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**RECORD OF REVISIONS**

<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>POC</b>	<b>RM</b>
0	9/17/2014	Initial issue. Some material an update of Section I, Rev. 3 articles 14, 15, etc.	Ari Ben Swartz, <i>ES-EPD</i>	Larry Goen, <i>ES-DO</i>

**Contact the Standards POC for upkeep, interpretation, and variance issues.**

<b>Chapter 17</b>	<a href="#"><u>Pressure Safety POC and Committee</u></a>
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This document is online at <http://engstandards.lanl.gov>

Note: This document is not to be used for new pressure systems that include boilers, pressure vessels, air receivers, or supporting piping (see Chapter 17 Section ASME), nor DOT, OSHA, etc. (see Section GEN).

Note: Piping that does not meet an attached equivalency evaluation must meet all Section ASME requirements (including but not limited to B31.3, B31.9, etc.)

## 1.0 NEW FABRICATION

- A. Piping that is not part of a “supporting piping system” but is within the scope of [B31.3](#) or [B31.9](#) may apply the applicable, approved equivalency evaluations in the Attachments (e.g., *NASME-1*, *NASME -2*)
- B. In order to be eligible for the attached equivalencies, the piping system cannot have a boiler, pressure vessel, or air receiver as part of the pressure system or be part of the supporting piping system.

*From ESM Ch 17 Section GEN Attachment GEN-1 Definitions and Acronyms:*

*“Supporting piping systems” shall be considered any and or all the piping necessary for the function of the process or system for all pressure vessels, boilers, and air receivers. Piping that is attached in excess of that required for the process or system operation is not “supporting piping.” For LANL, the system boundaries are defined by ESM Chapter 1, Section 220, and Chapter 1, Section 210, Attachment A. In practical applications to separate “supporting piping” from non-supporting piping, a unique pressure safety system identification number in accordance with ESM Chapter 17 will be used to identify piping that is considered to be non-supporting piping. All pressure systems are required to meet the requirements of ESM Chapter 17.*

## 2.0 DOT, IM, AND UM PORTABLE TANKS

- A. Special Instructions for DOT-4L Cylinders<sup>1</sup>

WARNING: A cylinder used for CO<sub>2</sub> service must remain CO<sub>2</sub> service and must not be used for other gas products, especially oxygen or nitrous oxide.

1. Follow the manufacturer’s instructions for service and maintenance
2. Excessive loss of product or excessive build-up of pressure is an indication of possible loss of vacuum in the vacuum jacket. Follow the manufacturer’s instructions for troubleshooting.
3. If frost spots appear in a non-uniform manner, or are in miscellaneous areas the cylinder may have internal damage and will need to be removed from service until repaired (call cylinder manufacturer for details.)
4. Relief devices must be maintained as defined in this document
5. Where manufacturer recommends checking the set point of relief devices in place, the method must be performed as defined in this document.
6. Solidified contents in cylinders (CO<sub>2</sub>) must be re-liquefied per the manufacturer’s instructions.

- B. Inspection Frequencies

1. Records of DOT, IM, and UM vessel inspection and certification reports must be made available upon request.
2. Owners of DOT, IM, and UM vessels must maintain their DOT vessels certified within the inspection interval frequency.

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<sup>1</sup> Chart Industries, Inc., “Liquid Cylinder” Users Manual P/N 10642912 Date:12/00

3. DOT, IM, or UM vessels that are not permanently installed in a pressure system must comply with the retest frequencies in CFR Title 49, 180.209. The following table displays the inspection frequencies and retest pressure for cylinders, but does not contain all the requirements of the CFR. The system owner is advised to carefully review the applicable sections.

**Table 14-1 Cylinder Inspection Frequencies and Retest Pressures**

Specification under which cylinder was made	Minimum retest pressure (psig)	Retest period (years)
DOT-3	3000 psig	5
DOT-3A, 3AA	5/3 times service pressure, except non-corrosive service *	5, 10, or 12 *
DOT-3AL	5/3 times service pressure	5 or 12 *
DOT-3AX, 3AAX	5/3 times service pressure	5
3B, 3BN	2 times service pressure	5 or 10 *
3C	Retest not required	Retest not required
3D	5/3 times service pressure	5
3E	Retest Not Required	Retest not required
3HT	5/3 times service pressure	3 *
3T	5/3 times service pressure	5
4	700 psig	10
4A	5/3 Times service pressure *	5 or 10 *
4AA480	2 times service pressure	5 or 10 *
4B, 4BA, 4BW, 4B-240ET	2 times service pressure except non-corrosive*	5, 10, or 12 *
4C	Retest not required	Retest not required
4D, 4DA, 4DS	2 times service pressure	5
DOT-4E	2 times service pressure except non-corrosive*	5
4L	Retest not required	Retest not required
8, 8AL	-	10 or 20*
DOT-9	400 psig (maximum 600)	5
25	500 psig	5
26 (for filling over 450 psig)	5/3 times service pressure	5
26 (for filling at 450 psig)	2 times service pressure	5
33	800 psig	5
38	500 psig	5
Special Permit Cylinder	See current special permit.	See current special permit
Foreign Cylinder (see CFR Title 49 section 173.301(j) for restrictions on use).	As marked on the cylinder, but not less than 5/3 of any service or working pressure marking.	5
*See CFR Title 49 Section 173.34(e) for specific instructions for types of vessels.		

4. The following table displays the NBIC inspection frequencies for DOT, IM, and UM portable tanks and vessels. Portable vessels must be maintained within their inspection due dates.<sup>2</sup>

**Table 14-2 Portable Tank and Vessel Inspection Frequencies (DOT, IM, and UM)**

Specification	Periodic Inspection and Test	Intermediate Periodic Inspection and Test
UM or UN Portable Tanks once placed in service	5 years	2-1/2 years
DOT 51 Portable Tanks	5 years	-
DOT 56 or DOT 57 Portable Tanks (the first periodic inspection and test is required 4 years after being placed into service and each 2-1/2 years thereafter.)	2-1/2 years	-
DOT 60 Portable Tanks (the first periodic inspection and test is required 4 years after being placed into service and the per the schedule to the right)	For the first 12 years of service, every 2 years.	After 12 years of service, yearly.
Retesting is not required on a rubber lined tank, except before relining.		
For IM and UN Portable Tanks, periodic inspection and test must include at least an internal and external of the portable tank and fittings, taking into account the hazardous material intended to be transported.		

### **3.0 MOBILE PRESSURE SYSTEMS AND TRANSPORT TANKS**

#### **A. Definitions**

1. LANL-owned mobile pressure vessels and tanks [Category 406 (4 psi)] are subject to the requirements of this document. These systems and vessels include, but are not limited, to the following:
  - a. ASME Section XII vessels
  - b. Portable tanks for transporting cryogenic fluids (greater than 120 gallons), not part of a Road-Tank vehicle.
  - c. Rail Tanks
  - d. Cargo Tanks – Intended primarily for the carriage of liquids or gases and includes appurtenances, reinforcements, fittings, and closures. Is permanently attached to or forms a part of a motor vehicle, or is not permanently attached to a motor vehicle but which by reason of its size, construction, or attachment to a motor vehicle is loaded or unloaded without being removed from the motor vehicle. Is not fabricated under a specification for cylinders, portable tanks, tank cars, or multi-unit tank car tanks.
2. Pressure vessel designs within the scope of Section XII are as follows:
  - a. Full vacuum to 3000 psig

<sup>2</sup> NBIC Part-2 Table S6.14, Inspection Intervals

- b. Temperature range is between -452°F to 650°F
    - c. Thickness of shells and heads does not exceed 1.5 inches.
- B. Procurement
  - 1. Transport tanks must be procured with the ASME (T) stamp symbol.
  - 2. Mobile pressure systems and transport tanks that do not bear the ASME stamp symbol must be evaluated as equivalent through engineering calculations.
- C. Pressure Relief Devices
  - 1. Must comply with the tolerances and capacities as defined by ASME Section VIII, and must be installed as defined in ASME Section XII, paragraph TR-130.
  - 2. Must be code stamped relief devices (UV) or (UD). ASME Section VIII stamped components are authorized to be used on (U) stamped vessels provided the requirements of Section XII are met as defined in ASME Section XII, Article TG-120.2.
  - 3. Must comply with the re-test/replace intervals, as specified in this Chapter.
- D. Piping, Valves, and Fittings
  - 1. Each connection must be clearly labeled to indicate its function
  - 2. Piping, valves and fittings must be grouped and protected from damage.
  - 3. Must comply with ASME B31.3 as defined by ASME Section XII.
- E. Pressure System Documentation Package Required Initial Contents
  - 1. The manufacturer’s data report (T-1A, B, or C) and/or partial data report.
  - 2. Relief valve calculations, recall date, and set pressure.
- F. Repairs and Alterations
  - 1. Must be performed by an institution holding the (TR) stamp, in accordance with NBIC/NB-23, and as defined in ASME Section XII Part TP.
  - 2. Must be documented and maintained in the pressure system documentation package.
- G. Tests and Inspections
  - 1. Testing and inspection must be performed as defined in ASME Section XII, Articles TP-4 and TP-5.
  - 2. Records of inspections must be maintained in the pressure system documentation package as defined in ASME Section XII, Article TP-6.

**4.0 ATTACHMENTS**

NASME-1	B31.3 Equivalent Safety Evaluations:
NASME-1-A	Category D Non-Metallic Requirements for Piping Not Associated with Pressure Vessel, Boilers, or Air Receivers
NASME-1-B	Category Normal Non-Metallic Requirements for Piping Not Associated with Pressure Vessel, Boilers, or Air Receivers
NASME-1-C	Normal Fluid Service Requirements for Metallic Piping Not Associated with Pressure Vessel, Boilers, or Air Receivers

NASME-1-D	Category D Requirements for Metallic Piping not Associated with Pressure Vessel, Boilers, or Air Receivers
NASME-2	B31.9 Equivalent Safety Evaluations (future)