CGA

Compressed Gas Association

The Standard For Safety Since 1913

CGA P-46–2015

SAFE HANDLING OF ELECTRONIC SPECIALTY GASES

FIRST EDITION

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PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA P-46, *Safe Handling of Electronic Specialty Gases*, jointly produced by members of the International Harmonization Council and originally published by the Asia Industrial Gases Association (AIGA) as AIGA 018, *Safe Handling of Electronic Specialty Gases*.

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.

PLEASE NOTE:

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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.

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

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1 Introduction

With the worldwide proliferation of electronic gases and recognizing that these gases present certain inherent dangers and risks with their use, this safety publication has been written to assist both the packager and user of these gases.

This publication is intended to recommend best practices, which will enhance safety in the workplace where these gases and mixtures are prepared and during transport from the production site to the ultimate user, where they are stored and used. Since these gases are usually packaged at high pressure and can be reactive, flammable, toxic, or corrosive, great care should be exercised in their use even if mixtures containing these gases are classified as inert.

While the information contained in this publication is applicable, in principle, to all compressed gas packages, this publication is primarily focused on electronic specialty gases.

Electronic specialty gases encompass gases and mixtures that are primarily used in the semiconductor and photovoltaic industry (hereafter called the electronics industry). Because of the inherent need for very high purity, extraordinary precautions are taken in this publication to ensure that the gases are packaged in cylinders with valves that have extremely low leak rates, and that the stability of the contained gas or mixture is maintained for the entire specified shelf life of the package.

In addition, some electronic specialty gases can also be considered as potential chemical weapons. The guidelines in this publication will assist in raising the level of safety and security on sites that process and handle these materials.

2 Scope and purpose

These recommendations form the basis for the safe storage, handling, and use of electronic specialty gases that are packaged in containers. Information on potential hazards of these gases, containers, and gas supply systems also includes direction for handling problem containers.

The information contained in this publication is designed to provide awareness and guidance for personnel working in facilities that package, distribute, and use gases primarily in the electronic industry such as the manufacture of semiconductors, thin film transistor liquid crystal display (TFT-LCD), fiber optics, opto-electronic devices, and solar cells. It is not meant to take the place of work instructions or standard operating procedures (SOPs), but rather to assist personnel to identify generic steps that need to be taken in their routine operations as well as to recognize issues that could result in injury to personnel or damage to equipment.

Where practical, the theory pertaining to these principles being discussed is presented. However, this coverage is meant to provide a very minimal overview of pertinent technical facts that would explain the reasons for taking or avoiding certain practices.

Each section will provide guidance and direction as to where additional information can be found in the literature of AIGA, CGA, EIGA, IGC, IMGA, International Organization for Standardization (ISO), U.S. Department of Transportation (DOT), Transport Canada (TC), European Agreements Concerning the International Carriage of Dangerous Goods by Road (ADR) and by Rail (RID) as well as the regulations promulgated by the United Nations (UN), *Recommendations on the Transport of Dangerous Goods* (Orange book) [1, 2, 3, 4, 5].[1]

The term "gas", when used in this publication, can encompass both a pure material and a mixture of several individual pure gases. If there is a specific distinction between a compressed gas, a liquefied gas, or nonliquefied gas, this will be highlighted. The information contained in this document was collected from sources that are believed to be accurate. However, it should be understood that every potential aspect of the safe handling of electronic gases has not been considered and the reader is encouraged to take steps to ensure that such a comprehensive review is undertaken.

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

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