



## CLINICAL POLICY

### Handling and Use of Compressed Gases

**A. EFFECTIVE DATE:**

June 21, 2021

**B. PURPOSE:**

To cover general procedures for the safe handling and storage of all compressed gas cylinders and provide recommended safe practices for the handling, storage and transport of cylinders.

**C. POLICY:**

**D. SCOPE:**

- A. All UConn Health faculty, staff and contractors that use, handle, store or transport compressed gas cylinders.
- B. Only experienced and properly instructed personnel are to handle compressed gases.

**E. DEFINITIONS:**

**NFPA 55 3.3.49.1\* Compressed Gas.** A material, or mixture of materials, that (1) is a gas at 68°F (20°C) or less at an absolute pressure of 14.7 psi (101.3 kPa) and (2) has a boiling point of 68°F (20°C) or less at an absolute pressure of 14.7 psi (101.3 kPa) and that is liquefied, non-liquefied, or in solution, except those gases that have no other health or physical hazard properties are not considered to be compressed gases until the pressure in the packaging exceeds an absolute pressure of 40.6 psi (280 kPa) at 68°F (20°C).

**F. MATERIAL(S) NEEDED:**

None

**G. PROCEDURE:**

**General Information:**

- a. Tanks of compressed gases must be brought into the Hospital through the West Receiving Dock or to a designated storage location in a clinical area.
- b. Cylinders are not to be filled or trans-filled to mix gases at UConn Health.
- c. Only aluminum grab and go/e-tanks are to be utilized in all UCH locations.

**Identification of Gas Cylinders:**

- a. Cylinders of gas must be properly identified as to their contents. If the marking on the cylinder is not clear, or the color does not agree with the following codes, the cylinder should not be used. Return it to the onsite Airgas technician.

Note color codes alone cannot be relied upon for identification, proper labeling must also be present.

Types of Gas	Cylinder Color	Types of Gas	Cylinder Color
Air	Yellow	Nitrogen	Black
Carbon Dioxide	Gray	Nitrous Oxide	Blue
Carbon Dioxide/Oxygen	Gray & Green	Oxygen	Green
Helium/Oxygen	Brown & Green	Oxygen/Nitrogen	Green & Black

- b. At the time of each use, personnel should verify the tank’s contents and determine if the remaining quantity of gas is adequate for the intended use period. Use the UCH Cylinder Tag to indicate cylinder status (e.g., Full, In—Use, Empty). A pressurized gas cylinder is considered “full” if the contents pressure gauge shows 2000 psi and “empty” if the contents pressure gauge shows less than 500 psi.
- c. Do not deface or remove any markings on a cylinder.
- d. When a cylinder is empty, tear off In-Use tag to leave the Empty sign showing.
- e. If using a cylinder in the MRI area, only those marked “MRI safe” or “Non Magnetic” are allowed to be used.

**Transporting and Storing Gas Cylinders:**

- a. Move cylinders using a suitable hand truck or cart.
- b. Cylinders must be transported, stored and used upright, and must be securely fastened to prevent them from falling or being knocked over. Suitable racks, straps, chains or stands are required to support cylinders

**NFPA 55 7.1.11.5 Temperature Extremes.** Compressed gas cylinders, containers, and tanks, whether full or partially full, shall not be exposed to temperatures exceeding 125°F (52°C) or sub-ambient (low) temperatures unless designed for use under such exposure.

**NFPA 55 7.1.11.5.1** Compressed gas cylinders, containers, and tanks that have not been designed for use under elevated temperature conditions shall not be exposed to direct sunlight outdoors where ambient temperatures exceed 125°F (52°C). The use of a weather protected structure or shaded environment for storage or use shall be permitted as a means to protect against direct exposure to sunlight.

- c. Every cylinder must be kept secured at all times; whether in use or in storage.
- d. “Oxytote” oxygen small cylinders, also known as “Grab and Go” and “Walk about” are designed with integrated regulator, contents gauge, flowmeter valve, and carrying handle. These special cylinders may be hand-carried between storage locations for placement in cylinder holders on beds, stretchers, wheelchairs or in a cylinder cart. It is imperative that these special cylinders be stored in cylinder carts, racks and secured when not in use. They must NOT be left standing on their base, placed on their side on the floor or bed surface. They must always be secured in a proper holder or rack when in use and when stored, as is the case for all medical gas cylinders.

**Using Compressed Gases:**

- a. Only regulators and other devices approved to be compatible with the gas should be used. Special threads and pin indexing are used as a safety feature. If a regulator must be forced to fit the valve of the cylinder or if the regulator does not seal properly on the valve stem double check that you have the correct cylinder.
- b. Never permit oil, grease, or other readily combustible substances to come in to contact with cylinders, valves, regulators, gauges, hoses, and fittings. Oil and certain gases such as oxygen or nitrous oxide may combine with explosive force. Do not handle with oily hands or tools.
- c. Do not modify a regulator or connection. If difficulties occur, contact Clinical Engineering, as the wrong or inappropriate part may be present.
- d. Keep connections tight to prevent leakage. When mounting a regulator on a small (e-cylinder), do not reuse the gasket. The gasket should be removed and discarded and a new gasket installed. Gaskets are available from the Airgas onsite technician who is stationed at the West Receiving dock, if not supplied with the

cylinder. Verify that the regulator's pin-indexing safety system pins are in place and that the pins match the holes on the gas cylinder. This ensures a correct match between medical gas cylinder and the regulator.

- e. When a hose is used, make certain the hose and end fittings are in good condition and make airtight connections.
- f. Slowly open the cylinder valve to a fully open position when it is put into use. If appropriate, keep the cylinder valve closed when not in use.
- g. Never use tools on a valve other than those specified for use on medical gases.
- h. Never hammer the valve wheel in an attempt to open or to close it.

**Questions or Problems Regarding Gas Cylinders:**

- a. Questions or problems with respiratory gases, regulators, cylinders, and compressed gases should be directed to Clinical Engineering.
- b. Use of compressed gases throughout UConn Health is also covered by UConn Health guidelines on this subject. This policy is consistent with the UConn Health guidelines, but staff using such gases in research must also consult the UConn Health guidelines. UConn Health guidelines are available from the office of Environmental Health & Safety.

**H. ATTACHMENTS:**

None

**I. REFERENCES:**

Connecticut Fire Prevention Code  
NFPA 55 Compressed Gases and Cryogenic Fluids Code  
NFPA 99 Healthcare Facilities Code  
and referenced standards of the above codes

**J. SEARCH WORDS:**

None

**K. ENFORCEMENT:**

Violations of this policy or associated procedures may result in appropriate disciplinary measures in accordance with University By-Laws, General Rules of Conduct for All University Employees, applicable collective bargaining agreements, the University of Connecticut Student Code, other applicable University Policies, or as outlined in any procedures document related to this policy.

Potential Fines and imprisonment CGS 29-291c (a) and (e)

Sec. 29-291c. State Fire Prevention Code: Abatement of certain conditions, injunction, citation, penalties. (a) When the State Fire Marshal or a local fire marshal ascertains that there exists in any building, or upon any premises, a condition that violates the State Fire Prevention Code, the State Fire Marshal or local fire marshal shall order such condition remedied by the owner or occupant of such building or premises. Any such remedy shall be in conformance with all building codes, ordinances, rules and regulations of the municipality involved. Such owner or occupant shall be subject to the penalties prescribed by subsection (e) of this section and, in addition, may be fined fifty dollars a day for each day's continuance of each violation, to be recovered in a proper action in the name of the state.

(e) In addition to the fine prescribed in subsection (a) of this section, any person who violates any provision of the State Fire Prevention Code shall be fined not less than two hundred dollars or more than one thousand dollars or be imprisoned not more than six months, or both.

**L. STAKEHOLDER APPROVALS:**

On File

**M. COMMITTEE APPROVALS:**

None

**N. FINAL APPROVAL:**

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|--|---------------------------|
| <b>1.</b> <u>Bruce T. Liang, MD (Signed)</u><br>Bruce T. Liang, MD<br><b>Interim Chief Executive Officer &amp; EVP for Health Affairs<br/>Dean, School of Medicine</b> | <u>11/08/2022</u><br>Date |
| <b>2.</b> <u>Anne Horbatuck (Signed)</u><br>Anne D. Horbatuck, RN, BSN, MBA<br><b>Clinical Policy Committee Co-Chair</b>   | <u>11/02/2022</u><br>Date |
| <b>3.</b> <u>Scott Allen, MD (Signed)</u><br>Scott Allen, MD<br><b>Clinical Policy Committee Co-Chair</b>  | <u>11/04/2022</u><br>Date |
| <b>4.</b> <u>Caryl Ryan (Signed)</u><br>Caryl Ryan, MS, BSN, RN<br><b>Chief Operating Officer, JDH<br/>VP Quality and Patient Services &amp; Chief Nursing Officer</b> | <u>11/04/2022</u><br>Date |

**O. REVISION HISTORY:**

Date Issued: 6/21

Date Reviewed:

Date Revised: