

SAFETY BULLETIN

CYLINDER CONNECTIONS ON PORTABLE LIQUID CRYOGENIC CYLINDERS

Significant amounts of medical and industrial gases are being delivered in portable cryogenic vessels or dewars, most commonly the DOT-4L/TC-4LM series cylinders.

In December 2000, it was brought to the attention of the Compressed Gas Association (CGA) by the U.S. Food and Drug Administration (FDA) that fatalities had been caused by incidents where CGA outlet connections on DOT-4L/TC-4LM containers had been switched to connect such a cylinder to a distribution system containing product different from the product in the cylinder. In each case, the cylinder outlet connection was changed on a filled liquid cylinder that was properly labeled and ready for use. Cylinder outlet connections are easily removable with common hand tools when the CGA outlet connection is attached by a pipe-thread rather than by being permanently connected to the valve by brazing (lead-free solder), welding, or by using other tamper-resistant mechanisms.

There have been several reported incidents at industrial gas customers that were also caused by the switching of CGA connections. Based on these incidents, the container owner shall meet the following requirements.

Industrial DOT-4L/TC-4LM liquid cylinders

The outlet connection of an industrial liquid cylinder valve shall be:

- 1) A threaded or socket connection, brazed (lead-free solder), welded, or attached by other tamper-resistant methods to the valve body in a manner that prevents removal or would render the connection or valve body outlet unusable if removal was attempted or accomplished;
- 2) A permanent and integral part of the valve body; or
- 3) A threaded connection with a device that deters removal of the fitting and provides indication that removal was attempted or accomplished.

Medical DOT-4L/TC-4LM liquid cylinders

The outlet connection of a medical liquid cylinder valve shall be:

- 1) A threaded or socket connection, brazed (lead-free solder), welded, or attached by other tamper-resistant methods to the valve body in a manner that prevents removal or would render the connection or valve body outlet unusable if removal was attempted or accomplished; or
- 2) A permanent and integral part of the valve body.

Only trained and qualified personnel with knowledge of proper safety precautions shall perform required modifications specified in this safety bulletin.

All DOT-4L/TC-4LM liquid cylinders shall be labeled in accordance with [CGA C-7](#), *Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers* and have additional product identification visible from all directions with minimum 2 in (51 mm) high letters (such as 360 degree wrap-around tape for medical liquid cylinders) [1].

In addition to the product identification, a statement should be added to the cylinder warning against changing or force fitting connections, or the use of adapters on cylinder connections.

Never use adapters or try to change CGA connections on the cylinder when trying to attach to a product distribution connection.

Users of cryogenic liquid cylinders and related equipment should be familiar with the characteristics and safe handling of gases as outlined in [CGA P-1, Safe Handling of Compressed Gases in Containers](#) and [CGA P-2, Characteristics and Safe Handling of Medical Gases](#) [2, 3].

References

Unless otherwise specified, the latest edition shall apply.

[1] [CGA C-7, Guide to the Preparation of Precautionary Labeling and Marking of Compressed Gas Containers](#), Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

[2] [CGA P-1, Safe Handling of Compressed Gases in Containers](#), Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

[3] [CGA P-2, Characteristics and Safe Handling of Medical Gases](#), Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantilly, VA 20151. www.cganet.com

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