March 2022

Models covered:
H-DHW-RF-V-450-4800
For 450mm diameter vented cylinders

RETROFIT

Compute powered water heater

A groundbreaking energy efficiency measure that decarbonises homes and provides free hot water to households that need it.

Supported by

heata | harnessing heat from cloud compute

British Gas

UKRI Innovate UK

sustainable ventures

What is a heata unit?

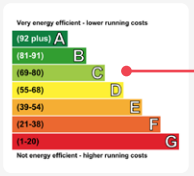
It's a powerful compute server, similar to a those found in a data centre. Computer chips get very hot when they undertake complex processing, and heata has re-configured the hardware to take advantage of that heat. Instead of wasting it (like a typical data centre) we capture it and transfer the heat into the water in domestic hot water cylinders.

Patented thermal transfer mechanism: GB2576035

Benefits

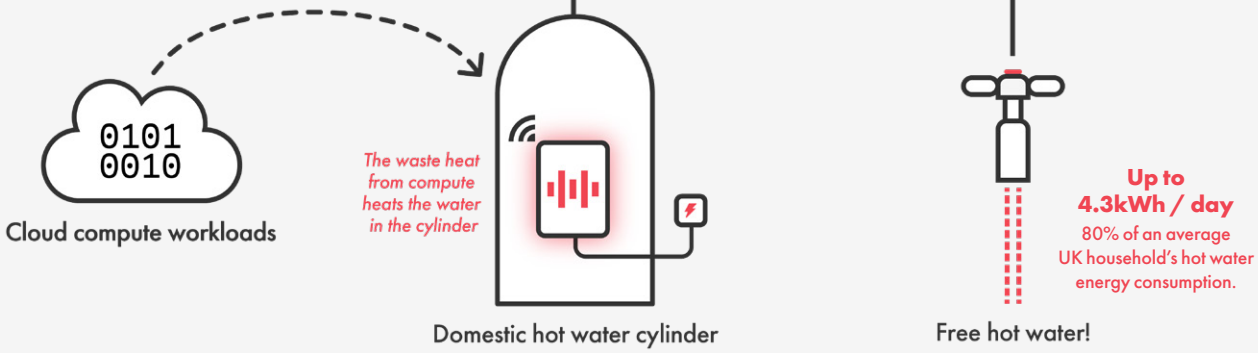
- Saves up to 1 tonne of CO_2 per unit per year
- Free hot water for tenants
- Expected 4-8 point EPC improvement*

Heata is undertaking the SAP process 2022-2023.



New tenancies: EPC C by 2026

Attaches to domestic hot water cylinders. **No plumbing required.**



How it works

The heata units on domestic hot water cylinders create our data centre. Climate conscious compute buyers use our network to reduce their compute carbon footprint and provide free hot water to households that need it.
Win-Win.

*Depending on primary heating system.

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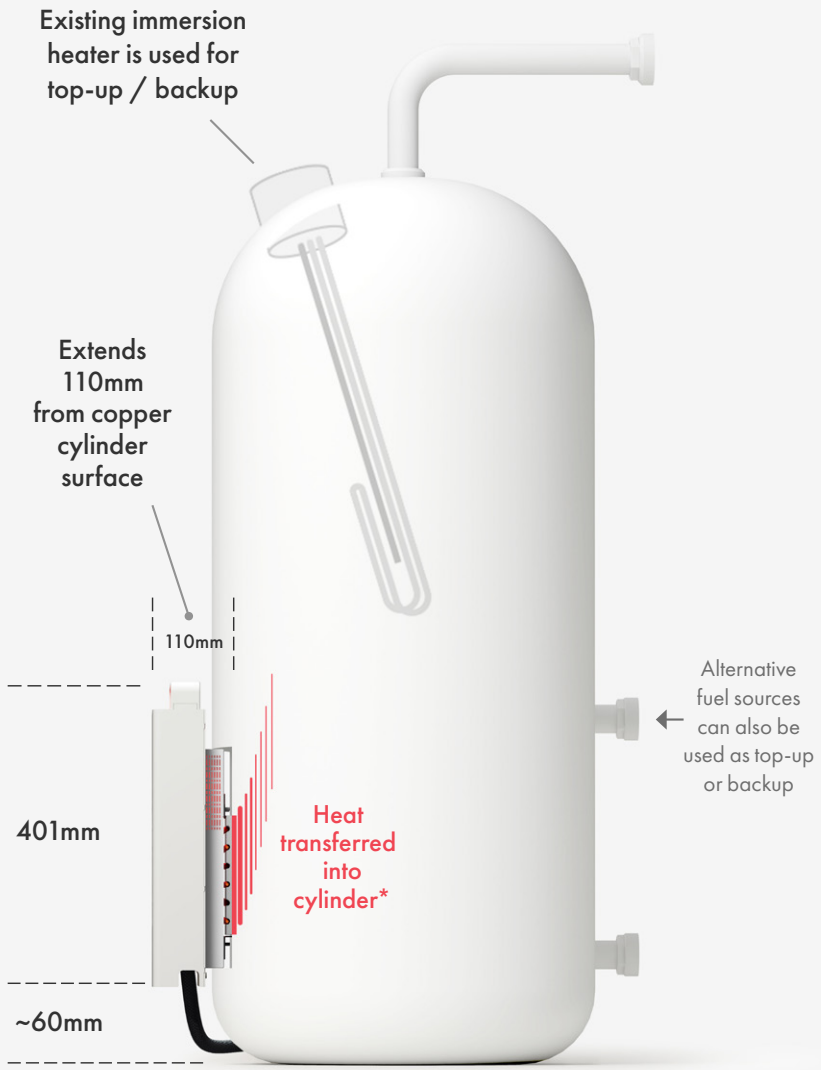
Installing a heata unit

Installation takes under two hours and requires no plumbing. The unit's power supply has an integrated meter so we know exactly how much electricity it is using.



450mm diameter cylinder

Installation process tested and approved by British Gas

- Insulation is cut away and thermal bridge is attached to the cylinder.
- Replaceable heata unit bolted to thermal bridge.
- Heata unit is wired in to the immersion heater circuit.

No plumbing required.

British Gas

Repairs and upgrades

- Heata unit is unbolted from thermal bridge.
- New unit attached to thermal bridge.
- Take 30 minutes or less and can be scheduled at a time that suits the household.

Flexible timing to suit the household.

Removal

- Heata unit unbolted from thermal bridge.
- Cylinder is reinsulated.

Cylinder warranty is unaffected.

Models covered:
H-DHW-RF-V-450-4800

*Thermal transfer mechanism:
UK patent GB2576035

FAQ

Here are the commonly asked questions. If you have any other questions that aren't answered here, please drop us an email: **support@heata.co**

A **host** is the the tenant living in the house or flat into which the heata unit is fitted.

	Q	A
Benefits	How much hot water does a heata unit provide per day?	The heata unit will deliver up to 4.8kWh of hot water per day. This is approximately 80% of the hot water requirements of an average UK household. We are contractually obliged to provide 2.5kWh per day.
	What kind of carbon saving does the heata unit offer?	Each heata unit saves up to 1 tonne of carbon dioxide per year, vs a typical data centre + household heating.
	How much can a host save per year?	Based on average household hot water yearly usage (water heated using electricity not gas), the host could save up to £200 / year.
	Who pays for the electricity and how do you know how much electricity the heata unit uses?	Heata pays for the electricity to run the device, not the host. The electricity used by the unit is metered (the host can see the meter reading on the power supply unit) and the host is credited for the amount used, at 10% above the market rate.
	What is the projected EPC improvement?	We estimate that the heata unit will improve the EPC rating by 4-8 points depending on the primary heating system. We are going through the SAP process with BRE in 2022-2023 to confirm the number of points.
Installation	Does the heata unit replace the host's boiler or immersion heater?	No, the heata unit will provide a base load of hot water; approximately 80% of an average household's hot water requirement. The host's current hot water heating system stays in place and will provide top-up heat as required / per their central heating controls.
	Does installing a heata unit invalidate my cylinder's warranty?	The installation procedure is a larger version of how a standard tank stat is installed. We've tested the installation process with a British Gas engineer, and spoken to a leading cylinder manufacturer who confirmed that following the approved installation process won't invalidate a cylinder's warranty.
	Is a plumber needed to install the heata unit?	No, an electrician fits the heata unit to the outside of the hot water cylinder and it doesn't need to be plumbed in. This simplifies installation, and avoids the ongoing liabilities of problems associated with any plumbing work.
	Does adding a heata unit change the energy efficiency rating of the cylinder, now that the rating is an industry requirement?	Whilst the unit is installed it will be always on, giving heat to the cylinder. When decommissioned, a plug / cap of equal or greater thermal resistance will cover the hole.
	Does the size of the unit prohibit its installation in tighter spaces / airing cupboards?	Yes, in some cases it won't be possible to install the unit. It is something we'll manage carefully as part of the initial pre-installation process.
Removal	If the unit is removed what happens to the area without insulation?	A plug / cap of equal or greater thermal resistance will cover the hole, and the cylinder's warranty is unaffected.

	Q	A
Problems, repairs, upgrades	What happens when something goes wrong with a heata unit?	The host doesn't lose any hot water as their existing immersion heater will take over. The repairs team is notified automatically and they will be in touch to arrange a time to replace the unit. Once initial installation has been completed, repairs and updates are relatively quick as the unit is simply clipped onto the mounting plate that is already in place on the cylinder.
	How often will an engineer need access for maintenance?	We schedule a yearly maintenance visit, much like a yearly boiler service to maintain a Gas Safety Certificate.
	What is the lifespan of the unit?	Like most computer hardware, being outdated / unprofitable to run (perhaps 4 years) tends to happen before failure, a swap to new hardware will take about 30 minutes.
Impact on host	Does the heata unit use the host's broadband?	No, the heata unit uses its own connection, which will either be its own dedicated fibre line, or connection via 4G / 5G.
	Will the unit interfere with other wireless equipment installed in the house?	The unit has passed EMC testing, which means that it won't affect the host's electronic equipment, including WiFi.
	Does the unit produce any noise, if so what dB?	There are variable speed low noise air circulation fans, no louder than 30db (a whisper) at max speed.
	Can the host use the computer processing power of the heata unit?	No, the processing is used and paid for by companies who want to process their data more sustainably - it's a lovely story for them to know that their compute doesn't require air conditioning and is providing free hot water for a household.
Safety and Security	What safety measures are in place to prevent the unit or water from overheating?	There are 4 levels of overheat protection: 1. All processors throttle their speed (and therefore power output) when they reach their max operating temp. 2. The machine will monitor the case and water temperature on the machine and reduce work accordingly. 3. There will be an auto reset-able thermal switch in the unit, which will temporarily cut the power to the unit if the above measures fail. 4. There will be a non auto reset-able thermal cut out as a back-up to the above device. 3 and 4 are as those found in standard immersion heaters, so as to comply with EN60335-2-73 (National Safety Standards).
	Could a host gain access to the heata unit?	There are chassis intruder alarms, and all peripherals are disabled and physically inaccessible. The storage within the heata unit is LUKS / AES-256 fully encrypted and inaccessible if removed from the heata unit.
	How secure is the heata network - can the heata unit see what the household is accessing and viewing online?	Heata units are on a private subnet, isolated from the host's network and all network traffic goes out through a VPN (AES-256 encrypted) to the wider internet, so the host's home network is completely inaccessible to compute workloads and vice-versa.
	Will the water get hot enough to prevent pathogens?	There is no additional risk from the unit, as the primary water heating system is still active. If anything, with better monitoring we'll be able to identify problems that might stop the water getting sufficiently hot to prevent the development of pathogens.

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Cylinder checklist

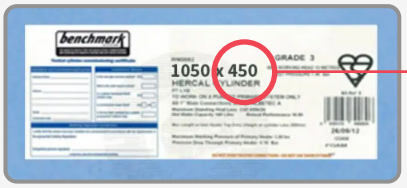
The retrofit unit has been designed to work with the majority of UK hot water cylinders. If the answers to these questions are 'Yes' your properties should be fine.

1 Is it a vented cylinder?

- They typically look like this.
- Fed from a water cylinder (often in loft).

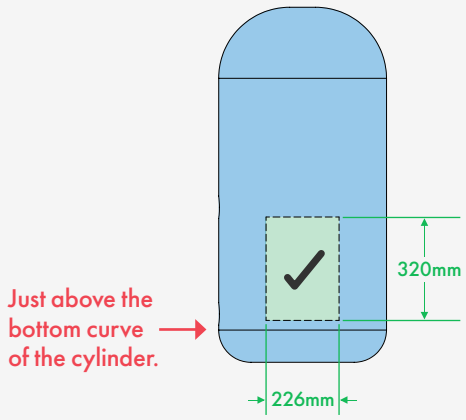
Unvented pressurised cylinder

2 Is the diameter 425mm - 450mm?

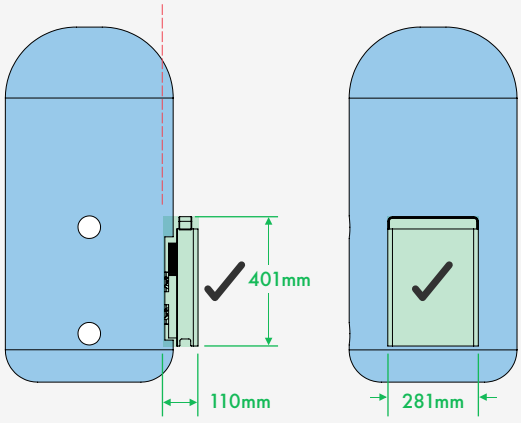


Make sure this is the cylinder diameter shown on the label.

3 Is there a 226 x 320mm clear space on the foam just above the bottom curve?



4 Is there 110mm clear space straight out from the cylinder for the full width and height of the unit?

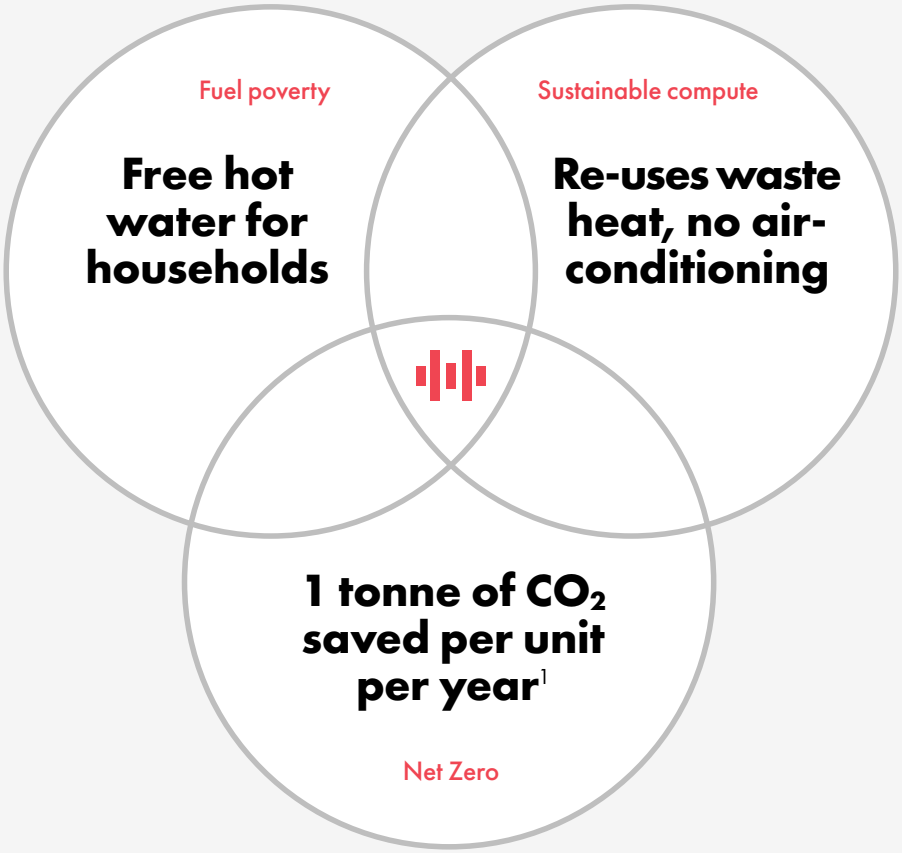


Measured from the copper cylinder, not the foam.

About heata

Heata is an innovative company turning a compute problem (waste heat) into a social benefit (free hot water), helping households living in fuel poverty and reducing the climate impact of cloud compute.

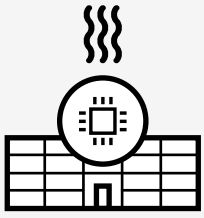
How we help



Literally had to make the choice between Heating or Eating

Danny
Fuel Poverty Action, Energy Bill of Rights

For each tonne of CO_2 emitted, three square metres of Arctic summer sea ice **disappears**.[2]



The waste heat from one data centre could heat the hot water in **11,000 homes**.[3]

1. CO_2 saving is based on electricity generating 0.307kg/kWh [0.283 kg/kWh (generation)[11] + 0.024kg/kWh (distribution)[11]]. Typical Data Centre + domestic hot water: 680W/hour (300W compute + 180W air conditioning[7] + 200W hot water). Heata: 300W/hour (300W compute, including 200W harnessed from waste heat). Average UK domestic hot water energy use: 4.67kWh[8]. Therefore average hourly hot water power consumption = 195W. We've rounded up to 200W for simplicity of calculations.
2. Notz, D., and J. Stroeve (2016) Observed Arctic sea-ice loss directly follows anthropogenic CO_2 emission. Science, available online. doi: 10.1126/science.aag2345.
3. A large data centre typically consumes 30GWh/year[4]. At a PUE of 1.6 this equates to 18.75GWh/year of compute power. Average daily UK domestic hot water energy use is: 1705kWh/year @4.67kWh/day[5].
4. https://www.techuk.org/images/programmes/DataCentres/Data_Centres_and_Power.pdf
5. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/48188/3147-measure-domestic-hot-water-consump.pdf

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