



AEROSPACE INFORMATION REPORT

AIR505

REV. A

Issued	1961-08
Noncurrent	1997-10
Reaf. Nonc.	2003-10
Stabilized	2014-10

Superseding AIR505

Oxygen Equipment, Provisioning and Use in High Altitude
(to 40,000 ft.) Commercial Transport Aircraft

RATIONALE

The A-10 Committee concluded that the content of this document will not be updated in the future. New documents updating the issues previously addressed have been or are being developed that addresses current technologies and practices specific to commercial operations above 40,000 ft. Therefore, the Committee decided to stabilize this document in its current state.

STABILIZED NOTICE

This document has been declared "Stabilized" by the SAE A-10 Aircraft Oxygen Equipment Committee and will no longer be subjected to periodic reviews for currency. Users are responsible for verifying references and continued suitability of technical requirements. Newer technology may exist.

SAENORM.COM : Click to view the full PDF of air505a

SAE Technical Standards Board Rules provide that: "This report is published by SAE to advance the state of technical and engineering sciences. The use of this report is entirely voluntary, and its applicability and suitability for any particular use, including any patent infringement arising therefrom, is the sole responsibility of the user."

SAE reviews each technical report at least every five years at which time it may be revised, reaffirmed, stabilized, or cancelled. SAE invites your written comments and suggestions.

Copyright © 2014 SAE International

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without the prior written permission of SAE.

TO PLACE A DOCUMENT ORDER: Tel: 877-606-7323 (inside USA and Canada)
Tel: +1 724-776-4970 (outside USA)
Fax: 724-776-0790
Email: CustomerService@sae.org
http://www.sae.org

SAE WEB ADDRESS:

**SAE values your input. To provide feedback
on this Technical Report, please visit
<http://www.sae.org/technical/standards/AIR505A>**

SAE Committee A-10 Members

who participated in the drafting of these recommendations are as follows:

A. E. Miller, Chairman
Scott Aviation Corporation

W. V. Blockley
North American Aviation, Inc.
Los Angeles Division

T. J. Cook
Lockheed Aircraft Corporation
California Division

D. R. Good
WADD - USAF

F. C. Hale
U. C. L. A.

W. P. Hannan
American Airlines

K. Hobein
Pioneer-Central Division of
Bendix Aviation Corporation

C. W. Jonasson
Boeing Airplane Co., Transport Div.

R. W. Maddock
Douglas Aircraft Company
Santa Monica Division

G. F. Moore
TWA Office
Convair

J. R. Poppen
Office of Naval Research

A. C. Princeau
United Airlines

R. T. Stringer
The Firewel Co., Inc.

A. H. Tidd
Rose Aviation, Inc.

E. Witek
Conair
San Diego Division

SAENORM.COM : Click to view the full PDF of air505a

The assistance and guidance extended to the committee in the revision of this document by Dr. Charles Barron (Lockheed Aircraft Corp.) and Dr. Thrift Hanks (Boeing Airplane Co.) and by other interested individuals and groups, is gratefully acknowledged.

This document antedated the formulation of specific requirements for oxygen equipment and provisioning by the Federal Aviation Agency. The recommendations contained herein were, until the formulation of applicable FAA regulations, the only authoritative guide, and are still useful as reference and background data. Since the issuance of CAR 4b, Amendment -9 and Amendments 12 to CAR 40, 18 to CAR 41, and 15 to CAR 42, the FAA regulations supersede this document.

NOTE: This document was originally drafted during the period December 1952 to December 1956 by a Subcommittee of SAE Committee A-9, Aero-Space Environmental Control Systems (then known as "Aircraft Air Conditioning") and revised August 27, 1957 by a newly formed Committee A-10, Aircraft Oxygen Equipment.

INTRODUCTION

In the preparation of these recommendations, several assumptions were made:

- (a) That until service experience proves otherwise, it must be anticipated that rapid or sudden loss of pressurization, at high altitude, might occur at some time in the operating life of the airplane.
- (b) That in the event of loss of pressurization, the pilot will immediately initiate a maximum rate descent to an altitude of approximately 14,000 ft. (or to the lowest practical altitude), and that the flight will be continued at the lowest altitude compatible with terrain, weather, and fuel supply.
- (c) That the decompression will be recognized and descent will be initiated in less than one minute, possibly in as little as ten seconds. (It is essential, for physiological reasons, that this descent be completely accomplished in less than three minutes after decompression.)
- (d) That an unknown percentage of passengers probably will not don their oxygen masks until after descent.
- (e) That immediate availability of oxygen during descent (for those passengers capable of using their masks) and for a limited period thereafter to all passengers is necessary.
- (f) That oxygen in high concentrations should be available for a limited number of passengers because of physiological conditions.
- (g) That cabin attendants are most likely to be affected by the hypoxic effects of decompression, and that while every effort should be made to provide them with adequate oxygen equipment, it must be assumed that passengers will receive minimal assistance from the cabin attendants in the period immediately following decompression.

- (h) That a continuing program will be established for proper training of crew personnel (including cabin attendants) in the recognition and treatment of hypoxia, and in the use of the oxygen equipment provided.

1. PURPOSE:

The purpose of this Report was to provide guidance to the commercial transport aviation industry in the selection and usage of oxygen equipment for high altitude transport aircraft.

This Report reflects the consensus of views of the various parts of the industry contacted. The document is based on sound engineering and physiological principles and research data.

2. SCOPE:

The recommendations embodied in this document are applicable to commercial transport aircraft for operations between 8,000 and 40,000 ft. altitude.

CREW 25,000 TO 40,000 FT.

(Note: For the purposes of this Report flight crew members not on active flight deck duty are considered as passengers. Cabin attendants are not considered as flight crew members, but are considered separately.)

- A. (1) Until such time as adequate quick-donning masks or other means are proven to be equally effective, the pilot in control of the airplane should wear his oxygen mask, which should be connected to a suitable regulator, with oxygen supplied to the regulator, during entire flight time at flight altitudes greater than 25,000 ft.
- (2) The oxygen regulator should be of the "demand-diluter" type which will deliver to the mask on each inspiration a mixture of air and oxygen containing a total percentage of oxygen not less than that shown in Table I. The regulator should be equipped with a manual control which will enable the user to cause the regulator to deliver 100% oxygen at any altitude.

TABLE I

Oxygen Mixtures Required to Provide a 5,000 Ft. Equivalent Altitude
Between Sea Level & 36,000 Ft.

<u>Cabin Altitude (Ft.)</u>	<u>Percent Total Oxygen</u>	<u>Percent Added Oxygen</u>
5,000	21	0
10,000	26	6
15,000	32	14
20,000	41	25
25,000	52	40
30,000	69	60
35,000	100	100
and above		

- (3) Each crew member on flight deck duty should be provided with an oxygen regulator and an oxygen mask which is connected to the regulator and ready for instant use. The mask should be stowed within arms-reach of each crew member while seated at his duty station.
- (4) The crew on flight deck duty should be provided with sufficient oxygen supply in accordance with paragraph A. (2) and the characteristics of the regulator for the total estimated flight time at cabin altitudes greater than 10,000 ft., in addition to the requirements of paragraph A. (1).

CABIN ATTENDANTS 25,000 TO 40,000 FT.

- B. (1) *Each cabin attendant should carry on her (or his) person an oxygen mask with oxygen delivery tube attached.
- (2) *The oxygen delivery tube should be equipped with a fitting by which it can be connected to and the mask used with either (1) the portable equipment described under paragraph B. (3) below, or (2) fixed-system outlets.
- (3) Portable supplementary oxygen equipment which can be worn on the person should be provided at a sufficient number of stations so as to be readily available to and ready for immediate use by cabin attendants. (See B. (7)).
- (4) Portable equipment should furnish the user with the oxygen mixture required to provide a sea level equivalent altitude oxygen concentration, assuming a ventilation rate of 15 LPM (BTPD).