

Individual Dwelling Units and Heat Pump Water Heaters

2022 Energy Code (Title 24 Part 6) Assistance Sheet

For prescriptive and mandatory requirements of other water heating systems and configurations refer to the 2022 Building Energy Efficiency Standards single family sections 150.0(n) for mandatory requirements, 150.2(b) for alterations, 150.2(a) for additions, or 150.1(c) for new construction. For multifamily refer to sections 160.4 for mandatory requirements, 180.2(b) for alterations, 180.1(a) for additions, or 170.2(d) for new construction.

When does the 2022 Code allow HPWHs?

	Performance Path	Prescriptive Path
New Construction	Allowed	Allowed (two options)
Additions installing a 2 nd water heater	Allowed	Allowed (two options described below)
Alterations	Allowed	Allowed (two options described below)

Can a HPWH be used in an addition installing a 2nd water heater or replace an existing water heater? YES!

For Single-Family Residential additions and replacements IF:

- The HPWH meets the federal minimum efficiency requirements. The HPWH storage tank is not located outdoors and is located on an R-10 or higher incompressible rigid surface. The water heater is installed with a communication interface that either meets the requirements of Section 110.12(a) or has an ANSI/CTA-2015-B communication port. (§ 150.2(a)1Di and § 150.2(b)1Hiii); **OR**
- The HPWH is rated as NEEA Tier 3 (§ 150.2(a)1Dii and § 150.2(b)1Hiiic); **OR**
- The permit applicant can demonstrate the project complies with Energy Code using the performance method. (§ 150.2(a)2 and § 150.2(b)2)

For Multifamily Residential HPWH replacements IF:

The HPWH meets either of the requirements listed in the Single-Family Residential section above

For Multifamily Residential additions of HPWHs serving individual dwelling units IF:

Adding a HPWH serving an individual dwelling unit:

- The HPWH meets the federal minimum efficiency requirements and the following conditions:
 1. A compact hot water distribution system is installed as specified in Reference Appendix RA4.4.6 in climate zones 1 and 16
 2. A drain water heat recovery system that is field verified is installed as specified in the Reference Appendix RA3.6.9 in Climate Zone 16; **OR**
- The HPWH is rated as NEEA Tier 3. In addition, for climate zone 16, a drain water heat recovery system that is field verified as specified in Reference Appendix RA3.6.9 (§ 170.2(d)1B); **OR**
- The permit applicant can demonstrate the project complies with Energy Code using the performance method. (§ 180.1(b))

For Multifamily Residential additions of HPWHs serving multiple dwelling units IF:

- For heat pump water-heating systems serving multiple dwelling units, the water-heating system shall be installed according to the manufacturer's design and installation guidelines and meet the following requirements:
 1. The hot water return from the recirculation loop shall connect to a recirculation loop tank and shall not directly connect to the primary heat pump water heater inlet or the primary thermal storage tanks.
 2. The fuel source for the recirculation loop tank shall be electricity if auxiliary heating is needed. The recirculation loop heater shall be capable of multi-pass water-heating operation.
 3. For systems with single pass primary heat pump water heater, the primary thermal storage tanks shall be piped in series if multiple tanks are used. For systems with multi-pass primary heat pump water heater, the primary thermal storage tanks shall be piped in parallel if multiple tanks are used.
 4. The primary storage tank temperature setpoint shall be at least 135°F.
 5. The recirculation loop tank temperature setpoint shall be at least 10°F lower than the primary thermal storage tank temperature setpoint such that hot water from the recirculation loop tank is used for the temperature maintenance load before engaging the recirculation loop tank heater.
 6. The minimum heat pump water heater compressor cut-off temperature shall be equal to or lower than 40°F ambient air temperature.
 7. A recirculation system. (Exception to Section 170.2(d)2G: Buildings with eight or fewer dwelling units.)
 8. Design documentation shall be provided in accordance with JA14.4.

NEEA Rated HPWHs

The Northwest Energy Efficiency Alliance (NEEA) maintains a list of products that meets its Advanced Water Heater Specifications. NEEA has recently introduced two new tiers of HPWHs, tiers 4 and 5, which have design and control features that make them more efficient than tier 3 HPWHs. There are already many NEEA tier 4 HPWHs on the market. A list of products that meet NEEA specifications is available online here: <https://neea.org/img/documents/qualified-products-list.pdf>.

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What to look for on the required CF1R-ALT-05-E Compliance Form¹ and Permit Application

Field	Field Name	Data Entry 1	Data Entry 2	Data Entry 3
02	Water Heating System ID or Name			
03	Water Heating System Type			
04	System Option (from §150.2(b)1Hiii)			
05	Water Heater Type			
06	Volume			
07	Fuel Type			
08	# of Water Heaters in System			

Source: <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency-3>

Water Heater Type: HPWH

Fuel Type: Electric

Heating Efficiency Type: Uniform Energy Factor (UEF)

Heating Efficiency Value: "NEEA Tier 3" or higher is required or meet all the following conditions:

- the HPWH storage tank is located in the garage or conditioned space;
- the HPWH is located on an R-10 or higher incompressible rigid surface; and
- A communication interface is installed that either meets the requirements of Section 110.12(a) or has an ANSI/CTA-2015-B communication port.

Any HPWH used must have an efficiency value \geq the minimum UEF in accordance with federal appliance standards. Minimum federal appliance standards for common heat pump water heaters are provided in Page 2.

What to look for when inspecting an installed heat pump water heater

The installed HPWH matches what's on the approved CF1R form.

The installed HPWH is rated as NEEA Tier 3 or meets the requirements above.

If the water heater being replaced was a natural gas water heater, the natural gas line has been capped off.

A dedicated 240 V/30 A electrical line (for most HPWHs). If an existing dedicated 240 V/30 A line is not already near the HPWH installation location, electrical work for a new line and an upgrade to the electric panel to accommodate the new electric load may be required.

Insulation for new and existing hot and cold-water pipes from the storage tank (when accessible).

Condensate waste removal, and if necessary, a drop/overflow basin and drainage piping. Note that condensate contains no combustion products or acids and so may be drained to sanitary sewer or to outside via a hose.

A visible AC disconnect.

Seismic bracing for the storage tank.

Minimum federal appliance standards UEF for common heat pump water heaters[†]

Volume (gallons)	$0 \leq \text{FHR} < 18$	$18 \leq \text{FHR} < 51$	$51 \leq \text{FHR} < 75$	$\text{FHR} \geq 75$
60	1.86	1.98	2.05	2.18
75	1.84	1.96	2.03	2.16
80	1.84	1.96	2.03	2.15

Source: https://www.energy.ca.gov/sites/default/files/2022-10/2022_WaterHeating_EfficiencyGuide_ADA.pdf

[†]UEF varies depending on the size of the tank (volume) and the first hour rating (FHR) which is the number of gallons of hot water that a water heater can supply per hour starting with a tankful of hot water.

¹ Similar for CF1R-ALT-01 (altering other parts of the house) and CF1R-ADD-01 (prescriptive addition)
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 Page 2 of 2 | Last Updated 12/14/2022

