



CGA P-48—2014
RECIPROCATING
CRYOGENIC PUMPS AND
PUMP INSTALLATIONS

FIRST EDITION

PREFACE

As a part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has adopted the original European Industrial Gases Association (EIGA) Document 159/14 *Reciprocating Cryogenic Pumps and Pump Installations*. This document is an internationally harmonized standard for the worldwide use and application by all members of the Asia Industrial Gases Association (AIGA), CGA, EIGA, and the Japan Industrial and Medical Gases Association (JIMGA). The CGA edition, P-48, *Reciprocating Cryogenic Pumps and Pump Installations, First Edition* has the same technical content as the EIGA edition. However, there are editorial changes primarily in formatting and spelling and references to regional regulatory requirements.

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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 will operate both safely and reliably it is important that pumps are correctly designed, installed, operated, and maintained as required for the 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.

This publication has been prepared by member associations of the International Harmonization Council, under the lead of EIGA and is intended for the worldwide use and application by all members of the International Harmonization Council. The International Harmonisation Council is composed of members from the Asia Industrial Gases Association (AIGA), Compressed Gas Association (CGA), European Industrial Gases Association (EIGA), and the Japanese Industrial and Medical Gases Association (JIMGA). Regional editions may use non SI units and refer to national, and/or regional legislation.

2 Scope

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

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

NOTE—Information regarding carbon dioxide pumps is in CGA G-6.3, *Carbon Dioxide Cylinder Filling and Handling Procedures* [1].

NOTE—Centrifugal liquid oxygen pumps are covered by CGA G-4.7, *Installation Guide for Stationary, Electric-Motor-Driven, Centrifugal Liquid Oxygen Pumps* [2].

3 Definitions

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 Cavitation

This phenomenon occurs when the pressure in a liquid drops below the vapor pressure of the liquid at a certain temperature. At this point, liquid vaporizes, thereby creating vapor bubbles. These bubbles can cause a pump to lose prime or suffer heavy vibration and damage.