SECTION 22 35 00 – STEAM SEMI-INSTANTANEOUS DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes steam semi-instantaneous domestic water heaters.

1.2 SUBMITTALS

A. Product Data: For each type and size of heat exchanger indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Source quality-control test reports.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For water heaters to include in emergency, operation, and maintenance manuals.

F. Warranty: Special warranty specified in this Section.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain same type of water heaters through one source from a single manufacturer.

B. Product Options: Drawings indicate size, profiles, and dimensional requirements of heat exchangers and are based on the specific system indicated. Refer to Division 01 Section "Submittal Procedures."

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to Owner's Representative, and marked for intended use.

D. ASME Compliance: Where ASME-code construction is indicated, fabricate and label heat-exchanger storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

E. Comply with NSF 61, "Drinking Water System Components - Health Effects; Sections 1 through 9" for all components that will be in contact with water.

1.4 COORDINATION

A. Coordinate size and location of concrete bases with Architectural and Structural Drawings.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of heat exchangers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including heat exchanger, storage tank, and supports.
b. Faulty operation of controls.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Periods: From date of Substantial Completion:

a. Semi-Instantaneous Water Heaters:

1) Tube Coil: Unconditional, non-prorated 10 year guarantee against failure caused by thermal shock, mechanical failure on erosion.
2) Shell, Liner, and Top Head: Unconditional, non-prorated 10 year guarantee against leakage due to internal corrosion.
3) Anticipator: Unconditional, non-prorated 10-year guarantee against any failure.
4) Controls and Other Components: One years.

PART 2 - PRODUCTS

2.1 SEMI-INSTANTANEOUS HEAT EXCHANGERS

A. Heating-Fluid-in-Coil, Instantaneous Heat Exchangers:

1. Manufacturers: AERCO International, Inc or approved equal.
2. Description: Packaged assembly of tank, heat-exchanger coils, controls, and specialties for heating domestic water with steam in heat-exchanger coils.
3. Construction: ASME-code, negligible-capacity, copper-lined, carbon-steel shell with 150-psig minimum working-pressure rating.

a. Tappings: Factory fabricated of materials compatible with heat-exchanger shell. Attach tappings to shell before testing and labeling.

1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.

b. Insulation: Comply with Seattle Energy Code, unless otherwise indicated, and suitable for operating temperature. Surround entire shell and nozzle except connections and controls.
c. Heat-Exchanger Coils: Copper, helix-wound coils for heating fluid with pressure rating equal to or greater than heating-fluid supply pressure.
d. Temperature Control: Adjustable thermostat that operates control valve and that is capable of maintaining outlet-water temperature within 4 deg F of setting.
e. Safety Control: Automatic, high-temperature-limit cutoff device or system.
f. Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3, for combination temperature and pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of heat exchanger. Select one relief valve with sensing element that extends into storage tank.

4. Miscellaneous Components: Strainers, steam-control valve, steam trap, valves, pressure gage, thermometer, and piping. Include components fitted for pneumatic control.

a. Exception: Steam trap is not required if manufacturer's written instructions direct that it not be used.

5. Stand: Factory fabricated for floor mounting.

2.2 SOURCE QUALITY CONTROL

A. Test and inspect heat-exchanger storage tanks, specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.

B. Prepare test reports.

PART 3 - EXECUTION

3.1 WATER HEATER INSTALLATION

A. Install water heaters on concrete bases.

1. Concrete base construction requirements are specified in Division 23 Section "Common Work Results for Mechanical."

B. Install water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.

C. Anchor heat exchangers to substrate.

D. Install seismic restraints for heat exchangers. Anchor to substrate.

E. Install temperature and pressure relief valves in top portion of storage tank shells. Use relief valves with sensing elements that extend into shells. Extend relief-valve outlet, with drain piping same as water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

F. Install water heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for heat exchangers that do not have tank drains. Refer to Division 22 Section "Domestic Water Piping Specialties" for hose-end drain valves.

G. Install thermometer on outlet piping of water heaters. Refer to Division 22 Section "Meters and Gages for Piping" for thermometers.

H. Fill water heaters with water.

3.2 CONNECTIONS

A. Piping installation requirements are specified in other Division 22 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to water heaters to allow service and maintenance. Arrange piping for easy removal of heat exchangers.

C. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections, and to assist in field testing. Report results in writing.

B. Perform the following field tests and inspections and prepare test reports:

1. Leak Test: After installation, test for leaks. Repair leaks and retest until no leaks exist.
2. Operational Test: After electrical circuitry has been energized, confirm proper operation.
3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. Remove and replace water heaters that do not pass tests and inspections and retest as specified above.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain heat exchangers. Refer to Division 01 Section "Closeout Procedures."

END OF SECTION 22 35 00