

Why residential boilers need LWCO's

There are both legal and practical considerations that create the need to install a low water cut-off (LWCO) device on a residential hot water boiler. Jurisdictions have adopted codes which state when an LWCO must be installed, while the practical side is based upon system conditions.

ASME

The American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code has been universally adopted as the minimum requirement for the manufacture, installation and maintenance of boilers. Section I, for power boilers, requires low water protection. Steam heating boilers of any size, regardless of where they are installed, must have a low water cut-off per ASME Section 4. For hot water boilers, the same code only requires that hot water boilers with input greater than 400,000 btu must have a low water cut-off. In lieu of an LWCO, coil type boilers above 400,000 btu input, which require a flow of water to prevent overheating, shall have a safety device (typically a flow switch) to prevent burner operation when the flow of water is inadequate.

CSD-1

CSD-1-2002 is an additional ASME standard for Controls and Safety Devices for Automatically Fired Boilers. As in Section 4, CSD-1 Part CW-120a

requires at least one LWCO on all steam boilers. However, the requirement (Part CW-130a) for hot water boilers has the words added, "...except those installed in residences (as defined by the authority having jurisdiction)..." This requires that any hot water boiler, regardless of size, not installed in a residence, must have a low water cut-off.



120V LWCO
(RB-122)

IMC

The Internal Mechanical Code (IMC) is a new standard that is being adopted by jurisdictions. It is a consolidation of codes written in the past by BOCA, SBCC, and other independent code councils. Section 1007.1 of the IMC states "All steam and hot water boilers shall be protected by a low water cutoff control." If it's a hot water boiler, it must have a low water cut-off.

The Fill Valve

There has always been a controversy about whether to keep the fill valve open or closed after initially filling a hot water heating system. If the valve is closed and there is a leak in the system, no water is added to the system if a leak develops. Because the fill valve has a strainer that collects the debris (sand, silt, minerals, rust, etc.) that is present in the water which can clog the strainer, leaving the valve open is no guarantee that water will flow through if a leak occurs.

Piping Elevation

Some systems have piping for radiators, snow melt and tankless water heaters below the minimum safe water level of the boiler. Boiler manufacturers and organizations such as ANSI and the National Fuel Gas code have recognized this. Each has added a section in their literature or standards that indicates that if a hot water boiler is installed above the level of radiation, then a low water cut-off should or shall be installed.

For many years, industry leaders have identified the need for low water cut-offs on hot water boilers. They agree that the only way to detect a low water condition is with a low water cut-off device. No other safety device can determine if water is present.

In 1997, McDonnell & Miller introduced the Series RB line of probe type low water cut-offs. Designed for use in residential boiler applications, they feature a green "power on" LED, a "low water condition" red LED, and high sensitivity for use in a broad range of liquids. The Series RB can be installed in either the boiler tapping or supply riser and are easy to wire into either a 24V or 120V burner circuit. Low cost and easy to install, they are an excellent choice as the device to sense a low water condition in a hot water boiler.



24V LWCO
(RB-24)

Remember, even with the many other safety devices (temperature limits, pressure relief valves, flow sensors, etc.) installed on a hot water boiler, the low water cut-off is a low cost component which will protect the boiler and system from damage if a low water condition occurs.

For more information on low water cut-offs, or answers to any boiler control questions, contact your local McDonnell & Miller/Hoffman Specialty Representative, or visit our web sites.

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