CGA

Compressed Gas Association

The Standard For Safety Since 1913

CGA G-18—2016

HYDROGEN SELENIDE

FIRST EDITION

PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA G-18, *Hydrogen Selenide*, jointly produced by members of the International Harmonization Council and originally published by the Japan Industrial and Medical Gases Association (JIMGA) as JIMGA-T-S/85/12 *Hydrogen Selenide*.

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:

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 website, 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.

Work Item 14-061
Specialty Gases Committee

FIRST EDITION: 2016

Contents **Page**

Tables

Figures

1 Introduction

Hydrogen selenide is a highly toxic, flammable, colorless gas with a disagreeable penetrating odor at room temperature and atmospheric pressure [1]. It is shipped as a liquefied compressed gas under its own vapor pressure of 138 psia at 70 °F (0.950 MPa, abs at 21.1 °C) [2]. It is also supplied in a gaseous state, diluted with other gases under pressure.

The use of hydrogen selenide has constantly been growing and this usage is expected to continue throughout the world. The issue of the safe handling of hydrogen selenide is a very important and relevant topic to the compressed gas industry as well as the user community of this electronic specialty gas.

Hydrogen selenide is used to prepare metallic selenides and organoselenium compounds. It is used in doping gas mixtures for the preparation of semiconductor materials containing a controlled amount of a significant impurity [3]. It is also used to manufacture photovoltaic cells such as copper-indium selenide/sulfide (CIS) or copper-indium-gallium-selenide (CIGS) as in thin-film deposition of multiple junction photovoltaic cells.

Hydrogen selenide can be safely handled if equipment is properly designed, maintained, and employees are trained. As a minimum, all personnel should have access to a hydrogen selenide safety data sheet (SDS) and training in the use of the SDS and other reference material.

NOTE—In this publication, hydrogen selenide is understood to be in the gaseous phase unless otherwise stated.

2 Scope and purpose

2.1 Scope

This publication is intended for the suppliers, distributors, and users of hydrogen selenide and its handling equipment. The publication includes guidance for design of equipment, cylinders and valve usage, handling controls, and safety. Guidelines on the operational steps associated with the use of hydrogen selenide and hydrogen selenide mixtures as well as fire protection, gas detection, ventilation, and related safeguards are also included. The manufacture, purification, and analysis of hydrogen selenide are beyond the scope of this publication, although the general guidance given is also relevant to these processes.

2.2 Purpose

This publication was written to address the high toxicity and flammability of hydrogen selenide where the consequences of improper handling of hydrogen selenide could cause injury, death, and/or facility damage. This publication will provide a description of the potential hazards involved in handling hydrogen selenide and the guidelines to be taken to minimize risk potential.

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.