

SECTION 22 33 36.16 – COMMERCIAL STORAGE ELECTRIC DOMESTIC WATER HEATERS

PRODUCT: PVI DURAWATT

**PART 1 – GENERAL**

**1.1 RELATED DOCUMENTS**

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

**1.2 SUMMARY**

This section includes electric storage water heaters for potable water.

**1.3 REFERENCES**

- A. UL 1453 “Electric Booster and Commercial Storage Tank Water Heaters”
- B. ASME Boiler and Pressure Vessel Code, Section IV, Part HLW
- C. ASHRAE/IES 90.1-2010
- D. NFPA 70 – National Electric Code
- E. NSF/ANSI Standard 61 – Drinking Water System Components
- F. NSF/ANSI Standard 372 – Drinking Water System Components – Lead Content
- G. ASTM G123 – 00(2005) “Standard Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution.”

**1.4 SUBMITTALS**

- A. Product Data: Include rated capacities; shipping, installed, and operating weights; furnished specialties and accessories for each model indicated.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, required clearances, components, and size of each field connection.
- C. Wiring Diagrams: Detail for wiring power signal, differentiate between manufacture-installed and field-installed wiring.
- D. Maintenance Data: Include in the maintenance manuals specified in Division 1. Include maintenance guide and wiring diagrams.

**1.5 REGULATORY REQUIREMENTS**

- A. Conform to applicable code for internal wiring of factory wired equipment.
- B. Units: ETL, UL, or CSA Listed as a Complete Electric Water Heater Assembly.

- C. Conform to ASME Section IV, Part HLW for Duplex Water Heater construction.
- D. Conform to NSF/ANSI Standard 372 – Drinking Water System Components – Lead Content

## **1.6 QUALITY ASSURANCE**

- A. Listing: The water heater will be ETL listed to UL 1453 “Electric Booster and Commercial Storage Tank Water Heaters”
- B. ASME Compliance: Water heater shall bear the ASME HLW stamp and be National Board listed.
- C. NSF/ANSI Compliance: Water heater shall conform to the NSF/ANSI 372 by a recognized certifying body.
- D. Manufacturer: Company specializing in manufacturing the products specified in this section with minimum twenty years’ experience.

## **1.7 COORDINATION**

Coordinate size and location of concrete bases.

## **1.8 WARRANTY**

- A. The online warranty for this product is located on PVI’s website (<https://www.pvi.com/>) and in the event that the terms or conditions of this specification conflict with the online warranty, the terms and conditions of the online warranty shall control.
- B. Storage Tank: 25-year (15 years full, 10 years prorated) coverage for manufacturing or material defects, leaks, production of rusty water and/or chloride stress corrosion cracking. Tank warranty does not require inspection and maintenance of anode rods.
- C. All other heater parts: 1 year
- D. The heater shall have a first-year service policy, which shall cover labor and freight costs under certain conditions for warranty covered services.

<OPTIONAL> The heater shall have a long-life service policy, which shall cover labor and freight costs under certain conditions for warranty covered services.

## **PART 2 – PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Available Manufacturers: Manufacturer shall be a company specializing in manufacturing the products specified in this section with minimum twenty years’ experience.
- B. The water heaters shall be ETL listed as a complete unit. The heater shall satisfy current Federal Energy Policy Act standards for both thermal efficiency and standby heat losses.
- C. Manufacturers: PVI is the basis of design. Acceptable manufacturers shall be subject to compliance with the requirements.

### **2.2 CONSTRUCTION**

- A. The storage section of the water heater shall be ASME HLW stamped, and National Board Registered for the maximum allowable working pressure of 150 psi and pressure tested at 1-1/2 times working pressure.

- B. All tank connections/fittings shall be nonferrous. The tank shall be equipped with a ball-type drain valve. Tank design will include a manway-sized access to the tank interior.
- C. The storage tank shall be an unlined pressure vessel constructed from phase-balanced austenitic and ferritic duplex steel with a chemical structure containing a minimum of 21% chromium to prevent corrosion and mill certified per ASTM A 923 Methods A to ensure that the product is free of detrimental chemical precipitation that affects corrosion resistance. The material selected shall be tested and certified to pass stress chloride cracking test protocols as defined in ISO 3651-2 and ASTM G123 – 00(2005) “Standard Test Method for Evaluating Stress-Corrosion Cracking of Stainless Alloys with Different Nickel Content in Boiling Acidified Sodium Chloride Solution.”
- D. Waterside surfaces shall be welded internally utilizing joint designs to minimize volume of weld deposit and heat input. All heat affected zones (HAZ) shall be processed after welding to ensure the HAZ corrosion resistance is consistent with the mill condition base metal chemical composition. Weld procedures (amperage, volts, welding speed, filler metals and shielding gases) utilized shall result in a narrow range of austenite-ferrite microstructure content consistent with phase balanced objectives for welds, HAZ and the base metal.
- E. All internal and external tank surfaces shall undergo full immersion passivation and pickling processing to meet critical temperature, duration and chemical concentration controls required to complete corrosion resistance restoration of pressure vessel surfaces. Other passivation and pickling methods are not accepted. Immersion passivation and pickling certification documents are required and shall be provided with each product.
- F. Materials shall meet ASME Section II material requirements and be accepted by NSF 61 for municipal potable water systems. Storage tank materials shall contain more than 80% post-consumer recycled materials and be 100% recyclable.
- G. Water contacting tank surfaces will be non-porous and exhibit 0% water absorption.
- H. Internally lined or plated storage tanks will not be acceptable.
- I. Water heaters that require anodes will not be acceptable.
- J. Heating elements will be rated at 9 kW and 40 W/in<sup>2</sup> density or 18 kW and 80 W/in<sup>2</sup> density.
- K. Heating elements will be sheathed in Incoloy. Each element will individually mount to the tank by means of a four-bolt bronze flange over stainless steel studs with an O-ring seal. A fused magnetic contactor will be supplied for each power circuit. Maximum current per circuit will be 50 amps on three-phase units.

### 2.3 WATER HEATER TRIM

- A. As a minimum, the heater will be equipped with the following:
  - a. An electronic low water cutoff
  - b. An *immersion* operating thermostat
  - c. *Immersion* temperature limiting device
  - d. An ASME rated temperature and pressure relief valve
- B. Operating and safety controls shall meet the requirements of UL 1453. Operating and safety controls shall meet the requirements of MASS code.

- C. <OPTIONAL> The water heater shall employ an electronic operating control with digital temperature readout. The operator shall be capable of connecting to a building automation system through serial connection using Modbus RTU protocol.
- D. <OPTIONAL> A protocol gateway for BACnet MSTP/IP will be provided.  
<OPTIONAL> A protocol gateway for Lonworks will be provided.  
<OPTIONAL> A protocol gateway for Modbus TCP/IP will be provided.

### **PART 3 – EXECUTION**

#### **3.1 INSTALLATION**

Install water heaters level and plumb in accordance with manufacturers' written instructions and referenced standards.

#### **3.2 FINISHING**

The heater will be completely packaged, requiring only hookup for electrical and plumbing. The heater will be insulated with multiple layers of heavy-density fiberglass, jacketed with powder-coated steel panels, and mounted on heavy-duty channel skids. The heater will fit properly in the space provided and installation will conform to all local, state, and national codes.

#### **3.3 START-UP**

Start up on the unit will be performed by factory trained and authorized personnel. A copy of the startup report will be provided to the owner.

END OF SECTION