

# Pressure, Vacuum, and Cryogenic Systems: Hydrogen Requirements

Department: Chemical and General Safety

Program: Pressure, Vacuum, and Cryogenic Systems

Owner: Program Manager

Authority: ES&H Manual, Chapter 14, Pressure, Vacuum, and Cryogenic Systems<sup>1</sup>

All pressure systems must be in conformance with the requirements of Chapter 14, and this exhibit provides the additional required information specific to hydrogen systems. If you need further clarification on the unique characteristics of this type of system or the specific codes, regulations, and standards, please contact the program manager.

## ***Unique Characteristics***

The design, installation, and use of hydrogen systems must incorporate the following:

- **Monitoring equipment**, as specified by codes that specify how rooms or areas are to be monitored for a leak
- An **excess flow control valve** to minimize the effects of a catastrophic line break or leak

*Note Hydrogen is a flammable gas that is lighter than air. Hydrogen has a tendency to dissipate readily if released into the air.*

## ***Required Regulations, Codes, and Standards***

In addition to those listed in Section 3, “Standards”, of Chapter 14, the following regulations, codes, and standards apply.

*Note Use the most current edition unless otherwise indicated.*<sup>2</sup>

### **American Society of Mechanical Engineers (ASME) Standards**

- ASME B31.3-2002, “Process Piping”
- ASME B16 series, “Standards of Pipes and Fittings”

### **National Fire Protection Association (NFPA) Standards**

- NFPA 55, “Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks”

### **California Fire Code**

- Chapter 30, “Compressed Gases”

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1 *SLAC Environment, Safety, and Health Manual* (SLAC-I-720-0A29Z-001), Chapter 14, “Pressure, Cryogenic, and Vacuum Systems”, [http://www-group.slac.stanford.edu/esh/hazardous\\_activities/pressure/policies.htm](http://www-group.slac.stanford.edu/esh/hazardous_activities/pressure/policies.htm)

2 See the “SLAC Research Library Community Pages”, <http://www-group.slac.stanford.edu/library/CommunityPages.asp>, for available standards.

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- Chapter 27, “Hazardous Materials – General Provisions”

### **California Mechanical Code**

- Chapter 14, “Process Piping”

### **Compressed Gas Association (CGA) Standards**

- CGA G-5, “Hydrogen”
- CGA G-5.3, “Commodity Specification for Hydrogen”
- CGA G-5.4, “Standard for Hydrogen Piping Systems at Consumer Locations”
- CGA G-5.5, “Hydrogen Vent Systems”

### ***Related Documents***

- Hazardous Materials: Hydrogen Safe Handling Guideline (SLAC-I-730-0A09T-007)<sup>3</sup>
- Hazardous Materials: Personal Protective Equipment Requirements (SLAC-I-730-0A09S-017)<sup>4</sup>
- Pressure, Vacuum, and Cryogenic Systems: Codes, Regulations, and Standards List (SLAC-I-730-0A21V-001)<sup>5</sup>

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3 <http://www-group.slac.stanford.edu/esh/eshmanual/references/hazmatGuideHydrogen.pdf>

4 <http://www-group.slac.stanford.edu/esh/eshmanual/references/hazmatReqPPE.pdf>

5 <http://www-group.slac.stanford.edu/esh/eshmanual/references/pressureListStandards.pdf>