

Boiler Pressure and Temperature Controls

Boiler pressure and temperature controls are essential features that affect boiler operation, efficiency and safety. These controls place operational and safety limits on the pressure and temperature inside of the boiler. Pressure controls are commonly associated with steam systems and temperature controls are mainly associated with hot water systems. Failure to maintain these controls in good working order can result in increased operating and maintenance costs and may result in equipment damage and bodily injury to operators and others.

This guide details the general requirements for these types of controls, derived from the National Board Inspection Code and the American Society of Mechanical Engineers' Controls and Safety Devices for Automatically Fired Boilers (ASME CSD—1-2018), both of which are nationally recognized standards.

Pressure Controls

Automatically fired steam boilers should have two pressure controlling devices:

- One which governs the maximum operating pressure of the boiler/system.
- One which prevents violating maximum allowable working pressure of the boiler pressure vessel. This device should cause a safety shutdown and require manual resetting. Each automatically fired boiler is required to have this device.
Note: The upper limit of a pressure control device should not exceed the maximum allowable working pressure of the boiler.

Pressure control devices may be installed in a manifold. There can be no isolations between the boiler and pressure control devices, and there must be a siphon or other device which prevents water intrusion into each pressure control device.

In multiple boiler systems where the boilers are attached to common steam piping, only one operating pressure control for the system is required if that control will cutoff fuel supply to all associated boilers.

Temperature Controls

Automatically fired hot-water boilers should have two temperature-controlling devices:

- One which governs the maximum operating temperature of the boiler/system.
- One which prevents violating maximum allowable working temperature of the boiler pressure vessel. This device should cause a safety shutdown and require manual resetting. Each automatically fired boiler is required to have this device. *Note: The upper limit of a temperature control device should not exceed the maximum allowable working temperature of the boiler.*

Temperature control devices may NOT be installed in a manifold. There can be no isolation valves between the boiler and the control device unless there is a flow sensing device or valve position sensing device that prevents firing the boiler until there is enough flow or the isolation valve is fully open.

In multiple boiler systems where the boilers are attached to common hot water piping, only one operating temperature control for the system is required if that control will cut off the fuel supply to all associated boilers.

Testing

Control devices should be frequently tested and adjusted after initial installation in order to ensure devices are operating as designed.

In-service control devices should be visually inspected daily, and manually adjustable devices should have the setpoints visually checked daily to ensure they remain at the proper settings.

Control device maintenance and testing should be scheduled in accordance with manufacturer's recommendations and local jurisdictional requirements, but never less frequently than annually.

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- Operation and setpoints should be tested in accordance with manufacturer's recommendations.
- Detailed records of findings, including unsatisfactory results and corrections, should be included in the boiler's maintenance history or other written record.

IMPORTANT NOTE: State and local jurisdictions may require additional testing and/or controls. Please contact your State and local Safety Office or your Travelers Risk Control Consultant for further assistance.



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