SECTION 13 1507 – WATER FEATURE HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. This section includes the following:

1. Gas Fired Water Heaters
2. Electric Water Heaters
3. Saltwater Applications

B. Related Sections:

1. SECTION 13 1401 – WATER FEATURE PIPE AND FITTINGS
2. SECTION 13 1403 – WATER FEATURE PIPE HANGERS, SUPPORTS, AND ANCHORS
3. SECTION 13 1501 – WATER FEATURE MECHANICAL IDENTIFICATION
4. SECTION 13 1502 – WATER FEATURE PUMPS AND MOTORS
5. SECTION 13 1503 – WATER FEATURE FILTERS
6. SECTION 13 1504 – WATER FEATURE CHEMICAL FEED SYSTEMS
7. SECTION 13 1505 – WATER FEATURE OZONE GENERATION AND INJECTION
8. SECTION 13 1506 – WATER FEATURE UV STERILIZERS
9. SECTION 13 1508 – WATER FEATURE HYDRONIC SYSTEMS
10. SECTION 13 1509 – WATER FEATURE CHILLERS
11. SECTION 13 1510 – WATER FEATURE HEAT EXCHANGERS
12. SECTION 13 1511 – WATER FEATURE VALVES, GAUGES, AND METERS
13. SECTION 13 1602 – WATER FEATURE CONTROLS
14. SECTION 13 1607 – WATER FEATURE PROGRAMMABLE LOGIC CONTROLLERS

C. References:

1. ASME SECTION 8D – BOILER AND PRESSURE VESSELS
2. NFPA 30 – FLAMMABLE AND COMBUSTIBLE LIQUIDS CODE
3. NFPA 54 – NATIONAL FUEL GAS CODE
4. NFPA 70 – NATIONAL ELECTRICAL CODE (NEC)
5. UL 174 – HOUSEHOLD ELECTRIC STORAGE TANK WATER HEATERS
6. UL 1453 – ELECTRIC BOOSTER AND COMMERICAL STORAGE TANK WATER HEATERS

1.2 SUBMITTALS FOR REVIEW

A. SECTION 01 3300 – SUBMITTAL PROCEDURES

B. Product Data: Submit manufacturer's literature including printed recommendations, dimensions and sizes for Pool and Spa Heaters and accessories.

1. Indicate on each submittal which materials, models, data, and options are being selected.

C. Shop Drawings: Submit shop drawings indicating heater dimensions, clearances, anchors, attachments, lifting points, tappings, drains, and venting.

D. Manufacturer's Certification: Submit documentation from the Manufacturer certifying that the Pool and Spa Heaters conform with the National Sanitation Foundation (NSF) Standard 50 guidelines.

E. Operation and Maintenance Data: Provide the Manufacturer's installation instructions, specifications, start-up procedures, assembly drawings, troubleshooting checklists, schedule maintenance recommendations, and replacement part lists and repair data.

F. Warranty: Submit manufacturer's warranty and ensure forms have been completed in the owner's name and registered with the manufacturer.

1.3 QUALITY ASSURANCE

A. Manufacturer: A Company specializing in manufacturing products specified in this Section with a minimum five (5) years of documented experience.

B. Installer Qualifications: A Company specializing in performing the Work of this Section with a minimum of five (5) years of documented experience.

C. Ensure products and installation of specified products are in conformance with recommendations and requirements of the following organizations:

1. American Gas Association (AGA)
2. National Sanitation Foundation (NSF)
3. American Society of Mechanical Engineers (ASME)
4. National Board of Boiler and Pressure Vessel Inspectors (NBBPVI)
5. Underwriters Laboratories (UL)

D. Pool and Spa Heaters: Provide with on-site start-up operator training, and on-site warranty service, all of which shall be performed by a representative trained and authorized by the Manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery with installation time to assure minimum holding time.

B. Accept Heaters and accessories on site in original factory packaging. Immediately upon receipt of shipment, inspect and check for damage.

C. Protect Heater and accessories from physical damage including effects of weather, water, and construction debris. Provide temporary inlet and outlet caps; maintain caps in place until installation.

PART 2 - PRODUCTS

2.1 GAS FIRED WATER HEATERS

A. Acceptable Manufacturers

1. Raypak, Incorporated
2. Lochinvar, LLC
3. Laars
4. Pentair

B. The Heater shall meet or exceed the following requirements:

1. Heater shall be designed specifically for swimming pool heating applications and specifically designated as such by the Manufacturer.
2. The Heater shall be rated at least 82-percent thermal efficiency by a recognized independent gas appliance test laboratory, independent of the manufacturer.
3. The Heater shall meet the requirement of the ASME Boiler and Pressure Vessel Code for 160 psi (1.10 MPa) working pressure and shall bear the ASME seal and registration number of the National Board of Boiler and Pressure Vessel.
4. The Heater shall be the atmospheric type using stainless steel burners. Burners shall be capable of quiet ignition and extinction, and equipped with fixed primary air ports for atmospheric gas firing.
5. The Heater shall not require a blower motor to supply combustion air or to create venting action.
6. The fuel-air mixture shall be factory set for a maximum combustion efficiency and shall be tamperproof in the field.
7. The Heater shall be equipped with 125 psi (862 kPa), ASME pressure relief valve.
8. The Heater shall be equipped with 24-volt main electric gas valve, a factory calibrated pressure switch, a pool thermostat, and a high limit switch.
9. Equipped with flow switch and mounted by the Manufacturer.

C. Heat Exchanger:

1. Shall be of single level horizontal grid design constructed with cupro nickel fin tubes with fins spaced at seven (7) per 1-inch (25mm).
2. Incorporate extra heavy galvanized steel gull baffles secured tightly to the tubes above the point of tangency of the fins.
3. Each end of the tubes shall be rolled to ASME fire box steel tube sheet and sealed to bronze headers with silicone “O” rings with a temperature rating over 500 ˚F (260 ˚C).
4. The headers shall be precision machined for easy removal and the “O” rings shall positively prevent boiler water from reaching the steel tube sheets.
5. Headers shall be of high-pressure bronze with integral bronze baffling to direct water through the heat exchanger in two (2) passes.
6. The heat exchanger shall be capable of withstanding a 1,000 psi (6,89 MPa) hydrostatic pressure.
7. The heat exchanger shall be readily cleanable from either the right side or the left side of the heater.
8. The heat exchanger shall be explosion proof on the water side.
9. Water ways shall be 100-percent copper and bronze to positively protect the heater from galvanic action.

D. Controls

1. Factory equipped with low voltage 24-volt controls as standard equipment.
2. Equipped with solid state ignition control and electronic pilot flame supervision, which shall de-energize the main burner controls within one (1) second of a pilot failure.
3. Include a close-differential aquastat specifically designed for swimming pool control.
4. A high temperature limit control with automatic reset switches.
5. A pressure flow switch to sense the pressure of the incoming water.
6. A low flow switch on the Heater outlet that will shut down the burners in case of a low water flow conditions.
7. A low water cutoff switch to shut down the burners in case of low water level in the heat exchanger.
8. 24-volt transformer.
9. Electronic pilot ignition for natural gas heaters.
10. Other control options as required by local codes.
11. Include power ventilation system if required in installation. Power vent must match the Manufacturer and model of heater supplied.

E. Internal Circulation (Model sizes from 500,000 BTU/hour to 1,000,000 BTU/hour):

1. Heater shall be equipped with a Unitherm Governor Bypass Valve to automatically control the internal water temperature between 105 and 115 ˚F (40 – 46 ˚C).

F. Internal Circulation (Model sizes above 1,000,000 BTU/hour):

1. The Heater shall be equipped with an external bronze pump and bypass arrangement designed to maintain the water entering the Heater at the proper temperature that will prevent condensation and scale in the heat exchanger.
2. The entire water way shall be non-ferrous.
3. Include a pump override temperature control.

G. Spa Applications:

1. 2-inch (50mm) glass lined heaters rated at 125 psi (862 kPa)
2. Rated for low NOx output.

2.2 ELECTRIC WATER HEATERS

A. Acceptable Manufacturers

1. Coates Heater Company

B. Shall include the following standard features:

1. Close Differential Thermostat
2. Manual Reset High Limit
3. Flow Switch with element and flow switch “ON” lights
4. Element sequencing of single phase heaters
5. Internal protective fusing (units over 48 amps)
6. 316L Stainless Steel tank
7. UL Listed for indoor and outdoor installation
8. Incoloy 825 Heating Elements

2.3 SALTWATER APPLICATIONS

A. Heaters and heat exchangers used in saltwater applications shall be constructed such that waterways and plates are made of titanium to insure against corrosion.

PART 3 - EXECUTION

3.1 GENERAL

A. Supply all labor, equipment, and materials to construct, test, and put into operation complete heating system with lines, valves, heaters, and gauges in accordance with the Contract Documents and as directed by the Engineer of Record.

B. Install all piping without bending, springing, or forcing, true to line and grade, in a neat workman like manner and properly supported.

C. Install tubing in adequate lengths so equipment can be moved or adjusted in positions and locations for maintenance purposes without disconnecting tubing.

D. Inspect all equipment and remove any dirt or foreign material before attaching inlet, outlet piping or tubing.

E. Install the entire Heating system to meet applicable state and local codes, including, but not limited to National Sanitation Foundation (NSF).

F. Heaters shall be capable of fitting in to the space shown on the Contract Documents.

3.2 INSTALLATION

A. Install Heaters in accordance with the Manufacturer’s recommendations.

B. Place and level the Heater in location shown on the Contract Documents on concrete equipment pads and where there is adequate access for service and inspection on all sides.

C. Install outlet venting piping in accordance with ANSI Z223.1 and local building codes. Support venting pipe so the weight of the piping does not rest on the Heater.

D. Install venting to allow easy removal of the draft hood and Heater top for normal service and inspection.

E. Install gas piping to Heater in accordance with local building codes. Install a drip leg and manual gas shutoff valve near the location of the Heater.

F. Influent and Effluent supply lines connecting the Heater to the main circulation line shall be copper pipe for a minimum distance of 8-feet (2.43m) then change to PVC pipe. CPVC may be used upon approval by the Engineer.

G. Install a check valve on the Heater inlet between the filter system and the Heater.

H. Pipe pressure relief valve discharge to a floor drain.

END OF SECTION