

Laars Model ET Heat Pump Water Heater Temperature Maintenance (Swing) Tank Specification**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 WORK INCLUDED

- A. Section includes temperature maintenance (swing) tank, an electric water heater for use with heat pump water heater systems. The heater shall be fabricated, assembled, charged, and tested by one manufacturer.

1.3 SUBMITTALS

- A. Submit shop drawings, mechanical layout, flow schematics, and product data, as specified. Include capacity data, installation manual, startup and service instructions, and spare/replacement parts lists.

1.4 QUALITY ASSURANCE AND COMPLIANCE

- A. Reference Standards
 - a. ETL Standard For Electric Booster and Commercial Storage Tank Water Heaters, Construction and Test of Electric Storage-Tank Water Heaters (R2014) [CSA C22.2#110:1994 Ed.5+G1;U2;U3]
 - b. NSF/ANSI 372 Low Lead Content.
 - c. ASME Boiler and Pressure Vessel Code Section IV HLW Stamp.
 - d. ASHRAE 90.1b Energy Efficiency Standard for Buildings.
- B. Each submittal shall be provided with documentation certifying that all materials, products, components, and test reports comply with the design requirements for this project.
- C. Furnish all equipment, materials, and accessories new and free from defects.

1.5 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of tank that fail in materials or workmanship within specified warranty period.
- B. Warranty Period:
 - a. 10-Year limited tank warranty.
 - b. 6-Year limited electric element warranty.
 - c. 1-Year warranty for all other parts.

PART 2 – PRODUCTS**2.1 RATINGS**

- A. Gallon Capacity:
 - a. Model ET0200: 200 gallons (757 liters)
 - b. Model ET0300: 300 gallons (1136 liters)
- B. Power and Recovery – Heaters shall be available with the following power and recovery ratings:
 - a. 15 kW (51,180 Btu/hr) – 62 gph (234 L/h) recovery at 100°F (56°C) rise
 - b. 18 kW (61,416 Btu/hr) – 74 gph (280 L/h) recovery at 100°F (56°C) rise
 - c. 30 kW (102,360 Btu/hr) – 123 gph (465 L/h) recovery at 100°F (56°C) rise
 - d. 36 kW (122,832 Btu/hr) – 148 gph (559 L/h) recovery at 100°F (56°C) rise

- e. 45 kW (153,540 Btu/hr) – 185 gph (699 L/h) recovery at 100°F (56°C) rise
 - f. 54 kW (184,248 Btu/hr) – 221 gph (835 L/h) recovery at 100°F (56°C) rise
 - g. 60 kW (204,720 Btu/hr) – 246 gph (930 L/h) recovery at 100°F (56°C) rise
 - h. 72 kW (245,664 Btu/hr) – 295 gph (1115 L/h) recovery at 100°F (56°C) rise
 - i. 90 kW (307,080 Btu/hr) – 369 gph (1395 L/h) recovery at 100°F (56°C) rise
 - j. 108 kW (368,496 Btu/hr) – 443 gph (1675 L/h) recovery at 100°F (56°C) rise
- C. Heaters shall be available in the following voltages:
- a. 15-60 kW models:
 - i. 208V single phase
 - ii. 240V single phase
 - iii. 208V three phase
 - iv. 240V three phase
 - v. 380V three phase
 - vi. 400V three phase
 - vii. 415V three phase
 - viii. 480V three phase
 - ix. 600V three phase
 - b. 72-108 kW models:
 - i. 208V three phase
 - ii. 240V three phase
 - iii. 380V three phase
 - iv. 400V three phase
 - v. 415V three phase
 - vi. 480V three phase
 - vii. 600V three phase
- D. Operating Conditions:
- a. Maximum water pressure = 150 psi (1034 kPa)
 - b. Maximum water temperature = 180°F (82°C)

2.2 CONSTRUCTION

- A. Description: Laars Heat Pump Temperature Maintenance (Swing) Tank, Model ET.
- B. Heater shall be vertically oriented.
- C. Heater diameter shall be:
 - a. Model ET0200: 32 inches (81 cm)
 - b. Model ET0300: 40 inches (102 cm)
- D. Heater height shall be 80 inches (203 cm).
- E. The heater shall have a painted steel jacket. The jacket shall be coated on both sides and have a durable finish for maximum protection.
- F. The heater tanks shall be covered with high-density open cell foam insulation used to meet ASHRAE 90.1b, allowing for maximum 4 Watts per square foot of tank surface energy loss.
- G. Heater tank shall be double-glass lined with a coating that produces a superior, resistant, long-lasting material that bonds to the steel substrate. Lining shall be 20 mils thick (+/- 4 mils). Lining shall be able to withstand temperatures up to 180°F (82°C), and shall feature antimicrobial product protection to help prevent the growth of bacteria, mold and mildew on the surface of the tank lining. The glass lining shall be tested under the following ASTM testing guidelines:
 - a. Degradation: W-H-196 Test = 7.0 – 8.0 mg/in².
 - b. Resistance: PEI T-21 Spot Acid Test = Class A.
 - c. Adhesion: Impact Resistance = Class 4 to 5.
 - d. Hi-Pot Test: Less than 20.
- H. Heater shall be built with an electrical panel that has a hinged door with keyed lock.
- I. Heater shall be built with lifting lug access.
- J. Heater shall be constructed with a channel iron skid base.
- K. An inspection opening shall provide easy access to the heater interior for inspection and cleaning.
- L. Low watt density incoloy elements shall be used. This tough alloy resists the effects of prolonged high operating temperatures, hard water, acids, corrosion, and thermal shock.

- M. All elements and circuits shall be internally fused in 48 Amp increments, providing complete electrical protection. Cartridge type fuses shall be rated at 200,000 Amp interrupting capacity.
- N. Heater shall use magnetic contactors with immersion thermostats.
- O. The control circuit shall be 120V, with built-in transformer.
- P. Elements shall be thermostatically controlled in 54kW maximum increments.
- Q. Heater shall have a digital temperature display, located on the front of cabinet.
- R. Heater shall be equipped with a manual reset high water temperature limit.
- S. Terminal block connections shall be used, for easy and safe wiring connections.
- T. Heater shall have BMS contacts.
- U. Heater shall be equipped with an alarm bell to warn of various failures.
- V. Heater shall be equipped with an installed temperature and pressure relief valve.
- W. Heater shall have 3" NPT water outlet.
- X. Heater shall have 3" NPT heat pump water connection.
- Y. Heater shall have a 1½" NPT recirculation connection.
- Z. Heater shall be equipped with a drain.
- AA. Heater tank shall include magnesium anode rods, quantities and placement chosen to best protect the tank.

2.3 OPTIONS

- A. The heater shall be available with the following options:
 - a. Low water cutoff to prevent energizing of the heater when not filled with water, or upon a low water condition.
 - b. Pilot lights and manual limiting switches permit manual limitation of heating input by switching off current to each contactor.
 - c. Shunt trip disconnect that provides maximum protection by interrupting all power to the system in the event of a control sensed malfunction or over current (mounted separately).
 - d. Low pressure switch that turns off control circuit when water pressure drops below a set minimum.
 - e. High pressure switch that turns off control circuit when water pressure exceeds a set maximum.
 - f. Electric step controller for electronic sequencing of thermostats (cannot be used with CTA-2045 grid-enabled protocol).
 - g. 7-day clock to control off/on cycles of the heater as programmed by the owner or electric utility requirement.
 - h. 24-hour clock to control on/off cycles in 24-hour cycles.
 - i. Safety door interlock that prevents opening of access door while heater is energized.
 - j. Pressure gauge that is jacket mounted for convenient viewing.
 - k. 12-inch x 16-inch manway that provides means to easily remove sediment from heater (available on 300 gallon heater).