



HephaHeat technology

HephaHeat technology is designed for electric water heating products and is aimed at the domestic and commercial water heating industry.

HephaHeat water heaters use electricity to create metallic thermal stores. The water required is heated on demand in-line via a heat exchange process with delivery temperature and flow rate fully adjustable.

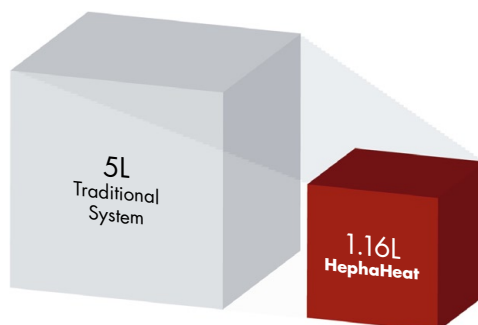
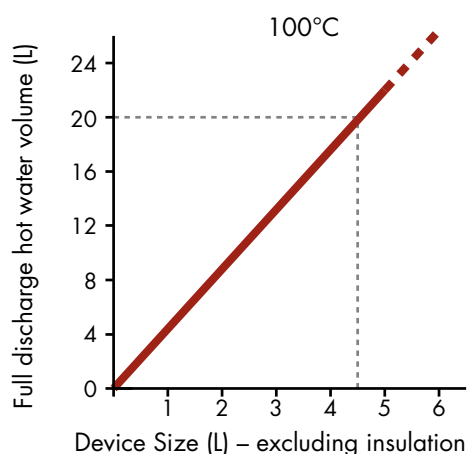
By utilising HephaHeat technology in your products, systems from 38 – 60 – 100°C can achieve real benefits in a number of key areas.

100°C Systems

Instant boiling water systems have grown in popularity in recent years, with many providers offering similar systems.

Using our technology a typical 5L unit will be four times smaller and yet still supply the same quantity of water, while out performing current systems in the area of re-heat time, cups per hour and standing losses.

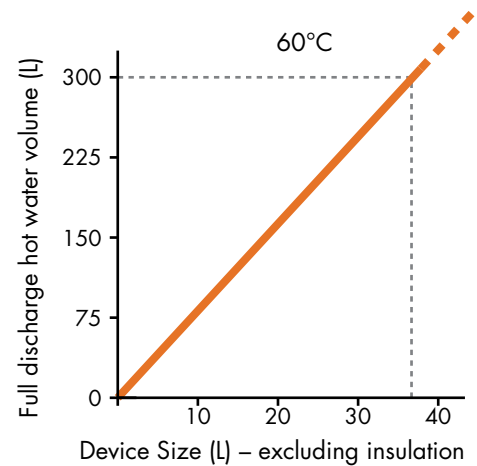
- Delivery volume up to 4:1 – hot water to device size (see graph)
- Fast recovery time – start to draw off water within 20% of recharge time
- Install at point of use – units can be installed directly where needed
- HephaHeat units connect directly to a standard single phase mains 13 Amp spur



60°C Systems

Cylinders used to supply large amounts of hot water are currently large and occupy precious space within most domestic environments. A HephaHeat device will supply 300L of water at 60°C and yet is sized at 35L providing valuable extra space. Charge rate and times can be decided at design stage and the units benefit from the same low levels of standing loss as the entire family of HephaHeat systems. Water scaling issue is removed as the high temperature operation ensures that lime scale does not build up on the heating element.

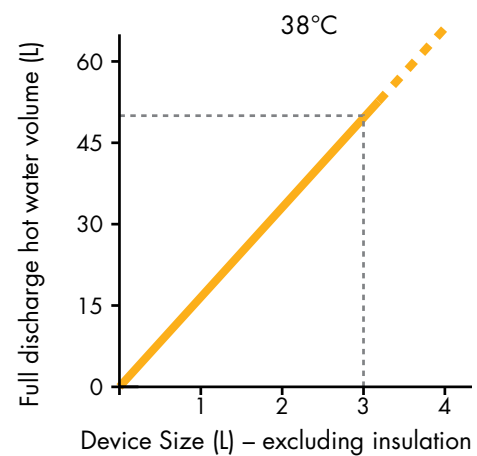
- Charge at night electricity rates
- User selected flow rate up to 15L/min
- Delivery volume up to 8:1 – hot water to device size (see graphs)
- Fast recovery time – start to draw off water within 20% of recharge time
- No limescale build-up



38°C Systems

Tanked or instantaneous 38°C water systems typically located above or below sinks or used for showering can see improvements using HephaHeat technology. A HephaHeat device of 0.30L can supply 5L of hot water in a single draw.

- Delivery volume up to 17:1 – hot water to device size (see graph)
- Charge at night electricity rates
- Fast recovery time – start to draw off water within 20% of recharge time
- Ultra small device size
- No limescale build-up



HephaHeat benefits

	HephaHeat
High energy efficiency	✓
Low standing losses	✓
High delivery volume ratio	✓
Compact size	✓
Charge on night electricity rates	✓
Single phase 13 Amp fused spur	✓
Unit descaling	✓
Install at point of use – reduce water run off	✓
Robust materials ensure long life cycles	✓
Ease of manufacture for low cost volume production	✓

General Charge and Recharge time

While the primary driver behind the charge and recharge time of a HephaHeat unit is determined by unit size and the type of insulation used, the reduced volume and surface area of a HephaHeat unit allows for the use of more advanced insulation materials and techniques than would normally be commercially viable in equivalent tanked systems.

Electrical rating can be varied to allow product specific designs, with 1.8 – 3kW being the rating normally chosen to balance power draw and recharge time.

In addition to the benefit of a fast charge and recharge time, HephaHeat units do not need to be fully charged in order to deliver water at the required temperature. Typically this can start to be drawn at 20% of the nominal charge time of a given device.

How it works – the basics

The system works by charging a metallic thermal store to a high temperature (500 to 900°C). By using a material such as steel, which has approximately the same volumetric heat capacity as water, substantially more thermal energy may be retained than in a similar tanked volume of water.

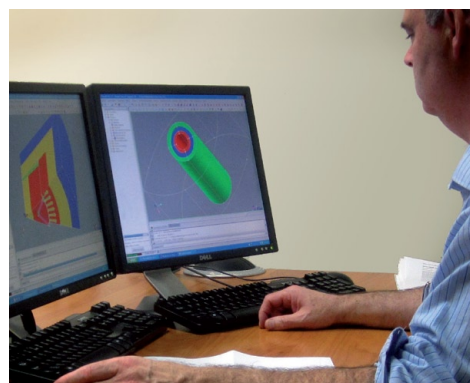
When hot water is required, the cold water input is split into two separate branches. One is allowed to flow into the thermal store with the flow rate controlled by a standard valve. When this branch flows through the thermal store it is instantaneously converted to steam which is then mixed (via a steam injector) into the second branch of cold water.

This mix of steam to cold water allows the output water temperature to be controlled.

Demonstration Area

At our Dublin office a full demonstration and testing facility is available for clients in order to fully understand the benefits of HephaHeat technology and to carry out detailed tests in order to validate the use of the technology within their product lines, new or existing.

HephaHeat technology is available to companies to incorporate into their own products under license. For further information, to request a demonstration, or to order a test unit please contact Michael Daly (michael.daly@steorn.com).

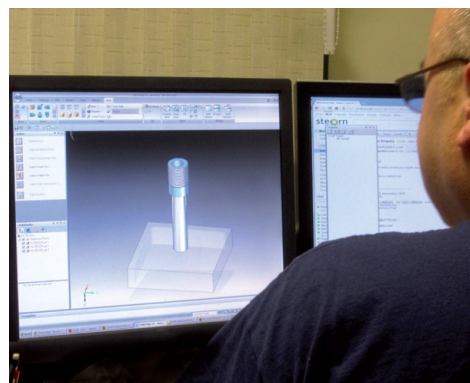


Research for Heating Technology

Steorn's R&D department conducts research into multiple technologies using solid engineering principles based around modern computer simulation modeling and CAD tools. This is complemented by physical testing using advanced test systems and calorimeter systems.

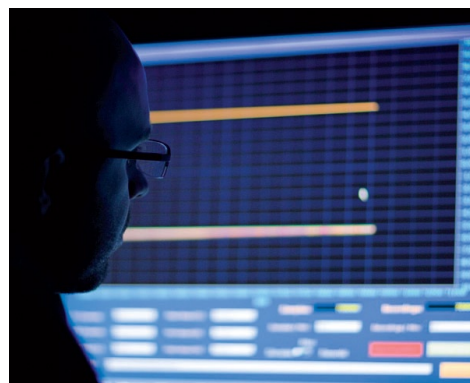
Simulation

Used at the concept and design stage, computer simulation provides valuable information in terms of the feasibility of the concept and design. The effect of varying the full set of engineering parameters on the performance can be determined in the design stage. This allows for a rapid process from concept evaluation to design optimization.



Design

Our CAD system allows the production of 3D designs, allowing engineers to produce mechanical drawings, animations, rendered images and bill of materials documentation for engineering projects.



Prototype & Testing

Prototyping is used as part of the product design process to allow engineers and designers the ability to test systems and confirm performance prior to starting production of a new product.

Calorimetry

The ultimate tool for measuring energy performance is calorimeter testing. Systems are tested to strict criteria in a sealed environment to allow the accurate measurement of electrical energy used versus heat energy produced.

Steorn Limited

Steorn Limited is a company registered in Ireland. The company engages in the research and development of products in the area of electromagnetism. Established for over ten years and having developed many technologies, most recently Orbo, our new patent pending technology is HephaHeat.