Designation: ~~D5631 – 11~~ D5631 – 15

Standard Practice for Handling, Transportation, and Storage of Halon 1301, Bromotrifluoromethane (CF_3Br)[1]

This standard is issued under the fixed designation D5631; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This practice covers guidance and direction to suppliers, recyclers, reclaimers, purchasers, and users in the handling, transportation, and storage of Halon 1301.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are ~~for information only.~~mathematical conversions to SI units that are provided for information only and are not considered standard.

1.3 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and to determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

~~D5632~~D5632/D5632M Specification for Halon 1301, Bromotrifluoromethane (CF_3Br)

2.2 *CGA Standards:*[3]

C-1 Methods for ~~Hydrostatic~~Pressure Testing ~~of~~ Compressed Gas Cylinders

C-6 ~~Standards~~Standard for Visual Inspection of Steel Compressed Gas Cylinders

C-7 Guide to ~~Preparation of Precautionary Labeling and Marking of Compressed Gas Containers~~Classification and Labeling of Compressed Gases

P-1 Standard for Safe Handling of Compressed Gases in Containers

~~S-1.1 Pressure Relief Device Standards – Part 1 – Cylinders for Compressed Gases~~

~~S-1.2 Pressure Relief Device Standards – Part 2 – Cargo and Portable Tanks for Compressed Gases~~

~~S-1.3 Pressure Relief Device Standards – Part 3 – Stationary Storage Containers for Compressed Gases~~

SB-1 Safety Bulletin: Hazards of Refilling or Reusing Compressed Refrigerant (Halogenated Hydrocarbon) Gas Cylinders

SB-5 Safety Bulletin: Hazards of Reusing Disposable Refrigerant (Halogenated Hydrocarbon) Gas Cylinders

SB-18 Safety Bulletin: Use of Refrigerant (Halogenated Hydrocarbon) Recovery Cylinders

2.3 *U.S. Government Standards:*[4]

~~Code of Federal Regulations~~CFR Title 40, Part 82.106, ~~(CFR) Title 40, Part 82.106~~Environmental Protection Agency, Warning Statement Requirements

CFR Title 49, Part 172, U.S. DOT, Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

~~Code of Federal Regulations~~CFR Title 49, Part 173, ~~(CFR) Title 49, Part 173, U.S. Department of Transportation (DOT)~~ U.S. DOT, Specifications, Shippers-General Requirements for Shipping and Packagings

~~Code of Federal Regulations~~CFR Title 49, Part 178, ~~(CFR) Title 49, Part 178, U.S. DOT~~U.S. DOT, Specifications for Packagings

~~Code of Federal Regulations~~CFR Title 49, Part 180, ~~(CFR) Title 49, Part 180,~~ U.S. DOT, Continuing Qualification and Maintenance of Packagings

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[1] This practice is under the jurisdiction of ASTM Committee D26 on Halogenated Organic Solvents and Fire Extinguishing Agents and is the direct responsibility of Subcommittee D26.09 on Fire Extinguishing Agents.

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[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

[3] Available from ~~the Compressed Gas Association.~~Compressed Gas Association, 14501 George Carter Way, Suite 103, Chantille, VA 20151, http://www.cganet.com.

[4] Available from ~~Superintendent of Documents,~~ U.S. Government ~~Printing Office, Washington, DC 20036.~~Publishing Office, 732 N. Capitol St., NW, Washington, DC 20401-0001, http://www.gpo.gov.

2.4 *Other ~~Documents:~~Document:*[5]

Safety Guide for Decommissioning Halon Systems, Volume 2 of the U.S. Environmental Protection Agency Outreach ~~Report,~~Report: Moving Towards a World Without Halon

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *containers*—storage vessel for Halon 1301.

3.1.2 *cylinders*—containers of Halon 1301.

3.1.3 *Halon 1301*—bromotrifluoromethane, a compound used to inert or suppress a fire or explosion hazard.

3.1.4 *insulated*—placed in an isolated situation to protect and prevent the transfer of damage.

4. Significance and Use

4.1 This practice provides requirements for the handling, transportation, and storage of Halon 1301 encountered in distribution through both commercial and military channels. It is intended to ensure that Halon 1301 is handled, transported, and stored in such a way that its physical property values are not degraded. Transport may be by various means, such as, but not limited to, highway, rail, water, and air.

5. Practice

5.1 To ensure safe handling, loading, storing, and transporting of material, personnel shall be trained in the CGA publications, CFR regulations, and other documents, as listed in Sections 2.2, 2.3, and 2.4, respectively.

5.2 *Handling:*

5.2.1 Handling shall be in accordance with CGA Publication ~~No P-1,~~ P-1 Standard for Safe Handling of Compressed Gases in Containers and as specified by the manufacturer.

5.2.1.1 Personnel who handle or store, or both, cylinders of Halon 1301 shall be trained properly to recognize and identify the characteristics of the product and the proper methods of safely handling full, partly full, and empty cylinders.

5.2.2 All Halon transfers between storage containers and recycling processes shall be performed by personnel trained in handling procedures.

5.2.3 Halon 1301 recycling and transfer processes shall be in conjunction with the equipment requirements specified by the manufacturer.

5.2.4 Halon handling shall be in nonsmoking, heater-free, ventilated areas to preclude product accumulation. Provisions shall be made to ensure that service areas limit Halon 1301 concentrations to not exceed 10 % by volume for 1 min and 0.1 % ~~for~~ by volume for a time-weighted exposure of 8 h.

5.2.5 Cylinders shall not be over filled. The maximum permitted filling density for Type II product in accordance with Specification ~~D5632~~D5632/D5632M shall be 77 lb/ft^3 (1233 kg/m^3). The maximum permitted filling density for Type I product in accordance with Specification ~~D5632~~D5632/D5632M shall be ~~70~~ 70 lb ~~lb/ft~~/ft^3 ~~(1121~~ (1121 kg ~~kg/m~~/m^3). The liquid portion of the liquefied gas shall not completely fill the container's internal volume and the pressure shall not exceed five fourths the service pressure of the container at any temperature up to and including 130°F (54°C). The filling density requirements for pure specification quality (Type II) product are specified in CFR Title ~~49 CFR~~49, Parts 173.304 and 173.305.

5.2.6 Handling of materials should be done in a manner that prevents contamination ~~of~~for commingling of materials other than Halon 1301.

5.2.7 Cylinders shall be free of dirt and contamination that would contribute to or would cause deterioration of the product during shipment or storage. Precautions should be taken to prevent the entry of oil, water, or any other foreign matter into the container. Unique coatings or preservatives applied prior to shipment to protect the containers are not considered contamination.

5.3 *Transportation:*

5.3.1 ~~Shipment of materials between distributors, collectors, recyclers, and reclaimers~~ Transportation shall be as specified in accordance with the DOT regulations ~~Title 49 CFR.~~of CFR Title 49.

5.3.1.1 Shipment of materials between distributors, collectors, recyclers, and reclaimers should be within approved DOT guidelines for Class 2.2, regulated materials. Any further provisions for special transportation or packaging should be agreed upon between the collectors, recyclers, and reclaimers.

5.3.1.2 The minimum design pressure requirements shall be as stated in CFR Title ~~49 CFR~~ 49, Part ~~173.301.~~173.304. The pressure inside the container at 70°F (21°C) shall not exceed the service pressure for which the container is marked. The pressure inside the container at 130°F (54°C) shall not exceed five fourths the service pressure for which the container is marked. Fig. 1 illustrates the effect of temperature on cylinders filled with mixtures of Halon 1301 and nitrogen.

[5] Available ~~by means of the Internet: http://www.halon.org/pdfs/intro.pdf~~ from Halon Recycling Corporation, 1001 19th St., N, Suite 1200, Arlington, VA 22209, http://www.halon.org/safe.php.