

CGA P-8.9—2013

**BULK LIQUID OXYGEN, NITROGEN,
AND ARGON STORAGE SYSTEMS AT
PRODUCTION SITES**

FIRST EDITION



PREFACE

As part of a program of harmonization of industry standards, the European Industrial Gases Association (EIGA) and the Compressed Gas Association (CGA) formed a Joint Working Group (JWG) to produce P-8.9—2013, *Bulk Liquid Oxygen, Nitrogen, and Argon Storage Systems at Production Plants*. This standard is intended as an international harmonized standard for the worldwide use and application of all members of the Asia Industrial Gases Association (AIGA), EIGA, Japan Industrial and Medical Gases Association (JIMGA) and CGA worldwide. The CGA edition is identical in technical content to the EIGA edition except for regional regulatory requirements and it has minor changes in formatting and spelling.

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Work Item 07-169
Atmospheric Gases and Equipment Committee

FIRST EDITION: 2013

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1 Introduction

As a part of a program of harmonization of industry standards, this publication has been prepared by a group of industry experts representing major industrial gas companies and is based on the technical information and experience currently available to the authors. This publication is intended as an international harmonized standard for the worldwide use and application by all members of the Asia Industrial Gases Association (AIGA), the Compressed Gas Association (CGA), the European Industrial Gases Association (EIGA), and the Japanese Industrial and Medical Gases Association (JIMGA). The regional editions published by each organization have the same technical content however there can exist editorial changes primarily in formatting, units used and spelling. Also references to local regulatory requirements can be different.

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. It has therefore become more important to consider at the design stage the potential hazards associated with liquid products, the consequences and effects on the local environment of a major release of liquid and the preventive measures required.

This publication is intended for the guidance of those persons directly associated with the design, installation, operation, and maintenance of bulk cryogenic liquid storage systems. It does not claim to cover the subject completely but gives advice and should be used with sound engineering judgement. The intent of this guide 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.

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 documents, (BCGA) CP 20 *Bulk Liquid Oxygen Storage at Production Sites* and CP 22, *Bulk Liquid Argon or Nitrogen Storage at Production Sites* [1, 2].

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 remote.

All new storage installations shall comply with this publication. Application of this guide to existing installations is an individual company or storage system owner's decision.

2 Scope

A bulk liquid storage installation is defined, for the purpose of this publication, as the total fixed assembly of liquid storage tank(s) integrated with other equipment, such as pumps, filling equipment, pressure buildup vaporizers, controls and other related ancillary equipment that are connected to it.

This publication specifically covers storage installations on production sites where the storage tank is flat bottomed constructed and is connected to the production process plant and the individual tank capacity exceeds 125 000 L. For storage installations made with vacuum-insulated tanks or cluster tanks or where the tanks have an individual capacity less than 125 000 L it is an individual company or storage system owner's decision to use the present publication as a guide for the general requirements of the installation.

The facilities for filling road tankers or rail vehicles are not specifically covered in this publication, although its provisions can generally be applied to the liquid storage part of the fill installation. Specific requirements for loading systems can be found in the publication CGA P-31, *Liquid Oxygen, Nitrogen, and Argon Cryogenic Tanker Loading Systems* [3].

Other storage installations usually found in production plants (for example a nitrogen tank for instrument air and seal gas back-up system) as well as the process systems of the production plant (such as compressors, heat exchangers, distillation columns, etc.) are specifically excluded from the scope of this publication.