

SOCIETY OF AUTOMOTIVE ENGINEERS, Inc.

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AERONAUTICAL STANDARD

AS 463

OXYGEN REGULATORS FOR COMMERCIAL TRANSPORT AIRCRAFT

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Revised

1. **PURPOSE:** To specify minimum requirements for the design, construction and performance of oxygen regulators to be used in commercial transport aircraft.
2. **SCOPE:** This standard covers the types of oxygen regulators considered satisfactory for use in commercial transport aircraft at altitudes up to 25,000 ft. The types of regulators covered are:
 - (a) Continuous Flow
 - (1) Preset
 - (2) Manual
 - (3) Automatic
 - (4) Others
 - (b) Demand Flow
 - (c) Diluter Demand
3. **GENERAL REQUIREMENTS:**
 - 3.1 **Materials and Workmanship:**
 - 3.1.1 **Materials:**
 - (a) Shall be of a type, grade and quality which experience and/or tests have demonstrated to be suitable for the purpose intended.
 - (b) Any material which is easily deteriorated or otherwise affected adversely by continuous service use with oxygen shall not be used.
 - (c) Rubber (natural or synthetic) and rubber-like components shall have been cured not more than twelve months before delivery of the regulator to the purchaser.
 - (d) Curing date (month and year) shall be stamped legibly on all rubber or rubber-like parts except those which have insufficient area.
 - (e) Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other.
 - 3.1.1.1 **Finish:** All materials which are not inherently corrosion resistant shall be finished with a protective treatment or coating to minimize the effects of exposure to oxygen and to atmospheric conditions which may be encountered in the service for which the regulator is intended. The use of any protective coating that will crack, chip or scale with age or with extremes of atmospheric conditions shall be avoided.
 - 3.1.2 **Workmanship:** Shall be consistent with accepted high grade aircraft equipment practice.

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3.1.3 Construction: Regulators shall be so constructed that component parts will not work loose in service and shall withstand without adverse effects the strains, jars, vibration and other conditions incidental to shipping, storage, installation and service.

3.2 Environmental Conditions: Regulators shall function under the following environmental conditions:

3.2.1 Temperature:

- (a) When used in accordance with the manufacturer's specifications, the regulator shall function as specified herein at any temperature between -20° F. and +160° F.
- (b) When exposed to a temperature of -65° F. for a period of 72 hours, the equipment shall not suffer any permanent damage and shall perform all specified functions when its temperature is raised to -20° F. or higher.

3.2.2 Altitude: Regulators shall function at altitudes in the range of sea level to 25,000 ft. and shall not be adversely affected by exposure to an altitude of 35,000 ft.

3.2.3 Vibration: Regulators shall be capable of withstanding and satisfactorily operating when subjected to a steady vibration over a range of frequencies from 500 to 3000 cycles per minute at a double amplitude (total displacement) of 0.018" in any of the three mutually perpendicular planes.

- (a) The regulator shall be vibrated over the range of 500 to 3000 cycles per minute at the amplitudes noted above and in each of the three mutually perpendicular planes. The frequencies at which resonance occurs, if any, shall be observed and noted.
- (b) If resonance is observed, a vibration test shall be conducted for 1,000,000 cycles at each resonant frequency.
- (c) If resonance is not observed, a vibration test shall be conducted for 1,000,000 cycles at a frequency of 3000 cycles for each of the three mutually perpendicular planes.
- (d) At the conclusion of the vibration test there shall be no evidence of structural failure and the regulator performance shall be satisfactorily demonstrated.

3.2.4 Acceleration:

- (a) The regulator shall not be adversely affected after subjection to a momentary acceleration of 3 G's in any direction.
- (b) While being subjected to a steady acceleration of 1-1/2 G's in any direction, the regulator performance shall not be impaired to the extent that a hazardous condition might result.

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- (c) Compliance with Item (b) must be proven by test unless it can be satisfactorily proven by calculation.

4. DETAIL REQUIREMENTS:

4.1 All Types:

- (a) Regulators which are not to be used as part of a portable equipment shall have provision for mounting to the air frame structure, the mounting to be of sufficient strength to withstand the vibration and shock loads which can be anticipated in service.
- (b) Regulators which are to be attached directly to oxygen cylinders shall be provided with a male threaded adapter having a minor thread diameter not less than that of a 1/4 ANPT male thread (11/32").
- (c) Regulators which are to be attached directly to an oxygen cylinder valve shall be equipped with a female nut and nipple in accordance with CGA Standard Connection No. 540.
- (d) The valve and all high pressure passages shall be so constructed that heat generated by adiabatic compression (when oxygen is admitted suddenly under pressure) is readily dissipated.
- (e) Regulators which are to be connected to the oxygen supply source by means of tubing shall be provided with an inlet tapped for 1/8 or larger ANPT tapered pipe threads.
- (f) All tapered pipe threads shall conform to Specification MIL-P-7105.
- (g) Each regulator shall be permanently marked with the manufacturer's name, model, serial number, and/or date of manufacture, and applicable "AS" number.
- (h) The curing date (month and year) of oldest rubber or rubber-like components, exclusive of static seals, shall be legibly stamped on each regulator.
- (i) The manufacturer shall furnish an outline of functional tests whereby the user may check the condition and operation of the regulator.

4.2 Continuous Flow Regulators:

4.2.1 Preset:

- (a) Oxygen, admitted through the inlet, shall pass through a pressure reducing valve which shall be controlled by a means responsive to the pressure at the regulator outlet. The pressure responsive means shall be adjustable to attain a desired outlet pressure and some means provided for locking the adjustment in that position. The use of some tool shall be necessary to unlock and readjust.