topics that are of specific interest.

The document set is written as an introductory level, suitable for anyone who would like to understand the basics of oxygen systems in aircraft, and specifically for the engineer who has just recently been assigned to aircraft oxygen systems. Many of these documents point the reader toward more detailed treatments located in other SAE documents.

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Documents
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1. SCOPE:

Oxygen system integration and performance precautions are in particularly dependent on applicable sections of airworthiness requirements per FAR/JAR 25. In this document information will be provided on common principles and good practices regarding design criteria, installation, manufacturing, safety aspects and system handling during maintenance and inspection.

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, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AIR825/13	Guide for Evaluating Combustion Hazards in Aircraft Oxygen Systems
AS861	Minimum General Standards for Oxygen Systems
AIR1059	Transfiling and Maintenance of Oxygen Cylinders
AIR1176	Oxygen System and Component Cleaning, Packaging
AIR1390	Convenient Location of Oxygen Masks for Both the Crew and Passengers of Aircraft
AIR1398	Testing of Oxygen Equipment
ARP1532	Oxygen System Installation and Fabrication
AS8010	Aviator's Breathing Oxygen Purity Standard

2.1.2 FAR Publications: Available from Federal Aviation Administration, 800 Independence Avenue, SW, Washington, DC 20591.

FAR/JAR 25 Airworthiness Requirements
FAR 23

2.1.3 CGA Publications: Available from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2823.

CGA No. 540 CGA Pamphlet V – I, American National, Canadian and Compressed Gas Association Standard for Compressed Gas Cylinder
Cylinder Valve Outlet Connection for Oxygen

2.1.4 U.S. Government Publications: Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

AFGS-87226A U.S. Air Force Guide Specification for Oxygen Systems, Aircraft, General
Specification for
MIL-STD-464

2.1.5 RTCA Publications: Available from RTCA Inc., 1140 Connecticut Avenue, NW, Suite 1020, Washington, DC 20036.

RTCA/DO-160D Environmental Conditions and Test Procedures for Airborne Equipment

2.2 Definitions:

SYSTEM INTEGRATION AND PERFORMANCE PRECAUTIONS: Measures to be considered by system design, manufacturing, installation, handling, maintenance and inspection to ensure system performance is in compliance with applicable airworthiness requirements.

3. DESIGN OBJECTIVES:

Oxygen systems shall comply with regulations, specifications and recommendations as applicable to a whole system or subsystems and components.

Performance to be provided shall meet particular airworthiness requirements of FAR/JAR 25.1439 - 1453.

Environmental conditions such as:

- Temperature
- Altitude/pressure
- Humidity
- Rain-condensation
- Mechanical vibration
- Shocks
- Constant acceleration
- Fungus
- Pollution
- Explosive environment
- Magnetic effect
- Hermeticity
- Hazardous elements
- Susceptibility to high, radiation and conduction frequencies
- Lightning strike protection
- Fire
- Sand and dust

3. (Continued):

shall to be taken into account to ensure safe system function under any foreseeable operational condition. Where necessary, redundancies shall be incorporated to satisfy the requirements of an emergency system. For immediate availability and use, a system should be equipped with its own control and indication devices.

Dependencies and interfaces to other aircraft systems should be minimized to avoid undesirable impacts on system function.

In designated engine burst areas practical design measures should be taken to minimize, on the basis of good engineering judgment, the risk of system damage due to non-contained engine rotor debris.

4. GENERAL INSTALLATION PRINCIPLES:

4.1 Location of Dispensing Equipment:

Oxygen dispensing equipment shall be located within easy reach of the users according to recommendations of AIR1390 and FAR/JAR 25.1447.

4.2 Number and Type of Fittings - Locations:

The number of fittings should be kept to a minimum. Their location should allow easy inspection. Enough space must be provided to torque the fittings tight.

On tubings of a gaseous system only one connection type shall be used. Combination between flared and flareless fitting ends within a specifically defined system must be avoided.

The oxygen system must be leak tested after final installation.

All fittings must be located such that any escaping oxygen will not lead to appreciable accumulation of oxygen inside electronic racks or compartments. The fittings of the oxygen system should not be installed directly adjacent to fittings of fuel, oil or hydraulic systems.

4.3 Support for Oxygen Lines:

- 4.3.1 Rigid Tubes: Oxygen lines must be supported by clamps that prevent excessive line movement during aircraft flight and shall have adequate protection against chafing. Vibration isolator clamps are recommended where vibration is considered excessive to prevent lines from cracking or fracturing. Isolators minimize fatigue or fracture to oxygen lines from forces of flight. Ensure adequate space is provided to prevent lines touching aircraft structure or components. Supporting of oxygen lines on aircraft parts that are dislocated during maintenance actions shall be avoided.