Designation: D7122 – 17

Standard Specification for HCFC Blend B (CF_3CCl_2H, Ar, and CF_4)[1]

This standard is issued under the fixed designation D7122; 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 specification covers requirements for HCFC Blend B as a fire-fighting medium.

1.2 This specification does not address the fire-fighting equipment or hardware that employs HCFC Blend B or the conditions of employing such equipment (for example, handhelds, fixed installations, etc.).

1.3 This specification does not address the storage or transportation of HCFC Blend B. Storage, handling, and transportation issues are addressed in Practice D7123.

1.4 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.

1.5 The following safety hazards caveat pertains only to the test methods portion, Section 6, of this specification: *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.* Specific hazards statements are given in 4.5.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D6806 Practice for Analysis of Halogenated Organic Solvents and Their Admixtures by Gas Chromatography

D7123 Practice for Handling, Transportation, and Storage of HCFC Blend B (CF_3CCl_2H, Ar, and CF_4)

2.2 *ISO Standard:*[3]

ISO 3427 Gaseous Halogenated Hydrocarbons (Liquefied Gases)–Taking of a Sample

2.3 *ASHRAE Standard:*[4]

ASHRAE 34 Designation and Safety Classification of Refrigerants

2.4 *U.S. Government Standard:*[5]

CFR Title 49, Part 172, Subpart D, U.S. Department of Transportation (DOT), Marking Requirements of Packaging for Transportation

2.5 *AHRI Standard:*[6]

2008 Appendix C Analytical Procedures for AHRI Standard 700-2014

3. Terminology

3.1 *Definitions of Terms Specific to This Standard:*

3.1.1 *HCFC*—hydrochlorofluorocarbon; a chemical compound in which the compound molecule is comprised exclusively of hydrogen, chlorine, fluorine and carbon atoms.

3.1.2 *HCFC Blend B*—tertiary blend comprised primarily of HCFC-123 (2,2-dichloro-1,1,1-trifluoroethane); a compound used to inert, extinguish, or suppress a fire or explosion hazard. The blend also contains argon and tetrafluoromethane.

3.1.2.1 *Discussion*—The terminology system for fluorine-containing compounds (described in detail in ASHRAE Standard 34) provides a convenient means to reference the structure of individual compounds. By definition, the first digit of the numbering system represents one less than the number of carbon atoms in the compound molecule; the second digit, one more than the number of hydrogen atoms in the compound molecule; and the third digit, the number of fluorine atoms in the compound molecule. Unaccounted for valence requirements are assumed to be chlorine atoms. For example, the designation HCFC-123 indicates two carbon atoms (1 + 1), one hydrogen atom (2-1), three fluorine atoms (3), and two chlorine atoms (2 atoms required based on valence requirements). Example: CF_3CCl_2H = HCFC-123.

[1] This specification 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 American National Standards Institute (ANSI), 25 W. 43rd St., 4th Floor, New York, NY 10036, http://www.ansi.org.

[4] Available from American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE), 1791 Tullie Circle, NE, Atlanta, GA 30329, http://www.ashrae.org.

[5] Available from U.S. Government Publishing Office (GPO), 732 N. Capitol Street, NW, Washington, DC 20401-0001, http://www.gpo.gov.

[6] Available from Air-Conditioning, Heating, and Refrigeration Institute, 2111 Wilson Blvd., Suite 500, Arlington, VA 22201, http://www.ahrinet.org.

4. Material Requirements

4.1 The fill density of HCFC Blend B within a container should not exceed that needed to achieve complete filling of the container at the maximum envisaged storage temperature. For example, the fill density should not exceed 86 lb/ft^3 (1377 kg/m^3) for a maximum expected temperature of 130 °F (54 °C). Recommended fill density is 76 lb/ft^3 (1219 kg/m^3) or less.

4.2 HCFC Blend B shall conform to the requirements prescribed in Table 1 when tested by the appropriate test methods, such as those listed in Section 6.

4.3 When a material analysis is required, by agreement between the purchaser and the supplier, the total pressure in the HCFC Blend B container, the fill density of HCFC Blend B within the container and the maximum safe storage temperature shall be part of the material analysis (certification). The pressure shall be reported in pound-force per square inch gage (preferred) or bar. The fill density shall be reported in pounds per cubic foot at 70 °F (preferred) or kilograms per cubic meter at 21 °C. The maximum safe storage temperature of the HCFC Blend B container shall be reported in degrees Fahrenheit (preferred) or in degrees Celsius and shall conform to applicable regulations for the HCFC Blend B container design and use.

4.4 By agreement between the purchaser and the supplier, analysis may be required and limits established for elements or compounds not specified in Table 1.

4.5 Prolonged exposure to concentrations of HCFC Blend B in excess of 2 % by volume in air during periods of elevated adrenaline could produce cardiac arrhythmia in some personnel.

5. Sampling

5.1 Samples of HCFC Blend B, taken from the liquid phase, shall be taken from filled containers in accordance with the method specified in ISO 3427. The sampling cylinder shall be capable of safely resisting the vapor pressure of the sample at the highest temperature that could be encountered.

5.2 The HCFC Blend B selected in accordance with 5.1 shall be tested for quality conformance in accordance with Table 1. The presence of one or more defects shall be cause for rejection.

TABLE 1 Requirements

Property	Requirement
HCFC-123 Purity	99 %, mol/mol, min (exclusive of any argon or tetrafluoromethane present)
HCFC-123 Content	95 %, mol/mol, min
Argon Content	0.2 %, mol/mol, min
Tetrafluoromethane Content	0.4 %, mol/mol, min
Acidity	1.0 ppm by mass, as HCL, max
Water content	20 ppm by mass, max
Nonvolatile residue	0.01 % by weight, max
Suspended matter or sediment	none visible

6. Test Methods

6.1 *Purity*—Conduct the analysis in accordance with Practice D6806.

6.2 *Acidity*—Conduct the analysis in accordance with the method specified in 2008 Appendix C to AHRI Standard 700-2014, Part 1.

6.3 *Water Content*—Conduct the analysis in accordance with the method specified in 2008 Appendix C to AHRI Standard 700-2014, Part 2.

6.4 *Nonvolatile Residue*—Conduct the analysis in accordance with the method specified in 2008 Appendix C to AHRI Standard 700-2014, Part 3.

6.5 *Suspended Matter or Sediment*—While performing the nonvolatile residue analysis, examine visually for any suspended matter or sediment. Observation of any suspended matter or sediment shall constitute failure of the test.

7. Container, Packaging, and Package Marking

7.1 Containers used for shipping and storage of HCFC Blend B conforming to this specification shall be marked in accordance with Code of Federal Regulations (CFR) Title 49, Part 172, Subpart D. The proper shipping name is "UN1956, Compressed Gas, N.O.S., 2.2 (Contains Argon, Tetrafluoromethane)." In addition to DOT requirements, containers should be marked with the following information as a minimum:

7.1.1 Supplier's name and address,

7.1.2 HCFC Blend B, and

7.1.3 Statement that material conforms to Specification D7122.

8. Keywords

8.1 2,2-dichloro-1,1,1-trifluoroethane; argon; CF_3CCl_2H; fire extinguishant; fire suppressant; Halotron[7] I; HCFC-123; HCFC Blend B; tetrafluoromethane

[7] Halotron is a registered trademark of American Pacific Corporation.