CGA

Compressed Gas Association

The Standard For Safety Since 1913

CGA P-76–2018

HAZARDS OF OXYGEN-DEFICIENT ATMOSPHERES

FIRST EDITION

PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA P-76, *Hazards of Oxygen-Deficient Atmospheres*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 44, *Hazards of Oxygen-Deficient Atmospheres*.

This publication is intended as an international harmonized standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association (EIGA), and Japan Industrial and Medical Gases Association (JIMGA). Each association's technical content is identical, except for regional regulatory requirements and minor changes in formatting and spelling.

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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.

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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 at Phone: 703-788-2700, ext. 799. E-mail: customerservice@cganet.com.

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1 Introduction

The industrial gas industry is very concerned about the incidents that industrial gas companies and users of inert gases continue to report each year, where the direct cause has been lack of oxygen resulting in asphyxiation.

There are two essential points to remember related to oxygen-deficiency incidents involving inert gases:

- Incidents resulting from oxygen deficiency due to inert gases happen unexpectedly and the reactions of personnel can be incorrect; and
- Incidents involving asphyxiating atmospheres are always serious, if not fatal.

2 Scope and purpose

This publication sets out the essential information necessary to prevent asphyxiation incidents involving inert gases.

It is not a detailed procedure for confined space entry, but focuses on the considerations that are important when there is an actual or potential hazard from inert gases or oxygen deficiency.

The minimum safe oxygen concentration for entry into a space is 19.5% oxygen. There are applications with oxygen concentrations less than 19.5% where entry is permitted provided that further precautions are taken in accordance with proper risk assessment and national regulations.

This publication is intended for supervisors, line managers, direct workers and users wherever inert gases are produced, stored, used, or where oxygen depletion could otherwise occur.

Appendix A is a simplified summary of the main publication.

Appendix B lists some actual incidents that have taken place in recent years and may be used as examples to underline the potentially fatal hazards of inert gases.

Other hazards exist with oxygen-enriched atmospheres greater than 23.5% oxygen. When presented with an oxygen-enriched atmosphere, see CGA P-5, *Fire Hazards of Oxygen and Oxygen-Enriched Atmospheres*, for more information [1].[1]

Although carbon dioxide is not an inert gas, most of the information in this publication is applicable as it too will cause oxygen depletion. This publication does not cover the specific hazards and physiological effects of carbon dioxide, see EIGA Safety Information 24, *Carbon Dioxide Physiological Hazards – "Not just an Asphyxiant!*," or CGA G-6, *Carbon Dioxide*, for more details about the additional hazards of carbon dioxide [2, 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.

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