

OPERATIONS MANUAL

REFRIGERANT RECOVERY/RECYCLING EQUIPMENT CERTIFICATION PROGRAM



AHRI RRRE OM – JANUARY 2018

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PREFACE

The following manual outlines the procedures and policies of the Performance Certification Program for Refrigerant Recovery/Recycling Equipment (RRRE) Certification Program operated by the Air-Conditioning, Heating and Refrigeration Institute (AHRI). This manual is to be used in conjunction with the AHRI General Operations Manual for AHRI Certification Programs. Where the AHRI General Operations Manual and this product-specific manual differ, this product-specific operations manual shall prevail.

The revision of this manual supersedes all previous revisions. The current edition of this manual, as well as the AHRI General Operations Manual, can be acquired through the AHRI website, www.ahrinet.org.

The RRRE Certification Program by AHRI provides for independent verification of the Refrigerant/Recovery/Recycling Equipment Participants' stated equipment performance. Safety criteria are not within the scope of this program.

Participation in the program is voluntary. Any Participant, regardless of AHRI membership, may obtain approval of Program Ratings and use of the AHRI RRRE Certification Mark hereinafter referred to as the "Mark". The Mark is the Participant's public representation that the ratings of randomly selected samples have been verified by an independent laboratory in accordance with test procedures prescribed by this operations manual. A Certification Agreement is executed between the Participant and AHRI specifying the conditions under which such Ratings and the Mark may be used. No Participant has the right to use Program Ratings or to state that their products have been tested in conformance with the procedures outlined in this Rating Procedure unless and until they have received written authority from AHRI to use the Marks as applied to the specific approved Program Ratings.

This Operations Manual has been prepared to assure that administration of the program is carried out in a uniform manner. It is an amplification of the Certification Agreement signed by licensees and AHRI. General information, procedural details, and copies of forms are included in this Operations Manual. Provisions of the Operations Manual may be amended as provided in the Certification Agreement.

This certification program complies with requirements of the ISO/IEC Standard 17065:2012, *General Requirements for Bodies Operating Product Certification Systems*.

Note:

This manual supersedes the AHRI Refrigerant Recovery / Recycling Equipment Certification Program Operational Manual, March 2017.

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1. Program Overview

1.1 Applicable Rating Standard. It is mandatory for program Participants to comply with the provisions of the latest edition of AHRI Standard 740, *Performance Rating of Refrigerant Recovery Equipment and Recovery/Recycling Equipment (Standard)*. A copy of this Standard is available for download from the AHRI website, www.ahrinet.org.

1.2 Product Definitions. All terms in this document shall follow the AHRI GOM and the Standard definitions unless otherwise defined in this section.

1.2.1 Refrigerant Recovery Equipment. A piece of self-contained or system-dependent equipment capable of removing refrigerant, in any condition, from a system and storing it in an external container.

1.2.2 Refrigerant Recycling Equipment. A piece of self-contained equipment capable of reducing contaminants in used refrigerants by separating oil, removing non-condensables and reducing moisture, acidity, and particulate matter to the levels prescribed in *Industry Recycling Guideline (IRG-2)*.

1.2.3 Refrigerant Recovery and Recycling Equipment. A piece of self-contained equipment capable of refrigerant recovery and recycling functions as noted above.

1.2.4 System Dependent Equipment. Refrigerant recovery equipment which requires for its operation the assistance of components contained in an air-conditioning or refrigeration system.

1.3 Program Scope. This program applies to all Production Models of RRRE as defined in Section 1.2. The scope does not preclude equipment capable of refrigerant reclamation in a recycling mode.

1.4 Intended Market. The Intended Market for this certification program includes all products defined in Section 1.3 that are sold for use in the U.S. (including U.S. territories) and Canada.

1.5 Basic Model Groups (BMGs). Each Participant's listing shall be grouped by BMG. A BMG is a family of products which has the same basic components and no significant differences that affect performance. A different type (Recovery, Recycling, Recovery/Recycling and System Dependent Equipment) also constitutes a different BMG. Each model's certified ratings per refrigerant shall be the same as all other models within the BMG (exception: The Final Recovery Vacuum Level and Residual Trapped Refrigerant ratings may be different).

2. Qualification Process

2.1 Original Equipment Participant (OEM) Applicants. With the additions noted below, the OEM qualification process shall proceed according to the AHRI General Operations Manual, Section 4.

STEP 2.1.1 Certification Application Package. In addition to the Application for AHRI Certification, Annual Sales Volume Form, product-specific ratings and data, noted in the AHRI General Operations Manual, Section 4, STEP 4.1, Applicants shall submit the following documentation to AHRI:

- Published installation instructions in printed or electronic format; and
- If the Applicant chooses to conduct witness testing at its AHRI Approved Test Stand within a Facility (Facility), all required forms per Section 3.3.1 of this manual for Witness Testing Facility Approval shall also be submitted.

STEP 2.1.2 Processing Application Package.

STEP 2.1.2.1 Performance Certification Agreement for Original Equipment Participant (OEM Agreement). No further action required beyond that listed in Section 4, STEP 4.2 of the AHRI General Operations Manual.

STEP 2.1.2.2 Participation and Licensing Fee Invoice. Payment of the Participation and Licensing Fee is due within 30 calendar days of the invoice issue date. Testing shall not be conducted until the invoice is paid in full. No further action required beyond that listed in Section 4, STEP 4.2 of the AHRI General Operations Manual.

STEP 2.1.3 Selection and Acquisition of Test Samples.

STEP 2.1.3.1 Number of Qualification Tests. Each BMG shall be individually qualified. To qualify a BMG, one (1) model within the BMG shall be tested for each refrigerant and one (1) model within the BMG (if other models exist) shall be inspected. See below for Qualification Inspection Requirements. and refer to Section 3 for Test Requirements

STEP 2.1.3.1.1 Qualification Inspection Requirements. Each unit selected for inspection shall be inspected to the following protocol:

- Components of the sampled unit shall be compared to the components of the model within the same BMG that was selected for test.
- The internal layout of the sampled unit shall be compared against internal layout of the model within the same BMG that was selected for test.
- The original Close on Rise of Outlet (CRO) valve settings shall be confirmed to match the valve settings of the model within the same BMG that was selected for test.
- The Applicant's instruction manual shall be reviewed to ensure that no substantive differences (differences that would affect the unit's performance ratings) exist between the manual of the inspected unit and the model of the unit within the same BMG that was selected for test.

STEP 2.1.3.2 Acquisition of Qualification Test Samples/Selection Criteria. Within 30 calendar days of a request from AHRI, the Applicant shall have samples available for selection. Samples shall be acquired in accordance with Section 3 of this manual.

STEP 2.1.4 Qualification Testing. AHRI shall supply the Independent Third-party Laboratory Contracted by AHRI (Laboratory) with the Published Ratings. The Laboratory shall conduct the testing of the samples in accordance with the Standard, against the Published Ratings.

STEP 2.1.4.1 Successful Completion of All Qualification Tests. If all qualification tests pass proceed to STEP 2.5.

STEP 2.1.4.2 First Sample Qualification Test/Inspection Failure.

STEP 2.1.4.2.1 First Sample Qualification Test Failure. When the Applicant is notified of a first sample qualification test failure, the Applicant has seven (7) calendar days to select one of the following options:

- Re-rate all models within the failed unit's BMG, proportionate to the failed test's results; or
- Test second sample of the same model (sample shall be available within the timeframe and procedure allotted in Section 3.4 following notification of decision to AHRI via Manufacturer's Decision Form [MDF]).

STEP 2.1.4.2.2 *First Sample Inspection Failure*. In the event that the qualification inspection fails, the model shall be subject to test at the Laboratory.

STEP 2.1.4.3 *Second Sample Qualification Test Failure*. All models within the BMG shall be re-rated proportionate to the failed second sample test's results.

STEP 2.1.5 *Welcome to the Program*. No further action required beyond that listed in Section 4, STEP 4.5 of the AHRI General Operations Manual.

2.2 *Private Brand Marketer (PBM) Applicants*. With the additions noted below, the PBM qualification process shall proceed according to the AHRI General Operations Manual, Section 5.

PBM Applicants are not required to undergo qualification testing. PBM product certification is contingent upon the certification of the associated OEM product.

STEP 2.2.1 *Certification Application Package*. No further action is required beyond that listed in Section 5, STEP 5.2.1 of the AHRI General Operations Manual.

STEP 2.2.2 *Processing Application Package*.

STEP 2.2.2.1 *Performance Certification Agreement for Private Brand Marketer (PBM Agreement)*. No further action required beyond that listed in Section 5, STEP 5.2.1 of the AHRI General Operations Manual.

STEP 2.2.2.2 *OEM Agreement on Behalf of the PBM Applicant*. No further action required beyond that listed in Section 5, STEP 5.2.2 of the AHRI General Operations Manual.

STEP 2.2.2.3 *Licensing Fee Invoice*. Payment of the Licensing Fee is due within 30 calendar days of the invoice issue date.

STEP 2.2.3 *Welcome to the Program*. No further action required beyond that listed in Section 5, STEP 5.3 of the AHRI General Operations Manual.

3. Equipment Selection and Testing

3.1 *Annual Inspection and Test Requirements*.

3.1.1 *Annual Inspection Requirements*. One (1) of each Participant's models within all BMGs shall be subject to a scheduled inspection unless there are no models from the BMG manufactured in the calendar year (Refer to Section 6.2). The Participant shall cease production of a unit not inspected within 2 calendar years.

Prior to the inspection of the unit, the Participant shall inform AHRI of any substantive changes made to any BMG that would impact the performance ratings. Failure to inform AHRI of any substantive changes shall result in a program violation (Refer to Section 7).

Each unit selected for inspection shall be inspected to the following protocol:

- Components of the sampled unit shall be compared to the components listed on the Participant's bill of materials.
- The internal layout of the sampled unit shall be compared against photographs taken by the Laboratory during previous tests or inspections.
- The original CRO valve settings shall be confirmed, within ± 3 psig.
- The Participant's instruction manual shall be reviewed to ensure that no substantive changes were made that would affect the unit's performance ratings.

3.1.1.1 *Inspection Results.* In the event that the certification inspection reveals that substantive changes were made to any certified model that impact the performance ratings, the model shall be subject to test at the Laboratory. The entire BMG shall be removed from the AHRI Directory of Certified Product Performance (Directory) until testing of the new model is complete. The sample shall be available within 30 calendar days of failing the certification inspection.

3.1.2 *Test Requirements.* Tests are required when Participants list additional individual refrigerants on the Directory for an existing BMG, new models, and/or when an inspection reveals substantive changes to a BMG. Tests for additional individual refrigerants are still required even if the additional individual refrigerants are included in the refrigerant category of a representative test refrigerant that is already listed on the Directory. Categories for representative test refrigerants can be found in Table 4 of the Standard.

Each sample shall be tested against all applicable criteria under the conditions described in the Standard for each refrigerant chosen to be certified by the Participant. A High Temperature Vapor Recovery Rate shall be measured for equipment having at least one (1) designated refrigerant with a boiling point in the range of -50 to +10 °C.

For each sample tested:

- Equipment performance data shall be recorded;
- The internal layout and equipment components of the sample shall be documented and photographs shall be taken for future comparisons;
- Variable setting components such as CRO valves shall have their settings documented; and
- The Participant's instruction manual shall be reviewed and retained for future comparison by the Laboratory.

3.1.2.1 *Listing Additional Refrigerants for a Model within a Certified BMG.* Prior to listing additional refrigerants for a model within a certified BMG listed in the Directory, a qualification test of one (1) model within the BMG for each additional refrigerant shall be required.

3.1.2.2 *Listing an Additional Model within a Certified BMG.* Prior to listing an additional model within a certified BMG listed in the Directory, the model shall be inspected.

3.1.2.3 *Listing a New BMG.* Prior to listing a new BMG, and model(s) within it, one (1) model within the BMG shall undergo a qualification test and all other models, if any, are required to undergo inspection.

3.2 *Location of Test and Inspection.* The Participant shall elect to conduct inspections at the Laboratory or Facility. If inspections are to occur at the Laboratory, the Participant shall ship the selected sample(s) to the Laboratory.

The sample(s) shall be tested at the Laboratory unless the Laboratory is unable to accommodate the sample(s), in which case the sample(s) shall be tested at the Facility. The sample shall be installed in accordance with the Participant's published installation instructions in printed or electronic format.

The Facility shall be approved by AHRI prior to any test being conducted. All tests and inspections, regardless of location, shall be conducted by the Laboratory's Representative (Representative).

3.3 Witness Testing Procedures and Operations. This Certification Program allows witness testing; where Participant personnel witnessed by the Representative, conducts testing at a Facility. Witness testing requirements are covered in the AHRI General Operations Manual, Section 9 and as specified below.

3.3.1 Application for Witness Testing. A Participant shall submit all of the following to AHRI:

- A complete list of all instruments and equipment being used to perform certification testing in accordance with Standard and a copy of each calibration report showing date of last calibration.
- A schematic drawing of the area of the test facility in which AHRI certification testing will be performed; and
- Photographs of the test facility in which AHRI certification testing will take place, which shall include sufficient views to show the location and connection of each instrument.

3.3.1.1 Acknowledgement of Request. AHRI shall acknowledge receipt of the Participant's application to conduct witness testing. AHRI shall review the material and shall inform the Participant if additional information and/or changes are required for the Facility to meet the Standard.

3.3.2 Inspection of Witness Test Facility. Following preliminary witness test facility approval based on submitted data, the Representative shall inspect the witness test facility to verify compliance to the data submitted and to the certification program. Testing is scheduled simultaneously with witness test facility inspection; however, should the witness test facility fail inspection, the testing shall be delayed until the witness test facility is brought into compliance.

3.3.2.1 Non-Compliant Inspection Results. If the results of the inspection indicate that a Facility is non-compliant with the certification program, all discrepancies shall be resolved and resubmitted to AHRI, before approval can be granted to proceed with certified rating tests.

3.3.2.2 Final Approval of Witness Test Facility. Upon acceptable results of the inspection, AHRI shall notify the Participant of final acceptance and approval to proceed with the witness tests.

3.3.3 Witness Test Operations at a Facility.

3.3.3.1 Advance Set-Up of Sample in the Facility. A Participant may set up the test sample in the Facility prior to the arrival of the Representative. Prior to witness test commencement, the Representative shall verify that the sample is the model selected by AHRI for witness testing and that the sample has been set up in the Facility in accordance with the Participant's installation instructions and referenced method of test. The Representative may photograph any and all components of the sample and associated test equipment. The Representative shall notify AHRI immediately if the tested sample is suspected to not match construction of the model selected.

3.3.3.2 Duty Assignments of Representative. Sample testing, data acquisition, and generation of test data shall be performed by the Representative.

Participant or Facility personnel shall be on-hand to assist the Representative as requested and are permitted to be present but are not permitted to tamper or adjust samples during witness tests, unless specifically approved by the Representative responsible for the witness test.

Verification of instrument application (in accordance with the procedures defined in the Standard) and verification of calibrations shall be performed by the Representative.

3.3.3.3 Use of Instrumentation. The Representative shall use primary test instruments belonging to the Facility if available, in accordance with certification program requirements. The Laboratory shall provide secondary instrumentation to verify measured data. If the measurement(s) indicate that the Facility instrumentation accuracy may not be in accordance with the Standard, the Representative shall consult AHRI and the issue must be resolved prior to conducting the witness test.

The Facility shall provide at least the following instruments and conditions:

- Capacity weight scale;
- Necessary test refrigerant(s) for testing;
- Large source tank;
- Hoses for the sample that are sized as required by Standard;
- Room temperature for testing as required by Standard; and
- If a high temperature vapor recovery test is needed, then the Facility shall provide a walled off section to be heated to the temperature required by Standard during testing.

3.3.3.4 Sample Start-Up and Operation. Start-up and operation of the sample shall be in accordance with the Participant's published installation instructions in printed or electronic format.

3.4 Selection of Test Samples. Selections shall be made based on data contained in the Directory. AHRI shall inform the Participant, in writing, of the sample(s) selected for test.

3.5 Methods for Acquiring Test Samples. AHRI, or the Laboratory personnel shall make a Random Sample Selection or Random Component Selection from the Participant's stock inventory within 30 calendar days of a selection by AHRI. Selected samples shall be shipped to the Laboratory accompanied by Participant's published installation instructions in printed or electronic format. Refer to Section 9 of the AHRI General Operations Manual (OM). The Participant shall abide by Section 9.5 of the General OM with the following exceptions:

- A Participant who produces less than five units annually shall submit production schedules in December and June every year to AHRI to ensure first sample testing is completed within the calendar year.

3.6 Sample Acquisition Timeframe. The Participant shall deliver the selected sample(s) to the Laboratory within 14 calendar days of Random Sample Selection or Random Component Selection by Laboratory personnel.

3.7 Certified Data. In accordance with the Standard, the following certified ratings are verified by test:

Table 1: Certified Data for Each Refrigerant Based on Type of Equipment				
	<u>Refrigerant Recovery</u>	<u>Refrigerant Recovery/Recycling</u>	<u>Refrigerant Recycling</u>	<u>System Dependent</u>
Performance Parameter				
Push/Pull Liquid Refrigerant Recovery Rate, kg/min	✓	✓		
Liquid Refrigerant Recovery Rate, kg/min	✓	✓		
Vapor Refrigerant Recovery Rate, kg/min	✓	✓		
High Temperature Vapor Recovery Rate, kg/min	✓ ¹	✓ ¹		
Final Recovery Vacuum Level, kPa	✓	✓		✓
Recycle Flow Rate, kg/min		✓	✓	
Refrigerant Loss, kg	✓ ³	✓	✓	✓ ³
Residual Trapped Refrigerant, kg	✓ ²	✓ ²	✓ ²	✓ ²
Quantity of Refrigerant Processed at Rated Conditions, kg		✓	✓	
Contaminants				
Moisture Content, ppm by weight		✓	✓	
Chloride Ions (pass/fail)		✓	✓	
Acid Content, ppm by weight		✓	✓	
High Boiling Residue, % by volume		✓	✓	
Particulates/Solids (pass/fail)		✓	✓	
Non-condensables, % by volume		✓	✓	

Note: Refer Table 2 and Table 3 of the Standard for additional requirements.

✓¹ A High Temperature Vapor Recovery Rate shall be measured for equipment having at least one (1) designated refrigerant with a boiling point in the range of -50 to +10 °C.

✓² Mandatory rating for equipment tested for multiple refrigerants.

✓³ Mandatory rating if multiple refrigerants, oil separation or non-condensable purge are rated.

3.8 *Inspection and Test Failures.*

3.8.1 *Inspection Failure.* In the event that the inspection fails, the model shall be subject to test at the Laboratory.

3.8.2 Options Following 1st Sample Test Failure. When the Participant is notified of a first sample certified rating failure, the Participant has seven (7) calendar days to select one of the following options:

- Re-rate all models within the failed unit's BMG, proportionate to the failed test's results;
- Test second sample of the same model (sample shall be available within the timeframe and procedure allotted in Section 3.4 following notification of decision to AHRI via Manufacturer's Decision Form [MDF]); or
- Obsolete the model, which also obsoletes all models within the corresponding BMG.

3.8.3 Options Following 2nd Sample Test Failure. When the Participant is notified of a second sample certified rating failure, the Participant has seven (7) calendar days to select one of the following options:

- Re-rate all models within the failed unit's BMG, proportionate to the failed test's results; or
- Obsolete the model, which also obsoletes all models within the corresponding BMG.

4. Challenge Tests

Refer to Section 10 of the AHRI General Operations Manual.

5. AHRI Directory of Certified Product Performance

All certified products shall be listed in the Directory, www.ahridirectory.org. Certification shall not be implied nor claimed for any product not listed in the Directory. Except as noted below, the Participant shall follow the steps outlined in Section 11 of the AHRI General Operations Manual.

5.1 Publication of Certified Ratings in Certified Directory. For each certified model, the Directory shows:

- AHRI Certified Reference Number;
- Name of Participant;
- Model Status;
- Brand Name of Model;
- Model Number(s) or Designation;
- Refrigerant;
- Type of Equipment (Recovery, Recycling, Recovery/Recycling, System Dependent);
- Designated refrigerants and the following as applicable for each:
 - Push/Pull Liquid Refrigerant Recovery Rate, kg/min;
 - Liquid Refrigerant Recovery Rate, kg/min;
 - Vapor Refrigerant Recovery Rate, kg/min;
 - High Temperature Vapor Recovery Rate, kg/min;
 - Final Recovery Vacuum Level, kPa;
 - Refrigerant Loss, kg;
 - Residual Trapped Refrigerant, kg;
 - Quantity of Refrigerant Processed at Rated conditions, kg;
 - Recycle Flow Rate, kg/min;
 - Moisture Content, ppm by weight;
 - Chloride Ions, pass/fail;

- Acid content, ppm by weight;
- High Boiling Residue, % by volume;
- Particulates/Solids, pass/fail; and
- Non-Condensables, % by volume.

In addition, those performance characteristics that are set at a required level (i.e. Chloride, Particulates, and Refrigerant Loss due to Non-Condensable Purging) may be listed or noted elsewhere in the Directory.

Data presented in the Directory certifies equipment performance on the designated refrigerants only.

5.2 Data Forms. Each Participant shall list its products by BMG. OEM and PBM Participants shall submit/edit product data via the Directory.

6. Assessment and Payment of Certification Fees

Except as noted below, the assessment and payment of certification fees shall proceed according to the AHRI General Operations Manual, Section 12.

6.1 Monetary Penalty. The Participant shall pay a fixed penalty of \$2,500 for one (1) inspection failure and one (1) involuntary re-rate per model (involuntary re-rate from test required after an inspection failure).

7. Issuance of Violations and/or Termination

7.1 Program Violation. Please refer to Section 14 of the AHRI General Operations Manual. Additions to Table 11 of Section 14 specific to the RRRE Certification Program are as follows:

- Failure to inform AHRI of any substantive changes to a unit before inspections constitutes a Tier 2 Violation.
- Failure to apply the AHRI 740 label and/or the required EPA-approved certification label directly on the unit constitutes a Tier 1 Violation.

8. Program Hierarchy, Complaints, and the Appeals Process

Refer to Section 15 of the AHRI General Operations Manual.

9. Proper Use of the AHRI Certification Mark and Claims to Certification

Refer to the AHRI Brand Usage Guide.