

## CHAPTER 20

# BOILERS AND WATER HEATERS (including 2017 errata)

### SECTION M2001 BOILERS

**M2001.1 Boilers.** Boilers shall comply with the *Seattle Boiler and Pressure Vessel Code*.

~~(M2001.1 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 name plate 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.

**M2001.1.1 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. Controls and safety devices for boilers with fuel input ratings of 12,500,000 Btu/hr (3 663 388 watts) or less shall meet the requirements of ASME CSD 1. Gas-fired boilers shall conform to the requirements listed in Chapter 24.

**M2001.2 Clearance.** Boilers shall be installed in accordance with their *listing and label*.

**M2001.3 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.

**M2001.4 Flood resistant installation.** In flood hazard areas established in Table R301.2(1), boilers, water heaters and their control systems shall be located or installed in accordance with Section R322.1.6.

### SECTION M2002 OPERATING AND SAFETY CONTROLS

**M2002.1 Safety controls.** Electrical and mechanical operating and safety controls for boilers shall be *listed and labeled*.

**M2002.2 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.

~~M2002.3 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.

~~M2002.4 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.

~~M2002.5 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.

~~M2002.6 Operation.~~ Low water cutoff controls and flow sensing controls required by Section M2002.5 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 M2003 EXPANSION TANKS

**M2003.1 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.

~~M2003.1.1 Pressurized expansion tanks.~~ Pressurized expansion tanks shall be consistent with the volume and capacity of the system. Tanks shall be capable of withstanding a hydrostatic test pressure of two and one-half times the allowable working pressure of the system.

~~M2003.2 Minimum capacity.~~ The minimum capacity of expansion tanks shall be determined from Table M2003.2.))

**((TABLE M2003.2  
EXPANSION TANK MINIMUM CAPACITY<sup>a</sup>  
FOR FORCED HOT WATER SYSTEMS**

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

For SI: 1 gallon = 3.785 L, 1 pound per square inch gauge = 6.895 kPa,  
 $^{\circ}\text{C} = [(\text{^{\circ}\text{F}}) - 32] / 1.8$ .

- a. Based on average water temperature of 195°F (91°C), fill pressure of 12 psig and a maximum operating pressure of 30 psig.
- b. System volume includes volume of water in boiler, convectors and piping, not including the expansion tank.

**SECTION M2004  
WATER HEATERS USED FOR SPACE HEATING**

**M2004.1 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, ((Chapter 28)) and the manufacturer’s instructions.

**SECTION M2005  
WATER HEATERS**

**[W]M2005.1 General.** Water heaters shall be installed in accordance with Chapter ((28)) 5 of the *Uniform Plumbing Code*, the manufacturer’s instructions and the requirements of this code. Water heaters installed in an *attic* shall comply with the requirements of Section M1305.1.3. Gas-fired water heaters shall comply with the requirements in Chapter 24. Domestic electric water heaters shall comply with UL 174. Oil-fired water heaters shall comply with UL 732. Thermal solar water heaters shall comply with Chapter 23 and UL 174. Solid fuel-fired water heaters shall comply with UL 2523.

**M2005.2 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.

**M2005.2.1 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.

**M2005.3 Electric water heaters.** Electric water heaters shall also be installed in accordance with the applicable provisions of Chapters 34 through 43.

**M2005.4 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 M2006  
POOL HEATERS**

**M2006.1 General.** Pool and spa heaters shall be installed in accordance with the manufacturer’s installation instructions. Oil-fired pool heaters shall comply with UL 726. Electric pool and spa heaters shall comply with UL 1261.

**M2006.2 Clearances.** The clearances shall not interfere with *combustion air*, draft hood or flue terminal relief, or accessibility for servicing.

**M2006.3 Temperature-limiting devices.** Pool heaters shall have temperature-relief valves.

**M2006.4 Bypass valves.** Where an integral bypass system is not provided as a part of the pool heater, a bypass line and valve shall be installed between the inlet and outlet piping for use in adjusting the flow of water through the heater.