

Residential Water Heaters: Guide to 2019 Energy Code Requirements

What is the energy code and why does it matter?

California's energy code, the Building Energy Efficiency Standards (Title 24, Part 6; the Standards), outlines the energy efficiency requirements for newly constructed buildings as well as additions and alterations to existing buildings. Energy efficiency reduces energy costs and wasteful consumption, improves building comfort, and reduces environmental impacts of energy use. The Standards ensure that builders use technologies and practices that are energy efficient and cost-effective for building owners.

What are the water heater requirements?

The Standards require all **new or replacement water heaters** to meet certain energy specifications. This can be done either by meeting specific requirements prescribed by the state (called the prescriptive approach), or by using a computer model to figure out a custom-designed set of requirements.

Water heater replacements

Most often, water heaters that are being replaced use the prescriptive approach. The guidelines for this approach are laid out on page 2. In addition, the replacement water heater must meet federal appliance standards.*

New water heaters

New construction, such as building a new home, usually uses the performance approach. In addition, any project that adds anything other than a single gas or propane tankless water heater to a home with an existing water heating system must demonstrate that the energy use of the building has not been increased using the performance approach.

The performance approach uses California Energy Commission-certified compliance software to calculate the energy budget for space conditioning, and allows more efficient energy features in a home to compensate for less efficient features.† The architect or designer for the project should know how to proceed with this approach. If you need help finding someone who can create a model for you, the California Association of Building Energy Consultants maintains a list of qualified professionals here: www.cabec.org/find.

[\(Step-by-step prescriptive standards guide for water heater replacements on page 2\)](#)

This guide applies to storage gas water heaters, instantaneous or tankless gas water heaters, electric resistance water heaters, and electric heat pump water heaters. For information on permitting requirements for other water heating system types and configurations, see section 150.2(b)¹ of the *2019 Building Energy Efficiency Standards*.

Required 2019 compliance documents can be found at:

https://ww2.energy.ca.gov/title24/2019standards/2019_compliance_documents/Residential_Documents/

For more information on 2019 Title 24 Part 6 requirements:

- Visit the California Energy Commission website: www.energy.ca.gov/title24/2019standards/
- Contact the CEC energy code hotline at (800) 772-3300 or email: title24@energy.state.ca.us
- Contact the BayREN Codes & Standards Program by email: codes@bayren.org

* California Energy Commission. Water Heater Efficiency Guide.

https://ww2.energy.ca.gov/title24/2016standards/documents/2016_water_heater_efficiency_guide.pdf

† 2019 Building Energy Efficiency Standards, <https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2019-building-energy-efficiency>

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REPLACING AN EXISTING WATER HEATER:

What type of water heater do you plan to install? (All of the following must comply with federal appliance standards.)

- Natural gas or propane tankless water heater with an input rating of 200,000 BTU per hour or less
- Natural gas or propane storage water heater with an input rating of 75,000 BTU per hour or less
- Electric Resistance, 60 gallons or less, or Tankless Electric (allowed only if natural gas is not available to building¹)
- Electric Heat Pump

The following criteria must be met:

- The building is in CZ 1-15 (the whole Bay Area qualifies), **natural gas is connected to the existing water heater location**, and the installed HPWH is not located outdoors **AND:**
 - o Is rated as NEEA Tier 3 (§ 150.2(b)1Hiii); **OR**
 - o Meets minimum federal appliance standards with demand responsive controls, and is located on an R-10 rigid surface (§ 150.2(b)1Hiiib); **OR**
- No natural gas is connected to the existing water heater location** and the HPWH meets minimum federal appliance standards. § 150.2(b)1Hiii; **OR**
- The permit applicant can demonstrate the project complies with Energy Code using the performance method. § 150.2(b)2

SYSTEM REQUIREMENTS FOR WATER HEATER REPLACEMENTS:

PIPE INSULATION REQUIREMENTS:

The following pipes must have **at least one inch of insulation**⁴

- First five feet of new or accessible existing hot and cold water pipes nearest a storage type water heater
- Any newly installed hot water piping $\frac{3}{4}$ inch or greater in diameter and less than 1 inch
- Any newly installed hot water piping less than $\frac{3}{4}$ inch that is
 - o Associated with a domestic hot water recirculation system
 - o From water heater to kitchen fixtures
 - o Buried below grade

RECIRCULATION SYSTEM REQUIREMENTS:

Plan to add or replace an existing recirculation system⁵?

- If yes, **only Demand Recirculation Systems with manual on/off control may be installed.** Any other type requires the Performance Compliance Approach. Accessible pipes within the loop must be insulated when adding or replacing a water heater.

ISOLATION VALVE REQUIREMENTS:

- Tankless** water heaters with an input rating greater than 6,800 BTU per hour (2kW) require isolation valves on both cold water supply and hot water pipe leaving the water heater, and hose bibs or other fittings on each valve for flushing the water heater when the valves are closed.

¹ Section 105.2- Energy Efficiency Standards for Additions and Alterations to Existing Low-Rise Residential Buildings, <https://energycodeace.com/site/custom/public/reference-ace-2019/index.html#!Documents/section1502energyefficiencystandardsforadditionsandalterationsto.htm>

² California Building Climate Zone Areas: https://ww2.energy.ca.gov/maps/renewable/building_climate_zones.html

³ For a full list of Common NEEA Tier 3 products in the Bay Area nine county region, visit <https://neea.org/img/documents/qualified-products-list.pdf>

⁴ For newly installed specifications, see Section 150.0 (j)2. For existing specifications, see Section 150.0 (j)2Ai, iii, and iv.

⁵ Reference Appendix RA4.4.9, <https://ww2.energy.ca.gov/2018publications/CEC-400-2018-021/CEC-400-2018-021-CMF.pdf>