PART 1 - GENERAL

1.1 RELATED DOCUMENTS
A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY
A. This Section includes the following water heaters:
   1. Non-circulating, storage water heaters.
   2. Water heater accessories.

1.3 SUBMITTALS
A. Product Data: For each type and size of water heater 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 operation, and maintenance manuals.
F. Warranty: Special warranty specified in this Section.

1.4 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 water heaters and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, 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.

1.5 COORDINATION

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

1.6 WARRANTY

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

1. Failures include, but are not limited to, the following:
   a. Structural failures including water heater, storage tank, and supports.
   b. Faulty operation of controls.
   c. Deterioration of metals, metal finishes, and other materials beyond normal use.

2. Warranty Period(s): From date of Substantial Completion:
   a. Storage Water heaters:
      1) Storage Tank: Five years.
      2) Heat Exchanger: One year.
      3) Controls and Other Components: One year.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.
2.2 STORAGE WATER HEATERS

A. Storage Water heaters:

1. Manufacturers:
   a. Hubbell Water Heaters.

2. Description: Assembly of hot-water storage tank with heating hot water heat-exchanger; controls; and specialties for heating domestic water with water in exchanger.

   b. Manhole: 12 by 16 inches (280 by 380 mm) in side of storage tank shell.
   c. Tappings: Factory fabricated of materials compatible with tank. Attach tappings to tank before testing and labeling.
      1) NPS 2 (DN 50) and Smaller: Threaded ends according to ASME B1.20.1.
      2) NPS 2-1/2 (DN 65) 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.
   d. Lining: Cement (Hydrastone) (optional complying with NSF 61) barrier materials for potable-water tank linings, including extending lining into and through tank fittings and outlets.
   e. Anode Rods: Not required for cement lined steel tanks & not accept.
   f. Insulation: Complying with ASHRAE/IESNA 90.1, unless otherwise indicated, and suitable for operating temperature. Surround entire storage tank and nozzle except connections and controls.

4. Heat-Exchanger: Heat Exchanger shall be brazed plate, (optional: plate and frame) single wall (optional: double wall) water to water heat exchanger. Heat Exchanger must be sized to reduce design boiler water return temperature to 100F or below to increase condensing boiler plant efficiency and reduce HWS pump flow and electric consumption. Domestic water heaters that return higher than 100F boiler water at design will not be acceptable.

5. Temperature Control: Adjustable temperature aquastat, mounted in storage tank shell head, unless otherwise indicated.

6. 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 water heater. Select one relief valve with sensing element that extends into storage tank.


8. Capacity and Characteristics:
   a. Capacity: (Insert) gallons
   b. Recovery: (Insert) gph (40-140 deg F) at 100 deg F temperature rise.
c. Heating Hot Water Supply:
   1) Inlet Flow Rate: (Insert) gpm.
   2) Temperature: (Insert) deg F
   3) Temperature Drop: Refer to HVAC drawings.

d. Domestic Water Inlet and Outlet Pipe Size: (Insert) inch.
e. Electrical Characteristics:
   1) Volts: 120.
   2) Phases: 1.
   3) Hertz: 60.
   4) Full-Load Amperes: 5.

2.3 HEAT-EXCHANGER ACCESSORIES

A. Combination Temperature and Pressure Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3. Include relieving capacity at least as great as heat input, and include pressure setting less than working-pressure rating of water heater. Select relief valves with sensing element that extends into heat-exchanger storage tank.

B. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1 or ASHRAE 90.2.

2.4 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. Hydrostatically test water heater storage tanks before shipment to minimum of one and one-half times pressure rating.

C. 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 22 Section "Common Work Results for Plumbing."

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 water heaters to substrate.
D. Install temperature and pressure relief valves in top portion of storage tank shells of water heaters with domestic water storage. 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.

E. Install heat-exchanger 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 water heaters that do not have tank drains. Refer to Division 22 Section "Domestic Water Piping Specialties" for hose-end drain valves.

F. Install thermometer on each heat-exchanger domestic-water outlet piping. Refer to Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.

G. Install pressure gages on heat-exchanger heating-fluid piping. Refer to Division 22 Section "Meters and Gages for Plumbing Piping" for pressure gages.

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 water heaters.

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

1. 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. Train Owner's maintenance personnel to adjust, operate, and maintain water heaters. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION