



# U.S. DOE Zero Energy Ready Home for Single Family Homes Version 2 Quality Assurance Checklist & Certification Review

A Zero Energy Ready Home Quality Assurance Checklist shall be completed during each quality assurance file review and field review (QA review) of homes being certified through the DOE Zero Energy Ready Home (ZERH) program in accordance with the policies and procedures of the DOE-recognized Home Certification Organization for the Zero Energy Ready Home program (HCO for ZERH). This edition of the QA checklist (prior to any Revisions) is mandatory for homes certified under ZERH for Single Family Homes Version 2.

## Instructions for Performing Quality Assurance Review

- Instructions for All Reviews:
  - Items found to be out of compliance, in accordance with the HCO for ZERH policies, shall be corrected. If correction is not possible, the home's certification is required to be withdrawn (please contact [zerh@doe.gov](mailto:zerh@doe.gov) for guidance).
  - Additional items may be reviewed at the reviewer's discretion and included in the Additional Checklist Items and Exemptions report below.
- Instructions for File Review:
  - Complete all items in the following sections of the checklist: Action Items/Summary of QA, Documentation Collection, and Energy Rating File Review.
- Instructions for Field Review:
  - Complete all items in the following sections of the checklist: Action Items/Summary of QA, Documentation Collection, Energy Rating File Review, ZERH SF Homes National Rater Field Checklist Review.
  - Where a National Rater Field Checklist item cannot be verified because it is not visible, not accessible, cannot be tested, or there are other extenuating circumstances, mark the box in the column "Not Verified" and include an explanation in an attached document.
  - In accordance with the HCO for ZERH policies, a limited amount of the required QA Field Reviews may be performed at the pre-drywall stage. Mark items that are not yet installed as "Not Verified." If any items are "Not Verified" an action/explanation summary document shall be attached.



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**DOE Zero Energy Ready Home – Single Family Homes, Version 2 QA Checklist**

Home Address:	City:	State:	
<b>Action Items / Summary of QA</b>		<b>Yes</b>	<b>No</b>
Action/explanation summary document is attached for any items in this checklist marked “No” or “Not Verified”		<input type="checkbox"/>	<input type="checkbox"/>
<b>Documentation Collection – Collect these items as part of the QA data file</b>			
A) Energy Rating File collected		<input type="checkbox"/>	<input type="checkbox"/>
B) Documentation that the builder was a ZERH Partner at the time of the home’s certification. If documentation of active partnership cannot be verified, contact zerh@doe.gov.		<input type="checkbox"/>	<input type="checkbox"/>
C) Documentation that the home is certified under ENERGY STAR Single Family New Homes Version 3.2		<input type="checkbox"/>	<input type="checkbox"/>
D) Documentation that the home is certified under EPA Indoor airPLUS		<input type="checkbox"/>	<input type="checkbox"/>
E) DOE Zero Energy Ready Home PV-Ready Checklist Version 2 is collected, with all applicable items marked “Verified.”		<input type="checkbox"/>	<input type="checkbox"/>
F) DOE ZERH Single Family Homes, Version 2 National Rater Field Checklist collected, with no items left blank or marked Must Correct.		<input type="checkbox"/>	<input type="checkbox"/>
List of any exemptions or alternatives used by the Rater:		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Slab edge insulation allowance for jurisdictions designated as having Very Heavy Termite Infestation</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Slab edge insulation allowances permitted by the most recent version and revision of the ENERGY STAR Single Family New Construction program, listed here: <a href="http://www.energystar.gov/slabeledge">www.energystar.gov/slabeledge</a></li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Windows are exempted from U / SHGC requirements because they are utilized as part of a passive solar design</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Windows are permitted to meet different U values based on climate zone and project site elevation</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Use of a non-ENERGY STAR certified refrigerator</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Up to 5% of lighting, for task or decorative lighting, is not LED lighting</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>One or more exceptions for applying the PV Ready Checklist Version 2 apply:               <ul style="list-style-type: none"> <li>Home already includes an on-site PV system</li> <li>Home receives renewable energy from a community solar system, with an agreement meeting the terms noted in National Program Requirements V2</li> <li>Location has significant natural shading</li> <li>Home as designed does not have at least 600 square feet of roof area oriented in between 110 degrees to 270 degrees of true north</li> </ul> </li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Electric vehicle ready provision not applied because home is without a private driveway or garage</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Electric vehicle ready circuit not connected to panel because it would require installation of a new, higher capacity panel</li> </ul>		<input type="checkbox"/>	<input type="checkbox"/>



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Documentation Collection (continued)	Yes	No
<ul style="list-style-type: none"> <li>Heat pump water heater ready provision not applied because home utilizes an electric water heater</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>3'x3'x7' space not provided for heat pump water heater ready provision because home has a tankless water heater</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Heat pump space heating ready provision not applied because home utilizes an electric space heating system for its primary heating system</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>List any other exceptions or alternatives used:</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>
G) Rater name, rater inspection dates, and rater signature are recorded	<input type="checkbox"/>	<input type="checkbox"/>
H) Unique identifier (once available) for ZERH certification for dwelling unit	<input type="checkbox"/>	<input type="checkbox"/>
Energy Rating File Review		
A) Energy Rating file passes the HCO for ZERH's quality assurance review checklist.	<input type="checkbox"/>	<input type="checkbox"/>
B) ERI of the home meets or exceeds the DOE ZERH ERI Target for the program version applicable at the time of certification.	<input type="checkbox"/>	<input type="checkbox"/>
3.1 Modeled total building thermal envelope UA is equal to or lower than the UA value that results from multiplying the U factors in the 2021 IECC Table R402.1.2 by the same assembly areas as the home being certified	<input type="checkbox"/>	<input type="checkbox"/>
3.2 Windows meet the high-performance requirements based on climate zone	<input type="checkbox"/>	<input type="checkbox"/>
4.1 All heating and cooling distribution ducts and heating and cooling air-handling equipment are located within the thermal and air barrier boundary or meet an alternative specified in the National Program Requirements.	<input type="checkbox"/>	<input type="checkbox"/>
5.1 Hot water delivery systems meet efficient design requirements. <b>OR</b>	<input type="checkbox"/>	<input type="checkbox"/>
5.2 Water heater and fixtures meet efficiency criteria.	<input type="checkbox"/>	<input type="checkbox"/>
6.1 All builder-supplied and builder-installed refrigerators, dishwashers, clothes washers, and clothes dryers are ENERGY STAR qualified.	<input type="checkbox"/>	<input type="checkbox"/>
6.2 100% of builder-installed lighting fixtures and lamps (bulbs) provided are LEDs	<input type="checkbox"/>	<input type="checkbox"/>
6.3 All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified	<input type="checkbox"/>	<input type="checkbox"/>
7.2 Energy efficient balanced ventilation (HRV or ERV) is provided in Climate Zones 6-8, and meets or exceeds the following specifications: ≥ 65% SRE (@ 32 °F) and ≥ 1.2 CFM/Watt	<input type="checkbox"/>	<input type="checkbox"/>



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DOE ZERH Single Family Homes National Rater Field Checklist Review – For field review only. As an alternative, complete and attach the National Rater Field Checklist <sup>1</sup>	Y	N	Not Verified
<b>3. Building Envelope</b>			
3.1 Insulation which is accessible for inspection matches the corresponding insulation value used in the energy rating file <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3.2 U and SHGC values of windows in rated home match corresponding values in the energy rating file.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>4. Duct System</b>			
4.1 All accessible heating and cooling distribution ducts and heating and cooling air-handling equipment are located within the thermal and air barrier boundary. <sup>2</sup>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>5. Water Heating Efficiency (comply with 5.1 <i>or</i> 5.2; mark the other line N/A)</b>			
5.1 Hot water delivery systems meet efficient design requirements.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.2 Water heater and fixtures meet efficiency criteria.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>6. Lighting and Appliances</b>			
6.1 All builder-supplied and -installed refrigerators, dishwashers, clothes washers, and clothes dryers are ENERGY STAR qualified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.2 100% of builder-installed lighting fixtures and lamps (bulbs) provided are LEDs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6.3 All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>7. Indoor Air Quality</b>			
7.2 Energy efficient balanced ventilation (HRV or ERV) is provided in Climate Zones 6-8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>8. Renewable Ready</b>			
8.1 Provisions of the DOE Zero Energy Ready Home Version 2 PV-Ready Checklist are completed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>9. Electric Vehicle Ready</b>			
9.1 One parking space is provided per dwelling unit that includes a powered 208/240V, 40A receptacle installed in garage or within 3 feet of driveway or dedicated parking space. The electric service panel identifies the branch circuit as “Electric Vehicle Charging.”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>10. Heat Pump Water Heater Ready</b>			
10.1 Individual branch circuit outlet is installed and energized and terminates within 3 feet of each installed fossil fuel water heater and a space located within the home or garage that is at least 3’ x 3’ wide and 7’ high must be available surrounding or within 3 feet of the installed fossil fuel water heater, to facilitate future heat pump water heater installation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>11. Heat Pump Space Heating Ready</b>			
11.1 Individual branch circuit outlet is installed or conduit is installed to facilitate future wiring for a heat pump installation. Circuit or conduit labeled as “For future heat pump.”	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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**QA Review**

Review Type: \_\_ File \_\_ Field QA Reviewer: \_\_\_\_\_ Date of Review: \_\_\_\_\_

*For field review only:*

Field Review Rater Name: \_\_\_\_\_ Status of home: \_\_ Pre-drywall \_\_ Final or completed

**Original Rating**

Rater Company Name: \_\_\_\_\_

Pre-Drywall Inspection Rater Name: \_\_\_\_\_ Rater ID #: \_\_\_\_\_ Date: \_\_\_\_\_

Final Inspection Rater Name: \_\_\_\_\_ Rater ID #: \_\_\_\_\_ Date: \_\_\_\_\_

**Additional Checklist Items and Exemptions**

Use this space to list additional items reviewed and describe any exemptions that were used (attach additional pages, if needed).						
Checklist Name	Item #	Notes	Yes	No	Not Verified	N/A
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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## Certification Review

DOE has developed a process, called Certification Review, to address cases where a homeowner has concerns about the ZERH certification of their home. The purpose of a Certification Review is to determine whether a home should maintain its ZERH certification. There are two possible outcomes: (1) the home will maintain its DOE ZERH certification or (2) the home's ZERH certification will be withdrawn. To find out more about DOE's Certification Review process, visit

<https://www.energy.gov/eere/buildings/complaints-and-zerh-certification-review>.

As part of the ZERH Certification Review, the ENERGY STAR Certification Review Process must also be implemented because ENERGY STAR certification is a requirement for ZERH certification. Details on the ENERGY STAR Certification Review Process are located in the ENERGY STAR Single-Family New Homes Quality Assurance & Certification Review Checklists, accessible on the program's website:

[https://www.energystar.gov/partner\\_resources/residential\\_new/homes\\_prog\\_reqs/national\\_page](https://www.energystar.gov/partner_resources/residential_new/homes_prog_reqs/national_page).

## Certification Review Process

When an HCO for ZERH receives an eligible homeowner inquiry, the HCO for ZERH will initiate a Certification Review of the home and assign it to an appropriate individual according to organization's policies. The assigned reviewer shall complete the Certification Review within 60 days by performing the following steps:

1. **Collect Documentation.** Collect all pertinent documentation using the Document Collection sections of the Quality Assurance Checklist. Inability to collect a required documentation item constitutes a failure, in which case proceed directly to Step 3: preparing the certification review report.
2. **Perform Home Inspection.** Coordinate a time with the homeowner to inspect the home. During that inspection, complete the remainder of the Quality Assurance Checklist based on observations of the current state of the home.
3. **Prepare Certification Review Report.** Prepare a report that includes the completed Quality Assurance Checklist, documented observations of the home's current state, and a determination of whether the Certification Review passes or fails. If the assigned reviewer is a third-party, the reviewer must share a copy of the report with the HCO for ZERH, which will in turn provide a copy to the homeowner. If the reviewer is internal to the HCO for ZERH, the HCO for ZERH must provide a copy to the homeowner. Regardless of who develops the report, the HCO for ZERH must also provide a copy to DOE (zerh@doe.gov).

If the assigned reviewer determines that the Certification Review fails, the DOE ZERH certification of the home shall be withdrawn.

If the assigned reviewer determines that the Certification Review passes, the DOE ZERH certification of the home shall be maintained. In that case, the homeowner has the opportunity to appeal the determination. Refer to the Z-HCO's policies for details on the appeals process.



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## **Instructions for Performing Certification Review**

This document should be used in conjunction with the applicable DOE ZERH Program Requirements, Rater Review Checklist, and PV-Ready Checklist. Additional program requirements may be inspected and included in the Additional Checklist Items and Exemptions table above. Alternatives and exceptions in those documents, including those in the footnotes, should be considered where applicable. Where a program revision or policy record entry has lowered the stringency of a requirement, the most recent policy may be used, even if it was not in place at the time of original certification.

In general, the benefit of doubt should be given to the original rating unless it is definitively clear that a requirement was not met at the time of certification. The assigned reviewer should apply judgment in accounting for normal aging of construction materials over time, such as the settling of blown insulation. Homes are eligible for Certification Review only if there have been no significant structural changes to the home since it was built. If such modifications are observed, the assigned reviewer has the prerogative to suspend the inspection and share documentation of the observed modifications with the HCO for ZERH in lieu of the Certification Review Report.

If any individual item on the Rater Quality Assurance Checklist is marked as “No,” the Certification Review is considered to have failed.

## **Guidance on Destructive Testing**

At the behest of the homeowner, destructive testing may be used to inspect items that would otherwise not be visible. For example, if it were suspected that no insulation was installed in an exterior wall, observation holes could be drilled in the interior gypsum board. The homeowner bears the complete responsibility for arranging all demolition and repair for destructive testing that they elect to undertake. Before undertaking destructive testing, it is recommended that homeowners consult with a qualified expert who can use non-invasive methods like infrared imaging to prioritize areas of concern. Demolition work, such as drilling observation holes, must occur in the presence of the assigned reviewer performing the Certification Review. Areas that are exposed outside the presence of the assigned reviewer shall be ignored for the purpose of the Certification review.



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## Endnotes:

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<sup>1</sup> These items have been edited for space or have footnotes with exemptions or alternatives. Refer to the National Rater Field Checklist or other referenced program document for details. When an item is properly met using an exemption or alternative, mark the item as “Yes” and record a description in the Additional Checklist Items and Exemptions table.

<sup>2</sup> This item is modified from the original program requirement in order to be applicable in the context of a finished home.