



Coffee Break Training - Fire Protection Series

Hazardous Materials: Compressed Gas Cylinder Control Valve Safety Systems

No. FP-2014-43 October 28, 2014

Learning Objective: The student will be able to describe the purpose and designation of compressed gas control valve safety systems.

High- or low-pressure steel and aluminum compressed gas cylinders are common objects found in a variety of occupancies: schools, health care facilities, industry, businesses, fire and ambulance stations, even residential occupancies. The cylinder may contain products that are asphyxiants, corrosive, flammable, cryogenic, inert, oxidizing, pyrophoric or toxic/poisonous gases.

The cylinders are filled or emptied through main control valves such as the one illustrated today. Standard cylinder valve outlet connections have been devised by the Compressed Gas Association (CGA) to prevent mixing of incompatible gases (CGA V9, Standard for Compressed Gas Cylinder Valves).

Valves are designed to comply with safety system criteria as follows, depending upon the pressure rating and application. Low-pressure cylinders store their contents at less than 900 pounds per square inch gauge (psig) (62 bar), while high-pressure cylinders are for products greater than 900 psig (62 bar) up to about 7,500 psig (517 bar).



Control valves for compressed gas cylinders are manufactured with various internal or external thread connectors to ensure that they are compatible with the gases stored in the cylinder.

| System Designation | Description |
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| Diameter-Indexed Safety System | a system of specifications for threaded low -pressure connections between station outlets, flow meters and other devices, such as nebulizers, ventilators and anesthesia apparatus. |
| American Standard Safety System (ASSS) | a system of specifications for threaded high -pressure connections between compressed gas cylinders and their attachments. |
| Pin-Indexed Safety System | a subsection of ASSS that applies only to valve outlets of small cylinders and employs a yoke and pin connection. Commonly used on portable medical oxygen equipment. |

The outlet threads that are used vary in diameter; some are internal, and some are external; some are right-handed, and some are left-handed. To minimize undesirable connections, only CGA standard combinations of valves and fittings should be used in compressed gas installations. The threads on cylinder valves, regulators and other fittings should be examined to ensure that they correspond and are undamaged before any connections are made. Connections should never be joined by force.

For more information, consider enrolling in the National Fire Academy course “Hazardous Materials Code Enforcement” (R0615). Information and applications can be obtained at <http://apps.usfa.fema.gov/nfacourses/catalog/details/10504>.



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