



Energy Star Manufactured Homes: CERTIFIER Requirements and Procedures

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Introduction

Under a policy effective November 1, 2005, the U.S. Environmental Protection Agency (EPA) has made plant certification, third-party plant Certifier oversight and field performance verification for manufactured homes the responsibility of a National Quality Assurance Provider (QAP). EPA has designated the Manufactured Housing Research Alliance (MHRA) as a QAP.

This document is intended for Manufactured Housing ENERGY STAR Certifiers (Certifier). It is a companion document to *ENERGY STAR Qualified Manufactured Homes: Design, Manufacturing, Installation and Certification Procedures - THIRD EDITION*¹ (the *Guidelines*) and should be read in conjunction with that publication. The Guidelines contain additional requirements for Certifiers.

This document provides information on:

- The responsibilities, capabilities and qualifications required of the Certifier.
- The Certifier's role during the plant qualification process.
- Approved computer analysis methods for developing special ENERGY STAR packages.
- The Certifier's role in helping a plant maintain ENERGY STAR partner status.
- Procedures for field testing of representative homes.
- Other Certifier resources.

The requirements and procedures contained in this document are subject to revision to reflect experience with monitoring the ENERGY STAR program. The Certifier is responsible for staying up-to-date on program requirements and how they impact their responsibilities under the program. A current version of this document is available on the MHRA website: www.mhrahome.org/certifiers.

Where the term *Certifier* is used in this document, it includes the Certifier primary contact and the Certifier's employees or subcontractors engaged as the Certifier's representatives in the conduct of ENERGY STAR manufactured home plant certification activities.

The Manufactured Housing ENERGY STAR Certifier

In qualifying to produce ENERGY STAR qualified manufactured homes (HUD-code), plants are required to retain an independent, third-party energy expert, referred to as the Manufactured Housing ENERGY STAR Certifier. Each plant must have a Certifier of record at all times. Plants may change Certifiers, but must notify MHRA in writing upon doing so with the name of the new Certifier.

The Certifier's Role at a Glance

- Oversee the plant ENERGY STAR qualification process.
- Train plant production staff in ENERGY STAR techniques.
- Review and if acceptable, approve plant processes and the plant's ENERGY STAR-related documentation including ENERGY STAR qualified home designs, ENERGY STAR Site Installation Checklist, Quality Control Manual and the Manufacturer's Installation Manual.
- After initial plant certification, conduct ongoing quality control inspection and testing of a representative sample of completed homes.
- Participate in and contribute to periodic meetings of Certifiers conducted by MHRA regarding program quality control and oversight.

¹ This document and all documents referenced herein are available on the MHRA website at www.mhrahome.org.

Certifier Responsibilities

1. Each certifying organization (Certifier) shall have one person responsible for the program who is the primary contact for MHRA. The primary contact person shall:
 - Attend MHRA training sessions as required.
 - Serve as the primary point of contact for the organization.
 - Attend MHRA briefings held approximately three times per year. Attendance may be in person or via conference call.
 - Have responsibility for the performance of their organization's field representatives and for ensuring that their field representatives are properly trained and qualified in accordance with MHRA requirements.
2. The Certifier will ensure that its representatives are properly outfitted with well-maintained and calibrated equipment (for duct and shell leakage testing).
3. The Certifier shall serve as the primary contact and resource of first resort for their plants with regard to issues and questions about the program.

Certifier Capabilities and Qualifications

Each Manufactured Housing ENERGY STAR Certifier must be accredited by an EPA-approved Quality Assurance Provider (MHRA) to possess competency in the following areas:

- Manufactured housing design, construction, and installation methods.
- Building science and diagnostics (e.g., is certified as a Home Energy Rating System (HERS) rater or is licensed as an engineer or architect).
- Duct leakage and building shell leakage testing—specifically, duct and blower door tests.
- Document preparation and record keeping.

Certifiers must have on file with MHRA an approved **Certifier Capabilities and Qualifications Affidavit: Application to Become an MHRA-Approved ENERGY STAR Manufactured Home Plant Certifier**. This affidavit verifies that the Certifier possesses the necessary skills to perform the certification functions. A copy of this document is included in Appendix A. It should be completed, signed and submitted to MHRA. If accepted, MHRA will countersign the application and return it to the Certifier. The Certifier shall provide a fully executed copy of this form to each of the plants.

MHRA may at any time and with cause revoke the approval of a Certifier. The Certifier and the plants for which they are listed as Certifier of Record will be notified in writing that the Certifier is no longer eligible to provide ENERGY STAR services.

Certifier Responsibilities: Plant Qualification Process

This section describes the role of the Certifier during the plant qualification process. (Also refer to the *Guidelines* for more information about the plant certification process.)

The Certifier provides quality oversight services in the following areas:

Initial In-Plant Review

- Verify that all proposed ENERGY STAR qualified home designs comply with ENERGY STAR requirements.
- Verify that the methods used to create and document any proposed custom ENERGY STAR qualified home designs comply with ENERGY STAR requirements.

- Verify that the Site Installation Checklist satisfactorily covers all installation-dependent construction elements of the home in keeping with ENERGY STAR requirements.
- With regard to the ENERGY STAR guidelines, verify the accuracy and completeness of any custom third-party-approved design packages.
- With regard to the ENERGY STAR guidelines, verify the accuracy and completeness of the Quality Control Manual.
- Verify that the three duct leakage tests in the plant—measuring total air leakage—meet the ENERGY STAR requirements for the ENERGY STAR package(s) selected. To convert *total leakage* to *leakage to the outside*, Certifiers may assume that 50% of the leakage from a completed home goes to the outside or they may wish to test finished homes in advance to develop a ratio for the plant. Certifiers and plants should recognize that if this ratio differs for the plant’s completed ENERGY STAR field test homes, additional duct sealing measures may be required. If the estimated leakage levels derived from the in-plant duct tests do not meet design specifications, verify that modifications have been made and that the homes’ duct system(s) have been retested and comply with the above requirements.

Field Review

- Inspect the installation of the three qualification homes and certify that the items on the Site Installation Checklist have been completed successfully. The qualification homes may be set up at the plant. If they are to become ENERGY STAR qualified homes at their final location, then a new site installation checklist must be completed at the time of final installation.
- Verify that the duct pressurization tests on the qualification homes—measuring air leakage to the outside—comply with ENERGY STAR requirements. If levels do not meet design specifications, verify that modifications have been made, that the homes have been retested, and that they comply.
- Verify the shell leakage tests on the qualification homes. If levels do not meet design specifications, verify that modifications have been made, that the homes have been retested, and that they comply.

Final In-Plant Review

- Verify that any design changes identified through testing and visual inspection in the field are incorporated into the plant’s third-party-approved design packages, the Quality Control Manual, and the Site Installation Checklist.
- Verify that the plant’s proposed process for collecting, tracking, and archiving documentation is consistent with the goals of the ENERGY STAR program.
- Submit the Plant Qualification Form (Appendix B) to the Quality Assurance Provider as documentation that the plant has been certified to produce ENERGY STAR qualified homes.

Certifier Responsibilities: Developing Custom ENERGY STAR Packages

An ENERGY STAR package is a unique combination of building elements, including building thermal envelope, specific duct and building shell leakage levels, space heating and cooling equipment type and efficiency, and hot water heater efficiency. These elements taken together assure that the home meets the ENERGY STAR requirements for home energy performance.

The *Guidelines* contain several pre-approved packages for each of the four ENERGY STAR climate regions. Certifiers have the authority to approve additional customized ENERGY STAR packages for plants so long as the packages are developed using MHRA-approved software. A list of approved software is available via the MHRA website.

The Certifier must review and approve all calculations and/or computer simulations used to identify a home as ENERGY STAR that are associated with each custom package submitted by the plant. The certifier and plant must keep on file a copy of the calculations and associated written approval(s).

Custom packages may be deemed acceptable if an energy consumption analysis shows that the estimated annual energy use of the proposed custom package is equal to or less than that of a current EPA-approved manufactured housing ENERGY STAR package for an otherwise identical home in the same location under identical conditions.

In general, custom packages may be used if the plant knows the future permanent location of the home. In the event that the orientation and/or site features (shading) are not known, then worst case orientation and shading is to be assumed.

Certifier Responsibilities: Helping the Plant Maintain ENERGY STAR Qualified Home Partner Status

After a plant has been qualified and has begun producing ENERGY STAR qualified homes, the Certifier has an additional ongoing responsibility in assuring the plant is meeting ENERGY STAR requirements: spot checking performance by certifying the testing of randomly selected homes in the field.

To verify ongoing conformance with the program requirements, the Certifier is responsible for the following:

1. Determine when testing is required and the number of homes to test

In order to catch potential problems in the field at the earliest possible opportunity, the following testing schedule shall be applied:

- **Initial testing:** At least one home shall be tested within 90 days of the signature date on the Site Installation Checklist for a plant's first ENERGY STAR qualified home (not including homes tested as part of the plant's qualification process).
- **Minimum number tested:** At least 2% of all ENERGY STAR qualified homes completed by a plant per calendar year or a minimum of one home, whichever is greater, shall be tested. A home is *completed* when it has been installed at its permanent location and the Site Installation Checklist has been completed, signed, and returned to the plant.
- **Testing schedule:** In each calendar year, the first field test must be completed within 90 days following the completion (checklist signature date) of the 5th home and every 50th additional completed home thereafter.

2. Select a representative sample of homes for testing

The Certifier monitors the plant's production of ENERGY STAR qualified homes by using MHRA web-based software, *MHRA ENERGY STAR Information Manager*. Using *Information Manager*, the Certifier will be able to monitor a plant's ENERGY STAR production levels and establish a testing schedule as follows:

- The plant is responsible for maintaining information about ENERGY STAR homes in their *Information Manager* account. The Certifier is responsible for monitoring the data and initiating the process of field testing. It is the responsibility of the Certifier to notify the plant when it is time to conduct the quality control testing.
- The Certifier shall make every effort to select homes representative of the type of ENERGY STAR qualified homes the plant has built (e.g., if the plant has labeled primarily double-section homes most of homes tested should also be double section). Homes selected for testing should represent as wide a cross-section as possible of the following:
 - * Housing types (single and multi-section homes)
 - * Duct system types—overhead, under floor, in-line, perimeter

- * Production dates
 - * Retailers
 - * Installers; heating, ventilating, and air conditioning (HVAC) contractors; and trim-out crews
 - * Geographical regions
 - * ENERGY STAR climate regions
 - * ENERGY STAR package numbers
- If, in the opinion of the Certifier, a home has been modified by its owner following installation such that it no longer complies with ENERGY STAR requirements, then that home shall not be used as one of the quality control test homes and another home shall be selected.
 - The Certifier, plant or retailer may make arrangements with the homeowner to conduct the testing. Contact information for the homeowner and retailer should be available through **Information Manager**.

3. Inspect and test homes in the field

Once on site, the Certifier completes the **Quality Control Inspection Worksheet for ENERGY STAR Qualified Manufactured Homes** (see Appendix C) (the **Worksheet**).

The field inspection process includes the following steps:

- Confirm that the home contains both the **EPA ENERGY STAR label** and the **MHRA Quality Assured label**.
- Visually inspect the home for compliance with ENERGY STAR requirements such as thermostat type and equipment efficiencies.
- Verify compliance with the **Site Installation Checklist**.
- Conduct a duct pressurization test on the sample home to measure leakage to the outside. If the leakage level does not meet design specifications, identify the root cause for non-compliance and determine whether the problem is isolated or systemic in nature. The Certifier should follow a duct pressurization test protocol provided by the test equipment manufacturer. A list of acceptable equipment manufacturers is listed on the MHRA website.
- Conduct a shell leakage test on the sample home. If the shell leakage level does not meet design specifications, identify the root cause for non-compliance and determine whether the problem is isolated or systemic in nature. The Certifier should follow a shell leakage test protocol provided by the test equipment manufacturer. A list of acceptable equipment manufacturers is listed on the MHRA website.
- Document all findings, including any discrepancies, on the **Worksheet** and submit the completed and signed **Worksheet** to MHRA and to the manufacturer.



4. Follow non-compliance procedures

In the event of non-compliance of any quality control test home, the following protocol shall apply:

- a) After documenting the failure(s) on the Worksheet, determine whether the failure was due to a systemic failure at the plant, or is an isolated case. Inform the plant and/or retailer as to

- corrective actions required. The home must then be repaired under the authority of the plant and re-tested by the Certifier.
- b) Within 45 days of the failure, select and test two additional homes of a similar type to the one that failed. If, in the judgment of the Certifier, the failure was set-up related, select homes installed by the same crew. If both homes pass, then resume remainder of quality control testing, if any.
 - c) If one of the additional homes fails, then repeat Steps a and b on a second pair of homes. If one of the new homes fails, repeat Steps a and b again. If a failure is found in one or more of the third pair of homes, then cease testing and notify MHRA immediately.

Certifier Capabilities and Qualifications Affidavit

Application to become an MHRA-approved ENERGY STAR Manufactured Home Plant Certifier

_____ hereby asserts that s/he meets or exceeds all required capabilities and
(Name of Certifier)
qualifications to provide ENERGY STAR Certification services as indicated by completing the information on this form. In addition, _____ hereby states that s/he does not have financial interests in or maintain any
(Name of Certifier)
affiliation with a home manufacturer, retailer or installer, nor does s/he provide services that might affect her or his capacity to evaluate compliance with the ENERGY STAR program and render reports of findings objectively and without bias. Any employees or contractors performing ENERGY STAR services for _____
(Name of Certifier)
also meet these requirements.

Authorized Company
Representative: _____ Company: _____
Signature: _____ Date: _____
Address: _____
City/State/Zip: _____
Telephone: _____ Fax: _____ E-Mail: _____

Capabilities and Qualifications

MANUFACTURED HOUSING DESIGN, CONSTRUCTION AND INSTALLATION METHODS

(Must check all boxes below)

- Working knowledge of the Federal Manufactured Home Construction and Safety Standards
- Working knowledge of the plant production processes
- Working knowledge of the DAPIA/IPIA oversight processes
- Knowledge of manufactured home design, construction, installation, material use, and fabrication techniques

BUILDING SCIENCE AND ENERGY EFFICIENCY EXPERIENCE

(Must check at least one box below)

- Certified Home Energy Rating System (HERS) rater or provider
- Licensed Engineer or Architect

(Must check all boxes below)

- Hands-on experience conducting duct and whole-house air leakage measurements in manufactured (HUD-code) homes
- Experience and training in the principles of building science
- Experience and training in energy efficiency construction practices

DOCUMENT PREPARATION AND RECORD KEEPING

(Must check all boxes below)

- Working knowledge of the HUD-required documentation for manufactured housing
- Capability to maintain computer records and communicate via email

SUBMIT TO MHRA:

- MHRA fax number: 212-496-5389, or
- MHRA address: 2109 Broadway, Suite 200, New York, NY 10023

If approved, MHRA will return a countersigned copy of this application to the certifier. The certifier shall provide a copy of the approved application to the plant.

MHRA Approval Signature: _____ Date: _____

A copy of the ENERGY STAR Manufactured Home Plant Certifier: Capabilities and Qualifications Affidavit is available on the MHRA Web site, www.mhrahome.org.

ENERGY STAR Manufactured Home Plant Certification

Qualification to Produce ENERGY STAR Qualified Homes

_____ hereby certifies that _____, located at _____, has demonstrated the capability consistently to produce ENERGY STAR qualified homes and is therefore authorized to apply the ENERGY STAR label to new homes manufactured under the terms and conditions of the ENERGY STAR program.

ENERGY STAR Certifier: _____ Company: _____
Signature: _____ Date: _____
Address: _____
City/State/Zip: _____
Telephone: _____ Fax: _____ E-Mail: _____
Plant contact person: _____ Telephone: _____ E-Mail: _____

Plant Requirements to Qualify for Producing ENERGY STAR Qualified Homes:

METHOD OF COMPLIANCE

(Must check one box below)

- Home designs comply with ENERGY STAR Package
- Computer Analysis (attached)

ENERGY STAR DESIGN FEATURES INCORPORATED IN PLANT QUALITY ASSURANCE PROCEDURES

(Must check all boxes below)

- Information included in third-party-approved package
- Information included in plant Quality Control Manual
- Information included in Manufacturer's Installation Manual

HOMES TESTED IN PLANT

(Must check all boxes below)

- Three (3) consecutive homes meet ENERGY STAR duct tightness requirements

SITE INSTALLATION CHECKLIST VERIFIED

(Must check all boxes below)

- Acceptable site installation checklist identifying field-installed items and processes that are part of the ENERGY STAR package verified during installation

HOMES TESTED IN FIELD

(Must check all boxes below)

- Three (3) consecutive homes meet ENERGY STAR requirements
- Any design changes recorded and used to update specifications in the third-party-approved package, Site Installation Checklists, Quality Control Manual and Installation Manual

ENERGY STAR INCORPORATED IN ROUTINE OPERATIONS

(Must check all boxes below)

- Corrective actions identified during tests implemented
- Key plant personnel trained on critical processes and procedures
- Unique features in ENERGY STAR third-party-approved packages are reviewed with plant's third-party design approval and inspection agencies
- Process in place for collecting, tracking and archiving documentation on ENERGY STAR qualified homes

SUBMIT TO MHRA

- Fax number: 212-496-5389, or
- Address: 2109 Broadway, Suite 200, New York, NY 10023

A copy of the ENERGY STAR Manufactured Home Plant Certification: Qualification to Produce ENERGY STAR Qualified Homes form is available on the MHRA Web site, www.mhrahomes.org and on the EPA Web site www.energystar.gov/homes

(This form must be submitted to MHRA before producing ENERGY STAR qualified homes).



Quality Control Inspection Worksheet for ENERGY STAR Qualified Manufactured Homes



Complete all applicable items and return to: **Manufactured Housing Research Alliance**
 By fax: (212) 496-5389
 By mail: 2109 Broadway, Suite 200, New York, NY 10023

1. CONTACT INFORMATION

a) Certifier primary contact

 Company Name

 Address

 City State Zip

 Telephone Fax Email

b) Certifier field tester (if different from primary contact)

 Company Name

 Address

 City State Zip

 Telephone Fax Email

c) Manufacturer

 Corporate Parent

 Plant name

 Plant City Plant State

d) Retailer

 Company Name

 Address

 City State Zip

 Telephone Fax

e) Installer (if known)

 Company Name

 Address

 City State Zip

 Telephone Fax

f) Homeowner

 Name

 Address

 City State Zip

 Telephone

2. HOME

- a) No. of floor sections _____
- b) ENERGY STAR package number* (from Information Manager) _____
- c) Serial no. _____
- d) Square footage _____
- e) ENERGY STAR climate region _____
- f) Date manufactured _____

* Based on the ENERGY STAR package number, insert the appropriate values into the blanks in questions 5, 8, 9 and 11

VERIFICATION OF ENERGY STAR DOCUMENTATION

3. DAPIA PACKAGE (must be checked)

Check if complies

- a) The thermal design specifications listed on this home's DAPIA package meet the ENERGY STAR package minimum requirements for overall U-value and window solar heat gain coefficient.....

FIELD TESTS

Tests are to be conducted on the home on an as is basis. Responses to items 4 through 12 should reflect the home without any modifications or repairs.

4. ENERGY STAR LABELS (all three boxes must be checked)

Check if complies

- a) EPA ENERGY STAR label affixed to home
- b) Climate region listed on ENERGY STAR label corresponds to home location
- c) MHRA Quality Assured™ label affixed to home

From label: Name of field rep _____ Signature date _____

Check if complies

5. EQUIPMENT (must be completed for all equipment present).....

Equipment

	<u>Required</u>	<u>Actual</u>
Electric furnace	EF =	
Gas/oil furnace	AFUE =	
Heat pump heating	HSPF =	
Heat pump cooling	SEER =	
Air conditioner	SEER =	
Water heater	EF =	
Water heater insulation wrap	R-value =	

6. ADDITIONAL COOLING EQUIPMENT INFORMATION

	Manufacturer	Model	Capacity (in tons)
Heat pump			
Air conditioner			

7. CONTROLS (boxes must be checked if applicable)

Check if complies

- a) Programmable thermostat present (if required by ENERGY STAR package)
- b) Zone controls present (if required by ENERGY STAR package).....

8. SETUP (all applicable boxes must be checked)

- a) Exterior duct R-value is a minimum of R-_____ (see package requirements). Actual: R-_____
- b) Crossover collar mechanically secured to the trunk and cannot rotate or move.....
- c) Duct mechanically secured to the collar and cannot rotate or move
- d) The crossover duct is properly cut to length, runs straight and is supported off the ground with nylon or metal straps/saddles.
- e) Bottom board penetrations are sealed with durable and permanent patch to prevent air leakage.
- f) Exterior duct insulation is pushed into the floor cavity and sealed with tape or foam sealant at all bottom board penetrations.....

9. BASEMENT (one box must be checked)

- a) This home does NOT have a basement with access directly from the home.
 - b) This home has a basement with access directly from the home and one of the following is true:
 - This home has an UNHEATED BASEMENT. All interior stairwells from the heated space into the basement are constructed in the same manner as an exterior wall with full insulation and a weather-stripped, insulated exterior door.
- OR**
- This home has a HEATED BASEMENT. The basement wall insulation level is a minimum of: R-_____ (see package requirements). Actual: R-_____

10. HOUSE TIGHTNESS

- a) ACH50 must be 7.0 or less. Measured: _____

11. DUCT TIGHTNESS

- a) Duct leakage to outside at 25 pascals. Required: _____ Measured: _____

12. DISCREPANCIES

- a) PASSES: No discrepancies were identified
- b) FAILS: Discrepancies are described on the following sheet.

Signature of field tester: _____ Date of test: _____

