

OPERATIONS MANUAL

COMMERCIAL FURNACES CERTIFICATION PROGRAM



AHRI CFRN OM – MAY 2021

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

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PREFACE

The following manual outlines the procedures and policies of the Performance Certification Program for Commercial Furnace (CFRN) Certification Program operated by the Air-Conditioning, Heating, and Refrigeration Institute (AHRI). This manual is to be used in conjunction with the AHRI General Operations Manual (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 GOM, can be accessed through the AHRI website, www.ahrinet.org.

The CFRN Certification Program by AHRI provides for independent verification of the CFRN 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 CFRN Certification Mark hereinafter referred to as the "Mark". The Mark is the Participant's public representation that the ratings of randomly selected units 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 Agreements.

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 Commercial Furnace Operations Manual, December 2019.

CERTIFICATION OPERATIONS MANUAL FOR

COMMERCIAL FURNACES

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1. Program Overview

1.1 Applicable Rating Standard. It is mandatory for program Participants to comply with Department of Energy (DOE) commercial furnace test procedures as published in the latest edition of the Code of Federal Regulations, 10 CFR Part 431 (Standard). A copy of the Standard is available for download from the U.S. Government Printing Office website, GPO Access, at www.gpo.gov/fdsys.

1.2 Product Definitions.

1.2.1 Commercial Furnace. A self-contained gas-fired or oil-fired furnace, with a rated input of 225,000 Btu/h or more, designed to supply heated air through ducts.

1.2.1.1 Gas-Fired Commercial Furnace. A commercial furnace utilizing natural gas or propane as its fuel source.

1.2.1.2 Oil-Fired Commercial Furnace. A commercial furnace utilizing heating oil as its fuel source.

1.3 Program Scope. This program applies to Production Models of Commercial Furnaces as defined in Section 1.2 and commercial furnace/electric air-conditioner combinations.

1.3.1 Program Scope Exclusions.

- Unit heaters;
- Duct heaters;
- Commercial Furnaces greater than 40 feet in length, greater than 8.5 feet in width, heavier than 30,000 lbs, or with an input rate over 1,000,000 Btu/h may be excluded from the program, at the Participant's option. If the excluded Commercial Furnaces appear on the same printed or electronic catalog and advertising literature as certified Commercial Furnaces, the literature shall clearly distinguish between certified and noncertified products.

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 Basic Model Group (BMG). For models with an input rate over 1,000,000 Btu/h, a BMG is a family of models which have identical ratings for thermal efficiency and the same primary energy source (e.g. gas or oil). For all other models, a BMG is a family of models which have identical ratings for thermal efficiency and the same primary energy source (e.g. gas or oil) and which do not have any differing physical or functional characteristics that affect energy consumption.

2. Qualification Process for OEM Applicants

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 General Operations Manual, Section 4, STEP 4.1, Applicants shall submit the following documentation to AHRI:

- Test reports to support the ratings in accordance with DOE's rating procedure for a model representative of each BMG;
- Published installation instructions in printed or electronic format.

- If the Applicant chooses to conduct witness testing at its AHRI Approved Test Stand within a Facility (Facility), all required forms per Section 3.3.1 of this manual for Witness Testing Facility Approval shall also be submitted;
- An Applicant requesting AHRI to submit data to CEC, DOE, FTC, and NRCan shall submit third-party authorization, compliance forms and other necessary information; and

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

STEP 2.1.2 Processing Application Package.

Refer to 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. 30% 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. Refer to Section 3.5 & 3.6 of this OM.

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 published 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 published 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 3.9.1.

STEP 2.1.4.3 Second Sample Qualification Test Failure. Refer to Section 3.9.2.

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

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. Fractional numbers shall be rounded to the nearest whole number using traditional rounding methods.

If the Participant opts to conduct witness testing at its Facility, at least one (1) model selected for annual testing shall be tested at the Laboratory per program year. Additionally, the Laboratory shall test a model of each fuel type in a two-year period. Propane models shall not be selected as part of the annual testing requirement unless there is no natural gas version of the model or if the input rating of the propane model varies by more than 3% of the natural gas version.

3.2 Location of Test. The Participant shall elect to conduct testing at the Laboratory or at the Facility and the sample shall be installed in the test facility in accordance with the Participant's published installation instructions in printed or electronic instructions.

Commercial Furnaces greater than 40 feet in length, greater than 8.5 feet in width, heavier than 30,000 lbs, or with an input rate over 1,000,000 Btu/h shall be witness tested. The 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 GOM, Section 9 and as specified below.

3.3.1 Application for Witness Testing. A Participant shall submit all of the following to AHRI. Electronic forms shall be obtained from AHRI. (available on www.ahrinet.org under the Product-Specific Certification Program):

- Form CFRN-WT1, Application for Witness Testing;
- Form CFRN-WT2, Personnel Experience Questionnaire;
- Form CFRN-WT3, Facility and Equipment Questionnaire;
- A complete list of all instruments and equipment being used to perform certification testing in accordance with the Standard and a copy of each calibration report showing date of last calibration;
- A schematic drawing of the area of the test facility in which AHRI certification testing shall be performed; and
- Photographs of the test facility in which AHRI certification testing shall take place, which shall include sufficient views to show the location and connection of each instrument.

3.3.2 Inspection of Witness Test Facility. Following preliminary test 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. The Representative shall complete applicable portions of Form CFRN-WT3.

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 rating tests. AHRI shall provide the Facility with a certificate of approval that shall be displayed in the Facility.

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 of 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.

3.3.5.2 Duty Assignments of Laboratory 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 primary test instruments belonging to the Facility, in accordance with certification program requirements. The Laboratory shall provide secondary instrumentation to verify measured data. If the measurement(s) indicate that the Facility instrumentation accuracy may not be in accordance with the 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.

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

3.4.1 Basis for Selection. The following criteria may be used to select models for testing:

- Voluntarily re-rated models;
- At random;

- Models anticipated to provide the majority of the Participant's production volume;
- For cause;
- New models; and
- Infrequently manufactured models that are scheduled for production.

AHRI reserves the right to request Participants to identify models that account for the majority of the Participant's production, regardless of their date of manufacture; infrequently manufactured models that are scheduled for production; and identify the best manner and means of obtaining models to be selected for testing.

3.5 Methods for Acquiring Test Samples. AHRI shall make a Build-to-Specifications selection based on the Participant's product data in the Directory. For models packaged with air-conditioning equipment, the Participant has the option to provide only the furnace portion for test.

3.5.1 Testing Punch List. The Participant shall complete and provide a Punch List (refer to the AHRI website) in electronic format to the Laboratory prior to sample arrival at the Laboratory. The Participant may choose to furnish a single Punch List for multiple tests.

The Punch List shall not contradict the installation and operations manual provided by the Participant. If there is a discrepancy between notes written on the Punch List, Installation and Operations Manual, and/or the Directory, AHRI shall determine which document takes precedent.

3.5.2 Shared Testing with Unitary Large Equipment (ULE). If a manufacturer is a Participant in both the CFRN certification program and the ULE certification program, the Participant may share test samples between the two programs in the same test year. In the ULE annual selection letters, AHRI shall inform the participant of any selected ULE samples eligible to be tested in the CFRN certification program. Within seven (7) calendar days, the Participant shall identify the AHRI certified reference numbers for the CFRN models compatible with each ULE selection. Shared samples will be selected using the process found in Section 3.4 of the ULE Operations Manual. Once the corresponding CFRN certified reference numbers are received from the Participant, AHRI shall notify the Participant if any of the compatible CFRN samples will be selected for test.

3.6 Sample Acquisition Timeframe. For selections that will be tested at a Laboratory, Participants shall deliver their samples to the Laboratory on a quarterly basis, spread out over the last three (3) quarters of the test year. AHRI shall notify the Participant, in writing, of the number and type of samples that must be delivered per quarter to the Laboratory.

For selections that will be witness tested, the Participant shall work with AHRI to determine a mutually agreed upon test date which may require the Participant to accelerate product production.

3.7 Tolerances. For annual verification testing, the Standard Rating shall be such that any Commercial Furnace selected and tested in accordance with the Standard has a Thermal Efficiency not less than 95% of the Standard Ratings.

3.8 Certified Data. In accordance with the Standard, Thermal Efficiency is verified by test.

3.9 Test Failures.

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

- Re-rate all models in the BMG proportionate to the failed test's results. The failed model shall be re-rated to the nearest 0.10% Thermal Efficiency and no better than the test results. Other models in the BMG shall be re-rated in accordance with the percentage by which the tested unit failed;

- Test second sample of the same model (sample shall be available within the timeframe and procedure allotted in Section 3.6 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 Second Sample Failure. When the Participant is notified of a second sample certified rating failure, it has seven (7) calendar days to select one of the following options:

- Re-rate all models in the BMG proportionate to the failed test's results. The failed model shall be re-rated to the nearest 0.10% Thermal Efficiency and no better than the test results. Other models in the BMG shall be re-rated in accordance with the percentage by which the tested unit failed;
- Obsolete all models in the BMG.

4. Challenge Tests

Refer to Section 10 of the AHRI GOM.

5. AHRI Directory of Certified Product Ratings

All certified products shall be listed in the Directory, www.ahridirectory.org. Certification shall not be implied or claimed for any product not listed in the Directory. The directory is free for the public to access. The Participant shall follow the steps outlined in Section 11 of the AHRI GOM.

5.1 Publication of Ratings in Certified Directory. For each certified model, the AHRI Directory of Commercial Furnaces lists:

- AHRI Certified Reference Number
- Name of Manufacturer
- Model Status
- Brand Name of Model
- Model Number(s) or Designation(s)
- Fuel type (gas or oil)
- Input Rating (MBtu/h)
- Thermal Efficiency, T_E , %
- Furnace Type
- Configuration

Additional data may be shown for products sold in areas requiring further product information/ratings.

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

5.2.1 Listing of Multiple Configurations. The Participant may list each configuration with unique ratings. In such a case, AHRI shall select the specific configuration to be tested. Alternatively, the Participant may choose to consolidate all possible configurations into a single model listing, in which case the lowest ratings shall be published in the Directory.

6. Assessment and Payment of Certification Fees

Refer to Section 9 and 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 Section 8 of the AHRI General Operations Manual.