

## Chapter 10

### Gas Cylinders



#### Purpose:

This chapter addresses the policies and procedures to be followed in the storage, transportation and supply of gas cylinders at Hanford.



#### Scope:

The following topics are covered in this chapter

- ❖ Application
- ❖ Construction and Testing
- ❖ Marking and Labeling
- ❖ Hazard Labels
- ❖ Valves and Caps
- ❖ Transportation and Handling
- ❖ Storage
- ❖ Standards for Gas Cylinders
- ❖ Welding and Cutting
- ❖ Inspection and Testing
- ❖ References
- ❖ Attachments



#### Application:

1. Cylinders for the storage, transportation, and supply of compressed gases or compressed liquified gases on the Hanford Site shall comply with the referenced documents and with the requirements in this chapter. For a complete definition of compressed gas, see 49 CFR 173.300.
2. These rules apply to vessels in compressed gas service. Such vessels must have been constructed according to recognized specifications such as those of the DOT or the ASME Unfired Pressure Vessel Code.
3. Vendor owned cylinders must also comply with the construction, testing, and labeling requirements of DOT regulations and with the valve specifications of ANSI. Tagging shall be used for information such as “empty,” ownership, destination, cylinder or valve condition, etc.
4. Vendor cylinders that do not comply with these minimum requirements shall not be issued for use but shall be returned to the vendor.



### Construction and Testing:

1. Compressed gas cylinders must be constructed, tested, and stamped as prescribed by DOT regulations.
2. Government owned or controlled cylinders shall have the name of the contents stenciled on the cylinder. The color of the name lettering shall contrast with the basic colors of the cylinder.
3. Specifications under which a cylinder was built must be clearly legible.
4. Portable fire extinguisher cylinders shall be tested according to NFPA 10.
5. Re-testing must be performed according to Dot requirements (usually by the water jacket method). The period between re-tests shall be as required by DOT.
6. Cylinders that are dented, deformed, or otherwise show evidence of possible damage shall not be used until reworked and re-tested according to DOT regulations.



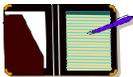
### Marking and Labeling:

1. All cylinders shall be identified by name of the contained gas stenciled with approximately 2" letters using contrasting color. The bottom of such lettering will be one inch above the shoulder of the cylinder and perpendicular to the long axis of the cylinder. Except that on acetylene type cylinders with dished heads, the top of such lettering shall be one inch below the shoulder. Cylinders smaller than the usual 200 pound size may be identified with proportionally reduced lettering.
2. 49 CFR 173.34 is the basic reference for labeling and tagging. Where doubt exists as to the proper label, the local safety authority shall be consulted.



### Hazard Labels:

Compressed gas cylinders containing hazardous materials must have the proper warning label applied before they are shipped off site. The definitions of hazardous materials and the descriptions of the required labels are to be found in DOT regulations (49 CFR).



### Valves and Caps:

1. Valves and connections used on compressed gas cylinders shall be as specified in ANSI B 57.1. Necessary adapters shall be in the custody of the local safety authority. Cylinders containing air for human respiration shall be fitted with connection No. 1340 as specified in ANSI B 57.1, except where an alternate fitting listed in ANSI B 57.1 is specifically approved by the local authority.
2. When there is no specification for valves and/or connectors for a particular situation, the local safety authority shall decide what shall be used.
3. When cylinders are provided with caps, or intended to have caps, the caps shall be in a place at all times, except when the cylinders are in use or connected to system ready for use.



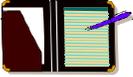
### Transportation and Handling:

1. Compressed gas cylinders shall be transported and stored in the upright position. They shall be securely restrained at about two-thirds their height. Protective caps when provided or intended shall be in place. An exception shall be permitted in the case of breathing air cylinders which are affixed as part of a bank to be transported for the purpose of recharge of fixed systems or to supply breathing air directly. In such cases, the position of the cylinders may be other than vertical and caps may be replaced by other means of valve protection.
2. Cylinders shall be handled carefully. They shall not be rolled on their sides or dragged on the bottom side. They may be rolled on the bottom edge while tipped slightly from the vertical.
3. When cylinders are handled mechanically, every precaution shall be taken to prevent their falling and to prevent scratches, gouges, or other damage from the handling equipment.



### Storage:

1. Cylinders containing combustible materials must be separated from oxidizing agents by at least twenty feet distance or fire rated barrier walls.



2. Cylinders shall be stored upright, properly secured, and with caps in place. They shall be located out of traffic lanes and protected from damage by vehicles and mechanical equipment.
  
3. Cylinders stored out-of-doors shall be shall be protected from the weather to prevent overheating and icing. Minimum protection shall be an all weather non-combustible floor and roof.

**Standards for Gas Cylinders:**

This section outlines the responsibilities and procedures in connection with compressed gas cylinder color coding, standardizes the cylinder valve outlets to insure compliance with ICC Regulations relative to cylinder testing and shipping requirements.

**Responsibilities:**

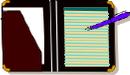
1. Unless specifically covered here, questions concerning the use of bottled gas cylinders shall be referred to the safety representative of the using contractor in whose area the cylinder is to be used.
  
2. The Contractor Safety Department must be contacted for color code and valve outlet size assignment before ordering or shipping any material not covered by this section and contained in Hanford-owned compression gas cylinders.
  
3. It will be the responsibility of the using organizations to see that cylinders used under their jurisdiction meet the provisions of this section.
  
4. Compressed gas cylinders filled at the Hanford will be filled according to ICC Regulations.

**Cylinder Identification:**

Hanford-owned and/or controlled cylinders suggested color listing (not mandatory). This does not apply to vendor owned cylinders.

1. Suggested cylinder color coding:

Acetylene	Black body
Argon	2/3 brown body, top 1/3 green
97% Argon, 3% CO2	2/3 blue body, top 1/3 brown
90% Argon, 10% Methane	2/3/ brown body, top 1/3 red
Breathing Air	2/3 blue body, top 1/3/ white
Chlorine	Light brown body
CO2	2/3/ blue body, top 1/3 black
CO2 (Fire)	Red body
Compressed Air	Black body with yellow name band on shoulder



Freon	White body
Helium	2/3 gray body, top 1/3 orange
Hydrogen	2/3 olive drab body, top 1/3 blue
Methane	Brown body
Nitrogen-oil pumped	2/3 olive drab body, top 1/3 red
Nitrogen-water pumped	Gray body, two black 3" stripes 2" apart, "Water pumped Nitrogen" on side.
Oxygen (Medical)	Green Body same as industrial oxygen where USP 99.8 standard is used
Prestolite B	Olive drab

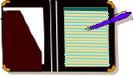
2. Color coding of cylinders will be repainted when identification is doubtful due to condition of the paint.
3. All cylinders shall be identified by name of the contained gas painted approximately 2" letters a contrasting color. The bottom of such lettering will be one inch above the shoulder of the cylinder and perpendicular to the long axis of the cylinder. Except on acetylene type cylinders (ref. ASA Z48.1-1954) with dished head, the top of such lettering shall be one inch below the shoulder.
4. Cylinders smaller than the usual 200 pound size may be identified with proportionately reduced lettering.

Cylinder Valve Outlets:

1. DOE-owner cylinders.
  - A. Cylinder valve outlets on DOE-owned and/or -controlled cylinders shall be in accordance with ASA B-57.1-1965.
  - B. Adapters when required will be controlled by the safety representative at the using installation.
2. Vendor or other privately owned cylinders.
  - A. Cylinder valve outlets shall be in accordance with ASA B57-1.1965.
  - B. Adapters when required to meet the ASA Standard will be controlled by the safety representative at the using installation.
3. Breathing Air cylinders.  
Valve outlet shall be same as Air for Human Consumption connection No. 1340.

Inspection and Testing:

- A. Cylinders shall be tested and shipped according to ICC Regulations.



- B. When any doubt exists as to the soundness of a cylinder it must be tested event though it is between the five year test periods required by ICC Regulations.
- C. Cylinders must be purged, fitted with proper valve outlet, repainted and tested before being filled with a gas different from that which it contained previously.
- D. When the contest of a cylinder are in doubt, that cylinder a shall not be used.



#### **Welding and Cutting:**

Compressed gases shall be used for welding and cutting in accordance with Part IV of this series and 29 CFR 1910.252.



#### **Inspection and Testing:**

Cylinders in compressed gas service shall be regularly inspected and tested as required by 49 CFR 173.34. See Attachment 1.



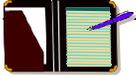
#### **References:**

- ❖ R.M. Graziano's Tariff No.31, "Hazardous Materials Regulations of the Department of Transportation." (DOT Regulations)
- ❖ 49 CFR, Parts 171-179 and 14 CFR, Part 103, "Hazardous Materials Regulations."
- ❖ ANSI Z 48.1, "Method of Marking Portable Compressed Gas Containers to Identify the Material Contained."
- ❖ ANSI B 57.1, "Compressed Gas Cylinder Valve Outlet and Inlet Connections."
- ❖ NFPA 10, "Standard for Portable Fire Extinguishers."
- ❖ 29 CFR 1910.166 and 1910.252, OSHA Safety and Health Standards.



#### **Attachments:**

- ❖ Attachment 1: *Compressed Gas Cylinders Inspection and Testing Records*



**Attachment 1:**

*Compressed Gas Cylinders Inspection and Testing Records*



Please insert a copy of applicable records following this page or indicate the location of these records on the form below.

<b>Facility Name:</b>		
<b>Records Location:</b>	<b>Initial:</b>	<b>Date:</b>