CGA®

Compressed Gas Association

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# CGA C-17—2022

## METHODS TO AVOID AND DETECT INTERNAL CORROSION OF GAS CYLINDERS AND TUBES

THIRD EDITION

## PREFACE

As part of a program of harmonization of industry standards, the Compressed Gas Association (CGA) has issued CGA C-17, *Methods to Avoid and Detect Internal Corrosion of Gas Cylinders and Tubes*, jointly produced by members of the International Harmonization Council and originally published by the European Industrial Gases Association (EIGA) as EIGA Doc 62, *Methods to avoid and detect internal corrosion of gas cylinders and tubes*.

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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Cylinder Specifications Committee

NOTE—Technical changes from the previous edition are underlined.

THIRD EDITION: 2022
SECOND EDITION: 2014
FIRST EDITION: 2008

**Contents** **Page**

# 1 Introduction

There are a number of reasons for a cylinder or a tube to fail. These reasons can include but are not limited to, abuse, misuse, manufacturing flaws, and internal corrosion. A number of gases can react with moisture to produce corrosive media that could react with the cylinder or tube material and lead to a cylinder or tube failure. The number of incidents resulting from internal corrosion is relatively small compared to the number of cylinders and tubes in service because the industry follows procedures to reduce moisture in cylinders and tubes.

# 2 Scope and purpose

This publication provides guidance to help prevent and detect internal corrosion of compressed gas cylinders and tubes. It applies to gas cylinders, bundles of cylinders, and tubes including installations at customer sites.

NOTE—Unless noted by exception, the use of the word "cylinder" in this publication refers to both cylinders and tubes.

The main emphasis of this publication focuses on steel cylinders containing oxygen/oxygen mixtures including compressed air and carbon dioxide/carbon dioxide mixtures in the presence of moisture. Certain aspects of this publication can also apply to other gases that can react in the presence of moisture such as hydrogen chloride.

# 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.

## 3.2 Technical definitions

### 3.2.1 Bundle of cylinders
Portable assembly that consists of a frame and two or more cylinders, each of a capacity up to 150 L and with a combined capacity of not more than 3000 L, or 1000 L in the case of toxic gases, connected to a manifold by cylinder valves or fittings such that the cylinders are filled, transported, and emptied without disassembly.

### 3.2.2 Corrosion
Reaction of the cylinder material with certain aqueous media (for example, carbonic acid formed from carbon dioxide and water).

### 3.2.3 Corrosive gas
Gas in a cylinder that will interact with the cylinder material in an oxidizing manner in the presence of moisture.