# **SECTION 22 3000 - PLUMBING EQUIPMENT**

# PART 1 - GENERAL

### 1.01 SECTION INCLUDES

- A. Water Heaters.
- B. Pumps.
  - 1. Circulators.
  - 2. Sump Pumps.

#### **1.02 RELATED SECTIONS**

A. Drawings and General Provisions of the Contract apply to this section.

#### **1.03 REFERENCES**

- A. ANSI Z21.10.1 Gas Water Heaters Volume I Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less.
- B. ANSI Z21.10.3 Gas Water Heaters Volume III Storage Water Heaters with Input Ratings Above 75,000 Btu per Hour, Circulating and Instantaneous Water Heaters.
- C. ASME (BPV VIII, 1) Boiler and Pressure Vessel Code, Section VIII, Division 1 Rules for Construction of Pressure Vessels; The American Society of Mechanical Engineers.
- D. NFPA 31 Standard for the Installation of Oil Burning Equipment.
- E. NFPA 54 National Fuel Gas Code.
- F. UL 174 Standard for Household Electric Storage Tank Water Heaters; Underwriters Laboratories Inc.
- G. UL 1453 Standard for Electric Booster and Commercial Storage Tank Water Heaters; Underwriters Laboratories Inc.

## **1.04 SUBMITTALS**

- A. Product Data:
  - 1. Provide dimension drawings of water heaters indicating components and connections to other equipment and piping.

Riverhouse at Odette's 100% Construction - June 25, 2018 Stokes Architecture PLUMBING EQUIPMENT

- 2. Indicate pump type, capacity, power requirements.
- 3. Provide certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable.
- 4. Provide electrical characteristics and connection requirements.
- B. Shop Drawings:
  - 1. Indicate heat exchanger dimensions, size of tappings, and performance data.
  - 2. Indicate dimensions of tanks, tank lining methods, anchors, attachments, lifting points, tappings, and drains.
- C. Manufacturer's Instructions: Indicate installation and maintenance procedures.
- D. Project Record Documents: Record actual locations of components and equipment.
- E. Operation and Maintenance Data: Include operation, maintenance, and inspection data, replacement part numbers and availability, and service depot location and telephone number.
- F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

## 1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.
- B. Identification: Provide pumps with manufacturer's name, model number, and rating/capacity identified by permanently attached label.
- C. Performance: Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, operate within 25 percent of midpoint of published maximum efficiency curve.

### 1.06 CERTIFICATIONS

- A. Water Heaters: NSF approved.
- B. Gas Water Heaters: Certified by ANSI Z21.10.1 or ANSI Z21.10.3, as applicable.
- C. Electric Water Heaters: UL listed and labeled to UL 174 or UL 1453.
- D. Oil-Fired Water Heaters: To NFPA 30.

Riverhouse at Odette's 100% Construction - June 25, 2018 Stokes Architecture PLUMBING EQUIPMENT

- E. Pressure Vessels for Heat Exchangers: ASME labeled, to ASME (BPV VIII, 1).
- F. Water Tanks: ASME labeled, to ASME (BPV VIII, 1).
- G. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated.

# 1.07 DELIVERY, STORAGE, AND PROTECTION

A. Provide temporary inlet and outlet caps. Maintain caps in place until installation.

## 1.08 WARRANTY

A. Provide five year manufacturer warranty for domestic water heaters, water storage tanks, packaged water heating system, in-line circulator, submersible sump pumps, sump pumps, and sewage ejectors.

### **1.09 MAINTENANCE PRODUCTS**

A. Supply two 50 pound bags of water softener salt.

# 1.10 EXTRA MATERIALS

A. Provide two pump seals.

## **PART 2 - PRODUCTS**

### 2.01 WATER HEATER MANUFACTURERS

- A. A.O. Smith Water Products Co.
- B. Bock Water Heaters, Inc.
- C. Rheem Manufacturing Company
- D. State Water Heaters
- E. Bradford-White

## 2.02 COMMERCIAL GAS FIRED WATER HEATERS

- A. Type: Automatic, natural gas-fired, vertical storage.
- B. Performance: As scheduled on the drawings.

Riverhouse at Odette's 100% Construction - June 25, 2018 Stokes Architecture PLUMBING EQUIPMENT

- C. Tank: Glass lined, welded steel ASME labeled; multiple flue passages, 4 inch diameter inspection port, thermally insulated with minimum 2 inches [glass fiber] [polyurethane], encased in corrosion-resistant steel jacket; baked-on enamel finish; floor shield and legs.
- D. Accessories: Brass water connections and dip tube, drain valve, magnesium anode, and ASME rated temperature and pressure relief valve.
- E. Certification: As automatic storage water heater for operation at 180 degrees F.
- F. Controls: Automatic water thermostat with temperature range adjustable from 120 to 180 degrees F, automatic reset high temperature limiting thermostat factory set at 195 degrees F, gas pressure regulator, multi-ribbon or tubular burner, 100 percent safety shut-off pilot and thermocouple, flue baffle and draft hood.
- G. Controls: Automatic direct immersion thermostat with temperature range adjustable minimum 175 degrees F differential, automatic reset high temperature limiting thermostat factory set at 195 degrees F, gas pressure regulator, multi-ribbon or tubular burner, 100 percent safety shut-off pilot and thermocouple, intermittent electronic ignition monitoring pilot and main flame, trial for re-ignition for momentary loss of flame, shutdown of pilot and main burner in 2-4 seconds after loss of flame, and automatic flue damper and power venter.

#### 2.03 IN-LINE CIRCULATOR PUMPS

- A. Manufacturers:
  - 1. Armstrong Pumps Inc.
  - 2. ITT Bell & Gossett
  - 3. Sterling Fluid Systems (USA), Inc. (Peerless Pump)
  - 4. Taco, Inc.
- B. Casing: Bronze, rated for 125 psig working pressure.
- C. Impeller: Bronze.
- D. Shaft: Alloy steel with integral thrust collar and two oil lubricated bronze sleeve bearings.
- E. Seal: Carbon rotating against a stationary ceramic seat.
- F. Drive: Flexible coupling.
- G. Performance and Electrical Characteristics: As scheduled on the drawings.

Riverhouse at Odette's 100% Construction - June 25, 2018 Stokes Architecture

#### PLUMBING EQUIPMENT

# 2.04 SUMP PUMPS AND SEWAGE EJECTORS

- A. Manufacturers:
  - 1. Armstrong Pumps Inc.
  - 2. Goulds Pumps
  - 3. Zoeller Pump Company
  - 4. Alyan Pump Company.
- B. Type: Vertical centrifugal, direct connected, simplex arrangement.
- C. Casing: Cast iron volute with radial clearance around impeller.
- D. Impeller: Cast iron; open non-clog, keyed to corrosion resistant alloy steel shaft.
- E. Support: Cast iron pedestal motor support on steel floor plate with gas tight gaskets.
- F. Bearings: Forced grease lubricated bronze sleeve spaced maximum 48 inches and grease lubricated ball thrust at floor plate.
- G. Drive: Flexible coupling to vertical, solid shaft ball bearing electric motor.
- H. Sump: Steel cover plate on steel sump basin with inspection opening and cover, and alarm fittings.
- I. Controls (Simplex): Float switch with float rod, stops, and corrosion resistant float, and separate pressure switch high level alarm with transformer, alarm bell and stand-pipe.
- J. Controls: Float operated mechanical alternator with float rod, stops, and corrosion resistant float to alternate operation of pumps, cut-in second pump on rising level or lead pump failure, separate pressure switch high level alarm with transformer, alarm bell, and standpipe, and emergency float switch with float rod, stops, and corrosion resistant float to operate both pumps on failure of alternator.
- K. Performance and Electrical Characteristics: As scheduled on the drawings.

# 2.05 SUBMERSIBLE SUMP PUMPS

- A. Manufacturers:
  - 1. Armstrong Pumps Inc.
  - 2. Goulds Pumps

Riverhouse at Odette's 100% Construction - June 25, 2018 Stokes Architecture PLUMBING EQUIPMENT

- 3. Zoeller Pump Company
- 4. Flyght Pump
- B. Type: Completely submersible, vertical, centrifugal.
- C. Casing: Cast iron pump body and oil filled motor chamber.
- D. Impeller: Cast iron; open non-clog, corrosion resistant alloy steel shaft.
- E. Bearings: Ball bearings.
- F. Sump: Fiberglass basin with steel coverplate.
- G. Accessories: Oil resistant 6 foot cord and plug with three-prong connector for connection to electric wiring system.
- H. Servicing: Slide-away coupling consisting of discharge elbow secure to sump floor, movable bracket, guide pipe system, lifting chain and chain hooks.
- I. Controls: Integral mercury switch type level controls with separate liquid level control high level alarm.
- J. Controls: Motor control panel containing across-the-line electric motor starters with ambient compensated quick trip overloads in each phase with manual trip button and reset button, circuit breaker, control transformer, electro mechanical alternator, hand-off-automatic selector switches, pilot lights, high water alarm pilot light, reset button and alarm horn. Provide mercury switch liquid level controls, steel shell switch encased in polyurethane foam with cast iron weight for pump on (each pump), pump off (common), and alarm.
- K. Performance and Electrical Characteristics: As scheduled on the drawings.

# PART 3 - EXECUTION

### 3.01 INSTALLATION

- A. Install plumbing equipment in accordance with manufacturer's instructions, as required by code, and complying with conditions of certification, if any.
- B. Coordinate with plumbing piping and related fuel piping, gas venting, and electrical work to achieve operating system.
- C. Domestic Water Heat Exchangers:
  - 1. Install domestic water heat exchangers with clearance for tube bundle removal without disturbing other installed equipment or piping.

Riverhouse at Odette's 100% Construction - June 25, 2018 Stokes Architecture PLUMBING EQUIPMENT

- 2. Support unit on pipe stand and equipment saddle.
- 3. Pipe relief valves and drains to nearest floor drain.
- 4. Connect steam branch line from top of main. Pipe in flexible manner, pitched with steam flow, with pipe union connections. Provide steam pressure gauge at exchanger inlet.
- 5. Provide steam traps and valves as indicated.
- 6. Pitch shell for condensate drain to traps.
- D. Domestic Water Storage Tanks:
  - 1. Provide steel pipe support, independent of building structural framing members.
  - 2. Clean and flush prior to delivery to site. Seal until pipe connections are made.

### E. Pumps:

- 1. Ensure shaft length allows sump pumps to be located minimum 24 inches below lowest invert into sump pit and minimum 6 inches clearance from bottom of sump pit.
- 2. Provide air cock and drain connection on horizontal pump casings.
- 3. Provide line sized isolating valve and strainer on suction and line sized soft seated check valve and balancing valve on discharge.
- 4. Decrease from line size with long radius reducing elbows or reducers. Support piping adjacent to pump such that no weight is carried on pump casings. Provide supports under elbows on pump suction and discharge line sizes 4 inches and over.
- 5. Ensure pumps operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
- 6. Align and verify alignment of base mounted pumps prior to start-up.

### END OF SECTION 22 3000

## PLUMBING EQUIPMENT