OPERATIONS MANUAL

NON-CONDENSABLE GAS PURGE EQUIPMENT FOR USE WITH LOW PRESSURE CENTRIFUGAL LIQUID CHILLERS CERTIFICATION PROGRAM

AHRI PRGE OM – DECEMBER 2019

Sponsored and administered by:

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PREFACE

The following manual outlines the procedures and policies of the Performance Certification Program for Non-Condensable Gas Purge Equipment for Use With Low Pressure Centrifugal Liquid Chillers Certification Program (PRGE) 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 PRGE Certification Program by AHRI provides for independent verification of the Non-Condensable Gas Purge Equipment for Use With Low Pressure Centrifugal Liquid Chillers 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 PRGE 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 ARI Non-Condensable Gas Purge Equipment for Use With Low Pressure Centrifugal Liquid Chillers Certification Program Operational Manual January 2018.

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CERTIFICATION OPERATIONS MANUAL FOR NON-CONDENSABLE GAS PURGE EQUIPMENT FOR USE WITH LOW PRESSURE CENTRIFUGAL LIQUID CHILLERS

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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 580, *Non-Condensable Gas Purge Equipment for Use With Low Pressure Centrifugal Liquid Chillers* (Standard). A copy of the Standard is available for download from the AHRI website, www.ahrinet.org.

1.2 *Product Definition for Non-Condensable Gas Purge Equipment for Uses with Low Pressure Centrifugal Liquid Chillers*. A device, used with low pressure centrifugal liquid chillers used to separate non-condensable gases from refrigerant and remove them from the refrigeration system. Purge devices may contain secondary separation media as listed below:

1.2.1 *Automatically Regenerated Media*. Media that is recycled at the purge system to remove entrained refrigerant and return this refrigerant to the chiller. The regeneration process is initiated automatically by the purge control system**.**

1.2.2 *Manually Regenerated Media*. Media that is recycled at the purge system to remove entrained refrigerant and return this refrigerant to the chiller. The regeneration process is setup and initiated by an operator.

1.2.3 *Replaceable Media.* Media that is removed from the system and replaced with new or recycled media. The media from the system is processed to ensure refrigerant is not released to the atmosphere.

1.3 *Program Scope*. This program applies to 60 Hz and 50 Hz Production Models of Non-Condensable Gas Purge Equipment for Use With Low Pressure Centrifugal Liquid Chillers, as defined in Section 1.2.

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. Each BMG is a family of products that have the same type of purge devices (e.g. Automatically Regenerated Media, Manually Regenerated Media, or Replacement Media).

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 documentation to AHRI:

- One test report for each BMG

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*. 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*. Within 30 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 *Successful Completion of All Qualification Tests*. If all qualification tests pass proceed to STEP 2.1.5.

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

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

STEP 2.1.5 *Welcome to the Program*. No further action required beyond that listed in Section 4, STEP 4.5 of the AHRI General Operations Manual.

2.2 *Private Brand Marketer (PBM) Applicants*. With the additions noted below, the PBM qualification process shall proceed according to the AHRI General Operations Manual, Section 5.

PBM Applicants are not required to undergo qualification testing. PBM product certification is contingent upon the certification of the associated OEM product.

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*. 30% of a Participant's BMGs shall be tested annually, with a minimum of two (2) tests. Fractional numbers shall be rounded to the nearest whole number using traditional rounding methods. Each test shall consist of a sample with a specific refrigerant; samples shall be tested for each refrigerant listed in the AHRI Directory of Certified Product Performance (Directory).

3.2 *Location of Tests*. Testing shall be performed at the Independent Third-party laboratory contracted by AHRI (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 *Methods for Acquiring Test Samples*. AHRI or the Laboratory personnel shall make a Random Sample Selection or a Random Component Selection from the Participant's stock inventory within 30 calendar days of a selection by AHRI. 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 Operation Manual.

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

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

- Concentration, ratio of mass of refrigerant to mass of air, g of refrigerant/g of air.

3.7 *Test Failures.*

3.7.1 *Options Following 1st Sample Failure*. When the Participant is notified of a first sample 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.

3.7.2 *Options Following 2nd Sample Failure*. When the Participant is notified of a second-sample 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 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;
- Name of Manufacturer ;
- Model Status;
- Brand Name of Model;
- Model Number(s) or Designation(s) ;
- Concentration (without Media), g of refrigerant/g of air;
- Concentration (with Media), g of refrigerant/g of air;
- Refrigerant Holding Capacity (where applicable), g; and
- Refrigerant Type.

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

APPENDIX A: LABORATORY REQUIREMENTS

A.1 Laboratory Criteria. Laboratories seeking to conduct PRGE compliance testing need to have demonstrated capability in key areas. When approving a test lab the following will be taken into consideration:

- The Laboratory shall demonstrate the ability to develop/provide a test fixture comprising a refrigerant system that can create the test conditions specified in the latest edition of AHRI Standard 580 (Standard);
- The Laboratory shall have an on-site gas chromatograph, sampling equipment, and the capability to develop the air/refrigerant calibration samples per the test method;
- Technicians shall be trained in the proper use of gas chromatography;
- Technicians shall be familiar with basic instruments and capable of running test procedures and acquiring data;
- Technicians shall be capable of performing the necessary tasks to install and operate refrigeration systems including electrical hookup, brazing operations, evacuation and charging of refrigerant;
- Technicians shall demonstrate the capability to document operating procedures for the successful implementation of a certification test program;
- The Laboratory shall be accredited by a third party to ISO 17025;
- The Laboratory shall demonstrate the capability to provide an analysis of measurement uncertainty for the air/refrigerant concentration results per the gas chromatograph test method;
- The Laboratory shall provide a summary of a proposed process to select and seal test samples and the logistics of how the samples will be handled during shipment, test, and return to the program participant.

A.2 Test Fixture and Unit Connections

Purge units typically pull non-condensable gases from the unit condenser with an attachment point located in the condenser where non-condensable gases accumulate due to flow and gravitational forces. A test fixture shall be provided by the Laboratory that is capable of maintaining stable conditions in both the evaporator and condenser sections such that the test conditions specified in the Standard shall be maintained. Due to stability issues, the test fixture should be designed to be large enough so that while under test, the unsteady operation of a purge device shall not create unstable conditions that exceed the stability criteria in the Standard.

It is also possible that purge designs may have additional requirements that go beyond simple connections to the condenser or evaporator shells on the test fixture. In these cases, the Laboratory shall work with the Participant to develop adaptations to the general test fixture to create the needed connections to the purge device. The costs associated with these modifications shall be borne by the Participant. A technical analysis shall be provided by the Participant to the Laboratory and to AHRI detailing the necessary text fixture modifications and how these modifications shall simulate the operation of a typical chiller and provide the needed connections to their purge device. AHRI will review and approve the needed modifications.

A.3 Laboratory Approval and Audit

AHRI in coordination with the Chemicals and Refrigerant Reclaimers Product Section shall evaluate potential laboratories according to Sections E.1 and E.2 and approve as needed for the certification program. AHRI shall audit the capabilities of the existing approved laboratories every year to verify that key areas detailed in Section E.1 continue to be in place.

A.4 Laboratory Test Documentation

The Laboratory shall document the setup and test procedures for each purge BMG to ensure testing is conducted consistently every year. Any special considerations for specific purge BMGs will be agreed upon between the Laboratory, the Participant, and AHRI and documented accordingly.