

POSITION STATEMENT

USE OF LIQUEFIED PETROLEUM GAS OR PROPANE TANKS AS COMPRESSED HYDROGEN STORAGE BUFFERS

Background

The Compressed Gas Association (CGA) recognizes that in the developing hydrogen economy there is often need to store hydrogen in low pressure storage tanks. A few examples of such storage are:

- receivers for on-site hydrogen production plants such as an electrolysis or reformer-based hydrogen generator;
- receivers for waste hydrogen purification processes;
- receiver in a system that blends hydrogen with a nonoxidizing gas;
- compressor suction buffer; and
- any need to match production rate with user demand.

Liquefied petroleum gas (LPG) and liquid propane bulk storage tanks are available from 100 gal to 30 000 gal (379 L to 113 562 L) water capacity. Typically, these tanks are designed with a maximum allowable working pressure (MAWP) of 250 psi (1724 kPa).

One option for the system designer is to procure a tank originally designed for LPG or propane service and modify the tank for compressed hydrogen service.

Question

Can gaseous hydrogen be safely stored in pressure vessels that were originally designed for LPG or liquid propane service?

Answer

Yes, a pressure vessel previously designed for LPG or liquid propane storage can be converted for use as a compressed hydrogen gas storage system when the following conditions are met:

- Pressure vessel is designed, built, and stamped in accordance with the American Society of Mechanical Engineers (ASME) *Boiler & Pressure Vessel Code*, Section VIII [1];
- Vessel appurtenances (isolation valves, fill lines, pressure gauges, etc.,) originally designed for LPG or propane service are removed and replaced with appurtenances appropriate for gaseous hydrogen service in accordance with ASME B31.12, *Hydrogen Piping and Pipelines* [2]; and
- New pressure relief valves are set no greater than the original MAWP of the vessel and sized and installed in accordance with CGA G-5.5, *Hydrogen Vent Systems*; and CGA S-1.3, *Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases* [3, 4].

References

Unless otherwise specified, the latest edition shall apply.

[1] ASME *Boiler & Pressure Vessel Code*, Section VIII, Division 1, American Society of Mechanical Engineers.
www.asme.org

[2] ASME B31.12, *Hydrogen Piping and Pipelines*, American Society of Mechanical Engineers. www.asme.org

[3] CGA G-5.5, *Hydrogen Vent Systems*, Compressed Gas Association. www.cganet.com

[4] CGA S-1.3, *Pressure Relief Device Standards—Part 3—Stationary Storage Containers for Compressed Gases*, Compressed Gas Association. www.cganet.com

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NOTE—No technical information has been changed from the 2008 edition. This reaffirmed edition may include minor editorial changes.

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