

2008 BUILDING ENERGY

CALIFORNIA
ENERGY
COMMISSION

EFFICIENCY STANDARDS FOR RESIDENTIAL AND NONRESIDENTIAL BUILDINGS



REGULATIONS / STANDARDS

This version of the revised 2008 Standards is the marked version indicating the changes from the original 2008 Standards.

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SECTION 113 – MANDATORY REQUIREMENTS FOR SERVICE WATER-HEATING SYSTEMS AND EQUIPMENT

- (a) **Certification by Manufacturers.** Any service water-heating system or equipment may be installed only if the manufacturer has certified that the system or equipment complies with all of the requirements of this subsection for that system or equipment.
1. **Temperature controls for service water-heating systems.** Service water-heating systems shall be equipped with automatic temperature controls capable of adjustment from the lowest to the highest acceptable temperature settings for the intended use as listed in Table 2, Chapter 9 of the ASHRAE Handbook, HVAC Applications Volume.
- EXCEPTION to Section 113(a)1:** Residential occupancies.
- (b) **Efficiency.** Equipment shall meet the applicable requirements of the Appliance Efficiency Regulations as required by Section 111, subject to the following:
1. If more than one standard is listed in the Appliance Efficiency Regulations, the equipment shall meet all the standards listed; and
 2. If more than one test method is listed in the Appliance Efficiency Regulations, the equipment shall comply with the applicable standard when tested with each test method; and
 3. Where equipment can serve more than one function, such as both heating and cooling, or both space heating and water heating, it shall comply with all the requirements applicable to each function; and
 4. Where a requirement is for equipment rated at its "maximum rated capacity" or "minimum rated capacity," the capacity shall be as provided for and allowed by the controls, during steady-state operation.
- (c) **Installation.** Any service water-heating system or equipment may be installed only if the system or equipment complies with all of the applicable requirements of this subsection for the system or equipment.

1. **Outlet temperature controls.** On systems that have a total capacity greater than 167,000 Btu/hr, outlets that require higher than service water temperatures as listed in the ASHRAE Handbook, Applications Volume, shall have separate remote heaters, heat exchangers, or boosters to supply the outlet with the higher temperature.
2. **Controls for hot water distribution systems.** Service hot water systems with circulating pumps or with electrical heat trace systems shall be capable of automatically turning off the system. Pumps for circulating systems. ~~Circulating service water heating systems shall have a control capable of automatically turning off the circulating pump when hot water is not required.~~

EXCEPTION to Section 113(c)2: Water heating systems serving a single dwelling unit.

3. **Temperature controls for public lavatories.** The controls shall limit the outlet temperature to 110°F.
4. **Insulation.** Unfired service water heater storage tanks and backup tanks for solar water-heating systems shall have:
 - A. External insulation with an installed R-value of at least R-12; or
 - B. Internal and external insulation with a combined R-value of at least R-16; or
 - C. The heat loss of the tank surface based on an 80°F water-air temperature difference shall be less than 6.5 Btu per hour per square foot.
5. **Water Heating Recirculation Loops Serving Multiple Dwelling Units, High-Rise Residential, and Hotel/Motel and Nonresidential Occupancies.** A water heating recirculation loop is a type of hot water distribution system that reduces the time needed to deliver hot water to fixtures that are distant from the water heater, boiler or other water heating equipment. The recirculation loop is comprised of a supply portion, connected to branches that serve multiple dwelling units, guest rooms, or fixtures and a return portion that completes the loop back to the water heating equipment. A water heating recirculation loop shall meet the following requirements:
 - A. Air release valve or vertical pump installation. An automatic air release valve shall be installed on the recirculation loop piping on the inlet side of the recirculation pump and no more than 4 feet from the pump.

- This valve shall be mounted on top of a vertical riser at least 12" in length and shall be accessible for replacement and repair. Alternatively, the pump shall be installed on a vertical section of the return line.
- B. Recirculation loop backflow prevention.** A check valve or similar device shall be located between the recirculation pump and the water heating equipment to prevent water from flowing backwards through the recirculation loop.
- C. Equipment for pump priming.** A hose bibb shall be installed between the pump and the water heating equipment. An isolation valve shall be installed between the hose bibb and the water heating equipment. This hose bibb is used for bleeding air out of the pump after pump replacement.
- D. Pump isolation valves.** Isolation valves shall be installed on both sides of the pump. These valves may be part of the flange that attaches the pump to the pipe. One of the isolation valves may be the same isolation valve as in item C.
- E. Cold water supply and recirculation loop connection to hot water storage tank.** Storage water heaters and boilers shall be plumbed in accordance with the boiler manufacturer's specifications. The cold water piping and the recirculation loop piping shall not be connected to the hot water storage tank drain port.
- F. Cold water supply backflow prevention.** A check valve shall be installed on the cold water supply line between the hot water system and the next closest tee on the cold water supply line. The system shall comply with the expansion tank requirements as described in the California Plumbing Code Section 608.3.
6. **Service water heaters in state buildings.** Any newly constructed building constructed by the State shall derive its service water heating from a system that provides at least 60 percent of the energy needed for service water heating from site solar energy or recovered energy.

EXCEPTION to Section 113(c)56: Buildings for which the state architect determines that service water heating from site solar energy or recovered energy is economically or physically infeasible.

SECTION 114 – MANDATORY REQUIREMENTS FOR POOL AND SPA HEATING SYSTEMS AND EQUIPMENT

- (a) **Certification by Manufacturers.** Any pool or spa heating system or equipment may be installed only if the manufacturer has certified that the system or equipment has all of the following:
1. **Efficiency.** A thermal efficiency that complies with the Appliance Efficiency Regulations; and
 2. **On-off switch.** A readily accessible on-off switch, mounted on the outside of the heater that allows shutting off the heater without adjusting the thermostat setting; and
 3. **Instructions.** A permanent, easily readable, and weatherproof plate or card that gives instruction for the energy efficient operation of the pool or spa heater and for the proper care of pool or spa water when a cover is used; and
 4. **Electric resistance heating.** No electric resistance heating; and
- EXCEPTION 1 to Section 114(a)4:** Listed package units with fully insulated enclosures, and with tight-fitting covers that are insulated to at least R-6.
- EXCEPTION 2 to Section 114(a)4:** Pools or spas deriving at least 60 percent of the annual heating energy from site solar energy or recovered energy.
- ~~5. **Pilot light.** No pilot light.~~
- (b) **Installation.** Any pool or spa heating system or equipment shall be installed with all of the following:
1. **Piping.** At least 36 inches of pipe shall be installed between the filter and the heater or dedicated suction and return lines, or built-in or built-up connections shall be installed or built-in or built-up connections to allow for the future addition of solar heating equipment; and
 2. **Covers.** A cover for outdoor pools or outdoor spas that have a heat pump or gas heater.
- EXCEPTION to Section 114 (b) 2:** Pools or spas deriving at least 60 percent of the annual heating energy from site solar energy or recovered energy.