



# U.S. DOE Zero Energy Ready Home Single Family Homes Quality Assurance Checklist & Certification Review Version 2 (Rev. 1)

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 is mandatory for homes certified under ZERH Single Family Homes Version 2 (Rev. 1).

## 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 If correction is not possible, the home's certification is required to be withdrawn (please contact [zerh@doe.gov](mailto:zerh@doe.gov) for guidance).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 reported in Table 9: Additional Checklist Items and Exemptions.
- Instructions for File Review:
  - Complete Tables 1 through 8 below, except where marked "For Field Review Only."
- Instructions for Field Review:
  - Complete all items in Tables 1 through 8 below. Complete all File Review items **before** completing "For Field Review Only" items.
  - Where a National Rater 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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**1. Project Information**

Home Address	City	State

**2. Original Rating Information**

Rater Company Name		
Pre-Drywall Inspection Rater Name	Rater ID #	Date of Pre-Drywall Inspection
Final Inspection Rater Name	Rater ID #	Date of Final Inspection

**3. QA Review Information**

QA Reviewer Name	File Review or Field Review?	Date of Review	
<i>For Field Review Only</i>	Field Review Rater Name	Pre-drywall or Final/completed?	Date of Review

**4. Action Items / Summary of QA**

	Yes	No
All items in Tables 5 – 7 are marked “Yes.”		
If any items in Tables 5 – 7 are marked “No” or “Not Verified,” a document explaining these items is attached to this file.		



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## 5. Documentation Collection

All items below must be collected as part of the QA data file for both file and field reviews.		Yes	No
A	Energy rating file (model).		
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.		
C	Documentation that the home is certified under ENERGY STAR Single Family New Homes Version 3.2.		
D	Documentation that the home is certified under EPA Indoor airPLUS.		
E	DOE Zero Energy Ready Home Single Family Homes PV-Ready Checklist Version 2 (Rev. 1) is collected, with all applicable items marked "Verified," or the home meets an exemption or alternative as specified in the National Program Requirements (see Table 8, below).		
F	DOE Zero Energy Ready Home Single Family Homes National Rater Checklist Version 2 (Rev. 1) is collected, with no items left blank or marked "Must Correct."		
G	Documentation that the home is certified under EPA WaterSense Labeled Homes Version 2.0 <b>or</b> either item 5.1 or 5.2 on the DOE Zero Energy Ready Home Single Family Homes National Rater Checklist is marked as "Rater Verified."		
H	Unique identifier (once available from DOE) for ZERH certification is recorded on the dwelling unit's ZERH certificate.		

## 6. Energy Rating File (Model) Review

All items below must be verified as part of the QA process for both file and field reviews.		Yes	No
I	Energy rating file (model) passes the HCO for ZERH's quality assurance review checklist.		
J	ERI of the modeled home meets or exceed the DOE ZERH ERI Target for the program version applicable at the time of certification.		
K	Energy rating file (model) is consistent with the National Rater Checklist (see items 3.1 – 7.2 below).		
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.		
3.2	Modeled windows meet the high-performance requirements based on climate zone.		
4.1	All heating and cooling distribution ducts and heating and cooling air handling equipment are modeled as located within the thermal and air barrier boundary or meet an alternative as specified in the National Program Requirements (see Table 8, below).		
5.2	If Item 5.2 on the DOE Zero Energy Ready Home Single Family Homes National Rater Checklist is marked as "Rater Verified," water heater is modeled to the applicable efficiency level specified in Item 5.2 and fixtures are modeled as low-flow (if software allows). If Item 5.2 is <b>not</b> marked as "Rater Verified," mark this item as "N/A."		



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6.2	Modeled lighting is at least 95% LEDs.		
7.2	If the project is located in 2021 IECC Climate Zones 6-8, it is modeled with energy efficient balanced ventilation that meets or exceeds 65% SRE (@32 °F) and 1.2 CFM/Watt. If the project is located in 2021 IECC Climate Zones 1-5, mark this item as "N/A."		

**7. DOE Zero Energy Ready Home Single Family Homes Rater Checklist Review**

All items below must be verified as part of the QA process for both file and field reviews.		Yes	No
L	Rater name(s) is/are recorded.		
M	Rater inspection dates are recorded.		
N	Rater signature(s) is/are recorded.		
All items below must be verified, with applicable documentation collected, as part of the QA process <b>for field reviews only</b> . As an alternative, complete and attach the DOE Zero Energy Ready Home Single Family Homes National Rater Checklist.		Not Verified	Yes No
O	As-built home is consistent with the National Rater Checklist and Energy Rating File (Model) (see items 3.1 – 11.1, below).		
3.1	Insulation which is accessible for inspection matches the corresponding insulation value used in the energy rating file (model).		
3.2	U and SHGC values of windows in rated home match corresponding values in the energy rating file (model).		
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.		
5.2	If Item 5.2 on the DOE Zero Energy Ready Home Single Family Homes National Rater Checklist is marked as "Rater Verified," installed water heater efficiency matches corresponding efficiency value used in the energy rating file (model), and installed showerheads and bathroom sink faucets and aerators which are accessible for inspection are WaterSense labeled. WaterSense label can be verified using the item's serial number (if available) if the fixture's label has been removed since installation. If Item 5.2 is <b>not</b> marked as "Rater Verified," mark this item as "N/A."		
6.1	All builder-supplied and builder-installed refrigerators, dishwashers, clothes washer, and clothes dryers are ENERGY STAR certified, or all builder-supplied and builder-installed dishwashers, clothes washers, and clothes dryers are ENERGY STAR certified and refrigerator meets an alternative as specified in the National Program Requirements (see Table 8, below).		
6.2	100% of builder-installed lighting fixtures and lamps (bulbs) are LEDs or the lighting meets an alternative as specified in the National Program Requirements (see Table 8, below).		
6.3	All installed bathroom ventilation fans are ENERGY STAR certified.		
7.2	Installed energy efficient balanced ventilation (HRV or ERV) matches the corresponding efficiency values in the energy rating file (model). If no balanced ventilation system is present in the home, mark this item "N/A."		



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8.1	Provisions of the DOE Zero Energy Ready Home Single Family Homes PV-Ready Checklist marked as "Verified" are present in the as-built home.			
9.1.1	One parking space is provided per dwelling unit that includes a powered 208/240V, 30A receptacle installed in dwelling unit's garage or within 6 feet of private driveway and the electric service panel identifies the branch circuit as "Electric Vehicle Charging," or the project meets an alternative as specified in the National Program Requirements (see Table 8, below). If the dwelling unit does not have a private driveway or garage, mark this item "N/A" and review item 9.1.2, below.			
9.1.2	20% of parking spaces allocated for dwelling units are provided with EV Capable, EV Ready, or EVSE. 10% of spaces are EVSE and the remaining 10% are any combination of EV Capable and EV Ready, or the project meets an alternative as specified in the National Program Requirements (see Table 8, below). If the dwelling unit has a private driveway or garage, mark this item and items a, b, and c, below as "N/A."			
	a All EV Capable spaces have a continuous raceway or cable assembly installed between an enclosure or outlet located within 3 feet of the EV Capable space and a panelboard or other onsite electrical distribution equipment. If no EV Capable spaces are provided, mark this item "N/A."			
	b All EV Ready spaces are provided with a branch circuit and either an outlet, junction box, or receptacle, that will support an installed EVSE. The branch circuit terminates at an outlet or enclosure located within 3 feet of each EV Ready space it serves and has a rated capacity not less than 8.3kVA (40A at 208/240V) or meet an alternative as specified in the National Program Requirements (see Table 8, below). If no EV Ready spaces are provided, mark this item "N/A."			
c	All EVSE spaces are provided with equipment for plug-in power transfer including the ungrounded, grounded, and equipment grounding conductors, and the electric vehicle connectors, attachment plugs, personal protection system and all other fittings, devices, power outlets or apparatus installed specifically for the purpose of transferring energy between the premises wiring and the electric vehicle. Each installed EVSE is located within 3 feet of the space it serves and the branch circuit has a rated capacity not less than 8.3kVA (40A at 208/240V) or meets an alternative as specified in the National Program Requirements (see Table 8, below).			
10.1	Individual branch circuit outlet is installed, energized, and terminates within 3 feet of each installed fossil fuel water heater, or the water heater meets an alternative as specified in the National Program Requirements (see Table 8, below).			
10.2	A space is located within the home or garage that is at least 3' x 3' wide and 7' high surrounding or within 3 feet of the installed fossil fuel water heater, or the water heater meets an alternative as specified in the National Program Requirements (see Table 8, below).			
11.1	Individual branch circuit outlet or conduit is installed to facilitate future wiring for a heat pump installation. Circuit or conduit is labeled as "For future heat pump." Or, the space conditioning equipment meets an alternative as specified in the National Program Requirements (see Table 8, below).			



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**8. DOE Zero Energy Ready Home Single Family Homes Rater Checklist Exemptions and Alternatives**

Mark any exemptions or alternatives used during the original rating.		Yes	No
3.1	Slab edge insulation allowance for jurisdictions designated as having Very Heavy Termite Infestation.		
	Slab edge insulation allowances permitted by the most recent version and revision of the ENERGY STAR Single Family New Homes program, listed here: <a href="http://www.energystar.gov/slabeledge">www.energystar.gov/slabeledge</a> .		
	Adjustments to the UA calculation related to slab edge insulation details that are permitted by ENERGY STAR Single Family Homes Version 3.2.		
3.2	Windows are exempted from U/SHGC requirements because they are utilized as part of a passive solar design.		
	Windows are permitted to meet different U values based on climate zone and project site elevation.		
6.1	Use of a non-ENERGY STAR certified refrigerator.		
6.2	Up to 5% of lighting, for task or decorative lighting, is not LED lighting. The remaining builder-installed lighting is LED.		
8.1	The home has an on-site PV system.		
	The home receives renewable energy from a community solar system, with an agreement meeting the terms noted in the National Program Requirements.		
	Location has significant natural shading.		
	The home does not have at least 500 square feet of roof area oriented in between 110 degrees and 270 degrees of true north.		
9.1.1	The circuit is not connected to the electrical panel because the addition of a 30-amp Electric Vehicle Charging branch circuit would increase the electrical service to the next nominal size (i.e., from 200-amp to 400-amp service), the Rater retained a copy of the sizing calculations or statement from the electrical designer, and the conductor is labeled as "electrical vehicle charging."		
	The EV charging capacity is reduced based on the available existing electric distribution capacity because the local electric distribution entity cannot provide the full distribution capacity required for an additional 40A receptacle within 2 years of the estimated date of occupancy. The utility has certified this in writing and the Rater has included the utility's written explanation in the project records.		
	The EV charging capacity provided is reduced based on the available existing electric distribution capacity because an additional 30A receptacle will increase the utility side cost to the builder or developer by more than \$450 per dwelling unit. The utility has documented this additional cost and the Rater has included this in the project records.		
9.1.2	The total number of EV Capable, Ready, and EVSE spaces is reduced because the cost of energy use in the parking lot or garage is not the responsibility of the Builder/Developer, Building Owner, or Property manager.		







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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.

## 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.





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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.