

ENERGY STAR Qualified Modular Homes

Instructions for Field Raters

In 2008, the U.S. Environmental Protection Agency (EPA) designated the Systems Building Research Alliance (SBRA) as the national Quality Assurance Provider (QAP) for ENERGY STAR modular homes, making SBRA responsible for providing ENERGY STAR labels to modular plants and builders and for program quality assurance oversight. SBRA developed, and now administers for EPA, the process used by modular home manufacturing plants and builders to qualify new homes for the ENERGY STAR label.

Under the modular ENERGY STAR compliance process, the modular home manufacturing plant (the “plant”) completes those portions of the ENERGY STAR requirements that can be accomplished in the plant. The plant then ships the home modules, along with information needed to complete the remaining ENERGY STAR features, to the site builder/dealer (the “Builder”). The Builder is responsible for installing the remaining ENERGY STAR elements not furnished by the plant and for obtaining third-party verification that the home qualifies for the ENERGY STAR label. The Builder, in effect, purchases a partially completed home that the manufacturer represents as containing specified parts of the overall ENERGY STAR package. The Builder has the responsibility for completing the process and qualifying the home for the ENERGY STAR label.^{1,2,3}

Similarly, quality control is separated into two distinct parts—plant and site—with procedures and protocols appropriate to each. The work of the plant is conducted under the auspices of a Plant Certifier (the “Certifier”), a specialist in factory building with expertise in energy efficient construction who qualifies the modular plant to build modules in compliance with ENERGY STAR requirements.⁴

Verifying ENERGY STAR compliance of the completed home and specifically the work of the Builder falls under the purview of a third-party HERS rater (the “Rater”). The Rater inspects and qualifies the homes. Therefore, while the plant is certified to routinely construct homes ready to earn the ENERGY STAR label, there is no equivalent certification for the Builder. Rather, homes are checked in the field by the Rater for compliance with the ENERGY STAR provisions.

Site testing follows a sampling protocol, reflecting the fact that the manufacturer has demonstrated the ability to consistently achieve ENERGY STAR conforming construction in the plant. Table 1 highlights some of the major provisions of the process.

¹ Some state and local programs that provide incentives for ENERGY STAR construction may have additional construction and/or procedural requirements that differ from and/or exceed this national program.

² ENERGY STAR specifications that differ from or that exceed the national program requirements are applicable in some regions, including California, Florida, Hawaii and the Pacific Northwest (Washington, Oregon, Idaho and Montana). In Montana and Idaho, either the requirements of the national program or the Pacific Northwest regional program may be used. For details, see the ENERGY STAR website http://www.energystar.gov/index.cfm?c=bop.pt_bop_index.

³ For information on the ENERGY STAR requirements for attached housing, including condominiums, apartments, townhouses and duplexes, see the ENERGY STAR website http://www.energystar.gov/index.cfm?c=bldrs_lenders_raters.nh_attached_housing.

⁴ Plants that produce both manufactured and modular homes that are certified to produce ENERGY STAR manufactured homes must be separately certified to produce ENERGY STAR modular homes.

Table 1 Major provisions of the ENERGY STAR program for modular homes

| Provision | Requirement |
|------------------------|--|
| PLANT COMPLETED | |
| Certification | <ul style="list-style-type: none"> ▪ Conducted by third-party Certifier retained by Plant |
| Labeling | <ul style="list-style-type: none"> ▪ Quality assurance (QA) label applied in the plant |
| Inspection and testing | <ul style="list-style-type: none"> ▪ Visual inspection of all homes by plant QC staff using <i>Inspection Checklist</i> (includes thermal bypass items) ▪ Semi-annual inspections/tests by third-party Plant Certifier |
| FIELD COMPLETED | |
| Certification | <ul style="list-style-type: none"> ▪ Conducted by third-party Rater retained by Builder |
| Labeling | <ul style="list-style-type: none"> ▪ ENERGY STAR Home label applied to home upon completion |
| Inspection and testing | <ul style="list-style-type: none"> ▪ Visual inspection of all homes by Rater (and Builder) using same <i>Inspection Checklist</i> partially completed by plant ▪ Testing by Rater (1 in 7 minimum, plus first 2 homes per Builder) |

Once certified, the modular home plant applies the maroon quality assurance (QA) label to homes that have been constructed using ENERGY STAR compliant designs and specifications based on either EPA’s prescriptive packages (Builder Option Packages, or BOPs) or custom packages that conform to the EPA performance path requirements. The QA label verifies that the home was constructed in a certified modular home plant in accordance with SBRA oversight requirements and indicates that part of the ENERGY STAR home qualification process is complete. The home only becomes ENERGY STAR qualified when the *Completion Report* and *Inspection Checklist* are completed, and the blue EPA ENERGY STAR Qualified Home label, obtained by the Rater, is applied to the home in the field.

The Rater’s Role

The Rater is hired by the Builder to certify individual factory built ENERGY STAR homes installed and completed by the Builder on site. The Rater is responsible for the following:

1. Visual inspections. All on-site visual inspections of the ENERGY STAR features of the home utilizing the *Inspection Checklist* provided by the Plant. The Rater is required to visually inspect every home at least once during construction.
2. Testing. For a representative sample of 1 in 7 homes, pressurization testing as required to comply under the ENERGY STAR protocol.
3. Reporting and labeling. The Rater submits the finalized *Completion Report* and *Inspection Checklist* to SBRA for review. Subject to approval, SBRA will provide the Rater with the blue ENERGY STAR Qualified Home label and the homeowner’s ENERGY STAR Home Certificate. The Rater provides the label and certificate to the Builder, who applies the label to the home and presents the certificate to the homeowner.

Responsibilities of the Rater

1. **Become a Modular Rater:** The Builder engages a Rater to inspect and/or test completed homes. HERS Raters are eligible to qualify ENERGY STAR modular homes once they review the *ENERGY STAR Modular Homes Compliance Procedures* and complete a *Modular Rater*

Application, both of which are available on the SBRA website www.research-alliance.org/pages/es_mod.htm. A list of participating Raters can be found on the SBRA website.

- 2. Coordinate with the Builder:** Prior to construction, the Builder provides the Rater with home address, construction documents, expected delivery date and construction schedule. The Rater coordinates with the Builder on the inspection schedule. The Rater is required to visually inspect every home at least once during construction (see Step 3). The Rater randomly selects homes such that a minimum of 1 in 7 of all homes completed by the Builder within each 12-month period is tested (see Step 4).
- 3. Inspect home during installation:** The Builder provides the Rater with a copy of the *Inspection Checklist for ENERGY STAR Qualified Modular Home*, which has been partially completed by the plant's QC staff per procedures approved by their third-party plant Certifier. The Builder installs the home, ensuring completion of all items on the Checklist. The Rater selects the best time to visit the site to inspect as many items on the Checklist as possible. The Rater reviews remaining items with the Builder and completes and signs the Checklist. Raters should attempt to inspect as many critical items as possible but may delegate a Builder's representative to verify and initial select items. The Builder can verify up to six (6) Thermal Bypass items (these items are typically located on page 1 of the Checklist). If the Builder verifies any item, they must also sign the Checklist. Both the Builder and the Rater complete and sign the *Completion Report for ENERGY STAR Modular Home*.

If any of the inspection results do not meet requirements noted on the Checklist or other program requirements, the Rater follows the non-compliance procedures described below.

- 4. Test representative homes:** The Rater selects representative homes to be tested (a minimum of 1 in every 7 constructed by the Builder). Additionally, the Rater must test the first two (2) homes constructed by the Builder under the modular compliance procedures. These two homes are not counted as part of the routine sampling (1 in 7 homes), but may include those homes that were part of the plant's qualification process.

To confirm that a Builder has met the "first two homes tested" requirement, check the list of participating Builders on the SBRA website www.research-alliance.org/pages/es_mod.htm.

The "first two homes tested" requirement can be waived if the Builder provides documentation to the Rater verifying the Builder has completed at least two ENERGY STAR qualified modular homes under the site built/previous modular protocols.

The field tests verify that the home meets or exceeds the target performance levels stipulated on the Checklist. Testing includes the following:

- Conduct an envelope leakage test to confirm conformance to ENERGY STAR requirements.
- Conduct test to measure duct air leakage to the outside (not required if all ducts and air handling equipment are in conditioned space and envelope has been tested to no more than 3 ACH50 or 0.25 CFM50 per square foot of building envelope⁵).

If any test results do not meet requirements noted on the Checklist, the Rater follows the non-compliance procedures described below.

⁵ A fresh air ventilation system may be required for homes with this level of leakage.

- 5. Submit Completion Report and Checklist to SBRA:** The Rater submits the completed and signed Checklist together with the Completion Report to SBRA, along with a check for \$40 for the certificate and label processing fee. SBRA will review the documentation and issue an ENERGY STAR Qualified Home label and certificate to the Rater.⁶
- 6. Apply ENERGY STAR label to home:** The Rater provides the Builder with the ENERGY STAR label and certificate. The Builder applies the blue ENERGY STAR Qualified Home label inside the home adjacent to the QA label and provides the certificate to the homeowner. This completes the ENERGY STAR process.

Protocol for Addressing Non-Compliance at the Site

If and when a Rater identifies an item of non-compliance during a site inspection or test and if the item of non-compliance is deemed by the Rater to be systemic (relating to routine methods in either site construction or plant production), the Rater is required to take the following actions:

1. After documenting one or more such non-compliance items, the Rater files a **Completion Report for ENERGY STAR Modular Home** with SBRA describing the non-compliance and informs the Builder as to any corrective actions required. The home is then repaired and re-tested.
2. Inspect and test the next two homes built by the same Builder. These homes shall **not** count towards the 1 in 7 sample test rate. At the discretion of the Rater, the inspection and testing may be limited to the item(s) found deficient on the failed home, but must include the deficient items. If both homes pass, resume standard quality control testing regimen.
3. If one of the additional homes fails, then cease testing and notify SBRA immediately for instructions on how to proceed.
4. If, in the Rater's judgment, continued non-conformance is the result of work by the Builder and not related to measures implemented in the plant, ENERGY STAR verification can only resume after repeating the two (2) home initial evaluation successfully and the Rater is fully satisfied that all systemic problems have been addressed and the Builder is ready to consistently meet ENERGY STAR requirements.

If continued non-conformance is the responsibility of the plant, construction of ENERGY STAR Qualified Modular Homes can only resume after the plant certification process, including inspection and testing of all relevant items on three homes, has been successfully repeated and demonstrates to the Certifier's full satisfaction that all systemic problems have been addressed and the plant is ready to consistently meet ENERGY STAR requirements.

Rater Qualifications and Eligibility Criteria

Raters must be familiar with the requirements and procedures contained in the ENERGY STAR Modular Homes **Compliance Procedures for Plants and Builders** and have proven skills in reviewing energy efficient building practices, building diagnostics and conducting testing associated with ENERGY STAR compliance. SBRA is responsible for reviewing and approving Rater credentials. SBRA reserves the right to revoke Rater credentials at any time and for any reason.

Credentials for Raters include all of the following:

- Working knowledge of the residential building codes,
- Knowledge of modular home design, construction, installation, material use and fabrication,
- Certified Home Energy Rating System (HERS) Rater.

⁶ The Rater submits documentation and receives labels from the QAP (SBRA), not their HERS provider.