

## SECTION 22 33 00

### ELECTRIC DOMESTIC WATER HEATERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes the following electric water heaters:
  - 1. Light-commercial electric water heaters.
  - 2. Compression tanks.
  - 3. Water heater accessories.

##### 1.2 SUBMITTALS

- A. See Section 01 3000 – Administrative Requirements, for submittal procedures.
- B. Product Data: For each type and size of water heater indicated. Include rated capacities, operating characteristics, furnished specialties, and accessories.
- C. Shop Drawings: Diagram power, signal, and control wiring.
- D. Product Certificates: For each type of commercial electric water heater, signed by product manufacturer.
- E. Source quality-control test reports.
- F. Field quality-control test reports.
- G. Operation and Maintenance Data: For electric water heaters to include in emergency, operation, and maintenance manuals.
- H. Warranty: Special warranty specified in this Section.

##### 1.3 QUALITY ASSURANCE

- A. Source Limitations: Obtain same type of electric water heaters through one source from a single manufacturer.
- B. Product Options: Drawings indicate size, profiles, and dimensional requirements of electric 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 indicated, fabricate and label commercial water heater 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 potable water.

##### 1.4 COORDINATION

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

## 1.5 WARRANTY

- A. See Section 01 7800 – Closeout Submittals, for additional warranty requirements.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric 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 Period(s): From date of Substantial Completion:
    - a. Light-Commercial Electric Water Heaters:
      - 1) Storage Tank: Five years.
      - 2) Controls and Other Components: Five years.
    - b. Compression Tanks: Five years.

## 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. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 LIGHT-COMMERCIAL ELECTRIC WATER HEATERS

- A. Description: Comply with UL 174 for household, storage electric water heaters.
  - 1. Manufacturers:
    - a. American Water Heater Company.
    - b. Rheem Water Heater Div.; Rheem Manufacturing Company.
    - c. Ruud Water Heater Div.; Rheem Manufacturing Company.
  - 2. Storage-Tank Construction: Steel, vertical arrangement.
    - a. Tappings: ASME B1.20.1 pipe thread.
    - b. Pressure Rating: 150 psig.
    - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.
  - 3. Factory-Installed Storage-Tank Appurtenances:
    - a. Anode Rod: Replaceable magnesium.
    - b. Dip Tube: Provide unless cold-water inlet is near bottom of tank.
    - c. Drain Valve: ASSE 1005.
    - d. Insulation: Comply with ASHRAE/IESNA 90.1 or ASHRAE 90.2.
    - e. Jacket: Steel with enameled finish.
    - f. Heating Elements: Two; electric, screw-in immersion type; wired for non-simultaneous operation, unless otherwise indicated.
    - g. Temperature Control: Adjustable thermostat for each element.
    - h. Safety Control: High-temperature-limit cutoff device or system.

- i. Relief Valve: ASME rated and stamped and complying with ASME PTC 25.3 for combination temperature and pressure relief valves. Include relieving capacity at least as great as heat input, and include pressure setting less than water heater working-pressure rating. Select relief valve with sensing element that extends into storage tank.
4. Special Requirements: NSF 5 construction with legs for off-floor installation.

## 2.3 COMPRESSION TANKS

- A. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air pre-charge to minimum system-operating pressure at tank.
  1. Manufacturers:
    - a. AMTROL Inc.
    - b. Honeywell Sparco.
    - c. Taco, Inc.
    - d. Watts Regulator Co.
  2. Construction:
    - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1, pipe thread.
    - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.

## 2.4 WATER HEATER 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 water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.
- B. Pressure Relief Valves: ASME rated and stamped and complying with ASME PTC 25.3. Include pressure setting less than water heater working-pressure rating.
- C. Water Heater Mounting Brackets: For tank-less heaters located below Break Room and Coffee area sinks used to serve counter glass filler, utilize water heater manufacturer's factory-fabricated steel bracket for wall mounting and capable of supporting water heater and water.
- D. Shock Absorbers: ASSE 1010 or PDI WH 201, Size A water hammer arrester.

## 2.5 SOURCE QUALITY CONTROL

- A. Test and inspect water heater 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 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.
- B. Install combination temperature and pressure relief valves in top portion of storage tanks. 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.
- C. Install combination temperature and pressure relief valves in water piping for water heaters without storage. 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 water heaters that do not have tank drains. Refer to Division 22 Section "Domestic Water Piping Specialties" for hose-end drain valves.
- E. Install thermometer on outlet piping of water heaters. Refer to Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.
- F. Install thermometers on inlet and outlet piping of electric water heater. Refer to Division 22 Section "Meters and Gages for Plumbing Piping" for thermometers.
- G. Fill water heaters with water.
- H. Charge compression tanks with air.

### 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."

### 3.3 FIELD QUALITY CONTROL

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

END OF SECTION 22 33 00