

CGA S-1.2 — 2024

11<sup>TH</sup> EDITION

**PRESSURE RELIEF  
DEVICE STANDARDS -  
PART 2 -  
PORTABLE  
CONTAINERS FOR  
COMPRESSED GASES**

---



**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 website, [www.cganet.com](http://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](http://www.cganet.com). For more information contact CGA. Phone: 703-788-2700, ext. 799. E-mail: [customerservice@cganet.com](mailto:customerservice@cganet.com).

Work Item 18-043  
Bulk Distribution Equipment and Standards Committee

NOTE—Technical changes from the previous edition are underlined.

NOTE—Appendices A and B (Informative) are for informational only.

ELEVENTH EDITION: 2024  
TENTH EDITION: 2019  
NINTH EDITION: 2009  
EIGHTH EDITION: 2005

© 2024 The Compressed Gas Association, Inc. All rights reserved.

All materials contained in this work are protected by United States and international copyright laws. No part of this work may be reproduced or transmitted in any form or by any means, electronic or mechanical including photocopying, recording, or any information storage and retrieval system without permission in writing from The Compressed Gas Association, Inc. All requests for permission to reproduce material from this work should be directed to The Compressed Gas Association, Inc. 8484 Westpark Dr., Suite 220, VA 22102. You may not alter or remove any trademark, copyright or other notice from this work.

<b>Contents</b>	<b>Page</b>
1 Introduction.....	1
2 Scope and purpose .....	1
2.1 Scope .....	1
2.2 Purpose .....	1
3 Definitions.....	1
4 Types of pressure relief devices.....	4
5 Application requirements for pressure relief devices.....	5
5.1 General.....	5
5.2 Piping of pressure relief systems.....	12
5.3 Determination of set and flow rating pressures .....	13
5.4 Jacket relief device .....	13
6 Design and construction requirements for pressure relief devices.....	14
6.1 General.....	14
6.2 Flow rate requirement for conditions excluding fire .....	27
6.3 Flow rate requirement under fire conditions .....	31
6.4 Pressure relief valves .....	33
6.5 Rupture disk devices .....	35
6.6 Rupture disk in combination with a pressure relief valve .....	36
6.7 Breaking/buckling pin device in combination with a pressure relief valve .....	36
6.8 Fusible plug devices .....	36
7 Tests of pressure relief devices.....	36
7.1 Pressure tests of pressure relief valves.....	36
7.2 Flow capacity tests of pressure relief valves .....	36
7.3 Tests of pressure relief devices other than spring-loaded pressure relief valves.....	36
7.4 Rejected material.....	37
8 Identification .....	37
9 Maintenance requirements for pressure relief devices.....	37
10 References .....	38
11 Additional references.....	39
<b>Tables</b>	
Table 1—Set pressure and flow rating pressure criteria .....	8
Table 2—Minimum required working pressures.....	10
Table 3—Constant C for gas or vapor related to ratio of specific heats ( $k = C_p/C_v$ ) at 60 °F and 14.696 psia (15 °C and 101.325 kPa, abs).....	34
Table 4—Saturation temperature, compressibility factor, and average specific heat for common gases at selected flow rating pressures [20] .....	34
Table 5—Thermal conductivity for refrigerated (cryogenic) fluids at the mean temperature between saturation and 360 degrees Rankine at 14.696 psia (922 Kelvin at 101.325 kPa, abs) .....	35
<b>Figure</b>	
Figure 1—Nomenclature .....	15
<b>Appendix</b>	
Appendix A—Pressure relief system capacity examples in U.S. customary units (Informative).....	40
Appendix B—Calculation of $G_f$ and $G_v$ (Informative).....	54
<b>Appendix figures</b>	
Figure A-1—Theoretical vacuum-insulated cargo tank – dimensional definitions.....	40
Figure A-2—Cargo tank loss of vacuum under ambient conditions .....	41
Figure A-3—Spring-loaded pressure relief device capacity for vacuum-insulated cargo tank.....	42
Figure A-4—Vacuum-insulated cargo tank fire and loss of vacuum .....	48

## 1 Introduction

This part of the Pressure Relief Device Standards presents the minimum requirements recommended by the Compressed Gas Association, Inc. (CGA) for pressure relief devices (PRDs) being used on portable containers for compressed gases that comply with the specifications and charging and maintenance regulations of the U.S. Department of Transportation (DOT) or the corresponding specifications and regulations of Transport Canada (TC) [1, 2].<sup>1</sup>

## 2 Scope and purpose

### 2.1 Scope

It is recognized that there are portable containers that conform to the specification requirements of DOT and TC that are used in services beyond the jurisdiction of either authority. In such cases, it is recommended that international, state, provincial/territorial, local, or other authorities having jurisdiction over these containers use this publication to determine adequate PRD requirements provided that the portable containers are charged with gas and maintained in accordance with DOT or TC regulations.

It is further recognized that there may be portable containers used in services not within the jurisdiction of DOT or TC that do not conform to the specification requirements of either authority. It is recommended that the authorities having jurisdiction over such portable containers use this publication to determine PRD requirements provided that such portable containers are considered by the authority as having a construction at least equal to the equivalent DOT or TC specification requirements, and further provided that the portable containers are charged with gas and maintained in accordance with DOT or TC regulations.

PRD requirements for tank cars including multi-unit tank car tanks can be found in Title 49 of the U.S. *Code of Federal Regulations* (49 CFR) Part 179 [1].

PRD standards for DOT specifications 3AA, 3AAX, and 3T cylinders can be found in CGA S-1.1, *Pressure Relief Device Standards—Part 1—Cylinders for Compressed Gases* [3]. PRD standards for stationary American Society of Mechanical Engineers (ASME) vessels can be found in CGA S-1.3, *Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases* [4].

NOTE—In 49 CFR Part 171.7, the 1980 edition of this publication is incorporated by reference [1].

### 2.2 Purpose

The purpose of this publication is to complement the requirements of various regulations, codes, standards, or specifications applicable to portable containers. In case of conflict, the requirements of the regulations, codes, standards, or specifications of the authorities having jurisdiction over such portable containers shall apply. It is recommended that portable containers fabricated after December 31, 1995, use PRDs that meet the requirements of this edition.

## 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.

---

<sup>1</sup> References are shown by bracketed numbers and are listed in order of appearance in the reference section.