1. Building Eligibility Requirements

The following multifamily building types are eligible to participate in the DOE Zero Energy Ready Home (ZERH) program using the ZERH Multifamily Version 2 (ZERH MF V2) national program requirements:[1]

- Any multifamily building with dwelling units[2] or sleeping units[3] that is NOT a dwelling[4]
- Any mixed-use buildings with dwelling units or sleeping units, where the dwelling units, sleeping units, and common space exceed 50% of the building square footage (parking garage square footage is excluded from this calculation).[5]
- Townhouses, if following requirements listed in the endnote.[6]

Note that throughout the remainder of this document, the term 'dwelling unit' is implied to also apply to 'sleeping units' unless otherwise stated.

Townhouses are eligible to participate in the DOE ZERH program, using either the ZERH MF V2 or the ZERH Single Family Homes Version 2 (ZERH SF V2) national program requirements. For more information about ZERH SF V2, visit: https://www.energy.gov/eere/buildings/zerh-single-family-version-2.

Dwelling units in eligible multifamily and mixed-use buildings may only be certified under the ZERH program if the entire building (all dwelling units and covered common spaces) is certified to meet the ZERH MF V2 program requirements. See endnote for the conditional certification process, which allows individual dwelling units to be conditionally certified prior to building completion and full-building certification.[7]

While primarily intended for new construction, existing buildings (e.g., undergoing a gut rehabilitation) are also eligible to participate in the ZERH program. Note that compliance with these requirements does not imply compliance with all local code requirements that may be applicable to the building. In cases where local codes overlap with and/or exceed the ZERH program requirements, these local requirements shall be met.[8]

To determine the required version and revision of DOE ZERH program requirements to use based on a project's location, building type, and permit date[9], partners must reference the DOE ZERH implementation timeline information posted on the DOE ZERH program requirements website. Note that these National Program Requirements do not apply to projects located in California, where the ZERH program has state-specific requirements.

Partners are advised to check the DOE ZERH website and IRS Guidance on the 45L tax credit for information about tax credit eligibility. Also note 45L tax credit eligibility is based on a project's Acquisition Date.

2. Partnership, Training, and Credentialing Requirements

The following requirements must be met prior to certifying multifamily buildings:

- The builder or developer for the building must register as a ZERH partner and sign the ZERH Builder Partner Agreement, available in Partner Central on the ZERH website.
- Energy Rating Companies (e.g., rater companies and Providers[10]) are required to register as a ZERH partner and sign a ZERH Partnership Agreement, available in Partner Central on the ZERH website. Energy Rating Companies must also operate under either a Home Certification Organization for the Zero Energy Ready Home program (HCO for ZERH) or a Multifamily Review Organization for the Zero Energy Ready Home program (MRO for ZERH).[11] Learn more and find a current list of DOE-recognized organizations at https://www.energy.gov/eere/buildings/certification-oversight.

- Raters[12] are required to complete the DOE ZERH Orientation Training, administered by their oversight organization. This training is also available to all partners on the ZERH website, under Program Resources.

Where Functional Testing (FT) Agents are used for field verification of ZERH MF V2 HVAC requirements, the ESMFNC credentialing requirements for FT Agents shall apply. See the ENERGY STAR FT Agent requirements at:
https://www.energystar.gov/partner_resources/residential_new/working/other_participants.

3. DOE ZERH Multifamily Certification Process[13]

The certification process offers three paths to meet the ZERH MF V2 performance target. Each has varying levels of flexibility to select a custom combination of measures for each building. Dwellings may qualify using the Prescriptive path, the Energy Rating Index (ERI) path, or the ASHRAE 90.1 compliance path ("ASHRAE Path"). Note that, regardless of the path chosen or the efficiency measures selected, the DOE ZERH MF V2 Mandatory Requirements (Exhibit 1) are also required and impose certain constraints on the efficiency measures selected (e.g., insulation levels, window specifications).

On-site power generation may not be used to meet the DOE ZERH MF V2 ERI target or the performance target in the ASHRAE path.

3.1 Prescriptive Path Certification Process

Under the Prescriptive path, each dwelling unit must be equivalent in performance to the applicable minimum requirements of the ZERH MF V2 Target Dwelling Design (Exhibit 2). Dwelling units and common spaces must also meet or exceed the requirements in the ZERH MF V2 National Rater Checklist, which include meeting the applicable mandatory requirements as shown in Exhibit 1. The following process applies:

3.1.1. Select efficiency measures for dwelling units and common spaces that meet or exceed all applicable items in the ZERH MF V2 National Rater Checklist, which includes meeting the minimum requirements set in Exhibit 1. In addition, the efficiency features described in the ZERH MF V2 Target Dwelling Design (Exhibit 2) are mandatory within the dwelling units.

3.1.2. Upon completion of design, specific documentation (See Exhibit 4) may be submitted to an MRO for ZERH for review and approval. DOE strongly recommends submitting this documentation before construction; however, Raters may instead choose to submit the design documentation at final certification. MROs for ZERH may choose to implement alternative design review requirements.

3.1.3. Construct the building using the measures selected in Step 3.1.1, with all dwelling units meeting the minimum requirements in Exhibit 1 and the mandatory requirements in Exhibit 2, as they apply.

3.1.4. Use a Rater operating under a DOE-recognized MRO for ZERH to verify that all requirements for certification have been met in accordance with the inspection procedures for minimum rated features in ANSI / RESNET / ICC Standard 301-2019, Appendix B.[14] For modular multifamily buildings, a Rater must verify any requirement in the plant not able to be verified on-site because a feature will be concealed prior to shipment.[15]

3.1.5. The Rater submits the whole building to the MRO for ZERH for final certification once verification on all units and common spaces is complete.[7] The submission must include the documentation specified in Exhibit 4 based on as-built conditions. The Rater is required to keep electronic or hard copies of the completed and signed ZERH MF V2 National Rater Field Checklist.

3.2 Energy Rating Index (ERI) Path Certification Process

Under the ERI path, each dwelling unit must be at least equivalent in performance to the applicable minimum requirements of the ZERH MF V2 Target Dwelling Design (Exhibit 2), as assessed through energy modeling. Dwelling units and common spaces must also meet or exceed the requirements in the ZERH MF V2 National Rater Checklist, which include meeting the applicable mandatory requirements as shown in Exhibit 1. On-site power generation may not be used to meet the ZERH MF V2 ERI Target. The following process applies.

3.2.1. Obtain the ERI score for the ZERH Multifamily Target Dwelling Design, which is determined using a DOE-recognized HCO for ZERH's Approved Software Rating Tool.[16]

3.2.2. Using the same software program specified in Step 3.2.1, configure the preferred set of efficiency measures for the unit to be certified and verify that the resulting ERI meets or exceeds the ZERH Multifamily V2 Target Dwelling ERI score, as determined in Step 3.2.1. Select efficiency measures for units that also meet or exceed all applicable items in Exhibit 1 (Mandatory Requirements). Select efficiency measures for common spaces that meet or exceed all items in the ZERH MF V2 National Rater Field Checklist (which contain all Exhibit 1 Mandatory items) to the extent that they apply.

3.2.3. Construct the building using the measures selected in Step 3.2.2.

3.2.4. Use a Rater operating under a DOE-recognized HCO for ZERH to verify that all requirements for certification have been met in accordance with the inspection procedures for minimum rated features in ANSI / RESNET / ICC Standard 301-2019, Appendix B.[14] For modular multifamily buildings, a Rater must verify any requirement in the plant not able to be verified on-site because a feature will be concealed prior to shipment.[15]

3.2.5. The Rater submits the whole building to the HCO for ZERH for final certification once verification on all units and common spaces is complete.[7] The submission must include the documentation specified by the HCO for ZERH, based on as-built conditions. The Rater is required to keep electronic or hard copies of the completed and signed ZERH MF V2 National Rater Field Checklist.

3.3. ASHRAE 90.1 Path Certification Process

Under the ASHRAE 90.1 compliance path, the building must meet or exceed the ASHRAE performance target, as described in Exhibit 3. Buildings following this path must be certified through an MRO for ZERH. DOE recommends that Raters identify their MRO for ZERH during the design stage, but at the latest, the building must be under MRO for ZERH oversight prior to the first inspection. MROs for ZERH have limited discretion to grant an exemption to this policy (e.g., when a building switched paths). Buildings using this path must follow the modeling requirements in the ENERGY STAR Multifamily Simulation Guidelines located here, at the bottom of the page under Supporting Documents, ASHRAE Model.

Exception: For buildings that are certified as PHIUS CORE 2021 or PHIUS ZERO 2021 (using PHIUS modeling protocols in lieu of ENERGY STAR Multifamily Simulation Guidelines), achieving 20% less than the PHIUS CORE 2021 source energy criteria, without renewables, is accepted in lieu of achieving the ASHRAE performance target based on a baseline of ASHRAE 90.1-2019.

3.3.1. Meet or exceed the mandatory requirements specified in Exhibit 1. Following the ENERGY STAR Multifamily Simulation Guidelines, configure the preferred set of efficiency measures for the unit to be certified and verify that the resulting energy savings above the ASHRAE building baseline meets or exceeds the required performance target per Exhibit 3.

3.3.2. Upon completion of design, specific documentation may be submitted to an MRO for ZERH for their review and approval as described in Exhibit 4. DOE strongly recommends submitting this documentation before construction; however, Raters may instead choose to submit the design documentation at final certification. MROs for ZERH may choose to implement alternative design review requirements.

3.3.3. Construct the building using the measures selected in step 3.3.1 and the Mandatory Requirements in Exhibit 1.

3.3.4. Use a Rater operating under a DOE-recognized MRO for ZERH to verify that all requirements have been met in accordance with the inspection procedures for minimum rated features in ANSI / RESNET / ICC Standard 301-2019, Appendix B.[14] For modular multifamily buildings, a Rater must verify any requirement in the plant not able to be verified on-site because a feature will be concealed prior to shipment.[15]

3.3.5. Once verification on all units and common spaces is complete[7], submit the whole building to the MRO for ZERH for final certification with the MRO for ZERH-specified documentation (Exhibit 4) based on as-built conditions. The Rater is required to keep electronic or hard copies of the completed and signed ZERH MF V2 National Rater Field Checklist.

Exhibit 1: DOE Zero Energy Ready Home Multifamily Mandatory Requirements

Where ZERH Mandatory requirements apply only to dwelling units and not to common spaces, common space requirements shall be met through compliance with ENERGY STAR Multifamily New Construction Version 1.2 National Program Requirements.

Area of Improvement	Mandatory Requirements	Applicability[17]
1. ZERH Multifamily V2 National Rater Field Checklist	☐ Rater completes the DOE ZERH Multifamily Version 2 National Rater Field Checklist.[18]	Dwelling Units and Common Spaces
2. ENERGY STAR Multifamily New Construction Baseline	☐ Certified under ENERGY STAR Multifamily New Construction Program Version 1.2.[19]	Dwelling Units and Common Spaces
3. Envelope	☐ ERI and ASHRAE Paths: Ceiling, wall, floor, and slab insulation for dwelling units meet or exceed 2021 IECC - Residential chapter or Commercial Group R levels.[20, 21, 22] ☐ Prescriptive Path: Ceiling, wall, floor, and slab insulation for dwelling units meet ZERH MF Target Dwelling Design insulation levels.[23, 21] ☐ Windows meet high performance requirements based on climate zone.[24]	Dwelling Units
4. Duct System	☐ All heating and cooling distribution ducts and heating and cooling air-handling equipment are located within the thermal and air barrier boundary.[25]	Dwelling Units
5. Hot Water Efficiency	☐ WaterSense labeled fixtures for dwelling unit showerheads, bath faucets, and aerators. ☐ Hot water delivery systems meet stored volume criteria.[26] ☐ In-dwelling unit recirculation systems use on-demand controls.[27] ☐ Recirculating central hot water distribution systems meet pipe insulation thickness criteria. [28]	Dwelling Units
6. Lighting & Appliances	☐ All builder-supplied and builder-installed in-dwelling refrigerators[29], dishwashers, clothes washers, and clothes dryers are ENERGY STAR qualified.[30] ☐ 100% of in-dwelling, builder-installed lighting fixtures and lamps are LEDs.[31] ☐ All installed bathroom ventilation and ceiling fans are ENERGY STAR qualified.[32]	Dwelling Units
7. Indoor Air Quality	☐ Certified under EPA Indoor airPLUS.[33] ☐ Either unitized or centralized energy efficient balanced ventilation (HRV or ERV) is provided for dwelling units in Climate Zones 6-8.[34]	Dwelling Units
8. Renewable Ready	☐ Provisions of the DOE ZERH Program, Multifamily National Program Version 2, PV-Ready Checklist are completed.	See Checklist

9. Electric Vehicle Ready	☐ Provisions of the DOE ZERH Program, Multifamily National Program Version 2, EV-Ready Checklist are completed.	See Checklist
10. Heat Pump Water Heater (HPWH) Ready	☐ Dwelling units with in-unit water heaters meet minimum electric and space requirements.[35] ☐ Dwelling units with in-unit water heaters have a condensate drain installed within three feet of existing water heater.[36]	Dwelling Units
11. Heat Pump Space Heating Ready	☐ For units with in-unit combustion space heaters, 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." [37]	Dwelling Units
Advisory – HPWH Installation Quality	**Advisory – HPWH Installation Quality**: in-dwelling unit HPWH installations are encouraged to adhere to these installation practices to achieve optimal performance: ☐ HPWH has direct access to manufacturer-specified volume of ambient air (typical specs range from 450 to 1200 ft3), free of major dust sources, in the space surrounding the water heater through the mechanical room volume or the use of a louvered door, wall vents, ducting, or other strategy. ☐ HPWH installation complies with the manufacturer's minimum clearance requirements to make the unit accessible for maintenance and filter cleaning/replacement. ☐ HPWH has a sound rating of ≤ 55 dBA and a louvered door is not used to separate the unit from living space, or the HPWH has a sound rating of ≤ 35 dBA when a louvered door is used. Alternately, the HPWH is separated from living spaces by sound-attenuating assemblies with STC 35 or greater (i.e., by adding batt insulation to the surrounding wall assembly). DOE will consider making these installation practices requirements in a future program update.	Dwelling Units

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Exhibit 2: DOE Zero Energy Ready Home Multifamily Target Dwelling Design

The following requirements apply to dwelling units only, unless otherwise specified. For equipment, fixtures, building envelope assemblies, and appliances serving only common spaces, follow ENERGY STAR Multifamily New Construction Version 1.2 National Program Requirements.

This Exhibit does not apply to projects pursuing the ASHRAE 90.1 compliance pathway. For ASHRAE path projects, see Exhibit 3, below.

Hot Climates (2021 IECC Zones 1,2,3, 4A and 4B)	**Mixed and Cold Climates** (2021 IECC Zones 4C,5,6,7,8)
Residential Cooling Equipment (Where Provided) in Dwelling Units[18] modeled at the applicable efficiency levels below**.** If not listed here, see Exhibit A.	
▪ **Central AC Cooling:** CZ 1, 2: 18 SEER; CZ 3, 4A, 4B: 16 SEER ▪ **Air Source Heat Pump Cooling:** CZ 1, 2: 18 SEER; CZ 3, 4A, 4B: 16 SEER ▪ **Ground Source Heat Pump Cooling:** CZ 1, 2: 16 EER; CZ 3, 4A, 4B: 14 EER	▪ **Central AC Cooling:** 14 SEER ▪ **Air Source Heat Pump Cooling:** 16 SEER ▪ **Ground Source Heat Pump Cooling:** 14 EER
HVAC Grading: Installation quality at -7.5% blower fan airflow deviation, 0.45 W/cfm blower fan efficiency, and Grade III refrigerant charge.	
Residential Heating Equipment (Where Provided) in Dwelling Units[18] modeled at the applicable efficiency levels below. If not listed here, see Exhibit A.	
▪ **Gas Furnace, Gas Boiler:**[38] CZ 1, 2: 80 AFUE; CZ 3: 90 AFUE; CZ 4A, 4B: 95 AFUE ▪ **Air Source Heat Pump:** 9.2 HSPF ▪ **Ground Source Heat Pump:** 2.7 COP	▪ **Gas Furnace, Gas Boiler:**[38] 95 AFUE ▪ **Air Source Heat Pump Heating:** 9.5 HSPF ▪ **Ground Source Heat Pump:** 2.8 COP
HVAC Grading: Installation quality at -7.5% blower fan airflow deviation, 0.45 W/cfm blower fan efficiency, and Grade III refrigerant charge.	

Infiltration and Mechanical Ventilation								
Climate Zone	**1**	**2**	**3**	**4A, 4B**	**4C, 5**	**6**	**7**	**8**
Mech. Ventilation Efficacy (cfm/W)	2.9	2.9	2.9	2.9	1.2	1.2	1.2	1.2
Heat Recovery	None				Balanced, 65% SRE			
Infiltration Rate	0.25 CFM50/ft^2 of enclosure surface							
Mechanical Ventilation Rate	CFM = (0.01 x CFA) + (7.5 x (Nbr +1)), where CFA = Conditioned Floor Area and Nbr = Number of Bedrooms; Runtime: 24 hours/day							
Mechanical Ventilation Fan Watts	Watts = CFM Rate/Ventilation Efficacy, where CFM Rate and Ventilation Efficacy are determined above							

Envelope, Windows, and Doors for Dwelling Units.								
Dwelling unit insulation levels modeled to 2021 IECC levels (Residential, wood-frame) and Grade I installation per ANSI / RESNET / ICC Standard 301.[21, 22, 23]								
Climate Zone	**1**	**2**	**3**	**4A, 4B**	**4C, 5**	**6**	**7**	**8**
Slab Insulation R-value	0	0	10	10	10	10	10	10
Slab insulation Depth (ft)	0	0	2	4	4	4	4	4
Basement Wall U-Factor	0.360	0.360	0.091	0.059	0.050	0.050	0.050	0.050
Wood Framed Floor Assembly U-Factor[39]	0.064	0.064	0.047	0.047	0.033	0.033	0.028	0.028
Mass Floor U-Factor	0.322	0.087	0.074	0.051	0.051	0.051	0.042	0.038
Wall Assembly U-Factor	0.084	0.084	0.060	0.045	0.045	0.045	0.045	0.045
Celling Assembly U-factor	0.035	0.026	0.026	0.026	0.024	0.024	0.024	0.024
Dwelling Unit Windows Prescriptive Pathway: meet allowable U/SHGC combinations as listed in End Note 24, unless Class AW then meet values listed in table below. ERI Pathway: windows modeled to the following U and SHGC levels. If Class AW, then modeled to those values as listed below.								
Climate Zone	**1**	**2**	**3**	**4A, 4B**	**4C, 5**	**6**	**7**	**8**
Window U-Value	0.40	0.40	0.30	0.30	0.27	0.25	0.25	0.25
Window SHGC	0.23	0.23	0.25	0.30	0.30	0.30	0.30	0.30
Dwelling Unit Doors (unless Class AW) meet high performance targets as follows:								
Door type	**Opaque**		**≤ ½ Lite**		**> ½ Lite**			
Climate Zone	**Any**		**Any**		**1 – 3**		**4 – 8**	
Door U-Factor	0.17		0.25		0.30		0.30	
Door SHGC	Any		0.25		0.25		0.40	
Class AW Fenestration								
Climate Zone	**1**	**2**	**3**	**4A, 4B**	**4C, 5**	**6**	**7**	**8**
Fixed Window U-Factor	0.48	0.43	0.40	0.34	0.34	0.32	0.28	0.27
Operable Window U-Factor	0.59	0.57	0.51	0.43	0.43	0.40	0.34	0.30
Glazed Entrance Door U-Factor	0.79	0.73	0.65	0.60	0.60	0.60	0.60	0.60
SHGC	0.25	0.25	0.25	0.40	0.40	0.40	any	any

Water Heater	
Dwelling Unit Gas Water Heater[40]: UEF = 0.95	
Dwelling Unit Electric Water Heater: UEF = 1.95	
Central System Gas Water Heater: E_t = 90%	
Central System Electric Water Heater: COP = 2.2	
Thermostat and Ductwork	
Programmable thermostat	
All ducts and air handlers located in conditioned space, uninsulated, with no leakage to the outside.	
Dwelling Unit Lighting, Appliances, and Fixtures	
Lighting	ENERGY STAR light bulbs or fixtures with Tier II efficiency in 100% of Qualifying Light Fixture Locations, as defined by ANSI/RESNET/ICC 301.
Refrigerator	ENERGY STAR Qualified
Dishwasher	ENERGY STAR Qualified
Ceiling Fan(s)	ENERGY STAR Qualified
Water Fixtures	WaterSense bathroom faucets, aerators, showerheads

Exhibit 3: DOE Zero Energy Ready Home ASHRAE Path Performance Targets

ASHRAE Energy Savings Requirements	Other Mandatory Requirements
20% energy cost savings or 20% source energy savings above ASHRAE 90.1-2019. The use of on-site renewable energy, including cogeneration, photovoltaics, or wind turbines, may not contribute to meeting the Performance Target (but may be used to exceed it).	All items from Exhibit 1, above.

Appendix G from ASHRAE 90.1 must be used, along with the ASHRAE Standard 90.1 Performance Based Compliance Form and ENERGY STAR's Multifamily Simulation Guidelines_AppG2016, available on the ENERGY STAR Guidance Documents page which can be found at www.energystar.gov/mfguidance at the bottom of the page under 'Supporting Documents. DOE encourages the use of Appendix G from ASHRAE 90.1-2022, but will accept the use of Appendix G-based modeling for 90.1-2016 and 90.1-2019 until further notice.

Projects must demonstrate that a proposed building achieves a Performance Cost Index less than or equal to 80% of the Performance Cost Index Target calculated in accordance with Section 4.2.1.1c of ASHRAE 90.1. Regardless which version of Appendix G is used, the modeling must demonstrate a Performance Cost Index that is ≤ 80% of the following Building Performance Factors from 90.1-2019.

For energy cost savings use the following table:

Building Performance Factor (BPF) Energy Cost from ASHRAE 90.1-2019																
Climate Zone	0A, 1A	0B, 1B	2A, 2B	3A	3B	3C	4A	4B	4C	5A	5B	5C	6A	6B	7	8
BPF for Multifamily Buildings	0.68	0.70	0.66	0.69	0.68	0.59	0.74	0.76	0.74	0.70	0.73	0.75	0.68	0.71	0.68	0.72

Exhibit 4: ASHRAE and Prescriptive Path MRO Documents

Upon completion of design, documentation listed below (except documentation designated as 'final only') may be submitted to an MRO for ZERH for their review and approval. DOE strongly recommends submitting this documentation before construction; however, Raters may instead choose to submit the design documentation at final certification along with the documentation designated as 'final only'. *All documentation* listed below must be submitted at final certification. MROs for ZERH may choose to implement alternative design review requirements.

Party Responsible	Documents
Requirements Applicable to the Prescriptive and ASHRAE Paths	
Rater	ZERH Multifamily Workbook
	ZERH Multifamily Version 2 National Rater Checklist
	Construction Documents
	Photo Documentation (final only)
Requirements Applicable to the ASHRAE Path Only	
ASHRAE Modeler	ASHRAE Path Calculator or ASHRAE Standard 90.1 Performance Based Compliance Form
	Modeling file or modeling input and output files

Exhibit A: Values for HVAC equipment serving **Dwelling Units**.

For any equipment not listed, minimum efficiencies shall be based on 10**%** improvement over those listed in ASHRAE 90.1-2019. Use the values for "after 1/1/2023" where listed. For equipment types listed below that serve only common spaces, requirements may be found in the ESMFNC V1.2 National Rater Field Checklist, Exhibit X. Use the values that apply to common spaces.

Equipment Type	Equipment Size	CZ: 1-2	3	4A, B	4C, 5, 6, 7, 8
Room A/C (window, through-wall)		Certified under ENERGY STAR Version 5.0 Program Requirements for Room Air Conditioners (or subsequent versions once implemented)			
Air conditioners, air cooled (split system and single package)	< 65 kBtu/h	See Target Dwelling Design			
	≥ 65 and < 135 kBtu/h	16.3 IEER	15.7 IEER		14.6 IEER
	≥ 135 and < 240 kBtu/h	15.6 IEER	15.1 IEER		14.0 IEER
	≥ 240 and < 760 kBtu/h	14.5 IEER	14.1 IEER		13.0 IEER
Warm-air furnace (gas)		See Target Dwelling Design			
Gas heating component of a Packaged Terminal Air Conditioner (PTAC)		80% Et	82% Et, with infiltration rate of 0.25 cfm50/ft^2 of enclosure area, (average across all units)		
Packaged Terminal Air Conditioner cooling efficiency		12.7 EER	12.5 EER		11.9 EER
Packaged Terminal Heat Pump (PTHP) cooling efficiency*	< 7 kBtu/h	13.0 EER	12.5 EER		11.9 EER
	≥ 7 and ≤ 10 kBtu/h CZ 1-4 ≥ 7 and ≤ 15 kBtu/h CZ 4C-8	15.0 - (0.340 x Cap/1000) EER	14.7 - (0.320 x Cap/1000) EER		14.0 - (0.300 x Cap/1000) EER
	> 10 kBtu/h CZ 1-4 > 15 kBtu/h CZ 4C-8	11.6 EER	11.5 EER		9.5 EER
PTHP heating efficiency*	< 8 kBtu/h	3.3 COP			3.6 COP
	≥ 8 kBtu/h	3.7 - (0.052 x Cap/1000) COP			3.5 COP
Air cooled heat pump (split system and single package) cooling efficiency*	< 65 kBtu/h	See Target Dwelling Design			
	≥ 65 and < 135 kBtu/h	15.5 IEER	15.1 IEER		
	135 and < 240 kBtu/h	14.9 IEER	14.4 IEER		
Air cooled heat pump (split system and single package) heating efficiency*	< 65 kBtu/h	See Target Dwelling Design			
	≥ 65 and < 135 kBtu/h	3.5 COP			3.7 COP
	135 and < 240 kBtu/h	3.4 COP			3.6 COP
VRF air conditioners and heat pumps, cooling efficiency*		16.6 IEER	16.2 IEER		
VRF heat pumps, heating efficiency*		3.3 COP			3.5 COP
Water-loop heat pump (WLHP) cooling efficiency*	< 135 kBtu/h	15.0 EER			
WLHP heating efficiency*	< 135 kBtu/h	4.5 COP			
Boilers, hot water	< 300 kBtu/h	See Target Dwelling Design			
	≥ 300 kBtu/h	80% Et	86% Et (89% Et with WLHP)	95% Et (90% Et with WLHP)	

Cap means the rated capacity of the product in Btu/h

*For buildings where dwelling units are served by heat pump water heaters, space conditioning equipment may instead meet the efficiency listed in ASHRAE 90.1-2019. Use the values for "after 1/1/2023" where listed.

Endnotes

[1] Buildings that do not contain dwelling or sleeping units are not eligible for certification under ZERH. The term 'building' refers to a structure that encompasses dwelling/sleeping units and (if present) common spaces, sharing one or more of the following attributes: a common street address, a common entrance or exit, central/shared mechanical systems, or structurally interdependent wall or roof systems. Attached structures such as townhouses and 4-story two-unit structures (commonly referred to as "2-over-2s") may be considered separate buildings if they are divided by a vertical fire separation wall from the foundation to the roof sheathing and share none of the other attributes listed above. A skyway or a breezeway that connects to structures is not considered a common entrance or exit.
For the purposes of eligibility, hotels, motels, and senior care facilities are not considered multifamily buildings. Visit https://www.energystar.gov/partner_resources/residential_new/program_reqs/mfnc_building_eligibility for more information.

[2] A dwelling unit, as defined by the ANSI/RESNET/ICC 301, 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] A sleeping unit, as defined by ANSI/RESNET/ICC 301, is a room or space in which people sleep, that can also include permanent provisions for living, eating, and either sanitation or kitchen facilities but not both. Such rooms and spaces that are part of a dwelling unit are not *sleeping units*.

[4] A dwelling, as defined by ANSI/RESNET/ICC 301, is any building that contains one or two dwelling units used, intended, or designed to be built, used, rented, leased, let, or hired out to be occupied, or that are occupied for living purposes.

[5] The term 'common space' refers to any spaces in the building being certified that serve a function in support of the residential part of the building that is not part of a dwelling or sleeping unit. This includes spaces used by residents, such as corridors, stairs, lobbies, laundry rooms, exercise rooms, residential recreation rooms, and dining halls, as well as offices and other spaces used by building management, administration, or maintenance in support of the residents.

[6] A 'townhouse,' as defined by ANSI/RESNET/ICC 301, is a single-family dwelling unit constructed in a group of three or more attached units in which each unit extends from the foundation to the roof and has open space on at least two sides. They also must use the ERI path of the ZERH MF program, as they are not eligible to use the Prescriptive path or the ASHRAE 90.1 path. However, the DOE ZERH MF ERI Target for townhouses must be determined using Exhibit 1 of the DOE ZERH Single Family Homes National Program Requirements Version 2.

[7] Generally, buildings must be submitted for certification after verification on all units and common spaces is complete. Alternatively, at the discretion of the Provider (an Approved Rating Provider as defined by ANSI/RESNET/IECC 301 that is a designee of an HCO or MRO), individual dwelling units may be conditionally certified prior to the building completion if the following process is observed:

i. The Provider must generate a Conditional ZERH Certification Disclosure letter to be included with the label and certificate for the homebuyer of each conditionally certified unit.
ii. Once verification on all dwelling units and common spaces is complete and the whole building is certified, the Provider must generate a ZERH Certification Confirmation letter, for the building to deliver to the applicable homebuyers.

If any dwelling unit or common space in the building is ultimately unable to be verified, the building will not be able to earn certification, the Provider must decertify any conditionally certified units, and the builder must notify the applicable homebuyers.

[8] While certification will result in compliance with many code requirements, a Rater is not responsible for ensuring that all code requirements have been met prior to certification. In the event that a code requirement, a manufacturer's installation instructions, or an engineering document conflicts with a requirement of the ZERH program, then the conflicting requirement within these program requirements shall not be met. Certification shall only be allowed if the Rater has determined that no equivalent option is available that could meet the intent of the conflicting requirement. Note that a dwelling unit must still meet its energy performance target. Therefore, other efficiency measures may be needed to compensate for the omission of the conflicting requirement.

[9] The Rater may define the 'permit date' as either the date that the permit was issued or the application date of the permit. In cases where permit or application dates are not available, Providers have discretion to estimate permit dates based on other construction schedule factors. These assumptions should be both defensible and documented.

[10] The term 'Provider' refers to an Approved Rating Provider as defined by ANSI/RESNET/IECC 301 that is a designee of an HCO for ZERH.

[11] HCOs for ZERH are independent organizations recognized by DOE to implement a ZERH certification program for single-family and multifamily homes and apartments using an Energy Rating Index (ERI) compliance path. MROs for ZERH are independent organizations recognized by DOE to implement a ZERH certification program for multifamily apartments using a Prescriptive compliance path.

[12] The term 'Rater' refers to the person(s) completing the third-party verification required for certification. The person(s) shall: a) be a Certified Rater, Approved Inspector, as defined by ANSI/RESNET/IECC 301, or an equivalent designation as determined by a recognized HCO or MRO for ZERH; and, b) have attended and successfully completed a DOE-recognized training class. Raters may contact their HCO or MRO for ZERH to access this training.

Sampling of features specific to the DOE ZERH MF V2 certification may be conducted in accordance with the participating HCO or MRO for ZERH's approved Sampling Protocol.

[13] These requirements apply to all dwelling units and common spaces covered by the program, and garages (open or enclosed) in the building being certified, and where specified, parking lots. These requirements do not apply to commercial or retail spaces. These requirements do not apply to common spaces that are located in buildings on the property without any dwelling units. These requirements do not apply to parking garages or lots where the cost of the energy use of the parking garage or lot is not the responsibility of the builder/developer, building owner, or property manager.

[14] The Rater must review all items on the ZERH MF V2 National Rater Field Checklist for the whole building. 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).

If a Rater finds an item that is inconsistent with the intent of the checklist, the building cannot earn ZERH certification until the item is corrected. If correction of the item is not possible, the building cannot earn ZERH certification and individual units in the multifamily building also cannot be certified. If an item on the ZERH MF V2 National Rater Field Checklist cannot be inspected by the Rater, the building as well as individual dwelling units also cannot earn ZERH certification.

If a Rater is not able to determine whether an item is consistent with the intent of a provision, (e.g., an alternative method of meeting a checklist requirement has been proposed), then the Rater shall consult their Provider (e.g., rating company), MRO for ZERH, or HCO for ZERH. If the Provider, MRO for ZERH, or HCO for ZERH also cannot make this determination, then the Rater, MRO for ZERH, HCO for ZERH, or Provider shall report the issue to DOE prior to building completion at zerh@doe.gov and will typically receive an initial response within 10 business days. If DOE 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 building in question. However, if DOE believes the program requirements need revisions to make the intent clear, then this guidance will be provided to the partner but only enforced for buildings permitted after a specified transition period following the release of the revised requirements, typically 60 days in length. This process will allow DOE to make formal policy decisions as partner questions arise and to disseminate these policy decisions through the Policy Record and the periodic release of revised program documents to ensure consistent application of the program guidelines.

[15] A modular building is a prefabricated building that is made of multiple modules or sections that are manufactured and substantially assembled in a manufacturing plant. These pre-built sections are transported to the building site and constructed by a builder to meet all applicable building codes for site-built buildings.

[16] The software program shall automatically determine (i.e., without relying on a user-configured ZERH Multifamily Target Dwelling Design) the ERI target for each rated unit by following the DOE Zero Energy Ready Home Multifamily National Program, Version 2 ERI Target Procedure.

[17] “Applicability” refers to the space types covered by the provision, including the systems located within the listed spaces as well as the systems serving those spaces. The term ‘dwelling unit’ in Exhibits 1 and 2 includes both sleeping and dwelling units, unless otherwise noted.

[18] Two tracks are provided for satisfying the ZERH MF National Rater Field Checklist Item 5 – HVAC Systems. Track A – HVAC Grading by Rater allows a Rater to utilize ANSI/RESNET/ACCA 310 for grading the installation of residential HVAC systems serving individual spaces and a Functional Testing (FT) Agent to verify commercial and central systems and systems serving common spaces. Track B – HVAC Testing by FT Agent uses an FT agent to assessing all HVAC systems. Either track may be selected, but all requirements within that track must be satisfied for the building to be certified. See the ZERH MF V2 Rater Checklist for specific requirements for both tracks.

[19] DOE Zero Energy Ready Home Multifamily Version 2 requires compliance with ESMFNC V1.2, including in states where ESMFNC V1.1 (or an earlier version) is effective.

[20] Projects may reference either IECC Residential or Commercial (Group R), but all building components within each item on the ZERH MF V2 National Rater Field checklist must reference the same standard (whether it be residential or commercial).

[21] Building envelope assemblies, including exterior walls and unvented attic assemblies (where used), shall comply with the relevant vapor retarder provisions of the 2021 International Residential Code (IRC).

The total building envelope UA shall be less than or equal to the UA value that results from multiplying the U factors from the 2021 IECC (for ERI and 90.1 compliance path projects) or the U factors in the Target Design in Exhibit 2 (for prescriptive path projects) by the same assembly areas as the dwelling unit being certified. For ERI and 90.1 compliance path projects, U factors shall be taken from the 2021 International Energy Conservation Code (IECC) – Table R402.1.2 (when using the Residential chapter) or Table C402.1.4 (when using the Group R values from the Commercial chapter).

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. The performance of components (i.e., fenestration, ceilings, walls, floors, slabs) can be traded off using the UA approach. However, note that the ZERH Mandatory window provisions (Exhibit 1) and Items 1.5, 1.6, and 3.1 through 3.7 of the ESMFNC National Rater Field Checklist must be met regardless of the UA tradeoffs calculated.

[22] Any slab edge insulation allowances permitted by the most recent version and revision of the ESMFNC program are permitted. A list of currently exempted details is available at www.energystar.gov/slabedge. Note that ERI path projects using these exempted details must still achieve the Target ERI and the total building envelope UA requirement, which assume the use of slab edge insulation per the 2021 IECC prescriptive values. ASHRAE path projects may use these exempted details but still achieve the total building envelope UA requirement, which assumes the use of slab edge insulation per the 2021 IECC prescriptive values. Prescriptive path projects may use these exempted details but must still achieve the total building envelope UA requirement, which assumes the use of slab edge insulation per the Target home definition in Exhibit 2.

For jurisdictions designated by a code official as having Very Heavy Termite Infestation, the slab edge insulation value and depth shall be adjusted in the target UA calculation. The code-required insulation level and depth shall be set to the insulation level and depth found in the Rated Dwelling Unit for the purpose of determining compliance with this ZERH requirement.

The total building envelope UA shall be less than or equal to the UA value that results from multiplying the U factors from the 2021 IECC (for ERI and 90.1 compliance path projects) or the U factors in the Target Design in Exhibit 2 (for prescriptive path projects) by the same assembly areas as the dwelling unit being certified. For ERI and 90.1 compliance path projects, U factors shall be taken from the 2021 International Energy Conservation Code (IECC) – Table R402.1.2 (when using the Residential chapter) or Table C402.1.4 (when using the Group R values from the Commercial chapter).

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. The performance of components (i.e., fenestration, ceilings, walls, floors, slabs) can be traded off using the UA approach. However, note that

the ZERH Mandatory window provisions (Exhibit 1) and Items 1.5, 1.6, and 3.1 through 3.7 of the ESMFNC National Rater Field Checklist must be met regardless of the UA tradeoffs calculated.

[23] Prescriptive path projects may meet these insulation requirements for each envelope component listed here individually (using the U or R method) or may use these U-factors to establish a UA target for the total envelope of the dwelling unit and meet that calculated target.

[24] Windows shall meet the performance criteria below based on climate zone:

Window Specs Required for DOE ZERH Projects	**IECC CZ 1-2**		**IECC CZ 3,4A, 4B**		**IECC CZ 4C, 5 (SHGC values listed below may be paired with the U-value in the same row)**		**IECC CZ 6-8**	
	U-Value	SHGC	U-value	SHGC	U-Value	SHGC	U-Value	SHGC
	≤ 0.40	≤ 0.23	[CZ 3] ≤ 0.30 [CZ 4] ≤ 0.30	[CZ 3] ≤ 0.25 [CZ 4] ≤ 0.40	≤ 0.27 = 0.28 = 0.29 = 0.30	Any ≥ 0.32 ≥ 0.37 ≥ 0.42	≤ 0.25	Any

If no NFRC rating is noted on the window or in product literature (e.g., for site-built fenestration), select the U factor and SHGC value from Tables 4 and 10, respectively, in 2013 ASHRAE Fundamentals, Chapter 15. Select the highest U-factor and SHGC value among the values listed for the known window characteristics (e.g., frame type, number of panes, glass color, and presence of low-e coating) to determine the rating of the unrated fenestration. This rating must comply with ZERH window specifications, above.

The following exceptions to the ZERH Window performance criteria apply:

a. An area-weighted average of fenestration products (per dwelling unit) shall be permitted to satisfy the U-factor requirements;
b. An area-weighted average of fenestration products ≥ 50% glazed (per dwelling unit) shall be permitted to satisfy the SHGC requirements;
c. 15 square feet of glazed fenestration per dwelling unit shall be exempt from the U-factor and SHGC requirements, and shall be excluded from area-weighted averages calculated using a) and b), above;
d. One side-hinged opaque door assembly up to 24 square feet in area shall be exempt from the U-factor requirements and shall be excluded from area-weighted averages calculated using a) and b), above;
e. Fenestration utilized as part of a passive solar design shall be exempt from the U-factor and SHGC requirements and shall be excluded from area-weighted averages calculated using a) and b), above. Exempt windows shall be facing within 45 degrees of true South and directly coupled to thermal storage mass that has a heat capacity > 20 btu / $ft^3x^{\circ}F$ and provided in a ratio of at least 3 sq. ft. per sq. ft. of South facing fenestration. Generally, thermal mass materials will be at least 2 in. thick.
f. For project sites located at an elevation ≥ 5,000 feet above sea level and located in Climate Zones 5 – 8, windows with a maximum U factor of 0.30 (with any SHGC) may be used to satisfy this program requirement. For project sites located at an elevation ≥ 8,000 feet above sea level and located in Climate Zones 5 – 8, windows with a maximum U factor of 0.32 (with any SHGC) may be used to satisfy this program requirement.

g. Structural dwelling unit windows and doors that are classified as "Class AW" under the North American Fenestration Standard. Class AW windows must instead meet the U and SHGC values listed in Exhibit 2 of the ZERH MF V2 National Program Requirements.

[25] Exceptions and alternative compliance paths to locating 100% of forced-air ducts serving dwelling units within the building's thermal and air barrier boundary are:

a. Up to 10 ft. of total duct length is permitted to be outside of the thermal and air barrier boundary.
b. Ducts (but not air handlers) may be located in a vented attic if minimum R-8 duct insulation is used, duct leakage to outdoors is measured ≤ 3 CFM25 per 100ft2 of conditioned floor area, and:
    i. In Moist (A) climate zones (per 2021 IECC Table R301.1), an additional 1.5 in. (min.) of closed-cell spray foam encapsulates the ducts and ductwork is buried under 2 in. (min.) of blown-in insulation; OR
    ii. In Dry (B) and Marine (C) climate zones (per 2021 IECC Table R301.1, ductwork is buried under at least 3.5 in. of blown-in insulation.
c. Systems which meet the criteria for "Ducts Located in Conditioned Space" as defined by the 2021 IECC Section R403.3.2.
d. Jump ducts which do not directly deliver conditioned air from the heating/cooling equipment may be located in attics if all joints, including boot-to-drywall, are air sealed and the jump duct is fully buried under the attic insulation.
e. Ducts and air-handling equipment may be located within an uninsulated and unvented crawl space or basement when the applicable dehumidification requirements of the Indoor airPLUS program are met.
f. Ducts and air-handling equipment associated with dedicated outdoor air systems (DOAS), which may also provide supplemental heating and cooling, are permitted to be outside of the building's thermal and air barrier boundary.
g. This provision does not apply to equipment or ductwork that only provides ventilation, including make-up air systems.

[26] Hot water delivery systems meet the following efficiency requirements:

To minimize water wasted while waiting for hot water and water heating energy, the hot water distribution system shall store no more than 1.2 gallons (4.5 liters) of water in any piping/manifold between the hot water source and any hot water fixture. This provision applies to in-dwelling unit plumbing systems and central hot water distribution systems. System options include manifold-fed systems; structured plumbing systems; core plumbing layouts, and recirculation systems.

To verify that the distribution system stores no more than 1.2 gallons (4.5 liters), raters shall either use the Calculation method ***or*** the Field Verification method. In the Calculation method, the rater shall calculate the stored volume between the hot water source and the furthest fixture from the source using the piping or tubing inside diameter and the length of the piping/tubing. In the case of recirculation systems, the 1.2-gallon (4.5 liter) storage limit shall be measured from the point where the branch feeding the furthest fixture branches off the recirculation loop, to the fixture itself. An Excel-based tool is available on the DOE ZERH website for this calculation.

Using the Field Verification method, no more than 1.4 gallons (5.3 liters) of water shall be collected from the hot water fixture before hot water is delivered. This accounts for any water stored in the fixture in addition to the 1.2-gallon limit on pipe storage. Only the fixture with the greatest stored volume between the fixture and the hot water source (or recirculation loop) needs to be tested. To field-verify that the system meets the 1.4-gallon (5.3 liter) limit, raters shall first

initiate operation of recirculation systems, if present, and let such systems run for at least 40 seconds. Next, a bucket or flow measuring bag (pre-marked for 1.4 gallons) shall be placed under the hot water fixture. The hot water shall be turned on completely and a digital temperature sensor used to record the initial temperature of the water flow. Once the water reaches the pre-marked line at 1.4 gallons, the water shall be turned off and the ending temperature of the water flow (not the collection bucket) shall be recorded. The temperature of the water flow must increase by ≥ 10 °F in comparison to the final to the initial temperature reading.

[27] In-dwelling unit hot water recirculation systems meet the following requirements:

a. Must be based on an occupant-controlled switch or an occupancy sensor, installed in each bathroom in the dwelling unit which is located beyond a 1.2 gallon stored-volume range from the water heater or central recirculation loop.
b. In-dwelling unit recirculation systems which operate based on "adaptive" scheduling, meaning that they "learn" the hot water demand profile in the dwelling unit and adapt their operation to anticipate this profile, are permitted at this time, and do not require the use of occupant-controlled switches or occupancy sensors.
c. In-dwelling unit recirculation systems that are activated based **solely** on a timer and/or temperature sensor are not eligible.

These provisions do not apply to recirculating central hot water distribution systems.

[28] For recirculating central hot water distribution systems, the following pipe insulation thickness levels must be met or exceeded. Additionally, pipe insulation shall cover the entire length of the recirculation loop to the extent possible.

Nominal Pipe or Tube Size (inches)	Insulation Thickness (inches)
< 1.5	1.5
≥ 1.5	2.0

[29] Due to industry supply chain challenges, DOE is temporarily allowing the use of non-ENERGY STAR certified refrigerators for projects using the ERI and ASHRAE 90.1 compliance paths. Any project utilizing this temporary alternative must account for the non-ENERGY STAR certified refrigerator in the energy model and still achieve the required performance threshold. DOE advises partners that this alternative may be rescinded in a future program update.

[30]Products in categories which are not covered by ENERGY STAR product criteria are exempt.

[31] Up to 5% of lighting, for task or decorative lighting, may be exempt from this provision. The Target Home specification for lighting will remain at 100% regardless of whether this exemption is used. Projects following the prescriptive path may not use this 5% exemption.

[32] This provision does not apply to H/ERVs that are used to provide exhaust ventilation for bathrooms.

[33] Buildings permitted on or before 12/31/2024 must certify under the Indoor airPLUS Version 1 program requirements. For buildings permitted after 12/31/2024, DOE will consider a revision to these program requirements that specifies if an updated version of Indoor airPLUS must be used. See the Indoor airPLUS program site for information on program updates: https://www.epa.gov/indoorairplus/indoor-airplus-program-documents

[34] An in-unit HRV or ERV is required to provide whole-dwelling mechanical ventilation for dwelling units in Climate Zones 6 – 8 and must meet or exceed the following specifications: ≥ 65% SRE (@ 32 °F) and ≥ 1.2 CFM/Watt. Alternatively, projects may utilize centralized H/ERVs serving multiple dwelling units.

[35] Each dwelling unit with an in-unit water heater has an individual branch circuit outlet that is installed, energized, and terminates within 3 feet of each installed fossil fuel water heater, and a space located within the dwelling unit that is at least 3' x 3' wide and 7' high shall be available surrounding or within 3 feet of the installed fossil fuel water heater, to facilitate future heat pump water heater installation. The individual branch circuit shall have a rating not less than 240V/30A or 120V/20A. The 3' x 3' x 7' volume may contain the existing water heater. An exception to the requirement for the 3' x 3' x 7' space is provided when the installed water heater is an electric tankless system or a fossil fuel tankless water heater.

Dwelling units utilizing an electric water heater are exempt from this requirement.

[36] Drain is no more than two inches higher than the base of the installed water heater and allows draining without pump assistance. Drain is not required to be reserved exclusively for use with a future heat pump water heater.

[37] If a branch circuit outlet is installed, it shall be in compliance with 2021 IRC Section E3702.11 based on heat pump space heating equipment sized in accordance with 2021 IECC R403.7 and shall terminate within three feet of each fossil fuel space heater. Alternatively, code-compliant wiring conduit to facilitate future wiring for a heat pump installation may be installed and shall terminate within three feet of each fossil fuel space heater.

Dwelling units utilizing in-unit electric heating systems as the primary heating for the dwelling unit are exempt from this requirement.

[38] For prescriptive path buildings with oil-fired equipment, use the efficiency listed for gas-fired equipment.

[39] For all floor assemblies other than mass floors, prescriptive path projects must use the U-factor requirements listed in this row.