



COMPRESSED GAS ASSOCIATION, INC.

POSITION STATEMENT

PS-25—2006

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AERIAL STORAGE OF COMPRESSED HYDROGEN

Background

Fueling system providers are developing ways to provide fueling systems for hydrogen vehicles. Although the best location for liquid hydrogen storage appears to be underground, in the case of compressed hydrogen, which can require large areas of storage, overhead locations should be considered. Some of the best candidate locations for compressed hydrogen storage are:

- on top of the canopy above fuel dispenser islands;
- on top of the roof of a retail or commercial occupancy adjacent to the fueling islands;
- on a platform above the fueling dispenser areas; and
- on a platform above hydrogen production or compression systems.

Any leaks from an overhead hydrogen storage system would be above any exposures to flame, sparking equipment, vehicles, pedestrians, or station operators. Also, aerial locations limit access by unauthorized personnel and are out of sight of the public.

Question

Can compressed hydrogen storage systems be located above exposures that would otherwise require some setback distances from the hydrogen storage systems?

Answer

Yes, aerial storage of compressed hydrogen should be considered an acceptable practice, as long as the following considerations are addressed:

1. A fire barrier with a minimum 2-hour rating shall be installed between aerial hydrogen storage systems and the exposures below:
 - to eliminate the risk of ignited hydrogen jets impinging on such exposures; and
 - to protect aerial hydrogen storage systems from any fire originating below the hydrogen storage system, for example a fire from a vehicle at a dispenser island.
2. A combustible occupancy such as an office, shop, or retail space located below aerial hydrogen storage systems shall have a fire suppression system.
3. Where aerial hydrogen storage systems are supported by occupancies such as offices, shops, or retail space, the structural members that support the aerial hydrogen storage system shall have a minimum 2-hour fire rating.
4. All aerial storage systems shall have thermal relief valves vented to a safe location in accordance with CGA G-5.5, *Hydrogen Vent Systems* [1]. Direct-acting thermal relief valves are preferable to systems calling for the automatic discharge of stored hydrogen in conjunction with the activation of fire suppression equipment, as described in the *International Fire Code*, Chapter 22, 2004 supplement [2].

Summary

While somewhat unconventional in comparison to existing hydrogen systems used to support industrial applications of hydrogen, aerial storage of compressed hydrogen systems does present viable options to the hydrogen vehicle fueling station system designer. Candidate locations for hydrogen storage systems are on top of fueling island canopies, on the roof of utility or retail occupancies, or above other plant equipment.

Aerial storage systems should be considered an acceptable practice in industrial, commercial, and retail consumer environments as long as good engineering practice and the provisions of this document are used.

Reference

Unless otherwise specified, the latest edition shall apply.

[1] CGA G-5.5, *Hydrogen Vent Systems*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151. www.cganet.com

[2] *International Fire Code*, International Code Council Headquarters, 5203 Leesburg Pike, Suite 600, Falls Church, VA 22041. www.iccsafe.org.

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Work Item 04-85
Hydrogen Technology Committee

FIRST EDITION: 2006

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