



**ANSI/CGA P-18—2020
STANDARD FOR BULK INERT
GAS SYSTEMS**

FIFTH EDITION



Currently in preview, click to buy full version

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

Work Item 18-009
Bulk Distribution Equipment and Standards

NOTE—Due to the extensive changes in this document, technical changes from the previous edition are not identified.

FIFTH EDITION: 2020
FOURTH EDITION: 2013
THIRD EDITION: 2006
SECOND EDITION: 2005

© 2020 The Compressed Gas Association, Inc. All rights reserved.

All materials contained in this work are protected by United States and international copyright laws. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopying, recording, or any information storage and retrieval system without permission in writing from The Compressed Gas Association, Inc. All requests for permission to reproduce material from this work should be directed to The Compressed Gas Association, Inc., 8484 Westpark Drive, Suite 220, McLean, VA 22102. You may not alter or remove any trademark, copyright or other notice from this work.

AMERICAN NATIONAL STANDARD

Approval of an American National Standard requires verification by ANSI that the requirements for due process, consensus, and other criteria for approval have been met by the standards developer.

Consensus is established when, in the judgment of the ANSI Board of Standards Review, substantial agreement has been reached by directly and materially affected interests. Substantial agreement means much more than a simple majority, but not necessarily unanimity. Consensus requires that all views and objections be considered, and that a concerted effort be made toward their resolution.

The use of American National Standards is completely voluntary; their existence does not in any respect preclude anyone, whether he has approved the standards or not, from manufacturing, marketing, purchasing, or using products, processes, or procedures not conforming to the standards.

The American National Standards Institute does not develop standards and will in no circumstances give an interpretation of any American National Standard. Moreover, no person shall have the right or authority to issue an interpretation of an American National Standard in the name of the American National Standards Institute. Requests for interpretations should be addressed to the secretariat or sponsor whose name appears on the title page of this standard.

CAUTION NOTICE: The American National Standard may be revised or withdrawn at any time. The procedures of the American National Standards Institute require that action be taken to periodically reaffirm, revise, or withdraw this standard. Purchasers of American National Standards may receive current information on all standards by calling or writing the American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

Approved as an American National Standard on October 28, 2020.

Contents	Page
1 Introduction.....	1
2 Scope	1
3 Definitions.....	2
4 Health hazards and safety considerations	4
4.1 General safety considerations	4
4.2 Properties of gases.....	4
4.3 Storage, handling, and uses of cryogenic inert gases.....	5
4.4 Health hazards	6
5 Site selection	8
5.1 Meeting code setback distances	8
5.2 Supplier and customer responsibilities	10
5.3 Electrical considerations.....	11
6 Developing a suitable site	11
6.1 Equipment layout.....	11
6.2 Foundations and supports	11
6.3 Security of areas.....	12
6.4 Grounding.....	12
6.5 Site access	12
6.6 Utilities.....	12
7 Equipment selection	13
7.1 Cryogenic fluid storage tanks	13
7.2 Vaporizers	13
7.3 Gas receivers	14
7.4 Reciprocating pumps.....	14
7.5 Pressure regulation devices	15
7.6 Pressure relief devices	15
7.7 Low temperature protection.....	16
7.8 Valves.....	16
7.9 Piping and tubing.....	17
7.10 Vent devices.....	17
8 Equipment transportation	17
9 Equipment installation	17
9.1 Indoor system	17
9.2 Outdoor systems	18
9.3 Courtyard locations.....	19
9.4 Temporary systems	19
9.5 Identification	20
9.6 Cryogenic fluid storage tanks	20
9.7 Vaporizers	20
9.8 Gas receivers	20
9.9 Reciprocating pumps.....	21
9.10 Pressure regulation devices	21
9.11 Low temperature protection.....	21
9.12 Valves.....	21
9.13 Piping and tubing.....	21
9.14 Vent devices.....	22

10	Startup.....	22
10.1	Initial fill.....	22
10.2	Product testing.....	22
10.3	Installation checklist.....	22
10.4	Startup testing.....	23
10.5	Introduction of product to a customer system.....	23
11	Operation.....	23
11.1	Maintenance.....	23
11.2	Management system.....	24
11.3	General safety.....	24
11.4	Personnel.....	24
11.5	Shutdown, repair, and startup.....	24
12	System removal.....	25
12.1	General.....	25
12.2	Receiver removals.....	25
12.3	Tank removals.....	25
13	References.....	25

Tables

Table 1—Physical constants of inert gases [13].....	5
Table 2—Effect of oxygen concentration on humans [11].....	7
Table 3—Minimum separation distance between containers (stationary) use points and exposures [2].....	9
Table 4—Minimum separation distance between containers (portable) use points and exposures [2].....	10

This page is intentionally blank.

Currently in preview, click buy full version

1 Introduction

This standard contains minimum requirements for locating/siting, selecting equipment, installing, starting up, maintaining, and removing bulk inert gas supply systems.

2 Scope

A bulk inert gas supply system is one that contains greater than 20 000 scf (566 m³) of inert gas. Requirements of this standard are limited to systems operating up to 15 000 psi (103.4 MPa).

Two types of bulk inert gas supply systems are covered in this standard: liquid and gaseous.

A liquid system is one where the inert gas is delivered to the supply system and stored on-site in liquid form. The inert gas is supplied in either liquid or gaseous form to the customer's requirement. When required, pumps are used to increase the gas pressure before it is supplied to the customer. When required, coded vessels are used to store the gas before it is supplied to the customer. The system is a bulk liquid system instead of a bulk gaseous system because the gas is delivered from the supplier to the storage of the system in liquid form.

A gaseous system is one where an inert gas is delivered to the supply system, stored, and is supplied to the customer's requirement in gaseous form.

This standard applies to inert gas supply systems containing any of the following equipment. Not all inert gas systems include all the equipment listed.

Inert gas supply systems include:

- cryogenic storage tank;
- gas storage vessels (receivers);
- vaporizers;
- valves including manual and automatic shutoff valves and check valves;
- pressure control equipment including regulators and control valves;
- piping (pipe and tubing);
- cryogenic pumps;
- snubbers and pulsation dampeners, and
- monitoring and control systems including electrical and instrumentation.

The bulk inert supply system terminates at the source valve where the gas or liquid supply first enters the supply line.

This standard does not apply to carbon dioxide systems. For additional requirements on bulk inert gas systems at health care facilities, see CGA M-1, *Standard for Medical Gas Supply Systems at Health Care Facilities (an American National Standard)*, NFPA 55, *Compressed Gases and Cryogenic Fluids Code*, and NFPA 99, *Health Care Facilities Code* [1, 2, 3].¹ Bulk carbon dioxide system requirements are found in NFPA 55 and CGA G-6.1, *Standard for Insulated Liquid Carbon Dioxide Systems at Consumer Sites* [2, 4].

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