

**SECTION 223300**  
**ELECTRIC, DOMESTIC-WATER HEATERS**

**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. Section Includes:  
1. Commercial, electric, domestic-water Instantaneous heaters.

**1.3 ACTION SUBMITTALS**

- A. Product Data:  
1. For each type and size of domestic-water heater indicated. Include:  
a. Rated capacities  
b. Operating characteristics  
c. Electrical characteristics  
d. Furnished specialties  
e. Accessories.
- B. Shop Drawings:  
1. Wiring Diagrams: For power, signal, and control wiring.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For each type of commercial, electric, domestic-water heater, from manufacturer.
- B. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- C. Source quality-control reports.
- D. Field quality-control reports.
- E. Warranty: Sample of special warranty.

**1.5 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

**1.6 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- C. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61 Annex G, "Drinking Water System Components - Health Effects."

**1.7 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

**1.8 WARRANTY**

- A. Warranty all electrical components against defects in workmanship and material for a period of one (1) year from date of start-up, and the pressure vessel for a full five (5) years Non Pro-Rated from date of start-up

- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-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 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. Commercial, Electric, Domestic-Water Instantaneous Heaters:
      - 1) Controls and Other Components: Three years.

**PART 2 - PRODUCTS**

**2.1 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS**

- A. Manufacturers
  - 1. Hubbell (Basis of Design)
  - 2. A.O. Smith Corporation
  - 3. Lochinvar
  - 4. Rheem
- B. Commercial, Electric, Domestic-Water Instantaneous Heaters:
  - 1. Standard: UL 1453.
  - 2. Type instantaneous electric circulation heater
  - 3. Model No. CR as manufactured by HUBBELL HEATERS., Stratford, CT. (Basis of Design)
  - 4. The pressure vessel section, including:
    - a. The electrical control panel
    - b. Mounted on structural supports
    - c. Insulated
    - d. Jacketed
    - e. Painted
    - f. Lifting lugs
  - 5. The unit is to be packaged ready for plumbing and electrical service connections and shall bear the UL listing mark certifying the entire unit.
- C. PRESSURE VESSEL
  - 1. The pressure vessel shall be all welded Type 304 Stainless Steel.
  - 2. rated for a maximum allowable working pressure of 150psi.
  - 3. Units rated over 58KW shall be ASME Code Section IV stamped and approved.
  - 4. The pressure vessel is to be completely covered with 2" thick "E" type energy conservation fiberglass blanket insulation and enclosed in a heavy gauge galvanized steel metal jacket finished in gray hammertone enamel.
  - 5. The vessel shall be protected by a factory installed ASME rated combination temperature and pressure relief valve set at 150psi and 210°F.

**2.2 RECOVERY**

- A. The recovery section shall be rated at # KW which will heat # GPM of water at #°F rise (# ° to #°F).

**2.3 ELECTRICAL**

- A. The heater shall be designed to operate at # volts, # phase, 60 Hz, with a fused low voltage transformer providing 120 volt to all operating controls.
- B. The immersion heating element shall be low watt density, high quality copper sheathed and sized to obtain the rated recovery.
- C. Each element circuit is to be independently operated through a definite purpose magnetic contactor having a resistive load rating equal to or exceeding the ampere rating of that

particular circuit and shall be protected by individual fuses rated at approximately 125% of the ampacity of the circuit.

- D. Multiple circuit elements shall be provided with a master terminal block for connecting of the incoming power feeds.
- E. A safety door interlock switch shall interrupt power to the control circuit when the control panel door is opened.
- F. The operating thermostat shall be immersion type and shall be consistent with the recovery rate of the heating element as to the number of steps required.
- G. A Hi-Limit control with a manual reset button shall be factory installed to disconnect all ungrounded conductors to the heating element in the event of an over-temperature condition.
- H. A paddle-type flow switch shall be factory installed to disengage the control circuitry when there is insufficient flow/water through the heater.

## **2.4 SOURCE QUALITY CONTROL**

- A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements.
- D. Prepare test and inspection reports.

## **PART 3 - EXECUTION**

### **3.1 DOMESTIC-WATER HEATER INSTALLATION**

- A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 033000 "Cast-in-Place Concrete."
  - 1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
  - 2. Maintain manufacturer's recommended clearances.
  - 3. Arrange units so controls and devices that require servicing are accessible.
  - 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
  - 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  - 6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 7. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 8. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-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.
  - 1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves
- C. Install combination temperature-and-pressure relief valves in top portion of heater. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-

heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.

- D. 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 electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves.
- E. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers.
- F. Install thermometers on inlet and outlet piping of residential, solar, electric, domestic-water heaters.
- G. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.
- H. Fill electric, domestic-water heaters with water.
- I. Charge domestic-water compression tanks with air.

### **3.2 CONNECTIONS**

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

### **3.3 IDENTIFICATION**

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.4 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
  - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements.
- C. Prepare test and inspection reports.

### **3.5 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain commercial electric, domestic-water heaters.

**END OF SECTION 22 3300**