



COMPRESSED GAS ASSOCIATION, INC.

# TECHNICAL BULLETIN

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## GUIDELINES FOR THE PROPER HANDLING AND USE OF CGA 630/710 SERIES ULTRA HIGH INTEGRITY SERVICE CONNECTIONS

### Background

In 1989, the Compressed Gas Association, Inc., (CGA) approved a new group of cylinder valve outlet connections assigned as the CGA 630/710 series. This series was conceived to provide higher purity and leak integrity than previous connections. Extensive design and testing was undertaken by CGA's Cylinder Valve Committee, formerly known as the Connections Standards Committee, to fulfill these requirements. Refer to drawings 630 and 710 in CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections* for complete design information [1].

### Description

The final design resulted in a connection that is unique in appearance and uses a more precise and sophisticated sealing mechanism than other CGA connections (see Figure 1).

- The sealing mechanism consists of a precision-machined gasket between a pair of precision-machined, polished circular ridges called toroids, one located in the valve outlet and one located in the nipple;
- The valve outlet is extended to permit the incorporation of the diameter index safety system (DISS), anti-rotational slots, and flow-limiting devices;
- Noninterchangeability of connections is achieved in the DISS system by a series of increasing and decreasing diameters in the valve outlets and in a recess on the nipples;
- The nipple has two keys or pins oriented 180 degrees apart, a recessed face to protect the toroid and retain the sealing gasket, and a notch to facilitate the gasket removal;
- The nut has two leak test holes and is internally silver plated; and
- The sealing gasket has a retaining clip, and its sealing surfaces are recessed for protection.

### Guidelines

The following guidelines are recommended for the proper functioning and maximum service life of the 630/710 series of connections. Failure to follow these guidelines can adversely affect the sealing of the connection and its useful life:

- A fully annealed nickel 200 gasket is the recommended metal sealing gasket (maximum hardness 100 Brinell). A new gasket with a sealing surface finish of 10 Ra (microinches) maximum and free of nicks and scratches shall be installed at each use. Used gaskets can cause damage to the toroids;
- A new Nickel 200 gasket is the recommended metal sealing gasket for use with the valve outlet seal cap in the shipment of cylinders containing flammable, pyrophoric, or toxic loadings with an  $LC_{50}$  of less than 1000 ppm when thermal cycling of the cylinder coincident to transportation conditions is likely;
- Other metals and polymeric materials, such as polychlorotrifluoroethylene (PCTFE), may be used for gaskets provided that the materials selected and the assembly method used do not compromise the leak integrity of the connection or outlet seal cap, and are compatible with the lading;
- Inspect the threads and sealing surfaces before each use. Do not connect parts that appear to be damaged;

- Use only gaskets designed for connections 630/710. The entire series uses the same size gasket;
- Keep new gaskets in their protective packaging until installed;
- Insert a gasket into the nipple by compressing its retaining clip and sliding the gasket into the nipple so the open ends of the retaining clip are opposite the thumb notch access in the nipple;
- 630/710 connections are permanently marked with the assigned CGA connection number. Always match these components before attempting to assemble them;
- Anti-rotational slots in the valves and keys on the nipples are meant only to prevent rotation between sealing surfaces during assembly when the normal clockwise tightening torque is applied to the CGA 630/710 nut. Torque applied directly to the nipple during or after assembled can damage the valve connection;
- Check before assembly that the gasket is retained by its clip in the nipple recess. Do not try to make a connection without a gasket. If back-purging is used before or during assembly, the gasket could be dislodged. To avoid this problem, minimal flows should be used when back-purging;
- Only use connecting nipples that have the anti-rotation device. This also applies to gas-tight outlet caps when using metal gaskets;
- When removing gaskets, always use the notch provided. If a tool must be used to remove the gasket, care should be taken not to deface or deform the toroid surface;
- Always use a torque wrench when tightening CGA 630/710 connections. The recommended torque value for these connections with a nickel 200 gasket is 35 ft-lb +5 ft-lb to –0 ft-lb (47 Nm +6.8 Nm to –0 Nm). Excessive torque will damage the connection and possibly result in a hazardous condition; and

NOTE—A torque value of 12 ft-lb +3 ft-lb to –0 ft-lb (16 Nm +4.1 Nm to –0 Nm) is recommended for PCTFE gaskets. Torque values and tolerances for other metals and polymeric materials shall be subject to specific user applications and manufacturer recommendations. It is recommended that alternate gasket materials be qualified in accordance with Appendix 1 of CGA V-1 [1].

- An assembled connection should be pressurized with inert gas and leak tested using a suitable leak detector before it is put in service. This is especially important with toxic and other dangerous products. If a leak is detected, the connection should be depressurized and remade using a new gasket at the recommended torque. Do not attempt to increase the torque to achieve a seal. If the leak is detected after the procedure has been repeated, the connection should be considered damaged. Contact your gas supplier for further assistance.

## Reference

Unless otherwise specified, the latest edition shall apply.

[1] CGA V-1, *Standard for Compressed Gas Cylinder Valve Outlet and Inlet Connections*, 4221 Walney Road, 5th Floor, Chantilly, VA 20151. [www.cganet.com](http://www.cganet.com)