

13 NCAC 13 .0409**AUTOMATIC LOW-WATER FUEL CUTOFF CONTROLS AND WATER-FEEDING DEVICES**

- (a) Each automatically fired steam or vapor boiler, except miniature boilers, shall meet the following criteria:
- (1) Have at least two automatic low-water fuel cutoff devices;
 - (2) One of the low-water fuel cutoff devices may also be used to regulate the normal water level;
 - (3) Each cutoff device shall be installed to prevent startup and to shut down the boiler fuel or energy supply automatically when the surface of the water falls to a level not lower than the lowest visible part of the gauge glass;
 - (4) One control shall be set to function ahead of the other. The lower fuel cutoff device shall be equipped with a manual reset which shall prevent the boiler from being fired after the low water limit has been reached until the operator resets the switch manually; and
 - (5) The low-water fuel cutoffs shall be attached to the boiler or to the water column with no stops or valves. For float type low-water fuel cutoffs installed external to the boiler, each device shall be installed in individual chambers which shall be attached to the boiler by separate pipe connections below the waterline. If the low-water fuel cutoff is connected to the boiler by pipe and fittings, no shut off valves of any type shall be placed in such pipe. A cross or equivalent fitting shall be placed at every right angle turn to facilitate cleaning. Piping from the boiler shall be not less than 1 inch NPS. Low-water fuel cutoff designs embodying a float and float bowl shall have a vertical straightaway valved drain pipe of not less than ¾ inch NPS at the lowest point in the water-equalizing pipe connections by which the bowl and the equalizing pipe can be flushed and the device tested.
- (b) Each automatically fired hot water heating boiler with heat input greater than 400,000 Btu/hr (117 kW) shall meet the following criteria:
- (1) Be protected by a low-water fuel cutoff intended for hot water service;
 - (2) The fuel cutoff device shall be installed to prevent startup and to shut down the boiler fuel or energy supply automatically when the surface of the water falls to a level not lower than the lowest safe permissible water level established by the boiler manufacturer;
 - (3) The fuel cutoff device shall be equipped with a manual reset that shall prevent the boiler from being fired after the lowest water level has been reached until the operator resets the switch manually;
 - (4) The low-water fuel cutoff installed in a hot water heating boiler system may be installed anywhere in the system above the lowest safe permissible water level established by the boiler manufacturer; and
 - (5) Testing the operation of the low-water fuel cutoff on a hot water heating boiler system shall be provided without resorting to draining the entire system. Such testing shall not render the device inoperable, except as follows:
 - (A) The device is temporarily inoperative during the testing;
 - (B) The device automatically returns to operating condition;
 - (C) The connection may be so arranged that the device cannot be isolated from the boiler except by a cock placed at the device and provided with a tee or lever handle arranged to be parallel to the piping in which it is located when the cock is open.
- (c) As permitted by the Accepted Design and Construction Code, coil type boilers or watertube boilers requiring forced circulation to prevent overheating of the coils or tubes may have a flow and/or temperature sensing device installed at or near the boiler proper, in lieu of a low-water fuel cutoff, to automatically cut off the fuel supply when the circulation of flow is interrupted. The flow and/or temperature sensing device shall be independent of all other controls and may be automatically reset when adequate flow is restored. If there is a definitive water line, a low-water fuel cutoff complying with Paragraph (a) or (b) of this Rule, as applicable, shall be provided in addition to the flow-sensing device.
- (d) Electric boilers where uncovering of the electrical element can lead to a risk of damage to the boiler shall be equipped with a low-water fuel cutoff device. In the case of electrode type boilers, where the reduction in water level provides a self-limiting control on heat input, a low-water cutoff control is not required.
- (e) Automatically fired boilers shall be provided with a system to automatically maintain a constant water level so that the water level cannot fall below the lowest safe water line. This constant water level system requirement shall not apply to hot water heating boilers used in closed-loop radiant floor heating systems when installed in accordance with the manufacturer's instructions.

(f) Low water fuel cutoff devices embodying a float and float bowl shall be installed so that the boiler feedwater or makeup water cannot be introduced through the float chamber.

History Note: Authority G.S. 95-69.14;
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