

A DOE Zero Energy Ready Home Quality Assurance Checklist shall be completed during each quality assurance file review and field review (QA review) of buildings being certified through the DOE Zero Energy Ready Home Multifamily Program Version 2 (ZERH MF V2) using the ASHRAE or Prescriptive path in accordance with the policies and procedures of the Multifamily Review Organization for the Zero Energy Ready Home program (MRO for ZERH). Review complete instructions below. Please note that many of the requirements listed below have been edited for length and detail. See the ZERH MF V2 National Rater Checklist for complete requirements. This edition of the QA checklist is mandatory for homes certified under ZERH Multifamily Version 2 (Rev. 1).

#### **Instructions for Performing Quality Assurance Review**

#### • Instructions for All Reviews:

- An ENERGY STAR Multifamily New Construction Quality Assurance Review must be completed on the unit in question in order for a Quality Assurance Review for ZERH Multifamily Version 2 to be performed.
- One checklist shall be used to document all applicable items for one dwelling unit. Where more than one dwelling unit in a building is being reviewed, additional checklists shall be used for the additional dwelling units.
- Items found to be out of compliance, in accordance with the MRO for ZERH policies, shall be corrected. If correction is not possible, the unit's certification may be withdrawn (please contact <u>zerh@doe.gov</u> for guidance).
- o If the building under review was certified using the Prescriptive path, all items in the tables below noted as "(ASHRAE path only)" may be marked as N/A.
- 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 11 below, except where marked "For Field Review Only."

#### Instructions for Field Review:

- Complete all items in Tables 1 through 11 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 MRO 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.
- During field review, field verification must occur in at least 10 dwelling or sleeping units. For buildings with 10 units or fewer, field verification must occur in all units.



## 1. Project Information

Building Address			City			State
Building Name (leave blank if N/A)			Number of Units Permit D		ate	
Compliance Path	☐ ASHRAE	☐ ASHRAE	E (PHIUS)	☐ Pres	criptive	

## 2. Original Rating Information

Energy Rating Company Name	Energy Rating Company Name				ZERH partner status confirmed?			
				Yes		No		
Pre-Drywall Inspection Rater Name	Rater ID #	Date of Pre-Drywall	Completion dates of ZERH training					
rie-Drywaii inspection Nater Name	Rater ID #	Inspection	and assessments					
			V2 (	Orientation				
			MF	V2 Training				
Final Inspection Rater Name	Rater ID #	Date of Final	Con	npletion dates	of Z	ERH training		
Final inspection Rater Name	Rater ID #	Inspection	and	nd assessments				
			V2 (	Orientation	•			
			MF	V2 Training				

#### 3. QA Review Information

QA Reviewer Name		File Review or Field Review?	Unit Number	Date of Review
	Field Review Rater Name	Pre-drywall or final construction	/completed?	Date of Review
Review Only				

## 4. Action Items / Summary of QA

	Yes	No
All items in Tables 5 – 11 are marked "Yes" or "N/A."		
For all items in Tables 5 – 11 marked "No" or "Not Verified," a document explaining these items is attached to this file. (If all items in Tables 5-11 are marked "Yes" or "N/A," mark this row N/A.)		

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#### 5. Documentation Collection

All i	tems below must be collected as part of the QA data file for both file and field reviews.	N/A	Yes	No
Α	DOE ASHRAE Standard 90.1 Performance Based Compliance Form. (ASHRAE path only)			
В	DOE ASHRAE Standard 90.1 Companion Tool,			
С	Energy modeling files <i>or</i> input and output reports. (ASHRAE path only)			
D	Documentation that the ASHRAE modeler was listed in the <u>EPA online directory</u> at the time of certification. (ASHRAE path only)			
Е	PHIUS certification documentation. (ASHRAE/PHIUS path only)			
F	Documentation that the builder or developer is a ZERH Partner. If documentation of active partnership cannot be verified, contact zerh@doe.gov.			
G	Documentation that all dwelling units in the multifamily building are certified under ENERGY STAR Multifamily New Construction Version 1.2.			
Н	Documentation that all dwelling units in the multifamily building are certified under EPA Indoor AirPlus (permit date before 1/1/2026: Version 1; permit date on/after 1/1/2026: Version 2 Certified or Gold).			
I	DOE Zero Energy Ready Home Multifamily PV-Ready Checklist Version 2 is collected, with all applicable items marked "Verified," or the building meets an exemption or alternative as specified in the Multifamily PV-Ready Checklist.			
J	DOE Zero Energy Ready Home Multifamily EV-Ready Checklist Version 2 is collected, with all applicable items marked "Verified," or the building meets an exemption or alternative as specified in the Multifamily EV-Ready Checklist (see Table 11).			
К	DOE Zero Energy Ready Home Multifamily National Rater Checklist Version 2 is collected, with no items left blank or marked "Must Correct."			
L	ENERGY STAR Multifamily Workbook with ZERH addenda is collected.			
М	Construction documents showing integration of all items from the three ZERH MF Cheare collected.	cklists		
N	All required photo documentation is collected and complies with ZERH Photo Documentation Guidance (see Tables 8-11).			

#### 6. Multifamily Workbook with ZERH Addenda

All ite	ms below must be verified as part of the QA process for both file and field reviews.	Yes	No		
Multifamily Workbook entries are consistent with the National Rater Checklist (see items 3.1 – 7.2 below).					
3.1	Envelope assembly layers are fully described in appropriate workbook tabs and meet ZERH Multifamily Version 2 National Rater Checklist (either 3.1a or 3.1b).				
3.1	Prescriptive path only: Workbook indicates that dwelling unit U factors for opaque assemblies come from 2021 IECC Residential Chapter.				
3.2	Dwelling unit windows as documented in the Multifamily Workbook meet the high-performance requirements based on climate zone.				



5.1	Documentation (cut sheet or directory reference) provided confirming WaterSense certified dwelling unit showerheads, bath faucets, and aerators.			
6.1	Reported refrigerators, dishwashers, clothes washers, clothes dryers, and bathroom ventilation fans are listed in the ENERGY STAR product directory and indicated as ENERGY STAR in the appliances tab.			
6.2	Lighting tab shows 100% of in-unit lamps/bulbs are LED.			
7.2	For projects located in Climate Zones 6-8, H/ERV equipment reported in the workbook. Documented efficiency is confirmed based on model number and meets the requirements of DOE ZERH Multifamily Version 2 Rater Checklist Item 7.2.	N/A		
12a	Prescriptive path Track A only: Workbook documents HVAC grading consistent with DOE ZERH Multifamily Version 2 National Rater Checklist Items 12a.1 and 12a.2			
12b	Prescriptive path Track B only: Workbook documents installation of a heat pump water heater or infiltration testing results consistent with DOE ZERH Multifamily Version 2 National Rater Checklist Item 12b.1.			

# 7. Compliance Form and Companion Tool (ASHRAE path only, mark here if N/A $\rightarrow \Box$ ) For PHIUS alternative, confirm documented efficiencies match PHIUS model and mark line E "N/A."

All i	tems below must be collected as part of the QA data file for both file and field reviews.	Yes	No
А	Residential cooling equipment efficiency documented in the Multifamily Workbook with ZERH Addenda matches efficiency documented in the ASHRAE model and Compliance Form.		
В	Residential heating equipment efficiency documented in the Multifamily Workbook with ZERH Addenda matches efficiency documented in the ASHRAE model and Compliance Form.		
С	Residential mechanical ventilation equipment heat recovery documented in the Multifamily Workbook with ZERH Addenda matches efficiency documented in the ASHRAE model and Compliance Form.		
D	Residential water heating efficiency documented in the Multifamily Workbook with ZERH Addenda matches efficiency documented in the ASHRAE model and Compliance Form.		
Е	Companion Tool has the ZERH program selected and BPFs shown match those in Exhibit 3 of the ZERH Multifamily Version 2 National Program Requirements.		
F	Companion Tool reports that the building achieves at least 20% energy cost savings or source energy savings above ASHRAE 90.1-2019.		
F	PHIUS alternative: Building achieves 20% less energy use than PHIUS Core 2021 Source Energy Criteria		
G	On-site renewable energy does not contribute to meeting the performance target.		

## 8. ASHRAE Energy Model or Prescriptive Efficiency Verification

	All items below must be verified, with applicable documentation collected, as part of the QA process for field reviews only.			Yes	No
Α	Constructed building is consistent with :  • Energy Rating File (Model) for ASHRAE path projects or  • Exhibit 2 of the National Program Requirements (NPRs) for Prescriptive path projects				
D	ASHRAE	Installed heating equipment's efficiency matches corresponding efficiency value used in the energy model and/or Compliance Form.			
В	Prescriptive	Installed heating equipment's efficiency matches corresponding efficiency value in Exhibit 2 of the National Program Requirements.			
С	ASHRAE	Installed cooling equipment's efficiency matches corresponding efficiency value used in the energy model and/or Compliance Form.			
C	Prescriptive	Installed cooling equipment's efficiency matches corresponding efficiency value in Exhibit 2 of the National Program Requirements.			
7	ASHRAE	Installed mechanical ventilation equipment recovery efficiency matches corresponding efficiency value used in the energy model and/or Compliance Form.			
D	Prescriptive	Installed mechanical ventilation equipment recovery efficiency matches corresponding efficiency value in Exhibit 2 of the National Program Requirements.			
_	ASHRAE	Installed water heater efficiency matches corresponding efficiency value used in the energy model and/or Compliance Form.			
E	Prescriptive	Installed water heater efficiency matches corresponding efficiency value in Exhibit 2 of the National Program Requirements.			

## 9. DOE Zero Energy Ready Home Multifamily National Rater Checklist Review

All iter	ns below must be verified as part of the QA process for both file and field reviews.		Yes	No
Α	A Rater name(s) is/are recorded.			
В	Rater inspection dates are recorded.			
С	C Rater signature(s) is/are recorded.			
D	D ZERH Builder ID is accurately recorded on the Rater Checklist			
Е	If any Builder Verified items are used, builder employee, inspection date, and initials are recorded.	N/A		
F	If any LP Verified items are used, Licensed Professional, LP inspection date, and initials are recorded.			
QA pr	All items below must be verified, with applicable documentation collected, as part of the QA process for field reviews only. As an alternative, complete and attach the DOE Zero Energy Ready Home Multifamily National Rater Checklist.			No



Const	ructed building is consistent with the National Rater Checklist (see items 3.1 – 11.1, b	elow).	
2.1	Insulation which is accessible for inspection matches the corresponding insulation value used in the energy model and/or Compliance Form (ASHRAE path) or NPRs Exhibit 2 (Prescriptive path).		
3.1	*ASHRAE path note: If commercial space is included in the ASHRAE model used to demonstrate compliance with the ZERH savings threshold, commercial space insulation must meet residential common space insulation requirements.		
3.2	U and SHGC values of windows in rated unit match corresponding values in the energy model and/or Compliance Form (ASHRAE path) or NPRs Exhibit 1 item 3.3 (Prescriptive path).		
4.1	All accessible heating and cooling distribution ducts and heating and cooling air- handling equipment within the dwelling unit are located within the thermal and air barrier boundary or meet an alternative as specified in the National Program Requirements (see Table 10, below).		
5.1	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.		
5.2	Hot water delivery systems within the dwelling unit meet stored volume criteria based on a review of submitted construction documents. If compliance cannot be determined based on a review of construction documents, mark this item "not verified."		
5.3	In-dwelling unit recirculation systems, if present, use on-demand controls.		
5.4	Piping which is part of a central recirculating hot water distribution system and that is accessible for inspection matches the corresponding insulation value used in the energy model and/or Compliance Form (ASHRAE path) or NPRs Item 5.4 (Prescriptive path).		
6.1	All builder-supplied and builder-installed in-dwelling refrigerators, dishwashers, clothes washer, and clothes dryers are ENERGY STAR certified or all builder-supplied and builder-installed in-dwelling dishwashers, clothes washers, and clothes dryers are ENERGY STAR certified and the exemption for a non-ENERGY STAR refrigerator noted in the National Program Requirements is used.		
6.2 <sup>1</sup>	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 10, below).		
6.3	All installed bathroom ventilation fans in dwelling units are ENERGY STAR certified.		
7.2	Installed energy efficient balanced ventilation (HRV or ERV) matches the corresponding efficiency values in the energy model and/or Compliance Form (ASHRAE path) or NPRs Item 7.2 (Prescriptive path). If no balanced ventilation system is present in the unit, mark this item "N/A."		
10.1	a. Individual branch circuit outlet is installed, energized, and terminates within 3 feet of each installed fossil fuel water heater in a dwelling unit, or the water heater meets an alternative as specified in the National Program Requirements (see Table 10, below).		

<sup>&</sup>lt;sup>1</sup> If the unit in question is or has been resident-occupied, reviewer is only required to verify that permanently installed integrated fixtures are LEDs.



	b. A volume of open space that is at least 3' x 3' wide and 7' high is located within the dwelling unit surrounding or within 3 feet of the installed fossil fuel water heater in the dwelling unit, or the water heater meets an alternative as specified in the National Program Requirements (see Table 10, below).		
10.2	Dwelling units with in-unit water heaters have a condensate drain installed within three feet of existing water heater. If dwelling unit is served by a central domestic hot water system, mark this item "N/A."		
11.1	For dwelling units with in-unit combustion space heaters, 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 10, below).		

## 10. DOE Zero Energy Ready Home Multifamily Rater Checklist Exemptions and Alternatives

Mark any exemptions or alternatives used during the original rating. If exemption is NOT used, mark N/A.			Exemption accurately recorded?	
			No	
3.1	Slab edge insulation allowance for jurisdictions designated as having Very Heavy Termite Infestation.			
	ENERGY STAR insulation allowances, exceptions, and compliance alternatives (e.g., for slab edge (above-grade and on-grade), columns, balcony details) recognized by the most recent national version and revision of ENERGY STAR Multifamily New Construction (ESMFNC) are used.			
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.			
	Class AW windows are included in the area-weighted window calculation and meet U/SHGC requirements noted in the National Program Requirements.			
	Distribution ducts and/or heating and cooling air-handling equipment serves multiple dwelling units or is not located in the rated unit.			
4.1	Jump ducts that do not directly deliver conditioned air from heating/cooling equipment may be located in attics if all joints are air sealed, and duct is fully buried under attic insulation.			
6.2	Up to 5% of lighting, for task or decorative lighting, is not LED lighting. The remaining builder-installed lighting is LED.			
7.2	The dwelling unit is served by a centralized HRV or ERV.			
10.1	a. Dwelling unit utilizes an electric water heater or is served by a central water heating system.			
	b. Dwelling unit utilizes an electric water heater, is served by a central water heating system, or utilizes a tankless water heater system.			
10.2	The installed water heater is tankless or an electric system with a tank volume of less than 50 gallons and the condensate drain is not provided.			



	The installed primary heating system for the dwelling unit is electric or the dwelling		
	unit is served by a central heating system.		

## 11. DOE Zero Energy Ready Home Multifamily EV-Ready Checklist

All items below must be verified as part of the QA process <u>for both file and field reviews</u> . This table is required for the first dwelling unit reviewed in a building. Where additional checklists are used for additional dwelling units, this table is not required.			Yes	No
А	Rater name(s) is/are recorded.			
В	B Rater inspection dates are recorded.			
С	Rater initials are recorded.			
D	If any Builder Verified items are used, builder employee, inspection date, and initials are recorded.			
Е	If any LP Verified items are used, Licensed Professional, LP inspection date, and initials are recorded.			
F	If exception A, B, and/or C is used, documentation is provided which supports the claim.			
proces Ready origina	All items below must be verified, with applicable documentation collected, as part of the QA process <u>for field reviews only</u> . As an alternative, complete and attach the DOE Zero Energy Ready Home Multifamily EV-Ready Checklist. The reviewer is <b>not</b> required to verify items originally signed off by a builder or LP and may mark these items "Not Verified."  If Exception A is claimed, this section is not required. Mark here if N/A → □			No
1	Exceptions A, B, and C are <u>not</u> claimed, and allocated parking for dwelling units in multifamily or mixed-use buildings are provided with an EV Capable, EV Ready, or EVSE space for 20% of units or automobile parking spaces, whichever is less. (If Exception A, B, or C is claimed, mark this item "N/A.")  Exception B or C <u>is</u> claimed and documented, and allocated parking for dwelling units in multifamily or mixed-use buildings are provided the percentage of EV Capable, EV Ready, or EVSE spaces indicated on the EV-Ready checklist. (If neither exception is claimed, mark this item "N/A.")  The Low-Power Level 2 (L2) alternative is used, and all spaces provided are EVSE. (If			
	the alternative is not used, mark this item "N/A.")			
For all	EV Capable spaces provided:			
2a	A continuous raceway or cable assembly is installed between a panelboard (or other on-site electrical distribution equipment) and an enclosure or outlet located within 6 feet of the space.			
2c	The panelboard to which the raceway or cable assembly connects has sufficient dedicated space for a two-pole circuit breaker or set of fuses.			
2d	The electrical enclosure or outlet and the panelboard are both marked "For electrical vehicle supply equipment (EVSE)."			
For all	EV Ready spaces provided:			
3a	A branch circuit is installed and terminates at an enclosure or outlet located within 6 feet of the space.			



3c	The branch circuit termination (electrical enclosure or outlet) and the panelboard are both marked "For electrical vehicle supply equipment (EVSE)."				
For all	For all EVSE spaces provided:				
4a	EVSE is installed within 6 feet of the space.				
	right is required. For the two options which are	Nameplate charging capacity of installed EVSE is not less than 6.2 kVA (30A and 208/240V).			
		An energy management system (EMS) is installed. The nameplate charging capacity of installed EVSE is not less than 2.1 kVA per space (10A at 208/240V).			
		The Rater has indicated that the L2 alternative is used. The nameplate charging capacity of installed EVSE is not less than 3.3 kW (16A at 208/240V).			
4d	Installed EVSE is listed and labeled in accordance with UL 2202 or UL 2594.				

## 12. Additional Checklist Items and Exemptions

Use this space to list additional items reviewed and describe any other exemptions or alternatives that were used (attach additional pages, if needed).				
Checklist Name Item #		Notes		



#### **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 <a href="https://www.energy.gov/eere/buildings/complaints-and-zerh-certification-review">https://www.energy.gov/eere/buildings/complaints-and-zerh-certification-review</a>.

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\_regs/national\_page.

#### **Certification Review Process**

When an MRO for ZERH receives an eligible homeowner inquiry, the MRO 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 MRO for ZERH, which will in turn provide a copy to the homeowner. If the reviewer is internal to the MRO for ZERH, the MRO for ZERH must provide a copy to the homeowner. Regardless of who develops the report, the MRO 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, PV- Ready Checklist, and EV-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 MRO 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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