



**CGA P-8.9—2023  
BULK LIQUID OXYGEN,  
NITROGEN, AND ARGON  
STORAGE SYSTEMS AT  
PRODUCTION SITES**

**THIRD EDITION**

**PREFACE:**

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA P-8.9, *Bulk Liquid Oxygen, Nitrogen, and Argon Storage Systems at Production Sites*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 127, *Bulk Liquid Oxygen, Nitrogen, and Argon Storage Systems at Production Sites*.

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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NOTE—Technical changes from the previous edition are underlined.

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## 1 Introduction

The increase in recent years in the size and production capacity of air separation plants has led to a corresponding increase in the capacity of cryogenic liquid storage installations at production sites. Therefore, it has become more important to consider the potential hazards associated with cryogenic liquid, the consequences and effects on the local environment of a major release of liquid, and the preventive measures required.

## 2 Scope and purpose

### 2.1 Scope

This publication specifically covers storage installations on production sites where the storage tank is flat-bottom constructed, is connected to the production process plant, and the individual tank capacity is greater than 125 000 liters.

See Appendices A and B, for bulk liquid storage installations on production sites where the storage tank(s):

- is vacuum-insulated constructed with an individual capacity greater than 125 000 liters;
- are manifolded vacuum-insulated tanks with a combined capacity greater than 125 000 liters;
- are cluster tanks where the tanks have a combined capacity greater than 125 000 liters; or
- are combinations of vacuum-insulated tanks and cluster tanks that are manifolded together and have a combined capacity greater than 125 000 liters.

The information contained in this publication applies only to new installations designed after the publication of this document and not to existing installations. However, the information contained in this publication may benefit existing installations or those in the project phase.

Specific requirements for loading systems can be found in CGA P-31, *Liquid Oxygen, Nitrogen, and Argon Cryogenic Tanker Loading Systems* [1].<sup>1</sup>

For flat-bottom storage tanks not connected to a production process plant, the requirements of this publication shall be met. For vacuum-insulated tanks or other storage configurations, see Appendices A and B.

### 2.2 Purpose

This publication provides guidance for those persons directly associated with the design, installation, operation, and maintenance of bulk cryogenic liquid storage systems. The intent of this publication is to ensure that a minimum, uniform level of safety is provided throughout the industrial gas industry for the protection of the public and industry employees. Users of this publication should recognize that it is presented with the understanding that it cannot take the place of sound engineering judgment, training, and experience.

The information presented does not supplant, but is intended to complement, national and local regulations and codes of practice such as the British Compressed Gases Association publications, (BCGA) CP20, *Bulk liquid oxygen storage at production sites* and BCGA CP22, *Bulk liquid argon or nitrogen storage at production sites* [2, 3].

This publication presents recommendations to reduce the possibility of large releases of stored cryogenic fluids from a storage system through installation of protective equipment and instrumentation, equipment inspection and testing, and storage system design criteria.

It is the intent of this publication to emphasize prevention of releases. However, this publication provides basic information about mitigation of releases even if they are unlikely.

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