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CGA P-48—2021

RECIPROCATING CRYOGENIC PUMPS AND PUMP INSTALLATIONS FOR OXYGEN, ARGON, AND NITROGEN

SECOND EDITION

PREFACE:

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA P-48, *Reciprocating Cryogenic Pumps and Pump Installations for Oxygen, Argon, and Nitrogen*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 159, *Reciprocating Cryogenic Pumps and Pump Installations Oxygen, Argon, and Nitrogen*.

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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Atmospheric Gases & Equipment Committee

NOTE—Technical changes from the previous edition are underlined.

SECOND EDITION: 2021
FIRST EDITION: 2014

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1 Introduction

Reciprocating cryogenic pumps have become key components within the industrial gas industry handling primarily, liquid oxygen, argon, and nitrogen. To ensure that pumps operate both safely and reliably, it is important that pumps are correctly designed, installed, operated, and maintained for the required duty.

Pumping cryogenic fluids is accompanied by some degree of hazard. The hazards include liquid under pressure, cryogenic temperatures, volume and pressure increases due to vaporization, and the ability of oxygen to accelerate combustion.

This publication gives guidance to manage these hazards.

2 Scope

This publication is intended to cover cryogenic reciprocating pumps and installations for liquid oxygen, argon, and nitrogen.

The publication contains a summary of industrial practices and is based on the combined knowledge, experience, and practices of industrial gas and equipment suppliers.

Carbon dioxide pumps are not covered in this publication. For information regarding carbon dioxide pumps, see CGA G-6.3, *Carbon Dioxide Cylinder Filling and Handling Procedures* or EIGA Doc 83, *Recommendations for Safe Filling of CO_2 Cylinders and Bundles* [1, 2].[1]

Centrifugal liquid oxygen pumps are not covered in this publication. See CGA G-4.7, *Stationary Electric-Motor-Driven Centrifugal Liquid Oxygen Pumps* [3].

The design and installation requirements and recommendations included in this publication apply only to installations begun after the publication date and not to existing installations. However, the information contained in this publication may benefit existing installations or those in the project phase. Furthermore, to the extent that they exist, national laws supersede the suggested practices listed in this publication. It should not be assumed that every local standard, test, safety procedure, or method is contained in these recommendations or that abnormal or unusual circumstances may not warrant additional requirements or procedures.

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.

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