



AEROSPACE INFORMATION REPORT

AIR6036™

Issued 2013-05
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Passenger Hypoxia Protection Utilizing Oxygen Enriched Gas Mixtures

RATIONALE

There is increased interest within the aviation oxygen community in the possibility of using on-board oxygen concentration systems to supply oxygen-enriched breathable gas mixtures having less than 99.5% oxygen content. This Aerospace Information Report provides information that supplements standards addressing other aspects of passenger oxygen dispensing device performance, such as AS8025A.

AIR6036 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE

Currently, existing civil aviation standards address the design and certification of oxygen dispensing devices that utilize oxygen sources supplying at least 99.5% oxygen. This Aerospace Information Report discusses issues relating to the use in the passenger cabin of oxygen enriched breathing gas mixtures having an oxygen content of less than 99.5% and describes one method of showing that passenger oxygen dispensing devices provide suitable hypoxia protection when used with such mixtures.

1.1 Purpose

There is no current guidance available to certify passenger oxygen dispensing devices (e.g., oxygen masks) for use with oxygen sources supplying less than 99.5% oxygen. This document is intended to provide information for use as a supplement to standards that address other aspects of passenger oxygen dispensing device performance, such as AS8025.

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.

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Documents

Standard, visit Sharing Hub

2.1.1 SAE Publications

Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Telephone: 877-606-7323 (inside USA and Canada) or 724-776-4970 (outside USA), Web address: <http://www.sae.org>

AIR825	Oxygen Equipment for Aircraft
AS8010	Aviators Breathing Oxygen Purity Standard
AS 8025	Passenger Oxygen Mask

2.1.2 FAA Publications:

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

14 CFR Part 25 Airworthiness Standards: Transport Category Airplanes

2.1.3 U.S. Government Publications

Available from Document Automation and Production Service (DAPS), Building 4/D, 700 Robbins Avenue, Philadelphia, PA 19111-5094, Tel: 215-697-6257, <http://assist.daps.dla.mil/quicksearch/>.

MIL-PRF-27210 Oxygen, Aviator's Breathing, Liquid and Gas

2.1.4 European Aviation Regulations

Available from European Aviation Safety Agency, Otto Platz 1, Koln Deutz, Postfach 101253, D-50452 Cologne Germany, Tel: +49-221-8999-000, www.easa.eu.int.

CS Part 25 Certification Specifications for Large Airplanes

2.2 Definitions

ALVEOLAR SPACE: The areas of the lungs containing the alveoli, in which transfer of gas between the inhaled gases and the blood supply takes place. Sometimes called the respiratory zone of the respiratory tract.

ARTERIAL OXYGEN SATURATION (SaO₂): The ratio of the quantity of oxygen actually carried in the blood by hemoglobin to the maximum hemoglobin transport capacity of the blood. This ratio is expressed as a percentage.

AVIATORS BREATHING OXYGEN (ABO): Oxygen of a quality and purity suitable for breathing use in aviation applications. Usually, ABO has a minimum oxygen content of 99.5%, although AS8010 includes certain classes for which this is not the case.

DEAD SPACE: Also called Dead Volume. Portion of the respiratory tract (mouth, trachea, and bronchi) that conducts or carries inhaled gases from the mouth to the areas of the lungs in which transfer of gas between the inhaled gases and the blood supply takes place. Sometimes called the conducting zone of the respiratory tract.

OXYGEN DISPENSING DEVICE: Equipment that conveys oxygen between the supply source and the respiratory tract of the user. Commonly an oxygen mask.

OXYGEN ENRICHED BREATHING GAS (OEBG): A breathing gas mixture having trace impurity levels equivalent to ABO and containing a higher percentage of oxygen than ambient air but a lower percentage of oxygen than is present in Aviators Breathing Oxygen.