OPERATIONS MANUAL

UNITARY SMALL AIR-CONDITIONERS AND AIR-SOURCE HEAT PUMPS
(INCLUDES MIXED-MATCH COILS)
(Rated below 65,000 Btu/h)
CERTIFICATION PROGRAM

AHRI OM 210/240 –November 2009
PREFACE

The following manual outlines the procedures and policies of the AHRI Unitary Small Air-Conditioners (including mixed-match coils) Certification Program and the AHRI Unitary Small Air-Source Heat Pumps (including mixed-match coils) 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 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 Unitary Small Air-Conditioners (including mixed-match coils) Certification Program and the Unitary Small Air-Source Heat Pumps (including mixed-match coils) Certification Program by AHRI provides for independent verification of the performance of the participant’s equipment. 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 USAC/USHP Certification Marks 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 License 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 Marks 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 license agreement signed by licensees and AHRI. General information, procedural details, and copies of forms are included in the guide. Provisions of the Operations Manual may be amended as provided in the Certification Agreements.

This efficiency certification program complies with requirements of AHRI Standard 210/240, Performance Rating of Unitary Air-Conditioning & Air-Source Heat Pump Equipment.

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1. Program Overview


1.2 Product Definitions.

1.2.1 Unitary Air-Conditioner. One or more factory-made assemblies ordinarily including an evaporator or cooling coil(s), compressor(s), and condenser(s) and may include a heating function.

1.2.2 Air-Source Unitary Heat Pump. One or more factory-made assemblies ordinarily including an evaporator or cooling coil(s), compressors(s), condenser(s), and a heating function.

1.2.3 Single Packaged System. A system in which all components are integrated into one cabinet.

1.2.4 Split System. A system in which components are provided in separate assemblies but are designed to be used together.

1.3 Program Scopes.

1.3.1 Unitary Small Air-Conditioner (and Mix-Matched Coils) Certification Program. This program applies to:

- unitary air-conditioners, single packaged and split systems; and
- air-conditioning coils (and air-handling products with air-conditioning coils) that a coil-only manufacturer rates as a system with other manufacturer’s outdoor units that are rated below 65,000 Btu/h cooling.

1.3.2 Unitary Small Air-Source Heat Pump (and Mix-Matched Coils) Certification Program. This program applies to:

- air-source unitary heat pumps, single packaged and split systems; and
- heat pump coils (and air-handling products with heat pump coils) that a coil-only manufacturer rates as a system with other manufacturer’s outdoor units that are rated below 65,000 Btu/h cooling.

1.4 Intended Market. The intended market for both certification programs includes all products that are sold for use in North America (U.S., U.S. Provinces, Canada, and Mexico) only.

1.5 Basic Model Groups. A participant’s listings will be grouped by Basic Model Group (BMG).

1.5.1 System Manufacturer BMG Criteria. A system BMG consists of products with the same outdoor unit used with several indoor coil combinations (i.e. horizontal, vertical, A-coil, etc.). Same “outdoor unit” refers to models with the same or comparable compressor, used with the same outdoor coil surface area and the same outdoor air quantity.

1.5.2 Coil-Only Manufacturer BMG Criteria. A coil-only BMG consists of coils (indoor units) with matching capacity range of 6,000 Btu/h and the following identical geometry parameters: air-handler, evaporator fan type, evaporator number of rows, type (air-cooled, water-cooled or evaporatively-cooled), evaporator tube centers, evaporator fin types, evaporator fins/inch (see Appendix H), evaporator tube OD, evaporator expansion device, fin length per slab, fin height per
slab, number of slabs in the coil, fin material type, tube material type, and total number of active tubes.

1.6 **NAECA Compliance.** Only products meeting or exceeding ratings set by the Department of Energy (DOE) in the National Appliance Energy Conservation Act (NAECA) are eligible for certification through the AHRI certification program.

## 2. Qualification Process

2.1 **Original Equipment Manufacturer (OEM) Applicants.** With the additions noted below, the OEM qualification process will proceed according to the AHRI General Operations Manual, Section 4.

**STEP 1 Certification Application Package.** In addition to the Application for Certification Form and Annual Certified Sales Volume Form noted in the AHRI General Operations Manual, Section 4, STEP 1, the applicant must also complete product data submittal spreadsheets and provide the DOE approval letter for their ARM (Alternate Rating Method). The data submittal spreadsheets are available from AHRI. These spreadsheets must be correctly completed in their entirety, and returned to AHRI, before any sample selections for qualification testing can be made.

**STEP 2 Participation Agreement.** No further action required beyond that listed in Section 4, STEP 2 of the AHRI General Operations Manual.

**STEP 3 Qualification Sample Selection and Participant Fee Invoice.**

**STEP 3A Number of Qualification Tests.**

- **System Manufacturers.** For each program, 30% of the applicant’s basic models will be tested. Fractional models should be mathematically rounded to the nearest whole number. No less than two (2) units will be tested.

- **Coil-Only Manufacturers.** For each program, number of selections will be based on one (1) unit per 6,000 Btu/h’s rated in the AHRI Directory of Certified Product Ratings (Directory). For example, if a participant builds indoor coils in Btu/h increments from 6,000 to 65,000 Btu/h’s, the participant would have 10 tests. If the participant has ratings submitted through the screening approval process that exceeded the screening threshold and were listed in the Directory, then there will be up to an additional three (3) tests from those ratings. If a participant does not have ratings that exceeded the screening threshold, they are not subject to this additional testing. The number of tests required of the participant will be reviewed throughout the year. No less than two (2) units will be tested.

**STEP 3B Acquisition of Qualification Test Samples.** Within 30 calendar days of a request from AHRI, the participant must have units available for selection. Samples will be acquired in accordance with Section 3.4 of this manual. All samples will be provided with the equipment listed in Sections 3.6 and 3.7 of this manual.

**STEP 4 Qualification Testing.** In addition to the tests noted in 3.10 or 3.11, the following additional tests will be conducted for all qualification tests:

- Maximum Operating Conditions (MOC)
- Voltage Tolerance (VT)
Insulation Efficiency
- Low Temperature Operation
- Condensate Disposal

Should a qualifying unit fail any of these, a second sample must pass to qualify into the program.

STEP 5  Signing of License Agreement and Payment of Licensing Fee Invoice. No further action required beyond that listed in Section 4, STEP 5 in the AHRI General Operations Manual.

STEP 6  Welcome to the Program. No further action required beyond that listed in Section 4, STEP 6 in the AHRI General Operations Manual.

2.2 Private Brand Marketer (PBM) Applicants. With the additions noted below, the PBM qualification process will 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 1  Certification Application Package. In addition to the Application for Certification Form and Annual Certified Sales Volume Form noted in the AHRI General Operations Manual, Section 4, Step 1, the applicant must also complete product data submittal spreadsheets. These spreadsheets, which show the correlation between PBM participant and OEM participant units, are available from AHRI. These spreadsheets must be correctly completed in their entirety, and returned to AHRI, for the qualification process to continue.

STEP 2  Licensing and Fees

STEP 2A  PBM License Agreement and Licensing Fee Invoice. No further action required beyond that listed in Section 5, STEP 2A of the AHRI General Operations Manual.

STEP 2B  OEM Participation Agreement on Behalf of the PBM Applicant. No further action required beyond that listed in Section 5, STEP 2B of the AHRI General Operations Manual.

STEP 3  Welcome to the Program. No further action required beyond that listed in Section 5, STEP 3 of the AHRI General Operations Manual.

3. Equipment Selection and Testing

3.1 Annual Testing Requirement.

3.1.1 System Manufacturers. For each program, thirty percent (30%) of a participant’s basic models, but with no less than one model per year, will be tested. Fractional models should be mathematically rounded to the nearest whole number.

3.1.1.1 Basis for System Manufacturer Test Selections. The selection of units for test are based on 1/3 at random, 1/3 for cause, and 1/3 Highest Sales Volume Tested Combination (HSVTC).

3.1.2 Coil-only Manufacturers. For each program, the number of scheduled first tests is dependent upon the participant’s first test failure rate on a three-year lookback. The three-year lookback is based on data from the most recently completed test year and the two (2) years previous to that. The three-year lookback is always based on data gleaned from three (3) consecutive years of participation in the program.
3.1.2.1  **Three-year Lookback First Test Failure Rate ≤ 10%**. For each program, number of selections will be based on one unit per 6,000 Btu/h’s rated in the directory. For example, if a participant builds indoor coils in Btu/h increments from 6,000 to 65,000 Btu/h’s, the participant would have 10 tests. If the participant has ratings submitted through the screening approval process that exceeded the screening threshold and were listed in the Directory, then there will be up to an additional three (3) tests from those ratings. If a participant does not have ratings that exceeded the screening threshold, they are not subject to this additional testing. The number of tests required of the participant will be reviewed throughout the year.

3.1.2.2  **Three-year Lookback First Test Failure Rate > 10%**. For each program, the number of tests will be doubled based on last year’s annual number of tests. The number of scheduled first tests will remain doubled until the participant’s failure rate, based upon the three-year lookback, falls ≤ 10%.

3.1.2.3  **Basis for Coil-only Manufacturer Test Selections**. For each program, test selections are based on 50% at random and 50% discretionary. Selections are made such that each unit is selected from a unique BMG.

3.2  **Location of Test**. Testing shall be performed at the Independent Third-party Laboratory contracted by AHRI (Laboratory).

3.3  **Selection of Test Samples**. Selections will be made based on data contained in the Directory.

3.4  **Methods for Acquiring Test Samples**. Typically, samples will be acquired in accordance with the procedure noted in the AHRI General Operations Manual.

3.4.1  **Alternate Model Selection**. If a specific selection is not available and AHRI does not authorize an alternate model for selection, the participant shall make a sample available within 30 calendar days from a minimum stock of three (3) units; or the selector may witness the assembly of a unit from a minimum sampling of three (3) of each major component, indoor coil, outdoor coil and compressor, each selected at random by the selector. This latter option is applicable for the initial and all subsequent visits for models which have a list of major components on file at AHRI. Expenses for these options are borne by the participant.

When selections are not available from the manufacturer within 30 calendar days, selections may be made from distributors’ stocks. The manufacturer will be notified and is expected to supply the distributor with a replacement unit.

AHRI may anonymously order a custom-made unit, not stocked by the manufacturer, from a distributor. The manufacturer shall then reimburse AHRI or the Laboratory for the purchase.

3.4.2  **Two Sample Supply Option**. The participant has the option to have two (2) units initially selected as to assure, if needed, the availability of a second sample. After the units are selected and sealed, the participant may ship both units to the laboratory or hold the second sample until requested. In the event the selected second sample is not available upon request by AHRI, the participant shall build three (3) more units for selection.

3.5  **Sample Acquisition Timeframe**. Within 30 calendar days of a request from AHRI, the participant must have units available for selection.

3.6  **System Manufacturer’s Required Equipment Provisions**. The system manufacturer shall provide the outdoor unit, indoor coil, expansion device, air-moving equipment (if required) and other listed system enhancement devices as a complete system for test.

3.7  **Coil-Only Manufacturer’s Required Equipment Provisions**. The coil-only manufacturer shall provide the indoor coil, expansion device, air-moving equipment (if required) and other listed system enhancement devices.
3.8 **Break-in Operation of Test Units.** A participant, at his expense, may have the laboratory operate the equipment for a specified time prior to testing. The break-in request should be listed in the comments section of the directory database.

3.9 **Certified Data.** At operating conditions designated in the Standard, the following certified ratings are verified through test:

3.9.1 **Unitary Small Air-Conditioners (Systems and Mixed-Match Coils), Air-Cooled under 65,000 Btu/h [19,000 W].**
- AHRI Standard Rating Cooling Capacity, Btu/h [W]
- Seasonal Energy Efficiency Ratio, SEER, Btu/(W·h)

3.9.2 **Unitary Small Air-Conditioners (Systems and Mixed-Match Coils), Water-Cooled and Evaporatively Cooled under 65,000 Btu/h [19,000 W].**
- AHRI Standard Rating Cooling Capacity, Btu/h [W]
- Energy Efficiency Ratio, EER, Btu/(W·h)

3.9.3 **Unitary Small Air-Source Heat Pumps (Systems and Mixed-Match Coils), Air-Cooled under 65,000 Btu/h [19,000 W].**
- AHRI Standard Rating Cooling Capacity, Btu/h [W]
- Seasonal Energy Efficiency Ratio, SEER, Btu/(W·h)
- High Temperature Heating Standard Rating Capacity, Btu/h [W]
- Region IV Heating Seasonal Performance Factor, HSPF, Minimum Design Heating Requirement, Btu/(W·h)

3.10 **Tests, Air-Conditioning (Systems and Mix-Matched Coils).** All unitary air-conditioning equipment will be tested with the DOE “A” and “B” cooling tests as described in the Standard. Standard Rating tests shall be conducted using the nameplate rated voltage and frequency specified in the Standard. For dual nameplate voltage ratings (other than NAECA equipment), tests shall be conducted at 230 Volts.

3.11 **Tests, Heat Pumps (Systems and Mix-Matched Coils).** All unitary heat pump equipment will be tested with the DOE “A” and “B” cooling tests, High and Low Temperature Heating, and Frost Accumulation tests as described in the Standard. Standard Rating tests shall be conducted using the nameplate rated voltage and frequency specified in the Standard. For dual nameplate voltage ratings (other than NAECA equipment), tests shall be conducted at 230 volts.

3.12 **EER$_A$ Verification Test.** Verified EER$_A$ is calculated from the DOE “A” test conditions by dividing the capacity by the total system power. EER$_A$ is not a certified value, however the calculated EER$_A$ must be within 95% of the rated value. For multi-stage systems, the highest rated capacity is used to determine EER$_A$. Verified EER$_A$ ratings shall be given for all single-package units and all combinations of split systems which the manufacturer intends to be used together.

3.13 **Default Factors - Systems.** At the completion of DOE “A” and “B” tests, the laboratory calculates the SEER using the Cyclic-Degradation Coefficient ($C_D$) default factor 0.25 even if the unit is certified with a lower $C_D$, not less than zero.

For heat pumps, at the completion of heating mode and frost accumulation tests, the laboratory calculates the HSPF with $C_D$ default factor 0.25.

3.14 **DOE “C” and “D” Tests.** If the calculated SEER is less than 95% of the certified SEER, the unit may proceed through the DOE “C” and “D” tests at the participant’s option and expense.
Even if the requirements are met using a default $C_D$ value of 0.25, the participant may opt for “C” and “D” tests to be performed at his expense. If the tested $C_D$ is higher than the default value, the default value is to be used to calculate SEER and HSPF.

AHRI may require, at the expense of the Program, “C” and “D” tests to be performed on systems to assure sufficient qualified condensing units for coil-only tests.

3.15 **High Temperature Heating Cyclic Test.** For heat pumps whose calculated HSPF is less than 95% of the certified HSPF, the unit may, at the participant’s option and expense, undergo High Temperature Heating Cyclic Test.

Even if the requirements are met using a default $C_D$ value of 0.25, the participant may, at his expense, opt to perform the High Temperature Heating Cyclic Test.

AHRI may require, at the expense of the program, the High Temperature Heating Cyclic Test to be performed on systems to assure sufficient qualified condensing units for coil-only tests.

3.16 **Coil-Only/Outdoor unit Pairing for Testing Purposes.** An outdoor unit is provided from a certified HSVTC system that is tested at or above 97% of all certified and verified values. Also, if the tested SEER and HSPF of the HSVTC outdoor unit is equal to or greater than 95% and is less than 97% with a default $C_D$, then AHRI can use it for coil-only testing.

If this outdoor unit is unavailable, then an alternate outdoor unit can be obtained using Alternate A or Alternate B (Appendix C). Condensing units using Alternate A shall be exhausted before resorting to Alternate B.

3.17 **Test Failures and Re-rating Procedures.**

3.17.1 **Certified Rating Test Failures - Systems.**

3.17.1.1 **First Sample Certified Rating Test Failure.** When the participant is notified of a first sample certified rating failure, it has seven (7) calendar days to select one of the following options (refer to Appendix D):

- Re-rate the model and all other models in the corresponding BMG as described in the AHRI General Operations Manual.
- Re-test the same unit if the unit has operated less than 16 hours including any break-in running time. After 16 hours of operation, the participant may request a second DOE “A” and/or “B” test, all at the participant’s expense. This re-test will establish whether the first test is a pass or fail.
- Test second sample of the same model or combination. The second sample test results will not change the first test failure rate calculation.
- Obsolete the model, which also obsoletes the corresponding BMG.
- Claim unit defective as described in the AHRI General Operations Manual.
- If the failure occurred due to incorrect orifice information, then the participant has the option to change the orifice size once and re-test the first sample. For the second sample test, specific orifice size will be supplied along with the second sample and no orifice change is allowed.
- If the failure is the result of an obvious data input error, and satisfactory proof is provided to AHRI, the participant may choose a second test unit in the same BMG but a different combination. AHRI will notify the participant, in writing, whether the claim is accepted. The first combination proven to be in error shall be re-rated accordingly, but the remainder of the BMG ratings shall be dependent upon the second test results.
3.17.1.2 Second Sample Certified Rating Test Failure. When the participant is notified of a second sample certified rating failure, the model and all models in its corresponding BMG are re-rated as described in the AHRI General Operations Manual. If the failed model was not the HSVTC in a BMG, the participant may elect to test the HSVTC in that BMG (see 3.17.1.3).

3.17.1.3 Option to Save HSVTC and Remaining BMG Ratings. If the failed system is not the HSVTC, the participant may, at his expense and within seven (7) calendar days after notification of test results, request the HSVTC be tested. If the HSVTC passes the test, then the participant has the option to have another unit selected for test by AHRI from the same BMG to save the rest of the BMG. If the other unit fails, the entire BMG other than the HSVTC is re-rated to the latest test results. For a BMG with multiple HSVTCs, the highest rated (SEER/HSPF or capacity) HSVTC shall be tested.

3.17.2 Certified Rating Test Failures – Coil-Only.

3.17.2.1 First Sample Certified Rating Test Failure. If a coil-only participant’s coil fails with a given system manufacturer’s outdoor unit, then the coil-only manufacturer has seven (7) calendar days to decide to choose one of the following options:

- Re-rate that combination and all the other combinations in that BMG;
- If the coil-only unit was matched with an HSVTC outdoor unit that was tested with a SEER and HSPF equal to or greater than 95% and less than 97% using default $C_D$ and the coil-only unit’s $C_D$ is higher than or equal to 0.20, then the coil-only manufacturer has the option to re-test the same coil with a different outdoor unit.
- Pay for “C” and “D” tests using the measured $C_D$, if the unit was tested with default $C_D = 0.25$.
- Direct AHRI to select and test the coil with an outdoor unit from a different system manufacturer. The coil must be rated with the outdoor unit selected.
  - If the combination passes, only the combination that failed must be re-rated.
  - If the combination fails, then re-rate that combination and all the other combinations in that BMG

If the system manufacturer’s outdoor unit has not been tested within the previous two (2) or current program years, coil-only manufacturers may request the performance of the outdoor unit be verified. If the matched system does not fall within the required performance range, then it is determined that the outdoor unit was damaged and the coil is to be tested with a different outdoor unit. The program shall pay the cost of the re-test. If the performance of the matched system is within the performance range (see Section 3.16), the coil failure stands.

3.17.2.2 Second Sample Certified Rating Test Failure. When the participant is notified of a second sample certified rating failure, the model and all models in its corresponding BMG are re-rated as described in the AHRI General Operations Manual.

3.17.2.3 Alternate Outdoor Unit Failures. Any coil-only test selections made by AHRI using an HSVTC alternate outdoor unit that fails certified ratings per Alternate B (Appendix C) will be incremental to the OEM’s yearly selection. Its statistics and penalties will be credited to the OEM’s following year’s selection and the test failure will follow the current operations manual procedure. The re-rate procedures will apply to the current year.
3.17.3 **Verified EERₐ Failures – Systems and Coil-Only.**

3.17.3.1 **First Sample Failure.** When the participant is notified of a verified EERₐ rating failure, the participant may select one of the following options (refer to Appendix D):

- Re-rate EERₐ rating to the test results; or
- Test a second sample of the same model or combination. The participant has seven (7) calendar days to elect to withdraw his unit, to be replaced by a second and final unit. The second sample test results shall apply to certified and verified ratings.

3.17.3.2 **Second Sample Failure.** If the second sample certified rating(s) fail, the failure will be considered, and treated as a first sample certified rating failure. If only the verified rating (EERₐ) fails, then it will be re-rated to the test results.

3.17.4 **Operating Test Failures – Systems and Coil-Only.**

3.17.4.1 **First Sample Failure.** If an initial failure is the Maximum Operating Conditions Test (MOC) and/or Voltage Tolerance Test (VT), the participant may elect to:

- Obsolete all units within the same BMG; or
- Test a second sample.

3.17.4.2 **Second Sample Failure.** If the second unit fails an operating test(s) it shall be made obsolete, together with all units within the same BMG.

3.18 **NAECA and Energy Policy Act (EPACT) Re-rating Requirements.** EPACT units are those that operate on three phase power.

- In all cases of tested combinations where the test results require re-rating at less than the applicable minimum efficiency, the model must be made obsolete and listed with the appropriate “WAS” ratings. Second sample option tests continue to apply.
- For single packaged units that do not meet the minimum efficiency requirement, all models in the BMG must be re-rated in proportion to the test results and made obsolete.
- If the HSVTC was tested for split system combinations, all models in the BMG must be re-rated in proportion to the difference between the rated and test results.
- If the HSVTC is not tested, all combinations in the BMG will be re-rated in proportion to the difference between the rated and test results.
- If the failed system is not the HSVTC, the participant may, at his expense and within seven (7) calendar days after notification of test results, request the HSVTC be tested. If the HSVTC passes the test, then the participant has the option to have another unit selected for test by AHRI from the same BMG to save the rest of the BMG. If the other unit fails, the entire BMG other than the HSVTC is re-rated to the latest test results.
- All of the above applies for Coil-only manufacturers’ NAECA and EPACT units. A coil that fails with a given outdoor unit requires that all of the Coil-only manufacturer combinations with that outdoor unit be proportionately re-rated. AHRI will select, at the participant’s option, within 15 calendar days after notification of the test results a combination with the same outdoor unit that failed.
- If any system in a BMG is re-rated below the applicable minimum efficiency, the participant may elect to test any such combination to determine the pass/fail status of that combination only.
- The participant also has the option, within 15 calendar days after notification of test failure, to pursue additional tests on a failed combination in accordance with 10 CFR Part 430, Subpart F, Appendix B “Sampling Plan for Enforcement Testing” as referenced in the Federal Register Vol. 54, No. 24. A first sample size N₁ of four (4) units will be tested in accordance to this subpart F. This sample shall include the originally selected first unit and if applicable,
the second unit. Using the methodology of Appendix B, the mean of results of these tests is calculated to determine whether this specific combination only is likely to be considered in compliance by DOE. If non-compliance is indicated, the combination shall be re-rated to the mean of the results, made obsolete and so listed. If results indicate compliance, the system’s original rating is vindicated.

3.19 **Penalty Tests.** Each participant shall be subject to penalty tests when first-test certified ratings failures exceed 10%, even in the event that the second-test sample(s) subsequently passes.

Any unit currently certified is subject to verification by penalty testing. All penalty tests are conducted at the Laboratory and paid for by the participant. In addition, all participants who are subject to penalty tests should have their penalty and scheduled tests selected and tested as first priority in the new test year starting with the participant with highest failure rate.

3.19.1 **Penalty Test Calculation.** First test certified ratings failures and penalty tests will be determined in the following manner:

- If a participant has no first-test certified ratings failures in a given program year, no penalty tests are required.
- The first-test three year look back failure rate is determined by adding the number of first test-failures in a given program year with those of the two (2) previous years, and dividing that sum by the total number of first tests during that same period.
- For coil-only manufacturers, if the current year schedule testing plus the prior two (2) year’s first-test failure rate is 10% or less, then the penalty tests are cancelled. If not, penalty testing continues until either the first-test failure rate is 10% or less, or up to twice the number of previous program year’s tests (selected from unique BMG) are done.
- For system manufacturers, although the basic program requires testing of 30% of a participant’s basic models, as applicable, penalty testing continues until the first-test failure rate is 10% or less, or until all basic models are tested. Should the latter be the case, the number of basic models is based on the average number of basic model groups offered during the same period.
- For a new participant, there will be penalty tests if the first-test failure rate exceeds 20% in the first year. For the second year, the first test failure rate will be determined by summarizing the first two (2) year’s first-test failures and dividing that by the number of first-test over the same period. There will be penalty tests if the second year’s look back first test failure rate exceeds 10%. In the third year, the participant is no longer a new participant and the three (3) year period is in effect.

4. **Challenges**

The following are in addition to the policies in Section 10 of the AHRI General Operations Manual.

4.1 **Challenge of HSVTC Designation.** A systems manufacturer participating in the certification program may challenge the HSVTC designation of another participating system’s manufacturer. The challenging party must submit, in writing, the basis for such a challenge to AHRI. Within 30 calendar days of being notified of the challenge, the challenged party must justify to AHRI, in writing, its determination of the HSVTC to AHRI. Resolution of the challenge, and any appeal, will be conducted in accordance with the procedure and policies noted in the AHRI General Operations Manual.

4.2 **System Manufacturer Challenges.** The policies and procedures regarding the challenge of system ratings are outlined in the AHRI General Operations Manual. Verified EER\(_A\) ratings may be challenged.
4.3 **Coil-Only Manufacturer Challenges.** If a coil-only manufacturer is challenged, the laboratory will first test the outdoor unit as a system paired with the system manufacturer's indoor unit. All performance descriptors must pass at or above 95%.

In the event the system manufacturer’s system does not pass at or above 95%, the challenge test will be redirected towards the system manufacturer and treated as a system manufacturer’s challenge. If the system manufacturer ultimately re-rates the system, the coil-only manufacturer must re-rate its affected models by the same percentage re-rate as the system’s ratings.

If all system performance descriptors pass at or above 95%, all of the performance descriptors of the system’s HSVTC must pass according to Section 3.16.

If the system’s HSVTC performance descriptors pass according to Section 3.16, the outdoor unit is tested with the challenged coil belonging to the coil-only manufacturer.

4.3.1 **Coil-Only Challenge Test Failure.** Following a first sample failure, the challenged party may elect to re-rate the model or request a test of a second sample. No other options are permitted.

5. **AHRI Directory of Certified Product Ratings Data Listings**

5.1 **NAECA Requirements.** The Directory only lists equipment meeting NAECA minimum. If a product, or group of products, must be removed from the Directory for failure to meet NAECA minimum, AHRI may notify DOE of the delisting. It is solely the participant's responsibility to address all DOE requests and obligations.

5.2 **Data Submittal Spreadsheets.** Participants may supply data for all certified products through the Directory. Contact AHRI to acquire copies of the data submittal spreadsheets.

5.3 **DOE Approved ARM.** All participants are required to submit to AHRI the DOE approval letter of their ARM.

5.4 **Designation of Highest Sales Volume Tested Combination (HSVTC).** A HSVTC is the system combination designated by a participant as being the most likely to be sold. For multi-split units, the HSVTC represents highest sales model family. A systems manufacturer participant must designate a HSVTC within each BMG. Two (2) or more HSVTCs are permitted within the same BMG. The HSVTC within each BMG must be indicated and affirmed by the participant’s senior engineering executive and senior marketing executive.

5.4.1 **Single-Speed, Split-System Air-Conditioner Requirements.** The HSVTC for a single-speed, split-system air-conditioner shall be a coil-only indoor unit likely to have the largest volume of retail sales with the particular model of outdoor unit. In other words, the HSVTC for such a product shall be an RCU-A-C (air-cooled condensing unit, coil alone) combination. This rule is exempt for mini-splits, multi-splits and through-the-wall units.

5.4.2 **Split-System Heat Pumps.** The above coil-only HSVTC requirement does not apply to any split-system heat pumps.

5.5 **Coil-Only Manufacturer Listing Requirements.** Coil-only manufacturers shall list certified ratings for all coils together with each outdoor unit intended to be used in a system. Adequate installation instructions must be available with the coil. Optional and standard devices, not a part of the coil assembly, which affect ratings, must be indicated in the manufacturer's installation instructions.

5.5.1 **Heat Pump Listing Requirements.** Coil-only manufacturers shall comply with Requirements for Certification of Coil-only Manufacturer Heat Pump Ratings (Appendix A).
5.6 **Identical Coil Ratings.** Should the performance of two (2) coils be identical and the only physical difference is that one is encased or in a sleeve, both can be listed on the same line and both be designated with the condensing unit as the HSVTC.

5.7 **Listing Equipment with Enhancement Components.** The ducted air mover and enhancements (e.g. thermal expansion valve (TXV), time delay relay (TDR), etc.) shall be indicated by model number and when assembled, shall result in a complete indoor section with sufficient information contained in the installation instructions to describe the assembly.

Enhancements, available via distribution by the coil-only manufacturer, are to be indicated in Directory listings by the plus (+) sign, following the indoor unit designation. All combinations of these enhancements are to be listed, with respective certified system performance data.

5.8 **Coil-Only Manufacturer Notice of Revised System HSVTC Rating.** A Coil-only manufacturer participant will receive an email from AHRI if a change is made to a system HSVTC rating. The Coil-only manufacturer participant will have 30 calendar days to review the notice and choose to a) re-rate its affected units or b) decide no rating change is required. If the Coil-only manufacturer participant does not make a choice within 30 calendar days and the system was re-rated, AHRI shall automatically re-rate the coil-only manufacturer’s ratings by the same percentage of re-rate in the system’s rating.

5.9 **Specific Indoor Coil Data.** Participants can download additional specific indoor coil data and condenser curve coefficients from the directory.

5.10 **Condenser Curve Coefficients.** See Appendix B for definitions of the condenser curve coefficients to be supplied by system manufacturers.

5.11 **Rating Screening.** AHRI will screen all AC and HP ratings that are in excess of the system manufacturer’s SEER, EER and HSPF ratings in accordance with the screening criteria described below. Ratings exceeding the thresholds indicated below will be published only after AHRI has reviewed and approved the data. The screening criteria are as follows:

1. Screen all coil-only AC ratings that are in excess of the coil-only HSVTC system manufacturer’s rating by more than 6% SEER and/or EER.
2. Screen all variable speed furnace AC ratings that are in excess of the system manufacturer’s HSVTC coil ratings with the same furnace and condensing unit by more than 6% SEER and/or EER.
3. For variable speed furnace AC ratings, in the event of absence of HSVTC coil rating with the furnace, screen all ratings that are more than 6% SEER and/or EER in excess of the highest rating of a system manufacturer’s coil rated with that furnace and outdoor unit.
4. Screen all coil-blower HP ratings that are in excess of the HSVTC coil-blower system manufacturer’s rating by more than 6% SEER and/or EER and/or HSPF ratings.
5. For variable speed air-handler AC and HP ratings, in the event of absence of variable speed HSVTC air-handler rating, screen all ratings that are more than 6% SEER and/or EER and/or HSPF in excess of the highest rating of a system manufacturer’s coil rated with that variable speed air-handler and outdoor unit.
6. For variable speed furnace HP ratings, in the event of absence of HSVTC coil rating with the furnace, screen all ratings that are more than 6% SEER and/or EER and/or HSPF ratings in excess of the highest rated system manufacturer’s coil matched with that furnace and outdoor unit.
7. Screen all coil-only HP ratings that are in excess of the coil-only system manufacturer’s highest rating by more than 6% SEER and/or EER and/or HSPF ratings.
8. For ratings of Coil-only Manufacturer coil-only combinations (-C ratings) that are based on system manufacturer HSVTC coil blower (–CB) BMG and without coil-only (–C) ratings, if the system manufacturer HSVTC coil blower (–CB) system combination is with either a furnace or air-handler with variable speed motor, then the Coil-only Manufacturer cannot list a coil-only (–C) rating with it. If the HSVTC coil blower type is a single or multiple speed motor, then the Coil-only Manufacturer coil-only (–C) rating cannot be in excess of the system manufacturer’s HSVTC by more than 6% SEER and/or EER and/or HSPF ratings.

AHRI will screen all new ratings that meet the above screening thresholds. Unless disapproved, the rating will appear in the Directory within three (3) business days of submission of the rating to the AHRI directory by the manufacturer.

Entering data above 6% screen: Manufacturer will supply ratings to AHRI that exceed the 6% threshold. Based on that submittal, AHRI will select either 30% of the submitted BMGs for system manufacturers or one test per 6,000 Btu/h for the submitted Coil-only manufacturer’s ratings and will be tested at the Laboratory. Based on AHRI’s approval, the listings will be published in the directory. This test data does not substitute for the participant’s annual scheduled tests.

5.12 Special Case Preliminary Ratings. Preliminary ratings may be proposed between the participant and the customer in a single correspondence addressed only to the customer. The correspondence must clearly state that if a system(s) were certified, it would be certified at this rating and subject to test for compliance under the rules of the certification program and shall include this statement:

“This preliminary rating information is not AHRI certified and is not to be released and must be understood to be private information.”

If the system(s) becomes certified, it must be listed in the Directory for at least six (6) months.

6. Assessment and Payment of Certification Fees

6.1 Test Fees. Refer to www.ahrinet.org or contact AHRI, for information regarding the cost of test fees.

6.2 Shipping Costs. The participant shall pay the cost involved in shipping the unit between the stockpoint and the Laboratory. After completion of the test, the unit shall be shipped prepaid to the destination specified by the participant.

6.3 Monetary Penalties. Each participant shall be subject to monetary penalties when

• For the current program year, the first sample failure rate is greater than 20% and the participant was determined to be subject to penalty tests on the previous year per Section 3.19.

And/or

• The second sample test failure for the previous year exceeds five percent (5%).

Verified EER/A rating failures are not subject to monetary penalties.

6.3.1 Calculation of Monetary Penalties for First Sample Failure Rates. Monetary penalties fees are assessed as per First Sample Monetary Penalty Program for Unitary Small Air-Conditioners and Unitary Small Air-Source Heat Pumps (Appendix G). Penalties apply only if the participant was determined to be subject to penalty tests on the previous year per Section 3.19. The first sample failure rate is calculated by dividing the total number of scheduled tests for the current year by the number of first sample failures on the schedule tests. Penalty tests are not used in this calculation.
6.3.2 **Calculation of Monetary Penalties for Second Sample Test Failure Rates.** The second sample test failure rate percentages of scheduled tests will be calculated to determine the participant’s monetary penalty. Monetary penalty fees are assessed as per Second Sample Monetary Penalty Program for Unitary Small Air-Conditioners and Unitary Small Air-Source Heat Pumps (Appendix F) and will be added to the participant’s licensing fees the following year.

The second sample test failure rate’s percentage is determined by dividing the total number of BMGs re-rated by the number of scheduled tests for each participant.

When all annual scheduled tests are completed, each participant’s monetary penalty is determined by use of Appendix F. The total dollar penalty is calculated based on calendar year sales volume data multiplied by the applicable cumulative per dollar penalty. These cumulative per unit penalties are based on a graduated and cumulative formula, designed so that as the re-rating percentage increases, the penalty range category dollar amount increases and further, the cumulative per-unit dollar penalty totals increase cumulatively.

For heat pumps, the per-unit dollar penalty fully applies if the re-rating consists of a cooling cycle and heating cycle failure. Otherwise a cooling cycle only failure or a heating cycle only failure constitutes a one-half failure.

6.4 **Program Violations for Repeated First Sample High Failure Rates.** Each participant shall be subject to a program violation if the first sample failure rate for the current year scheduled test and for one of the two previous years exceed twenty percent (20%) and the total first sample plus second sample re-rate percentage for the current year exceeds five percent (5%). Voluntary plus involuntary re-rate percentage is calculated by adding the total re-rated BMGs from the first and second sample scheduled tests and dividing by the total present year first sample scheduled tests. These program violations should be applied and treated as described in Section 14 of the AHRI General Operations Manual. In addition, a participant that has a program violation for a given year, should be required to provide test data and computed ARM (Alternate Rating Method) outputs for all new input ratings until it is determined on the following years that the participant will not be subjected to a new violation (until and when the year first sample failure rates is equal or below 20% or the total voluntary plus involuntary re-rate percentage for that year is equal or less than five percent (5%)).
APPENDIX A: REQUIREMENTS FOR CERTIFICATION OF COIL-ONLY MANUFACTURER HEAT PUMP RATINGS

1. Information regarding the mixed indoor coil may be verified by the matched system manufacturer.

2. Mixed Coil Requirements
   A. The internal refrigerant volume of the mixed indoor coil assembly shall not be smaller than the volume of the smallest matched certified indoor coil assembly, nor shall it exceed the internal refrigerant volume of the largest certified matched indoor coil assembly. Should the matched system manufacturer elect to list only one internal volume for a system, then the mixed coil shall not be smaller than the listed matched indoor coil, nor greater than 120% of the internal volume of the matched system coil.
   B. The heating Btu/h capacity of the mixed coil shall not be less than 100% of the smallest certified matched indoor capacity when rated with a given outdoor section, nor shall it exceed the capacity of the largest certified matched indoor coil capacity when rated with a given outdoor section.

3. Mixed Expansion Device Requirements
   A. Mixed systems may always use an appropriately sized thermostatic expansion valve (TXV) except for series restrictor systems described below.
   B. If the certified matched system combinations have only TXV indoor, then the mixed system shall be TXV.
   C. Flow Factor requirements on mixed coils with fixed restrictions:
      a. If the highest sales volume tested combination (HSVTC) matched system has a fixed restrictor, then the mixed system flow factor must be within the range of 100-125%. This holds true with the exception, that if the HSVTC matched system uses a series capillary tube restriction arrangement (i.e. no check valves), then the flow factor for the mixed system must be within the range of 100-115%.
      b. If the HSVTC system is a TXV system, but there are other matched systems which use a fixed indoor restrictor, then the flow factor for the mixed system is based on the fixed indoor restrictor from the matched system with cooling capacity closest to the tested system. The mixed flow factor must be within the range of 100-125%.

4. The mixed indoor coil assembly shall meet the same burst strength requirements as the matched indoor assembly.

5. If a supplemental heater will be operated simultaneously with the heat pump, the heater should be located in the indoor air circuit downstream from the indoor coil. The heater should be capable of operating reliably in an elevated ambient (30-40°F above return air temperatures).

6. If the return air passes over the indoor coil before passing over the blower motor, the motor should be capable of operating reliably in an elevated ambient (30-40°F above return air temperatures).
APPENDIX B: CONDENSER CURVE INFORMATION

Purpose

This appendix will:

- Characterize the refrigeration effect (capacity) and power of the Highest Sales Volume Tested Combination (HSVTC) condensing unit independent of the indoor evaporator and its associated power.
- Provide a standardized, general equation form to characterize condenser performance and power.
- Provide a method of identifying the equation coefficients required for the capacity and power equations.

Requirements

The following information is required for AHRI submittal of each HSVTC condensing unit and heat pump:

<table>
<thead>
<tr>
<th>Table B1: AHRI Submittal Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item</td>
</tr>
<tr>
<td>------</td>
</tr>
<tr>
<td>m1</td>
</tr>
<tr>
<td>m2</td>
</tr>
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<td>m3</td>
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<tr>
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</tr>
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<td>b2</td>
</tr>
<tr>
<td>b3</td>
</tr>
<tr>
<td>b4</td>
</tr>
<tr>
<td>TL A</td>
</tr>
</tbody>
</table>

For 2-stage systems, a set of capacity and power coefficients as well as liquid temperature is required at each operational stage. One set of coefficients, shown above, is required at each capacity level at the A and B test conditions.

Scope

The methods outlined herein are applicable to:

- HSVTC condensing units that are used for cooling only applications
- HSVTC heat pump outdoor units, cooling only performance and power
- AHRI/DOE A and B test conditions as defined in AHRI 210/240

Definitions

- Condensing Unit - Consists of the outdoor unit and all interconnecting lines, liquid and suction, used to connect the outdoor refrigeration system to the indoor coil.
- Condenser performance is characterized by the general linear equation:

  \[
  \text{Gross Capacity or Power} = m \cdot (\text{Evaporator Temperature}) + b
  \]

  Where:
  
  \[
  m = \text{slope} \\
  b = \text{intercept}
  \]

- Condenser power – power, watts, associated with the outdoor unit only; no indoor power is to be included
- Condenser capacity – total capacity, Btu/h (btuh), with no (0) indoor power
- Evaporator temperature - the refrigerant saturation temperature based on the outlet refrigerant pressure of the evaporator.
- HSVTC – Highest sales volume tested combination
- Liquid temperature - the mean of the actual liquid temperature, F, measured at the inlet to the evaporator flow control during HSVTC tests.
Guidelines to Determine Coefficients

Figure B1 provides an overview of the process to determine the equation coefficients. Tables B1 and B2 provide a tabular form of the information required to determine the coefficients. As noted on these Tables, information is required from the HSVTC tests and simulation of the HSVTC system at different evaporating temperatures.

Rules governing coefficient determination:

1. Simulations are run in the range of 40-52° F evaporator temperatures
2. Simulations must take into account the pressure drops associated with the liquid and suction interconnecting lines
3. Simulated evaporator superheat is to remain a constant value in the case of HSVTC systems utilizing an expansion valve. For fixed orifice, capillary tubes, or other fixed flow control devices, the superheat shall remain at a constant value for all A-test simulations and remain constant for all B-test simulations. The A-test and B-test superheat are not required to be the same superheat value.
4. Indoor airflow changes, suggested range of ±20-25%, can be used to simulate different evaporator temperatures.
5. Corrections to the simulated values are required so that the performance and power curves pass through the actual mean HSVTC test points. This is accomplished through changes in the intercept values (b1…b4). Reference Figures B2 and B3.
Determine required HSVTC Data
See Table 1

Simulate
Use different evaporating temperatures

Determine the values required in Table 2

Only 2 evaporator temperatures simulated?

Perform least squares linear regression using simulations
(Ref Table 2)

Calculate slopes: m1, m2, m3, & m4 from simulations, Table 2

Calculate intercepts: b1, b2, b3, & b4 based on HSVTC data in Table 1

Correct intercepts based on HSVTC data in Table 1

Determination of Coefficients Complete

Figure B1: Equation Coefficients
### Table B2: DOE HSV Test Data

<table>
<thead>
<tr>
<th>Item</th>
<th>Value</th>
<th>Comments</th>
</tr>
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<tbody>
<tr>
<td>Indoor Power, watts</td>
<td></td>
<td>Mean of the values measured during HSVTC testing</td>
</tr>
<tr>
<td>Mean System Net Capacity A-test, btuh</td>
<td></td>
<td>Calculated value; Mean system net + indoor power converted to btuh</td>
</tr>
<tr>
<td>Mean System Net Capacity B-test, btuh</td>
<td></td>
<td>Mean of the values measured during HSVTC testing</td>
</tr>
<tr>
<td>Outdoor Unit Gross Capacity, A-test, btuh</td>
<td></td>
<td>Calculated value; Mean system net + indoor power converted to btuh</td>
</tr>
<tr>
<td>Mean System Power A-test, watts</td>
<td></td>
<td>Mean of the values measured during HSVTC testing</td>
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<tr>
<td>Outdoor Unit System Power, A-test, watts</td>
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<td>Calculated value; Mean system net - indoor power</td>
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<tr>
<td>Mean System Power B-test, watts</td>
<td></td>
<td>Mean of the values measured during HSVTC testing</td>
</tr>
<tr>
<td>Mean System Power B-test, watts</td>
<td></td>
<td>Calculated value; Mean system net - indoor power</td>
</tr>
<tr>
<td>Mean Indoor Liquid Temperature, A-test, F</td>
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<td>Mean of the values measured during HSVTC testing</td>
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<tr>
<td>Mean Indoor Suction Pressure A-test, psig</td>
<td></td>
<td>Mean of the values measured during HSVTC testing</td>
</tr>
<tr>
<td>Mean Evaporator Temperature, A-test, F</td>
<td></td>
<td>Input or Calculated value; Calculation based on saturation temperature for pressure above</td>
</tr>
<tr>
<td>Mean Indoor Suction Pressure B-test, psig</td>
<td></td>
<td>Mean of the values measured during HSVTC testing</td>
</tr>
<tr>
<td>Mean Evaporator Temperature, B-test, F</td>
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<td>Input or Calculated value; Calculation based on saturation temperature for pressure above</td>
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</table>

### Table B3: Simulation Inputs

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<thead>
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<td>A-Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaporator Temperature, T1, F</td>
<td></td>
<td>Saturated suction temperature, evaporator leaving</td>
</tr>
<tr>
<td>Condenser capacity, A-test, @ T1, btuh</td>
<td></td>
<td>Includes pressure loss of interconnecting lines with addition of indoor power converted to btuh</td>
</tr>
<tr>
<td>Condenser power A-test, @ T1; watts</td>
<td></td>
<td>Compressor &amp; OD air mover power only</td>
</tr>
<tr>
<td>Evaporator Temperature, T2, F</td>
<td></td>
<td>Saturated suction temperature, evaporator leaving</td>
</tr>
<tr>
<td>Condenser capacity, A-test, @ T2, btuh</td>
<td></td>
<td>Includes pressure loss of interconnecting lines with addition of indoor power converted to btuh</td>
</tr>
<tr>
<td>Condenser power A-test, @ T2; watts</td>
<td></td>
<td>Compressor &amp; OD air mover power only</td>
</tr>
<tr>
<td>B-Test</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaporator Temperature, T1, F</td>
<td></td>
<td>Saturated suction temperature, evaporator leaving</td>
</tr>
<tr>
<td>Condenser capacity, B-test, @ T1, btuh</td>
<td></td>
<td>Includes pressure loss of interconnecting lines with addition of indoor power converted to btuh</td>
</tr>
<tr>
<td>Condenser power B-test, @ T1; watts</td>
<td></td>
<td>Compressor &amp; OD air mover power only</td>
</tr>
<tr>
<td>Evaporator Temperature, T2, F</td>
<td></td>
<td>Saturated suction temperature, evaporator leaving</td>
</tr>
<tr>
<td>Condenser capacity, B-test, @ T2, btuh</td>
<td></td>
<td>Includes pressure loss of interconnecting lines with addition of indoor power converted to btuh</td>
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<tr>
<td>Condenser power B-test, @ T2; watts</td>
<td></td>
<td>Compressor &amp; OD air mover power only</td>
</tr>
</tbody>
</table>
Figure B2: Typical Condenser Capacity Curve

Figure B3: Typical Condenser Power Curves
APPENDIX C:
CONDENSING UNITS FOR COIL-ONLY CERTIFICATION

Outdoor Method Specified in the Operations Manual
(≤ 97% Certified HSVTC OD)

COMPLETE

OD Unit Available?

COMPLETE

YES

Alternate A

Test w/ OEM HSVTC Certified at >=95% & <97%

Test ICM Coil

COMPLETE

Pass?

YES

Retest by Obtaining Another OD unit per current OM

NO

Alternate B

Condensing Unit NOT Previously Tested OR Mix-match Unit

Test Coil (C & D Tests If required)

COMPLETE

Pass?

Y

Test Condensing Unit Using HSVTC System

NO

Ratings >97%

NO

COIL TEST FAILURE

YES

Ratings < 95%

NO

Complete

YES

First Test Systems Manufacturer Failure See OM

Figure C1: Condensing Units for Coil-Only Certification
APPENDIX D:
COMPLIANCE PROGRAM FLOW CHARTS

ARI Selection Process

*Break-in Requested?*
- Yes: Break-in Per Participant’s Instructions (Participant’s Expense)
- No:
  - First Test Sample Certification Testing

*First Test Sample Certification Testing*

*Rated Values Pass Certification Test?*
- Yes: Complete
- No: First Test Failure

*First Test Failure*
- See Appropriate Chart for First Test Failure Options

*Rated EERₐ Passes Verification Test*
- Yes: Complete
- No: Rerate EERₐ to Tested Values

*Second Sample Test*

Figure D1: Selection and Testing Process
**Figure D2: First Test Failure Options**

- **System Manufacturer First Test Failure Options (Efficiency Above NAECA Minimum)**

  - **Rerate** – Rerate all Combinations in the BMG using the First Sample Test Results
    - Complete
  
  - **Total runtime < 16 hours?**
    - Yes
      - Retest the same unit as first sample test
        - Retest determines the first test pass or failure.
    - No
      - Defective unit?
        - Yes
          - Refer to general OM for the defective claim requirements
            - Replace the defective component and retest the unit
        - No
          - Obsolete – Entire BMG is derated and obsolete
            - Complete
      - No
        - Test Second Sample
          - Manufacturer must supply second sample within 30 days
            - Second Sample Test
  
  - **Data input Error?**
    - Yes
      - Provide Documentation to AHRI
        - AHRI accepts
          - Invalid Option
        - Yes
          - This combination only is rerated per test values
            - New combination from the BMG is tested
              - First Sample Testing
Coil-Only Manufacturer
First Test Failure Options
(Efficiency at or above NAECA minimum)

Rerate all combinations in that
BMG. Rerate will be the same % by
which the tested unit failed.

Yes

Test Second Sample

Use same outdoor unit?

No

Test Second Sample

Use same indoor coil?

Yes

Same coil & AHRI selects outdoor unit from another manufacturer

Second Sample Test

Date input error?

Yes

Refer to the general OM for the defective claim requirements

Replace the defective component and retest the unit

Defective coil?

Total runtime < 16 hours?

Request a new A and B test (Participants’ expense)

Coil reevaluated for first sample pass or failure

Complete

Complete

New indoor coil of the same model

No

Use same indoor coil?

Yes

Obsolete – All combinations in that BMG will be derated and obsolete.

Figure D3: Coil-Only Manufacturer First Test Failure Options
Figure D4: Second Sample Test
Figure D5: Systems Manufacturer Second Test Failure Options

Figure D6: Coil-Only Manufacturer Second Test Failure Options
Figure D7: Coil or Systems Manufacturer First or Second Test Failure Options
APPENDIX E
SYSTEMS MANUFACTURER’S DECISION FORMS

MANUFACTURER’S DECISION FORM – TEST FAILURE NOTIFICATION
AHRI CERTIFICATION PROGRAM FOR
UNITARY SMALL AIR-CONDITIONING AND HEAT PUMP EQUIPMENT
(SYSTEMS)

Dear Certification Program Participant:

Please be advised that the following system, when tested under the AHRI Certification Program for Unitary Small Equipment, failed to perform in accordance with AHRI Standard 210/240, Unitary Air-Conditioning and Heat Pump Equipment. Test data is attached to this notification.

Manufacturer: ____________________________  AHRI Reference #: ____________________________
Model/Combo: ____________________________  AHRI Test #: ____________________________
Date of Test: ____________________________

Notes to Manufacturer:

Per program rules, following notification of a test failure the participant has seven (7) calendar days to elect one of the following options. If a completed manufacturer’s decision form is not received by AHRI within seven (7) calendar days of this notification, all systems within the Basic Model Group (BMG) will be re-rated proportionate to the failed test’s results.

FOLLOWING A FAILURE, PLEASE CHOOSE ONE OF THE FOLLOWING OPTIONS. THE OPTION CHOSEN MUST CORRESPOND TO ONE AVAILABLE PER THE AHRI GENERAL OPERATIONS MANUAL AND UNITARY SMALL AIR-CONDITIONING AND HEAT PUMP EQUIPMENT CERTIFICATION PROGRAM OPERATIONS MANUAL. IF ONLY EERₐ HAS FAILED, THE ONLY OPTIONS AVAILABLE ARE RE-RATE OR TEST A SECOND SAMPLE.

☐ Defective Failure. The participant claims that defective part(s) and/or assemblies caused the test failure. Within seven (7) calendar days of returning this manufacturer’s decision form to AHRI, the participant must provide AHRI with a detailed defect report stating the reason for the defective part(s) and/or assemblies. If AHRI agrees that the program’s definition of a defect has been met, AHRI will notify the participant to supply new part(s) and/or assemblies, to replace only those that have been deemed defective, to the testing laboratory. These new part(s) and/or assemblies must be supplied to the testing laboratory within 14 calendar days of AHRI’s request to the participant to supply replacement parts. Failure to provide a defect report and/or new part(s) and/or assemblies by their respective deadlines will forfeit the participant’s opportunity for a replacement test, thus automatically re-rating all models within the BMG proportionate to the failed test sample’s results.

The participant may send its own representative to install the replacement part(s) and/or assemblies or may request the testing laboratory to perform the replacement. If the participant chooses to have the testing laboratory install the replacements part(s) and/or assemblies, the participant may not claim improper installation of the part(s) and/or assemblies by the test lab.

Upon receipt of payment for the replacement test, the unit will be re-tested with the replacement part(s) and/or assemblies installed. If the unit passes, the participant will not be issued a first sample test failure. If the unit fails, the participant will be issued a first sample failure and will have the option to re-rate all models within the BMG proportionate to the failed test’s results, or perform a second sample test.

The participant is responsible for the costs associated with the installation of the replacement parts or assemblies, as well as the cost to re-test the unit. The testing laboratory will directly invoice the participant for the costs associated with the replacement part installation. Prior to conducting the re-test, AHRI will invoice the participant for the cost of the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within this timeframe will result in termination from the certification program.

Participants with an annual testing requirement (not including penalty, qualification, second sample, or replacement tests) of 50 units or less are allowed one defective failure claim per program test year. Participants with an annual testing requirement of 51 units or greater are allowed two defective failure claims per program test year.
Re-rate. All systems within the BMG will be re-rated proportionate to the failed test’s results. These re-rates will be reflected in the AHRI Directory of Certified Product Ratings. All matches re-rated at less than the specified minimum NAECA efficiencies must be obsoleted.

Within 14 calendar days of this failure notification, the participant is required to advise AHRI of the steps being taken to correct advertising literature, specifications, software, etc.

Within 60 calendar days of this failure notification, the participant is required to have withdrawn all known advertising literature, specifications, software, etc. and to have submitted corrected publications/software to AHRI, distributors, dealers, and all other affected parties. The draft public notification of corrections, a copy of the distribution list of those to receive the notification and corrections, as well as a copy of the corrected publication(s)/software, must be reviewed by AHRI prior to dissemination to the public.

Failure to comply with program rules regarding publication/software correction will result in a program violation.

Re-test the Same System (following 1st sample failure). If the failed system operated less than 16 hours, including time for break-in, the participant may choose to re-test the same system. DOE “A” and/or “B” tests will be run and the result of this test will establish whether the 1st test is a pass or fail.

AHRI will invoice the participant for the re-test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing, thus automatically rerating all models within the BMG proportionate to the failed test’s results.

Re-test the Same System w/ Different Orifice Size (following 1st sample failure). If the system failed the first sample test due to incorrect orifice information, the orifice size may be changed once and re-tested. This option is not available for 2nd sample tests where there are no opportunities for orifice changes. The correct orifice must be supplied within 30 calendar days of this notification. Failure to do so will forfeit further opportunities for testing and all models within the BMG will be re-rated proportionate to the failed test’s results.

AHRI will invoice the participant for the re-test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing, thus automatically re-rating all models within the BMG proportionate to the failed test’s results.

Second Sample (following 1st sample failure). The participant must have a 2nd sample, of the same model or combination, available for selection within the timeframe allotted by the product-specific operations manual from the date of this failure notification. If the system is not supplied within that timeframe, the participant will forfeit further opportunities for testing and all models within the BMG will be re-rated proportionate to the failed test’s results.

AHRI will invoice the participant for the 2nd sample test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing and all models within the BMG will be re-rated proportionate to the failed test’s results.

HSVTC Sample (following 2nd sample failure). This option may be chosen following a 2nd sample failure in an attempt to preserve the ratings of the Highest Sales Volume Tested Combination (HSVTC) and the entire BMG other than the tested combination in a BMG. This option is only available if the failed system was not the HSVTC. The participant must have an HSVTC sample available for selection within the timeframe allotted by the product-specific operations manual from the date of this failure notification. If the system is not supplied within that timeframe, the participant will forfeit further opportunities for testing and all models within the BMG will be re-rated proportionate to the failed test’s results.

AHRI will invoice the participant for the HSVTC test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing and all models within the BMG will be re-rated proportionate to the failed test’s results.

Obsolete (following 1st sample failure). Obsolete Models are those that the manufacturer stops producing following an AHRI test failure. Obsoletion is mandatory when a unit fails to meet minimum NAECA requirements. If obsoletion is chosen, all models within the BMG must be obsoleted. Obsolete models, with their correct ratings, are shown in the AHRI Directory of Certified Product Ratings for six months.

Within 14 calendar days of this failure notification, the participant is required to advise AHRI of the steps being taken to correct its advertising literature, specifications, software, etc.

Within 60 calendar days of this failure notification, the participant is required to have withdrawn all known advertising literature, specifications, software, etc. and to have submitted corrected publications/software to AHRI, distributors, dealers, and all other affected parties. The draft public notification of corrections, a copy of the distribution list of those to receive the notification and corrections, as well as a copy of the corrected publication(s)/software, must be reviewed by AHRI prior to dissemination to the public.
Failure to comply with program rules regarding publication/software correction will result in a program violation.

**Data Input Error.** Should a 1st sample failure be the result of an obvious data input error, satisfactory proof (documentation) must be provided to AHRI within seven (7) calendar days of returning this manufacturer’s decision form. If the proof is acceptable to the AHRI Vice President, Certification Programs, a 2nd sample within the same BMG as the failed unit, but a different combination, will be selected for test. The 1st tested sample, whose data was proven to be in error, shall be re-rated to the 1st sample test results but the remainder of the BMG ratings shall be dependent upon the second test results.

If the participant’s claim is not accepted by the AHRI Vice President, Certification Programs, the participant will be required to resubmit the manufacturer’s decision form choosing a different option. The completed form must be returned to AHRI within seven (7) calendar days of being requested to choose a different option.

If proof of the data error is not received within seven (7) calendar days of the return of this manufacturer’s decision form, the 1st sample test results will stand and the participant will have to choose to re-rate all models within the BMG according to 1st sample test results or obsolete all models within the BMG.

The participant must have the second sample available for selection within the timeframe allotted by the product-specific operations manual from the date of AHRI’s decision. AHRI will invoice the participant for the test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to have a sample available within the timeframe allotted by the product-specific operations manual, or failure to submit payment for the test within the noted timeframe, will forfeit the participant’s opportunity for further testing. Additionally, the participant will have to choose to re-rate all models within the BMG according to 1st sample results or obsolete all models within the BMG.

**To ensure your opportunity to preserve this BMG, please return this completed manufacturer’s decision form via email or fax within seven (7) calendar days to the certification engineer noted below.** More details on the above options can be found in the AHRI General Operations Manual and the Certification Program Operations Manual for Unitary Small Air-Conditioners and Heat Pumps. The engineer can address any questions you have regarding the available options.

Certification Engineer  
Phone: (703)524-8800  
Fax: (703) 562-1942

Thank you for your participation in the AHRI Certification Program.

(Please complete all fields)

Company: ____________________________  
Submitted by: ______________________  
Email: ____________________________  
Print  
Fax: ____________________________

Signature: _______________________  
Phone: __________________________

Title: ____________________________
APPENDIX F: MIX-MATCHED COILS MANUFACTURER’S DECISION FORM

MANUFACTURER’S DECISION FORM – TEST FAILURE NOTIFICATION

AHRI CERTIFICATION PROGRAM FOR UNITARY SMALL AIR-CONDITIONING AND HEAT PUMP EQUIPMENT (MIX-MATCHED COILS)

Dear Certification Program Participant:

Please be advised that the following system, when tested under the AHRI Certification Program for Unitary Small Equipment, failed to perform in accordance with AHRI Standard 210/240, Unitary Air-Conditioning and Heat Pump Equipment. Test data is attached to this notification.

Manufacturer: ________________  AHRI Reference #: ________________
Model/Combo: ________________  AHRI Test #: ________________
Date of Test: ________________

Per program rules, following notification of a test failure the participant has seven (7) calendar days to elect one of the following options. If a completed manufacturer’s decision form is not received by AHRI within seven (7) calendar days of this notification, all matches with this coil will be re-rated proportionate to the failed test’s results.

IF THE SYSTEM FAILED A CERTIFIED AND/OR VERIFIED RATING POINT(S), PLEASE CHOOSE ONE OF THE FOLLOWING. THE OPTION CHOSEN MUST CORRESPOND TO ONE AVAILABLE PER THE AHRI GENERAL OPERATIONS MANUAL AND UNITARY SMALL AIR-CONDITIONING AND HEAT PUMP EQUIPMENT CERTIFICATION PROGRAM OPERATIONS MANUAL. IF ONLY EER_A HAS FAILED, THE ONLY OPTIONS AVAILABLE ARE RE-RATE OR TEST A 2ND SAMPLE:

☐ Defective Failure. The participant claims that defective part(s) and/or assemblies caused the test failure. Within seven (7) calendar days of returning this manufacturer’s decision form to AHRI, the participant must provide AHRI with a detailed defect report stating the reason for the defective part(s) and/or assemblies. If AHRI agrees that the program’s definition of a defect has been met, AHRI will notify the participant to supply new part(s) and/or assemblies, to replace only those that have been deemed defective, to the testing laboratory. These new part(s) and/or assemblies must be supplied to the testing laboratory within 14 calendar days of AHRI’s request to the participant to supply replacement parts. Failure to provide a defect report and/or new part(s) and/or assemblies by their respective deadlines will forfeit the participant’s opportunity for a replacement test, thus automatically re-rating all models within the BMG proportionate to the failed test sample’s results.

The participant may send its own representative to install the replacement part(s) and/or assemblies or may request the testing laboratory to perform the replacement. If the participant chooses to have the testing laboratory install the replacements part(s) and/or assemblies, the participant may not claim improper installation of the part(s) and/or assemblies by the test lab.

Upon receipt of payment for the replacement test, the unit will be re-tested with the replacement part(s) and/or assemblies installed. If the unit passes, the participant will not be issued a first sample test failure. If the unit fails, the participant will be issued a first sample failure and will have the option to re-rate all models within the BMG proportionate to the failed test’s results, or perform a second sample test.

The participant is responsible for the costs associated with the installation of the replacement parts or assemblies, as well as the cost to re-test the unit. The testing laboratory will directly invoice the participant for the costs associated with the replacement part installation. Prior to conducting the re-test, AHRI will invoice the participant for the cost of the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within this timeframe will result in termination from the certification program.

Participants with an annual testing requirement (not including penalty, qualification, second sample, or replacement tests) of 50 units or less are allowed one defective failure claim per program test year. Participants with an annual testing requirement of 51 units or greater are allowed two defective failure claims per program test year.

☐ Re-rate. All matches within the BMG of this coil will be re-rated proportionate to the failed test’s results. These re-rates will be reflected in the AHRI Directory of Certified Product Ratings. All matches re-rated at less than the specified minimum NAECA efficiencies must be obsoleted.
Within 14 calendar days of this failure notification, the participant is required to advise AHRI of the steps being taken to correct advertising literature, specifications, software, etc.

Within 60 calendar days of this failure notification, the participant is required to have withdrawn all known advertising literature, specifications, software, etc. and to have submitted corrected publications/software to AHRI, distributors, dealers, and all other affected parties. The draft public notification of corrections, a copy of the distribution list of those to receive the notification and corrections, as well as a copy of the corrected publication(s)/software, must be reviewed by AHRI prior to dissemination to the public.

Failure to comply with program rules regarding publication/software correction will result in a program violation.

☐ **Re-test the Same System (following 1st sample failure).** If the failed system operated less than 16 hours, including time for break-in, the participant may choose to re-test the same system. DOE “A” and/or “B” tests will be run and the result of this test will establish whether the 1st test is a pass or fail.

AHRI will invoice the participant for the re-test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing, thus automatically re-rating all matches with this coil proportionate to the failed test’s results.

☐ **Re-test the Same coil with a different outdoor unit.** If the failed system operated less than 16 hours, including time for break-in, the participant may choose to re-test the same system. DOE “A” and/or “B” tests will be run and the result of this test will establish whether the 1st test is a pass or fail.

AHRI will invoice the participant for the re-test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing, thus automatically re-rating all matches with this coil proportionate to the failed test’s results.

☐ **2nd Sample (utilizing same coil and same condenser).** The laboratory will re-test the failed system using the same coil and condenser provided for the 1st sample test. If the sample passes, only the failing combination will be re-rated. If the sample fails, all combinations utilizing the coil will be re-rated proportionate to the 2nd sample test results.

If the coil is not supplied within 30 days, the participant will forfeit further opportunities for testing and all combinations utilizing the coil will be re-rated proportionate to the failed test’s results.

AHRI will invoice the participant for the 2nd sample test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing and all combinations utilizing the coil will be re-rated proportionate to the failed test’s results.

☐ **2nd Sample (utilizing same model coil and same condenser).** The participant must have a 2nd sample, of the same model coil as the 1st sample, available for selection within the timeframe allotted in the program-specific operations manual from the date of this failure notification. The coil will be tested with the same condenser as used in the failed test. If the sample passes, only the failing combination will be re-rated. If the sample fails, all combinations utilizing the coil will be re-rated proportionate to the 2nd sample test results.

If the coil is not supplied within the allotted timeframe, the participant will forfeit further opportunities for testing and all combinations utilizing the coil will be re-rated proportionate to the failed test’s results.

AHRI will invoice the participant for the 2nd sample test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing and all combinations utilizing the coil will be re-rated proportionate to the failed test’s results.

☐ **2nd Sample (utilizing same model coil and different system manufacturer condenser).** The participant must have a 2nd sample, of the same model as the 1st sample, available within the timeframe allotted in the product-specific operations manual from the date of this failure notification. The coil will be tested with a different system manufacturer’s condenser (chosen by AHRI) that is recognized as a match in the AHRI Directory of Certified Product Ratings. If the sample passes, only the failing combination will be re-rated. If the sample fails, all combinations utilizing the coil will be re-rated proportionate to the 2nd sample test results.

If the coil is not supplied within the allotted timeframe, the participant will forfeit further opportunities for testing and all combinations utilizing the coil will be re-rated proportionate to the failed test’s results.

AHRI will invoice the participant for the 2nd sample test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to make payment within that timeframe will forfeit the participant’s opportunity to conduct further testing and all combinations utilizing the coil will be re-rated proportionate to the failed test’s results.
**Obsolete (following 1st sample failure).** Obsolete Models are those that the manufacturer stops producing following an AHRI test failure. Obsolescence is mandatory when a unit fails to meet minimum NAEC requirements. If obsoletion is chosen, all combinations utilizing this coil must be obsoleted. Obsolete models, with their correct ratings, are shown in the AHRI Directory of Certified Product Ratings for six months.

Within 14 calendar days of this failure notification, the participant is required to advise AHRI of the steps being taken to correct its advertising literature, specifications, software, etc.

Within 60 calendar days of this failure notification, the participant is required to have withdrawn all known advertising literature, specifications, software, etc. and to have submitted corrected publications/software to AHRI, distributors, dealers, and all other affected parties. The draft public notification of corrections, a copy of the distribution list of those to receive the notification and corrections, as well as a copy of the corrected publication(s)/software, must be reviewed by AHRI prior to dissemination to the public.

Failure to comply with program rules regarding publication/software correction will result in a program violation.

**Data Input Error.** Should a 1st sample failure be the result of an obvious data input error, satisfactory proof (documentation) must be provided to AHRI within seven (7) calendar days of returning this manufacturer’s decision form. If the proof is acceptable to the AHRI Vice President, Certification Programs, a 2nd sample within the same BMG as the failed coil, but a different combination, will be selected for test. The 1st tested sample, whose data was proven to be in error, shall be re-rated to the 1st sample test results but the remainder of the matches paired with this coil shall be dependent upon the second test results.

If the participant’s claim is not accepted by the AHRI Vice President, Certification Programs, the participant will be required to resubmit the manufacturer’s decision form choosing a different option. The completed form must be returned to AHRI within seven (7) calendar days of being requested to choose a different option.

If proof of the data error is not received within seven (7) calendar days of the return of this manufacturer’s decision form, the 1st sample test results will stand and the participant will have to choose to re-rate all combinations utilizing this coil according to 1st sample test results or obsolete all combinations utilizing this coil.

The participant must have the second sample available within the timeframe allotted in the program-specific operations manual from the day of AHRI’s decision. AHRI will invoice the participant for the test prior to conducting the test. Payment must be received within 30 calendar days from date of invoice. Failure to have a sample available within the timeframe allotted in the program-specific operations manual from the date of this failure notification, or failure to submit payment for the test within the noted timeframe, will forfeit the participant’s opportunity for further testing. Additionally, the participant will have to choose to re-rate all combinations utilizing this coil according to 1st sample results or obsolete all combinations utilizing this coil.

To ensure your opportunity to preserve this coil, please return this completed manufacturer’s decision form via email or fax within seven (7) calendar days to the certification engineer noted below. More details on the above options can be found in the AHRI General Operations Manual and the Certification Program Operations Manual for Unitary Small Air-Conditioning and Heat Pumps. The engineer can address any questions you have regarding the available options.

Certification Engineer  
Phone: (703)524-8800  
Fax: (703) 562-1942

Thank you for your participation in the AHRI Certification Program.

*(Please complete all fields)*

Company:  
Submitted by:  
Email:  
Fax:  
Signature:  
Phone:  
Title:
APPENDIX G: SECOND SAMPLE FAILURE RATE MONETARY PENALTY

Monetary Penalty Program for Unitary Air-Conditioners and Air-Source Unitary Small Heat Pumps

Table G1: Monetary Penalty Program for Unitary Small Air-Conditioners and Unitary Small Air-Source Heat Pumps

<table>
<thead>
<tr>
<th>Penalty Range %</th>
<th>Penalty amount $ based on sales volume information for both systems and coil-only units</th>
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</thead>
<tbody>
<tr>
<td>0-5</td>
<td>0.00%</td>
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<tr>
<td>6-10</td>
<td>0.05%</td>
</tr>
<tr>
<td>11-20</td>
<td>0.10%</td>
</tr>
<tr>
<td>21-30</td>
<td>0.20%</td>
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<tr>
<td>31-40</td>
<td>0.30%</td>
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<td>41-50</td>
<td>0.50%</td>
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<tr>
<td>51-60</td>
<td>0.70%</td>
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<tr>
<td>61-70</td>
<td>1.00%</td>
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<tr>
<td>71-80</td>
<td>1.50%</td>
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<td>81-90</td>
<td>2.00%</td>
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<tr>
<td>91-100</td>
<td>2.50%</td>
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APPENDIX H: FIRST SAMPLE FAILURE RATE MONETARY PENALTY

First Sample Monetary Penalty Program for Unitary Air-Conditioners and Air-Source Unitary Small Heat Pumps

<table>
<thead>
<tr>
<th>Scheduled Tests First Sample Failure Rate</th>
<th>Air-Conditioner and Heat Pump Matched System and Indoor Coil/Blower Manufacturer’s First Sample Monetary Penalty</th>
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<tbody>
<tr>
<td>Penalty Range %</td>
<td>Penalty Amount Due within 15 days of the Completion of Test that Increases First Sample Failure Rate above the Penalty Range</td>
</tr>
<tr>
<td>0 - 20</td>
<td>0</td>
</tr>
<tr>
<td>21 - 30</td>
<td>$20,000</td>
</tr>
<tr>
<td>31 - 40</td>
<td>$20,000</td>
</tr>
<tr>
<td>41 - 50</td>
<td>$20,000</td>
</tr>
<tr>
<td>51 - 60</td>
<td>$20,000</td>
</tr>
<tr>
<td>61 - 70</td>
<td>$20,000</td>
</tr>
<tr>
<td>71 - 80</td>
<td>$20,000</td>
</tr>
<tr>
<td>81 - 90</td>
<td>$20,000</td>
</tr>
<tr>
<td>91 - 100</td>
<td>$20,000</td>
</tr>
</tbody>
</table>

Penalties apply only if the participant was determined to be subject to penalty test on the previous year per Section 3.20

If a single test failure increases Failure Rate by more than 10%, the combined amounts for the ranges increased is due.
## APPENDIX I – COIL-ONLY BMG DEFINITION

### Table I1: Coil-Only BMG Definition

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Characteristics</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity</td>
<td>6,000 Btu/h increments</td>
<td>One Per 6,000 BTUH capacity. (For example, see Table H1)</td>
</tr>
<tr>
<td>Air-handler</td>
<td>Yes or No (mixed case)</td>
<td></td>
</tr>
<tr>
<td><strong>EVAPORATOR FAN TYPE</strong></td>
<td>Single Speed; Dual Speed; Multiple Speed; Variable Speed (mixed case)</td>
<td></td>
</tr>
<tr>
<td><strong>EVAPORATOR NUMBER OF ROWS</strong></td>
<td>Whole number</td>
<td></td>
</tr>
<tr>
<td>Air-Cooled, Water-Cooled or Evaporatively-Cooled</td>
<td>Air-Cooled, Water-Cooled or Evaporatively-Cooled</td>
<td></td>
</tr>
<tr>
<td><strong>EVAPORATOR TUBE CENTERS</strong></td>
<td>0.800 x 0.693; 0.85 x 0.736; 1.00 x 0.625; 1.00 x 0.750; 1.00 x 0.866; 1.25 x 1.08; Other; N/A (this option only applicable to Non-Air Cooled Product)</td>
<td></td>
</tr>
<tr>
<td><strong>EVAPORATOR FIN TYPE</strong></td>
<td>Flat; Corrugated; Hi Performance; Lanced; Louvered; N/A (This option only applicable to Non-Air Cooled product)</td>
<td></td>
</tr>
<tr>
<td><strong>EVAPORATOR FINS/INCH</strong></td>
<td>Whole Number</td>
<td>Two (2) fins/inch per BMG (example: 8-9,10-11, 12-13,14-15..etc)</td>
</tr>
<tr>
<td><strong>EVAPORATOR TUBE OD</strong></td>
<td>1/4 in; 5/16 in; 3/8 in; 7/8 in; 1/2 in; 1 x 0.072 in; rifled 1/4 in; rifled 5/16 in; rifled 3/8 in; rifled 1/2 on; rifled 7mm; N/A (This option only applicable to Non-Air-Cooled product)</td>
<td></td>
</tr>
<tr>
<td><strong>EVAPORATOR EXPANSION DEVICE</strong></td>
<td>Orifice, Capillary Tube, Expansion Valve (mixed case)</td>
<td></td>
</tr>
<tr>
<td><strong>FINNED LENGTH PER SLAB (IN)</strong></td>
<td>One decimal. Minimum 0, maximum 60 in</td>
<td></td>
</tr>
<tr>
<td><strong>FINNED HEIGHT PER SLAB (IN)</strong></td>
<td>One decimal. Minimum 0, maximum 60 in</td>
<td></td>
</tr>
<tr>
<td><strong>NUMBER OF SLABS IN THE COIL</strong></td>
<td>Whole Number, minimum 1, maximum 10</td>
<td></td>
</tr>
<tr>
<td><strong>FINNED MATERIAL TYPE</strong></td>
<td>Options: Copper, Aluminum</td>
<td></td>
</tr>
<tr>
<td><strong>TUBE MATERIAL TYPE</strong></td>
<td>Options: Copper, Aluminum</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL NUMBER OF ACTIVE TUBES</strong></td>
<td>Whole Number, minimum 1, maximum 1000</td>
<td></td>
</tr>
</tbody>
</table>
### Table I2: Coil-only Manufacturer BMG Coil Capacity Range

<table>
<thead>
<tr>
<th>BMG Coil Capacities</th>
<th>Min Capacity (in Btu/h)</th>
<th>Max Capacity (in Btu/h)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6000</td>
<td>11900</td>
</tr>
<tr>
<td>2</td>
<td>12000</td>
<td>17900</td>
</tr>
<tr>
<td>3</td>
<td>18000</td>
<td>23900</td>
</tr>
<tr>
<td>4</td>
<td>24000</td>
<td>29900</td>
</tr>
<tr>
<td>5</td>
<td>30000</td>
<td>35900</td>
</tr>
<tr>
<td>6</td>
<td>36000</td>
<td>41900</td>
</tr>
<tr>
<td>7</td>
<td>42000</td>
<td>47900</td>
</tr>
<tr>
<td>8</td>
<td>48000</td>
<td>53900</td>
</tr>
<tr>
<td>9</td>
<td>54000</td>
<td>59900</td>
</tr>
<tr>
<td>10</td>
<td>60000</td>
<td>64900</td>
</tr>
</tbody>
</table>

#### Definitions:

I. **Fin Definitions**
   
   a. **Flat.** A flat surface without amplitudes.
   
   b. **Corrugated.** A flat surface modified with angular amplitudes.
   
   c. **Hi-performance.** A flat surface modified with sine wave amplitudes, but no lances or louvers.
   
   d. **Lanced/Louvered.** A surface modified with raised lances or louvers.

II. **Slab:** An independent tube coil assembly or module, used for heat transfer between refrigerant and air. For example, an A Coil consists of two slabs; a pleated coil has 3 or more slabs.

III. **Active Tubes:** Tubes in the slab intended to carry refrigerant.