



Designation: D 4995 – 004

## Standard Specification for Electronic and Degreasing Grades of 1,1,2-Trichloro 1,2,2,-Trifluoroethane Solvent<sup>1</sup>

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### 1. Scope

1.1 This specification establishes the requirements for three grades of trichlorotrifluoroethane solvent:

1.1.1 Type I electronic or ultra-clean grade,

1.1.2 Type II standard or vapor-degreasing grade, and

1.1.3 Type IIA general purpose, packaged in a pressurized container grade.

<sup>1</sup> This specification is under the jurisdiction of ASTM Committee D-26 on Halogenated Organic Solvents and Fire Extinguishing Agents and is the direct responsibility of Subcommittee D26.03 on Cold Cleaning.

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## 2. Referenced Documents

### 2.1 ASTM Standards:<sup>2</sup>

- D 1078 Test Method for Distillation Range of Volatile Organic Liquids  
 D 2109 Test Methods for Nonvolatile Matter in Halogenated Organic Solvents and Their Admixtures  
 D 3401 Test Methods for Water in Halogenated Organic Solvents and Their Admixtures  
 D 3443 Test Method for Chloride in Trichlorotrifluoroethane  
 D 3444 Test Method for Total Acid Number of Trichlorotrifluoroethane  
 D 34478 Test Method for Purity Specific Aqueous Conductance of Trichlorotrifluoroethane  
 D-3448 Test Method 3844 Practice for Specific Aqueous Conductance of Trichlorotrifluoroethane<sup>3</sup> Labeling Halogenated Hydrocarbon Solvent Containers  
 D 3684406 Practice for Labeling Analysis of Halogenated Hydrocarbon Solvent Containers<sup>3</sup> Organic Solvents and Their Admixtures by Gas Chromatography

### 2.2 Other Documents:<sup>3</sup>

- 29 CFR 1919.1200 Department of Labor, OSHA Regulations on Hazard Communications  
 49 CFR 100 to 199 Department of Transportation Hazardous Materials Regulations  
 PPP-C-2020 Federal Specification, Chemicals, Liquid, Dry and Paste: Packaging of<sup>4</sup>  
 STP 310A Handbook of Vapor-Degreasing<sup>5</sup>  
 STP 403A Cold Cleaning with Halogenated Solvents<sup>5</sup>

## 3. Classification

3.1 *Type I*—Type I solvent is intended for use in the cleaning of space vehicle components, precision assemblies, oxygen systems and electronic equipment by the processes of spraying, flushing, vapor degreasing, or ultrasonics. The solvent is especially applicable for cleaning precision parts and assemblies in clean rooms and for use as a medium in testing the cleanliness of components that are assumed to be clean.

3.2 *Types II and IIA*—Types II and IIA are typically used in vapor degreasing applications or in other processes where the requirements for purity and cleanliness are less stringent than those of a cleaning process using Type I solvent.

## 4. Properties

4.1 Electronic or ultra-clean and degreasing grades of trichlorotrifluoroethane shall conform to the requirements prescribed in Table 1.

<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*, Vol 06.04, volume information, refer to the standard's Document Summary page on the ASTM website.

*Annual Book*

<sup>3</sup> The Code of ASTM Standards, Vol 15.05, Federal Regulations may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

<sup>4</sup> The Code

<sup>4</sup> Copies of Federal Regulations may be obtained Specifications are available from the Superintendent of Documents, U.S. Government Printing Office, General Services Administration, Specification Unit WFSIS, 7th and D Street SW, Washington, DC 204026, or from General Services Administration Business Service Centers in Boston, New York, Philadelphia, Atlanta, Chicago, Kansas City, MO, Ft. Worth, Houston, Denver, San Francisco, Los Angeles, and Seattle, WA.

<sup>5</sup> Copies of Federal Specifications are available

<sup>5</sup> Available from General Services Administration, Specification Unit WFSIS, 7th and D Street SW, Washington, DC 20406, or from General Services Administration Business Service Centers in Boston, New York, Philadelphia, Atlanta, Chicago, Kansas City, MO, Ft. Worth, Houston, Denver, San Francisco, Los Angeles, and Seattle, WA. ASTM Headquarters, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959.

**TABLE 1 Chemical and Physical Properties<sup>A</sup>**

Property	Solvent Type			Test Method
	Type I	Type II	Type IIA	
Boiling point (at standard barometric pressure)	47.6 ± 0.2°C (117.6 ± 0.4°F)	47.6 ± 0.2°C (117.6 ± 0.4°F)	47.6 ± 0.2°C (117.6 ± 0.4°F)	D 1078
Chemical purity trichlorotrifluoroethane; percent, minimum (by weight)	99.9	99.8	99.8	D 3447
Chemical purity trichlorotrifluoroethane; percent, minimum (by weight)	99.9	99.8	99.8	D 6806
Balance of product	Other halogenated solvents	Other halogenated solvents	Other halogenated solvents	
Balance of product	Other halogenated solvents	Other halogenated solvents	Other halogenated solvents	D 6806
Moisture Content, ppm, maximum (by weight)	10	10	50	D 3401
Chloride Ion, ppm, max (by weight)	0.1	0.1	0.1	D 3443
Specific Aqueous Conductance <sup>B</sup> (µs/cm; max)	1.9	1.9		D 3448
Acid Number, mg KOH/g of sample, max	0.003	0.003		D 3444
Residue, ppm, max (by weight)	1	2	25	D 2109

<sup>A</sup> Properties apply to total trifluorotrchloroethane and do not specify distribution between isomers.

<sup>B</sup> Specific aqueous conductance test may be used as an alternate to chloride ion test for types I and II.

## **5. Packaging**

5.1 Package and label industrial or commercial quantities in accordance with DOT regulations in 49 CFR 100 to 199, in accordance with state and local regulations, in accordance with OSHA regulations found in 29 CFR 1910.1200, and in accordance with EPA regulations found in 40 CFR 82 Subpart E.

## **6. Keywords**

6.1 CFC-113; trichlorotrifluoroethane

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