CSA/ANSI PRD 1:20

National Standard of Canada
American National Standard

Pressure relief devices for natural gas vehicle (NGV) fuel containers

Approved American National Standard

Standards Council of Canada
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IGAC

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Preface

This is the third edition of CSA/ANSI PRD 1, *Pressure relief devices for natural gas vehicle (NGV) fuel containers.* It supersedes the previous editions published in 2013 and 1998.

This publication represents a standard for safe operation, substantial and durable construction and performance testing of pressure relief devices (PRD) for natural gas vehicle (NGV) fuel containers, for the on-board storage of compressed natural gas for vehicle operation within limitations given below and in the scope of this Standard.

This Standard is based on proven engineering principles, research, and the combined expertise of gas utilities, manufacturers, users, and others having specialized experience.

Nothing in this Standard is to be considered in any way as indicating a measure of quality beyond compliance with the provisions it contains. It is designed to allow compliance of products which may exceed that specified in the provisions herein. In its preparation, full recognition has been given to possibilities of improvement through ingenuity of design. This Standard is subject to revision as further experience and investigation may show it is necessary and desirable.

This Standard does not apply to fuel system components that will be incorporated during original manufacture of motor vehicles which comply with *Federal Motor Vehicle Safety Standards (FMVSS)* or *Canadian Motor Vehicle Safety Standards (CMVSS)* for Natural Gas Powered Vehicles.

Users of this Standard are advised that the devices/products/activities within its scope may be subject to regulation at the federal, state, or local levels. Users are strongly urged to investigate this possibility through appropriate channels. In the event of a conflict with this Standard, the federal, state, or local regulations should be followed.

CSA Group acknowledges that the development of this Standard was made possible, in part, by the financial support of Natural Resources Canada.

This Standard is considered suitable for use for conformity assessment within the stated scope of the Standard.

This Standard was prepared by the Subcommittee on Standards for Pressure Relief Devices for Natural Gas, under the jurisdiction of the Technical Committee on Natural Gas Transportation and the Strategic Steering Committee on Transportation, and has been formally approved by the Technical Committee on Natural Gas Transportation and the Interprovincial Gas Advisory Council.

This Standard has been developed in compliance with Standards Council of Canada requirements for National Standards of Canada. It has been published as a National Standard of Canada by CSA Group.

This Standard has been approved by the American National Standards Institute (ANSI) as an American National Standard.

Notes:

1) *Use of the singular does not exclude the plural (and vice versa) when the sense allows.*
2) *Although the intended primary application of this Standard is stated in its Scope, it is important to note that it remains the responsibility of the users of the Standard to judge its suitability for their particular purpose.*
3) *This Standard was developed by consensus, which is defined by* CSA Policy governing standardization — Code of good practice for standardization *as "substantial agreement. Consensus implies much more than a simple*

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   b) *provide an explanation of circumstances surrounding the actual field condition; and*
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   c) *wording of the proposed change; and*
   d) *rationale for the change.*

CSA/ANSI PRD 1:20
Pressure relief devices for natural gas vehicle (NGV) fuel containers

0 History of the development of CSA/ANSI PRD-1

In 1988, a group of U.S. gas utility companies formed the Natural Gas Vehicle (NGV) Coalition (the Coalition) to promote the widespread use of natural gas as a vehicle fuel. The Coalition organized committees to address technical, marketing, and legislative issues which would affect future expansion.

The Coalition recognized that an important consideration in the successful commercialization of natural gas as a vehicle fuel was the issue of codes and standards (or lack of codes and standards, or harmonized codes and standards) pertaining to both fuel stations and vehicle fuel systems. The Coalition's Technology Committee undertook the goal of establishing a program for the development of an organized family of coordinated codes, standards and regulations addressing natural gas vehicles and fuelling stations. To help achieve this goal, the Technology Committee established the Standards and Standardization Subcommittee.

The Standards and Standardization Subcommittee is comprised of interests from gas utilities, vehicle and fuelling station original equipment manufacturers (OEM), component OEM's and NGV conversion industries, among others. The Subcommittee also has "liaison" representation from the Society of Automotive Engineers (SAE), the Gas Research Institute (GRI), the American Gas Association (A.G.A.), the Canadian Gas Association, the Compressed Gas Association, the National Fire Protection Association's (NFPA) Technical Committee on Compressed Natural Gas Vehicular Fuel Systems, and the International Association for Natural Gas Vehicles (IANGV). International Approval Services (formerly the American Gas Association Laboratories) serves as Administrative Secretariat to the Subcommittee.

One of the major technical obstacles to the above goal concerned the on-board fuel containers. It was acknowledged that the lack of a design standard and certification program for vehicle fuel supply containers was a major obstacle to wider use of compressed natural gas as a vehicle fuel. U.S. Department of Transportation (DOT) regulations and exemptions do not address the use of cylinders as vehicle fuel containers. Such government regulations only cover cylinders which are approved for use in interstate transportation.

At its July 19, 1990, meeting, the Standards and Standardization Subcommittee's On-Board Fuel Cylinders Working Group established a task group (NGV2 Task Group) to prepare a draft standard addressing NGV on-board fuel containers. This Standard, *Basic Requirements for Compressed Natural Gas Vehicle (NGV) Fuel Containers*, ANSI/AGA NGV2, was approved by ANSI in 1992.

The NGV2-1992 standard covered requirements for pressure relief devices (PRDs) as separate components by referencing the Compressed Gas Association's standard, *Pressure Relief Device Standards, Part 1 — Cylinders for Compressed Gases*. At its July 19–20, 1995, meeting, the NGV2 Task Group agreed to form a working group to evaluate the applicability of the CGA S-1.1 standard for on-board NGV fuel containers. After meetings between the working group and the Compressed Gas Association's Pressure Relief Device Standing Subcommittee, it was mutually agreed upon that an entirely new standard should be developed for PRDs applied to NGV fuel containers. The NGV2 Task Group agreed that the task of developing a draft standard for PRDs for NGV fuel containers should be

assigned to the original working group. The working group chairman assembled a review committee consisting on individuals who had expressed an interest in PRDs. Many of the review group members were also members of the Compressed Gas Association's Pressure Relief Device Standing Subcommittee.

The first draft of the Standard for *Basic Requirements for Pressure Relief Devices for Natural Gas Vehicle Fuel Containers*, PRD-1, dated January 19, 1996, was distributed to the review committee. As a result of comments received from the review committee, a second draft, dated February 16, 1996 was developed. As a result of additional comments received from the review committee on the second draft, a third draft of the PRD-1 standard was developed. The third draft was distributed for canvass ballot on December 13, 1996. In light of favourable ballot results, the third draft of the PRD-1 standard was submitted to ANSI. The first edition of the standard for Basic Requirements for Pressure Relief Devices for Natural Gas Vehicle Fuel Containers was approved as an American National Standard by ANSI on June 4, 1998.

In 2007, in response to industry requests, the Standard was revised and was published as the second edition of PRD 1. This occurred again in 2013 for the third edition.

Previous editions of this Standard are as follows:
- IAS PRD 1-1998; and
- ANSI PRD 1-2013 (R2018).

The following identifies the designation and the year of the harmonized standard:
- CSA/ANSI PRD 1:20.

1 Scope

1.1 General

1.1.1
This Standard establishes minimum requirements for pressure relief devices (PRDs) intended for use on fuel containers that comply with ANSI/CSA NGV2, 49 CFR Part 571.304 (FMVSS 304), CSA B51, Part 2, and/or ISO 11439.

PRDs can be of any design or manufacturing method that meets the requirements of this Standard.

1.1.2
This Standard does not apply to reseating or resealing devices.

1.1.3
PRDs designed to comply with this Standard are expected to be used with natural gas fuel containing no more than 2% hydrogen by volume.

1.2 Relevant documents
Documents which apply to fuel container installation and vehicle systems include 49 CFR Part 571.303 (FMVSS 303), TC 301.2, NFPA 52, CSA B109, and CSA/ANSI NGV 6.1.