CGA G-6.7—2009

SAFE HANDLING OF LIQUID CARBON DIOXIDE CONTAINERS THAT HAVE LOST PRESSURE

FOURTH EDITION

PLEASE NOTE:

The information contained in this document was obtained from sources believed to be reliable and is based on technical information and experience currently available from members of the Compressed Gas Association, Inc. and others. However, the Association or its members, jointly or severally, make no guarantee of the results and assume no liability or responsibility in connection with the information or suggestions herein contained. Moreover, it should not be assumed that every acceptable commodity grade, test or safety procedure or method, precaution, equipment or device is contained within, or that abnormal or unusual circumstances may not warrant or suggest further requirements or additional procedure.

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.

This document should not be confused with federal, state, provincial, or municipal specifications or regulations; insurance requirements; or national safety codes. While the Association recommends reference to or use of this document by government agencies and others, this document is purely voluntary and not binding unless adopted by reference in regulations.

A listing of all publications, audiovisual programs, safety and technical bulletins, and safety posters is available via the Internet at our website at www.cganet.com. For more information contact CGA at Phone: 703-788-2700, ext. 799. E-mail: customerservice@cganet.com.

Work Item 12-007
Carbon Dioxide Committee

NOTE—Technical changes from the previous edition are underlined.

NOTE—Appendix A (Informative) is for information only.

FOURTH EDITION: 2009
THIRD EDITION: 2007
SECOND EDITION: 2003
FIRST EDITION: 1996

Contents **Page**

Tables

Figures

Appendix

Appendix Figures

1 Introduction

This publication is one of a series compiled by the Compressed Gas Association, Inc. (CGA) to satisfy the demand for information on the production, handling, storage, transportation, and use of compressed and liquefied gases, cryogenic liquids, and related products.

2 Scope and purpose

2.1 Scope

The scope of this publication is concerned primarily with the safe repressurization of stationary or transportable liquid carbon dioxide containers made of low alloy carbon steels and having a minimum design metal temperature above –110 °F (–78.9 °C).

2.2 Purpose

The purpose of this publication is to provide information to personnel to ensure that carbon dioxide containers that have lost pressure and may contain dry ice are safely repressurized before being returned to service.

Examples are given of repressurization procedures for containers manufactured under the American Society of Mechanical Engineers *ASME Boiler & Pressure Vessel Code*, Section VIII, Division 1, Pressure Vessels (ASME Code) [1].[1]

3 Definitions

For the purpose of this publication, the following definitions apply.

3.1 Autorefrigeration
The lowering of the temperature of carbon dioxide as the pressure reduces to maintain temperature and pressure equilibrium.

3.2 Brittle
The property of a material that causes it to break under load with little or no deformation.

3.3 Coincident temperature
The corresponding temperature for a substance at a given pressure at equilibrium.

3.4 Compressed gas
A substance existing only as a gas at a given temperature and pressure.

3.5 Condensation
The process by which a gas converts to a liquid.

3.6 Container
An insulated pressure vessel manufactured in accordance with the ASME Code for the storage of liquid carbon dioxide [1]. Container is interchangeable with vessel or tank.

3.7 Critical size
The size of a flaw in the container material that causes an uncontrolled increase of the length of a crack while under constant stress.

3.8 Depressurization
A reduction of pressure in a container resulting in a container temperature below the minimum design metal temperature (MDMT) or the solidification of the carbon dioxide.

NOTE—Typical causes are the overdrawing of a pressure-building vaporizer, leaks, or a pressure relief device that did not reseat properly.

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