

(3) all documents relating to the request for certification and all documents submitted therewith; and

(4) correspondence and other data material to the hearing.

(i) The hearing file will be available for inspection by the petitioner at the office of the Presiding Officer.

(j) An applicant may appear in person or may be represented by counsel or by any other duly authorized representative.

(k) The Presiding Officer, upon the request of any party or at his or her discretion, may arrange for a pre-hearing conference at a time and place he or she specifies. Such pre-hearing conferences will consider the following:

(1) Simplification of the issues;

(2) Stipulations, admissions of fact, and the introduction of documents;

(3) Limitation of the number of expert witnesses;

(4) Possibility of agreement disposing of any or all of the issues in dispute; and

(5) Such other matters as may aid in the disposition of the hearing, including such additional tests as may be agreed upon by the parties.

(l) The results of the conference shall be reduced to writing by the Presiding Officer and made part of the record.

(m) Hearings shall be conducted by the Presiding Officer in an informal but orderly and expeditious manner. The parties may offer oral or written evidence, subject to the exclusion by the Presiding Officer of irrelevant, immaterial, and repetitious evidence.

(n) Witnesses will not be required to testify under oath. However, the Presiding Officer shall call to the attention of witnesses that their statements may be subject to the provisions of 18 U.S.C. 1001, which imposes penalties for knowingly making false statements or representations or using false documents in any matter within the jurisdiction of any department or agency of the United States.

(o) Any witness may be examined or cross-examined by the Presiding Officer, the parties, or their representatives.

(p) Hearings shall be reported verbatim. Copies of transcripts of proceedings may be purchased by the petitioner from the reporter.

(q) All written statements, charts, tabulations, and similar data offered in evidence at the hearings shall, upon a showing satisfactory to the Presiding Officer of their authenticity, relevancy, and materiality, be received in evidence and shall constitute a part of the record.

(r) Oral argument may be permitted at the discretion of the Presiding Officer and shall be reported as part of the record unless otherwise ordered by the Presiding Officer.

(s) The Presiding Officer shall make an initial decision that shall include written findings and conclusions and the reasons or basis regarding all the material issues of fact, law, or discretion presented on the record. The findings, conclusions, and written decision shall be provided to the parties and made a part of the record. The initial decision shall become the decision of the Administrator without further proceedings, unless there is an appeal to the Administrator or motion for review by the Administrator within 20 days of the date the initial decision was filed.

(t) On appeal from or review of the initial decision, the Administrator or her or his designated representative shall have all the powers which he or she would have in making the initial decision, including the discretion to require or allow briefs, oral argument, the taking of additional evidence, or a remand to the Presiding Officer for additional proceedings. The decision by the Administrator or her or his designated representative shall include written findings and conclusions and the reasons or basis therefore on all the material issues of fact, law, or discretion presented on the appeal or considered in the review.

[68 FR 43809, July 24, 2003]

APPENDIX A TO SUBPART F OF PART 82—  
SPECIFICATIONS FOR FLUOROCARBON  
AND OTHER REFRIGERANTS

This appendix is based on the Air-Conditioning and Refrigeration Institute Standard 700-1995.

*Section 1. Purpose*

1.1 *Purpose.* The purpose of this standard is to evaluate and accept/reject refrigerants regardless of source (*i.e.*, new, reclaimed and/or repackaged) for use in new and existing

refrigeration and air-conditioning products as required under 40 CFR part 82.

1.1.1 *Intent.* This standard is intended for the guidance of the industry including manufacturers, refrigerant reclaimers, repackagers, distributors, installers, servicemen, contractors and for consumers.

1.1.2 *Review and Amendment.* This standard is subject to review and amendment as the technology advances.

#### Section 2. Scope

2.1 *Scope.* This standard specifies acceptable levels of contaminants (purity requirements) for various fluorocarbon and other refrigerants regardless of source and lists acceptable test methods. These refrigerants are R-113; R-123; R-11; R-114; R-124; R-12; R-401C; R-406A; R-500; R-401A; R-409A; R-401B; R-411A; R-22; R-411B; R-502; R-402B; R-408A; R-402A; R-13; R-503 as referenced in the ANSI/ASHRAE Standard 34-1992. (American Society of Heating, Refrigerating and Air-conditioning Engineers, Inc., Standard 34-1992). Copies may be obtained from ASHRAE Publications Sales, 1791 Tullie Circle, NE, Atlanta, GA 30329. Copies may also be inspected at Environmental Protection Agency; Office of Air and Radiation Docket; 1301 Constitution Ave., NW., Room B108; Washington, DC 20460.

#### Section 3. Definitions

3.1 “*Shall,*” “*Should,*” “*Recommended,*” or “*It Is Recommended.*” “*Shall,*” “*should,*” “*recommended,*” or “*it is recommended*” shall be interpreted as follows:

3.1.1 *Shall.* Where “shall” or “shall not” is used for a provision specified, that provision is mandatory if compliance with the appendix is claimed.

3.1.2 *Should, Recommended, or It is Recommended.* “Should”, “recommended”, or “it is recommended” is used to indicate provisions which are not mandatory but which are desirable as good practice.

#### Section 4. Characterization of Refrigerants and Contaminants

4.1 *Characterization.* Characterization of refrigerants and contaminants addressed are listed in the following general classifications:

##### 4.1.1 Characterization

- a. Gas Chromatography
- b. Boiling point and boiling point range

##### 4.1.2 Contaminants

- a. Water
- b. Chloride
- c. Acidity
- d. High boiling residue
- e. Particulates/solids
- f. Non-condensables
- g. Impurities including other refrigerants

#### Section 5. Sampling, Summary of Test Methods and Maximum Permissible Contaminant Levels

5.1 *Referee Test.* The referee test methods for the various contaminants are summarized in the following paragraphs. Detailed test procedures are included in *Appendix C to ARI Standard 700-1995: Analytical Procedures for ARI Standard 700-1995*, 1995, Air-Conditioning and Refrigeration Institute. *Appendix C to ARI Standard 700-1995* is incorporated by reference. [This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies may be obtained from the Air-Conditioning and Refrigeration Institute, 4301 North Fairfax Drive, Arlington, Virginia 22203. Copies may also be inspected at Public Docket No. A-92-01, Environmental Protection Agency, 1301 Constitution Ave., NW., Washington, DC, 20460 or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC.] If alternative test methods are employed, the user must be able to demonstrate that they produce results equivalent to the specified referee method.

##### 5.2 Refrigerant Sampling

5.2.1 *Sampling Precautions.* Special precautions should be taken to assure that representative samples are obtained for analysis. Sampling shall be done by trained laboratory personnel following accepted sampling and safety procedures.

5.2.2 *Gas Phase Sample.* A gas phase sample shall be obtained for determining the non-condensables. Since non-condensable gases, if present, will concentrate in the vapor phase of the refrigerant, care must be exercised to eliminate introduction of air during the sample transfer. Purging is not an acceptable procedure for a gas phase sample since it may introduce a foreign product. Since R-11, R-113, and R-123 have normal boiling points at or above room temperature, non-condensable determination is not required for these refrigerants.

5.2.2.1 *Connection.* The sample cylinder shall be connected to an evacuated gas sampling bulb by means of a manifold. The manifold should have a valve arrangement that facilitates evacuation of all connecting tubing leading to the sampling bulb.

5.2.2.2 *Equalizing Pressures.* After the manifold has been evacuated, close the valve to the pump and open the valve on the system. Allow the pressure to equilibrate and close valves.

5.2.3 *Liquid Phase Sample.* A liquid phase sample is required for all tests listed in this standard except the test for non-condensables.

5.2.3.1 *Preparation.* Place a clean, empty sample cylinder with the valve open in an oven at 110 °C (230 °F) for one hour. Remove it from the oven while hot, immediately connect to an evacuation system and evacuate

to less than 1 mm mercury (1000 microns). Close the valve and allow it to cool. Weigh the empty cylinder.

5.2.3.2 *Manifolding*. The valve and lines from the unit to be sampled shall be clean and dry. The cylinder shall be connected to an evacuated gas sampling cylinder by means of a manifold. The manifold should have a valve arrangement that facilitates evacuation of all connecting tubing leading to the sampling cylinder.

5.2.3.3 *Liquid Sampling*. After the manifold has been evacuated, close the valve to the pump and open the valve on the system. Take the sample as a liquid by chilling the sample cylinder slightly. Accurate analysis requires that the sample container be filled to at least 60% by volume, however under no circumstances should the cylinder be filled to more than 80% by volume. This can be accomplished by weighing the empty cylinder and then the cylinder with refrigerant. When the desired amount of refrigerant has been collected, close the valve(s) and disconnect the sample cylinder immediately.

5.2.3.4 *Record Weight*. Check the sample cylinder for leaks and record the gross weight.

### 5.3 Refrigerant Characterization.

5.3.1 *Primary Method*. The primary method shall be gas chromatography (GC) as described in *Appendix C to ARI Standard 700-1995*. The chromatogram of the sample shall be compared to known standards.

5.3.2 *Alternative Method*. Determination of the boiling point and boiling point range is an acceptable alternative test method which can be used to characterize refrigerants. The test method shall be that described in the Federal Specification for "Fluorocarbon Refrigerants," BB-F-1421 B, dated March 5, 1982, section 4.4.3.

5.3.3 *Required Values*. The required values for boiling point and boiling point range are given in Table 1A, *Physical Properties of Single Component Refrigerants*; Table 1B, *Physical Properties of Zeotropic Blends (400 Series Refrigerants)*; and Table 1C, *Physical Properties of Azeotropic Blends (500 Series Refrigerants)*.

### 5.4 Water Content.

5.4.1 *Method*. The Coulometric Karl Fischer Titration shall be the primary test method for determining the water content of refrigerants. This method is described in *Appendix C to ARI Standard 700-1995*. This method can be used for refrigerants that are either a liquid or a gas at room temperature, including refrigerants 11, 113, and 123. For all refrigerants, the sample for water analysis shall be taken from the liquid phase of the container to be tested. Proper operation of the analytical method requires special equipment and an experienced operator. The precision of the results is excellent if proper sampling and handling procedures are followed. Refrigerants containing a colored dye

can be successfully analyzed for water using this method.

5.4.2 *Limits*. The value for water content shall be expressed as parts per million (ppm) by weight and shall not exceed the maximum specified (see Tables 1A, 1B, and 1C).

### 5.5 Chloride.

The refrigerant shall be tested for chloride as an indication of the presence of hydrochloric acid and/or metal chlorides. The recommended procedure is intended for use with new or reclaimed refrigerants. Significant amounts of oil may interfere with the results by indicating a failure in the absence of chloride.

5.5.1 *Method*. The test method shall be that described in *Appendix C to ARI Standard 700-1995*. The test will show noticeable turbidity at chloride levels of about 3 ppm by weight or higher.

5.5.2 *Turbidity*. The results of the test shall not exhibit any sign of turbidity. Report the results as "pass" or "fail."

### 5.6 Acidity.

5.6.1 *Method*. The acidity test uses the titration principle to detect any compound that is highly soluble in water and ionizes as an acid. The test method shall be that described in *Appendix C to ARI Standard 700-1995*. This test may not be suitable for determination of high molecular weight organic acids; however these acids will be found in the high boiling residue test outlined in 5.7. The test requires a 100 to 120 gram sample and has a detection limit of 0.1 ppm by weight calculated as HCl.

5.6.2 *Limits*. The maximum permissible acidity is 1 ppm by weight as HCl.

### 5.7 High Boiling Residue.

5.7.1 *Method*. High boiling residue shall be determined by measuring the residue of a standard volume of refrigerant after evaporation. The refrigerant sample shall be evaporated at room temperature or at a temperature 45 °C (115 °F) for all refrigerants, except R-113 which shall be evaporated at 60 °C (140 °F), using a Goetz bulb as specified in *Appendix C to ARI Standard 700-1995*. Oils and/or organic acids will be captured by this method.

5.7.2 *Limits*. The value for high boiling residue shall be expressed as a percentage by volume and shall not exceed the maximum percent specified (see Tables 1A, 1B, and 1C). An alternative gravimetric method is described in *Appendix C to ARI Standard 700-1995*.

### 5.8 Method of Tests for Particulates and Solids.

5.8.1 *Method*. A measured amount of sample is evaporated from a Goetz bulb under controlled temperature conditions. The particulates/solids shall be determined by visual examination of the Goetz bulb prior to the evaporation of refrigerant. Presence of dirt, rust or other particulate contamination is reported as "fail." For details of this test

**Pt. 82, Subpt. F, App. A**

**40 CFR Ch. I (7-1-10 Edition)**

method, refer to Part 3 of *Appendix C to ARI Standard 700-1995*.

**5.9 Non-Condensables.**

**5.9.1 Sample.** A vapor phase sample shall be used for determination of non-condensables. Non-condensable gases consist primarily of air accumulated in the vapor phase of refrigerants. The solubility of air in the refrigerants liquid phase is extremely low and air is not significant as a liquid phase contaminant. The presence of non-condensable gases may reflect poor quality control in transferring refrigerants to storage tanks and cylinders.

**5.9.2 Method.** The test method shall be gas chromatography with a thermal conductivity detector as described in *Appendix C to ARI Standard 700-1995*.

**5.9.3 Limit.** The maximum level of non-condensables in the vapor phase of a refrigerant in a container shall not exceed 1.5% by volume (see Tables 1A, 1B, and 1C).

**5.10 Impurities, including Other Refrigerants.**

**5.10.1 Method.** The amount of other impurities including other refrigerants in the subject refrigerant shall be determined by gas chromatography as described in *Appendix C to ARI Standard 700-1995*.

**5.10.2 Limit.** The subject refrigerant shall not contain more than 0.5% by weight of impurities including other refrigerants (see Tables 1A, 1B, and 1C).

*Section 6. Reporting Procedure*

**6.1 Reporting Procedure.** The source (manufacturer, reclaimer or repackager) of the packaged refrigerant shall be identified. The refrigerant shall be identified by its accepted refrigerant number and/or its chemical name. Maximum permissible levels of contaminants are shown in Tables 1A, 1B, and 1C. Test results shall be tabulated in a like manner.

**Table 1A. Physical Properties of Single Component Refrigerants**

	REPORTING UNITS	REFEREN CE (SUBCLAS USE)	R-11	R-12	R-13	R-22	R-113	R-114	R-123	R-124
<b>CHARACTERISTICS:</b>										
BOILING POINT <sup>1</sup>	°F - 1.00 ATM	---	74.9	-21.6	-114.6	-41.4	117.6	38.8	82.6	12.2
	°C - 1.00 ATM	---	23.8	-29.8	-81.4	-40.8	47.6	3.8	27.9	-11.0
BOILING POINT RANGE <sup>1</sup>	K	---	0.3	0.3	0.5	0.3	0.3	0.3	0.3	0.3
TYPICAL ISOMER CONTENT	BY WEIGHT	---					0-1% R-113A	0-30% R-114A	0-8% R-123A	0-5% R-124A
VAPOR PHASE CONTAMINANTS:										
AIR AND OTHER NON-CONDENSABLES	% BY VOLUME - 25°C	5.9	N/A <sup>2</sup>	1.5	1.5	1.5	N/A <sup>2</sup>	1.5	N/A <sup>2</sup>	1.5
LIQUID PHASE CONTAMINANTS:										
WATER	PPM BY WEIGHT	5.4	20	10	10	10	20	10	20	10
ALL OTHER IMPURITIES INCLUDING REFRIGERANTS	% BY WEIGHT	5.1	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
HIGH BOILING RESIDUE	% BY VOLUME	5.7	0.01	0.01	0.05	0.01	0.03	0.01	0.01	0.01
PARTICULATES/SOLIDS	VISUALLY CLEAN TO PASS	5.8	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ACIDITY	PPM BY WEIGHT	5.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
CHLORIDES <sup>3</sup>	NO VISIBLE TURBIDITY	5.5	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS

**Table 1B. Physical Properties of Zeotropic Blends (400 Series Refrigerants)**

	REFORTIN G UNITS	REFERE NCE (SUBCLA USE)	R-401A	R-401B	R-402A	R-402B	R-406A <sup>3</sup>
<b>CHARACTERISTICS:</b>							
REFRIGERANT COMPONENTS			R-22/152A/124	R-22/152A/124	R-125/290/22	R-125/290/22	R-22/600A/142B
NOMINAL COMP. WEIGHT%			53/13/34	61/11/28	60/2/38	38/2/60	55/4/41
ALLOWABLE COMP. WEIGHT%			51-54/11.5-13.5/33-35	59-63/9.5-11.5/27-29	58-62/1-3/36-40	36-40/1-3/58-62	53-57/3-5/40-42
BOILING POINT <sup>1</sup>	°F · 1.00 ATM	---	-27.7 TO -18.1	-30.4 TO -21.2	-54.8 TO -53.9	-53.3 TO -49.0	-32.7 TO -15.0
	°C · 1.00 ATM	---	-33.2 TO -27.8	-34.7 TO -29.6	-48.2 TO -47.7	-47.4 TO -45.0	-36.0 TO -26.1
BOILING POINT RANGE <sup>1</sup>	K	---	5.4	5.1	0.5	2.4	9.9
VAPOR PHASE CONTAMINANTS:							
AIR AND OTHER NON- CONDENSABLES	% BY VOLUME 25°C	5.9	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS:							
WATER	PPM BY WEIGHT	5.4	10	10	10	10	10
ALL OTHER IMPURITIES INCLUDING REFRIGERANTS	% BY WEIGHT	5.1	0.50	0.50	0.50	0.50	0.50
HIGH BOILING RESIDUE	% BY VOLUME	5.7	0.01	0.01	0.01	0.01	0.01
PARTICULATES/SOLIDS	VISUALLY CLEAN TO PASS	5.8	PASS	PASS	PASS	PASS	PASS
ACIDITY	PPM BY WEIGHT	5.6	1.0	1.0	1.0	1.0	1.0

Table 1B (continued). Physical Properties of Zeotropic Blends (400 Series Refrigerants)										
	REPORTING UNITS	REFERENCE (SUBCLASS USE)	R-407C	R-408A	R-409A	R-410A	R-410B	R-411A <sup>3</sup>	R-411B <sup>3</sup>	
CHARACTERISTICS:										
REFRIGERANT COMPONENTS			R-32/125/134A	R125/143A/22	R22/124/142B	R32/125	R32/125	R1270/22/152A	R1270/22/152A	R-411B <sup>3</sup>
NOMINAL COMP. WEIGHT%			23/25/52	7/46/47	60/25/15	50/50	45/55	1.5/87.5/11.0	3/94/3	
ALLOWABLE COMP. WEIGHT%			22-24/23-27/50-54	5-9/45-47/45-49	58-62/23-27/14-16	48.5-50.5/49.4-51.5	44-46/54-56	0.5-1.5/87.5-89.5/10-11	2-3/94-96/2-3	
BOILING POINT <sup>1</sup>	F -1.00 ATM C -1.00 ATM	---	46.4 TO -33.0	-48.8 TO -47.9	-32.4 TO -18.2	-60.1 TO -60.0	-60.3 TO -60.2			
BOILING POINT RANGE <sup>1</sup>	K	---	-43.6 TO -36.6	-44.9 TO -44.4	-35.8 TO -27.9	-51.2 TO -51.1	-51.3 TO -51.2			
VAPOR PHASE CONTAMINANTS: AIR AND OTHER NON-CONDENSABLES	% BY VOLUME @ 25°C	5.9	7.0	0.5	7.9	0.1	0.1			
LIQUID PHASE CONTAMINANTS:										
WATER	PPM BY WEIGHT	5.4	10	10	10	10	10	10	10	10
ALL OTHER IMPURITIES INCLUDING REFRIGERANTS	% BY WEIGHT	5.1	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50
HIGH BOILING RESIDUE	% BY VOLUME	5.7	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
PARTICULATES/SOLIDS	VISUALLY CLEAN TO PASS	5.8	PASS	PASS	PASS	PASS	PASS	PASS	PASS	PASS
ACIDITY	PPM BY WEIGHT	5.6	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0

**Table 1C. Physical Properties of Azeotropic Blends (500 Series Refrigerants)**

	REPORTING UNITS	REFERENCE (SUBCLAUSE E)	R500	R502	R503	R507	R508 <sup>3</sup>
<b>CHARACTERISTICS:</b>							
REFRIGERANT COMPONENTS			R12/152A	R22/115	R23/13	R125/143A	R23/116
NOMINAL COMP. WEIGHT%			73.8/26.2	48.8/51.2	40.1/59.9	50/50	39/61
ALLOWABLE COMP. WEIGHT%			71.8-74.8/ 25.2-27.2	44.8-52.8/ 47.2-55.2	39-41/ 59-61	49-51/ 49-51	37-41/ 59-63
BOILING POINT <sup>1</sup>	° F · 1.00 ATM	---	-28.1	-49.7	-127.7	-52.1	-123.5
	° C · 1.00 ATM	---	-33.4	-45.4	-88.7	-46.7	-86.4
BOILING POINT RANGE <sup>1</sup>	K	---	0.5	0.5	0.5	0.5	0.5
VAPOR PHASE CONTAMINANTS:							
AIR AND OTHER NON-CONDENSABLES	% BY VOLUME 25°C	5.9	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS:							
WATER	PPM BY WEIGHT	5.4	10	10	10	10	10
ALL OTHER IMPURITIES INCLUDING REFRIGERANTS	% BY WEIGHT	5.1	0.50	0.50	0.50	0.50	0.50
HIGH BOILING RESIDUE	% BY VOLUME	5.7	0.05	0.01	0.01	0.01	0.01
PARTICULATES/SOLIDS	VISUALLY CLEAN TO PASS	5.8	PASS	PASS	PASS	PASS	PASS
ACIDITY	PPM BY WEIGHT	5.6	1.0	1.0	1.0	1.0	1.0
CHLORIDES <sup>2</sup>	NO VISIBLE TURBIDITY	5.5	PASS	PASS	PASS	PASS	PASS

<sup>1</sup> BOILING POINTS AND BOILING POINT RANGES, ALTHOUGH NOT REQUIRED, ARE PROVIDED FOR INFORMATIONAL PURPOSES.  
<sup>2</sup> RECOGNIZED CHLORIDE LEVEL FOR PASS/FAIL IS 3PPM.  
<sup>3</sup> SHADED COLUMNS DENOTE REFRIGERANTS FOR WHICH ANALYTICAL DATA IS NOT AVAILABLE.

APPENDIX A. REFERENCES—NORMATIVE

Listed here are all standards, handbooks, and other publications essential to the formation and implementation of the standard. All references in this appendix are considered as part of this standard.

ASHRAE *Terminology of Heating, Ventilating, Air Conditioning and Refrigeration*, American Society of Heating Refrigeration and Air-Conditioning Engineers, 1992, 1791 Tullie Circle NE., Atlanta, GA 30329-2305; U.S.A.

ASHRAE Standard 34-1992, *Number Designation and Safety Classification of Refrigerants*, American Society of Heating Refrigeration and Air-Conditioning Engineers, 1992, 1791 Tullie Circle NE., Atlanta, GA 30329-2305; U.S.A.

Appendix C to ARI Standard 700-1995: *Analytical Procedures to ARI Standard 700-1995, Specifications for Fluorocarbon and Other Refrigerants*, Air-Conditioning and Refrigeration Institute, 1995, 4301 North Fairfax Drive, Suite 425, Arlington, VA 22203; U.S.A.

Federal Specification for *Fluorocarbon Refrigerants, BB-F-1421-B*, dated March 5, 1992,

**Environmental Protection Agency**

**Pt. 82, Subpt. F, App. B1**

Office of the Federal Register, National Archives and Records Administration, 1992, 800 North Capitol Street, NW., Washington, D.C. 20402; U.S.A.

[69 FR 11981, Mar. 12, 2004]

**APPENDIX A1 TO SUBPART F OF PART 82—GENERIC MAXIMUM CONTAMINANT LEVELS**

Contaminant	Reporting units
Air and Other Non-condensables.	1.5% by volume @ 25 °C (N/A for refrigerants used in low-pressure appliances <sup>1</sup> ).
Water .....	10 ppm by weight 20 ppm by weight (for refrigerants used in low-pressure appliances <sup>1</sup> ).
Other Impurities Including Refrigerant.	0.50% by weight.
High boiling residue .....	0.01% by volume.
Particulates/solids .....	visually clean to pass.
Acidity .....	1.0 ppm by weight.
Chlorides (chloride level for pass/fail is 3ppm).	No visible turbidity.

<sup>1</sup> Low-pressure appliances means an appliance that uses a refrigerant with a liquid phase saturation pressure below 45 psia at 104 °F.

**BLEND COMPOSITIONS (WHERE APPLICABLE)**

Nominal composition (by weight%)	Allowable composition (by weight%)
Component constitutes 25% or more .....	±2.0
Component constitutes less than 25% but greater than 10% .....	±1.0
Component constitutes less than or equal to 10% .....	±0.5

[69 FR 11988, Mar. 12, 2004]

**APPENDIX B1 TO SUBPART F OF PART 82—PERFORMANCE OF REFRIGERANT RECOVERY, RECYCLING AND/OR RECLAIM EQUIPMENT**

This appendix is based on the Air-Conditioning and Refrigeration Institute Standard 740-1993.

**REFRIGERANT RECOVERY/RECYCLING EQUIPMENT**

*Section 1. Purpose*

1.1 *Purpose.* The purpose of this standard is to establish methods of testing for rating and evaluating the performance of refrigerant recovery, and/or recycling equipment, and general equipment requirements (herein referred to as "equipment") for containment or purity levels, capacity, speed, and purge loss to minimize emission into the atmosphere of designated refrigerants.

1.1.1 This standard is intended for the guidance of the industry, including manufacturers, refrigerant reclaimers, repackers,

distributors, installers, servicemen, contractors and for consumers.

1.1.2 This standard is not intended to be used as a guide in defining maximum levels of contaminants in recycled or reclaimed refrigerants used in various applications.

1.2 *Review and Amendment.* This standard is subject to review and amendment as the technology advances.

*Section 2. Scope*

2.1 *Scope.* This standard defines general equipment requirements and the test apparatus, test mixtures, sampling and analysis techniques that will be used to determine the performance of recovery and/or recycling equipment for various refrigerants including R11, R12, R13, R22, R113, R114, R123, R134a, R500, R502, and R503, as referenced in the ANSI/ASHRAE Standard 34-1992, "Number Designation of Refrigerants" (American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc.).

*Section 3. Definitions*

3.1 *Recovered refrigerant.* Refrigerant that has been removed from a system for the purpose of storage, recycling, reclamation or transportation.

3.2 *Recover.* Reference 40 CFR 82.152.

3.3 *Recycle.* Reference 40 CFR 82.152.

3.4 *Reclaim.* Reference 40 CFR 82.152.

3.5 *Standard Contaminated Refrigerant Sample.* A mixture of new and/or reclaimed refrigerant and specified quantities of identified contaminants which are representative of field obtained, used refrigerant samples and which constitute the mixture to be processed by the equipment under test.

3.6 *Push/Pull Method.* The push/pull refrigerant recovery method is defined as the process of transferring liquid refrigerant from a refrigeration system to a receiving vessel by lowering the pressure in the vessel and raising the pressure in the system, and by connecting a separate line between the system liquid port and the receiving vessel.

3.7 *Recycle Rate.* The amount of refrigerant processed (in pounds) divided by the time elapsed in the recycling mode in pounds per minute. For equipment which uses a separate recycling sequence, the recycle rate does not include the recovery rate (or elapsed time). For equipment which does not use a separate recycling sequence, the recycle rate is a maximum rate based solely on the higher of the liquid or vapor recovery rate, by which the rated contaminant levels can be achieved.

3.8 *Equipment Classification.*

3.8.1 *Self Contained Equipment.* A refrigerant recovery or recycling system which is capable of refrigerant extraction without the assistance of components contained within an air conditioning or refrigeration system.