
Association of Home Appliance Manufacturers Room Air Conditioner Certification Program Procedural Guide

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Sponsor:

Association of Home Appliance Manufacturers

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FOREWORD

The Association of Home Appliance Manufacturers (AHAM) sponsors the Room Air Conditioner Certification Program. This Program provides a uniform and commercially practical verification of manufacturers' Btu/hr cooling and heating capacity, ampere rating(s) and Energy Efficiency Ratios (EER). An independent laboratory under contract to AHAM provides verification.

Participation in the Program is voluntary. Participants' models must be certified and listed in a Directory of Certified Room Air Conditioners. A participant's public representation that the stated Btu/hr capacity, ampere ratings, and EER of its room air conditioners have been verified is the certification seal which appears on each unit.

The AHAM manufacturer's license agreement is the basic contractual document for participation in the Certification Program. This *Procedural Guide* (referred to hereafter as the Guide) is an extension of and incorporated into that agreement and provides for administration of the Program and its execution in a uniform manner. General information and procedural details are included in this Guide. The *Procedural Guide* may be revised at any time by consensus of the participants and approval by AHAM's Major Appliance Engineering Council as the need for such revision is deemed advisable.

A number of forms are used to administer this Program. The current forms and the accompanying instructions booklet, AHAM *Room Air Conditioner Certification Program – Instructions for Completing Forms*, can be obtained from AHAM or Intertek/ETL SEMKO.

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TABLE OF CONTENTS

	<u>Page</u>
1.0. Basic Outline of Roles	
1.1. Role of AHAM	5
1.2. Role of Laboratory	6
1.3. Role of Licensee	6
2.0 General Information	
2.1 Factors Certified	8
2.2 To Enter the Program	8
2.3 Laboratory Examination	8
2.4 Program Policy Decisions	9
2.5 Certification Seal	9
2.6 Program Funding	9
2.7 Program Forms	10
2.8 Program Procedural Guide	10
3.0 Certification Data and Information to be Supplied by Licensee	11
3.1 Licensee Information	11
3.2 Models to Be Included In the Program	11
3.3 Carry-Over Models	12
3.4 Models of Prior Production Still Being Marketed	12
3.5 Submission of Data	12
3.6 Publication of Directories	12
3.7 Program Year	12
3.8 Submitting Data	13
4.0 Test Procedures and Applicable Standard	14
4.1 Certified Ratings	14
4.2 Tolerance	14
4.3 Nameplate Data for Dual-Voltage Models	15
4.4 Rating Built-In Models	15
4.5 Room Air Conditioners Designed for Use in Sleeves	15
4.6 Verification Testing	16
4.7 Number of Models Tested in Program Year	16
4.8 Confidentiality	17
4.9 Test Conditions	17
4.10 Acquisition and Shipping of Test Samples	18
4.12 Disposal of Test Samples	18

5.0 Verification Testing Results and Follow-up Actions

5.1	Finding of Compliance	19
5.2	Enhanced Test Conditions	19
5.3	First Sample Testing of Heating/Cooling Units	19
5.4	Finding of Non-Compliance - General	19
5.5	Second Sample Testing Following Non-Compliance	20
5.6	Second (or Additional) Sample Not Available	20
5.7	Second Sample Non-Compliance	20
5.8	Withdrawing a Model Due to Non-Compliance	20
5.9	Cost of Testing	21
5.10	Review of Quality Control Records	21
5.11	Examples for Permitting Retests or Additional Sample Selections	21
5.12	Notification of Revised Ratings	22
5.13	Exclusion from the Program	23
5.14	Extending Period for Re-Rating	24
5.15	Market Surveillance	24
5.16	Basic Model Brand Name Re-Ratings	24
5.17	Challenge Procedure	24
5.18	Voluntary Changes in Ratings	25

6.0 Rules for Use of the Seal, Advertising and Promotional References

6.1	Rules for Use of the Seal and Advertising	26
6.2	Definition of the Seal	26
6.3	Use of Seal	26
6.4	Statement to Accompany Seal Reproductions	27
6.5	Mixing Certified and Non-certified Models	27
6.6	Defining What Is Being Certified	27
6.7	Reference to the Laboratory	27
6.8	Submission of Specification Sheets and Promotional Material	28
6.9	Examples of Improper Use or Statements	28
6.10	Accurate Representation	28
6.11	Discontinuing Use of Seal and References to Certification Program	29

APPENDIX A – DEFINITION OF TERMS	30
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APPENDIX B – SAMPLING PROCEDURE USED AFTER TWO SAMPLE FAILURES	32
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PROGRAM FORMS: Refer to the instructions booklet titled *Room Air Conditioner Certification Program – Instructions for Completing Forms*

1.0 BASIC OUTLINE OF ROLES

1.1 Role of AHAM

- A. Licenses U.S. manufacturers and private-brand sellers to certify, under the AHAM program, the Btu/hr cooling and heating capacities, the Energy Efficiency Ratios (EER) and the electrical input in amperes of room air conditioners sold in the United States and, on a selective basis, abroad.
- B. Licenses foreign manufacturers and importers to certify, under the AHAM program, the Btu/hr cooling and heating capacities, the Energy Efficiency Ratios (EER) and electrical input in amperes of room air conditioners sold in the United States.
- C. Provides administrative staffing for the Program.
- D. Provides an electronic version of the certification seal to companies licensed in the Program.
- E. Monitors release and use of seals.
- F. Collects certification fees quarterly from Licensees for purposes of funding the Program.
- G. Publishes and distributes a periodic Certification Directory
- H. Monitors:
 - (1) Program participation
 - (2) All re-ratings
 - (3) All challenges
- I. Informs participants of:
 - (1) All re-ratings.
 - (2) Exclusion of any Licensee from the Program.
- J. Contracts with an independent testing laboratory for those activities noted in Section 1.2

1.2 Role of Laboratory

- A. Examination and monitoring of Licensees' testing facilities and quality control procedures or data, as needed.
- B. Collection of certified data, basic model information, etc.
- C. Random test samples acquisition.
- D. Verification testing in accordance with ANSI/AHAM Standard RAC-1 (latest edition) and the tolerances provided in this Guide, giving priority to those models which each licensee sells in greatest volume and /or has voluntarily re-rated.
 - (1) Annual testing of at least 50% of new certified basic models and 10% of carryover basic models to average at least a 25% basic model program;
 - (2) Verification under challenge procedure;
 - (3) Verification of voluntary re-rates.
- E. Issuance of verification test reports (and notices of non-compliance should testing indicate re-rating necessary).
- F. Determination of revised rating to be certified in case of mandatory (either as result of regular Program testing or challenge procedure) or voluntary re-rating.
- G. Disposition of all test samples.
- H. Compilation and dissemination to AHAM of all certified models' ratings by brand for subsequent Certification Directory publication.
- I. Compilation and issuance of annual report summarizing individual participant test results and overall Certification Program test data.

1.3 Role of Licensee

- A. Certifies cooling and heating capacity in Btu/hr, Energy Efficiency Ratios (EER) and electrical input in amperes of all Program models
- B. Places certified capacity and amperage ratings on nameplate of each unit with the Certification Program and identifies each rating as an AHAM value.
- C. Affixes certification seals to each unit produced under the Program.
- D. Pays AHAM quarterly an amount equal to the current Unit Production Fee multiplied by 1/4 of its certified units produced during the 12-month period ending the previous June 30.

- E. Submits model data and sample acquisition information to the Laboratory under contract to AHAM.
- F. Furnishes test specimens at no cost to Program and pays all shipping costs to and from the Laboratory.
- G. May challenge certified ratings of other Licensees on basis of full and proper test of a sample unit.
 - Forwards challenge with supporting test data to the laboratory (with copy to AHAM).
- H. Re-rates certified ratings in accordance with Program procedures.
 - (1) Voluntary re-ratings.
 - (i) May voluntarily re-rate on basis of quality control
 - (ii) Notification of re-rating must be sent to the Laboratory and the revised rating must appear on all units subsequently produced.
 - (2) Mandatory re-ratings.
 - (i) Accepts revised rating(s) determined by the Laboratory.
 - (ii) Notification of re-rating must be sent to the first line of distribution, all literature must be revised at its next printing (with evidence of each action provided to AHAM), and revised Btu/hr and ampere rating(s) must appear on all units subsequently produced.
- I. Submits copies of specification sheets and promotional material to AHAM periodically upon request.
- J. Confirms all Communications in Writing - All communications must be confirmed in writing (e-mail or letter) to be considered official. Neither AHAM nor the Laboratory will assume any liability for the actions take which are not confirmed in writing.

2.0 GENERAL INFORMATION

2.1 Factors Certified

Under this Program, Licensees certify cooling and heating capacity in Btu/hr, the Energy Efficiency Ratio (EER), and electrical input in amperes determined in accordance with ANSI/AHAM Standard RAC-1 (latest edition).

2.2 To Enter the Program

To Enter the Program - A licensee enters the Program by completing and submitting to AHAM (a) a Production Survey and (b) a signed license agreement (including signed Certification Affidavit).

2.3 Laboratory Examination

Each participating manufacturer may then be required, at the discretion of AHAM and the Laboratory based on available data, to have its laboratory testing facilities examined and its quality-control procedures reviewed by the Laboratory. This examination will help the Laboratory determine if a manufacturer's quality control procedures indicate need for the early scheduling of tests of that manufacturer's units. Foreign licensees may be required to send qualified representatives to the United States to meet with AHAM and the Laboratory to review the quality control records, procedures and test results of its certified room air conditioners.

- A. The plant visit will generally take only one day.
- B. The manufacturer should provide technical data on calibration of instruments used in the testing facilities, information from the cross-testing of units with other manufacturers or the Laboratory, and other regularly conducted calibration-work data. Forms for taking data, calculation sheets, etc., should also be made available for review. The quality control department should provide records showing the extent of the statistical analysis of product evaluation, especially statistics that give a prompt indication of quality during a manufacturing process. Manufacturers are invited to communicate with the Laboratory regarding specific details of the inspection and survey.
- C. The Laboratory may visit Non-Licensee participants (whose models are certified by either the Licensee-manufacturer or Licensee brand name owner) for a general review of their participation in the Program. In some cases, these participants may have testing facilities of their own, and may monitor production of their brand room air conditioners. When models are manufactured by a non-licensee plant, the licensee must obtain authorization from the non-licensee manufacturer for the visit.

- D. Licensees having more than one manufacturing location, relocating operations, or establishing new facilities are required to inform the Laboratory of such changes.

2.4 Program Policy Decisions

The AHAM Major Appliance Engineering Council, composed of AHAM member company representatives, is responsible for approving decisions on policy matters related to this Program. Recommendations from the Participants will be taken into consideration wherever possible.

2.5 Certification Seal

At the time and place of manufacture, a certification seal bearing the words, "AHAM Certified, Capacity, EER & Amperes, ANSI/AHAM RAC-1" must be affixed to each room air conditioner under the Program. The certified capacity and ampere ratings are listed on the nameplate of each unit.

- A. Graphic Elements CD containing the certification seal artwork and reproduction requirements (size and color, for example) is provided at no additional charge to each Licensee whose certification payments to the Program are current. Licensees may elect to either have the seal embedded directly in the nameplate or may elect to have labels made that can be affixed directly onto the nameplate. All label specifications must be in accordance with the AHAM Graphic Standards CD.
- B. The AHAM certification seal is separate from and independent of any other label; the certification seal must be affixed to each certified room air conditioner. In the case of room air conditioners for which sleeves are shipped separately, the certification seal must be affixed to the unit chassis, visible when the front grille is removed.
- C. Licensees may not sell, lend, transfer, or otherwise dispose of the actual certification seals in any manner other than by affixing them to licensee's production of certified room air conditioners.
- D. The specific rules for use of the certificate seal, as well as rules on advertising and promotional references to the Program are included in Section 6.0 of this Guide.

2.6 Program Funding

Upon joining the Program, and annually in July thereafter, Licensees are required to complete a Production Survey form advising AHAM of the actual production of room air conditioners sold in the United States for the twelve-month period of July 1 of the previous year through June 30 of the current year.

- A. The amount payable by the Licensee during the calendar year will be determined by multiplying the current AHAM member or non-member Unit Production Fee (established periodically by the Major Appliance Engineering Council) by the reported Production figure. If this amount is less than the minimum participant fee specified in the AHAM Fee Schedule, the Licensee pays the minimum fee. One-quarter of the fee is billed quarterly by AHAM and is payable quarterly by Licensee during the calendar year.
- B. New Licensees just entering the market that do not have any production during the specified period noted above (July 1 of previous year to June 30 of current year) pay a flat fee for the first year of participation. Refer to the current AHAM Fee Schedule.
- C. AHAM pays all Program costs except those costs involved in the challenge procedure, additional sample acquisition, shipping costs, and costs associated with the Laboratory having to purchase samples on the open market.

2.7 Program Forms

The forms listed below are used to administer this Program. The forms and the accompanying instructions booklet, *Room Air Conditioner Certification Program – Instructions for Completing Forms*, and can be obtained from AHAM or Intertek ETL/SEMKO.

<u>Form Number</u>	<u>Title</u>
N-1	Model Data for Directory
N-2	Cross Index of Model Numbers
N-3	Contact and Selection Site Form
N-4	Selection Report
N-5C	Report of Cooling Capacity Test
N-5H	Report of Heating Capacity Test
N-5-F1	First Sample Failure Notification
N-5-F2	Second Sample Failure Notification
N-6	Notice of Non-Compliance
N-8	Request for Model Deletion
N-9	Challenge Request Form

2.8 Program Procedural Guide

The Procedural Guide is intended to assure the integrity of the Program and to impartially maintain the uniformity and equity of its administration.

3.0 CERTIFICATION DATA AND INFORMATION TO BE SUPPLIED BY LICENSEE

3.1 Licensee Information

Licensee shall provide the Laboratory with sufficient information to determine the proper identification of:

- A. Models to be listed in the Certification Directory
- B. Participants' basic models
- C. The best manner and means of obtaining samples for testing. Such samples are to be furnished by Licensee at no cost to the Program.

3.2 Models to be Included in the Program

Each Licensee (both foreign and domestic) shall certify cooling and heating capacity in Btu/hr, EER and electrical input in amperes, supply data on, and submit for Directory listing all room air conditioners they manufacture or are manufactured for them under its brand names for sale in the United States and all private-brand models, which the Licensee is to distribute in the United States.¹

- A. The manufacturer-licensee may certify and supply data on private-brand models that it manufactures for sale to and distribution by a concern separate from and unrelated to it. However, to have any such private brands included in the Certification Program, the manufacturer shall certify and supply data on all models which it manufactures for the same private brand and include the production data for these models in the annual Production Survey.
- B. The U.S. Licensee may, at its option, selectively certify and supply data on model(s) manufactured for export. The Licensee must include the production data for these models in the Production Survey.
- C. These requirements for certification apply to all models to be sold whether or not they are sold for test market purposes in a limited quantity and specified market area. Certification is not required for limited quantity models distributed on a consignment basis for test purposes.

¹ The United States includes all of the states, the District of Columbia, the Territories and other geographical areas associated with, or subject to the jurisdiction of the United States.

3.3 Carry-Over Models

The Licensee shall also submit data on carry-over models (models whose production started in previous years but which are still being produced during the current Program year) for continued certification listing. Identical model numbers may be carried over from a prior year if no physical changes are made in the models which would affect their certified ratings. However, if a carry-over model is to have different certified rating(s) from its previous one, it must be assigned a new model number.

A carry-over model is subject to testing again even though tested during prior years. The licensee is responsible for maintaining the performance of the model and must advise the Laboratory of any changes in production which may affect its certified values.

3.4 Models of Prior Production Still Being Marketed

The Licensee may also submit data on models no longer being produced but, are still available for sale by the brand name owner. Models may continue to appear in the Certification Directory only as long as they are being marketed by the brand-name owner and will be subject to possible annual testing even though tested during a prior year.

3.5 Submission of Data

Certification data for a model subject to the Program must be submitted no later than the first day of production of that model. The estimated date on which production will begin must be included on the data form provided to the Laboratory.

3.6 Publication of Directories

AHAM publishes certification directories each year which list Program models and their certified ratings. Current directory closing and issue dates are listed in the AHAM Directory Publication Schedule.

In the event that an incorrect rating, model number, or other error in licensee's certified model listing appears in the Directory of Certified Room Air Conditioner, AHAM will issue a correction notice to all Program participants advising of the correct listing. If the error was the result of incorrect data supplied by licensee, the licensee responsible for the model(s) will be responsible for all costs relative to issuance of this notice to participants. However, if the error was the result of an oversight on the part of AHAM staff or the Laboratory, the correction notice will be issued at no cost to the licensee.

3.7 Program Year

The Program Year runs January 1 to December 31. Models available for sale during this period are considered to be models of the current Program year even though manufacturer or reseller may give them some other year designation.

3.8 Submitting Data

Only an AHAM licensee may submit data to the Program. Manufacturer-licensees shall submit forms for their own brands and may submit for brands manufactured by them for private-brand resellers. Private -brand resellers should normally have the form submitted on their behalf by the licensee-manufacturers unless other arrangements are made by both parties (with the Laboratory). However, if a licensee-reseller's brand is produced by a non-licensee-manufacturer, the forms then must be submitted by the licensee reseller. Duplicate forms shall not be submitted. The private brand owner is ultimately responsible for all listings under its brand name.

4.0 TEST PROCEDURES AND APPLICABLE STANDARDS

4.1 Certified Ratings

Under the AHAM Room Air Conditioner Certification Program, licensees certify Btu/hr cooling and heating capacity ratings, EER and electrical input in amperes determined in accordance with ANSI/AHAM Standard RAC-1 (latest edition). This standard specifies, among other things.

- A. That the Btu/hr cooling and heating capacity ratings and electrical input for cooling amperes be stated on the nameplate;
- B. That the cooling capacity rating in Btu/hr and electrical input for cooling in amperes be based upon tests made in accordance with the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 16 "Method of Testing for Rating Room Air Conditioners, " (latest edition);
- C. That the heating capacity rating in Btu/hr and electrical input for heating in amperes be based upon tests made in accordance with the ASHRAE Standard 58 "Method of Testing for Rating Room Air Conditioner Heating Capacity," (latest edition).

Licensees must use all practical means at their command to continuously assure that the certified ratings of their room air conditioners are in compliance with Program requirements.

4.2 Tolerance

The cooling and heating capacity and EER of any production unit shall be not less than 95% of its claimed rating, and the electrical input in amperes not more than 110% of its claimed rating.

- A. These tolerances are to allow for variations in testing that inevitably occur in any given laboratory facility, variations between laboratories, and variations in components. They are not to be used to rate a given model at values better than the expected average value of all units from the assembly line.
- B. The intent of the industry is to assure that the average capacity, amperes and EER for all units produced by each licensee is 100% of the certified rating.
- C. The Laboratory will conduct tests and evaluate test data within the framework of the Standard, License Agreement, and this Guide. It is the responsibility of each participant to rate units in accordance with these documents and applicable government regulations.

4.3 Nameplate Data for Dual-Voltage Models

Both voltages in volts must be shown on the nameplate with associated cooling amperes for each. It is not mandatory that the certified capacity rating appear for each voltage; however, when only one capacity rating is carried on the nameplate of a dual-voltage model, that rating must be the lower of the two certified values. When such model is certified for both cooling and heating capabilities, the lower rating of each must appear on the nameplate.

Licenseses are encouraged to voluntarily carry dual capacity ratings for both cooling and heating, as well as heating amperes, on the nameplate of dual-frequency or voltage units.

4.4 Rating Built-In Models

The capacities, EER and electrical input ratings of built-in models shall be certified to the Program for a given set of grilles, cases, sleeves, etc. If more than one such combination is made available, ratings shall be certified for each combination.

4.5 Room Air Conditioners Designed for Use in Sleeves

- A. Room air conditioners with wrap-around sleeves (as provided by the Licensee certifying the model) encasing the chassis must be tested and rated as stand-alone units.
- B. Room air conditioners with chassis, which needs to be inserted in a wall sleeve, must be certified in a given sleeve (as provided by the Licensee certifying the model). If such room air conditioner chassis is designed for use in two different sleeves, and use in each sleeve would result in a different certified rating, identification of each sleeve and appropriate rating must be submitted to the Program.
- C. In each such case, identification of the appropriate equipment and resultant certified capacity and ampere ratings for each must appear on the unit nameplate and on all advertising literature and any place else certified values appear for each pertinent room air conditioner chassis. The Certification Directory will carry the room air conditioner model number and will appropriately note each certified rating per optional equipment.
- D. This provision applies only to room air conditioners specifically designed for installation with one or more optional wall sleeves as provided by the Licensee certifying the model, and does not apply to possible installation by contractors and placed in building with existing sleeves, or models promoted for use in other manufacturer's sleeves.

4.6 Verification Testing

Regular verification testing will be performed by the Laboratory. Tests are to be performed on randomly selected samples for the Licensee's regular production. In addition, verification tests of any model may be performed if examination of data submitted by the Licensee indicates that a rating may be improperly stated.

- A. The extent of the Laboratory's testing under this Program may vary depending on the number of confirming tests necessary due to findings of non-compliance, and the Program's schedule for testing.
- B. The Laboratory's findings will be given to the Licensee responsible for the model on a standard report form, Form N-5C (cooling) or Form N-5H (heating). These reports are confidential to the Licensee and are not to be used for commercial or advertising purposes. Their issuance does not necessarily imply that the sample has met the requirements for continued listing.
- C. The report will indicate the findings of compliance or non-compliance.

4.7 Number of Models Tested In a Program Year

The number of models on which the Laboratory will conduct verification testing is based on the number of basic models included in the program and also on production volume for each model. At the beginning of each Program Year, the participant must furnish the Laboratory with a list identifying all the new and carryover basic models and the estimated quantities represented by each so that the number of units to be tested during the Program Year can be determined.

- A. During a Licensee's first year of participation in the program, AHAM requires that 50% of the basic models be tested. At least one additional unit is tested of any basic model and its derivatives whose production during a Program Year exceeds 20,000 units.

Example: Assume a new Licensee has 20 Basic Models. As a new participant, there are no carry-over models. AHAM will require verification testing of 50% (or 10) of the basic models during the first year of participation. If the production of any one of these basic models exceeds 20,000, AHAM would test at least one additional unit. For each 20,000 units in production, an additional sample will be tested.

- B. For subsequent years, AHAM requires that 50% of the Licensee's new basic models and 10% or more of the carryover basic models (those certified the previous year) be tested each Program Year to average at least a 25% basic model testing Program. At least one additional unit is tested of any basic model and its derivatives whose production during a Program Year exceeds 20,000 units. For each 20,000 units in production, an additional sample will be tested.

Example: Assume a Licensee has 20 carry over models (from last year) and 8 new models that were introduced in the second year for a total of 28 basic models. As a second year participant, AHAM will test 50% of the new models ($8/2=4$) and 10% of the carry over models ($20/10=2$). This would result in 6 units being tested out of a total of 28. AHAM would then test one (1) additional unit to bring the total samples up to at least 25% of the total ($28/4=7$). If the production of any one of these basic models exceeds 20,000, AHAM would test at least one additional unit.

- C. Also for every two models that fail to meet certified ratings within the allowable tolerance (not necessarily a re-rating), the Laboratory will select and test one additional model. Costs for these additional tests are to be paid by the Licensee. Verification testing is performed throughout the year. However, certified models may be tested at any time if there is reason to believe that there has been a change in a model's performance.

The Laboratory is the sole judge of the accuracy of the certified ratings subject to all provisions of this Guide and of the license agreement.

4.8 Confidentiality

The Laboratory will hold the results of all the testing in strict confidence, except for:

- A. Communication with the Licensee with regard to the test results and findings on Licensee's own unit(s);
- B. Communication with a challenging Licensee with regard as outlined under Challenge Procedure, Section 5.17 of this Guide;
- C. Communication with AHAM with regard to test results and findings which AHAM deems necessary for the proper operation of the Program.

4.9 Test Conditions

Testing at the Laboratory will be conducted in accordance with the methods specified in the latest edition of ASHRAE Standard 16 (latest edition) for cooling and Standard 58 (latest edition) for heating, published by ASHRAE, in conjunction with ANSI/AHAM Standard RAC-1 (latest edition).

Certified ratings must be within the allowable tolerance as stated in Section 4.2 of this Guide. Changes in testing procedures and methods will be periodically reviewed to determine the feasibility of their application to the Certification Program.

4.10 Acquisition and Shipping of Test Samples

The Laboratory randomly selects units either from manufacturer's and distributors' stocks or from the open market. Units selected for the certification program shall be provided by the participants on a consignment basis if at all possible and shipped to the Laboratory on a PREPAID freight basis.

Samples may be purchased by the Laboratory on the open market where stock is not available from manufacturers or resellers facilities, or at the request of the Licensee. However, costs for open market purchase must be paid for by the Licensee.

If a second or subsequent unit must be tested, the Licensee will assume all costs incident to the selection, testing and handling of such units.

The Laboratory will invoice Licensee directly in accordance with the current fee schedule in the Service Contract between the Laboratory and AHAM.

When selection of a second or subsequent sample cannot be accomplished as part of the Laboratory's normal national selection program, the Licensee will be invoiced per diem plus travel expenses.

4.11 Disposal of Test Samples

As provided in the license agreement, the Laboratory must be notified by the Licensee of the method selected for disposal of tested room air conditioners. All tested units will be returned to the Licensee unless an optional method is requested by Licensee which the Laboratory is able to honor. If the Licensee has special instruction for disposal of their unit, they must notify the Laboratory in writing within 30 business days following receipt of the test report. All costs associated with the optional method of disposal shall be borne by the Licensee.

- A. The Licensee may give standing instructions to the Laboratory to return all units to his address (or other designated point) until further notice. In this case, no separate notice is required. The units tested will then automatically be forwarded as instructed.
- B. Material Return Orders for the return of goods should be made out to the Association of Home Appliance Manufacturers, Room Air Conditioner Certification Program, and should be mailed to the Laboratory. Units supplied to the Program on a consignment basis remain the property of the supplier. No purchase order for return is required.
- C. All units shipped from the Laboratory will be forwarded on a freight-charge COLLECT basis. Participants are asked to advise the Laboratory of the base routing the return of goods and to supply "Return-Goods" tags, if required.

5.0 VERIFICATION TESTING RESULTS AND FOLLOW-UP ACTIONS

5.1 Finding of Compliance

When the results of verification tests indicate that the certified Btu/hr capacity rating(s), EER(s) and electrical input in amperes are within the allowable tolerance as specified in this Guide, verification is automatically established for the model tested and any derivatives thereof. The certified rating(s) for capacity, EER and amperes are continued in the Certification Directory and a copy of the test report is forwarded to the participant.

5.2 Enhanced Test Conditions

When the results of verification tests indicate that the certified ratings are marginally non-compliant, the participant has the option of having the testing repeated under enhanced environmental conditions [80.5°F dry bulb, 67.3° F wet bulb indoor; 94.5° F dry bulb, 74.7°F wet bulb outdoor]. If, under these enhanced environmental conditions, the verification tests indicate that the ratings are within allowable tolerances as specified in this Guide, then verification is established for the model tested and any derivatives thereof. The certified rating(s) for capacity, EER and amperes are continued in the Certification Directory and a copy of the additional test report is forwarded to the participant. All costs associated with testing under enhanced conditions must be paid for by the participant. To select this option, it is necessary for the participant to provide the Laboratory with written authorization to proceed with testing under enhanced environmental conditions.

5.3 Testing of Combination Heating/Cooling Units

First samples of combination cooling/heating units shall be tested for both cooling and heating model operation. If the first sample only failed one or more of the cooling mode parameters (i.e., cooling capacity, amps, or EER), then the heating mode tests are not required to be performed on the second sample.

5.4 Finding of Non-Compliance – General

If the results of the first sample verification test are not within the allowable test tolerance (even under Enhanced Conditions per Section 5.2), the Licensee is immediately notified by the Laboratory of the failure. The Licensee has three options:

- (1) Request that a second sample be tested (See Sections below)
- (2) Re-rate on the basis of the single sample test (Section 5.12)
- (3) Withdraw its product from the market. (Section 5.8)

If the capacity test results of a unit are 80% or less, the unit is to be considered defective and another sample of the model is to be selected for test. This sample is then tested for all certified ratings. If the claimed ratings are achieved, the model is verified.

5.5 Second Sample Testing Following Non-Compliance

If so requested, a second unit of the same model or a derivative is selected and tested at the Licensee's expense by the Laboratory.

If the results of test of the second unit are within the allowable tolerance of the certification program, the model and any derivatives are considered verified and the rating may be continued at their present values. If the unit fails a different rating from the first unit, a third unit must be selected. If the results of the test of the second unit are not within the allowable tolerance of the certification program [for the same ratings that failed during the first unit testing], refer to Section 5.7 of this Guide.

5.6 Second (or Additional) Sample Not Available

If no unit is available (from manufacturer's and distributors' stocks or from the open market) for second or subsequent test within 30 business days of the previous test, re-rating or withdrawal of the product from the market is required. In the case of withdrawal because a second (or additional) sample is not available, the unit will be listed in the Directory under the section "Models Withdrawn from the Program" with its last published rating.

5.7 Second Sample Non-Compliance

If the second sample test results are less than the tolerance allows for any of the certified ratings, the Licensee has three options: (1) Re-rate in accordance with the Laboratory's results, (2) Withdraw the product (refer to Section 5.8 of this Guide), or (3) authorize the Laboratory to conduct tests on two additional units per Appendix B, which is in accordance with the Department of Energy's (DOE) 10 CFR, Part 430, Subpart F, Appendix B.

5.8 Withdrawing Model Due to Non-Compliance

If the Licensee elects to withdraw a model following failure of one or more certified ratings, the model will be removed from its current listed section in the directory and placed in the directory under a section titled "Models Withdrawn from Certification Program". The withdrawn models will show both the previous rating(s) and the revised rating(s). Withdrawn models for which no additional sample was available for testing (refer to Section 5.6 of this Guide) will be listed with previous ratings only.

If testing results in a re-rating of EER, the model must be withdrawn from the Certification Program if the value is less than the applicable U.S. Department of Energy (DOE) federal minimum.

5.9 Cost of Testing

The Program assumes all costs incident to the selection and testing of one unit, unless the samples are purchased on the open market (refer to Section 4.10). If the results of the first unit tested indicate that any of its certified ratings are not within the allowable tolerance, the licensee responsible for certification of the model will assume all costs incurred in the obtaining, testing and handling of any subsequent units.

5.10 Review of Quality Control Records

When two units differ by approximately 10% in capacity tests and the test results are above 80% of the certified ratings, the licensee's quality control records are subject to being reviewed by the Laboratory and, on the basis of quality control, the Laboratory shall decide whether one unit was a random defect. If a random defect is determined, a third sample will be selected and tested.

5.11 Examples for Permitting Retests or Additional Sample Selections

Following is a list of examples for permitting retests or selection of additional samples for Program testing:

- A. Allowable Retest Defects Generally Not Requiring Confirming Quality Control Support Data
 - Insulation torn loose
 - Damaged grilles, damper doors, wrappers, drip trays of minor nature easily repairable or readily replaceable
 - Lead wires loose or not attached to terminals
 - Set screw on fan blade or blower wheel not tightened to motor shaft

- B. Allowable Retest Defects Requiring Confirming Quality-Control Support Data
 - Seals missing, damaged, or different from those described in owner's manual
 - Excessive chassis air leakage
 - Inadequately degreased coils
 - Lead wires connected to wrong terminals
 - Relocation or adjustment of:
 - a) Damper door settings
 - b) Fan blades or blower wheels
 - c) Air-discharge baffles (not louvers)
 - d) Fan motor to mount

- C. Defects Allowing Classification of Samples as an Operationally Defective Unit
- Crimped refrigerant tubes
 - Loss of refrigerant
 - Case and/or chassis misalignment resulting from shipping damage
 - Broken fan blades, blower wheel
 - Fan motor misaligned due to shipping damage
 - Coil surface deformed beyond routine repair
 - Wrong model number and/or nameplate
 - Broken or cracked (major damage) drip trays, shrouds, air ducts, etc.
 - Defective fan motor
 - Defective compressor
- D. Allowable Additional Sample Test

When measured capacity of two samples tested differs by 10% or more

The Laboratory may require confirmation that any of the defects (reason) listed above are not epidemic in production.

5.12 Notification of Revised Ratings

If re-rating of a model is required, Form N-6, Notice of Non-Compliance, is sent from the Laboratory by certified mail to the Licensee responsible for the model. This notice clearly states the next steps to be taken by the Licensee:

- A. Shall within 21 business days of receiving written notice from the Laboratory that a capacity, EER or ampere rating has been misstated; revise the stated claim(s) in accordance with the Laboratory's determination for the basic model group. The revised claim must not be greater than the capacity and/or EER rating(s) or less than the ampere rating(s) determined by the Laboratory.
- B. Shall, at their expense, within these 21 business days, give written notice of the revised claim(s) for each model within the basic model group (whether or not all are currently in production) to all distributors or others in the first line of distribution, including private brand owners. In

addition, every reasonable effort shall be made to assure that the dealers and brand owner are notified.

- C. Shall revise all literature (for example, specification sheets, full line folder, ad mats, plus any other sales promotion and/or advertising materials which could be used with potential customers) at its next printing.
- D. Shall furnish to AHAM and the Laboratory copies of the following:
 - (1) notice to the first line of distribution with 21 business days;
 - (2) evidence of reasonable action to notify dealers and brand owner within 21 business days;
 - (3) revised literature as soon as printed.
- D. Failure to take action within the time period allowed will result in expulsion from the Program.
- F. When the Licensee, within the allowable time period, takes the required action, AHAM will, upon receipt of the notice to distributors, concurrently advise other Licensees of their re-rate action.
- G. If the Licensee fails to take action by the time the Laboratory notifies AHAM that the allowable time period for notice to sales outlets has expired, AHAM will notify the Licensee that he is in default under the Licensee Agreement, and request that the notices be sent immediately. Concurrently with this notification, all other Licensees will be advised of the re-rate action by letter.
- H. Immediately after receiving the notification from AHAM, the Licensee must follow the steps outlined under Notification of Revised Ratings, Section 5.12 of this Guide. If this is not done, AHAM will take appropriate steps to exclude the Licensee from the Program.

5.13 Exclusion from the Program

A Licensee who is excluded from this Program shall not, upon receipt of notice from AHAM of their exclusion, affix the certification seal to any room air conditioner thereafter manufactured by or for their company and shall make no further reference to AHAM's certification seal or Certification Program. In addition, the excluded Licensee shall immediately return to AHAM all certification seals not then affixed to room air conditioners. Money paid to AHAM for quarterly production of certified units is not refundable.

Revised ratings will be identified in a suitable manner in the next edition of the Certification Directory, and in each remaining edition for the current calendar year. Should re-rate action occur after the closing date for the Directory, notice of the re-rate will appear only in the subsequent edition of the Directory. Notice of removal of a participant from the Program will be noted in the next edition of the Certification Directory.

5.14 Extending Period for Re-rating

If the Laboratory is unable to complete the testing of an additional unit due to extenuating circumstances, the period allowed for re-rating action may be extended. Such extension becomes valid only when the participant is notified in writing by the Laboratory (with copy to AHAM).

5.15 Market Surveillance

Licenses observing or receiving reports of re-rated models on display or advertised at other than the re-rated value are urged to report the fact, with identifying details, to AHAM. AHAM will bring the facts to the attention of the Licensee for the brand involved without identifying the source of the complaint, and request a report of corrective action taken. Within 21 business days, the Licensee responsible for the brand must take corrective action and furnish a report evidencing such action to AHAM.

5.16 Basic Model Brand Name Re-ratings

The Program requires that a basic model and all models derived from the basic model shall be re-rated if any one derivative of that basic model group is re-rated. This includes all brands of that basic model whether manufactured by the Licensee or for them by another manufacturer.

5.17 Challenge Procedure

A Licensee may challenge the certified ratings of another participant's model. A challenger must complete Form N-9 and submit it to the Laboratory. For the challenge to take place, the Licensee must include an explanation of why the challenge should be granted, and authorize the Laboratory to proceed at the challenging Licensee's expense for the initial Laboratory test. Upon receipt of this information, the Laboratory shall notify AHAM. AHAM will notify the challenged Licensee, in writing (with copy to the Laboratory) of the challenge instituted. The Laboratory will then acquire a sample of the challenged model and perform verification testing. AHAM and the Laboratory shall keep the identity of the challenger under this challenge procedure in strict confidence.

This challenge procedure may also be initiated by AHAM, at its discretion, should a model's rating(s) be in doubt. If the challenge initiated by AHAM is not substantiated, the challenge procedure will be funded by the Program. If it is substantiated, the challenged Licensee must pay for all costs incidental to the test(s).

- A. If the challenge is not upheld, the challenging Licensee must pay the Laboratory for all costs incidental to the test. The test unit will be shipped, freight collect, to the challenger.
- B. If the challenge is upheld, the challenged model must be re-rated. (See Notification of Revised Ratings, Section 5.12 of this Guide.) All costs incidental to a single Laboratory test, which upholds a challenge, are paid by AHAM from Program funds.

5.18 Voluntary Changes in Rating

Licensees are encouraged to make adjustments to the certified ratings when such is indicated by reason of quality control data reviewed. This may be done at any time except when the challenge procedure or mandatory re-rate procedure is in effect against that model's rating.

A Licensee must notify the Laboratory and AHAM when a voluntary change in certified rating is made and provide the Laboratory with the revised rating for the model on a revised N-1 Model Data for Directory Form. If the rating is to be greater than previously certified, the Laboratory must first select and test a sample of the model to support the increased rating. This additional test is not necessary if all previous Laboratory verification test results on the model support the increased rating. The Licensee will be responsible for all fees associated with the testing. In the event the Laboratory's test is unable to verify a Licensee's increased voluntary change in rating, the original certified rating will remain in force.

Changes in certified ratings under the foregoing conditions, which are not the result of changes in component parts of a previously certified model, do not require a change of model designation. However if, for example, a change in compressor modifies any of the previously certified data, the model number must be changed. This can be accomplished by the addition of a letter or number or by other means acceptable to the Licensee and the Licensee and the Program.

6.0 RULES FOR USE OF THE SEAL, ADVERTISING AND PROMOTIONAL REFERENCES

6.1 Rules for Use of the Seal and Advertising

Licensees may not use the certification seal or the terms "certified" or "AHAM verified" in connection with advertising to the public in referring to products that have not been certified or from which certification has been withdrawn. However, Licensees are encouraged to the proper usage and promotion of the Certification Program and the certification seal in specifications, literature and advertising.

6.2 Definition of the Seal

The AHAM Room Air Conditioner Certification Seal is the mark issued by AHAM to all manufacturers and private brand resellers or room air conditioners that are Licensees in the AHAM Room Air Conditioner Certification Program. Under this Program, manufacturers certify and AHAM verifies that:

The capacity ratings, Energy Efficiency Ratio (EER), and electrical input in amperes of all room air conditioners bearing this mark are determined and accurately stated in accordance with ANSI/AHAM Standard RAC-1 (latest edition).

6.3 Use of the Seal

Licensees are provided with a Graphics Standard CD containing the seal and the reproduction requirements. Licensees must then reproduce the certification seal for inclusion on the actual certified units or on the hangtags attached to the units. The following requirements must be followed:

- A. Size of seal should be such that all lettering is legible.
- B. In word content, it must be identical to the AHAM SEAL included in the Graphics Standard CD.
- C. It is preferred that the seal color be the same as that of the AHAM seal; if not, it should be black and white or, if reproduced on the nameplate, it should be in clearly distinguishable shades of the nameplate background color.
- D. The seal shall be affixed to the room air conditioner in a permanent manner and shall be placed where it is visible without having to move the room air conditioner. As an exception to placing the seal directly on the units, the seal may be reproduced on a hangtag attached to the room air conditioner unit. In this case, the hangtag paper stock must have a basic weight of not less than 110 pounds per 500 sheets (25 1/2 inches x 30 1/2 inches index) and the material attaching the hangtag to the unit must be of sufficient strength to ensure that if gradual pressure is applied to the

hangtag by pulling it away from where it is attached to unit, the hangtag will tear before the material used to affix the hangtag to the unit breaks.

6.4 Statement to Accompany Seal Reproduction

Reproductions of the seal may be used in advertising or promotional literature. However, there may be no alteration in seal design and all copy should be legible in reproductions. It is preferred that the color is the same as the AHAM seal provided in the Graphics Standard CD; if not, it should be black and white. When so used, the following statement, or similar to it, may appear in close proximity to it:

When AHAM Certified this seal is affixed to a room air conditioner and the Btu/hr capacity, EER and amperes ratings for that room air conditioner appear in the AHAM Certification Directory, it signifies that these ratings are certified accurate by the manufacturer and verified by the Association of Home Appliance Manufacturers in accordance with ANSI/AHAM Standard RAC-1 (latest edition).

6.5 Mixing Certified and Non-certified Models

Room air conditioner models that are not under certification may not be listed, indicated or described in literature, advertisements, or point-of-purchase material in which AHAM certified models also are listed or described because such listing could be misleading.

6.6 Defining What Is Being Certified

Only the Btu/hr capacities, EER in Btu/watt hr, and electrical input in amperes are certified. No implication should ever be made that the seal covers any other feature or performance factor.

- A. Literature which refers to models available with ducting should carry a statement such as:

"Certified Btu/hr capacities as stated are without duct."

- B. Advertising literature which refers to room air conditioners with heating capabilities may, in addition to the certified heating capacity and amperes, show ratings at other than standard rating conditions, provided that the certified ratings are clearly identified and that no implication is made that ratings at other than standard rating conditions are certified.

6.7 Reference to the Laboratory

Any reference to the Laboratory under contract to AHAM must clearly indicate that its function in the Program is limited to verification and technical administration.

6.8 Submission of Specification Sheets and Promotional Material

Two copies of specification sheets for models subject to the Program and two copies of promotional literature which refer to, illustrate, or describe certified models, should be forwarded to AHAM upon request by participants in the AHAM Room Air Conditioner Certification Program. AHAM shall review these to assure that references to the AHAM seal and Program provisions are in accordance with these recommendations.

6.9 Examples of Improper Use or Statements Which Might Cause Confusion as to the Scope of AHAM Verification

Following are examples of practices which must be avoided.

A. Use of an incomplete or poorly reproduced version of the Certification Seal. (All printed information on the seal must be clear and legible.)

B. Statements that might cause confusion as to the scope of AHAM verification. For example

(i) Accurate use of the AHAM seal and statement as to scope, except that the statement is immediately followed by: "You know that you are getting all the capacity you are paying for." (AHAM makes no verification as to the sales value of any particular model.)

(ii) Use of the following:

"AHAM rated capacities. The Association of Home Appliance Manufactures' seal is found on all (brand name) room air conditioners and signifies that all performance data stated are verified as accurate." (All performance data are not verified.)

"Every. room air conditioner rating is AHAM verified." (Every rating is not verified, such as watts).

"AHAM certified capacity."

(The capacity is certified by the Licensee; it is verified by AHAM.)

6.10 Accurate Representation

The above examples are typical of kinds of statements or usages which can cause confusion or suggest more than is covered by the scope of the Program. These rules and suggestions were established to properly promote the Room Air Conditioner Certification Program and are not intended to otherwise limit or restrict participants' advertising. Every circumstance where the principle of accurate representation applies cannot be anticipated and dealt with here. It is the responsibility of the Licensee not to misrepresent their status in the Program under any circumstances. If there are questions, Licensees should submit intended uses of the seal, draft advertisements and/or any other certification claims to AHAM for advanced review.

6.11 Discontinuing Use of Seal and References to AHAM Certification Program

Upon withdrawal or termination of certification, a Licensee must immediately discontinue use of the certification seal and discontinue publication of documents (including advertisement, websites, etc.,) containing the certification logo or reference to the Licensee's participation in the certification program.

The Licensee must also notify all channels in their first line of distribution of the withdrawal or termination. This notification is required to ensure that the initial customers to whom the Licensee is selling are made aware of the removal of products in the AHAM certification program that they have been purchasing.

APPENDIX A - DEFINITION OF TERMS

AHAM Licensee - An organization that has agreed in writing to the provisions of the Program and has been authorized by the Association of Home Appliance Manufacturers to participate in the Program. The term "AHAM" has been dropped in reference to "Licensee" in this guide.

Basic Model - A model that has been designated as such by the Licensee responsible for it. Each basic model differs from other models either in cooling or heating capacity, EER, amperage, compressor capacity, coil size or air flow. Models similar to the basic model should be designated by the licensee as derivatives; for Program purposes, all derivatives are reported for each basic model to form a model group. Different brand-name models may be in the same basic model group. If any model has the same capacity and EER as a designated basic model and differs only in decorative treatment, it should be considered a derivative of that basic model (i.e., in the same model group.)

Brand Name - The market name by which a product line is known as determined and provided by the Program participant.

Carry Over Model – A model that has been previously listed in the certification directory.

Certified - A statement by the Licensee that the capacity, EER and amperage rating as claimed were determined in accordance with ANSI/AHAM Standard RAC-1 (latest edition) and are within the tolerance limit provided in this Guide.

Directory - A listing of all models supplied by each participating Licensee, which are verified under the Certification Program requirements. This Directory is prepared and published at such times as AHAM believes shall best serve the purposes of the Certification Program. Interim supplements may also be published from time to time, as necessary.

First Line of Distribution - The initial customer(s) to whom the Licensee and/or its branch office is selling its products that are covered by the AHAM Certification Program. The initial customer may be, for example, another manufacturer that is being supplied with the Licensee's products, a private brander, a distributor that will be selling the products to a retailer, or a retailer to whom the Licensee is selling directly.

Manufacturer - The organization that produced the room air conditioner.

Participant - An organization having models listed in AHAM's Directory of Certified Room Air Conditioners. A participant may or may not be an AHAM Licensee. A Non-Licensee participant's room air conditioners are certified and submitted to the Program by another company (either the manufacturer or the brand name owner) who then must be an AHAM Licensee.

Private Brand Reseller - An organization that markets, but does not manufacture its own brand name units.

Program Models - All models whose ratings are required to be certified and submitted to the Program under the terms of the license agreement, this Guide, and letters of instruction from AHAM.

Testing Laboratory (Administrator) - An independent testing laboratory under contract to AHAM to perform verification and challenge tests and collect certified data; hereinafter referred to as "the Laboratory."

Verification Test - A test conducted by the Laboratory with ANSI/AHAM Standard RAC-1 (latest edition) to determine if the cooling and heating capacity in Btu/hr, the Energy Efficiency Ratio (EER) and electrical input in amperes are within the tolerance provided in this Guide

Verified - Confirmation of the licensee's capacity, EER, and amperage ratings by AHAM according to Program procedures.

APPENDIX B – SAMPLING PROCEDURE USED AFTER TWO FAILURES

Sampling After Two Failures

Step 1 The sample size (n_1) must be two additional units combined with the results of the initial two units.

Step 2. Compute the mean (\bar{x}_1) of the measured performance (capacity, EER and amps) of the n_1 units in the sample as follows:

$$\bar{x}_1 = \frac{1}{n_1} \left(\sum_{i=1}^{n_1} x_i \right)$$

(1)

Where x_i is the measured performance values of unit i .

Step 3. Compute the standard deviation (s_1) of the measured performance values of the n_1 units in the sample as follows:

$$s_1 = \sqrt{\frac{\sum_{i=1}^{n_1} (x_i - \bar{x}_1)^2}{n_1 - 1}}$$

(2)

Step 4. Compute the standard error ($s_{\bar{x}_1}$) of the measured performance values of the n_1 units in the sample as follows:

$$s_{\bar{x}_1} = \frac{s_1}{\sqrt{n_1}}$$

(3)

Step 5. Compute the upper control limit (UCL_1) and lower control limit (LCL_1) for the mean of the sample using the manufacturer's certified values as the desired mean and the appropriate probability level as follows:

$$LCL_1 = MCV - t_s \frac{\bar{x}_1}{n_1} \quad (4)$$

$$UCL_1 = MCV + t_s \frac{\bar{x}_1}{n_1} \quad (5)$$

Where t is a statistic based on

- (a) 95 percent two-tailed probability level and a sample of n_1 for capacity and EER;
- (b) 90 percent two-tailed probability level and a sample size of n_1 for amperes; and MCV is the appropriate manufacturer's certified value for the performance value being analyzed.

Step 6a. For capacity and EER measurements compare the appropriate mean of the sample (\bar{x}_1) with the corresponding upper and lower control limits (UCL_1 and LCL_1) to determine one of the following:

- (i) If the mean of the sample is below the lower control limit, then the basic model is in non-compliance and testing is at an end. (Do not go on to any of the steps below.)
- (ii) If the mean of the sample is equal to or greater than the upper control limit, then the basic model is in compliance and testing is at an end. (Do not go on to any of the steps below.)
- (iii) If the sample mean is equal to or greater than the lower control limit but less than the upper control limit, then no determination of compliance or noncompliance can be made and a second sample size is determined by Step 7a.

Step 6b. For the ampere measurement, compare the mean of the sample (\bar{x}_1) with the upper and lower control limits (UCL_1 and LCL_1) to determine one of the following:

- (i) If the mean of the sample is above the upper control limit, then the basic model is in non-compliance and testing is at an end. (Do not go on to any of the steps below.)
- (ii) If the mean of the sample is equal to or less than the lower control limit, then the basic model is in compliance and testing is at an end. (Do not go on to any of the steps below.)

(iii) If the sample mean is equal to or less than the upper control limit but greater than the lower control limit, then no determination of compliance or noncompliance can be made and a second sample size is determined by Step 7b.

Step 7a. For capacity and EER, determine the second sample size (n_2) as follows:

$$n_2 = \left(\frac{t}{.05} \frac{s_1}{MCV} \right)^2 - n_1$$

where s_1 and t have the values used in Steps 4 and 5 respectively. The term "0.05 MVC" is the difference between the applicable manufacturer's certified value and 95 percent of the value. This procedure yields a sufficient combined sample size ($n_1 + n_2$) to give an estimate 97.5 percent probability of obtaining a determination of compliance when the true mean is equal to the applicable certified value.

Given the solution value of n_2 determine one of the following:

(1) If the value of n_2 is less than or equal to zero and if the mean measured value of the first sample (\bar{x}_1) is either equal to or greater than the lower control limit (LCL_1) or equal to or greater than 95 percent of the applicable manufacturer's certified value (MCV), whichever is greater, i.e., if

$$n_2 < 0 \text{ and } \bar{x}_1 > \max(LCL_1, 0.95 \text{ MCV}),$$

the basic model is in compliance and testing is at an end.

(2) If the value of n_2 is less than or equal to zero and the mean measured value of the sample (\bar{x}_1) is less than the lower control limit (LCL_1) or less than 95 percent of the applicable manufacturer's certified value (MCV), whichever is greater, i.e., if

$$n_2 < 0 \text{ and } \bar{x}_1 < \max(LCL_1, 0.95 \text{ MCV}),$$

the basic model is in non-compliance and testing is at an end.

(3) If the value of n_2 is greater than zero, then the value of the second sample size is determined to be the smallest integer equal to or greater than the solution value of n_2 for equation (8a). If the value of n_2 so calculated is greater than $20 n_1$, set n_2 equal to $20 n_1$.

Step 7b. For amperes, determine the second sample size (n_2) as follows:

$$n_2 = \left(\frac{t}{.10} \frac{s_1}{MCV} \right)^2 - n_1$$

Where s_1 and t have used in Steps 4 and 5, respectively. The term "0.10 MCV" is the difference between the applicable manufacturer's certified value and 110 percent of that value. This procedure yields a sufficient combined sample size ($n_1 + n_2$) to give an estimated 97.5 percent probability of obtaining a determination of compliance when the true mean is equal to the applicable certified value.

Given the solution value of n_2 , determine one of the following:

(1) If the value of n_2 is less than or equal to zero and if the mean measured amperes of the first sample (\bar{x}_1) is either equal to or less than the upper control limit (UCL_1) or equal to or less than 110 percent of the manufacturer's certified value (MCV), whichever is less, i.e., if

$$n_2 < 0 \text{ and } \bar{x}_1 < \min(UCL_1, 1.10 \text{ MCV}),$$

the basic model is in compliance and testing is at an end.

(2) If the value of n_2 is less than or equal to zero and the mean measured value of the first sample (\bar{x}_1) is greater than the upper control limit (UCL_1) or more than 110 percent of the manufacturer's certified value (MCV), whichever is less, i.e., if

$$n_2 < 0 \text{ and } \bar{x}_1 > \min(LCL_1, 1.05 \text{ MCV}),$$

the basic model is in non-compliance and testing is at an end.

(3) If the value of n_2 is greater than zero, then the value of the second sample size is determined to be the smallest integer equal to or greater than the solution value of n_2 for equation (6b). If the value of n_2 so calculated is greater than $20 - n_1$, set n_2 equal to $20 - n_1$.

Step 8. Compute the combined mean (\bar{x}_2) of appropriate measured value of the n_1 and n_2 of the combined first and second samples as follows:

$$\bar{x}_2 = \frac{1}{n_1 + n_2} \sum_{i=1}^{n_1 + n_2} x_i$$

(7)

Step 9. Computer the standard error ($s_{\bar{x}_2}$) of the appropriate measured value of the n_1 and n_2 units in the combined first and second samples as follows:

$$S_{\bar{x}_2} = \frac{s_1}{\sqrt{n_1 + n_2}}$$

(8)

Note. s_1 is the value obtained in Step 3.

Step 10. For an Energy Efficiency Standard, compute the lower control limit (LCL_1) for the mean of the combined first and second sample using the manufacturer's certified values as the desired mean and the appropriate one-tailed probability level as follows:

$$LCL_2 = MCV - t s_{\bar{x}_2}$$

(9a)

$$UCL_2 = MCV + t s_{\bar{x}_2}$$

(9b)

where t has the value obtained in Step 5 above.

Step 11a. For capacity and EER, compare the combined sample mean (\bar{x}_2) to the lower control limit (LCL_2) to find one of the following:

- (i) If the mean of the combined sample (\bar{x}_2) is less than the lower control limit (LCL_2) or 95 percent of the applicable manufacturer's certified value (MCV), whichever is greater, i.e., if

$$\bar{x}_2 < \text{MAX}(LCL_2, .95 MCV),$$

the basic model is in non-compliance and testing is at an end.

(ii) If the mean of the combined sample (\bar{x}_2) is equal to or greater than the lower control limit (LCL_2) or 95 percent of the applicable manufacturer's certified value (MCV), whichever is greater, i.e., if

$$\bar{x}_2 \geq \text{max} (LCL_2, .095 MCV),$$

the basic model is in compliance and testing is at an end.

Step 11b. For the ampere measurement, compare the combined sample mean (\bar{x}_2) to the upper control limit (UCL_2) to find one of the following:

(i) If the mean of the combined sample (\bar{x}_2) is greater than the upper control limit (UCL_2) or 110 percent of the manufacturer's certified value (MCV), whichever is less, i.e. if

$$\bar{x}_2 > \text{min} (UCL_2, 1.10 MCV),$$

the basic model is in non-compliance and testing is at an end.

(ii) If the mean of the combined sample (\bar{x}_2) is equal to or less than the upper control limit (UCL_2) or 100 percent of the manufacturer's certified value (MCV), whichever is less, i.e., if

$$\bar{x}_2 \leq \text{min} (UCL_2, 1.10 MCV),$$

the basic model is in compliance and testing is at an end.

Manufacturer-Option Testing

If determination of non-compliance is made in Steps 6, 7 or 11, above, the manufacturer may request that additional testing be conducted, in accordance with the following procedures.

Step A. The manufacturer request that an additional number, n_3 , of units be tested, with n_3 chosen such that $n_1+n_2+n_3$ does not exceed 20.

Step B. Compute the mean of the measured values, standard error, and lower or upper control limit of the new combined sample in accordance with the procedures prescribed in Steps, 8, 9, and 10 above.

Step C. Compare the mean performance of the new combined sample to the revised lower or upper control limit to determine one of the following:

a.1. For capacity and EER, if the new combined sample mean is equal to or greater than the lower control limit or 95 percent of the applicable manufacturer certified value, whichever is greater, the basic model is in compliance and testing is at an end.

a.2. For amperes, if the new combined sample mean is equal to or less than the upper control limit or 110 percent of the applicable manufacturer certified value, whichever is greater, the basic model is in compliance and testing is at an end.

b.1. For capacity and EER, if the new combined sample mean is less than the lower control limit or 95 percent of the applicable manufacturer certified value, whichever is greater, and the value of $n_1+n_2+n_3$ is less than 20, the manufacturer may request that additional units be tested. The total of all units tested may not exceed 20. Steps A, B, and C are then repeated.

b.2. For amperes, if the new combined sample mean is greater than the upper control limit or 110 percent of the manufacturer certified value, whichever is less, and the value of $n_1+n_2+n_3$ is less than 20, the manufacturer may request that additional units be tested. The total of all units tested may not exceed 20. Steps A, B, and C are then repeated.

c. Otherwise, the basic model is determined to be in non-compliance.

Subject to the provisions of this section, two units of a basic model normally must be tested before a determination can be made that a certified rating for all models within that model group has been misstated by the licensee.

The Program assumes all costs incident to the selection and testing of one unit. If the results of the first unit tested indicate that any of its certified ratings are not within the allowable tolerance, the licensee responsible for certification of the model will assume all costs incurred in the obtaining, testing and handling of a second (subsequent) unit.

When two units differ by approximately 10% in capacity tests, the licensee's quality control records are to be reviewed by the Laboratory and, on the basis of quality control, the Laboratory shall decide whether one unit was a random defect. If a random defect is determined, a third sample will be selected and tested.