**Section 890.1220 Hot Water Supply and Distribution**

a) All water heaters shall comply with Appendix A.Table A (Approved Standards for Plumbing Appliances/Appurtenances/Devices) and ASHRAE 90 Standards. Hot water storage tanks shall meet construction requirements of ASME, AGA or UL listed in Appendix A.Table A (Approved Standards for Plumbing Appliances/Appurtenances/Devices), as appropriate. Hot water supply boilers with heat input in excess of 200,000 BTU per hour, water temperature in excess of 200 degrees Fahrenheit, or capacity in excess of 120 gallons shall also comply with the requirements of 41 Ill. Adm. Code 120(Boiler and Pressure Vessel Safety). Smaller water storage tanks that are not subject to ASME requirements shall be constructed of durable materials and constructed to withstand 150 psi. (See Appendix I.Illustrations L and M, for examples of typical water heater installations.)

1) All equipment used for heating and storage of hot water shall bear the marking of an approved testing agency certifying that it has been tested and approved and listed as meeting the requirements of the applicable standard. Listing by UL, the Canadian Standards Association (CSA), or National Board of Boiler and Pressure Vessel Inspectors, or the ASME Standard shall constitute evidence of conformance with these standards.

2) Solar Hot Water Heat Exchangers

A) A hot water heat exchanger used in a solar-heated system may be of single wall construction if a non-toxic transfer fluid with no conditioning chemicals in the system is used.

B) A hot water exchanger used in a solar-heated system using a toxic transfer fluid or having conditioning chemicals in the system shall be separated from the potable water by double wall construction that has an air gap vented to the atmosphere between the walls.

3) A hot water heat exchanger may be of single wall construction if a non‑toxic transfer fluid with no conditioning chemicals in the system is used.

4) A hot water heat exchanger operating at or below 65 psi using a toxic transfer fluid or having conditioning chemicals in the system shall be separated from the potable water by double wall construction, with an air gap open to the atmosphere between the two walls.

5) A hot water heat exchanger shall not be permitted on any hot water boiler system operating in excess of 65 psi or 250 degrees Fahrenheit, unless:

A) the heat exchanger is double-walled;

B) the heat exchanger has an air gap open to the atmosphere between the two walls; and

C) the heat exchanger has a pressure gradient monitor system with a "fail-safe to off" switch installed to isolate the heat exchanger from the potable cold or hot water system. If pressure on the potable water side reaches a pressure less than 20 psi above the pressure of the transfer fluid or steam and a pressure-reducing valve is installed on the inlet to the heat exchanger with a setting 20 psi lower than the potable water pressure at the heat exchanger, an audible alarm shall be activated and the heat exchanger shall be automatically shut off until the alarm and heat exchanger can be reset manually.

6) Any boiler using toxic chemicals shall have a label with a minimum size of 5 inches by 5 inches attached to the boiler in a conspicuous place. The label shall read as follows:

WARNING

Chemicals and additives used to treat the boiler feed water in this boiler are not approved for potable water. The steam or hot water produced by this boiler is not potable. If the steam or hot water produced by this boiler is used to heat water, the water will not be considered potable if the steam and potable water are mixed.

7) Indirect, External, Submerged Coils. Indirect, external, tankless or submerged coils used in heating water shall be equipped with a thermostatic mixing valve or valves when not connected to a storage tank. A pressure relief valve shall be installed on the cold water inlet of the tank. A properly sized temperature and pressure relief valve, based upon the energy input rating of the coils, shall be installed on the tempered line with the temperature sensing element immersed in the tempered water line as close as possible to the mixing valve.

8) Water Heaters Used for Space Heating. Any water heater to be used for space heating, in addition to hot water supply, shall conform to ANSI Z21.10.1, Z21.10.1a and Z21.10.1b and shall be constructed for continuous use, and the piping for space heating shall be conducted to a proper terminal heating device.

A) A thermostatic mixing valve, conforming to ASSE 1017, shall be installed on the hot water line to the plumbing fixtures. (The mixing valve shall be set to prevent temperatures exceeding 120 degrees Fahrenheit from reaching the plumbing fixtures.)

B) A single check valve shall be installed in the cold water line supplying the water heater. This will prevent hot water backing up from the heating unit to the plumbing fixtures.

C) A properly sized and approved expansion tank shall be located on the outlet side of the check valve in the water heater's cold water supply, with no shut-off valve between the heater and expansion tank.

D) Valves (manual, automatic) supplying hot water to the heat transfer unit for space heating shall have a minimum of a ⅛-inch orifice. This will prohibit potable water from standing in the heat transfer unit when not in use. This does not prohibit full shut off/isolation valves on either side of the pump within a heat transfer unit, as needed, to permit the servicing of the pump.

E) The water heater instructions shall have a statement specifying that piping and components connected to the water heater for the space heating application shall be suitable for use with potable water, and the water heater shall not exceed a developed length of more than 25 feet from the heating coil.

F) A statement specifying that toxic chemicals, such as those used for boiler treatment, shall not be introduced into the potable water used for space heating shall be included in the instructions. A label with the following words shall be firmly attached to any water heater used for space heating: "DO NOT INJECT TOXIC MATERIALS INTO THIS TANK."

G) A statement specifying that a water heater that will be used to supply potable water shall not be connected to any heating system or components previously used with a non-potable water heating appliance shall be included in the installation instructions.

H) Each water heater shall bear a statement on the rating plate as follows: "SUITABLE FOR POTABLE WATER HEATING AND SPACE HEATING."

9) Point-of-Use Water Heaters. Point-of-use water heaters shall meet the following requirements:

A) Non-storage and non-pressurized units intended to deliver water temperatures exceeding 110 degrees Fahrenheit, or with no mechanical or electrical temperature limiting device, shall have the faucet located at least 3 inches from the 110 degrees Fahrenheit hot water or cold water faucet. Faucet outlets shall have labels clearly and conspicuously indicating extremely hot water. These units are exempt from the requirement that a relief valve or valves be used to protect against excessive or unsafe temperature or pressure.

B) Units intended to deliver water temperatures 110 degrees Fahrenheit or less shall have an internal burnout element. These units are exempt from the requirement that a relief valve or valves to be used to protect against excessive or unsafe temperature and/or pressure.

C) All pressurized point-of-use water heaters, other than those in subsection (a)(9)(A) or (B), shall be provided with proper temperature and pressure relief.

10) Steam Heat. All water heaters, including storage heaters, instantaneous shell and tube heat exchangers, steam injection heaters and any other device using steam to heat water for potable use, shall meet the following requirements:

A) All chemicals and additives used to treat the boiler feed water in a boiler supplying steam to heat potable water shall be approved for use with potable water. If approved chemicals and additives are used with steam boilers generating at 15 psi or less, or are used with pressure reducing stations with pressure relief valves set at 15 psi or less downstream from the pressure reducing valves, single wall heat exchangers may be used.

B) All steam heat exchangers operating in excess of 15 psi but less than 50 psi shall be separated by double wall construction, with an air gap open to the atmosphere between the two walls.

C) All steam heat exchangers operating in excess of 50 psi shall meet the following requirements:

i) The heat exchanger shall be double-walled;

ii) The heat exchanger shall have an air gap open to the atmosphere between the 2 walls; and

iii) The heat exchanger shall have a pressure gradient monitoring system with a "fail-safe to off" switch installed to isolate the heat exchanger from the potable cold or hot water system.  If the pressure on the potable water side reaches a pressure less than 20 psi above the pressure of the transfer fluid or steam and a pressure reducing valve is installed on the inlet to the heat exchanger with a setting 20 psi lower than the potable water pressure at the heat exchanger, an audible alarm shall be activated and the heat exchanger shall automatically shut off until the conditions resulting in an alarm are corrected and the heat exchanger pressure gradient monitoring system can be manually reset.

D) The steam pressure to all the steam heat injectors shall be 15 psi lower than the water pressure at the ejector. Steam injection heaters shall be supplied with steam from a generator or boiler that uses only United States Food and Drug Administration (FDA) approved additives or chemicals.

E) The following warning label with a minimum size of 5 inches by 5 inches shall be permanently attached on the front of any boiler providing steam to direct-injection steam hot water heaters:

"If the chemicals used to treat the boiler feed water in this boiler are not approved for potable water, the steam produced by this boiler cannot be considered potable. Therefore, if steam from this boiler is used to heat water, the water shall not be considered potable and any cross-connections between the hot water produced and a potable water supply must be provided with a device to prevent the backflow of the non-potable hot water into the potable water supply."

b) Water Heaters – Food Service. Water heaters installed and used in food service establishments with dishwashing machines shall comply with National Sanitation Foundation (NSF)/ANSI Standard Number 5.

c) Discharge. With the exception of special water heaters used for space heating in addition to hot water supply, as provided in subsection (a)(8), water that leaves the potable water system for heating, cooling, use in equipment or other similar uses shall not be returned to the potable water distribution system. If water is discharged to the building drainage system, it shall be discharged through a fixed air gap.

(Source: Amended at 38 Ill. Reg. 9940, effective April 24, 2014)