



COMPRESSED GAS ASSOCIATION, INC.

POSITION STATEMENT

PS-27—2006

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USE OF EXCESS FLOW CONTROL

Background

An excess flow control device is typically used to reduce the flow of the compressed gas; the excess flow control device closes when flow through the device exceeds its flow rating. Both the *International Fire Code*[®] (IFC) and NFPA 1, *Uniform Fire Code*[™] (UFC), require that onsite delivery piping systems that carry designated hazardous compressed gases with hazard ratings above certain threshold limits have provisions for excess flow control or emergency shutoff to minimize discharge rates in the event of a line break [1, 2]. This position statement is intended to clarify the need for excess flow control devices in gas supply systems that have a bulk liquid source.

Question

Are excess flow control devices required in compressed gas supply systems if the supply source is a cryogenic liquid with a health hazard rating 3 or 4?

NOTE—Examples of cryogenic liquids with health hazard rating 3 include argon, hydrogen, nitrogen, helium, liquefied natural gas, ethylene, and oxygen. See NFPA 704, *Standard System for the Identification of the Hazards of Materials for Emergency Response*, or CGA P-19, *CGA Recommended Hazard Ratings for Compressed Gases*, for additional information [3, 4].

Answer

Excess flow control is not required in these compressed gas supply systems if the cryogenic bulk storage is installed using guidelines listed in CGA P-12, *Safe Handling of Cryogenic Liquids* [5], and:

- the flammability hazard rating of the compressed gas is not 4;
- the reactivity hazard rating of the compressed gas is not 3 or 4; or
- the bulk supply system was installed before implementation of the IFC 2003 edition and NFPA 55, 2005 edition.

Gases that require excess flow control include hydrogen, natural gas, and ethylene.

Gases that do not require excess flow control include argon, nitrogen, helium, and oxygen.

Hazard ratings for compressed gases can be found in CGA P-19, Table 3 [4].

Discussion

UFC Chapter 63, "Compressed Gases and Cryogenic Fluids," specifies the requirements for these products. Chapter 63 also points to NFPA 55, *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks* [6]. NFPA 55, Chapter 7, "Compressed Gases," contains requirements for excess flow control. NFPA 55, Chapter 7, mandates excess flow control for compressed gases with one or more of the following hazard ratings per NFPA 704:

- health hazard rating 3 or 4;
- flammability hazard rating 4; or
- reactivity hazard rating 3 or 4.

Because NFPA 55 Chapter 7 applies to gases and not to cryogenic liquids, the typical health hazard rating of 3 for cryogenic liquids is not applicable. The gaseous forms of these liquids typically have a health hazard rating of 0 (zero). The IFC includes industrial gases in Chapter 30, "Compressed Gases," and Chapter 32, "Cryogenic Fluids." However, the requirements for excess flow control are located in Chapter 27, "Hazardous Materials – General Provisions." The IFC also requires excess flow control for compressed gases that have one or more of the following hazard ratings per NFPA 704:

- health hazard rating 3 or 4;
- flammability hazard rating 4; or
- reactivity hazard rating 3 or 4.

The IFC also allows an approved leak detection and emergency shutoff system in place of excess flow control.

Hydrogen and other flammable gases in liquid form have a flammability hazard rating of 4 and thus meet the IFC criteria for requiring excess flow control or an alternate method.

References

Unless otherwise specified, the latest edition shall apply.

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

[2] NFPA 1, *Uniform Fire Code*[™], National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269. www.nfpa.org

[3] NFPA 704, *Standard for the Identification of the Fire Hazards of Materials for Emergency Response*, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269. www.nfpa.org

[4] CGA P-19—2004, *CGA Recommended Hazard Ratings for Compressed Gases*, Compressed Gas Association, Inc, 4221 Walney Rd., 5th Floor, Chantilly, VA 20151. www.cganet.com

[5] CGA P-12, *Safe Handling of Cryogenic Liquids*, Compressed Gas Association, Inc., 4221 Walney Rd., 5th Floor, Chantilly, VA 20151. www.cganet.com

[6] NFPA 55, *Standard for the Storage, Use, and Handling of Compressed Gases and Cryogenic Fluids in Portable and Stationary Containers, Cylinders, and Tanks*, National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269. www.nfpa.org