Version Tracking Document for

DOE Challenge Homes, National Program Requirements (Rev. 03)

4/17/2013

In the time since Revision 02 of the DOE Challenge Home National Program Requirements was released, DOE 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 section of the National Program Requirements in which they appear. DOE has also posted the revised National Program Requirements, labeled Rev. 03, on its Web site at www.buildings.energy.gov/challenge.

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.

Note that new language is shown in underline, and deleted language shown in ~~strikethrough~~.

Introduction to National Program Requirements

1. Clarification – Buildings which are eligible for DOE Challenge Home qualification

To clarify which types of buildings are eligible to participate in the DOE Challenge Home program, the introduction to the National Program Requirements has been revised to read:

"Single family detached and attached dwelling units and dwelling units in multifamily buildings with 3 stories or fewer above-grade, are eligible for qualification."

Two footnotes have added to define the terms used to describe eligible building types:

"(2) A dwelling unit, as defined by the 2012 IECC, is a single unit that provides complete independent living facilities for one or more persons, including permanent provisions for living, sleeping, eating, cooking, and sanitation.

(3) Any above-grade story with 20% or more occupiable space, including commercial space, shall be counted towards the total number of stories for the purpose of determining eligibility to participate in the program. The definition of an 'above-grade story' is one for which more than half of the gross surface area of the exterior walls is above-grade. All below-grade stories, regardless of type, shall not be included when evaluating eligibility. Per ASHRAE 62.2-2010, occupiable space is any enclosed space inside the pressure boundary and intended for human activities or continual human occupancy, including, but not limited to, areas used for living, sleeping, dining, and cooking, toilets, closets, halls, storage and utility areas, and laundry areas."

DOE Challenge Home Performance Path

2. Change – How qualifying DOE Challenge Home submittals should be processed

DOE is requiring that the DOE Challenge Home compliance verification report, as generated by the RESNET-accredited rating software for qualifying projects, be sent to DOE at this email address: doechallengehome@newportpartnersllc.com. Previously DOE had required the qualifying projects be uploaded to the RESNET National Buildings Registry. However, DOE Challenge Home is not yet integrated with that database, so qualifying home submittals must be sent to DOE for the builder to receive credit for the home.

Footnotes

3. Refinement – Exhibit 3: Inclusion of zero bedrooms in Benchmark Home exhibit

To more clearly convey the Benchmark Home size of a home with zero bedrooms, a "zero bedroom" design scenario is now shown in Exhibit 3.

4. Refinement – Footnote numbers have changed.

As a result of adding footnotes, REV03 footnotes differ in numbering from REV02 footnotes. Footnotes described in this document refer to the updated, REV03 footnote numbers.

5. Change – Footnote #7: Accommodation for "blind" filled building assemblies.

To accommodate very high R-value assemblies where insulation is blind filled (e.g. added between 2 layers of sheathing) within the ENERGY STAR Thermal Enclosure System Rater Checklist, the following language was added to this footnote:

With respect to Provision 2.2 within the ENERGY STAR Qualified Homes, Version 3 (REV06) Thermal Enclosure System Rater Checklist: where ceiling, wall, or floor assembly insulation is installed "blind" between layers of sheathing and therefore cannot be visually inspected, such assemblies are deemed equivalent to a RESNET-defined Grade 1 installation if the assembly insulation level is at least 50% greater than the specified value for the DOE Challenge Home Target Home, based on nominal R-value.

6. Change – Footnote #8: Alternative compliance path for kitchen ventilation in PHIUS+ qualified homes.

To accommodate low infiltration homes using continuous whole-house ventilation systems that are PHIUS+ certified, this footnote allows a 2012 IRC-compliant kitchen ventilation system with the following footnote:

For homes achieving PHIUS+ certification, DOE will allow compliance with the 2012 IRC kitchen ventilation airflow rates (M 1507.4) as an alternative to those specified within ASHRAE 62.2. This alternative will remain in effect while DOE works to develop an ASHRAE 62.2-compliant solution optimized for very low-load homes.

7. Change – Footnote #10: Allowance to use triple-glazed window assemblies which may not be ENERGY STAR certified products.

To accommodate the use of high thermal resistance, triple-glazed window assemblies which may not be ENERGY STAR certified units because they are imported, footnote #10 was modified as follows:

Windows shall meet the ENERGY STAR Window Product Criteria which are in force at the time of the final rating inspection. See www.energystar.gov/windows for current ENERGY STAR Window Product Criteria. Where triple glazed window assemblies with thermal breaks/spacers between the panes are used, such windows are deemed to meet this requirement even in the absence of an ENERGY STAR certification.

8. Change – Footnote #12: Allowance to include fenestration in the total UA calculation to meet 2012 IECC insulation levels.

To allow rated homes to "get credit" for the use of high performance windows, the total UA calculation methodology has been amended to include fenestration in the calculation. Previously, fenestration was not included in the total UA calculation to prevent designs from qualifying where highly insulated opaque assemblies made up for low thermal resistance windows. However DOE Challenge Home includes a mandatory provision for ENERGY STAR qualified windows, assuring that the windows will be high performance regardless of total UA tradeoffs. The revised footnote reads as follows:

(12d) 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 2012 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 insulation levels of ~~all non-fenestration components (i.e.,~~ fenestration, ceilings, walls, floors, and slabs~~)~~ can be traded off using the UA approach under both the Prescriptive and the Performance Path. ~~Note that fenestration products (i.e., windows, skylights, doors) shall not be included in this calculation.~~ Also, note that while ceiling and slab insulation can be included in trade-off calculations, Items 4.1 through 4.3 of the ENERGY STAR for Homes V3 Thermal Enclosure System Rater 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.

9. Clarification – Footnote #14: Added detail on efficient hot water distribution system design and verification requirements

The revisions to footnote #14 provide greater detail on the design requirements for hot water distribution systems and the required verification steps. The revised footnote reads as follows:

(14) Hot water delivery systems shall meet efficiency requirements found in Section 3.3 of the EPA WaterSense Single-Family New Home Specification. Under the DOE Challenge Home program, the approved verifier may also confirm compliance with these requirements. These requirements are stated below:

> Hot Water Delivery System – To minimize water wasted while waiting for hot water, the hot water distribution system shall store no more than 0.5 gallons (1.9 liters) of water in any piping/manifold between the hot water source and any hot water fixture. In the case of occupant-controlled or occupancy sensor-based recirculation systems, the 0.5 gallon (1.9 liter) storage limit shall be measured from the point where the branch feeding the fixture branches off the recirculation loop, to the fixture itself. To verify that the system stores no more than 0.5 gallons (1.9 liters), verifiers shall calculate the stored volume using the piping or tubing inside diameter and the length of the piping/tubing.
>
> To account for the additional water that must be removed from the system before hot water can be delivered, no more than 0.6 gallons (2.3 liters) of water shall be collected from the hot water fixture before hot water is delivered. ~~Timer- and temperature-based recirculating systems shall not be used to meet the criteria.~~ Recirculation systems must be based on an occupant-controlled switch or an occupancy sensor. Recirculation systems that are activated based **solely** on a timer and/or temperature sensor do not meet this requirement. To verify that the system meets the 0.6 gallon (2.3 liter) limit, verifiers shall first initiate operation of occupant-controlled or occupancy sensor-based recirculation systems, if present, and let such systems run for at least 40 seconds. Next, a bucket or flow measuring bag (pre-marked for 0.6 gallons) shall be placed under the hot water fixture. The hot water shall be turned on completely, a digital thermometer placed in the stream of water just where it meets the water being collected, and the starting temperature recorded. Once the water reaches the pre-marked line (approximately 24 seconds for a lavatory faucet), the water shall be turned off and the ending temperature reading at the same location recorded. The temperature must increase by 10 °F. Only the fixture with the greatest stored volume between the fixture and the hot water source (or recirculation loop) needs to be tested.

10. Clarification – Footnote #16: Revised language on the exceptions to full Indoor airPLUS compliance to reflect recent Indoor airPLUS specification updates

The revisions to footnote #16 reflect recent updates to the Indoor airPLUS (IAP) specifications. These updates have nullified 2 previous DOE Challenge Home exceptions to the IAP specifications. The revised footnote reads as follows:

The following exception applies to the mandatory requirement to meet the EPA Indoor airPLUS Verification Checklist and Construction Specifications: Compliance with the ENERGY STAR for Homes V3 Water Management System Builder Checklist shall be equivalent to compliance with the EPA Indoor airPLUS Verification Checklist "Moisture Control" provisions (Provisions 1.1 through 1.13).

a. ~~Builders shall not be required to provide home buyers with radon test kits (Provision 2.2 of Indoor airPLUS). However, builders are strongly encouraged to include a radon fact sheet in their homeowner materials.~~
b. ~~For Provision 5.6 of Indoor airPLUS, garage exhaust fans operated by automatic fan controls that activate the fan whenever the garage is occupied and run for at least 10 minutes after the garage has been vacated are deemed acceptable.~~

Homes utilizing this exception ~~any of these exceptions~~ will not qualify for the Indoor airPLUS label. Builders seeking the Indoor airPLUS label must achieve full compliance with the Indoor airPLUS Verification Checklist.

11. Clarification – Footnote #17: Revised language on the applicability of the two renewable-ready checklists.

Footnote #17 has been edited to reflect that the renewable-ready checklists only apply when all of the 4 sub-bullets are relevant. Also, a web-based online calculator has been added to sub-bullet b to allow a specific calculation of the kWh/m2/day for a given project location. Previously there was only a static map reference. The edited footnote is shown here:

The Renewable Energy Ready Home (RERH) checklists only apply under all of the following conditions:

a. If a solar photovoltaic or solar hot water system is already included with the home, then compliance with the solar photovoltaic or solar hot water RERH checklist, respectively, is not required.
b. ~~Location has at least 5 kWh/m2/day average daily solar radiation based on annual solar insolation (http://www.energysavers.gov/pdsf/208.pdf).~~ Location, based on zip code, has at least 5 kWh/m^2/day average daily solar radiation based on annual solar insolation using this online tool: http://gisatnrel.nrel.gov/PVWatts_Viewer/index.html.
c. Location does not have significant natural shading (e.g., trees, tall buildings) on the south-facing roof.
d. Home as designed has adequate free roof area within +/- 45° of true south as noted in the table below. Note that in some cases a house may have insufficient roof area for the Solar Electric RERH checklist, but it may still have the minimum roof area for the Solar Thermal RERH checklist, and would therefore have to comply with the Solar Thermal RERH checklist. In other cases, the home may only have adequate south facing roof for the Solar Electric or Solar Thermal RERH checklist, but not both. In that case, the builder can decide which one of those two checklists to apply.

Conditioned Floor Area of House (ft^2)	Minimum Roof Area for Solar Electric RERH Checklist (ft^2)	Minimum Roof Area for Solar Thermal RERH Checklist (ft^2)
≤ 2000	110	40
≤ 4000	220	60
≤ 6000	330	80
>6000	440	100

12. Clarification – Footnotes 18 and 19: Revised language to reflect that a solar site analysis per the Renewable Ready checklists is not required, as a solar resources screening criteria is already built into footnote #17

Footnote #18 (Renewable Energy Ready Home Solar Electric Checklist) and footnote #19 (Renewable Energy Ready Home Solar Water Heating Checklist) have both been edited to remove the formal requirement for a solar site analysis. A solar resource screening for applicability of the checklists is already embedded into footnote #17.