



**AquaLec**  
**Electric Storage Calorifiers**

Operating & Instruction Manual

Standard storage  
capacities available

**300 to 6000**  
**Litres**

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## 1. Description

The standard range of AquaLec electric storage calorifiers (calorifiers fitted with an electric immersion heater), are mostly used in domestic hot water systems. In the majority of applications, the primary power requirements is 400v 3ph electric, but 240v 1ph supply is suitable on smaller vessels.

Other applications may arise with different water temperatures and materials of construction. This manual covers stainless steel and copper vessels.

### Specific Design Data

Pressure	BarG or °C
Maximum Secondary Working Pressure	5.0 BarG
Secondary Hydraulic Test Pressure	8.25 BarG
Maximum Secondary Working Temperature	60°C
Maximum Primary Working Pressure	5.5 BarG
Primary Hydraulic Test Pressure	8.25 BarG
Maximum Primary Working Temperature	50°C
Design Code	BS853 & PED 1999 (S1 1999-2001) Cat:SEP

## 2. PED Information

The standard range of AquaLec units are designed in accordance with the requirements of the Pressure Equipment Directive 97/23/EC, with the primary medium up to a maximum temperature of 110°C.

Units classed as SEP in the PED category, are not supplied with a CE mark. Units in category I and II are CE marked and appropriate markings and certification is supplied with each unit.

It is the responsibility of the user and/or installer, to ensure that the unit is installed and operated safely, and in accordance with the instructions supplied within this manual.

**The standard AquaLec unit is designed for a water medium in the shell.**

## 3. Installation

### Lifting & Handling

- Use lifting lugs where fitted.
- Do not lift a vessel by the insulation, if fitted.
- Straps may crush or damage the insulation casing.
- Due to the insulation casing material thickness, care should be taken when moving and handling the vessel, not to damage the insulation.
- Do not lift the vessel using chains directly in contact with the shell.
- Do not allow operatives to stand on the vessel.

## Siting

- Unless specifically ordered for an external installation, the vessel must be sited indoors.
- Foundations or plinths must be firm and level to prevent settling, pipe strain or distortion of the shell.
- Unless specifically ordered differently, the vessel must be installed in a level position.
- Protective covers and plugs may be fitted to connections, to prevent them in transit. These must be removed prior to use.
- If a connection is not required, seal it appropriately.
- Check for any foreign material which may have got into the vessel.
- Pipe work connected to the vessel, must be adequately supported to prevent any loads being transmitted to the vessel.
- Provide for thermal expansion with bends and expansion joints.
- Fit isolation valves prior to the vessel connections to facilitate servicing (NOT TO THE VENT).
- For flanged connections, tighten bolts in a diametrically opposite sequence, to load the flanges evenly onto the gasket.
- Ensure adequate venting for air removal during filling and operation (pressurised systems should have an automatic air vent and a manual air vent for this).
- Safety valves should have their discharge pipes away to a safe disposal point, preferably via an air-break and tundish, so that the discharge is unrestricted and easily visible.
- Water expansion must be accommodated by a separate expansion vessel fitted in the system.

## De-stratification Pumpset

To avoid damage in transit, the pipe-work and pump of a de-stratification set (if included), may be supplied loose for fitting on site. The pump should be installed to circulate water from the top of the cylinder to the bottom.

To ensure that the anti-stratification pump does not adversely affect performance of the calorifier during peak demand periods, the power supply to the pump should be timed to come on during periods of low demand if possible, but often enough to guarantee heating the calorifier contents fully for a period of at least 1 hour per day.

**The unit should be flushed thoroughly with clean water prior to operation.**

## Immersion Heaters

The immersion heaters are tested before leaving the factory and are ready for installation. The immersion heaters are thoroughly dried prior to despatch, but moisture may collect in the heater during transit or site storage. It is important that prior to connecting the heaters to the mains, an insulation test must be made across each element to earth.

If the insulation resistance is less than 50,000 Ohms, the heater must be dried out prior to connection. This can be done by placing the heaters in a low temperature oven or by passing a low voltage (maximum of 25% of the working voltage) through the elements in open air to a maximum temperature of 60°C.

The heaters should be switched off at regular intervals to prevent overheating. For further instructions on the immersion heater, refer to separate literature.

## Control Panel

Prior to commissioning and wiring to the immersion heaters, check all the control circuitry and that main circuit connections are tight, using the appropriate tools. Remove all loose items from inside the panel and other items that may be fastened to the cables.

The equipment must be connected to a suitable power supply in accordance with local regulations and the wiring diagram supplied. For units supplied without a factory fitted control panel, the installer must ensure that the thermostat maximum current is not exceeded.

In most cases this will mean using suitable contactors to send power to the electric immersion heater elements. To avoid damage to the electric immersion heater elements, do not allow electric immersion heaters to be run dry.

## Important Note

**Insulated vessels** - When filling/in operation, take extra care to avoid any spillages or leaks from the connections, particularly the top connections.

Any water between the insulated jacket and the shell, will void any warranties as severe corrosion is likely.

Ormandy Rycroft will not take responsibility for any corrosion, due to water ingress between the shell and jacket.

## Un-Insulated Stainless Steel Vessels

Prior to insulation by others, it is essential, for mineral wool insulation applications, that the vessel is wrapped with aluminium foil, prior to matting.

Mineral wool reacts with stainless steel and can cause severe corrosion.

Warranties will be void if aluminium foil is missing.

## 4. Commissioning & Operation

Do not operate the equipment at pressures or temperatures in excess of those specified on the nameplate of the vessel marking.

Do not subject the equipment to conditions of vacuum or partial vacuum. This is particularly vital for copper-lined steel calorifiers, which are supplied complete with anti-vacuum valve - **which must not be removed.**

**For example:** partial vacuum can be caused if the cold feed or the vent are restricted during draw off or drain down.

It is assumed here that the secondary pipe-work is already full of water.

For sealed systems, it is assumed here that any cold water booster set and/or pressure reducing valve is already commissioned and set to the correct pressure.

1. Start with primary, secondary flow, return and cold feed valves closed, and anti-stratification and secondary re-circulation pumps off.
2. Close the drain valve.
3. For sealed systems, ensure auto-air vent is operational.
4. For sealed systems open the manual vent valves.
5. For sealed systems, open the expansion vessel isolation valve.
6. Open the cold feed valve and slowly fill the calorifier with cold water.
7. For sealed systems, when the water reaches the manual vent valve, close it.
8. When the calorifier is full, slowly introduce the hot fluid to the tube bundle.
9. Allow the unit to heat up.
10. Adjust the temperature control gradually and ensure that the correct operating temperature is maintained by it.
11. If the calorifier is open vented and shares a vent with other calorifiers, connect it to the common vent using the 3-way valve.
12. Carefully open the secondary flow and return the valves.
13. Open the anti-stratification pump isolation valves.
14. switch the anti-stratification and secondary re-circulation pumps' power on.

### Important Notes

Check that all gaskets are effective when the unit is operating. Some bolt tightening may be necessary after the unit has been first heated and subsequently from time to time. Following installation and commissioning, it is advisable to remove, clean and re-assemble any strainers.

All fluids must be drained when the unit is out of operation, to prevent freezing or possible corrosion.

## 5. Maintenance

The AquaLEC is designed to operate efficiently with a minimum of attention. A regular maintenance program will ensure continued high operating efficiency and trouble-free operation.

Annual maintenance should include cleaning debris from the base of the calorifier to comply with guidelines on prevention of legionella bacteria proliferation. Also, the site insurers may require annual inspection of heat exchanger and calorifier shell condition.

### General Points

It is recommended that a set of gaskets be carried for use when the unit is stripped down for insurance inspection, or cleaning.

Maintenance of the pump and other ancillary equipment, should be carried out in accordance with the instructions supplied for these items by their respective manufacturers. Copies of these are included with these instructions.

**Check the thermostats every 12 months by removing and testing the contact resistance and comparing the switch point by immersion in hot water using a separate thermostat.**

### To drain the AquaLEC calorifier down (secondary side)

It is recommended that you first obtain a complete set of replacement gaskets from "Heat Exchanger Spares.com".

It is assumed here, that all isolation valves (except drain) are open at the start.

1. Isolate the primary fluid inlet and outlet. Switch off the primary pump and boilers if necessary.
2. Switch off the secondary system return pump and isolate the secondary return to the calorifier.
3. Isolate the secondary flow.
4. Isolate the cold feed.
5. For sealed systems, reduce the residual calorifier pressure by manually operating the safety valve. Some hot water will come out.
6. For sealed systems, open a manual vent valve to allow air in during drain-down.
7. For copper-lined steel calorifiers, ensure that the anti vacuum valve is not stuck shut. Also, ensure that a vent is available at the top of the calorifier of the flow area, at least one half of the flow area of the drain connection.
8. Remove one of the fittings on the top of the calorifier, if necessary, to achieve this. Partial vacuum, caused by inadequate venting of copper-lined calorifiers during drain-down, will cause damage to the thin copper lining.
9. If the calorifier is open vented and shares a vent with other calorifiers, isolate it from the common vent, using the 3 way valve (it will now vent to atmosphere).
10. Pipe the drain to a drain point and open the drain valve. The AquaLEC calorifier shell internal condition can be inspected by removing the inspection cover to allow visual examination.
11. Re-fit new gaskets and re-fill the calorifier according to the commissioning instructions above.

## Important Notes

Constant circulation through the AquaLEC unit, minimises fouling. However, a clean heater gives maximum efficiency and capacity, and it is much easier to clean tubes with a light coat of scale, than it is to clean tubes which have been permitted to get excessively fouled.

The AquaLEC should be cleaned periodically, to ensure maximum efficiency. Higher operating temperatures cause scale to accumulate in the heat exchanger more quickly than lower temperatures.

Hard, untreated water, causes much faster scale accumulation than treated soft water. Cleaning frequency will be determined by experience.

Check the thermostats every 12 months by removing and testing the contact resistance and comparing the switch point by immersion in hot water, using a separate thermostat.

## 6. Spares

Please contact [Heat Exchanger Spares.com](http://HeatExchangerSpares.com) regarding spares. we recommend as a minimum, a set of heater gaskets and an inspection opening gasket be kept as spares.





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