CGA G-8.3—2016

SAFE PRACTICES FOR STORAGE AND HANDLING OF NITROUS OXIDE

SECOND EDITION

CGA
Compressed Gas Association
The Standard For Safety Since 1913

PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA G-8.3—2016, *Safe Practices for Storage and Handling of Nitrous Oxide*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 176, *Safe Practices for Storage and Handling of Nitrous Oxide*.

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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NOTE—Technical changes from the previous edition are underlined.

SECOND EDITION: 2016
FIRST EDITION: 2013

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1 Introduction

Nitrous oxide (N_2O) has been produced and distributed by the industrial gases industry for many years. It is mainly used for medical purposes (anesthesia). It is also used in the food and electronic industries.

Accidents, such as violent decomposition of nitrous oxide and the rupture of nitrous oxide tanks, have occurred at production, storage, and distribution facilities. In addition, nitrous oxide gas, in elevated concentrations, can cause health effects in operators that shall be prevented.

This publication describes the properties and hazards of nitrous oxide. On this basis, the principles and relevant details of safe storage and distribution of nitrous oxide are considered. Most severe accidents have been caused by insufficient understanding of the properties of nitrous oxide.

Regulatory requirements for medical applications shall also be followed. For example, the European Guide Good Manufacturing Practice in Europe, U.S. Food and Drug Administration (FDA) and Health Canada good manufacturing practices in North America, as well as NFPA 99, *Health Care Facilities Code* in the United States and CSA Z305.1, *Nonflammable Medical Gas Piping Systems* in Canada, for medical gas piping systems [1, 2, 3, 4, 5] [1].

2 Scope

This publication is intended for the safe use in the industrial and medical gases industry for the design, engineering, construction, and operation of nitrous oxide, storage, and supply installations. This publication does not cover the manufacturing of nitrous oxide or quality control and analysis procedures. See CGA G-8.4, *Safe Practices for the Production of Nitrous Oxide Using Ammonium Nitrate* [6].

3 Definitions

For purposes 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
Used only to indicate the future, not a degree of requirement.

3.1.5 Can
Indicates a possibility or ability.

3.2 Technical definitions

3.2.1 Authorized person
Trained and qualified person approved or assigned to perform specific types of duties or to be at a specific location.

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