

OPERATIONS MANUAL

CENTRAL STATION AIR-HANDLING UNIT SUPPLY FANS CERTIFICATION PROGRAM



AHRI AHU OM – JUNE 2023

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 Central Station Air-Handling Units Supply Fans (AHU) 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 AHU Certification Program by AHRI provides for independent verification of the Central Station Air-Handling Units 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 AHU 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*.

Notes:

This manual supersedes Central Station Air-Handling Unit Supply Fans Operations Manual, December 2021.

CERTIFICATION OPERATIONS MANUAL FOR
CENTRAL STATION AIR-HANDLING UNITS

TABLE OF CONTENTS

SECTION	PAGE
1	Program Overview
1.1	Applicable Rating Standard 1
1.2	Product Definitions 1
1.2.1	Central Station Air-Handling Unit (AHU)..... 1
1.2.1.1	Unducted Fan Discharge Central Station Air-Handling Unit 1
1.2.1.2	Ducted Fan Discharge Central Station Air-Handling Unit 1
1.2.1.3	Unit Appurtenances 1
1.2.2	Backwards-Inclined Fan..... 1
1.2.3	Central Station Air-Handling Unit (CSAHU or AHU)..... 1
1.2.3.1	Unducted Fan Discharge Central Station Air-Handling Unit 1
1.2.3.2	Ducted Fan Discharge Central Station Air-Handling Unit 1
1.2.3.3	Unit Appurtenances 1
1.2.3.4	Casing Design Pressure 1
1.2.4	Counter-Swirl..... 1
1.2.5	Fan Array 1
1.2.5.1	Contained Fan 1
1.2.5.2	Partially Contained Fan 2
1.2.5.3	Uncontained Fan 2
1.2.6	Forward-Curved Fan 2
1.2.7	Housed Fan 2
1.2.8	Plenum Fan (Plug Fan)..... 2
1.2.9	Pre-Swirl 2
1.3	Program Scope 2
1.3.1	Program Scope Exclusions 2
1.3.2	Optional Certification for Units with an Airflow Larger than 50,000 cfm. 2
1.3.3	Optional Certification for Units with Casing Design Pressure equal to or in excess of ± 10 in H ₂ O..... 2
1.4	Intended Market 2
1.5	Basic Model Groups (BMGs) 2
1.5.1	Optional BMG Subdivision – Ducted Fan Discharge..... 3
1.5.2	Optional BMG Subdivision – Supply Fan Housing..... 3
1.5.3	Optional BMG Subdivision – Direct-drive drive type 3
1.5.4	Optional BMG Subdivision – Other 3
2	Qualification Process
2.1	Original Equipment Manufacturer (OEM) Applicants 3
STEP 2.1.1	Certification Application Package..... 3
STEP 2.1.2	Processing Application Package..... 4
STEP 2.1.2.1	Performance Certification Agreement for Original Equipment Manufacturer (OEM Agreement) 4
STEP 2.1.2.2	Participation and Licensing Fee Invoice 4

	STEP 2.1.2.3	Selection Rating Software Approval.....	4
STEP 2.1.3		Selection and Acquisition of Test Samples.....	4
	STEP 2.1.3.1	Number of Qualification Tests.....	4
	STEP 2.1.3.2	Acquisition of Qualification Test Samples/Selection Criteria.....	4
	STEP 2.1.3.3	Facility Approval and Sample Selection	4
STEP 2.1.4		Qualification Testing	5
	STEP 2.1.4.1	Successful Completion of All Qualification Tests	5
	STEP 2.1.4.2	First Sample Qualification Test Failure.....	5
	STEP 2.1.4.3	Second Sample Qualification Test Failure.....	5
STEP 2.1.5		Welcome to the Program	5
2.2		Private Brand Marketer (PBM) Applicants	5
	STEP 2.2.1	Certification Application Package.....	5
	STEP 2.2.2	Processing Application Package	5
	STEP 2.2.2.1	Performance Certification Agreement for Private Brand Manufacturer (PBM Agreement)	5
	STEP 2.2.2.2	OEM Agreement on behalf of the PBM Applicant	5
	STEP 2.2.2.3	Licensing Fee Invoice	5
	STEP 2.2.2.4	Selection Rating Software Approval.....	5
STEP 2.2.3		Welcome to the Program	5

3 Equipment Selection and Testing

3.1		Annual Testing Requirement.....	6
3.2		Location of Tests.....	6
3.3		Witness Testing Procedures and Operations	6
	3.3.1	Application for Witness Testing.....	6
	3.3.1.1	Acknowledgement of Request	6
	3.3.2	Inspection of Witness Test Facility	6
	3.3.2.1	Non-Compliant Inspection Results	6
	3.3.2.2	Final Approval of Witness Test Facility.....	7
	3.3.3	Scheduled Witness Test Facility Re-approval	7
	3.3.4	Unscheduled Facility Re-approval.....	7
	3.3.5	Witness Test Operations at a Facility	7
	3.3.5.1	Advance Set-Up of Sample in the Facility	7
	3.3.5.2	Duty Assignments of Representative	7
	3.3.5.3	Use of Instrumentation.....	7
	3.3.5.4	Sample Start-Up and Operation.....	7
3.4		Selection of Test Samples	7
3.5		Method of Acquiring Test Samples	8
3.6		Sample Acquisition Timeframe	8
3.7		Selection Rating Software/Catalog.....	8
	3.7.1	Requesting Approval of Rating Methods	8
	3.7.1.1	Installation of Selection Rating Software	9
	3.7.2	Requesting Approval of Rating Methods	9
	3.7.3	Initial Approval of Selection Rating Software through Published Rating Comparison.....	9
	3.7.4	Updates to Previously Approved Software	9
	3.7.5	Statements Regarding Certification.....	9
	3.7.5.1	For Units Within the Scope of the Program	10
	3.7.5.2	For Units Outside the Scope of the Program	10
	3.7.5.3	For Units Outside the Scope of the Standards.....	10
3.8		Repairs and Adjustments Prior to Testing	10
3.9		Certified Data	10
	3.9.1	For Units with Motors 1 HP or Greater	10
	3.9.2	For Units with Motors Less Than 1 HP	10
3.10		Test Failures	10

3.10.1	Options Following 1 st Sample Failure	10
3.10.2	Options Following 2 nd Sample Failure	11
3.11	Re-rate Procedure	11
4	Challenge Tests	11
5	AHRI Directory of Certified Product Performance	
5.1	Publication of Ratings in Certified Directory.....	11
5.2	Data Forms	12
6	Assessment and Payment of Certification Fees	
6.1	Equipment Delivery/Disposal Fees.....	12
7	Issuance of Violations and/or Terminations	12
8	Program Hierarchy, Complaints, and the Appeals Process	12
9	Proper Use of the AHRI Certification Mark and Claims to Certification	12

1. Program Overview

1.1 Applicable Rating Standard. It is mandatory for program Participants to comply with the provisions of AHRI Standard 430-2020 (I-P), *Performance Rating of Central Station Air-handling Units Supply Fans*, or AHRI Standard 431-2020 (SI), *Performance Rating of Central Station Air-handling Units Supply Fans (Standard)*. A copy of the Standard is available for download from the AHRI website, www.ahrinet.org.

1.2 Product Definitions.

1.2.1 Axial Fan. A housed fan that moves air in the general direction of the axis about which it rotates. This includes tubeaxial fans, centaxial fans, and vaneaxial fans. Fan rotor or wheel within a tubular-type casing that includes supports for either belt drive or direct drive.

1.2.2 Backwards-Inclined Fan. Fans where each blade is oriented with the tip pointing opposite to the direction of rotation.

1.2.2.1 Airfoil Fan. Airfoil fans are backwards-inclined fans comprised of individual airfoil blades.

1.2.3 Central Station Air-Handling Unit (CSAHU or AHU). A factory-made encased assembly consisting of a fan or fans and other necessary equipment to perform one or more of the functions of circulating, cleaning, heating, cooling, humidifying, dehumidifying and mixing of air. It shall not contain a source of cooling or heating other than gas or electric heat. The AHU shall have a maximum design external static pressure (ESP) greater than 1.0 in H₂O [0.25 kPa]. While the ESP for a specific application may be less than 1.0 in H₂O, any units generally capable of delivering greater than 1.0 in H₂O ESP shall be considered to be an AHU. This certification program applies to supply fan ratings for plenum fans in a cabinet with a full face opening axial discharge, fan arrays in a cabinet, housed centrifugal fans, and axial fans.

1.2.3.1 Unducted Fan Discharge Central Station Air-Handling Unit. A unit containing a fan that does not have a ducted fan outlet.

1.2.3.2 Ducted Fan Discharge Central Station Air-Handling Unit. A unit that has a ducted fan outlet.

1.2.3.3 Unit Appurtenances. Equipment added to AHU for purposes of control, isolation, safety, static pressure regain, wear, etc. Such appurtenances include coils, filters, dampers, air-mixers, spray assemblies, eliminators, discharge plenum, etc.

1.2.3.4 Casing Design Pressure. The Central Station Air-handling Unit manufacturer's stated maximum casing operating pressure.

1.2.4 Counter-Swirl. A condition where the airflow profile at the fan inlet has a rotational component in the opposite rotational direction as the fan.

1.2.5 Fan Array. A matrix of regularly spaced direct-drive plenum supply fans operating in parallel with inflow from a common inlet plenum and with outflow into a common outlet plenum. All impellers and motors must be of identical construction. All operating fans must run at the same speed. If applicable, all variable frequency drives must be programmed to provide identical frequency and voltage.

1.2.5.1 Contained Fan. Fans in a Fan Array that are within substantially uniform enclosure(s) and do not aerodynamically interact with each other within the array.

1.2.5.2 Partially Contained Fan. Fans in a Fan Array that are within non-uniform enclosure(s) and some supply fans aerodynamically interact with each other within the array.

1.2.5.3 Uncontained Fan. Fans in an array that aerodynamically interact with each other.

1.2.6 Forward-Curved Fan. Fans with blades that curve forward in the direction of the wheel rotation.

1.2.7 Housed Fan. A fan that includes a flow collector of some geometry at the leaving side of the fan wheel that guides the flow in a specific direction. The bare fan performance includes the effect of that collector in its ratings.

1.2.8 Plenum Fan (Plug Fan). A fan assembly consisting of a single inlet impeller, mounted perpendicular to airflow, which pressurizes a plenum chamber in an air distribution system. The impeller is typically an airfoil or backwardly inclined design.

1.2.9 Pre-Swirl. A condition where the airflow profile at the fan inlet has a rotational component in the same rotational direction as the fan.

1.3 Program Scope. This program applies to all 50 Hz and 60 Hz Production Models of Central Station Air-Handling Units, as defined in Section 1.2.

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

- Units with Plenum Fans that are available exclusively with a top or bottom discharge;
- CSAHUs with an airflow larger than 50,000 cfm; and
- CSAHUs with a Casing Design Pressure equal to or greater than ± 10 in H₂O.

1.3.2 Optional Certification for Units with an Airflow Larger than 50,000 cfm

- Participants may optionally certify units larger than the scope of the program;
- Larger units may be certified using testing in accordance with AHRI Standards 430/431; and
- All general advertising and promotional literature containing certified and excluded models shall clearly claim certification only for certified models.

1.3.3 Optional Certification for Units with Casing Design Pressure equal to or greater than ± 10 in H₂O

- Participants may optionally certify units with a Casing Design Pressure greater than ± 10 in H₂O;
- All general advertising and promotional literature containing certified and excluded models shall clearly claim certification only for certified models.

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. and Canada (U.S., 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 having a similar configuration; similar supply fan type; and similar drive type in common as stated below:

- Configuration;
 - i. Unducted Fan Discharge
 - ii. Ducted Fan Discharge
- Supply fan type;
 - Housed Fan
 - i. Airfoil/Backward-Inclined
 - ii. Forward-Curved
 - iii. Axial
 - Plenum Fan
 - iv. Airfoil/Backward-Inclined
- Drive type;
 - i. Direct-drive
 - ii. Belt-drive
- Fan Arrays;
 - i. Uncontained Fan Arrays
 - ii. Partially Contained Fan Arrays
 - iii. Contained Fan Arrays

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

1.5.1 Optional BMG Subdivision – Ducted Fan Discharge. Vertical Ducted Fan Discharge configurations can be further divided into vertical Ducted Fan Discharge Pre-Swirl and vertical Ducted Fan Discharge Counter-Swirl.

1.5.2 Optional BMG Subdivision – Supply Fan Housing. Participants have the option to increase the number of BMGs to separate groupings by supply fan housing. Plenum Fans may be separated into vertical-shafted or horizontal-shafted configurations.

1.5.3 Optional BMG Subdivision – Direct-drive drive type. Participants have the option to increase the number of BMGs to separate groupings by direct-drive drive types including Brushless DC motors/Electronically Commutated Motor (ECM), induction motor – single phase/three phase, and permanent magnet motor.

1.5.4 Optional BMG Subdivision - Other. Participants have the option to increase the number of BMGs to separate groupings of units having the same fan discharge orientation or other engineering considerations. Some examples of additional BMG subdivisions which a Participant may use, but are not limited to, are:

- Separate between airfoil and backward-inclined supply fans;
- Counter-Swirl and Pre-Swirl configurations;
- Component manufacturer;
- Number of fans in parallel in the AHU;
- Verified geometric proportionality (e.g., cabinet size, or fan families);
- Other considerations (e.g., fan size); or
- Input electrical frequency

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, New Applicant License Fee Form – Sales Volume, and 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:

- One test report for each BMG
- If the Applicant chooses to conduct witness testing at an 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; and
- Copy of Applicant's Selection Rating Software or Selection Rating Catalog (refer to Section 3.7).

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 2.1.2.3 Selection Rating Software Approval. AHRI shall provide the Applicant with a login/password to a personalized Virtual Machine (VM) to install their Selection Rating Software. Once the Applicant notifies AHRI that the Selection Rating Software has been successfully installed, AHRI shall grant approval of the Selection Rating Software.

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 to the nearest whole number using traditional rounding methods.

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 2.1.3.3 Facility Approval and Sample Selection. If the Applicant has applied to conduct witness testing at its facility, the Independent Third-Party Laboratory contracted by AHRI (Laboratory) shall contact the Applicant to schedule a preliminary witness test facility inspection. Upon final approval of the Applicant's witness test facility and the approval of the Applicant's Selection Rating Software and/or paper catalogs, the Laboratory shall contact the Applicant to schedule initial qualification testing. Section 3 further explains the requirements and procedures for applying and conducting witness testing.

Qualification testing may be scheduled simultaneously with facility inspection; however, should the facility fail inspection the testing shall be delayed until the facility is brought into compliance.

If the Applicant has not applied to conduct witness testing at its facility, the qualification process shall continue with the approval of the Applicant's Selection Rating Software and/or catalogs. Upon approval by AHRI, the Laboratory shall contact the Applicant to schedule initial qualification testing.

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 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 witness test facility inspection or initial qualification testing. PBM product certification is contingent upon the certification of the associated OEM product.

STEP 2.2.1 Certification Application Package. In addition to the Application for AHRI Certification and product-specific ratings and data 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 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 2.2.2.4 Selection Rating Software Approval. AHRI shall provide the Applicant with a login/password to a personalized Virtual Machine (VM) to install their Selection Rating Software. Once the Applicant notifies AHRI that the Selection Rating Software has been successfully installed, AHRI shall grant approval of the Selection Rating Software.

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 two (2) models. 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 or Facility and the sample shall be installed in the test facility in accordance with the Participant's published installation instructions in printed or electronic format. The Participant is responsible for arranging for approval of the Facility where the test will be conducted. If the sample is tested using calibrated motor method and is tested at the Laboratory, the motor calibration shall be performed after airflow performance testing is completed.

All samples outside the Laboratory's limits shall be tested at the Participant's Facility, including, but not limited to samples:

- Rated above 50,000 cfm;
- With air outlet discharge orientations which are vertical;
- With multiple air outlet discharges;
- Weighing greater than 10,000 pounds;
- Shipped in more than 2 sections;
- Having a width greater than 8 feet;
- Having a height greater than 8 feet;
- Greater than a 75 HP motor;
- Exceeding 460 V, 3 phase, 60 Hz;
- Exceeding 99 amps; and
- Unable to be lifted by a forklift

The Participant's Facility shall be approved by AHRI prior to any test being conducted. Testing shall continue to be conducted at the Participant's Facility, contingent upon it remaining AHRI-approved, or until the Participant notifies AHRI, in writing, of its desire to change facilities. All tests, regardless of location, shall be conducted or witnessed 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 witness testing forms LAB-FA1 and LAB-FR1 to AHRI. Electronic copies of these forms are available from AHRI.

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 facility approval based on submitted data, the Representative shall inspect the facility to verify compliance to the data submitted and to the certification program. Testing may be scheduled simultaneously with facility inspection; however, should the facility fail inspection, the testing shall be delayed until the 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 Facility of final acceptance and approval to proceed with certified ratings tests. AHRI shall provide the Facility with a certificate of approval.

3.3.3 Scheduled Witness Test Facility Re-approval. The Facility shall remain approved for no more than two (2) years. At this time, re-approval shall be required, including submittal of the documents outlined in Section 3.3.1 and inspection outlined in Section 3.3.2.

3.3.4 Unscheduled Facility Re-approval. Any changes that may affect a Facility’s ability to function per the certification program requirements shall be required to be re-approved by Laboratory personnel prior to conducting any witness testing. At this time, re-approval shall be required, including submittal of the documents outlined in Section 3.3.1 and inspection outlined in Section 3.3.2.

3.3.5 Witness Test Operations at a Facility.

3.3.5.1 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 test commencement, the Representative shall verify that the sample is the model selected by AHRI for 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. For a direct drive fan, a Participant may send the motor to the Laboratory for calibration in accordance with the calibrated motor method in AMCA 210.

3.3.5.2 Duty Assignments of Representative. Sample testing, data acquisition, and data reduction shall be performed by the Participant personnel and assisted and witnessed 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 tests, unless specifically approved by the Representative responsible for the test.

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

3.3.5.3 Use of Instrumentation. The Representative shall use test instruments belonging to the Facility, in accordance with certification program requirements. The Laboratory shall provide instrumentation to verify the accuracy of Facility’s equipment, on a “spot-check” basis. If the measurement(s) indicate that the Facility instrumentation accuracy may not be in accordance with the certification program requirements, AHRI shall be consulted and the issue resolved prior to conducting the test.

3.3.5.4 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. Information relevant to testing the sample per the Standard shall be provided by the Participant per selection letter instructions.

3.4 Selection of Test Samples. AHRI shall make a Built-to-Specification Test Sample Selection based on the data contained in the Directory. AHRI shall utilize the Participant’s AHRI approved Selection Rating Software or catalog to select a sample to operate within the limits of rating conditions per the Standard.

The only Appurtenance contained within the CSAHU shall be a coil unless the unit is unducted and the dimensions of the axial full face discharge are larger than the dimensions of the test chamber. Unducted units with larger full face axial dimensions than the test chamber may be provided with discharge or inlet plenums. Units to be tested shall contain the largest cataloged face area coil for that size and arrangement. The coil, fan sheave (if belt-driven), and internally mounted fan motor shall be mounted in their most restrictive cataloged location relative to the fan with the coil having a pressure drop of at least 0.075 in H₂O [0.019 kPa]. Unducted Fan Discharge Central Station Air-Handling Unit at 500 fpm [2.5 m/s] coil face velocity with Standard Air. Airflow shall be through a de-energized coil without coil bypass (Selecting a unit with an entering water temperature of 60°F [15.6°C] should ensure that the Selection Rating Software does not account for condensation pressure drop). In the case of an unducted fan discharge central station air-handling heating-cooling unit with multiple discharge paths, all but the cooling coil position shall be blocked and the unit tested with horizontal air discharge. The pressure drop of the coils shall have been determined in accordance with AHRI Standard 410. For units which are outside of the scope of the Laboratory, AHRI staff may work with the Participant to select a unit which is scheduled to be in production.

The Participant shall have five (5) calendar days from the date of the selection notice to notify AHRI personnel, in writing, if the selected model will be unavailable, is not a viable product, or if any adjustments need to be made prior to testing. [For example; the AHRI 430/431 test configuration for plenum fan units is axial full face discharge. The testing configuration shall be a plenum fan with axial full face discharge which may contain empty downstream section(s) and a shipping split or with an end of unit wall for structural stability. If the sample is selected with downstream section(s) the Participant shall build and submit the sample as selected. If the sample is built with an end of unit panel or downstream section(s) the Participant or certifying lab shall remove this prior to testing to obtain a full face axial opening for the certification check test.]

3.5 Method of Acquiring Test Samples. AHRI will provide instructions for submitting data to the Laboratory with the Selection Letter. The Participant shall submit data (i.e. special instructions, installation instructions, sample disposition, etc.) to the Laboratory with all the required information or be available for Witness Testing at the Facility.

3.6 Sample Acquisition and Timeframe. If testing at the Laboratory, the Participant shall deliver the units to the Laboratory within 60 calendar days from the receipt of the selection letter. Extended transit times shall be approved by AHRI prior to selection. Prior to test, AHRI shall supply the Laboratory with the Published Ratings. For Witness Testing, the unit shall be available for testing within 120 days of receipt of the Selection Letter.

3.7 Selection Rating Software/Catalog

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

- Selection Rating Software shall be either personal computer (PC) based, run on MS Windows® platform, or web-based software and allow for selection of any certified product at any application rating condition per the Standard
- Provide outputs for:
 - Unit Model Number;
 - Certified ratings;
 - Fan type/size;
 - Number of fans;
 - Voltage;
 - Phase;
 - Frequency;
 - Controller or VFD parameters for certified ratings¹
 - Version number or other revision coding;

- Proper claims to AHRI Certification (Refer to Section 3.7.5);

¹Applicable for units that include motor controller of VFD.

- All necessary passwords to access Selection Rating Software and updates,
- Instructions for use of the Selection Rating Software, including an example of an AHRI selection done in the software; and
- A copy of the Participant(s) published catalog, if applicable.

The Selection Rating Software shall meet the requirements set forth in Section 9. If the Participant has more than one Selection Rating Software available to users, each program shall be verified by AHRI.

3.7.1.1 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 Selection Rating 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 five (5) business days.

3.7.2 Requesting Approval of Rating Methods: Selection Rating Catalog. A Participant shall request approval of its Selection Rating Catalog by submitting all of the following to AHRI:

- A copy of the Participant(s) published catalog which includes, at a minimum:
 - Fan performance data for all sizes and types of fans within the scope of the AHU Certification Program

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 Operational Manual, Section 17, 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. Major changes to Selection Rating Software shall go through an Initial Approval as per Section 3.7.2 and adhere to the requirements in Section 3.7.1. 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.

3.7.5 Statements Regarding Certification.

All Selection Rating Software outputs from an approved Selection Rating Software shall include one of the following:

3.7.5.1 For Units Within the Scope of the Program. For units within the scope of the program, the Mark is required to be included on the unit per Section 8 of the AHRI General Operations Manual. When possible, the Mark should be included on Selection Rating Software outputs for certified units in accordance with the AHRI Brand Usage Guide. Selection Rating Software outputs shall have the following statement:

“Certified by the AHRI Central Station Air-Handling Unit (AHU) Certification Program, which is based on AHRI Standard 430/431. AHRI certified units are subject to rigorous and continuous testing, have performance ratings independently measured and are third-party verified. Certified units may be found in the AHRI Directory at www.ahridirectory.org”

3.7.5.2 For Units Outside the Scope of the Program. For units outside the scope of the program but rated to AHRI Standard 430/431, the Mark shall not be included on the unit or on the Selection Rating Software Outputs. The Selection Rating Software Output shall have the following statement:

“Unit is outside of the scope of AHRI Central Station Air-Handling Unit (AHU) Certification Program but is rated in accordance with AHRI Standard 430/431.”

3.7.5.3 For Units Outside the Scopes of the Standards. For units outside the scope of AHRI Standard 430/431, the Mark shall not be included on the unit or on the Selection Rating Software Outputs. The Selection Rating Software Output shall have the following statement:

“Unit is outside of the scope of AHRI Standard 430/431.”

3.8 Repairs and Adjustments Prior to Testing. Repairs and adjustments prior to testing shall be in accordance with the Participant’s installation instructions, as applicable. For example, fans shall be properly aligned, per design.

3.9 Certified Data. In accordance with the Standard, the following certified ratings are verified by test, based on either Section 3.9.1 or Section 3.9.2:

3.9.1 For Units with Motors 1 HP or Greater:

- Fan Speed, rpm [rev/s];
- Fan Electrical Power, kW [kW]; and
- Fan Shaft Power, bhp [W]¹

¹Applicable if ratings are calculated using AMCA 207.

3.9.2 For Units with Motors Less Than 1 HP:

- Fan Speed, rpm [rev/s];
- Fan Electrical Power, kW [kW], if tested in accordance with Section 5.1.1 of AHRI Standard 430/431;
- Fan Shaft Power, bhp [W], if not tested in accordance with Section 5.1.1 of AHRI Standard 430/431

3.10 Test Failures.

3.10.1 Options Following 1st 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. Refer to Section 3.11 for the software re-rate procedure;
- 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.

3.10.2 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. Refer to Section 3.11 for the software re-rate procedure; or
- Obsolete the model, which also obsoletes all models within the corresponding BMG.

3.11 Re-rate Procedure. Re-rates will be reflected on the Directory for six (6) months as a footnote and in the display of the affected BMG. The note will reference the Selection Rating Software (or catalog) name and version in which selections were made. Software or literature updates need to be made within 60 calendar days. Note that the Selection Rating Software must be installed on the designated VM and functional within that time frame. Participants shall notify AHRI at once when the Selection Rating Software has been revised.

Additionally, Participants shall provide the following information to prove compliance:

- Computer output for the failed unit in the revised software;
- Computer outputs for two (2) additional units in the same BMG in both the old and revised versions of the Selection Rating Software;
- Revised Selection Rating Software name and version number.

The percent difference in the failed rating, between the old and new Selection Rating Software Versions, must meet or exceed the percentage by which the model failed.

AHRI shall review the re-rate submission package and shall grant access the Participant access to install the revised Selection Rating Software on the VM. The Participant shall notify AHRI after the software is fully operational. A re-rate is considered to be a major change and Selection Rating Software shall go through an initial approval as per Section 3.7.2

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 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;
- Supply Fan Type;
- Drive Type (Belt-drive or Direct-drive);
- Configuration (Unducted Fan Discharge or Ducted Fan Discharge);
- Fan Arrays Included (Yes or No);
- Fan Array Type (Contained, Uncontained, or Partially Contained);
- Casing Design Pressure;
- Units $\geq \pm 10$ in H₂O Casing Design Pressure optionally certified (Yes or No);
- Units $\geq 50,000$ cfm optionally certified (Yes or No);
- Rating Method (Measured or Calculated using AMCA 207);
- Selection Method
- Selection Software Name;
- Software Version; and/or
- Catalog Name; and
- Catalog Version.

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

The assessment and payment of certification fees shall proceed according to the AHRI General Operations Manual, Sections 9 and 12.

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.