



Designation: D6127 – 21

# Standard Practice for Handling, Transportation, and Storage of HFC-23 (Trifluoromethane, CHF<sub>3</sub>)<sup>1</sup>

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, health, and environmental practices and determine the applicability of regulatory limitations prior to use.*

1.4 *This international standard was developed in accordance with internationally recognized principles on standardization established in the Decision on Principles for the Development of International Standards, Guides and Recommendations issued by the World Trade Organization Technical Barriers to Trade (TBT) Committee.*

## 2. Referenced Documents

- 2.1 *ASTM Standard*:<sup>2</sup> [ASTM D6126/D6126M Specification for HFC-23 \(Trifluoromethane, CHF<sub>3</sub>\)](#)
- 2.2 *CGA Standards*:<sup>3</sup>
  - C-6 Standards for Visual Inspection of Steel Compressed Gas Cylinders
  - C-7 Guide to Classification and Labeling of Compressed Gases
  - P-1 Standard for Safe Handling of Compressed Gases in Containers

<sup>1</sup> 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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<sup>2</sup> For referenced ASTM standards, visit the ASTM website, [www.astm.org](http://www.astm.org), or contact ASTM Customer Service at [service@astm.org](mailto:service@astm.org). For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

<sup>3</sup> Available from Compressed Gas Association (CGA), 8484 Westpark Drive, Suite 220, McLean, VA 22102, <http://www.cganet.com>.

- SB-1 Hazards of Refilling Compressed Refrigerant (halogenated hydrocarbon) Gas Cylinders
- SB-5 Hazards of Reusing Disposable Refrigerant (Halogenated Hydrocarbon) Gas Cylinders
- SB-18 Use of Refrigerant (Halogenated Hydrocarbon) Recovery Cylinders
- 2.3 *U.S. Government Standards*:<sup>4</sup>
  - 49 CFR Part 172 Hazardous Materials Table, Special Provisions, Hazardous Materials Communications, Emergency Response Information, Training Requirements, and Security Plan
  - 49 CFR Part 172.101 Purpose and Use of Hazardous Materials Table
  - 49 CFR Part 173 Shippers—General Requirements for Shipments and Packaging
  - 49 CFR Part 178 Specifications for Packagings
  - 49 CFR Part 180 Continuing Qualification and Maintenance of Packagings

## 3. Terminology

- 3.1 *Definitions of Terms Specific to This Standard*:
  - 3.1.1 *containers, n*—storage vessel for HFC-23.
  - 3.1.2 *cylinders, n*—containers of HFC-23.
  - 3.1.3 *HFC-23, n*—trifluoromethane, a compound used to inert or suppress a fire or explosion hazard.
  - 3.1.4 *insulated, adj*—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.

<sup>4</sup> Code of Federal Regulations (CFR) documents are available from U.S. Government Publishing Office (GPO), 732 N. Capitol St., NW, Washington, DC 20401, <http://www.gpo.gov>.

5. Practice

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

5.2 Handling:

5.2.1 Handling shall be in accordance with CGA Publication P-1 and as specified by the manufacturer.

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.

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

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

5.2.5 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 49 CFR Part 173 and 49 CFR Part 173.305. Fig. 1 illustrates the effect of temperature on cylinders filled with HFC-23.

5.2.6 Handling of materials should be done in a manner that prevents contamination or comingling of materials other than HFC-23.

5.2.7 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 49 CFR regulations.

5.3.1.1 Shipment of materials between collectors, recyclers, and reclaimers should be within approved Department of Transportation (DOT) guidelines for Class 2, Division 2.2, regulated materials. Any further provisions for special transportation or packaging should be agreed upon between the collectors, recyclers, and reclaimers.

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 49 CFR Part 178 and must be maintained in legible condition as required by 49 CFR Part 173.

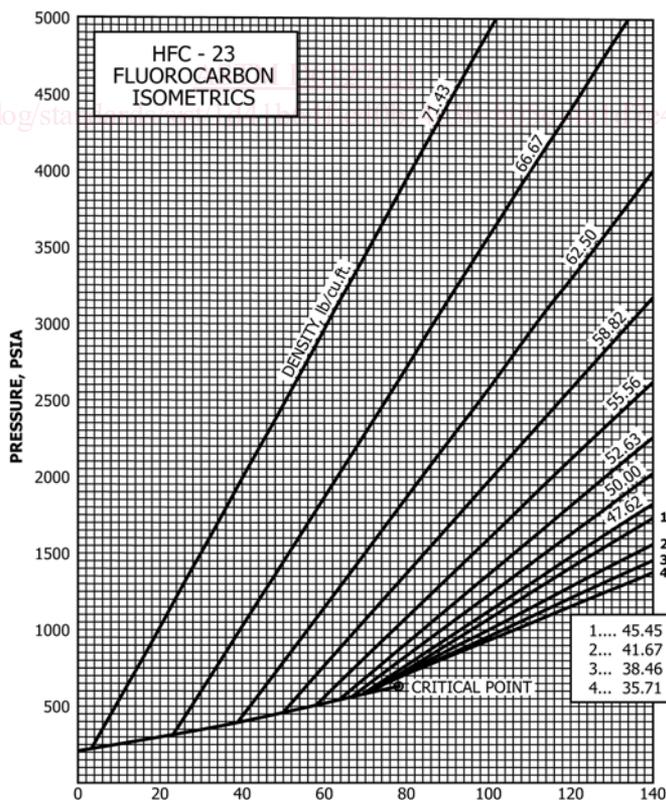


FIG. 1 HFC-23 Fluorocarbon Isometrics