Effective July 1, 2005 — December 31, 2005
• SUPERSEDES ALL PREVIOUS DIRECTORIES •

DIRECTORY OF

CERTIFIED REFRIGERANT RECOVERY/RECYCLING EQUIPMENT / 740

CERTIFIED RECLAIMED REFRIGERANTS / 700

CERTIFIED REFRIGERANT TESTING LABORATORIES / 700

This directory and the directories listed below, are mailed regularly and free on a limited basis upon written request on business letterhead to ARI from an individual or company in the air conditioning or allied industries. A directory will be sent automatically whenever a new edition is issued, unless ARI is requested to stop or the Post Office Department advises that the address is no longer deliverable.

For all requests, up to two copies are sent for free. For any additional copies, price per copy is $4.00.

Other certified products are published in ARI directories or can be found on line at www.ari.org as follows:

1. Directory of Certified Unitary Products

    - Unitary Air-Conditioners
    - Unitary Air-Source Heat Pumps
    - Sound Rated Outdoor Unitary Equipment

2. Directory of Certified Applied Air Conditioning Products

    - Air-Cooling and Air-Heating Coils
    - Centrifugal and Rotary Screw Water-Chilling Packages
    - Central Station Air-Handling Units
    - Ground Source Closed-Loop Heat Pumps
    - Ground Water-Source Heat Pumps
    - Positive Displacement Compressor and Air-Cooled Rotary Screw Water-Chilling Packages
    - Non-Condensable Gas Purge Equipment
    - Packaged Terminal Air Conditioners
    - Packaged Terminal Heat Pumps
    - Room Fan-Coils and Unit Ventilators
    - Unitary Large Equipment
    - Variable Air Volume Terminals
    - Water-Source Heat Pumps

3. Directory of Certified Transport Refrigeration Units

4. Directory of Certified Drinking-Water Coolers

5. Directory of Certified Automatic Commercial Ice-Cube Machines and Ice Storage Bins

CERTIFICATION PROGRAM REQUIREMENTS WILL BE AMENDED AS NECESSARY TO MEET THE REQUIREMENTS OF FEDERAL REGULATIONS AS THESE BECOME EFFECTIVE.

CONTENTS

NOTICE

This Program is sponsored and administered by the Air-Conditioning and Refrigeration Institute (ARI).

During the period for which the directory is effective, there may be some participants added or removed from the Program; also some refrigerants may be added, deleted or revised. In the event of any question regarding the listing of any refrigerant or participant, communicate directly with

Vice President, Engineering and Research
Air-Conditioning and Refrigeration Institute
4100 North Fairfax Drive, Suite 200
Arlington, VA 22203
e-mail: ari@ari.org
URL: www.ari.org

To the User of this Directory

This directory lists recovery, recovery/recycling and recycling equipment certified in accordance with ARI Standard 740, reclaimed refrigerants certified in accordance with ARI Standard 700, and refrigerant testing laboratories certifying refrigerant testing to ARI Standard 700.

The Air-Conditioning and Refrigeration Institute sponsors and administers certification programs to help ensure that industry products perform as rated.

PERSPECTIVE

The Air-Conditioning and Refrigeration Institute (ARI) is a voluntary, nonprofit organization comprised of the manufacturers of air conditioning, refrigeration, and heating products. More than 90 percent of the air conditioning and refrigeration machinery and components manufactured in the United States is produced by members of ARI.

ARI traces its history back to 1903 when the Ice Machine Builders' Association of the United States started. The Air-Conditioning and Refrigeration Institute was formed in 1953 through a merger of two related trade associations. Since that time several other related trade associations have been merged into ARI, making it the strong association that it is today.

Over the past 40 years, ARI has emerged as the major voice for the industry. Manufacturers are drawn to ARI membership in part because of the variety of services and benefits afforded those who participate in ARI activities. These activities include:

- Establishing standards for testing and rating products.
- Testing products to verify certified performance ratings, and publishing certification rating data.
- Providing representation and technical assistance to government entities in federal/state/local legislative and regulatory matters.
- International trade research and analysis.
- Public relations and promotional programs for the industry.
- Consumer education programs.
- Credit information services.
- Regular statistical reports on product shipments.

WHAT CERTIFICATION MEANS

Two of ARI's most important functions are the development of performance rating standards and the administration of performance certification programs for the eligible products. Each product section, with the support of the ARI engineering staff, may develop certification programs for the eligible products. Participation in the program is voluntary and open to non-members of ARI on an equal basis.
ARI regularly selects random samples of products to be tested by an independent laboratory under contract to ARI. The product is tested using procedures stipulated in the corresponding ARI standard to verify that it meets the manufacturer's certified published performance ratings.

The ARI certification label appearing on products has been an indication of verified performance for more than 40 years. Once a product is certified it is listed with its performance ratings in the

appropriate ARI directory. These directories serve as authoritative sources of specification and performance ratings for manufacturers, wholesalers, retailers, contractors, utilities, architects, engineers, and consumers.

REFRIGERANT RECOVERY/RECYCLING EQUIPMENT

This Directory of Certified Refrigerant Recovery/Recycling Equipment lists all eligible models of this type of equipment produced by each manufacturer participating in the certification program of the Air-Conditioning and Refrigeration Institute.

Listing in the directory means that the models have been certified by the manufacturers to ARI under the applicable standard to meet the performance ratings claimed for them by their producers under test conditions described in ARI Standard 740-1998. Listing does not constitute a recommendation by ARI regarding safety or reliability of any listed product.

Under the program, participating manufacturers must file certification data with ARI on all models produced within the scope of the program. ARI conducts standard performance tests of an average of 33% of each manufacturer's basic models each year in a verification-testing program.

In addition to evaluation of the certified data, and to the ARI ongoing random testing program, participating manufacturers which question certified ratings of competitors' models may request that those models be tested.

The manufacturer of a model which fails to pass the specified tests has two basic alternatives: rerate the model in question to reflect its tested performance, or stop production of that model.

If neither of the above solutions is accomplished, the manufacturer's right to use the ARI certification symbol on *all* of its models is withdrawn, and the manufacturer's name and listings are deleted from the directory.

The ARI certification program is designed to assure contractors and other equipment specifiers, as well as consumers, that products manufactured by a program participant have been accurately rated and thus are eligible for the ARI certification label.

RECLAIMED REFRIGERANTS

This Directory of Certified Reclaimed Refrigerants lists all reclaimers and refrigerants regularly processed by each reclaimer participating in the certification program of the Air-Conditioning and Refrigeration Institute.
Listing in the directory means that listed refrigerants have been certified by the reclaimer to ARI under the applicable standard to meet the purity claimed for them by the reclaimer under test conditions described in ARI Standard 700-1999. Listing does not constitute a recommendation by ARI regarding safety or reliability of any listed product.

Under the program, participating reclaimers must file certification data with ARI on all refrigerants reclaimed on a regular basis within the scope of the program. ARI conducts analysis of each reclaimer's refrigerant(s) each quarter of each year in a verification testing program.

In addition to evaluation of the certified data, and to the ARI ongoing random testing program, participating reclaimers which question certification of competitors' refrigerants may request that these refrigerants be tested.

The reclaimer of a refrigerant which fails to pass the specified tests must initiate corrective action or cease shipment of the failed reclaimed refrigerant.

If neither of the above solutions is accomplished, the reclaimer's right to use the ARI certification symbol on *all* of its refrigerants is withdrawn, and the reclaimer's name and listings are deleted from the directory.

The ARI certification program is designed to assure contractors, manufacturers and other refrigerant users, as well as consumers, that refrigerants reclaimed by a program participant have been accurately tested and thus are eligible for the ARI certification label.

REFRIGERANT TESTING LABORATORIES

This Directory of Certified Refrigerant Testing Laboratories lists all refrigerant testing laboratories, performing ARI-700 testing on any new or reclaimed refrigerants as covered by ARI Standard 700-2004, participating in the certification program of the Air-Conditioning and Refrigeration Institute.

Listing in the directory means that the listed laboratories have certified to ARI that they can accurately perform ARI Standard 700 testing of those refrigerants listed.

Under the program, the participating laboratory must submit requested information on the applicant's laboratory facilities, personnel, equipment and technical capability. A site visit is conducted to verify all data submitted by the certifying laboratory. In addition, the prospective laboratory shall analyze three "doped" samples and accurately determine, for each contaminant, whether it meets or fails to meet ARI Standard 700 purity and accurately determine the quantity, within acceptable range, of each contaminant in the sample.

In addition to the aforementioned qualification procedure, quarterly random tests are conducted on "doped" refrigerant samples. Laboratories that report incorrect results shall be subject to retests with more strict analysis and reporting requirements.
A participating laboratory that fails to pass the specified tests shall be terminated from the program. After a specified waiting period, the laboratory must requalify prior to reinstatement to the program.

The ARI certification program is designed to assure contractors, manufacturers and other refrigerant users, as well as consumers, that refrigerants tested by program participants have been accurately analyzed to ARI Standard 700.

ARI STANDARDS COVERED

ARI Standard 740-1998 for *Refrigerant Recovery/Recycling Equipment* was prepared to establish: definitions; requirements for testing and rating; requirements for specifications, literature and advertising; and conformance conditions.

ARI Standard 700-2004, *Specification for Fluorocarbon Refrigerants*, was prepared to establish: definitions; requirements for testing; requirements for specifications, literature and advertising; and conformance conditions.

Copies of these standards may be purchased from ARI and may be viewed on the Internet at http://www.ari.org.

SCOPE OF REFRIGERANT RECOVERY/RECYCLING EQUIPMENT CERTIFICATION PROGRAM

A. Standard

The program references ARI Standard 740-1998 for *Refrigerant Recovery/Recycling Equipment*.

Certification by manufacturers under this standard requires that the manufacturers' certified ratings are established per ARI Standard 740-1998.

B. Equipment Covered

Factory-made refrigerant recovery/recycling equipment models, certified to ARI, as defined in ARI Standard 740-1998, are included in this Program.

Refrigerant Recovery Equipment is defined as a device designed for the purpose of removal of refrigerant from a system for the purpose of storage, recycling, reclamation or transportation.

Refrigerant Recycling Equipment is defined as a device designed to reduce contaminants in used refrigerant by oil separation and single or multiple passes through devices which reduce moisture, acidity and particulate matter, such as replaceable core filter driers.

Refrigerant Recovery/Recycling Equipment is defined as a device designed for the purpose of removal of a refrigerant from a system and decontamination of the refrigerant for reintroduction to the system.

C. Basis of Participation

Participation in this Program by contract between participating manufacturers and ARI consists of:

1. Certification by the manufacturer to ARI that its model(s) comply with ARI Standard 740-1998.
2. Participation by the manufacturer in the random test program, at an independent testing laboratory under contract to ARI. Representatives of the testing agency select units for test from manufacturers' inventories.
3. Recovery and/or Recycling units shall have "passed" tests for Chlorides, Particulates and Refrigerant Loss due to Non-Condensable Purging, as applicable, as a minimum requirement for listing in the Directory.

D. Evidence of Participation

The qualified participating manufacturer may indicate its participation in the Certification Program in the following ways:

1. Display of Certification Symbol on all units of certified models.
2. The Certification Symbol with the statement "Rated in accordance with ARI Standard 740-1998", shall be displayed on all specification sheets, literature and advertising.
3. Distribution of the Directory carrying the name of each participating manufacturer and a list of its certified models, together with its certified ratings.

E. Equipment Classification

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

System Dependent Equipment. Refrigerant recovery equipment that requires, for its operation, the assistance of components

contained in an air conditioning or refrigeration system.

THE SYMBOL

The Certification Symbol, as required to cover the governing Standard, is illustrated below.

This symbol has been registered with the United States Patent Office. The Symbol may not be reproduced or copied except by permission of ARI. The Symbol may be displayed on qualified units in the form of a label obtained from ARI, or may be an integral part of the nameplate.

THE DIRECTORY

The Directory lists the names, addresses, trade names and certified ratings of the participating manufacturers and their certified products.

STANDARD RATING DEFINITIONS

Standard Rating. A *Standard Rating* is a rating based on tests performed at Standard Rating Conditions set forth in ARI Standard 740-1998.

Standard Contaminated Refrigerant Sample. A mixture of new and/or reclaimed refrigerant and specified quantities of identified contaminants defined in Table 1, which are representative of field obtained, used refrigerant samples and which constitute the mixture to be processed by the equipment under test.

F. Performance Rating Definitions

Performance Ratings are based on tests as set forth in ARI Standard 740-1998. Performance Ratings shall include the following:

Liquid Recovery Rate. The liquid refrigerant recovery rate shall be expressed in kg/min [lbs/min] and measured by weight change at the mixing chamber (see Figure C1 of ARI Standard 740-1998) divided by elapsed time to an accuracy within 0.008kg/min [0.02 lbs/min] for flow rates up to 0.42 kg/min and 2.0% for flow rates larger than 0.42 kg/min.

Liquid Recovery Rate (Push/Pull). 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.

Vapor Recovery Rate. The vapor refrigerant recovery rate shall be expressed in kg/min [lbs/min] and measured by weight change at the mixing chamber (see Figure C1 of ARI Standard 740-1998) divided by elapsed time to an accuracy within 0.008 kg/min [0.02 lbs/min] for flow rates up to 0.42 kg/min and 2.0% for flow rates larger than 0.42 kg/min.

Recycle Rate. The amount of refrigerant processed divided by the time elapsed in the recycling mode, expressed in kg/min [lbs/min]. For equipment that uses a separate recycling sequence, the recycle rate does not include the recovery rate (or elapsed time). For equipment that 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. If no separate recycling loop is used, the rate shall be the higher of the vapor refrigerant recovery rate or the liquid refrigerant recovery rate.

Shut off Vacuum. The shut off vacuum levels shall be expressed in kiloPascals [inches of mercury vacuum] to an accuracy of 0.33 kPa [0.1 in Hg vac].

System Dependent Equipment shall be rated

by shut off vacuum level only.

Contaminants. The contaminant levels remaining after testing shall be published as follows:

-- Moisture content, PPM (parts per million) by weight.

-- Acidity, PPM (parts per million) by weight.

-- High boiling residue, percentage by volume.

-- Non-condensables, percentage by volume.

Maximum Contaminant Levels of Recycled Refrigerants in Same Owner's Equipment

The air-conditioning and refrigeration industry has established the **Industry Recycling Guide (IRG-2),** ***Handling and Reuse of Refrigerants in the United States*****,** to specify procedures and guidelines to maintain the quality of refrigerants used in refrigeration and air-conditioning equipment. The intent is to protect the end user, the consumer and the refrigeration and air-conditioning products owned by the consumers.
IRG-2 lists maximum levels of contaminants of recycled refrigerants placed in the same owner's equipment. Some recycling equipment models listed in the Directory currently reach those levels given the standard contaminant samples defined in ARI Standard 740-1998.

TOLERANCES

Any machine tested shall produce contaminant levels not higher than the published ratings. The liquid refrigerant recovery rate, vapor refrigerant recovery rate, vacuum levels and recycle flow rate shall not be less than the published ratings.

PRODUCT LABELING

Type of equipment: Recovery, Recovery/ Recycling, or Recycling.

Designated refrigerants and/or refrigerant categories and the following as applicable for each:

1. Push/Pull liquid refrigerant recovery rate
2. Liquid refrigerant recovery rate
3. Vapor refrigerant recovery rate
4. Shut off vacuum level
5. High temperature vapor recovery rate
6. Residual trapped refrigerant
7. Recycle flow rate
8. Moisture Content
9. Acidity
10. High Boiling Residue
11. Non-condensables
12. Quantity recycled at filter change

Table 1. Standard Contaminated Refrigerant Samples

Contaminants	R11	R12	R13	R22	R23	R113	R114	R123	R134a	R500	R502	R503	R507	R508A	R508B	R509
Moisture Content: ppm by Weight of Pure Refrigerant	100	80	30	200	30	100	85	200	200	200	200	30	200	20	20	100
Particulate Content: ppm by Weight of Pure Refrigerant[1]	80	80	N/A	80	N/A	80	80	80	80	80	80	N/A	80	N/A	N/A	80
Acid Content: ppm by Weight of Pure Refrigerant[2]	500	100	N/A	500	N/A	400	200	500	100	100	100	N/A	100	N/A	N/A	100
Oil (HBR) Content: % by Weight of Pure Refrigerant	20	5	N/A	5	N/A	20	20	20	5	5	5	N/A	5	N/A	N/A	5
Viscosity/Type[3]	300/ MO	150/ MO	N/A	300/ MO	N/A	300/ MO	300/ MO	300/ MO	150/ POE	150/ MO	150/ MO	N/A	150/ POE	N/A	N/A	150/ MO
Non-Condensable Gases (Air Content): % by Volume	N/A	3	3	3	3	N/A	3	N/A	3	3	3	3	3	3	3	3

Contaminants	R401A	R401B	R401C	R402A	R402B	R404A	R406A	R407A	R407B	R407 C	R407D	R408 A	R409A	R410 A	R411A	R411B	R412A
Moisture Content: ppm by Weight of Pure Refrigerant	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200
Particulate Content: ppm by Weight of Pure Refrigerant[1]	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
Acid Content: ppm by Weight of Pure Refrigerant[2]	200	200	200	200	200	500	200	500	500	500	500	200	200	500	200	200	200
Oil (HBR) Content: % by Weight of Pure Refrigerant	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Viscosity/Type[3]	150/ AB	150/ AB	150/ AB	150/ AB	150/ AB	150/ POE	150/ AB	150/ POE	150/ POE	150/ POE	150/ POE	150/ MO	150/ MO	150/ POE	150/ MO	150/ MO	150/ AB
Non-Condensable Gases (Air Content): % by Volume	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3

Superscripts:
1 Particulate content shall consist of inert materials and shall comply with particulate requirements in Appendix D to ARI Standard 740-1998.
2 Acid consists of 60% oleic acid and 40% hydrochloric acid on a total number basis.
3 POE = Poluoester, AB = Alkylbenzene, MO = Mineral Oil.

N/A = Not Applicable.

Certification Directory Listings - Directory listings shall include all of the certified ratings for each refrigerant as follows. If a manufacturer promotes the use of a model for more than one refrigerant, then it is mandatory that contaminant ratings for all specified refrigerants be certified.

Types of Equipment

Certified Item for Each Separate Refrigerant	Recovery	Recovery/Recycling	System Dependent	Recycling
Liquid Refrigerant Recovery Rate	X	X	-	-
Vapor Refrigerant Recovery Rate	X	X	-	-
Shut Off Vacuum Level	X	X	X	-
Recycle Flow Rate	-	X	-	X
Refrigerant Loss due to Non-condensable Purging	*	X	-	X
Moisture Content	*	X	-	X
Chloride Ions	*	X	-	X
Acidity	*	X	-	X
High Boiling Residue	*	X	-	X
Particulates	*	X	-	X
Non-condensables				

*Manufacturer may at its option publish any of these. If so, they shall be subject to verification.

Air-Conditioning and Refrigeration Institute

MANUFACTURERS' TRADE OR BRAND NAME INDEX

	Trade or Brand Name	Recovery	Recovery/ Recycling	Recycling
Carrier Corporation 315-433-4500 Carrier Parkway, TR-2, Syracuse, NY 13221	Carrier TotalVAC	x x	x	
ICOR International Inc. 800-497-6805 10640 East 59th Street, Indianapolis, IN 46236	Spooter	x		
Redi Controls, Inc. 800-626-8640 755 East Main Street, Greenwood, IN 46143	Refrigerant Mizer	x		
Trane (PBM) 608-787-2000 3600 Pammel Creek Road, LaCrosse, WI 54601	AllVac EVac Commercial HandiVac LoVac MicroVac MityVac	x x x x x x		
York International Corporation 704-598-0000 631 South Richland Avenue, York, PA 17405	York	x	x	

EQUIPMENT AVAILABLE FOR SPECIFIC REFRIGERANTS

The manufacturer designates the refrigerants and/or refrigerant categories that each model is capable of processing. The following table lists the manufacturers who offer model(s) that are designated for the particular refrigerant, as defined in ARI Standard 740-1998.

Refrigerant	Carrier Corp.	ICOR International Inc.	Redi Controls, Inc.	The Trane Company	York International Corp.
R-11	√			√	√
R-12	√	√		√	√
R-13			√		
R-22	√	√		√	√
R-23					
R-113					
R-114					√
R-123					√
R-134a	√	√		√	√
R-401A	√	√		√	
R-401B	√	√		√	
R-401C	√	√		√	
R-402A	√			√	
R-402B	√	√		√	
R-404A	√			√	
R-406A	√	√		√	
R-407A	√			√	
R-407B	√			√	
R-407C	√	√		√	
R-407D	√	√		√	
R-408A	√	√		√	
R-409A	√	√		√	
R-410A	√			√	
R-411A	√	√		√	
R-411B	√	√		√	
R-500	√	√		√	√
R-502	√	√		√	√
R-503			√		
R-508A					

ARI STANDARD RATINGS FOR REFRIGERANT RECOVERY/RECYCLING EQUIPMENT

Model Number	Refrigerant	Push/Pull Liquid Refrig. Recovery Rate†		Liquid Refrigerant Recovery Rate		Vapor Refrigerant Recovery Rate		Shut Off Vacuum		High Temp Vapor Recovery Rate		Residual Trapped Refrigerant		Recycle Flow Rate		Moisture Content	Acidity	High Boiling Residue	Non Condens-ables	Quantity Recycled at Filter Change	
		kg/min	***lb/min***	kg/min	***lb/min***	kg/min	***lb/min***	kPa	***Hg vac***	kg/min	***lb/min***	kg	***lb***	kg/min	***lb/min***	PPM by weight	PPM by weight	% by volume	% by volume	kg	***lb***
Carrier Corporation																					
Trade Name: Carrier																					
Type: Recovery																					
19XB	R22	70.00	***154.32***	N/A	***N/A***	1.60	***3.53***	64.07	***11.00***	0.04	***0.09***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
19XB	R134a	50.00	***110.23***	N/A	***N/A***	1.40	***3.09***	40.37	***18.00***	1.84	***4.06***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Trade Name: Total Vac II																					
P706-0001-L	R12	4.80	***10.58***	2.05	***4.52***	0.09	***0.20***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
P706-0001-L	R22	6.37	***14.04***	2.29	***5.05***	0.14	***0.31***	50.53	***15.00***	0.15	***0.33***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
P706-0001-L	R134a	5.06	***11.16***	1.94	***4.28***	0.08	***0.18***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
P706-0001-L	R407C	6.51	***14.35***	2.34	***5.16***	0.13	***0.29***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
P706-0001-L	R410A	7.35	***16.20***	2.83	***6.24***	0.15	***0.33***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
P706-0001-L	R500	5.90	***13.01***	2.06	***4.54***	0.10	***0.22***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
P706-0001-L	R502	6.67	***14.70***	2.44	***5.38***	0.16	***0.35***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
ICOR International Inc.																					
Trade Name: SPOOTER																					
Type: Recovery																					
SP II	R22	N/A	***N/A***	0.70	***1.54***	0.03	***0.07***	67.46	***10.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
SP II	R134a	N/A	***N/A***	0.70	***1.54***	0.03	***0.07***	67.46	***10.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
SP II	R407C	N/A	***N/A***	0.70	***1.54***	0.03	***0.07***	67.46	***10.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
SP II	R500	N/A	***N/A***	0.70	***1.54***	0.03	***0.07***	67.46	***10.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Redi Controls, Inc.																					
Trade Name: Refrigerant Mizer																					
Type: Recovery																					
RS-503/13-C3	R13	N/A	***N/A***	N/A	***N/A***	0.14	***0.31***	101.33	***0.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RS-503/13-C3	R503	N/A	***N/A***	N/A	***N/A***	0.11	***0.25***	101.33	***0.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***

For explanation of footnotes, see page 13.

ARI STANDARD RATINGS FOR REFRIGERANT RECOVERY/RECYCLING EQUIPMENT

Model Number	Refrigerant	Push/Pull Liquid Refrig. Recovery Rate†		Liquid Refrigerant Recovery Rate		Vapor Refrigerant Recovery Rate		Shut Off Vacuum		High Temp Vapor Recovery Rate		Residual Trapped Refrigerant		Recycle Flow Rate		Moisture Content	Acidity	High Boiling Residue	Non Condens-ables	Quantity Recycled at Filter Change	
		kg/min	***lb/min***	kg/min	***lb/min***	kg/min	***lb/min***	kPa	***Hg vac***	kg/min	***lb/min***	kg	***lb***	kg/min	***lb/min***	PPM by weight	PPM by weight	% by volume	% by volume	kg	***lb***
Trane																					
Trade Name: EVac Commercial																					
Type: Recovery																					
RRDA11	R22	147.42	***325.00***	N/A	***N/A***	2.72	***6.00***	50.53	***15.00***	2.95	***6.50***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Trade Name: HandiVac																					
Type: Recovery																					
RRBA	R22	11.34	***25.00***	3.54	***7.80***	0.24	***0.53***	50.53	***15.00***	0.28	***0.62***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Trade Name: LoVac																					
Type: Recovery																					
RRFA31	R11	45.36	***100.00***	N/A	***N/A***	0.30	***0.66***	3.12	***29.00***	N/A	***N/A***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Trade Name: MicroVac II																					
Type: Recovery																					
RRAB	R12	4.80	***10.58***	2.05	***4.52***	0.09	***0.20***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RRAB	R22	6.37	***14.04***	2.29	***5.05***	0.14	***0.31***	50.53	***15.00***	0.15	***0.33***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RRAB	R134a	5.06	***11.16***	1.94	***4.28***	0.08	***0.18***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RRAB	R407C	6.51	***14.35***	2.34	***5.16***	0.13	***0.29***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RRAB	R410A	7.35	***16.20***	2.83	***6.24***	0.15	***0.33***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RRAB	R500	5.90	***13.01***	2.06	***4.54***	0.10	***0.22***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RRAB	R502	6.67	***14.70***	2.44	***5.38***	0.16	***0.35***	50.53	***15.00***	N/A	***N/A***	<0.05	***<0.11***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Trade Name: MityVac																					
Type: Recovery																					
RRCA11	R22	24.95	***55.00***	N/A	***N/A***	0.71	***1.56***	50.53	***15.00***	0.73	***1.60***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***

For explanation of footnotes, see page 13.

ARI STANDARD RATINGS FOR REFRIGERANT RECOVERY/RECYCLING EQUIPMENT

Model Number	Refrigerant	Push/Pull Liquid Refrig. Recovery Rate†		Liquid Refrigerant Recovery Rate		Vapor Refrigerant Recovery Rate		Shut Off Vacuum		High Temp Vapor Recovery Rate		Residual Trapped Refrigerant		Recycle Flow Rate		Moisture Content	Acidity	High Boiling Residue	Non Condens-ables	Quantity Recycled at Filter Change	
		kg/min	***lb/min***	kg/min	***lb/min***	kg/min	***lb/min***	kPa	***Hg vac***	kg/min	***lb/min***	kg	***lb***	kg/min	***lb/min***	PPM by weight	PPM by weight	% by volume	% by volume	kg	***lb***
York International Corporation																					
Trade Name: York																					
Type: Recovery																					
RTU-10DD	R134a	124.56	***274.60***	N/A	***N/A***	4.00	***10.16***	50.53	***15.00***	5.89	***12.99***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
RTU-10DD	R22	148.14	***326.59***	N/A	***N/A***	5.00	***10.16***	67.46	***15.00***	3.00	***12.99***	N/A	***N/A***	N/A	***N/A***	N/A	N/A	N/A	N/A	N/A	***N/A***
Type: Recovery/Recycling																					
RP-1000V	R11	19.11	***42.12***	N/A	***N/A***	0.24	***0.53***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	N/A	249.5	***550.0***
RP-1000V	R123	19.11	***42.12***	N/A	***N/A***	0.23	***0.51***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	N/A	55.0	***121.3***
RP-114V	R114	19.11	***42.12***	N/A	***N/A***	0.70	***1.54***	2.44	***29.20***	N/A	***N/A***	N/A	***N/A***	0.13	***0.28***	32	10	0.56	1.90	249.5	***550.0***
RSR-1100V	R11	19.11	***42.12***	N/A	***N/A***	0.24	***0.53***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	N/A	245.0	***540.1***
RSR-1100V	R114	19.11	***42.12***	N/A	***N/A***	0.70	***1.54***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	1.90	240.0	***529.1***
RSR-1100V	R123	19.11	***42.12***	N/A	***N/A***	0.23	***0.51***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	N/A	55.0	***121.3***
RSR-1600V	R11	19.11	***42.12***	N/A	***N/A***	0.24	***0.53***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	N/A	245.0	***540.1***
RSR-1600V	R114	19.11	***42.12***	N/A	***N/A***	0.70	***1.54***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	1.90	240.0	***529.1***
RSR-1600V	R123	19.11	***42.12***	N/A	***N/A***	0.23	***0.51***	2.44	***29.20***	N/A	***N/A***	0.50	***1.10***	0.13	***0.28***	32	10	0.56	N/A	55.0	***121.3***
RP-2200	R12	26.74	***58.96***	N/A	***N/A***	1.25	***2.76***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	249.5	***550.0***
RP-2200	R134a	26.74	***58.96***	N/A	***N/A***	1.10	***2.43***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RP-2200	R22	26.74	***58.96***	N/A	***N/A***	1.25	***2.76***	43.08	***17.20***	0.48	***1.05***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	175.0	***385.8***
RP-2200	R500	26.74	***58.96***	N/A	***N/A***	1.26	***2.78***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RP-2200	R502	26.74	***58.96***	N/A	***N/A***	1.59	***3.50***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RSR-2212	R12	26.74	***58.96***	N/A	***N/A***	1.25	***2.76***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	249.5	***550.0***
RSR-2212	R134a	26.74	***58.96***	N/A	***N/A***	1.10	***2.43***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RSR-2212	R22	26.74	***58.96***	N/A	***N/A***	1.25	***2.76***	43.08	***17.20***	0.48	***1.05***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	175.0	***385.8***
RSR-2212	R500	26.74	***58.96***	N/A	***N/A***	1.26	***2.78***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RSR-2212	R502	26.74	***58.96***	N/A	***N/A***	1.59	***3.50***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RSR-2222	R12	26.74	***58.96***	N/A	***N/A***	1.25	***2.76***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	249.5	***550.0***
RSR-2222	R134a	26.74	***58.96***	N/A	***N/A***	1.10	***2.43***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RSR-2222	R22	26.74	***58.96***	N/A	***N/A***	1.25	***2.76***	43.08	***17.20***	0.48	***1.05***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	175.0	***385.8***
RSR-2222	R500	26.74	***58.96***	N/A	***N/A***	1.26	***2.78***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***
RSR-2222	R502	26.74	***58.96***	N/A	***N/A***	1.59	***3.50***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.25	***0.56***	41	13	0.21	1.60	215.0	***474.0***

For explanation of footnotes, see page 13.

ARI STANDARD RATINGS FOR REFRIGERANT RECOVERY/RECYCLING EQUIPMENT

Model Number	Refrigerant	Push/Pull Liquid Refrig. Recovery Rate†		Liquid Refrigerant Recovery Rate		Vapor Refrigerant Recovery Rate		Shut Off Vacuum		High Temp Vapor Recovery Rate		Residual Trapped Refrigerant		Recycle Flow Rate		Moisture Content	Acidity	High Boiling Residue	Non Condens-ables	Quantity Recycled at Filter Change	
		kg/min	***lb/min***	kg/min	***lb/min***	kg/min	***lb/min***	kPa	***Hg vac***	kg/min	***lb/min***	kg	***lb***	kg/min	***lb/min***	PPM by weight	PPM by weight	% by volume	% by volume	kg	***lb***
RP-3400	R12	112.49	***247.99***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.59	***1.31***	30	1	0.13	1.70	249.5	***550.0***
RP-3400	R134a	106.01	***233.71***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.58	***1.27***	48	1	0.13	1.70	170.1	***375.0***
RP-3400	R22	109.54	***241.49***	N/A	***N/A***	5.85	***12.89***	43.08	***17.20***	2.95	***6.50***	0.50	***1.10***	0.59	***1.31***	48	2	0.13	1.90	170.1	***375.0***
RP-3400	R500	97.16	***214.20***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.59	***1.31***	40	1	0.13	1.70	215.5	***475.0***
RP-3400	R502	93.31	***205.70***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.54	***1.20***	0.59	***1.31***	32	1	0.40	1.90	215.5	***475.0***
RSR-3436	R12	112.49	***247.99***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.59	***1.31***	30	1	0.13	1.70	249.5	***550.0***
RSR-3436	R134a	106.01	***233.71***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.58	***1.27***	48	1	0.13	1.70	170.1	***375.0***
RSR-3436	R22	109.54	***241.49***	N/A	***N/A***	5.85	***12.89***	43.08	***17.20***	2.95	***6.50***	0.50	***1.10***	0.59	***1.31***	48	2	0.13	1.90	170.1	***375.0***
RSR-3436	R500	97.16	***214.20***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.59	***1.31***	40	1	0.13	1.70	215.5	***475.0***
RSR-3436	R502	93.31	***205.70***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.54	***1.20***	0.59	***1.31***	32	1	0.40	1.90	215.5	***475.0***
RSR-3445	R12	112.49	***247.99***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.59	***1.31***	30	1	0.13	1.70	249.5	***550.0***
RSR-3445	R134a	106.01	***233.71***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.58	***1.27***	48	1	0.13	1.70	170.1	***375.0***
RSR-3445	R22	109.54	***241.49***	N/A	***N/A***	5.85	***12.89***	43.08	***17.20***	2.95	***6.50***	0.50	***1.10***	0.59	***1.31***	48	2	0.13	1.90	170.1	***375.0***
RSR-3445	R500	97.16	***214.20***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.50	***1.10***	0.59	***1.31***	40	1	0.13	1.70	215.5	***475.0***
RSR-3445	R502	93.31	***205.70***	N/A	***N/A***	4.42	***9.75***	43.08	***17.20***	N/A	***N/A***	0.54	***1.20***	0.59	***1.31***	32	1	0.40	1.90	215.5	***475.0***

For explanation of footnotes, see page 13.

FOOTNOTES:

- Deleted models are those, whose production has ceased but there is stock still available for sale.

◊ Obsolete models are those, whose production has ceased because of a participant's decision, as a result of a failure under the ARI scheduled or challenge test procedure. These models will be listed under the heading “Obsolete Models" in the next Supplement following obsolescence and subsequent issues of the Directory until the stock for sale is depleted, and will be listed as rerated.

† Denotes manufacturer selected push/pull method of liquid recovery rating which may not be applicable in all field situations. Consult operating manual for applications.

♦ New listing or voluntarily revised since last Directory, unless accompanied with a WAS in which case the change was mandatory.

♦ WAS indicates a rating that has been changed since the last Directory, as a result of a failure under the ARI scheduled or challenge test procedure.

1. For recovery-only units, “N/A” indicates that contaminant levels are not applicable.
2. For a recovery or recovery/recycling unit, one must rate either liquid refrigerant recovery rate, the push/pull liquid refrigerant recovery rate or vapor refrigerant recovery rate or can rate for two or all three items. If rating only one or two, the other(s) shall be indicated by “N/A”.

SCOPE OF RECLAIMED REFRIGERANTS CERTIFICATION PROGRAM

A. Standard

The program references ARI Standard 700-2004, *Specification for Fluorocarbon Refrigerants*.

Certification by reclaimers under this standard requires that the reclaimers' refrigerants do not exceed the contaminant level established per ARI Standard 700-2004, Tables 1A, 1B, and 1C.

B. Refrigerants Covered

This standard defines and classifies refrigerant contaminants primarily based on standard and generally available test methods and specifies acceptable levels of contaminants (purity requirements) for various fluorocarbon refrigerants hereinafter referred to as refrigerants regardless of source. These refrigerants are: R-11, R-12, R-13, R-22, R-23, R-32, R-113, R-114, R-115, R-116, R-123, R-124, R-125, R-134a, R-141b, R-142b, R-143a, R-152a, R-218, R-236fa, R-245fa, R-401A, R-401B, R-402A, R-402B, R-403A, R-403B, R-404A, R-405A, R-406A, R-407A, R-407B, R-407C, R-407D, R-407E, R-408A, R-409A, R-409B, R-410A, R-410B, R-411A, R-411B, R-412A, R-413A, R-414A, R-414B, R-415A, R-415B, R-416A, R-417A, R-418A, R-419A, R-500, R-502, R-503, R-507A, R-508A, R-508B and R-509A as referenced in the ANSI/ASHRAE Standard 34 with addenda, *Designation and Safety Classification of Refrigerants* (American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.).

C. Basis of Participation

Participation in this Program by contract between participating reclaimers and ARI consists of:

1. Certification by the reclaimer to ARI that its reclaimed refrigerants comply with ARI Standard 700-2004.
2. Participation by the refrigerant reclaimers in the random test program. Refrigerants for test are selected from reclaimers' inventories by representatives of an independent testing laboratory under contract to ARI.

D. Evidence of Participation

The qualified participating reclaimer may indicate its participation in the Certification Program in the following ways:

1. Display of the Certification Symbol on all packaging of certified refrigerants by means of a label or by printed application directly on packaging.

2. The Certification Symbol with the statement "Rated in accordance with ARI Standard 700-2004, shall be displayed on all specification sheets, literature and advertising.

3. Distribution of the Directory carrying the name of each participating reclaimer and a list of its certified refrigerants.

THE SYMBOL

The Certification Symbol, as required to cover the governing Standard, is illustrated below.

This symbol has been registered with the United States Patent Office. The Symbol may not be reproduced or copied except by permission of ARI. The Symbol may be displayed on qualified packaging in the form of a label obtained from ARI, or may be an integral part of the packaging.

THE DIRECTORY

The Directory lists the names, addresses, and certified refrigerants of the participating reclaimers and location of all reclaim facilities.

Maximum Contaminant and Rating Definitions

Maximum contaminants are defined in ARI Standard 700-2004 based on tests as set forth in the Standard.

High Boiling Residue Method. High boiling residue shall be determined by measuring the residue from a standard volume of refrigerant after evaporation. Oils and/or organic acids will be captured by this method.

Conductivity (alternative chloride or acidity tests). A refrigerant may be tested for conductivity as an indication of the presence of acids, metals, chlorides, and any compound that ionizes in water. This alternative procedure is intended for use with new or reclaimed refrigerants.

Acidity. The Acidity Test uses the titration principle to detect any compound that ionizes as an acid. The test requires about a 100 to 120 gram sample and has a lower detection limit of 0.1 ppm by weight.

Water Content. The Coulometric Karl Fischer Titration method shall be used for determining the water content of refrigerants. Water is a harmful contaminant in refrigerants because it causes freeze up, corrosion and promotes unfavorable chemical breakdown.

Chloride Ions. The refrigerant shall be tested for chlorides as an indication of the presence of hydrochloric or similar acids. The results of the test shall not exhibit any sign of turbidity. Results are reported as “pass” or “fail”.

Particulates/Solids. During the Boiling Range Test, a measured amount of sample shall be placed in a Goetz bulb under controlled temperature conditions. The particulates/solids are determined by visual examination of the empty Goetz bulb after the sample has evaporated completely. Presence of dirt, rust or other particulate contamination is reported as “fail”.

Volatile Impurities including Other Refrigerants. The amount of volatile impurities including other refrigerants in the subject refrigerant shall be determined by the gas chromatographic method described in *Appendix C to ARI Standard 700* for the appropriate refrigerant.

Noncondensables. Noncondensable gases consist primarily of air accumulated in the vapor phase of refrigerant-containing tanks. The solubility of air in the refrigerant’s liquid phase is extremely low and air is not significant as a liquid phase contaminant.

Table 1A. Characteristics of Single Component Refrigerants and their Maximum Allowable Levels of Contaminants										
	Reporting Units	nce (Subcl	R-11	R-12	R-13	R-22	R-23	R-32	R-113	R-114
CHARACTERISTICS[1]:										
Boiling Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		23.7 74.7	-29.8 -21.6	-81.5 -114.7	-40.8 -41.5	-82.0 - 115.6	-51.7 -61.0	47.6 117.7	3.6 38.5
Boiling Point Range[1]	K ºR		0.3 0.5	0.3 0.5	0.5 0.9	0.3 0.5	0.5 0.9	0.3 0.5	0.3 0.5	0.3 0.5
Critical Temperature[1]	ºC ºF		198.0 388.4	112.0 233.6	28.9 84.0	96.2 205.2	26.1 79.0	78.1 172.6	214.1 417.4	145.7 294.3
Isomer Content Isomer	% by weight		N/A	N/A	N/A	N/A	N/A	N/A	0-1 R- 113a	0-30 R- 114a
VAPOR PHASE CONTAMINANTS: Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	N/A[2]	1.5	1.5	1.5	1.5	1.5	N/A[2]	1.5
LIQUID PHASE CONTAMINANTS: Water	ppm by weight	5.4	20	10	10	10	10	10	20	10
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight (as HCl)	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[3]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass	pass

[1] Boiling points, boiling point ranges and critical temperatures, although not required, are provided for informational purposes.
[2] Since R-11, R-113, R-123, R-141b, and R-245fa have normal boiling points near or above room temperature, non condensable determinations are not required for these refrigerants.
[3] Recognized chloride level for pass/fail is about 3 ppm.
N/A Not Applicable
-- Data Not Available

Table 1A (continued). Characteristics of Single Component Refrigerants and their Maximum Allowable Levels of Contaminants									
	Reporting Units	Reference (Subclause)	R-115	R-116	R-123	R-124	R-125	R-134a	R-141b
CHARACTERISTICS[1]:									
Boiling Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-38.9 -38.1	-78.2 -108.8	27.8 82.1	-12.0 10.4	-48.1 -54.6	-26.1 -14.9	32.0 89.6
Boiling Point Range[1]	K ºR		0.3 0.5	0.3 0.5	0.3 0.5	0.3 0.5	0.3 0.5	0.3 0.5	0.3 0.5
Critical Temperature[1]	ºC ºF		80.0 176.0	19.9 67.8	183.7 362.7	122.3 252.1	66.0 150.8	101.1 214.0	206.8 404.2
Isomer Content Isomer	% by weight		N/A	N/A	0-8 R-123a+ R-123b	0-5 R-124a	N/A	0-0.5 R-134	0-0.1ea R-141, R-141a
VAPOR PHASE CONTAMINANTS: Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	1.5	1.5	N/A[2]	1.5	1.5	1.5	N/A[2]
LIQUID PHASE CONTAMINANTS: Water	ppm by weight	5.4	10	10	20	10	10	10	100
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.9
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight (as HCl)	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[3]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass

[1] Boiling points, boiling point ranges and critical temperatures, although not required, are provided for informational purposes.
[2] Since R-11, R-113, R-123, R-141b, and R-245fa have normal boiling points near or above room temperature, non condensable determinations are not required for these refrigerants.
[3] Recognized chloride level for pass/fail is about 3 ppm.
N/A Not Applicable
-- Data Not Available

Table 1A (continued). Characteristics of Single Component Refrigerants and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-142b	R-143a	R-152a	R-218	R-236fa	R-245fa
CHARACTERISTICS[1]:								
Boiling Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-9.2 15.5	-47.2 -53.0	-24.0 -11.2	-36.8 -34.3	-1.4 29.4	14.9 58.8
Boiling Point Range[1]	K ºR		--	0.3 0.5	0.3 0.5	0.3 0.5	0.3 0.5	0.3 0.5
Critical Temperature[1]	ºC ºF		137.1 278.8	72.7 162.9	113.3 235.9	72.0 161.6	124.9 256.8	154.1 309.4
Isomer Content Isomer	% by weight		0-0.1ea R-142, R-142a	0-0.01 R-143	N/A	--	--	0-0.1ea R-245ca, R-245cb, R-245ea, R-245eb
VAPOR PHASE CONTAMINANTS: Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	2.0	1.5	1.5	1.5	1.5	N/A[2]
LIQUID PHASE CONTAMINANTS: Water	ppm by weight	5.4	15	10	10	10	10	20
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight (as HCl)	5.7	3.0	1.0	1.0	1.0	1.0	1.0
Chloride[3]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass

[1] Boiling points, boiling point ranges and critical temperatures, although not required, are provided for informational purposes.
[2] Since R-11, R-113, R-123, R-141b, and R-245fa have normal boiling points near or above room temperature, non condensable determinations are not required for these refrigerants.
[3] Recognized chloride level for pass/fail is about 3 ppm.
N/A Not Applicable
-- Data Not Available

Table 1B. Characteristics of Zeotropic Blends (400 Series Refrigerants) and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-401A	R-401B	R-402A	R-402B	R-403A	R-403B	R-404A
CHARACTERISTICS[1]:									
Refrigerant Components			R-22/ 152a/124	R-22/ 152a/124	R-125/ 290/22	R-125/ 290/22	R-290/ 22/218	R-290/ 22/218	R-125/ 143a/134a
Nominal Comp, weight%			53/13/34	61/11/28	60.0/2.0/38.0	38.0/2.0/60.0	5/75/20	5/56/39	44/52/4
Allowable Comp, weight%			51-55/11.5-13.5/33-35	59-63/9.5-11.5/27-29	58.0-62.0/1.0-2.1/36.0-40.0	36.0-40.0/1.0-2.1/58.0-62.0	3-5.2/73-77/18-22	3-5.2/54-58/37-41	42-46/51-53/2-6
Bubble Point[1]	°C @ 101.3 kPa °F @ 14.7 psia		-33.3 -28.0	-34.9 -30.8	-49.0 -56.2	-47.0 -52.6	-47.8 -54.0	-49.2 -56.6	-46.2 -51.2
Dew Point[1]	°C @ 101.3 kPa °F @ 14.7 psia		-26.4 -15.5	-28.8 -19.8	-46.9 -52.4	-44.7 -48.5	-44.3 -47.7	-46.8 -52.3	-45.5 -49.9
Critical Temperature[1]	°C °F		105.3 221.5	103.5 218.3	76.0 168.8	83.0 181.4	87.0 188.6	79.7 175.5	72.1 161.8
VAPOR PHASE CONTAMINANTS:									
Air and other non condensables	% by volume @ 75.0°F[23.9°C]	5.10	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS:									
Water	ppm by weight	5.4	10	10	10	10	10	10	10
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight (as HC1)	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[2]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass

[1] Bubble points, dew points and critical temperatures, although not required, are provided for informational purposes.
[2] Recognized chloride level for pass/fail is about 3 ppm.
-- Data Not Available

Table 1B (continued). Characteristics of Zeotropic Blends (400 Series Refrigerants) and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-405A	R-406B	R-407A	R-407B	R-407C	R-407D	R-407E
CHARACTERISTICS[1]: Refrigerant Components			R-22/152a/ 142b/C318	R-22/ 600a/142b	R-32/125/ 134a	R-32/125/ 134a	R-32/125/ 134a	R-32/125/ 134a	R-32/125/ 134a
Nominal Comp, weight%			45/7/5.5/42.5	55/4/41	20/40/40	10/70/20	23/25/52	15/15/70	25/15/60
Allowable Comp, weight%			43-47/6-8/4.5-6.5/40.5-44.5	53-57/3-5/ 40-42	18-22/38-42/ 38-42	8-12/68-72/ 18-22	21-25/23-27/50-54	13-17/13-17/68-72	23-27/13-17/58-62
Bubble Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-32.9 -27.2	-32.7 -26.9	-45.3 -49.5	-46.8 -52.2	-43.6 -46.5	-39.5 -39.1	-42.9 -45.3
Dew Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-24.5 -12.0	-23.5 -10.4	-38.9 -38.0	-42.5 -44.5	-36.6 -33.9	-32.9 -27.2	-35.8 -32.4
Critical Temperature[1]	ºC ºF		106.0 222.8	116.5 241.7	82.3 180.1	75.0 167.0	86.0 186.8	91.4 196.5	88.5 191.3
VAPOR PHASE CONTAMINANTS: Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS: Water	ppm by weight	5.4	10	10	10	10	10	10	10
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[2]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass

[1] Bubble points, dew points and critical temperatures, although not required, are provided for informational purposes.
[2] Recognized chloride level for pass/fail is about 3 ppm.
-- Data Not Available

Table 1B (continued). Characteristics of Zeotropic Blends (400 Series Refrigerants) and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-408A	R-409A	R-409B	R-410A	R-410B	R-411A	R-411B
CHARACTERISTICS[1]:									
Refrigerant Components			R-125/ 143a/22	R-22/ 124/142b	R-22/124/142b	R-32/125	R-32/125	R-1270/ 22/152a	R-1270/ 22/152a
Nominal Comp, weight%			7/46/47	60/25/15	65/25/10	50/50	45/55	1.5/87.5/11.0	3/94/3
Allowable Comp, weight%			5-9/45-47/ 45-49	58-62/23-27/14-16	63-67/23-27/ 9-11	48.5-50.5/ 49.5-51-5	44-46/54-56	0.5-1.5/87.5-89.5/10-11	2-3/94-96/ 2-3
Bubble Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-44.6 -48.2	-34.7 -30.4	-35.6 -32.1	-51.4 -60.6	-51.3 -60.4	-39.5 -39.1	-41.6 -42.8
Dew Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-44.1 -47.4	-26.4 -15.5	-27.9 -18.2	-51.4 -60.5	-51.6 -60.2	-36.6 -33.9	-40.0 -40.0
Critical Temperature[1]	ºC ºF		83.1 181.6	106.9 224.4	106.9 224.4	71.4 160.5	70.8 159.4	99.1 210.4	96.0 204.8
VAPOR PHASE CONTAMINANTS:									
Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS:									
Water	ppm by weight	5.4	10	10	10	10	10	10	10
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight (as HCl)	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[2]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass

[1] Bubble points, dew points and critical temperatures, although not required, are provided for informational purposes.
[2] Recognized chloride level for pass/fail is about 3 ppm.
Data Not Available

Table 1B (continued). Characteristics of Zeotropic Blends (400 Series Refrigerants) and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-412A	R-413A	R-414A	R-414B	R-415A	R-415B	R-416A
CHARACTERISTICS[1]:									
Refrigerant Components			R-22/218/ 142b	R-218/ 134a/600a	R-22/124/ 600a/142b	R-22/124/ 600a/142b	R-22/152a	R-22/152a	R-134a/ 124/600
Nominal Comp, weight%			70/5/25	9/88/3	51.0/28.5/4.0/ 16.5	50.0/39.0/1.5/ 9.5	82.0/18.0	25.0/75.0	59.0/39.5/1.5
Allowable Comp, weight%			68-72/3-7/24-26	8-10/86-90/2-3	49.0-53.0/26.5-30.5/3.5-4.5 /15.5-17.0	48.0-52.0/ 37.0-41.0/1.0-2.0/ 8.5-10.0	81.0-83.0/17.0-19.0	24.0-26.0/74.0-76.0	58.0-59.5/39.0-40.5/1.3-1.6
Bubble Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-38.0 -36.4	-30.6 -23.1	-34.0 -29.2	-32.9 -27.2	-37.5 -35.5	-27.7 -17.8	-23.4 -10.1
Dew Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-28.7 -19.6	-27.9 -18.2	-25.8 -14.4	-24.3 -11.8	-34.7 -30.5	-26.2 -15.2	-21.8 -7.2
Critical Temperature[1]	ºC ºF		107.2 225.0	98.5 209.3	110.7 231.3	111.0 231.8	100.0 212.0	111.3 232.3	108.2 226.8
VAPOR PHASE CONTAMINANTS:									
Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS:									
Water	ppm by weight	5.4	10	10	10	10	10	10	10
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight (as HC1)	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[2]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass

[1] Bubble points, dew points and critical temperatures, although not required, are provided for informational purposes.
[2] Recognized chloride level for pass/fail is about 3 ppm.
-- Data Not Available

Table 1B (continued). Characteristics of Zeotropic Blends (400 Series Refrigerants) and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-417A	R-418A	R-419A				
CHARACTERISTICS[1]:									
Refrigerant Components			R-125/ 134a/600	R-290/ 22/152a	R-125/134a/ E170				
Nominal Comp, weight%			46.6/50.0/3.4	1.5/96.0/2.5	77.0/19.0/4.0				
Allowable Comp, weight%			45.5-47.7/ 49.0-51.0/ 3.0-3.5	1.0-2.0/95.0-97.0/2.0-3.0	76.0-78.0/18.0-20.0/3.0-5.0				
Bubble Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-38.0 -36.4	-41.2 -42.1	-42.6 -44.7				
Dew Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-32.9 -27.2	-40.1 -40.2	-36.0 -32.8				
Critical Temperature	ºC ºF		89.9 193.8	96.7 206.1	79.1 174.4				
VAPOR PHASE CONTAMINANTS:									
Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	1.5	1.5	1.5				
LIQUID PHASE CONTAMINANTS:									
Water	ppm by weight	5.4	10	10	20				
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5				
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01				
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass				
Acidity	ppm by weight (as HCl)	5.7	1.0	1.0	1.0				
Chloride[2]	No visible turbidity	5.6	pass	pass	pass				

[1] Bubble points, dew points and critical temperatures, although not required, are provided for informational purposes.
[2] Recognized chloride level for pass/fail is about 3 ppm.
- Data Not Available

Table 1C. Characteristics of Azeotropic Blends (500 Series Refrigerants) and their Maximum Allowable Levels of Contaminants

	Reporting Units	Reference (Subclause)	R-500	R-502	R-503	R-507A	R-508A	R-508B	R-509A
CHARACTERISTICS[1]:									
Refrigerant Components			R-12/152a	R-22/115	R-23/13	R-125/143a	R-23/116	R-23/116	R-22/218
Nominal Comp, weight%			73.8/26.2	48.8/51.2	40.1/59.9	50/50	39/61	46/54	44/56
Allowable Comp, weight%			72.8-74.8/ 25.2-27.2	44.8-52.8/ 47.2-55.2	39-41/ 59-61	49.5-51.5/ 48.5-50.5	37-41/ 59-63	44-48/ 52-56	42-46/ 56-60
Bubble Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-33.6 -28.5	-45.2 -49.3	-87.8 -126.0	-46.7 -52.1	-87.4 -125.3	-87.0 -124.6	-49.8 -57.6
Dew Point[1]	ºC @ 101.3 kPa ºF @ 14.7 psia		-33.6 -28.5	-45.0 -48.9	-87.8 -125.9	-46.7 -52.1	-87.4 -125.3	-87.0 -124.6	-48.1 -54.5
Critical Temperature[1]	ºC ºF		102.1 215.8	80.2 176.3	18.4 65.1	70.6 159.1	10.8 51.4	11.8 53.2	68.6 155.5
VAPOR PHASE CONTAMINANTS:									
Air and other non condensables	% by volume @ 75.0ºF[23.9ºC]	5.10	1.5	1.5	1.5	1.5	1.5	1.5	1.5
LIQUID PHASE CONTAMINANTS:									
Water	ppm by weight	5.4	10	10	10	10	10	10	10
All other volatile impurities	% by weight	5.11	0.5	0.5	0.5	0.5	0.5	0.5	0.5
High Boiling Residue	% by volume	5.8	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Particulates/Solids	Visually clean to pass	5.9	pass	pass	pass	pass	pass	pass	pass
Acidity	ppm by weight	5.7	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Chloride[2]	No visible turbidity	5.6	pass	pass	pass	pass	pass	pass	pass

[1] Bubble points, dew points and critical temperatures, although not required, are provided for informational purposes.
[2] Recognized chloride level for pass/fail is about 3 ppm.
-- Data Not Available

AIR-CONDITIONING AND REFRIGERATION INSTITUTE

ARI CERTIFIED RECLAIMED REFRIGERANTS - EFFECTIVE July 1, 2005

REFRIGERANT RECLAIMERS	R11	R12	R13	R22	R23	R113	R114	R123	R134a	R500	R502	R503
National Refrigerants, Inc. 661 Kenyon Avenue, Bridgeton, NJ 08302 (800) 262-0012	YES	YES	---	YES	---	YES	YES	---	---	YES	YES	---

SCOPE OF REFRIGERANT TESTING LABORATORIES CERTIFICATION PROGRAM

A. Standard

The program references ARI Standard 700-1999, *Specifications for Fluorocarbon and Other Refrigerants*.

Certification by a refrigerant testing laboratory under this standard requires the laboratory to perform refrigerant analysis to this standard.

B. Refrigerants Covered

This standard defines and classifies refrigerant contaminants primarily based on standard and generally available test methods and specifies acceptable levels of contaminants (purity requirements) for various fluorocarbon and other refrigerants regardless of source. These refrigerants are: R-11, R-12, R-13, R-22, R-23, R-32, R-113, R-114, R-115, R-116, R-123, R-124, R-125, R-134a, R-141b, R-142b, R-143a, R-152a, R-218, R-236fa, R-245fa, R-401A, R-401B, R-402A, R-402B, R-403A, R-403B, R-404A, R-405A, R-406A, R-407A, R-407B, R-407C, R-407D, R-407E, R-408A, R-409A, R-409B, R-410A, R-410B, R-411A, R-411B, R-412A, R-413A, R-413B, R-414A, R-414B, R-415A, R-415B, R-416A,R-417A, R-418A, R-419A, R-500, R-502, R-503, R-507A, R-508A, R-508B and R-509[a] as referenced in the ANSI/ASHRAE Standard 34, *Designation and Safety Classification of Refrigerants* (American Society of Heating, Refrigerating and Air Conditioning Engineers, Inc.).

C. Basis of Participation

Participation in this Program by contract between participating refrigerant testing laboratories and ARI consists of:

1. Certification by the laboratory to ARI that all refrigerant analysis is performed to ARI Standard 700-2004.
2. Participation by the laboratory in the random test program. Random refrigerants samples are “doped” and sent to the participating laboratories by an independent testing laboratory under contract to ARI.

D. Evidence of Participation

The qualified participating reclaimer may indicate its participation in the Certification Program in the following ways:

1. Display of the Certification Symbol.
2. Distribution of the Directory carrying the name of each participating refrigerant testing laboratory and a list of its certified refrigerants.

THE SYMBOL

The Certification Symbol, as required to cover the governing Standard, is illustrated below.

This symbol has been registered with the United States Patent Office. The Symbol may not be reproduced or copied except by permission of ARI. The Symbol may be displayed on qualified packaging in the form of a label obtained from ARI, or may be an integral part of the packaging.

THE DIRECTORY

The Directory lists the names, addresses and telephone numbers of the participating refrigerant testing laboratories and lists all refrigerants that the program participant tests and certifies to ARI Standard 700.

Method of Analysis

Methods of Analysis are defined in ARI Standard 700-2004. Procedures are defined in *Appendix C to ARI Standard 700-1995*.

Maximum Contaminants are defined in ARI Standard 700-2004 based on tests as set forth in the Standard.

High Boiling Residue Method. High boiling residue shall be determined by measuring the residue from a standard volume of refrigerant after evaporation. Oils and/or organic acids will be captured by this method.

Conductivity (alternating to chloride or acidity rosos). A refrigerant may be tested for conductivity as an indication of the presence of acids, metals, chlorides, and any compound that ionizes in water. This alternative procedure is intended for us with new or reclaimed refrigerants.

Volatile Impurities including Other Refrigerants. The amount of volatile impurities including other refrigerants in the subject refrigerant shall be determined by the gas chromatographic method described in *Appendix C to ARI Standard 700* for the appropriate refrigerant.

Non Condensables. Non condensable gases consist primarily of air accumulated in the vapor phase of refrigerant-containing tanks. The solubility of air in the refrigerant's liquid phase is extremely low and air is not significant as a liquid phase contaminant.

Acidity. The Acidity Test uses the titration principle to detect any compound that ionizes as an acid. The test requires about a 100 to 120 gram sample and has a lower detection limit of 0.1 ppm by weight.

Water Content. The Coulometric Karl Fischer Titration method, as described in Appendix C to ARI 700 , shall be used for determining the water content of refrigerants. Water is a harmful contaminant in refrigerants because it causes freeze up, corrosion and promotes unfavorable chemical breakdown.
Results are reported as "pass" or "fail".

LISTING OF REFRIGERANT TESTING LABORATORIES CERTIFIED TO ARI
Effective July 1, 2005

Laboratory	Qualified Refrigerants
National Refrigerants Laboratory, Inc. 661 Kenyon Avenue Bridgeton, NJ 08302 Telephone: (800) 262-0012 Telephone: (856) 455-2776	R-11, R-12, R-13, R-22, R-23, R-32, R-113, R-114, R-123, R-124, R-125, R-134a, R-143a, R-401A, R-401B, R-402A, R-402B, R-403A, R-403B, R-404A, R-405A, R-406A, R-407A, R-407B, R-407C, R-407D, R-407E, R-408A, R-409A, R-409B, R-410A, R-410B, R-411A, R-411B, R-412A, R-413A, R-414B, R-416A, R-417A, R-422A, R-500, R-502, R-503, R-507A, R-508A, R-508B, R-509A
RemTec International 436 North Enterprise Bowling Green, OH 43402 Telephone: (419) 867-8990	R-11, R-12, R-22, R-23, R-113, R-114, R-123, R-125, R-134a, R-143a, R-409a, R-410a, R-500, R-502

ARI DIRECTORIES OF CERTIFIED EQUIPMENT

DIRECTORY OF CERTIFIED UNITARY PRODUCTS (STOCK #1000)
Air-Conditioners; Sound-Rated Units; Air-Source Heat Pumps
Available on www.ariprimenet.org
Also Available on CD January and June **$99.00**

DIRECTORY OF CERTIFIED APPLIED AIR-CONDITIONING PRODUCTS (STOCK #2000)
Air-Cooling & Heating Coils, Central Station Air-Handling Units, Packaged Terminal Air-Conditioners, Package Terminal Heat Pumps, Room Fan-coil Air-Conditioners, Water-Source Heat Pumps, Ground Source Closed-Loop Heat Pumps, Water Source Heat Pumps, Variable Air Volume Terminals , Unitary Large Equipment, and Centrifugal and Rotary Screw Water-Chilling Packages

Available on www.ariprimenet.org
Also Available on CD – January and June **$49.00**

DIRECTORY OF CERTIFIED TRANSPORT REFRIGERATION UNITS (STOCK #3000)
Available on www.ariprimenet.org

DIRECTORY OF CERTIFIED DRINKING-WATER COOLERS (STOCK #4000)
Available on www.ariprimenet.org

DIRECTORY OF CERTIFIED AUTOMATIC COMMERCIAL ICE-CUBE MACHINES AND ICE STORAGE BINS (STOCK #5000) **$2.00**

Published every January and July

DIRECTORY OF CERTIFIED REFRIGERANT RECOVERY/RECYCLING EQUIPMENT (STOCK #6000) **$4.00**

Published every January and July

DIRECTORY OF CERTIFIED RECLAIMED REFRIGERANTS (STOCK #7000) **$4.00**

Published every January and July

ARI STANDARDS ON CD-ROM WITH COMPREHENSIVE WORLDWIDE STANDARDS SERVICE-INDEX AND ARI STANDARDS AND DIRECTORIES OF CERTIFICATION ARE AVAILABLE ON A SUBSCRIPTION BASIS ON MICROFILM FROM: INFORMATION HANDLING SERVICES, P.O. BOX 1154, ENGLEWOOD, CO 80150

OTHER PUBLICATIONS

INDOOR AIR QUALITY BRIEFING PAPER (STOCK #8000)

AIR-CONDITIONING AND REFRIGERATION EQUIPMENT GENERAL MAINTENANCE GUIDELINES FOR IMPROVING INDOOR AIR ENVIRONMENT (STOCK #9000)

ARI
CONSUMER
BROCHURES

How to Keep Your Cool and Save Cold Cash. Answers 42 questions that consumers often ask ARI. Topics include average system life, changing air filters, efficiency ratings, economical operation tips, replacement considerations, and many more (14 panels).

Heat, Cool, Save Energy with a Heat Pump. Highlights energy-saving and functional features of heat pumps; includes glossary and schematic drawings (14 panels).

Breathing Clean – How Air Filters Provide Cleaner Living. Discusses various types of air filters and explains how filters provide cleaner living (8 panels).

Handling and Reuse of Refrigerants in the U.S. (IRG-2). Provides industry-recommended guidelines for using recycled and recovered refrigerants. (12 pages).

ARI Coloring Book. A full-size (8.5 X 11) coloring book that helps children understand the HVAC industry. Up to 10 copies are free if requested on company or school letterhead.

Thermal Energy Storage – A Solution for Our Energy, Environmental and Economic Challenges. Describes thermal energy storage technology and how it can save energy and money in building cooling
(6 panels).

Energy Recovery Ventilation - Describes Energy Recovery Ventilation using air-to-air heat exchangers to recover space-conditioning energy from exhaust air, which is then used to precondition the outside air before it enters the building or the HVAC system (5 panels).

Orders for Pamphlets

$0.30 each (50 pamphlet minimum) Single copies are available free with a stamped, self-addressed business envelope or through ARI's web site: ***http://www.ari.org***

ARI
EDUCATION AND TRAINING
PUBLICATIONS

Refrigeration and Air-Conditioning, 4th Edition. Hardcover textbook, with almost 1100 pages and 1100 illustrations, (ISBN 0-13-09255-713). Teachers may qualify for a review copy by calling 1-800-526-0485 Prentice-Hall, Inc.

Understanding Electricity and Wiring Diagrams for HVACR. Hardcover textbook with over 300 pages is a basic, supplemental text dealing with electrical concepts and diagrams, (ISBN 0-13-517897-5)

Air Conditioning Systems Principles, Equipment and Services. Hardcover textbook with over 350 pages is a basic, supplemental text dealing with a/c systems and the components that make up these systems, (ISBNO-13-517921-1).

To Order:

Call Prentice Hall at 1-800-282-0693. For schools to order, call 1-800-922-0579. Teachers may qualify for a review copy by calling 1-800-526-0485.

Supplements:

Laboratory Manual. Applies to above textbook. Contains one experiment for each major topic in text. Based on performance objectives in text.

Instructors Manual. Applies to above textbook. Answers to all questions and problems in text. Shows correlation between text, lab manual and curriculum guide.

Computerized Test Generator. Win PH Custom Test. Windows-based, has edit and print functions. Test questions for all chapters. (ISBN 0-13-110/93-5).

ARI Curriculum Guide. Guide for HVACR teachers who train students to become entry-level service, installation maintenance technicians. Lists technical competencies and areas of study. 135 pages. *Price: $25.00 (prepaid)*.

Career Opportunities in Heating, Air Conditioning and Refrigeration. Career pamphlet (8pages). Describes job opportunities, education and training required for a career in the HVACR industry. *Free single copy. Additional copies $0.25 each.*

Study Guide for Refrigerant Containment Section 608 Clean Air Act. Manual designed as a study guide for ARI's EPA-approved certification test. The manual includes 20 sample questions, 200 focused study questions, and text on Types 1-3 certification and specific information dealing with the content of the EPA exam. *Price: $15.00 prepaid.*

Cool Careers. Seven minute video illustrating career options in the HVACR field. Can be customized to display your organization(s) name/address, etc. *Prices: Non customized video: $38.00. Customized video: $375.00 to $400.00. Prices include shipping.*

Target a Successful Career. Brochure designed to attract individuals into the HVACR and Plumbing Industry. Free single copy. Additional copies $0.15 each.

Establishing an HVACR Program in Your School – This is How-to Guide provides a framework for implementing a local school HVACR program which adheres to PAHRA (Partnership for Air-Conditioning, Heating, Refrigeration Accreditation) standards. It includes sample curriculum and equipment lists. Single copy no charge.

Ordering Information

Except for the Textbook, Textbook Supplements, all orders should be mailed to:

ARI, attn: Education Department

4100 N. Fairfax Drive, Suite 200; Arlington, VA 22203

Prices subject to change without notice.

Catch our Wave on

ARI CoolNet

http://www.ari.org
e-mail: ari@ari.org

CoolNet is the name of the Air-Conditioning & Refrigeration Institute (ARI)'s World Wide Web site. If you have access to the Internet and the World Wide Web, and use a graphical browser such as Netscape Navigator or Microsoft Internet Explorer, you can obtain the latest information relevant to the heating, ventilation, air-conditioning, and refrigeration (HVACR) industry.

What does ARI offer on **CoolNet**?

- **ARI PrimeNet** -- download and search directories of product performance ratings
- **Bookstore** -- secure ordering of ARI's publications with your credit card
- **Consumer Brochures** -- descriptions, printable versions, prices, & ordering information
- Current & Historical **Press Releases** on the latest news
- **Email** access to ARI staff
- **Public Policy Affairs**
  - Legislative & Regulatory issue briefs
  - Links to the White House, U.S. Congress, government agencies, & state agencies
  - International trade shows and related associations
  - ICARMA - International Council of Air-Conditioning & Refrigeration Manufacturers' Association
- **Meetings & Events** at ARI and throughout the HVACR industry
- **Member Companies** -- online membership database with ARI members & direct links to their web sites
- Direct links to **Related Organizations**
- **ARTI 21st Research & Technology** -- HVACR Research in the 21st Century (21-CR) program with ongoing research projects & reports
- **Standards & Guidelines** -- lists, descriptions, prices and ordering information for hardcopies, free downloads of electronic copies of ARI performance standards & guidelines
- **Statistical Releases** -- detailing monthly industry performance

How to Surf Our Wave

ARI's web site, "CoolNet"

Using your Internet service provider, enter the World Wide Web, using a browser such as Netscape or Microsoft Explorer.

Web address **http://www.ari.org**
E-mail address: ari@ari.org

If you have questions or need more information, please contact:

Abby Buchanan
Manager of Internet Communications
ARI
4100 N. Fairfax Dr., Suite 200
Arlington, VA 22203 (USA)
phone: +1-703-524-8800
fax: +1-703-528-3816

Web: http://www.ari.org
e-mail: ari@ari.org

ARI's Communications Contacts

Joe Stevens -- Manager of Communications	jstevens@ari.org
Abby Buchanan -- Manager of Internet Communications	abuchanan@ari.org

ARI ORDER FORM

Mail or fax complete form to:
ARI, 4100 N. Fairfax Drive, Suite 200
Arlington, VA 22203
Fax: (703)528-3816

THERE WILL BE A $3.00 CHARGE FOR HANDLING PURCHASE ORDERS.

SHIP TO:

Name:_____

Company:_____

Address:_____

City:_____State:_____ Zip:_____

Country:_____

Telephone:_____Fax:_____

Note: Telephone number is required on all orders. Orders may be delayed without required information.

PAYMENT METHOD:
(We do not take credit card orders for Consumer Brochures.)

☐ Check/Money Order ☐ Purchase Order Number _____

Credit Card Information: ☐ Visa ☐ Mastercard

Account Name:_____

Card Number:_____ Expires:_____

Signature:_____

QUANTITY	DESCRIPTION	UNIT PRICE	TOTAL
For foreign orders, please include shipping costs: $3.00 per publication $85.00 for complete set of ARI standards (orders are sent airmail and must be pre-paid in U.S. currency) Domestic shipments of ARI Standards are by first class mail.		Add $3.00 for P.O.	
		4.5% tax within VA	
		Postage	

Please copy this page if ordering more than five items.	Total	