Residential Water Heaters:
Guide to 2022 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. In addition, 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[1]?

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 creating a computer model to evaluate compliance and accommodate a custom-design (called the "performance approach").

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, reflecting Subchapter 9, sections 150.2 (Additions and Alterations) of the Standards. In addition, the replacement water heater must meet federal appliance standards.[2]

New construction water heaters

New construction, such as newly built homes, typically uses the performance approach. All new construction water heating systems using gas or propane water heaters to serve individual dwelling units must meet electric ready requirements. This includes providing electric capacity and condensate drainage infrastructure as well as designating a space at least 2.5 feet by 2.5 feet wide and 7 feet tall suitable for the future installation of a heat pump water heater (HPWH) that meets the requirements in section 150.0(n)1 of the 2022 Building Energy Efficiency Standards.

The performance approach uses California Energy Commission-certified compliance software to calculate the energy budget for space conditioning and water heating and allows more efficient energy features in a home to compensate for less efficient features.[3] 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)[4] of the *2022 Building Energy Efficiency Standards*.

Required 2022 compliance documents can be found at:

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

For more information on 2022 Title 24 Part 6 requirements:

- Visit the California Energy Commission website: **www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency**
- 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**

[1] This permit guide summarizes state standards, but some local jurisdictions may have additional code requirements.

[2] California Energy Commission. Water Heater Efficiency Guide, https://www.energy.ca.gov/sites/default/files/2022-10/2022_WaterHeating_EfficiencyGuide_ADA.pdf

[3] 2022 Building Energy Efficiency Standards, https://www.energy.ca.gov/programs-and-topics/programs/building-energy-efficiency-standards/2022-building-energy-efficiency

[4] Section 150.2- Energy Efficiency Standards for Additions and Alterations to Existing Low-Rise Residential Buildings (energycodeace.com)

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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
- ☐ Natural gas or propane storage water heater
- ☐ Electric Resistance (allowed only if the existing water heater is electric resistance[5])
- ☐ Heat Pump Water Heater that meets minimum federal appliance standards

  The following criteria must be met:

  ☐ The HPWH meets the requirements of NEEA Advanced Water Heater Specification Tier 3[6] or higher (§ 150.2(b)1Hiiic); **OR**:

  ☐ The installed HPWH meets the following conditions (§ 150.2(b)1Hiiib):
  - The HPWH storage tank is not located outdoors **AND**:
  - The storage tank is placed on an incompressible, rigid insulated surface with a minimum thermal resistance of R-10; **AND**
  - The water heater shall be installed with a communication interface that either meets the requirements of Section 110.12(a) or has an ANSI/CTA-2045-B communication port; **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 be insulated. [7]

- ☐ New and accessible existing hot water pipes
  - Pipe insulation must be as thick as the diameter of the pipe for pipes 2 inches and less in diameter.
  - Pipes greater than 2 inches in diameter must have at least 2 inches of pipe insulation.

RECIRCULATION SYSTEM REQUIREMENTS:

Plan to add or replace an existing recirculation system[8]?

- ☐ 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.

[5] Single gas or propane tankless water heaters, HPWHs, or an instantaneous electric water heaters must meet requirements specified in section 150.2(b)1H of the 2022 Building Energy Efficiency Standards

[6] 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

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

[8] Reference Appendix RA4.4.9, https://www.energy.ca.gov/sites/default/files/2022-08/CEC-400-2022-010-AP.pdf

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