

**Version Tracking Document for  
ENERGY STAR Certified Homes, Version 3 (Rev. 08)  
07/01/2015**

In the time since Revision 07 of the Version 3 ENERGY STAR Certified Homes Program Requirements were released, EPA has modified, clarified, and refined various aspects of the program documents, primarily in response to partner questions and comments. This document is a summary of these edits, organized by the program document containing the change. EPA has also posted the revised program documents, labeled Version 3 (Rev. 08), on its Web site at [www.energystar.gov/newhomesguidelines](http://www.energystar.gov/newhomesguidelines).

All revisions are categorized as a Change, Clarification, or Refinement. These are defined as follows:

**Change** – The addition, deletion, or modification of a program requirement. A change will typically result from a partner question or feedback indicating that EPA’s original intent is not being met or due to changes in relevant standards (e.g., ENERGY STAR labeled product requirements, NAECA standards, ICC codes). A change is the most significant type of edit for partners because it is likely to change the way that partners comply with the program.

**Clarification** – The clarification of a program requirement, typically resulting from a partner question indicating confusion or ambiguity. Clarifications are not intended to significantly change the scope of the program guidelines, but rather to clarify the original intent of the requirement. A clarification is secondary in importance to a change; it should not significantly alter the way that most partners comply with the program.

**Refinement** – A minor revision, such as an improved choice of words, a grammatical correction, or a correction to a typographical error. A refinement is the least important type of edit; it should have no impact on the way that partners comply with the program.

## **National Program Requirements**

1. **Refinement** – All program documents: ‘guidelines’ changed to ‘requirements’

All references to program ‘guidelines’ have been revised to program ‘requirements’ to align with the current terminology of the ENERGY STAR program.

2. **Refinement** – Certifying Homes Section: Renamed to Eligibility Requirements

To better fit the content of the section, the Certifying Homes Section has been renamed to Eligibility Requirements Section.

3. **Refinement** - Certifying Homes Section: Regional program requirements moved to Exhibit 4

The second to last paragraph in the Certifying Homes Section, which includes a list of locations for which regional program requirements have been developed, has been moved to Exhibit 4 for improved clarity.

4. **Clarification** – Northwest Regional Checklists: Integration into National Program

To foster the integration of the Northwest regional program into the national program requirements, two Footnotes have been added to the national program documents that, for the time-being, maintain regional alternatives and exemptions for specific items.

The first of these two Footnotes has been added to the HVAC Commissioning Checklist to accommodate current regional alternatives and exemptions related to commissioning. This Footnote, Footnote 2, reads as follows:

“For a home certified in the State of ID, MT, OR, or WA, the following alternatives and exemptions apply:

- a. For a home with an air-source heat pump up to 65 kBtuh with a forced-air distribution system (i.e., ducts), the contractor is permitted to complete the 2011 PTCS® Commissioned Heat Pump Certificate and Startup Form in lieu of this Checklist.
- b. For a home with a split air conditioner or unitary air conditioner up to 65 kBtuh with a forced-air distribution system (i.e., ducts), the contractor is permitted to complete the Northwest Central AC Commissioning & Startup Form in lieu of this Checklist.
- c. For a home in a location with < 600 CDD, the completion of this Checklist is recommended, but not required.”

The second of these two Footnotes have been added to the Rater Field Checklist to accommodate current regional alternatives and exemptions related to duct testing. This Footnote, Footnote 38, reads as follows:

“For a home certified in the State of ID, MT, OR, or WA that is permitted before 01/01/2016, as an alternate to Rater-verified duct leakage, a PTCS® Duct Sealing Certification Form is permitted to be collected by the Home Energy Rater.”

5. **Change – Prescriptive Path Section, Performance Path Section, Exhibit 1, and Footnotes 8, 16 – 19, 21 – 23, 26, and 27: Removal of Prescriptive Path**

No homes reported to EPA since 2012 have used the Prescriptive Path for certification. Having two paths instead of one adds to the complexity of the program - unnecessarily so, if one of those two paths is never used. To simplify the program, the Prescriptive Path has been removed.

Specifically, homes with a permit date on or after 60 days after the release of Rev. 08 will only be permitted to use the Performance Path, which has been renamed the ENERGY STAR Certification Process. However, to minimize the disruption to partners who might have had Prescriptive Path projects in process at the time Revision 08 was released, homes with a permit date before 09/01/2015 will be permitted to use the modified Prescriptive Path allowance, available at [www.energystar.gov/v3prescriptivepath](http://www.energystar.gov/v3prescriptivepath).

To reflect this change and simplify the National Program Requirements document, the Prescriptive Path Section and Footnotes 8, 16 through 19, 21 through 23, 26, and 27 have been removed. Additionally a new Footnote has been added to the National Program Requirements as follows:

“Prior to Rev. 08, homes were permitted to be certified using either a Prescriptive Path or a Performance Path. Homes with a permit date on or after 60 days after the release of Rev. 08 shall only use the Performance Path, which has been renamed the ENERGY STAR Certification Process. To minimize disruption to projects that are in process, homes with a permit date before 09/01/2015 are permitted to use a modified version of the Prescriptive Path in lieu of the Performance Path. For more information about this compliance option, visit: [www.energystar.gov/v3prescriptivepath](http://www.energystar.gov/v3prescriptivepath).”

Finally, because the Prescriptive Path has been removed, Exhibit 1 is no longer a set of prescriptive measures to be installed in a home to be certified but rather a set of efficiency features used to determine the ENERGY STAR HERS Index Target. For this reason, Exhibit 1 has been renamed ‘ENERGY STAR Reference Design Home’ and a paragraph has been added to the beginning explaining this new intent as follows:

“The ENERGY STAR Reference Design Home is the set of efficiency features modeled to determine the ENERGY STAR HERS Index Target for each home pursuing certification. Therefore, while the features below are not mandatory, if they are not used then other measures will be needed to achieve the ENERGY STAR HERS Index Target. In addition, note that the Mandatory Requirements for All Certified Homes, Exhibit 2, contain additional requirements such as total duct leakage limits, minimum allowed insulation levels, and minimum allowed fenestration performance. Therefore, EPA recommends that partners review the documents in Exhibit 2 prior to selecting measures.”

Additionally, several items throughout Exhibit 1 have been reworded to convey this intent and any efficiency features that are not used to determine the ENERGY STAR HERS Index Target (e.g., ground-source heat pumps, skylights, total duct leakage) have been removed from Exhibit 1.

6. **Refinement – Partnership, Training, and Credentialing Requirements Section relocated**

For improved clarity, the Partnership, Training, and Credentialing Requirements Section has been relocated below the Certifying Homes Section.

7. **Refinement – Performance Path: Combine first paragraph with Step 1**

To streamline the text in the Performance Path section, the first paragraph of this section has been combined with Step 1 as follows:

“The certification process provides the flexibility to select a custom combination of measures for each home that is equivalent in performance to the minimum requirements of the ENERGY STAR Reference Design Home, Exhibit 1, as assessed through energy modeling. Use a RESNET-accredited Home Energy Rating software program to determine the ENERGY STAR HERS index Target, which is the highest numerical HERS Index value that each rated home may achieve to earn the ENERGY STAR.”

8. **Refinement – Step 1 of Performance Path: Procedural details moved to Footnote**

The second sentence of this paragraph, which provides details on how to determine the ENERGY STAR HERS Index Target, has been relocated to a new Footnote and refined, as follows: “The software program shall automatically determine (i.e., without relying on a user-configured ENERGY STAR Reference Design) this target for each rated home by following the ENERGY STAR HERS Index Target Procedure, Version 3 (Rev. 08), available on EPA’s website.”

9. **Refinement** – Performance Path and Footnote 9: Integration of cover page from Inspection Checklists

As part of a larger effort to reduce the amount of paperwork required to certify a home, the cover page of the Inspection Checklists has been deleted and much of the content moved to the National Program Requirements. Because the Inspection Checklists are often printed for each home certified, eliminating the cover page will reduce the paperwork required for each home that is certified.

Specifically, the following paragraphs have been moved from the cover page of the Inspection Checklists to Step 4 of the Performance Path:

“The Rater is required to keep electronic or hard copies of the completed and signed Rater checklists and the HVAC Design Report.

The Rater must review all items on the Rater checklists. Raters are expected to use their experience and discretion to verify that the overall intent of each inspection checklist item has been met (i.e., identifying major defects that undermine the intent of the checklist item versus identifying minor defects that the Rater may deem acceptable).

In the event that a Rater finds an item that is inconsistent with the intent of the checklists, the home cannot earn the ENERGY STAR until the item is corrected. If correction of the item is not possible, the home cannot earn the ENERGY STAR. In the event that an item on a Rater checklist cannot be inspected by the Rater, the home also cannot earn the ENERGY STAR. The only exceptions to this rule are in the Thermal Enclosure System Section of the Rater Field Checklist, where the builder may assume responsibility for verifying a maximum of eight items. This option shall only be used at the discretion of the Rater. When exercised, the builder’s responsibility will be formally acknowledged by the builder signing the checklist for the item(s) that they verified.

In the event that a Rater is not able to determine whether an item is consistent with the intent (e.g., an alternative method of meeting a checklist requirement has been proposed), then the Rater shall consult their Provider. If the Provider also cannot make this determination, then the Rater or Provider shall report the issue to EPA prior to project completion at: [energystarhomes@energystar.gov](mailto:energystarhomes@energystar.gov) and will typically receive an initial response within 5 business days. If EPA believes the current program requirements are sufficiently clear to determine whether the intent has been met, then this guidance will be provided to the partner and enforced beginning with the house in question. In contrast, if EPA believes the program requirements require revisions to make the intent clear, then this guidance will be provided to the partner but only enforced for homes permitted after a specified transition period after the release of the revised program requirements, typically 60 days in length.

This process will allow EPA to make formal policy decisions as partner questions arise and to disseminate these policy decisions through the periodic release of revised program documents to ensure consistent application of the program requirements.”

Additionally, the following language about sampling protocols has been moved from the cover page of the Inspection Checklists to Footnote 10:

“Raters who operate under a Sampling Provider are permitted to verify the Minimum Rated Features of the home and to verify any Checklist Item designated “Rater Verified” using the RESNET-approved sampling protocol for homes outside California, and the CEC-approved sampling protocol for homes in CA. No parties other than Raters are permitted to use sampling. All other items shall be verified for each certified home. For example, no items on the HVAC Commissioning Checklist are permitted to be verified using a sampling protocol.”

10. **Refinement** – Exhibit 1: References to certain ENERGY STAR products removed

Exhibit 1 defines the efficiency of, among other products, heat pumps, air conditioners, windows, and doors that are configured in the ENERGY STAR Reference Design Home. These efficiencies are not changing, however, a new more stringent specification has been finalized for ENERGY STAR certified products of this type. Therefore, the phrase ‘ENERGY STAR Certified’ has been removed from references to these product types to avoid confusion.

11. **Change** – Exhibit 1: Thermostat & Ductwork Section: Duct leakage limits for systems serving small spaces

To address the challenges that partners are experiencing for systems serving small spaces, an absolute amount of allowed duct leakage has been added to the program requirements. The current limit on total duct leakage at ‘rough-in’ has been revised to be the greater of  $\leq 4$  CFM25 per 100 sq. ft. of CFA or  $\leq 40$  CFM. While this change only impacts the limit on total duct leakage, the current limit on leakage to outdoors has been aligned with the new limit on total duct leakage at ‘rough-in’ to simplify the overall policy regarding duct leakage. As a result, the duct leakage to the outdoors that shall be modeled in Exhibit 1 will be revised as follows:

“Duct leakage to outdoors modeled at the greater of  $\leq 4$  CFM25 per 100 sq. ft. of conditioned floor area or  $\leq 40$  CFM25.”

12. **Refinement** – **Exhibit 2: Updated Terminology For Mandatory Requirements**

As part of a larger effort to improve the workflow required to certify a home, the inspection checklists required to certify a home have been, in part, rearranged and renamed to improve the workflow of the certification process. Exhibit 2 has been updated to reflect the revised program documents and who is responsible for completing each of them, as follows:

Party Responsible	Mandatory Requirements
<b>Rater</b>	<ul style="list-style-type: none"> <li>• Completion of Rater Design Review Checklist</li> <li>• Completion of Rater Field Checklist</li> </ul>
<b>HVAC System Designer</b>	<ul style="list-style-type: none"> <li>• Completion of HVAC Design Report</li> </ul>
<b>HVAC Installing Contractor</b>	<ul style="list-style-type: none"> <li>• Completion of HVAC Commissioning Checklist</li> </ul>
<b>Builder</b>	<ul style="list-style-type: none"> <li>• Completion of Water Management System Builder Requirements</li> </ul>

13. **Refinement** – **Effective Date Section, Exhibit 4, & Footnote 28: Reformatting of Implementation Timelines**

The Effective Date Section has been refined to indicate that Version 3 is applicable unless otherwise noted and to list the locations with regional program requirements, as follows:

“Regional program requirements and associated implementation schedules have been developed for homes in CA, FL, GU, HI, the Northern Mariana Islands, PR, and the Pacific Northwest.”

In addition, the graphic in Exhibit 4 has been replaced with a table listing the locations for which the Version 3.1 implementation timeline has been defined, which will be used in lieu of Version 3. Additionally, Footnote 28, which defines ‘final inspection’ and is no longer relevant, has been deleted.

14. **Refinement** – **Footnotes 10, 11, 12, 13, 20, 24 and 25: Removed**

Because the information in these Footnotes is already contained in the Inspection Checklists, or is already part of a standard HERS rating, they have been deleted to streamline this document.

## Inspection Checklists

15. **Refinement** – **Cover Page - Relocation of Content**

As part of a larger effort to reduce the amount of paperwork required to certify a home, the cover page of the Inspection Checklists has been deleted and much of the content has been moved to the National Program Requirements. Because the Inspection Checklists are often printed for each home certified, eliminating the cover page will reduce the paperwork required for each home that is certified.

Specifically, the following paragraphs have been moved from the cover page of the Inspection Checklists to Step 4 of the Performance Path section of the National Program Requirements:

“The Rater is required to keep electronic or hard copies of the completed and signed Rater checklists and the HVAC System Design Report.

The Rater must review all items on the Rater checklists. Raters are expected to use their experience and discretion to verify that the overall intent of each inspection checklist item has been met (i.e., identifying major defects that undermine the intent of the checklist item versus identifying minor defects that the Rater may deem acceptable).

In the event that a Rater finds an item that is inconsistent with the intent of the checklists, the home cannot earn the ENERGY STAR until the item is corrected. If correction of the item is not possible, the home cannot earn the ENERGY STAR. In the event that an item on a Rater checklist cannot be inspected by the Rater, the home also cannot earn the ENERGY STAR. The only exceptions to this rule are in the Thermal Enclosure System Section of the Rater Field Checklist, where the builder may assume responsibility for verifying a maximum of eight items. This option shall only be used at the discretion of the Rater. When exercised, the builder’s responsibility will be formally acknowledged by the builder signing the checklist for the item(s) that they verified.

In the event that a Rater is not able to determine whether an item is consistent with the intent (e.g., an alternative method of meeting a checklist requirement has been proposed), then the Rater shall consult their Provider. If the Provider also cannot make this determination, then the Rater or Provider shall report the issue to EPA prior to

project completion at: energystarhomes@energystar.gov and will typically receive an initial response within 5 business days. If EPA believes the current program requirements are sufficiently clear to determine whether the intent has been met, then this guidance will be provided to the partner and enforced beginning with the house in question. In contrast, if EPA believes the program requirements require revisions to make the intent clear, then this guidance will be provided to the partner but only enforced for homes permitted after a specified transition period after the release of the revised guidelines, typically 60 days in length.

This process will allow EPA to make formal policy decisions as partner questions arise and to disseminate these policy decisions through the periodic release of revised program documents to ensure consistent application of the program guidelines.”

Additionally, the following language about sampling protocols has been moved from the cover page of the Inspection Checklists to Footnote 10 of the National Program Requirements:

“Raters who operate under a Sampling Provider are permitted to verify any item designated “Rater Verified” using the RESNET-approved sampling protocol for homes located outside California, and the CEC-approved sampling protocol for homes located in CA. No parties other than Raters are permitted to use sampling. All other items shall be verified for each certified home. For example, no items on the HVAC System Commissioning Contractor Checklist are permitted to be verified using a sampling protocol.”

## **Thermal Enclosure System Rater Checklist**

### **16. Change - Transition to Rater Design Review Checklist and Rater Field Checklist**

As part of a larger effort to reduce the amount of paperwork required to certify a home and to better align the workflow for certification with that of a HERS rating, the requirements from this Checklist have been migrated to two new program documents - the Rater Design Review Checklist and the Rater Field Checklist.

The Rater Design Review Checklist contains the Items from the Thermal Enclosure System Rater Checklist that can be completed at the design stage, prior to the start of construction, and the Rater Field Checklist contains the Items that must be completed in the field.

Detailed modifications to Items, Sections, and Footnotes are described in the entries below along with a description of their new location on the Rater Design Review Checklist and the Rater Field Checklist.

### **17. Change - Section 1: Transition to Section 2 of the Rater Design Review Checklist and Section 1 of the Rater Field Checklist**

As part of an overall transition from the Thermal Enclosure System Rater Checklist to the Rater Design Review Checklist and Rater Field Checklist, Item 1.2 has been moved to Item 2.1 of the Rater Design Review Checklist and Item 1.1 of the Rater Field Checklist. Item 1.1 from this checklist has been removed due to the elimination of the Prescriptive Path. Item 2.1 of the Rater Design Review Checklist now reflects that this Item is to be completed prior to construction, based upon the design, and Item 1.1 of the Rater Field Checklist now reflects that this Item is to be completed in the field and should reflect the fenestration specified during the design stage.

Item 2.1 of the Rater Design Review Checklist reads as follows:

“Specified fenestration meets or exceeds 2009 IECC requirements”

Item 1.1 of the Rater Field Checklist reads as follows:

1.1: “Fenestration meets or exceeds levels specified in Item 2.1 of the Rater Design Review Checklist”

### **18. Change - Section 2: Transition to Section 3 of the Rater Design Review Checklist and Section 1 of the Rater Field Checklist**

As part of an overall transition from the Thermal Enclosure System Rater Checklist to the Rater Design Review Checklist and Rater Field Checklist, Item 2.1 has been moved to Item 3.1 of the Rater Design Review Checklist and Item 1.2 of the Rater Field Checklist. Item 2.2 has been moved to 1.3 of the Rater Field Checklist. Item 1.2 of the Rater Design Review Checklist now reflects that this Item is to be completed prior to construction, based upon the design, and Item 1.2 of the Rater Field Checklist now reflects that this Item is to be completed in the field and should reflect the insulation levels specified during the design stage.

Item 3.1 of the Rater Design Review Checklist reads as follows:

“Specified ceiling, wall, floor, and slab insulation levels comply with one of the following options:

- Meets or exceeds 2009 IECC levels OR;

- Achieves  $\leq$  133% of the total UA resulting from the U-factors in 2009 IECC Table 402.1.3, per guidance in Footnote 4d, AND specified home infiltration does not exceed the following:

3 ACH50 in CZs 1, 2 / 2.5 ACH50 in CZs 3, 4 / 2 ACH50 in CZs 5, 6, 7 / 1.5 ACH50 in CZ 8”

Item 1.2 of the Rater Field Checklist reads as follows:

“Insulation meets or exceeds levels specified in Item 3.1 of the Rater Design Review Checklist”

Item 1.3 of the Rater Field Checklist reads as follows:

“All insulation achieves RESNET-defined Grade I installation. See Footnote 4 for alternatives.”

To improve readability, a new Footnote, Footnote 4, has been added to Item 1.3 with the alternatives to Grade I insulation installation, as follows:

“Two alternatives are provided: a) Grade II cavity insulation is permitted to be used for assemblies that contain a layer of continuous, air impermeable insulation  $\geq$  R-3 in Climate Zones 1 to 4,  $\geq$  R-5 in Climate Zones 5 to 8; b) Grade II batts are permitted to be used in floors if they fill the full depth of the floor cavity, even when compression occurs due to excess insulation, as long as the R-value of the batts has been appropriately assessed based on manufacturer guidance and the only defect preventing the insulation from achieving Grade I is the compression caused by the excess insulation.”

#### 19. **Change - Section 3: Transition to Section 2 of the Rater Field Checklist**

As part of an overall transition from the Thermal Enclosure System Rater Checklist to the Rater Design Review Checklist and Rater Field Checklist, Section 3 has been moved to Section 2 of the Rater Field Checklist. The Section has been reformatted due to space considerations, and important clarifications and refinements are detailed in Policy Record Entry 00467.

#### 20. **Change - Section 4: Transition to Section 3 of the Rater Field Checklist**

As part of an overall transition from the Thermal Enclosure System Rater Checklist to the Rater Design Review Checklist and Rater Field Checklist, Section 4 has been moved to Section 3 of the Rater Field Checklist. The Section has been reformatted due to space considerations, and several clarifications and refinements related to the advanced framing details are detailed in Policy Record Entry 00469.

#### 21. **Change - Item 4.4.5: Application of advanced framing details to multifamily dwelling units**

To address advanced framing details that may not be feasible in certain multifamily dwelling units due to unique structural requirements, the existing exemptions for specific advanced framing details have been consolidated into a single over-arching Footnote, referenced by Item 4.4.5 as follows:

“All advanced framing details shall be met except where the builder, architect, or engineer provides a framing plan that encompasses the details in question, indicating that structural members are required at these locations and including the rationale for these members (e.g., full-depth solid framing is required at wall corners or interior / exterior wall intersections for shear strength, a full-depth solid header is required above a window to transfer load to jacks studs, additional jack studs are required to support transferred loads, additional cripple studs are required to maintain on-center spacing, or stud spacing must be reduced to support multiple stories in a multifamily building). The Rater shall retain a copy of the detail and rationale for their records, but need not evaluate the rationale to certify the home.”

Language related to this exemption in Footnote 19 has been removed, and the Footnote revised as follows:

“Compliance options include continuous rigid insulation sheathing, SIP headers, other prefabricated insulated headers, single-member or two-member headers with insulation either in between or on one side, or an equivalent assembly. R-value requirement refers to manufacturer’s nominal insulation value.”

Finally, Footnote 20 has been removed, as the explanation of when more jack studs or cripple studs might be needed has been included in the new Footnote.

#### 22. **Clarification – Footnote 1: Rater retains primary responsibility for builder-verified Items**

With regards to builder-verified Items, if a quality assurance review indicates that such Items have not been successfully completed, the Rater will be responsible for facilitating corrective action. To clarify this intent, Footnote 1 has been revised as follows:

“At the discretion of the Rater, the builder may verify up to eight items in Sections 1-4 of this Checklist. When exercised, the builder’s responsibility will be formally acknowledged by the builder signing off on the checklist for

the item(s) that they verified. However, if a quality assurance review indicates that Items have not been successfully completed, the Rater will be responsible for facilitating corrective action.”

23. **Change – Section 1 and Footnote 2: Allowance for PHIUS+ certified homes to use triple-glazed windows**

In recognition of the generally high performance of triple-glazed windows with thermal breaks / spacers, the following alternative compliance option has been added to the end of Footnote 2:

“In Passive House (PHIUS+) certified homes, where triple-glazed window assemblies with thermal breaks/spacers between the panes are used, such windows meet the intent of Item 1.2 and shall be excluded when assessing compliance with a) through e), above.”

24. **Change - Item 2.1 & Footnote 3d: Inclusion of fenestration in total UA calculation**

Fenestration (i.e., windows, doors, and skylights) has been included in the total UA calculation. While Section 1 still requires fenestration to meet or exceed the component U-factor and SHGC requirements specified in the 2009 IECC – Table 402.1.1, fenestration that does exceed code can be used to offset small decreases in insulation elsewhere in the thermal enclosure system.

The phrase “excluding fenestration and” has been removed from Item 2.1.2. In addition, Footnote 3d has been revised as follows:

“An alternative equivalent U-factor or total UA calculation may also be used to demonstrate compliance, as follows:

An assembly with a U-factor equal or less than specified in 2009 IECC Table 402.1.3 complies.

A total building thermal envelope UA that is less than or equal to the total UA resulting from the U-factors in Table 402.1.3 also complies. The performance of all components (i.e., ceilings, walls, floors, slabs, and fenestration) can be traded off using the UA approach under both the Prescriptive and the Performance Path. Note that while ceiling and slab insulation and fenestration can be included in trade-off calculations, Items 4.1 through 4.3 and Section 1 of the Checklist shall be met regardless of the UA tradeoffs calculated. The UA calculation shall be done using a method consistent with the ASHRAE Handbook of Fundamentals and shall include the thermal bridging effects of framing materials. The calculation for a steel-frame envelope assembly shall use the ASHRAE zone method or a method providing equivalent results, and not a series-parallel path calculation method”.

25. **Change – Section 3, Footnotes 8 & 9: Clarified intent of air barrier configurations**

Section 3 has been edited to distinguish between vertical and horizontal air barriers for ceilings, walls, and floors, as well as to define the required locations of the air barriers relative to the surface of the insulation. The changes are detailed below. In addition, helpful diagrams illustrating the revised policy are included in Policy Record Entry 00467.

The requirements for each component type (i.e., ceiling, walls, and floors) has been grouped with the details associated with that component (e.g., ceiling requirements have been grouped with the list of ceiling details that must be inspected).

The requirements for floors have been clarified by:

- Relocating all floor details into the Floors Section
- Clarifying that an air barrier is always required at the exterior vertical surface of floor insulation
- Clarifying that an air barrier is also required at the interior horizontal surface of the floor insulation, if located over unconditioned space.
- Clarifying that an air barrier is recommended, but not required, at the interior vertical surface of all floor insulation in CZ 4-8.

In addition, the language regarding wind baffles at ceiling insulation has been made more consistent.

Finally, the phrase, “blocking at exposed edge” in the section on floors has been rephrased as a requirement for an air barrier at the “exterior vertical surfaces of floor insulation”. The revised language in Section 3 reads as follows:

“At each insulated location below, a complete air barrier shall be provided that is fully aligned as follows:

- Ceilings: At interior or exterior horizontal surface of ceiling insulation in Climate Zones 1-3; at interior horizontal surface of ceiling insulation in Climate Zones 4-8. Also, at exterior vertical surface of ceiling

insulation in all climate zones (e.g., using a wind baffle that extends to the full height of the insulation in every bay or a tabbed baffle in each bay with a soffit vent that prevents wind washing in adjacent bays)

- Walls: At exterior vertical surface of wall insulation in all climate zones; also at interior vertical surface of wall insulation in Climate Zones 4-8
- Floors: At exterior vertical surface of floor insulation in all climate zones and, if over unconditioned space, also at interior horizontal surface including supports to ensure alignment. See Footnotes 10 and 11 for alternatives”

The following details within each section have been modified:

- Walls: Item 3.1.5 has been revised to state, “Walls adjoining porch roofs or garages”
- Walls: Item 3.1.8, garage rim / band joist adjoining conditioned space, has been deleted and a new Item added to the Floors Section to address this detail.
- Floors: A new Item has been added to address rim / band joists and other floors that are adjoining unconditioned space: “All other floors adjoining unconditioned space (e.g., rim / band joists at exterior wall or at porch roof)”

Footnotes 7 & 10 have been merged and renumbered to improve clarity and reflect new exemptions to the requirement for interior air barriers in basements. This new Footnote has been further modified as follows:

“All insulated vertical surfaces are considered walls (e.g., above and below grade exterior walls, knee walls) and must meet the air barrier requirements for walls. The following exceptions apply: air barriers recommended, but not required, in adiabatic walls in multifamily dwellings; and, in Climate Zones 4 through 8, an air barrier at the interior vertical surface of insulation is recommended but not required in basement walls or crawlspace walls. For the purpose of these exceptions, a basement or crawlspace is a space for which  $\geq 40\%$  of the total gross wall area is below-grade.”

In addition, Footnote 7, which recommends the inclusion of an interior air barrier at rim / band joists in Climate Zones 4 through 8, has been refined and moved to Footnote 9 of the Rater Field Checklist, as follows:

“EPA highly recommends, but does not require, an air barrier at the interior vertical surface of floor insulation in Climate Zones 4-8.”

Footnote 8, which provides the alternative compliance option of completely filling a floor cavity, has been revised by removing references to air barriers because the requirements are not intended to be any different when this alternative is used:

“Examples of supports necessary for permanent contact include staves for batt insulation or netting for blown-in insulation. Alternatively, supports are not required if batts fill the full-depth of the floor cavity, even when compression occurs due to excess insulation, as long as the R-value of the batts has been appropriately assessed based on manufacturer guidance and the only defect preventing the insulation from achieving the required installation grade is the compression caused by the excess insulation.”

Finally, Footnote 9, which provides the alternative compliance option of aligning the air barrier with the exterior (instead of interior) horizontal surface of the floor insulation, has been revised to use consistent terminology regarding the required location of air barriers, as follows:

“Alternatively, an air barrier is permitted to be installed at the exterior horizontal surface of the floor insulation if the insulation is installed in contact with this air barrier, the exterior vertical surfaces of the floor cavity are also insulated, and air barriers are included at the exterior vertical surfaces of this insulation.”

## 26. **Change – Item 3.1: Removal of interior air barrier requirement in most basements & crawlspaces**

Because it was not EPA’s intent to require the use of drywall finishes or foam insulation products in basements or crawlspaces as a prerequisite for ENERGY STAR certification under Version 3, the requirement in Item 3.1 to include an interior air barrier on all below-grade walls has been made a recommendation, rather than a requirement. To reflect this change, and improve clarity, Footnote 7 & 10 have been merged and revised as follows:

“All insulated vertical surfaces are considered walls (e.g., above and below grade exterior walls, knee walls) and must meet the air barrier requirements for walls. The following exceptions apply: air barriers recommended, but not required, in adiabatic walls in multifamily dwellings; and, in Climate Zones 4 through 8, an air barrier at the interior vertical surface of insulation is recommended but not required in basement walls or crawlspace walls. For

the purpose of these exceptions, a basement or crawlspace is a space for which  $\geq 40\%$  of the total gross wall area is below-grade.”

In addition, the guidance related to ceiling surfaces has been relocated into a separate Footnote:

“All insulated ceiling surfaces, regardless of slope (e.g., cathedral ceilings, tray ceilings, conditioned attic roof decks, flat ceilings, sloped ceilings), must meet the requirements for ceilings.”

**27. Change – Item 4.4.5e: Removal of requirement for 24” o.c. spacing or R-20 cavity insulation in CZ 5**

To address partner concerns about homes with 2x6 framing in Climate Zone 5, this Item has been revised by removing these requirements only in Climate Zone 5. Item 4.4.5e has been revised as follows:

“Minimum stud spacing of 16 in. o.c. for 2x4 framing in all Climate Zones and, in Climate Zones 6 through 8, 24 in. o.c. for 2x6 framing”.

In addition, the Climate Zones in Footnote 22 have been revised as follows:

“In Climate Zones 6 - 8, a minimum stud spacing of 16 in. o.c. is permitted to be used with 2x6 framing if  $\geq R-20.0$  wall cavity insulation is achieved. However, all 2x6 framing with stud spacing of 16 in. o.c. in Climate Zones 6 - 8 shall have  $\geq R-20.0$  wall cavity insulation installed regardless of any framing plan or alternative equivalent total UA calculation.”

**28. Change – Section 5: Transition to Section 4 of the Rater Field Checklist**

As part of an overall transition from the Thermal Enclosure System Rater Checklist to the Rater Design Review Checklist and Rater Field Checklist, Section 5 has been moved to Section 4 of the Rater Field Checklist. The Section has been reformatted due to space considerations.

In addition, a note has been added to the header of Section 4 in the Rater Field Checklist clarifying that all references to ‘sealed’ in this Section indicate the use of caulk, foam, or equivalent material, unless otherwise noted. Additionally, all references to ‘caulk, foam, or equivalent material’ in Section 4 of the Rater Field Checklist have been replaced with ‘sealed’.

Items 5.1.1 through 5.1.4 have been consolidated into a single new Item, Item 4.1, to encompass sealing requirements for most types of penetrations, as follows:

4.1: “Ducts, flues, shafts, plumbing, piping, wiring, exhaust fans, & other penetrations to unconditioned space sealed, with blocking / flashing as needed”

Items 5.1.5, 5.2.1, 5.2.2, 5.2.3, 5.2.4, 5.2.7, and 5.3.1 have been moved to Items 4.2, 4.3, 4.4, 4.5, 4.6, 4.8, and 4.9 on the Rater Field Checklist, respectively, with minor refinements.

Items 5.3.2 & 5.3.3 have been merged into a single new Item, Item 4.10, on the Rater Field Checklist, as follows:

4.10: “Attic access panels, drop-down stairs, & whole-house fans equipped with durable  $\geq R-10$  cover that is gasketed (i.e., not caulked). Fan covers either installed on house side or mechanically operated.”

Because Items 5.1.6, 5.2.5, and 5.2.6 are only applicable to a small percent of homes participating in the program, these Items and the associated Footnote, Footnote 23, have been removed.

**29. Change – Item 5.3: Addition of Item to clarify air sealing intent for garages**

A new Item has been added to the Air Sealing section to further clarify that the combination of an air barrier and air sealing is always required in floor cavities that are aligned with walls separating attached garages from occupiable space. In addition, a helpful diagram illustrating the revised policy is included in Policy Record Entry 00471. It has also been clarified that the requirement for air sealing applies to the garage wall itself. The new Item reads as follows:

5.3: “Walls that separate attached garages from occupiable space sealed and, also, an air barrier installed and sealed at floor cavities aligned with these walls.”

**30. Change – New Footnotes from Cover Page of Inspection Checklists: Definition of Rater**

In an effort to reduce the amount of paperwork associated with the ENERGY STAR Certified Homes Program, the cover page of the Inspection Checklists has been deleted and much of the information it contained has been moved to the remaining program documents. Specifically, Footnote 1 of the Cover Page of the Inspection Checklists has been moved to both Footnote 1 on the Rater Design Review Checklist and Footnote 2 on the Rater Field Checklist. Additionally, Footnote 2 of the Cover Page of the Inspection Checklists has been moved to both Footnote 12 on the Rater Design Review Checklist and Footnote 29 on Rater Field Checklist.

## HVAC System Quality Installation Contractor Checklist

### 31. **Change** - Transition to HVAC Design Report and HVAC Commissioning Checklist

As part of a larger effort to reduce the amount of paperwork required to certify a home and to better align the workflow for certification with that of a HERS rating, the requirements from this Checklist have been migrated to two new program documents - the HVAC Design Report and the HVAC Commissioning Checklist.

The HVAC Design Report contains the design-related Items from the HVAC System QI Contractor Checklist and will continue to be completed by the HVAC designer once per system design. Responsibilities of the designer have been added to the top of the HVAC Design Report, in lieu of Footnotes 4-6, as follows:

- “Complete one HVAC Design Report for each system design for a house plan, created for either the specific plan configuration (i.e., elevation, option, orientation, & county) of the home to be certified or for a plan that is intended to be built with potentially different configurations (i.e., different elevations, options, and/or orientations). Visit [www.energystar.gov/newhomeshvacdesign](http://www.energystar.gov/newhomeshvacdesign) and see Footnote 2 for more information.
- Obtain efficiency features (e.g., window performance, insulation levels, and infiltration rate) from the builder or Home Energy Rater.
- Provide the completed HVAC Design Report to the builder or credentialed HVAC contractor and to the Home Energy Rater.”

The HVAC Commissioning Checklist contains the commissioning-related Items from the HVAC System QI Contractor Checklist and will continue to be completed by a credentialed HVAC contractor for each HVAC system. Responsibilities of the commissioning contractor have been added to the top of the HVAC Commissioning Checklist, in lieu of Footnotes 4-6, as follows:

- “The commissioning contractor must be credentialed by an HVAC oversight organization to complete this checklist. One checklist must be completed and signed by the commissioning contractor for each HVAC system that is commissioned.
- The completed checklist for each commissioned system, along with the corresponding HVAC Design Report, shall be retained by the contractor for quality assurance purposes. Furthermore, the contractor shall provide the completed checklist to the builder, the Home Energy Rater responsible for certifying the home, and the HVAC oversight organization upon request.
- Visit [www.energystar.gov/newhomeshvac](http://www.energystar.gov/newhomeshvac) for information about the credential requirement and this checklist.”

Detailed modifications to Items, Sections, and Footnotes are described in the entries below along with a description of their new location on the HVAC Design Report or the HVAC Commissioning Checklist.

### 32. **Clarification** - Applicable version of ASHRAE 62.2 standard

Because of the significant differences to the ASHRAE 62.2 standard that can occur due to the release of new addenda and new versions, it has been clarified that partners are permitted to, but are not required to, use the latest version and addenda of the standard.

To reflect this change on the HVAC-C, the reference to the standard in Item 1.1 has been changed to “ASHRAE 62.2-2010 or 2013”; Footnote 1 has been changed, in part, to read, “This report is designed to meet the requirements of ASHRAE 62.2-2010 / 2013”; and the beginning of Footnote 7 has been changed to read, “Airflow design rates and run-times shall be determined using ASHRAE 62.2-2010 or later. Designers are permitted, but not required, to use published addenda and/or the 2013 version of the standard to assess compliance.”

To reflect this change on the HVAC-R, the beginning of Footnote 1 has been changed to read, “This Checklist is designed to meet the requirements of ASHRAE 62.2-2010 / 2013.”

All remaining references to “ASHRAE 62.2-2010” in the National Program Requirements, HVAC-C, and HVAC-R are simply definitions and have remained unchanged. Because the reference to the standard in Footnote 37 of the HVAC-R is also simply a definition, the phrase “and published addenda” has been deleted.

### 33. **Change** - Checklist Header: Transition to Section 1 of the HVAC Design Report and the HVAC Commissioning Checklist

To ensure that critical fields that provide an overview of the design and commissioning process are not overlooked, Section 1 has been created in the HVAC Design Report to encompass the Design Overview information and Section 1 has been created in the HVAC Commissioning Checklist to encompass the Commissioning Overview information.

The fields in the header of the Checklist related to system description and temporary occupant loads have been assigned to new Items in Section 1 of the HVAC Design Report and refined as follows:

1.4: "Area that system serves:  Whole-house  Upper-level  Lower-level  Other \_\_\_"

1.5: "Is cooling system for a temporary occupant load?  Yes  No"

To further document the design overview, three new Items have been added to Section 1 of the HVAC Design Report as follows:

1.1: "Designer name: \_\_\_\_\_ Designer company: \_\_\_\_\_ Date: \_\_\_\_"

1.2: "Select which party you are providing these design services to:  Builder or  Credentialed HVAC contractor"

1.3: "Name of company you are providing these design services to (if different than Item 1.1): "

The address of the home has been moved to Item 1.4 of the HVAC Commissioning Checklist:

"1.4 Home address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_\_ Zip code: \_\_\_\_"

To document the commissioning contractor completing the HVAC Commissioning Checklist, several fields from the signature block have been moved to three new Items in the HVAC Commissioning Checklist, as follows:

1.1: "Contractor name \_\_\_\_\_ Contractor company \_\_\_\_\_ Date \_\_\_\_"

1.2: "Organization that your company is credentialed with:  ACCA  Advanced Energy  NYSERDA"

1.3: "Builder client name: \_\_\_\_\_"

To better associate the HVAC Commissioning Checklist with a particular HVAC Design Report, three additional Items have been added to the HVAC Commissioning Checklist, as follows:

1.5: "HVAC Design Report corresponding to this system has been collected from designer or builder.  Contractor-verified"

1.6: "Area that system serves, per Item 1.4 of HVAC Design Report:  Whole-house  Upper-level  Lower-level  Other \_\_\_\_\_"

1.7: "House plan, per Item 1.6 of HVAC Design Report: \_\_\_\_\_  Site-specific design  Group design #: \_\_\_\_\_"

#### 34. **Change - Section 1: Transition to Section 2 of the HVAC Design Report**

As part of an overall transition from the HVAC System QI Contractor Checklist to the HVAC Design Report and HVAC Commissioning Checklist, Section 1 has been moved to Section 2 of the HVAC Design Report. The new Section more clearly lists the whole-building mechanical ventilation requirements.

Item 1.1, representing the overall requirement to meet ASHRAE 62.2, is now reflected in the expanded Items contained within Section 2 of the HVAC Design Report and by a clarification to Footnote 1, the beginning of which has been revised as follows:

"“This report is designed to meet ASHRAE 62.2..”,.

Item 1.2 has been moved to Item 2.8 of the HVAC Design Report and revised to clarify the requirements for outdoor air intakes connected to the return side of the HVAC system, as follows:

2.8: "No outdoor air intakes designed to connect to the return side of the HVAC system, unless specified controls operate intermittently and automatically based on a timer and restrict intake when not in use (e.g., motorized damper)."

Item 1.3 has been revised and divided into five Items, Items 2.1 through 2.5 of the HVAC Design Report, to document various parameters of the ventilation system design. As a result of these revisions, no separate documentation about the ventilation system design is required. These revised Items read as follows:

2.1: "Ventilation airflow design rate & run-time meet the requirements of ASHRAE 62.2-2010 or 2013"

2.2: "Ventilation airflow rate required by 62.2 for a continuous system \_ CFM"

2.3: "Design for this system: Vent. airflow rate: \_ CFM Run-time per cycle: \_ min Cycle time: \_ min."

2.4: "Specified system type:  Supply  Exhaust  Balanced "

2.5: "Specified control location: \_(e.g., Master bath, utility room)"

A Footnote has been added to Item 2.1 to clarify which versions and addenda of ASHRAE Standard 62.2 are permitted to be used to determine the airflow design rate and run-time, as follows:

"Airflow design rates and run-times shall be determined using ASHRAE 62.2-2010 or later. Designers are permitted, but not required, to use published addenda and/or the 2013 version of the standard to assess compliance."

Items 1.4 and 1.5 are represented by a single new Item, Item 2.6 of the HVAC Design Report, as follows:

2.6: "Specified controls allow the system to operate automatically, without occupant intervention."

Finally, Item 2.7 and Items 2.9 through 2.13 have been added to the HVAC Design Report to define requirements for override controls and labeling, sound limits, efficiency, and air inlets, as follows:

2.7: "Specified controls include a readily-accessible ventilation override and a label has also been specified if its function is not obvious (e.g., a label is required for a standalone wall switch, but not for a switch that's on the ventilation equipment)"

2.9: "The fan of the specified system is rated  $\leq 3$  sones if intermittent and  $\leq 1$  sone if continuous, or exempted"

A Footnote has been added to this Item for clarification and to provide an exemption, as follows:

"Whole-house mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.3. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated  $\geq 400$  CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be  $\geq 4$  ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms."

2.10: "If system utilizes the HVAC fan, then the specified fan type in Item 4.7 is ECM / ICM, or the specified controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling"

2.11: "If bathroom fans are specified as part of the system, then they are ENERGY STAR certified"

A Footnote has been added to this Item to provide an exemption, as follows:

"Bathroom fans with a rated flow rate  $\geq 500$  CFM are exempted from the requirement to be ENERGY STAR certified."

2.12: "Inlet pulls ventilation air directly from outdoors and not from attic, crawlspace, garage, or adjacent dwelling unit"

2.13: "Inlet is  $\geq 2$  ft. above grade or roof deck;  $\geq 10$  ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and  $\geq 3$  ft. from known sources exiting the roof"

A Footnote has been added to the header of Item 2.12 and 2.13 to recommend, but not require, that ventilation inlets be located so as to facilitate access and regular maintenance, as follows:

"Without proper maintenance, ventilation air inlet screens often become filled with debris. Therefore, EPA recommends, but does not require, that these ventilation air inlets be located so as to facilitate access and regular service by the owner".

### 35. **Change - Section 2: Transition to Section 3 of the HVAC Design Report**

As part of an overall transition from the HVAC System QI Contractor Checklist to the HVAC Design Report and HVAC Commissioning Checklist, Items in Section 2 related to load calculations have been moved to Section 3 of the HVAC Design Report. Remaining Items in Section 2 related to equipment selection have been moved to Section 4 and Items related to duct design have been moved to Section 5 of the HVAC Design Report. Various Items have been clarified, added, and deleted in an attempt to represent the most important design parameters

The design parameters listed in the header of Section 2 have been deleted. However, Item 3.2 has been added to the HVAC Design Report so that the designer can explicitly verify that the proper indoor design temperatures were used in the load calculations. Item 3.2 reads as follows:

“Indoor design temperatures used in loads are 70°F for heating and 75°F for cooling.”

To clarify that room-by-room, rather than block, loads are required and to clarify which design methodologies may be used, Item 2.1 has been revised and moved to Item 3.1 of the HVAC Design Report as follows:

3.1: “Room-by-room loads calculated using:  Unabridged ACCA Manual J v8  2013 ASHRAE Fundamentals  Other per AHJ”.

A new Footnote has been added to clarify the intent of the second and third option, as follows:

“Select ‘2013 ASHRAE Fundamentals’ if using Chapter 17 of the 2013 ASHRAE Handbook of Fundamentals. Select ‘Other per AHJ’ if the Authority Having Jurisdiction where the home will be certified mandates the use of a load calculation methodology other than Unabridged ACCA Manual J v8 or 2013 ASHRAE Fundamentals.”

Item 2.2 has been moved to Item 5.1 of the HVAC Design Report, because it relates to duct design, and has been revised as follows to clarify that the ACCA Manual D methodology must be used:

5.1: “Duct system designed for the equipment selected in Section 4, per ACCA Manual D”

Item 2.3 has been moved to Item 4.1 of the HVAC Design Report, because it relates to equipment selection, and has been revised as follows to clarify the ACCA Manual S methodology must be used:

4.1: “Equipment selected per ACCA Manual S”.

Item 2.4 has been moved to Item 3.3 of the HVAC Design Report and revised. For a more thorough discussion of the changes to this Item, see Policy Record Entry 00480. The revised Item reads as follows:

3.3: “Outdoor design temperatures used in loads: (See Footnote 12 and [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps)) County & State selected: \_ Cooling season: \_°F Heating season: \_°F”

Items 2.5 and 2.12 through 2.14 have been moved to Items 3.10 through 3.12 on the HVAC Design Report, which will allow designers to document cooling loads for multiple orientations.

Items 2.6 to 2.11 have been moved to Items 3.4 to 3.9 of the HVAC Design Report with only minor refinements.

Item 2.15 has been moved to Item 3.14 with only minor refinements.

Item 2.16 has been moved to Item 5.2 of the HVAC Design Report and revised to clarify its intent. A new Item, Item 5.3, has also been added for the designer to indicate the fan speed setting associated with these design airflows. These two Items read as follows:

5.2: “Design HVAC fan airflow: Cooling mode \_ CFM Heating mode \_ CFM”

5.3: “Design HVAC fan speed setting (e.g., low, medium, high): Cooling mode\_ Heating mode\_”

The Footnote accompanying Item 5.2 has been refined as follows:

“Design HVAC fan airflow is the design airflow for the blower in CFM, as determined using the manufacturer’s expanded performance data.”

And a Footnote has been added for Item 5.3 as follows:

“Design HVAC fan speed setting is the fan speed setting on the control board (e.g., low, medium, high) that corresponds with the Design HVAC fan airflow.”

Item 2.17 has been moved to Item 5.4 of the HVAC Design Report. To clarify that the intent of this Item is to list the design value for the Total External Static Pressure, the Item has been revised as follows:

5.4: “Design total external static pressure (corresponding to the mode with the higher airflow in Item 5.2)”

The Footnote accompanying Item 5.4 has been refined as follows:

“Design total external static pressure is the pressure corresponding to the Design HVAC fan airflow, inclusive of external components (e.g., evaporator coil, whole-house humidifier, or ≥ MERV 6 filter).”

To eliminate the need for separate documentation for room-by-room design airflows (currently documented on the test and balance report), a new Item and table has been added to the HVAC Design Report, as follows:

5.5: “Room-by-room design airflows documented below (which must sum to the mode with the higher airflow in Item 5.2)”

For designers that choose to document these airflows on supplemental documentation, rather than in Item 5.5, a Footnote has been added with this allowance, as follows:

“Designers may provide supplemental documentation with room-by-room and total design airflows in lieu of completing Item 5.5.”

A second Footnote has been added to recommend, but not require, that orientation-specific room-by-room airflows be specified, as follows:

“Orientation-specific room-by-room design airflows are recommended, but not required, to distribute airflow proportional to load, thereby improving comfort and efficiency.”

Finally, Item 2.18 and its associated Footnote has been removed, because the most important design parameters have been added directly to the HVAC Design Report.

36. **Clarification - Item 2.1 & Footnote 8: Unabridged vs Abridged Manual J Methodologies**

To reflect the clarification that the unabridged, rather than abridged, version of Manual J must be used, references to Manual J in Item 2.1 and Footnote 8 have been revised by adding the word, “Unabridged”.

37. **Change - Item 2.4 & Footnote 9: Refined design temperature limits and exception process**

To clarify the intent and ensure more consistent enforcement of this Item, county-level outdoor design temperature limits have been defined and posted as a resource to [www.energystar.gov/hvacdesigntemps](http://www.energystar.gov/hvacdesigntemps).

As a result, Item 2.4 has been refined and moved to Item 3.3 on the HVAC Design Report, as follows:

3.3: "Outdoor design temperatures used in loads: (See Footnote 12 and [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps))  
County & State Selected: \_ Cooling Season: \_°F Heating Season: \_°F"

As a result, Footnote 9 has been removed and replaced with Footnote 12 of the HVAC Design Report, as follows:

“Visit [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) for the maximum cooling season design temperature and minimum heating season design temperature permitted for ENERGY STAR certified homes. For “County & State selected”, select the County and State where the home is to be certified. The same design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93 F, then the same report could be used in Fairfax County (which has a higher limit of 94 F) but not in Arlington County (which has a lower limit of 92 F)”.

38. **Change – Footnote 8: Revised group design policy**

To improve and clarify the allowance regarding group designs, the following changes have been made:

A new Item has been added to the HVAC Design Report for the designer to record the name of the house plan that the system has been designed for and to indicate whether the design is site-specific or part of a group:

1.6: “House plan: \_\_\_\_ Check box to indicate whether the system design is site-specific or part of a group:

Site-specific design. Option(s) & elevation(s) modeled: \_\_\_\_

Group design. Group #: \_\_\_\_ out of \_\_\_\_ total groups for this house plan. Configuration modeled: \_\_\_\_”

Footnote 8 has also been revised and relocated to a new Footnote referenced by Item 1.6 in the HVAC Design Report, as follows:

“The report shall represent a single system design for a house plan. Check the box for ‘site-specific design’ if the design was created for the specific plan configuration (i.e., elevation, option, orientation, and county) of the home to be certified. Check the box for ‘group design’ if the design was created for a plan that is intended to be built with potentially different configurations (i.e., different elevations, options, and/or orientations). Regardless of the box checked, the system design as documented on this HVAC Design Report must fall within the following tolerances for the home to be certified:

- Item 3.3: The outdoor design temperature used in loads are within the limits defined at [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps).
- Item 3.4: The number of occupants used in loads is within  $\pm 2$  of the home to be certified.
- Item 3.5: The conditioned floor area used in loads is between zero and 300 sq. ft. larger than the home to be certified.
- Item 3.6: The window area used in loads is between zero and 60 sq. ft. larger than the home to be certified.
- Item 3.7: The predominant window SHGC is within 0.1 of the predominant value in the home to be certified.

- Items 3.10 - 3.12: The sensible, latent, & total heat gain are documented for the orientation of the home to be certified.
- Item 3.13: The variation in total heat gain across orientations is  $\leq 6$  kBtuh.
- Item 4.16: The cooling sizing % is within the cooling sizing limit selected.

Provide the HVAC Design Report to the party you are providing these design services to (i.e., a builder or credentialed HVAC contractor) and to the Home Energy Rater. The report is only required to be provided once per system design, even if multiple homes are built using this design (e.g., in a production environment where the same plan is built multiple times, only one report is required). As long as a report has been provided that falls within tolerance of the home to be certified, no additional work is required. However, if no report falls within these tolerances or if any aspect of the system design changes, then an additional report will need to be generated prior to certification.

Visit [energystar.gov/newhomeshvacdesign](http://energystar.gov/newhomeshvacdesign) for a tool to assist with group designs and for more information.”

To facilitate the reporting of loads for multiple orientations for a group design, a new table has been added to the HVAC Design Report (Item 3.10 through Item 3.14). This table allows designers to list sensible heat gain and total heat gain by orientation (and the latent heat gain and total heat loss, which do not vary by orientation). With this addition, Item 2.5 is no longer needed because orientation is now captured by the horizontal axis of the new table.

A new Item, Item 3.13 of the HVAC Design Report, has been added to document one of the tolerances that's required to be met for a group design. This Item will be used to document the difference between maximum and minimum total heat gain across all orientations and to verify that this difference is less than or equal to 6 kBtuh. Additionally, two new Footnotes have been added to further explain this tolerance. Footnote 16 reads as follows:

“Orientation represents the direction that the front door of the house is facing. The designer is only required to document the loads for the orientation(s) that the house might be built in. For example, if a house plan will only be built one time in a specific orientation (e.g., a site-specific design), then the designer only needs to document the loads for this one orientation.”

And Footnote 17 of the HVAC Design Report reads as follows:

“Determine the orientation with the largest and smallest Total Heat Gain. Verify that the difference in Total Heat Gain between the orientation with the largest and smallest value is  $\leq 6$  kBtuh. If not, then assign the orientations into one or more groups until the difference is  $\leq 6$  kBtuh and then complete a separate HVAC Design Report for each group”.

### 39. **Change – Sections 3, 4, & 5: Transition to Section 4 of the HVAC Design Report**

As part of an overall transition from the HVAC System QI Contractor Checklist to the HVAC Design Report and HVAC Commissioning Checklist, Sections 3, 4, and 5, which all relate to heating and cooling equipment selection, have been moved to Section 4 of the HVAC Design Report.

A new Item, Item 4.2, has been added for the designer to indicate whether a cooling-only air conditioner or cooling & heating heat pump has been selected, which will determine which subsequent fields must be completed.

Items 3.1 through 3.3 have been moved to Items 4.3 through 4.5 on the HVAC Design Report.

Items 3.4 and 4.1, which correspond to the AHRI listed efficiency of an air conditioner and a heat pump, have been merged into a single new Item, Item 4.6 on the HVAC Design Report, as follows:

4.6: “AHRI listed efficiency: \_\_\_ / \_\_\_ EER / SEER    Air-source heat pump: \_\_\_ HSPF    Ground-source heat pump: \_\_\_ COP”

Because Items 3.5 and 3.6 do not directly related to program requirements, they have been removed.

Item 3.7 has been moved to Item 4.7 of the HVAC Design Report and clarified as follows:

4.7: “Evaporator fan type:     PSC     ECM / ICM     Other: \_\_\_\_\_”

Items 3.8 to 3.10 have been moved to Items 4.9 to 4.11 of the HVAC Design Report and clarified as follows:

4.9: “Latent capacity at design conditions, from OEM expanded performance data: \_\_\_ kBtuh”

4.10 “Sensible capacity at design conditions, from OEM expanded performance data: \_\_\_ kBtuh”

4.11 “Total capacity at design conditions, from OEM expanded performance data: \_\_\_ kBtuh”

Footnote 18, which provided guidance on how to obtain the system capacity at design conditions, has been deleted because this information has been incorporated directly into Items 4.9 to 4.11.

To clarify the original intent of Item 3.11, this Item has been deleted and replaced with a new Footnote in the HVAC Design Report, as follows:

“In ‘Warm-Humid’ climates as defined by 2009 IECC Figure 301.1 (i.e., CZ 1 and portions of CZ 2 and 3A below the white line), it is recommended, but not required, that equipment be specified with sufficient latent capacity to maintain indoor relative humidity at  $\leq 60\%$ .”

Item 3.12, which relates to equipment over-sizing limits, has been moved and expanded in the HVAC Design Report. For a more thorough discussion of the changes to this Item, see Policy Record Entry 00483.

Item 3.13, which required that an AHRI Certificate be attached, has been deleted. However, the requirement to report the AHRI reference number remains in Item 4.5 of the HVAC Design Report.

Items 4.2 and 4.3 have been combined and relocated to Item 4.12 of the HVAC Design Report. Additionally, the requirement to report part-load efficiency, along with Footnote 20, has been removed because this information is often not easily attainable and does not directly relate to certification of the home.

Finally, Items 5.1 through 5.4, which relate to furnace equipment, have been moved and expanded to Items 4.17 through 4.22 on the HVAC Design Report. For a more thorough discussion of the changes to this Item, see Policy Record Entry 00483.

**40. Change – Item 3.12 & 5.4: Cooling & Heating Equipment Over-Sizing Limits**

To clarify the intent and enforcement of the cooling and heating equipment over-sizing limits for the program, the limits have been aligned with the new version of ACCA Manual S. In addition, the phrase “next nominal size” has been replaced with a quantitative allowance. To reflect these changes, Items 3.12 and 5.4 have been replaced with several Items on the HVAC Design Report.

To more clearly document the percent over-sizing of the cooling and heating equipment selected relative to the total heat gain and total heat loss, Items 4.13 and 4.20 have been added, as follows:

4.13: “Cooling sizing % = Total capacity (Item 4.11) divided by maximum total heat gain (Item 3.12): \_\_\_\_\_ %”

4.20: “Heating sizing % = Total capacity (Item 4.19) divided by total heat loss (Item 3.14): \_\_\_\_\_ %”

Because the most recent release of ACCA Manual S has different cooling over-sizing limits that are dependent upon the equipment type, compressor type, and climate conditions, three new Items have been added to the HVAC Design Report to capture these parameters, as follows:

4.2: “Equipment type:  Cooling-only air conditioner or  Cooling & heating heat pump”

4.8: “Compressor type:  Single-speed  Two-speed  Variable-speed”

4.14: “Complete this Item if Condition B Climate will be used to select sizing limit in Item 4.15. Otherwise, check “N/A”:  N/A”

4.14.1: “Load sensible heat ratio = Max. sensible heat gain (Item 3.10) / Max. total heat gain (Item 3.12) = \_\_\_\_\_ %”

4.14.2: “HDD / CDD ratio (Visit [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) to determine this value for the design location) = \_\_\_\_\_”

A new Footnote has been added to Item 4.14 to further explain Condition B Climates, as follows:

“Per ACCA Manual S, Second Edition, if the load sensible heat ratio is  $\geq 95\%$  and the HDD/CDD ratio is  $\geq 2.0$ , then the Climate is Condition B, otherwise it is Condition A.”

To clearly convey the new over-sizing limits in ACCA Manual S, tables have been included in Item 4.15 and 4.21 for cooling and heating, respectively. Furthermore, in lieu of the “next nominal size” allowance, a quantitative allowance has been provided for cooling and heating equipment, and incorporated into these tables. Finally, for the designer to clearly indicate which over-sizing limit applies for the cooling and heating system, they will be asked to check the box of the applicable limit:

Item 4.15: “Check box of applicable cooling sizing limit from chart below:”

Equipment Type (Per Item 4.2) & Climate Condition (Per Item 4.14)	Compressor Type (Per Item 4.8)		
	Single-Speed	Two-Speed	Variable-Speed
For Cooling-Only Equipment or For Cooling Mode of Heat Pump in	<input type="checkbox"/> Recommended: 90 – 115% Allowed: 90 – 130%	<input type="checkbox"/> Recommended: 90 – 120% Allowed: 90 – 140%	<input type="checkbox"/> Recommended: 90 – 130% Allowed: 90 – 160%

Condition A Climate			
For Cooling Mode of Heat Pump in Condition B Climate	<input type="checkbox"/> 90% - 100%, plus 15 kBtuh	<input type="checkbox"/> 90% - 100%, plus 15 kBtuh	<input type="checkbox"/> 90% - 100%, plus 15 kBtuh

Item 4.21: "Check box of applicable heating sizing limit from chart below:"

When Used for Heating Only	When Paired With Cooling
<input type="checkbox"/> 100 – 140%	<input type="checkbox"/> Recommended: 100 – 140%    Allowed: 100 – 200%

Footnotes 19 and 21, which define the current "next nominal size" allowances, have been deleted. Two Footnotes have been added to further clarify the new allowances and to provide an alternative allowance for low-load spaces, as follows:

"Equipment shall be selected using the maximum total heat gain in Item 3.12 and the total heat loss in Item 3.14 per ACCA Manual S, Second Edition, except that cooling ranges above ACCA Manual S limits are temporarily allowed, per Item 4.15."

"As an alternative for low-load spaces, a system match-up including a single-speed compressor with a total capacity ≤ 20 kBtuh is permitted to be used in spaces with a total cooling load ≤ 15 kBtuh. A system match-up including a two-speed or variable-speed compressor with a total capacity ≤ 25 kBtuh is permitted to be used in spaces with a total cooling load ≤ 18 kBtuh."

As a final step, two new Items have been added for the designer to indicate that the cooling and heating sizing percentage is within the cooling and heating sizing limit, as follows:

4.16: "Cooling sizing % (4.13) is within cooling sizing limit (4.15)"

4.22: "Heating sizing % (4.20) is within heating sizing limit (4.21)".

**41. Change – Sections 6 & 7: Transition to Section 2 of the HVAC Commissioning Checklist**

As part of an overall transition from the HVAC System QI Contractor Checklist to the HVAC Design Report and HVAC Commissioning Checklist, Sections 6 & 7 have been moved to Section 2 of the HVAC Commissioning Checklist. These Sections relate to refrigerant charge testing, and grouping them into a single new Section will improve the clarity of the program without changing its overall intent.

**42. Change – Section 8: Removal of Electrical Measurements Section**

Section 8 has been removed from the Checklist. While the measurement of electrical parameters does provide value, there are other tasks (i.e., checking the airflow across the evaporator, the refrigerant charge, and the airflow delivered to each room) that EPA believes are more valuable and that should be prioritized first.

**43. Change – Section 9: Transition to Section 3 of the HVAC Commissioning Checklist**

As part of an overall transition from the HVAC System QI Contractor Checklist to the HVAC Design Report and HVAC Commissioning Checklist, Section 9, which relates to assessing indoor HVAC fan airflow, has been moved to Section 3 of the HVAC Commissioning Checklist.

Item 9.1, which represents the final outcome of the commissioning test – the airflow of the fan – has been relocated to the end of Section 3 of the HVAC Commissioning Checklist and refined, as follows:

3.7: "Measured HVAC fan airflow, using Item 3.5 and fan speed setting: \_\_\_\_\_ CFM"

Item 9.2, which instructs the contractor to record what mode the test has been conducted in, has been refined, linked to the HVAC Design Report, and moved to Item 3.1, as follows:

3.1: "The mode with the higher design HVAC fan airflow used, per Item 5.2 of HVAC Design Report:  Heating  Cooling"

Item 9.5 and Footnote 23, along with portions of Item 9.3 and 9.4, have been relocated to Item 3.2 on the HVAC Commissioning Checklist, to reflect the next step in the commissioning task, as follows:

3.2: "Static pressure test holes have been created, and test hole locations are well-marked and accessible.

Test hole location for return external static pressure:  Plenum  Cabinet  Transition  Other:

Test hole location for supply external static pressure:  Plenum  Cabinet  Transition  Other:"

Items 9.3 and 9.4 have been refined and moved to Items 3.3 and 3.4 on the HVAC Commissioning Checklist as follows:

3.3: "Measured return external static pressure (Enter value only, without negative sign): \_\_\_\_ IWC"

3.4: “Measured supply external static pressure (Enter value only, without positive sign): \_\_\_\_\_ IWC”

Two new Items, Items 3.5 and 3.6, have been added to the HVAC Commissioning Checklist to document interim steps required when verifying that the HVAC fan airflow is within 15% of the design HVAC fan airflow.

The first new Item, Item 3.5, requires the addition of the return and supply side external static pressure as follows:

3.5: “Measured total external static pressure = Value-only from Item 3.3 + Value-only from Item 3.4 = \_\_\_\_ IWC”

The second new Item, Item 3.6, requires the difference between the measured total external static pressure and the design total static pressure to be recorded as follows:

3.6: “Measured (Item 3.5) - Design (Item 5.4 on HVAC Design Report) total external static pressure = \_\_\_\_\_ IWC”

Finally, Item 9.6 has been clarified and moved to Item 3.8 on the HVAC Commissioning Checklist, as follows:

3.8: “Measured HVAC fan airflow (Item 3.7) is  $\pm 15\%$  of design HVAC fan airflow (Item 5.2 on HVAC Design Report)”.

44. **Change – Section 10: Transitioned to Section 4 of the HVAC Commissioning Checklist and Made a Recommendation**

While testing and balancing is a critical commissioning step, it has been made a recommendation, rather than a requirement, while additional resources are invested to ensure the precursors to balancing are met.

As part of an overall transition from the HVAC System QI Contractor Checklist to the HVAC Design Report and HVAC Commissioning Checklist, Section 10 has been moved to Section 4 of the HVAC Commissioning Checklist and renamed “Air Balancing of Supply Registers & Return Grilles”. Footnote 24 has been moved to Footnote 4 of the HVAC Commissioning Checklist and the beginning revised as follows:

“Air balancing of supply registers and return grilles is highly recommended to improve the performance of the HVAC system and comfort of the occupants, but is not required at this time for certification.”

Items 10.1 and 10.1.1 have been refined and moved to Items 4.1 and 4.2 of the HVAC Commissioning Checklist as follows:

4.1 “Balancing report attached with room-by-room design airflows from Item 5.5 on HVAC Design Report, and contractor-measured airflow using ANSI / ACCA 5 QI-2015 protocol”

4.2: “Room-by-room airflows verified by contractor to be within the greater of  $\pm 20\%$  or 25 CFM of design airflow”

Because a Rater is no longer required to verify Items in this Section, Item 10.1.2, which provided the option for a Rater to perform air balancing, has been removed.

45. **Refinement – Item 10.1.1 & Footnote 1: Update to 2015 edition of ANSI / ACCA 5- QI**

Because the 2015 edition of the ANSI / ACCA 5 – QI standard will be released in the near future, and the latest version available for public comment does not conflict with the current ENERGY STAR program requirements, the references to ANSI / ACCA 5 QI-2007 in Item 10.1 & Footnote 1 have been updated to ANSI / ACCA 5 QI-2015.

46. **Change – Section 11: Removal of System Controls Section**

Section 11 has been removed from the Checklist. While the assurance that operating and safety controls meet OEM requirements does provide value, there are other tasks (i.e., checking the airflow across the evaporator, the refrigerant charge, and the airflow delivered to each room) that EPA believes are more valuable and that should be prioritized first.

47. **Change – Section 12: Relocation of Drain Pan Requirement**

To help streamline the commissioning tasks required of the HVAC contractor, the Item requiring the visual inspection for the presence of a drain pan, and its associated Footnote, have been relocated to a new Item in the Water Management System Builder Checklist.

48. **Clarification – Footnote 1: Checklist designed to meet ASHRAE 62.2**

To clarify that the intent of the program is to require certified homes to meet the requirements of ASHRAE 62.2, , the beginning of Footnote 1 has been revised as follows: “This Checklist is designed to meet the requirements of ASHRAE 62.2..”.

## **HVAC System Quality Installation Rater Checklist**

49. **Change - Transition to Rater Design Review Checklist and Rater Field Checklist**

As part of a larger effort to reduce the amount of paperwork required to certify a home and to better align the workflow for certification with that of a HERS rating, the requirements from this Checklist have been migrated to two new program documents - the Rater Design Review Checklist and the Rater Field Checklist.

The Rater Design Review Checklist contains the Items from the HVAC System QI Rater Checklist that can be completed at the design stage, prior to the start of construction, and the Rater Field Checklist contains the Items that must be completed in the field.

Detailed modifications to Items, Sections, and Footnotes are described in the entries below along with a description of their new location on the Rater Design Review Checklist and the Rater Field Checklist.

50. **Change – Integration of cover page from Inspection Checklists**

The Item on the cover page of the Inspection Checklists requiring the Rater to verify that the builder is an ENERGY STAR partner has been moved to Item 1.1 of the Rater Design Review Checklist and reads as follows:

1.1: “Rater has verified that builder is an ENERGY STAR partner using [energystar.gov/partnerlocator](http://energystar.gov/partnerlocator)”.

51. **Change – Section 1: Transition to Section 1 & 4 of the Rater Design Review Checklist and Section 5 of the Rater Field Checklist**

As part of an overall transition from the HVAC System QI Rater Checklist to the Rater Design Review Checklist and Rater Field Checklist, Items 1.1 and 1.2 have been revised and moved to Section 4 of the Rater Design Review Checklist; Item 1.5 has been refined and moved to Item 1.2 of the Rater Design Review Checklist; Item 1.3 has been moved to 5.2 of the Rater Field Checklist; and Item 1.4 has been deleted. Detailed explanations of the revisions and refinements follow.

Item 1.1 has been moved to Item 4.1 of the Rater Design Review Checklist and revised to reference the HVAC Design Report rather than the HVAC System QI Contractor Checklist, to clarify that only the HVAC Design Report itself must be collected, and to clarify that the report must be “completed in its entirety”. Item 4.1 on the Rater Design Review Checklist reads as follows:

“HVAC Design Report collected for records, with no Items left blank.”

A new Item, Item 5.3 of the Rater Field Checklist, has been added that will permit, but not require, the Rater to collect the HVAC Commissioning Checklist, as follows:

5.3: “Permitted, but not required: HVAC Commissioning Checklist collected, with no items left blank.”

Footnotes 2 and 3 have been combined and moved to Footnote 7 of the Rater Design Review Checklist. This new Footnote clarifies that only one HVAC Design Report must be collected for each system design and that the report must fall within the tolerances in Item 4.2 on the Rater Design Review Checklist. The new Footnote reads as follows:

“The Rater shall collect one HVAC Design Report per system design per plan. Regardless of whether the ‘site-specific design’ or ‘group design’ box has been checked in Item 1.6 of the HVAC Design Report, the system design as documented on the HVAC Design Report must fall within the tolerances in Item 4.2 for the home to be certified. The report is only required to be collected once per system design, even if multiple homes are built using this design (e.g., in a production environment where the same plan is built multiple times, only one report is required as long as no aspect of the system design changes between homes). The Rater is only responsible for verifying that the designer has not left any items blank on the HVAC Design Report and for verifying the discrete objective parameters in Item 4.2 of this Checklist, not for verifying the accuracy of every input on the HVAC Design Report.”

Item 1.2 has been moved to Item 4.2 of the Rater Design Review Checklist and revised in several ways.

Item 1.2.1, which requires the Rater to verify that the design temperatures used in the load calculations fall within defined limits, has been moved to Item 4.2.1 of the Rater Design Review Checklist and reflects a new resource that defines those limits.

Item 1.2.2 has been moved to Item 4.2.6 of the Rater Design Review Checklist, expanded, and refined to reflect that multiple orientations can be documented on the HVAC Design Report. The new Item reads as follows:

4.2.6: “Sensible, latent, & total heat gain are documented (3.10 - 3.12) for the orientation of the home to be certified”

A new Footnote now accompanies this Item to define orientation and to clarify that loads are only required to be documented for orientation of the home to be certified. This new Footnote reads as follows:

“Orientation represents the direction that the front door of the house is facing. The designer is only required to document the loads for the orientation(s) that the house might be built in. For example, if a house plan will only be built one time in a specific orientation (e.g., a site-specific design), then the designer only needs to document the loads for this one orientation.”

Item 1.2.3 and its associated Footnote have been moved to Item 4.2.2 of the Rater Design Review Checklist and a tolerance added, per Policy Record 00432.

Items 1.2.4 through 1.2.6 have been moved to Items 4.2.3 through 4.2.5 on the Rater Design Review Checklist, and the tolerances refined per the revised group design policy. The Footnote associated with Item 1.2.6 has been moved to Footnote 6 of the Rater Design Review Checklist. In addition, Item 4.2.7 has been added to the Rater Design Review Checklist to reflect the new tolerance related to orientation in the revised group design policy. These revised Items read as follows:

4.2.3: “Conditioned floor area used in loads (3.5) is between zero and 300 sq. ft. larger than the home to be certified”

4.2.4: “Window area used in loads (3.6) is between zero and 60 sq. ft. larger than the home to be certified”

4.2.5: “Predominant window SHGC used in loads (3.7) is within 0.1 of predominant value in the home to be certified”

4.2.7: “The variation in total heat gain across orientations (3.13) is  $\leq 6$  kBtuh”

Items 1.2.7 and 1.2.8, which require the Rater to verify the latent and sensible capacity relative to the load, have been deleted. Item 1.2.9, which requires the Rater to verify the total capacity relative to the load, has been moved to Item 4.2.8 of the Rater Design Review Checklist and refined.

Item 1.2.10 has been moved to Item 5.1 of the Rater Field Checklist, refined, and clarified. Additionally, a phrase has been added to the Item and to Footnote 8 explaining that if the installed equipment does not match the HVAC Design Report, the Rater must obtain written approval from the designer confirming that the installed equipment meets the requirements of the HVAC Design Report. Item 5.1 reads as follows:

5.1: “HVAC manufacturer & model number on installed equipment matches either of the following (check box):

HVAC Design Report (4.3, 4.4, & 4.17)       Written approval received from designer”

This revised Footnote is Footnote 31 of the Rater Field Checklist and reads as follows:

“If installed equipment does not match the HVAC Design Report, then prior to certification the Rater shall obtain written approval from the designer (e.g., email, updated HVAC Design Report) confirming that the installed equipment meets the requirements of the HVAC Design Report. In cases where the condenser unit is installed after the time of inspection by the Rater, the HVAC manufacturer and model numbers on installed equipment can be documented through the use of photographs provided by the HVAC Contractor after installation is complete.”

Items 1.2.11 and 1.2.12 and their associated Footnote, Footnote 9, have been removed. While having the Rater verify the math associated with the refrigerant charge test does provide some value, there are other tasks that EPA believes are more valuable and that should be prioritized first.

Item 1.3 has been moved to Item 5.2 of the Rater Field Checklist. In addition, while Raters will continue to measure static pressure, they are no longer required to verify that the Rater-measured static pressure is within a certain range of the HVAC Contractor’s values. As a result, Item 5.2 reads as follows:

5.2: “External static pressure measured by Rater at contractor-provided test locations and documented below:

Return-Side External Static Pressure: \_\_\_\_\_ IWC      Supply-Side External Static Pressure: \_\_\_\_\_ IWC”

Additionally, a new Footnote has been added to reiterate this new intent:

“The Rater shall measure and record the external static pressure in the return-side and supply-side of the system using the contractor-provided test locations. However, at this time, the Rater need not assess whether these values are within a specific range to certify the home.”

Because air balancing has been made a recommendation rather than a requirement for HVAC contractors, Raters are no longer required to verify this measure. As a result, Item 1.4 has been removed.

Finally, Item 1.5, which requires the Rater to verify that the contractor has the credentials required to commission the HVAC system, has been refined and moved to Item 1.2 of the Rater Design Review Checklist, as follows:

"Rater has verified that HVAC contractor holds credential required to complete the HVAC Commissioning Checklist, unless all equipment to be installed in home to be certified is an exempted type, in which case check "N/A"  N/A

HVAC Contractor Company Name: \_\_\_\_\_"

The associated Footnote has been clarified and moved to Footnote 2 of the Rater Design Review Checklist as follows:

"HVAC contractors must be credentialed by an EPA-recognized HVAC Quality Installation Training and Oversight Organization (H-QUITO) if a split air conditioner, unitary air conditioner, air-source heat pump, or water-source (i.e., geothermal) heat pump up to 65 kBtuh with a forced-air distribution system (i.e., ducts) or a furnace up to 225 kBtuh with a forced-air distribution system (i.e., ducts) will be installed in the home to be certified. For all other permutations of equipment (e.g., boilers, mini-split / multi-split systems) and distribution systems, a credential is not required. An explanation of this credentialing process and links to H-QUITOs, which maintain lists of credentialed contractors, can be found at [energystar.gov/newhomeshvac](http://energystar.gov/newhomeshvac)".

**52. Change – Item 1.2.1 & Footnote 4: Refined design temperature limits and exception process**

To clarify the intent and ensure more consistent enforcement of this Item, county-level outdoor design temperature limits have been defined and posted as a resource to [www.energystar.gov/hvacdesigntemps](http://www.energystar.gov/hvacdesigntemps).

As a result, Item 1.2.1, which has been moved to Item 4.2.1 on the Rater Design Review Checklist, has been refined to reflect this new resource, as follows:

"Cooling season and heating season outdoor design temperatures used in loads (3.3) are within the limits defined at [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) for the State and County where the home will be built, or the designer has provided an allowance from EPA to use alternative values"

As a result of this change in policy, Footnote 4, which is associated with this Item, has been removed and replaced with Footnote 8 of the Rater Design Review Checklist. This new Footnote reads as follows:

"Visit [energystar.gov/hvacdesigntemps](http://energystar.gov/hvacdesigntemps) for the maximum cooling season design temperature and minimum heating season design temperature permitted for ENERGY STAR certified homes and the process for a designer to obtain an allowance from EPA. The same design report is permitted to be used in other counties, as long as the design temperature limits in those other counties meet or exceed the cooling and heating season temperature limits for the county selected. For example, if Fauquier County, VA, is used for the load calculations, with a 1% cooling temperature limit of 93 F, then the same report could be used in Fairfax County (which has a higher limit of 94 F) but not in Arlington County (which has a lower limit of 92 F)".

**53. Change – Item 1.2.9: Cooling Equipment Over-Sizing Limits**

To clarify the intent and enforcement of the cooling equipment over-sizing limits for the program, the limits have been aligned with the new version of ACCA Manual S. In addition, the phrase "next nominal size" has been replaced with a quantitative allowance. As a result, Item 1.2.9 on the HVAC System QI Rater Checklist has been moved to Item 4.2.8 of the Rater Design Review Checklist and revised, as follows:

4.2.8: "Cooling sizing % (4.13) is within the cooling sizing limit (4.15) selected by the HVAC designer"

Footnote 7, which defined the "next nominal size" allowance, has been deleted.

**54. Change – Item 1.2.3: Addition of tolerance for number of occupants**

A variance of  $\pm 2$  occupants has been added to Item 1.2.3 of this Checklist to maintain the original intent of this Item while eliminating the majority of disruptions in the certification process related to this input.

**55. Change – Sections 2, 3, and 4 – Transition to Section 6 of the Rater Field Checklist**

As part of an overall transition from the HVAC System QI Rater Checklist to the Rater Field Checklist, Sections 2 through 4, which all pertain to the duct system, have been moved to Section 6 of the Rater Field Checklist. The heading of this new Section has been named "Duct Quality Installation" and now indicates that its requirements apply to heating, cooling, ventilation, exhaust, & pressure-balancing ducts unless noted in a Footnote. Detailed explanations of the revisions and refinements follow.

The qualitative installation requirements in Items 2.1 through 2.3 have been merged into a single Item, Item 6.1 on the Rater Field Checklist, as follows:

6.1: "Ductwork installed without kinks, sharp bends, compressions, or excessive coiled flexible ductwork"

The associated Footnotes have also been merged and the requirements related to balancing dampers have been removed because this commissioning test has been made a recommendation. The Footnote reads as follows:

“Kinks are to be avoided and are caused when ducts are bent across sharp corners such as framing members. Sharp bends are to be avoided and occur when the radius of the turn in the duct is less than one duct diameter. Compression is to be avoided and occurs when flexible ducts in unconditioned space are installed in cavities smaller than the outer duct diameter and ducts in conditioned space are installed in cavities smaller than inner duct diameter. Ducts shall not include coils or loops except to the extent needed for acoustical control.”

Item 2.4 has been removed. While supporting flexible ducts at intervals recommended by the manufacturer is valuable, EPA believes that the other qualitative assessments included in Item 6.1 are more valuable and should be prioritized first.

Item 2.5 has been removed because it is redundant in the sense that building cavities that are used as ducts must already meet all of the duct requirements.

In an effort to streamline the certification process, Item 2.6 has been removed.

Because Raters will no longer be required to review the HVAC contractor’s commissioning work, including the quantity and location of duct terminals, Item 2.7 and its associated Footnote have been removed.

Based on feedback from partners, the option to provide 1 sq. in. of free area opening per 1 CFM of supply air has been removed from Item 2.8. The performance-based compliance option in Item 2.8 and associated Footnotes have been moved to Item 6.2 of the Rater Field Checklist. In addition, an alternative pressure limit has been added for bedrooms with a design airflow  $\geq$  150 CFM.

As a result of the removal of the Prescriptive Path, the Prescriptive Path requirements of Item 3.2 have been removed. Additionally, the remaining portion of Item 3.2, Item 3.1, and Item 3.3 have been condensed and have become Item 6.3 of the Rater Field Checklist. This Item reads as follows:

6.3: “All supply and return ducts in unconditioned space, including connections to trunk ducts, are insulated to  $\geq$  R-6.”

Because these Items are now in a Section whose header includes local mechanical exhaust and exhaust-only whole-house ventilation, a phrase has been added to Footnote 15 excluding these types of ducts from meeting the requirements of Item 6.3 of the Rater Field Checklist. Footnote 15 has been moved to Footnote 35 of the Rater Field Checklist and revised as follows:

“Item 6.3 does not apply to ducts that are a part of local mechanical exhaust and exhaust-only whole-house ventilation systems. EPA recommends, but does not require, that all metal ductwork not encompassed by Section 6 (e.g., exhaust ducts, duct boots, ducts in conditioned space) also be insulated and that insulation be sealed to duct boots to prevent condensation”.

Finally, Items 4.1 and 4.2 have been changed and moved to Items 6.4 and 6.5 on the Rater Field Checklist.

56. **Change - Item 2.8: Higher pressure limit for bedrooms with design airflow  $\geq$  150 CFM**

To accommodate challenges in bedrooms with high design airflows, and to clarify the level of precision required to meet this item, a new Footnote has been added to Item 2.8, as follows:

“As an alternative to the 3 Pa limit, a Rater-measured pressure differential  $\leq$  5 Pa is permitted to be used for bedrooms with a design airflow  $\geq$  150 CFM. The Rater-measured pressure shall be rounded to the nearest whole number to assess compliance.”

57. **Change - Item 4.1: Increased total duct leakage limit for a duct system with three or more returns**

To reflect an increased limit on total duct leakage for a duct system with three or more returns, a single new Footnote has been added to Items 4.1.1 and 4.1.2 as follows:

“For a duct system with three or more returns, the total Rater-measured duct leakage is permitted to be the greater of  $\leq$  6 CFM<sub>25</sub> per 100 sq. ft. of CFA or  $\leq$  60 CFM<sub>25</sub> at ‘rough-in’ or the greater of  $\leq$  12 CFM<sub>25</sub> per 100 sq. ft. of CFA or  $\leq$  120 CFM<sub>25</sub> at ‘final’.”

58. **Change - Item 4.1 & 4.2: Duct leakage limits for systems serving small spaces**

To address the challenges that partners are experiencing for systems serving small spaces, an absolute amount of allowed duct leakage has been added to Items 4.1 and 4.2 as follows:

“4.1 Rater-measured total duct leakage meets one of the following two options:

4.1.1 Rough-in: The greater of  $\leq 4$  CFM25 per 100 sq. ft. of CFA or  $\leq 40$  CFM, with air handler & all ducts, building cavities used as ducts, & duct boots installed. In addition, all duct boots sealed to finished surface, Rater-verified at final.

4.1.2 Final: The greater of  $\leq 8$  CFM25 per 100 sq. ft. of CFA or  $\leq 80$  CFM, with air handler & all ducts, building cavities used as ducts, duct boots, & register grilles atop the finished surface (e.g., drywall, floor) installed.

4.2 Rater-measured duct leakage to outdoors the greater of  $\leq 4$  CFM25 per 100 sq. ft. of CFA or  $\leq 40$  CFM25.”

Footnote 17 has been revised as follows to align with this intent:

“Cabinets (e.g., kitchen, bath, multimedia) or ducts that connect duct boots to toe-kick registers are not required to be in place during the ‘rough-in’ test. For homes permitted through 12/31/2013: Homes are permitted to be certified if rough-in leakage is the greater of  $\leq 6$  CFM25 per 100 sq. ft. of CFA or  $\leq 60$  CFM25, with air handler & all ducts, building cavities used as ducts, & duct boots installed.”

Finally, because the limit for leakage to outdoors has been revised in Item 4.2, Footnote 19 has been edited to remove the current allowance of  $\leq 5$  CFM25 per 100 sq. ft. of CFA in homes  $\leq 1,200$  sq. ft., as follows:

“Testing of duct leakage to the outside can be waived if all ducts & air handling equipment are located within the home’s air and thermal barriers AND infiltration does not exceed the following: CZ 1-2: 3 ACH50; CZ 3-4: 2.5 ACH50; CZ 5-7: 2 ACH50; CZ 8: 1.5 ACH50. Alternatively, testing of duct leakage to the outside can be waived if total duct leakage is  $\leq 4$  CFM25 per 100 sq. ft. of conditioned floor area or 40 CFM, whichever is larger.”

#### 59. **Change - Item 5.1: Airflow verification tolerances**

To better reflect the limitations in commissioning and equipment accuracy at low airflow rates, and better reflect this Item’s overall intent, Item 5.1 has been revised as follows:

“Rater-measured ventilation rate is within either  $\pm 15$  CFM or  $\pm 15\%$  of design value (2.3).”

#### 60. **Change - Sections 5 through 9 – Transition to Sections 7 and 8 of the Rater Field Checklist**

As part of an overall transition from the HVAC System QI Rater Checklist to the Rater Field Checklist, Sections 5 through 9, which pertain to the whole-house mechanical ventilation system, the local mechanical exhaust systems, and the HVAC controls, have been moved to Sections 7 and 8 of the Rater Field Checklist. The requirements related to the whole-house mechanical ventilation system have been consolidated in Section 7, titled, “Whole-House Mechanical Ventilation System”. The requirements related to the local mechanical exhaust systems have been consolidated in Section 8, titled, “Local Mechanical Exhaust”. The requirements related to HVAC control commissioning have been deleted. Detailed explanations of the revisions and refinements follow.

Item 5.1 has been moved to Item 7.1 of the Rater Field Checklist and the tolerances revised, as follows:

7.1: “Rater-measured ventilation rate is within either  $\pm 15$  CFM or  $\pm 15\%$  of design value (2.3)”

The accompanying Footnote, Footnote 42 of the Rater Field Checklist, has been revised to reference RESNET Standard 380 as the required methodology for measuring the ventilation rate, upon publication, as follows:

“The whole-house ventilation air flow and local exhaust air flows shall be measured by the Rater using RESNET Standard 380 upon publication and, in the interim, a flow hood, flow grid, anemometer, or substantially equivalent method.”

Items 6.1 through 6.3, along with their associated Footnotes, have been removed. While a quick assessment of whether the heating, cooling, and fan mode of the thermostat is operational does provide value, there are other tasks (i.e., measuring the ventilation and exhaust airflows, verifying HVAC equipment model numbers match the design) that EPA believes are more valuable and that should be prioritized first.

Item 6.4 & 6.5 have been combined into one Item, Item 7.2 of the Rater Field Checklist. Additionally the phrase ‘continuously-operating’ has been removed to clarify that both intermittent and continuous whole-house ventilation systems must have over-ride controls. This new Item reads as follows:

7.2: “A readily-accessible ventilation override control installed and also labeled if its function is not obvious (e.g., a label is required for a standalone wall switch, but not for a switch that’s on the ventilation equipment).”

A new visual verification task has been added as Item 7.3 of the Rater Field Checklist as follows:

7.3: “No outdoor air intakes connected to return side of the HVAC system, unless controls are installed to operate intermittently & automatically based on a timer and to restrict intake when not in use (e.g., motorized damper)”

Section 7, which contains the requirements for ventilation air inlets and ventilation sources, has been combined into a single Item, Item 7.7 of the Rater Field Checklist, to indicate that the Item only needs to be completed if ventilation air inlet locations have been specified on the HVAC Design Report, as follows:

“Air inlet location (Complete if ventilation air inlet location was specified (2.12, 2.13); otherwise check “N/A”).”

Footnotes 23 and 25 have been moved to Footnotes 45 and 46 on the Rater Field Checklist, respectively. In addition, an exemption from the visual inspections required in this Item has been added to Footnote 45 of the Rater Field Checklist if the inlets are only visible via rooftop access. As a result, Footnote 45 reads as follows:

“Ventilation air inlets that are only visible via rooftop access are exempted from Item 7.7 and the Rater shall mark ‘n/a’. The outlet and inlet of balanced ventilation systems shall meet these spacing requirements unless manufacturer instructions indicate that a smaller distance may be used. However, if this occurs the manufacturer’s instructions shall be collected for documentation purposes.”

Items 7.1 and 7.2 have been combined into a single new Item, Item 7.7.2 of the Rater Field Checklist. In addition, the requirements have been simplified by requiring the inlet to be  $\geq 2$  ft. above grade or the roof deck in all Climate Zone and by removing the requirement to visually verify that the inlet is not obstructed by snow, plantings, condensing units or other material at time of inspection. As a result of this change, Footnote 24, which permitted the use of inlet heights below 4 ft. in North Carolina, has been removed because it is no longer necessary.

7.7.2: “Inlet is  $\geq 2$  ft. above grade or roof deck;  $\geq 10$  ft. of stretched-string distance from known contamination sources (e.g., stack, vent, exhaust, vehicles) not exiting the roof, and  $\geq 3$  ft. distance from sources exiting the roof”

Item 7.3 has been moved to Item 7.7.3 of the Rater Field Checklist with only minor refinements.

Item 7.4 has been moved to Item 7.7.1 of the Rater Field Checklist with only minor refinements.

Section 8 has been moved to Section 8 of the Rater Field Checklist and Items 9.1 and 9.2 have been incorporated into this Section. In addition, the sound limits for intermittent bathroom exhaust fans have been made a recommendation, rather than a requirement. As a result of these changes, the heading for Section 8 has been revised to read:

“In each kitchen and bathroom, a system is installed that exhausts directly to the outdoors and meets one of the following Rater-measured airflow and manufacturer-rated sound level standards:”

And Items 8.1 and 8.2 of the Rater Field Checklist have been revised to read:

Location		Continuous Rate	Intermittent Rate
8.1 Kitchen	Airflow	$\geq 5$ ACH, based on kitchen volume	$\geq 100$ CFM and, if not integrated with range, also $\geq 5$ ACH based on kitchen volume
	Sound	Recommended: $\leq 1$ sone	Recommended: $\leq 3$ sones
8.2 Bathroom	Airflow	$\geq 20$ CFM	$\geq 50$ CFM
	Sound	Required: $\leq 1$ sone	Recommended: $\leq 3$ sones

The accompanying Footnote, now Footnote 42 of the Rater Field Checklist, has been revised to read as follows:

“The whole-house ventilation air flow and local exhaust air flows shall be measured by the Rater using RESNET Standard 380 upon publication and, in the interim, a flow hood, flow grid, anemometer, or substantially equivalent method.”

The two remaining Footnotes associated with this heading, which contain two definitions from ASHRAE 62.2-2010, have been combined into a single Footnote, Footnote 47 of the Rater Field Checklist, and expanded, as follows:

“Continuous bathroom local mechanical exhaust fans shall be rated for sound at no less than the airflow rate in Item 8.2. Intermittent bathroom and both intermittent and continuous kitchen local mechanical exhaust fans are recommended, but not required, to be rated for sound at no less than the airflow rate in Items 8.1 and 8.2. Per ASHRAE 62.2-2010, an exhaust system is one or more fans that remove air from the building, causing outdoor air to enter by ventilation inlets or normal leakage paths through the building envelope (e.g., bath exhaust fans, range hoods, clothes dryers). Per ASHRAE 62.2-2010, a bathroom is any room containing a bathtub, shower, spa, or similar source of moisture.”

Items 8.3 through 8.5, along with their associated Footnote, have been removed. While a quick visual inspection of shared exhaust ducts and clothes dryer exhaust ducts does provide value, there are other tasks (i.e., measuring exhaust airflows) that EPA believes are more valuable and that should be prioritized first.

Items 9.1 and 9.2, in addition to having been integrated into Section 8, have been combined and added to a new Item, Item 7.4 in the Rater Field Checklist, as follows:

7.4: "System fan rated  $\leq 3$  sones if intermittent and  $\leq 1$  sone if continuous, or exempted"

The accompanying Footnote, Footnote 43, defines these exemptions:

"Whole-house mechanical ventilation fans shall be rated for sound at no less than the airflow rate in Item 2.3 of the HVAC Design Report. Fans exempted from this requirement include HVAC air handler fans, remote-mounted fans, and intermittent fans rated  $\geq 400$  CFM. To be considered for this exemption, a remote-mounted fan must be mounted outside the habitable spaces, bathrooms, toilets, and hallways and there shall be  $\geq 4$  ft. ductwork between the fan and intake grill. Per ASHRAE 62.2-2010, habitable spaces are intended for continual human occupancy; such space generally includes areas used for living, sleeping, dining, and cooking but does not generally include bathrooms, toilets, hallways, storage areas, closets, or utility rooms."

Item 9.3, which generally requires bathroom fans used as part of a whole-house mechanical ventilation system to be ENERGY STAR certified, has been refined and moved to Item 7.6 of the Rater Field Checklist, as follows:

7.6: "Bathroom fans are ENERGY STAR certified if used as part of the whole-house system"

A new Footnote, Footnote 44 of the Rater Field Checklist, accommodates the existing exemption to this requirement, as follows:

"Bathroom fans with a rated flow rate  $\geq 500$  CFM are exempted from the requirement to be ENERGY STAR certified."

Finally, a new verification task has been added as Item 7.5 of the Rater Field Checklist, which requires the Rater to verify that if the whole-house mechanical ventilation system utilizes the HVAC fan, then a strategy is included to reduce energy consumption. This new Item reads as follows:

7.5: "If system utilizes the HVAC fan, then the specified fan type is ECM / ICM (4.7), or the controls will reduce the standalone ventilation run-time by accounting for hours when the HVAC system is heating or cooling".

#### 61. **Change - Sections 10: Transition to Section 10 of the Rater Field Checklist**

As part of an overall transition from the HVAC System QI Rater Checklist to the Rater Field Checklist, Section 10, which contains the requirements for combustion appliances, has been moved to Section 10 of the Rater Field Checklist. The Items in this Section have been updated by moving all alternatives to mechanically drafted or direct-vented equipment into the Footnotes; by updating the methodology for combustion safety testing to reflect RESNET's latest standards, where applicable; and by removing the alternative compliance path for fireplaces that is based on a pressure differential.

Item 10.1 reads as follows:

"Furnaces, boilers, and water heaters located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 56 for alternatives."

The alternative to this Item is now contained in Footnote 56 of the Rater Field Checklist, as follows:

"Naturally drafted equipment is allowed within the home's pressure boundary in Climate Zones 1-3 if the Rater has followed Section 805 of RESNET's Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Sections A3 (Carbon Monoxide Test) and A4 (Depressurization Test for the Combustion Appliance Zone), and verified that the equipment meets the limits defined within."

Item 10.2 reads as follows:

"Fireplaces located within the home's pressure boundary are mechanically drafted or direct-vented. See Footnote 57 for alternatives."

The alternative this Item is now contained in Footnote 57 of the Rater Field Checklist, along with the two relevant definitions from ASHRAE 62.2-2010. In addition, the alternative option for the Rater to verify that the pressure differential is  $\leq -5$  Pa using BPI's or RESNET's worst-case depressurization test procedure has been removed. Footnote 57 reads as follows:

"Naturally drafted fireplaces are allowed within the home's pressure boundary if the Rater has verified that the total net rated exhaust flow of the two largest exhaust fans (excluding summer cooling fans) is  $\leq 15$  CFM per 100

sq. ft. of occupiable space when at full capacity. If the net exhaust flow exceeds the allowable limit, it shall be reduced or compensating outdoor airflow provided. Per ASHRAE 62.2-2010, the term 'net rated exhaust flow' is defined as flow through an exhaust fan minus the compensating outdoor airflow through any supply fan that is interlocked to the exhaust fan. Per ASHRAE 62.2-2010, the term 'occupiable space' is defined as any enclosed space inside the pressure boundary and intended for human activities, including, but not limited to, all habitable spaces, toilets, closets, halls, storage and utility areas, and laundry areas. See Footnote 43 for the definition of 'habitable spaces'."

Item 10.3 reads as follows:

"If unvented combustion appliances other than cooking ranges or ovens are located inside the home's pressure boundary, the Rater has followed Section 805 of RESNET's Standards, encompassing ANSI/ACCA 12 QH-2014, Appendix A, Section A3 (Carbon Monoxide Test), and verified the equipment meets the limits defined within."

62. **Change - Sections 11: Transition to Section 9 of the Rater Field Checklist**

As part of an overall transition from the HVAC System QI Rater Checklist to the Rater Field Checklist, Section 11, which contains the requirements for filtration, has been moved to Section 9 of the Rater Field Checklist, with only minor refinements.

Items 11.1 and 11.3 have been combined and are now Item 9.1 of the Rater Field Checklist. Their associated Footnotes, Footnotes 40 and 41, have been condensed and are now Footnote 52 of the Rater Field Checklist.

Item 11.2 is now Item 9.3 of the Rater Field Checklist.

Item 11.4 is now Item 9.2 of the Rater Field Checklist. Additionally, Footnote 42 which is associated with this Item is now Footnote 53 of the Rater Field checklist.

63. **Refinement - Footnote 1 - Update to 2015 edition of ANSI / ACCA 5- QI**

Because the 2015 edition of the ANSI / ACCA 5 – QI standard will be released in the near future, and the latest version available for public comment does not conflict with the current ENERGY STAR program requirements, the reference to ANSI / ACCA 5 QI-2007 in Footnote 1 has been updated to ANSI / ACCA 5 QI-2015.

64. **Clarification - Footnote 1 – Checklist designed to meet ASHRAE 62.2**

To clarify that the intent of the program is to require certified homes to meet the requirements of ASHRAE 62.2, , the beginning of Footnote 1 has been revised as follows: "This Checklist is designed to meet the requirements of ASHRAE 62.2...,".

## **Water Management System Builder Checklist**

65. **Change – Repurposing of Checklist**

As part of a larger effort to reduce the amount of paperwork required to certify a home, the Water Management System Builder Checklist has been repurposed as the Water Management System Builder Requirements. While builders will not be required to maintain documentation demonstrating compliance for each individual certified home, builders will be required to develop a process to ensure compliance for each certified home. Furthermore, in the event that EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.

As a result of this repurposing, all four columns of checkboxes have been removed.

Footnote 2, which previously described the use of the checkboxes and process for Rater verification of the checklist has been deleted.

Because builders are no longer required to maintain documentation demonstrating compliance for each individual certified home but rather required to develop a process to ensure compliance for each certified home, the home address block at the top of the checklist is no longer applicable and has been removed. For this same reason, the builder employee name and signature and Rater signature fields have been removed.

To explain the repurposing of this Checklist, a new box has been added above Section 1 that reads as follows:

"Builder Responsibilities:

- It is the exclusive responsibility of builders to ensure that each certified home is constructed to meet these requirements.

- While builders are not required to maintain documentation demonstrating compliance for each individual certified home, builders are required to develop a process to ensure compliance for each certified home (e.g., incorporate these requirements into the Scope of Work for relevant sub-contractors, require the site supervisor to inspect each home for these requirements, and/or sub-contract the verification of these requirements to the Rater).
- In the event that the EPA determines that a certified home was constructed without meeting these requirements, the home may be decertified.”

**66. Change – Item 1.8: Use of interior drain tiles**

To clarify that a drain tile is permitted to be installed on the interior or exterior side of footings in new homes, so long as interior drain tiles are provided with a channel to allow movement of water from the exterior side of the footing, Item 1.8 has been revised as follows:

“Drain tile installed at basement & crawlspace walls, with the top of the drain tile pipe below the bottom of the concrete slab or crawlspace floor. Drain tile surrounded with  $\geq 6$  in. of  $\frac{1}{2}$  to  $\frac{3}{4}$  in. washed or clean gravel and with gravel layer fully wrapped with fabric cloth. Drain tile level or sloped to discharge to outside grade (daylight) or to a sump pump. If drain tile is on interior side of footing, then channel provided through footing to exterior side.”

To better clarify the use of interior drain tiles in existing homes, the relevant sentence from Footnote 9 has been revised as follows:

“In an existing home (e.g., in a home undergoing a gut rehab), a drain tile installed only on the interior side of the footing without a channel is permitted.”

**67. Change – Item 3.2: Additional alternative to gutters & downspouts**

To include a new alternative to the gutter & downspout requirements of Item 3.2 and improve clarity, Footnote 14 has been split into two footnotes and the second Footnote has been revised to allow for the additional alternative. The first Footnote reads as follows:

“The assessment of whether the soil is expansive or collapsible shall be completed by a certified hydrologist, soil scientist, or engineer.”

The second Footnote, which contains the new alternative, reads as follows:

“Any of the following are permitted to be used as alternatives to Item 3.2: a) a roof design that deposits rainwater to a grade-level rock bed with a waterproof liner and a lateral drain pipe that meets discharge requirements per Item 3.2; b) a rainwater harvesting system that drains overflow to meet discharge requirements per Item 3.2; or c) a continuous rubber membrane (e.g. EPDM) that is aligned with the foundation wall from final grade to  $\geq 8$  in. below grade and then slopes  $\geq 0.5$  in. per ft. away from the home for at least 5 ft, with Group I Soils (as defined in Footnote 9) covering the membrane to within 3 in. of final grade.”

**68. Change – Item 3.3: Definition of self-sealing bituminous membrane**

Because the requirements of Item 3.3 are generally derived from Section R905.2.8.2 of the 2009 International Residential Code (IRC) and because EPA recommends, but does not require, that partners use products that meet ASTM D1970, Item 3.3 has been revised to better align with the terminology in ASTM D1970 as follows:

“Self-adhering polymer-modified bituminous membrane at all valleys & roof deck penetrations.”

To further clarify that any applicable option in 2009 IRC Section R905.2.8.2 is permitted to be used to meet Item 3.3, a new Footnote has been added that reads as follows:

“As an alternative, any applicable option in 2009 IRC Section R905.2.8.2 is permitted to be used to meet Item 3.3 and any option in 2009 IRC Section R905.2.7.1 is permitted to be used to meet Item 3.4. EPA recommends, but does not require, that products meet ASTM D1970.”

**69. Change – Item 3.4: Definition of self-sealing bituminous membrane**

Because the requirements of Item 3.4 are generally derived from Section R905.2.7.1 of the 2009 International Residential Code (IRC) and because EPA recommends, but does not require, that partners use products that meet ASTM D1970, Item 3.4 has been revised to better align with the terminology in ASTM D1970 as follows:

“In 2009 IECC Climate Zones 5 & higher, self-adhering polymer-modified bituminous membrane over sheathing at eaves from the edge of the roof line to  $> 2$  ft. up roof deck from the interior plane of the exterior wall.”

To further clarify that any applicable option in 2009 IRC Section R905.2.7.1 is permitted to be used to meet Item 3.4, a new Footnote has been added that reads as follows:

“As an alternative, any applicable option in 2009 IRC Section R905.2.8.2 is permitted to be used to meet Item 3.3 and any option in 2009 IRC Section R905.2.7.1 is permitted to be used to meet Item 3.4. EPA recommends, but does not require, that products meet ASTM D1970.”

70. **Change – Section 4: New Item relocated from HVAC System Quality Installation Contractor Checklist**

To help streamline the commissioning tasks required of the HVAC contractor, Item 12.1 of the HVAC System Quality Installation Contractor Checklist has been relocated to a new Item on this Checklist.

## **HERS Index Target Procedure for National Program Requirements**

71. **Refinement – Step 1a: No longer referencing Prescriptive Path**

Because the option to use the Prescriptive Path has been removed, Step 1a's reference to the “minimum requirements of the Prescriptive Path” has been updated to “Exhibit 1 of the National Program Requirements”.

72. **Clarification – Exhibit 2: Configuration of thermal boundary in basements**

To clarify how to configure the location of the foundation insulation in the ENERGY STAR Reference Design home for a home with a basement, a Footnote has been added to the Insulation sub-section of the Foundation Section and the Floors Over Unconditioned Spaces Section of Exhibit 2 as follows:

“If software allows the user to specify the thermal boundary location independent of the conditioned space boundary in the basement of the rated home, then the thermal boundary of the ENERGY STAR Reference Design shall be aligned with this boundary. For example, if the thermal boundary is located at the walls, then the wall insulation shall be configured as if it was a conditioned basement. If the thermal boundary is located at the floor above the basement, then the floor insulation shall be configured as if it was a floor over an unconditioned space.”

73. **Clarification – Exhibit 2: Heating & cooling equipment configuration when Rated Home has neither**

To clarify how to configure the heating equipment efficiency in the ENERGY STAR Reference Design for Rated homes without heating equipment, a new Footnote has been added to the System Type subsection of the Heating Systems Section of Exhibit 2 as follows:

“For a Rated Home without a heating system, the ENERGY STAR Reference Design Home shall be configured with a 78% AFUE gas furnace system, unless the Rated home has no access to natural gas or fossil fuel delivery. In such cases, the ENERGY STAR Reference Design Home shall be configured with a 7.7 HSPF air-source heat pump.”

To clarify how to configure the cooling equipment efficiency in the ENERGY STAR Reference Design for rated homes without cooling equipment, a new Footnote has been added to the System Type subsection of the Cooling System Sections of Exhibit 2 as follows:

“For a Rated Home without a cooling system, the ENERGY STAR Reference Design Home shall be configured with a 13 SEER electric air conditioner.”

74. **Change – Exhibit 2: Expanded ENERGY STAR Reference Design Definition - Duct leakage limits for systems serving small spaces**

To address the challenges that partners are experiencing for systems serving small spaces, the limit on total duct leakage at ‘rough-in’ has been revised to be the greater of  $\leq 4$  CFM25 per 100 sq. ft. of CFA or  $\leq 40$  CFM on the HVAC System Quality Installation Rater Checklist. While this change only impacts the limit on total duct leakage, the limit on leakage to outdoors has been aligned with the new limit on total duct leakage at ‘rough-in’ to simplify the overall policy regarding duct leakage. As a result, the duct leakage to the outside that shall be modeled in the Thermal Distribution Systems section of Exhibit 2 has been revised as follows:

“Duct leakage to outside: the greater of  $\leq 4$  CFM25 per 100 sq. ft. of conditioned floor area or  $\leq 40$  CFM25.”

75. **Change – Thermal Distribution Systems Section: Duct location for multifamily dwelling units**

To eliminate any ambiguity surrounding the duct location configuration in the reference design for multifamily dwelling units, the ‘Supply and Return Duct Locations:’ sub-header in the Thermal Distribution Systems Section has been modified to read “Supply and Return Duct Locations shall be configured according to the table below or, if Rated home does not meet any of the conditions below (e.g., multifamily dwelling unit with conditioned unit below), then duct locations shall be configured to be 100% in attic space.”

76. **Change – Exhibit 2: Quantity of ceiling fans**

To clarify that the quantity of ceiling fans in the ENERGY STAR Reference Design home shall equal the number of bedrooms plus one when ceiling fans are present in the Rated home, and shall otherwise be zero, the Ceiling Fan row of the Lighting, Appliances, & Internal Gains Section of Exhibit 2 has been revised as follows:

“Ceiling Fan: 122 CFM per Watt; Quantity = Number of bedrooms + 1 when ceiling fans present in the Rated Home; otherwise Quantity = 0”