

CGA G-7—2019
STANDARD FOR
COMPRESSED AIR FOR
HUMAN RESPIRATION
EIGHTH EDITION

CGA
Compressed Gas Association
The Standard For Safety Since 1913

PLEASE NOTE:

The information contained in this document was obtained from sources believed to be reliable and is based on technical information and experience currently available from members of the Compressed Gas Association, Inc. and others. However, the Association or its members, jointly or severally, make no guarantee of the results and assume no liability or responsibility in connection with the information or suggestions herein contained. Moreover, it should not be assumed that every acceptable commodity grade, test or safety procedure or method, precaution, equipment or device is contained within, or that abnormal or unusual circumstances may not warrant or suggest further requirements or additional procedure.

This document is subject to periodic review, and users are cautioned to obtain the latest edition. The Association invites comments and suggestions for consideration. In connection with such review, any such comments or suggestions will be fully reviewed by the Association after giving the party, upon request, a reasonable opportunity to be heard. Proposed changes may be submitted via the Internet at our web site, www.cganet.com.

This document should not be confused with federal, state, provincial, or municipal specifications or regulations; insurance requirements; or national safety codes. While the Association recommends reference to or use of this document by government agencies and others, this document is purely voluntary and not binding unless adopted by reference in regulations.

A listing of all publications, audiovisual programs, safety and technical bulletins, and safety posters is available via the Internet at our website at www.cganet.com. For more information contact CGA. Phone: 703-788-2700, ext. 799. E-mail: customerservice@cganet.com.

Work Item 18-034
Medical Gases Committee

NOTE—Technical changes from the previous edition are underlined

EIGHTH EDITION: 2019
SEVENTH EDITION: 2014
SIXTH EDITION: 2008
FIFTH EDITION: 2003

© 2019 The Compressed Gas Association, Inc. All rights reserved.

All materials contained in this work are protected by United States and international copyright laws. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopying, recording, or any information storage and retrieval system without permission in writing from The Compressed Gas Association, Inc. All requests for permission to reproduce material from this work should be directed to The Compressed Gas Association, Inc., 14501 George Carter Way, Suite 103, Chantilly VA 20151. You may not alter or remove any trademark, copyright or other notice from this work.

Contents	Page
1 Introduction.....	1
2 Scope	1
3 Definitions.....	1
4 What is air?	1
5 Methods of producing compressed air for human respiration	3
5.1 Compressors	3
5.2 Synthetic air.....	5
6 Containers.....	5
6.1 Air containers.....	5
6.2 Container preparation.....	5
6.3 Valves on air containers	5
7 Pressure and temperature relationships	5
8 Use of compressed air	6
9 Precautions	6
10 References	6
Tables	
Table 1—Composition of air (dry)	2
Table 2—Physical characteristics of air	2

1 Introduction

This publication is intended to present general information regarding the characteristics and use of compressed air. To accomplish its purpose of supplying the answers to as broad a cross-section of inquiries as possible, it covers material of a general nature only. CGA has additional publications on compressed air, which can be found at www.cganet.com. In Canada, CSA Z180.1, *Compressed Breathing Air and Systems* and CSA Z7396.1, *Medical Gas Pipeline Systems - Part 1: Pipelines for Medical Gases, Medical Vacuum, Medical Support Gases, and Anaesthetic Gas Scavenging Systems*, should be consulted [1, 2].¹

2 Scope

This publication provides information relative to the preparation, transportation, handling, storage, and use of compressed air. While it deals with compressed air used for human respiration, much of the information is equally applicable to compressed air for other purposes. It should be used in conjunction with CGA G-7.1 *Commodity Specification for Air*, which describes the specification requirements and lists the grades for air, and prescribes methods of sampling and analysis [3].

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Publication terminology

3.1.1 Shall

Indicates that the procedure is mandatory. It is used wherever the criterion for conformance to specific recommendations allows no deviation.

3.1.2 Should

Indicates that a procedure is recommended.

3.1.3 May

Indicates that the procedure is optional.

3.1.4 Will

Is used only to indicate the future, not a degree of requirement.

3.1.5 Can

Indicates a possibility or ability.

4 What is air?

Air is not an element; it is a mixture of elements and compounds. At atmospheric temperature and pressure, air exists as a colorless, odorless, and tasteless gas.

The composition of dry air under normal conditions at sea level is shown in Table 1. Trace impurity levels can vary with geographic locations or with proximity to industrial areas or highways carrying dense traffic. This composition remains relatively constant at altitudes up to approximately 70 000 ft (21 300 m). Accurate data on the change in composition, if any, at higher altitudes is not available.

Synthetic air, which is also produced by the compressed gas industry, contains not less than 19.5% and not greater than 23.5% oxygen with nitrogen as the balance gas. In Canada, CSA Z180.1 requires that compressed air contains not less than 20% and not greater than 22% oxygen [1]. A major portion of the trace impurities normally contained in air is thereby eliminated.

¹ References are shown by bracketed numbers and are listed in order of appearance in the reference section.