



Cylinder Valve Connections - Don't Tamper with That Connection!

Some History

Any gas cylinder that you purchase is equipped with a valve outlet connection. Over the course of the last century the cylinder outlet connection has been studied, developed, and standardized in order to maximize safety and prevent the interconnection of incompatible gases or of gases at incompatible pressure ratings.

The hazards of valve outlet connections first became apparent during World War I, where many different connections were being used, and there was no standardization amongst gas manufacturers. In the United States and Canada committees were subsequently formed to study the problem, and a standardization plan was eventually developed and accepted in 1949 as National Standards in both countries.

Types and Characteristics of Valve Outlet Connections

In North America, standard valve outlet connections are manufactured according to the specifications defined by the Compressed Gas Association (CGA). The CGA provides detailed descriptions of the dimensions and design of each connection, which are based on the flammability, toxicity, state and corrosiveness of the gas, as well as its pressure rating. The connections are generally identified by a 3-digit number (i.e. CGA 555).

There are numerous other standards organizations around the world, such as British Standards (BS), the Deutsches Institut für Normung (DIN) in Germany, or Nederlandse Norm (NEN) in the Netherlands. Some Specialty Gas or Marine cylinders may occasionally be seen in North America, equipped with these valve outlet connections.

Connections cover the wide range of gases and gas mixtures available today, including industrial gases, ultra-high integrity gases for the electronics sector, and breathing mixtures for the SCUBA (self-contained underwater breathing apparatus) industry. The CGA also defines distinct pin-indexed connections for gases and gas mixtures used in medical applications, and has developed special propane connections for use by non-professionals, such as on home barbecue gas grills.

The Importance of Standardization

The goal of the CGA is to have one standard valve outlet connection for each gas or group of gases and mixtures with similar properties. This standardization has been instrumental in reducing error and maximizing safety. Connections have been designed and tested with great care, and reflect the experience and knowledge of compressed gas industry professionals, valve manufacturers, the military and other government agencies, and gas product consumers.

When a cylinder is delivered to a customer it is equipped with the appropriate valve and outlet connection for the gas product, within a specified pressure range. Any tampering or modifications to this connection may be hazardous. For this reason, Diversified CPC does not recommend the use of adaptors by customers. Should an adaptor be necessary in specific cases, these must only be added by trained personnel.

Summary and Safety Precautions

- Standard outlet connections allow the user to attach equipment to the cylinder valve, and safely withdraw its contents.
- Connections have been standardized to reduce the interconnection of incompatible gases (ex. flammables and oxidizers) and the interconnection of gases at incompatible pressure ratings.
- Always use the correct CGA outlet connection when hooking up cylinders to your equipment. DO NOT use adaptors.
- Never force connection threads. Check whether the connection is right-handed or left-handed. Left-handed nuts have a notch. Never turn the threads the wrong way when tightening the fitting.
- Always inspect and replace the O-ring or washer on the connection, if it is worn.
- Never use Teflon tape or other sealing compound on the outlet connection.
- Always use proper leak detector fluid to check for leaks! Leak detectors MUST NOT contain any nitrogen-based product such as ammonia.
- Contact Diversified CPC if you find any valve with damaged outlet threads or sealing surfaces.



Note: Connections alone do not guarantee complete safety. Gas products must always be properly identified by labeling.



Further information can be found in the following publications of the Compressed Gas Association:

- CGA V-1 Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections
- CGA V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
- CGA V-7.1 Standard Method of Determining Cylinder Valve Outlet Connections for Medical Gases

Cylinder Valve Threads

The CGA (Compressed Gas Association) outlets are standard for use with various compressed gases. The relation of one of these outlets to another is fixed so as to minimize undesirable connections. They have been so designed to prevent the interchange of connections which may result in a hazard. Because of the many thread forms available on equipment used in the LP-Gas industry today, the maze of letters, numbers and symbols which make up various thread specifications becomes confusing. To help eliminate some of this confusion, a brief explanation of some of the more widely used thread specifications used by Diversified CPC for use with butanes and propane is shown below.

 <p style="text-align: center;">CGA 165, or 1/4" SAE Flare</p>	<p>This connection assures a leak-tight joining of copper tubing to brass parts without need for brazing or silver soldering. The size used on Diversified CPC LP-Gas valves and fittings is 1/4" SAE (Society of Automotive Engineers) flare.</p>
 <p style="text-align: center;">CGA 510 or POL</p>	<p>Most widely used in this industry, POL is the common name for the standard CGA 510 vapor withdrawal connection. Thread specification is .885" – 14 NGO – LH – INT, meaning .885" diameter thread, 14 threads per inch, National Gas Outlet form, left-hand internal thread.</p>
 <p style="text-align: center;">CGA 555</p>	<p>CGA 555 is the standard cylinder valve outlet connection for liquid withdrawal of butanes and propane. Thread specification is .903" – 14 NGO – LH – EXT, which means .903" diameter thread, 14 threads per inch, National Gas Outlet form, left-hand external thread.</p>
 <p style="text-align: center;">CGA 660</p>	<p>CGA 660 is the standard cylinder valve outlet connection for several refrigerant gases including R12, R22, recovery refrigerants, as well as the connection used by Diversified CPC on our half-ton containers of HFO-1234ze(E). Thread specification is 1.030 - 14 NGO - RH - EXT (1.030" diameter thread, 14 threads per inch, National Gas Outlet form, right-hand external thread.</p>