

CONDENSING BOILERS

DESIGN GUIDELINES

1. Summary
 - a. This Section includes packaged, factory-fabricated and-assembled, gas-fired condensing boilers, trim, and accessories for generating hot water.
2. Heating Hot Water Design Requirements
 - a. Shall be designed with a maximum heating water supply temperature of 140°F. Design in this fashion reduces heat losses and ensures that the heating water system always operates in a range that will ensure flue gas condensation.
 - b. Shall be designed in a variable flow, primary only pumped configuration.
 - c. Boiler shutoff control valves shall be installed to stop the flow of hot water to offline boilers.
 - d. If all boilers are offline, control logic shall force all boiler isolation valves full open.
3. Boilers
 - a. Condensing boilers shall be capable of operation down to 15% of design water flow.
 - b. Boilers shall be warranted to operate down to zero water flow without damaging the boiler.
 - c. 15:1 turndown capability.
4. Location and Layout Requirements
 - a. Located for easy maintenance, replacement without disassembling or without removing flue ductwork or piping.
 - b. Boiler to withstand seismic forces.
 - The drawings shall indicate the specific requirements, including snubber size, anchor bolt size, embedment depths, edge distance requirements, anchor spacing requirements.
 - c. Piping shall be arranged so that the service valves can be closed and the piping and specialties between the service valves and boiler can be removed for servicing.
 - d. Flanges or Victaulic couplings shall be located to allow removal of a minimal amount of piping to main the boiler.
 - e. All specialties and service valves shall be line size, and not boiler connection size.
5. DDC Controls
 - a. Building Automation via direct digital control shall be provided for boilers.
 - b. Controls shall be arranged such that a boiler controller monitors and controls boiler staging, or that the building automation controls boiler staging.
 - c. If a boiler controller is provided, this device shall be integrated to the building automation system.
 - d. At a minimum, the following boiler points shall be monitored:
 - Entering water temperature

- Leaving water temperature
 - Status
 - Enable
 - Disable
 - Control valve command
- e. At a minimum, the following control commands shall be accepted by the boiler from the building automation system:
- Supply water temperature setpoint
 - Enable
 - Disable.
6. Related Sections.
- a. Breechings, Chimneys and Stacks
 - b. DDC Controls

EQUIPMENT and PRODUCT REQUIREMENTS

1. Condensing Boilers
- a. Description: Factory-fabricated, assembled and tested, condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and compatible controls.
 - b. Heat Exchanger: Stainless-steel primary and secondary combustion chamber.
 - c. Pressure Vessel: Carbon steel with welded heads and tube connections.
 - d. Burner: Natural gas, self-aspirating and self-venting after initial start.
 - e. Blower: Centrifugal fan to operate only during start of each burner sequence.
 - f. Boiler shall be configured for sealed combustion.

END OF SECTION