

# OPERATIONS MANUAL

## ROOM FAN-COIL UNITS CERTIFICATION PROGRAM

---



**AHRI RFC OM – JANUARY 2024**

2311 Wilson Blvd, Suite 400  
Arlington, Virginia 22201  
(703) 524-8800

Sponsored and administered by:



## **PREFACE**

The following manual outlines the procedures and policies of the Performance Certification Program for Room Fan-Coil Units (RFC) operated by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). This manual is to be used in conjunction with the AHRI General Operations Manual (GOM) for AHRI Certification Programs. Where the AHRI GOM 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 GOM, can be accessed through the AHRI website, [www.ahrinet.org](http://www.ahrinet.org).

The RFC Certification Program by AHRI provides for independent verification of the Room Fan-Coil Units Certification Program 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 RFC 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 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, *Conformity assessment – Requirements for bodies certifying products, processes and services*.

### Note:

This manual supersedes Room Fan-Coil Units Certification Program Operations Manual, June 2020 and is effective January 1, 2024.

**CERTIFICATION OPERATIONS MANUAL FOR**  
**ROOM FAN-COIL UNITS CERTIFICATION PROGRAM**

**TABLE OF CONTENTS**

<b>SECTION</b>		<b>PAGE</b>
<b>1</b>	<b>Program Overview</b>	
1.1	Applicable Rating Standard .....	1
1.2	Product Definitions .....	1
1.2.1	Room Fan-Coil Unit .....	1
1.2.1.1	Free Delivery Units .....	1
1.2.1.2	Furred-in Units .....	1
1.2.1.3	High-Static Units .....	1
1.3	Program Scope .....	1
1.3.1	Product Scope Exclusions .....	1
1.4	Intended Market .....	1
1.5	Basic Model Groups (BMGs) .....	1
1.5.1	Optional BMG Subdivision .....	2
<b>2</b>	<b>Qualification Process</b>	
2.1	Original Equipment Manufacturer (OEM) Applicants .....	2
STEP 2.1.1	Certification Application Package .....	2
STEP 2.1.2	Processing Application Package .....	2
STEP 2.1.2.1	Performance Certification Agreement for Original Equipment Manufacturer (OEM Agreement) .....	2
STEP 2.1.2.2	Participation and Licensing Fee Invoice .....	2
STEP 2.1.3	Selection and Acquisition of Test Samples .....	2
STEP 2.1.3.1	Number of Qualification Tests .....	2
STEP 2.1.3.2	Acquisition of Qualification Test Samples/Selection Criteria .....	3
STEP 2.1.4	Qualification Testing .....	3
STEP 2.1.4.1	Operating Tests .....	3
STEP 2.1.4.2	Successful Completion of All Qualification Tests .....	3
STEP 2.1.4.3	First Sample Qualification Test Failure .....	3
STEP 2.1.4.4	Second Sample Qualification Test Failure .....	3
STEP 2.1.5	Welcome to the Program .....	3
2.2	Private Brand Marketer (PBM) Applicants .....	3
STEP 2.2.1	Certification Application Package .....	3
STEP 2.2.2	Processing Application Package .....	3
STEP 2.2.2.1	Performance Certification Agreement for Private Brand Marketer (PBM Agreement) .....	3
STEP 2.2.2.2	OEM Agreement on Behalf of the PBM Applicant .....	3
STEP 2.2.2.3	Licensing Fee Invoice .....	3
STEP 2.2.3	Welcome to the Program .....	4
<b>3</b>	<b>Equipment Selection and Testing</b>	
3.1	Annual Testing Requirement .....	4
3.2	Location of Tests .....	4
3.3	Selection of Test Samples .....	4
3.4	Method of Acquiring Test Samples .....	4
3.5	Sample Acquisition Timeframe .....	4

3.5.1	U.S. and Canadian Participants .....	4
3.5.2	International Participants .....	4
3.6	Participant's Required Equipment Provisions .....	4
3.6.1	Free Delivery Units .....	4
3.6.2	Furred-in Units.....	4
3.6.3	High-Static Units.....	4
3.6.4	Medium Speed Testing.....	4
3.7	Certified Data .....	5
3.8	Required Tests.....	5
3.8.1	Testing Conditions.....	5
3.8.2	Fluid Flow Rate and Velocity.....	5
3.8.3	Air flow and Power.....	5
3.8.4	Reference Data .....	5
3.9	Test Failures and Re-rating Procedures.....	5
3.9.1	Options Following 1 <sup>st</sup> Sample Failure .....	5
3.9.2	Options Following 2 <sup>nd</sup> Sample Failure .....	6
<b>4</b>	<b>Challenge Tests .....</b>	<b>6</b>
<b>5</b>	<b>AHRI Directory of Certified Product Performance</b>	
5.1	Publication of Ratings in Certified Directory.....	6
5.2	Data Forms .....	7
<b>6</b>	<b>Assessment and Payment of Certification Fees.....</b>	<b>7</b>
<b>7</b>	<b>Issuance of Violations and/or Termination .....</b>	<b>7</b>
<b>8</b>	<b>Program Hierarchy, Complaints, and the Appeals Process.....</b>	<b>7</b>
<b>9</b>	<b>Proper Use of the AHRI Certification Mark and Claims to Certification .....</b>	<b>7</b>
<b>Appendices</b>		
Appendix A	Data Sheets .....	8

## 1. Program Overview

1.1 Applicable Rating Standard. It is mandatory for program Participants to comply with the provisions of AHRI 440-2019, *Performance Rating of Fan-coil Units* (Standard). A copy of the Standard is available for download from the AHRI website, [www.ahrinet.org](http://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 Room Fan-Coil Unit. A factory-made assembly that provides Forced-air Circulation, cooling or cooling and heating, and filtering of air, with a maximum design External Static Pressure (ESP) less than or equal to 1.0 in H<sub>2</sub>O, that does not include the source of cooling or heating, with the exception of optional electric heat.

1.2.1.1 Free Delivery Units. Fan-coil Units intended to be installed in the conditioned space and have no duct attached to distribute conditioned air. The units operate at an External Static Pressure of 0 in H<sub>2</sub>O and may be furnished with both integral filters and Grilles on the unit. Free Delivery Units is equal to Non-ducted.

1.2.1.2 Furred-in Units. Room Fan-Coil Units intended to be installed above a ceiling, within a side wall, or with a discharge grille. It may or may not have provisions for a filter.

1.2.1.3 High-Static Units. Room Fan-Coil Units intended to be installed with ductwork and designed to function at 0.20 in H<sub>2</sub>O [50 Pa] ESP and above.

1.3 Program Scope. This program applies to 50 Hz and 60 Hz Room Fan-Coil Units, as defined in Section 1.2.

1.3.1 Program Scope Exclusions. This certification program does not include:

- Units with an ESP greater than 1.0 in H<sub>2</sub>O.
- Units with volatile refrigerant coils (DX).
- Units with only heating.
- Heating performance.
- Central-station air-handling units as defined in AHRI Standard 430, or
- Unit ventilators as defined in AHRI Standard 840

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). A Participant's listing shall be grouped by BMG. At a minimum, a BMG is a regular range of units being the identical unit type, unit arrangement, coil configuration, motor type, and unit frequency as stated below:

- Unit type
  - Free delivery
  - Furred in
  - High static
- Unit arrangement
  - Vertical,
  - Horizontal,
  - Vertical high rise
- Coil configuration
  - Blow-through
  - Draw-through

- Motor type
  - ECM
  - PSC
  - Pole
- Unit frequency
  - 50 Hz
  - 60Hz
  - 50 and 60 Hz

A unit of a given nominal air flow is a model within a BMG and shall be listed separately in the AHRI Directory of Certified Product Performance (Directory).

1.5.1 Optional BMG Subdivision. Manufacturers have the option to increase the number of BMGs to separate groupings of units based on mounting arrangement or other engineering considerations, including but not limited to:

- Exposed or recessed units;
- Floor mounted, wall mounted, or ceiling mounted;
- Number of coil rows; or
- Unit type (Free-Delivery, Furred-In, High-Static).

## 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 GOM, Section 4.

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

- One (1) test report for each BMG.

Electronic forms shall be obtained from AHRI (available on [www.ahrinet.org](http://www.ahrinet.org) under the Product-Specific Certification Program).

STEP 2.1.2 Processing Application Package.

STEP 2.1.2.1 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 GOM.

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 GOM.

STEP 2.1.3 Selection and Acquisition of Test Samples.

STEP 2.1.3.1 Number of Qualification Tests. 20% of an Applicant's BMGs shall be tested, with a minimum of two (2) models. Fractional numbers shall be rounded up to the next whole number. (Example: 20% of 11 BMGs is 2.2 so the Applicant would have 3 tests.)

STEP 2.1.3.2 Acquisition of Qualification Test Samples/Selection Criteria. Within 60 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 Operating Tests. In addition to the Performance Rating tests, the following Operating Tests shall be conducted for all qualification tests:

- Insulation Efficiency Test.
- Low Voltage Test.

If a first sample test fails any Operating Test, a second sample shall be tested. If the second sample fails any Operating Test, then that model and BMG shall not be entered into the AHRI Directory of Certified Product Performance (Directory) and the Applicant shall cease production and sale of the failed model and BMG in order to qualify into the certification program. An additional qualification sample shall be selected and tested (if all BMGs have not been tested) to continue the qualification process.

STEP 2.1.4.2 Successful Completion of All Qualification Tests. If all qualification tests pass, proceed to STEP 2.5.

STEP 2.1.4.3 First Sample Qualification Test Failure. Refer to Section 4, STEP 4.4.2 of the AHRI GOM for details regarding the first sample qualification failure options:

STEP 2.1.4.4 Second Sample Qualification Test Failure. Refer to Section 4, STEP 4.4.3 of the AHRI GOM 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 GOM.

2.2 Private Brand Marketer (PBM) Applicants. With the additions noted below, the PBM qualification process shall proceed according to the AHRI GOM, 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 required beyond that listed in Section 5, STEP 2.2.1 of the AHRI GOM.

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 GOM.

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 GOM.

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 GOM.

### 3. Equipment Selection and Testing

3.1 *Annual Testing Requirement*. 20% of a Participant's BMGs shall be tested annually, with a minimum of two (2) models. Fractional numbers shall be rounded to the nearest whole number using traditional rounding methods. (Example: 20% of 11 BMGs is 2.2 so the Participant shall have 2 tests.)

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.

3.3 *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.

3.4 *Method of Acquiring Test Samples*. AHRI or Laboratory personnel shall make a random selection of a sample from the Participant's stock units of no fewer than two (2) units; or a Random Component Sample Selection for build-to-order units. The Participant shall complete and submit Form RFC-SEL1 within 30 calendar days of the date of the annual test requirement selection letter, sent by AHRI. Laboratory personnel shall randomly select stock units within 60 calendar days of the annual test requirement selection letter by AHRI. Selected samples shall be shipped to the Laboratory and shall be accompanied by the Participant's published installation instructions in either printed or electronic format. Refer to Section 9 of the AHRI GOM.

3.5 *Sample Acquisition Timeframe*.

3.5.1 *U.S. and Canadian Participants*. The Participant shall deliver the selected sample(s) to the Laboratory within 14 calendar days of random selection by Laboratory personnel.

3.5.2 *International Participants*. The Participant shall deliver the selected sample(s) to the Laboratory within 30 calendar days of random selection by Laboratory personnel. The Participant shall provide proof of shipment of the sample(s) selected by Laboratory personnel to AHRI within 48 hours of selection.

3.6 *Participant's Required Equipment Provisions*.

3.6.1 *Free Delivery Units*. The Participant shall provide any appurtenance(s) (filter and/or grille) required for the sample to operate as intended. Air filters built into Free Delivery samples shall be kept in place during tests and testing shall be conducted at an external static pressure of 0.00 in. H<sub>2</sub>O [0.0 Pa]. Grilles built into Free Delivery samples shall be kept in place during tests and testing shall be conducted at an external static pressure of 0.00 in. H<sub>2</sub>O [0.0 Pa].

3.6.2 *Furred-in Units*. Furred-in samples shall be tested at an external static pressure of 0.05 in. H<sub>2</sub>O [12.4 Pa], and without filters and grilles.

3.6.3 *High-Static Units*. High-Static Units shall be tested at an external static pressure of 0.2 in. H<sub>2</sub>O [50.0 Pa], and without filters and grilles.

3.6.4 *Medium Speed Testing*. The external static pressure for the medium speed tap testing is to be determined by the following equation:

$$\text{Medium Speed Tap ESP} = \text{High Speed Tap ESP} * \left[ \frac{\text{Medium Speed Tap SCFM}}{\text{High Speed Tap SCFM}} \right]^2$$



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

- Total Cooling Capacity, Btu/h [W];
- Sensible Cooling Capacity, Btu/h [W];
- Power Input, W [W]; and

3.8 Required Tests.

3.8.1 Testing Conditions. The following three performance points from Table 1 of AHRI 440-2019 shall be run:

Test Point	Fan Setting	Entering Dry-bulb Temperature, °F	Entering Wet-bulb Temperature, °F	Entering Water Temperature, °F	Leaving Water Temperature, °F
1	High	75	63	45	55 or 60
2	High	80	67	45	55 or 60
3	Medium	75	63	45	55 or 60

3.8.2 Fluid Flow Rate and Velocity.

- At each of the three test points, the unit shall be tested at the fluid flow rate that produces the rated  $\Delta T$ , provided the fluid flow velocity is greater than or equal to 1.0 fps.
- If the test unit is rated at a flow velocity less than 1.0 fps at any one of the three test points, the fluid flow velocity shall be increased to 1.0 fps per Participant instruction and the unit shall be tested at that fluid flow rate and the resulting  $\Delta T$ .

3.8.3 Air flow and Power.

- The dry-coil (no water flow) air flow rate and power shall be measured at the dry bulb temperature of Test points 1 and 3 at the ESP values in section 3.6 by the unit type.

3.8.4 Reference Data. In accordance with the Standard, the following are measured by test:

- Water Pressure Drop, ft H<sub>2</sub>O;
- Fluid Flow rate, gpm; and
- Airflow Rate, scfm.

3.9 Test Failures and Re-rating Procedures.

3.9.1 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 must 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.

3.9.2 *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.

#### 4. Challenge Tests

Refer to Section 10 of the AHRI GOM.

#### 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 GOM.

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 of Model;
- Model and Size Designation);
- Series Name;
- For the Certified Data points at:
  - Max or High Speed @ 80/67/45°F
    - Total Cooling Capacity, Btu/h [W];
    - Sensible Cooling Capacity, Btu/h [W];
    - Water Flow Rating, GPM [L/s];
    - Water Pressure Drop, ft. H<sub>2</sub>O [kPa];
    - Temperature Rise (10°F or 15°F), [5.6°C or 8.3°C];
  - Max or High Speed @ 75/63/45°F
    - Total Cooling Capacity, Btu/h [W];
    - Sensible Cooling Capacity, Btu/h [W];
    - Water Flow Rating, GPM [L/s];
    - Water Pressure Drop, ft. H<sub>2</sub>O [kPa];
    - Temperature Rise (10°F or 15°F), [5.6°C or 8.3°C];
  - Medium Speed @ 75/63/45°F
    - Total Cooling Capacity, Btu/h [W];
    - Sensible Cooling Capacity, Btu/h [W];
    - Water Flow Rating, GPM [L/s];
    - Water Pressure Drop, ft. H<sub>2</sub>O [kPa];
    - Temperature Rise (10°F or 15°F), [5.6°C or 8.3°C];
  - Max or High Speed

- Air Flow Rating, scfm [standard m<sup>3</sup>/s];
- Power Input, W [W];
- Medium Speed
  - Air Flow Rating, scfm [standard m<sup>3</sup>/s];
  - Power Input, W [W];
- Motor Type (PSC/Shaded Pole/EC Motor);
- Unit Type (Free Delivery Fan Coil Units, Furred-In Fan Coil, or High Static Units);
- Unit Arrangement; and
- Catalog Name.

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

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

Refer to 12 of the AHRI GOM.

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

Refer to Section 14 of the AHRI GOM.

## **8. Program Hierarchy, Complaints, and the Appeals Process**

Refer to Section 15 of the AHRI GOM.

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

Refer to the AHRI Brand Usage Guide.

**Appendix A. Data Sheets**

A.1 *RFC-SEL1, Selection Decision Form.*

Electronic form available for download from AHRI's website [www.ahrinet.org](http://www.ahrinet.org).