

2003 International Plumbing Code (Chapter 5)

Water Heaters

Section 501- General

501.1 Scope. The provisions of this chapter shall govern the materials, design and installation of water heaters and the safety devices and appurtenances.

501.2 Water heater as space heater. Where a combination potable water heating and space heating system requires water for heating at temperatures higher than 140 °F (60 °C), a master thermostat mixing valve complying with ASSE 1017 shall be provided to limit the water supplied to the potable hot water distribution system to a temperature of 140 °F (60 °C) or less. The potability of the water shall be maintained throughout the system.

501.3 Drain valves. Drain valves for emptying shall be installed at the bottom of each tank-type water heater and hot water storage tank. Drain valves shall conform to ASSE 1005.

501.4 Location. Water heaters and storage tanks shall be located and connected so as to provide access for observation, maintenance, servicing and replacement.

501.5 Water heater labeling. All water heaters shall be third-party certified.

501.6 Water temperature control in piping from tankless heaters. The temperature of water from tankless water heaters will be a maximum of 140 °F (60 °C) when intended for domestic uses. This provision shall not supersede the requirements for defective shower valves in accordance with Section 424.3.

501.7 Pressure marking of storage tanks. Storage tanks and water heaters installed for domestic hot water shall have the maximum allowable working pressure clearly and indelibly stamped in the metal or marked on a plate welded there to or otherwise permanently attached. Such markings shall be in an accessible position outside of the tank so as to make inspection or inspection readily possible.

501.8 Temperature controls. All hot water supply systems will be equipped with automatic temperature controls capable adjustments from the lowest to the

highest acceptable temperature settings for the intended temperature operating range.

Section 502 – Installation

502.1 General. Water heaters shall be installed in accordance with the manufacturer's installation instructions. Oil-fired water heaters shall conform to the requirements of this code and *International Mechanical Code*. Electric water heaters will conform to the requirements of this code and provisions of *ICC Electrical Code*. Gas-fired water heaters shall conform to the requirements of the *International Fuel Gas Code*.

502.2 Rooms used as a plenum. Water heaters using solid, liquid or gas fuel shall not be installed in a room containing air-handling machinery when such room is used as a plenum.

502.3 Water heaters installed in attics. Attics containing a water heater shall be provided with an opening and unobstructed passageway large enough to allow removal of the water heater. The passageway shall not be less than 30 inches (762 mm) high and 22 inches (559 mm) wide and not more than 20 feet (6096 mm) in length when measured along the centerline of the passageway from the opening to the water heater. The passageway shall have continuous solid flooring not less than 24 inches (610 mm) wide. A level service space at least 30 inches (762 mm) deep and 30 inches (762 mm) wide shall be present at the front or service side of the water heater. The clear access opening dimensions shall be a minimum of 20 inches by 30 inches (508 mm by 762 mm) where such dimensions are large enough to allow removal of the water heater.

502.4 Seismic supports. Where earthquake loads are applicable in accordance with the *International Building Code*, water heater supports shall be designed and installed for the seismic forces in accordance with the *International Building Code*.

Section 503 – Connections

503.1 Cold water line valve. The cold water branch line from the main water supply line to each hot water storage tank or water heater shall be provided with a valve, located near the equipment and serving only the hot water storage tank or water heater. The valve shall not interfere with or cause a disruption of the cold water supply to the remainder of the cold water system. The valve shall be provided with access on the same floor level as the water heater served.

503.2 Water Circulation. The method of connecting a circulating water heater to the tank shall provide proper circulation of water through the water heater. The pipe or

tubes required for the installation of appliances that will draw from the water heater or storage tank shall comply with the provisions of this code for material and installation.

Section 504 – Safety devices

504.1 Antisiphon devices. An approved means, such as a cold water “dip” tube with a hole at the top or a vacuum relief valve installed in the cold water supply line above the top of the heater or tank, shall be provided to prevent siphoning of any storage water heater or tank.

504.2 Vacuum relief valve. Bottom fed water heaters and bottom fed tanks connected to water heaters shall have a vacuum relief valve installed. The vacuum relief valve shall comply with ANSI Z21.22.

504.3 Shutdown. A means for disconnecting an electric hot water supply system from its energy supply shall be provided in accordance with the IEC Electrical Code. A spate valve shall be provided to shut off the energy fuel supply to all other types of hot water supply systems.

504.4 Relief valve. All storage water heaters operating above atmospheric pressure shall be provided with an approved, self-closing (levered) pressure relief valve and temperature relief valve or combination thereof. The relief valve shall conform to ANSI Z21.22. The relief valve shall not be used as a means of controlling thermal expansion.

504.4.1 Installation. Such valves shall be installed in the shell of the water heater tank. Temperature relief valves shall be so located in the tank as to be actuated by the water in the top 6 inches (152 mm) of the tank served. For installations with separate storage tanks, the valves shall be installed on the tank and there shall not be any type of valve installed between the water heater and the storage tank, There shall not be a check valve or shutoff valve between a relief valve and the heater or tank served.

504.5 Relief valve approval. Temperature and pressure relief valves, or combinations thereof, and energy cutoff devices shall bear the label of an approved agency and shall have a temperature setting of not more than 210°F (99°C) and a pressure setting not to exceeding the tank or water heater manufacturer’s rated working pressure or 150 psi (1035 kPa), whichever is less. The relieving capacity of each pressure relief valve and each temperature relief valve shall equal or exceed the heat input to the water heater or storage tank.

504.6 Relief outlet waste. The outlet of a pressure, temperature or other relief valve shall not be directly connected to the drainage system.

504.6.1 Discharge. The relief valve shall discharge full size to a safe place of disposal such as the floor, outside the building, or an indirect waste receptor. The discharge pipe shall not have any trapped sections and shall have a visible air gap or air gap fitting located in the same room as the water heater. The outlet end of the discharge pipe shall not be threaded and such discharge pipe shall not have a valve discharge piping to the disposal point. Such pipe shall be installed in a manner that does not cause personal injury to occupants in the immediate area or structural damage to the building.

504.6.2 Materials. Relief valve discharge piping shall be of those materials listed in Section 605.4 or shall be tested, rated, and approved for such use in accordance with ASME A112.4.1. Piping from safety pan drains shall be of those materials listed in Table 605.4.

504.7 Required pan. Where water heaters or hot water storage tanks are installed in locations where leakage of the tanks or connections will cause damage, the tank or water heater shall be installed in a galvanized steel pan having a minimum thickness of 24 gage, or other pans approved for such use.

504.7.1 Pan size and drain. The pan shall be not less than 1.5 inches (38 mm) deep and shall be of sufficient size and shape to receive all dripping or condensate from the tank or water heater. The pan shall be drained by an indirect waste pipe having a minimum diameter of $\frac{3}{4}$ inch (19 mm).

504.7.2 Pan drain termination. The pan drain shall extend full-size and terminate over a suitably located indirect waste receptor or floor drain or extend to the exterior of the building and terminate no less than 6 inches (152 mm) and not more than 24 inches (610 mm) above the adjacent ground surface.

Section 605 – Insulation

[E] 505.1 Unfired vessel insulation. Unfired hot water storage tanks shall be insulated so that heat loss is limited to a maximum of 15 British thermal units per hour (Btu/h) per square foot (47 W/m^2) of external tank surface area. For purposes of determining this heat loss, the design ambient temperature shall not be higher than 65°F (18°C).

