SECTION23 52 00: HEATING BOILERS

1. GENERAL

A. All heating equipment shall be designed with an electric energy source as the primary design option. A waiver must be submitted in order for any fossil fuel heating equipment to be designed and installed on campus.

B. Install boilers with either a structural steel base or a concrete housekeeping pad, minimum 4 inches thick.

C. Provide auxiliary 5/8-inch hose connections on feedwater piping at the main feedwater connection to the boiler(s).

D. Submit product literature detailing ratings, dimensions, materials of construction, applicable wiring diagrams, controls interfaces, BACNET communications address mapping and boiler accessories.

E. Warranty: boiler pressure vessels containing water or steam, as well as boiler heat exchangers, to be provided with a minimum 10 -year extended warranty, parts and labor.

F. Coordinate with project BAS vendor to ensure and test that all boiler system monitored points and alarms are properly reporting into the BAS and that all system interlocks are functional.

G. All internal boiler heat exchangers shall specified as stainless steel (no aluminum).

H. The section does not apply to boilers greater than 5 MMBTU No. 2 fuel oil input, 10 MMBTU natural gas input, or boilers requiring additional permitting by virtue of their emissions or alternative fuel input

I. Electric - Boiler:

1. Electric boilers to be provided with high quality feed water systems to mitigate corrosion and minimize insulation of electrodes. All wetted parts in electric boilers to be constructed from stainless steel.
2. Manufacturers:
    - Sussman
    - Lochinvar
    - Cleaver-Brooks

<u>Fossil Fuel Guidance (Waiver Required)</u>

A. For natural gas burners, confirm operating gas pressure requirements of the boiler with the available minimum gas pressure available from the local utility.

B. Boilers to be rated at less than, or equal to, 30 boiler horsepower (BHP) and 1 MMBTU input, each. For locations where boilers need to be of larger capacity, additional Building Automation System (BAS) monitoring to be provided to meet the City of Providence Ordinance requirements.

C. Use modulating type burners

D. Fuel oil burners not to be used, unless natural gas is unavailable. Oil and gas trains must, as a minimum, meet the safety criteria of the University's insurance underwriter, FM Global.

E. Steam boilers to be repeatedly skimmed when first placed into service to remove mill scale, rust, and oils until no residue appears in the sight glass.

F. Steam/Noncondensing Hot Water:
1. Manufacturers:
- Weil-McLain
- Cleaver-Brooks
- Bryan and Burham

G. Condensing:
1. To be direct-vent, sealed combustion type; exhaust venting material to be AL29-4C, only
2. Manufacturers:
- Camus
- Lochinvar
- Harsco
- RBI

2. ACCESSORIES

A. Provide petcocks for all pressure gauges and sight level gauges

B. Use thermowells in place of in-situ thermometers

C. Water boilers:
1. Extend safety relief valve drain to within 6 inches of existing floor drains with full -size ASTM B88 copper or ASTM A53 iron pipe
2. For boilers over 1 MMBTH: low water cut-off, or loss-of-flow sensor, and alarm contacts

Fossil Fuel Guidance (Waiver Required)

D. For steam boilers, provide the following:
1. Drip elbows for safety relief valves and extend drain to within 6 inches of existing floor drains with ASTM A53 iron pipe
2. Surface blowdown and pipe to drain
3. Water softeners or utilize a Reverse Osmosis/De-Ionized (RO/DI) water system on incoming water
4. For boilers over 1MMBTH: low and high water level switches and alarm contacts

E. Condensing boilers: provide condensate neutralization tanks with replaceable elements

1. CONTROLS

A. Use manufacturer-furnished controls for individual boiler control only. Multiple boilers to be sequenced and staged on and off by the building's BAS (Building Automation System).

B. All boilers, at a minimum, each to have an on/off status contact output and a common alarm contact output to the BAS for monitoring and a remote enable contact to allow for unit operation.

C. The following control points shall be monitored by the BAS for all hot water boilers over 30HP (1 MMBTU):
1. On/off status
2. Low water level alarm (low water cut-off switch) alarm
3. Loss of water flow alarm
4. Common boiler alarm (if provided)

5. Hot water temperature (analog input may be common for multiple-boiler installations)

D. The following control points to be monitored by the BAS for all steam boilers over 30HP (1 MMBTU):
   1. On/off status
   2. Low water level alarm (low water cut-off switch)
   3. High water level alarm (high water cut-off switch)
   4. High steam pressure alarm
   5. Common boiler alarm (if provided)
   6. Steam pressure (analog input may be common for multiple-boiler installations)