CGA

Compressed Gas Association

The Standard For Safety Since 1913

ANSI/CGA H-5—2020

STANDARD FOR BULK HYDROGEN SUPPLY SYSTEMS

THIRD EDITION

Approved American National Standard ANSI

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Work Item 18-048
Hydrogen Technology Committee

NOTE—Technical changes from the previous edition are underlined.

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

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1 Introduction

This standard contains minimum requirements for locating/siting, selecting equipment, installing, starting up, maintaining, and removing bulk hydrogen supply systems.

2 Scope

Two types of bulk hydrogen supply systems are covered in this standard: liquid and gaseous.

A bulk gas hydrogen supply system is one that contains more than 5000 scf (141.6 m^3) of hydrogen. A bulk liquid supply system is one that contains more than 39.7 gal (150 L) of hydrogen. Requirements of this standard are limited to systems operating up to 15 000 psi (103.4 MPa).[1, 2]

For the purpose of this standard, a liquid system is defined as one where hydrogen is delivered to the supply system and stored on-site in liquid form. Hydrogen is supplied in either liquid or gaseous form to the end user's requirement. When required, pumps and/or compressors are used to increase the hydrogen pressure before it is supplied to the end user. When required, coded vessels are used to store gaseous hydrogen before it is supplied to the end user. The system is considered to be a bulk liquid system instead of a bulk gaseous system because the hydrogen is delivered from the hydrogen supplier to the storage system in liquid form.

For the purpose of this standard, a gaseous system is defined as one where hydrogen is delivered to the supply system, stored, and is supplied to the end user's requirement in gaseous form.

See Figures A-1, A-2, A-3, A-4, A-5, and A-6 in Appendix A for typical gas and liquid system flow diagrams.

This standard applies to hydrogen supply systems containing any of the following equipment. Not all hydrogen systems include all the equipment listed. More details about hydrogen applications can be found in CGA G-5, *Hydrogen* and *Handbook of Compressed Gases.* [2, 3].

Hydrogen supply systems include:

- cryogenic hydrogen storage tank, either aboveground or belowground;
- gas storage vessels, either aboveground or belowground;
- heat exchangers (including vaporizers);
- valves including manual and automatic shutoff valves, and check valves;
- pressure control equipment including regulators and control valves;
- piping (pipe and tubing);
- cryogenic pumps;
- cryogenic and warm gas compressors;
- snubbers and pulsation dampeners; and
- monitoring and control systems including electrical and instrumentation.

The bulk hydrogen supply system terminates at the source valve or where the gaseous or liquid hydrogen supply first enters the supply line.

[1] kPa (MPa) shall indicate gauge pressure unless otherwise noted as (kPa, abs [MPa, abs]) for absolute pressure or (kPa, differential [MPa, differential]) for differential pressure. All kPa values are rounded off per CGA P-11, *Guideline for Metric Practice in the Compressed Gas Industry* [1].

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