1.08 REGULATORY REQUIREMENTS

A. Conform to ASME (BPV IV) for construction of boilers.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.09 DELIVERY, STORAGE, AND PROTECTION

A. Protect boilers from damage by leaving factory inspection openings and shipping packaging in place until final installation.

1.10 WARRANTY

A. Provide a twelve (12) year limited warranty on the heat exchanger and three (3) year limited warranty on the blower motor.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Heat Transfer Products

2.02 GENERAL

A. Substitutions shall be considered on their ability to fit the design documents without substantial modification or redesign of system schematic and the ability to meet the design temperature schedule. All requests for alternate consideration shall require a full set of plans indicating details, locations, sizing, integration into existing mechanical room and control sequence for engineers review. All boiler manufacturers shall have a minimum of 5 years field experience and operation in similar low temperature systems for consideration.

2.03 CONSTRUCTION

A. Construction: Boilers shall be natural gas fired, condensing firetube design with a modulating forced draft power burner and positive pressure vent discharge.

2.04 BOILER SIZE AND RATINGS

A. Boiler size and rating shall be as indicated in the schedule on the plans.

B. Boiler rating shall be based on firing natural gas with a rating of 1000 Btu's per cubic foot.

C. Output shall vary depending on return water temperature.

2.05 BOILER FLUE VENTING

A. The boiler shall be A.G.A./C.G.A. Approved as a Direct Vent Boiler, with conventional chimney or stack not required. The boiler shall have the combustion air intake supply ducted in from the outside. Intake piping to be PVC piping or equal. Exhaust venting shall be constructed of Polypropylene piping. Intake and exhaust piping is to be furnished by the contractor.

2.06 GAS FIRED CONDENSING BOILER

A. The boiler shall bear the ASME "H" Stamp with a working pressure of 160 psi and shall be National Board listed.

B. The boiler shall be a sealed combustion system, taking outside air for combustion and exhausting flue gas with stainless steel adpater for PVC. The boiler's total combined equivanent length, including fittings allowances for both intake and exhaust, shall not exceed 200 feet. The vent connectors shall be located on the top of the boiler.

C. The combustion chamber shall be designed to drain condensate to the back of the unit, where a condensate collection container will contain a flow switch to monitor condensate flow and have a cleanout for periodic maintenance.

D. The boiler's heat exchanger shall be constructed of 316L stainless steel, built and tested in accordance with ANSI Z21.13b-2002. The boiler shall be UL listed and shall exceed minimum efficiency requirements of ASHRAE 103 with an AFUE rating of up to 98%.

2.07 BOILER CONTROLS

A. The boiler shall have an integrated digital control system utilizing an algorithm to fully adjust the firing rate while maintaining the desired output temperature of the boiler. Combustion gas and air are premixed prior to introduction to the stianless steel sintered burner using a low voltage gas valve and variable speed fan. The control uses pulse width moduation to send a command signal to the fan which adjusts the volume of combustion air and gas supplied to the burner.

B. The control is cooected to a digital 2 line 20 character per line LCD display that provides information on the operation of the boiler. The display will show a fault code and narrative to aid in troubleshooting and also provide a means for adjustment of the operating temperature ranging from 50 - 190 degrees and differential temperature ranging from 5 - 30 degrees. The control shall be set up to monitor outdoor temperature through an outdoor sensor and provide outdoor reset shutdown capability. The control shall feature a dry contact output to connect to an optional alarm monitoring device. The control shall also regulate up to eight (8) boilers through a cascade system functioning as one boiler system. This allows for greater turn down ratios and systematic control to maximize efficiency. The control shall have a 0-10 volt input available to connectto building management system.

C. The boiler shall also have the ability to accept optional controls such as a U.L. 353 Compliant Low Water Cut Off and Manual Reset High Limit Temperatue Switch.

2.08 CONDENSATION NEUTRALIZING SYSTEM

A. PRODUCT
   1. Furnish and install fireside condensate neutralizing tubes for each boiler condensate drain and all flue pipe condensate drains.

B. PIPING
   1. All piping shall be PVC and supplied /installed by the contractor. All PVC joints shall be glued in place and secured with tie wraps.

C. OPERATION AND MAINTENANCE
   1. The contractor shall inform the owner of any maintenance or scheduled rechagge of the tube's limestone aggregate as described in the manufacturer's I and O manual.

2.09 BOILER TRIM

A. Low Water Cut-off: With drain valve and manual reset to automatically prevent burner operation whenever boiler water falls below safe level.

B. Temperature Controls:
   1. Manual reset type shall control burner to prevent boiler water temperature from exceeding safe system water temperature.

C. ASME rated pressure relief valves.

D. Combination pressure and thermometer gage.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install boiler and provide connection of natural gas service in accordance with requirements of the gas code and applicable codes.

C. Provide piping connections and accessories as indicated.

D. Pipe relief valves to nearest floor drain.

3.02 STARTING EQUIPMENT

A. An authorized service technician shall start, test, and adjust the boilers and furnish a start-up report attesting to a successful light-off for review by the engineer. Start-up report shall include a print out from an ECOM combustion analyzer for low, medium, and high fire. Gas analysis must include the following:

1. Air Temperature
2. Gas temperature
3. Oxygen as a %
4. CO as a %
5. NO as ppm
6. NO2 as ppm
7. NOx as ppm
8. CO2 as a %
9. Efficiency as a %
10. Losses as a %
11. Excess air as a %

B. This print out shall be submitted with the start-up report for review, and approval by the mechanical engineer.

3.03 TRAINING

A. Provide one day training for the operating personnel to be performed at the jobsite. Contractor shall coordinate with the manufacturer's representative for start-up and training services.

END OF SECTION 23 52 40