ASME Packaged Electric Water Heater

15 - 1600 KW - All Voltages & Phases, 80 - 5000 Gallon Capacity

Features

- Reliable
  - Only high grade materials used in construction to ensure long operating life
  - Hydrastone cement lining provides superior protection and tank longevity
  - Heavy duty construction withstands demanding commercial/industrial use

- Packaged System
  - Fully packaged water heater saves time and money during installation
  - All electrical operating controls are factory selected and wired to ensure reliable operation

- Versatile
  - Full range of styles, sizes, and optional features to meet your exact water heating needs
  - Highly efficient design lowers peak power demand and reduces operating costs

Applications

- Schools
- Office Buildings
- Prisons
- Stadiums
- Hotels
- Industrial Facilities
- Nursing Homes
- Hospitals

A Heavy Duty Storage Electric Water Heater

The Model SH and H is a fully packaged water heater designed to be a reliable and long lasting source for hot water. Each component is carefully selected to ensure performance in even the most demanding application. Whether you are heating potable water in a commercial building or heating process water in an industrial application you can select a Hubbell Model SH or H to do the job. When you specify and install a Hubbell SH or H model water heater you will have confidence in knowing that the owner will be provided with a quality product that is a long lasting and trouble free source for hot water.
Cement Lined Tanks Provide Longer Service Life

What is the most common reason why a water heater fails?

Failure of a tank’s protective lining allows water to come into direct contact with the steel tank causing it to corrode and leak. Therefore, the type of protective lining is the single most important feature when determining the quality of any water heater. The ability of a lining to protect the steel tank is primarily based upon its thickness and complete coverage of all steel surfaces.

Linings Available For A Steel Tank

1. **Cement Lining**
   A specially formulated Hydrastone cement applied to a minimum of $\frac{5}{8}''$ thickness on all surfaces. The cement lining covers 100% of all interior surfaces and is 125 times thicker than glass lining. Due to the thickness and guaranteed coverage of cement lining there is no need for a sacrificial anode. An extremely durable and long lasting lining suitable for hot and cold potable water storage in a variety of commercial and industrial applications.

2. **Alternative Cement Formulations**
   To meet the specific requirements of DI Water, RO Water, extended service and/or high temperature applications, alternative formulations of cement are available. Please consult factory for assistance.

3. **Phenolic Lining**
   An epoxy coating applied in 2 coats to a total of 10-12 mils DFT. Typically used in process applications using low conductivity DI, distilled, or food grade water.

4. **Galvanizing**
   The steel pressure vessel is pickled and hot dipped in molten zinc to create a barrier which internally and externally protects a steel vessel for cold and hot water storage.

Unlined Tanks

An **Unlined tank does not require a lining** because the pressure vessel itself is constructed from material which is impervious to the corrosive effects of hot water. This type of tank will provide a significantly longer service life than all lined steel tanks, but is initially more costly.

1. **90/10 Copper-Nickel**
   A 90% Copper 10% Nickel alloy similar to copper-silicon, but with added strength and corrosion resistance. Typically used in applications with corrosive environments (salt water) or in critical commercial and industrial applications requiring long tank life.

2. **Stainless Steel**
   Stainless steel (Specify: Type 304, 304L, 316, or 316L) is well suited for industrial and high purity applications requiring a corrosion resistant tank with minimal leaching of impurities into the water. Well suited for process, RO and DI water systems in the pharmaceutical, food and electronic industries.

**NOTE:** Unlined tanks do not require a Manway. Inspection openings will be provided as required.
SH and H Model Standard Equipment

Vessel Construction
1. All welded carbon steel vessel designed and built in strict accordance with the ASME Code Section IV and stamped, certified and registered with the National Board of Boiler and Pressure Vessel Inspectors
2. All internal tank surfaces are lined with a minimum of 5/8” thick Hydrastone cement for superior protection and tank longevity
3. Designed for 125 psi working pressure and hydrostatically tested at 188 psi (1½ times the WP)

General
1. Heavy duty 2” thick fiberglass blanket insulation covers 100% of the pressure vessel for maximum operating efficiency and minimal standby heat loss
2. Heavy gauge galvanized steel protective jacket with both top and bottom heads keeps insulation in place and protected to ensure high efficiency during operation
3. Entire vessel is supported on heavy duty integrally welded steel supports for sturdy floor mounting
4. Full five (5) year Non Pro-Rated tank warranty and one (1) year electrical component warranty
5. Bronze ASME rated combination temperature and pressure safety relief valve set at the vessel working pressure and 210°F

SH and H Model Optional Equipment

Vessel
1. Alternate protective lining:
   Phenolic epoxy resin, Flame spray copper, Hot dip galvanizing, other
2. Alternate vessel construction:
   Stainless Steel Type 304 or 316L, 90/10 Copper-Nickel, other
3. Alternate working pressure:
   Please specify
4. Tank designed, constructed and stamped to section VIII or Section I of the ASME Code

General
5. Skid mounting on heavy duty all welded I Beam
6. Type 304 stainless steel protective jacket, please specify if painted
7. Field removable (knocked-down) outer jacket
8. Alternate insulation system
9. Dual energy package provides operational flexibility for electric and (steam or boiler water) power
10. Manway 12” x 16” size
11. Inspection opening 3” NPT size
12. 316L Stainless Steel Temperature and Pressure relief valve

Electrical Operating Controls
1. All electrical operating controls are factory sized, selected, wired, tested and mounted in a NEMA 1 enclosure to ensure safe and reliable operation
2. A power distribution block is supplied for single point electrical connection
3. Power fuses rated at a maximum of 60 Amps protect each heating element branch circuit per NEC and UL requirements. Each branch circuit has a maximum rating of 48 Amps
4. Heavy duty definite purpose magnetic contactor with integrally mounted power fuse block assembly switches power on/off to each branch circuit
5. Heavy duty removable flange type copper sheathed immersion heating element provides long service life
6. Fully adjustable thermostat maintains accurate water temperature and is sized by the factory to control the appropriate number of heating element circuits
7. A generously sized transformer provides fused 120V to the control circuit
8. A fully adjustable (100-240°F) safety hi-limit device with manual reset interrupts power to the control circuit in the event of over-temperature water in the storage tank
9. Safety door interlock mechanism interrupts power to the control circuit upon opening the electrical control panel
10. Louvers in the control panel as needed to allow for cooling of the electrical components to ensure maximum electrical component longevity

Electrical
13. NEMA 4 weather resistant enclosure for outdoor/wet locations
14. Explosion resistant construction for hazardous locations
15. Built-in circuit breaker (with or without shunt trip) or a built-in non-fused On/Off disconnect switch
16. Alternate element sheath material (Please Specify: Incoloy, Stainless Steel, other)
17. Specialized heating element construction including: Special watt density rating, passivation, electropolishing, or any other feature required to meet the needs of your application
18. Factory installed low water cut out device to disengage electrically the heating element(s) in the event of insufficient water in the tank
19. Dial thermometer and pressure gauge factory installed in the tank
20. Intra-tank circulation pump package with On/Off switch to continuously circulate water within the tank and thereby reduce stratification. All bronze circulator pump is properly sized for the storage capacity
21. Status indicating lamp(s)
22. Audible alarm system
23. Digital display electronic temperature controller. Please specify with or without RS485 communication port for remote operation of the temperature controller
24. Building Automation System (BAS) package provides remote operating/alarms capability
25. Factory purchased mixing valve to supply high volume tepid water for safety shower systems. For details, please reference Hubbell Model EMV

Please note: Optional equipment may impact overall dimensions and weight. Please request submittal drawing from factory.
Outline Dimensions
Model SH (Vertical)

Model H (Horizontal)
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<th>Actual Storage Capacity (Gallons)</th>
<th>Overall Dimensions (Inches)</th>
<th>Storage Tank</th>
<th>Nominal Storage Capacity (Gallons)</th>
<th>Inlet Outlet Sizing (NPT)</th>
<th>Approx. Shipping Weight (Lbs.)</th>
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**Note:** All dimensions are approximate and subject to change. Please reference the submittal drawing for actual dimensions. The tank selections above are shown for convenience. A full selection of storage capacities are available by entering the desired capacity into the model number.

* 80, 120 and 150 gallon tanks do not come equipped with a manway. Please consult factory if desired on these sizes.
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<td>155</td>
<td>512,730</td>
<td>1,064</td>
<td>866</td>
<td>838</td>
<td>765</td>
<td>732</td>
<td>542</td>
<td>505</td>
<td>371</td>
<td>341</td>
<td>310</td>
</tr>
<tr>
<td>160</td>
<td>527,860</td>
<td>1,100</td>
<td>902</td>
<td>876</td>
<td>802</td>
<td>769</td>
<td>559</td>
<td>522</td>
<td>391</td>
<td>361</td>
<td>330</td>
</tr>
</tbody>
</table>

**Notes:**

1. The KW selections above are shown for convenience. A full selection of KW ratings from 15 to 1600 KW is available by entering the desired KW into the model number.
2. For alternative voltages, including 220, 277, 440, 460, 575 and 600 volt please consult factory for full KW selection.

**Electrical**

\[
\text{KW} \times 1000 + 1.73 = \text{Amps} \, 3Φ
\]

\[
\frac{\text{KW} \times 1000}{\text{Volts}} = \text{Amps} \, 1Φ
\]

**Example:**

150 KW at 480V 3Φ

\[
\frac{150 \times 1000}{480} = 312.5 \text{ Total Amp Draw}
\]

\[
180 \div 48 = 3.75 \text{ max circuit rating}
\]

**Note:** Each branch circuit is rated at a maximum of 48 Amps and each circuit is typically operated as an independent temperature step.
**Step 1**

**VARIABLES TO SOLVE FOR:**
Solve for the unknown using the formulas stated below.

1. **KW Requirement:**
   \[ \text{GPH} \times \text{°F} \Delta T \times 0.00244 = \text{KW} \]

2. **Temperature Rise:**
   \[ \frac{\text{KW} \times 410}{\text{GPH}} = \text{°F} \Delta T \]

3. **Flow Rate:**
   \[ \frac{\text{KW} \times 410}{\text{°F} \Delta T} = \text{GPH} \]

### Metric Conversions

- Liters \( \times 0.2641 = \text{Gallons} \)
- Gallons \( \times 3.79 = \text{Liters} \)
- Gallons \( \times 0.003785 = \text{m}^3 \)
- \( 1^\circ \text{C} \Delta T = 1.8^\circ \text{F} \Delta T \)
- \( \text{psi} \times 0.06896 = \text{Bar} \)
- \( \text{Bar} \times 14.5 = \text{psi} \)
- \( \text{psi} \times 6.86 = \text{kPa} \)
- \( \text{kPa} \times 0.1456 = \text{psi} \)
- \( \text{Lbs} \times 0.4536 = \text{Kg} \)
- \( \text{Kg} \times 2.2 = \text{Lbs} \)
- \( \text{Watts/Sq.Cm.} \times 6.4 = \text{Watts/Sq.In.} \)
- \( \text{Watts/Sq.In.} \times 0.155 = \text{Watts/Sq.Cm.} \)

### Model SH and H Number Designation

- **Step 1**
  - **Model:** SH = Vertical
  - **H:** Horizontal

- **Step 2**
  - **Actual Storage Capacity:** 80-5000 Gallons

- **Step 3**
  - **Lower KW:** 5-1600 KW

- **Step 4**
  - **Vessel Type:**
    - SL = Cement Lined Steel
    - GL = Phenolic Lined Steel
    - M = Hot Dip Galvanized Steel
    - CN = Solid 90/10 Copper-Nickel
    - SS = Solid Stainless Steel (specify Type 304 or 316L)

- **Step 5**
  - **Voltage/Phase/Hz:**
    - RS = 208-1-60
    - R = 208-3-60
    - S = 240-1-60
    - T = 240-3-60
    - W = 277-1-60
    - T3 = 380-3-50/60
    - T7 = 415-3-50/60
    - T5 = 440-3-60
    - T4 = 480-3-60
    - T6 = 600-3-60

**Example:** **SH350-0-90SLT4**

A vertical 350 gallon storage capacity water heater with a 90 KW heating element. Tank is cement lined. Power required is 480 VAC, 3 phase, 60 Hz.

**Option Note**

Any and all optional equipment for a water heater must be called out in the written specifications. A model number in and of itself does not reflect any optional equipment selected.
Master Specification: Model SH & H

General
Provide a quantity of _______ packaged type electric water heater(s) Model No. ___________________________ as manufactured by HUBBELL The Electric Heater Co., Stratford, CT. The pressure vessel section, including the electrical control panel, shall be mounted on structural supports and be suitably insulated, jacketed, painted and provided with lifting lugs. The entire unit is to be packaged ready for plumbing and electrical service connections and shall bear the UL listing mark certifying the entire water heater.

Pressure Vessel
The pressure vessel shall be all welded construction and ASME Code Section IV stamped for a working pressure of 125 psi (☐ Optional Specifications: Select 100, 150, 160, ______ psi) and contain a minimum of _______ gallons of storage. The storage vessel shall be carbon steel and lined with seamless Hydrastone cement applied to a minimum thickness of 1/8” on 100% of all interior tank surfaces (☐ Optional Specifications: Phenolic lined steel tank, Hot dipped galvanized steel tank, solid 90/10 copper-nickel tank, solid Type 304 or 316L stainless steel tank). The pressure vessel is to be completely covered with 2” thick energy conservation fiberglass blanket insulation (☐ Optional Specification: Foam Insulation) and enclosed in a heavy gauge galvanized steel metal jacket finished in gray hammertone enamel. The vessel shall be protected by an ASME approved automatic reseating combination temperature and pressure relief valve set at the tank working pressure and 210°F.

Recovery
The recovery section shall be rated at _______ KW which will heat _______ GPH of water at _______ °F rise (_______ °F. to _______ °F).

Electrical
The heater shall be designed to operate at _______ volts, _______ phase, _______ Hz, with a fused low voltage transformer providing 120 volt to all operating controls. The immersion heating element(s) shall be high quality copper sheathed (☐ Optional Specifications: Incoloy, Type 304 or 316 stainless steel Inconel) and sized to obtain the rated recovery. 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 power fuses rated at approximately 125% of the ampacity of the circuit. Multiple circuit elements shall be provided with a master terminal block for connecting of the incoming power feeds (☐ Optional Specifications: Built-in non-fused On/Off disconnect switch, Built-in circuit breaker with On/Off handle). A safety door interlock switch shall interrupt power to the control circuit when the control panel door is opened. The control thermostat shall be immersion type and shall be consistent with the recovery rate of the heating element as to the number of steps required. A hi-limit control with a manual reset button shall be factory installed to disconnect all ungrounded conductors to the heating element(s) in the event of an over-temperature condition in the storage section.

In addition, the water heater shall be supplied with the following optional features:

☐ Option ___________________________
☐ Option ___________________________
☐ Option ___________________________

Warranty
Hubbell shall warrant 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 (☐ Optional Specification: full ten (10) years Non Pro-Rated) from date of start-up, provided that the unit is started within three (3) months of date of shipment and installed and operated within the scope of the tank design and operating capability. Each water heater shall be shipped with a complete set of installation and operating instructions including spare parts list and approved drawing.