CGA

Compressed Gas Association

The Standard For Safety Since 1913

CGA P-8.8—2017

SAFE DESIGN AND OPERATION OF CRYOGENIC ENCLOSURES

SECOND EDITION

PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA P-8.8, *Safe Design and Operation of Cryogenic Enclosures*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 170, *Safe Design and Operation of Cryogenic Enclosures*.

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.

Work Item 17-043
Atmospheric Gases and Equipment Committee

NOTE—Technical changes from the previous edition are underlined.

SECOND EDITION: 2017
FIRST EDITION: 2012

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1 Introduction

Cryogenic processes often operate inside enclosures that insulate the process equipment and interconnecting piping from ambient air and temperature. This prevents many problems, including excessive heat leak into the process and water freezing around the equipment. In many cases, the enclosure is purged with a dry gas to prevent ambient air from entering the enclosure and creating hazardous mixtures.

2 Scope and purpose

Cryogenic enclosures can create potential process safety hazards. This publication identifies general hazards and provides guidance to reduce their frequency and consequences. It provides safety guidance and addresses design and operating practices only as they affect safety.

This publication addresses both cryogenic air separation unit (ASU) and hydrogen/carbon monoxide (HYCO) processes. A number of existing publications cover special requirements of these processes and their equipment [1, 2, 3, 4, 5].

This publication is primarily to document current practices and is intended to apply to new facilities. It is recognized that some existing plants may not meet all recommendations or requirements from this publication. This publication need not be applied retroactively, including where this publication uses the word “shall”.

This publication does not cover the following:

- Generally accepted engineering practices for structures and process equipment; only those issues that are specific to cryogenic enclosures are included;
- Enclosures for processes producing liquid hydrogen or helium. The extreme cold temperatures of these processes require specialized knowledge and practices that are beyond the scope of this publication; and
- External structures on/attached to the cryogenic enclosure, for example, platforms, ladders, vents, lightning arrestors, etc. For more information on the safe location of oxygen and nitrogen vents relative to the location of platforms and ladders, see CGA P-8.7, *Safe Location of Oxygen and Inert Gas Vents* [6].

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.

3.2 Technical definitions

3.2.1 Air separation unit
Separates air into its components. In this publication, an ASU is assumed to operate at cryogenic temperatures.