



CGA G-5.5—2014
HYDROGEN VENT
SYSTEMS

THIRD EDITION

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NOTE—Technical changes from the previous edition are underlined.

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1 Introduction

This publication provides information for personnel who design, install, and maintain hydrogen vent systems.

For the purpose of this publication, the use of the word *should* indicates a recommendation and the use of the word *shall* indicates a requirement.

2 Scope

This publication presents design guidelines for hydrogen vent systems used in gaseous and liquid hydrogen systems at user sites and provides recommendations for safe operation of these vents. It begins at the discharge port of safety devices and other components that control the release of hydrogen and ends at the point where hydrogen concentration in the atmosphere is below the lower flammable limits.

It also provides information on the production, transportation, handling, and storage of compressed hydrogen, cryogenic liquid hydrogen, and related products. Additional information on hydrogen can be found in CGA G-5, *Hydrogen*, CGA G-5.4, *Standard for Hydrogen Piping Systems at User Locations*, *CGA Handbook of Compressed Gases*, and NFPA 55, *Compressed Gases and Cryogenic Fluids Code* [1, 2, 3, 4].¹

Pressure relief devices (PRDs) for cylinders and tube trailers required by U.S. Department of Transportation (DOT) in Title 49 of the U.S Code of Federal Regulations (49 CFR) are not covered in the scope of this publication [5].

3 Definitions

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

3.1 ASME piping code

American Society of Mechanical Engineers (ASME) B31.12, *Hydrogen Piping and Pipelines* [6]. The process piping code in North America for hydrogen piping and pipelines.

3.2 Cylinder

Pressure vessel designed for pressures higher than 40 psi (276 kPa) and having a circular cross section with an internal water volume not exceeding 16 ft³ (450 L) or a water capacity of 1000 lb (454 kg) constructed in accordance with DOT specifications for cylinders [5].² In Canada, *Transportation of Dangerous Goods (TDG)* regulations apply to cylinders [8].

3.3 Deflagration

Propagation of a combustion zone at a velocity that is less than the speed of sound in the unreacted medium [9].

3.4 Detonation

Propagation of a combustion zone at a velocity that is greater than the speed of sound in the unreacted medium [9].

3.5 Gaseous hydrogen storage system

System in which hydrogen is delivered, stored, and discharged in gaseous form to the user's piping.

NOTE—A gaseous hydrogen storage system includes stationary containers or transport containers used as stationary storage for temporary supply, pressure regulators, PRDs, manifolds, interconnecting piping, and controls. The system terminates where hydrogen at service pressure first enters the user supply line.

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

² kPa shall indicate gauge pressure unless otherwise noted as (kPa, abs) for absolute pressure or (kPa, differential) for differential pressure. All kPa values are rounded off per CGA P-11, *Metric Practice Guide for the Compressed Gas Industry* [7].