Designation: D6127 – 11 (Reapproved 2015)

Standard Practice for Handling, Transportation, and Storage of HFC-23 (Trifluoromethane, CHF_3)[1]

This standard is issued under the fixed designation D6127; 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, purchasers, and users in the handling, transportation, and storage of HFC-23.

1.2 The values stated in inch-pound units are to be regarded as standard. The values given in parentheses are 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 determine the applicability of regulatory limitations prior to use.*

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D6126/D6126M Specification for HFC-23 (Trifluoromethane, CHF_3)

2.2 *CGA Standards:*[3]

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

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

P-1 Safe Handling of Compressed Gases in Containers

SB-1 Hazards of Refilling 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 Environmental Protection Agency, Warning Statement Requirements

Code of Federal Regulations (CFR) Title 49, Part 172 U.S. Department of Transportation (DOT), Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, and Training Requirements

Code of Federal Regulations (CFR) Title 49, Part 172.101 U.S. DOT, Tables of Hazardous Materials and Special Provisions

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

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

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

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *containers*—storage vessel for HFC-23.

3.1.2 *cylinders*—containers of HFC-23.

3.1.3 *HFC-23*—trifluoromethane, 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 HFC-23 encountered in distribution through both commercial and military channels. It is intended to ensure that HFC-23 is handled, transported, and stored in such a way its physical property values are not degraded. Transport may be by various means, such as, but not limited to, highway, rail, water, and air.

[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 Compressed Gas Association (CGA), 14501 George Carter Way, Suite 103, Chantilly, VA 20151-1788, http://www.cganet.com.

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

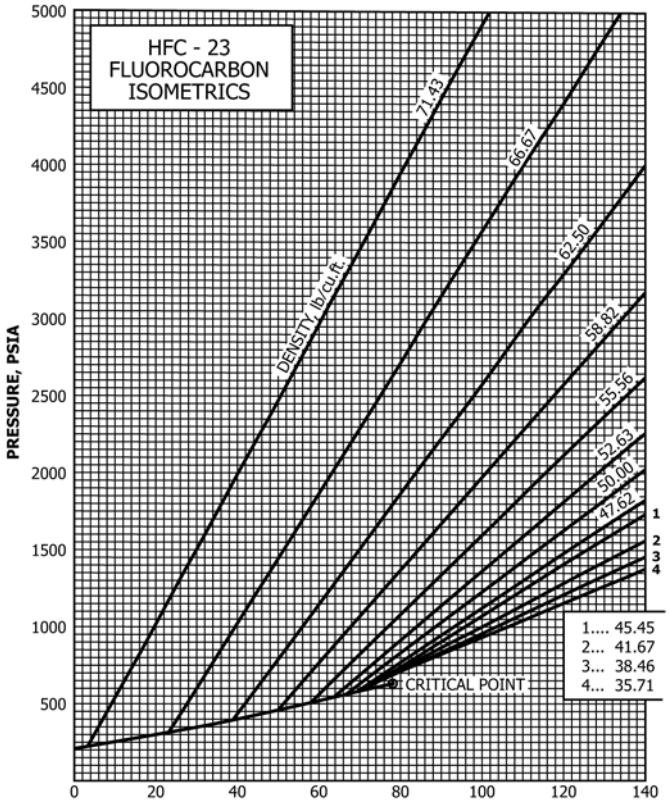

FIG. 1 HFC-23 Fluorocarbon Isometrics

5. Practice

5.1 To ensure safe handling, loading, unloading, storing, and transporting of material, personnel shall be trained in the CGA publications and Title 49 CFR regulations as listed in 2.2 and 2.3, respectively.

5.2 *Handling:*

5.2.1 Handling shall be in accordance with P-1.

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

5.2.2 All HFC-23 transfers between storage containers and recycling processes shall be performed by personnel trained in handling procedures.

5.2.2.1 HFC-23 recycling and transfer processes shall be in conjunction with the equipment specified by the manufacturer.

5.2.3 HFC-23 handling shall be in nonsmoking, heater-free, ventilated areas to preclude product accumulation. Provisions shall be made to ensure that service areas limit HFC-23 concentrations to not exceed 30 % for 1 min and 0.1 % for 8 h.

5.2.4 Cylinders shall not be overfilled. The liquid portion of HFC-23 must not completely fill the container's internal volume at any temperature up to and including 130°F (54°C). Filling density requirements are specified in Code of Federal Regulations (CFR) Title 49, Part 173 and Title 49 CFR, 173.305.

5.2.5 Handling of materials should be done in a manner that prevents contamination or commingling of halocarbons other than HFC-23.

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

5.3 *Transportation:*

5.3.1 Transportation shall be as specified in accordance with DOT regulations of Title 49 CFR.

5.3.2 Transportation shall be in suitable vehicles to preclude cylinder damage by excessive mechanical vibration, shock, freezing, or deleterious high temperatures throughout the entire transport route.

5.3.2.1 Should cylinders be expected to be subjected to unacceptable transport conditions, the cylinders should be placed under insulated conditions.

5.3.3 Compressed gas cylinder permanent marking requirements shall be as specified under Code of Federal Regulations (CFR) Title 49, Part 178 and must be maintained in legible condition as required by Code of Federal Regulations (CFR) Title 49, Part 173. Warning labels shall be affixed to the cylinders conforming to requirements of Code of Federal Regulations (CFR) Title 40, Part 82.106.

5.4 *Storage:*

5.4.1 Storage shall be in accordance with P-1, in qualified cylinders in accordance with Code of Federal Regulations (CFR) Title 49, Part 173 and Code of Federal Regulations (CFR) Title 49, Part 178.

5.4.2 Cylinders should be stored in areas that will protect vessels form physical and environmental damage, and tampering from unauthorized personnel.

5.4.2.1 Facilities should be of construction and orientation so that safety requirements are fulfilled for storage of pressurized cylinders.

5.4.3 Storage cylinders shall be fitted with pressure release mechanisms to limit vessel pressure to not more than the rated working pressure of the container in use at any particular time.

5.4.3.1 Periodic hydrostatic testing and re-inspection of cylinders used for HFC-23 shall comply with Part 180 of Title 49 CFR.

5.4.4 Containers shall be clearly marked and labeled to identify whether the HFC-23 contained conforms to Specification D6126/D6126M.

5.4.5 Insulation shall be placed on pallets or shoring and provisions should be made to prevent excessive shock or thermal fluctuations to cylinders.

5.4.6 Cylinders shall be stored in a manner that will prevent contamination from external sources.

6. Keywords

6.1 CHF_3; compressed gas; compressed liquefied gas; cylinders; explosion suppressant; FE-13[5]; fire suppressant; handling; HFC-23; storage; transport; trifluoromethane

[5] FE-13 is a trademark of Dupont.