

# OPERATIONS MANUAL

## AIR-TO-AIR ENERGY RECOVERY VENTILATORS CERTIFICATION PROGRAM

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## AHRI ERV OM – JANUARY 2023

Sponsored and administered by:

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## **PREFACE**

The following manual outlines the procedures and policies of the Performance Certification Program for Air-to-Air Energy Recovery Ventilation Equipment (ERV) 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 accessed through the AHRI website, [www.ahrinet.org](http://www.ahrinet.org).

The ERV Certification Program by AHRI provides for independent verification of the ERV manufacturers' stated equipment performance. Safety criteria are not within the scope of this program.

Participation in the program is voluntary. Any manufacturer, regardless of AHRI membership, may obtain approval of Program Ratings and use of the AHRI ERV 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 manufacturer and AHRI specifying the conditions under which such Ratings and the Mark may be used. No manufacturer 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 Mark 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 this 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 Air-to-Air Energy Recovery Ventilation Operations Manual, January 2022, and is effective January 1, 2023.

**CERTIFICATION OPERATIONS MANUAL FOR**  
**AIR-TO-AIR ENERGY RECOVERY VENTILATION EQUIPMENT**

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## 1. Program Overview

1.1 Applicable Rating Standard. It is mandatory for program Participants to comply with the provisions of AHRI Standard 1060-2018 (I-P), Performance Rating of Air-to-Air Exchangers for Energy Recovery Ventilation Equipment (Standard). A copy of the Standard is available for download from the AHRI website, [www.ahrinet.org](http://www.ahrinet.org).

1.2 Definitions. All terms in this document shall follow the AHRI General Operations Manual and the Standard definitions unless otherwise defined in this section.

1.2.1 Air-to-Air Energy Recovery Ventilation Equipment. Energy recovery components and packaged energy recovery ventilation units which employ Air-to-Air Heat Exchangers to recover energy from exhaust air for the purpose of pre-conditioning outdoor air, prior to supplying the conditioned air to the space, either directly or as part of an air-conditioning (to include air heating, air cooling, air circulating, air cleaning, humidifying and dehumidifying) system.

1.2.1.1 Air-to-Air Exchanger. A device that transfers heat/energy between an exhaust airstream and a separated supply airstream. Air-to-Air Exchangers are also referred to as energy recovery components.

1.2.1.1.1 Heat Pipe Heat Exchanger. A device employing tubes charged with a fluid for the purpose of transferring sensible energy from one airstream to another. Heat transfer takes place through the vaporization of the fluid exposed to the warmer airstream and condensation of the fluid in the cooler airstream.

1.2.1.1.2 Plate Heat Exchanger. A device for the purpose of transferring energy (sensible or total) from one airstream to another with no moving parts. This exchanger may incorporate parallel, cross or counter flow construction, or a combination of these to achieve the energy transfer.

1.2.1.1.3 Rotary Heat Exchanger. A device incorporating a rotating cylinder or wheel for the purpose of transferring energy (sensible or total) from one airstream to the other. It incorporates heat transfer material, a drive mechanism, a casing or frame, and includes any seals which are provided to retard the bypassing and leakage of air from one airstream to the other.

1.2.1.2 Packaged Energy Recovery Ventilation Unit. A device that utilizes one of the components listed in Section 1.2.1.1.

1.2.2 Published Ratings. All published ratings of certified products which fall within the scope of the program shall match the ratings generated using the Participant's Selection Rating Software listed on the AHRI Directory at the time of publication and shall reference the Selection Rating Software used to generate the certified performance with the following:

- Software Name; and
- Software Version Number

1.2.3 Original Equipment Manufacturer (OEM) Licensee. A corporate entity that manufactures or is responsible for certification of a certified component listed in Section 1.2.1.1. They may also incorporate that component into a packaged energy recovery ventilation unit. OEM Licensees are also referred to as OEM Participants.

1.2.4 Private Brand Marketer (PBM) Licensee. A corporate entity that markets a certified component or a packaged unit including a certified component manufactured by a different corporate entity (an OEM Licensee). This includes reselling a certified component, incorporating a certified component into a packaged unit, or reselling a packaged unit. PBM Licensees are also referred to as PBM Participants.

1.3 Program Scope. This program applies to Air-to-Air Energy Recovery Ventilation Equipment, as defined in Section 1.2, for which published ratings are available and are:

- Rated within the range of standard rating conditions (operating map) as defined in Section 3.8;
- Rated at or above 50 scfm but below or equal to 5000 scfm; and
- Rated above 5000 scfm, if all the following conditions are met:
  - The Participant's Basic Model Group includes a model rated at or above 50 scfm but below or equal to 5000 scfm;
  - All Basic Model Group defining characteristics of the larger and smaller certified models shall be the same;
  - All ratings of the larger and smaller certified models, except for nominal and net airflows, shall be the same; and
  - The face velocities (i.e. the nominal airflow divided by the face area of the heat exchanger component perpendicular to the airflow) of the certified models shall be the same. Perpendicular face areas shall be indicated on the forms under which the certification data is provided.

1.3.1 Program Scope Exclusions. Heat exchangers joined by a circulated heat transfer medium (run-around loop) are excluded from this certification program. A run-around loop employs liquid-containing coils placed in each of two or more airstreams, wherein the coils are connected to a closed loop.

1.3.2 Certification of Packaged Energy Recovery Ventilation Units. A Packaged Energy Recovery Ventilation Unit shall not be tested. Certification of the Packaged Energy Recovery Ventilation Unit is contingent upon the certification and proper utilization and application of the certified Air-to-Air Heat/Energy Exchanger employed in the unit. This includes:

- The rated rpm (for rotary heat exchangers),
- The rated tilt angle (for heat pipe heat exchangers), and
- The seals and casing, if any (for all heat exchangers).

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). An OEM Participant's listing shall be grouped by BMG. A BMG is a regular range of sizes of a similar type, design and construction, and having a common designation as catalogued.

1.5.1 BMGs for Heat Pipe Heat Exchangers. At a minimum, all products within a BMG shall have identical fin material, tube material, tubing pattern (geometry), tubing diameter, and fluid type (if changing refrigerant necessitates a change in design or other non-fluid materials of construction). A Participant, at its discretion, may identify and create additional BMGs.

1.5.2 BMGs for Plate Heat Exchangers. At a minimum, all products within a BMG shall have identical flow type, material, plate configuration (geometry), and surface preparation/enhancements. A Participant, at its discretion, may identify additional product characteristics to subdivide models into additional BMGs.

1.5.3 BMGs for Rotary Heat Exchangers. At a minimum, all products within a BMG shall have identical depth, material, matrix geometry, desiccant type (if any), and seal configuration. A Participant, at its discretion, may identify additional product characteristics to subdivide models into additional BMGs.

1.6 Exception to Certify-All Rule. A Participant may exclude an energy recovery model(s) from AHRI certification only with documented proof submitted stating that the model(s) is used exclusively in equipment certified by Home Ventilation Institute (HVI) and this documentation shall be approved by AHRI.



## 2. Qualification Process

2.1 Original Equipment Manufacturer (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 and New Applicant License Fee Form – Sales Volume noted in the AHRI General Operations Manual, Section 4, STEP 4.1, Applicants shall submit the following documentation to AHRI:

- One test report for each BMG; and
- Copy of Applicant's Selection Rating Software (refer to Section 3.7).

Electronic forms shall be obtained from AHRI.

STEP 2.1.2 Processing Application Package.

STEP 2.1.2.1 Selection Rating Software Approval. Refer to Section 3.7.

STEP 2.1.2.2 Performance Certification Agreement for Original Equipment Manufacturer (OEM Agreement). No further action required beyond that listed in Section 4, STEP 4.2 of the AHRI General Operations Manual.

STEP 2.1.2.3 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. 100% of an Applicant's BMGs shall be tested, with a minimum of two (2) models.

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 testing. Samples shall be acquired in accordance with Section 3 of this manual.

STEP 2.1.4 Qualification Testing. AHRI shall supply the Laboratory with the Published Ratings. The Laboratory shall conduct the testing of the samples in accordance with the Standard, against the Published Ratings.

Tested data for qualification tests shall be per Table 1. If any of the specified test conditions are outside the range of published ratings or cannot be tested due to laboratory limitations, AHRI will select alternate conditions.

Test allowances for qualification tests shall be one-half the allowances for annual tests.

Tested Metric	Thermal Conditions	Variable Airflow Fraction (VAF)	Supply Flow Ratio (SFR)	Pressure Differential		
Sensible Effectiveness	Standard Winter or Summer	VAF <sub>1</sub>	1	0		
Latent Effectiveness		VAF <sub>2</sub>		0		
Sensible Effectiveness		VAF <sub>3</sub>		0		
Latent Effectiveness		Wildcard Winter or Summer	VAF <sub>1</sub>	1	0	
Sensible Effectiveness			VAF <sub>2</sub>		Selected by AHRI	0
Latent Effectiveness			VAF <sub>3</sub>			0
Sensible Effectiveness	Lab Ambient		VAF <sub>2</sub>	1		0
Latent Effectiveness			VAF <sub>3</sub>			
Supply Pressure Drop	Lab Ambient		VAF <sub>1</sub>	1	0	
Exhaust Pressure Drop		VAF <sub>2</sub>				
Supply Pressure Drop	Lab Ambient	VAF <sub>1</sub>	1	0		
Exhaust Pressure Drop		VAF <sub>2</sub>				
Supply Pressure Drop	Lab Ambient	VAF <sub>1</sub>	1	0		
Exhaust Pressure Drop		VAF <sub>2</sub>				
EATR	Lab Ambient	VAF <sub>1</sub>	1	Negative, Selected by AHRI		
OACF						
EATR	Lab Ambient	VAF <sub>1</sub>	1	Positive, Selected by AHRI		
OACF						

**Table 1. Tested Data for Qualification Tests**

STEP 2.1.4.1 Successful Completion of All Qualification Tests. If all qualification tests pass, proceed to STEP 2.1.5.

STEP 2.1.4.2 First Sample Qualification Test Failure. Refer to Section 4, STEP 4.4.2 of the AHRI General Operations Manual for details regarding the first sample qualification failure options.

STEP 2.1.4.3 Second Sample Qualification Test Failure. Refer to Section 4, STEP 4.4.3 of the AHRI General Operations Manual for details regarding the second sample qualification failure options.

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. PBM software must directly correlate to OEM software. If the software has variations, the PBM must apply and test as an OEM Applicant.

STEP 2.2.1 Certification Application Package. In addition to the Application for AHRI Certification Form noted in the AHRI General Operations Manual, Section 5, STEP 5.1, Applicants shall submit the following documentation to AHRI:

- Copy of Applicant's Selection Rating Software (refer to Section 3.7)

STEP 2.2.2 Processing Application Package.

STEP 2.2.2.1 Selection Rating Software Approval. Refer to Section 3.7.

STEP 2.2.2.2 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 2.2.2.3 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 2.2.2.4 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 Testing Requirement. 20% of a Participant's BMGs shall be tested annually, with a minimum of one (1) model. For Participants with more than five (5) tests, AHRI shall work with the Participants to schedule quarterly testing if requested. Fractional numbers shall be rounded to the nearest whole number using traditional rounding methods.

3.2 Location of Tests. Testing shall be performed at the Laboratory and the sample shall be installed in the test facility in accordance with the Participant's published installation instructions in printed or electronic format. In lieu of installation instructions, the Participant shall supply Form ERV-DS1: Instruction Manual Waiver form. Forms are available for download at [www.ahrinet.org](http://www.ahrinet.org).

3.3 Selection of Test Samples. Selections shall be made based on data provided by the Participant's Selection Rating Software and/or contained in the Directory. AHRI shall inform the Participant, in writing, of the sample(s) selected for test.

3.4 Methods for Acquiring Test Samples. AHRI or Laboratory personnel shall make a Random Sample Selection, Serial Number Selection, or Random Component Test Sample Selection from the Participant's stock inventory within 30 calendar days of a selection by AHRI. Refer to Section 9 of the AHRI General OM. Selected samples shall be shipped to the Laboratory accompanied with the Punch List. The Punch List is available for download at [www.ahrinet.org](http://www.ahrinet.org).

3.4.1 Serial Number Selection. The Participant shall be instructed to prepare a pool of samples for each selection noted in the selection letter. Each selection pool must consist of three (3) samples of the specific model noted in the selection letter. The Participant shall provide three unique serial numbers for each of the units prepared. AHRI or the Laboratory shall choose one of the serial numbers to be shipped to the lab and one to be kept at the manufacturer's facility in the case of a damaged or second sample.

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

3.6 Allowed Equipment Adjustments Prior to Testing. Prior to testing, and with the Participant's approval, the Laboratory may repair or replace items damaged by shipping or handling. The Laboratory shall confirm the correct rpm for rotary heat exchangers and correct tilt angle for heat pipe heat exchangers, and dimensions for all heat exchangers using information provided in the non-public portion of the AHRI Directory. Once testing commences, Participants are not permitted to tamper with or adjust samples unless previously approved by AHRI. Refer to Section 9 of the AHRI GOM for presence of Participant personnel.

Laboratory personnel shall provide timely details on any changes to the testing equipment. Participants can request additional information as needed.

3.7 Selection Rating Software.

3.7.1 Requesting Approval of Rating Methods. A Participant shall request approval of its Selection Rating Software by submitting one of the following to AHRI:

3.7.1.1 Selection Rating Software. Software shall be either personal computer (PC) based, run on MS Windows ® platform, or web-based software that provides the following:

- Model Number(s);
- Certified Data (Refer to Section 3.8);
- Software Version Number or other revision coding; and
- Proper claims to AHRI Certification (Refer to Section 3.7.5)

3.7.1.2 AHRI Minimum Requirements Catalog Template. To be completed by the Participant. A blank template is available on [www.ahrinet.org](http://www.ahrinet.org).

If the Participant has more than one (1) Selection Rating Software available to users, each software shall be verified by AHRI.

3.7.2 Installation of Selection Rating Software. AHRI shall provide the Participant with a login/password to a personalized Virtual Machine (VM) to install their Selection Rating Software. The Participant shall generate two (2) random selections to ensure successful software installation and operation. Once the Participant notifies AHRI that the Selection Rating Software has been successfully installed, AHRI shall grant approval of the Selection Rating Software within seven (7) calendar days.

3.7.3 Initial Approval of Selection Rating Software through Published Rating Comparison. AHRI upon receiving the necessary materials shall, if applicable, utilize the Participant's Selection Rating Software to determine computer ratings for a certain set of conditions and compare them for the same conditions as those in the published catalog, if a published catalog exists. The Selection Rating Software output (printout and on-screen display) shall match the published certified ratings from the catalog, if applicable. AHRI may also request selection sheets from customers who have received bids. These selection sheets shall match the Selection Rating Software output.

The Participant shall be notified when the Selection Rating Software has been approved for certification. Upon approval from AHRI, the Participant may release the Selection Rating Software to other users. Selection Rating Software released to other users prior to obtaining AHRI approval shall result in a program violation. Also, the Selection Rating Software shall be approved by AHRI prior to field release.

3.7.4 Updates to Previously Approved Software. Per the AHRI General Operations Manual, Section 9, AHRI shall have an updated copy of any Selection Rating Software being used in the field. Any updates shall promptly be provided to AHRI via installation to the Participant's VM or by providing AHRI access to the new software. Major changes to Selection Rating Software shall go through an Initial Approval as per Section 3.7.3 and adhere to the requirements in Section 9.4.4.1 of the General Operations Manual. The Directory shall be locked, and Participants shall not be allowed to make changes to Selection Rating

Software version updates until the Participant has obtained approval from AHRI. Once the new Selection Rating Software has been approved, the Participant shall update the ERV Directory listings.

3.7.5 Statements Regarding Certification. All outputs from an approved Selection Rating Software shall include one of the statements shown in Sections 3.7.5.1 through 3.7.5.3.

3.7.5.1 For Units Within the Scope of the Program. The Certification Mark shall be included on the Selection Rating Software outputs in accordance with the AHRI Brand Usage Manual, and the Selection Rating Software outputs shall include the following statement: “Certified in accordance with the AHRI ERV Certification Program, which is based on AHRI Standard 1060. Certified units may be found in the AHRI Directory at [www.ahridirectory.org](http://www.ahridirectory.org).”

3.7.5.2 For Application Ratings Outside the Scope of the Program. The Certification Mark shall not be included on the Selection Rating Software outputs. The Selection Rating Software outputs shall include the following statement: “Application Rating is outside the scope of the AHRI ERV Certification Program but is rated in accordance with AHRI Standard 1060.”

3.7.5.3 For Units Outside the Scope of the Program. The Certification Mark shall not be included on the Selection Rating Software outputs. The Selection Rating Software outputs shall include the following statement: “Unit is outside the scope of the AHRI ERV Certification Program and is not AHRI certified.”

3.7.6 Software Requirements for PBM Participants. If a PBM has its own selection software:

- It is subject to the requirements of sections 3.7 and 3.8.
- The Participant shall notify AHRI of the corresponding OEM Participant’s selection software name and version number.
- All certified ratings shall match the ratings found in the OEM Participant’s software.
- The range of conditions certified within the software shall be the same or smaller than the range within the OEM Participant’s software.
- Updates to the OEM Participant’s software that affect the certified data shall also be reflected in the PBM Participant’s software.

If a PBM does not have its own selection software, it shall list the OEM software name and version number in the AHRI Directory.

3.8 Certified Data. The range of standard rating conditions in which software outputs can be certified is established in Table 1 of the Standard, except as modified by Table 2 of this Operations Manual. The range of psychrometric conditions is displayed below in Figure 1.

Data shall comply with Section 6 of the Standard and the Software Verification Process document, available on [www.ahrinet.org](http://www.ahrinet.org). Participants may limit software to discrete rating points rather than a continuous map. Only the rating points that can be generated from the software are certified, and the Participant may not publish or provide ratings at other points by any means. This also applies to the Minimum Requirements Catalog Template.

Item	Certified Range
Supply Flow Ratio	0.80 to 1.25
Pressure Differential	-2.5 to +2.5 in H <sub>2</sub> O

**Table 2. Range of Certified Supply Flow Ratio and Pressure Differential**

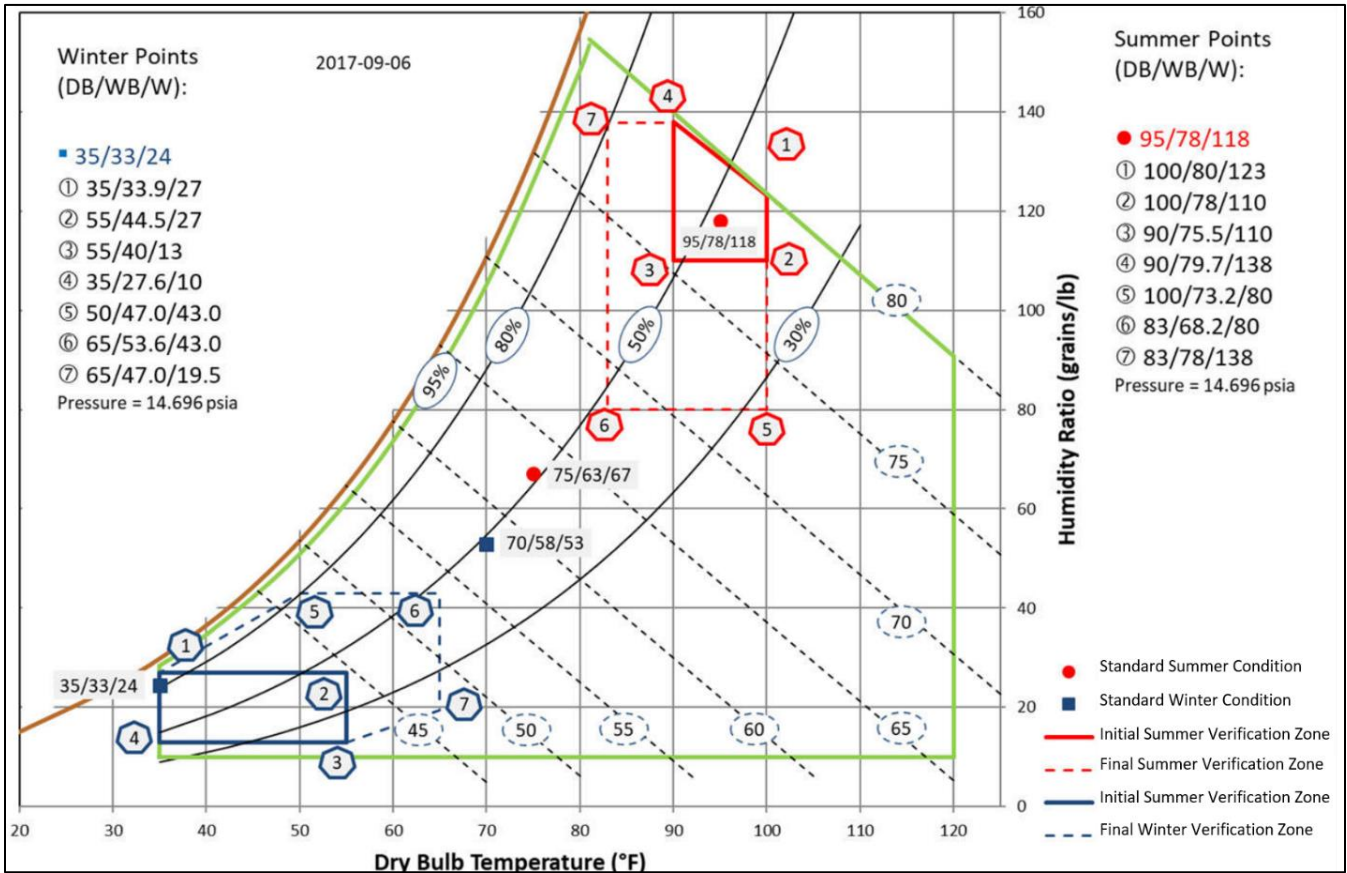


Figure 1. Range of Standard Rating Conditions (Operating Map)

3.9 *Tested Data.* AHRI shall select test points within the initial verification zones of Figure 1. Participants may elect to limit this range of software outputs. For additional information, refer to the Software Verification Process document, available on [www.ahrinet.org](http://www.ahrinet.org). Starting with the 2023 program year, tests shall be per Section 3.9.1. For tests remaining from previous program years, tests shall be per Section 3.9 of the January 2022 edition of the ERV Operations Manual.

3.9.1 *Annual, Penalty, and Discretionary Tests.* Tested data for annual, penalty, and discretionary tests shall be per Table 3. AHRI shall select a wildcard verification point from either the winter or summer verification zone for all tests in a given program year. If a Participant’s range of software does not include the wildcard verification point originally selected, AHRI shall select an alternate wildcard verification point allowed by the Participant’s Selection Rating Software.

Test allowances shall be as specified in Section 5 of AHRI 1060, except as modified by section 3.9.1.1 and 3.9.1.2 below for sensible and latent effectiveness.

Tested Metric	Thermal Conditions	Supply Flow Ratio (SFR)	Pressure Differential
Sensible Effectiveness	Selected by AHRI (Wildcard)	Selected by AHRI	0
Latent Effectiveness			
Supply Pressure Drop	Lab Ambient	1	0
Exhaust Pressure Drop			
EATR	Lab Ambient	1	Selected by AHRI
OACF			

**Table 3. Tested Data for Annual, Penalty, and Discretionary Tests**

3.9.1.1 *Sensible Effectiveness Allowance.* Test results for sensible effectiveness shall not be lower than the certified rating by more than the sum of four relative percentage points and two absolute percentage points, or three absolute percentage points, whichever is greater.

Example: For a sensible effectiveness rating of 75%, the allowance is  $(75\% \times 0.04) + 2\% = 5\%$ . The measured sensible effectiveness shall be greater than or equal to 70.0%.

3.9.1.2 *Latent Effectiveness Allowance.* Test results for latent effectiveness shall not be lower than the certified rating by more than the sum of six relative percentage points and three absolute percentage points, or four absolute percentage points, whichever is greater.

Example: For a latent effectiveness rating of 60%, the allowance is  $(60\% \times 0.06) + 3\% = 6.6\%$ . The measured latent effectiveness shall be greater than or equal to 53.4%.

3.9.2 *Pressure Drop Correction.* The tested values for pressure drop will be converted to standard density (considering temperature, humidity, and barometric pressure) before comparison. The software selection shall be as close as possible to 70°F, dry air, and standard barometric pressure (29.92 in Hg) or zero elevation.

3.10 *Required for Testing.* All selected samples shall be accompanied by the AHRI ERV Certification Test Punch List ([AHRI website](#)). The Participant shall provide either written installation instructions or the installation manual waiver form ERV-DS1 ([AHRI website](#)). At a minimum, the Participant shall provide any necessary hardware for the Laboratory to connect ductwork, and the following information

- Nameplate – Shall be attached to the sample and match the selection made by AHRI;
- Rotation direction;
- Motor wiring;
- Motor voltage;
- Air flow direction;
- Purge angle indicators; and
- Indication of purge location in reference to wheel rotation.
- Tilt angle

3.11 *Test Failures.*

3.11.1 *Additional Test Data for Failed Tests.* Starting with the 2023 program year, if a failure occurs on an annual, penalty, or discretionary test, additional testing will be automatically triggered on the same sample. If any of the specified test conditions are outside the range of published ratings or cannot be tested due to laboratory limitations, AHRI shall select alternate conditions.

If the failed tests results in re-rating or obsoleting the tested BMG, this additional test data does not replace or fulfil the Penalty Test requirement per Section 9.16 of the General Operations Manual.

3.11.1.1 Effectiveness. If a failure occurs on sensible effectiveness or latent effectiveness, test data shall be collected at the additional conditions specified in Table 4.

Tested Metric	Thermal Conditions	Variable Airflow Fraction (VAF)	Supply Flow Ratio (SFR)	Pressure Differential
Sensible Effectiveness	Standard Winter Condition	Same as initial test point	1	0
Latent Effectiveness				
Sensible Effectiveness	Standard Summer Condition	Same as initial test point	1	0
Latent Effectiveness				
Sensible Effectiveness	Initial Wildcard point	VAF <sub>2</sub>	Same as initial test point	0
Latent Effectiveness				
Sensible Effectiveness	Initial Wildcard point	VAF <sub>3</sub>	Same as initial test point	0
Latent Effectiveness				

**Table 4. Additional Effectiveness Test Data**

3.11.1.2 Pressure Drop. If a failure occurs on supply pressure drop or exhaust pressure drop, the sample shall be tested at two additional airflows selected by AHRI, at laboratory ambient conditions, with SFR = 1 and pressure differential = 0.

3.11.1.3 EATR or OACF. If a failure occurs on EATR or OACF, the sample shall be tested at zero pressure differential and two additional pressure differentials selected by AHRI. VAF shall be the same as the initial test point and SFR shall equal 1.

3.11.2 Options Following 1<sup>st</sup> Sample 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 sample’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.

3.11.3 Options Following 2<sup>nd</sup> Sample 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 sample’s BMG proportionate to the failed test’s results; or
- Obsolete the model, which also obsoletes all models within the corresponding BMG.

3.12 Re-rate Procedures. A BMG is to be re-rated based on the test results by “rounding off” effectiveness, pressure drop, outdoor air correction factor and exhaust air transfer ratio multiple as described in the Standard but no better than the actual final test results.

If any certified metric is re-rated, then the software will be revised to bring that metric in-line with the tested value. This revision shall apply across the operating range for that metric. For qualification tests, in the case where a failure occurs at one flow rate, but the unit passes at another flow rate, the Applicant or Participant will be allowed to smooth the performance curve out using both test results.

If any certified point is re-rated, then the passing certified points on the failed test will be analyzed further. If a passing certified point on a failed test falls within 25% of the tolerance differential allowed for passing, then the



marginally passing point will be also be re-rated to the test result. The re-rate shall also incorporate additional test data collected per section 3.11.1 such that the tested value at any additional point is within 75% of the test allowance from the final rated value. Reference example in Appendix A for more information.

The other models within the BMG are required to be re-rated following failure, based on the percentage that the tested unit failed. Any corresponding models of PBM Participants shall also be re-rated.

In addition to completing the actions required by Section 8.2 of the AHRI GOM the Participant shall provide AHRI an action plan within 60 calendar days of AHRI confirmation of the MDF. The action plan shall:

- Explain why the BMG was rated incorrectly;
- Explain how the cause of the incorrect ratings will be avoided in the future;
- Confirm when the corrective action will be taken;
- Confirm whether other untested BMGs are affected by the issue that caused the test failure; and
- Be signed by an officer of the company or the primary or secondary Certification Contact.

Updated software shall be provided to AHRI for review within 60 calendar days of AHRI confirmation of the MDF. The updated software shall not be released for public use until AHRI has granted approval.

AHRI will notify affected PBM Participants of the required re-rate 28 calendar days after AHRI confirmation of the MDF. Updated software with performance matching the OEM software shall be submitted within 60 calendar days of this notification.

After a Participant has provided the updated software to AHRI for review, AHRI will notify the Participant of the models and conditions chosen for re-rate verification using form ERV-DS2. The Participant shall complete the form and submit the required selection software output sheets within 10 business days from AHRI's request.

3.13 *Additional Penalty Requirements.* If a Participant is assessed Penalty tests for two consecutive years, the Participant will be assessed the following additional requirements at the beginning of the next year:

- Assess a monetary penalty of \$10,000 with a maximum of one monetary penalty per program year; and
- AHRI shall evaluate whether any of the Participant's BMGs have not been tested during the previous five (5) program years. If there are any untested BMGs within the past five program years, then AHRI shall assign tests for any and all BMGs that have not been tested in the previous five (5) program years.

3.14 *Requirement for Introduction of New BMG.* Prior to being listed in the AHRI Directory of Certified Product Performance (Directory), any new BMG introduced by a Participant shall undergo a qualification test as described in Section 2.1 STEP 2.1.4. A re-rate resulting from a qualification test for an existing Participant shall not result in a penalty test and shall not be published as a re-rate in the Directory.

#### **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](http://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 Ratings in Certified Directory. The following information pertaining to each model certified shall be published in the Directory:

- AHRI Certified Reference Number;
- Model Status;
- Brand Name;
- Model Number;
- Product Type (type of energy recovery component);
- Selection Software Name;
- Selection Software Version.

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

### **6. Assessment and Payment of Certification Fees**

Refer to Section 12 of the AHRI General Operations Manual.

### **7. Issuance of Violations and/or Termination**

Refer to Section 14 of the AHRI General Operations Manual.

### **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 Manual.

9.1 Publication of Non-Certified Ratings. Participant's printed materials may contain non-certified ratings but shall specifically state that the rating(s) or product(s) is outside the scope of the AHRI Air-to-Air Energy Recovery Ventilation Equipment Certification Program.

9.2 Published Ratings for Packaged Units Employing a Certified Energy Recovery Component. Any specification sheets, catalogs, or technical publications that display certified ratings shall include all certified ratings for the certified energy recovery component. The ratings shall be accompanied by the AHRI Certified Mark for Air-to-Air Energy Recovery Ventilators.

Other literature (including advertising, promotional, and sales brochures) shall omit ratings if all certified ratings for the certified energy recovery component are not shown. However, the airflow may be accompanied by the AHRI Certified Mark for Air-to-Air Energy Recovery Ventilators.

9.3 Published Rating Verification. AHRI provides verification of published ratings to all legitimate parties. Verifications shall only be made on jobs in which the Selection Rating Software implemented by the user matches that of the Selection Rating Software shown in the AHRI Directory. All requests shall provide the following information before verifications are completed:

- ERV Request for Verification Form
- Selection Ratings Software Performance output sheet

**APPENDIX A: EXAMPLE OF RE-RATED TEST REPORT**

\*Note that a marginally passing point will be re-rated only for a failed test.

Table A1: Example of Re-Rated Test Report									
Tested Metric	Certified Rating (Pre-Test)	Measured Value	Allowance	Pass Criteria	Results	25% of Allowance	Point has marginally passed if within this range:	Re-rated?	Certified Rating (Post-Test)
<b>Wildcard Thermal Test</b>									
Sensible Effectiveness	75.4%	73.13%	5.02%	≥ 70.38%	P	1.254%	≤ 71.63%	No	75.4%
Latent Effectiveness	52.3%	47.84%	6.14%	≥ 46.16%	P	1.535%	≤ 47.70%	No	52.3%
<b>Pressure Drop Test</b>									
Supply Pressure Drop	0.48	0.525	0.050	≤ 0.530	P	0.0125	≥ 0.518	Yes	0.53
Exhaust Pressure Drop	0.55	0.617	0.055	≤ 0.605	F	0.0138	≥ 0.591	Yes	0.62
<b>Leakage Test</b>									
EATR	0.0	0.461	1.00	≤ 1.00	P	0.25	≥ 0.75	No	0.0
OACF	0.89	0.812	0.801 ≤ Measured Value ≤ 1.000		P	≤ 0.823 or ≥ 0.973		Yes	0.81

Tested Metric	Certified Rating After Re-Rate	Measured Value	Test Allowance	75% of Test Allowance	Acceptable Range for Measured Value	Within Acceptable Range?
<b>Additional Pressure Drop Test Due to Failure</b>						
Supply Pressure Drop	0.21	0.247	0.050	0.0375	≤ 0.248	Yes
Exhaust Pressure Drop	0.25	0.27	0.050	0.0375	≤ 0.288	Yes
<b>Additional Pressure Drop Test Due to Failure</b>						
Supply Pressure Drop	0.60	0.63	0.060	0.045	≤ 0.645	Yes
Exhaust Pressure Drop	0.68	0.71	0.068	0.051	≤ 0.731	Yes

