

4101:8-20-01 Boilers and water heaters.

[Comment: When a reference is made within this rule to a federal statutory provision, an industry consensus standard, or any other technical publication, the specific date and title of the publication as well as the name and address of the promulgating agency are listed in rule 4101:8-44-01 of the Administrative Code. The application of the referenced standards shall be limited and as prescribed in section 102.5 of rule 4101:8-1-01 of the Administrative Code.]

SECTION 2001
BOILERS

2001.1 Installation. In addition to the requirements of this code, the installation of boilers shall conform to the manufacturer's instructions. The manufacturer's rating data, the nameplate and operating instructions of a permanent type shall be attached to the boiler. Boilers shall have their controls set, adjusted and tested by the installer. A complete control diagram together with complete boiler operating instructions shall be furnished by the installer. Solid and liquid fuel-burning boilers shall be provided with combustion air as required by Chapter 17.

2001.1.1 Standards. Packaged oil-fired boilers shall be listed and labeled in accordance with UL 726. Packaged electric boilers shall be listed and labeled in accordance with UL 834. Solid fuel-fired boilers shall be listed and labeled in accordance with UL 2523. Boilers shall be designed, constructed and certified in accordance with the "ASME Boiler and Pressure Vessel Code, Section I or IV." *The boiler shall be provided with safety devices and controls as required in the applicable section of the "ASME Boiler and Pressure Vessel Code."* For boilers with fuel input ratings of 12,500,000 Btu/hr (3663 kW) or less, controls and safety devices meeting the requirements of ASME CSD-1 is an acceptable alternative. Gas-fired boilers shall conform to the requirements listed in Chapter 24.

2001.2 Clearance. Boilers shall be installed in accordance with their listing and label.

2001.3 Valves. Every boiler or modular boiler shall have a shutoff valve in the supply and return piping. For multiple boiler or multiple modular boiler installations, each boiler or modular boiler shall have individual shutoff valves in the supply and return piping.

Exception: Shutoff valves are not required in a system having a single low-pressure steam boiler.

2001.4 Flood-resistant installation. In flood hazard areas established in Table 301.2(1), boilers, water heaters and their control systems shall be located or installed in accordance with Section 322.1.6.

SECTION 2002 **OPERATING AND SAFETY CONTROLS**

2002.1 Safety controls. Electrical and mechanical operating and safety controls for boilers shall be listed and labeled.

2002.2 Hot water boiler gauges. Every hot water boiler shall have a pressure gauge and a temperature gauge, or combination pressure and temperature gauge. The gauges shall indicate the temperature and pressure within the normal range of the system's operation.

2002.3 Steam boiler gauges. Every steam boiler shall have a water-gauge glass and a pressure gauge. The pressure gauge shall indicate the pressure within the normal range of the system's operation. The gauge glass shall be installed so that the midpoint is at the normal water level.

2002.4 Pressure relief valve. Boilers shall be equipped with pressure relief valves with minimum rated capacities for the equipment served. Pressure relief valves shall be set at the maximum rating of the boiler. Discharge shall be piped to drains by gravity to within 18 inches (457 mm) of the floor or to an open receptor.

2002.5 Boiler low-water cutoff. Steam and hot water boilers shall be protected with a low-water cutoff control.

Exception: A low-water cutoff is not required for coil-type and water-tube-type boilers that require forced circulation of water through the boiler and that are protected with a flow-sensing control.

2002.6 Operation. Low-water cutoff controls and flow-sensing controls required by Section 2002.5 shall automatically stop the combustion operation of the appliance when the water level drops below the lowest safe water level as established by the manufacturer or when the water circulation flow is less than that required for safe operation of the appliance, respectively.

SECTION 2003 **EXPANSION TANKS**

2003.1 General. Hot water boilers shall be provided with expansion tanks. Nonpressurized expansion tanks shall be securely fastened to the structure or boiler and supported to carry twice the weight of the tank filled with water. Provisions shall be made for draining nonpressurized tanks without emptying the system.

2003.1.1 Pressurized expansion tanks. Pressurized expansion tanks shall be consistent with the volume and capacity of the system. Tanks shall be capable of with-standing a hydrostatic test pressure of two and one-half times the allowable working pressure of the system.

2003.2 Minimum capacity. The minimum capacity of expansion tanks shall be determined from Table 2003.2.

TABLE 2003.2
EXPANSION TANK MINIMUM CAPACITY^a FOR
FORCED HOT-WATER SYSTEMS

<u>SYSTEM VOLUME^b</u> <u>(gallons)</u>	<u>PRESSURIZED</u> <u>DIAPHRAGM TYPE</u>	<u>NONPRESSURIZED</u> <u>TYPE</u>
<u>10</u>	<u>1.0</u>	<u>1.5</u>
<u>20</u>	<u>1.5</u>	<u>3.0</u>
<u>30</u>	<u>2.5</u>	<u>4.5</u>
<u>40</u>	<u>3.0</u>	<u>6.0</u>
<u>50</u>	<u>4.0</u>	<u>7.5</u>
<u>60</u>	<u>5.0</u>	<u>9.0</u>
<u>70</u>	<u>6.0</u>	<u>10.5</u>
<u>80</u>	<u>6.5</u>	<u>12.0</u>
<u>90</u>	<u>7.5</u>	<u>13.5</u>
<u>100</u>	<u>8.0</u>	<u>15.0</u>

For SI: 1 gallon = 3.785 L, 1 pound per square inch gauge = 6.895 kPa, °C = [(°F)-32]/1.8.

- a. Based on average water temperature of 195°F, fill pressure of 12 psig and an operating pressure of not greater than 30 psig.
- b. System volume includes volume of water in boiler, convectors and piping, not including the expansion tank.

SECTION 2004 **WATER HEATERS USED FOR SPACE HEATING**

2004.1 General. Water heaters used to supply both potable hot water and hot water for space heating shall be installed in accordance with this chapter, Chapter 24, *the plumbing code as modified by Chapter 25* and the manufacturer's instructions.

SECTION 2005 **WATER HEATERS**

2005.1 General. Water heaters shall be installed in accordance with *the plumbing code as modified by Chapter 25*, the manufacturer's instructions and the

requirements of this code. Water heaters installed in an attic shall comply with the requirements of Section M1305.1.2. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oiled-fired water heaters shall comply with UL 732. Solar thermal water heating systems shall comply with Chapter 23 and SRCC 300. Solid fuel-fired water heaters shall comply with UL 2523.

2005.2 Prohibited locations. Fuel-fired water heaters shall not be installed in a room used as a storage closet. Water heaters located in a bedroom or bathroom shall be installed in a sealed enclosure so that combustion air will not be taken from the living space. Installation of direct-vent water heaters within an enclosure is not required.

2005.2.1 Water heater access. Access to water heaters that are located in an attic or underfloor crawl space is permitted to be through a closet located in a sleeping room or bathroom where ventilation of those spaces is in accordance with this code.

2005.3 Electric water heaters. Electric water heaters shall be installed in accordance with the applicable provisions of *NFPA 70 as modified in Chapter 34*.

2005.4 Supplemental water-heating devices. Potable water-heating devices that use refrigerant-to-water heat exchangers shall be approved and installed in accordance with the manufacturer's instructions.

SECTION 2006 **POOL HEATERS**

2006.1 General. *Deleted.*

2006.2 Clearances. *Deleted.*

2006.3 Bypass valves. *Deleted.*

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CERTIFIED ELECTRONICALLY

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