

OPERATIONS MANUAL

DEDICATED OUTDOOR AIR SYSTEM UNITS CERTIFICATION PROGRAM



AHRI DOAS OM – DECEMBER 2020

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PREFACE

The following manual outlines the procedures and policies of the Performance Certification Program for DX-Dedicated Outdoor Air Systems Units (DOAS) 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.

The DOAS Certification Program by AHRI provides for independent verification of the performance of the DX-Dedicated Outdoor Air Systems manufacturer's 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 DOAS 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, *General Requirements for Bodies Operating Product Certification Systems*.

Note:

This manual supersedes the AHRI DX-Dedicated Outdoor Air System Units Certification Program Operational Manual, December 2019.

**CERTIFICATION OPERATIONS MANUAL FOR
DX-DEDICATED OUTDOOR AIR SYSTEM UNITS**

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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 920 (I-P), *Performance Rating of Direct Expansion Dedicated Outdoor Air System Units* (Standard). A copy of the Standard is available for download from the AHRI website, www.ahrinet.org.

1.2 Product Definitions.

1.2.1 Direct Expansion-Dedicated Outdoor Air System (DX-DOAS) Units. A type of air-cooled, evaporatively-cooled, or water-cooled air-conditioner, or an air-source or water source heat pump, that is a factory assembled product designed and marketed and sold to provide ventilation and dehumidification of 100 % Outdoor Air, is capable of dehumidifying air to a 55 °F dew point when operating under Standard Rating Condition A as specified in Table 4 or Table 5 of the Standard with a barometric pressure of 29.92 in Hg, and may include Reheat. It may include pre-conditioning of Outdoor Air using an enthalpy wheel, sensible wheel, desiccant wheel, plate heat exchanger, heat pipes, or other heat or mass transfer apparatus. Heating components are optional and may include electrical resistance, steam, hot water, or gas heat. In addition, it may provide for air cleaning or may include mixing box or economizer dampers to allow Return Air to be intermittently used as allowed by the controls.

1.2.2 Reheat. Sensible heat that the DX-DOAS Unit can input to the supply air in the dehumidification mode to raise its dry bulb temperature downstream of the conditioning coil.

1.2.2.1 Cycle Reheat. Heat that is used to increase the dry bulb temperature of dehumidified air leaving the evaporator that is supplied by a component that is either part of the vapor compression cycle, or a system that transfers heat from one part of the unit to the other (e.g., wrap-around heat pipe, wrap-around vapor compression cycle), or a system that transfers heat from outdoors, or air moving over the outdoor coil, to the dehumidified air. Cycle Reheat is not supplementary heat. Cycle Reheat is expressed in units of Btu/h.

1.2.2.2 Supplementary Reheat. Supplementary heat used during dehumidification mode.

1.2.3 Return Air. All DX-DOAS Units with recirculation capability shall be tested with any return air openings used for recirculation purposes blocked off by the Participant before shipment to the testing facility. This Operations Manual is not intended to be used for testing mixed air performance.

1.2.4 Ventilation Energy Recovery System (VERS). A system that preconditions Outdoor Air entering the DX-DOAS Unit through direct or indirect thermal and/or moisture exchange with the Exhaust Air.

1.3 Program Scope. This program applies to 60 Hz Production Models of DX-DOAS Units, as defined in Section 1.2, with a Moisture Removal Capacity (MRC) less than 230 lb of moisture/hr.

1.4 Intended Market. The Intended Market for this certification program, where the Standard applies, includes all products defined in Section 1.3 that are sold for use in the US and Canada (U.S., U.S. Territories, and Canada).

1.5 Basic Model Groups (BMGs). A Participant's listing shall be grouped for the DX-DOAS program as categorized in Table 1.

Table 1. Basic Model Groups	
Section 1. With VERS	BMG 10. Air-cooled Split System
	BMG 20. Air-cooled Packaged System
	BMG 30. Air-source Heat Pump Included
	BMG 40. Water-source Heat Pump Included
	BMG 50. Water-cooled condenser
Section 2. Without VERS	BMG 110. Air-cooled Split System
	BMG 120. Air-cooled Packaged System
	BMG 130. Air-source Heat Pump Included
	BMG 140. Water-source Heat Pump Included
	BMG 150. Water-cooled condenser

1.5.1 Optional Additional BMGs. A participant may choose to further subdivide its products into additional BMGs using optional characteristics (e.g. Water-source Heat Pump Included systems with VERS can be subdivided into BMG IDs 40 through 49).

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, Annual Sales Volume Form and product specific ratings and data, noted in the AHRI General Operations Manual, Section 4, STEP 4.1, Applicants shall submit the following:

- One test report for each BMG.

Electronic forms shall be obtained from AHRI.

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 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. 25% of the Applicant's BMGs shall be tested including a minimum of two (2) tests. If only one (1) BMG is listed, two (2) model

sizes from that BMG shall be tested. Fractional numbers shall be rounded to the nearest whole number using traditional rounding methods.

For an Applicant with BMGs in both Section 1 and Section 2 of Table 1, a minimum of one (1) unit in each section shall be tested per year. For Applicants with multiple configurations or sizes of a particular BMG, a random sample of that BMG using stock parts would be selected by AHRI.

STEP 2.1.3.2 Acquisition of Qualification Test Samples/Selection Criteria. The Applicant shall assemble the unit and ship to laboratory within 120 calendar days of the receipt of the selection letter. 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.

STEP 2.1.4.1 Operating Tests. In addition to the Performance Rating tests, all qualification tests shall include one (1) of the following Operating Tests to be conducted:

- Maximum Operating Condition Test;
- Dehumidification Low Temperature Operation Test; and
- Voltage Tolerance Test.

If the sample fails the Operating Tests, a second sample, to be selected by AHRI, shall pass in order to qualify into the program. If the second sample does not pass, 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. A new sample shall be selected and 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 2.1.5.

STEP 2.1.4.3 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 2.1.4.4 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 initial 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 5.1 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 Testing Requirement. 20% of the Participant's BMGs shall be tested, with a minimum of two (2) models. Fractional numbers should be mathematically rounded to the nearest whole number using traditional rounding methods.

For a Participant with BMGs in both Section 1 and Section 2 of Table 1, a minimum of one (1) unit in each section shall be tested per year. For manufacturers with multiple configurations or sizes of a particular BMG, a random sample of that BMG using stock parts would be selected by AHRI.

3.2 Location of Test. Testing shall be performed at the Laboratory and 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 Methods for Acquiring Test Samples. AHRI or the Laboratory shall make a Random Sample Selection or a Random Component Selection. Selected samples shall be shipped to the Laboratory accompanied by the Participant's published installation instructions in printed or electronic format. Refer to Section 9 of the AHRI General Operations Manual.

3.4.1 Random Component Selection. For Random Component Selection, sample shall be comprised of a minimum set of three (3) of each of the following:

- Compressors; and
- Remote condensers (if applicable).

The following components may not have serial numbers. Serial numbers for these components shall be supplied only if available:

- Indoor Coils;
- Outdoor Coils;
- Supply Fan(s); and
- Exhaust Fan(s).

3.5 Sample Acquisition Timeframe. The Participant shall assemble the unit and ship to laboratory within 120 calendar days of the receipt of the selection letter.

3.6 Certified Data. In accordance with the Standard the following certified ratings are verified by test. Certified ratings shall be determined by:

- Moisture Removal Capacity at standard rating condition A, lb of moisture/h; and
- Integrated Seasonal Moisture Removal Efficiency (ISMRE2), lb of moisture/kWh.
- Integrated Seasonal Moisture Removal Efficiency -70 (ISMRE2-70), for units with Supplementary Heat, lb of moisture/kWh.
- Exhaust air transfer ratio, when using option 1 of the Standard, %.

3.9 Test Failures.

3.9.1 Options Following First Sample Failure. When the Participants are notified of a first sample certified rating failure, they have 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 3.5 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 2nd 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 General Operations Manual.

5. AHRI Directory of Certified Product Ratings

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 Ratings in Certified Directory. The following information pertaining to each model certified shall be published in the Directory:

- AHRI Certified Reference Number;
- Model Status;
- Name of Manufacturer;
- Brand Name of Model;
- Main Unit Model Number or Designation;
- Remote Unit Model Number or Designation;
- Moisture Removal Capacity at Standard Rating Condition A per the Standard, lb of moisture/h;
- Integrated Seasonal Moisture Removal Efficiency (ISMRE2);
- Integrated Seasonal Moisture Removal Efficiency -70 (ISMRE2-70);
- Airflow rate, cfm;

- Exhaust air transfer ratio, %.

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

6.1. Equipment Disposal Fees. The Participant is responsible for the delivery and expenses associated with shipping test samples to and from the Laboratory. Following the completion of the test, the Participant shall provide instruction to the Laboratory regarding the disposal/shipment of the sample(s). The Laboratory shall invoice the Participant for expenses associated with the disposal/shipment of the sample from the Laboratory's facility to a location designated by the Participant.

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 Section 8 of the AHRI General Operations Manual.