

**Minimum Standard for Gaseous Oxygen Pressure Reducers**

**RATIONALE**

AS1248A has been reaffirmed to comply with the SAE five-year review policy.

**FOREWORD**

Changes in this reaffirm are format/editorial only.

**1. SCOPE:**

This standard applies to pressure reducers for gaseous breathing oxygen systems and for all performance profiles without regard to particular inlet or outlet pressures. Attention is given, however, to construction requirements for reducers with maximum supply pressures to 2250 psig (155 bar) and reduced pressures of 50 to 150 psig (3.4 to 10.5 bar).

**2. APPLICABLE DOCUMENTS:**

**2.1 SAE Publications:**

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS861 Minimum General Standards for Oxygen Systems  
AIR1176 Oxygen System and Component Cleaning and Packaging  
AIR4071 Lubricants for Oxygen Use  
AS8010 Aviator's Breathing Oxygen Purity Standard

**2.2 U.S. Government Publications:**

Available from DODSSP, Subscription Services Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-810 Environmental Test Methods  
MIL-P-7105 Pipe Threads, Taper, Aeronautical  
MIL-P-27401 Nitrogen, Type 1  
MS-33656 Fitting End, Standard Dimensions, Flared Tube Connection  
MS-33514 Fitting End, Standard Dimensions, Flareless Tube Connection  
MS-33649 Bosses, Fluid Connection, Internal Straight Thread

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### 2.3 ASTM Publications:

Available from ASTM, 100 Barr Harbor, West Conshohocken, PA 19428-2959.

ASTM G 63 Evaluating Non-metals for Oxygen Service  
ASTM G 88 Designing Systems for Oxygen Service  
ASTM G 94 Evaluating Metals for Oxygen Service

### 2.4 Other Documents:

RTCA/DO-160 Environmental Conditions and Test Procedures for Airborne Equipment  
CGA S-1.1 Pressure Relief Device Standards, Part 1

## 3. TECHNICAL REQUIREMENTS:

### 3.1 General Requirements:

3.1.1 Materials and Workmanship: Applicable are the general requirements of AS861. Any material that is easily deteriorated or otherwise affected adversely by continued service when used with oxygen shall not be used. All materials shall be suitable for the purposes intended. ASTM G 88 may be used for reference.

3.1.1.1 Metallic Materials: All metallic materials used for the reducers should be selected with consideration given for metal-oxygen compatibility and shall be of the corrosion resistant type or suitably treated to resist corrosion due to oxygen, salt, spray, or atmospheric conditions related to normal service and storage life. ASTM G 94 may be used for reference.

3.1.1.2 Elastomers: All elastomers used shall have been compounded within 24 months of the date of the equipment manufacture, and such cure date shall be shown on the elastomer if sufficient area is available; otherwise, the end product must be identified as to earliest cure date of elastomer components included therein. If silicone elastomers, or others which have indefinite storage or operational life, are used, cure dating requirements are not applicable. ASTM G 63 may be used for reference.

3.1.1.3 Protective Treatment: If protective treatments of materials are required, the application and the testing for these shall be documented and supplied with the qualification testing data for the reducer. Ensure that any protective treatments used are not a health hazard.

### 3.1.2 Temperatures:

3.1.2.1 Operating Temperatures: The reducer shall be operable and permit normal flow and shut-off of oxygen while being subjected to ambient temperatures in the range of -40 °F (-40 °C) to +120 °F (49 °C) unless otherwise specified in the procurement specifications.

- 3.1.2.2 Storage (Nonoperating Temperatures): The reducer shall be operable and permit normal flow and shut-off of oxygen at temperatures in the operating range, after being subjected to temperatures in the range of -67 °F (-55 °C) to 160 °F (71 °C) unless otherwise specified in procurement specifications.
- 3.1.3 Operating Media: The operating media shall be oxygen, aviator's breathing (ABO), per AS8010 Type 1.
- 3.1.4 Cleaning: Clean parts in accordance with AIR1176 or equivalent procedure.
- 3.1.5 Lubricants: Only those lubricants shall be used which are compatible with and have been approved for use with oxygen within the specified pressure range and the temperature range of the pressure reducer. All lubricants shall be selected in accordance with AIR4071 to assure elastomer compatibility.
- 3.1.6 Interchangeability: All parts having same manufacture designation and part number shall be interchangeable with respect to installation and performance.
- 3.2 Design and Construction Requirements:
- 3.2.1 Mounting: Reducers shall be provided with adequate mounting capabilities so that when attached to either rigid plumbing or other components such as a cylinder valve, or mounted to rigid structural members such as bulkheads, the device will withstand shock loads of 15 g ( $147 \text{ m/s}^2$ ) in any direction. Bending and distortion of the mounting is permitted. There shall be no failure of the mounting attachment.
- 3.2.2 Wrench Flats: Adequate wrench flats for tightening fittings without special tools, shall be provided at each connection port.
- 3.2.3 Connections: Inlet and outlet connections shall conform to MIL-P-7105, MS-33649 for female ports, MS-33656 for male flare, or MS-33514 for male flareless types. Other connections may be customer specified.
- 3.2.3.1 Inlet and outlet ports must be permanently identified or the direction of flow must be permanently indicated on the product. The use of an arrow indicating direction of the flow is recommended.
- 3.2.3.2 The maximum inlet pressure shall be permanently marked on the inlet or the identification plate of the reducer.
- 3.2.4 Filtration: Oxygen inlet ports shall have appropriate filtering to prevent the entrance of particulate matter which may be hazardous to the user or which may impair the function of the device.
- 3.2.5 Low Pressure Relief Valve: A low pressure relief valve shall release from the reduced pressure area of the device, any pressure in excess of that which can be safely contained, or in excess of that which will permit safe performance of the device. The valve shall reclose after release of excess pressure.

- 3.2.6 High Pressure Relief Valve: If the device is to be cylinder mounted, it shall include a safety relief device complying with the requirements of CGA Pamphlet S-1.1.

### 3.3 Performance Requirements:

Performance requirements related to inlet pressure, reduced pressure, reduced pressure tolerance, reduced pressure tolerance versus decaying inlet pressure, total flow performance versus decaying pressure requirement, total flow, permissible leakage, extreme temperature operation, proof pressure, burst pressure, and service life shall be specified by the customer or the product specification document.

## 4. QUALITY ASSURANCE PROVISIONS:

### 4.1 Classification and Scope:

- 4.1.1 Qualification Testing: Qualification testing by supplier shall consist of those tests required in 4.4 through 4.5 and shall be satisfactorily documented by the supplier for further reference at any time.
- 4.1.2 Acceptance Test: Acceptance shall be defined by the specification and shall include, at least, the requirements of 4.4.1 through 4.4.3.

### 4.2 Test Media:

The testing media shall be one of the following:

- a. Oxygen per AS8010, Type 1
- b. Nitrogen per MIL-P-27401, Type 1
- c. Air, equivalent in dryness and contamination levels to oxygen per AS8010, Type 1

### 4.3 Test Conditions:

The ambient conditions for testing shall be as follows:

- a. Temperature:  $77^{\circ}\text{F} \pm 18^{\circ}\text{F}$  ( $25^{\circ}\text{C} \pm 10^{\circ}\text{C}$ )
- b. Relative Humidity: 90% or less
- c. Barometric Pressure: 28 to 32 in Hg (950 to 1080 mbar)

### 4.4 Test Performance:

- 4.4.1 Examination of Product: The regulator shall be carefully examined to verify conformance with applicable drawings with respect to materials, workmanship, finish, dimensions, construction, surface conditions, markings, and cleanliness.