

Idaho National Laboratory

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Subcontractors	Program Requirements Document	eCR Number: 609188
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Manual: INL Subcontractor Requirements

Entire Document Changed

1. PURPOSE

This document provides requirements for the use, transportation, and storage of compressed gas, to ensure that hazards are controlled to minimize the risk to employees, the public health and welfare, DOE leased property, and the environment. This document highlights requirements referenced in the “Source Requirements” section, as well as Contractor requirements. Any applicable regulatory or Contractor requirements must be followed, with the most stringent requirement being met.

2. APPLICABILITY

This document applies to all subcontractors who use, transport, or store compressed gases or who use high-pressure compressed gas systems at the INL, as specified in their contract with Contractor. This procedure does not cover the handling of fission-product gases, such as xenon or krypton, which are covered in rare gas recovery procedures.

Stricter requirements may be imposed by subcontractors upon their employees or sub-tier contractors. The requirements of this document must be followed by subcontractors; however, the means of implementation may vary as determined by the subcontractor.

3. REQUIREMENTS

The Use of compressed gases shall meet the requirements of 29 CFR 1926 Subpart F “Fire Protection and Prevention” and 29 CFR 1926 Subpart J “Welding and Cutting.” Additional requirements specific to the use of compressed gases are specified below.

3.1 General Requirements

- 3.1.1 Personnel who operate, maintain, or modify compressed gas equipment, systems, and associated equipment shall be trained to operate those systems safely before assignment. Training shall be repeated as needed to maintain proficiency.
- 3.1.2 Valve outlet connections shall comply with the Compressed Gas Association (CGA) V-1, American National, Canadian, and Compressed Gas Association Standard Compressed Gas Cylinder Valve Outlet and Inlet Connections.
- 3.1.3 Supervision shall conduct frequent surveillance to ensure compliance with this document.

3.2 Connecting and Using Compressed Gases

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- 3.2.1 Before a regulator is removed from a cylinder, the cylinder isolation valve shall be closed and the regulator shall be relieved of gas pressure.

NOTE: *Regulators do not need to be removed at the end of work shifts when it is impractical, provided that the cylinder is properly maintained in the upright position and is protected from falling objects.*

- 3.2.2 With the exception of ongoing processes or operations (for example, analytical instrumentation), regulators shall be removed from cylinders at the end of each work shift.
- 3.2.3 Compressed gas systems shall be protected by reverse flow or check valves if they could be contaminated by feedback or process materials; check valves and/or traps shall be checked and maintained on a regular schedule to ensure proper operation.
- 3.2.4 Flash-back arresters shall be placed at regulators and used with oxygen-fuel gas systems.
- 3.2.5 Leaking compressed gas systems shall be reported to supervision and safety personnel for corrective action as soon as they are discovered.
- 3.2.6 Empty cylinders shall be identified using a tag, label, or other marking and shall be removed from the work area.
- 3.2.7 Gas cylinders shall not be taken into confined spaces without proper evaluation and controls being in place (see RD-2000, Work Coordination and Hazard Control).

3.3 Transportation and Handling

NOTE: *An exception to requirement 3.3.1 is permitted in the case of breathing air cylinders or lecture bottles, which may be in a position other than vertical.*

- 3.3.1 Compressed gas cylinders shall be transported in an upright position and shall be securely restrained at about two-thirds their height (or as necessary to prevent the cylinder from falling), with the protective caps in place.
- 3.3.2 Valves shall be closed, regulators shall be removed, and valve-protection caps shall be installed (when provided) before cylinders are moved, unless the cylinders are firmly secured on a special carrier intended for this purpose and the valves are protected.
- 3.3.3 When cylinders are moved mechanically by crane or hoist, they shall be secured with chain or rope tiedowns to a cradle, platform, or specifically designed lifting device.

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- 3.3.4 Magnets or choker slings shall not be used to hoist or transport individual cylinders.
- 3.3.5 Cylinders shall not be lifted vertically by the cap, dropped, or permitted to strike violently against each other or against other surfaces.
- 3.3.6 A two-wheel or specially designed cylinder cart with a chain tiedown shall be used to move a cylinder within a building, where practical.
- 3.3.7 A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.

3.4 Storage Locations

- 3.4.1 Compressed gas cylinders shall be stored in assigned places that meet the following criteria:
 - A. cylinders will not be knocked over or damaged
 - B. the area is dry and well ventilated (for inside storage only)
 - C. cylinders will not be exposed to continuous dampness
 - D. cylinders are not near sources of intense heat such as furnaces, steam lines, or radiators
 - E. cylinders will be shaded from direct sunlight and not stored at temperatures above 125 degrees F.
- 3.4.2 For storage in subsurface locations, a documented safety review shall be obtained before cylinders are stored (see RD-2000, Work Coordination and Hazard Control).
- 3.4.3 Compressed gas storage areas shall be prominently posted with the names of the gases to be stored and a “No Smoking or Open Flames” sign.
- 3.4.4 The following precautions shall be followed when storing cylinders:
 - 3.4.4.1 Cylinders shall be placed so they cannot become part of an electric circuit.
 - 3.4.4.2 Cylinders shall not be stored in exit pathways.
 - 3.4.4.3 Cylinders shall be stored in the upright position.

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3.4.4.4 Cylinders shall be securely restrained to a firm structure, at about two-thirds their height.

3.4.4.5 Cylinders shall be kept far enough away from hot work so that sparks, hot slag, or flames will not reach them (if this is not possible, fire-resistant shields shall be provided for the cylinders).

3.5 Fuel Gas and Oxygen Manifolds

3.5.1 Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least 1-inch high, either painted on the manifold or on a sign permanently attached to it.

3.5.2 Fuel gas and oxygen manifolds shall be placed in safe, well ventilated, and accessible locations.

3.5.3 Manifold hose connections between fuel gas and oxygen manifolds and supply header connections shall not be interchangeable.

NOTE 1: *All manifold design and use needs to go through a safety review (see RD -2000, Work Coordination and Hazard Control) to ensure compliance with applicable standards.*

NOTE 2: *Some gases may carry solvents with them (for example, acetone in acetylene) or corrosive contaminants (for example, water vapor in chlorine or hydrogen chloride).*

3.5.4 Manifold systems shall be designed and manufactured of materials suitable for the particular gas, potential contaminants, and service for which they are intended and in compliance with OSHA, ANSI, and CGA standards, and National Fire Protection Association (NFPA) Standards 50, 51, 51B, and 55.

4. DEFINITIONS

For definitions of terms used throughout the INL Subcontractor Requirements Manual, refer to LST-359.

5. REFERENCES

5.1 Source Documents

29 CFR 1910.252, Welding, Cutting, and Brazing General Requirements

29 CFR 1910.253, Oxygen-Fuel Gas Welding and Cutting

29 CFR 1926.350, Gas Welding and Cutting

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29 CFR 1926.352, Fire Prevention

29 CFR 1926.353, Ventilation and Protection in Welding, Cutting, and Heating

CGA V-1, American National, Canadian, and Compressed Gas Association

Standard Compressed Gas Cylinder Valve Outlet and Inlet Connections

5.2 Related Requirements

The following documents may also contain requirements that apply to this activity:

RD-2000, Work Coordination and Hazard Control

RD-2010, Welding, Cutting, and Other Hot Work

RD-2201, Flammable and Combustible Liquid Storage and Handling.