

Tennessee State Boiler Code Requirements

There are many misconceptions regarding the rules and regulations which govern the installation and operation of boilers in the state of Tennessee. The following information has been gathered to clarify these requirements.

The State of Tennessee is ASME CSD-1 code compliant. The State of Tennessee also has the authority to set forth requirements beyond that as required by ASME and other national standards. The State of Tennessee has set forth the following special requirements in addition to all other national codes:

- A height of at least 3 feet shall be provided between the top of the boiler and the ceiling or roof, and at least 3 feet between all sides of the boiler and adjacent walls or other structures.
- A low-water cutoff device must be provided on all boiler equipment exceeding 400,000 btu/hr.
(ASME CSD-1 2006 does exclude a low water cutoff device for forced circulation boilers which are water tube or coil-type. However, it is the decision of the Tennessee Board of Boiler Rules to require all boilers and domestic water supply boilers to require a CSD-1 compliant low-water cutoff device.)
- An emergency shutdown switch or circuit breaker shall be located just outside the boiler room door and marked for easy identification. If there is more than one door to the boiler room, there should be a switch located at each door. The emergency shutdown switch or circuit breaker must disconnect all power to the burner controls.
- A disconnecting means capable of being locked in the open position shall be installed at an accessible location at the boiler so that the boiler can be disconnected from all sources of potential. This disconnecting means shall be an integral part of the boiler or adjacent to it.
- All code requirements for hot water supply boilers apply to domestic/potable water boilers. The State of Tennessee does differentiate between hot water supply boilers and domestic/potable water boilers.

EXCERPT'S FROM:

**“RULES OF TENNESSEE DEPARTMENT OF LABOR AND WORKFORCE
DEVELOPMENT DIVISION OF BOILER AND ELEVATOR INSPECTION
BOARD OF BOILER RULES”**

**CHAPTER 0800-3-3
BOILER INSPECTIONS
*REVISED MARCH 2007**

**(6) AUTOMATIC LOW WATER FUEL CUTOFF AND/OR WATER FEEDING
DEVICE.**

(a) Each automatically-fired boiler shall be equipped with one or more automatic low-water fuel cutoff device conforming to the requirements of ASME CSD-1, latest edition/addenda adopted by the Board. If a water feeding device is installed, it shall be so constructed that the water inlet valve cannot feed water into the boiler through the float chamber, and so located as to supply requisite feed water. The lowest safe waterline should not be lower than the lowest visible part of the water glass.

(13) CLEARANCE.

(a) When boilers are replaced or new boilers are installed in either existing or new buildings, a height of at least 3 feet shall be provided between the top of the boiler proper and the ceiling or roof, and at least 3 feet between all sides of the boiler and adjacent walls or other structures. Boilers and pressure vessels having manholes shall have 5 feet clearance from the manhole opening and any wall, ceiling or piping that will prevent a person from entering the boiler or vessel. All boilers and pressure vessels shall be so located that adequate space will be provided for the proper operation of the boilers and pressure vessels and their appurtenances, for the inspection of all surfaces, tubes, waterwalls, economizers, piping valves and other equipment, and for the necessary maintenance, repair and replacement of tubes.

(b) A variance from the requirements of (a) above may be issued by the Chief Inspector for the installation of a Steam Heating, Hot Water Heating, Hot Water Supply, or Unfired Steam Boilers or Unfired Pressure Vessels. All requests must be submitted to the Chief Inspector prior to installation.

(15) EXIT FROM BOILER ROOM.

Any boiler room exceeding 500 square feet floor area and containing one or more boilers having a fuel-burning capacity of 1,000,000 BTU/hr., or equivalent electrical heat input, shall have at least two means of exit. Each exit shall be remotely located from the other. Each elevation in such boiler room shall have two means of exit, each remotely located from the other.

EXCERPT'S FROM:

“TENNESSEE RULE CASES AND INTERPRETATIONS”

CASE: BC98-03

CLEARANCE REQUIREMENTS FOR WATER STORAGE HEATERS AND UNFIRED PRESSURE VESSELS

0800-3-3-.04(13)(A)

Inquiry: Is it required for a potable water storage heater (hot water heater) or unfired pressure vessel to adhere to the three (3) foot clearance requirements set forth in Rule 0800-3-3-.04(13) of the Tennessee Boiler Rules and Regulations?

Reply: It is in the opinion of the Board

that potable water storage heaters (hot water heaters) that do not exceed a heat input of 400,000 BTU/hr, and unfired pressure vessels that do not exceed fifty (50) square feet (measured by diameter x length), are exempt from the clearance requirements of Rule 0800-3-3-.04(13)(a). Providing the name plate and code stamping is in view or as stated in Rule 0800-3-3-.03(23), and there is a minimum clearance of at least one and one-half feet (1½') between all sides of the vessel, unless further permitted in Rule 0800-3-3-.04(13)(b).

CASE: BC06-23

CLEARANCE REQUIREMENTS FOR WALL MOUNTED, STACKED AND MODULAR L.P. BOILERS

0800-3-3-.04(13)(A)

Statement of Need: The staff of the Tennessee Boiler Inspection Division is requesting a ruling by the Tennessee Board of Boiler Rules to allow hot water heating and hot water supply boilers of wall mounted, slacked, and modular design to be exempt in part for the installation clearance requirements of Rule 0800-3-3-.04(13).

Background: With advances in technology and design, the boiler industry has seen hot water heating and hot water supply boilers coming into the market that are mounted on walls, stacked atop each other, and even in modular.

These low pressure boilers have either been labeled and/or listed by a nationally registered testing agency. In the case of those boilers 200,000 BTU/hr and greater, the boiler is required to be stamped ASME and registered with the National Board.

Inquiry: Is it required for a low pressure hot water supply or hot water heating boiler designed and installed as a wall mounted, stacked, or modular unit to adhere to the three (3) foot clearance requirements set forth in Rule 0800-3-3-.04(13) of the Tennessee Boiler Rules and Regulations?

Reply: It is in the opinion of the Board that wall mounted, stacked, and modular low pressure hot water heating and hot water supply boilers that are designed accordingly may be exempt from the clearance requirements of Rule 0800-3-3-.04(13) as follows:

- 1) Wall side of wall mounted boilers.

- 2) Surfaces between stacked boilers (excluding those provided with an inspection manway).
- 3) Sides of modular boilers that are designed and installed to operate as a single multi-unit installation.
- 4) Unless exempt in (1), (2) and (3) above, boilers that exceed a heat input of 400,000 BTU/hr are required to have three feet (3 ft), while boilers that do not exceed a heat input of 400,000 BTU/hr must have a minimum clearance of at least one and one-half feet (1½ ft).
- 5) The boiler nameplate, and where applicable, code stamping is in view or as stated in Rule 0800-3-3-.03(23).
- 6) The boiler's safety relief device is easily accessible by the inspector.
- 7) The installer must indicate if the boiler is wall mounted, stacked, or modular on the permit application submitted for permission to install.

EXCERPT'S FROM:

“ASME CSD-1-2006”

CE-100 ELECTRICAL REQUIREMENTS

CE-110 General

Installation requirements shall apply to controls, safety devices, and burners on automatically fired boilers covered by this Standard. For information regarding boiler and/or burner installations, refer to local codes. In the absence of local codes, see NFPA 70, National Electrical Code.

(a) A disconnecting means capable of being locked in the open position shall be installed at an accessible location at the boiler so that the boiler can be disconnected from all sources of potential. This disconnecting means shall be an integral part of the boiler or adjacent to it.

A manually operated remote shutdown switch or circuit breaker shall be located just outside the boiler room door and marked for easy identification. Consideration should be given to the type and location of the switch to safeguard against tampering. If the boiler room door is on the building exterior, the switch should be located just inside the door. If there is more than one door to the boiler room, there should be a switch located at each door. The emergency shutdown switch or circuit breaker must disconnect all power to the burner controls.

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(b) All un-insulated live metal parts and all rotating or moving parts that may cause injury shall be guarded to avoid accidental contact.

(c) The electrical equipment shall be arranged so that failure of this equipment will cause the fuel supply to be shut off.

(d) The power supply to the electrical control system shall be from a two-wire branch circuit that has a grounded conductor; otherwise, an isolation transformer with a two-wire secondary shall be provided. When an isolation transformer is provided, one side of the secondary winding shall be grounded. Control voltage shall not exceed 150 nominal volts, line to line.

(1) One side of all coils shall be electrically located in the grounded side of the circuit. All switches, contacts, and over-current devices shall be electrically located in the ungrounded or “hot” side of the circuit.

(2) All electrical contacts of every safety device installed in the same control circuit shall be electrically connected in series.

(e) All electrical components and devices shall have a voltage rating commensurate with the supply voltage of the control system.

CW-130 REQUIREMENTS FOR WATER LEVEL CONTROLS FOR HOT-WATER HEATING BOILERS

(a) Each automatically fired hot-water heating boiler, except those installed in residences (as defined by the authority having jurisdiction), shall be protected by a low-water fuel cutoff intended for hot-water service (see also CW-210).

(b) Since there is no normal waterline to be maintained in a hot-water boiler, the low-water fuel cutoff can be located any place above the lowest safe permissible water level established by the boiler manufacturer.

(c) If the low-water fuel cutoff is located in the system piping, it must be assured that the float chamber will drain properly under a low-water condition; and the installation must be arranged to assure that if flow occurs in the float chamber, it will be in the upward direction. The low-water fuel cutoff device may be inserted internally or attached externally to the boiler. An external low-water fuel cutoff device attached to the boiler by piping and connections shall be at least NPS 1. If the low-water fuel cutoff is connected to the boiler by pipe or fittings, no shutoff valves of any type shall be placed in such piping. A cross, or equivalent fitting, shall be placed in the water piping connection at every right angle to facilitate cleaning and inspection. Low-water fuel cutoff devices embodying a separate chamber shall have a vertical drainpipe and a blow-off valve *not* less than NPS 3/4, located at the lowest point of the chamber of water equalizing pipe connections so that the chamber and equalizing pipe can be flushed and the device tested.

(d) Functioning of the low-water fuel cutoff due to a low-water condition shall cause safety shutdown and lockout. Where a reset device is separate from the low-water fuel cutoff, a means shall be provided to indicate actuation of the low-water fuel cutoff. The manual reset device may be the instantaneous type, or may include a time delay of not more than 3 min after the fuel has been cut off.

(e) A means shall be provided for testing the operation of the low-water fuel cutoff without resorting to draining the entire system. Such means shall not render the device inoperable. If the means temporarily isolates the device from the boiler during this testing, it shall automatically return to its normal position.

CW-200 AUTOMATIC FUEL CUTOFF FOR FORCED CIRCULATION BOILERS

CW-210 Requirements for Flow or Temperature Sensing Devices for Forced Circulation Boilers

(a) In lieu of the requirements for low-water fuel cutoffs in CW-100, a water tube or coil-type boiler, requiring forced circulation to prevent overheating and failure of the tubes or coils, shall have an accepted safety control to prevent burner operation at a flow rate inadequate to protect the boiler unit against overheating, at all allowable firing rates. This safety control shall shut down the burner and prevent restarting until an adequate flow is restored. Positive means shall be provided to determine during testing that the accepted safety control has functioned upon an inadequate flow condition. The positive means shall enable the accepted safety control to remain in the running safety lock circuitry

during testing. The safety control must be automatically restored to service after completion of system testing.

(b) When there is a definitive waterline, a low-water fuel cutoff complying with the applicable portions of CW-100 shall be provided in addition to the sensing device required in the preceding paragraph. Functioning of the low-water fuel cutoff shall cause a safety shutdown and lockout.

Ben Thorsby

REA, Inc – March 2008